

Further Evidence on the Policy Impact of Randomised Political Reservation

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Abstract

The theoretical link between mandated political representation, and implementation of policies favoured by mandated groups, is provided in “citizen candidate” models, which allow for the preferences of the representatives themselves to be asserted. The random assignment of gender reservation in elections to the post of head of local government in India has enabled testing of its policy impact. The findings reported in the literature are that this has led to alignment between gender-specific policy preferences and gender of the head. This paper finds on the contrary that economic fundamentals trump gender of the head in policy choices, but leaves open the possibility that (uniform) gender quotas for membership in the local body might have served to align choices with fundamentals. The results in this paper suggest that the impact of reservation could vary not merely by context, but also by the kind of policy impact tested for.

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1. Introduction

Mandated shares of political decision-making space for economically excluded segments of the population are increasingly resorted to as a means of inducing greater economic inclusivity. Gender-based quotas in elected posts or in political party candidate fields were at last count in force in 110 countries,¹ and there are other possible bases for quotas such as ethnicity, race or caste.

It is irrefutably plausible that differing genders or sociocultural groupings would have differing policy preferences, although a focus on the differences between groups tends to mask from view the many similarities driven by economic fundamentals. Large-scale empirical evidence on differing policy preferences is usually confined to OECD contexts where the data are available (Lott and Kenny, 1999, and Edlund and Pande, 2002), but Chattopadhyay and Duflo (2004b) use an ingenious approach to generate such evidence for two locations in India.

The theoretical link between mandated political representation, and achievement of particular interests has recently been provided in “citizen candidate” frameworks (Osborne and Slivinsky, 1996, Besley and Coate, 1997). Elected representatives in previous mainstream models made a public pre-commitment to the preferences of the median voter, driven by electoral motives of achieving and retaining power (Downs, 1957). Those models did not leave room for the attribute-shaped preferences of the representatives themselves to be asserted, and so did not provide a theoretical justification for mandated political representation. The new models therefore posit preferences immutably specific to individual citizens, where these preferences are known to all, with voters choosing the citizen candidate who corresponds most closely to their own individual immutable interests. In such a framework, reservations place decision-making in the hands of a subset of the electorate, with the possibility of the preferences of that subset being asserted, rather than that of the median voter. These models are clearly more applicable the smaller the electorate, where full information on all citizen preferences can plausibly be assumed. They have therefore been tested for the local government level in India, following a mandated minimum for gender representation set at one-third for the membership of the executive council, as well as for the post of head of council.

Econometric testing in the Indian local context is fortunately enabled by the random selection of local jurisdictions for reserving the post of head by gender. There are also other quotas by caste and tribe, assigned by population demographics, which are thereby not random, and therefore not testable in the same manner as the gender reservation. Within each such caste or tribe reservation, gender reservation is again assigned randomly. However, as explained in detail in section 2, when testing for the impact of the attributes of the head, what is in effect

¹ As reported in *Economist*, 2008, up from a mere thirty countries as reported in World Bank (2001).

being tested is whether the head exercises disproportionate impact on decisions which should in principle have been arrived at collectively by the members as a body.

This paper tests for whether the policy choices of village local councils (“*gram panchayats*”, GP) are impacted by reservation of the post of head (“*sarpanch*”) for females, using data from a survey of GPs conducted in 2006 in seventeen districts selected from four states, Madhya Pradesh, Chhattisgarh (a constituent of Madhya Pradesh until 2000), Rajasthan and Orissa. Policy choices are tested in binary form, for presence of expenditure in a particular sectoral direction. Since roads were a nearly universal choice of all GPs in the sample, the two sectoral choices tested for were expenditure on water and buildings, which were opted for by only about half the GPs in the sample in each case.

Section 2 briefly describes the Indian local institutional context, as a prelude to the review in section 3 of the theoretical and empirical literature on the issue of mandated representation, with a particularly detailed coverage of Chattopadhyay and Duflo, 2004b, who find that the differential preferences of the electorate by gender are statistically significant explanators of expenditures by female-headed GPs. Section 4 provides data descriptives. Sections 5 and 6 present the empirical findings for expenditure on water and buildings respectively. Section 7 presents other supplementary results on the impact of gender. Section 8 concludes.

2. Mandated Representation in Local Government in India

A third tier of local government was formally added to what in India had been a two-tier federation, by two amendments to the Constitution which went into effect in 1993. The seventy-third amendment mandated a three-tier governance structure for rural areas, at district, block and village levels.² Executive authority for revenue collection and expenditure on national or state funded schemes, such as anti-poverty programmes, is largely vested at the lowest level, the village-level GP.³ The amendments basically accorded constitutional recognition to governing units that had existed previously with spatially varying degrees of formality. Within the nationally uniform formal framework, there are variations in configuration in accordance with the state legislation through which it was effected. The uniform framework includes five-yearly elections, and reservation of a minimum of one-third of elected posts at all levels for women. Another required reservation at all levels is a minimum representation for members of underprivileged castes and tribes,⁴ with the gender reservation nested within this at the same

² The seventy-fourth amendment likewise mandated a local structure for urban areas that was single-tier, but differed in nomenclature and structure by size of city.

³ Rajaraman (2000).

⁴ These reservations are subject to a sunset clause of 50 years, by article 243D of the Seventy-third Amendment to the Constitution.

proportion. These reservations apply at the level of both council member, and head of council (*sarpanch*).⁵ The post of *sarpanch* is contested independently of council memberships in most states.⁶

The gender reservation is uniform across GPs within any state, at or above the national minimum of one-third, and is at the same level for both council member and *sarpanch*. The reservation by designated caste/tribe groups is required to be in proportion to their demographic share. For council membership, the share is that locally prevalent at GP level, possibly subject to floors or ceilings. At *sarpanch* level, the demographic share can be set at that prevailing anywhere from the level of the block (a sub-unit of a district), going up to the level of the state. Therefore the caste/tribe quota can vary not just across but also within states, and between membership and head. Details on the manner of assignment of all reservations for both member and head of council are in appendix table A1.

For a single post like that of the *sarpanch*, any reservation can clearly only be applied across GPs. The essential distinguishing characteristic of the gender reservation is that it is randomly assigned across demographics, and rotated between elections. The caste and tribe reservations for the *sarpanch* post on the other hand go by demographic shares, although they do rotate within designated subsets of GPs (except in some areas, falling under the Fifth Schedule of the Constitution, where they become permanently assigned to scheduled tribes for all GPs).⁷

The gender reservation for the post of *sarpanch*, by virtue of being entirely random, lends itself to testing for impact on policy choices. The impact of caste-tribe reservation on the other hand for the post of *sarpanch* does not lend itself to testing, since the policy choices could be endogenous to the underlying demographics.⁸ This is asserted in both Bardhan et. al. (2008b) and Chattopadhyay and Duflo (2004b).

⁵ Alternatively called a *pradhan*, the term used in Chattopadhyay and Duflo (2004a and b).

⁶ Although for West Bengal, the *sarpanch* is reported by Chattopadhyay and Duflo (2004b) to be chosen from among members of the council. As per the latest rules for the state, the *sarpanch* is directly elected.

⁷ This would be the case only for tribal areas; see notes to appendix table A1.

⁸ Depending on the state election rules (see table A1), if the caste/tribe quota for *sarpanch* is determined by block demographic shares, then the probability of a reserved head would be higher where the local share of reserved groups is higher. In one state (West Bengal), the uniform state quota is reported to be randomly assigned and rotated among GPs where the demographic share is 5 percent or more (Bardhan et. al. 2008b), but another paper reports randomization confined within each district, with the actual share set by the demographics for that district (Bardhan et.al. 2008c). The second conforms to the rules presently (after 2006) in force in West Bengal.

3. The Literature on Mandated Representation

Empirical investigations of the impact of mandated representation at panchayat level in India have looked at two major categories of nationally funded schemes, whose execution is vested with local government. In one category, involving welfare transfers or access to credit, beneficiary selection is done by GPs after public consultation with the general body (the *gram sabha*), and the funds flow directly to the beneficiary so chosen. For these schemes, there are studies that examine the pattern of beneficiary selection.⁹ In the other category of national schemes, principally those for employment generation, the funds are actually placed at the disposal of the GP.¹⁰ To the extent these funds are expended on classical public goods like roads or drains, the benefits of the infrastructure provided are not targeted, although in local jurisdictions covering a large area, there could be differential access determined by location of public works in terms of both employment and benefits, even of classical public goods. For these schemes there are studies such as Chattopadhyay and Duflo (C-D, 2004a and b), which have examined the sectoral choices made. This paper investigates the same issue of sectoral choices.

The theoretical framework for mandated representation of Osborne and Slivinski (1996) and Besley and Coate (1997), posits citizen candidates who do not commit themselves to the preferences of the electorate, but have their own preferences. Full information about the preferences of all citizens enables the choice of candidate by the electorate. There is a fixed cost of running for elections, which stands between citizens and the candidate pool. Reservation tilts the choice of policies in favour of preferences of citizens who were not in a position to get elected earlier, because they belonged to groups defined by gender or any other basis which either had a higher cost of running, or a lower ability to meet a uniform cost of running. The evidence on attribute-shaped choices by elected officials ranges from the finding in Levitt (1996) for the American Senate, that senators do not vote in line with either their party or their constituency preferences, and Pande (2003), who shows that in Indian states where a larger share of seats is reserved for minorities in the State Legislature, the level of transfers targeted towards these minorities is also higher. These issues have been explored in detail at the level of each constituency in State Legislatures of nine states (where reservation is permanently assigned, unlike the local level) in Krishnan (2007), which affirms and goes beyond the Pande finding to establish higher benefits to both the reserved population as well as the constituency as a whole with reserved representatives.

⁹ Bardhan et. al. (2008a, 2008b and 2008c), all for West Bengal, and Besley et. al. (2007) for the four major South Indian states. These are surveyed in this section.

¹⁰ The names of these schemes, for simultaneous provision of local employment and local public goods, have mutated over the years. At the time of survey a single scheme, the Sampoorna Gram Rozgar Yojana (SGRY) had been formed through the merger in 2001 of two earlier schemes, the Employment Assurance Scheme, and the Jawahar Gram Samridhhi Yojana (earlier named the Jawahar Rozgar Yojana).

This framework is adapted by C-D (2004b) to test for the impact of gender reservation of the post of *sarpanch* on the sectoral pattern of expenditure on infrastructure from the major nationally funded rural employment scheme. By the time of their study, GPs had been granted full discretionary latitude over sectoral patterns of use of funds from the scheme. However, this discretion was granted to the collective panchayat council, not to the individual *sarpanch*. The citizen candidate model presumes a context in which the citizen, once elected, is the sole, or dominant, decision maker. It was correctly applied by Levitt (1996), to the vote cast by the US Senator, over which he is the sole decision maker, and not to the outcome of the Senate voting as a whole, over which the individual Senator does not have even dominant let alone sole control. The analogous test in the Indian context would have been to test for the impact of the gender of the *sarpanch* on the vote cast by him or her in the internal deliberations of the GP, were such data available.¹¹ To test for the impact of gender of *sarpanch* on the policy choice of the decision making body tests in effect for whether the *sarpanch* is a dominant member of the local body, exercising power in a manner not envisioned in the decentralization legislation, which emphatically did not seek to replace the rule of the state with a local head of government functioning like a local lord (“*sarpanch raj*”).¹²

The C-D study, conducted in each of two districts in two separate states, finds a statistically significant impact, in the presence of gender reservation for the post of *sarpanch*, of differential female over male preferences for each sectoral type of expenditure (independently ascertained), upon quantum of infrastructure expenditure by sectoral type. Thus, their finding becomes in effect an affirmation of *sarpanch* domination in the two districts studied, across the entire range of expenditure choices facing them.

The rotating property of the randomly assigned reservation by gender implies that any modeling of the impact of gender reservation has to factor in the dynamics of this rotation for the long-term interests of the gender he/she represents. With rotating reservation, *prima facie*, it is not in the interests of the female *sarpanch* to allow domination even under her stewardship, since that will swing decisions away from the preferences of her group in the subsequent rounds of elections (a one-third reservation means that any one GP has a female *sarpanch* reservation only in every third election). By contrast, reservation of the post of *sarpanch* by caste or tribe rotates only where the groups are dominant. Those *sarpanches* do have an incentive to establish dominance, since the quota is in proportion to their dominance. However, the absence of random assignment makes it impossible to test econometrically for the impact of caste/tribe reservation,

¹¹ Alternatively, a test of the impact of reserved seat share on outcomes, as in Pande (2003) might have revealed the impact of gender reservation, but is not possible in the Indian local context where the reservation is uniform within, and for the most part between, states. There is a cross-country test of this kind in Ferber and Brun (2006).

¹² Although the organizational forms of other collective institutions in India, like political parties, for example, have indeed drifted towards domination by particular individuals or dynasties (Gowda and Sridharan, 2007, Sridharan 2007).

since such reservation is endogenous to the initial conditions of the area. The rotating character of female reservation means that the interests of the female *sarpanch*, as distinct from other reserved *sarpanches*, will be to enforce or retain the collective preferences of the body as a whole, so that females retain their voice even when the *sarpanch* is not female.

What if the female *sarpanch* has personal rather than purely gender-based aspirations, and sees scope for re-election as an unreserved open-field candidate in the subsequent election. In that case again, she is likely to revert to the preferences of the median voter in order to have appeal as an unreserved candidate to the electorate. Thus, dynamic considerations beyond one-term aspirations in the rotating reservation context suggest that gender-specific preferences would not be enforced. If reserved office-holders in one election can run as incumbents in the next election as unreserved candidates, dynamic considerations make the citizen candidate model merge into the standard median voter model as initially proposed by Downs (1957). The citizen candidate model works best when the mandated reservation is either permanent, or if rotating, such that the windows for the mandated groups take only the values one or zero, with no chances for individuals to move from reserved to unreserved categories.

The C-D finding is for a district in West Bengal and one in Rajasthan. In West Bengal, though not in Rajasthan, the authors report that the reservation was set at one-half, well above the stipulated minimum of one-third. This raises the probability of female acceptance of *sarpanch* dominance, since they retain power one-half of the time. It also lowers the likelihood of women being able to get elected as open candidates for the post of *sarpanch*, so that women *sarpanches* would be unlikely to position themselves for broader voter appeal. On both grounds therefore, the West Bengal setting is favourable to the C-D finding of female *sarpanches* being able to swing preferences in favour of the preferences of their gender, at least for the duration of their tenure. The finding for Rajasthan is not explained thereby. However, the C-D sample in Rajasthan was selected from areas controlled by a single NGO. The thrust of that NGO could, arguably, have led towards a *sarpanch* domination model, or towards an emphasis on provision of drinking water, which happened also to be a sharp female preference in a water-scarce state where fetching water is women's work.

The C-D paper measures the policy impact in terms of cumulative investments (normalized)¹³ in particular categories (roads, water, buildings) in the period since the last elections, which in both districts was two years. The notable and ingenious feature of the paper is the attempt to independently assess gender preferences through complaints lodged with the

¹³ These are normalized by taking the difference between the observed absolute figure for any panchayat and the mean for unreserved panchayats and dividing this difference by the standard deviation for the unreserved group, so enabling comparison across types of investments which may differ in quantum of investment.

panchayat by the local population, by the gender of the complainant.¹⁴ The female gender differential in complaints about the ith good, when interacted with the female reservation dummy, carries a positive and statistically significant coefficient. This is the key result that leads to their conclusion that female reservation leads to policy choices favouring female preferences.¹⁵ Another specification establishes that the aggregate share of complaints about the ith good, when interacted with the female reservation dummy, also carries a positive and statistically significant coefficient. This shows that female *sarpanches* also reflect more closely the concerns of the electorate, irrespective of gender.

The principal finding of the study in effect is that the gender attributes of the *sarpanch* prevail in what should be the outcome of a collective process. Thus, the findings of the specifications tested are at odds with the stated conclusion: "...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."¹⁶ In effect, the results confirm that the panchayat does not have effective control over policy decisions, and that the identity of the head of a collective body has a disproportionate impact on policy decisions. There is also possible endogeneity between the numbers of women coming forward to complain, and the gender of the head, if indeed the head dominates over the council.¹⁷

A sequence of papers (Bardhan et. al., 2008a, 2008b and 2008c) explores, also for the state of West Bengal, the impact of gender reservation, along with caste/tribe reservations, although these are demographically driven, as borne out by the statistically significant difference between means of variables for constituencies reserved and not reserved by caste/tribe (Bardhan et.al., 2008c). The focus is on the targeting of benefits from GP expenditures. The latest and most comprehensive is based on household surveys conducted over 2003-05, with retrospective

¹⁴ Complaints would normally be about the functioning of a particular service, and therefore about insufficient maintenance, rather than about deficient investment, which would not be seen as something the GP could rectify, although the investment data reported might well have covered expenditure on maintenance.

¹⁵ The authors conclude that because women complain most frequently about water and roads in West Bengal and about water in Rajasthan, these are the investments favoured. Actually what the specifications show is that investment is impacted by the differences, and the differences are actually greatest for drinking water (positive) and irrigation water (negative) in West Bengal. Thus, although roads and drinking water claim an equal share of female complaints in West Bengal, the upward impact on investment in drinking water is much greater because the gender difference in complaints is higher for that than for roads. There is also the pernicious implication that where the difference is large and negative, investment will for that reason be reduced, because of the positive coefficient of the gender difference.

¹⁶ Chattopadhyay and Duflo (2004b: 1440).

¹⁷ As indeed is quite explicitly stated in Chattopadhyay and Duflo (2004a).

recall going back to 1998, in 15 districts of the state.¹⁸ The general finding is that gender reservation does not improve targeting, either between or within villages in the sample. In particular, female-headed jurisdictions show lower targeting of cards issued to below-poverty-line households and housing benefits for disadvantaged households. This is in sharp contrast to the C-D finding of the greater general responsiveness of female-headed panchayats, although like that study, it serves to underline the apparent organizational model of *sarpanch* dominance in West Bengal whereby *sarpanch* attributes like gender matter. The negative effect of female *sarpanches* on targeting in the issue of BPL cards is reported also for three southern states (Besley et. al., 2007), once again confirming *sarpanch* dominance. Individual beneficiary identification in the areas studied clearly gets appropriated by *sarpanches* as a vehicle for patronage, despite the required involvement of the general body (*gram sabha*) in these decisions. Sectoral choices of expenditure might on the other hand be more open to collective determination. This paper attempts to examine whether *sarpanch* dominance varies by the type of sectoral choice. The paper does not extend to beneficiary selection programmes.

In contrast to gender reservation, caste/tribe reservation of the post of *sarpanch* is found to have a pro-equity impact, for some schemes at any rate, in both the series of papers by Bardhan, et. al., as in Besley et. al., (2004, 2007).¹⁹ However, these findings are affected by the endogeneity of this type of reservation to demographics. The underlying demographics in the first place would drive up entitlements to the major externally funded anti-poverty programmes. Aggregate per capita allocations between GPs are determined by allocation formulae, which are set out nationally even for within-state distribution, and favour jurisdictions with higher demographic concentrations of reserved castes/tribes. This could yield spurious inter-village findings on higher per capita benefits or higher percentages of households receiving benefits in jurisdictions with heads from reserved caste or tribe categories. A recent paper (Munshi and Rosenzweig, 2008) on caste/tribe reservations concludes that numerical dominance at sub-GP (ward) level leads to better public goods provision and higher observed leadership characteristics in the ward representative.²⁰ This finding for public goods provision is the first result for attributes of council member, rather than for head of council and is therefore the first to show absence of *sarpanch* domination (for the area studied). Paradoxically, however, at sub-GP ward

¹⁸ The latest is Bardhan, et. al. (2008b), based on a stratified random sample of 20 households from each village of a stratified random sample of 89 villages drawn from 57 GPs in 15 districts. An earlier paper covered the same region (Bardhan et. al., 2008c is the published version), but the data stopped at 1998, and were collected from official records rather than from household surveys. That paper found more pro-equity targeting of some benefits with gender reservation, using data stopping at 1998 and collected from official records rather than from household surveys.

¹⁹ The 2007 study is based on household and village survey data from 527 villages from 201 GPs in the four South Indian states of Tamil Nadu, Karnataka, Kerala and Andhra Pradesh, but the 2004 paper excludes Kerala.

²⁰ Also borne out by the Besley, et.al. (2007) finding that politicians from reserved categories are elites with higher education and income levels.

level, the random property across elections of caste/tribe reservation, which is critical to their result, is less justified than at *sarpanch* level (see table A1).²¹ On the impact of the voter ethnicisation issue on representative quality, there are contrary findings, though not in the local context, that numerical dominance leads to lower quality of the political representative (Banerjee and Pande, 2008).

4. Data Descriptives

The data used for the empirical exercise reported in this paper are from a primary survey of panchayats, funded by UNDP in four pre-selected states: Madhya Pradesh (MP), Chhattisgarh (CH, a constituent of MP until 2000), Rajasthan (RJ) and Orissa (OR).²² Within these four states, there was further pre-selection of nine backward districts, where backwardness was defined by entitlement to a nationally funded Backward District Initiative,²³ and therefore by the criteria used for that programme. To these nine, a further eight non-backward districts were required to be added on, not pre-selected, to serve as a comparator set with lower deprivational characteristics. Details on the manner of selection of the comparator districts are in Rajaraman, 2007.²⁴

A total of seventeen districts in four states therefore constitute the universe of the study. Since the selection of districts in the state was non-random by the very terms of the project, the findings are necessarily specific to the districts surveyed, and cannot yield state-level generalizations (the Chattopadhyay and Duflo study was likewise confined to two districts, one in each of two selected states).

²¹ This is because within a GP, the ward-level concentration of reserved groups is likely to be so uneven as to result in near-permanent reserved representation for some wards and near-permanent absence of reservation for others. Whereas the *sarpanch* quota is more broadly based, at block or state level, and therefore more likely to transit between reserved and unreserved across elections.

²² The terms of reference of the study are set out in detail in Rajaraman, 2007. The principal focus of the study was the quantum and seasonal timing of fund flows received from Central and state funded schemes, performance of agency functions with respect to these schemes from data on fund utilization, and awareness and utilization of their own fiscal domain.

²³ The Rashtriya Sam Vikas Yojana, RSVY, of the Planning Commission, initially covered 100 districts, selected for low agricultural productivity and high demographic shares of underprivileged groups, and 32 districts with high prevalence of left wing extremist violence. It was re-named the Backward Regions Growth Fund in 2006 and further extended to the present total of 250 districts.

²⁴ All districts in each state were ranked by a weighted index of 14 indicators, where the weights were determined by the proportion of total variation absorbed by the first principal component. After excluding the pre-selected backward districts, the eight additional districts were selected from this ranking, with fixed intervals, modified by the need to have adequate representation for all geographical regions of the state.

The sampling unit of the primary survey was the gram (village) panchayat (GP). Although panchayats at all levels of the three-tier structure were sampled, the focus in terms of detail of information collected was the GP, where executive authority is vested. No households were surveyed.

The final sample of GPs was selected through a two-stage random procedure, with half the constituent blocks in each district selected at the first stage, and ten GPs on average per selected block at the second stage. From the 78 sample blocks, the targeted sample size of 780 GPs was selected from a universe of 6301 GPs, yielding a sample selection percentage of 12.38 at the second stage. This sampling interval was used to obtain the requisite number of GPs in each sample block through simple random sampling with replacement. The sample and universe at district and block levels are shown in appendix table A2.

The data collected pertain to the year 2005-06, using a questionnaire in two parts. Both parts of the questionnaire were filled in from the same respondent, who was in most cases the GP secretary, a paid non-elected functionary. Part I collected information on the composition of the elected body, and on an assortment of fiscal and other indicators on the GP as a whole, including receipt and utilization of funding from the SGRY, the principal focus of this paper. Part II collected information on household-level access to an assortment of amenities, but at an aggregate level rather than from households themselves, and only for the main village where the GP office is located. The information collected was of a purely factual nature with none on respondent perceptions of change. Perceptual bias has been explored in recent papers (Duflo and Topalova, 2004, and Beaman et. al. 2008), as a possible explanation of why surveys find no impact of political reservation on policy outcomes. Those possibilities arise when opinions are sought on change over time, or on impact. The respondent in this case had no incentive to misrepresent the factual information sought.

The exercise tests for the impact of the randomized gender reservation on the sectoral choices of GPs from the funds at their disposal for allocation at their discretion through the major nationally funded SGRY programme for rural employment and infrastructure. Reported expenditure from SGRY funds did not distinguish between current maintenance and capital construction of new facilities, and indeed in the rural context, it is difficult to distinguish between the two. Expenditure using this funding was classified into one of three mutually exclusive categories: waterworks, including sanitation and drainage, and not differentiating between drinking and irrigation water; roads, including culverts and bridges; and buildings, including structures of all kinds ranging from animal or bus shelters to offices or schools. Other assorted expenditures went into a residual category. Four GPs had no data on SGRY expenditure and therefore had to be deleted, yielding a total sample of 776 in all.

Roads claim the largest share of 60 percent of aggregate expenditure in the sample (table 1), with buildings and water essentially splitting the remainder equally, although it is clear from

a comparison of weighted and unweighted shares that GPs with larger total expenditure devote a higher share to roads and buildings and less to water.

The essential feature of the expenditure pattern is the high dispersion around the mean, and this in turn is a result of some GPs showing zero expenditure in all three types. This percentage is lowest for roads (14 percent), slightly under half for water (45 percent) and over half for buildings (55 percent). It is this choice, between spending and not spending of a particular type, that calls for explanation in the first instance, and is addressed in this paper. Since roads are opted for by 86 percent of GPs, it was not amenable to examination in the binary form adopted here, and clearly displayed no functional dependence on gender of the *sarpanch*. The residual category of expenditure was too negligible, and too diverse, to enable investigation. A Tobit specification to explain the quantum of expenditure on each sectoral type was not tried, because the data for expenditure pertain to a single financial year. Expenditures can vary in quantum across years within the same jurisdictions for reasons of lumpiness, so that data spanning two years or preferably more are needed to enable testing for explanators of cross-jurisdictional variations in quantum of expenditure.

The dependent variable in our specifications is therefore cast in binary form for each of the two selected categories of expenditure, with a value of one if there is any expenditure in that category, and zero if there is none.

[Table 1 about here]

The SGRY scheme accounted for 31 percent of the total external funds received by GPs, which accounted in turn for all but two percent of their budgetary revenues for the year. The failure of GPs to supplement the external funds they receive with own revenues from the fiscal base assigned to them is a well-known feature of the third tier in India (Jena and Gupta, 2008; Rajaraman, 2003). The allocation of SGRY funds was fairly rigidly laid down, between states by state shares in the national population of rural poor (as measured by the National Sample Survey, NSS), and within states by demographic shares in the state aggregate of underprivileged groups (as measured by the decennial census), subject to an absolute floor to the allocation for each GP, which makes the total size of SGRY receipts a stand-in for population demographics, and the ethnofractionalisation index.²⁵ Since the distribution of these funds is not on a uniform per

²⁵ This is a simplification of an allocation formula which is far more complicated in practice, with three-stage (district, block, village) distribution within states based also on the inverse of per capita agricultural production in the district, which carries equal weightage with population demographics, and shares of total rural population also featuring as an additional determinant within a district. In the event of larger numbers of GPs than in the base reference year, the floor does not apply to the constituents of split GPs. It would appear that all states do not adhere to the formula; note in particular the results in Bardhan and Mookherjee (2006) which suggest that in West Bengal, the amount allocated was inversely related to poverty and share of low caste households, which ought not to have been the case, even during their period of study (1978-98).

capita basis, the relative dispersion for per capita receipts is nearly as high as for total receipts (see table A3). The SGRY was gradually replaced by the National Rural Employment Guarantee Scheme, which began in a subset of all districts in the country almost immediately after the conclusion of the reference year of our survey, 2005-06, and is demand-driven.²⁶ Thus for the very first time, the total quantum of funding in any GP could possibly be influenced by the effectiveness of the council in formulating effective projects and getting funding, and certainly changes the character of what under the SGRY was entirely exogenously determined.

Descriptives on SGRY fund receipts, along with other explanatory and control variables used in the specifications tested are shown in appendix table A3. The percentage of households below the poverty line (BPL) are from state-level surveys to identify the poor for targeted programmes, based on a nationally uniform set of multidimensional indicators including asset ownership, as distinct from NSS surveys, which merely estimate the poor on the basis of a sample survey of consumer expenditure. The BPL survey was done in three rounds in the states, in 1992, 1997 and 2002. The figures collected in the survey here pertain to the 1997 round, except for Madhya Pradesh, where the 2002 percentages were reported.²⁷ Despite such disparate points of measurement, and a more expanded definition, the inter-state ranking accords with the poverty ranking of states from the National Sample Survey for 2004-05. The reported BPL percentage showed a correlation of 0.292 with per capita SGRY receipts, an affirmation of the use of numbers of rural poor in determining SGRY allocations between (through not within) states. Therefore the econometric specifications use an alternative measure of the BPL percentages, normalised by the state average, to yield an index for each sample GP of its relative poverty level within the state in which it is located. The use of demographic population shares for within state allocations was confirmed by the crude correlation coefficient of 0.114 between per capita SGRY receipts and the ethnofractionalisation index.

The gender of the head has been instrumented by the reservation dummy rather than by observed gender, so as to preclude endogeneity. Of the total of 780 sample GPs, 255 were reserved for females, and 31 females were freely elected without the reservation. Statistical tests of the randomness of the gender reservation are performed on the means of variables, dividing the sample into those reserved for females, and those unreserved (appendix table A4). From the t-values, it can be seen that the null hypothesis of equivalence between the means cannot be rejected at any acceptable level of significance.

In terms of other count data, 50 GPs (6.4 percent) reported disturbances of law and order during the five years preceding the date of survey, most of which (37) were murders resulting

²⁶ Initially in just one-third of all districts, currently in operation in all districts. The SGRY continued to function in all the residual districts for the period of their exclusion from the NREGS.

²⁷ Because of disputes over methodology and the implications for households classified as BPL by the 1997 but not by the 2002 survey, only one state (Madhya Pradesh) had moved to the 2002 measure at the time of survey.

from inter-personal rather than group strife.²⁸ Surveys of this kind in any case preclude GPs where insurgency threatens the safety of the investigator. Calamities during the five years preceding the date of survey, defined as adverse exogenous weather shocks (droughts, floods), were reported by 284 GPs (36.4 percent). NGO presence is recorded in only ten percent of the sample. Roughly one-fifth of the sample GPs reported at least one outbreak of these diseases during the reference year, a disturbingly high incidence (table A3).

5. Expenditure on Water

Between expenditure on water, roads and buildings, water is commonly considered the most likely preference for women, because water provisioning is a female task. The only objective measure of gender-based preferences in the Indian rural context (C-D, 2004) affirms this common presumption.²⁹

Three probit specifications assess variables explanatory of the probability of use of SGRY funds on water and drainage related works in the year 2005-06. The marginal coefficients and diagnostics are reported in table 2. The explanatory factors are in five groups: institutional features, among them gender reservation for the post of *sarpanch*; *sarpanch* educational levels; quantum of receipt of SGRY funds; local characteristics at the GP level; and household access characteristics on which data were collected only for the main village. Data on household access to water therefore pertain only to the main village, with a single exception, a dummy on adequacy of drinking water in all wards of the GP, as assessed by the respondent, a GP functionary. The descriptive data in table A3 show that the mean number of villages per GP was 3.6, with a very high dispersion around the mean, and a range from one to twenty-one. Interestingly, the crude correlation between the adequacy assessment and the access measures in the main village was very low, so that it was taken as an added variable in all the specifications. *Sarpanch* education levels were taken as additional controls so as not to introduce noise into the reservation dummy; as might be expected, the educational attainments of male *sarpanches* are markedly higher than that of females (table A5). The two education dummies demarcate access to schooling, and access to education beyond class 8, the two major points of difference by gender shown in table A5. There are no location-specific dummies, for the district or the state,

²⁸ The murders however are often precipitated by land disputes, given the tardy resolution of these by the courts, and could provide grounds for insurgency movements, which offer speedy justice. There were 6 GPs reporting group strife, 4 reporting robbery or dacoity, and 3 unclassified.

²⁹ However, Singh et.al. (2006), point out the distinction between responsibilities for domestic water consumption (female) and productive water usage for irrigation (male). Although both are bundled together in the data collected for this paper, the usage of SGRY funds is likely to have fallen almost entirely in the domestic water and drainage category, with the possible exception of minor maintenance work on surface irrigation channels.

because these carry no explanatory value. The attempt is to find explanatory variables across the locations in which the sample was collected.

[Table 2 around here]

Specification 1 carries the best diagnostics. Specification 2 tries alternative measures of the spatial dispersion of population in the GP, and specification 3, which replaces the per capita measure of SGRY funds with aggregate receipts, is the worst of the three. Correctness of prediction is stable across the three, at nearly 60 percent, with sensitivity much higher than specificity (a little over half of all GPs had non-zero expenditure on waterworks).

There are basically three significant explanators, robust across specifications. Per capita SGRY receipts carry a positive coefficient. The percent of households in the main village with access to handpumps, and average population per village both carry negative coefficients. The last is a measure of the density and spatial dispersion of population, although GP area by itself carries no significance. When spatial dispersion was captured through an alternative pair of variables, number of villages and overall population density per unit area (specification 2), the density variable again was negative and significant.

Gender reservation was not significant, either as an intercept dummy, nor when interacted with other explanators. Together, the specifications tell a coherent story of higher probability of expenditure on water with higher per capita funding, lower access to handpumps, and greater spatial dispersion of the population in the GP.

SGRY receipts were not significant when taken as an aggregate absolute. For two GPs with identical aggregate receipts, per capita receipts will be higher in GPs where the shares of underprivileged groups in the local population are higher (see footnote 21). The normalized BPL percent was not correlated with per capita SGRY receipts, and so was included in the tables as an additional explainer. The normalized BPL percent does not carry significance in either form. Neither do institutional features of functioning such as the average number of meetings of *gram sabhas* (GS), or NGO presence.

A second set of specifications for the incidence of water borne diseases in the main village (cholera and diarrhoea) in the reference year, on local characteristics at both GP and main village levels, is reported in table 3. The fit in general is very good, with reasonably high sensitivity. The pattern of statistically significant variables is again coherent. The probability of these outbreaks is higher where the GP is more spatially dispersed, measured by area and population per village, or alternatively by the number of villages. It is higher for higher ethnofractionalisation and percent of BPL households (not normalized), and for lower access to handpumps and lower connection to drains in the main village (data on the latter two variables were collected only for the main village). There is a positive coefficient for access to ponds,

suggesting that notwithstanding ease of access, surface water sources make for spread of water-borne diseases.

This second set of specifications supports the finding of higher probability of expenditure on water in more spatially dispersed GPs. A dispersed pattern of settlement is in itself a likely indicator of the underlying difficulty of access to water. The impact of population demographics is impossible to entangle from the impact of higher funding, since the funding of this programme is so closely calibrated to the presence of disadvantaged groups. But it is clear that higher per capita availability of funds, as a measure of both supply of funds and of the higher share in the GP population of disadvantaged groups, is also a significant explanator of the probability of selecting expenditure on water and drainage works, as is low access to safe water from handpumps.

Clearly gender reservation of the post of head does not matter in sectoral choices driven by fundamentals as is the case for water, where the response to factors determining the incidence of water-borne diseases, in terms of ensuring access to safe (non-surface) drinking water over the entire area of the GP, was clearly the overriding consideration. If it is presumed that women are more concerned with water adequacy and quality than men, then the one-third gender reservation of the posts in the council is probably what drives the uniform response to fundamentals, regardless of gender of the head.

6. Expenditure on Buildings

The probability of a GP using SGRY funds towards any expenditure on construction or maintenance of buildings is modeled in three specifications (table 4). The first shows the best diagnostics, although all three are about even in correctness of prediction, at roughly two-thirds, with much higher specificity than sensitivity (a little over half of all sample GPs chose not to spend on buildings).

The big difference here from the results for water is that the gender reservation intercept dummy is positive and significant, and reasonably robust across specifications (in specification 2, it just falls short of significance at 10 percent). Per capita SGRY funds carries a positive and significant coefficient, as before, but is lower (though still significantly positive) in gender-reserved GPs.³⁰ *Sarpanch* educational attributes also matter, with a positive and significant coefficient on the dummy for high school education, robust across specifications.

These coefficients point to two conclusions. First, it is clear that in the sample here, *sarpanch* gender and attributes can matter for some but not all expenditure decisions. Second,

³⁰ This coefficient is subject to correction using the inteff procedure.

the robustness of the dummy for high school education, where these will be mostly male (see table A5), suggests that gender-reserved heads may pattern their choices on those made by *sarpanches* with more education, and therefore higher status.

Distance from the bus stop carries a negative and significant coefficient because of the greater difficulty and cost of getting construction material, for both reserved and unreserved GPs (since there is no incremental effect of *sarpanch* reservation). There is a positive coefficient for GPs with their own office building (nearly 90 percent of all GPs in the sample had their own building), which perhaps reflects supplementary construction and maintenance. Also significant and positive is the spatial spread of the GP when measured by area, but not by number of villages, perhaps reflecting the need for secondary office structures or warehousing over more dispersed jurisdictions. There is a positive and very significant coefficient for normalized BPL household percentages (in normalized form, this variable is not correlated with per capita funding). To test for whether this reflects the need for more public amenities like toilets where relative poverty is higher, the BPL variable was replaced with percent households with toilets (specification 3), but the replacement was not statistically significant. Presence of NGOs was positive and significant in one of the specifications, but average GS meetings had no explanatory value. Neither did the occurrence of calamities or disturbances (table A3 has the definitions of these variables).

Juxtaposed against the results for water, it is clear that the decision to undertake construction of buildings is impacted by gender and educational attributes of the *sarpanch*, along with other need and cost considerations.

7. Other Results

In the previous sections we have looked into SGRY expenditures on the construction and maintenance of water works and buildings in binary form. The overall utilization of aggregate SGRY funds is not investigated for the same reasons for which the earlier analysis was conducted in binary form. Expenditure lumpiness can lead to external funding from other schemes being used on SGRY works, to be restored later. This can lead to spurious cross-sectional data on utilization percentages across GPs.

Finally, table 5 reports four specifications to test whether gender reservation impacts on own revenue collections by GPs. The generalized failure of GPs in most states to exploit their assigned fiscal base has already been alluded to in section 4. Own revenue is split into tax and non-tax components. Non-tax revenues account for three-fourths of total own revenue collections (table A3), and are therefore of greater interest. The diagnostics are in general worse for per capita non-tax revenue than for tax revenue, but there are many more significant variables than

for taxes, where the only robust coefficients are carried by state dummies. State dummies are unavoidable in this context, since there are variations across states in the defined fiscal domain.

Gender reservation has no impact on revenue collected, although *sarpanches* with some schooling do collect higher non-tax revenues. The dummy for higher levels of education does not have any further positive impact. There is more non-tax revenue collected where the general body (*gram sabha*) meets more frequently.³¹ Finally, negative and significant coefficients are attached to prosperity indicators as instrumented by percent scheduled tribe population, and percent pucca residential structures, and also to distance from the headquarters of the block in which the GP falls (an indicator of remoteness).

Finally, the positive state dummy coefficients for Chhattisgarh and Madhya Pradesh (relative to Rajasthan) are explained for taxes by the classification of some taxes in the local domain in these two states as obligatory (Rajaraman, 2007). The positive coefficient for non-tax revenue carries no such ready explanation, and for Orissa is somewhat surprising. The data show collection of non-tax revenue from leasing fishing rights to ponds falling within properties owned by GPs.

8. Conclusions

Gender quotas apply in elections to local government councils in India, for the posts of both member and head (*sarpanch*), at one-third in the states studied here (during 2005-06). For membership, the quotas apply uniformly to each council. For the post of head of council, the quota is randomly assigned across councils. This has invited econometric attention towards its possible policy impact. However, testing for the impact of gender of head on the policy choice of the decision making body become in effect a test of whether the head has a dominant role in decisions which should, in principle, reflect the preferences of the collective body rather than those of the individual heading it. Further, any randomized reservation of this kind will by definition rotate between elections so that it will not, *prima facie*, be in the interests of the female head to allow domination even under her stewardship, since that will swing decisions away from the preferences of her group after subsequent rounds of elections. Dynamic considerations, where there is scope for re-election as an unreserved open-field candidate in the subsequent election also make it likely that the reserved head might see fit to revert to the preferences of the median voter. Therefore, findings on the impact of the gender of the head will inevitably vary across contexts, depending on the strength of these considerations opposing dominance by reserved *sarpanches*.

³¹ For an interesting empirical investigation of the attributes determining participation in *gram sabha* meetings for four south Indian states, see Besley et.al. (2007).

Received findings in the literature for the sectoral allocation of funds from the major national rural public employment scheme report a statistically significant impact, in the presence of gender reservation for the post of *sarpanch*, of differential female over male preferences for each sectoral type of expenditure (independently ascertained), upon quantum of infrastructure expenditure by sectoral type. These studies in effect affirm *sarpanch* domination by the head in the areas studied, across the entire range of sectoral choices facing the local council.

This paper tests sectoral deployment of the same public employment funds, but in binary form, for expenditure on water and buildings, independently for each, based on a sample of village local councils (GPs) in four states. Since roads were a nearly universal choice of all GPs in the sample, the two sectoral choices tested for were expenditure on water and buildings, which were opted for by only about half the GPs in the sample in each case. Roads, by virtue of being the universal option, clearly displayed no functional dependence on gender of the *sarpanch*.

Expenditure on water is driven by the fundamentals, in terms of ensuring access to safe (non-surface) drinking water over the entire area of the GP, the absence of which explains the incidence of water-borne diseases like cholera and diarrhoea, as determined in a separate set of specifications. Roughly one-fifth of the sample GPs reported at least one outbreak of these diseases during the reference year, a disturbingly high percentage. Gender reservation was not significant, either as an intercept dummy, nor when interacted with other explanators. For expenditure on buildings, by contrast, gender and attributes (education levels) of the *sarpanch* do matter, along with need and cost considerations.

Sarpanch domination therefore can vary by type of decision. Where fundamentals drive the expenditure decision, there is no evidence of the impact of gender reservation of the post of head, although the alignment between choices and fundamentals may well reflect the gender reservation of one-third of all council memberships. If it is presumed that women are more concerned with water adequacy and quality than men, then the one-third gender reservation of the posts in the council is probably what drives the uniform response to fundamentals, regardless of gender of the head.

Where the fundamentals are less pressing, *sarpanch* dominance can come into play. Results in the literature confirm *sarpanch* domination in targeted anti-poverty schemes, where individual beneficiary identification may be appropriated by heads of council as a vehicle for patronage, despite the required involvement of the general body (*gram sabha*) in these decisions.

As long as *sarpanch* attributes matter for any decision, preservation of collective decision-making calls for limits on the permissible number of terms as head for any individual. The results in this paper are with reference to the year 2005-06. After 2006, rural employment schemes have gradually shifted all over the country to a demand-driven configuration, under the National Rural Employment Guarantee Act (NREGA). The effectiveness of the *sarpanch* could

well determine the quantum of funding secured under NREGA, so that *sarpanch* attributes might have a new role to play in a way they did not with the precursor programme investigated here, where the quantum was externally determined.

Finally, the paper tests for, and finds no impact, of *sarpanch* gender reservation on own revenue raised. However, *sarpanch* education levels do result in higher revenue collection, as does an active general body which meets frequently. Revenue collections are lower where prosperity levels are lower, and in the more remote locations. State dummies matter here, since there are variations across states in the defined fiscal domain.

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Table 1: Type of Expenditure by GPs (2005-06)

	Roads	Buildings	Water	Residual
Mean expenditure in Rs./GP (SD)	120372 (141264)	37912 (87181)	32902 (55626)	9702 (22227)
Share weighted	59.92	18.87	16.38	4.83
Share unweighted (SD)	57.54 (34.96)	16.04 (26.47)	19.47 (27.62)	6.94 (14.79)
Count of GPs with expenditure	668	351	428	325
Total sample	776	776	776	776
Percent GPs with expenditure by type	86.08	45.23	55.15	41.88

Source: See source to table A1.

Notes: These are the sectoral breakdown of GP expenditures from the national rural public employment scheme called the Sampoorna Grameen Rozgar Yojana (SGRY). Total expenditure across all sectors is reported in table A1.

Table 2: Explanators of Expenditure on Water

Probit Specifications	Dep. Var. y_water=1 if any expenditure on waterworks including drainage		
	Spec 1	Spec 2	Spec 3
	<i>Marginal effects</i>	<i>Marginal effects</i>	<i>Marginal effects</i>
<i>Institutional Features</i>			
D: Sarpanch_reserv (female = 1)	-0.0092	-0.0094	-0.0340
Average GS meetings	-0.0079	-0.0144	-0.0084
D: NGO presence	0.0065	0.0256	-0.0100
<i>Sarpanch Attributes</i>			
D: Schooling (=1 for any schooling)	-0.0170	-0.0115	-0.0121
D: High school (=1 if > class 8)	-0.0200	-0.0187	-0.0218
<i>SGRY funding</i>			
Per capita SGRY receipts (Rs.)	***0.0018	***0.0021	
Sarpanch_reserv * PCSGRY(Rs.)	-0.0009	-0.0009	
Total SGRY receipts(Rs.)			0.0000
Sarpanch_reserv * SGRY(Rs.)			-0.0000
<i>Local Characteristics (GP)</i>			
GP area	-0.0009		-0.0012
No. of villages		-0.0075	
Pop_density per square km.		*-0.00005	
Pop_per_vill	** -0.00004		***-0.00005
Normalised BPL households (%)	0.0123	0.0201	0.0207
D: Adeq_dr_water (=1 if adeq all wards)	-0.0152	-0.0279	-0.0478
D: Sarpanch_reserv * Adeq_dr_water	0.0466	0.0560	0.0622
<i>Local Characteristics (Main Village)</i>			
Toilets_hhs (%)	0.0008	0.0010	0.0009
Sarpanch_reserv * Toilets_hhs (%)	0.0012	0.0006	0.0008
Handpumps_hhs (%)	** -0.0158	** -0.0142	***-0.0160
Sarpanch_reserv * handpumps_hhs	0.0044	-0.0049	0.0039
Wells_hhs (%)	-0.0011	-0.0006	-0.0014
Sarpanch_reserv * Wells_hhs	0.0013	0.0011	0.0015
<i>Goodness of Fit</i>			
LR chi sq	44.90	42.26	28.70
Prob > chi sq	0.0004	0.0010	0.0522
Pseudo R squared	0.0421	0.0396	0.0269
Correct predict (%)	58.76	59.02	58.89
Sensitivity (%)	76.87	75.47	84.35
Specificity (%)	36.49	38.79	27.59
<i>Number of observations</i>	776	776	776

Source: Authors' calculations from sample survey data covering 17 districts in four states: Orissa, Chhattisgarh, Madhya Pradesh and Rajasthan. Descriptive data are in table A1.

Notes: The model was estimated using the Stata package, which does not compute the coefficients of interacted terms correctly (Norton, Wang and Ai, 2004). Since none of the interaction terms was significant, the inteff correction was not applied. The other marginal coefficients are not affected by this.

Table 3 Incidence of Water-borne Diseases

Probit Specifications	Dep. Var. water_borne_diseases=1 if any incidence of cholera/diarrhoea in the year preceding the date of survey			
	Spec 1	Spec 2	Spec 3	Spec 4
	<i>Marginal effects</i>	<i>Marginal effects</i>	<i>Marginal effects</i>	<i>Marginal effects</i>
<i>Local Characteristics (GP)</i>				
GP area			***0.0036	***0.0039
No. of villages	***0.0439	***0.0460		
Pop_density	-0.00003	-0.00002		
Pop_per_vill			***-0.00004	***-0.00004
Ethnofract_index	***0.4298	***0.4256	***0.4081	***0.4035
BPL households (%)	***0.0032	***0.0034	***0.0044	***0.0046
Normalised BPL households (%)				
D: Adeq_dr_water (=1 if adeq all wards)	-0.0206	-0.0394	-0.0357	**0.0574
<i>Local Characteristics (Main Village)</i>				
Drains_hhs (%)	***-0.0024		***-0.026	
Toilets_hhs (%)		-0.00005		-0.0000
Handpumps_hhs (%)	***-0.0106	***-0.0124	***-0.0135	***-0.0160
Wells_hhs (%)	0.0031	0.0026	0.0036	0.0037
Ponds_hhs (%)	**0.0322	***0.0384	**0.0319	***0.0385
<i>Goodness of Fit</i>				
LR chi sq	309.40	299.77	201.53	188.23
Prob > chi sq	0.0000	0.0000	0.0000	0.0000
Pseudo R squared	0.4067	0.3911	0.2649	0.2456
Correct predict (%)	90.17	89.74	85.51	85.00
Sensitivity (%)	58.67	56.95	43.33	38.41
Specificity (%)	97.75	97.62	95.67	96.18
<i>Number of observations</i>	773	780	773	780

Source and Notes: See source and notes to table 2.

Table 4: Explanators of Expenditure on Buildings

Probit Specifications	Dep. Var. $y_{\text{building}}=1$ if any expenditure on construction and maintenance of buildings		
	Spec 1	Spec 2	Spec 3
<i>Institutional Features</i>			
D: Sarpanch_reserv (female = 1)	*0.2349	0.2207	*0.2290
Average GS meetings	0.0139	0.0155	0.0150
D: Presence of NGO in the GP (=1 if present)	*0.1070	0.1054	0.1034
<i>Sarpanch Attributes</i>			
D: Schooling (=1 for any schooling)	0.0017	-0.0055	-0.0061
D: High school (=1 if > class 8)	***0.1445	***0.1447	***0.1407
<i>SGRY funding</i>			
Per capita SGRY receipts (Rs.)	***0.0032	***0.0031	***0.0032
Sarpanch_reserv * PCSGRY(Rs.)	***-0.0021	***-0.0020	***-0.0019
<i>Local Characteristics (GP)</i>			
GP area	*0.0025		0.0021
No. of villages		0.0019	
Pop_density		0.0000	
Pop_per_vill	0.0000		0.0000
Normalised BPL households (%)	***0.1107	***0.1028	
Toilets_hhs (%)			0.0010
D: GP Own office building (=1 if own building)	**0.1638	**0.1688	**0.1754
Sarpanch_reserv * GP own office bldg.	-0.1300	-0.1174	-0.1424
D: Occurrence of any calamity in the GP (=1 if yes)	-0.0199	-0.0069	-0.0114
D: Incidence of disturbances in the GP (=1 if yes)	-0.0140	-0.0134	-0.0071
<i>Local Characteristics (Main Village)</i>			
Distance from bus stop	** -0.0090	** -0.0092	* -0.0079
Sarpanch_reserv * dist from bus stop	0.0048	0.0045	0.0035
<i>Goodness of Fit</i>			
LR chi sq	99.58	96.42	88.42
Prob > chi sq	0.0000	0.0000	0.0000
Pseudo R squared	0.0932	0.0902	0.0827
Correct predict (%)	66.11	66.11	64.18
Sensitivity (%)	51.28	52.14	47.86
Specificity (%)	78.35	77.65	77.65
<i>Number of observations</i>	776	776	776

Source: See source to table 2.

Notes: The coefficient of per capita SGRY receipts interacted with *sarpanch* reservation is subject to the inteff correction; see notes to table 2.

Table 5: Explanators of Own Revenue Collection

Tobit Specification	Per capita own tax revenue		Per capita own non-tax revenue	
	Spec 1	Spec 2	Spec 1	Spec 2
<i>State Fiscal Domain (Dummies)</i>				
Orissa	-3.9559	-3.9401	***6.4493	***7.0195
Chhattisgarh	***9.8696	***10.2445	**3.7646	***4.8394
Madhya Pradesh	***11.7757	***12.3072	**4.2901	***5.2897
<i>Institutional Features</i>				
D: Sarpanch_reserv (female = 1)	-0.0668	-0.0392	-0.9233	-1.0504
Average GS meetings	0.5538	0.5729	*0.5135	*0.5293
D: Presence of NGO in the GP (=1 if present)	0.7571	0.5838	2.2316	2.0262
<i>Sarpanch Attributes</i>				
D: Schooling (=1 for any schooling)	0.7585	0.7377	**3.7194	**3.7591
D: High school (=1 if > class 8)	0.8514	0.8003	-0.3378	-0.5904
<i>Local Characteristics (GP)</i>				
No. of villages	0.2474	0.3083	0.0250	0.0811
Scheduled caste population (%)	-0.0402	-0.0350	-0.0387	-0.0317
Scheduled tribe population (%)	** -0.0552	-0.0342	*** -0.1019	*** -0.0764
Normalised BPL households (%)		-1.6836		-0.7315
Pucca residential structures (%)	-0.0244		* -0.0482	
<i>Local Characteristics (Main Village)</i>				
Distance from block head quarters	-0.0410	-0.0385	** -0.0778	* -0.0743
<i>Goodness of Fit</i>				
LR chi sq	73.18	74.26	57.94	54.77
Prob > chi sq	0.0000	0.0000	0.0000	0.0000
Pseudo R squared	0.0368	0.0374	0.0116	0.0109
Left censored at zero	593	593	211	211
<i>Number of observations</i>	780	780	780	780

Source: See source to table 2.

Notes: Mean per capita own non-tax revenue was 76 percent of mean per capita own revenue; see table A3.

Table A1: Gram Panchayat (GP) Reservation

	Scheduled Caste (SC)	Scheduled Tribe (ST)	Other Backward Castes (OBC)	General
Caste & Tribe				
Council	By pop share (GP) (if > 5% floor in RJ; fixed seat min in OR)	By pop share (GP) (if > 5% floor in RJ; fixed seat min in OR)	Flat (If SC+ST pop share < 50% in RJ, CH & MP; 1 seat if 50% < SC+ST pop < 70% in RJ; SC+ST+OBC seats capped at 75% in scheduled areas of MP, CH)	Residual
Sarpanch (directly elected)	By pop share (State in RJ, OR; Block in MP, CH) (if > 5 % floor in RJ) Random rotation	By pop share (State in RJ, OR; Block in MP, CH) (if > 5 % floor in RJ) Random rotation	Flat (If SC+ST pop share per block < 50% in RJ, MP & CH; 1 if 50% < SC+ST pop < 70% in RJ) Random rotation	Residual
Gender				
Council	One-third	One-third	One-third	One-third
Sarpanch (directly elected)	One-third Random rotation	One-third Random rotation	One-third Random rotation	One-third Random rotation

Notes: 1. Scheduled castes and tribes under Article 341 of the Constitution are entitled to mandated political reservation at national and state levels. Backward caste reservation is additionally provided for in state legislation pertaining to local elections, at a flat percent (21 % in RJ, 27% in OR, 25% in MP & CH) of council membership, and of the total number of GPs per block for the office of *sarpanch*. Reservation is sequentially done for SC, ST and OBC in that order.

2. GPs are divided into wards, with each ward represented by one elected member in the council. All reservations for council membership are rotated within GPs between wards which satisfy floor requirements at or above zero for population shares of reserved groups within the ward.

3. The one-third gender reservation in all states is a minimum provision, which can be exceeded if required by the discrete numbers. In Chhattisgarh the gender quota was raised to 50% in May 2008 (after the period of our survey).

4. In scheduled areas (listed in the Fifth Schedule of the Constitution) all offices of *sarpanch* and at least 50 percent of council memberships are reserved for ST in Orissa, Madhya Pradesh & Chhattisgarh.

5. The reservation pattern for the upper two tiers of the three-tier panchayat structure may be had from the authors.

Table A2: Sample Survey Coverage

A2a: Selected Districts

State	Total districts	Pre-selected backward	Selected other	Total sample	Coverage (percent)
Madhya Pradesh	45	2	2	4	8.89
Chhattisgarh	16	2	1	3	18.75
Rajasthan	32	3	2	5	15.63
Orissa	30	2	3	5	16.67
Total	123	9	8	17	13.82

Notes: The backward districts were Khargone, Mandla (MP), Rajnandgaon, Bastar (CH), Jhalawar, Banswara, Dungarpur (RJ), and Mayurbhanj, Kandhamal (Orissa). The supplementary sample selected included Bhind, Vidisha (MP), Dhamtari (CH), Jhunjhunu, Jodhpur (RJ), Kendrapara, Bargarh and Malkangiri (OR). Malkangiri was not in the RSVY list of districts (see text footnote 24) and therefore not among the pre-selected backward districts in the sample, but had human development indicators inferior to that of some in the backward sets. The total number of districts in each state relates to the year 2004-05. At present the total number of districts in MP, CH and RJ are 50, 18 and 33 respectively.

A2b: Randomly Selected Blocks Within Selected Districts

State	Total blocks in selected districts			Selected blocks			Coverage (percent)
	Backward	Other	All	Backward	Other	All	
Madhya Pradesh	18	13	31	9	7	16	51.61
Chhattisgarh	21	4	25	10	2	12	48.00
Rajasthan	19	17	36	11	9	20	55.56
Orissa	38	28	66	17	13	30	45.45
Total	96	62	158	47	31	78	49.37

A2c: Randomly Selected Gram Panchayats (GPs) Within Selected Blocks

State	Total GPs in selected blocks			Selected GPs			Coverage (percent)
	Backward	Other	All	Backward	Other	All	
Madhya Pradesh	1093	1028	2121	135	127	262	12.35
Chhattisgarh	1282	336	1618	159	42	201	12.42
Rajasthan	814	627	1441	101	78	179	12.42
Orissa	535	586	1121	66	72	138	12.31
Total	3724	2577	6301	461	319	780	12.38

Table A3: Descriptive Data on Explanatory and Control Variables

Dummy variables (GP)	Description	Count	Dummy variables (Main Village)	Description	Count	Maximum
Sarpanch_reserved	Female=1	255 (32.7%)	Approach road	All_year=1	625 (80.1%)	780
Sarpanch_observed	Female=1	286 (36.7%)	Water borne diseases	Occurrence=1	151 (19.4%)	780
NGOs	Presence=1	77 (9.9%)				
GP Office	Own struct=1	694 (89.0%)				
Disturbances*	Occurrence=1	50 (6.4%)				
Calamities*	Drought/flood=1	284 (36.4%)				
Adeq_dr_water	Adeq=1	449 (57.6%)				
Continuous variables	Unit	Mean	Standard deviation	Minimum	Maximum	No. Obs.
GP level						
Pop		3083	1950	515	15586	780
Pop/household		4.9	1.1	1.6	12.1	780
Area	Sq. km.	13.7	13.6	1.0	112.1	780
No. of villages	Per GP	3.6	3.2	1.0	21	780
Pop density	Per sq km	463	697	28	5991	780
Pop/village		1323	1289	164	12696	780
Ethnofract index	3 groups	0.4	0.2	0	0.7	780
No. of gram sabhas (GS)	Per GP	1.7	1.1	1.0	9.0	780
Average GS meetings	Per GS	3.6	2.0	0.0	15.0	780
SGRY expend/yr (Rs.)	Total	200886	185960	8520	1323050	776
	Per Cap	71.2	52.5	4.6	441.0	776
SGRY Receipts/yr (Rs.)	Total	220850	202091	7768	1425376	776
	Per Cap	78.6	59.0	3.0	429.1	776
SGRY available funds (Rs.)	Total	262519	254106	11794	1782950	776
	Per Cap	92.0	66.6	4.1	523.6	776
Own revenue (Rs.)	Total	15471	40692	0	774920	776
	Per Cap	5.8	14.2	0	157.4	776
Own tax revenue (Rs)	Total	3144	12433	0	148961	776
	Per Cap	1.4	5.6	0	74.5	776
Own non-tax revenue (Rs)	Total	12326	36768	0	743161	776
	Per Cap	4.4	12.3	0	157.4	776
Main village						
Pucca houses	Per Cent	20.1	27.3	0	99.5	780
Hhs_connected_drains	Per 100 hh	12.3	23.6	0	100	773
Wells	Per 100 hh	3.2	5.1	0	50	780
Pumps	Per 100 hh	4.4	5.0	0	55.1	780
Ponds	Per 100 hh	0.9	1.00	0	8.9	780
Distance to block HQ	Km.	20.6	15.8	0	150	780
Distance to pucca road	Km.	2.8	4.7	0	45	780
Distance to bus stand	Km.	3.8	6.03	0	69	780
Distance to ration shop	Km.	0.8	3.4	0	80	780
Distance to PHC	Km.	0.7	2.1	0	16	780
Distance to prim sch	Km.	0.01	0.1	0	2	780
Distance to middle sch	Km.	0.6	1.9	0	20	780
Distance to high sch	Km.	4.7	5.4	0	35	780
Distance to voc, other	Km.	33.6	30.2	0	200	780

Distance to Bank (km)	Km.	7.7	7.2	0	50	780
Distance to + 2	Km.	8.7	8.5	0	75	780
BPL Households (%)						
Orissa		64.3	19.3	0	99.0	138
Chhattisgarh		44.2	21.5	2.9	95.4	201
Madhya Pradesh		38.5	20.3	0.3	95.7	262
Rajasthan		30.2	26.4	0	98.3	179

Source: Primary data collected by the authors from sample GPs collected through multistage selection (table A2). All data pertain to the reference year (2005-06) except for those marked with an asterisk, which pertain to a five-year period ending in the reference year. Four GPs did not report data on expenditure from SGRY funds. Seven had no data on the number of households connected to drains. Tests for the randomness of the gender reservation process shown in table A1, on the difference between means for GP characteristics partitioned into two groups by gender reservation, are in table A4. Supplementary data on education levels of *sarpanch* are in table A5.

Notes:

1. The Sampoorna Grameen Rozgar Yojana (SGRY) was the national-level rural public employment and infrastructure programme in operation in 2005-06. For the antecedents of this programme, see footnote 22 in the paper. The sectoral breakdown of SGRY expenditures is shown in table 2. SGRY receipts record what was received in the reference year; available funds add to this the unspent (non-lapsable) balances from previous years. Expenditure could therefore in rare cases exceed the receipts for the year, but the mean value is below receipts.
2. The ethnofractionalisation (EF) index is calculated for three classes of population, underprivileged (scheduled) castes, scheduled tribes, and the residual. Because of the manner of calculation of SGRY entitlements, which at the sub-state level is calibrated to demographic shares of underprivileged populations, the crude correlation coefficient between the EF index and SGRY receipts was 0.136.
3. The gram sabha (GS) is the general body of voting members of the *gram panchayat*, where there can be more than one GS per GP. The range is between one and nine. Average GS meetings normalizes the number of GS meetings reported for the GP by the number of such bodies. The mean number of meetings was 3.6 per year, with a very wide range.
4. The BPL (below poverty line) percent of households reported are from state-level surveys every five years (the latest in 2002) based on a full census of households, using multidimensional indicators spanning income and assets. The more commonly cited state-level poverty estimates are from the nationwide National Sample Survey, which is based on a sample, and therefore does not identify the poor in the way the BPL survey does. Although the ranking of states by the reported BPL percent corresponds broadly to that from nationwide surveys, an alternative measure of poverty normalized by the state average was also used.

**Table A4: Tests of Significance on Means for Reserved (R)
and Unreserved (U) GP Characteristics**

Variable	R/U	Mean	Std. dev.	No. of obs.	t-value
Population density	R	431.44	645.74	255	-0.9077
	U	477.94	720.75	525	
Population	R	3142.40	2078.03	255	0.5703
	U	3054.59	1886.24	525	
Ethnofract index	R	0.3742	0.1487	255	-0.5720
	U	0.3809	0.1635	525	
SGRY receipts	R	218577.60	210133.50	255	-0.1479
	U	220897.80	197873.20	525	
SGRY receipts per capita	R	79.67	69.98	255	0.3973
	U	77.70	52.84	525	
SGRY expenditure	R	202983.00	190635.00	253	0.2156
	U	199872.20	183831.70	523	
SGRY expenditure per capita	R	73.80	62.60	253	0.8774
	U	69.91	46.86	523	

Source: See source to table A1.

Notes: The total number of observations was reduced to 776 for all expenditure-based variables, on account of unrecorded expenditure information for four GPs. Of the missing observations, two were reserved and two were unreserved.

Table A5: Descriptive Data on Sarpanch Education Levels

Level	All	Male	Female
Illiterate	16	5	11
Literate, no schooling	141	40	101
Primary (upto class 5)	146	89	57
Middle (class 6-8)	151	99	52
High (class 9-10)	132	89	43
Senior high (class 11-12)	88	75	13
Higher	106	97	9
Total	780	494	286

Source: See source to table A1.

Notes: The count of GPs with a female *sarpanch*, 286, was higher than the number reserved, 255. See table A1.