The Efficacy of Parochial Politics: Caste, Commitment, and Competence in Indian Local Governments *

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Abstract

This paper explores the possibility that community involvement in politics need not necessarily worsen governance and, indeed, can be efficiency-enhancing when the context is appropriate. Complementing the new literature on the role of community networks in solving market problems, we test the hypothesis that strong traditional social institutions can discipline the leaders they put forward, successfully substituting for secular political institutions when they are ineffective. Using new data on Indian local governments at the ward level over multiple terms, and exploiting the randomized election reservation system, we find that the presence of a caste equilibrium (in which the population share of the most numerous sub-caste crosses a fixed threshold) is associated with the selection of leaders with superior observed characteristics and greater public good provision. This improvement in leadership competence occurs without apparently diminishing leaders' responsiveness to their constituency.

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1 Introduction

Governance is a central problem for all countries, and differences in the performance of governments may be an important determinant of disparities in levels of economic activity around the world. It is increasingly recognized that the effectiveness of democratic governments depends on the role played by ethnic, linguistic, tribal, and caste groups in the political process. In India, the setting for this paper, caste politics appears to have grown stronger over time (Banerjee and Pande 2007) and a similar persistence in ethno-linguistic politics has been documented in countries at various stages of economic development (e.g., Posner 2005). The standard explanation for the emergence and the persistence of parochial politics is that social loyalty gives leaders leverage when political institutions are weak, allowing them to appropriate substantial rents for themselves in return for the patronage they provide to their supporters (Padro i Miquel 2007). Parochial politics is thus associated with corrupt rulers (kleptocracies), wasteful patronage transfer, and low levels of public good provision.

Economists historically associated networks and other community-based economic institutions with nepotism, rent-seeking, and inefficiency. In recent years, however, this view has been replaced by a more moderated position, which recognizes that these institutions can under the right circumstances facilitate economic activity when markets function imperfectly. Complementing the new literature on non-market economic institutions, this paper documents, using new data on local public good provision and electorate and elected leader characteristics, the role played by the community in solving leadership commitment problems when the democratic system functions imperfectly and the context is appropriate, providing a more complete assessment of parochial politics and its consequences.

The classical Downsian (1957) model of political competition is not concerned with leaders' (or candidates') characteristics, focussing instead on the identity and the preferences of the pivotal voter. Recently, however, citizen-candidate models in which leaders cannot commit to implementing policies that diverge from their own preferences have generated much attention in the political economy literature. Osborne and Slivinski (1996) and Besley and Coate (1997) are the early contributions to this literature, which has now received empirical support both in the United States (Levitt 1996, List and Sturm 2006) and in developing countries (Pande 2003, Chattopadhyay and Duflo 2004). To understand the consequences of such an absence of leadership commitment, consider a political system in which elected representatives allocate a fixed level of resources to two public goods, sanitation and street lights, in their constituencies. Individuals are heterogeneous in their preferences for public

goods. With suitable restrictions on entry costs, the citizen-candidate model predicts that the winning candidate will be endowed with the median level of ability in the constituency (in expectation) and policy choices will coincide with the predictions of the Downsian model.[1]

The predictions of the two models start to diverge, however, once we endogenize the total level of resources and allow individuals to differ on two dimensions – in their preference for public goods and their leadership competence. Assume that these two characteristics are correlated such that more competent individuals, who provide a higher level of resources for their constituency when elected, prefer larger expenditures on, say, street lights. The tension that arises when commitment is absent is that the pivotal median voter would like to endorse the most competent individual in the constituency as the leader but at the same time is aware that the share of resources subsequently allocated to street lights will exceed his own preferred allocation. Although the leader may now be endowed with greater competence than the median voter, the most competent individual will not necessarily be chosen. The distribution of resources will also fail to match the median voter's preferred distribution.

In a well-functioning polity, a party apparatus could solve this commitment problem. The political party has been seen to provide voters with information (Caillaud and Tirole 2002), to screen candidates (Snyder and Ting 2002), and, most importantly, to ensure that candidates commit to the party platform once they are elected to office (Alesina and Spear 1988, Harrington 1992). In countries with weak parties, as in much of the developing world, existing social ties could be exploited instead to ensure that elected leaders do not renege on their commitments. In India, networks organized around the endogamous sub-caste or *jati* have been seen to solve information and commitment problems in the credit market (Banerjee and Munshi 2004), the labor market (Munshi and Rosenzweig 2006), and to provide mutual insurance (Munshi and Rosenzweig 2009). If the sub-caste were able to extend the domain of its influence beyond the market to the political system, local leaders elected with the support of their sub-caste would make decisions that reflect the preferences of the group, even if they did not expect to be elected in the future, to avoid the social and economic punishment they would face if they chose their individually optimal policies instead. This would allow the most numerous sub-caste in a constituency to select its most competent member as the leader, while at the same time ensuring that his choices reflected the preferences of the median individual in the group

[1] Besley and Coate (1997) derive this result for single-candidate and two-candidate political equilibria. Their model rules out equilibria with three or more candidates.

(although not the entire constituency).

A number of recent papers have focused on the vertical (competence) dimension of leadership quality, studying how outside options and compensation in office shape the pool of candidates and the subsequent effort that elected leaders exert (Caselli and Morelli 2004, Messner and Polborn 2004, Ferraz and Finan 2008). Other studies, using data from India, have attempted to identify the misallocation of resources due to corruption or elite capture, which can be interpreted as another dimension of competence. These studies find some evidence that leaders appropriate resources for themselves (Besley, Pande, and Rao 2007), but little support for the common perception that wealthy individuals in the village or high castes receive a disproportionate share of the resources that are allocated (Bardhan and Mookherjee 2006). Our analysis is concerned with the characteristics of elected leaders and the resources that they provide to their constituency, net of any seepage through corruption or targeting. By concentrating on the commitment problem, and its effect on leader selection, we link the vertical dimension emphasized in the studies cited above to the literature on political competition and political parties, which has otherwise restricted itself to the horizontal (valence) dimension of leadership quality. In our framework, a social institution – the caste – decouples these two dimensions of leadership quality, allowing the most competent leaders to be selected.

We exploit a unique local governance experiment that is currently under way in rural India to test the hypothesis that parochial politics - organized around the sub-caste - can be efficiency-enhancing when the context is appropriate. The 73rd Amendment of the Constitution, passed in 1991, gave village governments or *panchayats* the power and the resources to make relatively substantial expenditures on public goods. The *panchayats* were divided into wards and regular elections for the position of *panchayat* president and for each ward representative have been held every five years in most states. Reservation of seats for historically disadvantaged groups – Scheduled Castes, Scheduled Tribes, Other Backward Castes, and women – was also introduced in the 73rd Amendment. Seats for each reserved category are assigned randomly across wards and, for the position of the president, randomly across *panchayats*, from one election to the next. This affords a unique opportunity to study the effect of exogenous leadership changes on the performance of the *panchayat*. Note that the changing requirements for leader eligibility across elections means that the discipline of re-election is almost entirely absent, making the commitment problem especially severe.[2]

Previous studies have exploited the transformation of the *panchayat* system with the 73rd Amend-

[2]Our data indicate that only 13.9 percent of elected members of *panchayats* had run for office previously.

ment to test the citizen-candidate model by examining the *distribution* of public and private goods across and within villages (Chattopadhyay and Duflo 2004, Bardhan, Mookherjee, and Torrado 2005). Consistent with the absence of commitment, public good provision is higher in the *panchayat* president's village, and scheduled castes and tribes receive more resources when the president's position is reserved for a member of their group (Besley, Pande, Rahman, and Rao 2004, Bardhan, Mookherjee, and Torrado 2005, Duflo, Fischer, and Chattopadhyay 2005). Our analysis differs from this research in three important ways: First, we focus on political outcomes at the ward level because sub-castes are too small to play a dominant role in state- or even *panchyat*-level elections in India (Chhibber 1999). Second, in addition to testing for leadership commitment, we directly measure leadership competence based on the *level* of resources channeled to the ward representative's constituency. Third, our analysis explicitly recognizes that reservation, by restricting the set of potential leaders, changes not only the identity of the leader but also the probability that a *caste equilibrium* that overcomes the leadership commitment problem and serves the interest of a different pivotal voter will emerge in the ward.

The data that we use in this paper are drawn from the sixth round of a nationally-representative panel survey of rural Indian households carried out by the National Council of Applied Economic Research (NCAER). The current round has three components that are relevant for this study: (i) a census of all households in the approximately 250 villages covered by the survey, which enables the identification of the pivotal voter at the ward level by sub-caste; (ii) a village module that includes information on public good provision at the street level for each of three *panchayat* terms; and (iii) the characteristics of the elected representatives to and electoral candidates for *panchayat* seats in each ward in those terms.

The survey data are indicative of the importance of local caste politics in India. Key informants were asked to list the various sources of support that the elected ward representatives received in each of the last three *panchayat* 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. Religious groups and wealthy individuals are evidently much less prevalent sources of support and, more importantly, just 41 percent of local representatives are reported to have received support from a political party.

In section 3 of the paper we develop a citizen-candidate model with citizens who are heterogeneous in their preferences for public goods and in leadership competence, and who belong to groups (castes)

that can discipline their leaders. The principal implication of the model is that the competence of the leader, and thus the level of public goods received, should increase discontinuously when the share of the most numerous caste in the ward crosses a threshold at or below 0.5, allowing a caste equilibrium with commitment to emerge. We test these predictions in Section 4 of the paper using the new survey data, exploiting the random change in the set of sub-castes that the leader can be drawn from across election terms to estimate the effect of a shift to a caste equilibrium on the level of public goods provided within each ward. We simultaneously estimate the relationship between the characteristics of pivotal voters and the composition of local public goods.

The model provides us with no guidance about which characteristics might actually increase leadership competence in this context. We consequently experiment with alternative characteristics and verify that some of these characteristics do change discontinuously above a threshold share, matching the pattern of public good provision. Our findings suggest that male representatives with managerial experience, and those with high value farms, are more competent leaders, but we find no evidence that formal education is indicative of leadership ability. We also find that women are more competent representatives than men, obtaining more resources for their constituencies, when there is a caste equilibrium.[3] Given that women have significantly lower education, this suggests that leadership ability may not easily be proxied by variables measuring formal schooling in the rural Indian context.

We complete the empirical analysis by assessing whether the commitment problem is overcome in a caste equilibrium, exploiting the fact that gender reservation is overlayed on caste reservation in India. The gender of the leader should have no effect on the composition of public goods in a caste equilibrium, although it could if there is not a caste equilibrium, regardless of the extent to which male and female preferences differ. We find that within a ward a randomly-induced change in the gender of the leader has no effect on the composition of public goods in a caste equilibrium, but changes the public goods portfolio when there is not a caste equilibrium, lending support for the hypothesis that the caste can discipline local representatives.

Our results thus suggest that in the context of Indian local governments, parochial (caste) politics appears to simultaneously increase both the competence and commitment of elected leaders, as indicated by the characteristics of the elected representatives and their enhanced delivery of local public

[3]These findings are broadly consistent with recent evidence in Chattopadhyay and Duflo (2004) and Beaman et al. (2008). Their results, however, are obtained for *panchayat*-level elections, for which caste equilibria are less likely.

goods in response to constituents' preferences. These effects, however, may not scale up. At the state and national level, multiple sub-castes must form coalitions to compete successfully, appealing to a broader caste identity to win elections. As discussed below, the collective punishments that discipline leaders within sub-castes do not cross caste lines. Without a mechanism to discipline leaders, caste politics at higher levels of government could thus be associated with substantial inefficiencies as documented by Banerjee and Pande (2007). Even at the local level, there are distributional consequences that are not necessarily benign. Because the elected ward representative in a caste equilibrium is answerable to the social group she belongs to, her choices will be aligned with the preferences of the median voter in her caste rather than the median voter in the constituency. The welfare consequences of a caste equilibrium are thus ambiguous. Caste politics is a second-best solution and, ultimately, there is no perfect substitute for well-functioning political institutions (parties) in a competitive democratic system.

2 Institutional Setting

For many decades after independence in 1947 there was little effort to encourage local government in India. Local government expenditures accounted for only 8.6 percent of total government expenditure in 1976-77 and 6.4 percent in 1986-87 (Datta 1993). Local government councils or *panchayats* were almost completely dependent on state governments for their revenues, which were typically earmarked for specific activities (Chhibber 1999). A serious attempt was made, starting in the early 1990s, to make *panchayats* more influential and autonomous. The 73rd Amendment of the Constitution, passed in 1991, established a three-tier system of *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 the power and the resources to make relatively substantial expenditures on public goods, and regular elections for the position of *panchayat* president and for each ward representative have been held every five years in most states (Chaudhuri 2003).

The major responsibilities of the *panchayat* are to construct and maintain local infrastructure (public buildings, water supply and sanitation, roads) and to identify targeted welfare recipients. Although *panchayats* can now raise their own revenues, in large part through land and water usage taxes, these revenues accounted for just 12.6 percent of total annual expenditures in 2006-2007, the last complete years for the *panchayats* in our sample. The major source of funding is still

the state government, although *panchayats* also benefit from specific central government programs. Chattopadhyay and Duflo (2004) note that most of these external funds are allocated through the Sampoorna Grameen Rozgar Yojana (SGRY), an infrastructure scheme covering irrigation, drinking water, roads, etc., and a Block Grant to the *panchayat*.[4] The *panchayat* has complete control over the Block Grant, and assuming that it has similar autonomy over the revenue that it raises, our data indicate that 50.2 percent of its budget is discretionary. Combining the discretionary and non-discretionary components of the budget, we will later see that the major expenditure items include the construction and maintenance of drinking water and sanitation facilities, roads, electricity, street lights, public telephones, irrigation infrastructure, and public buildings. The delivery of education and health services, however, remains under the control of the state government (Bardhan and Mookherjee 2006).

How are *panchayat* expenditures allocated? The council makes decisions collectively (the president does not have veto power) and so the ability of an elected ward representative to channel public goods to his constituency will depend on his influence within the *panchayat* as well as his ability to ensure that the earmarked resources reach their destination. As described in the Introduction, the mix of goods that the representative lobbies for will depend on the level of leadership commitment, with the leader choosing his preferred mix when commitment is absent. What makes the *panchayats* especially interesting for an analysis of leadership commitment is the system of randomized reservation, by caste and by gender, that was also introduced in the 73rd Amendment in 1991. The rule followed by almost all Indian states is that seats are reserved in each election for three historically disadvantaged groups – Scheduled Castes (SC), Scheduled Tribes (ST), and Other Backward Castes (OBC) – in proportion to their share of the population in each district. Within each of these categories, and in constituencies open to all castes in that election, one-third of the seats are reserved for women (Chattopadhyay and Duflo 2004). Seats are reserved randomly across wards and, for the position of the president, randomly across *panchayats*, from one election to the next in each district. The only restriction is that no seat can be reserved for the same group across consecutive elections (Besley, Pande, and Rao 2007), which exacerbates the leadership commitment problem since representatives in many reserved seats will be aware that they will hold office for a single term. This system of randomized

[4]Based on the balance sheets collected from 40 *panchayats* in the state of West Bengal, Chattopadhyay and Duflo report that the Block Grant accounts for 33 percent, the SGRY (formerly known as the Jawhar Rozgar Yojana) 30 percent, and welfare programs 15 percent of the external funds. Our all-India data are broadly consistent with these statistics. These data indicate that in the years 2006 and 2007 Block Grants accounted for 43 percent of external funds and the SGRY another 15 percent of these funds.

reservation exogenously changes the pool of eligible candidates within a ward, while leaving the electorate unchanged. We will see in Section 3 that a caste equilibrium in which the most numerous eligible sub-caste in the ward puts forward its most competent member and subsequently disciplines him will only emerge when its population-share crosses a fixed threshold. Exogenous changes in the set of eligible sub-castes from one election to the next thus result in exogenous changes in the likelihood that a caste equilibrium with commitment will emerge, which we exploit in the empirical analysis that follows in Section 4.

The main idea underlying the analysis in this paper is that sub-castes have been able to extend the domain of their influence from private economic activity to the public political arena. The basic rule in Hindu society is that individuals cannot marry outside their sub-caste or *jati*. Marriage ties built over many generations give rise to frequent interactions within a *jati* and so exclusion from these interactions serves as a natural and extremely effective mechanism to sustain cooperative behavior. Recent evidence from urban India indicates that networks organized around the *jati* provide credit (Banerjee and Munshi 2004) and jobs (Munshi and Rosenzweig 2006) for their members. More importantly for the current analysis, these networks continue to serve as the main source of mutual insurance for their members in rural India, particularly for major contingencies such as illness and marriage (Munshi and Rosenzweig 2009). Exclusion from future social interactions and network services can be a powerful disciplining device, and the key assumption in the model that follows in Section 3 is that the sub-caste is able to discipline its representative even if he only expects to hold political office for a single term. Moreover, the size of the sub-caste *within* the ward will have no bearing on the level of commitment that can be sustained since the collective punishments are organized at the level of the sub-caste, which extends beyond the ward and beyond the village.

3 The Model

This section describes leader selection and subsequent policy choices in political systems with different levels of commitment. We begin by characterizing equilibrium outcomes for the canonical cases with and without commitment. Subsequently we derive conditions under which a caste equilibrium with commitment will emerge. We make a number of simplifying assumptions for analytical convenience when deriving these conditions. Theoretical and empirical support for some of the important assumptions is provided at the end of this section.

3.1 Individual Preferences and Leadership Quality

N individuals reside in a political constituency. Each individual i is endowed with a unique level of ability or competence $\omega_i \in [0,1]$. Two public goods are provided in this economy. To highlight the trade-off between leadership competence and public good preferences in equilibrium and to keep the model simple we assume that preferences and ability are isomorphic: individual i's most preferred share of resources to be allocated to the second good is ω_i. Moreover, his utility is an additively separable function of the *level* of resources received in the constituency and the *share* of these resources allocated to the second good.[5]

The overall level of resources and the share of these resources allocated to the two goods is determined by the political leader selected by the residents of the constituency. The level of resources that this leader is able to provide is increasing in his ability. Without commitment, the leader will choose his most preferred mix of goods. Individual i's utility when individual j is selected as the leader is then specified as $\beta\omega_j - \gamma|\omega_j - \omega_i|$.

The first term in the expression above represents the amount of resources (in utility units) that the leader can generate for his constituency, which we assume is increasing linearly in his ability. The second term represents the cost to individual i when a leader with different characteristics is chosen. This disutility is specified to be a linear function of the distance in ability-space, or the difference in the preferred allocation of total resources, between the two individuals. Individual i would like the most able resident of the constituency to be the leader but is aware that this individual will also choose a mix of projects ω_j that differs from his own preferred mix ω_i. If the horizontal dimension dominates, $\gamma > \beta$, the linearity in our chosen specification implies that any individual i will prefer himself to any other individual in the constituency as the leader when commitment is absent.[6] We assume that this condition holds in the discussion that follows to emphasize the importance of commitment in leadership selection.

[5]These assumptions can be shown to be consistent with utility maximizing behavior. Let individual i receive the following utility from spending g_1, g_2 on the two goods: $U = (1-\omega_i)ln(g_1) + \omega_i ln(g_2)$.

For a fixed amount of total resources, $G \equiv g_1 + g_2$, the preceding expression can be rewritten in terms of the corresponding shares, S_1, S_2: $U = (1-\omega_i)ln(S_1) + \omega_i ln(S_2) + ln(G)$.

Utility is separable in the level of resources and the mix of goods, and for a given G it is straightforward to verify that utility is maximized at $S_2 = \omega_i$.

[6]Individual i will certainly prefer himself to any individual with lower ability, since that individual will be dominated on both the horizontal and the vertical dimension. He will prefer himself to any individual j with higher ability if $\beta\omega_i > \beta\omega_j - \gamma(\omega_j - \omega_i)$, which is satisfied for $\gamma > \beta$.

3.2 The Political Equilibrium

Each resident in the constituency can choose to stand for election or not. The decision to stand is accompanied by an entry cost that is close to zero. After all residents have simultaneously made their entry decision, the election takes place and the candidate with the most votes is declared the leader. For simplicity we restrict our attention to single-candidate equilibria.[7] The discussion that follows characterizes the identity of the leader, the level of public goods, and the mix of those goods obtained for the canonical cases with and without leadership commitment.

A. Political Equilibrium without Commitment

With the cost of standing for election close to zero, the only strategy profile that can be supported as a Nash equilibrium has the individual with median ability in the constituency, m, standing for election, while all the other individuals stay out. This median individual will generate a level of resources βm and allocate a share m of these resources to the second public good.

Normalizing so that the utility obtained in a constituency without a leader is zero, the median individual will not wish to deviate from the equilibrium since $\beta m > 0$. No other individual wants to deviate and stand for election (with its associated cost) since he would receive fewer votes than the median individual. To see why even an individual with ability greater than m would not stand, consider a candidate with ability $\omega_j > m$. For any individual i with $\omega_i \leq m$, $\beta m - \gamma(m - \omega_i) > \beta\omega_j - \gamma(\omega_j - \omega_i)$ for $\gamma > \beta$. A majority of the electorate will thus continue to vote for the median individual.[8] By the same argument, no strategy profile in which someone other than the median voter stands for election can be supported as an equilibrium. When the cost of standing is close to zero, the median voter will always deviate from such an equilibrium, stand for election and subsequently get elected.

B. Political Equilibrium with Commitment

If all residents in the constituency belong to the same sub-caste and ex post *commitment can be ensured, the individual with maximum ability $\overline{\omega}$ will be selected as the leader. He generates a level of resources $\beta\overline{\omega}$ and allocates a share m of these resources to the second public good.*

Allowing for lump-sum transfers between members of the sub-caste, the distribution of public

[7] In fact, the election was uncontested in over 50 percent of our ward elections.

[8] Any individual with ability lower than m would certainly lose to the median individual since all individuals with ability greater than m would vote for the median individual. He has greater ability (competence) than his rival and is closer in ability-space (on the valence dimension) to them.

goods will be chosen to maximize community welfare. If individuals are evenly spaced and located symmetrically on each side of the median individual in ability-space and the social planner places equal weight on all members of the group, it is straightforward to verify that the mix of goods will be chosen to satisfy the preferences of the median individual. The distribution of resources in the caste equilibrium will coincide with the prediction of the Downsian model, which is also the outcome without commitment when the cost of standing for election is sufficiently low. The overall level of resources, however, will be higher in the equilibrium with commitment, $\beta\overline{\omega} > \beta m$.

3.3 Equilibrium Selection

Although we assumed that all individuals in the constituency belonged to a single sub-caste when characterizing the equilibrium with commitment above, in practice the most numerous caste will account for a (possibly substantial) fraction of the population. The discussion that follows derives conditions under which a caste equilibrium with commitment will nevertheless be obtained. We assume that all the members of this caste are concentrated in a single segment of the ability distribution, ranging from $\underline{\omega}_c$ to $\overline{\omega}_c$. They are evenly spaced and located symmetrically on both sides of the median member of their group, who is endowed with ability m_c.[9] The rest of the population is located outside this segment and has no (alternative) caste affiliation. We are implicitly assuming here that no other caste can compete successfully against the most numerous caste and we will provide empirical support for this assumption at the end of the section.

Case 1: The most numerous caste accounts for the majority of the population in the constituency.

The most able member of the most numerous caste will stand unopposed for election. He will generate a level of resources $\beta\overline{\omega}_c$ and allocate a share m_c of total resources to the second public good.

The collective punishments that discipline the leader in the caste equilibrium also ensure that no member of the most numerous caste stands against him or votes opportunistically against him.[10] Thus to ensure that the proposed strategy profile is an equilibrium, we only need to verify that no other individual wants to deviate and stand for election. Because the most numerous caste has a majority and all members of that group will always vote for the selected candidate in a caste equilibrium, no individual outside the caste can ever win and so will not stand for election.

[9] We discuss the implications of relaxing this distributional assumption at the end of the section.

[10] Although voting is secret, it is straightforward to identify deviators, given their observed abilities, if the election does not go as planned.

We also need to verify that no other strategy profile can be supported as an equilibrium. A strategy profile in which an individual with ability $\omega_j < \underline{\omega}_c$ stands unopposed is clearly not an equilibrium since average utility in the most numerous caste would be greater on both the horizontal and the vertical dimension in the caste equilibrium: $\beta\overline{\omega}_c - \gamma\left(\frac{m_c - \underline{\omega}_c}{2}\right) > \beta\omega_j - \gamma\,(m_c - \omega_j)$.[11] A strategy profile in which an individual with ability $\omega_j > \overline{\omega}_c$ stands unopposed is also not an equilibrium. Average utility in the most numerous caste will be greater in the caste equilibrium if $\beta\overline{\omega}_c - \gamma\left(\frac{\overline{\omega}_c - m_c}{2}\right) > \beta\omega_j - \gamma\,(\omega_j - m_c)$. Rearranging terms and noting that $\omega_j - m_c = (\omega_j - \overline{\omega}_c) + (\overline{\omega}_c - m_c)$, the inequality can be expressed as $(\gamma - \beta)(\omega_j - \overline{\omega}_c) + \gamma\left(\frac{\overline{\omega}_c - m_c}{2}\right) > 0$, which will be satisfied if $\gamma > \beta$.

Case 2: The most numerous caste falls short of a majority and $\overline{\omega}_c < m$.

The median individual in the constituency will stand unopposed for election. He will generate a level of resources βm and allocate a share m of these resources to the second public good.

No individual outside the most numerous caste wants to stand against the median individual since he will certainly lose a straight contest, as described above. The caste representative with ability $\overline{\omega}_c$ will also lose to the median individual because all individuals with ability greater than or equal to m will prefer the median individual (he has greater ability and is closer in ability-space to them). By the same argument, no other strategy profile can be an equilibrium since the median individual will always deviate and stand against the proposed candidate.

Case 3: The most numerous caste falls short of a majority and $\underline{\omega}_c > m$.

If the median individual in the constituency prefers the caste representative to himself as the leader, then a caste equilibrium will be obtained in which a level of resources $\beta\overline{\omega}_c$ is provided and a share m_c of these resources is allocated to the second public good. If the median individual prefers himself as the leader, the corresponding level of resources will be m and the share allocated to the second good m as well.

The median individual prefers the caste representative to himself as the leader if $\beta\overline{\omega}_c - \gamma(m_c - m) > \beta m$. If this condition is satisfied, it is straightforward to verify that a strategy profile in which the

[11] We assume that members of the most numerous caste are evenly spaced on either side of the median individual. Let the spacing between adjacent individuals be Δ. The average distance between the median individual and the other members of the sub-caste is then $\frac{2\Delta\sum_{k=1}^{N_c/2} k}{N_c}$, where N_c is the number of individuals in the sub-caste (excluding the median individual). Noting that $\Delta \equiv \frac{m_c - \underline{\omega}_c}{N_c/2}$ and using the well known expression for the sum of natural numbers, the expression for average distance reduces to $\frac{m_c - \underline{\omega}_c}{(N_c/2)^2}\frac{N_c/2(N_c/2+1)}{2} \approx \frac{m_c - \underline{\omega}_c}{2}$. By symmetry, this expression can alternatively be written as $\frac{\overline{\omega}_c - m_c}{2}$. By the same argument, average distance to the individual with ability $\omega_j < \underline{\omega}_c$ can be shown to be $m_c - \omega_j$.

caste representative stands unopposed is an equilibrium: (i) For individuals with ability between m and $\underline{\omega}_c$ to prefer the caste representative to themselves, we need to show that $\beta\overline{\omega}_c - \gamma(m_c - \omega_i) > \beta\omega_i$, for any individual with $\omega_i \in (m, \underline{\omega}_c)$. Rearranging the inequality, it is straightforward to show that $\frac{\beta}{\gamma}(\overline{\omega}_c - \omega_i) - (m_c - \omega_i) > \frac{(\omega_i - m)(\overline{\omega}_c - m_c)}{\overline{\omega}_c - m} > 0$ when the median individual prefers the caste representative to himself as the leader. (ii) Any individual with ability less than m would lose a straight contest with the caste representative because everyone with ability greater than or equal to m would vote for the representative.[12] (iii) Individuals with $\omega_j > \overline{\omega}_c$ would not benefit from standing since everyone with ability less than or equal to m would prefer the caste representative when $\gamma > \beta$. To verify this last claim, we need to show that $\beta\overline{\omega}_c - \gamma(m_c - \omega_i) > \beta\omega_j - \gamma(\omega_j - \omega_i)$, for any individual with $\omega_i \leq m$. Rearranging the inequality, the required condition is $\gamma(\omega_j - m_c) - \beta(\omega_j - \overline{\omega}_c) > 0$, which is satisfied since $\gamma > \beta$ and $\omega_j - m_c > \omega_j - \overline{\omega}_c$.

Verifying that no other equilibrium can be supported when $\beta\overline{\omega}_c - \gamma(m_c - m) > \beta m$ is also straightforward. A strategy profile in which an individual, other than the median individual, from outside the most numerous caste stands unopposed is not an equilibrium since the median individual would want to deviate and stand against him. A strategy profile in which the median individual stands unopposed is also not an equilibrium. Average utility in the most numerous caste will be greater on both the horizontal and the vertical dimension in the caste equilibrium: $\beta\overline{\omega}_c - \gamma\left(\frac{m_c - \underline{\omega}_c}{2}\right) > \beta m - \gamma(m_c - m)$. The most numerous caste will thus put its representative forward and everyone with ability greater than or equal to m will vote for him.

Having established conditions under which a caste equilibrium is obtained, we now proceed to show that the unique equilibrium when $\beta\overline{\omega}_c - \gamma(m_c - m) < \beta m$ is characterized by the median individual standing for election unopposed. No individual outside the most numerous caste wants to deviate from this equilibrium since he will certainly lose to the median individual in a direct contest. The most numerous caste will also not put forward a candidate since its representative will now lose to the median voter in a straight contest, with all individuals with ability less than or equal to m voting for the median individual. For this result to be true, $\beta m - \gamma(m - \omega_i) > \beta\overline{\omega}_c - \gamma(m_c - \omega_i)$, for any individual with $\omega_i \leq m$. Rearranging the inequality, the required condition is $\beta\overline{\omega}_c - \gamma(m_c - m) < \beta m$, which is satisfied by definition when the median individual prefers himself to the caste representative.

[12] Individuals with ability between m and $\underline{\omega}_c$ prefer the caste representative to themselves as the leader and so would certainly prefer the caste representative to an individual with lower ability than them. Members of the most numerous caste, with ability ranging from $\underline{\omega}_c$ to $\overline{\omega}_c$ will always vote for the caste representative. Individuals with ability greater than $\overline{\omega}_c$ will prefer the caste representative to a candidate with ability lower than m since the caste representative dominates his rival on both the vertical and the horizontal dimension.

By the same argument, no other strategy profile could be supported as an equilibrium since the median individual would always deviate and stand for election.

Case 4: The median individual, with ability m, is a member of the most numerous caste.

A caste equilibrium will always be obtained in this case, regardless of the size of the most numerous caste. The caste representative will generate a level of resources $\beta\overline{\omega}_c$ and allocate a share m_c of total resources to the second public good.

To check whether a strategy profile in which the caste representative stands unopposed is an equilibrium, we only need to verify that no individual outside that caste would want to deviate (collective punishments ensure that members of the most numerous caste would never deviate). An individual with ability lower than $\underline{\omega}_c$ would certainly lose a straight contest with the caste representative since all members of the most numerous caste and all individuals with ability greater than $\overline{\omega}_c$ would vote against him. An individual with ability $\omega_j > \overline{\omega}_c$ would also lose such a contest, since all members of the most numerous caste and individuals with ability less than $\underline{\omega}_c$ would vote against him.[13] Having established that no one would deviate from the proposed strategy profile, we finally rule out all other strategy profiles. A strategy profile in which any individual outside the most numerous caste stood unopposed would never be an equilibrium since average utility in the most numerous caste would be greater in the caste equilibrium, using the same argument as in Case 3. The caste representative would deviate and step forward in that case, always winning the contest as described above.

3.4 Testable Predictions

Collecting the results from the previous section, a caste equilibrium will certainly be obtained if the share of the most numerous caste exceeds 0.5. A caste equilibrium will also be obtained, even if the most numerous caste falls short of a majority, if $\underline{\omega}_c > m$ and $\beta\overline{\omega}_c - \gamma(m_c - m) > \beta m$. To better understand the last condition, we rewrite the preceding inequality as

$$\frac{\beta}{\gamma} > \frac{d_c}{d_c + S_c/2},$$

where $d_c \equiv m_c - m$ is the distance in ability-space between the median individual in the constituency and the median individual in the most numerous caste, and $S_c \equiv 2(\overline{\omega}_c - m_c)$ measures the

[13] Collective punishments ensure that members of the most numerous caste vote for the caste representative. Following the same argument as in Case 3 above for individuals with ability $\omega_i \leq m$, it is straightforward to show that individuals with ability $\omega_i \leq \underline{\omega}_c$ will also prefer the caste representative to the alternative candidate with ability $\omega_j > \overline{\omega}_c$.

size or share of that caste. It is straightforward to verify that the right hand side of the preceding inequality is increasing in d_c and decreasing in S_c. Holding the median-distance d_c constant, a caste equilibrium is more likely to be obtained when the most numerous caste accounts for a greater share of the electorate. Holding caste size constant, a caste equilibrium is more likely to be obtained when the most numerous caste occupies a position towards the center of the ability distribution. In the extreme case, when the median individual in the constituency is a member of the most numerous caste, $\underline{\omega}_c < m < \overline{\omega}_c$, we saw in Case 4 above that a caste equilibrium was always obtained, regardless of caste size.

In a previous version of the paper (Munshi and Rosenzweig 2008) we showed empirically that the median-distance was declining monotonically with the share of the most numerous caste for multiple measures of ability in the range from 0 to 0.5. These two effects reinforce each other, and based on the preceding discussion this implies that there exists a threshold share $\underline{S}$, possibly below 0.5 (from Case 3) but not exceeding 0.5 (from Case 1) at which the non-caste equilibrium without commitment switches discontinuously to the caste equilibrium with commitment. The leader's ability will increase discontinuously from m to $\overline{\omega}_c$ at that point. Further increases in the share will have an ambiguous effect on the caste representative's ability; the range of the distribution $\overline{\omega}_c - \underline{\omega}_c$ will increase, but m_c could decrease as well. Precisely the same discontinuity described above will be obtained between the share of the most numerous caste and the overall level of resources received by the constituency, reflecting the mapping from the leader's ability to the resources he can procure.

In the non-caste equilibrium without commitment, the mix of goods is aligned with the preferences of the median individual in the constituency. In the caste equilibrium, the median individual in the most numerous caste assumes that pivotal position. Thus, although leadership competence and the overall level of resources may increase in the caste equilibrium, the net effect on welfare is ambiguous. A welfare comparison of the alternative political equilibria is beyond the scope of this paper. We will, however, verify that the identity of the relevant pivotal individual, which varies across *panchayat* terms with changes in reservation, does affect the mix of goods received in the ward. We also find evidence consistent with the hypotheses that overall resources increase and that commitment can be maintained in the caste equilibrium.

We close this section by providing theoretical and empirical support for some of the important assumptions of the model.

1. The most numerous caste is restricted to a single segment in the ability distribution: Relaxing this assumption does not qualitatively change the results of the model except that the discontinuity at $\underline{S}$ may no longer be obtained. In particular, a caste equilibrium can be supported with shares below $\underline{S}$ if even one member of the most numerous sub-caste has sufficiently high ability. Given the restrictions on economic and social mobility in rural India documented by Munshi and Rosenzweig (2009), we expect to find little *local* heterogeneity within sub-castes, in which case the assumption will nevertheless be approximately valid in practice. The sharp discontinuity that we will later observe just around 0.5, with numerous specifications and outcomes, is consistent with this claim.

2. The caste equilibrium is restricted to the most numerous caste: A sub-caste that is (somewhat) smaller than the most numerous caste but more centrally located in ability-space could, in principle, put its most able member forward and win the election. In practice, however, there is a sharp drop in size from the most numerous caste in the ward to the next largest sub-caste. In our data, the average share of the most numerous caste across wards is 0.64 versus 0.17 for the next largest sub-caste. Among the 32 percent of wards without any sub-caste with a share above 0.5, the difference in the share for the two largest castes narrows but is still 0.13 (0.36 versus 0.23). It thus seems reasonable to assume, both in the model and the empirical analysis that follows that the most numerous sub-caste is the only feasible candidate to support a caste equilibrium in a ward.

3. Inter-caste sanctions and coalitions are ruled out: Exclusion from social interactions is an effective disciplining mechanism within the sub-caste because these interactions are so frequent and so important. Given the spatial segregation by caste that is characteristic of the Indian village and given the historical restrictions on inter-caste social interactions, a similar collective disciplining mechanism is unavailable to maintain cooperation *between* castes. Inter-caste coalitions could form even if punishments were absent if long-term alliances could be maintained. The reservation scheme described in the previous section rules out long-term political coalitions and it follows that the caste representative cannot commit to implementing policies that diverge from the preferred choice of the median member of his sub-caste in equilibrium.

Our analysis focuses on exclusion from social interactions as the punishment mechanism and, hence, on the internal forces that allow the *jati* to discipline the leaders that it puts forward. However, coercion could also be used to discipline individual leaders, with the economically and socially dominant higher castes in a ward forcing a low caste leader elected on a reserved seat to choose

projects aligned with their own preferences (this is one example of what Bardhan and Mookherjee, 2006, refer to more generally as 'elite capture'). We do not attempt to rule out such phenomena in this paper but note that their presence cannot explain why superior leaders are selected and the level of resources received by the ward increases discontinuously when the share of the most numerous caste crosses a minimum threshold, net of the caste status (SC, ST, OBC, unreserved) of the leader. We also provide evidence that the identity of the relevant pivotal individual does vary across elections, depending on the political equilibrium that is in place, and does determine the mix of goods received by the ward.

4 Empirical Analysis

4.1 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, the most recent round of a nationally representative survey of rural Indian households first carried out in 1968. The survey, administered by the National Council of Applied Economic Research, covers over 250 villages in 17 major states of India. We make use of two components of the survey data - the village census and the village inventory - for 13 states in which there were ward-based elections and complete data in both components.[14] The census obtained information on all households in each of the sampled villages. The village inventory collected information on the characteristics of the elected ward representatives and public good provision in each ward in each of the last three *panchayat* elections prior to the survey.

The complete census of households in the sampled villages allows us to compute the population share of the most numerous eligible sub-caste in each ward and *panchayat* term, and to identify the pivotal household/individual depending on the political equilibrium that is in place. Households provided their sub-caste and religion. A sub-caste group is any set of households within a village reporting the same sub-caste name. Most of the Muslim households provided sub-caste (*biradari*) names. We also counted Muslim households within a village that were without a formal sub-caste name as a unique sub-caste. On average, there are seven wards per village, 67 households per ward, and six sub-castes per ward. We use the census information on the landholdings value of each

[14]The states are Andhra Pradesh, Bihar, Chhattisgarh, Gujarat, Haryana, Himachal Pradesh, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Rajastan, 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.

household, the education (in years) of the household head, and information on the head's occupation to characterize the pivotal voter. The census data also reveal for each household whether or not the household head or any family member was a candidate for election for the two last *panchayat* elections preceding the survey.

The village inventory includes a special module that obtained information on the characteristics (sub-caste, education, occupation) of all of the elected representatives from each ward in each of the three *panchayat* terms as well as 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 data 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 *panchayat* term. The combined data set covers 1085 wards in 136 villages. Ninety-five percent of the wards have information for at least two elections.

The main prediction of the model is that the shift to a caste equilibrium, when the population share of the most numerous caste crosses a threshold level, increases public good provision by improving leader selection. A ward that is more fractionalized along caste lines is mechanically less likely to be in a caste equilibrium. A positive effect when the share of the most numerous caste crosses a pre-specified threshold could then simply reflect the well documented fact that fractionalized populations tend to invest less in public goods (see, for example, Miguel and Gugerty 2005). This is less of a concern in India because most of the resources available to a *panchayat* are received from the state and central governments as described in Section 2. Nevertheless, it is still possible that less fractionalized wards could receive greater external transfers for a variety of reasons, in which case greater public good provision would be erroneously attributed to the efforts of their elected representatives.

To allow for the possibility that the population characteristics of a ward could determine the level of resources that it receives and to emphasize the role of leadership selection, we take advantage of the randomized caste reservation in *panchayat* elections, which exogenously changes the set of castes eligible to seek election and, hence, the probability that a caste equilibrium will emerge from one term to the next within a ward. Our analysis thus always uses a ward fixed effect. The implicit assumption here is that the population of the ward, or the electorate, remains unchanged over time. This may be a reasonable assumption given the unusually low spatial mobility that is characteristic

of rural India. Munshi and Rosenzweig (2009), 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 listing data indicate that since 1991 when the local electoral system was put in place, less than 3 percent of households had migrated into the sample villages.[15]

As described in Section 2, 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 3,300 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 sub-caste in the ward by type of election. These shares are generally quite large, reflecting the fact that neighborhoods in rural India are often dominated by a single caste. For example, half the wards have a share greater than 0.6 and a quarter have a share greater than 0.85 in the unreserved elections. Although the shares must be lower in the reserved elections on average since fewer castes are eligible to stand for election, the probability that the shares exceed 0.5 in these elections remains high.

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 thresholds, by the type of election. Matching the descriptive statistics in Panel A, the proportion of elections in which the threshold 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 threshold that is specified. Just as the likelihood that any threshold is crossed varies across different reservation schemes in Table 2, there will be variation in the likelihood that the threshold will be crossed and a caste equilibrium will emerge from one term to the next *within* a ward as the type of reservation changes. For example, suppose that the threshold share above which a caste equilibrium is obtained is 0.5 and suppose that the most numerous sub-caste in a ward is a high caste with a share of 0.6, followed by another high caste with a share of 0.2, and two Scheduled Castes (SC's) with shares of 0.1 each. When the election in that ward is unreserved, the most numerous sub-caste will put its most competent representative

[15]It is standard practice for researchers to ignore out-migration in empirical studies based in rural India. Munshi and Rosenzweig's explanation for low spatial and social mobility in rural India is based on the idea that social interactions within the sub-caste are less frequent and less important for those individuals who have out-migrated or out-married. Because punishments that rely on exclusion from social interactions are less effective for them, they cannot credibly commit to cooperate and so will be denied access to caste-based mutual insurance. This can be especially costly when alternative insurance arrangements of comparable quality are unavailable, giving rise to low mobility in equilibrium.

forward and a caste equilibrium will be obtained. When the election is reserved for SC candidates, however, a caste equilibrium will not be obtained and the median individual in the ward will be elected as the ward representative.[16] Thus in our empirical analysis we can avoid biases due to cross-sectional heterogeneity in the population (inclusive of fractionalization) by exploiting variation over time within a ward to estimate the effect of a caste equilibrium on leadership selection and public good provision. Notice from Table 2 that the likelihood that the threshold is crossed varies substantially across the different thresholds ranging from 0.3 to 0.5. This variation is also useful, allowing us to later experiment with alternative thresholds to identify the share above which a caste equilibrium can be sustained.

4.2 Public Good Provision

The main prediction of the model is that the competence of the elected representative and, hence, public good provision should increase discontinuously when the share of the most numerous subcaste crosses a threshold at or below 0.5. The model provides us with no information about which observed characteristics might actually measure leadership competence in this context. We consequently begin the empirical analysis by focussing on public good provision. We will subsequently experiment with alternative leader characteristics and verify that some of these characteristics do change discontinuously above a threshold share, matching the pattern of public good provision.

According to the model the level and composition of public goods is also a function of the characteristics of the pivotal voter. We consequently estimate the determinants of local public good provision taking into account (median) voter preferences and leadership competence with a specification of the form

$$G_{kjt} = (\alpha_k + \delta_k X_{jt})(1 + \theta M_{jt}) + h_j + \xi_{kjt} \tag{1}$$

where G_{kjt} measures the allocation of good k in ward j in term t, X_{jt} measures the characteristics

[16] We assume in the model and in the empirical analysis that follows that the median individual in the ward is eligible to stand for election when the caste equilibrium cannot be obtained. We use three measures of leadership competence based on occupation, wealth, and education later in the empirical analysis. Based on the occupation measure, the median individual was ineligible to stand for election in less than 3.5 percent of the relevant ward-terms (assuming that 0.5 was the threshold share above which a caste equilibrium was obtained). Based on the education measure, the education of the median individual and the closest eligible individual was statistically indistinguishable (at the 5 percent level) in those ward-terms. Finally, we could reject the hypothesis that wealth was the same for the two groups of individuals, but the correlation in the wealth of the median individual and the closest eligible individual was as high as 0.92.

and, hence, the preferences of the pivotal household or individual in the ward-term, M_{jt} indicates the presence of a caste equilibrium, and ξ_{kjt} is a mean-zero disturbance term. The level of public goods received by a ward in a given term will also depend on the political equilibria in other wards, as well as the characteristics of the *panchayat* president. However, random reservation in elections across wards and for the president's position allows us to ignore the identity of other elected representatives in the empirical analysis.[17]

When $M_{jt} = 0$, the pivotal household in the non-caste equilibrium is the median household in the ward. When $M_{jt} = 1$ and the regime shifts to the caste equilibrium, the pivotal household becomes the median household from the most numerous eligible caste in that ward-term. Note that the first term in parentheses in equation (1) thus characterizes the (linear) demand for different types of public goods, with the δ_k parameter identified off changes in the pivotal household within the ward over time. The second term in parentheses reflects the ability of the elected representative to raise the overall level of public goods received in the ward. Net of the ward fixed effects, h_j, the competence parameter θ and the demand parameters α_k, δ_k can be estimated using nonlinear least squares.

The model predicts that $\theta > 0$, reflecting the selection of more competent ward representatives in the caste equilibrium. Because variation in M_{jt} within a ward is generated by changes in caste reservation across terms, an alternative explanation for a positive θ estimate is that $M_{jt} = 0$ is disproportionately associated with less competent lower-caste leaders. Recall that the share of the most numerous eligible caste was less likely to cross any of the pre-specified thresholds, ranging from 0.3 to 0.5, in Table 2 when the election was reserved. Our solution to this potential problem is to include a full set of reservation dummies. Because M_{jt} enters multiplicatively in equation (1) above, the corresponding augmented specification allows competence to vary by the type of reservation:

$$G_{kjt} = \sum_{r=1}^{R} [w_{1r}(\alpha_k + \delta_k X_{jt}) + w_{2r}\theta M_{jt}(\alpha_k + \delta_k X_{jt})] + h_j + \xi_{kjt}, \tag{2}$$

where w_{1r}, w_{2r} estimate the effect of reservation, separately in the non-caste and caste equilibrium, on overall resources. The reservation categories include SC, ST, OBC, and women, with unreserved men occupying the reference category.[18]

G_{kjt} is measured as the fraction of households in the ward who received a particular good k in a

[17] Previous studies that focus on the role of the *panchayat* president have implicitly exploited the same randomness to ignore the role played by ward representatives in their analyses.

[18] All the public goods regressions also include a full set of term dummies as well as the election year, since *panchayat* elections are not synchronized across the country.

given *panchayat* term, where public good provision is defined to include both new construction and maintenance. This variable was constructed by matching the locations of households and goods, based on the street location of each public goods investment and the street addresses of the households. Our analysis focuses on six goods for which the benefits have a significant local and spatial component; that is, goods for which attachment or proximity to the household is desirable. The goods are: drinking water, sanitation, improved roads, electricity, street lights, and public telephones.[19] These six goods account for 15.2 percent of all local public spending, which is four times the amount spent on schools and health facilities.[20] The public goods we are examining are quite heterogeneous, including the degree to which they confer benefits to other wards and villages. For example, improved street paving may facilitate transportation of goods across wards, while piped water to a house is less likely to have externalities. We have thus allowed the public goods demand parameters α_k and δ_k to differ for each public good indexed by k.

Table 3 reports the fraction of households in the ward that received each public good, averaged across wards and *panchayat* terms, by type of election. Evidently, 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. Notice that public good provision does not appear to vary systematically across castes, or between open and reserved elections in Table 3.

Table 4 reports the estimates of the public goods delivery equation, with the public goods demand parameters reported in Table 4(a) and the competence parameters in Table 4(b). These estimates are based on the assumption that 0.5 is the threshold above which a caste equilibrium can be sustained (alternative thresholds will be investigated below). The first three columns of each table report estimates from the basic specification, equation (1), measuring the pivotal voter's characteristics sequentially by owned land value, occupation, and education. The next three columns of each table report estimates from the augmented specification, equation (2), allowing competence to vary by

[19]Public irrigation investments or school buildings, for example, are valued local public goods whose placement close to a ward resident, or even within the ward (defined by place of residence) may not be desirable. Some public goods, in contrast, have a private dimension. For example, water could be piped to some households but not to others within a ward. We do not have information on the distribution of public goods at the household level, only at the street level. Thus, it is not possible to carry out an analysis of within-ward discrimination in public goods provision.

[20]Key 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*, as discussed in Section 2.

the gender and caste of the elected ward representative with the same sequence of median voter characteristics.

The public good demand estimates in Table 4(a) are precisely estimated, with the intercepts α_k matching the pattern of public good provision in Table 3. Recall that a relatively large fraction of households benefited from expenditures on water, sanitation, and roads in each ward-term. Public telephones are the reference category in Table 4(a), and we see that the drinking water, sanitation, and roads intercepts are relatively large in magnitude and very precisely estimated.

The estimates also indicate, consistent with our model, that the characteristics of the pivotal household have a significant effect on the allocation of public goods in the ward. Relative to public telephone investment (the reference category), an increase in the value of the pivotal individual's landholdings increases the allocation of resources to roads and reduces the allocation to electricity. When the pivotal individual (household head) is employed in a managerial or professional occupation, we see a relative increase in the resources allocated to electricity and street lights. The education of the pivotal individual, in contrast, does not significantly affect the allocation to any single good. Nevertheless, we can reject the joint hypothesis that the pivotal characteristic has no effect on the distribution of public goods with 95 percent confidence for land value, occupation, and education.

The results in Table 4(a) indicate that elected ward representatives are responsive to the preferences of the pivotal individuals in their constituencies. The estimates, reported in table 4(b), also indicate that leaders are more competent when there is a caste equilibrium. The competence parameter θ in Table 4(b) is positive and significant across both specifications and for all measures of the pivotal voter's characteristics, ranging in magnitude from 0.13 to 0.20. The presence of a caste equilibrium in an election term thus appears to increase the overall level of local public resources the ward receives, with respect to this set of local public goods, by about 16 percent.

The augmented specification in Columns 4-6 allows competence to vary by caste and gender. Although some of the caste coefficients are individually significant, we cannot reject the hypothesis that all the caste coefficients, uninteracted and interacted with θ as in equation (2), are jointly zero. While a woman leader in the non-caste equilibrium is statistically indistinguishable from the reference category (unreserved men), it is interesting to note that elected women are more competent than elected male representatives when there is a caste equilibrium (when competence is more likely to matter for election outcomes). Female representatives raise the overall level of resources by 10 percent compared to men who are elected in the same equilibrium.

4.3 Alternative Thresholds

Although the model predicts that leader competence and public good provision will increase discontinuously when the population share of the most numerous eligible caste crosses a threshold at or below 0.5, it gives us no further guidance on where this threshold is located. We assumed that the threshold was 0.5 in obtaining the previous estimates. The analysis that follows will investigate alternative thresholds to identify the critical value above which a caste equilibrium is obtained.

One strategy to identify the location of the threshold would be to allow for a flexible non-linear relationship between public good provision and the share of the most numerous caste, replacing M_{jt} with $f(S_{jt})$ in equation (1). The estimated relationship would then allow us identify *ex post* the threshold share at which public good provision increased discontinuously. The problem with implementing this empirical strategy is that we must also take account of the pivotal individual in equation (1). To identify this individual it is necessary to take a stand *ex ante* on whether a caste equilibrium is in place for each share S_{jt}. To avoid this inconsistency, we will continue to estimate equation (1) with a dummy M_{jt} for the caste equilibrium, but will experiment with a wide range of assumed thresholds around 0.5, starting from 0.25 and extending till 0.75.[21] We have already seen that the level of public goods is significantly greater when the share of the most numerous caste exceeds 0.5 and we expect this result to continue to hold for thresholds just below 0.5. For assumed thresholds further away from 0.5, the estimated effect is more difficult to interpret.

To better understand the results that we report below, we simulated the model to generate a data set consisting of the actual share of the most numerous caste in each ward and election term in our villages and a hypothetical public goods level corresponding to each share. Recall that the basic prediction of the model is that public good provision should remain constant over all shares below a threshold value $\underline{S}$, which we assume for convenience to be 0.5 in the simulations. There should be a discrete increase in public good provision at $\underline{S}$, following which the relationship is ambiguous at shares greater than $\underline{S}$. We chose parameter values that would generate this relationship between the hypothetical public goods variable that we constructed and the share, as described in Figure 1.[22]

To help us later compare our estimates with those that would be obtained if the underlying model

[21] We will use the same approach with the leadership regressions that follow in the next section, but will also be able to directly estimate the non-linear relationship between our proxy measures of leadership competence and the share of the most numerous caste.

[22] We assumed the following relationship between public good provision in ward j in period t, G_{jt} and the corresponding share of the most numerous caste S_{jt}: $G_{jt} = 0.05 + 0.2M_{jt} + 0.1M_{jt}(S_{jt} - 0.5) + 0.6M_{jt}(S_{jt} - 0.5)^2$, where $M_{jt} = 1$ if $S_{jt} \geq 0.5$, $M_{jt} = 0$ otherwise.

did not have this threshold property, we also generated data sets in which public good provision is assumed to be a smoothly increasing concave or convex function of the most numerous caste's share in each ward and election term. The parameters for these alternative models were chosen so that the level of public goods generated by all three models coincided when the share was zero or one, although Figure 1 presents the public goods-share relationship from 0.25 to 0.75, matching the range over which we will later estimate the model.[23]

Restricting attention to a single public good and ignoring the demand component of equation (1), the public goods regression has the following basic form:

$$G_{jt} = \theta M_{jt} + \epsilon_{jt}, \tag{3}$$

where G_{jt} measures the level of public goods in ward j in term t, M_{jt} takes the value one if the share of the most numerous caste in that term S_{jt} exceeds an assumed threshold S and the value zero otherwise, and ϵ_{jt} is a mean-zero disturbance term. We will estimate equation (3) with S ranging from 0.25 to 0.75, in increments of 0.05. To estimate the regression with the data we have generated, a normally distributed mean-zero noise term with standard deviation 0.01 is added to each public good value. The estimated θ coefficient for each model and for each assumed threshold S is plotted in Figure 2.

When the underlying data are generated by the threshold model, the estimated θ coefficient increases steeply at low thresholds, reaching its maximum when the assumed threshold S coincides with the true threshold $\underline{S}$, which was specified to be 0.5. The θ coefficient at this point can be interpreted as the average effect of a caste equilibrium on public good provision. There is an initial decline for assumed thresholds just above 0.5, followed by a flattening out at higher thresholds.

In contrast to the pattern of estimated regression coefficients that are obtained when the underlying model has a threshold property, the estimated θ coefficients are smoothly and monotonically increasing (decreasing) in the assumed threshold when the data are generated by the convex (concave) model. Although the theory is ambiguous about the relationship between G_{jt} and S_{jt} above $\underline{S}$, public good provision was assumed to be an increasing and convex function of the share of the most numerous caste above $\underline{S}$ when generating the data for the threshold model. If we had assumed a

[23] We assumed the following relationship between public goods in ward j in period t, G_{jt} and the corresponding share of the most numerous caste S_{jt} for the convex and concave models, respectively:
$y_{jt} = 0.05 + 0.0025S_{jt} + 0.4S_{jt}^2$, and $y_{jt} = 0.05 + 0.8S_{jt} - 0.4S_{jt}^2$.

linear relationship instead, the estimated θ coefficient would have continued to decline monotonically to the right of 0.5 in Figure 2 instead of flattening out (not reported). The simulation results thus highlight a robust implication of the threshold model, which is that a trend break in the estimated pattern of θ coefficients should be observed at the true threshold value $\underline{S}$. This observation will allow us to rule out alternative explanations, based on alternative data generating processes, for the results that are obtained.

We complete the analysis of public good provision by returning to the survey data and estimating θ in equation (1) for different thresholds. Figure 3 reports the pattern of estimated θ's and the accompanying 95 percent confidence bands, for thresholds over the 0.25-0.75 range in 0.05 increments, using land value as the pivotal characteristic. As in Figure 2, the estimated θ coefficient is increasing steeply at thresholds below 0.5 and then subsequently increases at a slower rate, although a trend-break around a critical threshold is not visually discernable. Figures 4 and 5 repeat this exercise with occupation and education, respectively, as the pivotal characteristics. Once again we see a steep increase in the estimated θ coefficient at thresholds below 0.5. However, there is now a sharp trend-break at 0.5 in both figures, followed by a short decline and then a flattening out, precisely matching the predictions of the threshold model.

Ward fixed effects control for cross-sectional heterogeneity in population characteristics that could independently determine public good delivery, net of leadership selection. The caste reservation dummies control, in addition, for the possibility that the pool of potential candidates is weaker in reserved (lower caste) elections where a caste equilibrium is mechanically less likely to be obtained. Suppose, however, that the most competent individuals within each caste tend to cluster together in a relatively small number of wards, while less competent individuals are spatially dispersed. A positive relationship between the share of the most numerous caste and public good provision could then simply reflect the fact that the most competent members within each caste tend to be located in wards where they account for a disproportionate share of the population.

To rule out this unlikely possibility, we take advantage of the particular pattern of θ coefficients implied by the threshold model of leadership selection in Figure 2. As noted, this pattern matches reasonably well with the empirical results reported in Figures 3-5. The leadership selection results that we report next also reveal a discontinuous change in the elected representatives's characteristics just below 0.5, consistent with the hypothesized link between leadership competence and the level of public goods received by the ward. Even if there was a positive relationship between the share of

the most numerous caste in the ward and the competence of the pool of potential candidates, there is no reason why this relationship would display a discontinuity just around 0.5. If the relationship were smooth and monotonically increasing instead, the pattern of estimated θ coefficients would match with the predictions of the concave or convex models in Figure 2, which are qualitatively quite different from the patterns in Figures 3-5.[24]

A final alternative explanation combines the preceding hypothesis of spatial heterogeneity within castes with identity politics in which individuals vote mechanically on caste lines. This explanation would also generate the patterns in Figures 3-5, with the most numerous caste in a ward-term coming to power when its share exceeded 0.5, while being endowed at the same time with a superior pool of potential leaders. One approach to deal with this concern would be to control directly for the distribution of ability in the pool of potential candidates. We will later see that our proxy measure of leadership competence increases discontinuously at a threshold share just around 0.5 as the model would predict, *net* of the leadership ability of potential candidates in the ward. Moreover, what distinguishes our model from the alternative explanation based on identity politics is the assumption that the sub-caste overcomes the leadership commitment problem in this context, and we will provide direct evidence supporting this claim below.

4.4 Leadership Competence

Within the context of the model, the finding that public good provision increases discontinuously when the share of the most numerous eligible caste crosses a threshold around 0.5 is interpreted as a change in the political equilibrium, with the most competent individual in the most numerous eligible caste replacing the median individual in the ward. We now proceed to test whether variables that are plausibly correlated with the competence of elected ward representatives also exhibit a discontinuous jump at the same threshold.[25] The theory provides us with no guidance about which individual characteristics might be associated with leadership competence in the rural Indian context. Recall

[24] Although not reported in Figure 3, if public good provision were a linear positive function of the share of the most numerous caste, the estimated θ coefficients would be approximately constant across the entire range of assumed thresholds. This is once again qualitatively quite different from the patterns reported in Figures 3-5.

[25] This finding would also allow us to rule out alternative explanations for the discontinuous increase in public goods provision above a threshold share. For example, it is possible that the village council finds it easier or politically expedient to target resources to wards in which a single large sub-caste has nominated a representative. Although coalitions of sub-castes were ruled out in Section 3, if such coalitions did form then the discontinuous increase in public goods provision could reflect worse governance in the non-caste equilibrium (characterized by coalitions of small castes) rather than an improvement in leadership competence in the caste equilibrium. Neither of these competing explanations would predict a change in the characteristics of elected ward representatives coinciding with the increase in public goods provision.

from Section 2, however, that a major task of the ward representative, and the one we focus on here, is to channel resources to his constituency and to subsequently ensure that the planned construction and maintenance of public goods actually takes place. The representative's persuasive skills and his influence within the *panchayat* council more generally will thus be important determinants of his competence. More competent leaders will also be endowed with the managerial skills that ensure that targeted transfers reach their destination.

The village inventory elicited information on the elected representative's education and occupation over three election terms in each ward. Based on the preceding discussion, we would expect self-employed individuals in managerial occupations, such as businessmen and farmers, to make especially competent local leaders. These individuals need to make independent connections with buyers and suppliers, establish a reputation that allows them to gain access to formal and informal credit, and manage an enterprize that often employs large numbers of workers. Our first measure of leadership competence, based on the information on occupation, is thus a binary variable that takes the value one if the elected ward representative is in business or farming (self-employed), and zero if the leader is employed in a professional occupation, skilled labor, unskilled labor, agricultural labor, or housework. Individuals running large-scale operations may be particulary well-suited to manage public goods delivery, and we might also expect that wealthier individuals have more influence within the *panchayat* council. Although there is no information on the land ownership or wealth of the elected ward representatives, the census data identifies the candidates for council seats for the last two *panchayat* elections. We use information on the (log) value of land owned by these candidates, the most important component of wealth in rural India, to construct a second measure of leadership competence.[26] Our third measure of leadership competence is the elected representative's years of formal schooling. Education, particularly higher education, provides many of the skills that are associated with leadership competence in this context and years of schooling will also be positively correlated with innate ability to the extent that there is positive selection into education. However, in our sample of villages more than half of the men elected and more than three quarters of the women elected never went beyond primary school.

Replacing public good provision with the proxy for leadership competence as the dependent variable and augmenting equation (3) with ward fixed effects, the leadership equation is specified as

[26]Over half the elections had only one candidate.

$$y_{jt} = \lambda M_{jt} + f_j + \xi_{jt}, \tag{4}$$

where y_{jt} measures the occupation, wealth, or education of the leader selected (or candidate) from ward j in term t, $M_{jt} = 1$ if the share of the most numerous caste in the ward exceeds a pre-specified threshold in that term and $M_{jt} = 0$ otherwise, f_j is a ward fixed effect and ξ_{jt} is a mean-zero disturbance term. The model predicts that $\lambda > 0$ because more competent individuals are selected in the caste equilibrium.

This prediction of the model is based on the assumption that mean (or median) ability in the pool of potential leaders from the most numerous caste does not vary with its share in the population. This allows us to interpret a positive λ estimate in the equation above as a selection effect. In practice, however, because variation in M_{jt} across terms is generated by changes in the type of reservation and because the lower castes were historically severely disadvantaged, overall caste-based disparities in wealth, education, and occupation will be correlated with M_{jt}. That is, even if leaders are randomly selected from eligible households there may be variation in elected leader characteristics with M_{jt} solely because castes generally differ in wealth or skills.

Panel A of Table 5 compares the characteristics of potential leaders for unreserved, SC, ST, and OBC elections as measured by the median characteristic of eligible households in each ward in each of these reservation categories. The mean (with standard deviation in parentheses) of each median characteristic is then computed across all wards. We see that there are substantial differences in median household characteristics across reservation categories. For example, eligible households in unreserved elections have more land wealth, and heads of these households more education, compared with eligible households in restricted elections (particularly when they are reserved for SC and ST candidates). This is because in unreserved elections, unlike in the caste-restricted elections, upper-caste households may also put up candidates.

The statistics in panel A suggest that the pool of potential leaders could vary substantially with the type of caste reservation that is in place and this could account for variation in elected leader characteristics when $M_{jt} = 1$ even if there is no systematic leader selection within the caste group. Note, however, that an elected male representatives in Panel B is much more likely to have managerial experience and have substantially higher education than a typical (invariably male) household head in Panel A, within each caste reservation category. This suggests that there is systematic (non-random)

leader selection and rejects the hypothesis that the elected representative is always the median voter, although variation in the pool of potential leaders across types of elections may still play a role in determining leadership competence across terms within a ward. We will consequently include in equation (4) a full set of election reservation dummies – SC, ST, and OBC – as well as measures of the distribution of characteristics among the potential leaders in the ward in each term: the median and the 25th and 75th percentiles for each leadership variable.[27]

Panel C in Table 5 also shows that elected female representatives are substantially disadvantaged with respect to schooling and our measure of managerial experience. Our finding that elected women are in fact more capable than men in delivering public goods to their wards thus suggests that neither the occupational measure nor schooling fully capture leadership competence. Few women run businesses; most women, and no men, specialize instead in managing households. The occupational measure we use thus may not be appropriate for female representatives. Moreover, household land wealth does not reflect management experience for women, who typically do not participate in farm management decisions. If both wealthier women and men are more likely to be elected in caste equilibria this would call into question the hypothesis that wealth reflects managerial skill. We thus estimate equation (4) separately for men and women.[28]

Table 6 reports the estimates of λ for the three leader characteristics, by gender, controlling for the distribution of the characteristic among potential leaders in each case. The estimates are based on the assumption that 0.5 is the threshold share above which a caste equilibrium can be sustained (alternative thresholds will be investigated below). As reported in Column 1, the estimates indicate that the presence of a caste equilibrium, based on the assumed threshold of 0.5, has a large and significant effect on the probability that the male elected representative has managerial experience, increasing the probability he is employed in a managerial occupation by 16 percentage points (a 21 percent increase above the mean for all representatives). Women elected in a regime in which there is a caste equilibrium, however, are no more likely to be managing enterprizes than women elected in the non-caste equilibrium. This is not surprising given the low percentage of women in such occupations.

Matching the results with occupation in Column 1, the male candidates have significantly higher

[27] As with the public goods regressions, all the leadership regressions include a full set of term dummies as well as the election year.

[28] Note that nearly all women are elected because of the random set-aside of *panchayat* seats for women, so that stratification by gender does not result in this case in choice-based samples.

(log) land wealth in the caste equilibrium in Column 3. Although for males land value more than triples when there is a caste equilibrium, we actually see the opposite effect for females in Column 4. Women are rarely involved in farming decisions and so the value of land owned by their household provides little information about their managerial experience and, hence, leadership competence. The difference in signs for male and female leaders in Columns 3-4 also helps rule out the possibility that leadership positions in the caste equilibrium are simply being captured by wealthy elites.

In contrast to the results for managerial experience and land wealth, we find no change in the schooling attainment of the elected representatives when there is a shift to a caste equilibrium for either men or women. This finding seems to contradict evidence in Besley, Pande, and Rao (2007), where it was found that the education of *panchayat* presidents was positively associated with the likelihood that Below Poverty Line (BPL) ration cards were appropriately targeted to poorer households. BPL ration cards make up a small part of the overall *panchayat* budget – just 7 percent in our sample of villages – and this finding may reflect stronger preferences for redistribution among the more educated rather than competence or reliability in providing overall public goods for a constituency, the focus of our analysis.[29] Ferraz and Finan (2008) find that an exogenous increase in politicians' wages in Brazil increases both the education of elected leaders and the level of public goods delivered in their constituencies. However, the characteristics of these leaders differ on other dimensions as well, so a direct link between education and leadership competence cannot be established. In our data, formal schooling evidently cannot be used to assess how the presence of a caste equilibrium results in a better leader. Indeed, this variable appears to have little power in predicting competence across caste and gender lines, as we found that elected women representatives are actually more competent than men when there is a caste equilibrium despite having substantially lower education.

The estimates of λ in Table 6 for male representatives (or candidates) using occupation and land wealth as proxies for leadership competence are consistent with the model which predicts that competence will increase discontinuously when the share of the most numerous sub-caste crosses a threshold at or below 0.5. To further explore this prediction, we use a specification that allows for a non-linear relationship between leadership competence and the share S_{jt}. In particular, we replace M_{jt} in equation (4) with a set of five binary variables, $D_1 - D_5$, which take the value one if S_{jt} lies in the intervals $0.20 - 0.35$, $0.35 - 0.50$, $0.50 - 0.65$, $0.65 - 0.80$, and $0.80 - 1.00$, respectively. This

[29] Fehr *et al.*(2008) based on field experiments found that high castes had stronger egalitarian norms than did lower castes. In our data, educational attainment is strongly positively correlated with caste status.

allows us to compute predicted leadership competence, based on managerial experience and (log) land value, for male representatives across the share distribution. These predicted values (with 95 percent confidence intervals) are presented in Figures 6 and 7. Both figures indicate a sharp jump in the characteristic of the elected representative when the share of the most numerous sub-caste exceeds 0.5, with the shape corresponding closely to the discontinuous theoretical relationship between the share and leadership competence depicted in Figure 1.

Table 7 reports test statistics based on the estimated non-linear specification that indicate that the shape of the empirical relationship between the share of the most numerous sub-caste and the two measures of leadership competence is indeed consistent with the relationship implied by the model. In particular, the test statistics indicate that: (i) We cannot reject the hypothesis that there is no increase in the measure of leadership competence for shares below 0.5 relative to the reference category, $S_{jt} \in [0, 0.20]$. (ii) We cannot reject the hypothesis that the relationship between the proxy for leadership competence and the share is flat below 0.5. (iii) We *can* reject the hypothesis that the leadership competence measure is equal above and below 0.5. (iv) We cannot reject the hypothesis that the relationship between the leadership competence measure and the share is flat above 0.5.

To assess whether changes in leadership competence match up with changes in public goods provision, we return to the specification with a single variable M_{jt} and proceed to estimate equation (4) with different thresholds, ranging from 0.25 to 0.75, above which a caste equilibrium is assumed to be obtained. The results in Figures 6-7 and Table 7 coincide with the predictions of the threshold model depicted in Figure 1. We thus expect the pattern of λ coefficients over the $0.25 - 0.75$ range to match with the pattern corresponding to the threshold model in Figure 2. As predicted, the estimated λ coefficient is increasing steeply in the assumed share threshold in the region below 0.5 and then flattens out with a sharp trend-break with managerial experience as the proxy for leadership competence in Figure 7. A similar pattern is obtained in Figure 9 with (log) land value as the proxy for male leadership competence, although the positive slope below 0.5 is not as steep and the trend-break not as distinct. The pattern of estimated λ's in Figures 8-9, using select measures of leadership competence, broadly matches the corresponding pattern of estimated θ's, presented earlier in Figures 3-5. It is also reassuring that a trend-break or discontinuity is consistently observed at or just below 0.5 in all the figures, including Figures 6-7.

We close this section by verifying an additional prediction of the model, which is that the probability that the selected leader is drawn from the most numerous caste will increase discontinuously

(to one) when its share crosses the threshold above which a caste equilibrium is obtained. The village inventory did not collect information on the elected representatives' sub-castes. However, this information is available from the village census for all candidates in the last two *panchayat* elections. We can thus test this prediction by replacing leader (or candidate) competence as the dependent variable in equation (4) with a binary variable indicating whether any candidate belonged to the most numerous eligible sub-caste in each ward and election term. To estimate the non-linear relationship between the candidate's sub-caste and the share we construct a set of binary variables which take the value one if S_{jt} lies in the appropriate interval. The predicted value of the dependent variable (with 95 percent confidence intervals) is presented in Figure 10 across the entire range of shares. Although the probability that a candidate is drawn from the most numerous caste could increase mechanically as its share increases, even below the threshold, we see in Figure 10 that the predicted probability is flat up to a share of 0.35. It then increases discontinuously at 0.35, with a second sharp increase at 0.65, by which point the probability that the candidate is drawn from the most numerous caste is close to 0.9. Although we do not see a single discontinuous increase at a threshold close to 0.5, notice that the two points of discontinuity lie close to and are equidistant from 0.5.[30]

4.5 Leadership Commitment

The model predicts that the leader in the caste equilibrium will choose projects that are aligned with the preferences of the median individual in the most numerous caste, regardless of his or her own preferences. In contrast, the median individual in the ward, who is selected as the leader, will choose his or her preferred mix of projects in the non-caste equilibrium.

To test these predictions, we take advantage of an additional feature of the randomized reservation in Indian local governments, which is that a reservation for female ward representatives is overlayed on caste reservation. In particular, one third of all seats are randomly restricted to female leaders and this reservation is applied equally across caste and open seats in each *panchayat* election. It is generally believed that male and female preferences for public and private goods differ, with a voluminous literature on intra-household resource allocations providing empirical support for this claim. Within a ward, for a given type of caste reservation (or open election), the share of the most numerous caste and, hence, the political equilibrium, will be the same across *panchayat* terms

[30]The share dummies underlying Figure 10 are estimated in intervals of 0.1 to separate the multiple points of discontinuity in the figure.

whether or not the seat is reserved for a woman. If the ward representative's position is reserved for a woman in one of those terms, the allocation of public goods can be compared across male and female leaders to test the commitment hypothesis: that in a caste equilibrium variation in the elected ward representative's characteristics should not affect the distribution of public goods in the ward.

Given the problem of commitment, in the non-caste equilibrium we would also expect *elected* male and female representatives to have relatively similar preferences (close to the median preference in the ward). However, if the male and female preference distributions have little overlap, the allocation of resources could vary with the gender of the leader, as found by Chattopadhyay and Duflo (2004). The strong prediction of our model is that even in such cases differences in public goods allocations by gender should never be observed in the caste equilibrium.[31]

To test these predictions, we estimate a modified version of the public goods allocation equation. In particular, we now include ward-reservation fixed effects. We are thus identifying the role of the gender of the elected representative in delivering public goods for each equilibrium type controlling for all (observable and unobservable) characteristics of voters in the ward:

$$G_{kjtr} = \eta_k + \pi_k W_{jtr} + \tilde{h}_{jr} + \zeta_{kjtr} \tag{5}$$

where G_{kjtr} measures the share of households in ward j that received good k in term t when reservation r was in place. W_{jtr} is a binary variable that takes the value one if the position was reserved for a female leader in that ward-term, $\tilde{h}_{jr}$ is a ward-reservation fixed effect, η_k is a full set of public good dummies, and ζ_{kjtr} is a mean-zero disturbance term. The reservation categories are SC, ST, OBC, and Open. The regression is estimated separately for $M_{jt} = 0$ and $M_{jt} = 1$, and the prediction is that π_k should be zero for all public goods k when $M_{jt} = 1$. The female coefficient could be significant when $M_{jt} = 0$ if the male and female preference distributions are sufficiently far apart, as discussed above.

[31] If voting is probabilistic, candidates will announce policy platforms that lie somewhere between their own preferred choice and the median voter's preferred choice even if leadership commitment can be maintained. If the preferences of male and female leaders are closer in the caste equilibrium or if the electoral consequences of deviating from the median voter's preferred choice is greater in that equilibrium, then the predictions of the model could be replicated by an alternative framework in which commitment is always maintained. However, neither of these conditions is likely to valid in our context. First, it is reasonable to assume that greater electoral competition will increase the cost of deviating from the median voter's preferences. If individuals put weight on caste affiliation there will be less electoral competition in a caste equilibrium, where a single large caste is eligible to put candidates forward, and therefore candidates will choose policy platforms more closely aligned with their own preferences. Second, we saw in Table 6 that the coefficient on the caste equilibrium variable had the opposite sign for male and female leaders with each leadership characteristic. To the extent that occupation, wealth, and education are associated with preferences for public goods, these results imply that male and female leaders' preferences will actually be *farther* apart in the caste equilibrium.

Table 8 reports the estimates of equation (5) with ward-reservation fixed effects, separately for $M_{jt} = 0$ and $M_{jt} = 1$. We consider three thresholds above which a caste equilibrium is assumed to be present: 0.3, 0.4, 0.5. In the non-caste equilibrium ($M_{jt} = 0$), the woman representative coefficient is always positive and significant for street lights, increasing the share of households that receive that good by 0.07-0.09 relative to the reference good (public telephone). The woman-leader coefficient is also positive and significant for electricity and the coefficients are jointly significant for all public goods with the threshold set at 0.3, although the precision of the estimates declines at higher thresholds. In contrast to the estimates for the non-caste equilibrium, the elected woman-representative coefficient is *never* significant in the caste equilibrium ($M_{jt} = 1$) for any public good or jointly for all public goods.[32] Thus, while the election of a female ward representative does appear to change the mix of goods (the allocations are relative to the reference good) observed in the ward in the non-caste equilibrium, we cannot reject the hypothesis of leadership commitment in the caste equilibrium.

5 Conclusion

In this paper we explore whether community involvement in the political sphere always worsens governance. In particular, complementary to the new literature on the role of community networks in solving market problems, we test the hypothesis that strong traditional social institutions can discipline the leaders they put forward, successfully substituting for secular political institutions when they are ineffective. We do this by examining the interaction between an Indian institution that is hundreds of years old – the caste system – with a new set of political institutions – local democracy. Using detailed data on local public goods at the street level and Indian local politicians at the ward level over multiple terms, we find that the presence of a caste equilibrium (in which the population share of the most numerous sub-caste crosses a fixed threshold) is associated with the selection of leaders with superior observed characteristics and greater public goods provision. This improvement in leadership competence occurs without apparently diminishing leaders' responsiveness to their constituency.

[32] We cannot reject the hypothesis that all the female coefficients are zero with thresholds set at 0.4 and 0.5 in the non-caste equilibrium as well. Notice, however, that the p-values for the test range from 0.5 to 0.8 for $M_{jt} = 1$ but are much lower, ranging from 0.02 to 0.15 for $M_{jt} = 0$. Our inability to reject the null hypothesis in the non-caste equilibrium for all thresholds might simply be a consequence of the low power of the statistical test. Note again that we are only identified off variation in the gender of the leader within wards *and* reservation categories.

Although these results suggest that parochial politics does not necessarily imply bad governance, they need to be placed in the appropriate perspective. Although the sub-caste may be able to control the leaders it nominates at the ward level, it will have less influence at higher levels of government where a single sub-caste is rarely dominant. The negative effect of caste-identity politics on leadership selection and outcomes has been documented at the state level in India and similar negative outcomes have been associated with parochial politics in other parts of the world. Moreover, the elected representative in a caste equilibrium is answerable to the social group she belongs to and so her choices will be aligned with the preferences of the median voter in her caste rather than the median voter in the constituency. The welfare consequences of a caste equilibrium are thus ambiguous. Caste politics is a second-best solution and, ultimately, there is no perfect substitute for well functioning political institutions (parties) in a competitive democratic system.

Finally, our results shed new light on the efficiency consequences of political reservation in India. Randomly-assigned caste reservation mechanically increases the commitment problem by inducing exogenous turnover in the leadership. Reservation also reduces the likelihood that a caste equilibrium will emerge in any constituency, exacerbating the commitment problem. The obvious equity advantage of any reservation system is that it favors historically-disadvantaged groups. The multiple sources of inefficiency that we identify in this paper, however, suggest that a more systematic appraisal of the costs and the benefits of political reservation in India may be warranted. One notable exception to this qualified assessment of the reservation system is quotas for women. This particular reservation scheme does not adversely affect the probability that a caste equilibrium will emerge and we find that women leaders are significantly more competent than men in that equilibrium. To the extent that the historical lack of participation by women in local politics was based on underestimates of their competence, the reservation system has uncovered a new set of especially competent, and now experienced, leaders.

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Figure 1: Alternative Public Goods-Share Relationships

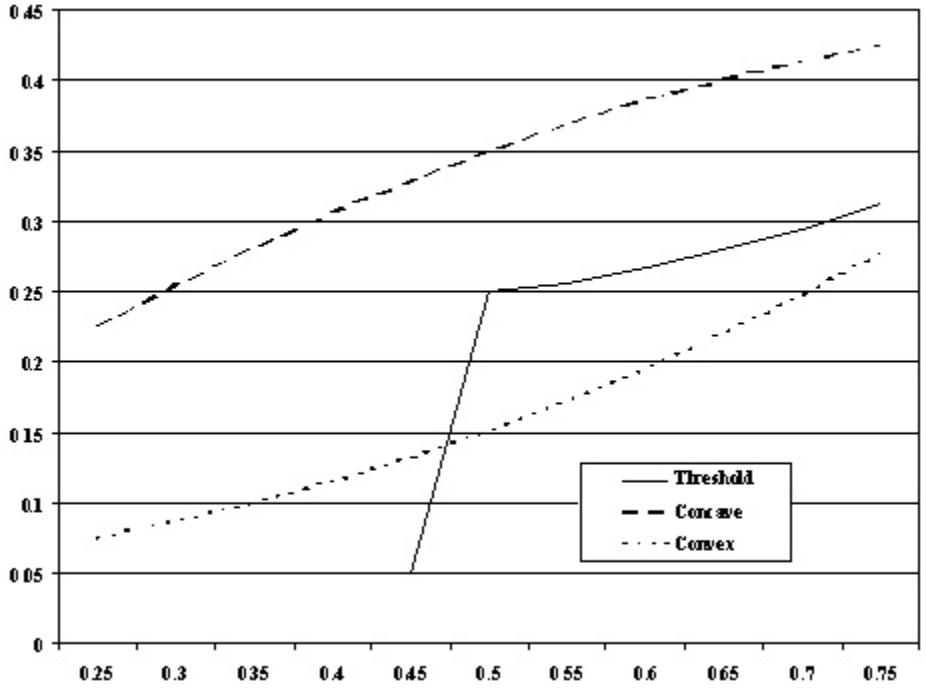

Figure 2: Estimated Caste Equilibrium Coefficients for Alternative Thresholds Using Simulated Data

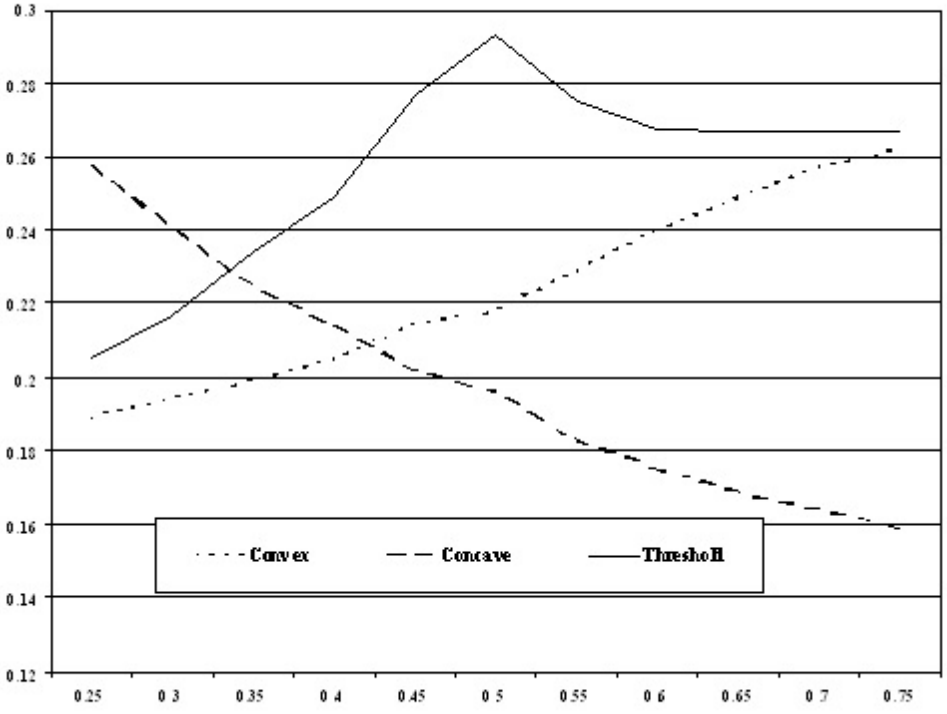

Figure 3: Estimated Competence Coefficient, with 95% Confidence Bounds, By Share Threshold (Land Wealth)

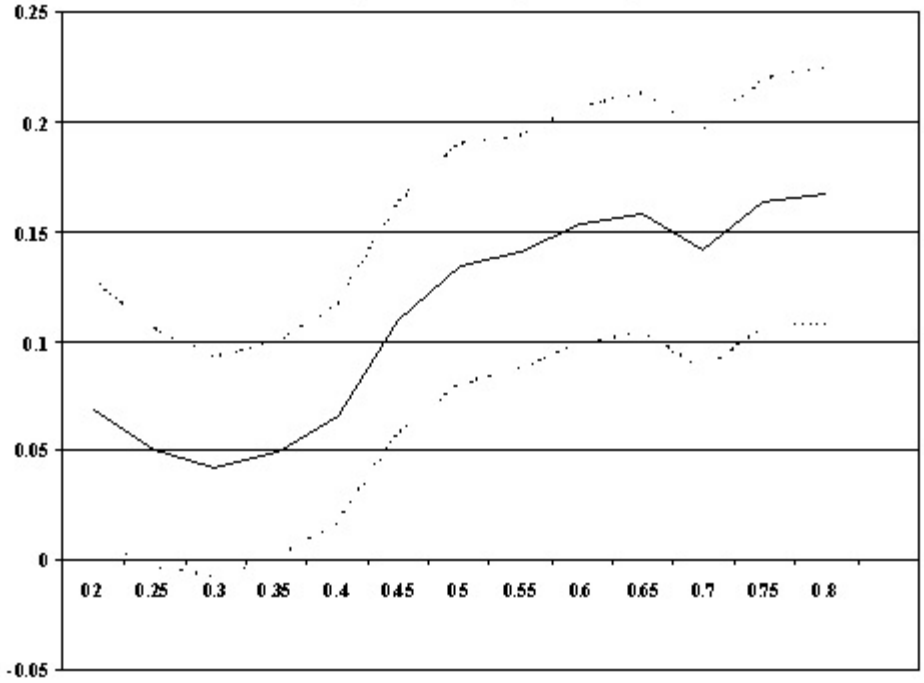

Figure 4: Estimated Competence Coefficient, with 95% Confidence Bounds, By Share Threshold (Occupation)

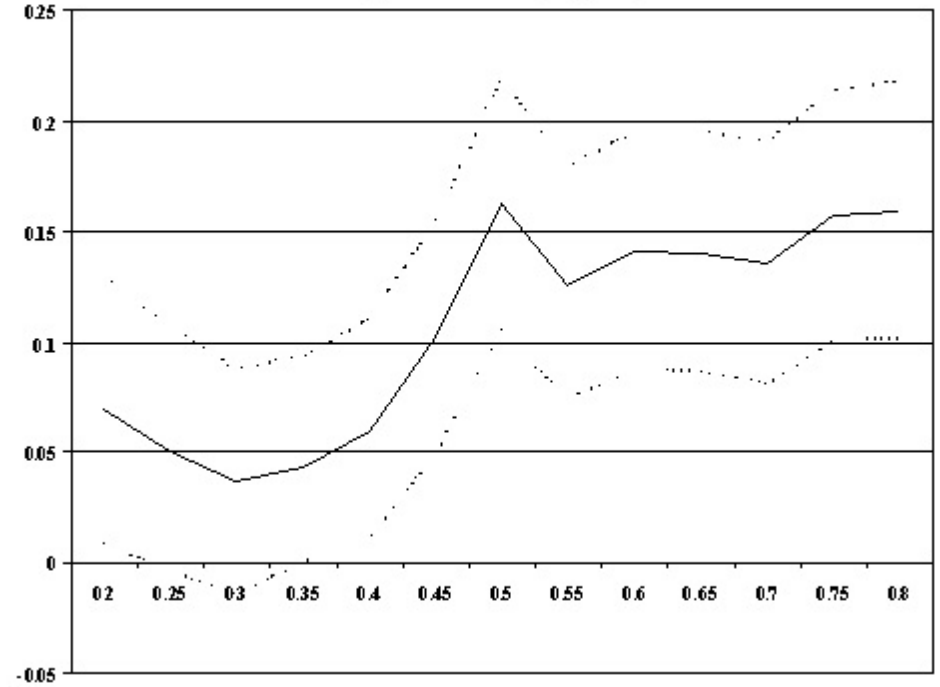

Figure 5: Estimated Competence Coefficient, with 95% Confidence Bounds, By Share Threshold (Education)

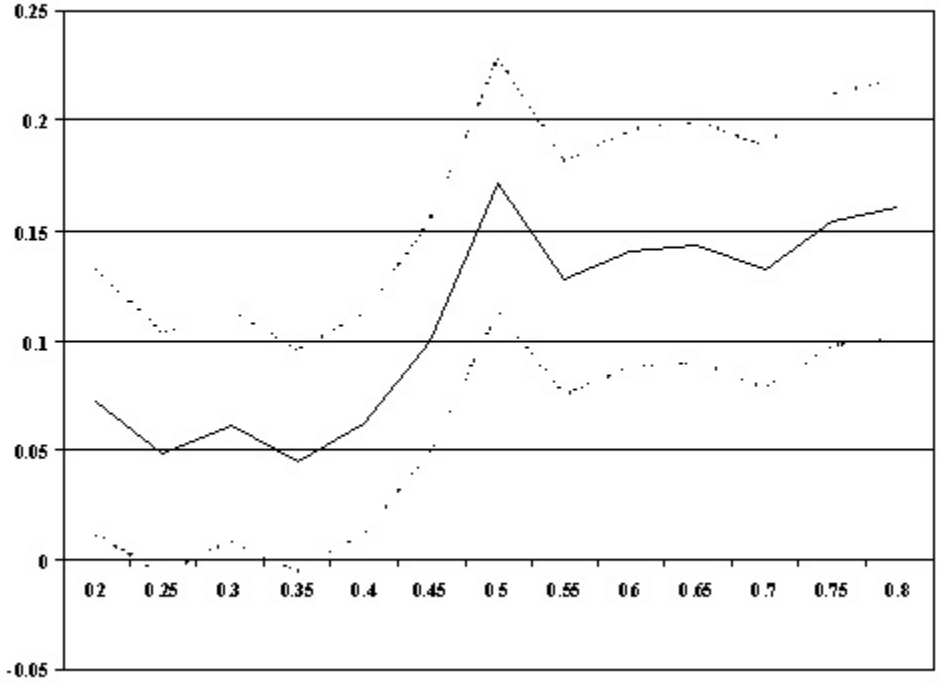

Figure 6: Relationship Between the Largest Caste Share and the Probability the Ward Representative has Managerial Experience, with 95% Confidence Bounds

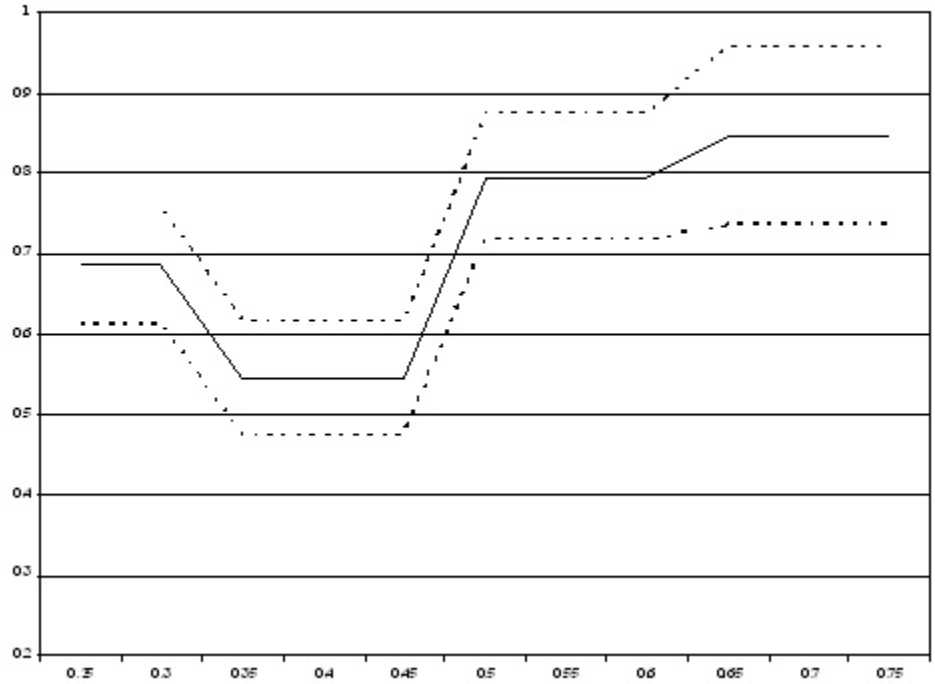

Figure 7: Relationship Between the Largest Caste Share and the (Log) Land Value of the Ward Representative, with 95% Confidence Bounds

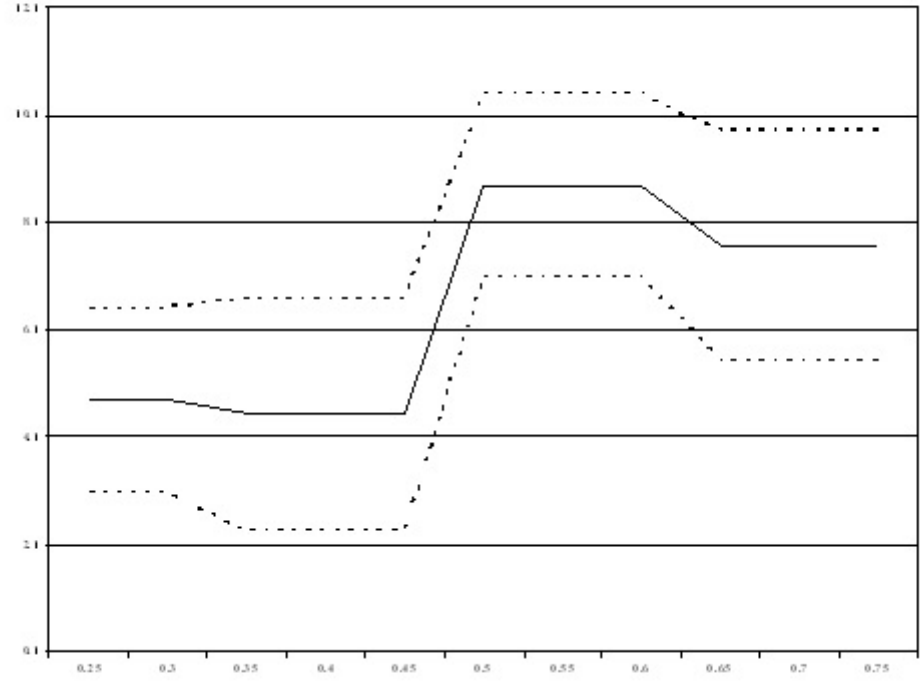

Figure 8: Estimated Effect of a Caste Equilibrium on the Probability the Ward Representative has Managerial Experience, by Share Threshold, with 95% Confidence Bounds

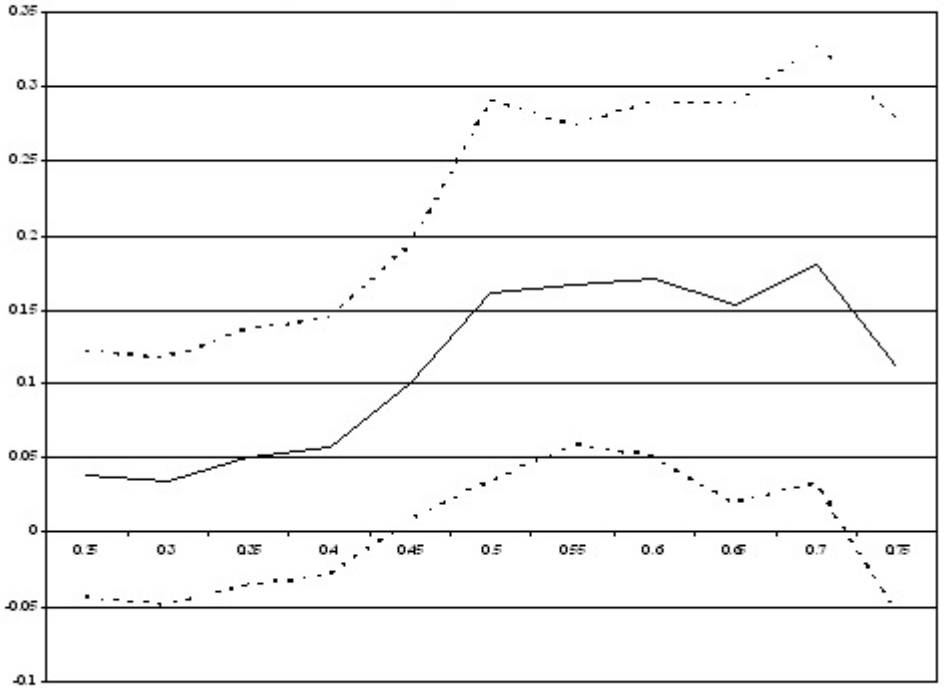

Figure 9: Estimated Effect of a Caste Equilibrium on the (Log) Land Value of the Ward Representative, by Share Threshold, with 95% Confidence Bounds

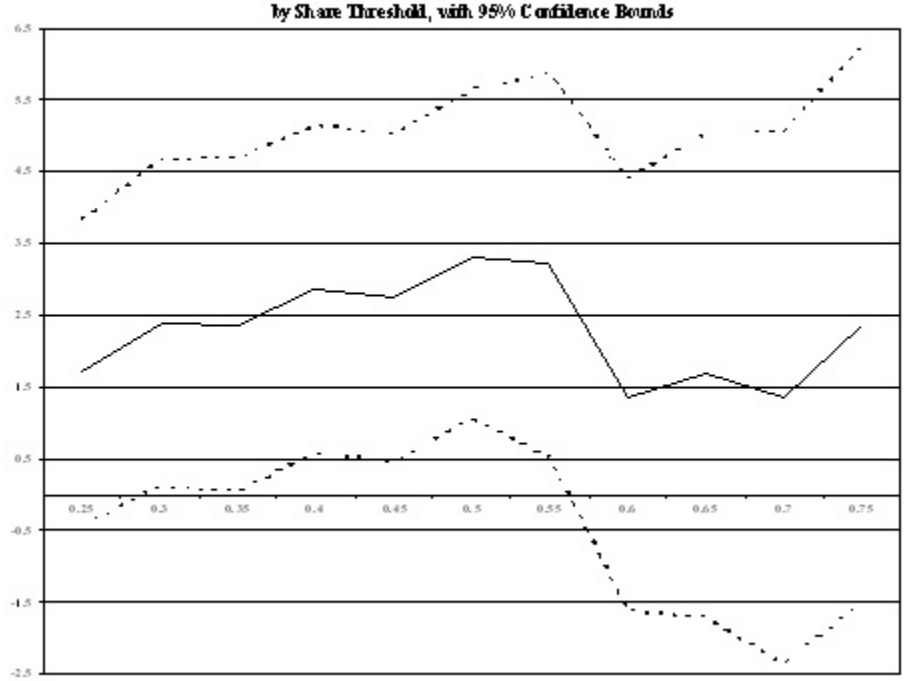

Figure 10: Relationship Between the Probability that a Member of the Largest Caste is a Candidate and the Share of the Largest Caste, with 95% Confidence Bounds

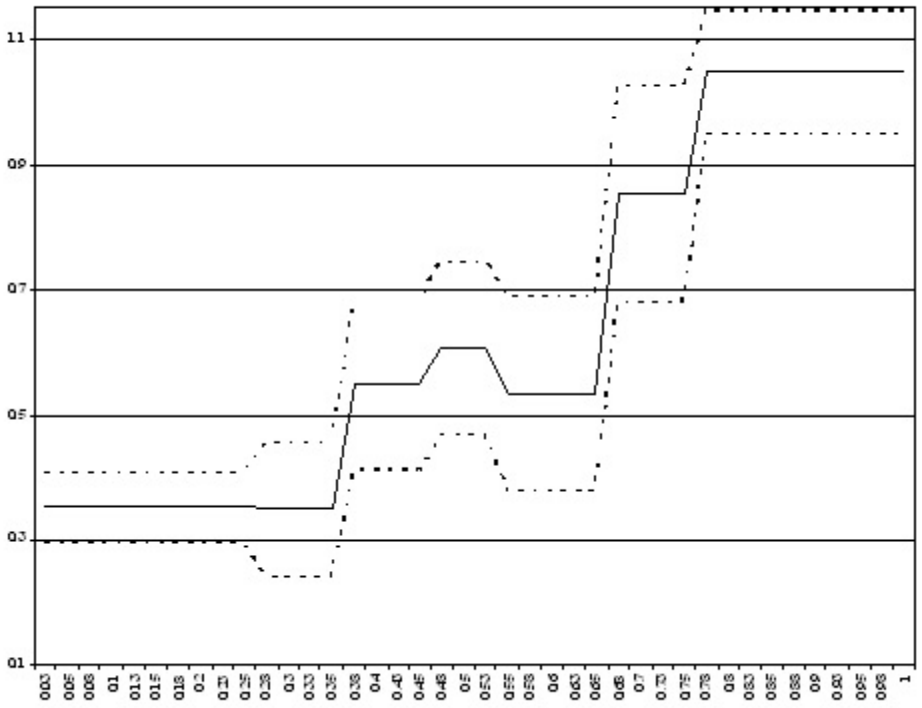

Table 1: Sources of Support for Elected Ward Representatives

Source of support:	within village	outside village
	(1)	(2)
From caste	82	29
From religion	28	13
From wealthy individuals	38	--
From a political party	--	41

The statistics are computed over the last three local governments in each ward.

Each statistic reflects the percent of leaders who received support from a given source.

Table 2: Share of the Most Numerous Eligible Caste in the Ward

Type of election:	Open	SC	ST	OBC
	(1)	(2)	(3)	(4)
Panel A: Distribution of shares				
25 percentile	0.42	0.14	0.16	0.20
50 percentile	0.60	0.33	0.57	0.41
75 percentile	0.85	0.65	0.95	0.69
Panel B: Fraction of wards where share exceeds				
0.3	0.92	0.52	0.67	0.63
0.4	0.79	0.46	0.61	0.53
0.5	0.67	0.37	0.52	0.44
Total number of observations	1,973	373	187	769

SC=scheduled caste, ST=scheduled tribe, OBC=other backward caste.
Information on reservation and election outcomes is obtained for three terms in each ward.

Table 3: Fraction of Households in the Ward Receiving Public Goods in each Term

Type of election:	Open	SC	ST	OBC
	(1)	(2)	(3)	(4)
Water	0.69	0.73	0.78	0.72
	(0.40)	(0.39)	(0.71)	(0.39)
Sanitation	0.42	0.42	0.55	0.42
	(0.46)	(0.46)	(0.47)	(0.46)
Roads	0.69	0.72	0.74	0.73
	(0.41)	(0.40)	(0.41)	(0.39)
Telephones	0.07	0.12	0.08	0.10
	(0.24)	(0.30)	(0.25)	(0.28)
Electricity	0.14	0.20	0.17	0.20
	(0.34)	(0.38)	(0.36)	(0.38)
Street lighting	0.16	0.19	0.19	0.22
	(0.36)	(0.38)	(0.39)	(0.40)
Number of observations	1,704	373	176	619

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.

Table 4(a): Public Goods Demand Parameters

Dependent variable:	public good provision					
Specification:	no reservation interactions			reservation interactions		
Pivotal characteristic:	land value	managerial/ professional occupation	education	land value	managerial/ professional occupation	education
	(1)	(2)	(3)	(4)	(5)	(6)
Water intercept	0.57	0.58	0.55	0.54	0.54	0.51
	(0.02)	(0.04)	(0.02)	(0.02)	(0.04)	(0.03)
Sanitation intercept	0.31	0.34	0.31	0.29	0.32	0.28
	(0.02)	(0.04)	(0.02)	(0.02)	(0.04)	(0.02)
Roads intercept	0.54	0.57	0.56	0.51	0.53	0.53
	(0.02)	(0.04)	(0.02)	(0.02)	(0.04)	(0.03)
Electricity intercept	0.09	-0.03	0.08	0.08	-0.03	0.07
	(0.01)	(0.03)	(0.01)	(0.01)	(0.03)	(0.01)
Street lights intercept	0.09	-0.03	0.09	0.08	-0.03	0.08
	(0.01)	(0.03)	(0.01)	(0.01)	(0.03)	(0.01)
Pivotal char. - water	5.76	-0.02	2.82	5.57	-0.02	3.67
	(4.43)	(0.04)	(3.31)	(4.26)	(0.04)	(3.20)
Pivotal char. - sanitation	2.20	-0.04	-1.05	2.07	-0.04	-0.24
	(4.85)	(0.04)	(3.49)	(4.58)	(0.04)	(3.33)
Pivotal char. - roads	24.50	-0.005	-1.22	23.60	-0.004	-0.01
	(5.47)	(0.04)	(3.55)	(5.22)	(0.04)	(3.40)
Pivotal char. - electricity	-17.70	0.10	-4.44	-16.50	0.09	-3.64
	(3.21)	(0.03)	(2.62)	(3.04)	(0.03)	(2.49)
Pivotal char. - street lights	-6.44	0.12	-3.19	-5.87	0.11	-2.37
	(3.50)	(0.03)	(2.65)	(3.28)	(0.03)	(2.51)
all pivotal char.-goods=0						
(F-statistic)	17.00	10.68	2.32	14.62	12.99	2.49
(p value)	0.00	0.00	0.04	0.00	0.00	0.03

Standard errors in parentheses are robust to heteroscedasticity and clustered residuals within each ward-term.

The dependent variable is computed as the fraction of households in the ward who received a given public good in a given term.
Public telephone is the excluded local public good.

The pivotal characteristic is the median in the ward (most numerous caste) when a caste equilibrium is assumed to be absent (present).

Land value is measured in thousands of Rupees. Coefficients on land value-goods in Columns 1 and 4 must be divided by 10^5.

Managerial/ professional occupation takes the value one for business, farming, and professional occupations
zero for agricultural labor, skilled labor, unskilled labor, technician, and housewife.

Education is measured as years of schooling. Coefficient on education-goods in Columns 3 and 6 must be divided by 10^3.

All regressions include ward fixed effects, term dummies and the election year.

Competence parameters are reported in Table 4(b).

Table 4(b): Leadership Competence Parameters

Dependent variable:	public good provision					
Specification:	no reservation interactions			reservation interactions		
Pivotal characteristic:	land value	managerial/ professional occupation	education	land value	managerial/ professional occupation	education
	(1)	(2)	(3)	(4)	(5)	(6)
Theta	0.13	0.16	0.17	0.15	0.20	0.19
	(0.03)	(0.03)	(0.03)	(0.05)	(0.05)	(0.05)
SC	--	--	--	0.08	0.12	0.12
				(0.05)	(0.05)	(0.05)
ST	--	--	--	0.09	0.11	0.13
				(0.07)	(0.08)	(0.08)
OBC	--	--	--	0.09	0.09	0.08
				(0.05)	(0.05)	(0.05)
Woman	--	--	--	-0.02	-0.001	-0.02
				(0.04)	(0.04)	(0.04)
SC x Theta	--	--	--	-0.02	-0.09	-0.04
				(0.08)	(0.08)	(0.08)
ST x Theta	--	--	--	0.09	0.04	0.02
				(0.10)	(0.10)	(0.10)
OBC x Theta	--	--	--	-0.05	-0.05	-0.04
				(0.06)	(0.06)	(0.06)
Woman x Theta	--	--	--	0.10	0.08	0.10
				(0.05)	(0.05)	(0.05)
all caste dummies=0						
(F-statistic)	--	--	--	0.79	1.57	1.93
(p value)				0.50	0.19	0.12
all caste dummies-caste equilibrium=0						
(F-statistic)	--	--	--	0.53	0.23	0.38
(p value)				0.66	0.88	0.77
R^2	0.37	0.36	0.36	0.37	0.36	0.36
Number of observations	14,270	14,215	14,255	14,270	14,215	14,255

Standard errors in parentheses are robust to heteroscedasticity and clustered residuals within each ward-term.

The dependent variable is computed as the share of the households in the ward who received a given good in a given term: clean water(1), sanitation(2), improved roads(3), electricity(4), street lights(5). Public telephone is the excluded category.

The pivotal characteristic is the median in the ward (most numerous caste) when a caste equilibrium is absent (present).

Land value is measured in thousands of Rupees.

Managerial/ professional occupation takes the value one for business, farming, and professional occupations zero for agricultural labor, unskilled labor, skilled labor, technician, and housewife.

Education is measured as years of schooling.

Reservation categories are SC, ST, OBC, and woman.

All regressions include ward fixed effects, term dummies and the election year.

Table 5: Characteristics of Pivotal Voters and Elected Ward Representatives

Election type:	Open	SC	ST	OBC
	(1)	(2)	(3)	(4)
Panel A: Median individuals				
Land value	94.80	47.35	63.35	94.76
	(173.19)	(105.85)	(182.02)	(157.49)
Managerial occupation	0.34	0.33	0.40	0.42
	(0.47)	(0.47)	(0.46)	(0.49)
Education	4.46	3.53	3.30	4.03
	(3.76)	(3.59)	(3.65)	(3.36)
Panel B: Male elected representatives				
Land value	99.55	81.50	58.36	83.21
	(23.69)	(20.16)	(19.91)	(15.23)
Managerial occupation	0.75	0.38	0.82	0.72
	(0.43)	(0.49)	(0.38)	(0.45)
Education	7.42	6.01	5.30	7.05
	(4.43)	(4.49)	(3.99)	(4.30)
Panel C: Female elected representatives				
Land value	95.61	43.01	31.50	62.44
	(30.23)	(10.10)	(40.86)	(91.83)
Managerial occupation	0.10	0.32	0.05	0.54
	(0.30)	(0.47)	(0.22)	(0.50)
Education	3.23	5.78	2.22	4.72
	(3.83)	(4.39)	(2.05)	(4.17)

All characteristics in Panel A are measured as the median value in the ward for the relevant caste category.
The means (standard deviations) of these characteristics across all wards are reported in the table.
Leaders' occupation and education is obtained for last three terms in each ward.
Information on land value is based on all candidates in the ward over the last two terms.
Information on the landholdings of elected representatives was not collected
Land value is measured in thousands of Rupees.
Managerial occupation takes the value one for business and farming and zero for
professional occupations, agricultural labor, skilled labor, unskilled labor, technicians, and housewife.
Education is measured as years of schooling.
SC=scheduled caste, ST=scheduled tribe, OBC=other backward caste.

Table 6: Leadership Selection Estimates

Dependent variable:	leader's characteristics					
Characteristics measured by:	managerial occupation		log(land value)		education	
Leader's gender:	male	female	male	female	male	female
	(1)	(2)	(3)	(4)	(5)	(6)
Caste equilibrium	0.16	-0.17	3.33	-8.12	0.68	-1.36
	(0.07)	(0.15)	(1.18)	(3.26)	(0.61)	(3.59)
SC reservation	-0.06	-0.31	0.96	-8.98	-0.99	-0.41
	(0.16)	(0.15)	(1.13)	(1.41)	(0.55)	(2.21)
ST reservation	-0.02	-0.10	2.96	--	-1.73	-1.07
	(0.09)	(0.23)	(1.48)		(0.84)	(4.22)
OBC reservation	-0.03	0.17	-0.12	-5.10	-0.37	1.87
	(0.04)	(0.11)	(0.78)	(2.84)	(0.37)	(2.19)
R^2	0.29	0.49	0.27	0.29	0.24	0.24
Number of observations	2,170	1,109	1,680	917	2,158	1,099

Standard errors in parentheses are robust to heteroscedasticity and clustered residuals within each ward-term.

Female refers to elections reserved for female leaders and male refers to all other elections.

All regressions include ward fixed effects, term dummies and the election year.

All regressions include 0.25, 0.50, and 0.75 quantile of potential leader distribution as regressors.

Caste equilibrium is a binary variable that takes the value one if the share of the most numerous caste in the ward exceeds 0.5, zero otherwise.

Managerial occupation takes value one for business and farming,
zero for profesional occupations, agricultural labor, skilled and unskilled labor, technicians, and housewife.

Land value is measured in thousands of Rupees.

Education is measured as years of schooling.

SC=scheduled caste, ST=scheduled tribe, OBC=other backward caste.

Leaders' occupation and education is obtained for last three terms in each ward.

Information on land value is based on all candidates in the ward over the last two terms.

No elections were reserved for women and ST in our wards over the last two terms.

Table 7: Shape of the Leader Characteristic - Share Relationship: test statistics

Leader characteristic:	managerial occupation	log(land value)
	(1)	(2)
H_0: $\lambda_1=\lambda_2=0$, share<0.5	0.16	0.13
H_0: $\lambda_1=\lambda_2$, share<0.5	0.13	0.92
H_0: $\lambda_3=\lambda_4=\lambda_5=0$, share≥0.5	0.04	0.01
H_0: $\lambda_3=\lambda_4=\lambda_5$, share≥0.5	0.94	0.27

Statistics in the table are p-values.

D_1=1 if S_{jt} lies in the 0.20-0.35 interval.

D_2=1 if S_{jt} lies in the 0.35-0.50 interval.

D_3=1 if S_{jt} lies in the 0.50-0.65 interval.

D_4=1 if S_{jt} lies in the 0.65-0.80 interval.

D_5=1 if S_{jt} lies in the 0.80-1.00 interval.

λ_1-λ_5 are the corresponding coefficients on the share-dummies.

Table 8: Leadership Commitment Estimates

Dependent variable:	public good provision					
Threshold for caste equilibrium:	0.3		0.4		0.5	
	(1)	(2)	(3)	(4)	(5)	(6)
Woman - water	-0.018	0.009	-0.012	0.012	0.003	0.005
	(0.039)	(0.017)	(0.028)	(0.019)	(0.024)	(0.020)
Woman - sanitation	-0.043	0.020	-0.007	0.017	-0.014	0.024
	(0.049)	(0.019)	(0.033)	(0.020)	(0.027)	(0.022)
Woman - roads	-0.105	0.034	-0.010	0.027	-0.021	0.038
	(0.050)	(0.018)	(0.033)	(0.020)	(0.028)	(0.021)
Woman - electricity	0.136	-0.006	0.053	0.003	0.037	0.004
	(0.045)	(0.014)	(0.030)	(0.015)	(0.024)	(0.016)
Woman - street lights	0.094	-0.001	0.075	-0.005	0.069	-0.008
	(0.046)	(0.015)	(0.030)	(0.016)	(0.024)	(0.017)
Caste equilibrium in the ward	No	Yes	No	Yes	No	Yes
All woman-goods=0						
(F-statistic)	2.80	0.89	1.63	0.50	1.77	0.82
(p value)	0.02	0.49	0.15	0.77	0.12	0.53
R^2	0.43	0.43	0.42	0.44	0.41	0.46
Number of observations	3,095	11,140	4,525	9,710	5,975	8,260

Standard errors in parentheses are robust to heteroscedasticity and clustered residuals within each ward-term.

The dependent variable is computed as the share of households in the ward who received a given good in a given term.

Public telephone is the excluded good.

Woman dummy equals one if the leader is a woman, zero otherwise.

A caste equilibrium is assumed to be present if the share of the most numerous caste in the ward exceeds the threshold.

Reservation includes SC=scheduled caste, ST=scheduled tribe, OBC=other backward caste, and Open.

All regressions include ward-reservation fixed effects, term dummies, the election year, and a full set of public goods dummies.