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Source: *Econometrica*, Vol. 72, No. 5 (Sep., 2004), pp. 1409-1443

Published by: The Econometric Society

Stable URL: <http://www.jstor.org/stable/3598894>

Accessed: 28-06-2018 12:29 UTC

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## WOMEN AS POLICY MAKERS: EVIDENCE FROM A RANDOMIZED POLICY EXPERIMENT IN INDIA

BY RAGHABENDRA CHATTOPADHYAY AND ESTHER DUFLO<sup>1</sup>

This paper uses political reservations for women in India to study the impact of women's leadership on policy decisions. Since the mid-1990's, one third of Village Council head positions in India have been randomly reserved for a woman: In these councils only women could be elected to the position of head. Village Councils are responsible for the provision of many local public goods in rural areas. Using a dataset we collected on 265 Village Councils in West Bengal and Rajasthan, we compare the type of public goods provided in reserved and unreserved Village Councils. We show that the reservation of a council seat affects the types of public goods provided. Specifically, leaders invest more in infrastructure that is directly relevant to the needs of their own genders.

KEYWORDS: Gender, decentralization, affirmative action, political economy.

### 1. INTRODUCTION

RELATIVE TO THEIR SHARE IN THE POPULATION, women are under-represented in all political positions. In June 2000, women represented 13.8% of all parliament members in the world, up from 9% in 1987. Compared to economic opportunities, education, and legal rights, political representation is the area in which the gap between men and women has narrowed the least between 1995 and 2000 (Norris and Inglehart (2000)). Political reservations for women are often proposed as a way to rapidly enhance women's ability to participate in policymaking. Quotas for women in assemblies or on parties' candidate lists are in force in the legislation of over 30 countries (World Bank (2001)), and in the internal rules of at least one party in 12 countries of the European Union (Norris (2001)).

Reservation policies clearly have a strong impact on women's representation,<sup>2</sup> and there is evidence that women and men have different policy preferences (Lott and Kenny (1999) and Edlund and Pande (2001)). This does not

<sup>1</sup>We thank Daron Acemoglu, Abhijit Banerjee, Timothy Besley, Anne Case, Mihir Ghosh Dastidar, Angus Deaton, Marie Lajus, Steve Levitt, Rohini Pande, and Emmanuel Saez for discussions, Prasad Chakraborty and Mihir Ghosh Dastidar for organizing and supervising the data collection in West Bengal, Callie Scott and Annie Duflo for organizing the data collection in Rajasthan, Lucia Breierova, Shawn Cole, and Jonathan Robinson for excellent research assistance, and the editor as well as four anonymous referees for very useful comments on previous drafts. We also thank the National Institute of Health (through grant RO1HD39922-01), Alfred P. Sloan Foundation, and the John D. and Catherine MacArthur Foundation for financial support. Chattopadhyay thanks the Institute for Economic Development at Boston University for its hospitality.

<sup>2</sup>See Jones (1998) for a study of the Argentinian case, and Norris (2001) for the impact of reservation in the Labour Party in the United Kingdom. Women's representation fell from 25% to 7% in Eastern Europe when gender quotas were eliminated during the transition from Communism (World Bank (2001)).

necessarily imply, however, that women's reservation has an impact on policy decisions. In a standard median voter model (e.g., Downs (1957)), where candidates can commit to a specific policy and have electoral motives, political decisions reflect the preferences of the electorate. Alternatively, in a Coasian world, even if the reservation policy increases women's bargaining power, only transfers to women should be affected; the efficient policy choices will still be made, and women will be compensated with direct transfers.

However, despite the importance of this issue for the design of institutions, very little is known about the causal effect of women's representation on policy decisions. The available evidence, based on cross-sectional comparison, is difficult to interpret, because the fact that women are better represented in a particular country or locality may reflect the political preferences of the group that elects them. The correlation between policy outcomes and women's participation then may not imply a causal effect from women's participation.<sup>3</sup>

Furthermore, even if we knew more about the causal effect of women's representation, this knowledge would not necessarily extend to the effects of quotas or other mechanisms to enforce greater participation of women in the political process. Ensuring women's representation through quotas may change the nature of political competition and thus have direct effects. For example, it may lower the average competence in the pool of eligible candidates, alter voter preferences for political parties, or increase the number of politicians that are new in office.

This paper studies the policy consequences of mandated representation of women by taking advantage of a unique experiment implemented recently in India. In 1993, an amendment to the constitution of India required the States both to devolve more power over expenditures to local village councils (Gram Panchayats, henceforth GPs) and to reserve one-third of all positions of chief (Pradhan) to women. Since then, most Indian States have had two Panchayat elections (Bihar and Punjab had only one, in 2001 and 1998 respectively), and at least one-third of village representatives are women in all major States except Uttar Pradesh, where only 25% of the village representatives are women (Chaudhuri (2003)). We conducted a detailed survey of all investments in local public goods in a sample of villages in two districts, Birbhum in West Bengal and Udaipur in Rajasthan, and compared investments made in reserved and unreserved GPs. As GPs were randomly selected to be reserved for women, differences in investment decisions can be confidently attributed to the reserved status of those GPs.

<sup>3</sup>For example, Dollar, Fisman, and Gatti (2001) find a negative correlation between representation of women in parliaments and corruption. Does this mean women are less corrupt, or that countries that are less corrupt are also more likely to elect women to parliament? Besley and Case (2000) show that worker compensation and child support enforcement policies are more likely to be introduced in states where there are more women in parliament, after controlling for state and year fixed effects. But they explicitly recognize that the fraction of women in parliament may be a proxy for women's involvement in politics, more generally.

The results suggest that reservation affects policy choices. In particular, it affects policy decisions in ways that seem to better reflect women's preferences. The gender preferences of men and women are proxied by the types of formal requests brought to the GP by each gender. In West Bengal, women complain more often than men about drinking water and roads, and there are more investments in drinking water and roads in GPs reserved for women. In Rajasthan, women complain more often than men about drinking water but less often about roads, and there are more investments in water and less investment in roads in GPs reserved for women.

We exploit specific features of the reservation legislation to further investigate whether the effects on public good provisions can be attributed to the gender of the Pradhan, rather than to other consequences of reserving seats. We specifically investigate whether the results can be explained by the fact that women are inexperienced, that they may perceive themselves as being less likely to be re-elected, and that they tend to come from more disadvantaged backgrounds than men. We do not find any evidence that the impact of reservation is driven by features other than the gender of the Pradhan.

These results thus indicate that a politician's gender does influence policy decisions. More generally, they provide new evidence on the political process. In particular, they provide strong evidence that the identity of a decision maker does influence policy decisions. This provides empirical support to political economy models that seek to enrich the Downsian model (Alesina (1988), Osborne and Slivinski (1996), and Besley and Coate (1997)). The results are consistent with previous evidence by Levitt (1996), which shows that U.S. Senators' votes do not reflect either the wishes of their constituency or that of their party, and by Pande (2003), who shows that in Indian States where a larger share of seats is reserved for minorities in the State Legislative Assembly, the level of transfers targeted towards these minorities is also higher. Our paper presents the advantage of being based on a randomized experiment, where identification is entirely transparent.

The remainder of this paper proceeds as follows: Section 2 describes the political context and the policy. Section 3 presents a simple model, based on the "citizen candidate" model of Osborne and Slivinski (1996) and Besley and Coate (1997), which outlines the possible effect of the reservation system. Section 4 discusses the data collection and the empirical strategy. Section 5 presents the central results of the paper: the difference in public goods provisions in reserved and unreserved GPs. Section 6 presents robustness checks. Section 7 concludes.

## 2. THE POLICY AND DESIGN OF THE STUDY

### 2.1. *The Panchayat System*

The Panchayat is a system of village level (Gram Panchayat), block level (Panchayat Samiti), and district level (Zilla Parishad) councils, members of



which are elected by the people, and are responsible for the administration of local public goods. Each Gram Panchayat (GP) encompasses 10,000 people in several villages (between 5 and 15). The GPs do not have jurisdiction over urban areas, which are administered by separate municipalities. Voters elect a council, which then elects among its members a Pradhan (chief) and an Upa-Pradhan (vice-chief).<sup>4</sup> Candidates are generally nominated by political parties, but have to be residents of the villages they represent. The council makes decisions by majority voting (the Pradhan does not have veto power). The Pradhan, however, is the only member of the council with a full-time appointment.

The Panchayat system has existed formally in most of the major states of India since the early 1950's. However, in most states, the system was not an effective body of governance until the early 1990's. Elections were not held, and the Panchayats did not assume any active role (Ghatak and Ghatak (2002)). In 1992, the 73rd amendment to the Constitution of India established throughout India the framework of a three-tiered Panchayat system with regular elections. It gave the GP primary responsibility in implementing development programs, as well as in identifying the needs of the villages under its jurisdiction. Between 1993 and 2003, all major states but two (Bihar and Punjab) have had at least two elections. The major responsibilities of the GP are to administer local infrastructure (public buildings, water, roads) and identify targeted welfare recipients. The main source of financing is still the state, but most of the money which was previously earmarked for specific uses is now allocated through four broad schemes: The Jawhar Rozgar Yojana (JRY) for infrastructure (irrigation, drinking water, roads, repairs of community buildings, etc.); a small additional drinking water scheme; funds for welfare programs (widow's, old age, and maternity pensions, etc.); and a grant for GP functioning.<sup>5</sup> The GP has, in principle, complete flexibility in allocating these funds. At this point, the GP has no direct control over the appointments of government paid teachers or health workers, but in some states (Tamil Nadu and West Bengal, for example), there are Panchayat-run informal schools.

The Panchayat is required to organize two meetings per year, called "Gram Samsad." These are meetings of villagers and village heads in which all voters may participate. The GP council submits the proposed budget to the Gram Samsad, and reports on their activities in the previous six months. The GP leader also must set up regular office hours where villagers can lodge complaints or requests.

In West Bengal, the Left Front (communist) Government gained power in 1977 on a platform of agrarian and political reform. The major political reform

<sup>4</sup>In Rajasthan, the chief is called a Sarpanch. In this paper, we will use the terminology "Pradhan" for both States.

<sup>5</sup>According to the balance sheets we could collect in 40 GPs in West Bengal, the JRY accounts for 30% of total GP income, the drinking water scheme 5%, the welfare programs 15%, the grant for GP functioning 33%, and the GP's own revenue for 8%. GPs can also apply for some special schemes—a housing scheme for SC/ST, for example.

was to give life to a three-tiered Panchayat electoral system. The first election took place in 1978 and elections have taken place at five-year intervals ever since. Thus, the system that was put into place by the 73rd Amendment all over India was already well established in West Bengal. Following the Amendment, the GP was given additional responsibilities in West Bengal. In particular, they were entrusted to establish and administer informal education centers (called SSK), an alternative form of education for children who do not attend school (an instructor who is not required to have any formal qualification teaches children three hours a day in a temporary building or outdoors).

In Rajasthan, unlike West Bengal, there was no regularly elected Panchayat system in charge of distribution of state funds until 1995. The first election was held in 1995, followed by a second election in 2000. Since 1995, elections and Gram Samsads have been held regularly, and are well attended. This setting is thus very different, with a much shorter history of democratic government. As in West Bengal, the Panchayat can spend money on local infrastructure, but unlike West Bengal, they are not allowed to run their own schools.

## *2.2. Reservation for Women*

In 1992, the 73rd Amendment provided that one-third of the seats in all Panchayat councils, as well as one-third of the Pradhan positions, must be reserved for women. Seats and Pradhan's positions were also reserved for the two disadvantaged minorities in India, scheduled castes (SC) and scheduled tribes (ST), in the form of mandated representation proportional to each minority's population share in each district. Reservations for women have been implemented in all major states except Bihar and Uttar Pradesh (which has only reserved 25% of the seats to women).

In West Bengal, the Panchayat Constitution Rule was modified in 1993, so as to reserve one-third of the councilor positions in each GP to women; in a third of the villages in each GP, only women could be candidates for the position of councilor for the area. The proportion of women elected to Panchayat councils increased to 36% after the 1993 election. The experience was considered a disappointment, however, because very few women (only 196 out of 3,324 GPs) advanced to the position of Pradhan, which is the only one that yields effective power (Kanango (1998)). To conform to the 73rd amendment, the Panchayat Constitution Rule of West Bengal was again modified in April 1998 (Government of West Bengal (1998)) to introduce reservation of Pradhan positions for women and SC/ST. In Rajasthan, the random rotation system was implemented in 1995 and in 2000 at both levels (council members and Pradhans).

In both states, a specific set of rules ensures the random selection of GPs where the office of Pradhan was to be reserved for a woman. All GPs in a district are ranked in consecutive order according to their serial legislative

number (an administrative number pre-dating this reform). They are then ranked in three separate lists, according to whether or not the seats were reserved for a SC, for a ST, or were unreserved (these reservations were also chosen randomly, following a similar method). Using these lists, every third GP starting with the first on the list is reserved for a woman Pradhan for the first election.<sup>6</sup>

From discussions with the government officials at the Panchayat Directorate who devised the system and district officials who implemented it in individual districts, it appears that these instructions were successfully implemented. More importantly, in the district we study in West Bengal, we could verify that the policy was strictly implemented. After sorting the GPs into those reserved for SC/ST and those not reserved, we could reconstruct the entire list of GPs reserved for a woman by sorting all GPs by their serial number, and selecting every third GP starting from the first in each list. This verifies that the allocation of GPs to the reserved list was indeed random, as intended.<sup>7</sup>

Table I shows the number of female Pradhans in reserved and unreserved GPs in both states. In both states, all Pradhans in GPs reserved for a woman are female. In West Bengal, only 6.5% of the Pradhans are female in unreserved GPs. In Rajasthan, only one woman was elected on an unreserved seat, despite the fact that this was the second cycle. Women elected once due to the reservation system were not re-elected.<sup>8</sup>

TABLE I  
FRACTION OF WOMEN AMONG PRADHANS IN RESERVED  
AND UNRESERVED GP

	Reserved GP (1)	Unreserved GP (2)
<i>West Bengal</i>		
Total Number	54	107
Proportion of Female Pradhans	100%	6.5%
<i>Rajasthan</i>		
Total Number	40	60
Proportion of Female Pradhans	100%	1.7%

<sup>6</sup>For the next election, every third GP starting with the second on the list was reserved for a woman, etc. The Panchayat Constitution Rule has actual tables indicating the ranks of the GPs to be reserved in each election.

<sup>7</sup>We could not obtain the necessary information to perform the same exercise in Rajasthan. However, there too, the system appears to have been correctly implemented.

<sup>8</sup>The one woman elected on an unreserved seat had not been previously elected on a reserved seat.

### 3. THEORY

#### 3.1. *Model*

In this section, we analyze the possible effects of the reservation policy in a representative democracy. We use the framework developed in Osborne and Slivinski (1996) and Besley and Coate (1997), where the elected representatives are “citizen candidates.” Citizen candidates cannot commit to specific policy platforms. Once elected, politicians will try to implement their preferred policy option. However, citizens know other citizens’ preferences and can influence the final political outcome through their choice of whom to elect. Citizens decide whether or not to run for office by trading off the probability of being elected (and getting to implement their favorite outcomes) against a fixed cost of running for election.

This framework is well suited to analyzing decentralized policymaking in India since it is reasonable to assume that citizens in a Gram Panchayat know each other well. In addition, a rationale for reservation in favor of women can be introduced very naturally, by recognizing that women have a much higher cost of running for office than men. These higher costs can prevent the participation of women in the political process in the absence of reservation; consequently, reservations can have a real effect on the decisions taken if women and men have different preferences over which public goods to provide.<sup>9</sup>

Everyone is eligible to vote and to stand as a candidate. The village elects an individual who will implement a policy, chosen in the interval  $[0, 1]$ . Each citizen has a preferred policy option  $\omega_i$ , and women and men have different policy preferences. Specifically, we assume that women’s preferences are distributed over the interval  $[0, W]$ , and men’s preferences are distributed over the interval  $[M, 1]$ .<sup>10</sup>

As in Osborne and Slivinski (1996) and Besley and Coate (1997), the political game has three stages. Citizens first decide whether or not to run. The cost of running for women,  $\delta_w$ , is greater than the cost of running for men,  $\delta_m$ . This seems to be a very realistic assumption: In rural areas in India (at least in the two states we are studying in this paper), literate women (who can run for

<sup>9</sup>Pande (2003) develops an alternative model to analyze the possible impact of the reservation of a share of seats to SC/ST in state legislative assemblies in India. The argument is that candidates are fielded by political parties, where minorities are under-represented relative to their share in the population, which in turn leads to an under-representation of SC/ST among legislators, in the absence of reservation. The present model seems better suited to the description of local democracy, and avoids assumptions on the objective functions of political parties.

<sup>10</sup>Women’s and men’s distributions can overlap—that is, we can have  $M < W$ . While, as shown below, we do seem to observe gender-based differences in tastes for public goods, the assumption that men’s and women’s preferences are neatly ordered in this linear fashion is, of course, quite extreme. However, relaxing this assumption would not change the qualitative nature of our results.

office) come from lower middle class backgrounds, where it is frowned upon for a woman to work outside their home, let alone to campaign or serve in public office (for example, Hindu women in Udaipur generally observe *Purdah*, and keep their face covered in public). Citizens then elect a candidate (as in Besley and Coate (1997), we will assume that voting is strategic), and finally the policy is implemented. During a given period of time, the candidate decides each period which decision to take. The utility of citizen  $i$  if outcome  $x_j$  is implemented is  $-|x_j - \omega_i|$  if citizen  $i$  was not a candidate, and  $-|x_j - \omega_i| - \delta_i$  if citizen  $i$  was a candidate.

Where our model departs from the basic models by Besley and Coate and Osborne and Slivinski is in the assumption that the policy that is finally implemented is a mixture of the preferred policy option of the elected candidate, and a policy option  $\mu'$ , preferred by the local elite (as against just what the candidate wants). This can reflect the “capture” of decentralized government by the local elite, modelled for example in Bardhan and Mookherjee (2000) and Besley and Coate (2001). An alternate, more positive view of this process is that the elected official is subject to the control of the village assembly or the elected council.<sup>11</sup> Under both interpretations, it is plausible that  $\mu'$  would be more “pro-male” than the median voter’s preference, since the local elite tend to be male, and men are also more likely to attend village meetings than women. Therefore, this is what we will assume. Formally our assumption is that the candidate’s preferences are given a weight  $\alpha$ , so the policy finally implemented by the elected citizen  $j$  is  $x_j = \alpha w_j + (1 - \alpha)\mu'$ . This formalization gives us an intuitive choice for the default decision, implemented if no one decides to run.<sup>12</sup> In this case, the decision is  $\mu'$ , and citizen  $i$ ’s utility is  $-|\mu' - \omega_i|$ . Initially, we will assume that  $\alpha$  is constant across elected candidates. We will also assume that  $\mu' > m$ , the median voter’s preferred outcome. Citizens know that the policy that will eventually be implemented will be influenced by the lobbying process, and they take this into account when they cast their vote.

### 3.2. *Analysis of the Model*

Despite the fact that voters are completely informed and vote strategically in this model (in particular, they correctly anticipate that the decision of the elected citizen will reflect *ex post* lobbying), the outcome that is finally implemented may not reflect the preference of the median voter, for several reasons.

<sup>11</sup>There is evidence of both phenomena in the districts we study. First, bigger and richer villages receive more public goods per capita than smaller villages, presumably because they have the means to lean on the Panchayat leader. Also, in village meetings, there are instances of groups trying to make sure they are getting the public goods they want, as well as of citizens complaining that the allocations of goods favor politically more powerful people.

<sup>12</sup>Of course, in practice, there is always a candidate. However, it is not infrequent that Pradhans are perceived as being a cover for someone else. There is even an expression to designate a Pradhan who is in fact a dummy for a lobbying group: a “shadow Pradhan.”

First, as in Besley and Coate (1997), there may be an equilibrium with two candidates who, if elected, will implement decisions that are symmetric around the median voter, but relatively far away from the median voter's preferred position. With strategic voting, it may be impossible for a third candidate to enter in the middle and win.<sup>13</sup> Second, and specific to this model, parameters may be such that, without reservation, there is no equilibrium where a woman is a candidate. In this case, the outcome that will be implemented in equilibrium will be to the right of  $M$ , the most "pro-female" outcome preferred by a man. Moreover, if the preferences of men and women do not overlap substantially, if the preferences of the lobbies (or the village meeting) are sufficiently biased towards male preferences, or if the power of the lobbies is sufficiently strong, it is fully possible that *any* policy outcome will be to the right of the median voter's preferred outcome. By inducing women to run, the reservation policy moves to the left of the range of outcomes that can be implemented in equilibrium. This will tend to improve women's utility, and, because the median voter's policy may now be included in the range of policies that can be implemented in equilibrium, this may also improve the utility of the median voter. The intuition for this result is that the influence of the lobbies tends to moderate women (since they start from the left of the median voter), while it makes men more extreme.

In this section, we first analyze women's decision to run for office when there is no reservation. We then derive the conditions under which the reservation policy unambiguously improves the welfare of the median female voter, and that of the median voter.

As most people who have analyzed a model of this class, we restrict the analysis to pure strategy equilibria where no more than three candidates run. Under mild assumptions, this also implies that there is no equilibria with more than two candidates.<sup>14</sup> All the proofs are in the Appendix.

The first proposition gives the conditions under which, without reservation, women will not run.

**PROPOSITION 1:** *If the following conditions hold, there is no equilibrium where a woman runs in the absence of reservation:*

- (i)  $\delta_w - .5 * \delta_m > \mu' - m$ ;
- (ii)  $\delta_w > m - (1 - \alpha)\mu'$ .

<sup>13</sup>Osborne and Slivinski (1996) show that this would not be true with sincere voting, which would be defined here as voting for the person who, after the influence of the lobbying, would implement the outcome that the citizen preferred. In this case, two candidates cannot be too far apart.

<sup>14</sup>Formally, Besley and Coate (1997) show that there are no equilibria with exactly three candidates if citizens abstain whenever they are indifferent between all candidates, and that Assumption I (nonclumping) holds: For any interval  $I$  of the policy space  $[0, 1]$ , if there exists an interval  $I'$  of smaller length that contains the ideal point of at least one-third of the citizens, the interval  $I$  must contain the ideal point of at least one citizen. They cannot rule out equilibria with more than three candidates.

The first condition is the condition under which no woman runs unopposed. The intuition is that when the cost of running is high for women, only women with strong pro-women preferences will want to run. But if the cost of running is low for a man, a man can then enter and win for sure. If the second condition is satisfied, no woman agrees to run against a man: The two candidates must have equal chances of winning, and thus the outcome they will implement must be symmetric around the median voter. Under this condition, the distance between the outcomes implemented by the two most extreme candidates symmetric among the median voter is too small to compensate even the most extreme woman's cost of running.

Of course, there is no guarantee that a woman would run once there is reservation. The following lemma states the condition under which no woman agrees to run even after reservation.

**LEMMA 1:** *If  $\delta_w > \alpha\mu'$ , there is no equilibrium in which a candidate runs under the reservation regime.*

Basically, if the cost of running is too high for women, or if the power of elected officials is low, even the women with the most extreme preferences would prefer the default option to what she can get by running and winning the election. The fact that no one runs may decrease the utility of the median voter: if a candidate had been running before the reservation, but no candidate is running now, the outcome after reservation may be further away from the preferences both of the female voters and the median voter. Reservation replaces representative democracy with lobbying. Proposition 2 makes this point.

**PROPOSITION 2:** *If  $\delta_w > \alpha\mu'$ ,  $\mu' - [\alpha M + (1 - \alpha)\mu'] \geq \delta_m$  and  $\mu' > \max(m + .5\delta_m, 2m - [\alpha M + (1 - \alpha)\mu'])$ , the reservation leads to an unambiguous loss in the utility of the median voter and that of women.*

By contrast, when women run because of the reservation, reservation can lead to an unambiguous increase in women's utility and the median voter's utility. The conditions under which this is true are given in Proposition 3.

**PROPOSITION 3:** *If  $\mu' - (1 - \alpha)\mu' \geq \delta_w$ , and the conditions in Proposition 1 are satisfied, so that no woman runs without a reservation system, then the reservation system:*

- (i) *always increases the utility of the median female voter if  $\mu' - [\alpha M + (1 - \alpha)\mu'] \geq \min(m + .5\delta_w, \alpha W + (1 - \alpha)\mu', \mu' - \delta_w)$ ;*
- (ii) *always increases the utility of the median voter and of the median female voter if condition (i) is satisfied and, in addition,  $\mu' - [\alpha M + (1 - \alpha)\mu'] > 2m - \max((1 - \alpha)\mu', (m - .5\delta_w))$ .*

The first condition ensures that the most "pro-woman" outcomes implemented by a man are to the right of the most "pro-man" outcomes

implemented by a woman. If this condition is not satisfied, the reservation may or may not increase the utility of the median female voter, depending on which equilibrium is chosen before and after the reservation system.

If the overlap between men's and women's preferences is not large, and if lobbying power is important (but not so important that women refuse to run altogether), reservation will unambiguously improve the median woman's utility. The median voter's utility will also improve if the moderation induced by electoral tactics (or the *ex post* lobbying) implies that the most pro-woman outcome that can be implemented after the reservation is not so left wing that it is further away from the median voter than the outcome implemented by a man (which is ensured by the second condition). A key insight here is that the existence of unbalanced *ex post* lobbying, over a range, increases the value of reserving seats for women. The reason is that the reservation gives the voters a chance to elect citizens (women) who were not running previously, and whose preferences counteract the pressure of the lobbies.

Finally, suppose that the conditions in Proposition 1 do not hold: Then there are equilibria with women running without reservation (either opposed or unopposed) before the reservation, and introducing a reservation system does not necessarily lead to an improvement in the utility of the median voter or an improvement in the utility of the median female voter.

What this analysis makes clear is that reservation can affect the policy outcome. *Any* post-reservation policy outcome is different from *any* pre-reservation outcome if  $\delta_w > \alpha\mu'$  and  $\mu' - [\alpha M + (1 - \alpha)\mu'] \geq \delta_m$  (no woman runs without reservation, whereas a man runs without reservation) or if the conditions in Proposition 1 are satisfied, and condition (i) in Proposition 3 is satisfied (in which case the policy implemented with reservation is unambiguously to the left of the policy implemented without reservation). Moreover, even when it is not possible to state that *any* equilibrium will generally be different with reservation, the *range* of equilibria that can be implemented will generally be different with and without reservation.<sup>15</sup> Moreover, if there are enough women who are willing to run, reservation will typically move policies in a pro-woman direction, or at least decrease the difference between what is adopted and what women want. More surprisingly, reservation may make the median voter in the entire population (who may be male) better off by providing a counterweight to *ex post* lobbying.

That said, the model has a number of obvious and important limitations. First, if  $\mu'$  reflects *ex post* lobbying by ordinary citizens, it could itself be influ-

<sup>15</sup>There are only two cases in which the range stays the same. First, if the parameters are such that women were running before reservation when they were unopposed, but not if they were opposed (condition (i) in Proposition 1 violated, and condition (ii) satisfied), then the range of policies that can be implemented is  $[m - .5\delta_w; m + .5\delta_w]$  both with and without reservations. Second, if women were running against men without reservation and  $(1 - \alpha)\mu' > 2m - \alpha W - (1 - \alpha)\mu'$ , then the feasible range of policies is  $[(1 - \alpha\mu'); 2m - (1 - \alpha\mu')]$  both before and after reservation.



enced by the reservation. For example, when the Pradhan is a woman, it might become easier for women to try to influence the policy process *ex post* (by lobbying or by attending the meetings). This would move  $\mu'$  to the left, and would reinforce the results in the previous section: women's reservation will move policy in a pro-woman direction.

Second, it assumes that all candidates have the same ability to impose their preferred policies (what we call  $\alpha$ ). Suppose we now allow  $\alpha$  to differ across people. It is easy to see that in this case the only women who will run before the reservation policies will tend to be strong women (high  $\alpha$ ). Further, men running before the reservation policies will tend to be strong men (to be elected, they have to be strong enough for the outcomes they implement to be reasonably close to what the median voter wants, even after lobbying). After the reservation, however, relatively weak women with a strong pro-women bias are as likely to be candidates as strong women with more moderate preferences, and both will implement similar policies. Candidates' characteristics are thus endogenous to the system of reservation; controlling for endogenous characteristics without controlling for preferences (which are unobserved) may therefore lead to biased estimates of the effect of the reservation policy. In specification checks, we will nevertheless be able to control for differences in some of these characteristics by using exogenous variation in candidates' characteristics generated by the reservation policies.

Third, the model ignores many other possible effects of the reservation system. In particular, it does not consider the possibility of strategic behavior on the part of the elected official, which would occur if there was a future election. Thus, it ignores possible effects of the model on incentives, which would arise naturally if we embedded this model in a several-period model. In this model, when Proposition 1 holds, women will return to not running when their GPs rotate away from the set of reserved GPs. They thus face different incentives than men who will be allowed to run again. On the other hand, men who are elected on seats that are reserved in the next election face a term limit. We will present estimates that directly control for different dynamic incentives, using exogenous variation generated by rotation in the reservation system.

### 3.3. *Testing the Empirical Predictions*

The most robust prediction of the model, which sets it in contrast with a Downsian or Coasian model of the political process, or with a model in which the Panchayat is entirely directed by the bureaucracy, is that policy outcomes are likely to differ in GPs that are reserved for women. To test this, we will simply compare the type of goods provided in reserved and unreserved areas and perform robustness checks to confirm that the difference seems to be due to the gender of the reserved Pradhans.

More specifically, the model predicts that, in some cases, policy outcomes will be closer to what women want than to what men want. To test this feature of the model, we need measures of the average preferences of women and

men. One possible approach would be to derive women's and men's preferences from a model of gender roles in the household. If the households are not unitary and cannot commit to excluding the policy environment in their bargaining, women and men will prefer policies that are likely to affect their bargaining power or the price of the goods they consume, and thus have different policy preferences. Women will thus prefer programs that increase women's opportunity (such as public works programs where they can be employed) or their productivity on their tasks (such as having a drinking water source next to their house), while men will prefer programs that improve men's opportunity and productivity. This is the approach in Foster and Rosenzweig (2002), who construct a model that predicts the preferences of the poor versus the rich, and then test when public goods allocation better reflects the needs of the poor than the needs of the rich. Another approach would be to ask men and women what their preferences are, an approach often conducted in political science. This approach has the drawback that individuals may be reporting socially acceptable preferences.

The approach we use here is to use the data on formal requests and complaints that are brought to the Pradhan. Since complaining is costly (the individual has to come to the GP office), the complaints are a reasonable measure of the preferences of the individuals, if the individuals assume that complaining will have an effect. A simple way of integrating the possibility of costly communication into our model is to build it into the lobbying outcome  $\mu'$ , so far assumed to be exogenously given.

Specifically, assume that the policy the Pradhan is implementing is in fact a series of binary policy decisions (a choice between two goods). Before every decision, a villager chosen at random gets a chance to convey to the leader his preference over the choice that the village faces in this specific period. Assume that villagers cannot lie. If a villager chooses to speak, he has to face a cost  $b_i$ , which differs across individuals. If the leader received no signal, the probability that he chooses to implement 1 is a weighted average of his own preferred policy (with a weight  $\alpha$ ) and his prior belief of what the villagers' preferred policy is. If the leader received a signal, his prior will be influenced by the signal. Specifically, assume the leader's prior is .5, and that he gives a weight  $\beta$  to his prior, and  $1 - \beta$  to the signal. Then an individual  $i$  will choose to convey his signal if and only if  $.5(1 - \alpha)(1 - \beta) \geq b_i$ .

In this very simple model, the probability of complaining depends only on the cost of complaining for an individual, not on the signal received or on the intensity of the individual's preferences (which only predicts how likely it is that the individual will prefer one of the outcomes in a specific period). Thus, the frequency of complaints of a specific type among a group of people is an unbiased estimate of the underlying distribution of preferences in this group. In practice, we do not observe 0 or 1 signals, but instead a series of complaints about different types of goods (drinking water, roads, irrigation, schools, etc.). If in every period, the Pradhan must decide between two goods and the individual who gets a chance to express his opinion can request one or the other

or none, the frequency at which a good appears is an unbiased estimate of the frequency at which this good is preferred to every other good (weighted by the probability that a pair of goods appears together). The difference

$$D_i = \left( \frac{n_i^w}{N^w} - \frac{n_i^m}{N^m} \right)$$

is thus a measure of the strength of the difference between women's and men's preferences for a particular good and the average

$$S_i = \frac{1}{2} \left( \frac{n_i^w}{N^w} + \frac{n_i^m}{N^m} \right)$$

is a measure of the strength of the preference in the aggregate population (i.e., men and women together) for the good, if we assume that there is an equal share of men and women.

In this model,  $D_i$  and  $S_i$  are not themselves affected by the reservation policy. Of course, this model might be too simple, and in general, they may themselves be outcomes of the reservation policy. If people report their preference  $\omega_i$  (instead of a discrete number) to the Pradhan, the distribution of who decides to complain will depend both on the preferences of the Pradhan, as well as on the preferences of the individual who gets a chance to communicate in a given period. The higher the cost, the more polarized the preferences will be that the request will reflect. Analyzing this communication game is beyond the scope of this paper and is the subject of Banerjee and Somanathan (2001). If women have a higher cost of speaking than men, for example, women's complaints will thus be more biased towards extreme preferences.<sup>16</sup> Men may express an opinion on just about anything, while women will speak only about relevant trade-offs. If there are specific goods that are on average more important, women's complaints may then be more skewed towards these goods than men's complaints. To this extent,  $D_i$  measures women's preferences with error, which should attenuate the results. The simplifying assumption (that the nature of the complaint does not depend on the intensity of preferences) is, however, testable if the cost of complaining is affected by reservation (we will show it is, since there are many more complaints by women in reserved GPs). In this case, if the assumption is not satisfied, there will be a difference in the frequency of requests for the different types of investments in reserved and unreserved GPs.

In the model, allocations are more closely aligned to women's needs in reserved GPs because of the selection of women candidates and potentially because of the reduction in the cost of speaking for women (which moves

<sup>16</sup>Women are indeed likely to have a higher cost of complaining in this context, given the social norms that limit their mobility (and hence the possibility of attending meetings, if they are conducted at night, for example) and the conditions under which they can speak to a man. Indeed, we will show that women are less likely to attend village meetings than men.

$\mu'$  to the left), but not because women are more responsive to the complaints of women (or to complaints in general). This differentiates it from a model where women make different decisions because they are more responsive to women's complaints, more altruistic—as the experimental literature suggests (e.g., Eckel and Grossman (1998))—less corrupt (Dollar, Fisman, and Gatti (2001)), on their best behavior because they know they are part of a social experiment, or simply more susceptible to lobbying. To test this, we will test whether, in reserved GPs, the Pradhan reacts more to the specific complaints expressed in this village (by women, in particular) than in unreserved GPs.

#### 4. DATA COLLECTION AND EMPIRICAL STRATEGY

##### 4.1. *Data Collection*

We collected data in two locations: Birbhum in West Bengal and Udaipur in Rajasthan.

In the summer of 2000, we conducted a survey of all GPs in the district of Birbhum, West Bengal. Birbhum is located in the western part of West Bengal, about 125 miles from the state capital, Calcutta. At the time of the 1991 census, it had a population of 2.56 million. Agriculture is the main economic activity, and rice is the main crop cultivated. The male and female literacy rates were 50% and 37%, respectively. The district is known to have a relatively well-functioning Panchayat system.

There are 166 GPs in Birbhum, of which five were reserved for pre-testing, leaving 161 GPs in our study. Table II shows the means of the most relevant village variables collected by the 1991 census of India in reserved and unreserved GPs, and their differences. As expected, given the random selection of GPs, there are no significant differences between reserved and unreserved GPs, and the differences are jointly insignificant. Note that very few villages (3% among the unreserved GPs) have tap water, the most common sources of drinking water being hand-pumps and tube-wells. Most villages are accessible only by a dirt road. Ninety-one percent of villages have a primary school, but very few have any other type of school. Irrigation is important: 43% of the cultivated land is irrigated, with at least some land being irrigated in all villages. Very few villages (8%) have any public health facility.

We collected the data in two stages. First, we conducted an interview with the GP Pradhan. We asked each one a set of questions about his or her family background, education, previous political experience, and political ambitions, as well as a set of questions about the activities of the GP since his or her election in May 1998 (with support from written records). We then completed a survey of three villages in the GP: Two villages randomly selected in each GP, as well as the village in which the GP Pradhan resides. During the village interview, we drew a resource map of the village with a group of 10 to 20 villagers. The map featured all the available infrastructure in the village, and we asked whether each of the available equipment items had been built

TABLE II  
VILLAGE CHARACTERISTICS IN RESERVED AND UNSERVED GP, 1991 CENSUS

Dependent Variables	West Bengal			Rajasthan		
	Mean, Reserved GP (1)	Mean, Unreserved GP (2)	Difference (3)	Mean, Reserved GP (4)	Mean, Unreserved GP (5)	Difference (6)
Total Population	974 (60)	1022 (46)	-49 (75)	1249 (123)	1564 (157)	-315 (212)
Female Literacy Rate	.35 (.01)	.34 (.01)	.01 (.01)	.05 (.01)	.05 (.01)	.00 (.01)
Male Literacy Rate	.57 (.01)	.58 (.01)	-.01 (.01)	.28 (.02)	.26 (.02)	.03 (.03)
% Cultivated Land that Is Irrigated	.45 (.03)	.43 (.02)	.02 (.04)	.05 (.01)	.07 (.01)	-.02 (.02)
Dirt Road	.92 (.02)	.91 (.01)	.01 (.02)	.40 (.08)	.52 (.07)	-.11 (.10)
Metal Road	.18 (.03)	.15 (.02)	.03 (.03)	.31 (.07)	.34 (.06)	-.04 (.10)
Bus Stop or Train Station	.31 (.04)	.26 (.02)	.05 (.04)	.40 (.08)	.43 (.07)	-.03 (.10)
Number of Public Health Facilities	.06 (.01)	.08 (.01)	-.02 (.02)	.29 (.08)	.19 (.06)	.10 (.10)
Tube Well Is Available	.05 (.03)	.07 (.02)	-.02 (.07)	.02 (.02)	.03 (.02)	-.01 (.03)
Handpump Is Available	.84 (.04)	.88 (.03)	-.04 (.05)	.90 (.05)	.97 (.02)	-.06 (.05)
Wells	.44 (.07)	.47 (.04)	-.02 (.08)	.93 (.04)	.91 (.04)	.01 (.06)
Tap Water	.05 (.03)	.03 (.02)	.01 (.03)	.12 (.05)	.09 (.04)	.03 (.06)
Number of Primary Schools	.95 (.07)	.91 (.03)	.04 (.08)	.93 (.09)	1.16 (.10)	-.23 (.15)
Number of Middle Schools	.05 (.01)	.05 (.01)	.00 (.01)	.43 (.08)	.33 (.07)	.10 (.10)
Number of High Schools	.09 (.01)	.10 (.01)	-.01 (.02)	.14 (.06)	.07 (.04)	.07 (.07)
<i>F</i> -Statistics: Difference Jointly Significant ( <i>p</i> -value)			.93 (.53)			1.54 (.11)

Notes: 1. There are 2120 observations in the West Bengal regressions, and 100 in the Rajasthan regressions. 2. Standard errors, corrected for clustering at the GP level in the West Bengal regressions, are in parentheses.

or repaired since May 1998. Previous experience of one of the authors, as well as experimentation during the pre-testing period, suggested that this method yields extremely accurate information about the village. We then conducted an additional interview with the most active participants of the mapping exercise, in which we asked in more detail about investments in various public goods. We also collected minutes of the village meetings, and asked whether women and men of the village had expressed complaints or requests to the GP in the previous six months. For all outcomes for which it was possible, we collected the same information at both the GP level and at the village level. The village level information is likely to be more reliable, because it is not provided by the Pradhan, and because it was easy for villagers to recall investments made in their village in the previous two years. However, the information given by the GP Pradhan refers to investment in the entire GP, and is thus free from sampling error. Therefore, when an outcome is available at both levels, we perform the analysis separately for both and compare the results.

Between August 2002 and December 2002 (after a first draft of this paper was completed), we collected the same village-level data (there was no Pradhan interview) in 100 hamlets in Udaipur, Rajasthan, chosen randomly from a subset of villages covered by a local NGO.<sup>17</sup> The reference period for asking about investment was also two years, 2000–2002. In Rajasthan, there was no regularly elected Panchayat system until 1995. Table II displays the characteristics of reserved and unreserved villages in our sample.<sup>18</sup> Udaipur is a much poorer district than Birbhum. It is located in an extremely arid area with little irrigation and has male and female literacy rates of 27.5% and 5.5% respectively. Because the villages are bigger, they are more likely to have a middle school, a health facility, and a road connection, compared to villages in West Bengal. As in West Bengal, we see no significant difference between the characteristics of reserved and unreserved villages before the reservation policy was implemented.

#### 4.2. *Empirical Strategy*

Thanks to the randomization built into the policy, the basic empirical strategy is straightforward. The reduced form effect of the reservation status can be obtained by comparing the means of the outcomes of interest in reserved and unreserved GPs. Note that this reduced form difference is not an estimate of

<sup>17</sup>Rajasthani villages are much more spread out than West Bengali villages (a Rajasthani village covers an area on average ten times bigger than a West Bengali village) and are much less densely populated. They are made of a series of independent “hamlets,” which are not administrative entities but function as independent villages. Our sampling unit is the hamlet: We first sampled 100 villages (with probability of selection weighted by village size) and then one hamlet per village (again, the probability of selection was weighted by village size).

<sup>18</sup>For Udaipur, we could not obtain the data necessary to match villages to Panchayat in the entire district.

the comparison between a system with reservation and a system without reservation. The policy decisions in unreserved GPs can be different than what they would have been if there was no reservation whatsoever. They will be different, for example, in the presence of dynamic incentives. What we are trying to estimate is the effect of being reserved for a woman, rather than not reserved, *in a system where there is reservation*.

Denoting  $Y_{ij}$  as the value of the outcome of interest for good  $i$  (say, investment in drinking water between 1998 and 2000) and  $R_j$  as a dummy equal to 1 if the GP is reserved for a woman, this is simply:

$$E[Y_{ij}|R_j = 1] - E[Y_{ij}|R_j = 0].$$

In the village-level regressions in West Bengal, the standard errors are adjusted for possible correlation within GP using the Moulton correction (Moulton (1986)).<sup>19</sup> We run village-level regressions using only the data for the two villages we selected randomly since the Pradhan's villages are not random and may be selected differently in reserved and unreserved GPs.

Since all the reserved GPs have a female Pradhan, and only very few of the unreserved GPs do, this reduced form coefficient is very close to the coefficient that one would obtain by using the reservation policy as an instrument for the Pradhan's gender.<sup>20</sup> We will therefore focus on the reduced form estimates, which are directly interpretable as the effect of the reservation policy. These estimates are the central results of the paper.

We then construct a standardized investment measure for the different categories of goods in both samples by subtracting the mean in the unreserved sample from the actual measure and then dividing this difference by the standard deviation in the unreserved sample. This generates variables whose scale can be compared across goods. We then run the following regressions to test the proposition that, in reserved GPs, there is more investment in goods mentioned more frequently by women:

$$(1) \quad Y_{ij} = \beta_1 + \beta_2 * R_j + \beta_3 D_i * R_j + \sum_{l=1}^N \beta_l d_{il} + \epsilon_{ij}$$

and

$$(2) \quad Y_{ij} = \beta_4 + \beta_5 * R_j + \beta_6 S_i * R_j + \sum_{l=1}^N \beta_l d_{il} + \epsilon_{ij},$$

<sup>19</sup>The outcomes we consider are jointly determined, since they are linked by a budget constraint. However, because the regressor ( $R$ ) is the same in all outcome equations, a joint estimation of the system of equations would produce coefficients and standard errors numerically identical to OLS estimation equation by equation.

<sup>20</sup>The instrumental variable estimate would simply be the reduced form estimate scaled up by a factor of 1.075 (the ratio of the reduced form effect and the difference in the probability that a woman is elected in reserved vs. unreserved GPs).

where  $d_{il}$  are good-specific dummies,  $D_i$  is the average difference between the fraction of requests about good  $i$  from women and from men, and  $S_j$  is the average fraction of requests across men and women. We expect  $\beta_3 \geq 0$  and potentially  $\beta_6 \geq 0$ .

Finally, we will test whether the difference in policy comes from greater responsiveness of women Pradhans to complaints expressed by women in a specific village by running the regression:

$$(3) \quad Y_{ij} = \beta_7 + \beta_8 * R_j + \beta_9 D_i * R_j + \beta_{10} D_{ij} * R_j + \beta_{11} S_{ij} * R_j + \beta_{12} S_{ij} \\ + \beta_{13} D_{ij} + \sum_{l=1}^N \beta_l d_{il} + \epsilon_{ij},$$

where  $D_{ij}$  is the difference between an indicator for whether issue  $i$  was brought by women in village  $j$  and an indicator for whether issue  $i$  was brought by men in village  $j$ , and  $S_{ij}$  is the sum of these two indicators. We expect  $\beta_{10} = 0$  and  $\beta_{11} = 0$  if the village specific complaints are drawn from a distribution of preferences common to the district and if, as our model assumes, the policy affects the outcome through the selection of a Pradhan with specific preferences.

Women elected as Pradhans differ from men in many dimensions. In particular, they are much more likely to be new leaders, and they are probably less likely to be re-elected in the next election.<sup>21</sup> The reduced form estimates capture all of these potential effects. As we noted earlier, controlling for Pradhan's characteristics (like poverty, previous experience, size of the village of origin of the Pradhan, etc.) can be misleading, since the Pradhan's characteristics are endogenous to the reservation system. We will nevertheless present these estimates and show that the results are unchanged. A very interesting feature of the experiment, however, is that it is possible to disentangle the effect of gender *per se* from these other effects of reserving electoral seats to specific groups, using only exogenous random variation generated by the policy. For the West Bengal sample, we collected additional data to perform these specification checks, which are described and implemented in Section 6.

## 5. RESULTS

### 5.1. *Effects on the Political Participation of Women*

Table III displays the effect of having a woman Pradhan on the political participation of women. In West Bengal, the percentage of women among participants in the Gram Samsad is significantly higher when the Pradhan is a woman (increasing from 6.9% to 9.8%). Since reservation does not affect the

<sup>21</sup>Recall that the reservation rotates: seats that were reserved in 1998 will not be reserved again in 2003.



TABLE III  
EFFECT OF WOMEN'S RESERVATION ON WOMEN'S POLITICAL PARTICIPATION

Dependent Variables	Mean, Reserved GP (1)	Mean, Unreserved GP (2)	Difference (3)
<i>West Bengal</i>			
Fraction of Women Among Participants in the Gram Samsad (in percentage)	9.80 (1.33)	6.88 (.79)	2.92 (1.44)
Have Women Filed a Complaint to the GP in the Last 6 Months	.20 (.04)	.11 (.03)	.09 (.05)
Have Men Filed a Complaint to the GP in the Last 6 Months	.94 (.06)	1.00	.06 (.06)
Observations	54	107	
<i>Rajasthan</i>			
Fraction of Women Among Participants in the Gram Samsad (in percentage)	20.41 (2.42)	24.49 (3.05)	-4.08 (4.03)
Have Women Filed a Complaint to the GP in the Last 6 Months	.64 (.07)	.62 (.06)	.02 (.10)
Have Men Filed a Complaint to the GP in the Last 6 Months	.95 (.03)	.88 (.04)	.073 (.058)
Observations	40	60	

Notes: 1. Standard errors in parentheses. 2. Standard errors are corrected for clustering at the GP level in the West Bengal regressions, using the Moulton (1986) formula.

percentage of eligible voters attending the Gram Samsad, this corresponds to a net increase in the participation of women, and a decline in the participation of men. This is consistent with the idea that political communication is influenced by the fact that citizens and leaders are of the same sex. Women in villages with a reserved Pradhan are twice as likely to have addressed a request or a complaint to the GP Pradhan in the last 6 months, and this difference is significant.<sup>22</sup> The fact that the Pradhan is a woman therefore significantly increases the involvement of women in the affairs of the GP in West Bengal.

In Rajasthan, the fact that the Pradhan is a woman has no effect on women's participation at the Gram Samsad or the occurrence of women's complaints. Note that women participate more in the Gram Samsad in Rajasthan, most probably because the process is very recent, and the GP leaders are trained to mobilize women in public meetings.<sup>23</sup>

<sup>22</sup>In the subsample of villages in which we conducted follow-up surveys, we also asked whether men had brought up any issue in the previous six months. In all cases but one (a reserved GP), they had.

<sup>23</sup>Interestingly, women's participation is significantly higher when the position of council member of the village is reserved for a woman (results not reported to conserve space). This difference is probably due to the very long distance between villages in Rajasthan.

### 5.2. Requests of Men and Women

Table IV shows the fraction of formal requests made by villagers to the Panchayat in the six months prior to the survey by type of good.<sup>24</sup>

In West Bengal, drinking water and roads were by far the issues most frequently raised by women. The next most important issue was welfare programs, followed by housing and electricity. In Rajasthan, drinking water, welfare programs, and roads were the issues most frequently raised by women. The issues most frequently raised by men in West Bengal were roads, irrigation, drinking water, and education. With the exception of irrigation, men have the same priorities in Rajasthan. A chi-square test rejects the hypothesis that the distributions of men's and women's complaints are the same (at less than 1% in West Bengal, and 9% in Rajasthan). Note that this pattern of revealed preferences is expected, in view of the activities of both men and women in these areas. Women are in charge of collecting drinking water, and they are the primary recipients of welfare programs (maternity pension, widow's pension, and old age pension for the destitute, who tend to be women). In West Bengal, they are the main source of labor employed on the roads. In Rajasthan, both men and women work on roads, and the employment motive is therefore common. However, men travel very frequently out of the villages in search of work, while women do not travel long distances; accordingly, men have a stronger need for good roads.

In columns (5) and (11), we report the average across men and women of the fraction of complaints related to infrastructure ( $S_i$  in the model) in West Bengal and Rajasthan, respectively.<sup>25</sup> In columns (6) and (12), we report the difference between the fraction of issues raised by women and the fraction of issues raised by men ( $D_i$  in the model). If the model is correct, we would expect more investments in drinking water and roads in reserved GPs in West Bengal, less investment in roads in Rajasthan, and less investment in education and irrigation in West Bengal.<sup>26</sup>

In columns (1) and (2) (for West Bengal), and (7) and (8) (for Rajasthan), we present the distribution of complaints in reserved and unreserved GPs. A chi-square test does not reject that they are drawn from the same distribution (and the point estimates are also very similar in West Bengal, where we have a difference in the number of women who complain). Our assumption that the intensity of preferences does not determine whether someone will communicate her preferences therefore seems to be satisfied.

<sup>24</sup>We recorded the exact complaint or request: For example, the need to repair a specific well. We classified them ex post into these categories. In West Bengal, we had initially not asked about issues raised by men: A random subset of 48 villages was subsequently resurveyed later.

<sup>25</sup>These are the goods that are linked together by a budget constraint for the Panchayat, and therefore where we should see a trade-off.

<sup>26</sup>There are no Panchayat-run schools in Rajasthan.

TABLE IV  
ISSUES RAISED BY WOMEN AND MEN IN THE LAST 6 MONTH

	West Bengal						Rajasthan					
	Women			Men			Women			Men		
	Reserved (1)	Unreserved (2)	All (3)	Reserved (4)	Unreserved (5)	All (6)	Reserved (7)	Unreserved (8)	All (9)	Reserved (10)	Unreserved (11)	All (12)
<i>Other Programs</i>												
Public Works	.84	.84	.84	.85	.84	-.01	.60	.64	.62	.87	.74	-.26
Welfare Programs	.12	.09	.10	.04	.07	.06	.25	.14	.19	.03	.04	.16
Child Care	.00	.02	.01	.01	.01	.00	.04	.09	.07	.01	.02	.06
Health	.03	.04	.04	.02	.03	.02	.06	.08	.07	.04	.03	.03
Credit or Employment	.01	.01	.01	.09	.05	-.08	.06	.06	.05	.04	.09	.01
Total Number of Issues	153	246	399	195			72	88	160	155		
<i>Breakdown of Public Works Issues</i>												
Drinking Water	.30	.31	.31	.17	.24	.13	.63	.48	.54	.43	.49	.09
Road Improvement	.30	.32	.31	.25	.28	.06	.09	.14	.13	.23	.18	-.11
Housing	.10	.11	.11	.05	.08	.05	.02	.04	.03	.04	.04	-.01
Electricity	.11	.07	.08	.10	.09	-.01	.02	.04	.03	.02	.02	.01
Irrigation and Ponds	.02	.04	.04	.20	.12	-.17	.02	.02	.02	.04	.03	-.02
Education	.07	.05	.06	.12	.09	-.06	.02	.07	.05	.13	.09	-.09
Adult Education	.01	.00	.00	.01	.00	.00	0	0	.00	.00	.00	.00
Other	.09	.11	.10	.09	.09	.01	.19	.21	.20	.12	.28	.05
Number of Public Works Issues	128	206	334	166			43	56	99	135		
<i>Public Works</i>												
Chi-square	8.84		71.72				7.48		16.38			
p-value	.64		.00				.68		.09			

Notes: 1. Each cell lists the number of times an issue was mentioned, divided by the total number of issues in each panel. 2. The data for men in West Bengal comes from a subsample of 48 villages. 3. Chi-square values placed across two columns test the hypothesis that issues come from the same distribution in the two columns.

### 5.3. *Effects of the Policy on Public Goods Provision*

Table V presents the effects of the Pradhan's gender on all public good investments made by the GP since the last election in West Bengal and in Rajasthan. As we aggregated investments in categories, these regressions reflect all the data we collected on public good investments.

Both in West Bengal and in Rajasthan, the gender of the Pradhan affects the provision of public goods. In both places, there are significantly more investments in drinking water in GPs reserved for women. This is what we expected, since in both places, women complain more often than men about water. In West Bengal, GPs are less likely to have set up informal schools (in the village, this is significant only at the 10% level) in GPs reserved for women. Interestingly, the effect of reservation on the quality of roads is opposite in Rajasthan and in West Bengal: In West Bengal, roads are significantly better in GPs reserved for women, but in Rajasthan, this is the opposite. This result is important since it corroborates expectations based on the complaint data for men and women. The only unexpected result is that we do not find a significant effect of reservation for women on irrigation in West Bengal. The differences between investments in reserved and unreserved GP are jointly significant. In West Bengal, we run the same regression for GP-level investments (instead of village-level). The results, presented in panel B, are entirely consistent, and the effect on informal schooling is significant at the 5% level in the GP-level regression.

These results suggest that the reservation policy has important effects on policy decisions at the local level. These effects are consistent with the policy priorities expressed by women.

In Table VI, we present estimates of equations (1) and (2) for both states, which are a convenient way to summarize these results.<sup>27</sup> Columns (1) and (6) show that, in both states, on average, the provision of public goods is indeed more closely aligned to the preferences of women than to those of men; if the difference between the frequency at which a specific request occurs for women and men is 10%, the provision of that good increases by .16 standard deviations in West Bengal, and .44 standard deviations in Rajasthan. Columns (2) and (7) show that in both states the decisions taken by women also end up reflecting more closely the issues that are relevant to villagers.<sup>28</sup>

Our model posits that women are no more sensitive to women's complaints per se than to men's complaints. This implies that public goods allocation

<sup>27</sup>The good-specific equation with the variable expressed in standard deviation leads to exactly the same conclusions as the level equations. They are thus omitted to save space.

<sup>28</sup>The model makes no prediction about the extent to which political decisions will reflect female preferences, conditional average preferences, and vice versa. However it is interesting to note that when both variables are entered in the regression simultaneously, the coefficient of  $D_i$  remains significant at the 10% level in both states (the coefficient (standard error) of the interaction  $D_i * R$  is .44 (.24) in West Bengal and 3.89 (2.18) in Rajasthan). The coefficient of the sum loses significance (result omitted from the table to save space).

TABLE V  
EFFECT OF WOMEN'S RESERVATION ON PUBLIC GOODS INVESTMENTS

Dependent Variables	West Bengal			Rajasthan		
	Mean, Reserved GP (1)	Mean, Unreserved GP (2)	Difference (3)	Mean, Reserved GP (4)	Mean, Unreserved GP (5)	Difference (6)
<i>A. Village Level</i>						
Number of Drinking Water Facilities	23.83 (5.00)	14.74 (1.44)	9.09 (4.02)	7.31 (.93)	4.69 (.44)	2.62 (.95)
Newly Built or Repaired	.41 (.05)	.23 (.03)	.18 (.06)	.90 (.05)	.98 (.02)	-.08 (.04)
Condition of Roads (1 if in good condition)	.06 (.02)	.12 (.03)	-.06 (.04)			
Number of Panchayat Run Education Centers	3.01 (.79)	3.39 (.8)	-.38 (1.26)	.88 (.05)	.90 (.04)	-.02 (.06)
Number of Irrigation Facilities	1.66 (.49)	1.34 (.23)	.32 (.48)	.19 (.07)	.14 (.06)	.05 (.09)
Other Public Goods (ponds, biogas, sanitation, community buildings)			4.15 (.001)			2.88 (.02)
Test Statistics: Difference Jointly Significant ( <i>p</i> -value)						
<i>B. GP Level</i>						
1 if a New Tubewell Was Built	1.00	.93 (.02)	.07 (.03)			
1 if a Metal Road Was Built or Repaired	.67 (.06)	.48 (.05)	.19 (.08)			
1 if There Is an Informal Education Center in the GP	.67 (.06)	.82 (.04)	-.16 (.07)			
1 if at Least One Irrigation Pump Was Built	.17 (.05)	.09 (.03)	.07 (.05)			
Test Statistics: Difference Jointly Significant ( <i>p</i> -value)			4.73 (.001)			

Notes: 1. Standard errors in parentheses. 2. In West Bengal, there are 322 observations in the village level regressions, and 161 in the GP level regressions. There are 100 observations in the Rajasthan regressions. 3. Standard errors are corrected for clustering at the GP level in the village level regressions, using the Moulton (1986) formula, for the West Bengal regressions.

TABLE VI  
OLS REGRESSIONS: DETERMINANTS OF PUBLIC GOOD PROVISION

	West Bengal			Rajasthan					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Reserved for a Woman	.23 (.101)	-.17 (.123)	.00 (.159)	.18 (.136)	.17 (.111)	.16 (.115)	-.29 (.19)	.04 (.16)	.16 (.118)
Reserved * $D_i$	1.63 (.501)		1.22 (.799)	1.56 (.629)	1.67 (.554)	4.40 (1.454)		4.66 (1.6)	4.29 (1.491)
Reserved * $S_i$		2.04 (.642)					1.78 (.728)		
Reserved * $D_{(ij)}$ (village level)			.03 (.047)					-.37 (.169)	
Reserved * $S_{(ij)}$ (village level)			-.01 (.155)					.05 (.27)	
Pradhan is New									
Pradhan is New * $D_i$					-.09 (.079)				
Reservation in 2003					-.10 (.323)				
Reservation in 2003 * $D_i$					.03 (.093)				
Reserved for SC/ST					-.19 (.326)				
Reserved for SC/ST * $D_i$					-.07 (.075)				.00 (.18)
$D_{(ij)}$	No	No	Yes	No	No	No	No	Yes	No
$S_{(ij)}$	No	No	Yes	No	No	No	No	Yes	No
Pradhan's Characteristics	No	No	No	Yes	No	No	No	No	No
Pradhan's Characteristics * $D_i$	No	No	No	Yes	No	No	No	No	No

Notes: 1. The dependent variable is a standardized measure of investment in each good. There are six types of goods in West Bengal (drinking water, roads, informal education, formal education, irrigation, others) and four types of goods in Rajasthan (drinking water, roads, formal education, others). 2. Standard errors (corrected for clustering at the GP level using Moulton (1986) in West Bengal) are in parentheses below the coefficients. 3. The regressions include a good-specific fixed effect. 4. The variables  $D_i$ ,  $S_i$ ,  $D_{(ij)}$ , and  $S_{(ij)}$  are defined in the text:  $D_i$  is the relative strength of women's preference for good  $i$  in the district;  $S_i$  is the average strength of preference in the district;  $D_{(ij)}$  is the difference of indicators for whether good  $i$  was mentioned by women and men in village  $j$ ;  $S_{(ij)}$  is the sum of the indicators for whether good  $i$  was mentioned by women and men in village  $j$ . 5. Pradhan characteristics include all variables in Table VII. 6. There are 323 village level observations in West Bengal, and 100 village level observations in Rajasthan.

should not be more responsive to the difference between women's and men's requests in reserved areas than the difference in nonreserved areas. We can also test whether they are more sensitive to complaints in general (which would be the case if  $\alpha$  was made endogenous). The results of estimating equation (3) are presented in columns (3) and (8). Controlling for the average preference of women in the district ( $D_i$  and  $D_i * R_j$ ), there are not more investments in goods about which women have complained more often in a specific village in GPs reserved to women (the coefficient of  $D_{ij} * R_j$  is not significant). There are also not more investments in goods about which both men and women have complained more often in GPs that are headed by women (the coefficient of  $S_{ij} * R_j$  is not significant).<sup>29</sup> Individual women are thus not particularly more responsive to the needs of women and men in their communities. Rather, it is because their own preferences are more aligned to the preferences of women that they end up serving them better. This also alleviates the concern that the effect may be temporary because women are on their "best behavior" because they are conscious of being part of a social experiment.

#### 6. ROBUSTNESS CHECKS: CONTROLLING FOR OTHER EFFECTS OF RESERVATIONS

Even though the differences in public goods provision seem to be aligned with the differences in revealed preferences—the switch in the coefficient on roads between Rajasthan and West Bengal is especially suggestive that this is related to preferences—the results we have discussed so far could potentially be attributed to other characteristics of the newly elected women.

Table VII presents the characteristics of Pradhans in reserved and unreserved constituencies in West Bengal.<sup>30</sup> Female Pradhans are significantly less educated and less likely to be literate. They also come from a more disadvantaged background: They are more likely to be officially classified as being below the poverty line, and they own fewer durable household goods.<sup>31</sup> They come from smaller villages than men. Our interviewers are more likely to report that female Pradhans are shy in answering questions.

Female Pradhans have less political experience prior to the 1998 election. Eighty-nine percent of women (and 57% of men) holding reserved positions had not been elected to any Panchayat position and most had not even participated in any Panchayat activity. None of them had served as Pradhan (12% of

<sup>29</sup>The coefficient of the interaction between the difference in women's and men's complaints and the indicator for reservation for women loses significance in West Bengal, but this is because this regression is run in a much smaller sample. In West Bengal, men's complaints were asked about only in 48 GPs. In Rajasthan, the coefficient does not change and stays significant.

<sup>30</sup>We do not have the comparable data for Rajasthan.

<sup>31</sup>We asked whether the Pradhan's household owned a television, had electricity in the home, had a telephone, a bicycle, a motorcycle, and a car. The durable goods variable is simply the sum of all of these variables.

TABLE VII  
PRADHAN'S CHARACTERISTICS IN RESERVED AND UNSERVED GP (WEST BENGAL)

Dependent Variables	West Bengal		
	Mean, Reserved GP (1)	Mean, Unreserved GP (2)	Difference (3)
<i>A. Pradhan's Background</i>			
Age	31.87 (1.08)	39.72 (.87)	-7.85 (1.45)
Years of Education	7.13 (.48)	9.92 (.29)	-2.79 (.54)
Literacy	.80 (.06)	.98 (.01)	-.19 (.04)
Married	.89 (.04)	.87 (.03)	.02 (.06)
Number of Children	2.45 (.20)	2.50 (.15)	-.05 (.26)
Below Poverty Line	.46 (.07)	.28 (.04)	.18 (.08)
Number of Household Assets	1.72 (.18)	2.36 (.14)	-.64 (.23)
Population of Pradhan's Own Village	1554 (204)	2108 (179)	-554 (291)
Hesitates when Answering the Questions (interviewer's impression)	.75 (.06)	.41 (.05)	.34 (.08)
<i>B. Pradhan's Political Aspirations and Experience</i>			
Was Elected to the GP Council Before 1998	.11 (.04)	.43 (.05)	-.32 (.07)
Was Elected Pradhan Before 1998	.00	.12 (.03)	-.12 (.04)
Took Part in Panchayat Activities Prior to Being Elected	.28 (.06)	.78 (.04)	-.50 (.07)
Knew How GP Functioned	.00	.35 (.05)	-.35 (.07)
Did Not Receive any Formal Training	.06 (.03)	.00	.06 (.02)
Spouse ever Elected to the Panchayat	.17 (.05)	.02 (.01)	.15 (.04)
Spouse Helps	.43 (.07)	.13 (.03)	.30 (.07)
Will Not Run Again	.33 (.06)	.21 (.04)	.13 (.07)
<i>C. Pradhan's Political Party</i>			
Left Front	.69 (.06)	.69 (.04)	-.01 (.08)
Right (Trinamul or BJP)	.19 (.05)	.18 (.04)	.01 (.06)
Observations	54	107	

Note: 1. Standard errors, corrected for clustering at the GP level using the Moulton (1986) formula, are in parentheses.



the men had). Women Pradhans are only slightly less likely to have received any training than men Pradhans, which reflects the government's efforts to train the new Pradhan and councilors elected under the reservation rule (Kanango (1998)). They are more likely to be helped by their spouse (43% of the women in reserved positions report that they are helped by their spouse, compared with 13% of the men). Seventeen percent are the spouse of a former Panchayat councilor or Pradhan. The worry that women may be their husband's proxy is thus not without foundation. Women are also more likely to claim that they will not run again. Finally, the reservation policy does not seem to affect party affiliation: The percentage of Pradhans in each political group is identical in reserved and unreserved GPs.

While some of these differences are mechanical (there are very few women with any experience, for example), these results suggest that there may be endogenous selection of weaker Pradhans in reserved areas, as the model suggested may happen.

In column (4) of Table VI, we control for all the Pradhan's characteristics listed in Table VII,<sup>32</sup> interacted with the relative strength of women's preferences on each good. The coefficient of the interaction between woman's reservation and the intensity of women's preference remains unchanged, and is still significant. The coefficients of the control variables are not reported to save space, but none of the interactions between the control variables and the relative female preferences are significant.<sup>33</sup> This is *prima facie* evidence that the results are not driven by Pradhan's characteristics other than gender (class, inexperience, lack of political ambition, etc.). These results fit with the prediction of our model, that the policy outcome should not be affected by the endogenous weakness of the Pradhan. The final policy outcomes are all the villagers use for selection, and the same policy outcomes will be achieved by selecting a weak woman with strong pro-women views or a strong woman with more moderate views.

The reservation system also allows us to control for exogenous differences between men and women; the interaction of different reservation rules generates exogenous variation in experience, desire to run again, and social status, of which we take advantage now in West Bengal.<sup>34</sup>

<sup>32</sup>Namely, Pradhan literacy, marital status, number of children, whether the household is below the poverty line, number of assets in the households, population of the Pradhan's village, whether the Pradhan hesitates when answering questions, previous experience as Pradhan or in the Panchayat, whether they knew what the function entailed before being elected, whether they have been trained, whether the spouse is elected as Pradhan, whether the spouse helps the Pradhan, and whether they plan to run again.

<sup>33</sup>The *F*-statistics for the joint significance of the interaction between the control variables and the relative female preferences is .93 and the *p*-value is .53.

<sup>34</sup>In Rajasthan, we did not collect the necessary data to run this test. The only test we could run (restricting the sample to places reserved for SC and ST) is not very informative, since over 85% of the places are reserved for ST. Obviously, the results are not affected.

### 6.1. *Women as New Pradhans*

The lack of experience could have a direct influence on the investments made by men and women: Inexperienced Pradhans may have a hard time achieving their objectives. On the other hand, they may be more energetic and want to start new projects. They may also favor starting new projects, rather than continuing existing projects.

There is a random subset of unreserved GPs where the Pradhan is always new in office. Individuals may run for a council seat only in the village in which she or he resides. Once elected, the councilors choose one of them to be Pradhan. As part of the reservation scheme, one-third of council seats (identified by village) were reserved for women: Thus, if the previous Pradhan was a man, and the seat of councilor was reserved for a woman in the 1998 election, we can be sure that the Pradhan for that GP will be new to office since the previous Pradhan will not be allowed to run again. We can therefore compare investments in GPs reserved for women to those in GPs that are not reserved, but where the councilor's seat of the previous Pradhan is reserved. Clearly, this does not fully control for the Pradhan's experience: even new Pradhans could be experienced politicians.

These results are presented in column (2) of Table VIII (for comparison, column (1) reproduces the results for the entire sample). In this subsample, all Pradhans are elected for the first time. Men are, nevertheless, more experienced politicians: they are still more likely than women to have served in the GP council before, but the difference is now smaller (.24 instead of .32 in the entire sample).

None of the results on public goods provision are affected. In particular, the point estimate of the coefficient of the interaction between woman's reservation and the difference between men's and women's complaints remains unchanged. This suggests that the effect that reservation for women has on policy cannot entirely be attributed to the fact that these women are new Pradhans.

### 6.2. *Women as Lame Ducks*

Decisions may be affected by the fact that women know they may not want or be able to run again. In Rajasthan, in the second rotation of the reservation system, only one woman was elected in an unreserved seat. This is an indication that women's prospects outside of the reservation system are still not very bright.

We thus control for whether the Pradhan is likely to be re-elected in 2003. Every third GP starting with the second in the list will be reserved for a female Pradhan for the 2003 election. Pradhans in those GPs should realize that they will not be able to stand for re-election as Pradhan (if their particular seat is not reserved, they may still be able to run for a position as a member of the GP council). We therefore restrict the sample to GPs reserved in 1998 and those

TABLE VIII  
EFFECT OF WOMEN'S RESERVATION IN SELECTED SUBSAMPLES

	Difference Between GP Reserved for Women and Unreserved GP			
	All GPs (1)	Previous Pradhan Barred from Running for Re-election (2)	GP Will Be Reserved in 2003 (3)	GP Is Reserved for SC/ST (4)
<i>A. Pradhan's Background and Experience</i>				
Pradhan's Education	-2.79 (.54)	-2.58 (.68)	-3.31 (.61)	-2.65 (.86)
Number of Assets	-.64 (.23)	-.70 (.26)	-.60 (.26)	-.37 (.27)
Pradhan is Below the Poverty Line	.18 (.08)	.12 (.10)	.18 (.09)	.12 (.12)
Population of Pradhan's Village	-554 (291)	-482 (312)	-357 (349)	14 (381)
Elected in GP Council Before 1998	-.32 (.07)	-.24 (.08)	-.31 (.08)	-0.14 (.09)
Elected as Pradhan Before 1998	-.12 (.04)	.00 (.)	-0.08 (.04)	-0.02 (.03)
Will Not Run Again	.13 (.07)	.14 (.09)	.13 (.09)	.16 (.1)
<i>B. Women's Participation</i>				
Have Women Addressed a Complaint to the GP in the Last 6 Months	.09 (.05)	.10 (.06)	.11 (.06)	.10 (.06)
<i>C. Public Goods</i>				
Number of Drinking Water Facilities Newly Built or Repaired	9.09 (4.02)	8.44 (5.5)	10.14 (5.25)	10.59 (6.01)
Condition of Roads (1 if in good condition)	.18 (.06)	.21 (.07)	.21 (.06)	.25 (.08)
1 if There Is an Informal Education Center in the GP	-.16 (.07)	-.14 (.09)	-0.13 (.09)	-0.14 (.11)
<i>D. Relationship to Women's Needs</i>				
Coefficient of the Interaction Reserved for Woman * $D_i$	1.63 (.501)	1.63 (.469)	1.63 (.469)	1.54 (.595)

Notes: 1. Column 2 presents the difference between the mean of the dependent variable in GPs reserved for women and GPs where the previous Pradhan was prevented from re-election due to a reservation of his seat. There are 55 GPs (110 villages) reserved for women, and 51 GPs (102 villages) where the previous pradhan's seat is reserved. 2. Column 3 presents the difference between the mean of the dependent variable in GPs reserved for women and GPs that will be reserved for woman in 2003. There are 55 GPs (110 villages) reserved for women in 1998, and 52 GPs (146 villages) that will be reserved in 2003. 3. Column 4 presents the difference between the mean of the dependent variable in GPs reserved for a woman SC/ST and GPs reserved for a SC/ST. There are 78 GPs (146 villages) reserved for SC and ST, including 28 reserved for women as well. 4. Standard errors are in parentheses, and are corrected for correlation at the GP level in the village level regressions using the Moulton (1986) formula.

that will be reserved in 2003. Of course, this does not necessarily imply that the Pradhans themselves effectively realize that the position of Pradhan in this GP will be reserved for a woman in the next period. Moreover, men could have a longer time horizon than just the next election. In fact, Pradhans in GPs that will be reserved in 2003 are still more likely than women to say that they want to run for the GP council again (they can still be a candidate for the council as long as their seat is not reserved).

The results for all the public good outcomes and for equation (1) are essentially unaffected (column (3), Table VIII). With all the caveats mentioned above, this still suggests that the results are not driven by women's low re-election prospects.

### 6.3. *Social Status and Other Effects of Reservation*

It is also possible to control to some extent for these and other differences between men and women, in particular for the fact that women Pradhans tend to come from poorer families and smaller villages, using minority reservations. As we discussed in Section 2, positions of Pradhan were reserved for Scheduled Castes and Scheduled Tribes, proportional to their population in the district (34.5% and 11.5% respectively in West Bengal). The Panchayat Rules prescribe that the randomization for women be stratified: Among seats reserved for each group as well as among "general" seats, one-third must be randomly selected to be reserved for women. Since this policy was also enacted in 1998, most of the Pradhans in GPs reserved for SC and ST are new. Only 2% (one) of the male Pradhans in SC/ST GPs had previously served as Pradhan; 22% had served as GP members. The difference in the proportion of incumbents is thus much smaller (14%) than in the entire sample, and not statistically significant. Men are still more likely to say that they may run again. Importantly, among SC/ST Pradhans, women and men come from villages of the same size, and men are not significantly richer than women. Their economic background is thus very similar (men are, however, better educated). Irrespective of their gender, all SC/ST Pradhans are elected because of the quota system, most of them have no experience, and women and men share similar economic backgrounds.

In column (4) of Table VIII, we compare outcomes in GPs reserved for SC or ST. The results are very similar to what we found in all GPs. The fact that most results remain unchanged suggests that the difference in public good investments was a consequence of the Pradhan's gender.

To summarize these results, we introduce controls for these three variables (the previous Pradhan was prevented from running, the seat will be reserved in 2003, and the seat is reserved for SC or ST) and their interaction with the relative strength of women's preferences, in equation (1). The results are presented in column (5) of Table VI. The coefficient of the interaction between women's reservation and the relative preference of women for each good is unaffected and remains significant. The coefficients of the interactions between each of

the indicator variables and the relative preference of women for each good are small and insignificant.

## 7. CONCLUSION

Mandated representation of women has important effects on policy decisions in local government.

Women elected as leaders under the reservation policy invest more in the public goods more closely linked to women's concerns: drinking water and roads in West Bengal and drinking water in Rajasthan. They invest less in public goods that are more closely linked to men's concerns: education in West Bengal and roads in Rajasthan.

These results seem to be largely attributable to the effect of the policy on the gender of the Pradhan, rather than on its other effects; the results are unaffected when we control for the Pradhan's characteristics. Furthermore, results remain virtually identical in the subsample of GPs reserved for SC/ST when we compare GPs that will be reserved in 2003 to those that were reserved in 1998 and when we compare GPs reserved for women to those where the Pradhan is also new due to the reservation policy.

These results contradict the simple intuition behind the Downsian model and the idea that political decisions are the outcomes of a Coasian bargaining process. In both of these views of the world, the fact that a woman is the head of the GP should not influence policy decisions. Indirectly, these results also confirm that the Panchayat has effective control over the policy decisions at the local level. These results suggest that direct manipulation of the identity of the policymaker can have important effects on policy.

The findings of this paper are thus important for two main reasons. First, as noted in the Introduction, reservations for women are increasingly being implemented at various levels of government. The last country to have adopted such a policy was Morocco, which had a quota of 30% for women in the last parliamentary elections, and the new institutions in independent East Timor are such that for each local government level, one man and one woman must be elected. Second, these findings have implications beyond reservation policy, suggesting that, even at the lowest level of a decentralized government, all mechanisms that affect politician's identities (term limits, eligibility conditions, etc.) may affect policy decisions. This is important at a time in which many new decentralized institutions are being designed around the world.

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*Manuscript received October, 2001; final revision received November, 2003.*

APPENDIX

This appendix contains the proof of the theoretical results.

PROOF OF PROPOSITION 1: Consider first an equilibrium where only one candidate runs unopposed and wins. Under what conditions will a woman agree to run unopposed? A woman is willing to run unopposed if and only if she prefers to pay the cost of running and implement the outcome  $x_j$  rather than not run, in which case the outcome  $\mu'$  will be implemented. Hence, she will run if  $\mu' - x_j \geq \delta_w$ . Therefore, the most "men-friendly" outcome implemented by a woman would be  $\tilde{x}_j = \mu' - \delta_w$ .

Is there a man that can enter and win against a woman that would implement outcome  $\tilde{x}_j$ ? A man would enter against this woman if the outcome he would implement was such that  $x_k - \tilde{x}_j \geq \delta_m$ , and he was sure to win, i.e.,  $x_k - m < m - \tilde{x}_j$ . The most "women-friendly" man willing to run against outcome  $\tilde{x}_j$  will implement the outcome  $\tilde{x}_k = \tilde{x}_j + \delta_m = \mu' - \delta_w + \delta_m$ . He is sure to win against the woman who would implement  $\tilde{x}_j$  if  $\delta_w - .5 * \delta_m > \mu' - m$ . Thus, no woman runs unopposed if  $\delta_w - .5 * \delta_m > \mu' - m$ .

Consider next an outcome where two candidates run against each other. Will a woman agree to run under these conditions? As Besley and Coate (1997) observe, if two candidates run against each other, they need to have an equal chance of winning, therefore the policy outcomes each of them would implement need to be symmetrical around the median voter's position. The outcome implemented by a woman with preference 0 is  $(1 - \alpha)\mu'$ . Therefore, the largest possible distance between two candidates who run against each other is  $2m - 2(1 - \alpha)\mu'$ . A woman finds it worthwhile to run against another candidate in these conditions only if  $2\delta_w < 2m - 2(1 - \alpha)\mu'$ . Thus, no woman runs against another candidate if  $\delta_w > m - (1 - \alpha)\mu'$ .

The nonclumping assumption and the Abstinance of Indifferent Voters restriction ensures that there are no pure strategy equilibria with more than two candidates (see Besley and Coate (1997, Proposition 9)), which completes the proof. Q.E.D.

PROOF OF LEMMA 1: After the reservation policy, only women can run. If no one runs, the outcome that will be implemented is  $\mu'$ . Will a woman agree to run, or will the outcome  $\mu'$  be implemented? The woman whose preferred outcome is the furthest from  $\mu'$  is the woman with preference 0. A woman with a preference of 0 implements the outcome  $(1 - \alpha)\mu'$ . If she is unopposed, she bears a cost  $\delta_w$  and wins the election for sure. Therefore, she will be a candidate if and only if the difference between what she can implement and  $\mu'$  is bigger than the cost of running, i.e.,  $\mu' - (1 - \alpha)\mu' \geq \delta_w$ . If this condition is not satisfied and she decides not to be a candidate, no other woman would agree to be a candidate. Q.E.D.

PROOF OF PROPOSITION 2: Consider the case where  $\mu' - (1 - \alpha)\mu' < \delta_w$ , so that Lemma 1 applies, but  $\mu' - [\alpha M + (1 - \alpha)\mu'] \geq \delta_m$ . In this case, at least one man would have run in the absence of a reservation, but no woman runs once the seat is reserved. If in the equilibrium without reservation, only one candidate were to run, the most "pro-male" possible outcome would have been  $m + .5 * \delta_m$ . If two candidates were to run, the most "pro-male" possible outcome would have been  $2m - [\alpha M + (1 - \alpha)\mu']$ . This is to be compared to the outcome with reservation, which by our assumptions is  $\mu'$ . Assume that  $\mu' > \max(m + .5 * \delta_m, 2m - [\alpha M + (1 - \alpha)\mu'])$ . In this case,  $\mu'$ , which is implemented after the reservation system, is more pro-male than the most pro-male outcome possible without reservation. The reservation system leads to a decline in the utility of the median voter, and that of women. Q.E.D.

PROOF OF PROPOSITION 3: The only possible equilibria under the reservation system are such that one woman runs unopposed (since condition (ii) in Proposition 1 ensures that a woman will not run against another woman either).

We will start by calculating the range of outcomes that can arise in equilibrium. As observed by Besley and Coate (1997), the outcome implemented by a woman who runs unopposed must

lie between  $m - .5\delta_w$  and  $m + .5\delta_w$ . If it were not the case, another woman would find it advantageous to run and would win for sure. Moreover, the outcome implemented by the woman with a preference of 0 is  $(1 - \alpha)\mu'$ . Therefore, the outcome implemented in equilibrium will lie to the right of  $\max((1 - \alpha)\mu', (m - .5\delta_w))$ .

Further, for a woman to want to run, the distance between what she will implement and  $\mu'$  has to be larger than  $\delta_w$ . Finally, the outcome implemented by the most "pro-male" woman is  $\alpha W + (1 - \alpha)\mu'$ . Therefore the outcome implemented in any equilibrium will lie to the left of  $\min(m + .5\delta_w, \alpha W + (1 - \alpha)\mu', \mu' - \delta_w)$ .

To summarize, the outcome implemented after reservation lies in the interval:

$$[\max((1 - \alpha)\mu', (m - .5\delta_w)); \min(m + .5\delta_w, \alpha W + (1 - \alpha)\mu', \mu' - \delta_w)].$$

(i) If  $\alpha M + (1 - \alpha)\mu' \geq \min(m + .5\delta_w, \alpha W + (1 - \alpha)\mu', \mu' - \delta_w)$ , the most "pro-female" outcome implemented by a man with no reservation system is to the right of the median voter and to the right of what the most "pro-male" woman who will run will implement. The reservation system unambiguously increases the utility of the median female voter.

(ii) If, in addition,  $\mu' - [\alpha M + (1 - \alpha)\mu'] > 2m - \max((1 - \alpha)\mu', (m - .5\delta_w))$ , the outcome implemented with no reservation is further away from the median voter than the most "pro-female" outcome implemented by a woman under the reservation system. The reservation system unambiguously increases the welfare of the median voter and the median female voter. Q.E.D.

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