

# POWERFUL WOMEN: DOES EXPOSURE REDUCE BIAS?\*

LORI BEAMAN  
RAGHABENDRA CHATTOPADHYAY  
ESTHER DUFLO  
ROHINI PANDE  
PETIA TOPALOVA

We exploit random assignment of gender quotas for leadership positions on Indian village councils to show that prior exposure to a female leader is associated with electoral gains for women. After ten years of quotas, women are more likely to stand for, and win, elected positions in councils required to have a female chief councilor in the previous two elections. We provide experimental and survey evidence on one channel of influence—changes in voter attitudes. Prior exposure to a female chief councilor improves perceptions of female leader effectiveness and weakens stereotypes about gender roles in the public and domestic spheres.

## I. INTRODUCTION

In 2008, women accounted for 18.4% of parliamentarians worldwide, and a woman headed the government in only thirteen countries (UNIFEM 2008). These gender disparities do not reflect legal restrictions—women can vote, support candidates, and run for office in almost every country. Rather, many suggest that in both rich and poor countries, women's access to public office is at least partly restricted by voter and party bias that favors male politicians.

The belief that the gender of policymakers may have important consequences for policy decisions, and the possibility that such bias, if present, may be malleable has led policymakers to emphasize the importance of supporting early cohorts of female politicians. The assumption is that once voters learn that women can lead effectively, gender bias in politics will diminish. This possibility has led more than one hundred countries to introduce affirmative action policies for women in public office, either by law or through voluntary actions of political parties, over the last

\*The views expressed in this paper are those of the authors and do not reflect those of the International Monetary Fund, its management, or its Executive Board. We thank Ash Institute Harvard, Nike Foundation, MIT, YCIAS Yale, and UNICEF for funding, Alexandra Cirone, Catherine Lee, and Kudzai Takavarasha for research assistance, and Prasad Chakraborty and the SRG team for outstanding fieldwork. We also thank Abhijit Banerjee, Tim Besley, Shawn Cole, Dominic Leggett, Elhanan Helpman, Larry Katz, four anonymous referees, and numerous seminar participants for comments.

© 2009 by the President and Fellows of Harvard College and the Massachusetts Institute of Technology.

*The Quarterly Journal of Economics*, November 2009

two decades (Krook 2005; Dahlerup 2006).<sup>1</sup> Although these policies have significantly increased female representation in politics (Jones 2004) and have often altered subsequent policymaking (Chattopadhyay and Duflo 2004; Powley 2007), little is known about their impact on women's electoral prospects and voter attitudes toward female leaders.

Although in many settings exposure to members of another group creates "empathy,"<sup>2</sup> whether mandated exposure to female leaders can successfully alter social norms or perceptions of women's ability to lead remains debated. A first reason for doubting their effectiveness is that voters may dislike quotas that restrict their choices, and therefore may dislike women leaders (Thernstrom and Thernstrom 1997). Another is that voters may perceive gender quotas as violating social norms and potentially reducing the value of traditionally male activities (Goldin 2002). As a result, quotas may precipitate a backlash against female leaders and strengthen taste-based discrimination (on this, also see Rudman and Fairchild [2004]; Boisjoly et al. [2006]).

An important counterargument is that mandated exposure to women leaders informs voters on women's ability to lead. Consider the case where voters are risk-averse and no women were initially elected leaders (possibly because of some small initial taste discrimination). Because voters gain relatively more information on the male leaders they elect, they will perceive the choice of female leaders as risky and continue to favor male leaders, causing biased perceptions about women's effectiveness as leaders to persist (Aigner and Cain 1977). In such settings mandated exposure can reduce statistical discrimination and improve perceptions of female leaders' effectiveness (unless women make incompetent leaders and being exposed to them causes voters to update negatively).<sup>3</sup>

In this paper we exploit random variation in mandated exposure to female leaders across village councils in India to provide direct evidence on these issues. Our data come from the Indian

1. Details of quotas by country are available at <http://www.quotaproject.org>. A different, possibly complementary, rationale for affirmative action is if policy preferences differ by gender and female turnout is relatively low, female politicians are required to ensure that women's preferences are represented in government.

2. For example, Boisjoly et al. (2006) show that students who were randomly assigned to an African-American roommate in college are more likely to sympathize with African-Americans and affirmative action.

3. One way that quotas could lead to less competent female leaders is if, as in Coate and Loury (1993), they work less, in anticipation of voter perceptions that quotas lead to less competent politicians being elected.

state of West Bengal. Each village council in this state consists of a set of elected councilors. These councilors elect a chief councilor, or pradhan. In every council election since 1998, one-third of councilor positions in each council and one-third of pradhan positions across councils in a district have been randomly “reserved” for women. Only women can run for election to a reserved position. We take advantage of this randomization to examine the causal impact of mandated exposure on electoral outcomes, as well as villager attitudes and perceptions of women leaders.

We start by documenting significant electoral gains in the May 2008 election for women candidates contesting unreserved councilor and pradhan positions in councils where the pradhan position was reserved for a woman in the previous two electoral cycles (i.e., for ten years). Electoral data on unreserved councilor positions across all village councils in a West Bengal district show that, relative to councils that never had a reserved pradhan, almost twice as many women stood for, and won, these positions in councils where the pradhan position had been reserved for women in the previous two elections. Data from a larger set of six West Bengal districts show similar gains for women contesting pradhan elections in councils where the pradhan position is currently unreserved. In the May 2008 election the share of female pradhans was 11% in councils where the pradhan position had never been reserved and 18.5% in councils that were continuously reserved for a female pradhan between 1998 and 2008.

An initial increase in female leadership can enhance the electoral prospects of subsequent generations of female leaders through multiple channels. In this paper we examine in detail one channel (which is not exclusive of others): changes in voter attitudes toward female leaders. We use survey data to show that repeated exposure improves voter evaluation of female pradhans. Relative to pradhans in councils where the pradhan position has never been reserved, female pradhans in councils reserved for a female pradhan for the first time receive worse evaluations. However, this is not true for women elected pradhan in councils reserved for a female pradhan the second time. This improvement in leader evaluation provides an explanation for the election results: subsequent to the improved ratings of female leaders in the second electoral cycle, more women contest and win village council elections in the third electoral cycle.

These results are consistent with an initial voter bias against female leaders that decreases with exposure. However, they are

also consistent with changes in the selection, or behavior, of female leaders over time. Although we do not find *prima facie* evidence that observable differences in the characteristics or actions of female leaders explain the results, we cannot rule out unobservable differences. Thus, our next step is to use experimental data to directly measure bias against female leaders and test whether exposure to a female leader changes voter attitudes.

Villagers were asked to evaluate the effectiveness of hypothetical leaders as described through vignettes and recorded speeches. The only variation across respondents was that leader gender was experimentally manipulated. In every village, half the respondents received “male” politician and the rest “female” politician vignettes and speeches. All other aspects of the speech and vignette were identical. We find that exposure to a female leader radically altered male villagers’ perceptions of female leader effectiveness. Men living in villages that had never been reserved judged the hypothetical leader as significantly more effective when the leader’s gender was experimentally manipulated to be male (rather than female). The evaluation gap disappears in currently or previously reserved villages. Among female villagers we observe a smaller (insignificant) bias that does not appear to be affected by the reservation status of the village.

We also conducted a series of computer-based Implicit Association Tests (IATs). The IAT is an experimental method, widely used in social psychology, that relies on the idea that respondents who more easily pair two concepts in a rapid categorization task associate those concepts more strongly (Nosek, Greenwald, and Banaji 2007). We first measured gender–occupation stereotypes by an IAT that examined the strength of association of male and female names with leadership and domestic tasks. Exposure to female leaders (through reservation) increased the likelihood that male villagers associated women with leadership activities (as opposed to domestic activities).

We then used an IAT designed to measure taste, that is, the association of men and women leaders with concepts of good and bad. In contrast to the gender–occupation IAT, we found strong same-gender preference that was unaffected by reservation. Further, in survey responses both genders state an explicit distaste for female leaders (relative to male leaders). This explicit distaste is unaffected by reservation; if anything, we observe a backlash effect among men.

Overall, our results suggest that although deep preferences and social norms remain difficult to erode, beliefs on effectiveness are much more malleable, and they play a role in the voting decision. In the setting we study, we see an improvement in voter perceptions of female leaders, followed by electoral gains for women. This suggests that the use of political affirmative action, which causes voters to acquire information on the abilities of traditionally disadvantaged groups, can durably influence political outcomes.

The rest of this paper is structured as follows. Section II describes the institutional context of political reservation, and Section III how it has affected electoral outcomes. Section IV analyzes how villagers' evaluation of their own leaders changes with reservation, and Section V provides experimental evidence on the change in voters' attitudes. Section VI concludes.

## II. INSTITUTIONAL CONTEXT

India has had universal franchise since independence and many prominent elected female leaders. However, the average share of women in national and state legislatures is only 10%. An important policy response to this gender disparity in female political leadership was implemented in a 1993 constitutional amendment. This amendment mandated a three-tier elected local self-government institution (the panchayat) and instituted gender quotas on all three tiers. Gender quotas have significantly increased local female leadership across Indian villages, and the number of elected female village leaders nationwide is now close to forty percent. Below we describe the institution of political reservation as implemented in our study state of West Bengal and some summary statistics on how it altered the profiles of leaders.

### *II.A. Village Councils and Political Reservation*

In each Indian state, the panchayat consists of a system of village (gram panchayat), block (panchayat samiti), and district (zilla parishad) councils. Council elections occur every five years. We focus on the village council, which is responsible for the provision of village infrastructure (such as public buildings, water, and roads) and for identifying government program beneficiaries. The main source of financing for its activities is the state government.

Unlike many states, which introduced panchayats after the 1993 constitutional amendment, West Bengal has had active elected panchayats since 1978. A West Bengal gram panchayat (GP) has, on average, 10,000 voters spread across multiple villages. Each GP is divided into electoral wards, with a councilor directly elected from each ward by plurality rule. Councilors elect (from among the set of councilors) a chief village councilor, the *pradhan*. The 1993 amendment required that at each election one-third of ward councilor positions in each council and one-third of *pradhan* positions in every district be reserved for women: only women can contest, and be elected, in a reserved position.

GP council decision making is by majority voting. The *pradhan* is the only full-time council member and exercises significant control over the final council decisions (Besley, Pande, and Rao 2007). For this reason, we focus on the effect of *pradhan* reservation on future electoral outcomes for women and public opinion toward female leaders.<sup>4</sup>

*Pradhan* reservation, for women and two disadvantaged minorities (scheduled castes (SC) and scheduled tribes (ST)), was introduced in a 1998 modification of the West Bengal Panchayat Constitution Rule (Government of West Bengal 1998). The rule requires that prior to an election GPs in a district be randomly assigned across three lists: Reserved for SC, Reserved for ST, and Unreserved.<sup>5</sup> These lists are redone at every election to ensure that no GP is reserved for SC or ST in two consecutive elections. Within a list GPs are ordered by serial number. In 1998, every third GP starting with number one on each list was required to be reserved for a woman, and in 2003 every third GP starting with number two on each list. We reconstructed the 2003 reservation list using the GP serial numbers and electoral law tables and found that the rule held, with no exception (the same was true in 1998; see Chattopadhyay and Duflo [2004]).

This assignment rule implies that *pradhan* reservation for women is random, with implicit stratification by SC/ST and administrative block (because GP serial number starts with a block identifier). In addition, a GP may be reserved for women twice in a row—for instance, if it was ranked first on a list in 1998 but second in 2003.

4. Following a referee suggestion we examined, but did not find, any impact of ward reservations on voters' attitudes.

5. The randomization is on the basis of GP serial number rank and tables provided in the electoral law. The extent of SC and ST reservation in a district is proportional to their population share.

In Table I we use 1991 census data (i.e., from before reservation was introduced) for the 495 villages for which we collected survey and experimental data to confirm that the randomization procedure resulted in a balanced sample. We assign villages to one of four categories: Never Reserved, Only Reserved in 1998, Only Reserved in 2003, and Reserved in 1998 and 2003. Village characteristics as of 1991 are not jointly correlated with the reservation assignment of GPs (see  $p$ -values in columns (5) and (6) of Table I). There are statistically significant differences by reservation status for only three of the thirty variables: sex ratio for children under the age of 6, presence of hand pumps, and presence of a permanent approach road.

Below, as background to our analysis, we describe how reservation increased female representation in leadership positions.

### *II.B. Political Reservation and Female Representation*

With the exception of our analysis of pradhan electoral outcomes, our study uses data from the 165 GPs located in Birbhum district, West Bengal. Birbhum, which is situated 200 km from the capital, Kolkata, is a largely rural and fairly poor district.

In Figure I we use data on the reservation status and pradhan electoral outcomes for Birbhum GPs in 1998 and 2003 to describe how GP reservation altered the extent of female leadership. Roughly 44% of all GPs (74 GPs) were never reserved, 21% were reserved once (36 and 35 GPs in 1998 and 2003, respectively) and 12% (20 GPs) were reserved in both elections. Turning to trends in female leadership, pradhans in GPs reserved for women are always female.<sup>6</sup> Although few women are elected pradhans in never-reserved GPs, this number increased from 7% in 1998 to 15% in 2003, and by an additional 2% in 2008 (not shown in Figure I). The increase between 1998 and 2003 is similar across never-reserved GPs and those only reserved in 1998 (16% in never-reserved and 14% in those only reserved in 1998).

Electoral data also show that reservation did not lead to a significant incumbency advantage for female leaders. Similarly to other Indian elections, we observe significant incumbency disadvantage in both reserved and unreserved GPs. In 2003, only 5.6% of incumbent pradhans in both reserved and unreserved positions were reelected. In 2008, the fraction of reelected incumbents

6. Due to political disturbances, one reserved GP did not have a pradhan at the time of our survey.

TABLE I  
VILLAGE-LEVEL RANDOMIZATION CHECK

Census variable	Only reserved 2003 (1)	Reserved 1998 and 2003 (2)	Only reserved 1998 (3)	Never reserved (4)	Diff: (1) and (2) (5)	Diff: (3) and (4) (6)
Total population	1,318 (1318)	1,197 (1295)	1,267 (1418)	1,362 (1555)	-102.279 (178.537)	-78.373 (189.410)
Fraction SC/ST population	0.432 (0.281)	0.502 (0.256)	0.450 (0.235)	0.471 (0.265)	0.004 (0.056)	-0.001 (0.033)
Average household size	5.436 (0.612)	5.222 (0.449)	5.362 (0.571)	5.497 (2.454)	0.137 (0.093)	-0.059 (0.135)
Sex ratio under 6	1.093 (0.590)	1.034 (0.276)	1.046 (0.218)	1.036 (0.226)	0.206 (0.113)	0.015 (0.025)
Literacy	0.387 (0.119)	0.351 (0.129)	0.391 (0.121)	0.373 (0.137)	0.014 (0.032)	0.021 (0.017)
Fraction women literate	0.287 (0.125)	0.265 (0.123)	0.296 (0.113)	0.275 (0.134)	-0.003 (0.033)	0.023 (0.016)
Fraction irrigated land	0.599 (0.321)	0.485 (0.349)	0.607 (0.323)	0.500 (0.352)	-0.038 (0.054)	0.054 (0.049)
Village has a bus or train stop	0.280 (0.451)	0.433 (0.500)	0.290 (0.456)	0.259 (0.439)	-0.130 (0.097)	0.061 (0.054)
Village has permanent approach road	0.110 (0.314)	0.300 (0.462)	0.176 (0.383)	0.194 (0.397)	-0.225 (0.082)	-0.006 (0.052)
Village has tube well	0.910 (0.288)	0.933 (0.252)	0.912 (0.285)	0.977 (0.151)	-0.022 (0.020)	-0.018 (0.031)



TABLE I  
(CONTINUED)

Census variable	Only reserved 2003 (1)	Reserved 1998 and 2003 (2)	Only reserved 1998 (3)	Never reserved (4)	Diff: (1) and (2) (5)	Diff: (3) and (4) (6)
Village has hand pump	0.124 (0.331)	0.000 (0.000)	0.100 (0.302)	0.057 (0.233)	0.000 (0.000)	0.013 (0.012)
Village has well	0.440 (0.499)	0.533 (0.503)	0.402 (0.493)	0.528 (0.500)	0.043 (0.082)	-0.066 (0.074)
Village has community tap	0.065 (0.248)	0.050 (0.220)	0.042 (0.202)	0.010 (0.098)	0.022 (0.020)	-0.018 (0.017)
Number of schools	1.190 (0.895)	1.233 (0.810)	1.265 (0.889)	1.160 (0.910)	-0.167 (0.160)	0.149 (0.111)
Number of health facilities	0.170 (0.403)	0.217 (0.490)	0.118 (0.324)	0.218 (0.809)	-0.036 (0.090)	-0.015 (0.069)
Overall effect: <i>F</i> stat					0.300	0.600
Overall effect: <i>p</i> value					.586	.438
<i>N</i>	105	60	108	222		

Notes. (1) The census variables are from the 1991 Census of India. *N* refers to the maximum number of observations. Infrastructure variables have between 454 and 478 total observations across GPs. (2) "First reserved 2003," "reserved 1998 and 2003," "only reserved 1998," and "never reserved" are indicator variables for GPs reserved for a female pradhan for the first time in 2003, in both 1998 and 2003, only in 1998, and not reserved in either election, respectively. (3) Columns (1)–(4) report means with standard deviations in parenthesis. Columns (5)–(6) report tests of differences of means across columns (1) and (2) and columns (3) and (4), respectively. Standard errors are in parentheses. Tests are based on regressions with block fixed effects and standard errors are clustered by GP.

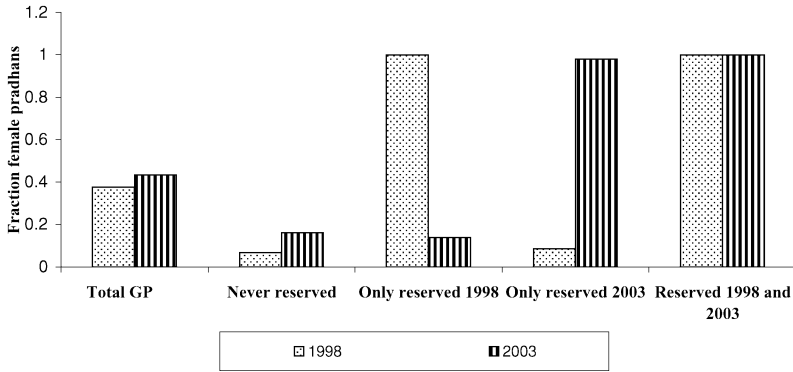


FIGURE I

## Political Leadership and Female Leadership

There are 165 GPs in Birbhum. Of these, 35 GPs were reserved for the first time in 2003 (first reserved 2003), 20 in both 1998 and 2003 (reserved 1998 and 2003), 36 GPs only in 1998 (only reserved 1998), and 74 were never reserved.

was even lower at 2% and 3% in reserved and unreserved GPs, respectively.

We conducted household surveys among all 1998 and 2003 pradhans in Birbhum. In Table II we use these data to examine whether, and how, male and female pradhans differ. Column (6) of Table II shows that, relative to male pradhans, female pradhans are younger, less educated, less likely to be married, and from poorer families. Male pradhans also have more political experience, both as ward councilor and as pradhan. However, contrary to the popular claim that women pradhans simply function as “shadows” for their husbands (who are disqualified from running), very few women pradhans are spouses of former male pradhans.

To summarize, reservation randomly exposed villagers to female leaders who differ from their male counterparts along multiple dimensions. The extent of exposure was significantly higher in twice reserved GPs. Against this background, we now examine whether reservation-induced exposure to a pradhan affected the subsequent electoral prospects of women in unreserved pradhan and ward councilor positions.

### III. DOES RESERVATION IMPROVE WOMEN'S FUTURE ELECTORAL PROSPECTS?

An important aim of the paper is to examine whether the electoral impact, if any, of political reservation is related to changes

TABLE II  
PRADHAN CHARACTERISTICS

	Only reserved 2003 (1)	Reserved 1998 and 2003 (2)	Only reserved 1998 (3)	Never reserved (4)	Diff: (1) and (2) (5)	Diff: (1)+(2) vs. (3)+(4) (6)
Age	35.424 (8.143)	33.842 (6.801)	41.571 (12.425)	41.194 (9.728)	0.912 (2.550)	-6.339 (1.518)
Years of education	8.091 (4.126)	8.895 (3.017)	11.229 (2.691)	10.278 (3.199)	-1.119 (0.927)	-2.104 (0.548)
Married	0.727 (0.452)	0.895 (0.315)	0.857 (0.355)	0.889 (0.316)	-0.202 (0.117)	-0.103 (0.065)
SC/ST	0.588 (0.500)	0.450 (0.510)	0.543 (0.505)	0.514 (0.503)	0.070 (0.158)	0.013 (0.084)
Wealth index: quartile 1	0.382 (0.493)	0.300 (0.470)	0.143 (0.355)	0.208 (0.409)	0.081 (0.143)	0.164 (0.077)
Wealth index: quartile 4	0.088 (0.288)	0.250 (0.444)	0.257 (0.443)	0.208 (0.409)	-0.132 (0.121)	-0.075 (0.065)
First time as pradhan in 2003 term	0.912 (0.288)	0.850 (0.366)	0.657 (0.482)	0.611 (0.491)	0.062 (0.116)	0.265 (0.068)
Number of times elected as ward councilor	1.176 (0.521)	1.450 (0.686)	1.686 (1.451)	1.611 (0.928)	-0.346 (0.227)	-0.340 (0.142)
Other political experience	0.212 (0.415)	0.368 (0.496)	0.286 (0.458)	0.417 (0.496)	-0.114 (0.140)	-0.121 (0.079)
Affiliated with CPI(M)	0.697 (0.467)	0.842 (0.375)	0.686 (0.471)	0.681 (0.470)	-0.227 (0.114)	0.072 (0.067)
Spouse ever elected to panchayat	0 (0)	0.050 (0.224)	0.029 (0.169)	0 (0)	-0.041 (0.053)	0.011 (0.023)

Notes: (1) Wealth index is based on a principal component analysis using the number of household assets. Other political experience is a normalized indicator for whether the pradhan has or holds other political offices, including: ward member; member of higher panchayat, state or national legislator; youth party president; district/block level posts of party; women's committee president. (2) Columns (1)-(4) report means with standard deviations in parenthesis. Column (5) reports a test of the difference in means across columns (1) and (2). Column (6) is the difference between currently reserved and unreserved GPs. Standard errors are in parentheses in columns (5) and (6). Tests are based on regressions with block fixed effects and standard errors are clustered by GP.

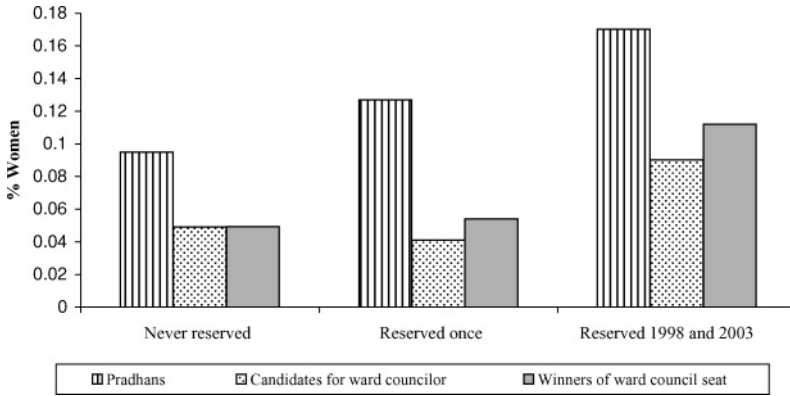


FIGURE II  
2008 Ward Council and Pradhan Election Outcomes

in voter attitudes toward female leaders. We use survey and experimental data collected in the 165 GPs in Birbhum district to measure voter attitudes, and we examine ward level electoral outcomes in this district as well. In addition, to be able to draw statistically significant conclusions on the impact of reservation on the impact of pradhan-level elections, we expanded our sample to six districts (including Birbhum).<sup>7</sup>

As a precursor to the regression analysis, Figure II shows the main findings for the 2008 pradhan and ward councilor elections. We distinguish among three GP categories (based on pradhan reservation status): Never Reserved, Reserved Once, and Reserved 1998 and 2003. For each category, Figure II shows the share of female pradhans elected in unreserved GPs (across the six districts) and the share of women who contested, and won, a nonreserved ward councilor seat (in Birbhum). In the pradhan sample, we see that women were elected pradhan in roughly 10% of the GPs that had no prior history of reservation. The share increases to about 13% for GPs reserved once, and to 17% for GPs reserved twice.

7. Only twenty GPs in Birbhum were reserved for women in both 1998 and 2003, and 35 were reserved in 2003 (Figure I). Because not all of these are unreserved in 2008, the sample becomes too small to establish conclusive findings (the point estimates for Birbhum only are consistent with what we obtain in the full sample). The sample includes the districts of Nadia, Howrah, Hooghly, Birbhum, South 24 Paraganas, and Burdwan. As election data are kept only in the districts, we expanded our sample by sending surveyors to districts close to Kolkata and Birbhum (Birbhum is roughly 200 km from Kolkata) for logistic reasons, and obtained complete data for six districts.

The fraction of unreserved ward council seats contested, and won, by women in never-reserved GPs in Birbhum was just 5%. Although the number remains similarly low among GPs that had been reserved only once (in either 1998 or 2003), we see a doubling of the fraction of female ward seat contestants and winners in GPs that had been reserved in the last two elections.

### III.A. Regression Results: Empirical Strategy

We now investigate the robustness of the trends observed in Figure II in a regression framework. We expand our sample to include data from both the 2003 and 2008 GP elections (reservation was introduced in 1998). As described earlier, our pradhan regressions use data from unreserved GPs in six districts and our ward councilor regressions use data from unreserved ward council seats across the 165 GPs in Birbhum.

Randomization of reservation assignment allows us to study its reduced-form effect by comparing the means of outcomes of interest across GPs with different reservation status. All reserved GPs, but relatively few unreserved and previously reserved GPs, have a female pradhan (Figure I). Hence, the reduced-form effect we estimate is close to what would be obtained by instrumenting for pradhan's gender by the reservation status of the GP.

For both ward councilor and pradhan elections, we first estimate the following regression in the 2003 election data:

$$(1) \quad y_{igj} = \beta_1 R_{g1} + \alpha_j + \epsilon_{ig},$$

where  $y_{igj}$  is a dummy for whether the elected representative (and candidate in the case of ward councilor elections)  $i$  in GP  $g$  and block or district  $j$  is a woman.  $R_{g1}$  is an indicator for whether the GP was reserved in 1998.  $\alpha_j$  denotes district dummies in pradhan election regressions and block dummies in ward councilor election regressions. We report robust standard errors in pradhan election regressions. In ward councilor regressions we cluster standard errors by GP, because each GP has multiple ward councilors.

In the 2008 data, we estimate the following regression:

$$(2) \quad y_{igj} = \beta_2 R_{g2} + \beta_{2\text{and}1} R_{g2\text{and}1} + \beta_1 R_{g1} + \alpha_j + \epsilon_{ig}.$$

$R_{g1}$  and  $R_{g2}$  are indicator variables for the GP being reserved only in the first and second electoral cycle respectively (i.e., only in 1998 and only in 2003).  $R_{g2\text{and}1}$  is an indicator for the GP being reserved

twice (in 1998 and 2003). Otherwise, the specification is identical to the previous regression. Finally, we estimate a regression where we stack the 2003 and 2008 data:

$$(3) \quad y_{igj} = \beta_2 R_{go} + \beta_{2and1} R_{g2and1} + \lambda_t + \alpha_j + \epsilon_{ig}.$$

$R_{go}$  is an indicator for GPs that were only reserved once (either in 1998 or in 2003).  $\lambda_t$  is an indicator for the 2003 election. Because there are multiple observations per GP for the pradhan and ward councilor regressions, we always cluster the standard errors by GP.

### III.B. Results

We start by examining electoral outcomes for pradhan elections in 2003 and 2008. Column (1) of Table III examines the 2003 election. Roughly 9% of the unreserved GPs elected female pradhans, and there is no discernible impact of prior reservation status. In column (2) we consider the 2008 election. Once again, being reserved for the first time in the previous (2003) election does not affect female electoral success; however, being reserved in the previous two elections does. There is also some evidence that reservation one cycle ago (in the 1998 election) matters. Finally, in column (3), we combine the data from 2003 and 2008 and run the stacked regression. We continue to see a strong effect of being twice reserved. In contrast, the overall effect of being reserved only once (pooled across 1998 and 2003) is now insignificant. In separate regressions (not reported here), we have estimated the regression for 2008 elections excluding GPs where the incumbent was reelected pradhan (lack of data on 1998 pradhan names for all districts means we cannot control for 1998 winner status). We find a noisier and somewhat smaller (5.4%), but statistically indistinguishable, effect. This suggests that at least some of the longer-term impact of reservation is due to spillovers on newcomers.

The influence of reservation on pradhan electoral outcomes is important because pradhans are responsible for most local policy decisions. That said, electoral results for ward councilors are also of independent interest because, unlike pradhans, they are directly elected by villagers.

We therefore next examine the impact of prior pradhan reservation on whether women contest, and win, in unreserved ward councilor elections in Birbhum. Columns (4) and (7) of Table III show no impact of 1998 GP reservation on the fraction of women

TABLE III  
ELECTORAL OUTCOMES FOR 2003 AND 2008

	Pradhans			Contestants			Winners		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Only reserved 1998	0.027 (0.023)	0.056 (0.031)		-0.003 (0.011)	-0.009 (0.011)		0.015 (0.020)	0.002 (0.019)	
Only reserved 2003		0.003 (0.026)			-0.007 (0.011)			0.000 (0.018)	
Only reserved once (either 2003 or 1998)			0.031 (0.022)			-0.004 (0.008)			0.012 (0.013)
Reserved 1998 and 2003		0.076 (0.041)	0.079 (0.041)		0.037 (0.014)	0.036 (0.014)		0.057 (0.032)	0.057 (0.030)
Test: equality of reservation indicators [ <i>p</i> values]		.157	.253		.009	.006		.224	.127
Year of election	2003	2008	2003 and 2008	2003	2008	2003 and 2008	2003	2008	2003 and 2008
Never reserved sample:									
Mean	0.092 (0.290)	0.109 (0.312)	0.099 (0.299)	0.076 (0.265)	0.049 (0.216)	0.066 (0.248)	0.083 (0.276)	0.049 (0.217)	0.071 (0.257)
Standard deviation	870	875	1,745	3,880	3,431	7,311	1,425	1,191	2,616
<i>N</i>									

*Notes.* (1) Columns (1)–(3) show regressions based on pradhan appointments in GPs not currently reserved for women pradhans, and columns (4)–(9) are based on GP election results for ward councillor seats not currently reserved for women. (2) Columns (1)–(3) use data from six districts in West Bengal: Birbhum, Burdwan, Hooghly, Howrah, Nadia, and South 24 Parangas, and the outcome variable is an indicator equal to one if the appointed pradhan is female. Columns (4)–(9) use the election results from elections in Birbhum district for council member seats not reserved for women. In columns (4)–(6), the outcome variable is an indicator equal to one if the contestant for a seat is female, whereas in columns (7)–(9), the outcome variable is an indicator equal to one if the winner of a seat is female. (3) Reserved once indicates that the GP was reserved in only 1998 or 2003. (4) The *p*-value is from a Wald test of the equality of the coefficients on first reserved in 2003 and reserved 1998 and 2003. (5) In columns (1)–(3), regressions include district fixed effects, and standard errors are adjusted for heteroskedasticity. In columns (4)–(9), regressions include block fixed effects, and standard errors are clustered by GP.

who ran for, and won, ward councilor positions in the 2003 election. Columns (5) and (8) consider the impact of previous GP reservation in 2008. In nonreserved wards belonging to GPs that had not been reserved for a female pradhan in 1998 or 2003, 4.9% of both the candidates and the elected ward councilors were women (33% of the wards are reserved, so roughly 38% of all ward councilors are women). As in the 2003 election, these numbers are unchanged for wards in GPs that were reserved only once. However, we once again see a striking difference for wards in GPs where the position of pradhan was reserved both in 1998 and in 2003. Specifically, relative to wards in never-reserved GPs, the proportion of female candidates in unreserved wards in twice-reserved GPs increased by 3.7 percentage points and the proportion of women elected more than doubled (10.7% versus 4.9%). These results (not reported here) are robust to excluding ward seats where the 1998 and/or 2003 pradhans contested and were reelected.

Finally, columns (6) and (9) report results where we stack the 2003 and 2008 data. The conclusions are similar, and we gain some precision: after one cycle, there are no more women candidates or elected in unreserved seats. After two cycles, there are about twice as many.<sup>8</sup>

To check that our ward-level results are not sensitive to the sample size of GPs (in particular, there are only 20 GPs that were reserved both in 1998 and in 2003) we computed Fischer exact  $p$ -values using randomization inference for the main results in columns (5), (6), (8), and (9) (Rosenbaum 1996; Imbens and Rosenbaum 2004).<sup>9</sup> We can reject the null of no effect at the 5% level for the coefficient on Reserved in 1998 and 2003 in columns (5) and (6) and at the 10% level in columns (8) and (9). These results are consistent with  $t$ -statistics based on clustered standard errors and are available from the authors.

Taken together, these results suggest that reservation significantly improved women's electoral prospects. They are also consistent with Bhavnani (2008), who finds that previous ward-level

8. We have also estimated regressions where we include an indicator for 2008 pradhan reservation status and the interactions between that variable and previous reservation status. Women are more likely to contest and win unreserved ward seats if the GP is reserved for a female pradhan. The effect at the ward level also persists: women are differentially more likely to compete for ward councilor positions in GPs twice previously reserved.

9. For 2000 draws, the treatment "status" is randomly assigned to all GPs, in proportion to what is observed in the data. The distribution of the "effect" size from each draw is used to create the  $p$ -value. We also did the analysis dropping each GP one by one and found similar results.



reservation for women in Mumbai improved their future representation in unreserved wards.

#### IV. VOTER BELIEFS AS A PATHWAY TO ELECTORAL SUCCESS

Reservations may have facilitated the entry of women in politics through multiple channels. First, female pradhans may act as important role models and mentors. Their presence may have directly motivated other women to participate in politics and made the public sphere less intimidating for women. Chattopadhyay and Duflo (2004) show that women are more likely to attend, and speak during, village meetings in reserved GPs. Second, female pradhans may have also helped create and strengthen political networks that benefit women politicians. We find evidence that parties are strategic and field more women candidates in GPs that are reserved for women pradhans.<sup>10</sup> If parties recognize the need to find suitable female pradhan candidates in a third of all GPs in every election, then they may encourage elected female pradhans to identify and mentor women candidates. This process may take some time, which would explain why significant results emerge only after two electoral cycles. Third, women leaders take different policy decisions (see Chattopadhyay and Duflo [2004] and our results in Section IV.D); voters may discover a preference for these types of decisions over time.

In the rest of this paper, we explore one possible channel in detail (more than one channel may, of course, be in play); namely, that exposure to a female pradhan may change voter attitudes toward female leaders. We start by using survey data to document variation in voters' opinion of their pradhans across different reservation categories. In Section V we use experimental data (for the same villagers) and examine whether these differences in voter opinion are paralleled by differences in gender bias in hypothetical leader evaluations.

##### IV.A. Data

Between June 2006 and November 2007 we surveyed a random sample of 495 villages spread across the 165 GPs in Birmahum district. In each village, we used a "Participatory Resource

10. In regression available from the authors, we found that in GPs where the position of pradhan was reserved for a woman, more women ran and were elected, even if the GP had never been reserved before. These results are significant, although the sample of GPs that were never reserved became quite small.

Appraisal (PRA)” exercise to obtain data on available public goods and the incidence of new investments and repair since the previous election. A facilities audit also provided information on the quality of public goods. We also administered household surveys to a random sample of fifteen households per village, and individual modules to a prime-aged male and female in each of these households. Our final sample contains 6,642 male and 6,568 female respondents.

The survey asked respondents to evaluate their *pradhans* along several dimensions. It also asked respondents detailed questions on public good provision and their satisfaction with level of provision. Finally, the survey elicited experimental data on villager evaluation of hypothetical leaders. On many issues of interest we ask respondents multiple questions. Within a family of outcomes, we expect the coefficients on the variables of interest to go in the same direction. To avoid drawing inferences based on selected outcomes, we report effects that average across outcomes within a family (Kling, Liebman, and Katz 2007). Specifically, for each outcome we construct a normalized transformation by subtracting the mean for never-reserved GPs and dividing by the standard deviation in the never-reserved sample. We obtain an average effect for the family of outcomes by estimating the effect for the average across these normalized outcomes.<sup>11</sup>

#### *IV.B. Voter's Evaluation of Their Pradhan*

Each respondent was asked four questions on the effectiveness of his or her actual *pradhan*, including “How would you rank the effectiveness of the current *pradhan*?” The responses are based on a scale from one to ten. In Table IV we report regressions where the dependent variable is the normalized average across these four questions, where each question is first normalized by the mean and standard deviation of responses in never-reserved GPs and then averaged. Our regressions are of the form specified in equation (2), and include demographic controls (age, education, caste, religion, household size, and proxies for household wealth); investigator gender and survey year indicators; and all the village controls listed in Table I. Excluding control variables produces very similar results.

11. As in Kling, Liebman, and Katz (2007), we obtain similar results if we obtain the average effect for the family of outcomes by using a seemingly unrelated regression (SUR) system (where we account for correlation across outcomes) and then averaging across outcomes.

TABLE IV  
EVALUATION OF ACTUAL PRADHAN: AVERAGE EFFECT

	Male				Female			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Only reserved 2003	-0.197 (0.058)	-0.139 (0.063)	-0.210 (0.058)	-0.152 (0.063)	-0.075 (0.060)	-0.012 (0.061)	-0.076 (0.060)	-0.015 (0.062)
Reserved 1998 and 2003	0.014 (0.072)	0.013 (0.083)	0.013 (0.072)	0.011 (0.083)	-0.006 (0.050)	0.010 (0.057)	-0.004 (0.050)	0.011 (0.057)
Only reserved 1998	0.001 (0.056)	-0.010 (0.057)	0.003 (0.056)	-0.009 (0.056)	0.037 (0.054)	0.018 (0.052)	0.040 (0.054)	0.021 (0.052)
With pradhan characteristics controls	N	Y	N	Y	N	Y	N	Y
With pradhan action controls	N	N	Y	Y	N	N	Y	Y
Test: 2003 = both 1998 and 2003 [p-value]	.008	.124	.004	.080	.216	.904	.191	.866
Test: 2003 = both 1998 and 2003 [p-value]	.012	.084	.009	.065	.301	.736	.285	.686
N	6,642	6,642	6,642	6,642	6,568	6,568	6,568	6,568

Notes: (1) The outcome variable averages across four questions: "is pradhan effective," and did pradhan: "look after village needs"; "look after your needs"; and "make BPL lists well." (2) All regressions include (i) block fixed effects; (ii) individual controls for age, age squared, household size, religion, caste dummies (for scheduled caste, scheduled tribe, and other backward caste), years of education, a wealth index (based on a principal components analysis using household assets), and dummy for land ownership; (iii) village controls for all variables in Table I; and (iv) survey year and surveyor gender indicator. Standard errors are clustered by GP. Columns (2) and (5) include pradhan characteristics from Table II, and columns (3) and (7) include the indices of public good quantity and quality (see Table V). Columns (4) and (8) include both pradhan characteristics and the public good quantity and quality indices. (3) We report the p-values from Wald equality tests.

Leader evaluations by villagers in GPs reserved for the first time in 2003 were significantly worse than in never-reserved GPs. The first row of column (1) shows that male respondents evaluate their pradhans 0.2 standard deviations below pradhans in unre-served GPs (pradhans in never-reserved GPs received, on average, a ranking of 5.1 on a scale of ten). Column (5) shows a negative, but smaller and insignificant, effect for female villagers.

In contrast, the second row in Table IV shows that both male and female villagers' evaluations of female pradhans in twice-reserved GPs are statistically indistinguishable from those of pradhans in never-reserved GPs. For men, we can reject equality between the coefficients of "Only Reserved 2003" and "Reserved in 1998 and 2003" at the 1% level. For women, the coefficients do not differ; this reflects, in part, the fact that we cannot reject the hypothesis that women rate their female leaders at par with male leaders. Finally, the third row shows that the current (mostly male) leaders in GPs that were previously reserved in 1998 and leaders from never-reserved GPs are similarly evaluated.<sup>12</sup>

The timing of these results is consistent with the electoral results. Villagers have very negative opinions of their female leaders during the first electoral cycle after reservation was introduced. If this caused parties and candidates to anticipate negative electoral outcomes for women, then few women would contest a seat or be designated pradhan immediately after. However, with improvements in voter opinion of female candidates during the second electoral cycle with reservation, more female candidates enter as candidates in the third electoral cycle.

Why are female pradhan ratings lower in GPs reserved for the first time than in GPs reserved for the second time? In Section II.B, we saw that political reservation led to the election of women who differed from male pradhans on multiple dimensions. It may be that the aggregate difference masked significant variation across first and second generation female pradhans. Specifically, it could be that, relative to pradhans in GPs only reserved in 2003, female pradhans in twice-reserved GPs are more similar to male pradhans and this underlies the change in voter evaluations. Motivated by this observation we examine two plausible explanations: Relative to first generation female pradhans, second generation

12. A question-by-question analysis yields identical results, and these are available in Table A.1 of the Online Appendix.

female pradhans either have different characteristics or act differently.

#### *IV.C. Pradhan Selection*

Women elected as pradhans from GPs reserved for the first and second time differ on very few observable characteristics. Column (5) of Table II shows that women leaders in first and second time-reserved GPs differ (significant at the 10% level or less) on only two of the eleven measures (one demographic and one political). However, these differences are potentially important: jointly, the observable characteristics of women elected in the GPs first reserved in 2003 significantly differ from those elected in GPs reserved in both 1998 and 2003 ( $p$ -value .01).

On demographics, the only significant difference relates to marital status. Relative to first-time female pradhans, those elected in GPs reserved for the second time are more likely to be married (as are male pradhans), though they are still no more likely to have spouses previously on the council. In terms of political experience and characteristics, the only difference is that women in GPs reserved for the second time are more likely to be from the ruling party (Communist Party of India (Marxist)) than either women in GPs reserved for the first time or pradhans in unreserved GPs. We do not have a good explanation for this result.

In order to assess whether these differences can explain the perception results, columns (2) and (6) of Table IV report the evaluation regression where we control for all eleven pradhan characteristics. For male respondents the coefficient on Only Reserved 2003 declines slightly, from  $-0.2$  to  $-0.14$ , but remains significant, as does the difference between first and second time reserved. In the case of female respondents, the coefficient remains small and insignificant. These results demonstrate that observable differences between male and female pradhans do not drive the evaluation gap. However, we cannot rule out the possibility that the evaluation gap reflects unobserved differences in the selection of women across GPs reserved for the first and second time. For example, political parties may learn over time how to select female candidates who appeal to male voters, or women could become more willing to run for offices thereby increasing the average quality in this group. The differences could even reflect differences in perceptions of why women were elected pradhan. For example, villagers may not understand the double reservation principle, and believe that, the second time around,

the pradhan was chosen because she was the best candidate, not because the pradhan had to be a woman.

#### IV.D. Pradhan's Actions

One way to shed more light on pradhans' effectiveness is to examine their performance along observable dimensions. In Table V we present evidence that, *prima facie*, male pradhans do not outperform female pradhans.

We start by using data from the PRA survey to construct the average quantity of public goods in the village, where we average across investments in the following sectors: water and sanitation, irrigation, roads, transport, schools and other educational facilities, and health. Across all public goods, the average number of repairs or new constructions since 2003 is 0.19 standard deviations higher in villages where the pradhan position is reserved for the first time (column (1)).<sup>13</sup> The effect in twice-reserved GPs is smaller and insignificant (0.04, with standard error of 0.06), although not statistically distinguishable from the effect in GPs only reserved in 2003. If anything, pradhans in twice-reserved GPs are less active than those in GPs reserved only once.

This result could occur because female pradhans in first-time reserved GPs invest in lower-quality public goods. The facilities audit allows us to measure the average quality of public goods across the water, roads, transport, school and other educational facilities, health, and fair price shop sectors. Columns (2)–(4) show similar quality of public good provision and also, on the average, very similar levels of self-reported villager satisfaction with public goods across GPs in different reservation categories.<sup>14</sup>

Because public goods are mainly financed by state government funds, the contrast between villagers' negative evaluation of female pradhans and the fact that female pradhans invest more with no discernible reduction in quality is unlikely to reflect resentment of a "big government" approach. Villagers may, however, have to pay for these goods through means such as voluntary

13. Section B of Appendix II describes these data and Online Appendix Table A.2 shows very similar results for goodwise regressions. Our findings are also broadly consistent with Munshi and Rosenzweig (2008), who find using nationally representative data that women leaders in non-caste-dominant GPs demonstrate higher competence, as measured by public good provision.

14. The only exception when we examine good-specific satisfaction is that men are unsatisfied with female leaders' allocation of the limited supply of BPL cards. In contrast, Dufo and Topalova (2004), using nationwide Indian data, found that villagers were, on average, less satisfied with public good provision when women were in charge.

TABLE V  
PRADHAN PERFORMANCE: PUBLIC GOODS, BRIBES, AND SATISFACTION

	Average public good provision		Average satisfaction		Average bribes	Alignment with female preferences
	Quantity (1)	Quality (2)	Male (3)	Female (4)		
Only reserved 2003	0.192 (0.070)	-0.043 (0.046)	0.037 (0.042)	-0.001 (0.039)	-0.094 (0.031)	0.521 (0.279)
Reserved 1998 and 2003	0.039 (0.061)	-0.030 (0.052)	-0.063 (0.052)	-0.042 (0.044)	-0.072 (0.029)	0.659 (0.358)
Only reserved 1998	0.097 (0.082)	-0.069 (0.037)	-0.008 (0.045)	0.025 (0.038)	-0.045 (0.038)	0.563 (0.243)
Test: 2003 = both 1998 and 2003 [ <i>p</i> -value]	.127	.763	.242	.381	.360	.942
Test: 2003 = both 1998 and 2003 [ <i>p</i> -value]	.343	.847	.095	.435	.493	.730

*Notes.* (1) The outcome variables are: the average quantity across public goods (column (1)), the average across quality measures for public goods (column (2)), the average across satisfaction with various public goods according to men and women, respectively (columns (3) and (4)), and averaged bribes (column (5)). Column (6) tests whether there is more investment in reserved GPs in goods mentioned more frequently by women, as measured by formal complaints to the GP in 2000. We report the coefficients from the alignment with female preferences measure in Chattopadhyay and Duflo (2004). (2) The sample in the column (1), (2), and (6) regressions are 495 villages, whereas the column (3)-(5) regressions use household surveys and include the controls defined in Table IV.

contributions and bribes. In column (5) we see that on the average, individuals in currently reserved GPs are less likely to have paid a bribe to obtain a BPL card or drinking water connection. This is true for both GPs reserved for the first and second time.

The evidence suggests that women leaders, especially first-time leaders, provide more public goods of equal quality at a lower effective price. However, the bundle of public goods chosen by female leaders may be less valued by male villagers. In the same setting, Chattopadhyay and Duflo (2004) showed that women leaders invest more in goods preferred by women.<sup>15</sup> In column (6) we use their measure of female preferences (constructed using the difference in male and female villagers' formal complaints) and find that female leaders invest more in women-preferred goods. This provides a potential explanation for why male villagers rate first-time female leaders negatively. However, because the policy choices of female pradhans in once- and twice-reserved GPs are equally pro-woman, this cannot explain the differential evaluation of pradhans across once- and twice-reserved GPs.

To investigate whether the difference in actions can explain voter opinions, columns (3) and (7) in Table IV report evaluation regressions where we control for the quantity and quality of public goods, using the indices from columns (1) and (2) of Table V. Columns (4) and (8) show that our evaluation regression results are robust to simultaneously controlling for pradhan characteristics and actions.

Although, *prima facie*, the results in Tables IV and V suggest that pradhan characteristics and actions do not account for the evolution of voters' opinion of female pradhans, it is possible that we have failed to capture relevant aspects of public good provision such as the targeting of transfers or jobs. Alternatively, the evaluation gap may reflect the fact that first-time women leaders are simply worse at getting credit for their work (Deaux and Em-swiler 1974). Another possibility is that female pradhans are not just less likely to take bribes but are also less willing (or able) to bribe influential villagers (for instance, by allocating them BPL cards or otherwise favoring them), and these villagers respond by adversely influencing public opinion.<sup>16</sup> In other words, women may make good leaders but bad politicians. In villages reserved

15. Our data show that they continue to invest in different types of goods; see Online Appendix Table A.2.

16. We thank one referee for this suggestion.



for the second time, women may have acquired better skills as politicians.

For all these reasons, actual leaders' approval ratings are insufficient to establish that male villagers are initially biased against female leaders, and that exposure to a female leader reduces this bias. We therefore turn to experimental measures that elicit villagers' opinion of women as leaders.

## V. DOES RESERVATION REDUCE BIAS AGAINST FEMALE LEADERS?

Bias against female leaders may reflect taste or statistical discrimination. The two could also reinforce each other if taste discrimination prevents the initial election of female candidates and this, in turn, prevents voters from gathering information on their leadership. Lack of information on women's competence may prevent risk-averse voters from subsequently electing women, creating a vicious circle where women are never elected.<sup>17</sup> In such an environment, gender quotas, by reducing statistical discrimination, may enhance women's long-run electoral prospects even if taste-based bias persists. To investigate this possibility, we use survey data that capture aspects of both taste and statistical discrimination.

### V.A. Data

*Hypothetical Leader Effectiveness.* Our individual survey modules included speech and vignette experiments that fall under the "Goldberg paradigm" (Goldberg 1968). Such experiments, in which the gender of the protagonist is randomly varied, have been widely used in the United States to isolate bias in the perceived effectiveness of women as leaders (Huddy and Terkildsen 1993; Matland 1994; Eagly and Karau 2002).

Each respondent heard a short tape-recorded leader speech. In the speech, which was adapted from an actual village meeting, the leader responds to a villager complaint about a broken tubewell by requesting villagers to contribute money and effort for local public goods (Appendix II provides the transcript). Respondents were randomly assigned one of six speech recordings (three per gender) and told that this was recorded during a village meeting in another district. After hearing the speech,

17. The working paper version of this paper, <http://www.nber.org/papers/w14198>, provides a model that formalizes this argument.

the respondent evaluated the leader's perceived performance and overall effectiveness according to seven criteria, including whether the leader addressed villagers' concerns correctly, and whether he/she would be good at collecting resources from villagers.

Each respondent also heard a randomly selected vignette in which a situation of resource scarcity was described and the leader chose to invest in either a drinking water or an irrigation project. Vignettes varied along two dimensions: the leader's gender and choice. Variation in the leader's choice was introduced because, relative to men, women invest more in drinking water and are more likely to cite drinking water as an issue of concern. In contrast, men state a greater concern with irrigation (Chattopadhyay and Duflo 2004). Randomizing the choice ensures, on average, a "gender-neutral" decision.<sup>18</sup>

Although leader gender was randomly varied across respondents, a respondent was exposed to the same leader gender in the speech and vignette. In our analysis, we combine villagers' responses across the speech and vignette and ask whether, holding actions constant, villagers, on average, rank female leaders below male leaders. The disaggregated results are available in the Online Appendix to this paper.

*Measure of Gender-Occupation Stereotype.* We used an activity-based IAT to examine whether exposure to a female leader alters the extent of gender stereotyping of occupations by villagers. We also conducted two taste-based IATs to measure general feelings toward women (described below). To the best of our knowledge, we are the first to conduct IATs in a developing country. Below, we first describe the general features of an IAT and then our activity-based IAT.

An IAT is a computerized test that aims to measure attitudes of which respondents may not be explicitly cognizant. It uses a double-categorization task to measure the strength of respondent association between two concepts. To account for limited computer familiarity and high illiteracy, our IATs used audio or pictorial prompts. Although we are unaware of other studies which conduct IATs with an illiterate population, the pioneers of the IAT argue that words, pictures, or sounds can be used

18. In practice, both genders considered investment in water to be the best decision, so that *pradhan's* approval was much higher among male and female respondents who received the vignette where drinking water was chosen.

to represent concepts, making it possible to administer IATs to “the blind, young children, and others who are unable to read” (Carney et al. 2007). English versions of our three IATs, along with a full list of prompts, are available electronically.<sup>19</sup>

During an IAT test block the respondent observes a computer screen and categorizes a sequence of stimulus-based categorization tasks. Appendix I shows a screenshot from the leadership-domestic IAT. Here the respondent sees two pictures (a setting and a person) on either side of the computer screen. In the “stereotypical” block, the male picture and leadership setting are grouped together on one side (say, the right-hand side) and the female picture and domestic setting on the other (left) side. The “non-stereotypical” block reverses this association between gender and domestic and leadership words (so now male pictures and domestic setting are on the right, and female pictures and leadership setting are on the left).

While viewing the screen the respondents hear or see a sequence of stimuli, such as a spoken word or picture. They then use the computer button to assign each stimulus to the correct side of the screen. For each stimulus, there is an unambiguously correct response that is made clear during two prior practice blocks.<sup>20</sup> The time a respondent takes to accomplish each categorization task is recorded in milliseconds. The presumption is that respondents with a stronger association between two concepts find the sorting task easier and complete it faster. The relative strength of association can, therefore, be detected by comparing response time across the stereotypical and nonstereotypical block. The normalized difference in mean response times between the “nonstereotypical” and “stereotypical” test blocks is the D-measure of IAT bias, with higher values indicating stronger implicit stereotype (Greenwald, Banaji, and Nosek 2003).

The complete IAT procedure for one subject consists of two practice rounds, with single cues on each side, followed by the two test blocks, with the stereotypical and nonstereotypical cues on each side. The order in which test blocks are administered is randomized. Following standard practice the IAT was automatically stopped if participants were too slow or made too many mistakes (Nosek, Banaji, and Greenwald 2002). The rationale is that the

19. The IATs are posted at <http://www.povertyactionlab.org/projects/project.php?pid=102>. Our IATs resemble those used for children (Baron and Banaji 2006).

20. A mistake in this example would mean that the respondent classified a female name on the male side, or a leadership word on the domestic side.

IAT relies on rapid responses and, therefore, on the respondent's understanding of the task at hand. Too many mistakes, or too slow a response time, suggests that the test captured the respondent's difficulty with the test rather than his or her attitudes. Our cut-off, which was based on extensive piloting and was more generous than those typically used, was to stop the test for respondents with an average response time of over six seconds or less than 60% average correct responses in the first block. To ensure similar treatment across blocks, at the analysis stage we dropped all respondents with an error rate of above 65% in either test block.<sup>21</sup>

We administered the IATs to adults aged 15 to 45 in a random subsample of five households per village. Each respondent was randomly assigned to one of the three IATs. Overall, we had 4,378 respondents from 1,968 households.<sup>22</sup> The screening criteria reduced the number of usable observations to 2,816 (across the three IATs). Both criteria were more likely to exclude older and female respondents.<sup>23</sup> Finally, we dropped stimulus responses, but not the entire test block, for which the respondent took more than ten seconds to categorize a prompt.<sup>24</sup>

Over the last ten years, IATs have been widely used to measure implicit bias in various subfields in psychology (Nosek, Greenwald, and Banaji 2007), neuroscience, market research, and recently, economics (Bertrand, Chugh, and Mullainathan 2005; Rooth 2007). However, their use is not uncontroversial. A first class of issues concern IATs' internal validity.<sup>25</sup> IAT current procedures have been developed to avoid such bias, and our IATs respect those procedures. A second category of issues concern "construct validity." These include whether IATs measure the strength of associations between concepts or some other reasons such as salience (Rothermund and Wentura 2004), or whether IATs capture cultural, rather than individual, association of categories (Karpinski and Hilton 2001; Arkes and Tetlock 2004; Olson and Fazio 2004). Finally, IATs reflect instant decisions and may

21. The results are not sensitive to this threshold.

22. We exclude IAT data from the one pilot village in each of 77 GPs.

23. Relative to included participants, the average D-measure of respondents excluded at the analysis stage was 0.12 standard deviation higher for men and 0.14 standard deviation lower for women. Our results are robust to not conducting the additional screening during analysis; these results are available from the authors.

24. We assumed the respondent was temporarily inattentive; standard practice in psychology literature is to top-code answers longer than three seconds at three seconds.

25. IATs could, for example, be affected by stimuli familiarity, the specific choice of stimuli, the order in which they appear, previous experience with the IAT, or the association of categories with a particular side.

not matter for deliberative decisions such as voting. Compared to the internal validity concerns, these criticisms are more fundamental and have led to a lively debate on the legitimate use of IAT. Nevertheless, the IAT has been shown to be a good predictor of individual behavior in several applications, including voting behavior (Nosek, Banaji, and Greenwald 2002; Arcuri et al 2008).<sup>26</sup>

Finally, an important innovation of our analysis is to examine the malleability of IAT bias in response to exposure to female leaders. We are aware of only one other field study that investigates the malleability of implicit beliefs. This study found that students in American colleges with a higher proportion of female professors were more likely to associate women with professional activities (Dasgupta and Asgari 2004). However, endogenous selection into college makes a causal interpretation of these results difficult.

Turning to our choice of IAT, we use an activity-based IAT to assess whether villagers exposed to reservation are less likely to associate women with domestic activities and men with leadership activities. The IAT examines the association between male and female names and domestic (e.g., taking rest) and leadership (e.g., public speaking) activities. To avoid biasing the results toward associating women with domestic activity, we chose gender-neutral domestic activities that were equally likely to be performed by men and women. This IAT does not capture a value judgment. Rather, it is informative as to whether the respondent considers both men and women as potential leaders.

*Measures of Voter Taste.* We use taste-based IATs and survey responses to construct measures of voters' explicit and implicit taste for male and female leaders in general.

Taste-based IATs have been widely used to measure group prejudice (Banaji 2001).<sup>27</sup> Our first taste IAT assesses the associational strength between male and female names and positive (e.g., nice) and negative (e.g., nasty) attributes. The second measures the association between these attributes and images of male and female politicians (pictures of either men or women giving speeches, leading crowds, etc.). In both cases the stereotypical block places male names or leader pictures and good attributes on

26. A list is maintained on Anthony Greenwald's web page, [http://faculty.washington.edu/agg/iat\\_validity.htm](http://faculty.washington.edu/agg/iat_validity.htm).

27. See the Project Implicit website, <http://implicit.harvard.edu/implicit/demo/background/bibliopic.html>, for an extensive list.

one side of the screen, and female names or leader pictures and bad attributes on the other side.

Households that received IATs were also explicitly asked, "On a ladder which has steps from 1 to 10, how do you feel about a [X]?" where X was (separately) a female leader, a male leader, a female villager, and a male villager.<sup>28</sup> This question is adapted from the "Feeling Thermometer," which has been widely used in the political science literature to produce rank orderings of parties and candidates (Keller and Mirer 1974) and to measure partisan affiliation (Weisberg 1980; Alvarez 1990). IATs and explicit measures, such as the above, are complements insofar as explicit measures such as the feeling thermometer capture socially acceptable responses, rather than a respondent's true opinion (Greenwald, McGhee, and Schwartz 1998).

### V.B. Results

*Hypothetical Leader Effectiveness.* We start by examining villagers' evaluation of the hypothetical pradhan actions described in the tape-recorded speech and vignette. Unlike actual pradhans, here, by construction, there are no observable or unobservable performance differences between the male and female leaders. If respondents choose to *infer* differences in pradhan performance based on pradhan gender, then this is evidence of statistical discrimination. Our objective is to evaluate whether such discrimination, if any, was affected by the reservation policy.

We examine whether villagers judge male and female pradhans differently, and whether this difference varies with the reservation status of the GP. Let  $F_{ig}$  indicate whether respondent  $i$  received a "female" stimulus (i.e., heard the speech in a female voice, or was described the vignette with a female leader). We estimate

$$(4) \quad y_{ig} = \delta F_{ig} + \lambda(R_g * F_{ig}) + \mu R_g + X_{ig}\gamma + \alpha_b + \epsilon_{ig}$$

and

$$(5) \quad y_{ig} = \delta F_{ig} + \lambda_2(R_{g2} * F_{ig}) + \lambda_{2and1}(R_{g2and1} * F_{ig}) \\ + \lambda_1(R_{g1} * F_{ig}) + \sum_k R_{k\lambda k} + X_{ig}\gamma + \alpha_b + \epsilon_{ig},$$

28. We did not refer to a particular female leader, either by name or function (pradhan); the question refers to any female leader.

TABLE VI  
 PERCEPTION OF FEMALE EFFECTIVENESS AS LEADERS: EXPERIMENTAL EVIDENCE  
 (SPEECH AND VIGNETTES)

	Average effect	
	Male	Female
	(1)	(2)
Panel A		
Female pradhan	-0.054 (0.027)	-0.035 (0.031)
Female pradhan × ever reserved	0.091 (0.036)	0.024 (0.038)
Test: female pradhan + female pradhan × ever reserved	0.038 (0.023)	-0.011 (0.022)
Panel B		
Female pradhan × only reserved 2003	0.112 (0.047)	-0.001 (0.048)
Female pradhan × reserved 1998 and 2003	0.092 (0.062)	0.052 (0.060)
Female pradhan × only reserved 1998	0.073 (0.046)	0.035 (0.045)
Test: FP × 2003 = FP × (both 1998 and 2003) = FP × 1998 [ <i>p</i> -value]	.774	.652

*Notes.* (1) The outcome variables are averages across all questions in the speech and vignettes: “is pradhan effective?” and “cares about villagers’ welfare?” in the speech and vignettes; “did pradhan address villagers satisfactorily?,” “will pradhan allocate BPL cards well?,” “will pradhan get resources by lobbying?,” “will pradhan collect villagers’ share well?,” and “will village approves pradhan’s budget?” in the speech; and “agree with pradhan” and “would vote for pradhan” in the vignettes. (2) Female pradhan is an indicator that is 1 if the leader speaking was female or the pradhan in the vignettes was female. All regressions include the controls defined in Table IV, and standard errors are clustered by GP.

where  $R_g$  indicates a GP that has ever been reserved for a female pradhan, in 1998, 2003, or both, and the indicator variables  $R_k$  control for the main effects of different reservation categories, as defined in previous sections.

In equation (4) the coefficients of interest are  $\delta$ , which captures bias toward female leaders in unreserved GPs, and  $\lambda$ , which indicates whether current or past exposure to a female leader changes the level of bias. In equation (5), we are interested in  $\lambda_2$ ,  $\lambda_{2\text{and}1}$ , and  $\lambda_1$ , and how they differ from each other.

Columns (1) and (2) of Table VI report the coefficients from regressions in which the dependent variable is the average of the normalized outcomes across the speech and vignette questions. In Panel A we observe a significant bias among men in never-reserved villages. The coefficient on female pradhan suggests that

they rate the effectiveness of a hypothetical female pradhan 0.054 standard deviation below that of a male pradhan. Although the bias is lower and insignificant among women, we cannot reject the hypothesis of a similar bias across genders.

In contrast, the coefficient on the interaction between female pradhan and ever reserved is a strongly significant 0.091. Combining the two Panel A coefficients suggests that reservation erases, indeed reverses, this bias (though the resulting pro-female bias is only weakly significant). Panel B shows a similar impact of reservation across reservation categories: all coefficients are positive, with similar-sized and statistically indistinguishable point estimates. The results are striking and suggest that exposure to at least one female leader due to reservation can erase statistical discrimination by male villagers. Moreover, this effect persists even after the woman has left office.

In comparison, our estimates, though noisy, suggest very limited updating among female villagers. One possible explanation is that female villagers are less involved in local politics: women are significantly less likely to know the pradhan's name or to have ever been in direct contact with him or her (Online Appendix Table A.4). If women are largely unaware of local politics, then it is unsurprising that reservation does not affect their evaluations. Even among men, the impact of reservation on statistical discrimination is concentrated among those who know the pradhan's name (Online Appendix Table A.5). Another possibility is that a female leader, by virtue of being a counterstereotypic figure, makes women's traditional roles appear lower-status and therefore women react negatively to this. Finally, it could be that members of a group are simply less likely to update about their own group based on another group member's behavior. The results suggest the absence of confirmatory bias in this setting: because, compared to women, men started with a worse opinion of women's relative ability to lead, they would have updated less than women.

*Gender–Occupation Stereotypes.* Next we use an occupation-based IAT to examine whether exposure to female leaders reduces villagers' propensity to associate leadership activities with men and domestic activities with women.

In Columns (1) and (2) of Table VII, Panel A, we examine the impact of having lived in a village that was ever reserved. The regression specification examines the difference between ever- and never-reserved GPs, where we control for respondent



TABLE VII  
EXPLICIT AND IMPLICIT PREFERENCES FOR FEMALE LEADERS

	IAT (D-measure of bias against females)							
	Leadership/domestic and male/female		Male/female names and good/bad		Male/female politician and good/bad		Feeling ladder	
	Male (1)	Female (2)	Male (3)	Female (4)	Male (5)	Female (6)	Male (7)	Female (8)
Ever reserved	-0.076 (0.032)	0.021 (0.041)	-0.004 (0.031)	-0.007 (0.043)	0.014 (0.037)	-0.023 (0.038)	0.208 (0.112)	0.099 (0.110)
Only reserved 2003	-0.090 (0.041)	0.112 (0.053)	-0.023 (0.045)	0.005 (0.051)	0.024 (0.051)	-0.004 (0.049)	0.271 (0.158)	0.088 (0.145)
Reserved 1998 and 2003	-0.023 (0.052)	-0.098 (0.075)	0.016 (0.041)	0.035 (0.074)	0.036 (0.057)	-0.011 (0.056)	0.063 (0.159)	0.053 (0.152)
Only reserved 1998	-0.098 (0.042)	-0.022 (0.051)	0.001 (0.045)	-0.061 (0.052)	-0.012 (0.048)	-0.050 (0.051)	0.240 (0.150)	0.139 (0.140)
Test: 2003 = both 1998 and 2003 = 1998 [ <i>p</i> -value]	.402	.021	.756	.316	.704	.709	.560	.875
Never reserved sample:								
Mean	0.110 (0.340)	0.150 (0.384)	0.134 (0.425)	-0.157 (0.418)	0.093 (0.452)	-0.079 (0.441)	1.446 (2.655)	0.560 (2.572)
Standard deviation								
<i>N</i>	477	357	510	408	554	510	3,511	3,671

Notes. (1) The outcome variables are: the difference in average response latencies between the stereotypical and nonstereotypical blocks in the IAT divided by the standard deviation of latencies (IAT D-measure in columns (1)-(6)) and the differences in the ranking between male and female pradhans on a scale of 1-10 (columns (7) and (8)). (2) "Ever reserved" is an indicator for whether a GP was reserved for a female pradhan in 1998, 2003, or both. (3) The IAT and ladder questionnaire were administered to adults in a random subset of households per village, and each respondent was administered one of the three IATs.

demographics, 1991 village control variables, block fixed effects, and investigator and survey year indicator. The Panel B regression examines whether this effect varies across reservation categories (regression specification is as in equation (2) with the additional controls listed above).

Both genders associate leadership activities more strongly with men in never-reserved GPs: they are faster at associating women with domestic activities than with leadership actions (on average, men are 0.1 standard deviation faster, and women 0.15 standard deviation faster). Exposure to a female leader significantly reduces this association among male respondents.

This effect is, however, absent among women. If anything, Panel B shows a strengthening of the stereotype associating women and domestic activities among women exposed to a female pradhan for the first time in 2003.

The vignettes and speech and the IAT suggest that statistical discrimination against women and the stereotyping of men with leadership activities disappear relatively fast, that is, within the first reservation cycle: two years after being first required to elect a woman, when presented with the same information on a leader's action, villagers judge a male and a female leader as equally able. In contrast, villagers who have never been exposed to a female leader judge a hypothetical female leader as less effective. This can explain why the evaluation of actual female leaders improves between the first and second reservation cycle. The first woman to be elected suffers from the same statistical discrimination as the female pradhan in the speech and vignette in never-reserved GPs: presented with similar information on her effectiveness (e.g., her first decisions), they rate her as less effective than they would rate a man. Progressively (maybe as they learn that the result of the same action taken by a man or a woman is the same), they begin to update their opinion of a woman leader (including the current one). However, despite favorable updating, their overall opinion of their current pradhan continues to be influenced by their low initial prior of the leader at the time of her election. Hence, it remains lower than that of male pradhans. Meanwhile, similar to the women in the speech and vignettes, the initial negative prior is absent for the second cohort of female pradhans and they are judged using standards similar to men.

*Preference for Male Leaders.* We now investigate whether exposure alters villagers' implicit and explicit taste for female

leaders. As a reminder, we measure implicit preference for male leaders by the D-measure in the taste IAT. To benchmark respondents' ranking of leaders, we also report IAT results for respondent preferences for male versus female villagers. We measure an explicit preference for male leaders by the difference between a villager's general rating of male and female pradhans (on a 1–10 scale). Our regression specifications are as in the previous section.

The results are in Table VII. For both taste IATs, the mean D-measures in the never-reserved samples suggest a strong same-gender preference among male and female villagers (columns (3)–(6)). Men are significantly more likely to associate good with male names or pictures of male leaders, whereas women associate female names (and images of female leaders) with positive attributes. Of particular interest is the coefficient in the first row of column (5), which suggests that, unlike the occupation IAT, men exposed to reservation do not update favorably toward women in the leader taste IAT. The point estimate is small and insignificant (0.014, with a standard error of 0.037). We can reject at 95% confidence interval a decrease of  $-0.076$  standard deviation on the D-measure. Note that the D-measure is 0.093 in the unreserved sample. Thus contrary to what we found for the effectiveness perception and gender–occupation measures, we can reject the hypothesis that exposure removed male citizens' implicit preferences for male leaders.

Next we examine villagers' explicit feelings. In columns (7) and (8) we see that villagers are not shy about admitting explicit preferences for males. Male villagers in never-reserved villages rate male leaders 1.44 points higher than female leaders. The difference, although smaller (0.56), remains significant among female villagers. The distaste for female leaders is not ameliorated by exposure. On the contrary, the coefficient of "Ever Reserved" (Panel A, column (7)) is positive for both genders. For male villagers, the effect is also significantly positive, suggesting that their relative explicit preference for male leaders (compared to female leaders) is strengthened in GPs that have experienced a gender quota.

These results suggest that affirmative action does not, in the short to medium run, alter voter taste for female leaders. As in most of the literature on IATs, we find some differences between implicit and explicit measures (Hoffman et al. 2005). However, in contrast to rich countries where explicit bias tends to be muted even when respondents exhibit strong implicit bias

(Bertrand, Chugh, and Mullainathan 2005), we find a strong explicit bias against women leaders (which is worsened by initial reservation). A possible explanation is deep-rooted social norms that members of disadvantaged groups, including women, should not lead. The finding that men are *more* biased in once-reserved GPs, but only as measured by explicit attitudes, supports a “backlash” hypothesis. That is, men protest against a quota system that forces them to elect women by stating a dislike for female leaders, even though their implicit preferences are unaffected. If the backlash reflects such a protest, and is driven by a general distaste for seeing members of disadvantaged groups in leadership positions, then this backlash should be stronger in GPs that are simultaneously reserved for multiple categories—women and either scheduled castes or scheduled tribes. Regressions that control for both types of reservation show that the backlash effect can be entirely attributed to GPs that are simultaneously reserved for SC and women: that is, voters’ stated dislike for women is particularly strong in GPs reserved for SC (results not reported). Finally, we underestimate the backlash to the extent that knowledge of the reservation policy induces people who have not yet had female pradhan reservation to become more negative toward women.<sup>29</sup>

Social norms that militate against female leadership, combined with same-gender preferences, could also explain the absence of consistent results across explicit and implicit attitudes for female villagers. Specifically, women’s explicit attitudes may reflect that they acknowledge that ranking female leaders below male leaders is prescribed behavior, even though they like female leaders (and this is captured by their implicit beliefs).<sup>30</sup>

## VI. CONCLUSIONS

Indian villagers prefer male leaders and have negatively biased priors on the effectiveness of female leaders. On a scale of one to ten, male villagers rate their feeling toward female leaders more

29. In Online Appendix Table A.6 we report multiple robustness checks. These include showing that evaluation of new pradhans is not worse (suggesting our results are not driven by women being new pradhans). We also show that the improvement in perceptions of female pradhans in twice-reserved does appear to reflect getting used to reservation. First-time women pradhans in GPs where the position was previously reserved for SCs receive negative evaluations.

30. We should note a final caveat for our IAT findings. It is possible that the very similar results across the two taste IATs reflect the fact that the second IAT may have failed to sufficiently capture a “leadership” dimension. Specifically, it may be that in both cases respondents only perceived the gender of the character as salient (and the respondents did not associate pictures of female leaders with leadership).

than one point below that toward male leaders; moreover, in never-reserved villages hypothetical leaders with identical performance are evaluated as less effective if they are female. Although reservation does not make male villagers more sympathetic to the idea of female leaders, our IAT and speech and vignette results suggest that it makes them more likely to associate women with leadership and improves their evaluation of female leader effectiveness.

The timing of effects is consistent across the actual pradhan evaluation and the experimental results. The speech and vignette results suggest that voters immediately update their opinion on the effectiveness of female leaders in general (i.e., after being exposed to reservation once). The second generation of female pradhans benefit from this decline in bias: this may explain why they are liked as much as male pradhans. In contrast, the evaluation of the first pradhan elected during reservation continues to be colored by voters' initial prior against women.

The timing of the impact on electoral outcomes follows naturally from the timing of the impact on citizens' explicit opinions: if, after one round of reservation, parties observe that the general distaste for female leaders has not improved (as we see in Table VII), and that voters are negatively disposed toward their current leaders (Table IV), then they have no incentive to field women candidates. Analogously, individual women may not consider running in an environment where female leaders are not well regarded. However, once female pradhans' approval ratings improve, fielding women becomes a good idea. Thus, if reservation improves electoral outcomes for women, the effect should be stronger after two cycles of reservations than after one cycle. This is what we observe in the electoral data. In the 2008 panchayat elections, the third since the reservation policy was implemented, more women were elected ward councilors and pradhans in GPs that had been reserved for women in the last two elections.<sup>31</sup> The results provide striking evidence that although ten years of exposure to women leaders may not have changed voters' stated preference for male leaders, by giving voters a chance to learn about the effectiveness of women leaders, they have effectively improved women's access to political office.

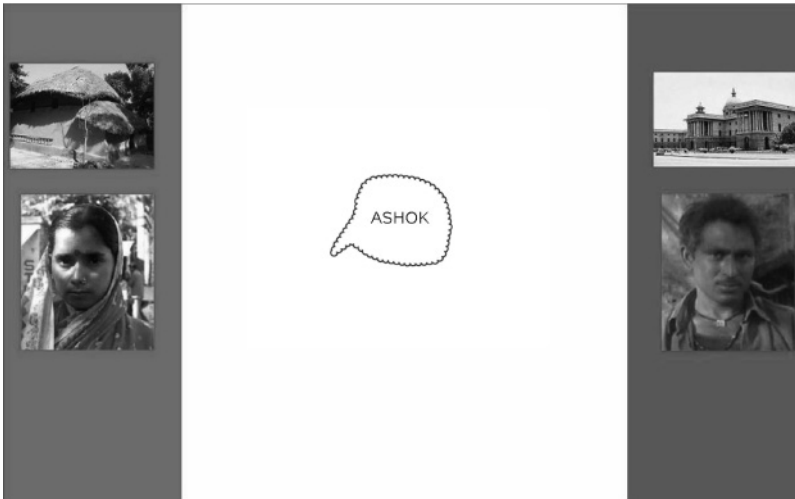
These results, of course, leave open the possibility that other channels of influence are also at work. Another important caveat

31. Even though we do not see impact of reservations on the attitude of the average woman, we have argued that the most likely explanation is their limited exposure to politics. Women who are capable of standing for election must, however, be the most politically aware.

is that our study occurred in a state that has seen a single party in power for the last thirty years, where village councils have worked well, and where gender discrimination is considered less extreme than in some other Indian states. In other settings, taste discrimination against women leaders may play a larger role in determining electoral outcomes. An encouraging sign for the external validity of our findings is the study of Bhavnani (2008), who finds similar results in Mumbai municipal wards. Conversely, the setting for this study is India, a poor country with relatively high levels of gender discrimination. It is possible that the impact of quotas in rich countries, which tend to have less gender discrimination, would look different.

That said, these results provide some of the first evidence on the potential role for public policy in mitigating voter discrimination. While the political underrepresentation of women is widely documented, there is almost no credible evidence on whether public policy can influence voters' belief systems and prejudice. Much of the evidence from outside the political sphere suggests that policies that limit awareness of a candidate's gender may be an optimal short-run response to discrimination (Goldin and Rouse 2000). Our results suggest that, in political settings where such strategies are infeasible, political affirmative action can play an important medium-run role. Although the first generation of women leaders may encounter significant prejudice, their experience can pave the way for others to go further.

## APPENDIX I



## APPENDIX II: DATA APPENDIX

A. *Vignette and Speech*

The gender of the leader was varied at the respondent level. We further randomized the investment decision in the vignette.

I.I. Vignette: Respondents received one of four vignettes, which varied in the gender of the pradhan (male (Tapan Das) or female (Sandhya Das)) and the investment decision (irrigation or water).

*READ OUT:* We will read a short description of the pradhan of village Chandi in district South 24 Parganas. We will ask you some questions about what you think the pradhan should have done. There are no right or wrong answers. Please answer each in terms of your own reactions. Pradhan Tapan Das [Pradhan Sandhya Das] has been serving his [her] panchayat for ten months. As the end of the year approaches, there is only a limited amount of money remaining in the budget. Yet villagers have been pressing him [her] to make improvements in two major areas: irrigation and drinking water. There was enough money to make investments in only one area. Prior to making a decision, Pradhan Tapan Das [Pradhan Sandhya Das] consulted with villagers at the gram sabha. Many people expressed frustration that there was still no safe drinking water available in the village. Many people, especially children, were getting sick. Others were upset about the quality of the irrigation system. Poor irrigation system meant that, in dry years, many people lost their crops. Shri Tapan Das [Shrimati Sandhya Das] considered the demands carefully, and wondered what to do. On the one hand, Shri Tapan Das [Shrimati Sandhya Das] knew the health cost of bad water quality. Yet wouldn't everyone be better off with better irrigation? After careful reflection Pradhan Tapan Das [Pradhan Sandhya Das] decided to invest in irrigation improvement [drinking water].

I.2. Speech: Respondents received one of six speech versions—three male voice recordings and three female voice recordings.

*READ OUT:* You will hear a tape-recorded speech from the village meeting of gram panchayat Labhpur in district West Dinajpur. We will ask you some questions on the effectiveness of the leader. There are no right or wrong answers. Please answer each in terms of your own reactions.

*VILLAGER:* The tubewell of our kumarpara is not functioning. The repairing job of the tubewell in your locality has been done partially, but the same work at Nutangram has been completed.

*PRADHAN:* For repairing of tubewells maximum amount of funds of the panchayat is being drained out. As a result of which, other work can't be done. From the next stage you, the people, should take mental preparations that the minor repairing jobs of the tubewells won't be done by the panchayat. I mean that if the work involves a large amount of money, e.g., if a pipe is needed then it involves the money above Rs. 250, Rs. 300, this type of work will be done by the panchayat. But for the minor repairing jobs the people have to

take initiative to collect subscriptions to do this. In the future, the plan of the panchayat will be “plans with equal sharings” (“samobhagi parikalpana”). The government won’t provide all the money. The government will provide some amount of money and the rest will have to be borne by the people either by giving labor or helping financially. In this way the work of the panchayat has to be done. Suppose a village road has to be constructed, then the people of the village will do the earthen work and the panchayat will supply the morram. Therefore the people will now share the jobs, which the panchayat did mostly. Then the total work can be made with success. So in the next stage, preparation has to be taken. I would now like all villagers to approve the village budget.

### B. Table V Variables

Our regressions in Table V consider as dependent variables an average public good quantity index (column (1)), an average public good quality index (column (2)), an average satisfaction index (columns (3) and (4)), average bribes (column (6)), and alignment with female preference (column (7)). We describe the construction of these variables.

*Public Good Quantity:* The index is the averaged sum of normalized investments in the goods listed below. We average over the number of types of public goods invested in, and normalize investments in each type of good by subtracting the mean for the never reserved villages and dividing by their standard deviation. For ease of exposition, each public good can be put into one of the following categories:

1. Water and sanitation: A dummy for whether a tubewell was built, a tubewell was repaired, a sanitation pit was built, or a sanitation pit was repaired.
2. Irrigation: A dummy for whether an irrigation pump was built or repaired.
3. Roads: A dummy for whether a metal road was built or repaired since 2003.
4. Transport: Number of transportation-related infrastructure components (bus stop, bus service, and private taxi/auto).
5. Schools and other education facilities: A dummy for whether any educational facility was built, a dummy for whether such a facility was repaired, a dummy for whether there is a creche, and an indicator for a CE center/library. Educational facilities considered for the built and repaired indicators include SSK, Anganwadi, government primary



schools, middle schools, libraries, secondary schools, and CE center/library.

6. Health: The number of health facilities, including public health centers and health subcenters/subsidiary centers, a dummy for whether a health facility was built, a dummy for whether a health facility was repaired (0 if no health facility existed), and number of doctors.

*Public Good Quality:* The index is defined analogously to the quantity variable.

1. Water: Handpumps are perennial, provide clean water, no stagnant water, and a drainage facility.
2. Road: Condition of road (1–5) and number of potholes in 100 m.
3. Transport: Dummy for presence of a bus stand and if bus stand has shelter.
4. Schools and other education facilities: Whether all primary schools have drinking water, toilets, and blackboards.
5. Health: Facility having tap or hand-pump water and an indicator for having a labor room.
6. Fair price shop quality: Whether prices displayed, no bad behavior of shopkeeper, and no complaint against shop.

*Satisfaction Variables:* The satisfaction index is defined analogously to the quantity variable. All of the variables below are either 0 (not satisfied) or 1 (satisfied):

1. Satisfaction with water provision: Satisfied with the quantity and quality of the water supply.
2. Satisfaction with public transport: Satisfied with the frequency, reliability, cost, and quality of the buses and the behavior of the driver/conductor in the public bus system.
3. Satisfaction with schools: Satisfied with (if available) the school's building, playground, recreational facilities, classrooms, toilets, drinking water, meals, quality of the teaching, quality of study material, and behavior of teacher.
4. Satisfaction with fair price shops: Satisfied with the quality of items, the quantity of items, the fairness of the shopkeeper, and the availability of items in the shop.
5. Satisfaction with health care: Satisfied with treatment, behavior of doctors, behavior of paramedical staff, quality of medicine, cleanliness inside the facility in outpatient health facilities; and satisfied with treatment, behavior of

doctors, behavior of paramedical staff, quality of medicine, quality of food, cleanliness inside the wards, and cleanliness inside the bathrooms in inpatient health facilities.

*Bribes:* The bribe index is the average over two variables, each of which is 1 if either adult respondent within a household reported

1. Paying speed money/a bribe for renewal or issuance of a BPL card.
2. Paying speed money/a bribe to rectify a problem with the water supply, either because it was requested or the individual offered the money voluntarily.

*Alignment with Female Preference:* The alignment with female preference specification tests whether there is more investment in reserved GPs in goods mentioned more frequently by women, as measured by formal complaints to the GP during six months in 2000. The data and specification are the same as in Chattopadhyay and Duflo (2004). Complaints were categorized into the following areas: drinking water, road improvement, education, irrigation, and other. The specification is

$$(6) \quad Y_{ij} = \beta_0 + \beta_2 R_{g2} + \beta_{2and1} R_{g2and1} + \beta_1 R_{g1} + \beta_3 D_i * R_{g2} \\ + \beta_4 D_i * R_{g2and1} + \beta_5 D_i * R_{g1} + \sum_{l=1}^N \beta_l d_{il} + \epsilon_{ij},$$

where  $D_i$  is the average difference between the fraction of requests about good  $i$  from women and from men and  $d_{il}$  are good-specific dummies.  $R_g$  are the reservation indicators as defined in the paper. In Table V, column (6), we report the coefficients from the interaction of reservation status and the average difference between the fraction of requests for goods in category  $i$  from women and from men (i.e.,  $\beta_3$ ,  $\beta_4$ , and  $\beta_5$ ).

NORTHWESTERN UNIVERSITY  
 INDIAN INSTITUTE OF MANAGEMENT, CALCUTTA  
 MASSACHUSETTS INSTITUTE OF TECHNOLOGY, NATIONAL BUREAU OF ECONOMIC  
 RESEARCH, AND CENTER FOR ECONOMIC POLICY RESEARCH  
 HARVARD UNIVERSITY AND CENTER FOR ECONOMIC POLICY RESEARCH  
 INTERNATIONAL MONETARY FUND

## REFERENCES

- Aigner, Dennis, and Glenn Cain, "Statistical Theories of Discrimination in Labor Markets," *Industrial and Labor Relations Review*, 30 (1977), 175–187.
- Alvarez, Michael, "The Puzzle of Party Identification—Dimensionality of an Important Concept," *American Politics Quarterly*, 18 (1990), 476–491.
- Arcuri, Luciano, Luigi Castelli, Silvia Galdi, Cristina Zogmaister, and Alessandro Amadori, "Predicting the Vote: Implicit Attitudes as Predictors of the Future Behavior of the Decided and Undecided Voters," *Political Psychology*, 29 (2008), 369–387.
- Arkes, Hal Richard, and Philip Tetlock, "Attributions of Implicit Prejudice, or Would Jesse Jackson 'Fail' the Implicit Association Test?" *Psychological Inquiry*, 15 (2004), 257–278.
- Banaji, Mahzarin, "Implicit Attitudes Can Be Measured," in *The Nature of Remembering: Essays in Honor of Robert G. Crowder*, Henry Roediger and James Nairne, eds. (Washington, DC: American Psychological Association, 2001).
- Baron, Anthony, and Mahzarin Banaji, "The Development of Implicit Attitudes: Evidence of Race Evaluations from Ages 6 and 10 and Adulthood," *Psychological Science*, 17 (2006), 53–58.
- Bertrand, Marianne, Dolly Chugh, and Sendhil Mullainathan, "Implicit Discrimination," *American Economic Review*, 95 (2005), 94–98.
- Besley, Timothy, Rohini Pande, and Vijayendra Rao, "Just Rewards? Local Politics and Public Resource Allocation in South India," Mimeo, Harvard, 2007.
- Bhavnani, Rikhil, "Can Governments Remedy Political Inequality? Evidence from Randomized Quotas in India," Mimeo, Stanford, 2008.
- Boisjoly, Johanne, Greg Duncan, Michael Kremer, Dan Levy, and Jacque Eccles, "Empathy or Antipathy? The Consequences of Racially and Socially Diverse Peers on Attitudes and Behaviors," *American Economic Review*, 96 (2006), 1890–1906.
- Carney, Dana R., Brian A. Nosek, Anthony G. Greenwald, and Mahzarin R. Banaji, "The Implicit Association Test (IAT)," in *Encyclopedia of Social Psychology*, Roy Baumeister and Kathleen Vohs, eds. (Thousand Oaks, CA: Sage, 2007).
- Chattopadhyay, Raghavendra, and Esther Dufo, "Women as Policy Makers: Evidence from a Randomized Policy Experiment in India," *Econometrica*, 72 (2004), 1409–1443.
- Coate, Stephen, and Glenn Loury, "Will Affirmative-Action Policies Eliminate Negative Stereotypes?" *American Economic Review*, 83 (1993), 1220–1240.
- Dahlerup, Drude, *Women, Quotas and Politics* (New York: Routledge, 2006).
- Dasgupta, Nilanjana, and Shaki Asgari, "Seeing Is Believing: Exposure to Counterstereotypic Women Leaders and Its Effect on the Malleability of Automatic Gender Stereotyping," *Journal of Experimental Social Psychology*, 40 (2004), 642–658.
- Deaux, Kay, and Tim Emswiller, "Explanations of Successful Performance on Sex-linked Tasks: What Is Skill for the Male Is Luck for the Female," *Journal of Personality and Social Psychology*, 29 (1974), 80–85.
- Dufo, Esther, and Petia Topalova, "Unappreciated Service: Performance, Perceptions, and Women Leaders in India," Mimeo, MIT, 2004.
- Eagly, Alice H., and Steven J. Karau, "Role Congruity Theory of Prejudice toward Female Leaders," *Psychological Review*, 109 (2002), 573–598.
- Goldberg, Philip, "Are Women Prejudiced against Women?" *Transaction*, 5 (1968), 28–30.
- Goldin, Claudia, "A Pollution Theory of Discrimination: Male and Female Occupations and Earnings," NBER Working Paper No. 8985, 2002.
- Goldin, Claudia, and Cecilia Rouse, "Orchestrating Impartiality: The Impact of 'Blind' Auditions on Female Musicians," *American Economic Review*, 90 (2000), 715–741.
- Government of West Bengal, *The West Bengal Panchayat (Constitution) Rules, 1975*, Department of Panchayats & Rural Development (1998).
- Greenwald, Anthony G., Debbie McGhee, and Jordan L. K. Schwartz, "Measuring Individual Differences in Implicit Cognition: The Implicit Association Test," *Journal of Personality and Social Psychology*, 75 (1998), 1464–1480.

- Greenwald, Anthony, Mahzarin Banaji, and Brian Nosek, "Understanding and Using the Implicit Association Test: I. An Improved Scoring Algorithm," *Journal of Personality and Social Psychology*, 85 (2003), 197–216.
- Hoffmann, Wilhelm, Bertram Gawronski, Tobias Gschwendner, Huy Le, and Manfred Schmitt, "A Meta-Analysis on the Correlation between the Implicit Association Test and Explicit Self-Report Measures," *Personality and Social Psychology Bulletin*, 31 (2005), 1369–1385.
- Huddy, Leonie, and Nayda Terkildsen, "Gender Stereotypes and the Perception of Male and Female Candidates," *American Journal of Political Science*, 37 (1993), 119–147.
- Imbens, Guido, and Paul Rosenbaum, "Robust, Accurate Confidence Intervals with a Weak Instrument: Quarter of Birth and Education," *Journal of the Royal Statistical Society*, 168 (2004), 109–126.
- Jones, Mark, "Quota Legislation and the Election of Women: Learning from the Costa Rican Experience," *Journal of Politics*, 66 (2004), 1203–1223.
- Karpinski, Andrew, and James Hilton, "Attitudes and the Implicit Association Test," *Journal of Personality and Social Psychology*, 81 (2001), 774–788.
- Keller, Stanley, and Thad Mirer, "The Simple Act of Voting," *American Political Science Review*, 68 (1974), 572–591.
- Kling, Jeffrey, Jeffrey Liebman, and Lawrence Katz, "Experimental Analysis of Neighborhood Effects," *Econometrica*, 15 (2007), 83–119.
- Krook, Mona, *Politicizing Representation: Campaigns for Candidate Gender Quotas Worldwide*, Ph.D. dissertation (New York: Columbia University, 2005).
- Matland, Richard E., "Putting Scandinavian Equality to the Test: An Experimental Evaluation of Gender Stereotyping of Political Candidates in a Sample of Norwegian Voters," *British Journal of Political Science*, 24 (1994), 273–292.
- Munshi, Kaivan, and Mark Rosenzweig, "The Efficacy of Parochial Politics: Caste, Commitment, and Competence in Indian Local Governments," Mimeo, Brown University, 2008.
- Nosek, Brian, Mahzarin Banaji, and Anthony Greenwald, "Harvesting Implicit Group Attitudes and Beliefs from a Demonstration Web Site," *Group Dynamics: Theory, Research and Practice*, 6 (2002), 101–115.
- Nosek, Brian, Anthony Greenwald, and Mahzarin Banaji, "The Implicit Association Test at Age 7: A Methodological and Conceptual Review," in *Automatic Processes in Social Thinking and Behavior*; John A. Bargh, ed., 265–292 (New York: Psychology Press, 2007).
- Olson, Michael, and Russel Fazio, "Reducing the Influence of Extrapersonal Associations on the Implicit Association Test: Personalizing the IAT," *Journal of Personality and Social Psychology*, 86 (2004), 653–667.
- Powley, Elizabeth, "Rwanda: The Impact of Women Legislators on Policy Outcomes Affecting Children and Families," Background Paper, State of the World's Children, 2007.
- Rooth, Dan Olof, "Implicit Discrimination in Hiring: Real World Evidence," IZA Discussion Paper 2764, 2007.
- Rosenbaum, Paul, "Observational Studies and Nonrandomized Experiments," *Handbook of Statistics*, 13 (1996), 181–197.
- Rothermund, Klaus, and Dirk Wentura, "Underlying Processes in the Implicit Association Test (IAT): Dissociating Salience from Associations," *Journal of Experimental Psychology: General*, 133 (2004), 139–165.
- Rudman, Laurie, and Kimberly Fairchild, "Reactions to Counterstereotypic Behavior: The Role of Backlash in Cultural Stereotype Maintenance," *Journal of Personality and Social Psychology*, 87 (2004), 157–176.
- Thernstrom, Stephan, and Abigail Thernstrom, *America in Black and White: One Nation, Indivisible* (New York: Simon and Schuster, 1997).
- UNIFEM, *Progress of World's Women* (New York: United Nations, 2008).
- Weisberg, Herbert, "A Multidimensional Conceptualization of Party Identification," *Political Behavior*, 2 (1980), 33–96.