Something to Complain About: How Minority Representatives Overcome Ethnic Barriers*

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JOB MARKET PAPER

Politicians are crucial for the delivery of public goods. Success in delivery often depends on their ability to collaborate across tiers. Using data from over 100,000 local politicians in India and variety of empirical methods, we argue that ethnic divisions within politicians affects public good provision. First, we use a regression discontinuity design to show that ethnic-minority (low-caste) representatives deliver fewer public goods when governing under non-minority (non-low-caste) representatives. Development projects are delayed and face more implementation hurdles. We then study if politicians can be incentivized to collaborate. In our setting, local politicians can file formal complaints to the higher bureaucracy under a grievance redressal system. A second RD-based strategy shows that ethnic minority representatives file a disproportionate number of complaints when paired with non-minority representatives. We then run a field experiment across 1612 local jurisdictions in India where we provide information about the grievance redressal system and offer filing assistance to randomly selected ethnic minority representatives. Our intervention, run across jurisdictions whose population totals to 15 million, increased complaint filing by 41 p.p and increased public works projects by 24%. We use a simple Nash bargaining model to explain how new complaints-based technologies can help fix politician incentives and, consequently, improve public good provision.

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1 Introduction

A vast literature argues that ethnic conflict adversely affects local public good provision (Alesina et al., 1999). However, empirical evidence on the exact causal mechanisms underpinning this result is scarce. Using data from over 100,000 local politicians across India, we argue that one mechanism involves the inability of ethnically diverse elected representatives to collaborate and provide public goods. The specific ethnic divisions we consider are related to caste. We define caste-mismatch as occurring when there is a difference in caste category between upper- and lower-tiered representatives. In this paper, we demonstrate that local elected representatives from low-caste groups exogenously governing under those from non-low caste groups undertake fewer water and sanitation projects. An implication of this result is that the adverse impacts of caste divisions could be mitigated by incentivizing elected representatives to collaborate. In our setting, local politicians are allowed to issue formal complaints regarding collaboration breakdowns to the higher bureaucracy via a grievance redressal system. We explore how these mechanisms prove important in mediating conflicts caused by ethnic tensions between politicians and, in turn, improve public good provision, especially in areas governed by low-caste representatives.

This paper is set in the Indian state of Bihar. Bihar's local administrative structure comprises over 8400 Gram Panchayats (GPs), which are further divided into wards (13.6 per GP). Both GPs and wards are represented by elected politicians, who we will simply refer to as "upper-tiered" (GP) and "lower-tiered" (ward) representatives. Upper-tiered representatives are often traditionally powerful local elites, who exert considerable influence over development projects in GPs across the state (Gupta (2002)). Lower-tiered representatives, on the other hand, have long been marginal players, representing 225 households or 7% of the GP.

In 2017, the government of Bihar transferred financial and implementation powers of two key water and sanitation (WAS) development programs, costing upwards of $4.5 billion, to lower-tiered representatives, thereby significantly altering the balance of power between the two tiers.[1].This constituted a significant decentralization measure, considerably raising the importance of the lower-tiered representative in the local administrative set up. However, money from the state's treasury to implement WAS schemes reaches the lower-tiered representative through the upper-tiered representative. In addition, the upper-tiered representative plays a role in overseeing project allocation across wards. WAS implementation, therefore, relies upon the explicit collaboration of politicians across tiers, with the upper-tiered representative providing oversight and the lower-tiered representative being the main implementer. In this paper, we show that ethnic divisions between these two tiers of representatives causes the upper-tiered representative to function less as a monitor and more as a gatekeeper of funds, causing impediments to effective implementation of public good projects.

[1]The WAS schemes are (i) laying of drains and village roads (ii) piped water connections to households

The low-caste groups we focus on are Scheduled Castes (SCs). SCs are a non-homogeneous collection of severely socioeconomically disadvantaged castes formerly considered "untouchable". Though the Indian state abolished untouchability in 1950, SCs continue to face discrimination and lag severely on several social indicators (Banerjee and Somanathan, 2007). While this paper looks at divisions between SCs and non-SCs and looks at the implications of hierarchies across those two broad groupings, both these categories comprise within them many sub-castes (*jatis*) with fierce rivalries across these.

Our first econometric strategy exploits the algorithm used to reserve upper-tiered representatives' seats in favour of SCs. This population-based rule mandates that GPs with SC-populations above a threshold are to be reserved. GPs just above the population threshold are 82 percentage points (p.p) likelier to be reserved than those marginally below. By focusing on wards governed by SC lower-tiered representatives on either side of the threshold, we can causally measure the impact of caste-matching between tiers of government on outcomes[2] using a fuzzy regression discontinuity (RD) design framework.

Our first finding is that caste-mismatch worsens provision of public goods in jurisdictions governed by SC lower-tiered representatives. Mismatched jurisdictions implement fewer WAS projects and suffer greater delays. We measure WAS outcomes using an official dataset of over 98,000 ward-level assets constructed across the state of Bihar during the period November 2016 - March 2019. We show that caste-matched wards undertake 40% more projects by the end of year 1. While this gap reduces somewhat by the end of year 2, caste-matched wards still see 12% more WAS projects, though the estimates are imprecise. We complement this finding with two additional pieces of evidence based on primary surveys of representatives. First, we interviewed randomly sampled lower-tiered SC representatives from either side of the population threshold. We asked them about WAS projects that had been undertaken in their wards. Mismatched representatives face more obstacles[3] while undertaking WAS projects and are 18 percentage points (41%) likelier to name the upper-tiered representative as the main impediment to their effective functioning. Second, in a survey of 1612 SC lower-tiered representative from areas where projects haven't yet been undertaken, they are *more* likely to blame the upper-tiered representative for the absence of projects. Finally, using a second econometric strategy, a close-election RD design featuring upper-tiered candidates of different sub-castes, we show that sub-caste mismatch adversely affects WAS provision too.

Our second finding documents the role that the novel technology of grievance redressal mechanisms can play in mediating conflict between tiers of politicians. The Bihar Right to Public Grievance Redressal Act (BPGRA).[4] was launched in 2016. It is a law that provides

[2]To be clear, SC wards from GPs that are above the threshold will are extremely likely to be caste-matched and those from GPs below the threshold will almost always be mismatched.

[3]They are likelier to report that the project is actually incomplete, that there were significant delays in starting projects and that they had less control over where the project would happen

[4]This is the government website for the BPGRS: http://lokshikayat.bihar.gov.in/AboutUsEn.aspx. A copy of the Act is here: http://lokshikayat.bihar.gov.in/PdfFiles/ACTS%20BPGRA.pdf

citizens with the right to redressal of a wide range of grievances in a time-bound manner. Grievances can be filed in-person, or via the phone or the internet. Over 75% of grievances are filed in person. Grievances filed under the BPGRA usually involve "hearings" at the subdivision office (one subdivision comprises 80 GPs) where the departmental bureaucrat responsible for resolving the grievance and a Public Grievance Redressal Officer sit with the complainant and attempt to resolve their problem. It was originally envisaged as avenues for citizens to monitor the local state and trigger the intervention of the non-local state.

In our setting, local representatives repurpose the grievance redressal mechanism to lobby on behalf of their constituents.[5] We use data on the universe of nearly 500,000 grievances filed across all 44 state departments in the first three years of the Act being in place. We match data on local representatives to our data on grievances to identify complaints filed by representatives. Using our third econometric strategy - a close-election RD design for lower-tiered elections - we causally demonstrate that narrow SC winners are twice as likely to file grievances than narrow losers. Significantly, they are 20 times as likely to file grievances regarding WAS public goods. This confirms to us that grievance filing is linked to their explicit role as implementers of WAS projects and not simply being politically active.

We then causally establish that SC representatives use the grievance redressal system to signal collaboration breakdowns when there is caste mismatch. To do so, we use the assignment algorithm that exogenously varies the upper-tiered representative's caste (our first RD design described above). SC lower-tiered representatives govening under non-SC upper-tiered representatives file more grievances. In particular, they file more grievances pertaining to public goods, local administrative problems and issues related to their wards. Crucially, they are at least 70 likelier to file grievances regarding WAS programs. Taken together, these results provide strong evidence that one recourse for lower-tiered representatives is the grievance redressal system.

Does filing grievances change incentives of upper-tiered representatives and trigger collaboration? Grievance filing, in our setting, is endogenous to public good provision. To measure causal impacts, we encourage randomly selected SC lower-tiered representatives in whose wards WAS projects were stalled to file grievances. Our field experiment is conducted across 1612 lower-tiered jurisdictions from GPs whose total population amounts to about 15 million persons.[6] Given the newness of the system, BPGRA's penetration is low: only 25% of our respondents claim to have heard of it and can correctly answer basic questions about how to use the system. Thus, in the experiment, our main treatment arm provides information regarding the BPGRA *and* offers to file grievances on behalf of randomly selected lower-tiered SC representatives regarding WAS project initiation. We find huge demand for the system: official data on grievances shows a jump of 41 p.p in grievances filed in treated wards in the

[5] Lower-tiered representatives have filed over 6000 grievances in the past 3 years. This translates to them being at least five times likelier than citizens to file grievances under the BPGRA.

[6] This study is registered in the AEA RCT Registry and the unique identifying number is: AEARCTR-0004308.

post-intervention period.[7]

The grievance redressal mechanism is an extremely effective tool to trigger collaboration. Our endline survey - conducted between 3-4 months after grievances were filed – shows an additional 6 p.p (24%) increase in WAS projects being undertaken in treated wards. This further rises to 11 p.p (33%) if we extend project initiation to include projects starting in the week of the survey. Treated representatives are also more likely to report that the main problem preventing projects from being undertaken had been resolved. Treatment has no negative spillovers. We find no evidence of projects in neighbouring wards being reduced to accommodate projects in treated wards. Back-of-the envelope calculations suggest that the intervention is highly cost-effective, costing 2.5 cents for every dollar's worth public goods provided.

What, then, are the barriers to greater adoption of the grievance redressal system? We use two separate pieces of evidence to argue that information may not be the main constraint. First, we conduct a smaller experiment where we treat lower-tiered SC representatives with information only, but do not offer to file grievances (N = 247). Information alone improves grievance filing rates by 4 p.p. (much lower than the 46 p.p increase caused by the grievance-filing treatment above). Second, we calculate spillovers of our treatment arms on grievance filing in neighboring wards. To do so, we restrict attention to GPs with one treated and one control ward (80% of our sample GPs). Having another treated lower-tiered representative in the same GP more than doubles the likelihood of filing grievances. However, in absolute terms, this increase is small: the likelihood of a neighbouring ward filing complaints increases from 0.3 p.p for control wards to 0.75 p.p in treatment wards.[8] Both these results suggest that the main constraint to grievance-filing is not information and that adoption would increase significantly with some form of *mediation* (Gupta, 2017), a reduction in transaction costs or improving beliefs in the efficacy of the state.

Other politician-level incentives could also mitigate the extent of under-provision of public goods in ethnically mismatched jurisdictions. We show that upper-tiered representatives who win with relatively smaller margins collaborate equally with representatives across ethnic groups. Furthermore, our results emphasize the role the asymmetric, hierarchical nature of divisions could play in determining outcomes. In particular, non-SC lower-tiered representatives exogenously matched to SC upper-tiered representatives do not provide fewer public goods in their jurisdictions. Thus, the direction of ethnic prejudice matters.

[7]The patterns in take-up in our experimental wards line up nicely with our previous results: caste-mismatched wards within the RD bandwidth are more likely to accept our offer to file grievances on their behalf.

[8]Note that while both the information treatment and spillovers from neighbours increase grievance filing through awareness, the information treatment will almost mechanically see greater treatment effects. This is because information was offered to representatives from wards where at least one - if not both - of the WAS projects had not been undertaken yet. On the other hand, for spillovers, we do not restrict our sample to include only those wards where projects had not been initiated.

We develop a simple model to examine (i) the nature of collaboration across representatives (ii) breakdowns caused by ethnic barriers and (iii) the role a grievance redressal system could play in affecting outcomes. The setup involves two players, an upper-tiered and a lower-tiered representative engaging over multiple stages. The objective is to collaborate to implement a project that generates a surplus. Collaboration involves some initial sunk effort (investment) to set up the project. If they both commit to making the effort investment, collaboration occurs and they bargain over the surplus with fixed weights. In addition to predicting that caste-mismatch causes both reduced collaboration and increased grievances, our model argues that an effective grievance redressal mechanism could trigger collaboration even in the absence of actual grievance-filing. In line with the results from our field experiment, our model argues that a reduction in costs of filing grievance increases number of grievances filed and improves chances of collaboration.

Our results speak to the literature in political economy that theoretically and empirically investigates the adverse effects of ethnic diversity on public good provision. A seminal paper in this literature is Alesina et al. (1999) who show a negative correlation between shares of public spending on ethnic fragmentation in U.S cities. Banerjee and Somanathan (2007) perform a similar exercise for data from India and find broadly similar results. While several other papers investigate this claim in depth,[9] the literature on causal mechanisms mediating it is scarce. In this paper, we provide strong evidence for one causal mechanism: the inability of ethnically diverse elected representatives to collaborate and provide public goods.

In addition, this paper speaks to four bodies of literature in economics. First, the literature on how elected representatives favour coethnics (Pande (2003), Munshi and Rosenzweig (2015)) and firms run by coethnics (Lehne et al. (2018)). Here, our contribution is that we focus attention towards coethnic favouring *within* local government.[10] Second, many papers document the role political misalignment across tiers of government plays in affecting outcomes - either positively (Brollo and Nannicini (2012)), negatively (Callen et al. (2018)) or more ambiguously (Sarkar (2019)).[11] We show that ethnic misalignment has costs too. We believe we are the first to document ways in which this can be fixed, at least partially. Third, by documenting the role higher-tiered bureaucrats can play in negotiating breakdowns in collaboration between tiers of local government, we also contribute to the literature on politician-bureaucrat interactions (Iyer and Mani (2012))[12] and, more broadly, decentralization (Mookherjee (2006)).[13] Fourth, this paper speaks to the literature on technologies to improve government responsiveness. To the wide range of documented tools – information

[9]Prominent papers in the literature include Alesina et al. (2004), Miguel and Gugerty (2005), Khwaja (2009) among others. Banerjee and Pande (2007) argue that ethnic factionalization can positively affect outcomes by improving politician quality because dominant group elected representatives have lesser competitive advantages.

[10]Also, see: Bardhan et al. (2010) Besley et al. (2004) Duflo (2005), Kumar and Sharan (2019).

[11]Asher and Novosad (2017) and Solé-Ollé and Sorribas-Navarro (2008) find overall positive effects, but Das and Sabharwal (2016) argue otherwise.

[12]Also: Gulzar and Pasquale (2017), Nath (2015)

[13]See: Bardhan and Mookherjee (2006), Gadenne and Singhal (2014).

(Reinikka and Svensson (2011)), mediation (Gupta, 2002), audits (Olken (2007)) – we add grievance redressal mechanisms, on which, barring Trucco (2017) and Raffler (2016), there is very little in the literature.

Our findings are also of relevance to policymakers. First, they urge policymakers to pay careful attention to the ethnic composition of tiers of local government because that has implications for how (and where) policies are implemented. Second, grievance redressal mechanisms are being implemented all over India (and indeed, in much of the developing world), with the central government and other states experimenting with different designs. Extrapolating cautiously, our results are in favour of designing mechanisms that provide avenues for complaints not merely by citizens but also members of the local state too. Our results indicate that such avenues could affect outcomes in hyper-decentralized settings that require coordination between tiers of government. It would also prove particularly useful for local representatives hailing from disadvantaged backgrounds.

The rest of the paper is organized as follows: section 2 provides background and delves in some detail into the grievance redressal mechanism, water and sanitation schemes and the local administrative structure in Bihar; section 4 lists our many secondary and primary datasets; section 5 presents our first set of results on the impact of caste-mismatch on WAS public good projects; section 6 walks the reader through the results on how caste-mismatch affects grievance filing; section 7 describes in detail our experiment, including sampling strategies, treatment arms (7.1.2), main results (7.3) and a discussion on barriers to adoption and a cost-benefit analysis of our treatment (7.5); section 8 concludes, speaking of policy implications, shortcomings and scope for future work.

2 Background and Context

2.1 Caste Barriers

This section discusses the historical causes for the existence of caste-barriers and briefly describes the main minority caste-group, Scheduled Castes. It then surveys the literature on the prevalence of caste-barriers and its impact on a host of socioeconomic outcomes.

2.1.1 Historical

For over two millennia, much of Indian society has been divided along caste lines. Caste is defined at birth and is usually based on the caste of the father. A defining feature of caste is the presence of strict hierarchies: the castes at the very top of the ladder have historically enjoyed (and indeed, continue to do so) great privileges in society, while those at the bottom

are discriminated against, both socially and economically. Much of the laws that defined the nature of caste-based society for the Indian subcontinent were laid down in the *Manusmriti* (or the "Laws of Manu") - a text written around the dawn of the common era. The text, *inter alia*, classified society into for broad hierarchical groups[14] that subsumed the thousands of sub-castes that constituted Indian society. The text prescribed strict rules for engagement between classes and castes, codified discriminatory practices by specifying punishments for rule violations and crystallized hierarchical norms. Lower castes and upper-castes were forbidden from dining together. Inter-marrying across castes continues to be rare in modern Indian society. The more egregious practices include notions of "pollution" emanating from contact with lower-castes, including the slightest touch with even their shadows. Modern India's first (and greatest) scholar of caste, Dr B.R. Ambedkar described the *Manusmriti* thus: "There is no code of laws more infamous regarding social rights than the Laws of Manu. Any instance from anywhere of social injustice must pale before it." (Ambedkar (1936)).

2.1.2 Scheduled Castes (SC)

Those sub-castes that fell outside the four broad caste-groupings were the untouchables, which are now grouped into a heterogeneous whole referred to as the Scheduled Castes. A term that is increasingly commonly used for this grouping is "Dalits" (literally - "the oppressed"). Historically these groups could not own land, conduct trade or business, receive education, or buy or sell in markets. Though the Indian state abolished untouchability in 1950, SCs lag severely on several socioeconomic indicators even today (Banerjee and Somanathan, 2007). Summarizing the literature - primarily in economics - from the two-decades leading up to 2012 and looking specifically at material well-being across castes, (Deshpande, 2011) argues that while there exists substantial regional variation, there is no "reversal of traditional caste hierarchies".

2.1.3 Caste-Barriers in India/Bihar today

Caste barriers continue to persist in India today, a fact rigorously documented across several social science disciplines, including economics. A mere 11 % of marriages in Bihar, the setting for our study, are inter-caste. On the other hand, 47 % of respondents surveyed say that someone in their household practises untouchability (Desai and Vanneman, 2015). Caste-barriers continue to dictate labour-market outcomes (Deshpande (2011), Singh and Thorat (2014)) and labour-market opportunities, with resume-studies confirming the presence of discrimination, even in urban India (Thorat and Newman, 2007); caste-networks are seen as barriers to rural-urban migration (Munshi and Rosenzweig, 2016). (Lowe, 2018)

[14] These four groups, ranked by hierarchy, were the Brahmins (priests), the Kshatriyas (warriors), the Vaishyas (traders) and Shudras (workers and farmers).

presents evidence of considerable prejudice among youths towards non-caste-matched peers and rigorously documents discrimination against lower-caste members.

2.2 Local Administrative Structure

Bihar's over 100 million strong rural population live in villages that come under administrative units called Gram Panchayats (GP). There are over 8400 GPs in Bihar. Each GP is headed by an elected representative called the "Mukhiya". In this paper, we will refer to the Mukhiya as the upper-tiered representative.

Each GP is divided into wards. Each ward is headed by a ward member. We will refer to the ward member as the lower-tiered representative. There are over 114000 wards in Bihar. There are no GP-level permanent bureaucrats. The lowest permanent bureaucrat is posted at the Block Headquarters and is called the Block Development Officer (BDO). In this paper, we will refer to the BDO as the upper-tiered bureaucrat. There is one Block Headquarters for every 15.8 GPs.

The elections for both the upper-tiered and the lower-tiered representational posts were held simultaneously in May 2016. Bihar's upper-tiered representatives are much more powerful than their lower-tiered counterparts. An upper-tiered representative represents, on average, a population of 13300 persons; on the other hand, the lower-tiered representative is elected from a population of approximately 1000[15]. Local bodies are responsible for, among other things, the implementation of a wide array of development projects, dispute resolution between citizens and representing their constituents' issues at higher levels. Within a GP, nearly all of this has been traditionally done by the upper-tiered representative Gupta (2002). Thus, in the local context, a typical lower-tiered representative is a political minority.

2.3 Devolution of Water and Sanitation (WAS) Schemes

This paper is set in the Bihar, a fast-growing, backward state in eastern India with a history of weak state capacity (Mathew and Moore, 2011), (Witsoe, 2013). In late 2016, the state government of Bihar devolved implementation of two major water and sanitation schemes to the lower-tiered representative. The two schemes, called "Nal Jal" [piped water for every household] and "Nali Gali" [construction of village roads and drains] formed key planks of the

[15]These are back-of-the-hand extrapolations. The last estimates of GP populations are from 2010: 10953 persons per GP. Since there exist 13.5 wards per GP. the average ward population for 2010 can be esitmated to be 806 persons. The figures of 13300 and 1000 are arrived at by assuming population growth for the decade to be 22 %

incumbent government's "seven-resolves"[16] to development. An estimated sum of 4 billion dollars have been allocated to the implementation of these schemes. Over 93 % of lower-tiered representatives surveyed report that these two schemes prove extremely beneficial to households in their jurisdictions.

2.3.1 Scope for Local Contestation

The decision to transfer implementation powers to the lower-tiered representatives constituted a significant decentralization move. In one stroke, the implementing authority was brought significantly closer to the citizen, by a factor of 13.5. For the first time in Bihar's history, lower-tiered representatives had a direct say in spending of state funds. Each lower-tiered representative was responsible for spending an average sum of $30,000 over a span of four years.

As per the rules, wards are selected for WAS asset construction in a specific manner. First, wards are ranked in the descending order of Scheduled Castes and Scheduled Tribe (ST) population and projects are allocated in sequence. Once all wards with SC/STs are exhausted, the rest of the wards are arranged in descending order of total population and are then allocated projects. Thus, the rule biases allocation in favour of wards with large SC/ST populations and, more generally, large populations. Every year, the list of wards where projects need to be implemented is drawn up by the upper-tiered bureaucrat. Often, in practice, this is done together with the upper-tiered representative of the GP. Money for WAS schemes is transferred from the state to the GP account, handled by the upper-tiered representative. The upper-tiered representative then transfers the amount to the lower-tiered representative. The lower-tiered representative is to then identify where the asset has to be created, find a suitable contractor or liaise with the relevant department to organize construction of and monitor implementation of WAS assets[17].

Thus, the main way in which the upper-tiered representative can interfere with WAS projects is in withholding funds for implementation (*funding*). Another less direct way would be to collaborate with the upper-tiered bureaucrat (the BDO) and manipulate the order in which wards are to be allocated projects (*selection*). The latter is, of course, slightly more tricky, since it would require the explicit cooperation of the BDO who is the authority in-charge of drawing up lists.

[16]The seven resolves - or "7-Nishchay" - include: skill development programs for youth, reservation for women in government jobs, electricity in every house, piped water to households, local drains, construction of toilets and improving higher education

[17]This is not entirely true: for a third of the wards, the piped water scheme is being implemented by the Public Health Engineering Department (PHED). This is because these wards are seen to have problems with ground-water quality. There was, however, some confusion over PHED's role for much of 2017-18 and some parts of 2018-19.

Caste-matching not merely affects when a ward begins projects, it also affects *how* projects are undertaken. To better understand how projects are undertaken, we undertook audits of projects and interviewed 234 SC lower-tiered representatives via the phone. Both these sources confirm the sanctity of the administrative data: over 95 % of projects reported are independently verified through audits and interviews.

Contrary to *de jure* procedures, our surveys with lower-tiered representatives confirm that the upper-tiered representative continues to enjoy significant control over how WAS projects are constructed. In about 12 % of the cases, the upper-tiered representative is reported to be the sole implementing authority - clearly violating administrative rules. Furthermore, even when the lower-tiered representative claims they are the main implementing authority, less egregious violations occur. The upper tiered-representative (and the upper-tiered bureaucrat) play oversized roles in project-site selection, ward-level opening of bank accounts, hiring contractors to construct the asset and, to a lesser extent, making payments to the contractor. Moreover, interactions with lower and upper-tiered representatives in focus-groups, interviews with district and state-level bureaucrats suggest that these numbers are biased downwards and that upper-tiered representatives have an even larger role to play than what is reported.

About 50 % of lower-tiered representatives report facing trouble while implementing the scheme. Over half of those who face obstacles report that the upper-tiered representative or the bureaucrat are the main impediments to effective functioning.

2.4 BPGRA

In 2016, the government of Bihar successfully passed the Bihar Right to Public Grievance Redressal Act (BPGRA) that gave every citizen the right to redressal of any grievance filed across 44 different departments of the state. Crucially, the Act mandated the creation of 102 posts for Public Grievance Redressal Officers (PGRO). Each district, on average, had about 2.5 PGROs who were tasked with the duty of hearing and resolving citizens' grievances. In these hearings, the complainant presented their grievance in the presence of the concerned departmental bureaucrat.The PGRO's job was to determine the validity of the grievance and, once determined as permissible to be acted upon under the law, ensure the grievance is disposed off within 60 days. In the first three years of its functioning, over 500,000 grievances were filed. Grievance redressal officers were empowered to punish errant departmental bureaucrats with fines upto INR 5000. Inayat Anaita (2019) notes that the law is not only the first of its kind - awarding citizens with a right to redressal of their grievance - but is also "a fairly strong law that is being administered with political and bureaucratic will". A study conducted by the IDFC Foundation in collaboration with the government of Bihar finds that, on average, a third of the grievances are redressed. The government's own estimates are, however, close to 90 %. There is one PGRO for every 5.23 Blocks, 84.6 GPs

and 1120 wards.

3 A Simple Theory of Collaboration Breakdowns and Grievance Redressal

In this section, we develop a simple model to examine (i) the nature of collaboration across representatives (ii) breakdowns caused by ethnic barriers and (iii) the role a grievance redressal system could play in affecting outcomes. The setup involves two players, an upper-tiered and a lower-tiered representative engaging over multiple stages. The objective is to collaborate to implement a project that generates a surplus. Collaboration involves some initial sunk effort (investment) to set up the project. If they both put in the effort investment, they bargain over the surplus with fixed weights. Caste barriers increases initial effort costs of representatives – especially for upper-tiered (upper-caste) representatives. The increase in effort costs could stem from the cost of overcoming inherent dislike/distaste of members of other (lower) castes. This could cause collaboration breakdowns. A grievance redressal mechanism allows the lower-tiered representative to provide a costly signal regarding breakdowns in collaboration. Such a signal results in increased monitoring costs of the upper-tiered representative. However, this does not always result in collaboration: the system may not work perfectly. The presence of a grievance redressal system and the consequent threat of filing a grievance may be sufficient to make the upper-tiered representative want to collaborate. Thus, a grievance will only be filed if (a) it is cost-effective to do so (b) there is a collaboration breakdown caused by the upper-tiered representative (c) the threat of filing a grievance is insufficient to trigger collaboration. Since caste-mismatch causes more breakdowns, more grievances are filed when there is mismatch.

3.1 The Environment

An upper-tiered representative, U and a lower-tiered representative L are collaborating to implement a project P. The surplus from implementing the project is τ^*.

Implementing the project involves some sunk effort costs e_j ($j = U, L$) for each type of representative. Both players must commit to incurring this cost for collaboration to occur. Commitments are made in advance, but costs are incurred only if collaboration occurs. Costs are heterogeneous both across and within types. For type j, effort costs are drawn from a normal distribution $e_j \sim \mathcal{N}(\mu_j, \sigma_j)$ and $\mu_j > 0$. If both players choose to invest e_j, then the two players are involved in Nash bargaining in stage 2 with fixed weights δ and $1 - \delta$ for U and L respectively. The share of surplus derived from the second stage is u and v respectively (where $v = \tau^* - v$).

Caste mismatch Caste mismatch (CM) adds costs E to the effort costs e_U in stage 1 for the upper-tiered representative such that $e_U = \mathbb{1}\{CM = 1\} * E + e_U$.[18]

Grievance Redressal A formal grievance redressal system allows the lower-tiered representative to provide a costly signal of breakdown. [19] The signal costs C.[20] When a complaint is filed, the upper-tiered representative always faces increased monitoring costs M.[21] When a complaint is filed, collaboration occurs with probability p.[22]

We assume a setting of perfect information: all costs and parameters are known to both players as soon as they are revealed by nature. For simplicity, we assume risk-neutral preferences over payoffs here. Any increasing risk-averse utility functions would also generate the same results.

Timing

1. Effort costs of collaborating, e_U and e_L are revealed to both representatives. We assume that C, M, p and E are fixed and known to both players.
2. L commits to making the sunk effort investment e_L if collaboration occurs
3. U commits to making the sunk effort investment e_U if collaboration occurs
4. If there's no collaboration, L decides whether to file a grievance or not

[18] Here, we assume that caste mismatch imposes no costs on the lower-tiered representative. This is a stricter assumption than what we would require for our results to go through. All we require is that mismatch imposes greater costs on the upper-tiered representative than the lower-tiered representative. In practice, this assumption holds because of the caste hierarchy. Upper-tiered upper-caste representatives are much less likelier to want to collaborate with lower-tiered lower-caste representatives than the other way around. Indeed, another way of modeling this setting is to assume that upper-castes face greater costs than lower-castes of a mismatch. Other reasons for upper-tiered representatives facing greater costs include the fact that they could potentially collaborate with other partners, whereas the lower-tiered representative has to always collaborate with the upper-tiered representative.

[19] A natural question that may arise is if upper-tiered representatives can also file grievances. In our setting, upper-tiered representatives do not use the grievance redressal system to file complaints regarding breakdowns in collaborative projects. This is because, in contrast to the lower-tiered representative, the upper-tiered representative usually belongs to a powerful, traditional, political class of elites. They are also much more deeply embedded in the state machinery. So, we model a setting where the upper-tiered representative doesn't have the option to file grievances.

[20] Costs involve transaction costs of filing grievances, the costs of backlash against members of the upper-tier, the opportunity costs of attending hearings etc.

[21] As per law, every grievance is subject to hearings. Irrespective of whether a grievance is legitimate or not, upper-tiered members of the state are called to hearings and are asked to present their side of the case. Thus, any grievance does increase scrutiny of the upper-tiered representative. This is captured by the parameter M. Our results go through even if we assume that M is incurred only when the grievance redressal system forces collaboration.

[22] One interpretation of p is that it captures the quality of the grievance redressal office: the higher the quality, the likelier it is to ensure that the biased upper-tiered representative is forced to collaborate. Our estimates suggest that p is between 0.2 and 0.25.

5. If there is collaboration, both players incur e_U and e_L and proceed to nash bargain with fixed weights

Strategies U has to choose a pure strategy from the strategy set, $S_U = (\{\text{Collaborate, No Collaborate}\})$

L has to choose a pure strategy from the strategry set:

$S_L = (\{\text{Collaborate, Grievance}\}, \{\text{Collaborate, No Grievance}\}, \{\text{No Collaborate, Grievance}\}, \{\text{No Collaborate, No Grievance}\})$

A strategy profile $S = (S_U, S_L)$

Equilibrium We characterize nash equilibria by backward induction.

3.1.1 Nash bargaining solution

In the nash bargaining stage, the two player optimize by solving for:

$$\begin{aligned} \max_{u,v}, \quad & (u)^{\delta}(v)^{1-\delta} \\ \text{s.t.}, \quad & u + v = \tau^* \end{aligned} \tag{1}$$

Solving for this, we have: [u*,v*] = [$\delta\tau^*$,$(1-\delta)\tau^*$]

Before we proceed to characterize the various equilibrium outcomes, note also that grievance-filing occurs only if it is not too costly for L. By filing a grievance after U has chosen not collaborate, L incurs an additional cost C. This triggers collaboration with probability p. In particular, for grievance filing to prove beneficial, we require:

$$\begin{aligned} & p * (e_L - (1-\delta)\tau^*) < C \\ \implies & e_L < (1-\delta)\tau^* - \frac{C}{p} \end{aligned} \tag{2}$$

Thus, there is an upper-bound on the effort-costs beyond which it is unprofitable for L to file grievances.

When it benefits L to file grievances in order to force collaboration, U's participation constraint slackens. To see this, consider U's payoffs to collaborating and not collaborating when L is likely to file grievances. When they collaborate, their payoff is: $e_U - \delta\tau^*$. Not collaborating, on the other hand, triggers a grievance being filed. So, their payoff is: $p*(e_U - \delta\tau^*) + M$.

Comparing the two, we can derive the participation constraint for U under grievance filing:

$$e_U < \delta\tau^* + \frac{M}{1-p} \tag{3}$$

3.2 Outcomes

Collaboration could be an equlibrium outcome in 3 ways,[23] depending on effort costs of U and L. We describe them below:

3.2.1 ({Collaborate}, {Collaborate, No Grievance})

When equation 2 is not satisfied (grievance filing is too costly), but e_L is still below the surplus from collaboration, we will see collaboration if U benefits from collaborating. In particular, we require:

$$\begin{aligned} e_U &< \delta\tau^* \\ (1-\delta)\tau^* - \frac{C}{p} < e_L &< (1-\delta)\tau^* \end{aligned} \tag{4}$$

3.2.2 ({Collaborate}, {Collaborate, Grievance})

Here, L's effort costs are low enough that it benefits them to file grievances if there is no collaboration. Knowing this, U's participation constraint slackens. For this to result in an equilibrium, we require:

$$\begin{aligned} e_U &< \delta\tau^* + \frac{M}{1-p} \\ e_L &< (1-\delta)\tau^* - \frac{C}{p} \end{aligned} \tag{5}$$

[23] We assume that players do not play weakly dominated strategies in equilibrium

3.2.3 ({No Collaborate}, {Collaborate, Grievance})

Here, collaboration is too costly for U. L files a grievance and collaboration occurs with probability p.

$$\begin{aligned} e_U &> \delta\tau^* + \frac{M}{1-p} \\ e_L &< (1-\delta)\tau^* - \frac{C}{p} \end{aligned} \tag{6}$$

3.2.4 Caste Mismatch

It is easy to see how caste mismatch makes collaboration harder in this setting. Since it adds an additional cost E to U's initial effort costs, it manifests to tighten their participation constraint, making them more likely to not want to collaborate. If grievance filing is not too costly for L, the breakdown caused by caste mismatch increases the likelihood of a grievance being filed.

Figures 1(a) visually plots the range of effort costs, e_U and e_L for which collaboration occurs and Figure 1(b) shows how caste-mismatch affects outcomes. The shaded blue rectangles in Figure 1(b) indicate effort cost ranges where collaboration breaks down because of mismatch alone. The red rectangle indicates a range of effort costs where grievances are filed because of mismatch.

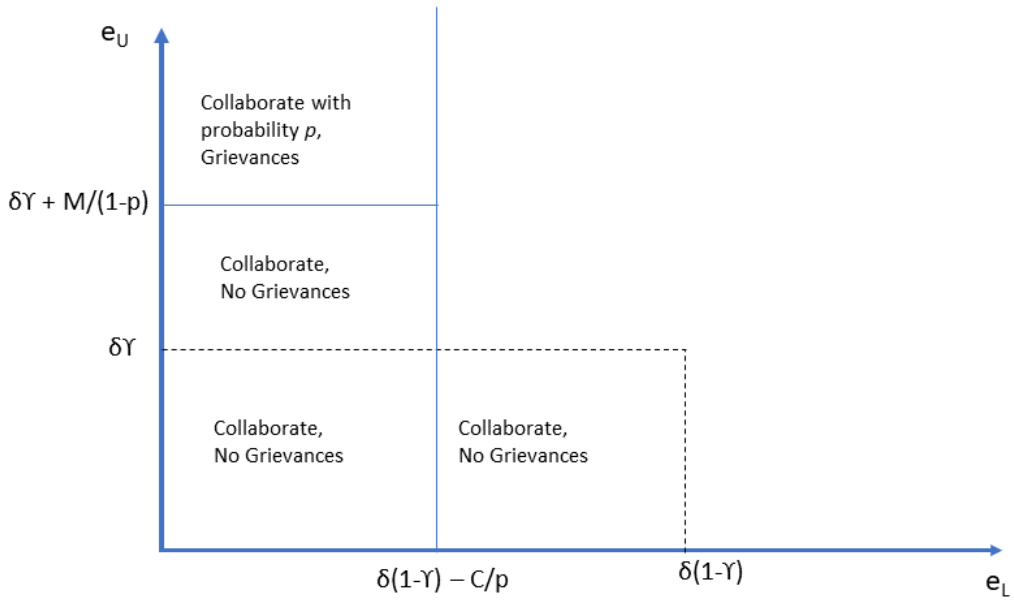
3.3 Predictions

1. Caste mismatch adversely impacts public good provision by increasing costs of collaboration.

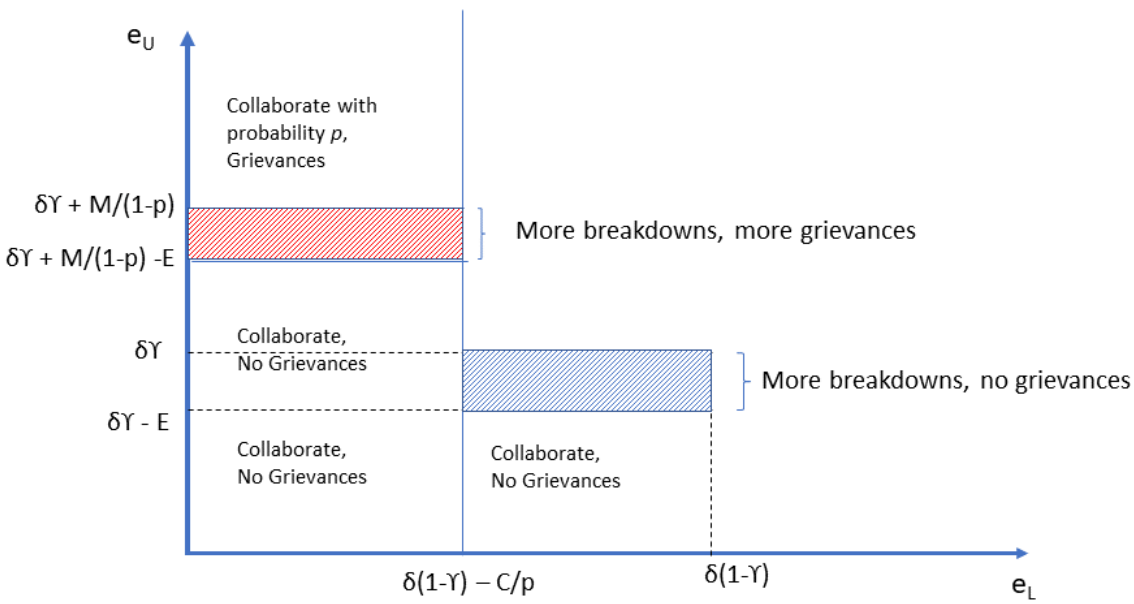
2. Caste mismatch increases the likelihood of grievances being filed. This is driven by cases where U doesn't collaborate because of caste mismatch and L's costs of filing grievances are sufficiently low. In the model, we assume that mismatch does not affect L's effort costs. We could relax that assumption to say that mismatch affects U's costs more than L and we will still see more complaining under mismatch.

3. A grievance redressal mechanism improves likelihood of collaboration in two ways:

   - "Threat" mechanism: The mere threat of filing a complaint makes U more likely to collaborate. This 'threat effect is increasing in M and p i.e the monitoring



(a) Caste Matching



(b) Caste Mismatch

costs the system imposes on U and the probability that the grievance redressal system triggers collaboration. This implies that a more effective grievance redressal system will induce greater collaboration but fewer complaints.

- "Force" mechanism: By actually making U to collaborate via the system. Here, collaboration occurs with a probability p.

4. When costs of grievance filing C is reduced such that it is beneficial for L to file grievances (independent of whether it was beneficial *ex ante*):

   - More grievances are filed
   - More collaboration occurs, triggered by both the "threat" and the "foce" mechanisms

4 Data Sources

This project brings together multiple data sources, both primary and secondary in nature. All our secondary data sources, except for data from two rounds of the decennial census of India, are obtained from different administrative departments of the Government of Bihar. Our primary data sources are obtained via surveys of various local actors in the administrative machinery.

4.1 Secondary Data Sources

4.1.1 BPGRA Grievances Data

We have official government data on the universe of over 500,000 grievances filed under the BPGRA between June 2016 and August 2019. Our data contains personal information including name and address of complainant. Furthermore, we have phone numbers for 82 % of these complainants. We also have data detailing grievances including the date filed, the exact text of the grievance, the number of hearings held, the date of redressal and whether appeals were filed.

4.1.2 WAS Scheme Data

This includes official government data regarding every single WAS asset constructed across Bihar's 114000 wards. This dataset is the source of our WAS-related outcome variables.

The data records WAS assets with a lag, but our audits strongly suggest that "ghost" assets (assets found only on paper) are under 5%.

4.1.3 Local Representatives Data

We have official government data on both upper- and lower-tiered representatives for 94 % of the upper-tiered representatives and 81 % of the lower-tiered representatives. We also have data on individuals who contested these elections at both tiers. In all, we have a dataset of over 350,000 local politicians. For each of these, we have personal characteristics including the name, age, education, gender, caste category of these representatives. We also have data on the number of votes won in the 2016 elections.

4.1.4 Census 2001 and 2011 data

This comprises data from India's decennial census. The variables here can be classified into two groups: demographic and village-wise public goods. We use the demographic information to independently back out the rule for reservation of GPs for SCs, women and STs.

4.2 Primary Data

All our primary data is collected via phone-based interviews of representatives or other politicians who contested and lost local elections.

4.2.1 Experimental Data

This includes primary data collected as part of the experiment. Here, we have baseline and endline data on the quantity and type of assets constructed in wards, self-reported impediments to effective functioning of the lower-tiered representative and knowledge about the BPGRA. In the endline data, we measure spillovers via interviews with lower-tiered representatives who occupy the nearest nodes in the experimental representatives' networks and one randomly sampled lower-tiered representative in the GP. We also measure impact of treatment on social perceptions of the efficacy of the incumbent representative by speaking with randomly sampled lower-tiered peers from their wards.

4.2.2 Survey of Lower-Tiered Representatives

To understand better how WAS projects have been undertaken, we interviewed 234 lower-tiered representatives. In these interviews, we asked them about whether WAS works from the administration data existed in their wards, the role they played in implementing WAS projects and whether they faced any trouble during implementation.

5 Caste-Matching on Public Good Provision

In this section, we describe how caste mismatch affects WAS projects. We present evidence from administrative and survey data and use two separate natural experiments (RDs) to argue that caste-mismatch adversely affects public good provision. We argue that this is more likely to be true SC lower-tiered representatives.

5.1 Econometric Strategy 1: RD for Caste-Matching

5.1.1 Stylized Representation

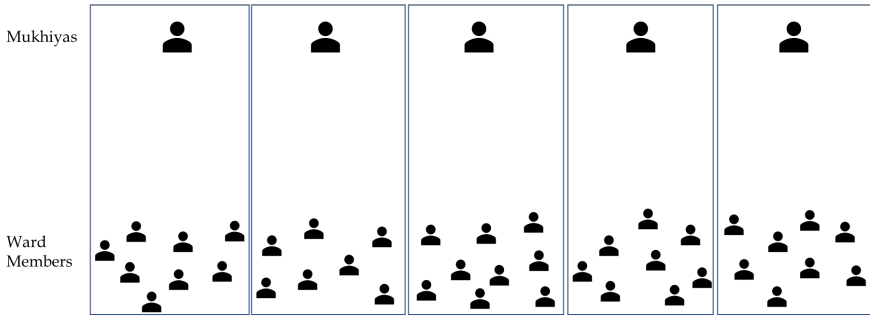
We use exogenous variation in the identity of the upper-tiered representative to causally establish the impact of caste-matching on our main outcome variables.

Figure 2 offers a stylized representation of how this plays out in practice. Panel 2(a) of the figure displays a tpyical set of GPs with a single upper-tiered representatives and a cluster (13.58) lower-tiered representatives. Panel 2(b) marks out the SC lower-tiered representatives in red. Panel 2(c) then indicates the presence of exogenous variation in the upper-tiered representative's caste category based on an RD (described below). Panel 2(d) indicates that for many of our regressions we measure the impact of caste-matching by restricting attention to only SC lower-tiered representatives in GPs with SC and non-SC upper-tiered representatives.

5.1.2 GP Reservation Rule for SCs

Upper-tiered representatives are elected at the Gram Panchayat (GP) level. GPs are reserved for SCs based on a population-based cutoff. This gives rise to a regression-discontinuity design where GPs marginally above the cutoff can be compared with those marginally below.

Bihar's 8400 GPs, as mentioned above, are housed in admistrative units called blocks, num-



(a) Representation of all lower-tiered and upper-tiered representatives

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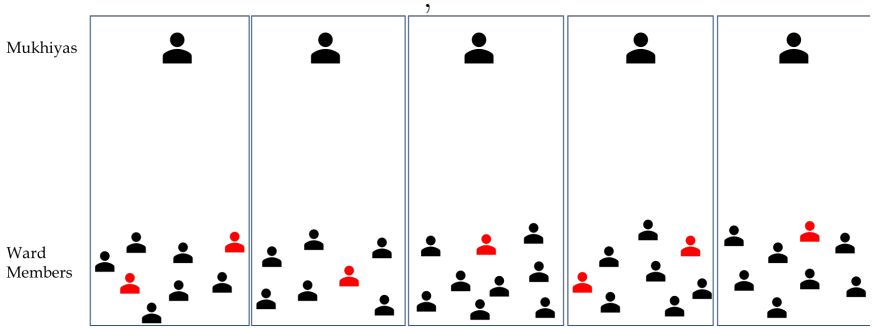

(b) Some lower-tiered representatives are SCs (marked in red)

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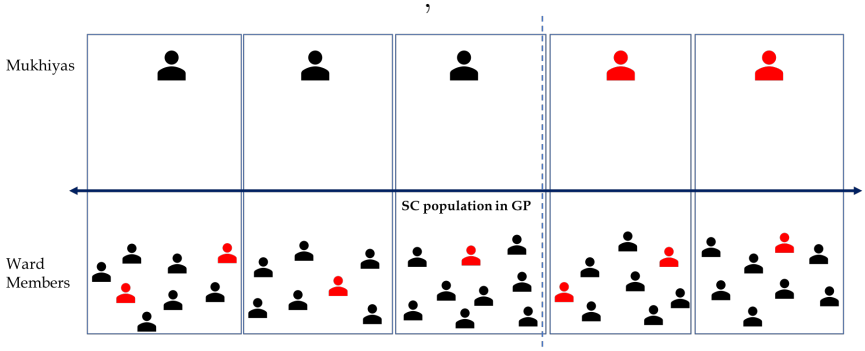
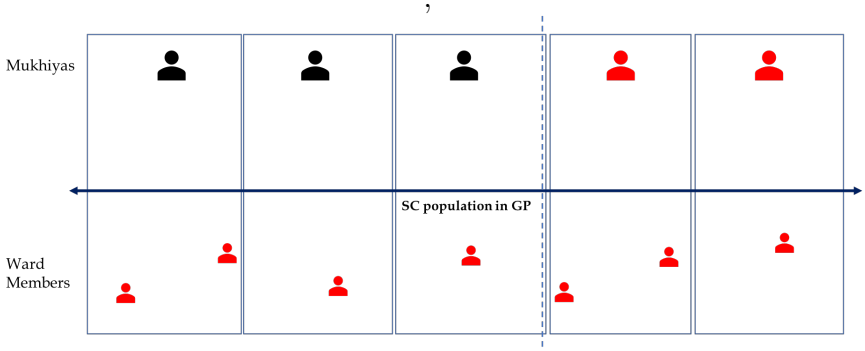


(c) Upper-tiered representatives to the right of the RD cutoff are quasi-exogenously SC too

,



(d) We restrict attention to only lower-tiered SC representatives in most of our regressions

Figure 2: Panel indicates our empirical strategy for measuring the impact of caste-matching between lower- and upper-tiered SC representatives on a range of outcomes. In the figure, all SC representatives are marked in red. Figure is for demonstrative purposes only.

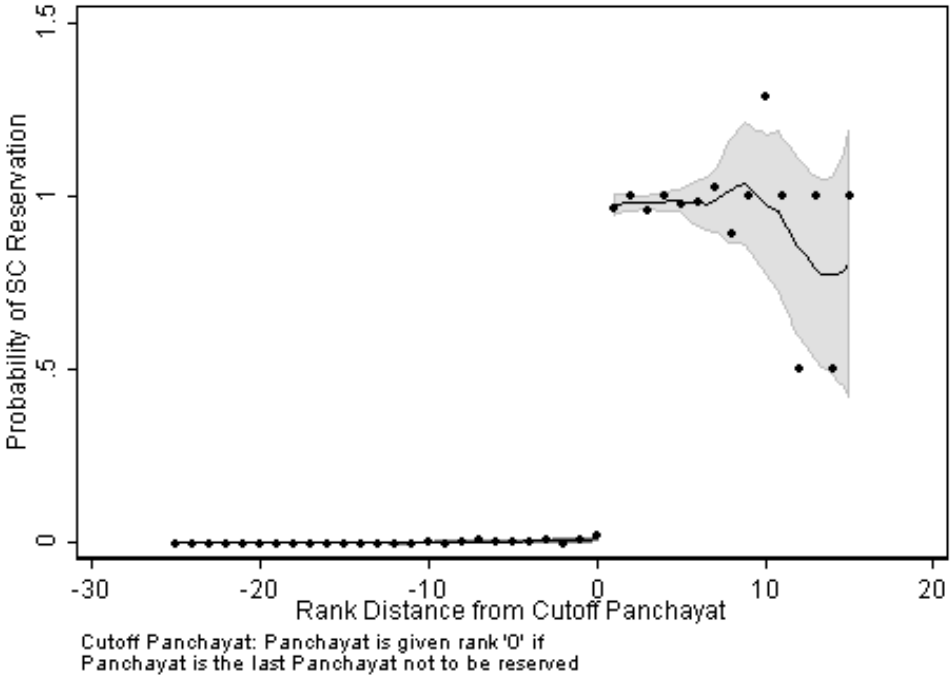


Figure 3: Figure plots the probability of reservation based on the rank of a GP within a Block for the elections of 2016. The last GP not to be reserved is given a rank 0 and the first GP to be reserved is ranked 1 and so on. Therefore, all negative ranks correspond to GPs not to be reserved and positive ones to GPs to be reserved. In this figure, we drop all GPs reserved for OBCs. The graph shows a strong first stage with a large, discontinuous increase in the probability of reservation above the RD cutoff.

bering 534 in all. The number of GPs to be reserved for SCs is a function of the proportion of SCs in the block in which the GP resides. This implies that within each block, the rule for reservation gives rise to an exogenous SC population cut-off below which no GP is reserved. Above the cut-off, not all GPs are reserved for SCs, as some are ruled to be reserved for OBCs. In practice, as Figure 3 shows, once we throw away GPs above the cut-off that are to be reserved for OBCs, the first stage results in a near 85 % jump in the probability of reservation.[24] Thus, we have a fuzzy RD with a strong first stage.

Our running variable is the difference in SC population of a GP and the mean of the SC Population of the last Panchayat to not be reserved and the first GP to be reserved. Thus, for GP i in Block j:

[24] We asked election officials serving at the time about the small discrepancy on the prediction in theory and the actual reservation. We were told this may have been because of the following reasons: officers calculating the cut-off wrongly; disputes regarding actual SC population figures; manipulation by local officials of the status of reservation of GPs. At least one instance of manipulation was flagged and officials punished.

$$\text{Running}_{ij} = \text{SCPop}_{ij} - \left(\frac{\text{SCPop}_{1j} + \text{SCPop}_{0j}}{2}\right) \tag{7}$$

where SCPop refers to SC Population and 0 and 1 subscripts stand for the the last GP to not be reserved and the first GP to be reserved, respectively.

This reservation rule was first implemented in 2006 for a period of 10 years. In 2016, the algorithm rotates to ensure that GPs previously reserved for SCs/STs/OBCs are not reserved again. As before, the number of GPs to be reserved is a function of the proportion of SCs in the block and this gives rise to an exogenous SC population cut-off below which no GP is reserved. The running variable is as defined previously and Figure 3 shows the first stage, plotting the probability of reservation against the value of the running variable. Here too, as Figure 3 shows, we have a strong first stage for our fuzzy RD design. Furthermore, Tables 1 and 2 show that a host of GP-level and ward-level covariates are balanced across the RD cutoff.

A more detailed discussion of the reservation rule is in the Appendix.

5.1.3 Main Estimating Equation

Under the assumption of continuity of all other GP characteristics, the fuzzy RD estimator calculates the local average treatment effect (LATE) of having an SC upper-tiered representative with population equal to the cutoff population for a block. Following Calonico et al. (2018), we estimate a fuzzy regression discontinuity design with covariates. Essentially, our primary specification uses a local linear regression within the CCT triangular bandwidth of the treatment threshold, and controls for the running variable (SC population in the GP) and a host of covariates - including block fixed effects, GP- and ward-level controls - on either side of the threshold. We use the following two stage instrumental variables specification:

$$\begin{aligned} Reserved_{igb} = \gamma_0 + \gamma_1 1(SCPop_{gb} > T_b) + \gamma_2(SCPop_{gb} - T_b) + \\ \gamma_3(SCPop_{gb} - T) * 1(SCPop_{gb} >= T_b) + \delta * X_g + \zeta * W_i + \psi + \eta_{igb} \end{aligned} \tag{8}$$

$$\begin{aligned} Y_{igb} = \beta_0 + \beta_1 Reserved_{igb} + \beta_2(SCPop_{gb} - T_b) + \\ \beta_3(SCPop_{gb} - T) * 1(SCPop_{gb} >= T_b) + \omega * X_g + \theta * W_i + \alpha + \epsilon_{igb} \end{aligned} \tag{9}$$

where Y_{igb} is the outcome of interest in ward i of GP g and Block b. T_b is the SC population cutoff for GPs in block b, $SCPop_{gb}$ is the SC-GP population, X_g is a vector of GP-level controls, W_i is a vector of ward level controls and psi indicates block fixed effects. eta_{igb} and ϵ_{igb} are error terms. GP level controls include total population of GP, distance to the nearest town/district head-quarters, whether GP was reserved for women/OBCs/STs in the previous/current term, herfindahl index of all castes/only SC castes in the GP, number of wards in the GP. Ward level controls include gender of lower-tiered representative and total candidates contesting ward-level elections in 2016. We cluster standard errors at the GP-level.

5.1.4 Threats to Validity

A basic threat to validity is if the reservation rule changes anything beyond the identity of the upper-tiered representative around the RD cutoff. Table 1 shows balance for a host of observables across a series of broad categories. In particular, reserved and unreserved GPs around the cutoff look similar across a series of variable related to the composition of SC citizens in the GP.

Another threat to validity emerges from whether reservation changes not merely the upper-tiered representative's caste-group, but also affects the pool of lower-tiered representatives in some way. Table 2 speaks directly to this concern. It shows that the SC lower-tiered winner is not significantly different along a host of observables including age, gender, education and electoral strength. Furthermore, the total number of SC lower-tiered winners in a GP also doesn't change across the RD cutoff (see Table 1). This increases confidence in our claim that the RD effects are driven by caste-matching across the lower- and upper-tiered SC representative and not something else. Nevertheless, in our main regression specifications, we control for all these covariates.

Qualitatively, we have reasons to believe that the type of lower-tiered representative was unaffected by reservation. First, the lower-tiered representative's post was, up until 2016, a relatively low-stakes one. On paper, a few local government-related issues did involve consultations with the lower-tiered representatives.[25] However, since they never had direct control over funds or implementation, most lower-tiered representatives were only nominally members of local government. In particular, the upper-tiered representative would be unlikely to worry about the lower-tiered representative's identity in any ward. Secondly, the window of time available between when announcement of upper-tiered representative's reservation status and the actual elections is small. Even if lower-tiered representatives had to strategically react, to form coalitions across tiers may take longer than the window available.

[25]For instance, the shelf of MGNREGS projects to be undertaken for a given financial year in a GP was, on paper, to be arrived at bottom-up, with lower-tiered representatives planning projects in their wards. However, in practice, this usually plays out with the upper-tiered representative choosing work-sites and projects with little or no inputs from the lower-tiered representative.

5.2 Results for Caste-Matching

5.2.1 Administrative Data

We begin by showing that the provision of WAS public goods is adversely affected when there is a caste mismatch between upper- and lower-tiered representatives.

Table 3 presents the results using regressions specified in equations 8 and 9. Wards with SC lower-tiered representatives see 0.14 (40 %) fewer projects being undertaken in the first year of the scheme's existence (column 2 of Table 3) under mismatch. This is direct evidence of significant delays. By end of year 2, mismatch still results in 0.15 fewer projects, but the effects are imprecise, since the overall number of projects across the spectrum increases (column 4 of Table 3). We do not see similar effects for wards represented by non-SCs (see Tab 17).

Table 18 shows that the effects hold even if halve or multiply the RD bandwidth by a factor of 1.5. Figure 9 plots time trends in projects being undertaken in caste-matched and caste-mismatched SC wards. We see that caste-matched wards undertake more projects throughout the entire the two year period. Thus, consistent with predictions from our model, caste-mismatch leads to more breakdowns in collaboration between tiers of representatives and lower likelihood of projects being undertaken.

5.2.2 Survey Data

To understand *how* caste-matching affects the manner in which projects are undertaken, we interviewed lower-tiered representatives in whose wards at least WAS project had been completed. These wards were sampled from GPs that fall on either side of the RD cutoff (within a bandwidth of 100). Thus, we have exogenous variation in caste-matching among our sampled lower-tiered representatives.

We present results with the following caveat: while there is exogenous variation in the upper-tiered representative, the results are not strictly causal. Wards where projects have been completed *and* there is caste-matching may be very different from their counterparts where there is no caste-matching. Thus, we are not looking at strictly comparable wards on either side of the RD cut-off. Two factors mitigate some concerns: first, we control for observable ward characteristics in our regression (including age, gender and educational qualifications of representative); second, as of May 2019, a majority of SC wards have undertaken projects in GPs on either side of the cutoff. Thus, it is likely that at least some of the wards where projects are undertaken are directly comparable, even in the absence of controls.

With that caveat in mind, Table 4 presents the results. We find that, in the presence of

caste-matching, projects are less likely to be incomplete (Table 4, col (1)) and reported wait-times to begin projects once a ward is "selected" is also lower (Table 4, col (2)). Moreover, lower-tiered representatives have more control over the contractor hired to implement the project (Table 4, col (3)) in their jurisdictions and report facing significantly less obstacles created by the upper-tiered representative (Table 4, col (4))[26].

We now present another piece of survey evidence using data from our experiment baseline. As part of our experiment, we randomly sampled SC lower-tiered representatives in whose wards WAS projects had not been undertaken and, to a random subset, offered to file grievances on their behalf. Mechanically, some of these wards lie in GPs that fall on either side of the RD cutoff[27]. We test whether take-up varies when the upper-tiered representative is randomly SC (using specifications in equations 8 and 9). We use this exogenous variation to test whether caste-matching predicts reported obstacles caused by the upper-tiered representative.

A similar caveat to the results in Table 4 apply here. While there is exogenous variation in caste matching, wards where project has not occurred *and* there is caste-matching may be very different from similar wards in GPs with caste-matching. In addition to the two mitigating factors mentioned above, we have a third here: our experimental wards covered a large subset of wards since there was variation in the number and types of projects undertaken in their jurisdictions. Any ward with at least one of the 2 WAS types of projects not being undertaken was part of our experimental sample. Thus, a ward with absolutely no WAS projects represents a very egregious violation of the rule and those with at least one project is more representative of a typical ward.

Table 5 presents findings: caste-matching reduces likelihood that the lower-tiered representative reports that projects have not been undertaken because the upper-tiered representative refuses to release funds. Furthermore, Col (2) shows that they are more likely to report that the upper-tier fund problem is because of caste-favouring[28]. Caste-matched lower-tiered representatives are more likely to say non-implementation is because of "procedural reasons" and not any violation of rules.

Tables 4 and 5 are, as explained, drawn from two separate samples of wards on either side of the cutoff. Together, these samples cover the universe of wards i.e wards where there are no projects (Experimental Sample), there is only one WAS projects (Experimental Sample/Survey Sample) and where both WAS projects have been undertaken (Survey Sample). The fact that caste-matching results in fewer reported impediments – particularly those

[26]Table 21 shows that on dropping GP- and ward-specific controls, the effect sizes remain the same, but the standard errors increase to make most results insignificant at the 10 % level of significance.

[27]Note that we did not purposively sample wards that fall within a specific bandwidth of the cutoff, but restricted our attention to all wards where WAS projects had not yet been undertaken.

[28]This could be mechanically true. However, the sign and magnitudes don't change even when we restrict our sample to only those wards that report an upper-tiered fund problem, we find that there is 11 percentage point drop in likelihood of the caste-matched lower-tiered representative saying this was because of caste-favouring ($p = 0.22$, $n = 587$)

caused by the upper-tiered representative for all these samples – across both these samples suggests to us that implementation of WAS projects is relatively easier when there is caste-matching.

5.3 Econometric Strategy 2: RD for Sub-caste-Matching

We causally estimate the impact of sub-caste matching in the following manner. First, we restrict our attention to GPs where the upper-tiered representative's election was close. We then consider wards that within these GPs who lower-tiered representatives are of the same sub-caste as either the winning or the losing candidate. Again, following Calonico et al. (2018), we estimate a sharp RD design with covariates and our primary specification uses a local linear regression within the CCT triangular bandwidth. The main estimating equation is as follows:

Again, following Calonico et al. (2018), we estimate a sharp RD design with covariates and our primary specification uses a local linear regression within the CCT triangular bandwidth. The main estimating equation is as follows:

$$\begin{aligned} Y_{ij} = \beta_0 + \beta_1 1(Votes_i > T_i) + \beta_2(Votes_i - T_i) + \\ \beta_3(Votes_i - T_i) * 1(Votes_i >= T_i) + \gamma * X_{ij} + \delta * G_i + \psi + \eta_{ij} \end{aligned} \tag{10}$$

where Y_{ij} is project-level outcomes from GP i and ward j; $Votes_i$ represents the number of votes polled by the upper-tiered politician in the election. T_i represents the mean of the votes polled by the first and second candidates from GP i, X_{ij} represents candidate-level controls including age, gender and education of candidate; we add GP-level controls, G_i. ψ represents Block fixed effects, η_{ij} represents the error term.

5.3.1 Threats to Validity

As in the case of our population-based RD cutoff, our main treatment and control groups emerge from settings where there is a narrow election at the upper-level *and* there is matching with some lower-tiered representative. Thus, any close-election RD of this sort may not be valid if there is some shock in a non-matched neighbouring ward that simultaneously influences both who comes to power in the upper-tiered election and who becomes a representative in the neighbouring ward. This is extremely unlikely in our setting since we have over 13 wards in every GP, so any single ward is unlikely to influence outcomes of the upper-tiered representative's election. Second, it is unclear that neighbouring wards will have influence over how elections proceed in local wards.

5.4 Results for Sub-Caste Matching

We briefly segue into an alternate causal approach to document the impact of ethnic matching. Here, we look at sub-caste matching. Two representatives match on sub-caste lines if (i) their broad caste category matches *and* (ii) their last names also match. This definition of matching is used in (Kumar and Sharan, 2019). We use the close-election RD estimating equation described above (equation 10).

Table 6 documents the results: sub-caste matching has positive effects on whether projects are undertaken at the end of Year 1 and Year 2. The effects are more precisely estimated for projects ending in year 2. A sub-caste matched ward is 18 % likelier to have had at least one WAS project being undertaken at the end of Year 2.

Section C in the appendix presents additional evidence that caste-mismatch with the upper-tiered bureaucrat (the BDO - block development officer) adversely affects WAS projects.

Taken together, all these disparate pieces of evidence point to the fact that collaboration breakdowns are likelier to occur under caste-mismatch. This manifests in fewer projects, more delays and more hurdles in implementation.

5.5 Discussion: Why does mismatch cause collaboration breakdowns?

5.5.1 Prejudice: Discrimination and Homophily

In this section, we present evidence on whether the hierarchical nature of the caste system affects outcomes. To fix ideas, we define two types of prejudice. "Homophily" occurs when there is prejudice towards all caste-groups but one's own. "Discrimination" occurs when prejudice manifests only towards those lower in the hierarchy. We argue that, in our setting, it is discrimination that is more common than prejudice.

We begin with evidence for discrimination. Table 3, as described above, shows that SC lower-tiered representatives are less likely to implement projects when matched with non-SC upper-tiered representatives. On the other hand, Table 17 shows that non-SC lower-tiered representatives do not face any difficulties in implementing projects while working with SC upper-tiered representatives.[29] These results suggest that non-SC upper-tiered

[29]Non-SCs are not a homogeneous whole. Non-SCs could be General Castes, OBCs, EBCs or STs. So, focusing on a collection of these groups gives us the impact of going from potential matching (to the left of the cutoff) to definite mismatch (to the right of the RD cutoff, since upper-tiered representative is always SC). Thus, the effect sizes are muted by design. But the presence of positive coefficients assuages concerns that what we are mistaking for non-discrimination is a weak negative effect muted by a preponderance of

representatives practice discrimination, while their SC counterparts do not.

On the surface, our sub-caste matching results could point to homophily (Table 6). Unlike our population-based RD sample, the close-election RD sample is not restricted to mismatches that are hierarchical in nature. However, we have reason to believe that sub-caste matching could also be a product of caste hierarchies. We show that poorer sub-castes gain from being matched to their own type, but richer sub-castes do not. This, once again, may be due to the graded inequality inherent to the caste system.

We partition our sample of sub-castes into two categories based on asset-wealth: above-median and below-median. Wealth scores for each sub-caste-GP pair are constructed using data from the socio-economic caste census (the details on the construction of this GP-sub-caste specific asset score can be found here: (Kumar and Sharan, 2019)). We then estimate the impact of sub-caste matching independently for both these samples. We cannot reject the null that sub-caste matching has no effects for sub-castes with asset wealth above the median. However, the opposite is true for below-median sub-castes. The coefficient on sub-caste matching for projects undertaken is four time as large for below-median sub-castes (see Table 7).

Our surveys allow us to piece together a narrative of how hierarchical discrimination plays out. SC lower-tiered representatives are more likely to report that the upper-tiered representative favours their own caste when there is a mismatch (Col (2) of Table 5). They also are less likely to informally approach their upper-tiered representatives to discuss undertaking projects (Col (4) of Table 5). The upper-tiered non-SC representatives are more likely to be reported as trouble-makers during project implementation ((Col (4) of Table 4).

Thus, while caste mismatch worsens public good outcomes through a combination of both hierarchy-based prejudice and homophily, our results indicate that the former plays a bigger role in our context.

5.6 Electoral Incentives and Caste Mismatch

Can electoral incentives override ethnic barriers? We test for this in the following way. We use margin of victory in the GP-elections as a predictor of the strength of incentives an upper-tiered representative faces. We break our sample into two parts based on the median margin of victory across GP-elections. We then run our RD specification separately across the two samples. Thus, we independently estimate the effects of caste-matching across "Small Margin Victors" and "Large Margin Victors". We also run balance tests separately across these two samples and none of the control variables vary discretely across the cutoff.

nulls.

Our results indicate that re-election incentives matter quite strongly. Table 8 presents results. Small margin victors do not differentiate along caste lines. Indeed, the estimates of caste-matching are centred around zero. On the other hand, lower-tiered SC representatives benefit considerably from matching with large margin victors. Put differently, the effects of caste-matching seem to be entirely driven by areas where the upper-tiered representative is a comfortable winner. This is a result of two separate factors among large margin victors: first, the non-SC upper-tiered representative collaborates on fewer projects with SCs (compare control means in Cols (1) and (3) of Table 8); second, a comfortable upper-tiered SC winner considerably outperforms a small margin upper-tiered SC winner.

The tension between re-election incentives and ethnic barriers can be described more formally by extending our model. We require that the indirect utility of the surplus s is a function of re-election incentives. s in our model can be modeled as $V(s, \theta)$ where θ is a parameter capturing re-election incentives. We require: $\frac{\frac{\partial V}{\partial s}}{\partial \theta} >= 0$ for our prediction that collaborations are more likely to breakdown in settings with weak re-election incentives.

6 Caste Matching on Grievance Filing

This section describes in detail how local representatives repurpose the grievance redressal mechanism to lobby on behalf of their constituents. We show that when there is caste mismatch, lower-tiered SC representatives are particularly likely to file grievances with respect to local public goods and WAS projects. We use data on the universe of nearly 500,000 grievances filed in the first three years of the Act being in place. We match data on local representatives to our data on grievances to identify complaints filed by representatives.

6.1 Lower-Tiered Representatives and Grievance Redressal

Lower-tiered representatives have filed over 6000 grievances in the past 3 years. This translates to them being at least five times likelier than citizens to file grievances under the BPGRA. This discrepancy is even larger for WAS projects: lower-tiered SC representatives are roughly 20 times as likely to file grievances regarding WAS public goods than citizens. Below, using a close election RD design, we argue that this increase is not driven by lower-tiered representatives being selected from a class of politically active citizens. On the other hand, the increase in grievance filing is linked to their explicit role as implementers of WAS public good programs in their wards.

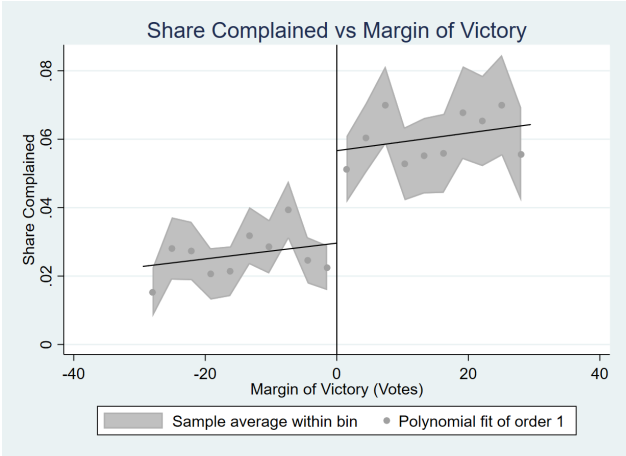


Figure 4: Figure shows the impact of narrowly winning or losing an election on likelihood of filing grievances for SC lower-tiered candidates.

6.2 Econometric Strategy 3: RD for Lower-tiered Representatives

We causally estimate the impact of being a lower-tiered representative on grievance filing using a close-election RDD. We restrict our attention to the top 2 candidates in every ward.[30] Again, following Calonico et al. (2018), we estimate a sharp RD design with covariates and our primary specification uses a local linear regression within the CCT triangular bandwidth. The main estimating equation is as follows:

$$\begin{aligned} Y_{ij} = \beta_0 + \beta_1 1(Votes_{ij} > T_j) + \beta_2(Votes_{ij} - T_j) + \\ \beta_3(Votes_{ij} - T_j) * 1(Votes_{ij} >= T_j) + \gamma * X_{ij} + \psi + \eta_{ij} \end{aligned} \tag{11}$$

where Y_{ij} is the outcome variable of interest - usually, the number and types of grievances filed by the lower-tiered politician i from ward j; $Votes_{ij}$ represents the number of votes polled by politician; T_j represents the mean of the votes polled by the first and second candidates from ward j, X_{ij} represents candidate-level controls including age, gender and education of candidate; ψ represents GP or Block fixed effects, η_{ij} represents the error term.

6.2.1 Results

Figure 4 shows that lower-tiered narrow SC winners are twice as likely to file grievances than their losing counterparts. Table 9 shows that for local administration and WAS-related

[30] We drop uncontested wards altogether.

issues, the overall trend is even more pronounced for lower-tiered SC representatives. The mean complaint-filing rate for narrow SC losers regarding WAS projects is very nearly zero. Thus, WAS grievances by representatives are not driven by their political activism, but more by their role as implementing partners of WAS projects.

6.3 Results for Caste-Mismatch and Grievance Filing

We once again turn to our population-based RD strategy from section **??** to measure the impact of caste-mismatch on grievance filing. Table 10 presents the results. SC lower-tiered representatives are less likely to file a grievance when exogenously matched to an SC upper-tiered representative. Crucially, they are much less likely to file a grievance that is public in nature (column 1) or pertains to the department handling GP-administration (column 2). Analysing the text of the complaint, we find that caste-matching lowers the likelihood of the upper-tiered representative being directly named (column 4) or the ward being mentioned (column 3).

As a robustness check, we test to see if grievance filing for non-SC lower-tiered representatives is affected across the RD cutoff. Table 11 presents the results - no such pattern emerges.[31] Another robustness check is to see if complaints related to private issues change differentially across the RD cutoff. Col (6) of Table 10 shows that caste-mismatch has no impact on the likelihood of filing private complaints.

We now discuss if caste-mismatch affects complaints regarding WAS schemes. As discussed previously, while collaboration across tiers is important across a host of government programs, WAS schemes mandate collaboration in explicit terms. Furthermore, WAS project outcomes are worse when there is a caste-mismatch.

Do marginalized lower-tiered representatives use the grievance redressal system to signal breakdowns in collaboration regarding WAS projects? Column (4) of Table 10 shows the results: caste matching significantly reduces likelihood of filing a WAS grievance for SC lower-tiered representatives.

Once more, as a robustness check, we see that there is no such effect for non-SC representatives (Col (6) of Table 11).

We now corroborate this finding from our experimental sample. These lower-tiered representatives have experienced some form of breakdown in collaboration.[32] Keeping in mind the caveats regarding comparability of wards across the RD cutoff from our experimental sam-

[31] A question remains: why don't we see *increased* grievance filing for non-SC lower-tiered representatives when paired with SC upper-tiered representatives in Table 11? One reason, as pointed out in the Discussion in Section 5.5, is that non-SCs are less likely to face discrimination.

[32] This is particularly true of those wards where neither WAS project was undertaken.

ple (discussed above), Col (5) of Table 5 presents the results. Caste-matching significantly reduces the likelihood of take-up of our offer to file grievances in treated wards.

In sum, these results form robust evidence that caste-mismatch increases the likelihood of grievances being filed by lower-tiered SC representatives. This is in line with the predictions from our model. However, our model also indicates that increased grievances alone is not sufficient to conclude that the grievance redressal system is effective at improving collaboration. To test if the grievance redressal system has "bite", we run a field experiment which we describe in the following section.

7 Experiment

In this section, we describe our experiment in detail. Our main aim is to understand how filing grievances affects WAS project implementation in wards. We go over our experimental design, estimating equations, main results; we discuss patterns in adoption of the grievance redressal system and perform a simple cost-benefit analysis of our main treatment arm.

7.1 Experimental Design

7.1.1 Main Questions

The purpose of the experiment is to understand how, if at all, grievance filing by incumbent lower-tiered representatives from marginalized groups affects provision of water-and-sanitation (WAS) public goods in their jurisdictions. Specifically, we seek to answer the following questions:

1. Does grievance filing by SC lower-tiered representatives initiate construction of WAS public goods in these jurisdictions?
2. Are there spillover effects of grievance filing - i.e does grievance filing by a lower-tiered representative in one jurisdiction result in more (a) grievance filing and (b) WAS public good construction in jurisdictions of other lower-tiered representative close to treated jurisdiction?

7.1.2 Treatments

All treatments are administered over the phone in our setting. The experiment comprises two treatments arms: a grievance-filing treatment and an information-only treatment.

In the grievance-filing treatment arm, we call randomly sampled SC lower-tiered representatives where, as per official records, no WAS project has been undertaken and provided them information about the grievance redressal scheme and offer to file grievances on the representatives' behalf. Our main objective here is to measure the impact of grievance filing on WAS public good provision.

In the information-only treatment arm, we call randomly sampled SC lower-tiered politicians and only provide information. The key difference from the grievance-filing treatment arm is that we do not offer to file grievances. Our main objective here is to see if information alone suffices to increase the number of grievances filed.

7.1.3 Design

On piloting, we realized that the official data is observed with a lag. About a third of wards that have "no wok" in the official data actually have both WAS projects either completed or ongoing on checking with representatives/visiting wards.

We, therefore, decided to have a set of screening questions to weed out such wards. Once we ascertain that at least one of the two WAS projects have not been undertaken - based on the ward representatives' testimony during the call - we then proceed to randomly offer to file grievances on their behalf.

The grievance filing treatment is carried out as follows: first, a call is made to a randomly sampled SC lower-tiered representative in whose ward, as per official data, WAS projects have not been undertaken. Subsequently, we screen out wards where the representative claims that at least one project has been undertaken. Once a representative clears the screening, she is randomized (with equal probability) into one of two arms: (a) treatment arm where she is given information about the grievance redressal mechanism and then offered the chance to file a complaint regarding non-implementation of WAS projects in her ward or (b) a control arm where she is given information about other welfare programs implemented on a priority basis by the state government. Once a complaint is filed in treated wards, a follow-up reminder call is sent to the representative the day of the first hearing of the grievance.

The information-only treatment mirrors the process in the grievance-filing arm with the key difference being that lower-tiered representatives are not offered the choice to file grievances through our enumerator. This will, thus, allow us to separate the role of awareness from that of transaction costs of filing a grievance in actual grievance-filing.

Control group representatives are randomized into the control group after screening questions ensure that they are eligible for treatment. Control group members are provided information too - about key government schemes, aside from the water and sanitation, that have been introduced by the incumbent government.

The Appendix (Section G) has more details on the sampling and randomization. Our pre-analysis plan has a comprehensive set of details on our outcome variables and empirical strategy.[33]

7.1.4 Sample selection

While the sample was randomly drawn from the population, we could only get through to about half the lower-tiered representatives over the phone. The main reason for our inability to get through to more representatives was because phone numbers were switched off or not reachable.[34] Table 14 compares the population with our sample on observables - while the sample is representative along most dimensions, contacted lower-tiered representatives are likelier to be somewhat less educated, marginally younger and would have obtain 3 more votes on average than the population. Based on the small magnitudes of these differences, we are confident, if not certain, that the estimates from our experiment cannot be vastly different from what we would have seen with our ideal population.

7.2 Experimental Regressions

We causally estimate the impact of filing grievances on behalf of (or providing information on grievance redressal mechanisms to) lower-tiered representatives on a host of outcome variables - including the quantity and quality of projects that occur/grievances being filed in treated/spillover wards – from our experiment. We estimate two main types of regression equations.

7.2.1 ITT Direct Impact

$$Y_{ig} = \beta_0 + \beta_1 * T_{ig} + X + S + \eta_{ig} \tag{12}$$

[33]This study is registered in the AEA RCT Registry and the unique identifying number is: AEARCTR-0004308.

[34]We attempted to get around this problem by trying to call neighbouring lower-tiered representatives for information on experimental representatives' phone numbers. However, we did not pursue this strategy too strongly for fear of contaminating spillover effects. An easy source of phone numbers would have been upper-tiered representatives themselves, but, for obvious reasons, we felt it unwise to use them as the source.

here, Y_{ig} could include whether a project was initiated (as per official data or endline survey), project completed, total projects undertaken, total money spent on projects and whether a grievance was filed in ward i of GP g. X is a vector of controls at the GP and ward-level. S indicates block fixed effects. T_i takes the value of 1 if the lower-tiered representative i is treated with either of two treatment arms (information or grievance filing).

7.2.2 ITT Spillover Impact

To measure within-GP spillovers in grievance-filing, we first ask and identify who the closest lower-tiered representatives are to participants in the experiment. We restrict our attention to a maximum of 3 such representatives. Next, we run:

$$N_{ig} = \beta_0 + \beta_1 * T_{ig} + C_{ig} + X + S + \eta_{ig} \tag{13}$$

where N_{ig} could include, among others, the number of close wards where, after the experiment, (a) WAS projects have been undertaken or (b) grievances are being filed by representatives. C_{ig} is the number representatives who are deemed "close" by the experimental lower-tiered representative.

7.3 Experimental Results: Grievance Filing Treatment

We have, thus far, shown that caste mismatch worsens public good provision. We now turn to whether increasing access to a grievance redressal system changes outcomes. In this section, we focus on our main treatment arm run over 1487 lower-tiered SC representatives. We randomly selected 727 and provided them information about the grievance redressal system and offered to file complaints on their behalf. Below, we describe effects of treatment on WAS projet initiation in treated and neighbouring wards.

7.3.1 WAS Public Good Provision

Our grievance-filing treatment significantly improved the likelihood of lower-tiered representatives filing grievances. The difference in grievance filing between treated and control representatives is 46 percentage points (see Figure 6) as per administrative data.

We now turn to impacts on projects being undertaken. We focus on four outcome variables from our Endline survey:[35] (i) whether the problem preventing projects from starting had

[35] Outcomes were pre-registered.

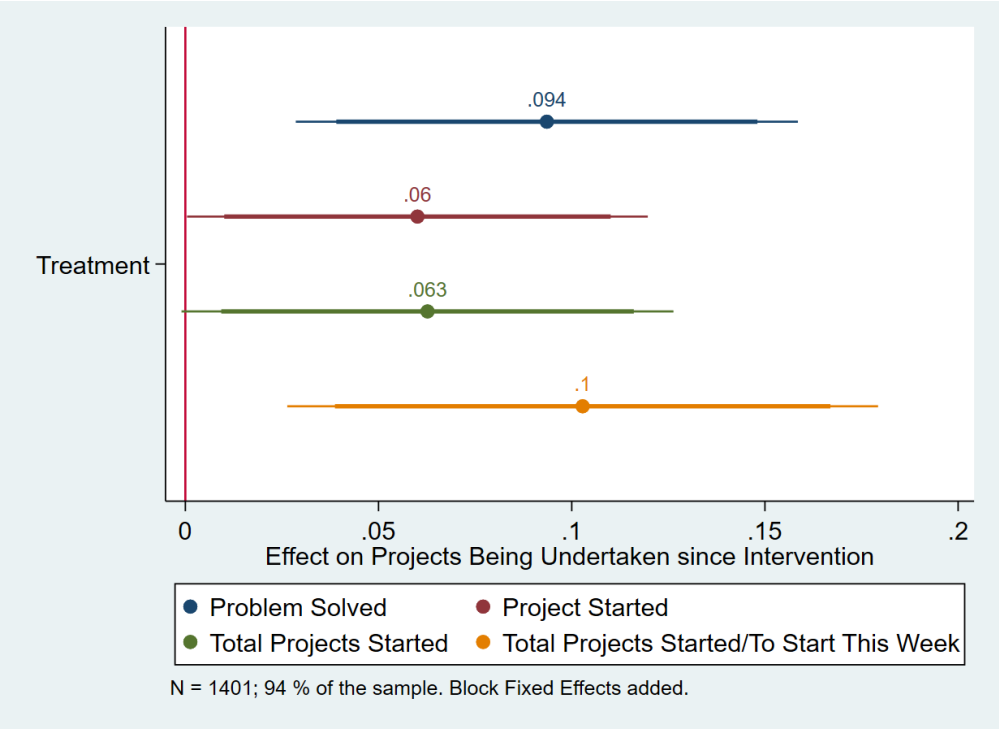


Figure 5: Figure plots impact of the grievance-filing treatment on outcomes. "Problem Solved" is a binary that captures whether the problem preventing projects from starting at baseline had been resolved; "Project Started" is a binary that captures whether projects had started; "Total Projects Started" captures the number of projects initiated; "Total Projects Started/To Start This Week captures number of projects that have been started or are to start this week. Block fixed effects are added. Standard errors are clustered at the Block level.

been resolved, (ii) whether projects had, consequently, started (iii) the number of projects started and (iv) number of projects that had started or had started this week. Figure 5 presents treatment impacts for each of these four variables.[36]

Figure 5 plots treatment effects for our main estimating equation. The grievance filing treatment had strong positive effects on project initiation. In particular, treatment improves project initiation by 6 p.p over a control mean of 26 p.p. This translated to a 24 % increase in the likelihood of project initiation. The effects are even stronger if we look at project initiation up to the end of the current week: 33 %. Table 15 lists out the effects across specifications. The results are robust to changing the level of fixed effects and adding additional controls.

If we assume that the reduced form ITT impacts on project completion come only from

[36]This specification - with block fixed effects - is our pre-registered specification.

the individuals that indeed filed complaints, then the ToT impact of filing a complaint on project initiation is 12 p.p (which translated to a 48 % increase). However, the exclusion restriction could not hold in this context: for instance, it is possible that that the threat of filing a complaint was enough to ensure projects were initiated.

Overall, it appears that the grievance filing treatment did significantly improve outcomes in the treated group. In the Appendix section E, we investigate whether our treatments caused backlash or threats against lower-tiered representatives in the study. While the point estimates in Table 23 on our measures of backlash are all positive, we find no statistically significant impacts. This suggests that lack of faith in the state or other costs of filing (information, transaction costs of filing grievances, mediation) could be more binding costs. We also find no negative spillovers of our treatment on projects undertaken in neighbouring wards.

7.4 Understanding Constraints to Grievance Filing

7.4.1 Information Treatment

Aside from our grievance filing treatment arm, we ran a smaller experiment with a sample of 247 lower-tiered SC representatives where we offered them information about the BPGRA. These respondents were told of where to file grievances in person and also given the call-centre's toll-free number. We did not, however, offer any filing assistance.

We find that information alone increases grievance-filing rates, but at a relatively lower rate. Compared to the control group, information results in 6 p.p more grievances (see Figure 7). Compare this to our grievance-filing treatment arm where complaints filed increased by 46 p.p. Thus, information *is* a constraint, but there are other costs to grievance-filing that make it less commonly used.

7.4.2 Spillovers in Complaining

To calculate spillovers in grievance filing, we restrict our attention to GPs that have only one experimental ward. This excludes a mere 18 % of GPs from our sample. We then test the impact of having either one treated or one control ward in the GP on complaints filed by non-experimental wards from that GP.

Table 16 sheds light on this question using administrative data on complaints filed. As mentioned above, we restrict our attention to GPs with only experimental ward in them (81 % of GPs in our sample have only one experimental ward). Having a treated neighbouring lower-tiered representative significantly increases the likelihood that a representative files

grievances. Indeed, for WAS related grievances, having a neighbouring treated ward more than doubles the likelihood of complaints being filed. The filing rate increases from 0.28 % to 0.72 % in these neighbouring wards. Once more, these indicate that while spillovers exist, these effects are modest.

7.4.3 Other Constraints

In our setting, grievance-filing can be done in three ways: via the phone, via the internet and in person. During piloting, we experimented with trying to get lower-tiered representatives to file complaints via the phone. This proved extremely difficult, since complaint-filing is a complex process, involving clear communication of the nature of the problem that extends beyond yes-no binaries. The call-centres were manned by urban youth; the representatives speaking to them were leaders, but from extremely marginalized groups in villages. As per government data, the median SC representative is barely literate, having not even completed primary school. As one research associate who listened in on these conversations evocatively put it: "it was as if they were from different countries". Only 3 % of grievances are filed via the call-centre. If complaining via the phone is difficult, accessing the internet and filling up text on an online portal is even harder. Thus, an intermediary is necessary for both these forms of grievance-filing. These results echo closely the work of Gupta (2017), who finds that information and *mediation* are both crucial factors in helping marginalized citizens access the state.

Complaining in person is easier to navigate relative to via the phone or the internet. This is because the grievance centres often have trained operators who convert verbal or written complaints into a standardized format that is fed into the online system. However, there is one grievance centre for every 80 GPs on average. Traveling to these centres is costly. Our survey estimates put it at INR 140 per trip and the loss of a full day's wage. Indeed, as figure 8 shows, the number of complaints filed falls away sharply as distance to the grievance redressal centre increases.

Two possible policy solutions emerge to make grievance filing less costly: first, re-locate grievance filing centres closer to representatives' villages; second, create intermediaries and/or re-train call-centre youth to be more sensitive to a wider range of callers. The government is experimenting with the former, but the cost-benefits of the latter are easier to estimate. We attempt to do this below.

7.5 Estimating Costs and Benefits

We examine cost-effectiveness of the intervention in creating public goods in lower-tiered jurisdictions. The baseline survey hired ten enumerators on average and ran for 25 days.

Subsequent follow-ups were conducted with a smaller team of 3 surveyors for another twenty days. The total amount paid to the survey company was Rs. 341020. In addition, the office and staff costs at the IDFC Institute for the pilot and intervention period is estimated at 375,000. About 25 % of those offered treatment attended hearings. Our survey estimates suggest that, conditional on doing so, the median respondent attends 2 hearings. We assume that the opportunity cost of attending hearings to be INR 220 (1.25 times the daily minimum wage). The total costs of the intervention, therefore, amount to 791990 Indian Rupees or $11,314.

Our primary measure of benefits is the total monetary costs of the public goods created. Our treatment impact on public good creation varies from an increase in 6.22 percentage points (currently started) to 10.4 p.p (includes projects to start within a week). This translates to an additional 45-75 projects in treated areas. The median project in SC wards costs 559900 in the administrative data. We extrapolate to estimate total costs of additional projects to be between 25 million ($360,000) to 40 million ($575,000) rupees. The cost per incremental dollar delivered is 1.97 - 3.1 cents.

The true benefits can vary significantly. If, eventually, control wards "catch up", then our estimates may overestimate the true benefits. Furthermore, the reported monetary costs of these projects are anecdotally higher than true costs of financing them. However, even halving the cost estimates still results in an estimated surplus of 12.5-20 million rupees.

We have reason to believe that these may actually be significant underestimates. As described above, WAS public goods are essential to ensuring connectivity and access to potable water at the household level. The true welfare benefits - emanating from factors as diverse as reductions in the disease-burden from clean water to a fall in transaction costs due to better roads – could be immense. Moreover, these are intention to treat estimates – only half of those offered treatment agreed to file grievances. Finally, the opposite of the "catch-up" mechanism could occur, resulting in a widening gap between treatment and control wards over the course of time. Overall, these estimates suggest that phone-based mediation could be cheaply applied to large and important public good programs and create substantial economic benefits.

8 Conclusion

This paper provides two key pieces of evidence from the Indian state of Bihar: first, using a natural experiment, we show that caste-mismatch between tiers of local government adversely affects implementation of key water and sanitation public good programs in jurisdictions governed by ethnic minorities. Second, we document a novel strategic response on their part - to use grievance redressal mechanisms to signal breakdowns in collaboration within local government. Our RCT shows that these mechanisms can prove to be powerful tools for

local members of the state to lobby for better public good provision. Thus, on the whole, we draw the following conclusions: first, the ethnic composition of the local state matters and second, that grievance redressal mechanisms, properly designed, can be used to right some of the collaboration-breakdowns caused by ethnic mismatch between tiers of the state. More broadly, grievance redressal mechanisms give voice to elected local representatives from disadvantaged backgrounds, improving their strategic bargaining power with upper-tiered members of the local state.

One implication of these policies is that grievance redressal mechanisms can be used not merely to solve individual complaints of citizens against the state, but by lower-tiered members of the local state themselves to lobby for their constituents. Our findings, therefore, speak to two different policy agendas in modern developing countries: first, it complicates our understanding of how grievance redressal mechanisms should be designed and their role in making the state more accountable; second, it also contributes to the thinking around making decentralization most effective, by arguing in favour of an active grievance redressal mechanism to be used *by* members of the local state. While reservation of seats for specific groups are one way in which ethnic barriers between tiers of government can be broken, they are blunt instruments that occur only at specific (five-year) intervals. The presence of a grievance redressal system provides an alternate, nuanced real-time option.

One limitation of this paper is that it doesn't speak about the role citizens play in grievance redressal mechanisms. We have projects lined up with the Government of Bihar that aim to understand how grievance redressal mechanisms can be used to improve citizen-welfare. Our companion papers will look into these. Another limitation is that it doesn't delve into what makes this particular grievance redressal mechanism effective. Our partnership with the government of Bihar has given us some understanding of the nature of the political and bureaucratic will, the incentive structures for high-level bureaucrats to perform their duties as grievance redressal officers and the systemic tweaks being made to build an effective platform. However, we do not have rigorous evidence on this yet and further work is being done to address these questions.

The expansion of grievance redressal policies and the plethora of mutli-tiered local governance models across India (and indeed, across the world) allows us a rich laboratory to study these questions in the future.

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A Tables

Table 1: Balance Across the RD Sample (GP-level Controls)

Variable	Treatment	Control	Difference	pvalue
Total Population of GP (Census 2011)	11,142.88	11,043.60	99.28	0.79
Proportion of SCs (Census 2011)	0.16	0.17	-0.01	0.44
Distance to Nearest Statutory Town (Census 2011)	25.55	23.49	2.06	0.20
Distance to District Headquarters (Census 2011)	34.82	34.95	-0.13	0.96
Number of Villages in GP (Census 2011)	5.04	5.81	-0.77	0.17
Total GP Area (Census 2011)	1,054.79	1,092.53	-37.74	0.67
Percentages of SCs in Main SC Village (Census 2011)	25.84	29.45	-3.61	0.14
Index of Public Goods (Census 2011)	0.12	0.12	0.00	0.94
Total SC Wards	2.75	2.97	-0.22	0.22
Mean non-SC Wealth Score	-0.04	0.02	-0.06	0.31
Mean SC Wealth Score	0.10	0.10	0.00	0.97
Upper-Tiered Representative Age	38.89	41.60	-2.71**	0.05
Wealth Score of Upper-Tiered Representative's Sub-caste	0.84	0.89	-0.05	0.66
Mean Wealth of SC Lower-Tiered Representatives	0.31	0.29	0.02	0.76

NOTE: Table presents results from a series of balance tests for GP-level variables across the population-based RD cutoff. We operationalize tests in the following manner: we run a fuzzy RD with bandwidth = 230. Standard errors are clustered at the GP level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 2: Balance Across the RD Sample (Ward-level SC Winners)

Variable	Difference	Reserved	Unreserved	pvalue
Margin of Victory	-2.85	24.14	26.99	0.38
Gender	0.06	0.47	0.41	0.17
Age	-1.26	38.30	39.56	0.32
Votes Obtained	-6.21	153.49	159.70	0.39
Barely Literate Or Below	0.03	0.74	0.71	0.64
Total Candidates	-0.17	2.57	2.74	0.18

NOTE: Table presents results from a series of balance tests for ward winner level variables across the population-based RD cutoff. We operationalize tests in the following manner: we run a fuzzy RD with bandwidth = 230. Standard errors are clustered at the GP level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 3: Impact of Caste-Matching on WAS Projects and Delays (RD)

	Before March 2018		Overall	
	(1) **Project Undertaken (Y/N)**	(2) **Total Projects**	(3) **Project Undertaken (Y/N)**	(4) **Total Projects**
Caste Differences (SC)	-0.10***	-0.14*	-0.03	-0.15
	(0.04)	(0.08)	(0.04)	(0.13)
Observations	17076.00	17076.00	17076.00	17076.00
Control Mean	.29	.49	.59	1.26
Bandwidth	240.87	241.91	257.33	266.38
Upper Band	YES	YES	YES	YES

Outcome variables are either: (a) a binary variable that capture whether any WAS project was undertaken (Project Undertaken (Y/N); (b) The total number of projects undertaken (Total Projects). Caste differences is the treatment variable which takes the value of 1 if the SC-GP population is below the population threshold (and hence mismatch occurs). Upper-tiered representatives are almost always SC above the cutoff and virtually never SC below the cutoff. For SC lower-tiered representatives (who we restrict attention to here), this implies potential caste-matching above and no almost caste-matching below. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 8 and 9). We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 4: Impact of Caste-Matching on How Projects Are Implemented (RD)

	Impact of Caste Differences on WAS Projects in SC Wards (RD)			
	(1)	(2)	(3)	(4)
	Incomplete	**Delay**	**Contractor**	**Trouble Upper Tier**
Caste-Matching	0.27**	0.34***	-0.11	0.12**
	(0.11)	(0.11)	(0.10)	(0.06)
Observations	213.00	208.00	200.00	213.00
Control Mean	-.17	-.35	-.64	-.07
Lower Band	100	100	100	100
Upper Band	100	100	100	100
Block FE	NO	NO	NO	NO
GP Controls	YES	YES	YES	YES

Outcome variables are in the following order: (1) Scheme Incomplete or Not done (2) Delay of over 5 months in implementation (3) Whether they hired the contractor or somebody else did (4) Faced trouble from the upper-tiered representative. Our sample comprises SC-wards in randomly sampled GPs from either side of the RD cutoff within a bandwidth of 100. Caste differences is the treatment variable which takes the value of 1 if the SC-GP population is below the population threshold (and hence mismatch occurs). Upper-tiered representatives are almost always SC above the cutoff and virtually never SC below the cutoff. For SC lower-tiered representatives (who we restrict attention to here), this implies potential caste-matching above and no almost caste-matching below. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 8 and 9).We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 5: Impact of Caste-Matching on Why Projects Are Not Implemented and Responses (RD)

	Impact of Caste Differences on Public Goods (RD)				
	(1) **Upper-Tier Fund**	(2) **Caste-Favoring**	(3) **Procedural Reason**	(4) **Informal Approach**	(5) **Formal Complaint**
Caste Differences (SC)	0.24*	0.06*	-0.19**	-0.24**	0.48**
	(0.13)	(0.04)	(0.08)	(0.11)	(0.20)
Observations	1610.00	1610.00	1610.00	1610.00	774.00
Control Mean	0.33	0.03	0.16	0.76	0.49
Lower Band	284.90	438.14	229.37	267.34	280.69
Upper Band	284.90	438.14	229.37	267.34	280.69
Controls	YES	YES	YES	YES	YES

Outcome variables are in the following order: (1) Whether no project due to upper-tier representative refusing to pass on funds (2) Whether no project due funding issues caused by caste-favouring by the upper-tiered representative (3) whether no project due to procedural reasons (4) Whether informally approached the upper-tiered representative/bureaucrat regarding non-implementation (4) Whether take-up our offer to file formal complaints on their behalf. Our sample comprises SC-wards where at least one of the WAS projects haven't been undertaken yet. Caste differences is the treatment variable which takes the value of 1 if the SC-GP population is below the population threshold (and hence mismatch occurs). Upper-tiered representatives are almost always SC above the cutoff and virtually never SC below the cutoff. For SC lower-tiered representatives (who we restrict attention to here), this implies potential caste-matching above and no almost caste-matching below. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 8 and 9).We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 6: Impact of Sub-caste-Matching on WAS Projects and Delays (RD)

	Year 1		Year 2	
	(1) **Project Undertaken (Y/N)**	(2) **Total Projects**	(3) **Project Undertaken (Y/N)**	(4) **Total Projects**
Sub-Caste Matching	0.03	0.07	0.07**	0.20*
	(0.02)	(0.06)	(0.03)	(0.11)
Observations	7825.00	7825.00	7825.00	7825.00
Control Mean	.14	.25	.37	.78
Lower Band	204	176	163	175
Upper Band	204	176	163	175
Block FE	YES	YES	YES	YES

Outcome variables are either: (a) a binary variable that capture whether any WAS project was undertaken (Project Undertaken (Y/N); (b) The total number of projects undertaken (Total Projects). We restrict attention to all pairs of lower- and upper-tiered representatives where the surname of the lower-tiered representative matches with either the winner or the loser of the upper-tiered post's election. Sub-caste-matching is the treatment variable which takes the value of 1 if the lower- and upper-tiered representatives' surnames match because the upper-tiered representative narrowly won (or lost) an election. Our running variable is the vote-margin of victory and is the difference between votes polled by the top 2 upper-tiered candidates and the average of the votes polled by the two of them. We estimate equations of the form described in the paper (equations 10. We estimate local polynomials on either side of the cutoff and use CCT triangular bandwidths. We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 7: Impact of Sub-caste-Matching on WAS Projects and Delays (RD)

	Above Median		Below Median	
	(1)	(2)	(3)	(4)
	Total Projects (Yr 1)	**Total Projects (Yr 2)**	**Total Projects (Yr 1)**	**Total Projects (Yr 2)**
Sub-Caste Matching	-0.01	0.08	0.10	0.36**
	(0.07)	(0.12)	(0.09)	(0.17)
Observations	3464.00	3464.00	3087.00	3087.00
Control Mean	.22	.72	.24	.82
Lower Band	153	187	187	172
Upper Band	153	187	187	172
Block FE	YES	YES	YES	YES

Outcome variables are either: (a) Total Projects in year 1; (b) Total Projects in year 2. We restrict attention to all pairs of lower- and upper-tiered representatives where the surname of the lower-tiered representative matches with either the winner or the loser of the upper-tiered post's election. Sub-caste-matching is the treatment variable which takes the value of 1 if the lower- and upper-tiered representatives' surnames match because the upper-tiered representative narrowly won (or lost) an election. In columns (1) and (2), we restrict attention to sub-castes that are above median on asset-wealth score. In columns (3) and (4), we restrict attention to sub-castes below media on asset-wealth scores. Our running variable is the vote-margin of victory and is the difference between votes polled by the top 2 upper-tiered candidates and the average of the votes polled by the two of them. We estimate equations of the form described in the paper (equations 10. We estimate local polynomials on either side of the cutoff and use CCT triangular bandwidths. We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 8: Caste-Matching vs Electoral Incentives (RD)

	Small Margin Victors		Large Margin Victors	
	(1) **Total Projects (Year 1)**	(2) **Total Projects (Overall)**	(3) **Total Projects (Y1)**	(4) **Total Projects (Overall)**
Caste Differences	-0.06	0.03	-0.20*	-0.37*
	(0.12)	(0.19)	(0.12)	(0.19)
Observations	8512.00	8512.00	8564.00	8564.00
Control Mean	.43	1.16	.53	1.3
Bandwidth	230	230	230	230
Block FE	YES	YES	YES	YES

Outcome variables are either: (a) a binary variable that capture whether any WAS project was undertaken (Project Undertaken (Y/N); (b) The total number of projects undertaken (Total Projects). Small margin victors (columns (1) and (2) are those upper-tiered representatives who won their elections by a margin smaller than the median margin of victory. Large margin victors (columns (3) and (4)), consequently, are those who won elections by above median margin of victory. We run the same specification across these two different samples and report results. Caste differences is the treatment variable which takes the value of 1 if the SC-GP population is below the population threshold (and hence mismatch occurs). Upper-tiered representatives are almost always SC above the cutoff and virtually never SC below the cutoff. For SC lower-tiered representatives (who we restrict attention to here), this implies potential caste-matching above and no almost caste-matching below. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 8 and 9).We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 9: Do Lower-Tiered SC Representatives file more grievances upon winning elections? (RD)

	Impact of Winning on Grievances			
	(1) **Grievance Filed**	(2) **Public Grievance**	(3) **Local Government**	(4) **WAS Project**
Winning Election RD	0.028***	0.025***	0.021***	0.019***
	(0.005)	(0.004)	(0.003)	(0.003)
Observations	35761.00	35761.00	35761.00	35761.00
Control Mean	.03	.01	0	0
Lower Band	33.34	30.82	28.57	34.34
Upper Band	33.34	30.82	28.57	34.34

Outcome variables are as follows: (1) Total complaints filed by candidate; (2) Total Public complaints filed by candidate (3) Total local administration related complaints filed (4) Total WAS project-related complaints filed. Our sample comprises all winning and losing lower-tiered SC candidates. We estimate close-election based RD specification described in equation 11. We estimate CCT triangular bandwidths.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 10: Do SC Ward Members Complain Less Under Caste-Matching?

	Impact of SC-Reservation on Complaints by SC Ward Members				
	(1) **Local Government**	(2) **Public Goods**	(3) **WAS Goods**	(4) **Mention Ward**	(5) **Placebo Private**
Caste Differences (SC)	0.028**	0.037**	0.027**	0.008**	-0.009
	(0.012)	(0.018)	(0.012)	(0.004)	(0.009)
Observations	15821.00	15821.00	15821.00	15821.00	15821.00
Control Mean	.02	.03	.02	0	.02
Upper Band	233.03	227.83	231.51	334.55	262.41
GP FE	YES	YES	YES	YES	YES

Outcome variables are as follows: in column (1), we look at whether a grievance is filed by the lower-tiered representative; column (2) indicates whether a public grievance is filed; column (3) refers to whether a grievance is filed regarding GP-administration; column (4) indicates whether a grievance was filed that directly named the upper-tiered representative; column (5) indicates whether the text of the grievance contained the term "ward". Caste differences is the treatment variable which takes the value of 1 if the SC-GP population is below the population threshold (and hence mismatch occurs). For SC lower-tiered representatives (who we restrict attention to here), this implies potential caste-matching above and no almost caste-matching below. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 8 and 9).We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 11: Do non-SC Ward Members Complain Less Under Caste-Matching?

	Impact of SC-Reservation on Grievances by Non-SC Ward Members					
	(1)	(2)	(3)	(4)	(5)	(6)
	Grievance	**Public**	**Local Government**	**Mention Upper-Tier**	**Mention Ward**	**WAS**
Caste-Mismatch (NSC)	-0.020	0.002	-0.005	-0.004	-0.003	-0.004
	(0.031)	(0.015)	(0.007)	(0.005)	(0.006)	(0.005)
Observations	46390.00	46390.00	46390.00	46390.00	46390.00	46390.00
Control Mean	.06	.03	.01	.01	.01	.01
Lower Band	165.87	166.17	163.94	165.65	166.97	167.02
Upper Band	165.87	166.17	163.94	165.65	166.97	167.02
GP FE	YES	YES	YES	YES	YES	YES

All regressions are restricted to non-SC lower tiered representatives. Outcome variables are as follows: in column (1), we look at whether a grievance is filed by the lower-tiered representative; column (2) indicates whether a public grievance is filed; column (3) refers to whether a grievance is filed regarding GP-administration; column (4) indicates whether a grievance was filed that directly named the upper-tiered representative; column (5) indicates whether the text of the grievance contained the term "ward". Caste Differences (NSC) is the treatment variable which takes the value of 1 if the SC-GP population is above the population threshold. Upper-tiered representatives are almost always SC above the cutoff and virtually never SC below the cutoff. For NON-SC lower-tiered representatives (who we restrict attention to here), this implies (potential) caste-mismatch above and some caste-matching below. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 8 and 9).We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 12: How Representative is the Final Sample?

Variable	(1) Population	(2) Sample	(3) Difference
Margin of Victory (Ward)	27.051	27.806	0.756
	(23.800)	(24.305)	(0.721)
Votes Obtained (Ward)	157.134	161.389	4.254***
	(54.642)	(54.736)	(1.632)
Total Candidates (Ward)	2.659	2.680	0.021
	(1.253)	(1.264)	(0.035)
Age (Lower-Tiered Representative)	39.825	38.950	-0.875***
	(13.350)	(11.068)	(0.329)
Literate (Lower-Tiered Representative)	0.576	0.531	-0.045***
	(0.494)	(0.499)	(0.014)
Illiterate (Lower-Tiered Representative)	0.145	0.106	-0.039***
	(0.352)	(0.308)	(0.009)
Ward Reserved for SCs	0.645	0.616	-0.029**
	(0.479)	(0.486)	(0.013)
Margin of Victory (GP)	169.732	171.240	1.509
	(170.502)	(172.391)	(4.754)
Votes Obtained (GP)	1,242.712	1,260.360	17.648
	(500.574)	(504.305)	(13.892)
Total Candidates (GP)	12.470	12.504	0.035
	(5.456)	(5.459)	(0.151)
Age (Upper-Tiered Representative)	40.318	40.712	0.394
	(12.398)	(10.449)	(0.310)
Total Candidates (GP)	12.470	12.504	0.035
	(5.456)	(5.459)	(0.151)
Literate (Upper-Tiered Representative)	0.347	0.323	-0.025*
	(0.476)	(0.468)	(0.013)
Illiterate (Upper-Tiered Representative)	0.016	0.014	-0.001
	(0.124)	(0.118)	(0.003)
Observations	3,588	2,117	5,705

NOTE: Tables present category-wise averages and t-tests of difference in means.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$..

Table 13: Balance Checks for Grievance Filing Treatment

Variable	(1) Control	(2) Treatment	(3) Difference
Mean SC Wealth Score	0.083	0.115	0.032
	(0.656)	(0.687)	(0.035)
Mean non-SC Wealth Score	0.067	0.074	0.007
	(0.532)	(0.504)	(0.027)
Upper-Tiered Representative Age	40.710	40.838	0.128
	(10.561)	(9.891)	(0.534)
Proportion of SCs (Census 2011)	0.206	0.199	-0.007
	(0.096)	(0.088)	(0.005)
Distance to Nearest Statuatory Town (Census 2011)	24.252	23.726	-0.526
	(13.634)	(13.671)	(0.717)
Distance to District Headquarters (Census 2011)	35.800	34.912	-0.889
	(20.496)	(19.585)	(1.052)
Number of Villages in GP (Census 2011)	5.868	6.011	0.143
	(3.896)	(4.354)	(0.217)
Total GP Area (Census 2011)	1,166.405	1,111.029	-55.376
	(871.227)	(658.712)	(40.420)
Total Population of GP (Census 2011)	11,073.166	11,038.147	-35.019
	(3,372.965)	(2,779.267)	(159.983)
Percentages of SCs in Main SC Village (Census 2011)	32.956	32.205	-0.750
	(19.935)	(19.834)	(1.087)
Index of Public Goods (Census 2011)	0.087	0.095	0.008
	(0.325)	(0.323)	(0.017)
Wealth Score of Upper-Tiered Representative's Sub-caste	0.346	0.381	0.036
	(0.579)	(0.655)	(0.034)
Lower-Tiered Representative's Age	39.190	38.713	-0.478
	(11.169)	(10.854)	(0.572)
Lower-Tiered Representative's Gender	0.362	0.370	0.008
	(0.481)	(0.483)	(0.025)
Observations	760	727	1,629

NOTE: Tables present category-wise averages and t-tests of difference in means.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 14: Balance Checks for Info-Only Treatment

Variable	(1) Control	(2) Treatment	(3) Difference
Mean SC Wealth Score	0.068	0.035	-0.033
	(0.571)	(0.703)	(0.079)
Mean non-SC Wealth Score	0.022	0.082	0.060
	(0.515)	(0.529)	(0.064)
Upper-Tiered Representative Age	40.797	40.808	0.011
	(10.224)	(10.071)	(1.240)
Proportion of SCs (Census 2011)	0.193	0.198	0.005
	(0.090)	(0.075)	(0.010)
Distance to Nearest Statuatory Town (Census 2011)	25.004	23.449	-1.555
	(14.904)	(15.655)	(1.884)
Distance to District Headquarters (Census 2011)	36.478	33.685	-2.793
	(22.046)	(17.323)	(2.431)
Number of Villages in GP (Census 2011)	5.504	5.693	0.189
	(3.875)	(4.292)	(0.505)
Total GP Area (Census 2011)	1,100.919	1,008.475	-92.444
	(692.032)	(535.960)	(75.880)
Total Population of GP (Census 2011)	11,080.661	10,933.098	-147.563
	(3,021.192)	(3,046.847)	(368.973)
Percentages of SCs in Main SC Village (Census 2011)	29.822	34.375	4.553*
	(16.646)	(23.093)	(2.645)
Index of Public Goods (Census 2011)	0.140	0.094	-0.046
	(0.347)	(0.384)	(0.045)
Wealth Score of Upper-Tiered Representative's Sub-caste	0.238	0.326	0.088
	(0.502)	(0.649)	(0.075)
Lower-Tiered Representative's Age	38.411	38.138	-0.273
	(10.663)	(10.427)	(1.282)
Lower-Tiered Representative's Gender	0.348	0.446	0.098
	(0.478)	(0.499)	(0.060)
Observations	141	130	1,629

NOTE: Tables present category-wise averages and t-tests of difference in means.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

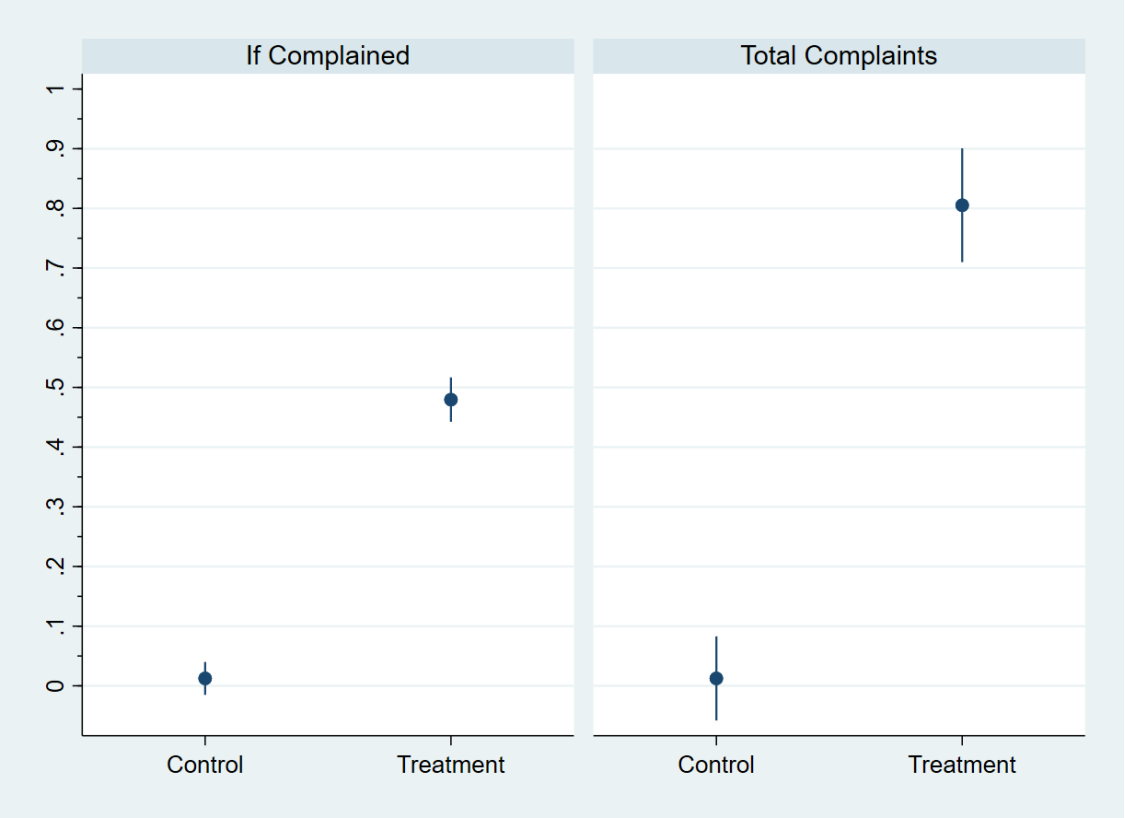

Figure 6: Figure plots the impact of our grievance filing treatment on (a) whether a complaint was filed and (b) the total complaints filed as per official administrative data on complaints filed. The graph shows a strong first stage, with nearly 50 % of those offered treatment taking-up.

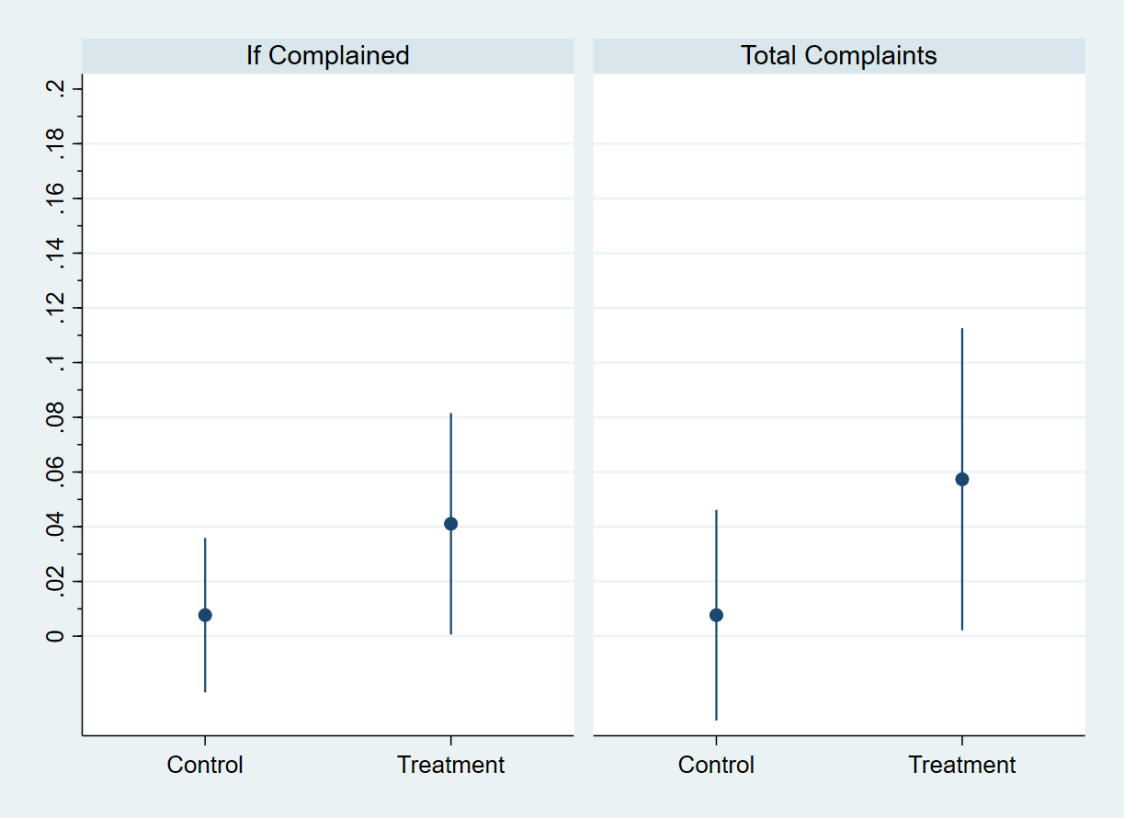

Figure 7: Figure plots the impact of our information treatment on (a) whether a complaint was filed and (b) the total complaints filed as per official administrative data on complaints filed. The graph shows a significant but muted first stage, with over 6 % of those given information regarding the grievance redressal system filing complaints.

Table 15: ITT Impact on WAS projects in a ward (Endline Survey)

	PANEL A: Problem Solved			
	(1)	(2)	(3)	(4)
Treatment	0.10***	0.07***	0.07***	0.10***
	(0.03)	(0.03)	(0.03)	(0.03)
Control Mean	.41	.41	.41	.41
	PANEL B: Total Projects Started/Starting This Week			
	(1)	(2)	(3)	(4)
Treatment	0.11***	0.08***	0.09***	0.11***
	(0.04)	(0.03)	(0.03)	(0.04)
Control Mean	.34	.34	.34	.34
	PANEL C: If Project Started			
	(1)	(2)	(3)	(4)
Treatment	0.06**	0.04*	0.04*	0.06**
	(0.03)	(0.02)	(0.02)	(0.03)
Control Mean	.27	.27	.27	.27
Observations	1370.00	1370.00	1370.00	1370.00
FE	Block	District	SubDivision	Block
Cluster	NO	NO	NO	YES
Pre-Specified	YES	NO	NO	NO

Table delineates the impact of the grievance-filing treatment on our three main outcome variables across different specifications. Each panel lists a different outcome. The first column - i.e specification (1) - across all three outcomes is our pre-specified estimating equation. Other columns vary the level of fixed effects and cluster errors at different levels. All regressions contain GP-level controls.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

Table 16: Spillover Impact of Treatment on Complaint Filing

	PANEL B: WITH BLOCK FIXED EFFECTS		
	(1) **Complaints**	(2) **Local Admin**	(3) **WAS**
Treated GP	0.0052***	0.0020**	0.0044**
	(0.0018)	(0.0010)	(0.0017)
Mean	.0046	.0021	.0028
Observations	1.3e+04	1.3e+04	1.3e+04
Block FE	YES	YES	YES
GP Controls	YES	YES	YES

Outcome variables are as follows: (1) Total complaints per ward; (2) Total local administration-related complaints per ward; (3) Total WAS project-related complaints per ward. All regressions restrict attention to GPs with only one experimental ward (either treatment or control). These form 82 % of our GPs. All regressions include *all* non-experimental lower-tiered representatives (for whom data is available) in these GPs. Standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

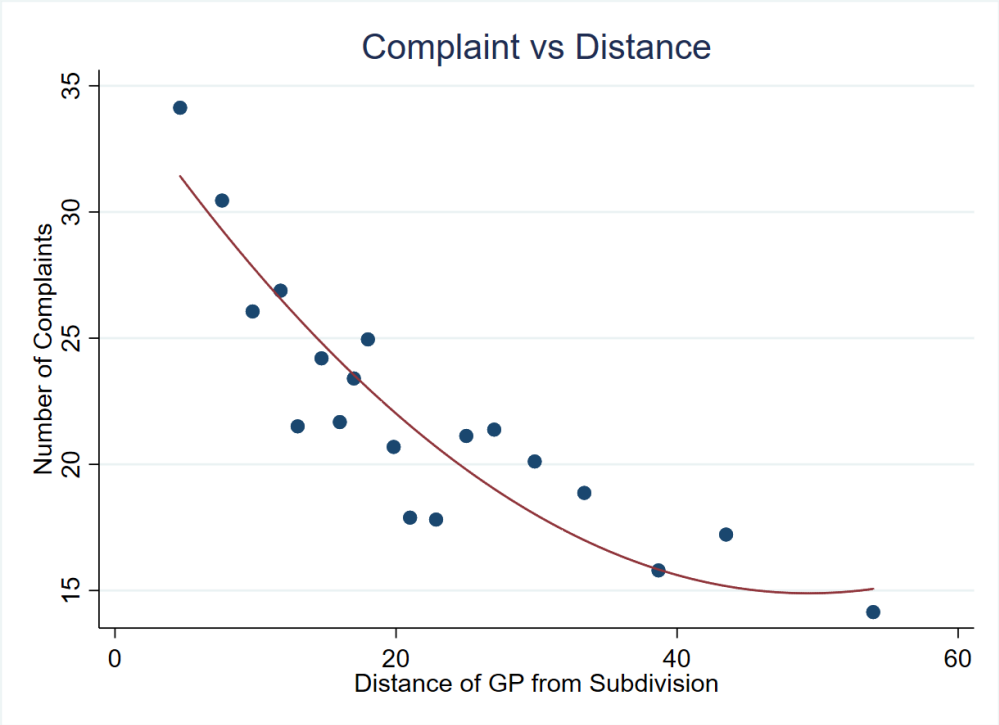

Figure 8: Figure plots number of grievances filed vs distance to the grievance redressal centre.

B Robustness Checks

Table 17: Impact of Reservation for SC on WAS Projects and Delays in non-SC wards (RD)

	Year 1		Year 2	
	(1) **Project Undertaken (Y/N)**	(2) **Total Projects**	(3) **Project Undertaken (Y/N)**	(4) **Total Projects**
Caste Differences (Non-SC)	0.03**	0.06	0.07	0.02
	(0.02)	(0.04)	(0.07)	(0.03)
Observations	52468.00	52468.00	52468.00	52468.00
Control Mean	.11	.17	.72	.35
Bandwidth	230	230	230	230
Upper Band	YES	YES	YES	YES

Outcome variables are either: (a) a binary variable that capture whether any WAS project was undertaken (Project Undertaken (Y/N); (b) The total number of projects undertaken (Total Projects). Caste-matching is the treatment variable which takes the value of 1 if the SC-GP population is above the cutoff and thus caste-matching occurs between the two tiers of representatives. We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 18: Robustness 1: 50 % Bandwidth

	Year 1		Year 2	
	(1) **Project Undertaken (Y/N)**	(2) **Project Undertaken (Y/N)**	(3) **Total Projects**	(4) **Total Projects**
Caste-Matching	0.12*	0.15**	0.27	0.42**
	(0.07)	(0.07)	(0.22)	(0.20)
Observations	22194.00	17179.00	22194.00	17179.00
Control Mean	.25	.25	1.24	1.24
Lower Band	115	115	115	115
Upper Band	115	115	115	115
Block FE	NO	YES	NO	YES

Outcome variables are either: (a) a binary variable that capture whether any WAS project was undertaken (Project Undertaken (Y/N); (b) The total number of projects undertaken (Total Projects). Caste-matching is the treatment variable which takes the value of 1 if the SC-GP population is above the cutoff and thus caste-matching occurs between the two tiers of representatives. We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level. $^{*}p < 0.1$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 19: Robustness 2: 150 % Bandwidth

	Year 1		Year 2	
	(1)	(2)	(3)	(4)
	Project Undertaken (Y/N)	**Project Undertaken (Y/N)**	**Total Projects**	**Total Projects**
Caste-Matching	0.08*	0.11**	0.11	0.18
	(0.04)	(0.04)	(0.13)	(0.14)
Observations	22194.00	17179.00	22194.00	17179.00
Control Mean	.26	.26	1.26	1.26
Lower Band	345	345	345	345
Upper Band	345	345	345	345
Block FE	NO	YES	NO	YES

Outcome variables are either: (a) a binary variable that capture whether any WAS project was undertaken (Project Undertaken (Y/N); (b) The total number of projects undertaken (Total Projects). Caste-matching is the treatment variable which takes the value of 1 if the SC-GP population is above the cutoff and thus caste-matching occurs between the two tiers of representatives. We control for GP-level covariates, ward-level covariates and Block-fixed effects. All standard errors are clustered at the GP-level.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

Table 20: Robustness

	PANEL A: Half Bandwidth					
	(1)	(2)	(3)	(4)	(5)	(6)
	Grievance	**Public**	**Local Government**	**Mention Upper-Tier**	**Mention Ward**	**WAS**
Caste-Matching (SC)	-0.146**	-0.104***	-0.070**	-0.017**	-0.073**	-0.064**
	(0.058)	(0.034)	(0.029)	(0.007)	(0.029)	(0.028)
Observations	16202.00	16202.00	16202.00	16202.00	16202.00	16202.00
Control Mean	.09	.05	.03	.01	.03	.03
Lower Band	115	115	115	115	115	115
Upper Band	115	115	115	115	115	115
GP FE	YES	YES	YES	YES	YES	YES
	PANEL B: 1.5 Bandwidth					
	(1)	(2)	(3)	(4)	(5)	(6)
	Grievance	**Public**	**Local Government**	**Mention Upper-Tier**	**Mention Ward**	**WAS**
Caste-Matching (SC)	-0.051	-0.052**	-0.040**	-0.015***	-0.042***	-0.039**
	(0.032)	(0.020)	(0.016)	(0.005)	(0.016)	(0.015)
Observations	16202.00	16202.00	16202.00	16202.00	16202.00	16202.00
Control Mean	.08	.04	.03	.01	.03	.03
Lower Band	345	345	345	345	345	345
Upper Band	345	345	345	345	345	345
GP FE	YES	YES	YES	YES	YES	YES

Panel A replicates Table 10 but with half the CCT triangular bandwidth. Panel B replicates Table 10 but with 1.5 times the CCT triangular bandwidth. The effects remain consistently negative across both types of bandwidths.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

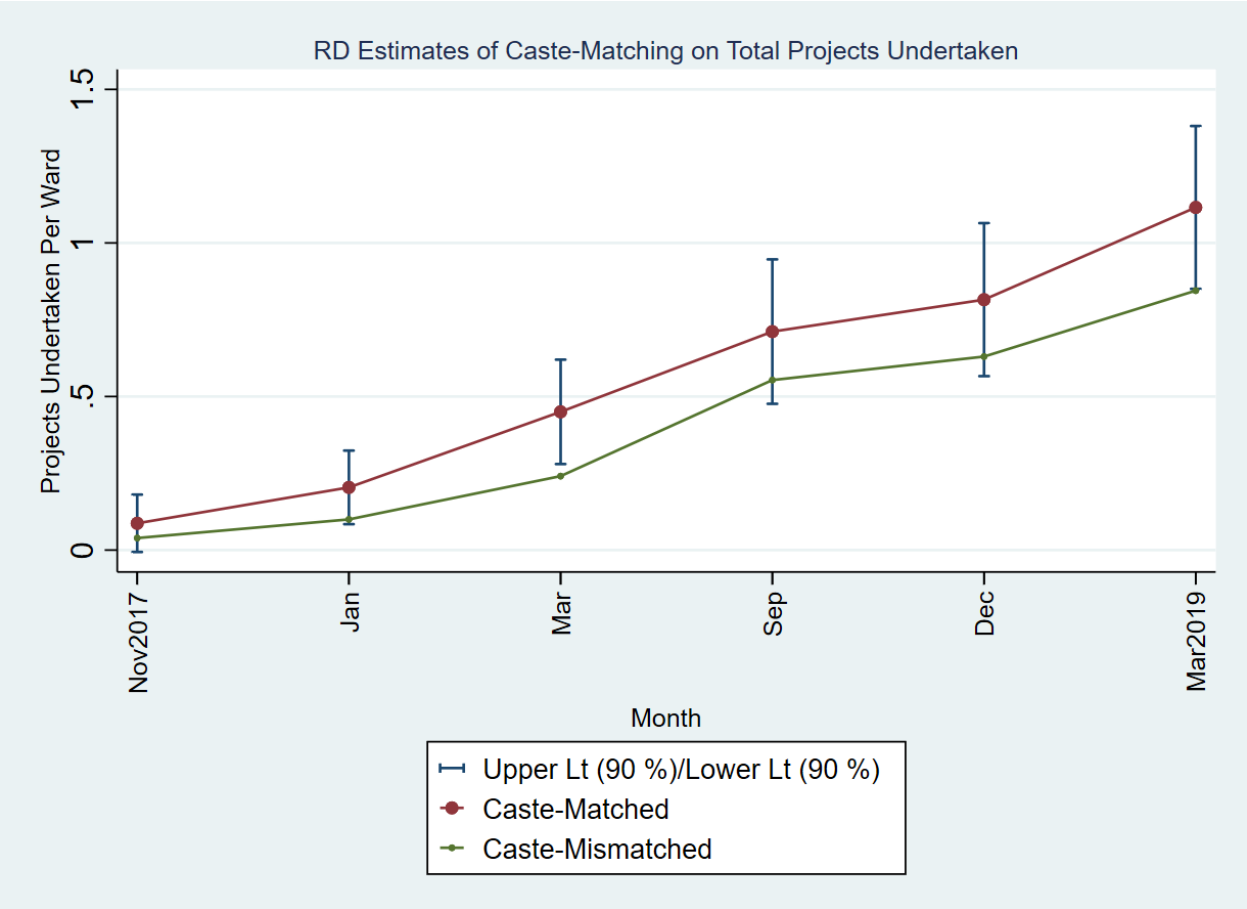

Figure 9: Figure plots the RD estimates on total projects undertaken in SC wards that are caste-matched and unmatched. The green line plots the "control group" estimates – i.e within a bandwidth of 200 below the RD cutoff; the red line shows the same plot, but by adding the RD treatment impacts to the control estimate. Block fixed effects and other controls are also added. As the figure shows, caste-matching improves likelihood of projects being undertaken across the board.

Table 21: Impact of Caste-Matching on How Projects Are Implemented (RD)

	Impact of Caste Matching on WAS Work (RD)			
	(1)	(2)	(3)	(4)
	Incomplete	**Delay**	**Contractor**	**Trouble Upper Tier**
Caste-Matching	-0.21	-0.23*	0.09	-0.11
	(0.13)	(0.12)	(0.12)	(0.07)
Observations	237.00	232.00	223.00	237.00
Control Mean	.24	.41	.62	.09
Lower Band	100	100	100	100
Upper Band	100	100	100	100
Block FE	NO	NO	NO	NO
GP Controls	NO	NO	NO	NO

Outcome variables are in the following order: (1) Scheme Incomplete or Not done (2) Delay of over 5 months in implementation (3) Whether they hired the contractor or somebody else did (4) Faced trouble from the upper-tiered representative. Our sample comprises SC-wards in randomly sampled GPs from either side of the RD cutoff within a bandwidth of 100. Caste-matching is the treatment variable which takes the value of 1 if the SC-GP population is above the cutoff and thus caste-matching occurs between the two tiers of representatives. All standard errors are clustered at the GP-level where indicated.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$.

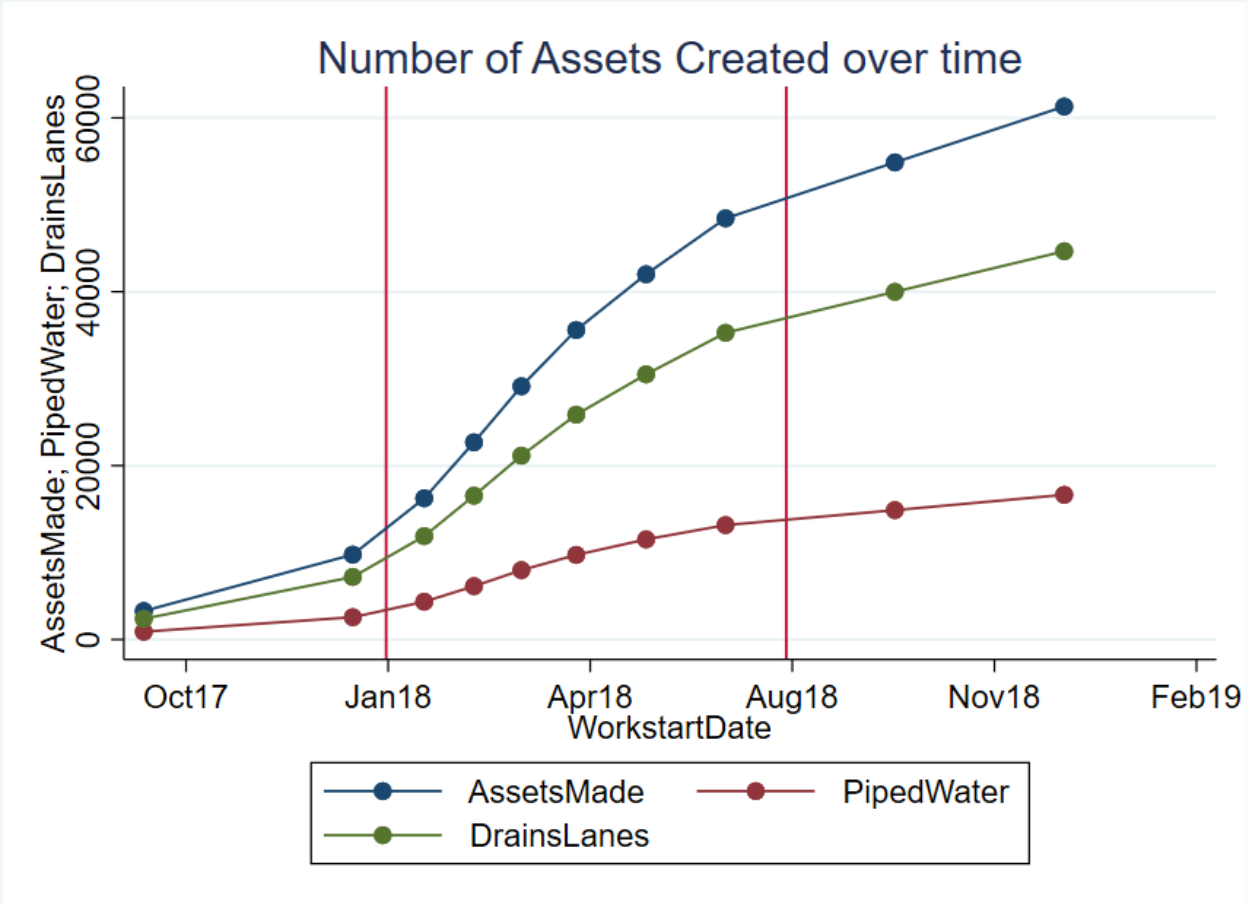

Figure 10: Graph plots the total WAS assets created as per official records.

C Caste Matching with the upper-tiered bureaucrat (BDO)

C.0.1 BDO Demographic Data

We collect demographic (including caste) information on over 600 Bihar Administrative Bureaucrats who have served as Block Development Officers in the period June 2016 - May 2019. The lists of bureaucrats - including transfers - are collected from government sources, but demographic information is obtained via interviews with upper-tiered representatives who function in close contact with BDOs. For every BDO, we triangulate information across a minimum of 3 upper-tiered representatives.

C.1 OLS Fixed Effects

To understand how caste-matching with the upper-tiered bureaucrat affects outcomes in wards, we run an OLS specification with both ward- and bureaucrat fixed effects. Thus, for each ward-bureaucrat combination, we measure the number of projects initiated in the following manner:

$$Y_{ib} = \gamma_0 + \gamma_1 CasteMatch_{ib} + \gamma_2 CasteMatch_{ib} * 1(C_i = SC) + \zeta + \psi + \eta_{ib} \tag{14}$$

where Y_{ib} is the number of projects constructed in ward i under bureaucrat b. C_i indicates the caste of the member i. $CasteMatch_{ib}$ is a dummy that takes the value 1 when the caste of the bureaucrat and the lower-tiered representative matches. We are interested in γ_2 - the impact of caste-matching when the lower-tiered representative is an SC.

We present OLS estimates (with bureaucrat and ward fixed effects) as in equation 14 for caste-matching between the upper-tiered bureaucrat and the lower-tiered representative on WAS outcomes. Table 22 presents the results. Columns (2) and (5) document that caste-matching results in more WAS assets being constructed in the SC lower-tiered representative's ward. In column (3), we restrict our attention to wards where an SC narrowly won or lost elections against non-SC members - thus, for these wards, caste-matching is as if random for SC ward members. Here too, we find strong and significant effects of caste-matching on WAS projects being undertaken.

Table 22: Impact of Caste-Matching with bureaucrat on WAS Projects and Delays (RD)

	Before March 2018		Overall	
	(1)	(2)	(3)	(4)
	Total Projects	**Total Projects**	**Total Projects**	**Total Projects**
BDO+Ward Caste Match	0.01	0.05	0.00	-0.17
	(0.01)	(0.09)	(0.01)	(0.16)
BDO+Ward Caste Match=1 × SC	0.07***		0.14***	
	(0.02)		(0.03)	
BDO+Ward Caste Match=1 × NarrowWin=1		0.07		0.51*
		(0.17)		(0.30)
Constant	0.13***	0.10***	0.37***	0.38***
	(0.00)	(0.02)	(0.00)	(0.04)
Observations	98497.00	1365.00	98497.00	1365.00
Ward Fixed Effects	YES	YES	YES	YES
BDO Fixed Effects	YES	YES	YES	YES

Outcome variable is the number of projects initiated in the term-period of a bureaucrat. We control for ward-level fixed effects and bureaucrat-fixed effects. NarrowLoss indicates a dummy variable where an SC-ward member narrow lost an election in an unreserved ward. All standard errors are clustered at the GP-level where indicated.

D Reservation Rule

D.1 Reservation rule for 2006

The reservation rule proceeds in the following manner:

- First, based on the proportion of SCs (STs) in the block, the number of GPs to be reserved for SCs (STs) is decided. If there are N_j GPs in block j and θ_j is the proportion of SCs (STs) in block j, then the number of GPs, n_j, to be reserved is

$$n_j = round(\theta_j * N_j, 1)$$

- Let n_{SC} and n_{ST} be the number of GPs to be reserved in block j for SCs and STs, respectively. The number of GPs to be reserved for OBCs is given by

$$n_{OBC} = min(round(0.2 * N_j, 1), round(0.5 * N_j - n_{SC} - n_{ST}, 1))$$

- If there are no STs in the block or n_{ST} is 0 (which is true in 480 of the 534 blocks), then the rule skips to the next step. However, if $n_{ST} > 0$, the rule proceeds by arranging all GPs in descending order of their ST population. The first GP in the list is then reserved for STs.

- Now, all remaining GPs are rearranged in the descending order of their non SCST population. The first GP on this truncated list is "blocked". The choice of word is deliberate and conveys an important distinction: the GP is not "reserved", it is merely blocked.

- Now, all unreserved and unblocked GPs are rearranged in descending order of their SC population. The first GP in this further truncated list is now reserved for SCs.

- This algorithm proceeds until the number of GPs reserved for STs = n_{ST} or the number reserved for SCs is n_{SC}. Once, a group hits its quota of reserved GPs, then the rearranging of GPs is no longer done by that group. For instance, if $n_{ST} = 1$, then, in the second round, GPs are no longer rearranged by ST population - instead, the rule proceeds straight to rearranging by non-SCST population.

- The algorithm further proceeds till the second group also hits its quota of reserved GPs. This throws up two sets of GPs, n_{ST} GPs that are reserved for STs and n_{SC} GPs that are reserved for SCs.

- Now, all the unreserved GPs (including the "blocked" ones) are collected and arranged by descending order of GP population.

- The first n_{OBC} GPs in this list is reserved for OBCs.
- Thus, for each block, one can arrive at an SC population cut-off - the population of the last GP to be reserved for SCs - below which no GP is reserved.

D.2 Reservation rule for 2016

The reservation rule for 2016 proceeds in a similar manner to that of 2006, with two major changes. First, it changes the order in which GPs are arranged. In 2006, GPs were arranged first by STs, then non-SCSTs, then SCs. In 2016, GPs are arranged first by non-SCSTs, then by SCs, then by STs. Second, since there is no provision for recurring reservation, no GP previously reserved for SCs (STs/OBCs) can again be reserved for the same. So, when GPs are arranged by descending order of population of a particular group, those previously reserved are struck off the list, even before the algorithm begins.

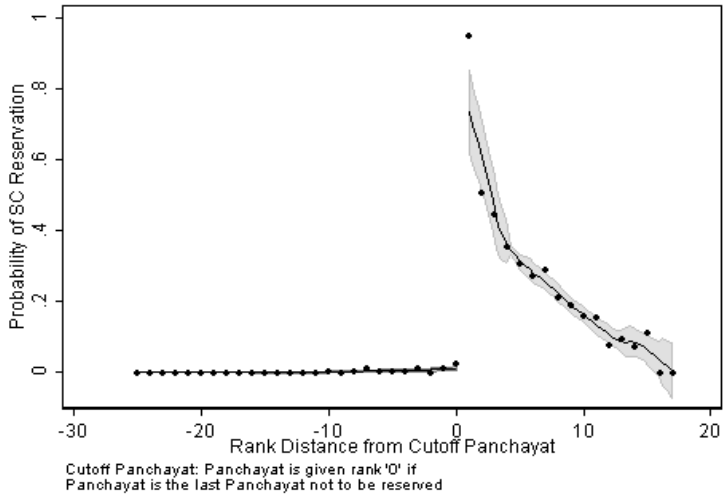

Figure 11: Figure plots the probability of reservation based on the rank of a GP within a Block for the elections of 2016. The last GP not to be reserved is given a rank 0 and the first GP to be reserved is ranked 1 and so on. Therefore, all negative ranks correspond to GPs not to be reserved and positive ones to GPs to be reserved. We keep all GPs reserved for OBCs too, which explains the sharp drop in the probability of reservation above the cutoff (since OBC reservation results in some top-ranked GPs in terms of SC population to be reserved for OBCs). Panel B plots the probability of reservation based on the rank of a GP within a Block for the elections of 2016, but we keep all GPs.

E Spillovers and Backlash

E.1 Spillovers

For spillovers in projects undertaken, we can only observe administrative data with a considerable lag. Thus, there exist few reported projects in the administrative data in the post-experimental period. We instead use survey data to measure spillovers on a specific subset of wards. At baseline, we asked every respondent to name a maximum of 3 other lower-tiered representatives who they were "close" to. In the endline, we ask if projects were initiated in these "close"-representatives' wards in the experimental period. We expect this data to have some noise - since estimating timelines of projects in neighbouring jurisdictions could be tricky - but limiting our attention to only those wards that are governed by members "close" to our experimental respondent allows us to be more confident of our reported estimates. As Panel C of Table 23 shows, we find no effect of the intervention on reported projects being undertaken in neighbouring wards.

E.2 Backlash

We now turn to effects on backlash from the upper-tiered representative. As Table 23 shows, we cannot reject the null that treatment does not increase contact by the upper-tiered representatives or that the respondents report facing no greater threats (though the signs of the coefficients are positive).

Table 23: ITT Impact of Grievance Treatment on Outcomes (Endline Survey)

	PANEL A: Someone Approached	
	(1)	(2)
Treatment	0.02	0.02
	(0.03)	(0.04)
Control Mean	.49	.49
	PANEL B: Someone Threatenned	
	(1)	(2)
Treatment	0.01	0.01
	(0.01)	(0.01)
Control Mean	.02	.02
	PANEL C: Close Ward Projects (Number)	
	(1)	(2)
Treatment	0.04	0.04
	(0.05)	(0.05)
Control Mean	.61	.61
Observations	1370.00	1370.00
FE	Block	Block
Cluster	NO	YES
Pre-Specified	YES	NO

Table delineates the impact of grievance-filing treatment on three ancillary outcome variables across different specifications. Each panel considers lists a different outcome Panel A Outcome is whether someone from the administration approached our respondent post intervention. Panel B is whether anybody from the administration threatened them. Panel C is the average number of projects undertaken in close wards. The first column - i.e specification (1) - across the two columns is our pre-specified estimating equation. Other columns vary the level of fixed effects and cluster at different levels.*$p < 0.1$, **$p < 0.05$, ***$p < 0.01$

F Classifying Complaints

To get a better sense of the types of complaints being filed, we classify complaints into "Public(-Spirited)" and "Private" complaints. In our data, complaints are sorted by Department (44 departments - land, police, rural development etc) and Type (there are over 2000 types). We focus on the top 280 types of complaints which account for nearly 90 % of the grievances filed and classify them using the following definitions:

- *Any complaint is considered public or public-spirited if the resolution to the complaint benefits more than one person (say, construction of a Panchayat Bhavan in the Panchayat).*
- *Any complaint is considered private if the resolution of the complaint results in the benefits of only oneself.*
- *For the class of complaints where it is difficult to ascertain who the final beneficiary is, we consider them neither Private nor Public.*

G Sampling and Randomization for RCT

Our sampling frame comprising all wards that, according to official government data in May 2019, had:

1. Had not seen any water-and-sanitation asset construction AND
2. Have a representative who belongs to a Scheduled caste.

Now, as explained previously, upon piloting we discovered that the official data reports asset construction with a lag. Hence, we have a series of screening questions to screen out wards where WAS projects have been completed.

Subsequently, local representatives are randomized into one the two treatments arms or the control arm. Randomization occurs in real-time on the survey app the enumerators use. Representatives are equally likely to be randomized into either of the treated arms or the control arm. However, since we want to detect smaller sized effects in Treatment G and power calculations suggest that we would require about 6 times as many wards to see the effect sizes we want to see, our experiment began with only two arms, Treatment G and Control, occurring with equal probability. Subsequently, the third treatment arm - Treatment I - was added and all three arms were to occur with equal probability.

We attempted to cover about 800 Treatment G wards, 150 Treatment I wards and 800 control wards. The actual numbers were as follows: 722 Treatment G wards, 130 Treated I wards and 760 Control wards.