Insiders and Outsiders: 
Local Ethnic Politics and Public Good Provision *

Kaivan Munshi†  Mark Rosenzweig‡

September 2015

Abstract

Ethnic politics is conventionally identified as playing a major role in the under-supply of public goods in developing countries. In this paper, we develop a theory in which elected representatives are members of ethnic groups, are heterogeneous in their abilities, and endogenously supply effort. Ethnic groups are both exclusionary and internally cooperative. As a result they can partially solve the classic collective action problem associated with the voluntary provision of public goods by providing incentives to the representatives they put forward to internalize the benefits to the group. This leads to greater public goods levels when representatives are elected from larger groups. Elected officials are also permitted to control the distribution of some public resources and can target them to insiders - members of their own group. As a result, while insiders and outsiders benefit from the increased effort levels of representatives from larger groups that result in the increased supply of non-excludable public goods, outsiders benefit less than insiders as the representatives of larger groups capture a larger fraction of targetable resources. Using newly-available Indian data at the most local (ward) level covering all the major states of India over three election terms we show that internal cooperation within the caste - the relevant ethnic group in India - results in the election of more competent representatives and a substantial increase in public goods when larger castes are elected. Despite the evidence consistent with the positive relationship between caste size and public good provision, however, we find that the representative of the largest caste group within a ward can only be elected when that caste has an absolute majority. Our theory and this finding, coupled with direct evidence of the targeting of welfare transfers, suggest that public resource targeting reduces the supply of public goods by reducing the probability that the largest group’s representative will be elected. Counterfactual simulations using structural estimates of the model indicate that decoupling public good provision from the distribution of welfare transfers would raise substantially the level of local public goods in rural India.

*We are grateful to Toke Aidt and Soenje Reiche for helpful discussions. Brandon D’Souza provided outstanding research experience. Bruno Gasperini graciously shared the code for the threshold test. Munshi acknowledges research support from the National Science Foundation through grant SES-0617847. We are responsible for any errors that may remain.

†University of Cambridge
‡Yale University
1 Introduction

There is a large and growing literature that is concerned with the negative effects of ethnic politics on growth and development.¹ Ethnic affiliation, on linguistic, tribal, or caste lines, determines the selection of political leaders and the level and distribution of public resources throughout the developing world. One negative consequence of ethnic politics for economic development is that citizens tend to vote mechanically on ethnic lines when information about candidates is limited, resulting in the selection of incompetent or corrupt leaders (Banerjee and Pande 2010, Casey 2015). Both insiders – members of the leaders’ own ethnic group – and outsiders are hurt, as public resources are siphoned off to the leaders themselves. A second consequence of ethnic politics is that it distorts the allocation of public resources. Public resources are targeted along ethnic lines, rather than by efficiency criteria, and insiders benefit at the expense of outsiders (Besley, Pande, and Rao 2007, Bardhan and Mookherjee 2010, Anderson et al. 2015, Burgess et al. 2015). In this paper we re-examine ethnic politics in the context of local elections, where the standard problem of limited information is absent. In contrast with the prior literature, we simultaneously consider both the level and the distribution of public resources. In particular, we examine the supply of non-excludable public goods as well as the distribution of targetable welfare transfers within a model that incorporates ethnic affiliation and heterogeneity in self-interested politicians’ abilities.

The voluntary provision of public goods is a classic problem in political economy, famously studied by Mancur Olson (1965) in his book the Logic of Collective Action. Olson’s insight is that individual volunteers will not internalize the benefits that other members of the group obtain from public goods, resulting in a sub-optimal level of public good provision. This collective action problem is perhaps most acute in local governments where non-professional politicians must volunteer for important tasks that involve the supply and distribution of substantial public resources. There has been a worldwide trend towards political decentralization and democratization in recent decades. Local government expenditures account for approximately 25% of total government expenditures in the United States and Europe, and in Brazil approximately 15% of federal government revenue is disbursed to municipalities (Ferraz and Finan 2011). Local governments are responsible for the financing and the administration of the school system in the United States, and in rural India, the setting for our empirical analysis and home to 65% of the Indian population, local governments construct and maintain public infrastructure and identify welfare recipients. Our analysis examines an endogenous, community-based, solution to the potentially serious collective action problem that is inherent in local governments.

¹This literature goes back to Easterley and Levine (1997). Recent contributions include Alesina and La Ferrara 2005, Miguel and Gugerty 2005, Padro i Miquel 2007, Burgess et al. 2015, and Alesina et al. forthcoming.
A fundamental characteristic of all ethnic communities, regardless of whether they are defined by kinship (tribe or caste), religion, or language, is a high degree of social connectedness. This connectedness supports high levels of internal cooperation. A large and growing literature has documented the role played by community-based networks in supporting private economic activity when markets function imperfectly.\(^2\) We assess whether the same communities reduce the collective action problem in local democracies. The basic idea is that social connectedness makes local political leaders internalize the benefit derived from the public good by all members of their ethnic community – the insiders – not just themselves. This could be because members of the local community can credibly commit to compensate them \textit{ex post} for their efforts. This results in the selection of more competent leaders and greater effort, which leads, in turn, to greater public good provision.

A second fundamental characteristic of ethnic communities – the flip side of the in-group solidarity described above – is their disregard for others. Political leaders elected with the support of their ethnic group will thus ignore (fail to internalize) the benefit derived from locally provided public goods by outsiders, resulting in a level of public goods that is less than first-best. If public goods cannot be spatially targeted within the local constituency, then everyone is nevertheless better off relative to the benchmark where leaders only value their own benefit from the public good. However, local governments are often entrusted with tasks, such as the distribution of welfare transfers, that can be targeted at specific households. When ethnicity is salient, local political leaders will target welfare transfers to their own group to the extent possible, leaving outsiders strictly worse off.\(^3\)

The theory that we develop incorporates the role played by ethnic communities in the selection of leaders and the supply of two types of public resources: non-excludable public goods and publicly financed welfare transfers to households. In our theory, each political constituency consists of multiple differently-sized ethnic groups. We begin by focusing exclusively on the provision of a non-excludable public good whose level depends on the amount of effort exerted by the elected representative. The cost of effort is decreasing in the representative’s ability, but more able individuals also have superior outside options. We allow for \textit{ex post} transfers within but not between groups, so each group will put forward as its representative the individual who maximizes its collective benefit from the public good, net of his effort and opportunity cost. Because the representative of a larger group


\(^3\)Although the targeting of public goods to co-ethnics has been documented at higher levels of spatial aggregation; e.g. Burgess et al. (2015), we show that such targeting is absent in the local constituencies (wards) that we study. In our analysis, targeting is restricted to welfare transfers.
internalize the benefit derived by a larger number of individuals, larger groups will put forward more able representatives who, in turn, provide a higher level of the public good. If the public good is non-excludable, it follows that everyone in the constituency wants the representative of the largest group to be elected. However, this may not be the electoral outcome in practice because groups can free-ride on others. In particular, if a group that is sufficiently close in size puts forward its representative as a candidate, then the largest group may prefer not to contest the election since it will receive a high level of public goods without having to bear its own representative’s effort and opportunity cost. Our first theoretical result is that the largest group will, nevertheless, put forward its representative with certainty when its share of the population in the constituency crosses a threshold level, and both insiders and outsiders will benefit from the increased provision of public goods.

As noted, local governments are often responsible for the distribution of welfare transfers. If the total amount of these transfers is fixed, then outsiders will be systematically crowded out, particularly when the representative belongs to a large ethnic group. Adding welfare transfers to our theory affects public good provision in two ways. First, the largest group in the constituency will now be less inclined to free-ride on smaller groups. Second, the representative of the largest group may no longer be preferred by everyone if the negative crowding-out effect associated with the private transfers dominates the positive public good effect. Adding private transfers to the representative’s list of responsibilities will increase the level of public goods if the largest group’s representative continues to be preferred by everyone, by shifting down the population-share threshold at which it comes to power with certainty. In contrast, if the negative crowding-out effect dominates, then the largest group will only come to power, with an accompanying increase in public good provision, when it has an absolute majority; i.e. when its share of the population exceeds 0.5. The coupling of public good provision and the distribution of welfare transfers now reduces the level of public goods.

We test the predictions of the theory with panel data from India across three elections, describing electoral outcomes at the most local (ward) level. This is an ideal setting in which to test theories of ethnic politics for a number of reasons. The caste system is arguably the most distinctive feature of Indian society. The exploitation, prejudice, and discrimination that are associated with the hierarchical structure of the caste system are well known and have been extensively documented. There is, however, another side to this system, which has to do with the solidarity and social connectedness within caste groups. Survey evidence indicates that over 95% of Indians continue to marry within their caste. Marriage ties built over many generations result in a high degree of social connectedness within castes, which span a wide area covering many villages. A large and growing literature has documented the role played by caste networks in supporting economic cooperation. Mutual insurance arrangements have historically been organized, and continue to be organized,
tend to be spatially clustered. This increases social connectedness within castes, but also expands the already wide social distance between castes. The insider-outsider dichotomy that lies at the heart of our theory of ethnic politics is exemplified by caste relations within the village.

The village governments or *panchayats* that we study have been responsible for the provision of local public goods and the identification of welfare-program recipients since 1991, when a constitutional amendment devolved substantial political power to the local level. A *panchayat* is typically divided into 10-15 wards, each of which comprises approximately 70 households. Political decisions are jointly made by the *panchayat* president and the ward representatives and our assumption will be that the representative’s ability and effort directly determine the level of public goods that his ward receives. The representative’s ability and effort will, in turn, depend on the numerical strength of his caste in the ward.

Data from the 2006 Rural Economic Development Survey, which we use in the empirical analysis, documents the importance of caste in local Indian politics. Key informants were asked to list the various sources of financial and organizational support that the elected ward representatives received in each of the last three elections. As described in Table 1, caste is clearly the dominant source of support: 82 percent of the elected ward representatives received support from their caste inside the village and 29 percent received support from caste members outside the village. In line with these statistics, the ward representative is always elected with the support of his caste in our theory.

Our theory describes the relationship between the population share of the most numerous caste in the ward and the supply of public goods. A ward with a numerically dominant caste will be less heterogeneous, and there is a large literature documenting the negative correlation between ethnic heterogeneity and the demand for public goods; e.g. Alesina and La Ferrara (2005), Miguel and Gugerty (2005). To disentangle the effect of ethnic affiliation on the supply of public goods, which we are interested in, from this demand effect, we take advantage of a system of set asides in Indian local governments that randomly reserves the ward representative’s position for historically disadvantaged castes (and tribes) from one election to the next. This changes the set of castes that can put forward their preferred representative, while leaving the electorate, and the demand for public goods, fixed over time. Net of ward fixed effects, which capture all time invariant ward characteristics, the prediction of the theory is that there should be a discontinuous change in the characteristics of elected representatives when the population share of the most numerous eligible

---

around the caste in rural India (Caldwell, Reddy, and Caldwell 1986, Mazzocco and Saini 2012, Munshi and Rosenzweig forthcoming). When urban jobs became available in the nineteenth century, with colonization and urbanization, these castes supported the migration of their members and the subsequent formation of urban labor market networks (Morris 1965, Chandravarker 1994, Munshi and Rosenzweig 2006). They continue to support the movement of their members into more remunerative occupations in the contemporary economy (Munshi 2011).
caste (which changes over time) crosses a threshold. Formal statistical tests for a structural 
break provide strong support for the theory; there is a discontinuous improvement in the 
elected representative’s ability, measured by his education, and an accompanying increase 
in public goods supplied to the ward. This occurs when the population share of the most 
umerous eligible caste is precisely 0.5.5

The most numerous eligible caste can only come to power when it has an absolute 
majority, despite the fact that it supplies a substantially higher level of public goods. 
This implies that the outsiders must be worse off when it comes to power on some other 
dimension. Consistent with this observation, data from multiple election terms show that a 
household is significantly less likely to benefit from programs targeted at households below 
the poverty line (BPL) when its ward representative belongs to a different caste. This 
crowding out is substantially greater when a larger group is in power and is not observed 
for public goods.

The location of the threshold at 0.5, together with the improved ability of the elected 
representative and the increased supply of public goods at the threshold, allows us to 
empirically identify both the positive and the negative aspects of ethnic politics associated 
with our theory. It follows from the theory that decoupling public good provision and 
the distribution of welfare transfers would shift the threshold down below 0.5, with an 
accompanying increase in the overall level of public goods. To quantify the benefit of 
this decoupling, we estimate the model structurally. Counter-factual simulations indicate 
that this simple policy change would substantially increase the supply of public goods. 
Previous studies; e.g. Besley, Pande, and Rao (2007), Bardhan and Mookherjee (2010), 
have documented caste-based targeting of welfare transfers. Our analysis highlights both 
the distributional consequences of this targeting, which favors insiders at the expense of 
outsiders, as well as its efficiency consequences, resulting in the election of less competent 
representatives and the reduced provision of non-excludable public goods.

2 Institutional Setting

2.1 Social Structure

The insider-outsider dichotomy is a feature of all traditional societies and is a key assump-
tion in the literature on ethnic politics. The reason why we choose to test our theory with

---

5This result is not implied by alternative theories of caste politics. Banerjee and Pande’s (2010) theory, 
which applies to higher levels of government where voters have limited information and vote mechanically 
on caste lines, would predict a decline in the elected leader’s quality when a single caste had an absolute 
majority in the constituency. Anderson et al.’s (2015) theory of clientelist politics, which like our theory is 
based on strong within-caste ties, is appropriate for the specific state – Maharashtra – that they consider. 
However, their prediction that programs targeted at households below the poverty line (BPL) will decline 
when a single caste is (numerically) dominant is rejected in our nationally representative sample of wards. 
Moreover, the increase in local public goods that are valued by all constituents, which we document when 
a single caste has an absolute majority in the ward, cannot be explained by their theory.
data from Indian local governments is that this dichotomy is especially pronounced in Indian society, even at the local level, due to its special caste-based structure. For example, Figure 1 reports cross-country results from the most recent round of the World Values Survey (conducted between 2005 and 2009) on questions relating to trust, and tolerance of outsiders. Restricting the sample to countries with a population in excess of 100 million that are classified by the World Bank as low or medium-low income, we see in Figure 1A that India ranks close to the top of the list with regard to trust in neighbors. Given the spatial segregation that characterizes the Indian village (described below) the Indian respondents are essentially reporting that they have a high degree of trust in their fellow caste members living nearby. However, the ranking reverses when we look at tolerance of outsiders – speaking a different language or following a different religion – in Figures 1B and 1C, respectively. India now lies at the very bottom of the list and, based on the preceding discussion, we would expect Indians to be similarly intolerant of neighbors belonging to a different caste (this is certainly reflected in how they live).

Survey data confirms that caste continues to be salient in India. The basic marriage rule in Hindu society is that individuals must match within their caste or jati. Muslims also follow this rule, matching within biradaris which are equivalent to jatis, while converts to Christianity continue to marry within their original jatis. Although the population census has not collected caste information since 1931, recent rounds of nationally representative surveys such as the 1999 Rural Economic Development Survey (REDS) and the 2005 India Human Development Survey (IHDS) report that over 95% of Indians continue to marry within their caste (or equivalent kinship community). Newly available genetic evidence indicates that these patterns of endogamous marriage have been in place for over 2,000 years, dividing the Indian population into 4,000 distinct genetic groups, each of which is a caste (Moorjani et al. 2013).

With 4,000 castes, and given India’s population of one billion, each caste comprises 250,000 members on average. Social sanctions are needed to support cooperation in such a large group. These sanctions typically involve exclusion from social interactions, which will only be effective when interactions within the group are sufficiently frequent and important, and all castes are intolerant of outsiders. A single caste will thus not have a presence in all villages in the area that it covers. It will instead cluster in select villages. This shows up clearly in the latest, 2006, REDS round, which we use for much of the analysis in this paper. The mean number of castes per state is 64, while the mean number of castes per village is 12. With 340 households on average in a village, this implies that a caste will have about 30 households in the select villages where it locates. This is a large enough number to support meaningful local interactions (and accompanying social sanctions, when required).
While the structure of Indian society results in a high degree of social connectedness within castes, the hierarchical nature of the caste system often gives rise to adversarial relations between castes in the village. Even where castes co-exist in relative harmony, they rarely socialize. Figure 2 uses data from the 2006 REDS village census to describe the distribution of castes and the nature of transactions in a sample of villages drawn from the major Indian states. Focusing on the 91% of villages for which there is ward-level information that can be used for the analysis of ethnic politics that follows, each caste makes up on average 6% of the population of a village. Within the ward, which is a smaller spatial unit, the average caste’s share of the population increases to 14%, indicative of the spatial clustering along caste lines that characterizes the Indian village.6

The REDS village census asks each household head to list the names of three individuals in the village that he would approach for food, in the event of a temporary shortfall, and for a short-term loan. If these individuals were approached without regard to caste affiliation, we would expect on average that 6% of the individuals providing food transfers and loans would belong to the respondent’s caste. What we see in Figure 2, based on the identity of the first listed individual, is that around 50% of food transfers and loans are from individuals belonging to the same caste. Munshi and Rosenzweig (forthcoming) document the importance of cross-village loans and transfers in caste-based rural insurance networks. If we included caste loans from outside the village, which make up more than half of caste loans, the fraction of individuals within the caste that would be approached for a loan would increase well above 50%. Informal transactions (and social interactions) are evidently concentrated within the caste in the Indian village.

2.2 Local Politics

The 73rd Amendment of the Indian Constitution, passed in 1991, established a three-tier system of local governments or panchayats – at the village, block, and district level – with all seats to be filled by direct election. The village panchayats, which often cover multiple villages, were divided into 10-15 wards. Panchayats were given substantial power and resources, and regular elections for the position of panchayat president and for each ward representative have been held every five years in most states. The major responsibilities of the panchayat are to construct and maintain local infrastructure (e.g., public buildings, water supply and sanitation, roads) and to identify targeted welfare recipients. Although public goods account for the bulk of local government expenditures, private transfers, including programs for households below the poverty line (BPL) and employment schemes

---

6Castes will often live together on particular streets; indeed, streets in Indian villages are informally referred to by caste names. If we went down even further to the neighborhood level, the proportion of the population belonging to a single caste would increase much further.
account for 15% of total expenditures.\footnote{Although panchayats raise their own revenues, through land and water usage taxes, and benefit from specific central government programs, the state government is the major source of funding.}

How are panchayat expenditures allocated? The council makes decisions collectively (the president does not have veto power) and so the level of public goods that a ward receives will depend on its representative’s influence within the panchayat as well as his ability to ensure that the earmarked resources reach their destination.\footnote{Key informants in the 2006 REDS were asked who in the panchayat decided the allocation of local revenue. Although 81% of informants reported that the president had a say, 93% said that it was, nevertheless, a joint decision of all panchayat members.} In general, the supply of public goods to a ward will depend on the representative’s ability and the effort he puts into the job. The central premise of our theory is that the caste can avoid the collective action problem, which arises because the representative only values his own benefit from the public good, by ensuring that its members can credibly commit to compensating him \textit{ex post} for his efforts.

\textit{Ex post} transfers within the caste are one (second-best) solution to the collective action problem. A second solution is to compensate the representative monetarily for his effort and opportunity cost. Ferraz and Finan (2011) provide evidence from Brazilian municipalities that higher wages attract wealthier and more educated candidates and increase legislative productivity. However, local politicians are rarely (adequately) compensated. Ferraz and Finan note that 98% of municipal legislators held a second job, and in our Indian local governments, the president is paid 50-60 dollars per month (less than the minimum wage) and the ward representatives earn even less. One reason why wage compensation, especially for local politicians, is not a viable solution to the incentive problem may be because high-powered incentive schemes, rather than fixed wages, are needed to elicit effort. It is difficult, however, to create clear and credible performance measures for many important political tasks (Besley 2004).

A third solution to the collective action problem is long-term incumbency. The members of the representative’s caste can credibly commit to compensate him \textit{ex post} for his efforts even when he is elected for a single term because they interact with him outside the political system on many other dimensions. If the representative could stay in office for a sufficiently long period of time, then the standard repeated game argument tells us that cooperation could even be sustained with socially unconnected outsiders. This solution is infeasible in Indian local governments because reservation for women and disadvantaged castes (and tribes) generates a high level of exogenous turnover in council seats. No seat can be reserved for the same group across consecutive elections within a constituency (Besley, Pandey, and Rao 2007). Given the negative priors that the electorate will have about female politicians and politicians drawn from historically disadvantaged groups, council representatives chosen in reserved elections thus have little chance of being subsequently
reelected. The representatives with the greatest chance for re-election are men elected in unreserved seats. However, the probability that an unreserved election will be followed by another unreserved election within a ward is just 0.4. Assuming that leaders in reserved seats are never reelected in the subsequent election, the maximum fraction of incumbent representatives that can be elected from one term to the next is 0.16. Consistent with these low rates of re-election, only 14.8 percent of the ward representatives in our sample had held a panchayat position before.

Previous studies; e.g. Banerjee and Pande (2010), Casey (2015), have used limited information about candidate-quality to explain a role for ethnic groups in politics. In our theory of local ethnic politics, voters have complete information about candidates’ ability and correctly predict the effort they will exert if elected. Ethnicity matters because members of ethnic groups can cooperate with each other, while at the same time excluding outsiders. The consequence of this insider-outsider dichotomy is that the ethnic composition of the local constituency (ward) determines who will be elected, the effort exerted by the elected representative, and the accompanying supply of non-excludable public goods.

3 The Theory

3.1 Ethnic Groups and Public Resources

\( N \) individuals, belonging to \( K \) ethnic groups, reside in a political constituency. Each ethnic group \( k \) consists of \( N_k \) individuals, such that \( \sum_k N_k = N \) and the \( k \) subscript sorts groups by size; \( N_{k-1} < N_k, \forall k \). An ethnic group is defined as a set of individuals who interact frequently with each other but very little with outsiders. Exclusion from these interactions is an effective sanctioning device, which allows groups to support high levels of internal cooperation. In the context of local politics, each group can, therefore, credibly commit to compensate its representative ex post for his effort, conditional on being elected, even if he holds office for a single term. The representative, in turn, will internalize the benefit that all his co-ethnics derive from the public resources he provides. In contrast, he places no weight on the benefit derived by outsiders because they cannot credibly commit to compensating him in the same way.

The residents of the constituency receive two types of public resources: a nonexcludable public good and a targetable welfare transfer. All individuals derive the same utility from

---

9 Chattopadhyay and Duﬂo (2004) note that not a single woman in their sample of reserved constituencies in the state of Rajasthan was elected in the subsequent term (without female reservation). Exposure can change these priors, but Beaman et al. (2009) find that it takes two reserved election terms before an increase in women elected in unreserved seats can be detected.

10 In our sample of ward-terms, 60 percent were unreserved, 11 percent were reserved for SC candidates, 6 percent were reserved for ST candidates, and 23 percent were reserved for OBC candidates (see Table 2 below). With one-third of the seats in all categories reserved for women, this implies that unreserved elections would occur 40 percent of the time.
these public resources. The literature on ethnic politics has focused on the targeting of public goods to co-ethnics (the insiders) at the cost of outsiders. At the local level, which is the focus of our analysis, a large component of public goods are nonexcludable. The analysis that follows will derive the relationship between the ethnic composition of the constituency and the ability (and effort) of the selected representative, which will, in turn, determine the supply of public goods that benefit both insiders and outsiders. It will, in addition, examine how these relationships change when targetable welfare transfers are included in the representative’s list of responsibilities.

3.2 Representative’s Effort and Candidate Ability

The constituency must select an unpaid representative from among its residents for a single term. We ignore the welfare transfers to begin with, so the representative’s sole task is to supply the public good to his constituents. The level of the public good will depend on the amount of effort that he exerts. When choosing his level of effort, the representative will take account of the cost of effort, which is decreasing in his ability, and the benefit derived from the public good by his co-ethnics residing in the constituency. A representative with ability $\omega$ belonging to group $k$ of size $N_k$, will thus choose effort, $e$, to maximize

$$N_k e^\beta - \frac{e}{\omega},$$

where $e^\beta$ is the level of the public good received in the constituency. While more effort will obviously increase the supply of the good, $\beta > 0$, we assume that the return to effort is decreasing at the margin, $\beta < 1$. In fact, we will need to place the stronger restriction that $\beta < 1/4$. We assume, in addition, that the level of the public good maps linearly into the utility derived from its consumption by each resident. We normalize so that this mapping is one-for-one. The representative’s optimal level of effort can then be expressed as an increasing function of his ability and the size of his group,

$$e(\omega, N_k) = (\beta \omega N_k)^{\frac{1}{1-\beta}}. \tag{1}$$

The level of effort when ethnicity is salient is greater than the benchmark where the representative only cares about himself ($N_k$ would be replaced by one in the preceding equation) but less than first-best (in which case $N_k$ would be replaced by $N$).

With ex post transfers, the ethnic group effectively operates as a unitary decision-making unit, putting forward as its candidate the individual who maximizes its overall benefit from the public good net of his effort cost and the cost of the outside opportunities he foregoes, which will be increasing in his ability. A group of size $N_k$ will thus put forward the individual with ability $\omega$ that maximizes

$$N_k [e(\omega, N_k)]^\beta - \frac{e(\omega, N_k)}{\omega} - \alpha \omega. \tag{2}$$
The opportunity cost is assumed to be increasing linearly in ability to be consistent with the linear specification of the effort cost. Substituting the expression for \( e(\omega, N_k) \) from equation (1) and then maximizing with respect to \( \omega \), the candidate’s ability can be expressed as an increasing function of the size of his group,

\[
\omega(N_k) = \left[ \frac{\beta N_k}{\alpha(1-\beta)} \right]^{\frac{1}{1-2\beta}}.
\]  
(3)

Substituting this expression back in equation (1), his effort (conditional on being elected) is also increasing in the size of his group

\[
e(N_k) = \left[ \frac{\beta N_k^2}{\alpha} \right]^{\frac{1}{1-2\beta}}.
\]  
(4)

It follows that representatives of larger groups will have higher ability and supply a higher level of the public good. Notice that this result is independent of the distribution of ability across groups.\(^{11}\) Substituting the expressions for ability and effort from equations (3) and (4) in (2), the net benefit from public good provision is

\[
\left( \frac{\beta^2}{\alpha} \right)^{\frac{\beta}{1-2\beta}} N_k^{\frac{1}{1-2\beta}} (1 - 2\beta),
\]  
(5)

which is strictly positive. Each group would prefer to put forward its own representative to the default with no public good provision. The analysis that follows examines which group’s representative will be selected in equilibrium.

### 3.3 Representative Selection and Public Good Provision

Elections are contestable. Each ethnic group in the constituency chooses whether or not to put its preferred candidate up for election.\(^{12}\) The decision to stand is accompanied by an entry cost, which is close to zero. The only role for this entry cost is to rule out equilibria in which candidates with no chance of winning stand for election. After all groups have simultaneously made their entry decision, the election takes place and the candidate with the most votes is selected to represent the constituency for a single term.

If all ethnic groups fielded their preferred representatives as candidates, then the representative of the largest group would always be selected. Once we allow groups to decide whether or not to field a candidate, however, this outcome will not necessarily be obtained. In particular, the largest group could free-ride on a smaller group (and avoid bearing the effort and opportunity cost of its own representative) if the level of the public good supplied by the other group’s representative is sufficiently large. The first theoretical result is that

\(^{11}\)The ability distribution could, in principle, vary across groups. All that we need for an interior solution is that the optimal ability level should lie within the support of the ability distribution in each group.

\(^{12}\)The electoral process is the same as the citizen-candidate models of Osborne and Slivinsky (1996) and Besley and Coate (1997), except that groups put up their preferred candidates.
the representative of the largest group will, nevertheless, be certainly selected if its share of the population in the constituency exceeds a threshold level. This implies the following:

**Proposition 1.** There is a discontinuous increase in the ability of the selected representative and the supply of the public good when the population share of the largest group crosses a threshold level, \( \frac{N^*_K}{N} \).

The representative of any ethnic group will certainly be selected if two conditions – the feasibility condition (FC) and the incentive condition (IC) – are satisfied. For the feasibility condition to be satisfied, the group’s representative must be preferred to the representative of any other group by a voter belonging to a third group. For the incentive condition to be satisfied, the group must prefer its own representative to the representative of any other group. The feasibility condition is evidently satisfied for the largest group since its representative supplies a higher level of the public good than any other representative. For the incentive condition to be satisfied, the largest group must prefer its own representative to the next largest group’s representative. If this is the case, then it will certainly prefer its own representative to any other (smaller) group’s representative. The required condition is

\[
N^*_Ke(N^*_K)^\beta - \frac{e(N^*_K)}{\omega(N^*_K)} - \alpha \omega(N^*_K) \geq N^*_Ke(N^*_{K-1})^\beta. \tag{6}
\]

Substituting from equations (3) and (4), the preceding inequality can be rewritten as,

\[
N^*_K \left( \frac{\beta^2}{\alpha} \right) \frac{1}{1-\beta} \left[ N^*_K^{1-2\beta} (1 - 2\beta) - N^*_{K-1}^{1-2\beta} \right] \geq 0. \tag{7}
\]

If this condition is satisfied, there is a unique equilibrium in which the largest group puts forward its representative for election and no other group fields a candidate.\(^{13}\)

When will the incentive condition (IC) be satisfied? This will depend on the ethnic composition of the constituency; in particular, the population share of the largest group. If all groups in the constituency are of equal size, \( N/K \), then the term in square brackets in inequality (7) will be negative (recall that \( \beta < 1/4 \) by assumption). If the largest group accounts for almost the entire population, \( N^*_K \to N \) and \( N^*_{K-1} \to 0 \), the term in square brackets will reverse sign. Holding constant the population of the constituency, the size

\(^{13}(i) \) The strategy profile in which no one contests, and the public good is not provided, is not an equilibrium. Any group would be better off by deviating and fielding its representative, who would generate a positive net benefit for the group – from (5) – once selected. (ii) Any strategy profile with multiple candidates is not an equilibrium. Given the cost of entry, smaller groups (who are sure to lose) would be better off not contesting. (iii) Any single-candidate strategy profile in which a group other than the largest group fields its representative is not an equilibrium. The largest group will always deviate and field its candidate if inequality (7) is satisfied. (iv) The proposed strategy profile is an equilibrium. The largest group will not deviate because it receives a positive net benefit from having its representative selected, which exceeds the default (with no public good provision) when no group fields a candidate. No other (smaller) group wants to deviate and put forward a candidate because it would certainly lose the contest, while having to bear the cost of entry.
of all other groups, including the next largest group, will decline as \( N_K \) increases. By a
continuity argument, there is thus a threshold \( N^*_K \), or, equivalently, a threshold population
share, \( \frac{N^*_K}{N} \), at which the inequality is just satisfied. Above the threshold, the largest
group will always put its representative up for election.\(^{14}\)

Below that threshold, inequality (7) is not satisfied and there will be multiple equilibria.
In general, there will be a group \( k \), with \( N_k < N_{K-1} \), for which inequality (7) is just satisfied.
Any strategy profile in which a group of size \( N_k \in (N_k, N_K) \) fields its representative, while
all other groups stay out, will be an equilibrium. Because any of these groups could be
selected in a given election, there will be a discontinuous increase in the size of the elected
representative’s group when the population share of the largest group just reaches the
threshold, \( \frac{N^*_K}{N} \). Given that there is a positive (and continuous) relationship between a
group’s size and the ability of its preferred representative, as well as the amount of the
public good he supplies, both the representative’s ability and the level of the public good
will increase discontinuously at that threshold.

3.4 Adding Welfare Transfers

Local government representatives are often entrusted with the task of distributing welfare
transfers in addition to their primary function of supplying public goods. Unlike public
goods, which are nonexcludable at the local level, these transfers can be targeted to the
representative’s ethnic group. Let each beneficiary receive one unit of the transfer, which
maps into its utility equivalent \( \theta \), and let the constituency receive a fixed \( T \in (\frac{N}{K}, N) \) units
of the transfer. A representative belonging to a group of size \( N_k \) will first ensure that each
member of his group receives the transfer, randomly allocating the remaining \( T - N_k \) units
to the \( N - N_k \) outsiders in his constituency.\(^{15}\) The probability that an outsider will receive
the private transfer, \( \frac{T - N_k}{N - N_k} \), is decreasing in \( N_k \). While a larger group’s representative
supplies a higher level of public goods, the opposing force we have now introduced is that
outsiders are worse off with respect to the transfer when a large group is in power. A given
ethnic group will continue to put forward the same (most preferred) representative and
that representative will continue to exert the same level of effort and supply the same level
of the public good. What changes is which group gets elected, and this changes the ability
of the selected representative and the supply of the public good in equilibrium.\(^{16}\)

\(^{14}\)We derive the result in terms of the population share of the largest group, \( \frac{N^*_K}{N} \), rather than its size
relative to the next largest group, \( \frac{N^*_K}{N_{K-1}} \), because the population share has additional significance in the
context of democratic elections. This will become clear when we introduce welfare transfers below.

\(^{15}\)In practice, the transfers are intended for economically or socially disadvantaged individuals. This
feature of the transfer mechanism could be easily incorporated in the model, without changing the results
that follow, by assuming that a fraction of non-eligible insiders receive the transfers and that the transfers
that remain are randomly allocated to eligible outsiders.

\(^{16}\)An ethnic group could put forward a candidate whose ability is higher than its most preferred represen-
tative as a way of getting elected and subsequently capturing the private transfers. This strategy is not
credible if other members of the group, in particular the preferred representative, can function as proxies
We noted that the representative of a given group will certainly be selected if two conditions – the feasibility condition (FC) and the incentive condition (IC) – are satisfied. The incentive condition will now tighten because free-riding on a smaller group is less attractive. As derived formally below, the population share at which the incentive condition just binds for the largest group will decline from \( \frac{N^*_K}{N} \) to \( \frac{N^{**}_K}{N} \). While the largest group now has a greater incentive to have its representative elected, the feasibility condition, which was previously always satisfied for this group, may no longer hold. As \( T \to N \), everyone receives the welfare transfer and so outsiders continue to want the representative of the largest group to be elected. As \( T/N \) declines, the negative crowding out effect associated with the welfare transfers grows in importance relative to the public good effect. However, we show in the Appendix that as long as \( T/N \) is not too small, the feasibility condition continues to be satisfied for some (but not all) values of \( N_K \). In particular, there exists a unique \( N^{**}_K \in (N_K, N) \), such that the feasibility condition is satisfied for \( N_K \leq N^{**}_K \), but not for \( N_K > N^{**}_K \).

As described in Proposition 2, adding targetable welfare transfers to the representative’s list of responsibilities will change which group gets elected, and the accompanying supply of public goods in the following way: If the feasibility condition is not binding for the largest group, then the threshold at which its representative gets selected will shift down. The reduced incentive to free-ride on other groups thus leads to an increase in the overall supply of the public good. In contrast, if the feasibility condition is binding due to the crowding-out effect of the welfare transfers, then the representative of the largest group will only be elected when it has an absolute majority. The threshold will now shift up, resulting in an overall decline in the supply of the public good.

**Proposition 2.** (a) If \( \frac{N^{**}_K}{N} > 0.5 \), or if \( \frac{N^{**}_K}{N} < 0.5 \) but the feasibility condition continues to be satisfied for the largest group; i.e. \( \frac{N^{**}_K}{N} < \frac{N^{***}_K}{N} \), then Proposition 1 is qualitatively unchanged. There will be a discontinuous increase in the ability of the selected representative and the supply of the public good at a threshold population share, \( \frac{N^{**}_K}{N} \), which is lower than the threshold without welfare transfers, \( \frac{N^{**}_K}{N} \). (b) If \( \frac{N^{**}_K}{N} < 0.5 \) and the feasibility condition is not satisfied for the largest group; i.e. \( \frac{N^{**}_K}{N} > \frac{N^{***}_K}{N} \), then Proposition 1 will continue to be qualitatively unchanged. However, the discontinuous increase in the representative’s ability and the supply of the public good will only occur when the largest group has an absolute majority; i.e. at a population share of 0.5.

To prove the proposition, we begin by establishing that the population share at which the incentive condition (IC) is just satisfied for the largest group declines when welfare transfers are added to the representative’s list of responsibilities; i.e. \( \frac{N^{**}_K}{N} < \frac{N^{***}_K}{N} \). Inequality for the candidate once he is elected.
(7) characterizes the condition under which the IC is satisfied with respect to the next largest group when welfare transfers are absent. With transfers, the analogous condition for any group $j \neq K$ is

$$N_K \left( \frac{\beta^2}{\alpha} \right)^{\frac{\beta}{1-\beta}} \left[ N_K^{2\beta} \left( 1 - 2\beta \right) - N_j^{2\beta} \right] + \theta N_K \left[ \max \left( 1, \frac{T}{N_K} \right) - \frac{T - N_j}{N - N_j} \right] \geq 0. \quad (8)$$

The second term in square brackets in inequality (8) characterizes the gain to the largest group, with respect to the welfare transfers, from having its representative selected. When its representative is selected, each member of the largest group receives the transfer with probability one when $N_K \leq T$ and probability $\frac{T}{N_K}$ when $N_K > T$. When the representative belongs to another group $j$, the probability that a member of the largest group receives a transfer, $\frac{T - N_j}{N - N_j}$, is less than $\frac{T}{N}$, which, in turn, is less than $\frac{T}{N_K}$. The second term in square brackets is thus always positive.

Applying the same argument that we used to prove Proposition 1, the first term in square brackets is negative when all groups are of equal size, $N_K = N_j = \frac{N}{K}$, positive when $N_K \to N$ and $N_j \to 0$, and increasing in $N_K$ (as $N_j$ declines). This implies that there is a population share $N^*_K(N_j)$ at which the first term in square brackets is exactly zero. With welfare transfers, once the positive second term in square brackets is introduced, it follows that the population share at which inequality (8) is just satisfied, $N^*_K(N_j)$, must be less than $N^*_K(N_j)$, $\forall j$. The incentive condition must be satisfied for all $j$: $N^*_K = \max_j N^*_K(N_j)$. It follows that $N^*_K < N^*_K$.\(^{18}\)

If $\frac{N^*_K}{N} \geq 0.5$, the feasibility condition is irrelevant. The representative of the largest group will be selected, regardless of his outside support, when its population share reaches $\frac{N^*_K}{N}$ because it has an absolute majority. If $\frac{N^*_K}{N} < 0.5$, then the feasibility condition must also be satisfied. The required condition is that the representative of the largest group must be preferred to the representative of any other group, $j \neq K$, by an individual belonging to neither of those groups,

$$\left\{ \left( \frac{\beta^2}{\alpha} \right)^{\frac{\beta}{1-\beta}} \left[ N_K^{2\beta} - N_j^{2\beta} \right] \right\} - \left\{ \theta \left[ \frac{T - N_j}{N - N_j} - \max \left( \frac{T - N_K}{N - N_K}, 0 \right) \right] \right\} \geq 0. \quad (9)$$

The first term in curly brackets in the preceding inequality, which we denote by $PG$, characterizes the advantage of selecting the largest group’s representative with respect to the supply of public goods. $PG$ is always positive because representatives of larger groups

\(^{17}\)Note that group $j$ never captures all of the transfers, unlike group $K$, because we have assumed that $T > \frac{N}{N}$.\(^{18}\)Without transfers, the incentive condition for the largest group is most difficult to satisfy with respect to the next largest group; $\max_j N^*_K(N_j) = N^*_K(N_{K-1})$. This is why inequality (7) was specified with respect to the next largest group, $K - 1$. With welfare transfers, the additional second term in square brackets in inequality (8) is increasing in $N_j$ and so $\max_j N^*_K(N_j)$ is not necessarily $N^*_K(N_{K-1})$. Nevertheless, as long as $N^*_K(N_j) < N^*_K(N_j), \forall j$, it follows that $\max_j N^*_K(N_j) < \max_j N^*_K(N_j)$.
supply more public goods. The second term in curly brackets, which we denote by \( WT \), characterizes the accompanying disadvantage with respect to the receipt of welfare transfers.

The probability that an outsider will receive a transfer when group \( j \)'s representative is in power, \( \frac{T-N_j}{N-N_j} \), is decreasing in \( N_j \). It follows that \( WT \) is always positive because \( N_j < N_K \), \( \forall j \).\(^{19}\)

If \( PG \geq WT \), then the feasibility condition is satisfied. The discussion that follows examines this condition for all values of \( N_K \in \left[ \frac{N}{2}, N \right] \). We previously assumed that an increase in \( N_K \) was accompanied by a decline in the size, \( N_j \), of all other groups, \( j \neq K \), to keep the total population, \( N \), constant. We now place the additional restriction that \( \frac{dN_j}{dN_K} = -\Delta_j \), where \( \Delta_j \in (0,1) \) and \( \Sigma \Delta_j = 1 \). It is straightforward to verify, from inequality (9), that \( PG = WT = 0 \) when \( N_K = N_j = \frac{N}{K} \). As shown in the Appendix, both \( PG \) and \( WT \) are monotonically increasing in \( N_K(N_j) \). In addition, as long as \( \frac{T}{N} \) is not too small, (i) \( \frac{dPG}{dN_K} > \frac{dWT}{dN_K} \) at \( N_K = N_j = \frac{N}{K} \), and (ii) \( WT > PG \) as \( N_K \to N \) and \( N_j \to 0 \). Thus, \( PG \) starts above \( WT \) at \( N_K(N_j) \to \frac{N}{K} \) and ends below it at \( N_K(N_j) \to N \), ensuring that the \( PG \) and \( WT \) functions cross at least once. Closer inspection of the \( PG \) and \( WT \) functions provides us with the stronger result (derived in the Appendix), which is that there is a unique point of intersection, \( N_K^{***}(N_j) \).

\( PG \geq WT \) and the feasibility condition is satisfied for \( N_K(N_j) \leq N_K^{***}(N_j) \). \( PG < WT \) and the feasibility condition is not satisfied for \( N_K(N_j) > N_K^{***}(N_j) \). The feasibility condition must be satisfied with respect to all \( j \), hence, \( N_K^{***} = \min_j N_K^{***}(N_j) \). If \( N_K^{***} < N_K^{**} \), then the threshold at which the representative’s ability and the supply of public goods increase discontinuously is located at \( N_K^{**} \). If \( N_K^{***} > N_K^{**} \), then the threshold will be located at 0.5 because the feasibility condition (for all \( j \)) will not be satisfied for any \( N_K > N_K^{***} \).

The theory incorporates the positive and the negative aspects of ethnic politics. If the threshold is empirically located at 0.5, this will allow us to identify both these aspects. The discontinuous increase in the representative’s ability and the supply of public goods when the population share of the largest group crosses a threshold is indicative of underlying cooperation within groups. The fact that the largest group’s representative is only elected when it has an absolute majority, despite the fact that he will provide a higher level of the nonexcludable public good, is indicative of targeting (of welfare transfers) to insiders, at the expense of outsiders.

\(^{19}\)For \( N_K \geq T \), outsiders receive no transfers when the representative belongs to the largest group. In that case, \( WT = \theta \frac{T-N_j}{N-N_j} > 0 \).
4 The Data

The data that we use are unique in their geographic scope and detail. They are from the 2006 Rural Economic and Development Survey (REDS), the most recent round of a nationally representative survey of rural Indian households first carried out in 1968. The 2006 REDS covers 242 of the original 259 villages in 17 major states of India. We make use of three components of the survey data - the village census, the village inventory, and the household survey - for 13 states in which there were ward-based elections and complete data in all components. The census obtained information on all households in each of the sampled villages, by ward. This enables us to measure the population share of each caste in each ward. The village inventory was designed, in part, to specifically assess models of public goods delivery, collecting information on the characteristics of the elected ward representatives and public good provision, at the street level, in each ward in each of the last three panchayat election terms prior to the survey. The household survey, administered to a sample of households in each REDS village, records participation in programs intended for households below the poverty line (BPL) in each of the last three election terms.

The theory relates the ethnic composition of the constituency, which we measure by the caste composition of the ward, to the supply of public goods. However, ethnic (caste) composition could also determine the demand for public goods. To disentangle the supply effect from the demand effect, we take advantage of the panel data on elections and randomized caste reservation in Indian local governments, which exogenously changes the composition of castes that are eligible to stand for election in the ward from one election to the next. This variation in the (eligible) caste composition over time allows us to subsume all permanent characteristics of the ward, including the demand for public goods by the electorate, in a fixed effect.

The specific prediction of the theory is that there will be a discontinuous increase in the ability of elected representatives and the supply of the public good when the population

---

20 The states are Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal. Punjab and Jharkhand did not have any ward-based elections and the election data are not available for Gujarat and Kerala.

21 A caste group is any set of households within a village reporting the same (sub) caste name. Christian households provided their original caste names and Muslim households provided their equivalent biradari affiliation. Most Christians continue to marry within their original caste group. We counted Muslim households within a village that were without a formal biradari name as a unique caste. On average, there are seven wards per village, 67 households per ward, and six castes per ward.

22 The implicit assumption when we include the ward fixed effect is that the population of the ward, or the electorate, remains essentially unchanged over time. This is a reasonable assumption given the unusually low spatial mobility that is characteristic of rural India. Munshi and Rosenzweig (forthcoming), for example, report that permanent migration rates of men aged 20-30 out of their origin villages were as low as 8.7 percent in 1999. The corresponding rates for entire households would be much lower. Indeed, the census listing data indicate that since 1991 when the local electoral system was put in place, less than 3 percent of new households had migrated into the sample villages.
share of the largest ethnic group (caste) crosses a threshold level. Once we include ward fixed effects, the prediction is that this discontinuous change will occur when the population share of the most numerous eligible caste crossed a threshold level. To implement this test, there needs to be sufficient variation in the population share statistic within wards over election terms. Ward elections are reserved for Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Castes (OBC) in proportion to the share of these groups in the population at the district level. Among the ward-terms in our sample, 11 percent were reserved for Scheduled Castes, 6 percent were reserved for Scheduled Tribes, and 23 percent were reserved for Other Backward Castes. Panel A of Table 2 describes the share of the most numerous eligible caste in the ward by type of election. These shares are generally quite large, even in reserved elections, reflecting the fact that neighborhoods in rural India are often dominated by a single caste. Nevertheless, there is substantial variation in population shares within and across reservation categories. Panel B of Table 2 displays the fraction of ward-terms in which the share of the most numerous eligible caste exceeds alternative pre-specified cutoffs, by the type of reservation. Matching the descriptive statistics in Panel A, the proportion of elections in which the cutoff is exceeded is largest for unreserved elections, followed by elections in which the ward candidates are restricted to ST, OBC, and SC in that order, regardless of the cutoff that is specified. Just as the likelihood that any pre-specified cutoff is crossed varies across different reservation schemes in Table 2, there will be variation in the likelihood that the threshold will be crossed from one term to the next within a ward as the type of reservation changes. It is possible that the pool of potential candidates will be weaker in reserved (lower caste) elections. All the regression specifications in this paper consequently include a full set of reservation dummies in addition to ward fixed effects.

The village inventory obtained information on whether new construction or maintenance of specific public goods actually took place on each street in the village for each term. These local public goods include drinking water, sanitation, improved roads, electricity, street lights, and public telephones as well as schools, health and family planning centers, and irrigation facilities. The survey was designed to permit the mapping of street-level information into wards so that public goods expenditures can be allocated to each ward, and its constituents, for each election term. Ninety-five percent of the wards have information for at least two election terms. Our analysis focuses on six goods for which the benefits have a significant local and spatial component; i.e., goods for which placement in the ward is desirable. The goods are: drinking water, sanitation, improved roads, electricity, street lights, and public telephones. These six goods account for 15.2 percent of all local public

---

23Public irrigation investments or school buildings, for example, are valued local public goods whose placement within the ward (defined by place of residence) may not be desirable.
spending, which is four times the amount spent on schools and health facilities. Appendix Table A1 reports the fraction of households in the ward that received each public good, averaged across wards and election terms, by type of reservation. It is apparent that a large fraction of households benefited directly from expenditures on water, roads, and sanitation, while a much smaller fraction benefited, in any term, from expenditures on electricity, street lights, and public telephones. Our measure of overall public good provision at the street level will be the fraction of the six public goods that are received in a given election term. The corresponding ward statistic, which we use to test the theory, will be the population-weighted average of the street-level statistic.

The ability of the elected ward representative is measured by his years of schooling. Education provides many of the skills that are associated with political competence and is likely to be positively correlated with innate ability to the extent that there is positive selection into schooling. The village inventory includes a special module that collected information on the education of all of the elected representatives from each ward in each of the last three election terms. Educational attainment of the elected ward representative is measured in four categories – illiterate, primary graduate, secondary graduate, and post-secondary graduate – which we convert into years of schooling. The theory predicts that representatives will be positively selected on ability, particularly when they belong to larger groups. Table 3 provides preliminary evidence of this selection by comparing the average educational attainment of elected representatives and representative (median) individuals in the ward, separately by reservation category. The median education of household heads in each ward, by reservation category, is computed from the household census and then averaged across wards. Since 95% of household heads are male, we report average educational attainment separately for male and female representatives. Male representatives have substantially higher schooling than the median household head in all reservation categories. Highlighting the positive selection that we document, even female representatives have higher schooling than the median household head in SC and OBC elections, despite the fact that female education is much lower than male education in rural India.

24Key informants in the village were asked to rank 12 issues, by importance, that came under the purview of the elected panchayat. Inadequate roads and drinking water were ranked 1 and 2, followed by health, schooling, sanitation, street lights and electrification. Note that the low spending on health and education and the relatively low level of importance assigned to these goods by the key informants reflects the fact that they are largely allocated at the state level and so fall outside the purview of the village panchayat.

25Years of schooling are imputed by assigning 4 years of schooling to primary graduates, 10 years of schooling to secondary graduates, and 14 years of schooling to post-secondary graduates.

26We do not distinguish between male and female representatives when testing the theory below. Female reservation is independent of the reservation by caste that generates variation in the size of the largest eligible caste over time, and thus can be ignored in the analysis.
5 Testing the Theory

5.1 Descriptive Evidence

The theory indicates that the elected representative’s ability and the supply of the public good will increase discontinuously when the population share of the largest eligible caste in the ward crosses a threshold level. We semi-parametrically examine the relationship between the population share and each of the outcomes by estimating the following equation:

\[ y_{jt} = \phi(S_{jt}) + X_{jt}\gamma + \zeta_{jt}, \]  

(10)

where \( S_{jt} \) is the population share of the largest eligible caste in ward \( j \) and election term \( t \); \( y_{jt} \) is either the elected representative’s ability, measured by educational attainment, or the supply of public goods, measured by the fraction of the six major public goods (described above) received by the ward in that term; \( X_{jt} \) is a vector of additional regressors including a full set of ward and reservation dummies, and \( \zeta_{jt} \) is a mean-zero disturbance term.

We estimate the relationship between \( y_{jt} \) and \( S_{jt} \) in two steps. In the first step, we partial out the additional regressors, \( X_{jt} \), by estimating an equation that replaces the \( \phi(S_{jt}) \) function with a vector of dummy variables. There are five dummy variables, partitioning \( S_{jt} \in [0, 1] \) into six intervals, in the benchmark specification.\(^{27}\) We discuss the robustness of the results to alternative specifications of the \( \phi(S_{jt}) \) function below.

The estimated \( \gamma \) vector from the first step can be used to construct the conditional outcome, \( \tilde{y}_{jt} \equiv y_{jt} - (X_{jt} - X_{jt})\hat{\gamma} \), where the sample average of each additional regressor, \( X_{jt} \), is included to preserve the mean of the outcome. In the second step, \( \tilde{y}_{jt} \) is regressed nonparametrically on \( S_{jt} \):

\[ \tilde{y}_{jt} = \phi(S_{jt}) + \zeta_{jt}. \]  

(11)

Figure 3 reports nonparametric estimates of equation (11), using the two-step procedure, with the elected representative’s education and the fraction of the six major public goods received in each ward-term as outcomes.\(^{28}\) The representative’s education and public good provision both increase (discontinuously) at a population share of 0.4, and continue to increase till 0.6, in Figure 3. Although the increase at the threshold is very steep, it is not vertical. We will see momentarily that this is simply because we are using a local polynomial smoother for the estimation. Notice that the two variables track closely over the entire range

\(^{27}\) The dummy variables, \( D_{1jt} - D_{5jt} \), are indicator variables that take the value one if \( S_{jt} \in (0.2, 0.35], (0.35, 0.5], (0.5, 0.65], (0.8, 1.0], (0.2, 0.35], \) respectively. The reference category is \( S_{jt} \in [0, 0.2] \).

\(^{28}\) These estimates, and the tests of the theory that follow, restrict the sample of wards to those with more than one caste and more than one street (this will allow us to test, and reject, the spatial targeting of public goods below). Outlying ward-terms with public goods expenditures above a ceiling are also excluded. The theory implicitly assumes that there is a continuum of individuals in each ethnic group, which allows it to select its optimal representative. Because the theory is consequently more accurately tested in large wards, we weight both the first-step and the second-step regressions by the ward population.
of population shares, highlighting the close relationship between the representative’s ability and public good provision that is an important feature of our theory.

5.2 Locating a Threshold

The descriptive evidence indicates that there is a discontinuous increase in the representative’s ability and the supply of the public good when the population share of the most numerous caste reaches a threshold level. We now proceed to formally test for the presence of a threshold, place statistical bounds on its location, and estimate the gain in the representative’s ability and the supply of public goods at the threshold. Because the data generating process in Figure 3 appears to be approximately characterized by a step function, we follow standard practice; e.g. Hansen (1999), to estimate the following equation at different assumed thresholds, $S$:

$$\tilde{y}_{jt} = \pi_1 + \pi_2 D_{jt} + \epsilon_{jt},$$

where $\tilde{y}_{jt}$ is the conditional outcome in ward $j$ in term $t$; $D_{jt}$ is an indicator variable that takes the value one if the population share of the largest eligible caste exceeds $S$; and $\epsilon_{jt}$ is a mean-zero disturbance term.

Suppose that the data generating process for $\tilde{y}_{jt}$ is characterized by a step function, as in equation (12), with the true threshold at $\hat{S}$. If we use Least Squares to estimate equation (12), and the range of assumed thresholds, $S \in [S_{\text{min}}, S_{\text{max}}]$, is wide enough to cover the true threshold, then the Residual Sum of Squares (RSS) will be minimized when the assumed threshold is precisely $\hat{S}$. However, when testing our theory, we are also interesting in determining whether or not the data generating process is characterized by a threshold (step) function. As described below, this can be done by examining the pattern of the Residual Sum of Squares across the entire range of assumed thresholds. When the data generating process is characterized by a step function, the RSS will increase steeply as the assumed threshold moves away from the value at which the RSS is minimized (this will be the true threshold). If the data generating process is characterized by a smoothly increasing function instead, there will still be an assumed threshold at which the RSS is minimized. However, the RSS will now change relatively little with other assumed thresholds.

Hansen (1999) formalizes this argument by constructing a likelihood ratio statistic,

$$LR(S) = \frac{RSS(S) - RSS(\hat{S})}{RSS(\hat{S})} \cdot N,$$

which is simply a normalization of the Residual Sum of Squares statistic, $RSS(S)$, based on its minimum value, $RSS(\hat{S})$, and the number of observations, $N$. The advantage of this statistic is that its asymptotic distribution can be derived. Thus, while the LR statistic will attain its minimum value, which is zero by construction, at the same assumed threshold, $\hat{S}$,
where the RSS statistic is minimized, the additional advantage is that we can place bounds on the location of the true threshold with any pre-specified level of statistical confidence, say 95% or 99%. If the bounds are tight, the data generating process is likely to be characterized by a discontinuity at a threshold.

To illustrate how Hansen’s LR statistic can be used to both identify the presence of a threshold and to pin down its location, we generated a data set that consists of three variables: the population share of the largest eligible caste in our ward-terms, a variable, $V_S$, that is constructed to be consistent with equation (12), with the threshold set at 0.5, and a variable, $V_L$, that is increasing linearly in the population share. The variables are constructed to have the same mean and we add a mean-zero noise term (with the same variance) to both variables. Figure 4 nonparametrically estimates the relationship between each variable and the population share. The $V_S$ variable, which is constructed to increase discontinuously (and vertically) at a population share of 0.5, actually exhibits an increase from around 0.4 that continues until 0.6. This is precisely what we observed for the conditional outcomes in Figure 3, and is due to the local polynomial smoother that we use for the estimation and the noise that we have added to the $V_S$ variable. Nevertheless, there is clearly a discontinuous relationship between this variable and the population share that contrasts with the $V_L$ variable, which is increasing continuously in the population share. The test that we describe below will pin down the threshold for the $V_S$ variable at precisely 0.5.

Figure 5 plots the LR($S$) statistic for assumed thresholds, $S \in [0.25, 0.75]$ in increments of 0.001. This statistic reaches its minimum value, which we noted is zero by construction, when the assumed threshold, $S$ is equal to 0.5 with the $V_S$ variable. It increases steeply as the assumed threshold moves away (on either side) from 0.5. In contrast, the LR($S$) statistic for the $V_L$ variable changes very little over the entire range of assumed thresholds. The horizontal line in Figure 5, which is the 1% Critical Value, allows us to bound the location of the threshold for each variable with 99% confidence. Consistent with the preceding discussion, the bounds are very tight for the $V_S$ variable, whereas the LR($S$) statistic always lies below the Critical Value line for the $V_L$ variable.

We now proceed to test formally for the presence of a threshold with the two outcomes – the representative’s education and public good provision – after partialling out the additional regressors, using the REDS data. The benchmark specification uses equation (12) to locate a threshold, with the assumed thresholds ranging from 0.25 to 0.75 (in increments of 0.001). The Likelihood Ratio (LR) statistic corresponding to each assumed threshold is plotted in Figure 6, separately for each outcome. The LR statistic reaches its minimum value, which is zero by construction, at an assumed threshold of 0.5 for both outcomes.

---

29Andrews (1993) shows that the search for a minimum value must be restricted to a subset of the unit interval for tests of a structural break to have sufficient power.
Variation in the LR statistic across the range of assumed thresholds in Figure 6 matches closely with the pattern for the $V_S$ variable in Figure 5, which was constructed to increase vertically at a population share of 0.5. The Critical Value (CV) line bounds the location of the threshold, and as in Figure 5, the true threshold is located very close to 0.5 with 99% confidence for both the representative’s education and public good provision.

Recall that the $\phi(S_{jt})$ function in equation (10) is approximated by a vector of five dummy variables in step one of the two-step procedure (where we partial out the additional regressors in the equation). Figures 7 and 8 assess the robustness of the results to alternative specifications of the $\phi(S_{jt})$ function. One alternative specification approximates the $\phi(S_{jt})$ function by a vector of 14 dummy variables, partitioning $S_{jt} \in [0, 1]$ more finely into 15 intervals. A second specification approximates the $\phi(S_{jt})$ function by a quintic polynomial in $S_{jt}$. Partiational out the additional regressors in the first step, using each of these alternative specifications, Figure 7 reports the corresponding second-step relationships between public good provision and the population share of the largest eligible caste. The estimated relationships are very similar to what we obtained with the benchmark specification for the $\phi(S_{jt})$ function in Figure 3. Threshold tests, reported in Figure 8, locate the threshold close to 0.5, with a high degree of precision, for each alternative specification of the $\phi(S_{jt})$ function.

Although the theory indicates that there will be a discontinuous increase in the representative’s ability and the supply of public goods at a threshold, it is not informative about the relationship between these outcomes and the population share of the largest eligible group below the threshold (where there are multiple equilibria). When we specify a step function in equation (12) to test for a threshold, we are implicitly assuming that there is no relationship between either outcome and the population share below the threshold. We are also ignoring the possibility that both the representative’s ability and the supply of public goods could be increasing in population share above the threshold (where the largest group is always in power). Figure 9 assesses the robustness of the threshold test to a flexible specification of equation (12) that allows for a linear relationship between the outcome and the population share below the threshold, a mean-shift at the threshold, and a linear relationship (with a possibly different slope and sign) above the threshold. Including the benchmark test based on equation (12) for comparison, we see in Figure 9 that greater flexibility increases the precision of the threshold test, while maintaining the estimated location of the threshold at 0.5.

### 5.3 Gain at the Threshold

While the presence of a threshold population share at which both the elected representative’s ability and the supply of public goods change discontinuously is consistent with
the theory, it is the increase in these outcomes that is indicative of the internal cooperation within ethnic (caste) groups that underlies our theory. Having precisely located the threshold at 0.5 for both outcomes, we proceed to estimate the following equation for each outcome:

\[ y_{jt} = \lambda_1 + \lambda_2 D_{jt} + X_{jt}\gamma + \zeta_{jt}, \]

where \( D_{jt} \) is an indicator variable that takes the value one if the population share of the largest caste exceeds 0.5 and the remaining variables were defined earlier in equation (10).

Table 4 reports estimation results with the supply of public goods and the elected representative’s education as dependent variables. The mean-shift coefficient, \( \lambda_2 \), is positive and significant for each outcome. Our estimates indicate that there is a 13 percent increase in the supply of the public good and a 54 percent increase in the educational attainment of the elected representative at the threshold. Counter-factual simulations of the structural model that we estimate below will provide an alternative (equivalent) measure of the increase in the supply of public goods that can be attributed to the internal cooperation within ethnic (caste) groups.

In our theory, larger ethnic groups select more competent representatives, measured by their educational attainment, because a larger number of co-ethnics benefit from the nonexcludable public good. An alternative explanation for the increase in the representative’s ability when the largest group has an absolute majority is that larger groups are more educated on average. We assess the validity of this explanation by separately estimating the relationship between the 25\textsuperscript{th}, 50\textsuperscript{th}, and 75\textsuperscript{th} percentiles of the education distribution for each caste in each ward, obtained from the household census, on the size of the caste in the ward. Nonparametric estimates of these relationships, reported in Figure 10, indicate that there is a mild decline in educational attainment with group size. Moreover, there is no evidence of a threshold in Figure 11. The sharp increase in the educational attainment of the ward representative that we observe in Figure 3 is evidently due to the systematic selection of more competent representatives by larger groups (castes).

5.4 Targeting

The location of the threshold at 0.5, despite the fact that the representative of the largest group delivers a substantially higher level of the public good to the ward indicates that he must not be preferred on some other dimension. Our theory highlights how the ability to target welfare transfers reduces the attractiveness of candidates from larger castes. To examine this other – exclusionary – side of ethnic politics, we study the receipt of Below the Poverty Line (BPL) transfers by households in our sample villages. These transfers are meant to be received by economically disadvantaged households, but it is well known and well documented (for example, by Besley, Pande, and Rao 2007, and Bardhan and
Mookherjee 2010) that ineligible households who are politically connected can also benefit from them. Information on whether a household received a BPL transfer, in each of the last three election terms, is obtained from the detailed survey that is administered to a sample of households in each REDS village.

In our theory, there is a fixed amount of transfer resources, which the representative allocates first to his own group (the insiders) and then to outsiders. Depending on the degree of crowding out, this shifts the threshold at which the representative of the largest group is surely elected (with an accompanying increase in public goods) up or down. If the total amount of transfers is fixed, then we should observe no relationship between the BPL variable we have constructed and the population share of the largest eligible caste. Figure 12 uses the two-step procedure described above to show the relationship between the population share of the largest eligible caste and both BPL transfers and public good provision at the ward-term level (as a basis for comparison). We see in the figure that there is no relationship between BPL transfers and the population share in the relevant range (up to the point where the largest group has an absolute majority and comes to power with certainty), although there is an unexplained increase at a population share of 0.8. Formal tests for a threshold in Figure 13, moreover, find no evidence of a threshold for BPL transfers, in contrast to what we observe for public goods.

Is there evidence of BPL targeting in the ward along caste lines? To answer this question, we estimate the following equation using the survey data:

$$BPL_{ijt} = \eta_1 RC_{ijt} + \eta_2 RN_{ijt} + Z_{ijt}\delta + \xi_{ijt},$$

where the dependent variable is an indicator that takes the value one if household $i$ receives a BPL transfer in ward $j$ in term $t$; $RC_{ijt}$ is a binary variable indicating whether or not the ward representative in that term belongs to the household’s caste; $RN_{ijt}$ measures the number of households belonging to the representative’s caste in the ward; $Z_{ijt}$ is a vector of additional regressors that includes household fixed effects; and $\xi_{ijt}$ is a mean-zero disturbance term. The sample is restricted to the 35% of ward-terms for which information on the ward representative’s caste is available from the village inventory and can be matched to castes in the ward (based on the village census).

The conditional (fixed effects) logit model is used to estimate equation (14) because the mean of the dependent variable is far from 0.5. The coefficient on the representative’s caste in Table 5, Column 1 is positive and significant. Because household fixed effects are included in the regression, the interpretation of this result is that a household is more likely to receive a BPL transfer when it shifts from being an outsider to an insider; i.e. when

---

30Equation (14) is estimated at the household level and so we no longer apply population weights in the regression. However, we are implicitly weighting the regression, as above, because larger wards will have more households in the sample.
the ward representative belongs to its own caste. This is directly indicative of targeting to insiders, at the expense of outsiders. However, the probability of receiving a BPL transfer does not appear to depend on the size of the representative’s caste.

Our theory indicates that the larger the size of the representative’s caste, the lower should be the probability of receiving BPL transfers for outsiders. To test this, we allow the size of the representative’s caste to affect insiders and outsiders separately by adding an interaction term to the preceding equation:

\[ BPL_{ijt} = \eta_1 RC_{ijt} + \eta_2 RN_{ijt} + \eta_3 RC_{ijt} \times RN_{ijt} + Z_{ijt} \delta + \xi_{ijt}. \]  

(15)

The \( \eta_2 \) coefficient now provides an estimate of how the size of the representative’s caste affects outsiders and is expected to be negative. Consistent with the theory, and directly indicative of targeting to insiders at the expense of outsiders, this coefficient in Table 5, Column 2 is negative and significant (at the 10 percent level). The point estimates indicate that for every increase in the size of the representative’s caste by 10 households, there is a decrease in the probability that an outsider receives the BPL transfer by 6 percentage points (25 percent). At the mean size of the representative’s caste (37 households), being an insider increases the probability of receiving the transfer by 4 percentage points.

A major virtue of the threshold test implemented above, and our estimates of the mean-shift at the estimated threshold, is that they are based on the population share of the largest eligible caste. This share changes exogenously within the ward across election terms due to random caste reservation. In contrast, the caste identity of the elected representative and the size of his group, which we include as regressors in Table 5 are endogenous outcomes of the electoral process. Once household fixed effects are included, the threat to identification is that \( RC_{ijt} \) and \( RN_{ijt} \) proxy for unobserved changes in the households BPL status.

Suppose, for example, that castes with a greater fraction of households below the poverty line put more effort into getting their representative elected. Then belonging to the representative’s caste is an indicator of adverse economic circumstances, and the \( \eta_1 \) coefficient will be biased upward if current economic conditions are omitted from the regression. Note that the over-representation of poorer castes will not be observed if there is no targeting to begin with, since the caste would not benefit from having its own representative elected. In general, a spurious correlation will not be generated if there is no targeting. We are primarily interested in identifying the presence of caste-based targeting, and this is still accomplished by testing (and rejecting) the hypothesis that \( \eta_1 = 0 \) in equation (14).

By an analogous argument, if larger groups are poorer and the household’s own caste-group’s size is omitted as a regressor, then the coefficient \( \eta_3 \) on the interaction term in equation (15) will be biased upward. If an increase in the size of any caste group is mechanically associated with a decline in the size of other caste groups, as assumed in the theory, then this would bias the \( \eta_2 \) coefficient downward. Note, however, that the size of
the household’s caste is subsumed in the household fixed effect, included in both equations (14) and (15), eliminating this source of bias. Panel data on BPL transfers allow us to test for targeting with an unusually high degree of confidence.

In contrast with the welfare transfers, the theory assumes that public goods are not targetable at the local level (within the ward). To test this assumption, we replace access to BPL transfers with public good provision as the dependent variable in equations (14) and (15). Public good provision is measured by the fraction of the six major public goods that is received on the household’s street in a given election term. The dependent variable is constructed to be the log of this fraction to be consistent with the structural estimation that follows (using the same household-level data). In contrast with what we observed for BPL transfers in Table 5, Column 1, belonging to the representative’s caste does not increase the household’s access to public goods in Column 3. A representative belonging to a larger caste does appear to supply more public goods, although the effect is not statistically significant at conventional levels. Inclusion of the interaction term in Column 4 has little effect on the other coefficients. The coefficient on the interaction term itself is positive, but very small in magnitude relative to the uninteracted coefficient, which remains positive (the standard errors on the two coefficients are comparable). There is thus no evidence of crowding out with respect to the public goods, in contrast with what we observed for BPL transfers.

5.5 Structural Estimation and Counter-Factual Simulations

Having found evidence consistent with both the positive and the negative aspects of ethnic politics as incorporated in the model, we proceed to estimate its structural parameters. The structural estimates are used to (i) validate the assumption that \( \beta < 1/4 \), (ii) quantify the increase in the supply of public goods due to the internal cooperation within castes, and (iii) assess the gain in the supply of public goods that would be achieved by decoupling public good provision and the distribution of welfare transfers.

From equation (4), the supply of public goods, \( G \equiv e^\beta \), can be expressed as:

\[
G = \left[ \frac{(\beta RN)^2}{\alpha} \right]^{\frac{\alpha}{1-\alpha}},
\]

where \( RN \) is the number of households in the representative’s caste.

When estimating the parameters, \( \alpha \) and \( \beta \), we attempt to stay as close to the structure of the model as possible. However, one obvious dimension where the theory and data diverge is the assumption that all households in the ward receive the same supply of public goods. In the data, as noted, public good provision is measured at the street level and varies across streets in a ward. We account for this feature of the data in the structural estimation by assuming that the same effort by the elected representative translates into different levels of
public good provision on the ground, across streets and over time.\textsuperscript{31} Public good provision on street, s, in ward, j, and term, t, is thus denoted by $G_{sjt} = F_{sjt} \cdot G_{jt}$, where $F_{sjt}$ maps ward-level effort into street-level public goods.

Taking logs, and substituting the expression for $G_{sjt}$ in equation (16), with appropriate subscripts,

$$
\log(G_{sjt}) = \frac{\beta}{1 - 2\beta} \log \left( \frac{\beta^2}{\alpha} \right) + \frac{2\beta}{1 - 2\beta} \log(RN_{jt}) + f_{sj} + \nu_{sjt},
$$

(17)

where the $F_{sjt}$ term is decomposed into a street-ward fixed effect, $f_{sj}$, and a mean-zero disturbance term, $\nu_{sjt}$.

The structural parameters, $\alpha$ and $\beta$, are evidently identified in the preceding equation and can be estimated using Nonlinear Least Squares.\textsuperscript{32} The point estimates are reported in Table 6. Consistent with the assumption of the theory, we see that the $\beta$ parameter estimate is less than $1/4$. The $\alpha$ parameter, which measures the increase in outside options with ability, is also positive as expected, but less precisely estimated.

We use the structural estimates to conduct two counter-factual experiments. The first counter-factual experiment compares the benchmark supply of public goods with what would be obtained if (i) the caste was unable to ameliorate the collective action problem, and (ii) this problem was solved completely. To implement the first scenario, we replace the size of the representative’s caste in the ward, $RN_{jt}$, by one (the representative), and then predict the supply of public goods from equation (17). In the second scenario, we replace $RN_{jt}$ by the number of households in the ward. We plot the predicted supply for each counter-factual scenario, together with the benchmark (where the predicted supply is based on $RN_{jt}$) against the size of the representative’s group in Figure 14. The estimates indicate that internal cooperation within the caste substantially increases the supply of public goods, and when a large caste is present in the ward, brings the supply close to first-best.

Figure 14 shows that there is a substantial gain in the supply of non-excludable public goods when the representative of a larger caste-group is elected. The negative crowding-out effect associated with the welfare transfers must, therefore, be substantial to explain why the representative of the largest caste is only elected when his group has an absolute majority. Our second counter-factual experiment quantifies the gain in the supply of public goods that could consequently be achieved by decoupling public good provision and the distribution of welfare transfers. In the benchmark scenario, the largest eligible caste in a given ward-term is predicted to be in power if its population share exceeds 0.5. If this

\textsuperscript{31}Note that we found no evidence that street-level differences in the supply of public goods reflects targeting.

\textsuperscript{32}We weight by the number of households on the street to allow for heteroscedasticity in the residual term, $\nu_{sjt}$. 

28
condition is not satisfied, then a (hypothetical) caste that is 80% of the size of the largest eligible caste is predicted to be in power (this number is based on the average across all relevant ward-terms in our data). Given the predicted caste size in each ward-term, the associated supply of public goods is obtained from equation (17). In the decoupled scenario, the representative of the largest caste will be elected, regardless of whether or not it has an absolute majority, if the following condition is satisfied from equation (7):

\[
\left( \frac{N_K}{N_{K-1}} \right) \geq \left( \frac{1}{1 - 2\beta} \right)^{\frac{1-2\beta}{2\beta}}.
\]

We plot the probability density function for public good provision, with the benchmark scenario and the decoupled scenario, in Figure 16. Public good provision under the decoupled scenario stochastically dominates the corresponding distribution under the benchmark scenario. Moreover, the counter-factual experiment indicates that the magnitude of the gain in the supply of public goods that would be achieved by decoupling is substantial. For example, in the benchmark scenario, 26% of wards receive less than one-half of the full set of public goods. Eliminating welfare transfers from the representatives list of responsibilities would reduce the fraction of under-supplied wards to 16%.

6 Conclusion

The undersupply of public goods is a hallmark of underdevelopment. A large and growing literature has taken the position that ethnic politics plays a major role in both limiting the supply of public goods and distorting their allocation in many developing countries. When information about candidates is limited, citizens vote mechanically on ethnic lines, resulting in the selection of corrupt representatives who siphon off public resources for themselves. This hurts both insiders – members of the representative’s own ethnic group – and outsiders. In addition, ethnic politics has been shown to result in the inefficient targeting of public resources, benefiting insiders at the expense of outsiders. In this paper, we develop a theory in which the exclusionary aspect of ethnic politics is highlighted, but also in which ethnic groups can coordinate to solve the classic collective action problem associated with the voluntary provision of public goods (by compensating the representatives they put forward for their effort and foregone earnings).

Using newly-available Indian data, covering all the major states over three election terms at the most local (ward) level, we show that internal cooperation within the caste – the relevant ethnic group in India – results in the election of more competent representatives and a substantial increase in the supply of non-excludable public goods. In particular, because the caste creates incentives for the representative to internalize the entire group’s benefit from public goods, representatives from larger castes exert more effort and have higher ability. Despite evidence consistent with the positive relationship between (local)
caste size and public good provision, however, we find that the representative of the largest caste within a ward only gets elected when his caste has an absolute majority. Despite the fact that outsiders and insiders benefit equally from the non-excludable public goods, the rest of the constituency evidently does not provide political support for the largest caste.

Ward representatives in India, like political representatives in other parts of the world, are responsible not only for the provision of public goods, but also for the distribution of welfare transfers. Although public goods are non-excludable at the local (ward) level, welfare transfers can be targeted to households in the representative’s caste. In line with the results from previous studies, we document caste-based targeting of below the poverty line (BPL) transfers using panel data from a representative sample of households over three election terms. While previous studies have focused exclusively on the distributional aspects of this targeting, the additional insight from our theory is that the targeting also affects the supply of public goods by changing which caste’s representative gets elected.

Although the representative of a larger group will supply more public goods, benefiting insiders and outsiders, he will also capture a greater fraction of the welfare transfers for his own group, crowding out the outsiders. The crowding-out effect creates an extra incentive for the largest group not to free-ride on smaller groups, increasing the probability that its representative will be elected with an accompanying increase in the supply of public goods. However, the crowding-out effect also reduces outside support for the largest caste, and we find in our rural Indian villages that the representative of the largest group is only elected when it has an absolute majority. Including welfare transfers to the representative’s list of responsibilities thus reduces the supply of public goods.

Based on our theory and empirical findings, the supply of public goods in rural India could be increased by decoupling public good provision and the distribution of welfare transfers. This would result in more competent representatives being elected even when their caste groups do not have an absolute majority. Counter-factual simulations based on structural estimates of the model indicate that the gains from this decoupling are substantial. A simple policy thus has the potential to partly solve the problem of the undersupply of public goods in rural India. In other contexts, however, as emphasized by the theory, the coupling of public good provision and the distribution of welfare transfers could lead to an increase in public goods. It is thus important to be attentive to both theory and context when designing policy.
7 Appendix: The Feasibility Condition

For the feasibility condition to be satisfied, the representative of the largest group, $K$, must be preferred to the representative of any other group, $j \neq K$, by an individual belonging to neither of those groups,

$$\left\{ \left( \frac{\beta^2}{\alpha} \right)^{\frac{2}{1-2\beta}} \left[ \frac{N_{K}^{2\beta}}{2 \beta} - \frac{N_{j}^{2\beta}}{2 \beta} \right] \right\} - \left\{ \theta \left[ \frac{T - N_{j}}{N - N_{j}} - \max \left( \frac{T - N_{K}}{N - N_{K}}, 0 \right) \right] \right\} \geq 0.$$  

Denote the first term in curly brackets by $PG$ and the second term in curly brackets by $WT$. We assume that $\frac{dN_{j}}{dN_{K}} = -\Delta_{j}$, where $\Delta_{j} \in (0, 1)$ and $\sum_{j} = 1$ to keep the total population, $N$, constant. The properties of the $PG$ and $WT$ functions can then be derived as follows:

$$\frac{dPG}{dN_{K}} = \left( \frac{\beta^2}{\alpha} \right)^{\frac{2}{1-2\beta}} \frac{2\beta}{1 - 2\beta} \left[ \frac{1}{N_{K}} \frac{1-4\beta}{1-2\beta} + \left( \frac{1}{N_{j}} \right)^{\frac{1-4\beta}{1-2\beta}} \Delta_{j} \right] > 0$$

$$\frac{d^{2}PG}{dN_{K}^{2}} \leq 0 \text{ for } \frac{N_{K}}{N_{j}} \leq \left( \frac{1}{\Delta_{j}} \right)^{\frac{1-2\beta}{1-2\beta}}$$

$$\frac{d^{2}PG}{dN_{K}^{2}} > 0 \text{ for } \frac{N_{K}}{N_{j}} > \left( \frac{1}{\Delta_{j}} \right)^{\frac{1-2\beta}{1-2\beta}}$$

For $N_{K} \leq T$:

$$\frac{dWT}{dN_{K}} = (N - T) \left[ \frac{\Delta_{j}}{(N - N_{j})^{2}} + \frac{1}{(N - N_{K})^{2}} \right] > 0$$

$$\frac{d^{2}WT}{dN_{K}^{2}} = 2(N - T) \left[ \frac{1}{(N - N_{K})^{3}} - \frac{(\Delta_{j})^{2}}{(N - N_{j})^{3}} \right] > 0$$

For $N_{K} > T$:

$$\frac{dWT}{dN_{K}} = (N - T) \frac{\Delta_{j}}{(N - N_{j})^{2}} > 0$$

$$\frac{d^{2}WT}{dN_{K}^{2}} = -2(N - T) \frac{(\Delta_{j})^{2}}{(N - N_{j})^{3}} < 0.$$  

The feasibility condition is satisfied if $PG \geq WT$. The following conditions, together with the expressions derived above, allow us to characterize the feasibility condition, $\forall N_{K} \in \left( \frac{N}{K}, N \right)$.

**C1.** \( \left( 1 - \frac{T}{N} \right) < \psi \left( \frac{2\beta}{1 - 2\beta} \left( \frac{1}{K} \right)^{\frac{1}{1-2\beta}} \right) (K - 1)^{2} \),

**C2.** \( \frac{T}{N} > \psi \),
where $\psi \equiv \frac{1}{\beta} \left( \frac{\beta}{\alpha} \right)^{\frac{1}{1-2\beta}} N^{\frac{2\beta}{1-2\beta}}$.

Condition C1 ensures that $\frac{dPG}{dN_K} > \frac{dWT}{dN_K}$ at $N_K = N_j = \frac{N}{K}$. Condition C2 ensures that $WT > PG$ as $N_K \to N$ and $N_j \to 0$. Both conditions will be satisfied if $\frac{K}{T}$ is not too small. These conditions, together with the fact that (i) $PG = WT = 0$ when $N_K = N_j = \frac{N}{K}$, and (ii) $\frac{dPG}{dN_K} > 0$, $\frac{dWT}{dN_K} > 0$, from the expressions above, imply that $PG$ starts above $WT$ at $N_K \to \frac{N}{K}$ and ends below it at $N_K \to N$. This ensures that the $PG$ and $WT$ functions intersect at least once.

If the $PG$ function was strictly concave and the $WT$ function was strictly convex, then the single-crossing property implies that there would be a unique point of intersection, with the $WT$ schedule cutting the $PG$ schedule from below. However, as shown above, the $PG$ function is concave initially and convex thereafter, with the point of inflexion at $N_K = N_j = (\frac{1}{K})^{1-2\beta}$. The $WT$ function is convex for $N_K \leq T$ and concave for $N_K > T$. Thus, the $PG$ schedule could cross back above the $WT$ schedule in the region where $PG(WT)$ are convex (concave). However, the single-crossing property implies that $PG > WT$ as $N_K \to N$ in that case, which is ruled out by condition C2. It follows that $PG$ and $WT$ must have a unique point of intersection, $N^{**}_K(N_j)$. $PG \geq WT$ and the feasibility condition is satisfied for $N_K \leq N^{**}_K(N_j)$, but not for $N_K > N^{**}_K(N_j)$.
References


Figure 1A: Percentage of Respondents Who Trust People in their Neighborhood, by Country (World Values Survey, 2005-2009)
Figure 1B: Percentage of Respondents Who Do Not Have a Problem with Their Neighbors Speaking a Different Language, by Country (World Values Survey, 2005-2009)
Figure 1C: Percentage of Respondents Who are Fine with their Neighbors Following a Different Religion, by Country (World Values Survey, 2005-2009)
Figure 2: The Importance of Caste within the Village
Figure 3: Public Goods and the Elected Representative’s Schooling (Years), by the Population Share of the Largest Eligible Caste
Figure 4: Public Goods and the Population Share of the Largest Caste: Simulated Data Relationships

- Step function
- Linear function

Population Share of the Caste in the Ward
Figure 5: Threshold Tests on Simulated Data: Step versus Linear Function

- **Step Function with 0.5 Share Threshold**
- **Linear Function**
- **1% Critical Value**
Figure 6: Threshold Tests: Public Goods and the Elected Representative’s Schooling

- **Level of Public Goods**
- **1% Critical Value**
- **Representative's Schooling**
Figure 7: Public Goods and the Population Share of the Largest Caste: Alternative First-Stage Specifications
Figure 8: Threshold Tests: Alternative First-Stage Specifications

- **Polynomial in Population Share**
- **Finer Partition of Population Share**
Figure 9: Threshold Tests: Alternative Second-Stage Specifications

- Red line: Piecewise-Linear Regression
- Blue dashed line: Step Function
Figure 10: Caste Population Schooling (Years) Distribution, by Caste Population Share
Figure 11: Threshold Tests: Education Distribution in the Caste
Figure 12: Public Goods Level and the Share of the Caste Households Receiving BPL Transfers, by the Population Share of the Largest Eligible Caste
Figure 13: Threshold Tests: Public Goods and Private Transfers (BPL)
Figure 14: Public Goods Level by the Size of the Elected Caste Relative to Two Benchmarks
Figure 15: Effect of Decoupling Private Goods and Public Goods on the Population Distribution of Public Goods (Probability Densities)
Figure 8: Effect of Decoupling Private Goods and Public Goods on the Population Distribution of Public Goods
Table 1: Sources of Support for Ward Representatives

<table>
<thead>
<tr>
<th>Source of support (%)</th>
<th>Within village</th>
<th>Outside village</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>From caste</td>
<td>82</td>
<td>29</td>
</tr>
<tr>
<td>From religion</td>
<td>28</td>
<td>13</td>
</tr>
<tr>
<td>From wealthy individuals</td>
<td>38</td>
<td>--</td>
</tr>
<tr>
<td>From a political party</td>
<td>--</td>
<td>41</td>
</tr>
</tbody>
</table>

The statistics are computed over the last three election terms in each ward.
Each statistic reflects the percent of representatives who received support from a given source.
Table 2: Caste Population-Shares, by Election Type

<table>
<thead>
<tr>
<th>Type of election:</th>
<th>Open (1)</th>
<th>SC (2)</th>
<th>ST (3)</th>
<th>OBC (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Panel A: Distribution of shares</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25 percentile</td>
<td>0.42</td>
<td>0.14</td>
<td>0.16</td>
<td>0.20</td>
</tr>
<tr>
<td>50 percentile</td>
<td>0.60</td>
<td>0.33</td>
<td>0.57</td>
<td>0.41</td>
</tr>
<tr>
<td>75 percentile</td>
<td>0.85</td>
<td>0.65</td>
<td>0.95</td>
<td>0.69</td>
</tr>
<tr>
<td>Panel B: Fraction of ward-terms where largest share exceeds</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0.25</td>
<td>0.97</td>
<td>0.48</td>
<td>0.64</td>
<td>0.69</td>
</tr>
<tr>
<td>0.5</td>
<td>0.66</td>
<td>0.29</td>
<td>0.50</td>
<td>0.44</td>
</tr>
<tr>
<td>0.75</td>
<td>0.36</td>
<td>0.18</td>
<td>0.41</td>
<td>0.21</td>
</tr>
<tr>
<td>Fraction of ward-terms</td>
<td>0.60</td>
<td>0.11</td>
<td>0.06</td>
<td>0.23</td>
</tr>
</tbody>
</table>

SC=scheduled caste, ST=scheduled tribe, OBC=other backward caste.
Population shares are measured in each ward-term.
Information on reservation status and population shares in each ward are obtained over three election terms.
Table 3: Mean Years of Schooling of Elected Representatives and Median Household Heads in the Wards, by Type of Election

<table>
<thead>
<tr>
<th>Election type:</th>
<th>Open (1)</th>
<th>SC (2)</th>
<th>ST (3)</th>
<th>OBC (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Median household head</td>
<td>4.46</td>
<td>3.53</td>
<td>3.30</td>
<td>4.03</td>
</tr>
<tr>
<td></td>
<td>(3.76)</td>
<td>(3.59)</td>
<td>(3.65)</td>
<td>(3.36)</td>
</tr>
<tr>
<td>Male representatives</td>
<td>7.42</td>
<td>6.01</td>
<td>5.30</td>
<td>7.05</td>
</tr>
<tr>
<td></td>
<td>(4.43)</td>
<td>(4.49)</td>
<td>(3.99)</td>
<td>(4.30)</td>
</tr>
<tr>
<td>Female representatives</td>
<td>3.23</td>
<td>5.78</td>
<td>2.22</td>
<td>4.72</td>
</tr>
<tr>
<td></td>
<td>(3.83)</td>
<td>(4.39)</td>
<td>(2.05)</td>
<td>(4.17)</td>
</tr>
</tbody>
</table>

Median household schooling, by reservation category in each ward, is computed from the village household census. The mean (standard deviation) across all wards is reported in the table. Representative’s education is obtained for the last three terms in each ward. Gender reservation is independent of caste reservation.
Table 4: Change in Public Goods Levels and Representative's Schooling at the Population Share Threshold of 0.5

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Public goods (1)</th>
<th>Representative's schooling (years) (2)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean-shift at threshold</td>
<td>0.042** (0.017)</td>
<td>2.264*** (0.655)</td>
</tr>
<tr>
<td>Number of observations</td>
<td>1666</td>
<td>1591</td>
</tr>
<tr>
<td>Threshold location</td>
<td>0.50</td>
<td>0.50</td>
</tr>
<tr>
<td>Mean of dependent variable below the threshold</td>
<td>0.335 [0.081]</td>
<td>4.157 [3.034]</td>
</tr>
</tbody>
</table>

* p < 0.1, ** p < 0.05, *** p < 0.01.
All regressions include ward fixed effects, reservation dummies, term dummies, and election year.
Public goods are measured as the fraction of the six major goods that were received in each ward-term.
Each regression is estimated at the population share threshold derived from the Likelihood Ratio test.
### Table 5: Targeting of Public Resources

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Household receives BPL transfers</th>
<th>Log public goods on street</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(1)</td>
<td>(2)</td>
</tr>
<tr>
<td>Belong to representative's caste</td>
<td>1.377**</td>
<td>0.213</td>
</tr>
<tr>
<td></td>
<td>(0.577)</td>
<td>(0.752)</td>
</tr>
<tr>
<td>Size of representative's caste</td>
<td>-0.0192</td>
<td>-0.0308*</td>
</tr>
<tr>
<td></td>
<td>(0.0190)</td>
<td>(0.0158)</td>
</tr>
<tr>
<td>Interaction</td>
<td>--</td>
<td>0.0053***</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(0.0201)</td>
</tr>
<tr>
<td>Mean</td>
<td>0.258</td>
<td>0.258</td>
</tr>
<tr>
<td></td>
<td>(0.438)</td>
<td>(0.438)</td>
</tr>
</tbody>
</table>

* p < 0.1, ** p < 0.05, *** p < 0.01.

Mean size of representative's caste is 37; standard deviation is 41.

Public goods measured by the log of the fraction of the six major public goods received on the household's street in each election term.

Private transfers measured by whether the household was the beneficiary of any program intended for households below the poverty line (BPL).

All regressions include household fixed effects.

The regressions with private transfers as the dependent variable (Columns 1-2) are estimated using Conditional Logit.

Standard errors are clustered at the ward level.
### Table 6: Structural Parameter Estimates

<table>
<thead>
<tr>
<th>Dependent variable</th>
<th>Log public goods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alpha</td>
<td>0.00267</td>
</tr>
<tr>
<td></td>
<td>(0.00221)</td>
</tr>
<tr>
<td>Beta</td>
<td>0.0523</td>
</tr>
<tr>
<td></td>
<td>(0.0186)</td>
</tr>
</tbody>
</table>

Public goods measured by the log of the fraction of the six major public goods received on the household's street in each election term. Jack-knifed standard errors in parentheses are computed by dropping one ward at a time.
### Appendix Table A1: Fraction of Households Receiving Public Goods Each Term

<table>
<thead>
<tr>
<th>Type of election</th>
<th>Open (1)</th>
<th>SC (2)</th>
<th>ST (3)</th>
<th>OBC (4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Water</td>
<td>0.69</td>
<td>0.73</td>
<td>0.78</td>
<td>0.72</td>
</tr>
<tr>
<td></td>
<td>(0.40)</td>
<td>(0.39)</td>
<td>(0.71)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>Sanitation</td>
<td>0.42</td>
<td>0.42</td>
<td>0.55</td>
<td>0.42</td>
</tr>
<tr>
<td></td>
<td>(0.46)</td>
<td>(0.46)</td>
<td>(0.47)</td>
<td>(0.46)</td>
</tr>
<tr>
<td>Roads</td>
<td>0.69</td>
<td>0.72</td>
<td>0.74</td>
<td>0.73</td>
</tr>
<tr>
<td></td>
<td>(0.41)</td>
<td>(0.40)</td>
<td>(0.41)</td>
<td>(0.39)</td>
</tr>
<tr>
<td>Telephones</td>
<td>0.07</td>
<td>0.12</td>
<td>0.08</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>(0.24)</td>
<td>(0.30)</td>
<td>(0.25)</td>
<td>(0.28)</td>
</tr>
<tr>
<td>Electricity</td>
<td>0.14</td>
<td>0.20</td>
<td>0.17</td>
<td>0.20</td>
</tr>
<tr>
<td></td>
<td>(0.34)</td>
<td>(0.38)</td>
<td>(0.36)</td>
<td>(0.38)</td>
</tr>
<tr>
<td>Street lighting</td>
<td>0.16</td>
<td>0.19</td>
<td>0.19</td>
<td>0.22</td>
</tr>
<tr>
<td></td>
<td>(0.36)</td>
<td>(0.38)</td>
<td>(0.39)</td>
<td>(0.40)</td>
</tr>
</tbody>
</table>

Means and standard deviations (in parentheses).
SC=scheduled caste, ST=scheduled tribe, OBC=other backward caste.
Statistics are based on the last three terms in each ward.