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ABSTRACT

Efficiency Consequences of Affirmative Action in Politics: Evidence from India*

We examine how overall delivery of public goods (i.e., efficiency) is affected by affirmative action in elections, i.e., restricting candidate entry in elections to one population group. We argue that when group identities are salient, such restrictions on candidate entry need not necessarily reduce electoral competition. In fact, when group sizes are asymmetric, affirmative action may increase electoral competition and consequently, improve provision of public goods. This happens because in an open election, the (best) candidate from the large group facing a minority candidate suffers from a moral hazard problem. Affirmative action eliminates this problem and increases within-group competition. We study a randomized caste based quota policy in village elections in a large state in India to test these claims. Consistently, we find that electoral quotas for a caste group (OBCs) increased provision of public goods in villages with high OBC population shares. We show that this did not happen due to changes in politicians' preferences or quality, and the increased provision of public goods did not disproportionately benefit the OBCs. Further, using election data, we show evidence in favor of our mechanism: win margins are narrower in quota elections relative to open elections in villages where OBC group is large. Our results highlight that efficiency concerns regarding affirmative action in politics may need reevaluation.

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1 INTRODUCTION

Affirmative action (AA) in electoral politics have proliferated in the modern world. These policies impose some form of restrictions or quotas in elections for members of certain population groups. Currently there are more than 100 countries which have some form of quota for women in elections and about 24 countries with electoral quotas for some ethnic group.[1] Evidently, these restrictions have been imposed to achieve equity in political representation that these groups lack due to historical discrimination faced in their respective societies. However, these affirmative action policies often face criticisms in public debates on the grounds of efficiency. Firstly, restrictions on candidate entry may dampen electoral competition as Auerbach and Zeigfeld (2016) find in the context of Indian elections, and Drometer and Rincke (2009), Stratmann (2005) and Burden (2007) find in the United States.[2] Also, such policies, the critics argue, may bar more competent candidates from running. The website http://www.quotaproject.org, for example, lists as one of the cons of gender quotas in elections the following: "Quotas imply that politicians are elected because of their gender, not because of their qualifications and that more qualified candidates are pushed aside." The general concern is that, if performance of elected leaders depends on both their competence and electoral competition, then affirmative action policies may potentially lead to worsening of overall delivery of public goods and services.[3]

We examine and challenge this view both theoretically and empirically by looking at caste based affirmative action policies in village elections in India. We show that affirmative action in the form of candidate restrictions may, in certain cases, *increase* electoral competition leading to improvement in leader's performance. We contend that demography often impinges on electoral competition in contexts where group identities are salient (such as in rural India). Moreover, the extent to which demography affects electoral competition depends on the group composition of candidates running for elections. Since affirmative action alters the group composition of candidates, its efficiency consequences in such scenarios may depend critically on the group composition of voters. To consider this more rigorously we build a probabilistic voting model with rent-seeking politicians where voters are divided

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[1]The information about quotas on women is available at http://www.quotaproject.org, which is a joint project of International IDEA, Inter-Parliamentary Union and Stockholm University. The information about countries adopting ethnic quotas is sourced from Bird (2014).

[2]The candidate restriction policies in the United States take the form of filing fees and signature requirements (known as ballot access restrictions).

[3]Such efficiency concerns regarding affirmative action policies is more general. There is a large literature that discusses these issues in the context of education (see, for example, Backes (2012), Antonovics and Backes (2014), Fang and Moro (2010) among others), employment (Loury (1992), Coate and Loury (1993), Moro and Norman (2003)), and tournaments in general (Schotter and Weigelt (1992), Calsamiglia, Franke and Rey-Biel (2013)). Similar discussions in electoral politics is, however, more rare.

into two groups and they prefer a leader from their own group. This preference for a "co-ethnic" leader, we believe, is natural in contexts where group identities are salient and AA is relevant. We claim that if group members have such "co-ethnic" preferences, then the effect of restricting candidate entry to one group depends on the size configuration of the groups. We show that public goods provision may in fact *improve* with AA when the sizes of the two voting groups are skewed, i.e., when one group is large enough. If preferences of voters are different across groups then the group eligible for AA would have to be large to get the result. When preferences are identical across groups, it doesn't matter which group is subjected to AA; as long as one group is relatively large, public goods provision under AA would be better than without AA. Also, we get this result even when we allow for the possibility that average quality of candidates may worsen with AA.

The result is primarily driven by the fact that presence of "co-ethnic" preferences creates friction in electoral competition. Therefore, when group sizes are asymmetric, the (best) candidate from the large group suffers from a moral hazard problem. Since a large fraction of the voters is expected to vote for her, she gets an undue advantage against the (best) candidate from the smaller group. This results in less than efficient provision of public goods. Imposition of AA eliminates this advantage for the candidate. Now all candidates are from the same group and therefore, they are liked (or disliked) equally. This inevitably increases (within group) competition and results in improvement in public goods provision. Also, as the group becomes larger, the moral hazard problem in open elections becomes even more severe. Therefore, the efficiency gain from imposing AA becomes greater as the group becomes larger.

This mechanism is similar to what Banerjee and Pande (2007) explore in their paper about the consequence of ethnic polarization of voters. They argue that the candidate from the larger group would be of lower quality than the minority candidate, and that this quality gap increases when voters become more polarized and the majority group becomes larger. However, unlike our model, in their context both the politicians and the groups (or parties) have no agency in choosing policy platforms and candidate quality, respectively. Further, they are motivated by how political parties choose candidates of differing qualities across jurisdictions and how that choice may be influenced by the level of "co-ethnic" preferences. We, on the other hand, are interested in the consequence of "co-ethnic" preferences for affirmative action.

Our model extends the standard result in the probabilistic voting literature about positive equilibrium rents by showing that in presence of groups with "co-ethnic" preferences, rents are not only positive but different across the candidates. In fact, when group sizes are asymmetric the expected winning candidate enjoys *higher* equilibrium rents (relative to the

other candidate) in an open election. This indicates the moral hazard problem discussed above.[4] This result forms the basis for our argument that affirmative action may have positive efficiency consequences.

The model is focused on explaining the level of public spending and therefore, doesn't consider any distributional consequences of AA. This is partly motivated by our context. Recent papers looking at caste based AA policies in Indian elections have found negligible distributional effects of such policies (see, for example, Bardhan, Mookherjee, and Torrado (2010), Dunning and Nilekani (2013) and Bhavnani (2016) for AA policies in village and municipal elections and Chin and Prakash (2011) and Jensenius (2015) for such policies in elections of state legislatures). This happens to be the case in our data as well (see Section 6 for more details). We therefore do not directly comment on the equity vs efficiency trade-offs of AA policies and highlight primarily its efficiency consequences. Our results in fact imply that in certain cases there is no such trade-off to begin with.

We empirically test the predictions of the model in the context of elections of village council heads in Rajasthan, a large Indian state. We compile a dataset comprising of a near universe of village councils of Rajasthan; the dataset contains detailed election results of the village council head elections, demographic characteristics of the villages, and data on work generated under NREGS (National Rural Employment Guarantee Scheme), the largest public works program implemented by the village councils. We exploit the randomized quota policy in village council head elections for a caste group, known as the Other Backward Classes (OBCs), to get exogenous variation in the nature of elections (i.e., open vs with AA). The quota policy randomly selected village councils using lotteries and imposed the restriction that all candidates running for the village head elections in the selected villages must be members of the OBC group.[5] This quota policy is referred to as the "reservation policy" for OBCs.

In this context the relevant groups that we consider are SC/STs and non SC/STs, and the quota for OBCs restricts candidate entry to the non SC/ST group.[6] The partition is dictated by data considerations; the census of India does not record population figures separately for OBCs. However, OBCs constitute 85% of the non SC/ST group in Rajasthan

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[4]Divergence in equilibrium platforms may arise in other contexts as well, as discussed in Alesina (1988). However, in such models the candidates have different preferences to begin with, i.e., the candidates are assumed to have different ideological bliss points. In our case divergence emerges even when the preferences of the candidates are identical.

[5]The lottery was performed on a subset of all village councils, after imposing quotas in some elections for other minority caste groups. The details of the quota procedure is provided in Section 5.1.

[6]Scheduled Castes (SCs) and Scheduled Tribes (STs) are historically discriminated minority caste groups and indigenous tribes, respectively. There are separate reservation policies in elections for them as well. However, their reservation rule is non-random and therefore is not helpful for us.

and therefore, may be treated similarly.[7] Also, there is wide variation in the population shares of the non SC/ST group across village councils; this is helpful for identifying the effect across the entire range of values of population shares. As indicated above, we look at public spending under NREGS to test the effects of AA on village head's performance. Finally, we note that the preferences for spending under NREGS is not identical across the two groups; specifically, the SC/STs derive higher benefits from NREGS spending than the non SC/STs.[8]

Given this preference configuration, we test a specific prediction proposed by the model: difference in per capita work generation under NREGS between OBC reserved and open election villages will differ across villages with different non SC/ST population shares. Specifically, the difference will be positive for villages where the non SC/ST share is greater than a threshold value. For villages with non SC/ST share smaller than the threshold value the difference will be negative, i.e., OBC reservation villages will have lower per capita work generation than open election villages. Also, as we increase the non SC/ST share from low to high values, the difference in work generation will eventually increase, starting negative it will eventually go up to zero at the threshold value and then will become positive.

This specific prediction described above is validated in the data. Among the villages where the non SC/ST population share is greater than 0.75, the per capita work generation is higher in OBC reserved village councils (compared to open election ones). At this population share, the reserved village councils have 5.1% more work. On the other hand, the effect becomes negative at low non SC/ST shares. Reserved village councils have 20% less work when the non SC/ST share is less than 35%.[9] About 44% of villages have non SC/ST population share larger than 0.75 and villages with non SC/ST share less than 0.35 constitute only 3% of the sample. Therefore, the estimated efficiency gains are economically significant. Importantly, the result remains same if we remove all village councils headed by non OBCs and do the analysis on only those village councils which have OBC heads (either in reserved or in open election councils). This indicates that the result is not driven by differential preferences of village heads (OBC vs rest). The result also rules out the case that OBC voters may be able to discipline a OBC head more to implement greater public spending, especially when the OBC group is large (as argued by Munshi and Rosenzweig (2016)); it is, therefore, due to AA *per se* that the effect is realized. Using education as a proxy for

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[7]As a robustness exercise we impute the OBC population from another data source and show that our results remain unchanged to such imputation. See section 6.3 for details.

[8]This is possibly driven by the fact that the SC/STs on average are poorer than the rest and consequently, they are disproportionately represented in the people who get jobs under this scheme, and therefore, derive higher benefits from every rupee spent under NREGS.

[9]All the estimates mentioned so far are statistically significant.

ability, we also show that OBC reservation did not improve politician ability, and therefore, can not be the mechanism behind the result.

We then look at the margin of victory in the elections, as a measure of electoral competition to verify if the mechanism of the result is consistent with what the model would predict. Our model predicts that there is a critical value of the non SC/ST population share below which AA will result in an increase in the win margin (i.e., lower electoral competition), and above which the win margin will fall due to AA.[10] Consistent with this prediction, we find that for village councils with non SC/ST share higher than 0.5, the win margin was lower in OBC reserved villages. For the rest of the village councils, the win margins are higher but the estimates lack in precision.

This paper, therefore, demonstrates that it is possible to improve efficiency with AA in place. Most of the existing literature on AA in elections, on the other hand, focus heavily on the distributional question (Dunning and Nilekani (2013), Jensenius (2015), Besley, Pande and Rao (2004), Besley, Pande and Rao (2012), Chattopadhyay and Duflo (2004), Bardhan, Mookherjee, and Torrado (2010) etc), as indicated before. An exception is Anderson and Francois (2017) who show that caste based AA indeed improved efficiency in a sample of villages in Maharashtra. However, in contrast to our paper, they find this result for villages where the population shares of the two relevant groups are symmetric, i.e., around 0.5. To explain this result they propose a model where incumbent politicians are motivated by reelection concerns. Such concerns are however largely absent in the context of elections that we examine. Banerjee et al. (2016) find that re-election rates are extremely low in elections for the village council heads in Rajasthan (around 5%).[11] This is true for many other states of India as well. Das and Palsson (2017) find that among village politicians in the state of Kerala - one of the most advanced states in India with strong political institutions - the average reelection rate is about 5% for the entire state and the rate of rerunning is about 11%. The Rural Economic and Demographic Survey (REDS), 2006, which is a pan-Indian survey conducted in 17 major states of India, reports that 90% of village heads either didn't run the previous time or never held office. Hence we use a static model of electoral competition to explain our result in the context of Rajasthan. The static model is also the standard framework applied in the literature discussing electoral politics in rural India. (See, for example, Chattopadhyay and Duflo (2004), Munshi and Rosenzweig (2016), Foster and Rosenzweig (2004), Bardhan and Mookherjee (2000) and Bardhan and Mookherjee (2006).)

There are some papers that look at changes in efficiency in presence of women quota (Gajwani and Zhang (2014), Afridi, Iversen and Sharan (forthcoming)). However, these

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[10]This critical value will generally be different from the one discussed before.

[11]The reelection rate two election cycles after is about 1%.

papers argue that lack of administrative knowledge of women leaders is the reason for the fall in efficiency. In fact, Afridi, Iversen and Sharan (forthcoming) show that the knowledge gap between men and women leaders is temporary; the women leaders catch up very quickly and by the end of their tenure they are as competent as their male counterparts. Besley et al. (2017) look at party lists in Sweden and argue that women quota on the list positions removed less able men from the list and made the average ability of the winning candidate higher. We, on the other hand, show that outcome can improve even when average ability worsens due to AA.

The paper is organized thus: in section 2, we exposit the theoretical model. Section 3 provides the background and institutional set up for empirical work. In section 4, we provide details of how we compile the dataset and discuss basic descriptive statistics. The empirical specifications and identification strategy are laid out in section 5. Section 6 discusses the main results and provides evidence for the mechanism laid out by out theoretical model. In addition, we provide results from some robustness checks and argue against other alternative explanations. We conclude in section 7.

2 MODEL

2.1 Set Up

2.1.1 Voter Preferences

Let us suppose that there is a continuum of voters of mass 1. They are divided into two groups or ethnicities, A and B. The population shares of the groups are given by α_A and α_B, with $\alpha_A + \alpha_B = 1$. Each voter is denoted by i and $g(i)$ denotes her group membership, i.e., $g(i) \in \{A, B\}$. The voters care about the amount of public resources spent by the elected leader, denoted by r_L, and the group identity of the leader. Specifically, a voter's expected utility from public spending is given by,

$$\hat{u}_i(r_L) = \gamma_{g(i)} r_L + \mathbb{I}\{g(i) = g(L)\}.$$

The first part of the utility function captures the preference for public good spending and the second part captures the benefits of having a co-ethnic leader in power. γ_A and γ_B are the relative preference parameters with $\gamma_A \leq \gamma_B$. They capture how much voters from a group prefer the public good spending relative to having a co-ethnic leader. Higher γ_g implies higher preference for public spending, or lower preference for having a co-ethnic leader.

2.1.2 Selection of Candidates

The leader is elected in a two candidate election. We fix the number of candidates in the model to focus on the changes in their composition and its consequent impact on electoral competition when election is changed from open to one with AA. Also, this modeling assumption is consistent with the literature that looks at behavior of rent-seeking politicians in a probabilistic voting setup (Polo (1998); Persson, Roland and Tabellini (1997); Besley, Persson and Strum (2010)). Moreover, in the context of our study there doesn't seem to be a lot of variation in number of candidates across two types of elections and the top 2 candidates receive a large share of the votes which makes the other candidates essentially "non-pivotal" (see Section 6.3 for more details). We later discuss an extension of the model where the number of candidates is endogenized.

For each group, there is a potential candidate pool from which the group (collectively) chooses its candidate. Candidates can be either high or low ability, their ability parameters being denoted by θ_H and θ_L respectively ($\theta_H > \theta_L > 0$). The ability of a politician captures her managerial talent or capacity of implementing public projects. The candidate pool for each group consists of two candidates, one of each ability type. We, therefore, assume that there is no difference between groups in terms of the talent pool of the politicians. [12]

Elections are of two types: open and "restricted" (i.e., with AA). In open elections each group puts up one candidate. A group chooses its candidate in a way to maximize its payoff, taking into account the other group's choice. In a restricted election both candidates come from one group - the group which is subjected to AA. Therefore, in restricted election the eligible group essentially doesn't have a choice but to put up its two candidates, one of each ability type.

2.1.3 Electoral Competition

Each candidate, once chosen by a group, announces her platform - the amount of public good spending that she will implement if elected. We assume that the candidates are able to commit to their announced platforms, i.e., their announcements are credible. However, announcing higher level of public spending is costly. The cost of higher spending depends on the ability type of the candidate. Therefore, a candidate c chooses her platform r_c to maximize:

$$v_c(r_c) = \pi_c \left[1 - \frac{r_c}{2\theta_c} \right]$$

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[12]This is not necessary for our results. As long as affirmative action is applied to a group which doesn't have a pool of more talented politicians, our results will go through.

where π_c is the probability that candidate c wins, which may depend on both her and her opponent's platforms. The gross rent from office is 1 and $\frac{r_c}{2\theta_c}$ is the effort cost of the candidate to deliver on her promise if elected. Therefore, the expression $(1 - \frac{r_c}{2\theta_c})$ captures the net rent candidate c would enjoy if elected to office. Announcing higher public spending may increase a candidate's probability of win, but it leaves her with lower net rent. That is the trade-off that each candidate faces. Before voting takes place, each voter gets two preference shocks for each candidate in the following manner. Let the candidates be c and c'. Then voter i votes for candidate c if

$$\hat{u}_i(r_c) > \hat{u}_i(r_{c'}) + \mu_i + \sigma$$

where μ_i is the relative idiosyncratic preference shock of i for candidate c'. μ_i could either be voter i's personal (relative) preference for c''s ideology, or it could be i's preference for the candidate's personal characteristics. We assume that

$$\mu_i \sim U\left[-\frac{1}{2}, \frac{1}{2}\right].$$

σ is the overall level of (relative) popularity of candidate c'. We again assume that

$$\sigma \sim U\left[-\frac{1}{2}, \frac{1}{2}\right].$$

We introduce these shocks to make the probability of win non-degenerate and smooth functions of the candidates' platforms. This is a standard technique applied in probabilistic voting models, first proposed by Polo (1998).

2.1.4 Timing of Events

The sequence of events in the model is as follows:

1. The election type - open or restricted - is decided.

2. The eligible group(s) decide their candidates.

3. The candidates announce their platforms.

4. The preference shocks μ_i and σ are realized.

5. Voters cast their vote.

6. The winner implements her announced platform and payoffs are realized.

2.2 Characterization of the Equilibrium

2.2.1 Open Election

In open elections, groups A and B first choose their candidates and then they announce their platforms. We assume that both A and B put up their high ability candidates. Therefore, the candidate profiles are (A, H) and (B, H). We later will show that this is indeed the equilibrium choice of the groups. Let r_{AH} and r_{BH} be the announced platforms of the candidates. When the candidates choose their platforms, they balance the trade-off between increasing their probability of win and the net rent from office. The equilibrium of this choice problem is stated in the following result:

Proposition 1 *Let the candidates of the election be given by (A, H) and (B, H). Then their platform announcement game has a unique Nash Equilibrium and it is given by*

$$r_{AH}^o = 2\theta_H - \frac{(2\alpha_A - 1)}{3\kappa} - \frac{1}{2\kappa},$$

$$r_{BH}^o = 2\theta_H + \frac{(2\alpha_A - 1)}{3\kappa} - \frac{1}{2\kappa},$$

where $\kappa = \alpha_A\gamma_A + \alpha_B\gamma_B$.

Now, if group B instead of putting forward a high ability candidate, had chosen a low ability one, the announced platforms of both candidates would have been different. This is because a low ability candidate from B would have changed the incentive of the high ability candidate from A to announce higher or lower r_{AH}. Therefore, when group $g \in \{A, B\}$ chooses its candidate c it optimizes the following problem:

$$\max_{c \in \{gH, gL\}} \gamma_g \mathbb{E}r^o + \pi_c^o$$

where π_c^o is the probability that candidate c wins an open election and $\mathbb{E}r^o$ is the expected public spending given the choice of the candidates. We now have the following result:

Proposition 2 *The open election game has a unique Nash Equilibrium where both groups choose their high ability candidates and the candidates announce platforms as specified in Proposition 1.*

2.2.2 Election with AA

We assume through out the paper that affirmative action is applied to group A. Therefore the candidate profiles in the election are (A, H) and (A, L). Hence, for voters from both

groups the candidates are symmetric from the point of view of being co-ethnic. For group A both candidates are co-ethnic while for group B none are so. Hence a voter from group g would vote for candidate (A, H) if

$$\gamma_g(r_{AH} - r_{AL}) - \sigma > \mu_i.$$

Following the same logic as before we can compute the probability of win for (A, H) to be

$$\pi_{AH} = \frac{1}{2} + \kappa(r_{AH} - r_{AL}).$$

Candidates choose r_{AH} and r_{AL} to maximize their expected rents from office. We now have the following result characterizing the equilibrium public spending in restricted election regime:

Proposition 3 *In the restricted election, the announcement game has a unique Nash Equilibrium. Candidates (A, H) and (A, L) announce*

$$r_{AH}^* = \frac{2(2\theta_H + \theta_L)}{3} - \frac{1}{2\kappa}$$

$$r_{AL}^* = \frac{2(\theta_H + 2\theta_L)}{3} - \frac{1}{2\kappa}.$$

2.3 Comparative Statics

We look at comparative static results for expected public spending and win margin, the two observables in the data, with respect to population share of a group and election regimes. One set of results will compare the outcomes at the two extremes of the population share distribution. Then we will see the behavior of the two variables under the two election regimes when population share moves between the two extreme ends.

2.3.1 Expected Public Spending

We have the following result on the effect of election regime on public spending:

Proposition 4 *If $\gamma_A < \frac{0.25}{\theta_H - \theta_L} < \gamma_B$ then,*

$$\lim_{\alpha_A \to 0} (\mathbb{E}r^* - \mathbb{E}r^o) < 0 \quad and \quad \lim_{\alpha_A \to 1} (\mathbb{E}r^* - \mathbb{E}r^o) > 0.$$

The result above states that provided the relative preferences of the groups are different enough, restricting candidate entry to one group would reduce public good spending when the restricted group is sufficiently small in size. However, the restriction would improve outcome when the eligible group is sufficiently large. Also, we need $\gamma_B > \frac{0.25}{\theta_H - \theta_L}$ for the first part of the statement and $\gamma_A < \frac{0.25}{\theta_H - \theta_L}$ for the second part.

We discuss the intuition for the second part of the result. The first part of the result has a similar argument. Suppose that group A is large. Therefore, the candidate (A, H) has a large co-ethnic advantage to begin with, which reduces competition. Hence, she can get away by announcing relatively low public good spending, i.e., $r_{AH}^o < r_{BH}^o$. Now, in case of restricted election, both candidates are from group A and therefore, the co-ethnic advantage of (A, H) is now removed. This intensifies the competition between the candidates. However, this higher electoral competition comes at the cost of allowing a low ability candidate to run. Therefore, the outcome improves when the co-ethnic preference is sufficiently important relative to the ability gap between the candidates, or stated otherwise, γ_A is small enough relative to $(\theta_H - \theta_L)$.

The following result shows how the gap between expected public spending under the two election regimes will change when population share of group A is changed.

Proposition 5 *Suppose $\gamma_A \leq \gamma_B$ and $\gamma_A < \frac{0.25}{\theta_H - \theta_L}$. Then there exists $\tilde{\alpha}_A \in (0, 1)$ such that,*

$$\frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial \alpha_A} > 0 \quad for\ all\ \ \alpha_A \in (\tilde{\alpha}_A, 1],$$

$$\frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial \alpha_A} < 0 \quad for\ all\ \ \alpha_A \in [0, \tilde{\alpha}_A), \quad and$$

$$\frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial \alpha_A} = 0 \quad at\ \ \alpha_A = \tilde{\alpha}_A.$$

The result states that when group A prefers public goods relatively less than group B then increasing the population share of group A eventually reduces the difference between public spending under restricted and open election regimes. Combining Propositions 4 and 5 we can say the following:

Proposition 6 *If $\gamma_A < \frac{0.25}{\theta_H - \theta_L} < \gamma_B$ then there exists $\bar{\alpha}_A \in (\tilde{\alpha}_A, 1)$ such that for all $\alpha_A < \bar{\alpha}_A$ we have $\mathbb{E}r^*(\alpha_A) < \mathbb{E}r^o(\alpha_A)$, for all $\alpha_A > \bar{\alpha}_A$ we have $\mathbb{E}r^*(\alpha_A) > \mathbb{E}r^o(\alpha_A)$, and at $\alpha_A = \bar{\alpha}_A$, $\mathbb{E}r^*(\alpha_A) = \mathbb{E}r^o(\alpha_A)$.*

This result is depicted in the Figure 1. The graph plots the difference between expected public spending under the restricted and open election regimes as a function of the population share

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Figure 1: Expected Policy and Population Share when $\gamma_A < \frac{0.25}{\theta_H - \theta_L} < \gamma_B$
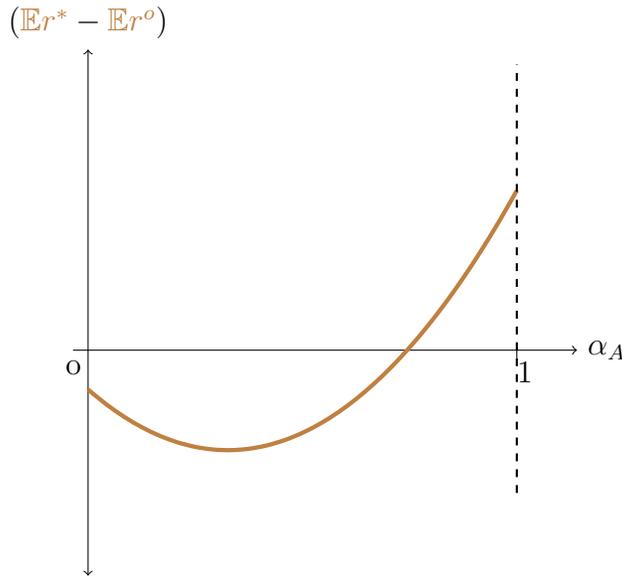
Figure 2: Expected Policy and Population Share when $\gamma_A = \gamma_B < \frac{0.25}{\theta_H - \theta_L}$
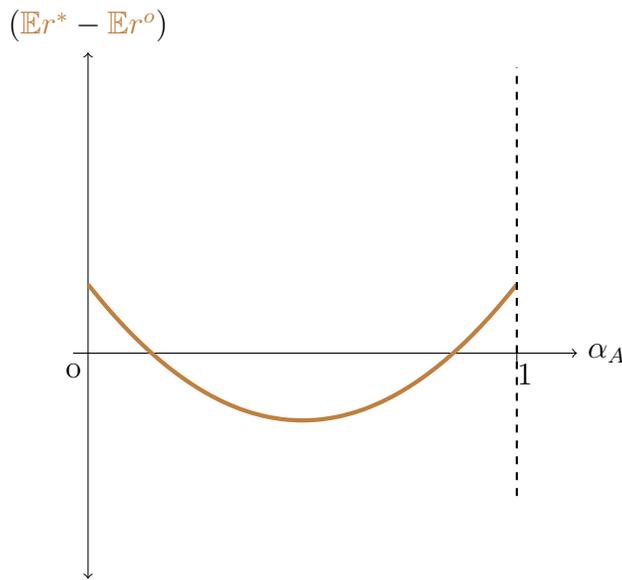
of group A. The parameter values are taken to be: $\theta_H - \theta_L = 0.25$, $\gamma_A = 0.9$ and $\gamma_B = 1.1$. As the figure shows, for a range of values of α_A, the curve is below the horizontal axis, implying that AA will lead to a fall in public spending for those values of α_A. However, for high values of α_A the curve comes above the horizontal axis. Figure 2 plots the same curves for the case when $\gamma_A = \gamma_B = 0.7$. This shows that for both high and low values of α_A the expected public spending with AA is higher than the one without. In the context where we test our model, we argue that $\gamma_A < \gamma_B$ and therefore, we can not test this specific prediction.

Hence, we focus on Proposition 6.

2.3.2 Margin of Victory

The main mechanism driving our result is the change in political completion. Hence we now look at the behavior of margin of victory as we change α_A. We first define win margins under the two election regimes as

$$m^o \equiv |V^o_{AH} - V^o_{BH}| \quad \text{and} \quad m^* \equiv |V^*_{AH} - V^*_{AL}|.$$

We now have two results which correspond to the results on public spending, i.e., Propositions 5 and 6.

Proposition 7 *If $\gamma_A < \frac{0.5}{\theta_H - \theta_L} < \gamma_B$ then there exists $\mathring{\alpha}_A \in (0.5, 1)$ such that for all $\alpha_A < \mathring{\alpha}_A$, $m^* > m^o$, for all $\alpha_A > \mathring{\alpha}_A$, $m^* < m^o$ and at $\alpha_A = \mathring{\alpha}_A$, we have $m^* = m^o$.*

Proposition 8 *The difference between margin of victory in two types of elections, $(m^* - m^o)$ is falling in α_A for $\alpha_A \in [\frac{1}{2}, 1]$, i.e.,*

$$\frac{\partial(m^* - m^o)}{\partial \alpha_A} < 0 \quad for \; \alpha_A \in [\frac{1}{2}, 1].$$

If $(\gamma_B - \gamma_A)(\theta_H - \theta_L) < 1$ then $(m^* - m^o)$ is increasing in α_A for $\alpha_A \in [0, \frac{1}{2})$.

Both these results imply that we should expect the exact opposite patterns on win margin compared to the result on public spending. This is because higher public spending in this model comes about due to tightening of electoral competition which means that the win margins should be lower in such cases. Therefore, the tests of the results on win margin would provide a test for the mechanism through which we get the effects on public spending. Before we move to our empirical setting to test these predictions, it is important to consider the impact of endogenizing the number of candidates in our model. We explore this possibility in an extension of the model in the section that follows.

2.4 Extension of the Model

In this section we discuss one possible extension of the model where we endogenize the number of candidates that a group can put up. We maintain the assumption that each group has a set of two potential candidates - one high and one low ability. In presence of AA the eligible group would still continue to put up both of its candidates, since putting up only

one candidate would result in zero public good provision owing to no electoral competition. Therefore, we only need to worry about the open elections.

Now let us consider a case where group A is majority and both groups have initially chosen their respective best candidates. Now suppose group A is considering whether to allow its low ability politician to run as well. If there is a second candidate from the same group, the high ability candidate from group A would increase her platform due to competition. This increases group A's payoff. However, notice that if the second candidate from group A runs, then *ceteris paribus* the group B candidate wins with higher probability, since the group A votes are now split between the two candidates. Therefore, the probability that any of the group A candidates wins is lower. This reduces group A's payoff. Also, since the second candidate from group A is of low quality, it reduces the average quality of the candidate pool which reduces expected public spending. Therefore, group A will put up a second candidate only when the moral hazard problem is quite severe, i.e., when α_A is very high. It is evident from this discussion that the minority group would not put up its second politician as candidate. For extremely high values of α_A, therefore, the majority group would put forward two candidates. However, this would not disturb the main result of the model. To see this notice the following: for large values of α_A, the two candidates from group A become the effective candidates in an open election. However, the presence of the group B candidate implies that the marginal return on announcing higher public spending is lower for the group A candidates in an open election compared to a restricted election regime, where the group B voters would not have any option but to vote for one of the group A candidates.[13]

Here we note that in our context, though the groups can have high population shares, they do not usually reach the limiting case when the aforementioned theoretical possibility is entertained. We discuss this in further detail in the section on descriptive statistics.

3 BACKGROUND AND INSTITUTIONAL DETAILS

3.1 Village Councils and Quota Policies in Village Elections in India

The village council or Gram Panchayat (GP from now on) is the lowest tier of governance in India. It is part of a three tier governance system that all Indian states adopted after the 73rd Constitutional amendment in 1993. In this system each state is divided into districts

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[13]Technically speaking, in election with AA, group B voters switch from one group A candidate to the other at an infinitely high rate with higher announcements by a candidate. However, in open elections, this rate is finite in presence of a group B candidate.

which are run by district councils headed by a President. The districts are further divided into blocks which are divided, in turn, into GPs. The GPs are comprised of councilors who are elected from single member wards within GPs. Each GP has a president or Sarpanch, analogous to a mayor in a municipality. Depending on the state, the Sarpanch may or may not be directly elected. We focus on the election of Sarpanches for our study and, therefore, choose as our context the state of Rajasthan which holds direct elections for that position. [14]

The positions of Sarpanches are subjected to affirmative action policies, in the form of quotas, for various groups, such as women, SCs, STs, and OBCs. We focus on caste based quotas for the Sarpanch elections. These policies select certain fraction of such positions where only members of the relevant caste group can run as candidates. The rules followed by the state governments in determining which positions will be reserved for what group varies from state to state. We study the context of Rajasthan because it gives us an exogenous determination of these positions for the case of the OBC group. We detail the algorithm for OBC reservation in Rajasthan in the Identification section (Section 5.1).

The primary responsibility of a GP is to provide local public goods, such as village roads, drinking water facilities (hand pumps, wells etc), primary schools, health centers, irrigation facilities (such as public canals, water sheds). The GPs, however, have minimal taxation power. Their expenditure is met by resources received from higher tier governments. Literature has shown that the Sarpanch enjoys significant discretionary power in deciding budgetary allocations in a GP, including the number of public projects to be implemented and their composition (see, for example, Besley, Pande and Rao (2004), Besley, Pande and Rao (2012), Chattopadhyay and Duflo (2004)). The source of this discretion is possibly the fact that the Sarpanch heads the planning and finance subcommittee within a GP and therefore signs off on all the public good expenditures. In the recent years, owing to increasing decentralization in the delivery of public goods and services, the resources available at the GPs have increased manifold. Therefore the extent of work done by a GP depends a lot on the organizational capacity of the GP which, in turn, is heavily influenced by the Sarpanch's managerial ability and efforts. In particular, in the provision of work under the National Rural Guarantee Scheme (NREGS), the role of the Sarpanch is especially important. We turn to that in the description of NREGS.

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[14]This is in contrast to the context used by Anderson and Francois (2017). Maharashtra is a state where the Sarpanch is chosen by elected members of the GP among themselves.

3.2 NREGS

National Rural Employment Guarantee Scheme (NREGS) is the largest running public works program in the world that was initiated by the Indian Government in 2006. By the year 2008, it was made universal, i.e., the program was running in all districts of India. As part of the program, any adult member of a rural household is entitled to 100 days of employment in a year. The employment is generated by implementing various public projects in the villages, such as construction of roads, watershed, irrigation canal, wells, sanitation facilities etc. The GPs are the implementing agencies of this program and by the time of our study, 2012-13, NREGS had become the largest expenditure head in the annual budgets of GPs, comprising of a significant majority of their annual expenditure. Though in principle the program is demand driven, there is now growing evidence that a significant part of the expenditure under NREGS is determined by supply side factors such as bottlenecks in bureaucratic procedures during fund allocation, or capacity of local GPs to plan for new projects and execute them on time (Himanshu et al., 2015). Hence, the managerial efforts of the Sarpanch is an important determinant of the level of public goods that's provided through this program. We therefore use the extent of work implementation under NREGS as our primary measure of performance of the Sarpanch.

4   DATA

4.1   Sources and Compilation

This study is based on data for $5,002$ GPs in the northern Indian state of Rajasthan. The sample is constructed by triangulation of three different administrative data sets: that for the public policy outcome, data on demographic characteristics as well as the infrastructure development of the GPs and GP election records. While descriptions of each data set used follow below, it is important to note at the outset that barring cases of missing administrative records, this is a census of all GPs eligible for having the position of Sarpanch reserved for a member of the "Other Backward Classes" (OBCs). We will return to the eligibility criterion for being in the pool for potential reservation in the section on empirical methodology (Section 5).

For each GP, we use data on the total days of work generated[15] under the NREGS for the financial year 2012-13.[16] This information is sourced from the official portal for the scheme (www.nrega.nic.in) and is available for the entire GP as well as for each major social

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[15]This is recorded as person-days of work in the administrative data.

[16]April, 2012 to March, 2013.

group in it: Scheduled Castes (SC), Scheduled Tribes (ST) and other groups ("Others"). For most of our analysis we will use the aggregate while we only turn to group wise outcomes when we discuss distributional concerns. We deflate the total days of work by the population of the GP to arrive at the main outcome variable of interest, the per capita number of days of work ($Days\,pc$). Another variable of interest that is obtained from the NREGS portal is demand for NREGS work. The official procedure for a household to get work under NREGS involves a written or oral request from the household to be given work. This is noted down by the GP NREGS officials and is available in administrative records.

Data on population of the GPs as well as it's other demographic characteristics are obtained from the 2011 census records.[17] Each GP consists of multiple villages. This mapping from village to GP is available in the local government directory maintained by government of India. Using this mapping, we aggregate information on villages belonging to a GP to calculate the total GP population. The census also provides information on the number of individuals who belong to each of the following social groups: SC, ST and "Others." It is important for our empirical analysis to note that the population in the social group OBC is part of the "Others" and is not recorded separately. While we will show in a later section that our results are robust to imputation of the OBC population using other data sources, for our main results, we will use the census population recorded for "Others." For the sake of clarity and reasons described below, we will refer to "Others" as "non SC/ST." Along with the aggregate population and its distribution among different social groups, the other variables of interest that are obtained from the census are the total number of literates and the total number of females in the GP, after suitable aggregation of the village data.

We also construct a GP development index using infrastructure data from the 2011 census. For each village, the census records the access to a set of amenities. Let $I_{jiv} = 1$ indicate that the village i in GP v has access to the amenity j (0 if it doesn't). We construct the GP access to the amenity j as $I_{jv} = \sum w_i I_{ijv}$ where w_i is the population weight of each village i in the GP. We construct such GP level indicators for access to a set of amenities.[18] Next, these indicators are combined to a GP level development index using principle component analysis. As is conventional in the literature, we use the first factor and

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[17] We use primary census abstracts from the census.

[18] We divide amenities into two groups. Since some facilities do not need to be inside a village to provide services, we take into account the distance to Primary Healthcare Centre, Post Office, All Weather (Pucca) Road, State Highway, Wholesale Market (Mandi), Assembly Polling Station, Government Primary School, Private Primary School, Government Senior Secondary School. We define the village to have access to these amenities if they are within 5 kms of the the village. For other amenities which need to be inside the village to benefit households, we define the village to have access if any household in the village has access to the stated amenity. We consider access to Treated Tap Water and Closed or Covered (permanent) Drainage facilities as a part of this list.

generate development quartiles using data on all GPs ($DEV\ Q1 - DEV\ Q4$) with $DEV\ Q4$ being the most developed GP.

The third source of data are election records. We use the results of elections that were held in 2010 for the position of the GP head. For all information related to this election- the caste category of the Sarpanch, whether the position was reserved for any caste category, vote share of the candidates, the total number of candidates who stood for election and which caste they belonged to- the source was the Rajasthan state election commission. While data on the former two variables were available from online records of the election commission (http://www.rajsec.rajasthan.gov.in), information on the latter variables were based on manual input of detailed official records of election results, as reported by district administrations to the election commission. Some of these sheets had been misplaced causing a loss of 631 observations.[19] Hence, in our empirical work, while in the main specification the number of observations are $5,002$, in a subsequent sub-section that looks at data from these manual records, our sample size drops a little (the actual drop depends on what variable we look at).

4.2 Descriptive Statistics

In our sample, the number of days of NREGS work per household is 19. However, households typically have differing number of members, which vary systematically with the community they belong to. Hence we deflate the total days of work in the GP by its population.[20] The per capita number of days of NREGS work is 3.2. We report this statistic as well as those for other variables in Table 1.

The GP demographic characteristic that matters most for our study is the share of population that belongs to the non SC/STs in the population $\left(S^O\right)$. This share is 0.7 for our sample with a standard deviation of 0.2. As Figure 3 shows, our sample covers the full range of non SC/ST shares. Data from a large representative sample (National Sample Survey, round on employment, 2011, referred hereafter as NSS (2011)) show that 85 percent of the Non SC/STs are in fact OBCs. The survey also allows us to calculate district level proportion of OBCs and non SC/ST share. If one uses the mapping derived from the NSS to impute OBC shares from the non SC/ST shares that we observe in census, we find that OBC shares range approximately from 5% to 70% (Figure 5). In addition, OBCs and the

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[19]In the case of manually recorded data, election records for 2 districts had gone missing by 2016 when we input the data. Some of the information was missing in some sheets. For example, while in all cases, the total number of candidates were recorded, the votes were not recorded for all candidates for some GPs, causing a further loss of observations. But this additional drop is small (56 observations).

[20]Another reason for doing so is that the census reports the total number of persons who belong to a social group, instead of the total number of households.

residual "general" category that make up the non SC/STs are lower demanders of NREGS work in contrast to the SCs and STs, as shown in Figure 4. According to household survey data collected by NSS (2011), while 80 percent of SC/ST households demanded NREGS work[21][22], the proportion of OBC households who demanded work was 66 percent, while the corresponding proportion for the general caste category was 54 percent. Hence, in the spirit of the model, the group Non SC/ST clubs together relatively low demanders of NREGS.

We now look at few other demographic characteristics which may also matter for NREGS work implementation in a GP. The average population per GP is $5,510$. A good measure of demand for NREGS work is also given by the level of education of the population. The literacy rate among those who are 6 years old and above is only 62 percent (this matches the overall literacy rate for rural Rajasthan). Another common feature of the scheme is that women, who have relatively lower outside job opportunities, work more on the projects provided under the scheme. Thus the proportion of females is potentially an important determinant of the amount of NREGS work provided. This proportion is 0.48 in our sample which again matches the figure for the whole of rural Rajasthan. NREGS demand may also depend on the infrastructure development index of the GP. The proportions of the lowest two development quartiles in our sample is 0.23 each while those of the third and fourth quartiles are 0.25 and 0.27 respectively.[23]

4.3   Focusing on Top 2 Candidates

In the model we fix the number of candidates to 2. However, in the data we find that the average number of candidates in our sample is about 6 (Table 1). We note here that like in many developing countries, village elections in India also see a large number of individuals running as candidates, though many of them get very small number of votes. We have reported in Table 1 the average vote shares of the top 4 candidates. The top 2 candidates on average get about 70% of the votes. Also the vote share of the third position candidate is about the same as the difference between the vote shares of the top two candidates (or the win margin). Therefore, the third position candidate in an average election is barely pivotal, in the sense that if all her votes went to the runner-up it would barely make her a winner. In that sense, the fourth position candidate is not at all pivotal. This motivates the assumptions of our model.

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[21]Based on the questions asked in the household survey, a household is said to have demanded NREGS work if it either worked in an NREGS project, or it applied for work but did not get any work.

[22]The proportion of households who demanded work among ST and SC households is 86 and 75 percent respectively.

[23]The quartiles are constructed based on all GPs, including those that were not eligible for OBC reservation.

Moreover the mechanics that is important for our model is that all candidates should not belong to the OBC group in open elections even when their share of population is high. Among the top 2, we find that in 59% of the cases, one of the top candidates is not an OBC. Even when the non SC/ST share is 75 percent and higher, in 48 percent cases, one of the top candidates is not an OBC candidate. If we consider the top 3, then the analogous numbers are 66% and 56% respectively. This is in contrast to reserved elections, where all candidates are OBC.

5 EMPIRICAL METHODOLOGY

We wish to test if OBC reservation status of a GP along with the population share of the non SC/ST group affect the level of work implemented under NREGS in a way that is consistent with the model described above. Let D_{vb}^{RES} be equal to 1 if the election for the village head in a GP v situated in an administrative block b is reserved for OBC candidates, and let S_{vb}^{O} be the population share of non SC/ST group in that GP. Now proposition 5 posits that the marginal effect of an increase in population share of the non SC/ST group on the outcome, namely $Days\,pc$, will eventually be larger in OBC reserved villages compared to open election ones. We run the following specification for test this claim:

$$Days\,pc_{vb} = \alpha_b + \beta_1 * S_{vb}^{O} + \beta_2 * D_{vb}^{RES} + \beta_3 * S_{vb}^{0} * D_{vb}^{RES} + \gamma' Z_{vb} + \varepsilon_{vb} \tag{1}$$

where Z represents a vector of characteristics: total population, literacy rate, the proportion of the population who are female, three village development quartiles (with the first quartile as the reference category) and α_b are block specific intercept terms (block fixed effects). In this specification, Proposition 5 can be examined by looking at

$$\frac{\partial E\left[Days\,pc|D^{RES}=1, S^{O}, Z\right]}{\partial S^{O}} \quad - \quad \frac{\partial E\left[Days\,pc|D^{RES}=0, S^{O}, Z\right]}{\partial S^{O}} \quad = \quad \beta_3 \tag{2}$$

which posits the following hypothesis

Hypothesis 1

$$\beta_3 \;>\; 0.^{[24]}$$

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[24]Proposition 5 in fact posits that β_3 turns positive for group shares that are higher than a threshold, which in turn may vary depending on underlying parameters. This would suggest a specification which interacts D^{RES} with a term quadratic in S^{O}. However, in no specification does the quadratic term play an important role. We propose an alternative specification later in the section to test the full statement of the proposition.

Proposition 4, on the other hand, implies the following hypothesis:

Hypothesis 2

$$\beta_2 \; < \; 0 \quad and \quad \beta_2 + \beta_3 \; > \; 0.$$

This is because the effect of reservation at $S^O = 0$ is β_2 and at $S^O = 1$ is $\beta_2 + \beta_3$. Further, to validate the claim made in Proposition 6, we use estimates of equation 1 to calculate the marginal effects

$$\mathbb{E}\left[Days\,pc_{vb}|D^{RES} = 1, S^O, Z\right] - \mathbb{E}\left[Days\,pc_{vb}|D^{RES} = 0, S^O, Z\right] = \beta_2 + \beta_3 S^O \quad (3)$$

at various values of S^O ranging from 0 to 1. We test the claim that there exists a threshold value of S^O below which the marginal effect is negative where as for values of S^O above the threshold it is positive.

Finally, to test the full statement of Proposition 5 we run the equation 1 on two sub-samples - one where S^O is smaller than some threshold value and the other where S^O is larger than that. Since the model doesn't inform us about the location of the threshold, we vary the threshold value over a range. The proposition implies that for the first sample β_3 would be negative, while it will be positive for the second sample.

5.1 Identification

In estimating equation 1, a natural concern would be that the GPs that are reserved for the OBCs have characteristics that are different from those with no reservation. However, the context we have chosen for our analysis makes this unlikely. The reservation for seats for the OBC are fixed for each election according to the following algorithm. The position for the head of a GP are subject to three reservations. First the total number of positions to be reserved for the SC and ST communities are fixed based on the population of these groups in each block. Once these numbers are fixed, the list of GPs which are subject to each of these reservations is drawn after arranging the villages in descending order of the group's population share. So, in the case of SC reservation, the GPs that have the largest SC population share are reserved first, unless they had been reserved in the previous election. Once the GPs that have been chosen for SC and ST reservation are picked, the remaining GPs form the potential pool on which OBC reservation is exercised. Moreover, and crucially for this empirical work, the GPs to be reserved for a OBC head are chosen at random, by draw of lotteries, from this residual pool. Hence for our empirical work, we focus on the sample of all GPs that remain in the pool after SC and ST reserved GPs have been decided

for each block. For ease of presentation, we refer to GPs where the head position has been reserved for the OBC community as OBC reserved GPs. Randomization ensures that, ex ante, OBC reserved GPs should not differ in characteristics from those that are not reserved, within each block.[25]

While randomization ensures there is no reason for the OBC reserved GPs to be apriori different from those not reserved, ex post there may be differences in characteristics. To allay such fears, we conduct balance tests where each characteristic is regressed on D^{RES} (Table 2). We compare the OBC reserved and unreserved GPs in terms of non SC/ST population share, registered demand for NREGS and other correlates of demand for NREGS work: total population, female share, literacy rate and village quartiles. Apart from non SC/ST shares, none of the variables are different between the OBC reserved and unreserved GPs. In the case of non SC/ST shares, though the difference is significant, the point estimate indicates that the non SC/ST share in unreserved GPs is 70 percent, while that in OBC reserved GPs it is only 1 percent lower, making them virtually identical.

While the small difference in non SC/ST group size exists between the reserved and unreserved GPs, we run all specifications with non SC/ST group share as a control. Therefore, what is more crucial for us is that there should be no difference in characteristics of demand between OBC reserved and unreserved GPs, at each level of non SC/ST group share. Table 3 shows that this is indeed the case when we divide the non SC/ST group share into smaller intervals. Each coefficient in the Table comes from a separate regression where the reservation dummy is regressed on a dependent variable for a sub-sample of GPs. The columns specify the dependent variables and the rows specify the sub-samples of GPs with different non SC/ST population share intervals. A joint (Wilk's lamda) test of difference in covariates between the unreserved and reserved GPs within each interval reveals that we cannot reject the null that there is no difference.

6   RESULTS

6.1   Main Results

Our theoretical model predicts that the impact of restricting candidates to a particular group depends on the group's share in the total population. While our empirical model sets up a specification with that prediction in mind, we begin by discussing the results of two standard exercises which would be suggested by an a-theoretic approach to the problem: one that asks what is the average impact of reservation on the per capita days of work on NREGS (Column (1) of Table 4). In the second exercise, we control for S^O in case the small difference in non

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[25]In our sample, on average, there are about 20 GPs within each block.

SC/ST confounds our results (Column (2)). Both estimating exercises yield insignificant results[26], as our model would predict, thus leading to a correct though uninteresting verdict that restricting elections to OBC candidates has no average effect on provision of public work.

However, as model points out, this average effect is misleading as the the effect of reservation can depend crucially on the relative size of the group. These are immediately apparent as soon as we allow an interaction term (Column (3)). The coefficient of D^{RES} (β_2) becomes negative and is significant at 5 percent. Moreover, the coefficient of the interaction term β_3 is positive (and significant). Also the sum of β_2 and β_3 is positive and statistically significant. These results stay the similar in our main specification, wherein we control for other covariates of demand (Column (4)). The results in Table 4 therefore validates both Hypotheses 1 and 2. Note that proposition 6, which measures the impact of reservation at various values of non SC/ST shares, requires one to calculate the expression given in equation 3. Using coefficients estimated in column (4), we find that the model predictions based on this proposition indeed bear out. Figure 6 plots the marginal effects of OBC reservation at various values of non SC/ST population shares (the estimates of marginal effects are reported in column (1) of Appendix Table 10). The impact of restricting elections to OBC candidates improve per capita days of NREGS work when the group share S^0 is high. On the other hand, when the group share of non SC/STs is low, reservations lead to a lower per capita days of NREGS work. Following the result described in Proposition 6, we can in fact calculate the threshold S^0 around which the effect changes sign. Based on our estimated coefficients, for non SC/ST population shares lower than 62 percent (the difference is 0 at $\frac{0.98}{1.56}$), the impact of OBC reservation is negative. Taking into account the precision of the estimates, this negative effect is significantly different from zero when S^0 is less than 35 percent (we use a 10 percent significant level as the default).[27] On the other hand, the per capita days of NREGS is statistically larger in OBC reserved GPs at 75 percent group population share.[28] Also, it is important to point out that almost 44.4% of all GPs are characterized by a non SC/ST share higher than 75 percent, while the proportion over which we get a negative result is only 3 percent. Hence the demographic of population shares over which our positive result holds is much more common in our sample than where we get a negative result.

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[26]The coefficients of D^{RES} are very similar to each other (and statistically the same). In addition, even after we include all the other controls (results not reported), the coefficient remains statistically the same, implying that the insignificant result is unlikely to be driven by differences between reserved and unreserved GPs.

[27]This threshold drops to 20 percent if we choose a 5 percent significance level.

[28]The analogous threshold for a positive effect of reservation is 80 percent for a 5 percent significance level.

The size effect of the impact of reservation is not small. When S^0 is at 0.75, the reserved GPs have 5.1 percent more work (a difference of 0.18 days given a base of around 3.5). The impact rises with higher non SC/ST group share, with OBC reserved GPs having 11 percent more work when S^0 is around 90 percent. The negative impact of OBC reservation is also large with reserved GPs having almost 20 percent less work when S^0 is less than 35 percent.

The verification of the full statement of Proposition 5 is done in Table 5. Column (1) reproduces the main result from Table 4 (column (4)). Columns (2) and (3) runs the main specification on the two samples of villages with low and high non SC/ST shares, respectively, the threshold share being 0.3. Results in columns (4) and (5) use population share threshold 0.35 and columns (6) and (7) use 0.4. In all the cases, β_3 is positive and significant at 10% level for the high population share samples, as predicted by the model. Also, consistent with Proposition 5, for the low population share villages the coefficient is negative in all the three threshold specifications. However, all the estimates are noisy, possibly due to small sizes of the samples. It is however interesting to note that the negative coefficients fall in their magnitudes as the thresholds are increased. This is indicative of the tapering off of the negative effect as shown in Figure 1.

While our model does not focus on distribution issues, it is interesting nonetheless to explore whether efficiency gains come with better or worse distribution. To explore this, we replace, in our main specification, the days of NREGS work per capita by the proportion of NREGS days that goes to the non SCST group. We find that though a larger share of NREGS work goes to the non SC/ST group when the group is larger, there is no evidence that it goes up differentially in the GPs with OBC reservation. Figure 7 illustrates the marginal effect of OBC reservation on the share of work going to the non SC/ST group for various population shares of the group. The estimates are never significant and are more or less stable over the entire range of population shares. This indicates that the higher public good provision in OBC reserved GPs with high non SC/ST share did not disproportionately benefit the OBC group.

Before we move on to explore the mechanism driving our result, it is important to make a note of the results regarding other covariates reported in Appendix Table 11. An argument can be made that greater days of NREGS work does not reflect welfare improving outcomes: that the greater person-days of public work reflects systematic mis-reporting or corruption. While showing direct evidence against corruption is hard, we address this issue in two ways. We argue that if the public provision of work under NREGS correlates positively with natural covariates of demand, then part of it reflects real transfer to households. To begin with, we know that the demand from SC and ST households for NREGS work is larger

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than from others. In line with that, the *Days pc* is negatively correlated with S^0. Large GPs have lesser per capita NREGS work, in line with the idea that they have more private economic activities to engage people. *Days pc* is positively correlated with the proportion of female population, reflecting the well known preference of women in the state to work on local NREGS projects. NREGS work is negatively correlated with literacy rates, which is expected as this is work done by the poorly educated. GPs that are well developed in terms of infrastructure (*DEV Q4*) show lower NREGS work per capita, re-affirming the idea that the need for NREGS is lower in developed GPs. Thus our results show that the GP level provision of NREGS work is consistent with some obvious correlates of the demand.

Further, we address this point more directly using survey data collected in Rajasthan covering 69 GPs (262 villages) and 3430 households in 2013.[29] The main point of contention is whether larger expenditure on NREGS per capita for the GP reflects actual increase of NREGS work for households, and does not merely reflect corruption. To show this correlation we run a household level regression where we regress two outcomes: whether a household got work under NREGS and the number of days of work under NREGS, on GP level expenditure per capita. We control for the economic situation of the household by including two controls: whether a household has Below Poverty Line (BPL) card and land ownership. Further we control for the caste category the household belongs to: OBC, ST, SC with the residual group as the reference group. Also, we control for block fixed effects and cluster standard errors at the GP level. Results (Appendix Table 12) show that the per capita expenditure correlates positively with the both the outcome variables, thus showing that when more money is reported to be spent on NREGS, households receive more work under NREGS. Hence larger expenditures per capita do reflect some welfare improvement to households.

6.2   Mechanism

To explore further why we obtain the results that we do, we delve into testing the mechanics of our model that drive the theoretical results. The main force at play, we claim, is political competition in the face of co-ethnic preferences. The model predicts that for values of S^0 above a threshold, the difference between win margins in restricted elections and open elections is negative, while for values of S^O below the threshold it will be positive. In other words, restricted elections are more competitive relative to open elections for high S^0. To test this, we estimate the following equation:

$$WinMargin_{vb} = \delta_b + \delta_1 * S^O_{vb} + \delta_2 * D^{RES}_{vb} + \delta_3 * S^0_{vb} * D^{RES}_{vb} + \eta' Z_{vb} + \epsilon_{vb} \qquad (4)$$

[29]For more on this survey, see Himanshu et al. (2015).

The proposition 7 implies the following hypothesis:

Hypothesis 3

$$(i) \; \delta_2 \; > \; 0, \quad (ii) \; \delta_3 \; < \; 0, \quad (iii) \; \delta_2 + \delta_3 \; < \; 0$$

Table 6 columns (1)-(4) report the results on win margins. We first note that while the average win margin is 10 percent, the reserved elections have, on an average 1 percentage point lower win margin than open elections (Table 1; Columns (1) and (2) in Table 6). Results of the specification in equation 4 are reported in column (4). All the coefficients have the sign as predicted by the model, but δ_2 is imprecisely estimated. Parts (ii) and (iii) of Hypothesis 3, however, are verified by the data. To estimate the effect of reservation at various values of S^O we compute

$$\mathbb{E}\left[WinMargin_{vb}|D^{RES} = 1, S^O, Z\right] - \mathbb{E}\left[WinMargin_{vb}|D^{RES} =, S^O, Z\right] = \delta_2 + \delta_3 S^O. \quad (5)$$

Using the estimated coefficients, we find that this difference is negative and significant at 5 percent for all S^0 greater than 0.7. The difference is positive below a non SC/ST group share of 0.5; however it is estimated with large standard errors and we cannot reject the null of no differential win margin (Figure 8).

We now turn to proposition 8 which tells us that the effect of reservation on win margin may potentially be non-monotonic. To test this we run equation (4) for two subsamples - one with GPs where S^O is smaller than 0.5 and another with S^O larger than 0.5. Proposition 8 implies that for the first subsample we may get $\delta_3 > 0$ while for the second one we would get $\delta_3 < 0$. Table 7 reports the results for these specifications. Column (1) reproduces the result from Table 6 (column (4)). The estimated coefficients of δ_3 in columns (2) and (3) have the signs as predicted by the model. However, for the first subsample the estimate is imprecise, possibly, again, due to small sample size.

In the mechanism suggested in the model, we underplay the possibility that the number of candidates responds to the election format. The number of electoral candidates can also increase the political competition and if it was the case that the total number of candidates was larger in reserved elections, at high values of S^0, this would have a similar effect on win margins. However, that this is unlikely to be the case as can be seen in column (5) of Table 6. We find that the number of candidates are no different across the two election formats; nor do they differ across the two types of elections for any value of S^0.

One may argue that our results are driven by a selection effect; that the rise in efficiency is given by selection of better candidates in reserved election, especially when the

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the OBC population share is high. While the ability of candidates is very hard to measure, we follow Anderson and Francois (2017) and Banerjee et al. (2016) in proxying quality by the education of the candidates. The results in columns (6) to (8) that regress the (average) years of schooling of the winner, the top 2 candidates and the top 3 candidates show that, if anything, the average quality falls in reserved elections. While the interaction term with S^O is positive, the overall marginal effect is still negative for very high population shares and is never significant.

6.3   Robustness

Comparing across OBC Sarpanches in open vs reserved elections: In the first robustness exercise, we explore the possibility that our results are driven by another plausible mechanism. It can be argued that when a group is large and the leader is aligned to the group, then public provision improves. One reason to expect this is that a large group can credibly discipline a leader from own group more and consequently, extract more work out of her. Munshi and Rosenzweig (2016) explore this mechanism in the context of ward level elections in rural India. In our context, the result that OBC reservation produces better public provision when S^0 is high enough could be driven by similar alignment issues. Reservation would always guarantee an OBC leader while open elections could produce non OBC heads even when S^0 is large. Hence there could be more cases of alignment when there is reservation as compared to open elections, thus giving rise to better provision. We test this hypothesis in two ways. In one specification, we add to our main specification a dummy variable for an OBC leader (whether reserved or open election) and it's interaction with S^0. If all the results are driven by such alignment, then the coefficient of D_{vb}^{RES} and $S_{vb}^0 * D_{vb}^{RES}$ should become insignificant after the inclusion of these variables. However, as Column (2) in Table 8 shows, this is not the case. The variables stay significant and retain their sign. Another exercise that brings this out more clearly is if we keep only the subset of GPs where some OBC headman came to power, irrespective of whether this was through open elections or reservations. We run our main regression on this sample. In this exercise, the comparison group for OBC reserved GPs is all GPs where an OBC has been elected in open elections. As evident from column (3) of the same table, we find a similar result as our main specification, thus pointing out that the results have nothing to do with OBC leaders coming into power. It has to do with the reservation per se. These results also show that party politics are not likely to drive these results. Though parties are formally not allowed to be part of local elections in Rajasthan, they are often informally aligned to candidates. These affiliations are often based on caste groups but are fluid over time, depending on political strategies. Our

results comparing OBC reserved GPs to those where OBCs win in open elections points out that party politics may have a limited role in explaining our results because in both cases, the party aligned is likely to be the same.

Imputation of OBC shares: The other potential threat to our results is that we have used SC/STs and non SC/STs as the relevant groups instead of using OBCs and the rest, which would have been ideal. Since the census data doesn't provide OBC demographics (the primary reason for our choice of groups), we computed district level OBC shares and non SC/ST shares from the NSS (2011) data. We then use the district level ratios of these two shares and impute village OBC shares by multiplying the village level non SC/ST shares with this ratio (which is identical for all villages with a district). We use these imputed OBC shares to run equation 1. The results are in column (6) of Table 9. As evident from the coefficients, the result remains unchanged.

Additional Controls: There can be two further threats to our results. The first threat comes from the fact that there may still be differences across the reserved and unreserved GPs. We have been parsimonious with our list of covariates that determine demand. A better proxy would be to include labour market characterization of the GPs which determine the demand for NREGS work. While data for the number of cultivators, the number of agricultural laborers and industrial workers are available from the census for 2011, the occupation profile is itself determined by the work offered under NREGS. Hence we have excluded the potentially endogenous characterization of the occupation profile from our baseline specification. However, a natural question arises about whether our results remains similar when we control for these covariates. We present results after including all these occupation variables, along with share of area irrigated in Table 9 (Column (1)). In addition, we also present results when we control directly for the reported demand for NREGS work by households (Column (2)). In both cases, our results remain unchanged. We also control for (potentially endogenous) electoral outcomes such as total number of candidates (in column (3)), years of schooling of the Sarpanch to proxy for his ability (in column (4)) and whether the village head is a woman or not (in column (5)).[30] These controls make the OBC reservation coefficient noisy, though the magnitude doesn't change a lot. The other two coefficients of interest remain statistically significant and their magnitudes remain almost identical.

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[30]Results go through even if we control for the number of candidates in each caste category: SC, ST and General candidates

7   CONCLUSION

One persistent concern with affirmative action policies, in general, is that it intends to promote equity at the cost of efficiency. We shed some light on this debate, albeit indirectly, in the world of politics by focusing on the efficiency consequences of affirmative action policies in election. We build a model to study the effects of AA on electoral competition and public spending and then test the predictions in the context of election of heads in GPs in the state of Rajasthan in India.

The insight from the model is that presence of "co-ethnic" preferences reduces electoral competition between candidates from two groups. This presents a moral hazard problem for the expected winning candidate. This is especially so when the population share of the groups are skewed, i.e., one group is relatively large in size. Therefore, in such a situation imposing a restriction on candidate entry in the form of an AA policy removes this friction from election and hence, electoral competition may go up leading to improvement in public goods provision. We exploit randomized quota policy of village president positions for a caste group (OBCs) in Rajasthan to show that affirmative action indeed improves outcome in the relevant GPs. We then show that the effect is not driven by changes in preference or ability of the elected leader, and in fact, the effects on win margin are consistent with the model's prediction about how it is mediated through tightening of electoral competition. Our results present novel evidence that it is possible to improve efficiency by imposing restriction on candidate entry and therefore, suggests that we may need to reevaluate the efficiency concerns of affirmative action policies.

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Tables and Graphs

Figure 3: Distribution of non SC/ST population share
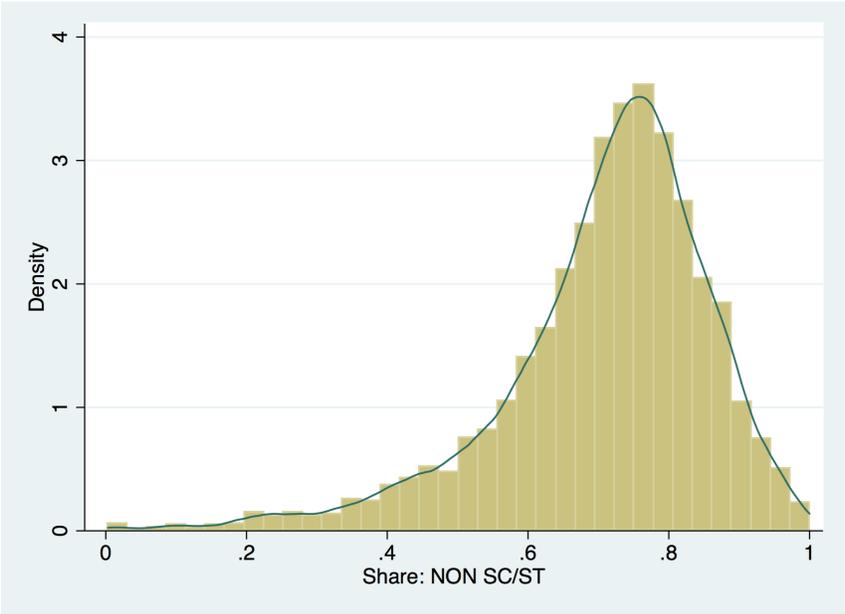

Figure 4: Demand for NREGS work different across groups
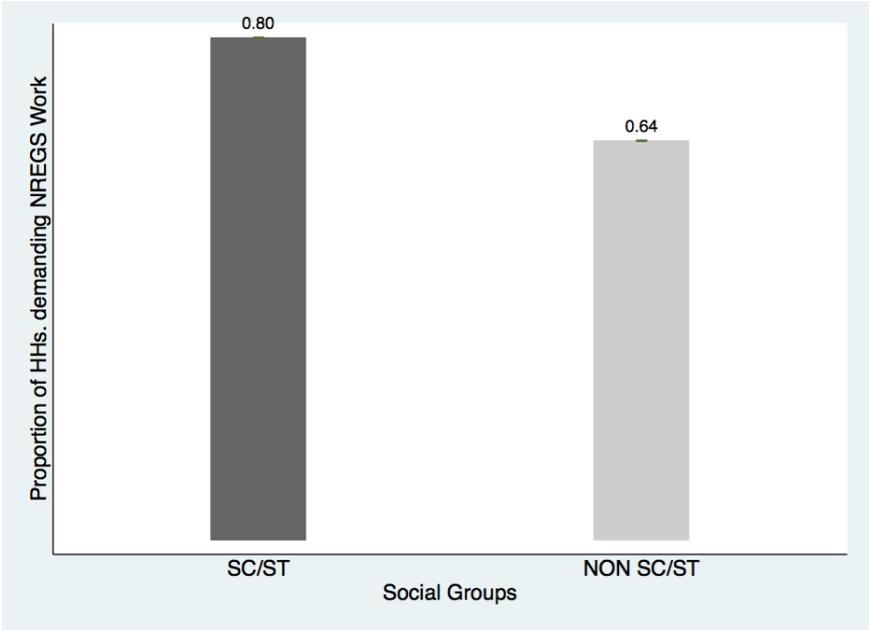
Figure 5: Correlation between Non SC/ST Population Share and OBC Population Share
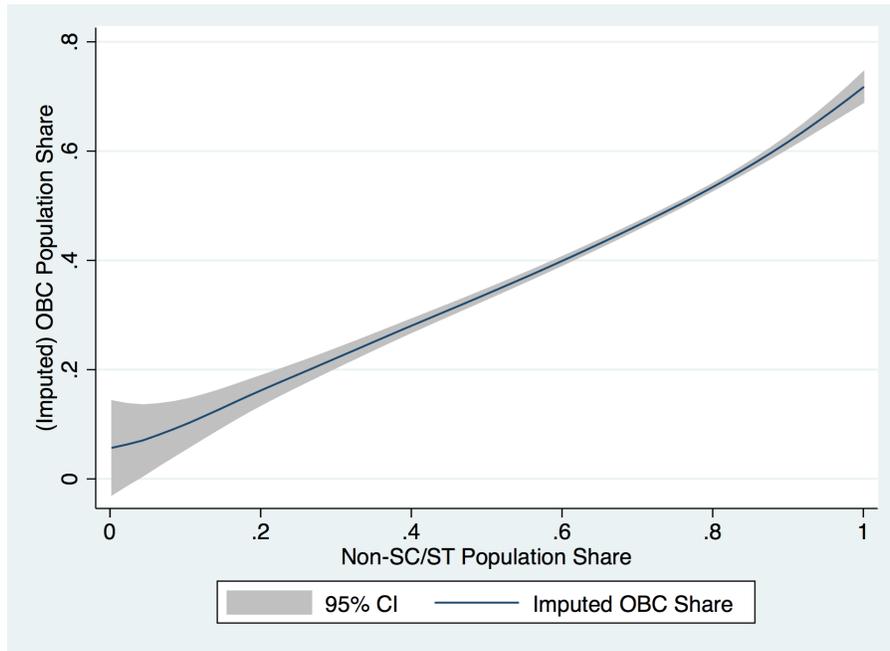

**Figure 6:** Differential Effects of OBC Reservation on NREGS Work Generation
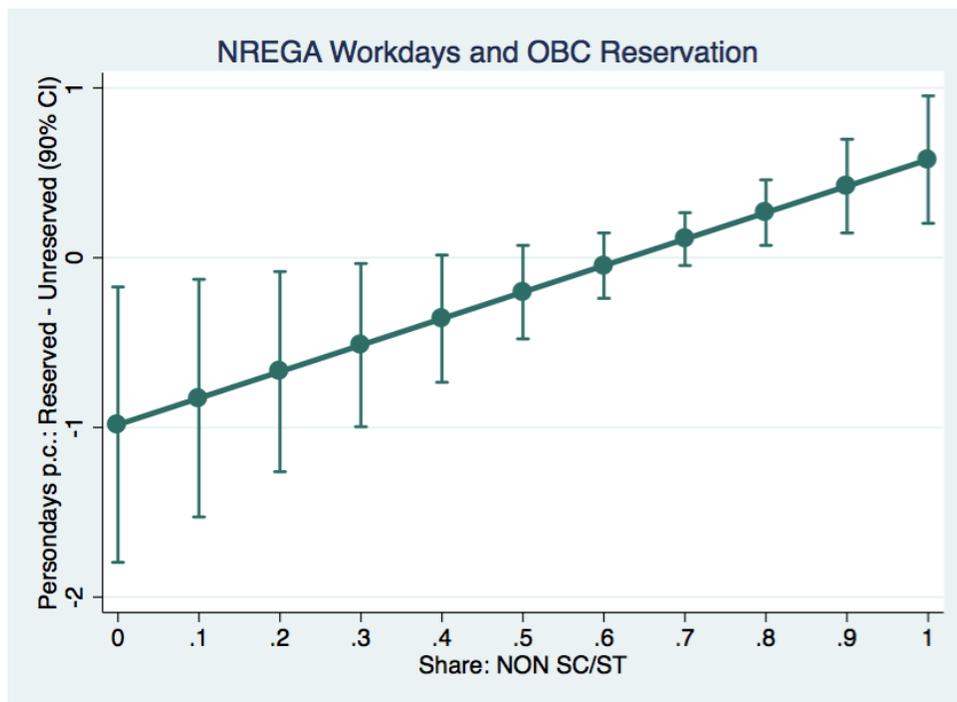
Figure 7: No Distributional Consequences of OBC Reservation
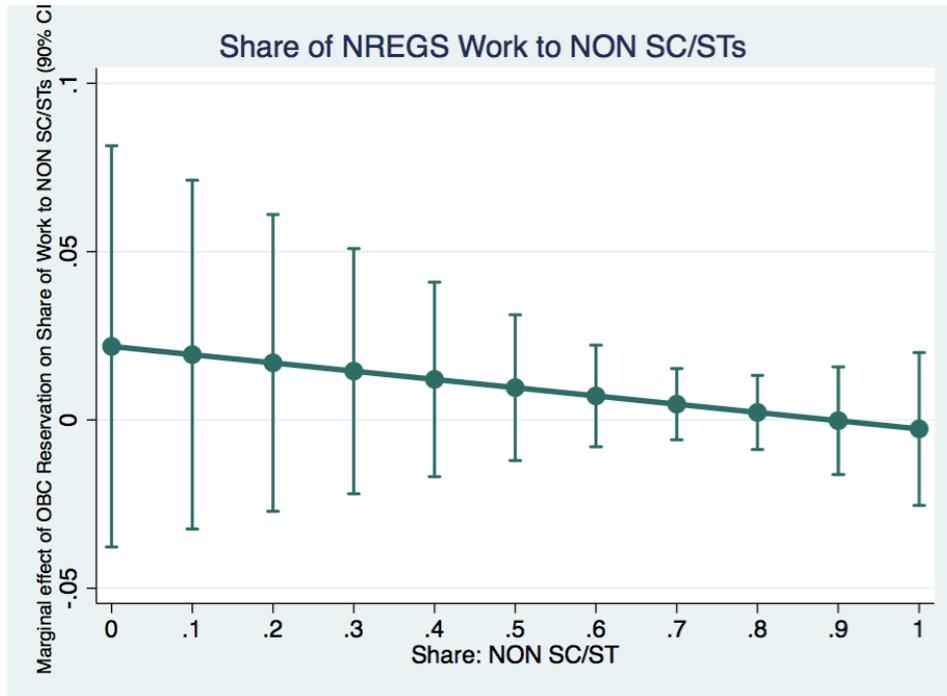
Figure 8: Differential Effects of OBC Reservation on Margin of Victory
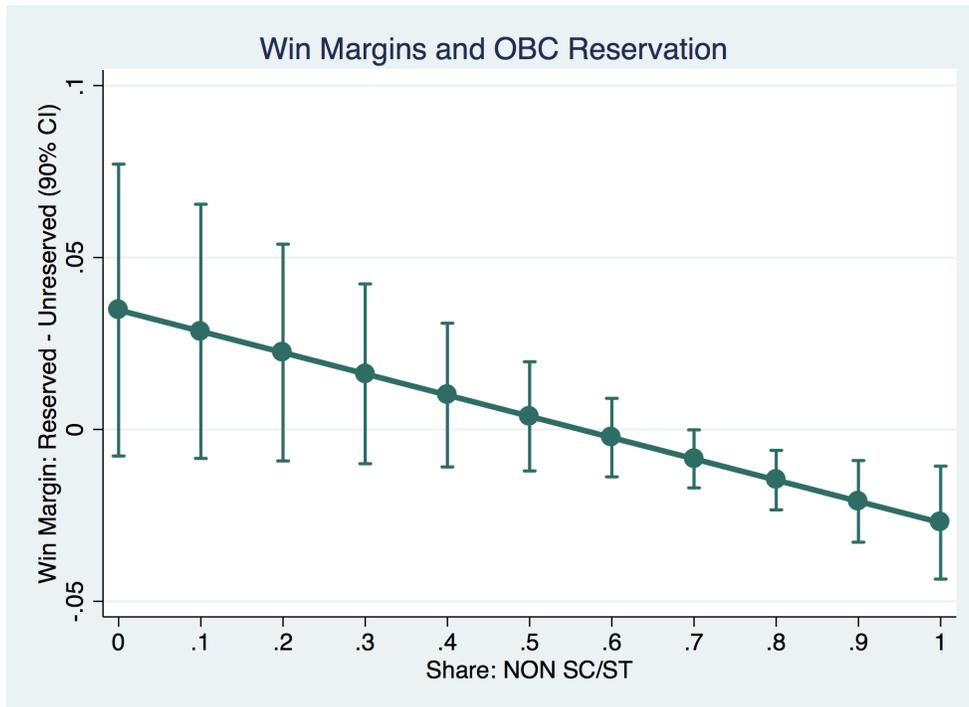
Table 1: Summary statistics

Variable	Mean	Std. Dev.	N
Number of NREGS Days Per Capita (Days p.c.)	3.6	4.2	5,002
Number of NREGS Days per Household (Days p.H.)	19.4	23	5,002
Share of population: non SC/ST	0.71	0.15	5,002
OBC Sarpanch reservation	0.24	0.43	5,002
non SC/ST Share * OBC Res	0.17	0.31	5,002
Total Population (in thousands)	5.51	1.93	5,002
Share of population: Females	0.48	0.01	5,002
Share of population: Literates	0.62	0.09	5,002
Dummy: Development Quartile 2 (DEV Q2)	0.23	0.42	5,002
Dummy: Development Quartile 3 (DEV Q3)	0.26	0.44	5,002
Dummy: Development Quartile 4 (Most Developed) (DEV Q4)	0.27	0.45	5,002
Total Number of Candidates	6.18	3.75	4,352
Vote share - position 1 (winner)	0.41	0.14	4,352
Vote share - position 2 (runner-up)	0.28	0.09	4,352
Vote share - position 3	0.13	0.08	4,352
Vote share - position 4	0.07	0.06	4,352
Win Margin	0.13	0.13	4,352

Table 2: Balance Table

	non SC/ST Share (1)	Demand (2)	Population (3)	Fem. Share (4)	Lit. Share (5)	Dev Q2 (6)	Dev Q3 (7)	Dev Q4 (8)
OBC Res	-0.01**	4.05	-0.00	-0.00	0.00	-0.01	0.02	0.00
	(0.00)	(12.32)	(0.06)	(0.00)	(0.00)	(0.01)	(0.01)	(0.01)
Constant	0.71***	1,077.31***	5.51***	0.48***	0.52***	0.23***	0.26***	0.27***
	(0.00)	(2.93)	(0.02)	(0.00)	(0.00)	(0.00)	(0.00)	(0.00)
Observations	5,002	5,002	5,002	5,002	5,002	5,002	5,002	5,002
R-squared	0.439	0.427	0.145	0.582	0.604	0.068	0.079	0.156
Block FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes: The dependent variables (column-wise) are (i) population share of non SC/ST, (ii) NREGA demand, (iii) population, (iv) female population share, (v) share of population that's literate, (vi - viii) Village Asset Index second quartile to fourth quartile. All regressions include block fixed effects and cluster the standard errors at the block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 3: Balance by non SC/ST Share

	Demand (1)	Popultion (2)	Fem. Share (3)	Lit. Share (4)	Dev Q2 (5)	Dev Q3 (6)	Dev Q4 (7)	Wilks' Lamda (8)
non SC/ST Share								
0-20 %	-59.54	-0.16	0.00	0.04	0.00	0.23	-0.38	0.78
	(75.92)	(0.60)	(0.01)	(0.07)	(0.00)	(0.34)	(0.32)	(p val. : 0.38)
20-40 %	82.57	0.38	0.00	-0.00	0.01	0.17	0.00	0.95
	(54.41)	(0.33)	(0.00)	(0.01)	(0.20)	(0.12)	(.)	(p val.: 0.52)
40-60%	-17.70	-0.07	-0.002**	0.01	0.04	0.04	0.02	0.99
	(41.82)	(0.15)	(0.001)	(0.01)	(0.06)	(0.06)	(0.05)	(p val.: 0.38)
60-80%	12.62	0.00	-0.00	-0.00	-0.01	0.00	0.01	0.99
	(18.30)	(0.09)	(0.00)	(0.00)	(0.02)	(0.02)	(0.02)	(p val. : 0.85)
80-100%	23.25	0.04	-0.00	0.00	-0.02	0.05	-0.02	0.99
	(28.40)	(0.15)	(0.00)	(0.00)	(0.03)	(0.03)	(0.03)	(p val.: 0.92)

Notes: Each cell in the table is the coefficient on OBC reservation dummy estimated from a separate regression. The columns (except column (8)) represent the dependent variables of the regression and the row specifies the sample on which the regression is done. For example, column (1) - row (1) reports the result of regressing NREGA demand on OBC reservation for GPs with non SC/ST population share between 0 and 20 %. All regressions include block fixed effects and cluster the standard errors at the block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 4: Differential Effect of OBC Reservation on NREGA Work

	Person-days generated per capita (Days pc)			
	(1)	(2)	(3)	(4)
OBC Res (β_2)	0.13	0.12	-1.14**	-0.98**
	(0.10)	(0.10)	(0.51)	(0.49)
non SC/ST Share (β_1)		-1.26***	-1.61***	-0.90**
		(0.40)	(0.44)	(0.41)
OBC Res * non SC/ST Share (β_3)			1.75**	1.56**
			(0.72)	(0.69)
Observations	5,002	5,002	5,002	5,002
R-squared	0.577	0.578	0.579	0.599
Block FE	YES	YES	YES	YES

Notes: The dependent variable is the total person-days generated per capita under the NGREGS program in 2012-13 in the state of Rajasthan. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST groups. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. The first three columns do not have any village level controls. In column (4), village level characteristics such as population, population share of women, literacy rate, village asset index etc have been included as controls. Standard errors are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1.

Table 5: Non-linear Effects of OBC Reservation on NREGA Spending

	All	Non SC/ST Population Share Thresholds					
		≤ 0.3	> 0.3	≤ 0.35	> 0.35	≤ 0.4	> 0.4
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
OBC Res	-0.980**	0.259	-1.011*	-0.266	-1.022	-0.0532	-0.976
	(0.491)	(1.848)	(0.601)	(1.525)	(0.640)	(0.962)	(0.671)
non SC/ST Share	-0.903**	0.289	-0.611	-3.396	-0.780	-3.842*	-0.671
	(0.412)	(5.753)	(0.501)	(4.029)	(0.538)	(1.970)	(0.550)
OBC Res * non SC/ST Share	1.558**	-4.040	1.601*	-2.250	1.615*	-1.126	1.558*
	(0.689)	(10.72)	(0.833)	(8.876)	(0.884)	(3.220)	(0.927)
Observations	5,002	110	4,892	156	4,846	218	4,784
R-squared	0.599	0.682	0.601	0.674	0.601	0.700	0.604
Block FE	YES	YES	YES	YES	YES	YES	YES

Notes: The dependent variable for all columns is the total person-days generated per capita under the NGREGS program in 2012-13 in the state of Rajasthan. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST group. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. "OBC Sarpanch" is a dummy indicating whether the sarpanch is from the OBC group. Column (1) is the same specification as in column (4) of Table 4. Column (2) is the same specification run on a sample of villages with Non SC/ST Share less than or equal to 0.3, and column (3) is for the rest of the villages. Columns (4) and (5) have the results with the Non SC/ST share cut-off being 0.35, and the cut-off is 0.4 for columns (6) and (7). Standard errors are clustered at block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 6: Differential Effect of OBC Reservation on Win margin, Number of Candidates and Candidates' Education

| | Win margin | | | | No. of | Candidate education | | |
| | | | | | Candidates | Winner | Top 2 | Top 3 |
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
OBC Res	-0.01*	-0.01*	0.04	0.03	-1.00	-1.98**	-1.30	-1.08
	(0.00)	(0.00)	(0.03)	(0.03)	(0.65)	(0.96)	(0.84)	(0.77)
non SC/ST Share		-0.03	-0.02	-0.03	-0.73	-0.89	-0.28	-0.31
		(0.02)	(0.02)	(0.02)	(0.48)	(0.72)	(0.58)	(0.55)
OBC Res * non SC/ST Share			-0.07*	-0.06*	1.27	2.08	1.39	1.19
			(0.03)	(0.03)	(0.87)	(1.30)	(1.14)	(1.04)
Observations	4,352	4,352	4,352	4,352	4,352	4,273	4,199	3,666
R-squared	0.100	0.100	0.104	0.104	0.385	0.099	0.121	0.126
Block FE	YES	YES	YES	YES	YES	YES	YES	YES

Notes: The dependent variable for columns (1)-(4) is win margin, for column (5) is the number of candidates running in the 2010 Sarpanch elections, and for columns (6) - (8) are the (average) years of schooling of the winning candidate, top 2 candidates and top 3 candidates, respectively. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST groups. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. In columns (4)-(8) village level characteristics such as population, population share of women, literacy rate, village asset index etc have been included as controls. Standard errors are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1.

Table 7: Non-monotonic Effects of OBC Reservation on Win Margin

| | | Win Margin | |
| | All | ≤ 0.5 | > 0.5 |
	(1)	(2)	(3)
OBC Res	0.03	-0.0695	0.0733**
	(0.03)	(0.0826)	(0.0363)
non SC/ST Share	-0.02	-0.176*	-0.0200
	(0.02)	(0.100)	(0.0330)
OBC Res * non SC/ST Share	-0.06*	0.180	-0.112**
	(0.03)	(0.196)	(0.0467)
Observations	4,352	387	3,965
R-squared	0.104	0.308	0.108
Block FE	YES	YES	YES

Notes: The dependent variable is the margin of victory in the 2010 sarpanch election in the state of Rajasthan. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST group. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. "OBC Sarpanch" is a dummy indicating whether the sarpanch is from the OBC group. Column (1) reproduces the result from column (4) of Table 6. Columns (2) and (3) runs that specification on samples of villages with less than %50 OBC population share and greater than %50 OBC population share, respectively. In all the columns village level characteristics such as population, population share of women, literacy rate, village asset index have been included as controls. Standard errors are clustered at block level. *** p<0.01, ** p<0.05, * p<0.1.

Table 8: Comparing OBC Sarpanches with the Same in Reserved GPs

	Person-days generated p.c. (Days pc)		
	(1)	(2)	(3)
OBC Res	-0.98**	-1.33**	-1.50**
	(0.49)	(0.65)	(0.68)
non SC/ST Share	-0.90**	-0.86*	-1.57**
	(0.41)	(0.44)	(0.75)
OBC Res * non SC/ST Share	1.56**	1.95**	2.11**
	(0.69)	(0.89)	(0.92)
OBC Sarpanch		0.45	
		(0.46)	
OBC Sarpanch * NON SC/ST Share		-0.44	
		(0.64)	
Observations	5,002	5,002	3,186
R-squared	0.599	0.600	0.620
Block FE	YES	YES	YES

Notes: The dependent variable is the total person-days generated per capita under the NGREGS program in 2012-13 in the state of Rajasthan. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST group. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. "OBC Sarpanch" is a dummy indicating whether the sarpanch is from the OBC group. Column (3) runs the column (1) specification on the sample of GPs with OBC sarpanches only. In all the columns village level characteristics such as population, population share of women, literacy rate, village asset index have been included as controls. Standard errors are clustered at block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 9: Robustness Checks

	Person-days generated per capita (Days pc)					
	(1)	(2)	(3)	(4)	(5)	(6)
OBC Res	-0.98**	-0.82*	-0.75	-0.65	-0.74	-0.64*
	(0.49)	(0.49)	(0.48)	(0.49)	(0.49)	(0.33)
non SC/ST Share	-0.85**	-0.61	-0.85**	-0.86**	-0.85**	
	(0.41)	(0.40)	(0.40)	(0.41)	(0.41)	
OBC Res * non SC/ST Share	1.56**	1.32*	1.31*	1.18*	1.30*	
	(0.69)	(0.68)	(0.69)	(0.70)	(0.69)	
No. of Candidates			-0.00			
			(0.02)			
Education of Sarpanch				-0.00		
				(0.01)		
Woman Sarpanch dummy					0.05	
					(0.08)	
Imputed OBC Pop Share						-0.97**
						(0.49)
OBC Res * Imputed OBC Pop Share						1.39**
						(0.59)
Observations	4,996	5,002	4,372	4,293	4,370	5,002
R-squared	0.600	0.625	0.619	0.616	0.619	0.599
Block FE	YES	YES	YES	YES	YES	YES

Notes: The dependent variable for all columns is the total person-days generated per capita under the NGREGS program in 2012-13 in the state of Rajasthan. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST group. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. Column (1) is the same specification as in column (4) of Table 4. Column (2) has additional village controls of occupational patterns and area irrigated added. Results in column (3) to (5) further controlled for 3 separate election outcomes: number of candidates, years of schooling of sarpanch and a dummy indicating whether sarpanch is a woman. Column (6) used imputed values of OBC population share of villages instead of Non SC/ST share. Standard errors are clustered at block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

A   Theoretical Results

A.1   Proof of Proposition 1

Suppose the candidates (A, H) and (B, H) announce r_{AH} and r_{BH} as their platforms. Then voters from group A would vote for candidate (A, H) if

$$\gamma_A(r_{AH} - a_{BH}) + 1 - \sigma > \mu_i$$

where μ_i is voter i's idiosyncratic (relative) preference for the candidate (B, H) and σ is the overall (relative) popularity of the same candidate. Therefore, the vote share of candidate (A, H) from group A is given by,

$$V_{AH}^A = \mathbb{P}[\gamma_A(r_{AH} - r_{BH}) + 1 - \sigma > \mu_i] = \frac{1}{2} + [\gamma_A(r_{AH} - r_{BH}) + 1 - \sigma].$$

Similarly, the vote share of candidate (A, H) from group B is given by,

$$V_{AH}^B = \mathbb{P}[\gamma_B(r_{AH} - r_{BH}) - 1 - \sigma > \mu_i] = \frac{1}{2} + [\gamma_B(r_{AH} - r_{BH}) - 1 - \sigma].$$

Notice that the vote shares are random because the overall (relative) popularity of the candidates are random, which makes the preference of the median voter random. Therefore, the probability that candidate (A, H) wins is non-trivial and is given by,

$$\pi_{AH} = \mathbb{P}\left[\alpha_A V_{AH}^A + \alpha_B V_{AH}^B > \frac{1}{2}\right]$$

$$\Rightarrow \quad \pi_{AH} = \frac{1}{2} + \kappa(r_{AH} - r_{BH}) + (2\alpha_A - 1),$$

$$\text{where} \quad \kappa = \alpha_A \gamma_A + \alpha_B \gamma_B$$

$$\Rightarrow \quad \pi_{BH} = 1 - \pi_{AH} = \frac{1}{2} + \kappa(r_{BH} - r_{AH}) - (2\alpha_A - 1)$$

Candidate (A, H) now solves the following problem:

$$\max_{r_{AH}} \pi_{AH}\left[1 - \frac{r_{AH}}{2\theta_H}\right]$$

which yields the following best response function:

$$r_{AH} = \theta_H + \frac{r_{BH}}{2} - \frac{(2\alpha_A - 1)\beta}{2\kappa} - \frac{1}{4\kappa}.$$

Similar optimization by candidate (B, H) results in the following best response function:

$$r_{BH} = \theta_H + \frac{r_{AH}}{2} - \frac{(2\alpha_A - 1)\beta}{2\kappa} - \frac{1}{4\kappa}.$$

As evident from the two equations, they entail a unique Nash Equilibrium given by,

$$r_{AH}^o = 2\theta_H - \frac{(2\alpha_A - 1)}{3\kappa} - \frac{1}{2\kappa},$$

$$r_{BH}^o = 2\theta_H + \frac{(2\alpha_A - 1)}{3\kappa} - \frac{1}{2\kappa}.$$

A.2 Proof of Proposition 2

Suppose that candidate from group B is (B, H). Now, group A is considering whether to put up the high or low ability candidate. If it puts up the candidate (A, L) then the equilibrium announcements by the candidates will be,

$$\tilde{r}_{AL}^o = 2(\frac{1}{3}\theta_H + \frac{2}{3}\theta_L) - \frac{(2\alpha_A - 1)}{3\kappa} - \frac{1}{2\kappa},$$

$$\tilde{r}_{BH}^o = 2(\frac{2}{3}\theta_H + \frac{1}{3}\theta_L) + \frac{(2\alpha_A - 1)}{3\kappa} - \frac{1}{2\kappa}.$$

Clearly, the expected public spending is lower in this case compared to the case where candidate (A, H) was put up since $\tilde{r}_{AL}^o < r_{AH}^o$ and $\tilde{r}_{BH}^o < r_{BH}^o$. Candidate (A, L) announces a lower public spending because she is less competent. Candidate from group B responds to that by announcing in equilibrium a lower public spending. Also, the probability that the candidate from group A wins is now,

$$\tilde{\pi}_{AL} = \frac{1}{2} + \kappa(\tilde{r}_{AL}^o - \tilde{r}_{BH}^o) + (2\alpha_A - 1) = \frac{1}{2} + \frac{2\kappa}{3}(\theta_L - \theta_H) + \frac{1}{3}(2\alpha_A - 1).$$

Therefore, $\tilde{\pi}_{AL} < \pi_{AH}^o = \pi_{AH}(r_{AH}^o, r_{BH}^o)$. Hence, group A's payoff is unambiguously worse under candidate (A, L). Therefore, group A will choose the high ability candidate. Notice that this will be true even if group B had picked its low ability candidate for election. It is, therefore, a dominant strategy for A to pick its high ability candidate. By similar logic, it is also a dominant strategy for group B to choose its high ability candidate. Hence, both groups picking their high ability candidate is a unique Nash Equilibrium.

Equilibrium expected public spending is calculated using the formula

$$\mathbb{E}r^o = \pi_{AH}^o r_{AH}^o + (1 - \pi_{AH}^o)r_{BH}^o$$

which gives us the necessary result.

A.3 Proof of Proposition 3

Proof follows similar logic as in the proof of Proposition 1.

A.4 Proof of Proposition 4

We calculate the difference between $\mathbb{E}r^o$ and $\mathbb{E}r^*$ at $\alpha_A = 0$ and 1.

$$(\mathbb{E}r^o - \mathbb{E}r^*)\,|_{\alpha_A=0} = \frac{1}{\gamma_B}\left[\gamma_B(\theta_H - \theta_L)\left\{1 - \frac{4}{9}\gamma_B(\theta_H - \theta_L)\right\} - \frac{2}{9}\right],$$

and

$$(\mathbb{E}r^o - \mathbb{E}r^*)\,|_{\alpha_A=1} = \frac{1}{\gamma_A}\left[\gamma_A(\theta_H - \theta_L)\left\{1 - \frac{4}{9}\gamma_A(\theta_H - \theta_L)\right\} - \frac{2}{9}\right].$$

Therefore, $\gamma_B(\theta_H - \theta_L) > 0.25$ implies that $(\mathbb{E}r^o - \mathbb{E}r^*)\,|_{\alpha_A=0} > 0$ and, $\gamma_A(\theta_H - \theta_L) < 0.25$ implies that $(\mathbb{E}r^o - \mathbb{E}r^*)\,|_{\alpha_A=1} < 0$.

A.5 Proof of Proposition 5

$$\mathbb{E}r^* - \mathbb{E}r^o = \theta_H - \theta_L + \frac{4\kappa(\theta_H - \theta_L)^2}{9} + \frac{2(2\alpha_A - 1)^2}{9\kappa}$$

$$\Rightarrow \quad \frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial\alpha_A} = \frac{4(\theta_H - \theta_L)^2(\gamma_A - \gamma_B)}{9} - \frac{2(2\alpha_A - 1)^2(\gamma_A - \gamma_B)}{9\kappa^2} + \frac{8(2\alpha_A - 1)}{9\kappa}$$

$$\Rightarrow \quad \frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial\alpha_A} = \frac{4(\theta_H - \theta_L)^2(\gamma_A - \gamma_B)}{9} + \frac{2(2\alpha_A - 1)}{9\kappa^2}[2\kappa + \gamma_A + \gamma_B]$$

It is clear that

$$\frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial\alpha_A}\,|_{\alpha_A=0} < 0 \quad \text{and} \quad \frac{\partial(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial\alpha_A}\,|_{\alpha_A=1} > 0$$

given that $\gamma_A \leq \gamma_B$ and $\gamma_A < \frac{0.25}{\theta_H - \theta_L}$. Hence there exists $\tilde{\alpha}_A \in (0,1)$ such that the derivative is zero at $\tilde{\alpha}_A$. Also,

$$\frac{\partial^2(\mathbb{E}r^* - \mathbb{E}r^o)}{\partial\alpha_A^2} > 0$$

implying that $\tilde{\alpha}_A$ is unique.

A.6 Proof of Proposition 6

Given the assumption $\gamma_A < \frac{0.25}{\theta_H - \theta_L} < \gamma_B$, we have $\mathbb{E}r^* < \mathbb{E}r^o$ at $\alpha_A = 0$ and $\mathbb{E}r^* > \mathbb{E}r^o$ at $\alpha_A = 1$, by Proposition 4. Since $(\mathbb{E}r^* - \mathbb{E}r^o)$ is falling in α_A in $[0, \alpha_A)$ (by Proposition 5), we have $\mathbb{E}r^* < \mathbb{E}r^o$ at $\alpha_A = \tilde{\alpha}_A$. Therefore, there exists at least one $\bar{\alpha}_A \in (\tilde{\alpha}_A, 1)$ where $\mathbb{E}r^* = \mathbb{E}r^o$. Since $(\mathbb{E}r^* - \mathbb{E}r^o)$ is monotonically increasing in $[\tilde{\alpha}_A, 1]$, $\bar{\alpha}_A$ is unique and we have $\mathbb{E}r^* < \mathbb{E}r^o$ for all $\alpha_A < \bar{\alpha}_A$ and $\mathbb{E}r^* > \mathbb{E}r^o$ for all $\alpha_A > \bar{\alpha}_A$.

A.7 Proof of Proposition 7

We calculate that

$$V^o_{AH} - V^o_{BH} = \frac{1}{2} + \kappa(r^o_{AH} - r^o_{BH}) + 2\alpha_A - 1 = \frac{1}{2} + \frac{1}{3}(2\alpha_A - 1)$$

$$\Rightarrow \quad m^o = \frac{1}{2} + \frac{1}{3}(1 - 2\alpha_A) \text{ for } \alpha_A \in [0, \tfrac{1}{2})$$

$$\text{and} \quad m^o = \frac{1}{2} + \frac{1}{3}(2\alpha_A - 1) \text{ for } \alpha_A \in [\tfrac{1}{2}, 1]$$

$$m^* = V^*_{AH} - V^*_{BH} = \frac{1}{2} + \kappa(r^*_{AH} - r^*_{AL}) = \frac{1}{2} + \frac{2}{3}\kappa(\theta_H - \theta_L)$$

$$\Rightarrow \quad m^* - m^o = \frac{2}{3}\kappa(\theta_H - \theta_L) - \frac{1}{3}(1 - 2\alpha_A) \text{ for } \alpha_A \in [0, \tfrac{1}{2})$$

$$\text{and} \quad m^* - m^o = \frac{2}{3}\kappa(\theta_H - \theta_L) - \frac{1}{3}(2\alpha_A - 1) \text{ for } \alpha_A \in [\tfrac{1}{2}, 1]$$

Therefore, at $\alpha_A = 0$, we have $m^* > m^o$ if $\gamma_B > \frac{0.5}{\theta_H - \theta_L}$. Similarly, at $\alpha_A = 1$, we have $m^* < m^o$ if $\gamma_A < \frac{0.5}{\theta_H - \theta_L}$. Also, $m^* > m^o$ at $\alpha_A = \frac{1}{2}$. Hence, $m^* > m^o$ for all $\alpha_A \in [0, \tfrac{1}{2}]$. Therefore, there exists a $\mathring{\alpha}_A \in (0.5, 1)$ such that $m^* > m^o$ for $\alpha_A \in [0, \mathring{\alpha}_A)$, $m^* < m^o$ for $\alpha_A \in (\mathring{\alpha}_A, 1]$ and $m^* = m^o$ for $\alpha_A = \mathring{\alpha}_A$.

A.8 Proof of Proposition 8

For $\alpha_A \in [\tfrac{1}{2}, 1]$ we have

$$\frac{\partial(m^* - m^o)}{\partial \alpha_A} = \frac{2}{3}(\gamma_A - \gamma_B)(\theta_H - \theta_L) - \frac{2}{3} < 0$$

and for $\alpha_A \in [0, \tfrac{1}{2})$ we have

$$\frac{\partial(m^* - m^o)}{\partial \alpha_A} = \frac{2}{3}(\gamma_A - \gamma_B)(\theta_H - \theta_L) + \frac{2}{3}$$

Therefore, $\frac{\partial(m^* - m^o)}{\partial \alpha_A} > 0$ if $(\gamma_B - \gamma_A)(\theta_H - \theta_L) < 1$.

B   Empirical Results

Table 10: Marginal Effect Estimates of OBC Reservation

Non SC/ST Share	*Person days generated p.c.*	*Win margin*
0	-0.98**	0.03
	(0.49)	(0.03)
0.1	-0.82*	0.03
	(0.42)	(0.02)
0.2	-0.67*	0.02
	(0.36)	(0.02)
0.3	-0.51*	0.02
	(0.29)	(0.02)
0.4	-0.36	0.009
	(0.23)	(0.01)
0.5	-0.20	0.004
	(0.17)	(0.01)
0.6	-0.05	-0.002
	(0.12)	(0.007)
0.7	0.11	-0.009*
	(0.09)	(0.005)
0.8	0.27**	-0.15***
	(0.12)	(0.005)
0.9	0.42**	-0.02***
	(0.17)	(0.007)
1	0.57**	-0.03***
	(0.23)	(0.01)
Observations	5,002	4,352

Notes: The dependent variables for the two columns are the total person-days generated per capita under the NGREGS program in 2012-13 and the win margin, i.e., the difference between vote shares of the winner and the runner-up in the 2010 village elections, respectively. The table provides estimates of marginal effect of OBC reservation across villages with different non SC/ST population shares, ranging from zero to 1. Standard errors are clustered at block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 11: Comparing OBC Sarpanches with the Same in Reserved GPs

| | Person-days generated per capita (Days pc) | | | |
	(1)	(2)	(3)	(4)
OBC Res	0.13	0.12	-1.14**	-0.98**
	(0.10)	(0.10)	(0.51)	(0.49)
non SC/ST Share		-1.26***	-1.61***	-0.90**
		(0.40)	(0.44)	(0.41)
OBC Sarpanch * non SC/ST Share			1.75**	1.56**
			(0.72)	(0.69)
Population				-0.24***
				(0.03)
Female Share				12.15**
				(6.09)
Literate Share				-4.45***
				(1.00)
DEV Q2				-0.14
				(0.15)
DEV Q3				-0.20
				(0.14)
DEV Q4				-0.43***
				(0.14)
Observations	5,002	5,002	5,002	5,002
R-squared	0.577	0.578	0.579	0.599
Block FE	YES	YES	YES	YES

Notes: The dependent variable is the total person-days generated per capita under the NGREGS program in 2012-13 in the state of Rajasthan. The variable "non SC/ST Share" is the proportion of GP population that belongs to the non SC/ST group. "OBC Res" is a dummy that takes value one when the GP sarpanch election is reserved for the OBC group. "OBC Sarpanch" is a dummy indicating whether the sarpanch is from the OBC group. Female Share and Literate Share are shares of the population who are female and literate, respectively. DEV Q2-Q4 are indicators of development quartiles based on village level infrastructure. Standard errors are clustered at block level. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 12: Correlation between Household level NREGS Work and Reported NREGS Work in GP

	Household Got Work (1)	No. of days of Worked (2)
Person-days of NREGS generated per capita	2.13**	176.86*
	(1.02)	(103.87)
Land owned (acres)	-0.00***	-0.18
	(0.00)	(0.14)
Household has Below Poverty Line Card	0.05**	5.38***
	(0.02)	(1.65)
Caste Category of Household - OBC	0.11**	9.11***
	(0.04)	(2.90)
Caste Category of Household - SC	0.14***	10.83***
	(0.04)	(2.76)
Caste Category of Household - ST	0.14**	14.10***
	(0.06)	(4.41)
Observations	3,430	3,430
R-squared	0.311	0.327
Block FE	YES	YES

Notes: The dataset used for this result comes from a household survey in Rajasthan in 2013 (Himanshu et al., 2015). The dependent variable in column (1) is a dummy indicating if any member of the household worked under NREGS in Rajasthan. The dependent variable for column (2) is the number of days a household worked under NREGS. The variable "Person-days of NREGS generated per capita" is the per capita person-days generated under the NREGS in the GP, as reported in the official sources. Standard errors are clustered at GP level. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.