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Can political reservations affect political equilibria in the long-term? Evidence from local elections in rural India

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Abstract: While many studies explored impacts of political quotas for females, often with ambiguous results, underlying mechanisms and long-term effects have received relatively little attention. Nation-wide data from India spanning a 15-year period allow us to explore how reservations affect leader qualifications, service delivery, political participation, local accountability, and individuals' willingness to contribute to public goods. Although leader quality declines and impacts on service quality are ambiguous, gender quotas are shown to increase political processes and participation, the willingness to contribute to public goods, and perceived ability to hold leaders to account. Key effects persist beyond the reserved period and impacts on females often materialize only with a lag.

Keywords: Public goods, reservations, India, discrimination, political economy
JEL Codes: O100, H110, H700

1. Introduction

Many developing countries suffer from long-standing and quantitatively large bias against women in terms of asset ownership and access to public goods and services. Redressing such bias is important not only for ethical reasons but also because social exclusion can reduce overall welfare and threaten social stability. Lack of voice that prevents women from ensuring that their specific needs are taken into account in the sphere of public service delivery as well as policy design is generally believed to be an important factor reinforcing such bias. Quotas that aim to increase women's political power by reserving a share of the seats contested in any election for females have therefore attained great popularity. In fact some 100 countries worldwide are reported to practice gender quotas in some form to overcome gender bias and long-standing inequalities.

Despite their political attractiveness and widespread adoption, electoral quotas are not uncontroversial. Supporters argue that empowering members of groups who had historically been disadvantaged can result in more inclusive processes of policy-making drawing in those previously excluded. This can change the median voter's preferences and thus the outcomes from political decision-making. To the extent that it improves access to public goods (e.g. education or roads) by those who earlier excluded or marginalized, this can be Pareto optimal and ensure better development and use of a society's human potential. Critics note that such measures run a danger of bringing to office individuals who lack necessary qualifications and may then be easily manipulated by traditional elites. In addition to adverse effects when they are in force, reservations may also adversely affect behavior by competitively elected leaders who, because they are prevented from standing for re-election, will have their time horizon truncated and thus be tempted to adopt myopic patterns of behavior that do not maximize long term social welfare.

Which side of this debate is correct is an empirical question. However, while a large and increasing number of studies explore the topic, virtually all of them focus on contemporaneous effects during the immediate reservation period. For a variety of reasons, these may be very different from longer-term changes in behavior the change of which is the ultimate goal of reservations. For an assessment of the extent to which such policies achieve their objective, it will thus be important to complement them with evidence on the extent to which reservation-induced effects persist over time. Looking at longer-term effects could also provide insights regarding channels through which such effects materialize, an issue of great interest for policy.

India is of particular interest in this respect. To overcome long-standing discrimination by gender and caste, far-reaching decentralization of power in the early 1990s was combined with regulations mandating that a share of elected leadership positions be 'reserved' for women and other disadvantaged groups. As villages subject to reservation are chosen randomly in any given period, differences between reserved and non-reserved locations can be interpreted in a causal sense. The fact that, at the point of our survey, the policy had been in effect for more than a decade also allows us to examine whether -and if yes how- reservations affected long-term outcomes. Beyond the broader interest in such results, recent debates in India about extending female reservations to the state and national levels imply that such evidence can also inform the country's ongoing policy debate.

We draw on a large national sample to assess impacts of female reservations on the perceived quality with which public goods are delivered, individuals' level of political participation and willingness to make a matching contribution to provide local public goods, and their self-reported ability to hold leaders to account. Conceptually, three main aspects are relevant. Based on the literature, we expect two effects that may go in opposite directions. On the one hand, reserved (female) leaders' lower qualifications -together with limited short-term discretion over budgets- could lead to a leader quality effect that would reduce the quality of public service provision under reservation. On the other hand, by making political processes more inclusive and thereby increase voters' ability to voice concerns and hold leaders to account, it may lead to more effective political participation. Also, a number of reasons -including learning about political processes by previously excluded voters or reversal of policies after reservations expire- suggest that some impacts of reservation may materialize with a lag so that medium term effects may be very different from those observed in the short term. To account for this, we distinguish immediate effects from those that might accrue in the medium term.

Three sets of results are relevant. First, we find weak or negligible effects of reservation on the perceived quality of public good provision in the period when they are in force. Reasons might be because either (i)

the positive results reported in some of the literature are limited to some regions or states with specific characteristics; (ii) respondents' perceptions are biased either by prejudices or by lack of direct exposure which prevent them from accurately reporting or assessing outcomes for specific public goods; or (iii) leader quality and political participation effects alluded to above are of similar magnitude and thus cancel out. At the same time, we find that reservations increase the quality of political processes and the extent to which they conform to rules, the level of participation, and -possibly as a result- individuals' willingness to contribute to public goods. These effects persist over time and, for females, materialize with some lag that could point towards learning. Moreover, individuals report a significant increase in their perceived ability to hold local officials accountable for provision of public service and discharging of their duties. Even if it imposes cost in the short term, female reservation can yield positive social benefits overall and a key channel for it to have an effect is through greater and more effective political participation.

The paper is structured as follows: Section two provides context by discussing the rationale for quotas by discussing in more detail the Indian context and the hypotheses guiding our investigation. Section three describes the data and compares key outcome variables -in terms of leader quality, total spending, change in perceived quality of public services, political participation, and willingness to contribute to public goods, between reserved and unreserved panchayats. Section four builds on this by econometrically exploring persistence and potential heterogeneity of reservations. Section five concludes with policy implications and suggestions for future research.

2. Gender quotas: Rationale, evidence, and approach

Concern about a failure of pre-existing and often deep-rooted gender gaps to narrow over time led many countries to adopt policies that reserve a certain share of political positions for females. Evidence on the impact of such policies is mixed and rather inconclusive. In India, high levels of gender discrimination provided the justification for legislation that reserved, in any election after 1995, leadership for females in one third of villages, randomly selected. While some note that leaders coming to power in this way may be less qualified and more prone to being influenced by others than those elected on unreserved seats, others find that these policies had significant impact on quality of public goods. We describe channels for such impacts to materialize, draw out implications for longer-term effects beyond the immediate period during which reservations had been imposed, and describe how these can be tested with the data at hand.

2.1 Female political participation in perspective

Women's preferences have been shown to differ from those by males (Edlund and Pande 2002) with potentially far-reaching effects on intra-household decision making and democratic voting outcomes

(Funk and Gathman 2008). Although standard political economy models with full pre-commitment imply that policy-makers' attributes -including their gender- will not matter for outcomes (Downs 1957), these have often been found to be inconsistent with empirical evidence. Citizen-voter models formalize the idea that legislators' identity can matter for outcomes (Besley and Coate 1997, Osborne and Slivinski 1996).

Many societies are characterized by under-representation of females in bodies for policy making at national or local level (Dahlerup 2006).¹ If such lack of representation is due to institutional barriers, cultural norms, or voter discrimination and if policy-makers' attributes matter, actions to increase this share could affect the nature of political equilibria and, by implication, long-term outcomes. This has been the main justification for affirmative action, including quotas to reserve a share of political positions for females, to bring about greater equality in opportunities and outcomes. Gendered quotas to increase women's share of elected positions have become very popular and, in different forms, been introduced in more than 100 countries (Krook 2009). In some cases, such measures have led to perceptible shifts in the composition of legislatures as in the case of Rwanda where, after establishment of a gender quota (of 30%) in 2003, female parliamentarians now make up the majority of the legislative assembly (Powley 2007). Quotas have also been introduced in many European countries although in some cases their impact may be diminished by the fact that often they apply to candidates rather than seats.²

Across countries, studies suggest that female participation in legislative processes helped to overcome gender bias in access to specific services and that female legislators tended to allocate more funds to causes important to women (Paxton and Hughes 2007, Reingold 1992, Saint-Germain 1989). Effective provision of greater volumes of public goods could then help previously disadvantaged groups to more quickly eliminate such biases while greater political participation increases the pool of talent which the system can draw upon or allow greater deliberation and innovation to eliminate mistakes in the process (Page 2007). Studies suggest that higher levels of female representation in parliament are associated with lower levels of corruption (Dollar *et al.* 2001) as well as more spending per student, higher shares of female teachers, and greater secondary enrollment by girls. Greater female representation is also found to improve women's access to health via higher public spending that in turn is noted to increase the number of doctors and women's ability to receive pre-natal care (Knack and Sanyal 2000).

Studies exploiting differences in the timing of the introduction of female voting across US states suggest that expansion of the suffrage to women led to increased public spending and more liberal voting patterns,

¹ Globally, less than 20% of members in national parliaments are female, although this varies from close to parity in Nordic and some African countries such as Rwanda to some 10 percent in Arab states (International Institute for Democracy and Electoral Assistance (IDEA) 2008).

² For example in France, although 50% of candidates are required to be women, only 18% make it to the national assembly (Frechette *et al.* 2008).

a phenomenon that persisted over time as females gradually took advantage of the franchise (Lott and Kenny 1999). Laws extending voting to females were followed by shifts in legislative behavior and large increases in local health spending (Miller 2008). At the same time, the impact of gender reservations is context specific. Evidence of higher female participation increasing health spending (Rehavi 2008) contrasts to findings from mayoral elections during the 2000s where policy-makers' gender did not appear to have any on effect on the size of government, the composition of municipal spending and employment, or actual outcomes such as crime rates (Ferreira and Gyourko 2010). One possible explanation is that city governments come closer to the Downsian model.³ In Californian school boards where females already hold 45% of elected seats, an anti-incumbent bias was observed whereby adding an additional female (male) increased the likelihood of a male (female) winning the next election (Schwarz 2010).

2.2 Gender reservations in the Indian context

India is characterized by large gender gaps in key human development indicators such as child mortality and malnutrition as well as levels of antenatal coverage, contraceptive use, adolescent fertility, and maternal mortality that are much worse than what is found in countries with similar or even lower levels of per capita income.⁴ Discrimination against females originates in marriage practices and caste structures that show little sign of disappearing and may even be reinforced over time (Anderson 2003). Despite high overall growth since the mid-1990s, gender gaps widened in southern states that enjoyed higher levels of income growth and higher initial levels of female empowerment (e.g. AP, KA, TN), suggesting that economic growth alone may not be sufficient to bring about gender equality. Persistently high levels of gender inequality are often believed to be reinforced by deficient provision of public goods, e.g. maternal health and peri-natal care for girl children (Bhalotra and Rawlings 2011). To the extent that they can bring about better and more equitable provision of such services, quotas to bring women into positions of power could help to address and eventually overcome such bias.

In 1992, India's 73rd Constitutional Amendment mandated far-reaching decentralization by establishing a three-tier system of district-, block- and village-level councils. The *gram panchayat* (GP) is the lowest tier of local government at village level. It comprises a president (*pradhan* or *sarpanch*) and council members who are elected from the panchayat's wards. Its responsibilities include (i) provision of major public services such as health, education, drinking water, and roads; (ii) setting rates and administering local taxes; (iii) administration, formulation and implementation of local development plans; and (iv)

³ Females are found to have higher levels of unobserved political skill, supporting the hypothesis that they may have had to overcome gender bias to be successful in politics.

⁴ UNDP's gender inequality index, based on 2008 data, ranks India 122 out of 138 countries, below Rwanda (83), Lao PDR (88), Egypt (108), Moldova (38), and China (40).

selection of beneficiaries and implementation of social and economic programs established and paid for by central government. Regular assemblies (*gram sabhas*) by all voters in the GP are meant to monitor performance and increase democratic accountability. To prevent decentralization from reinforcing rather than reducing the power wielded by traditional elites and to counter what was perceived as a legacy of disenfranchisement and under-representation by females and other disadvantaged groups, this was combined with reservation of a share of seats for women or scheduled castes and tribes.⁵

In fact, a number of studies find that efforts to increase female participation in political processes and decision-making had significant impacts. In West Bengal and Rajasthan, female policy makers provide more public goods more valued by female voters such as water and roads (Chattopadhyay and Duflo 2004). Mandated changes in female leadership prompted by quotas were found to increase the quality of political processes and prompt greater female participation in *gram sabha* meetings in South India (Besley *et al.* 2005). Reservations were also found to be associated with higher levels of child survival, an effect that is attributed to improved access to (and use of) services such as antenatal care and public birth facilities in villages led by females (who are more attuned to the needs of child health) which translate into significantly higher levels of breastfeeding and immunization (Bhalotra and Clots-Figueras 2010). The impacts of reservations can be felt in other spheres as well; phased introduction of reservations at state level is used to argue that female reservations gave women greater voice, resulting in increased reporting of crimes against women and greater resistance to violence (Iyer *et al.* 2010). Reserved seats occupied by low-caste or tribal (but not high-caste) females are also argued to have resulted in higher levels of investment in health and early education and more effort to implement redistributive land reforms and inheritance legislation favorable to women (Clots-Figueras 2009).

However, these studies contrast with others that point towards more ambiguous or even negative effects of reservations. Three explanations for this are that other factors may be relevant, that female leaders' quality may be lower, or that effects may be only short term. A first set of explanations suggests that, once other factors are controlled for, or for some types of outcomes, female *pradhans*' presumed advantages vanish or may even be below those of *pradhans* elected without restrictions (Ban and Rao 2008, Besley *et al.* 2004, Rajaraman and Gupta 2008). In some cases, aggregation may also be an issue as no effects are found in the aggregate but for some sub-groups (Dongre 2010). A study focusing on selection of beneficiaries from central government schemes suggests that, in this respect, reservation had

⁵ At village level, most states reserve one third of council members and *pradhan* positions for women. By comparison, the share of positions reserved to ST/SCs equals the population share of the ST/SC population (Bardhan *et al.* 2010). Although a large number of studies explored the impacts of caste reservations (Krishnan 2007, Pande 2003), our focus is on those for females. At district level, it appears that reservation of positions in the legislature for scheduled castes but not tribes improves access to education facilities, mainly primary schools, for relevant constituencies.

few, if any, positive effects on women. It worsened within-village targeting of such transfers to lower caste groups and failed to improve other targeting dimensions. This implies that, for disadvantaged women, the net effect of reservations was actually negative (Bardhan *et al.* 2010). While such an outcome can be explained in a number of ways,⁶ it suggests that greater clarity on channels through which reservations may affect results and attention to potential negative effects will be required. Three factors, namely (i) leaders' qualifications; (ii) the nature of political decision-making; and (iii) persistence and potential long-term effects seem to be of particular relevance.

Reservations -especially for caste- may undermine the ability of traditional social institutions to discipline leaders in situations where other forms of political organization (e.g. parties) are non-existent or ineffective. This can, at least in principle, result in selection of leaders with inferior characteristics and, consequently, reduced levels or quality in provision of public goods (Munshi and Rosenzweig 2008). While such effects should be less pronounced for gender reservations, in Tamil Nadu women pradhans on reserved seats are reported to have fared very badly –in fact much worse than SCs and STs– in a test designed to measure their understanding of relevant *gram panchayat* procedures (Gajwani and Zhang 2008). Attributing outcomes solely to the leader's gender is also equivalent to assuming full pradhan dominance of the *gram panchayat*. This may be at variance with ground realities where women occupying reserved seats are often poorly educated and may be guided by traditional elites (often husbands or family members) who may pull the strings from behind the scenes (Rajaraman and Gupta 2008). There is indeed evidence suggesting that female leaders depend on access to social and political networks through traditional leaders and that this reduce their ability to control events.⁷

Finally, as reservations will be in place for a limited time only, their impact can be appreciated only by looking beyond the immediate period when they are imposed. If they bestow power on representatives from disadvantaged groups who then will (for a limited time) direct public goods or programs towards their constituency, any effects observed during the reservation period may well be reversed -or possibly even over-compensated- once reservations have expired. This hypothesis receives support from the ambiguous longer-term effects of reservations on access to and quality of public goods found in longer-term studies that consider outcomes for more than just one period (Bardhan *et al.* 2010, Raabe *et al.* 2009). If, on the other hand, (female) reservation changes either the way in which public goods are provided or

⁶ The explanation favored by the study under concern is that female reservation is inconsistent with traditional models of electoral competition. It concludes that a more complex approach of capture-cum-clientelism os more appropriate but may itself be is susceptible to being weakened by election of inexperienced women to reserved positions (Bardhan *et al.* 2010).

⁷ In the Tamil Nadu study quoted earlier, some 80% indicated that their official decisions were to be influenced by their husbands, potentially pointing towards limited autonomy in decision-making (Gajwani and Zhang 2008).

the pattern of political participation and the associated political equilibrium, in particular the nature of the median voter, it can have long-term impacts.

Three channels through which reservations could affect outcomes in the long term are of relevance. First, they might prompt those who previously had not participated in political process to permanently change their behavior. Some evidence for persistent effects via greater participation along these lines is available from rural West Bengal (Beaman *et al.* 2010) and South India (Besley *et al.* 2005) as well as urban Mumbai (Bhavnani 2009). Second, they may trigger a process of learning and revision of prejudices. For example, reservations are argued to have led to exposure and revision of stereotypes regarding females' leadership qualities in a number of settings (Beaman *et al.* 2009). In particular, voters who traditionally had been excluded from political processes may require time to learn about how to access information about leaders' performance and ways to use such information to induce more 'appropriate' behavior by policy-makers. A third option less emphasized in the literature could be that, especially if they increase voice and political participation or shift the composition of public goods towards those more valued by certain groups, reservation may lead voters to increase their contributions to public goods. Such contributions can be very relevant because, even if key infrastructure such as roads or schools has been established (e.g. through central funds), the lifespan and effectiveness of such investment will be significantly affected by the amount of effort devoted to local maintenance or monitoring by beneficiaries to prevent service providers (e.g. school teachers) from shirking. While only a few studies explore the willingness to contribute to better service quality in India (Chandrashekar 2008), the underlying mechanisms have been studied in a number of contexts (Bagnoli and Lipman 1989, Messer and Zarghamee 2007). Below, we will explicitly test for this possibility.

2.3 Data and approach

We use data from a nationally-representative panel survey of 233 villages in rural India conducted in 2007 by the National Council of Applied Economics (NCAER) to explore these issues. In addition to its national coverage, this dataset, which is based on questionnaires at household and village levels, has three features of interest. First, it spans a 15 year-period that includes the current *panchayat* which, in most states, was elected in or after 2005, as well as the two previous ones for which elections were held around 2000 and 1995. For all of these, information on whether a reservation was in place, the election process, key characteristics and perceived leadership qualities by the *pradhan*, and relative quality of public good provision in different categories was obtained via recall. Second, individual data on political participation as well as the type of such participation -e.g. whether an individual raised issues in *gram sabha* meetings- is available for all household members 16 and older for the three *panchayat* periods. This is

complemented by an assessment of the ease with which local office-holders can be held to account. Third, for the current period, individuals were asked whether they would be willing to contribute to different types of public goods if doing so would trigger a larger government contribution to explore whether having pradhan reserved for a female affects the willingness to contribute to public goods.

As reservations are assigned randomly, OLS regressions of outcome variables on a reservation dummy and controls will yield unbiased and consistent estimates of such policies' impact. This allows empirical testing of hypotheses regarding contemporaneous or lagged impacts of reservations on a set of outcome variables (superscripted by j) regarding effectiveness of public good provision, participation in political processes, and willingness to contribute to local public goods. Letting i, v , and t denote individuals, villages, and the three time periods for which we have data, the general equation to be estimated is

$$Y_{ivt}^j = \beta_v^j + \beta_1^j R_{vt} + \beta_2^j R_{vt-1} + \beta_3^j X_{ivt} + \beta_4^j D_t + \varepsilon_{ivt}^j \quad (1)$$

where Y_{ivt}^j is the outcome variable of interest, β_v is a village or state fixed effect,⁸ R_{vt} and R_{vt-1} is dummy for current or lagged reservation that equals one if the pradhan position in village v at t or $t-1$ was reserved for females and zero otherwise, X_{ivt} is a vector of household and individual characteristics, D_t is a vector of time dummies, and $\beta_1, \beta_2, \beta_3$ are parameters to be estimated. While β_1 can be interpreted as the effect of a contemporaneous reservation on Y^j , we are able to explore heterogeneity of this effect by gender, caste, or landownership by introducing the relevant interaction with R_{vt} and, more importantly are able to test for persistence and dynamic effects by estimating β_2 , the impact of having had a reservation in the past on current outcomes. Below, we briefly summarize our hypotheses with respect to outcome variables in the area of public good provision, participation and accountability, and individuals' willingness to contribute.

First, in line with the literature, we use (1) to test whether female reservations lead to a change in the mix or perceived quality of public goods provided by local government, overall or for different groups of individuals. To do so, we divide such goods into three broad categories, i.e. those relating to (i) social infrastructure including sanitation and sewage, drinking water, education, and health; (ii) productive infrastructure such as roads, irrigation and electricity; and (iii) club goods such as credit, government schemes, street lights, and ceremonies, the benefits from which are at least partly appropriable. As discussed above, a number of reasons imply that we expect this impact to be ambiguous.

A second set of questions addresses the extent to which reservations affect participation in and quality of local political processes (e.g. whether agendas for *gram sabha* meetings are available in advance, minutes

⁸ For the regressions where data from multiple Panchayat periods are available, we use village fixed effect. In the case of villagers' willingness to contribute to improve local issues, we can only use the state dummies because the data are only available for the current Panchayat period.

are kept, and issues are raised by certain groups) including respondents' assessment of the ease with which they are able to hold local officials to account. This is relevant if a main goal of reservations is to allow those who had traditionally been excluded or lacked voice to more effectively participate in politics. Participation in India's village elections has traditionally been high and convening regular village assemblies (*gram sabhas*) is mandatory. In practice, local capture often limits the number and deliberative character of such assemblies, making it difficult for disadvantaged groups to effectively voice concerns (Singh 2007). To the extent that it changes any of these variables, reservation could improve participation in and results from political processes. Data on meeting participation, outcomes, and perceived ability to hold office-holders to account in multiple periods allows us to test hypotheses regarding the nature and persistence of reservation-induced impacts on the nature of political processes.⁹

A third aspect that can be addressed with our data relates to individuals' willingness to make public good contributions. To test whether, for example by increasing voice and effective participation, reservation of leadership positions for females might prompt individuals to contribute more towards public goods, we use individuals' stated willingness to contribute a modest amount (100 Rs.) to different categories of public goods if doing so would allow securing a matching government contribution of much larger size.¹⁰ While this variable is available only for the current period, thus requiring a slight modification of (1), the fact that we have information on whether a particular village was reserved in the past still allows us to test for persistence of such effects.

3. Descriptive evidence

Descriptive data indeed suggest that 'reserved' leaders have lower levels of observable qualifications and experience. Subjective assessments of perceived changes in quality of service delivery, however, fail to support the hypothesis that this reduces the quality of service delivery. Moreover, reservation seems to be associated with higher levels of political participation, greater willingness to contribute to public goods, and better perceived ability to hold leaders to account in a number of dimensions.

3.1 Leader qualification and subjective quality of public good provision

⁹ The wording for the three questions on holding local leaders to account was as follows: 'How easy is it for you to get problems associated with local service provision (such as repairing the road in front of your house, ensuring that the street lights function, etc.) fixed?', 'How easy is it for you to hold local officials accountable for the functions they are supposed to be performing?' and 'How transparent is the process of beneficiary selection regarding various government schemes in your village?' For the first two, possible answers were coded as 1 not a problem at all; 2 very easy; 3 relatively easy; 4 quite difficult and 5 impossible. For the third question, answers were coded as 1 completely transparent; 2 very transparent; 3 relatively transparent; 4 quite non-transparent; and 5 completely non-transparent.

¹⁰ To obtain an indication of individuals' willingness to contribute at the margin (for the current panchayat period), the question was phrased as follows. "Imagine the Government decides to contribute an additional Rs. 1 lakh (100,000) to solve a local problem but only if the majority of village households contribute Rs. 100 each. Imagine that almost enough people are willing to contribute and your decision to contribute or not will decide the outcome. Would you be willing to contribute Rs. 100 if the issue was?".

A key precondition for OLS estimates to be interpreted as a causal estimate of the impacts of reservation is that allocation of reserved seats across villages is indeed random. The fact that the last round of the panel survey was conducted in 1999 allows us to test this for the 2000 election. Descriptive statistics for village and household characteristics in 1999 in panel 1 and 2 of table 1 reveals little if any bias in this regard. Some 30% (71 out of 233) of the sample villages were reserved in this period. Reserved and unreserved villages are similarly sized and have similar levels of access to infrastructure and public goods (drinking water, anganwadi, food for work programs, with a difference only in the number of health workers. Household characteristics such as education, age, assets, income, and its composition, are not significantly different between reserved and unreserved villages either.

Comparison of pradhans in reserved and unreserved panchayats (table 2) points to some significant differences. The top panel 2 suggests that those on reserved seats have significantly lower educational qualifications; 25% as compared to less than 5% on unreserved seats are illiterate, and only 29% and 6% of them (vs. 70% and 27% respectively) completed at least secondary or high school. This also implies that very few ‘unreserved’ pradhans had been involved in politics before; the share of Pradhans who held GP positions or ran for Pradhan or ward member before is significantly higher in unreserved compared to reserved villages (24% versus 12% and 22% versus 7% for previous positions or candidacies, respectively). Female reservation appears to not significantly affect the probability of other marginalized groups, in particular scheduled castes and tribes or religious minorities, to be elected, allaying fears about potential negative equity consequences of this policy. The fact that women make up only 7% of pradhans in unreserved villages suggests that, without quotas, female participation would have been much lower. Reservations bring in new officials; compared to a quarter who had held office before in unreserved panchayats, only some 12% do so in reserved ones. Also, only 7%, as compared to some 21% in unreserved seats had been running for office without being elected before.

Table 2 panel 2 shows that reserved seats are no less competitive than unreserved ones. To the contrary, with 76% as compared to 72% for unreserved ones, elections for reserved seats in states where the pradhan is directly elected attract slightly higher voter turnout.¹¹ The bottom panel highlights that there is no significant difference in size and structure of budgets between reserved and unreserved panchayats. As, with some 90% of local budgets from central transfers, own revenues remain modest, this is expected.

Table 3 reports individual villagers’ assessment of pradhans’ perceived leadership quality, and their effectiveness in providing key types of public goods, separately for males and females. Two conclusions

¹¹ Panel 2 excludes Kerala and Maharashtra where the *pradhan* is indirectly elected by a vote among elected the ward members.

stand out. First, there are only very few instances where perceived leadership quality differs markedly between ‘reserved’ and ‘unreserved’ pradhans; for the vast majority of areas such as technical qualifications, awareness of national problems, ability to effectively provide local public goods or solve local disputes, respondents do not perceive differences between the two groups. Exceptions are ‘honesty and fairness’ where males and females rank pradhans benefiting from gender reservations slightly lower (marginally significant for females) and -for female respondents only- the ability to bring village problems to the attention of higher levels of government and (marginally significant) the selection of beneficiaries for central schemes. Second, there is little basis to conclude that reservation reduced the quality of service provision. Using the classification introduced earlier,¹² ‘reserved’ pradhans are perceived to have improved quality of health services and electrification (for male and female respondents), credit and input as well as government schemes (for males only and in the latter case marginally for women). Males rank them somewhat worse for drinking water and sanitation. There is thus no evidence to support strong conclusions either way.

3.2 Political participation, accountability, and willingness to contribute to public goods

To descriptively explore impacts of reservation on political participation, we use the number of village meetings (*gram sabhas*) convened, attendance in such meetings by individuals, their active participation, and adherence to procedure such as prior announcement of the agenda and preparation of minutes as proxies for the quality of local political processes. Results in the top panel of table 4 are consistent with the notion that having a female leader increases political participation (Beaman *et al.* 2009, Bhavnani 2009) and the extent to which political processes adhere to norms. ‘Reserved’ female pradhans convene more *gram sabha* meetings (7.2 vs. 6.6 and 6.2 vs. 5.7 for male or female respondents, respectively) that are better attended (4.4 vs. 3.5 by males and 4.6 vs. 3.3 by females), and that are characterized by higher quality of participation (voicing of concerns; marginally significant for females) and advance knowledge. Males, but not females, also perceive significant differences in terms of minutes being always prepared and accessible between reserved and unreserved panchayats.

Questions regarding willingness to contribute to public goods at the margin, as reported in the second panel of table 4, support the notion that in reserved panchayats, individuals are more willing to contribute to public goods, with differences being more significant for males than females (though levels for health, sanitation, education, natural resource management, and government schemes are higher for females). In reserved panchayats, men and women are more likely to contribute to irrigation, education, health, natural

¹² We distinguish social services (sanitation, drinking water, education, and health), productive infrastructure (roads, irrigation, and electricity), and club goods (credit and input subsidies, government schemes, street lighting, and ceremonies) where the scope for appropriation is high.

resource management, government schemes, and social issues or ceremonies. Men also increase their hypothetical contribution to sanitation, credit and (marginally) roads in reserved panchayats but are less willing to contribute to drinking water and do not change attitudes to electrification and street lights.

To assess how reservation affect local government accountability, we inquired about villagers' ability to hold officials to account, ensure that problems with local public goods are taken care of, and beneficiaries for centrally sponsored schemes -a key mechanisms to deliver public goods and social services in India- selected in a are selected in a transparent manner. Responses (with details on variables discussed earlier) in the bottom panel of table 4 suggest that, for males but not for females, reservation increases leader's accountability in all three respects, though in some cases with marginal significance only.

4. Econometric results

Regression results suggest that, although their impact on perceived quality of public service provision in the immediate reservation period is limited, reservations increase the level and quality of participation in political processes, the extent to which procedural details of local democracy are adhered to, and voting participation in the longer term. We also find evidence of reservations leading to improvements in self-reported ability to hold local officials to account and individuals' willingness to contribute to different types of public goods that persist over time. For most of these, short-term effects on females are much smaller than longer-term ones, pointing towards the possibility of learning and suggesting analysis with a longer time horizon is indeed appropriate.

4.1 Perceived quality of public good delivery

While descriptive statistics are suggestive, econometric analysis is needed to control for respondent and location characteristics, explore potential heterogeneity of impacts, and assess the extent to which impacts persist beyond the immediate reservation period. Econometric results are consistently reported, in tables 5-8, for three models. Model 1 only includes an indicator for current reservation (γ_1), model 2 where this variable is interacted with an indicator variable for female gender (ϕ_1), and model 3 that also includes indicator variables for past reservation (γ_2) and its interaction with a female dummy (ϕ_2). In addition to γ_1 and ϕ_1 , we report F-statistics for $\gamma_1 + \phi_1 = 0$ and $\gamma_2 + \phi_2 = 0$, to test whether females benefited from recurrent or past reservations.

We first check whether quality of public good provision is lower for panchayats with reserved rather than unreserved seats.¹³ Table 5 reports results from regressions where the dependent variable is a zero-one

¹³ Recall that in all regressions, state-level fixed effects, age, education, and dummies for caste, religion, landlessness, and marital status are included throughout. Also, clustering at the household level is adjusted for in all regressions.

indicator of perceived improvements in the quality of public good provision compared to the previous panchayat using the categories of public goods introduced earlier. With the exception of individual or club goods, which are perceived to have been better allocated in reserved panchayats, model 1 does not allow us to reject the hypothesis of reservation having no effects. Model 2 implies that even in the case of club goods, it was only males who perceived improvements while females did not see any change with reservation. A similar phenomenon is observed for productive public goods where distinguishing by gender of respondent reveals a marginal improvement in perception by males. At the same time, model points to some positive effects of reservation on perceived quality of public goods in the longer term, with $\gamma_2 > 0$ for productive and individual public goods (and at 10%) for social ones. At least for productive and club goods, this appears to be more than just a rebound after declines during reservation. In all cases, the hypothesis of current or past effect on females can be rejected at conventional levels of significance.

Our failure to find consistent impacts of reservation on quality of service provision mirrors findings in the literature and can possibly be explained in a number of ways. Even if female leaders perform better than males, cultural bias against acknowledging such performance may imply that perceptions are filtered before being reported (Beaman *et al.* 2009). Also, if there are persistent effects it may be more difficult to identify these in an environment where each panchayat will have been reserved at least once (Beaman *et al.* 2010). Another possibility is that the (negative) effect of ‘reserved’ pradhans’ lower qualifications is cancelled out by villagers’ greater willingness to contribute to public goods or that measurement error biases results towards zero. More detailed analysis, including that of intermediate variables, is needed to discriminate among these competing explanations.

4.2 Political participation

To assess the impact of reservations on participation in local political processes, table 6 reports results from regressions with the frequency and nature of participation in village meetings and the extent to which these adhere to common standards as dependent variables. Model one points to a significant rise in the number of meetings attended, estimated to increase by 1.3 compared to a mean of 3.7, advance knowledge of the agenda for such meetings and if minutes were kept (by 5 and 4 percentage points, respectively) but not on the probability of voicing concerns in such meetings. Disaggregating by gender in model 2 illustrates that the increase in *gram sabha* attendance is particularly pronounced for females whose participation increased much more than that by men. Gender disaggregation also reveals that the insignificant overall coefficient on voicing concerns can be attributed to a highly significant reduction for males and a more than commensurate increase for females who significantly increased their active participation in *gram sabhas*. At least part of the rise in women’s voicing concerns in panchayats with

reserved leadership does thus appear to come at the cost of men. Highly significant contemporaneous impacts on knowledge of procedures are estimated to be largely confined to men.

Adding a lagged effect of reservation in model 3 provides more insights. First, while participation rises in the reserved period, it declines significantly thereafter having, something that may be due to a reduction in the number of meetings convened, a variable that is at the discretion of the *pradhan*. Increases in the voicing of concerns, the knowledge of the agenda and of minutes, on the other hand, are estimated to be persistent over time. In other words, after a panchayat had been reserved for a woman, higher shares of male as well as female respondents knew the agenda of *gram sabha* meetings. The significant lagged effect on agenda on females for this variable may suggest that, possibly because of learning, the impact of female reservation may affect women with some lag.

4.3 Ability to hold local officials to account and willingness to contribute to public goods

Although the fact that information on individuals' perceived ability to hold officials to account could not be obtained retrospectively may reduce the precision of coefficient estimates, responses to this question can provide insights regarding the extent to which concurrent or past reservation improved accountability of leaders and officials at the local level. Table 7 reports results from estimating (1) with the dependent variable an indicator of whether respondents find it easy or very easy to hold local officials to account with regard to provision of local public goods, general administrative functions, and beneficiary selection points towards significant impacts of reservations on local accountability.¹⁴ Model 1 suggests that in reserved panchayats, (male) respondents find it significantly easier to hold officials accountable for local public good provision, but not general administrative functions or transparent selection of beneficiaries of central schemes. In none of the cases can we reject the hypothesis of reservation not affecting females' ability to ensure accountability (model 2).

Introducing a lagged indicator for female reservation changes the picture dramatically; regressions now suggest that concurrent reservation has a positive and significant effect throughout. In many cases, this effect is even bigger for panchayats that had been reserved on the past where we find strong evidence that reservation-induced effects persist. Also, in contrast to effects that are not or only marginally significant, females' ability to hold local officials to account is estimated to increase significantly over time for two out of the three types of goods considered (local public goods and general administrative functions). From a substantive point of view, this is consistent with the notion that time is needed for females to overcome

¹⁴ We also tried the regressions where the dependent variable equals one if the answer code 4 or 5 was chosen. The results are highly consistent with those based on code 1 or 2 as the signs are exactly the opposite.

a legacy of discrimination and familiarize themselves with the mechanics of political decision-making or effective ways to access information. From a methodological perspective, the significance and magnitude of the coefficients on past reservation implies that a focus on contemporaneous effects of reservations only may provide less than the full picture and significantly underestimate the impact of this policy.

While greater accountability by local officials is one way in which reservations can change the political equilibrium, having greater voice may also induce them to contribute more actively to political processes and the provision of specific services. Table 8 tests this hypothesis for the three types of public good described earlier, conditional on such contributions triggering larger support by government. The top panel suggests that reservations indeed lead to an increase in individuals' willingness to contribute to public goods; having a female leader increases this willingness by 1.7, 1.2, and 1 percentage points (the last only marginally significant), respectively. Model 2 implies that, with the exception of social goods, these effects are limited to males.

Results from model 3 suggest that effects of reservation are not only very persistent but also gender-differentiated.¹⁵ If an indicator for lagged reservation is introduced, regressions suggest a strong and significant current impact of reservation on social, productive, and club goods that extends to females in the first case. The effect persists for productive and individual goods in the case of males and social and individual goods in the case of females. With estimated increases of between 2 and 4 percentage points, the estimated increase in voluntary contributions amounts to some 10 percent of overall contributions and is thus not insignificant. This suggests that -contrary to political participation where longer-term impacts will be conditional on actions by the new panchayat president- female reservations lead to sustained increases in individuals' willingness to support public goods.

5. Conclusion and policy implications

Our analysis contributes to the debate on the extent to which reserving political positions for females can improve political outcomes. The fact that India has adopted far-reaching policies -allocated randomly across villages- to overcome the country's high level of gender bias and social stratification a long time ago makes this particularly suitable for our analysis. A nation-wide sample with a rich set of information for the period under concern allows us to contribute to the literature from a methodological and a substantive perspective.

Methodologically, we note that exploring effects of having had reservations in the past and differentiating between male and female respondents can provide new insights. For example, to the case of whether or

¹⁵ As our survey collected data only for the current period, it is impossible to make inferences on longer-term effects beyond one period.

not concerns were voiced in village assemblies, a positive reservation-effect on females and a negative one on males -which is plausible if the length of meetings did not change- would not be detected if only household-level data were used. Use of a longer horizon also allows us to provide, to our knowledge for the first time, an econometric estimate of whether reservation-induced effects persist, i.e. whether having had leadership positions reserved for females in the past will have an impact on current outcomes. If reservation-induced effects persistent, failure to allow for this may lead to biased coefficients. Our results suggest that this may indeed be of relevance in a number of cases.

Substantively, complementing reduced form equations of reservation on public good provision with variables that allow inferences regarding underlying mechanisms turns out to be informative. Variables such as political participation, access to information, willingness to contribute to public goods, and the ability to hold local leaders to account, all appear to be affected by reservation, though in the short term impacts may be more pronounced for males than for females. Greater and more effective participation in political processes could thus be a key channel for reservations to affect outcomes. The importance of learning which emerges from our results is consistent with the notion that those who had been excluded from political processes need time to familiarize themselves with the nature of political interaction and the most effective ways to make their voice heard locally.

If greater political participation is an important channel for reservation-induced effects to materialize, research to explore how reservations can complement other measures to enhance such participation or its effectiveness will be of great interest. This could be combined with use of direct information on outcomes that are likely to be affected by reservations -and which may range from breastfeeding and child health to intra-household bargaining or running for elected office by females- rather than perceptions about public good quality. Advantages of doing so would include the ability to explore how impacts of reservation might vary across for groups in the population and to assess whether measurement error associated with perception-based data underlies the largely ambiguous findings regarding quality of service delivery. If a major effect of reservations is from improving individuals' ability to participate in political processes and hold leaders to account, they are likely to interact with other interventions aiming to inform villagers on ways to access information, make their voice heard, ensure adherence to the rules, and seek to redress misbehavior. Exploring these interactions opens up not only a promising research agenda but is also of great policy relevance to help reservations accomplish their original goal of empowering those who had traditionally been excluded to effectively overcome biases that might arise from such exclusion or under-representation.

Table 1: Initial village and household characteristics by reservation status of the village

Variables	Total Mean	Village reserved?		Test for equality
		Yes	No	
Initial Village Characteristics				
Population in 1999	3870	3381	4088	0.81
Share of population Hindu (%)	86.60	84.49	87.53	0.87
Share of population Muslin (%)	6.62	6.92	6.48	0.19
Net area sown (acres)	1190	1181	1193	0.06
Net Area irrigated under Canal/Stream (acres)	323	221	370	1.24
Access to Bank	0.71	0.72	0.71	0.13
Distance to Mandi(km)	12.69	12.52	12.76	0.12
Distance to retail market (km)	8.67	8.87	8.57	0.22
Distance to nearest Town (km)	14.38	14.64	14.27	0.23
Distance to nearest Pucca Road (km)	2.45	2.22	2.56	0.45
Share of village with st. lights	0.49	0.42	0.53	1.43
Share of villages with PCO	0.33	0.28	0.35	1.04
Share of villages with trained dai	0.56	0.55	0.57	0.26
Share of villages with male health worker	0.47	0.35	0.52	2.31**
Share of villages with female health workers	0.61	0.52	0.65	1.81*
Share of villages with Anganwadi	0.82	0.80	0.83	0.32
Share of scheme building drinking water	0.24	0.23	0.25	0.35
Share of scheme building road	0.18	0.21	0.17	0.81
Share of villages with food for work programs	0.48	0.52	0.46	0.90
Daily male agricultural casual wage (Rs./day)	49.86	49.85	49.87	0.01
Daily female agricultural casual wage (Rs./day)	31.59	32.58	31.35	0.76
No. of observations	233	71	162	
Initial Household Characteristics				
Members < 14	1.93	1.92	1.93	0.24
members 14-60	3.97	4.04	3.95	1.15
Members > 60	0.42	0.40	0.43	1.35
Head's years of education	4.92	5.00	4.89	0.65
Head completed primary	0.51	0.51	0.51	0.17
Head completed middle school	0.31	0.31	0.31	0.16
Head's age	49.50	48.97	49.70	1.53
Female head	0.05	0.06	0.05	1.3
Area of cropland(acres)	2.75	2.78	2.74	0.21
Value of physical assets (Rs.)	43127	41358	43810	0.9
Value of total assets (Rs.)	52564	51829	52848	0.34
Household total income (Rs.)	15549	15380	15615	0.21
Share of crop income	0.52	0.53	0.52	0.44
Share of agriculture	0.67	0.68	0.66	1.22
Share of off-farm income (Rs.)	0.32	0.31	0.33	1.18
Household total expenditure (Rs.)	37769	37807	37755	0.04
Household consumption (Rs.)	9274	9367	9239	0.45
No. of observations	4,275	1,191	3,084	

Note: Distance to railway station, bus stand, post office, telephone office, weekly market, and all the other schemes between the reserved and unreserved groups are not statistically significant. The column 'test for equality' reports the |t|-statistic for the test of equality of means.

Table 2: Pradhan, election characteristics, and public spending for reserved and non-reserved villages

	Reserved		Test for equality
	Yes	No	
Pradhan characteristics			
Illiterate	24.72	5.74	***
At least primary education	75.28	94.26	***
At least secondary education	28.65	62.69	***
At least high school education	6.18	22.08	***
SC/ST	30.02	27.51	
Muslim	0.044	0.050	
Female	98.36	6.65	***
Held political office before	11.67	24.24	***
Was candidate before	6.67	20.92	***
Characteristics of the election			
Number of candidates contested	3.51	3.38	
Share of population voted	76.2	72.1	***
Share of votes received	47.35	49.01	
Revenue & expenditure (Rs. per capita/year)			
Local revenue per capita	174.42	169.07	
of which from govt. sources	156.58	151.79	
of which from own sources	17.84	17.47	
Centrally sponsored schemes	268.73	201.67	
No. of observation	180	459	

Source: Own calculation based on REDS/NCAER 2007 Survey. * significant at 10%; ** significant at 5%; *** significant at 1%

Note: Number of candidates contested is only for the 15 states where the pradhan is directly elected by popular vote i.e., Kerala and Maharashtra are excluded.

Table 3: Perceived Pradhan attributes and quality of public good provision by gender and reservation status

	Male respondents			Female respondents		
	Reserved		Test	Reserved		Test
	Yes	No		Yes	No	
Leadership qualities						
Honesty & fairness	0.533	0.543	***	0.508	0.513	*
Technical qualification	0.461	0.466		0.437	0.436	
National knowledge	0.477	0.483		0.462	0.459	
Provide local public good	0.582	0.579		0.561	0.557	
Solve local disputes	0.449	0.452		0.426	0.43	
Beneficiary selection	0.244	0.248		0.229	0.235	*
Represent village upwards	0.499	0.499		0.463	0.475	***
No of observations	30,708	72,254		28,418	67,874	
Effectiveness in providing ...						
Sanitation & sewage	0.643	0.654	*	0.633	0.639	
Roads & transport	0.659	0.651		0.669	0.668	
Irrigation	0.198	0.199		0.217	0.221	
Drinking water	0.538	0.552	**	0.494	0.498	
Electrification	0.523	0.503	***	0.486	0.468	***
Street lights	0.516	0.511		0.495	0.501	
Credit	0.342	0.329	***	0.302	0.295	
Education	0.717	0.71		0.637	0.642	
Health	0.443	0.427	***	0.489	0.477	***
NR management	0.327	0.326		0.295	0.302	
Government schemes	0.472	0.314	***	0.292	0.282	*
Social issues & ceremonies	0.516	0.509		0.469	0.475	
No. of observations	9,826	23,568		9,204	22,394	

Note: Numbers in the top panel refer to the share of respondents who ranked the Pradhan 'high' or 'medium' for each category. In the bottom panel, numbers refer to the share of respondents indicating that their household's situation regarding a specific public good is 'somewhat' or 'much' better under the current than under the previous panchayat. In both cases, results are obtained from a regression including state dummies.

Test 1 and 2 in the rightmost columns are for male vs. female respondents in reserved vs. unreserved *panchayats*.

* significant at 10%; ** significant at 5%; *** significant at 1%

Table 4: Participation in meetings and willingness to contribute to public goods by gender and reservation status

	Male respondents			Female respondents		
	Reserved		Test	Reserved		Test
	Yes	No		Yes	No	
Gram Sabha meetings						
No. of meetings held	7.247	6.59	***	6.188	5.734	***
No. attended	4.381	3.54	***	4.616	3.266	***
Active participation	0.651	0.674	**	0.377	0.339	*
Advance knowledge	0.285	0.384	***	0.413	0.446	*
Minutes always prepared	0.587	0.554	***	0.819	0.806	
Minutes always accessible	0.599	0.572	***	0.425	0.433	
No. of observations	2,833	9,766		1,514	5,035	
Willingness to contribute						
Sanitation & sewage	0.416	0.392	**	0.510	0.510	
Roads & transport	0.540	0.519	*	0.465	0.447	
Irrigation	0.174	0.099	***	0.144	0.109	***
Drinking water	0.674	0.726	***	0.575	0.585	
Electrification	0.141	0.148		0.147	0.137	
Street lights	0.601	0.609		0.523	0.538	
Credit	0.125	0.061	***	0.104	0.088	*
Education	0.364	0.335	**	0.408	0.370	***
Health	0.479	0.455	**	0.515	0.480	***
NR management	0.129	0.068	***	0.175	0.105	***
Government schemes	0.200	0.147	***	0.224	0.191	***
Social issues & ceremonies	0.192	0.135	***	0.152	0.127	**
No. of observations	2,586	5,657		2,538	5,580	
Leadership accountability¹						
Getting public goods fixed	0.493	0.470	**	0.271	0.266	
Perform admin. functions	0.499	0.483	*	0.265	0.268	
Transp. beneficiary selection	0.491	0.478	*	0.261	0.265	
No. of observations	3,891	8,595		3,593	8,130	

Note: Test 1 and 2 in the rightmost columns are for male vs. female respondents in reserved vs. unreserved *panchayats*.
*, **, and *** denotes significant at 10%, 5% and 1%, respectively.

¹In all cases, the figure given is the share of respondents who find it easy to ensure performance of the service.

Table 5: Female reservation and perceived improvements in quality of public good provision

	Social	Productive	Individual
Model 1:			
Reserved	-0.004 (1.10)	0.003 (0.94)	0.008** (2.10)
No of obs.	260,172	125,103	194,321
R ²	0.12	0.07	0.13
Model 2:			
Reserved(γ_1)	-0.003 (0.75)	0.007* (1.85)	0.012*** (2.77)
Reserved \times Female(φ_1)	-0.002 (0.62)	-0.008*** (2.70)	-0.008** (2.31)
<i>Test:</i> $\gamma_1 + \varphi_1 = 0$	0.04	0.15	0.11
No of obs.	260,172	125,103	194,321
R ²	0.12	0.07	0.13
Model 3:			
Reserved(γ_1)	-0.013** (2.43)	0.002 (0.47)	0.012** (2.29)
Reserved \times female (φ_1)	0.001 (0.13)	-0.007** (2.08)	-0.002 (0.54)
Reserved earlier (γ_2)	0.010* (1.76)	0.029*** (5.70)	0.029*** (5.39)
Reserved earlier \times female (φ_2)	-0.000 (0.00)	-0.004 (0.99)	-0.008* (1.80)
<i>Tests:</i> $\gamma_1 + \varphi_1 = 0$ $\gamma_2 + \varphi_2 = 0$	0.02 0.06	0.28 0.00	0.05 0.00
No of individuals	181,567	81,446	126,877
R ²	0.11	0.07	0.13

Note: The dependent variable is 1 if quality of public service provision is ‘much’ or ‘somewhat’ better than in the previous panchayat period. Categories are defined as follows: Social includes sanitation and sewage, drinking water, education, and health; productive includes roads, irrigation and electricity; individual includes credit, government schemes, street lights, and ceremonies. As we stack observations for the different types of services, we have 5, 3, and 4 observations per individual for the different types.

Table 6: Female reservation and characteristics of village meetings

	No. of meetings attended	Voiced concerns	Knew agenda	Knew minutes kept
Model 1:				
Reserved	1.305*** (6.46)	-0.012 (1.49)	0.050*** (4.36)	0.041*** (4.80)
No of individuals	12,911	13,065	13,103	12,973
R ²	0.53	0.41	0.30	0.39
Model 2:				
Reserved(γ_1)	1.187*** (6.45)	-0.026*** (2.66)	0.060*** (5.01)	0.050*** (5.20)
Reserved \times Female(ϕ_1)	0.600*** (2.62)	0.067*** (2.91)	-0.052*** (2.61)	-0.044** (2.46)
<i>Test:</i>				
$\gamma_1 + \phi_1 = 0$	65.47***	4.85**	0.41	0.17
No of individuals	12,911	13,065	13,103	12,973
R ²	0.53	0.42	0.30	0.39
Model 3				
Reserved (γ_1)	1.400*** (6.52)	-0.010 (0.77)	0.072*** (4.04)	0.056*** (3.86)
Reserved \times female (ϕ_1)	0.900*** (2.84)	0.053** (1.98)	-0.043* (1.80)	-0.004 (0.16)
Reserved earlier (γ_2)	-0.646*** (3.30)	0.035** (2.54)	0.066*** (3.94)	0.036** (2.45)
Reserved earlier \times female (ϕ_2)	0.222 (0.83)	-0.015 (0.59)	-0.009 (0.40)	-0.001 (0.07)
<i>Tests:</i>				
$\gamma_1 + \phi_1 = 0$	2.84*	3.00*	1.45	4.08**
$\gamma_2 + \phi_2 = 0$	0.16	0.84	3.79**	2.29
No of individuals	9,325	9,414	9,465	9,391
R ²	0.55	0.41	0.32	0.39

Note: Village-level fixed effects, household and individual characteristics (age, education, marital status, sex, caste, and landlessness) and dummies for different Panchayat periods are included in all regressions. Standard errors are adjusted for clustering at household level. Robust t-statistics are given in parentheses. We have three observations per individual, corresponding to the three panchayat periods, in models 1 and 2 and two observations in model 3 due to the inclusion of a lagged effect.

Table 7: Female reservations and individuals' perceive ability to hold local officials to account

	Local public goods	General admin. functions	Beneficiary selection
Model 1:			
Reserved	0.023** (2.50)	0.010 (1.11)	0.007 (0.81)
Observations	24,163	24,170	24,167
R ²	0.10	0.11	0.11
Model 2:			
Reserved (γ)	0.032*** (2.76)	0.021* (1.84)	0.017 (1.45)
Reserved*female (φ)	-0.020 (1.57)	-0.024* (1.86)	-0.020 (1.54)
<i>Test:</i>			
$\gamma + \varphi = 0$	(1.78)	(0.07)	(0.11)
Observations	24,163	24,170	24,167
R ²	0.10	0.11	0.11
Model 3:			
Reserved (γ_1)	0.041*** (3.44)	0.029** (2.48)	0.027** (2.32)
Reserved*female (φ_1)	-0.019 (1.51)	-0.023* (1.79)	-0.020 (1.60)
Reserved earlier (γ_2)	0.049*** (4.05)	0.045*** (3.64)	0.063*** (5.13)
Reserved earlier*female (φ_2)	0.012 (0.88)	0.012 (0.89)	-0.002 (0.15)
<i>Tests:</i>			
$\gamma_1 + \varphi_1 = 0$	5.44*	0.47	0.55
$\gamma_2 + \varphi_2 = 0$	39.52***	34.28***	39.18
Observations	16,107	16,112	16,110
R ²	0.11	0.11	0.11

Note: State fixed effects as well as dummies for caste, religion, landlessness and marital status as well as continuous variables for age and education included throughout but not reported. No time effects are included as data are available only for the current panchayat period. Standard errors are adjusted for household level clustering effect. Robust t statistics in parentheses. * significant at 10%; ** significant at 5%; *** significant at 1%.

Table 8: Female reservation and willingness to contribute to different types of public goods

	Social	Productive	Individual
Model 1:			
Reserved	0.012** (2.13)	0.017*** (2.60)	0.010* (1.86)
No of observations	56,737	40,781	61,808
R ²	0.20	0.17	0.19
Model 2:			
Reserved (γ_1)	0.013* (1.91)	0.023*** (3.07)	0.019*** (3.03)
Reserved \times Female (φ_1)	-0.002 (0.27)	-0.013 (1.64)	-0.019*** (3.13)
<i>Test:</i>			
$\gamma_1 + \varphi_1 = 0$	(3.55)*	(2.40)	(0.06)
No of observations	56,737	40,781	61,808
R ²	0.20	0.17	0.19
Model 3:			
Reserved (γ_1)	0.015** (2.07)	0.031*** (4.04)	0.028*** (4.42)
Reserved \times female (φ_1)	0.000 (0.01)	-0.020** (2.51)	-0.024*** (3.73)
Reserved earlier (γ_2)	0.006 (0.80)	0.040*** (4.61)	0.044*** (6.07)
Reserved earlier \times female (φ_2)	0.012 (1.56)	-0.040*** (4.77)	-0.022*** (3.33)
<i>Tests:</i>			
$\gamma_1 + \varphi_1 = 0$	5.90**	2.60	0.93
$\gamma_2 + \varphi_2 = 0$	8.13***	0.02	17.24***
No of observations	37,821	27,185	41,201
R ²	0.20	0.17	0.19

Note: State-level fixed effects, household and individual characteristics (age, education, marital status, sex, caste, and landlessness) and dummies for different Panchayat periods are included in all regressions. Standard errors are adjusted for household clustering effect. Robust t statistics in parentheses.

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