The Short- and Long-Run Distributional Consequences of Political Reservation*

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Abstract

A key goal of affirmative action policies is to reduce disparities between disadvantaged minority groups and others. We study one such policy: mandated political representation ("reservation") in favour of the marginalized Scheduled Caste (SC) groups in India. Using secondary data on public goods from across 45,000 villages, private assets from over 19 million rural households, political candidacy data of over 300,000 candidates and a primary survey of nearly 8,000 households from the state of Bihar, we study how political reservation affects inter-group/intra-group disparities in the short- and long-run. Using a regression discontinuity design framework, we show that political reservation in favour of SCs for the post of local government head (a) lowers SC-non-SC disparities in access to public goods in the short-run (5 years later) and long-run (13 years later) (b) lowers inter-group private asset inequality modestly in the short-run and substantially in the long-run (c) creates different sets of winners and losers *within* SCs and non-SCs (d) has no efficiency consequences in the short-run and (e) increases political participation and presence of SCs in local government in the long-run. Turning to mechanisms, we show that government programs are better targeted towards SCs in reserved constituencies, with effects persisting even after reservation is no longer in place. Our results suggest a virtuous cycle between political representation and resource access, each driving the other to reap significant benefits for minority groups in the long run.

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1 Introduction

Across the world, inequality has been rising for decades (Zucman, 2019). A common tool to tackle inter-group inequality has been affirmative action policies in favour of minorities. In this paper, we focus on one such policy: ethnic quotas in local government – or political "reservation" (Pande, 2003) (Duflo, 2005) – for members from socioeconomically disadvantaged groups.

A body of literature documents how reservation affects outcomes for marginalized castes in India (Pande (2003), Besley et al. (2004)). Our main contribution to the literature is to establish how reservation affects allocation of resources – public goods, private assets and political posts – across- and within-castes, over the short- *and* long-run. To do so, we brings to bear a wealth of data sources from the Indian state of Bihar – a census of nearly 20 million rural households, public goods from all its 45,000 villages and data on over 300,000 local political actors – and delineate impacts both on the targeted minority groups and map out distributional effects across all households and villages.

This paper focuses on reservation of posts for the post of village head in favour of Scheduled Castes (SCs). Bihar has over 8400 Gram Panchayats (GPs –"village councils"). GPs are run by an elected representative, the village head.[1] SCs are a collection of heterogeneous sub-castes who occupy the bottom rung of the caste hierarchy and have historically experienced the most discrimination. Comprising about 17% of the entire population of the state and rarely forming the majority of persons in the GP, SCs are too marginalized to be elected as village heads in the absence of political reservation. Starting with the elections of 2006, about 17 % of village head posts were "reserved" for Scheduled Castes (SCs).

Our empirical strategy exploits the algorithm used to reserve village head posts for Scheduled Castes (SCs). This population-based rule mandates that GPs with SC populations above a threshold will only have an SC village head. In practice, GPs just above the population threshold are 80 percentage points (p.p) likelier to be reserved than those marginally below. By focusing on outcomes from GPs on either side of the threshold, we can causally measure the impact of SC reservation using a fuzzy regression discontinuity design (RD) framework.

Bihar reserved seats for two consecutive election cycles. A GP reserved in 2006 had, by law, an SC head from 2006 - 2016. Consequently, in the GP elections of 2011, only SCs could contest in reserved GPs. Our outcomes span the entire 10 years from 2006 - 2016 and beyond. In the short-run, we collect village-level public good data from 2011, politician characteristics from 2011 and household-level private assets from 2012. For the long-run, we collect politician characteristics

[1] These heads are locally called "Mukhiyas".

from 2016, public goods from 2016-18 and private assets from 2018-19.[2]

Our first set of results show that SC reservation reduces private asset inequality between SCs and non-SCs, modestly in the short-run and substantially in the long-run. We employ asset data from a state-wide census of *all* rural households conducted in 2011-12 (the Socioeconomic Caste Census) to calculate asset scores. We show that SC reservation reduces the difference in the average asset scores between SCs and non-SCs by 0.08 SD. This is driven partly by an *increase* (statistically insignificant) in mean SC asset scores and a *decrease* in non-SC asset scores (also statistically insignificant).[3] We find no evidence of an equity-efficiency trade-off: overall, reservation has no impact on the mean or median asset score of a household in the GP.

How is within-group inequality in asset wealth affected? We are powered to see effects in the short-run. We measure catch-up of SC households with the median non-SC quintile in each GP across the 4 SC quartiles. The estimate of the impact of reservation on the mean asset score is positive across all quartiles, but significantly so only for the 3rd (0.1 SD, p=0.069) and 4th quartiles (0.13 SD, p = 0.027). Households in the top decile of the SC distribution are 0.18 SD ($p < 0.01$) better off in reserved GPs than their counterparts in unreserved GPs. This, then, suggests a slight increase in inequality within SCs.

Who among SCs benefits? First, we show that the "dominant caste" (Srinivas et al., 1955) within SCs, as defined by the numerically largest sub-caste, does not benefit more than the average SC. We proxy sub-castes by surnames. There is some evidence that members of the dominant non-SC are marginally worse off (-0.07 SD, p = 0.128). We then show that, consistent with the literature on clientelism and coethnic favoritism, reservation brings more benefits to those who are "close" to the village head, either owing to sharing the same surname (which we use as a proxy for subcaste) or living close to the elected village head. To do so, we first track down the village head's household in the SECC data, matching on head-level demographics. We are able to trace 61% of SC village heads. We then show that those close to the head are relatively better off. Having the same surname as the village head is associated with a 0.33 SD increase in catch-up; the commensurate figure is 0.86 SD for households within a 20-household distance of the village head and 1.47 SD for the village head's own household.

In order to measure impacts in the long-run, we rely on a primary survey we conducted of 7874 households across 99 GPs in 2019. Our "treated" GPs would have had exactly ten years (out of 13) of SC reservation and our "control" GPs would have had at most three years of SC reservation. Our primary survey tracks all but one of the private assets used to calculate the asset score from

[2]See Figure A1 in the Appendix for a visual representation of the various events and data sources in this paper.

[3]Throughout this paper, we drop Scheduled Tribes (STs) from our analysis. They comprise only 1.6% of households in the SECC data.

the 2012 census data.[4] We replicate the procedure to create asset indices and find that political reservation results in further catch-up between SCs and non-SCs. Despite the small sample, our point estimates on the reduction in difference in asset scores between the two groups (0.8 SD improvement) are large and significant and robust to changing bandwidths. The lower end of the 95% confidence interval shows a 0.22 SD improvement in SCs' relative asset scores.

Our second set of results show that political reservation improves public good access for SCs in the short- and long-run. Using population data from the decennial Census of India (2001), we identify the main SC village in the GP as the one where the most SCs live. To determine public good provision, we bring to bear data from the Census Village Amenities List (2011). We focus on 4 key public goods that a survey of village heads from 22 districts of Bihar revealed as the most important: construction of government primary schools, creation of functional ration shops, construction of roads and building child nutritional centres (Anganwadi centres). Following Duflo et al. (2005), we calculate the population normalized share of these public goods accruing to the main SC village in reserved and unreserved GPs. After five years of reservation (2006-2010), we find that this share increases by 0.2 SD in reserved GPs. We do not find any evidence of an equity-efficiency trade-off: the availability of public goods at the GP-level remains unaffected.

For long-run public good outcomes, we focus on a set of key water and sanitation (WAS) schemes that were launched after 2016, when the reservation cycle had switched. Once more, we find that *past* reservation increases the population normalized share of public goods going to SC wards in the GP by 0.16 SD. Thus, reservation improves outcomes for SCs, both in the short- and long-run, for public and private goods.

Our third finding is that reservation at the GP-level increases political participation of SCs in local government in the long-run. We begin by showing that SC village heads continue to win elections even in the absence of reservation. Many GPs that narrowly missed out on being reserved in 2006 are reserved in 2016. Hence we drop these in our analysis and restrict attention to GPs that are currently unreserved in 2016-2021 cycle. In other words, we compare GPs that were reserved in 2006 with GPs that were never reserved. We find that even in the absence of reservation, formerly reserved GPs are six times as likely to have an SC village head than GPs that were never reserved.

Reservation also improves political participation at lower tiers of government. Each GP comprises 13.6 wards on average. Bihar has a robust electoral system at the ward level. Reverting back to our full sample, we find that having an SC village head for 10 years causes a 30% increase in the number of SC winners from unreserved wards in the ward elections.[5]

[4] We do not collect data on phone ownership – but other work suggests that this would not prove informative since phone ownership is near universal.

[5] The number of winners from SC-reserved wards stays the same. This is trivially the case since the number of wards does not jump across the RD threshold.

Turning to mechanisms, we find, consistent with Besley et al. (2004), greater targeting of government schemes towards SCs in reserved GPs. We look at work-days provided under the National Rural Employment Guarantee Act (NREGA) in the last two years of the reservation cycle, i.e April 1st 2014 - March 31st 2016. We find that the population normalized share of households receiving 100 days of work increases by 0.17 SD. Second, we turn to house construction under the Pradhan Mantri Awas Yojana (PMAY). The data for PMAY is available only for years after 2016, when the reservation cycle switched. This, however, works to our advantage: at least some of the impacts we see could be attributed to the persistence of reservation's impacts even after the cycle is switched. We look at cumulative number of houses constructed up to 2019, the year our primary household survey measuring long-run effects was conducted. We find that the population normalized share of houses constructed for SCs rises by 0.13 SD. Quality of the house is a key component of our asset index, so this result is consistent with the increase in asset scores for SCs in the long-run. In addition, increased political participation could also explain part of the persistence of reservation's impact in channeling resources – public goods and private assets – towards SCs in the long-run. Finally, we reject the mechanism that the long-run consequences are because SC heads are likelier to be re-elected for a second term.

Previous literature on political reservation shows low to modest distributional impacts of political reservation on access to public goods (Besley et al. (2004), Jensenius (2015), Duflo et al. (2005)) or private gains such as benefits from anti-poverty programs (Pande (2003), Gulzar et al. (2020), Das et al. (2017), Dunning and Nilekani (2013), Bardhan et al. (2010) Chin and Prakash (2011)). This paper simultaneously focuses on a range of outcomes across multiple electoral cycles and shows that impacts could vary considerably across types of outcomes measured and in the short- and the long-run.[6]

There is a strand of literature on affirmative action that theorizes and measures efficiency-equity trade-offs for such policies (Loury (1992), Anderson and Francois (2017)): our study, like Bhavnani and Lee (2019), shows that such trade-offs may be less powerful than theoretically predicted. While we neither find evidence of efficiency gains (Das et al. (2017)) nor losses (Afridi et al. (2017)), we show that there are significant distributional gains, especially over longer time horizons. The nascent literature on political impacts of affirmative action – especially political reservation – has found positive long-run effects for women (Beaman et al. (2009), Bhavnani (2009)), but no effects for SC reservation for non-local political posts (Bhavnani (2017)).[7] This paper shows that there could be significant gains at the local level too.

[6] Gulzar et al. (2020) find that political reservation for Scheduled Tribes (STs) causes no efficiency losses, but substantial redistribution towards STs across a series of government schemes, including the NREGA.

[7] See also Auerbach and Ziegfeld (2020) for a comprehensive discussion on contemporaneous effects of political reservation across multiple tiers of government in India.

The popular discourse in India on reservations characterizes these as policies that either prove empowering for minorities or inefficient and ineffective, benefiting only an undeserving elite among the targeted group. This paper, in the tradition of empirical works challenging these facile binaries (Chauchard (2017), Chattopadhyay and Duflo (2004)), argues that the impacts can be quite complex. The answers depend on types of outcomes evaluated, their time-horizons and the nature of the comparisons being made.

2 Context

2.1 Scheduled Castes (SC) of Bihar

Bihar is arguably India's poorest state, with a population of over 130 million. Over 85% of Bihar lives in villages. SCs comprise 17% of Bihar. Historically SCs 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 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".

2.2 Local Administrative Structure

Bihar's villages are grouped into administrative units called Gram Panchayats (GP). There are over 8400 GPs in Bihar. Each GP is headed by an elected representative called the "Mukhiya". Each GP is divided into wards. There are over 114000 wards in Bihar. Each ward is headed by an elected ward member.

While elections for the village head's post were held since 2001, the year 2006 marked the beginning of political reservations for disadvantaged groups and women. This considerably changed the composition of the new cohort of Mukhiyas. In 2001, when there was no reservation, roughly 1 % of Mukhiyas were SCs (Gupta, 2002). This number went up to nearly 17 % in 2006.

3 Data Sources

This project brings together multiple secondary data sources and one primary survey.

First, from the State Election Commission in Bihar, we collected data on reserved and unreserved Panchayats and characteristics of village heads elected in 2006 (N = 8380, 99.7%), 2011 (N = 3489; 41.5%) and 2016 (N = 7736; 92.1%). We also have data on ward members and ward candidates from the 2016 elections (N = 96754; 84.9%).

Second, we collect data on census village characteristics using Census of India's Village Amenities Surveys of 2011. This allows us to not merely collect details on availability of various types of public goods in villages in reserved and unreserved GPs, but also contains indicators related to size, demographics and geography of these villages.

Third, we use the Socio Economic Caste Census (SECC). This survey, conducted in 2012, covered all rural households - nearly 20 million - of Bihar. The survey allows us to create our main asset- and caste indicators.

Fourth, we collect data on over 98,000 local government-constructed projects constructed under (a) piped water and (b) village lanes and drains scheme. These public goods are described and studied in detail by (Sharan and Kumar, 2019).

Finally, in 2019-20, we collected primary data on the main assets covered under the SECC across 99 GPs and 7874 households across rural Bihar. While households were randomly sampled from two villages in every GP, SCs were over-sampled: we end up with a sample comprising 38% SCs (across GPs whose proportion of SCs in 2001 was 18.5%).

4 Empirical Strategy

Bihar is divided into 38 districts, which are further divided into 534 blocks and 8400 GPs. Within each block, the number of GPs, say N to be reserved are determined based on (a) the total number of GPs in the block and (b) the share of SCs in that block. Once N is determined, GPs in the block are arranged in descending order of SC population and the top N GPs are reserved. Thus, within each block, the rule for reservation gives rise to an exogenous SC population cut-off below which no GP is reserved.

Above this threshold, however, not all GPs are reserved for SCs, as some are blocked to be reserved for Other Backward Classes (OBCs). In practice, as Figure 1(b) shows, the first stage results in a near 80 % jump in the probability of reservation[8]. Thus, we have a fuzzy pooled RD with a strong

[8]In addition, the reservation rule was not perfectly implemented – about 1.5 % of the GPs (including 33 SC reserved GPs) are to be reserved as per our reproduction of the algorithm, but are not reserved as per election commission records. We asked election officials serving at the time about this and were told this may have been because of the following reasons: officers calculating the cut-off wrongly; disputes regarding actual SC population

first stage.

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

$$Running_{ij} = SCPop_{ij} - (\frac{SCPop_{1j} + SCPop_{0j}}{2}) \tag{1}$$

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.

Following Calonico et al. (2019), we estimate a fuzzy regression discontinuity design with covariates. Essentially, our primary specification uses a local linear regression within the Calonico-Cattaneo-Titiunik (CCT) triangular bandwidth[9] of the treatment threshold, and controls for the running variable (SC population in the GP) and a small number of covariates, in addition to block fixed effects, on either side of the threshold. Block fixed effects are useful since we have a different threshold for each block. We use the following two-stage instrumental variables specification:

$$\begin{aligned} Reserved_{gb} = \gamma_0 + \gamma_1 1(SCPop_{gb} > T_b) + \gamma_2(SCPop_{gb} - T_b) + \\ \gamma_3(SCPop_{gb} - T) * 1(SCPop_{gb} >= T_b) + \delta * X_g + \psi + \eta_{gb} \end{aligned} \tag{2}$$

$$\begin{aligned} Y_{gb} = \beta_0 + \beta_1 Reserved_{gb} + \beta_2(SCPop_{gb} - T_b) + \\ \beta_3(SCPop_{gb} - T) * 1(SCPop_{gb} >= T_b) + \omega * X_g + \alpha + \epsilon_{gb} \end{aligned} \tag{3}$$

where Y_{gb} is the outcome of interest in 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 and psi indicates block fixed effects. eta_{gb} and ϵ_{gb} 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, total area of the village and number of villages in the GP.[10] We cluster standard errors at the block-level.

figures; manipulation by local officials of the status of reservation of GPs. At least one instance of manipulation was flagged and officials punished.

[9] For estimating long-run effects of reservation on private assets, we fix the bandwidth to be 150, because we are working with a sample of GPs that were explicitly chosen from around the RD threshold. Section 6.1 has more.

[10] Table B4 in the appendix shows that all our main results remain unchanged even when we drop all the controls.

Figure 1(a) performs a McCrary test on the running variable and shows there is little evidence to suggest any manipulation. Table B1 (appendix) presents balance tests for a host of GP level controls. The main threat to validity of this specification is the fact that SC reserved GPs close to the cutoff are much less likely to be female reserved than their non-SC reserved counterparts. This is an artefact of the reservation rule for women. In some sense, our main treatment effect, therefore, is more likely to be the impact of having an SC male village head vs a typical non-SC head (40% of those close to the threshold are women). Following Calonico et al. (2019), we control for female reservation in *all* our specifications. This – and the fact that, in 2006 in Bihar, men acted as proxies for women, mitigate some of these concerns.

5 Short-Run Impacts

5.1 Private Assets

We create an asset index based on 6 binary asset indicators found in the SECC dataset. We focus on ownership of the most common assets from the data: land; type of the roof (concrete or not) and wall (whether made of burnt brick or concrete) of the main dwelling room of the house structure; whether the house has 4 or more rooms; whether the household has a phone; whether the household owns a vehicle. Each of these assets is owned by at least 10 % of the population (see Figure A3 in the Appendix for a comparison of asset ownership between SCs and non-SCs.)

For each household, we create two types of asset scores: a "raw sum of assets" score, where each indicator gives the household one point; a PCA score of all assets (first component). Our private asset index is simply the standardized sum of the two scores.[11]

We first show that reservation has no impact on average private asset score of a household in a GP (Table 1, column (1)). This is an important fact to establish because reserved leaders come from worse socioeconomic backgrounds: they earn less, attain fewer years of schooling and are more likely to be first-time leaders. Yet, they perform just as well as the non-SC village heads on this metric.

However, this masks considerable variation, since there are distributional impacts, both across- and within-groups. Column (2) of Table 1 shows that the difference between SCs and non-SC asset scores falls by 0.084 SD in reserved GPs. These results are robust to changing the bandwidth (Tables 1, Panel B and C, and alternate definitions of the asset index (Table B2).

[11] Table B2 in the online appendix shows that the results are robust to working with only the RSOA or PCA scores and to defining the index as the mean of the two standardized scores (instead of the sum).

What drives this reduced gap between SCs and non-SCs? Figure 2 plots impacts by various subgroups. The top two estimates show that the overall fall is driven by a (statistically insignificant) increase in the mean asset scores of SCs and a commensurate (statistically insignificant) decrease in the mean asset scores of non-SCs.

Next, we turn to who among SCs benefit.

First, we estimate catch-up with the median non-SC quintile across the 4 SC quartiles. We see that while the mean impact is positive for 4 SC quartiles, the effects are significant - and magnitudes higher - for the top two quartiles. These effects are even more pronounced if we restrict attention to only SCs in the top decile. Thus, the top half of the ex-post distribution of SCs in reserved GPs is significantly better off than its counterparts in unreserved GPs. This suggests a small increase in within-SC inequality in reserved GPs.

We proxy for dominant sub-caste among SCs by the most commonly repeated surname. We then see that the numerically dominant sub-caste among SCs does no better than the average SC (see fourth estimate in Fig 2). However, the literature has long documented clientelistic behaviour by local leaders. We show results that speak to this literature. Figure 2 plots SD impacts by categories of individuals who are typically "close" to the village head. To do so, we track down village heads in reserved GPs from the Socioeconomic Caste Census (SECC) dataset. We match elected head's name, age, gender, occupation and village name (within a GP) to households within the SECC. We are able to track down 61% of the SC heads. We estimate catch-up by comparing difference in asset scores between households close to the village head (as defined below) with the median non-SC quintile household. We compare this to the average catch-up of all SC households in unreserved GPs.

As the bottom four estimates in Figure 2 show, being close to the village head is associated with a significant increase in relative asset scores. Having the same surname as the head is associated with a 0.33 SD increase in relative asset scores; moreover, living in the neighbourhood of the head is associated with a 0.86 increase in relative asset scores; and finally, being the head is associated with a 1.47 SD relative increase in asset scores.

The proximity results, strictly speaking, are not causal - since the identity of the head is a post-treatment variable. However, given the large effects, we present these results nonetheless, as strongly suggestive evidence that proximitiy to the head - along subcaste and geographical lines - results in improved asset scores.

We perform one check: prior to election in 2006, nominees were asked to submit their "income class" as part of their nomination forms. The fact that the estimates are broadly the same when we

restrict attention to only those SC village heads who, at the time of election, reported being from a low income class (as opposed to middle or high) suggests that our proximity results are causal (Appendix table A4).

Some groups lose out because of reservation. In particular, the numerically dominant non-SC subcaste (as proxied by the most commonly repeated surname) is worse off in reserved villages than. The impact on asset scores is -0.07 SD and marginally insignificant (p = 0.128) (second estimate in Figure 2).

5.2 Public Goods

From a survey of with 50 village heads who were in power during 2006-2011, we zero in on 4 main public goods. These were selected because villages heads were most likely to name these in conversations. Our list includes creation of government primary schools, construction of tar roads, running fair-price shops that distribute grains via the Public Distribution System (PDS) and setting up rural child care centres under the Integrated Child Development Scheme (ICDS).

We first measure effects on overall provision of public goods. We create an index of public goods that is the mean of the standardized scores of the 4 public goods in our list. Column (4) of Table 1 presents the results. The index of public goods increases by a statistically insignificant 0.02 SD.

We turn to inequalities in public good access. To do so, we first define the main SC village in the GP. Using Census (2011) data, we code the village with the most number of SCs as the main SC village. We then calculate, for each public good, the population normalized share of the good accruing to the main SC village in the GP. Our main outcome variable is the mean of these normalized shares. In an equal society with no hierarchies, the benchmark value of the normalized share should be 1, i.e. the main SC village, like every other village, should get as much access to public goods as its share in the overall population in the GP. However, for unreserved GPs close to the threshold, the main SC village has a share of 0.8, indicating substantial bias in provision against the main SC village.

How does reservation affect this unequal allocation of public goods? Column (5) of Table 1 presents the results. The normalized share of public goods increases by 0.2 SD in reserved GPs.[12] Column (5) of Panels B and C show robustness to changing the bandwidth.[13]

[12] This corresponds to an increase in the normalized share by 0.09.

[13] Table B3 breaks down the index to its constituents and while all 4 public goods are positively impacted by reservation, the coefficients are large and significant for primary schools and paved roads.

6 Long-Run Impacts

6.1 Private Assets

Using a household survey of 7874 randomly sampled households across 99 GPs, we recreate the poverty indices we use in the previous section. Three caveats here: first, we do not have data on phone ownership, but we do not expect that to bias our index since there is near-universal phone ownership in Bihar; we are working with only 99 GPs, but 65 of these GPs lie within a bandwidth of 150 from the cutoff. Our main specification for these regressions uses a bandwidth of 150 here, which is substantially smaller than what the CCT bandwidth is, but reflects the survey sampling strategy to focus on GPs very close to the threshold; third, this survey was conducted in 2019-20, 3.5 years *after* the reservation cycle had changed. We are, therefore, not comparing reserved GPs with unreserved GPs. Rather, in our sample, a "treated" GP has 10 years of exposure to a village head from an SC background (but is currently unreserved) and a "control" GP has at most 3.5 years of exposure (but maybe currently reserved). Crucially, however, at the time of the survey, there is no treated GP currently reserved for SCs.

Our main result is that the catch-up observed in the short term continue to hold in the long-term. We run the same specification as we do with the short run, with differing bandwidths (Table 1, column (4) of Panels A, B and C). We find strong evidence of continued catch-up: there is a 0.8 SD reduction in the difference between mean asset scores of SCs and non-SCs. Owing to the low sample size, the confidence intervals are wide, but the minimum end of the 95% interval suggests a 0.22 SD improvement in SCs' relative asset scores.

Given our relatively small sample sizes within groups, we are unable to make claims about the distributional consequences.

6.2 Public Goods

To measure improvements in public good provision in the long-run, we turn to our administrative dataset comprising water and sanitation (WAS) public goods. These WAS public goods are to be provided to every ward over a 3 year period (2017 - 2020). As Sharan and Kumar (2019) document: (a) wards headed by SCs, which almost always are numerically dominated by SCs, are to be prioritized in allocation of these goods across wards and (b) wards headed by SCs often see delays, but there is eventual catch-up.

Our main measure of long-run provision relates to delays. We measure the SC-proportion normal-

ized share of WAS projects[14] allocated to SC wards at the end of the first year of implementation of these WAS schemes (March 31st, 2018). Once more, as in the case of long-run private assets, we are comparing GPs that have had 10 years of reservation with GPs that have had, at most, 2 years of reservation.[15] Column (6) of Table 1 presents results: GPs reserved from 2006 - 2016 see a 0.16 SD increase in the SC-proportion normalized share of WAS projects.

6.3 Political Participation

6.3.1 Impact on GP elections

We first estimate the impact of reservation on the caste of the GP head in the next reservation cycle. To do so, we restrict attention to only those GPs that are not reserved in the next cycle. Note that, by law, all GPs reserved between 2006-16 are not reserved again. We end up with 4693 GPs that we have data for and are currently unreserved.

1.6% of never-reserved GPs have an SC village head. This number jumps by 11.6 p.p in reserved GPs close to the threshold (Table 2, Column (1)). The number of SC candidates contesting elections increases from 0.83 to 2.141 (Column (2)). These results are robust to changing bandwidths (Columns (1) and (2), Panel B and C of Table 2).

6.4 Impact on ward elections

Wards are a tier of local government below the GP. There are about 13.6 wards for every GP. The advantage of measuring effects at the ward level is that we run our RD for all available GPs. Here too, we find positive impacts. GPs reserved between 2006-16 see about 30% more SC winners and candidates contesting (Columns (3) and (4) of Table 2) when compared to counterparts in previously unreserved GPs. We report results only for unreserved wards in these GPs. As a placebo check, we show, in Column (5) that there are no additional winners coming from wards that are already reserved for SCs. These results are robust to changing bandwidths (Columns (1) and (2), Panel B and C of Table 2).

[14] Proportion normalized share = (Share of Projects in SC wards/Share of SCs in the GP)

[15] 35% of GPs that were previously unreserved and lie within the RD bandwidth are now reserved for SCs.

7 Mechanisms

7.1 Targeting Benefits

7.1.1 Housing

A main component of our asset index is house quality. Allocation of houses under the subsidized housing scheme, the Pradhan Mantri Awas Yojana (PMAY), falls under the ambit of the GP head. However, our housing data is only available for years after 2016, after the reservation cycle is switched. This, therefore, allows us to test if better targeting of housing schemes could explain some of the improved wealth scores in the long-run. Note that our primary survey was conducted in 2018-19. Hence, we focus on houses constructed up to March 31st, 2019.

As in the case of our long-run private asset and public good regressions, we are comparing GPs that have been reserved for 10 years but are currently unreserved with those that have, at most, been reserved for a period of 3 years.

Our first outcome is the number of houses constructed per SC in the GP. Column (1) of Table 3 shows that this outcome improves by 0.13 SD. To calculate how this translates to reductions in inequality between SCs and non-SCs, we normalize the share of houses completed for SCs by their share in the population of the GP. This improves by 0.08 SD (Column (2)), suggesting a reduction in SC- non-SC inequality in accessing to housing.

7.1.2 NREGA

We turn now to NREGA persondays data for the years 2014-2016, the last two years before which the reservation cycle switched.

We first look at the impact on SC persondays generated per SC individual in the GP (SC Person-days/SC Population). This rises – though somewhat imprecisely – by 0.08 SD (Column 3).

Bihar is not among the front-runners in the implementation of the NREGA (Kumar et al. (2021)). Indeed, the median SC household in our dataset receives about 6 man-days per year. NREGA pays minimum wage – so, 6 days of work is unlikely to affect asset scores for households, even over the very long run.

Hence, we turn to an alternate measure: the share of households receiving 100 days of work. A

household receiving a full 100 days of work makes a substantial sum of money through the scheme over the year.[16] To measure the impact on inequality between SCs and non-SCs, we calculate the share of SC households among all households receiving 100 days of work normalized by the proportion of SCs in the GP. Reservation increases this share by 0.17 SD (Column (4)).

7.2 Re-election

For 3489 GPs, we have data on whether the leader elected in 2006 won the election again in 2011. Remember that the reservation status of GPs was unchanged, so leaders could contest for re-election. Column (5) of Table 3 shows that SC leaders have consistently lower re-election rates than their non-SC counterparts, a finding that suggests that redistribution continued apace despite greater political churn in reserved areas.

7.3 A virtuous cycle?

Finally, this paper suggests a virtuous cycle between political participation and improved access to resources. Political reservation improves the material well-being of SCs (Table 1, Columns 1,2, 4 and 5). This could spur political participation among them (Table 2), which, once more could help improve their material outcomes in the long-run (Table 1, Columns 3 and 6).

8 Conclusion

This paper brings to bear a wealth of data to show that affirmative action policies like political reservation could help reduce inequality in access to public goods, accumulation of private assets and political posts, creating a complex web of winners and losers without any efficiency losses. The policy implications of this paper are three-fold: first, our results show that political reservation could be an important tool in reducing inter-group inequality in the short- and long-run; second, this paper shows the importance of having sustained affirmative action policies: while, at the end of the first electoral cycle SCs' access to public goods had improved, the true gains in private assets are realized much more in the long-run; third, the results suggest that well-implemented affirmative action policies could actually be self-reinforcing: reservation improves resource access which results in more political participation.

[16] Back-of-the-envelope calculations suggest that two years of 100 days of work would account for over 40% of the transfers under the housing scheme for the period 2014-16.

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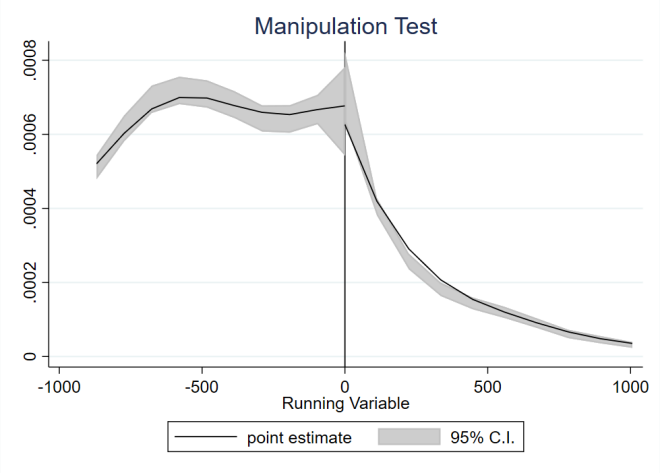
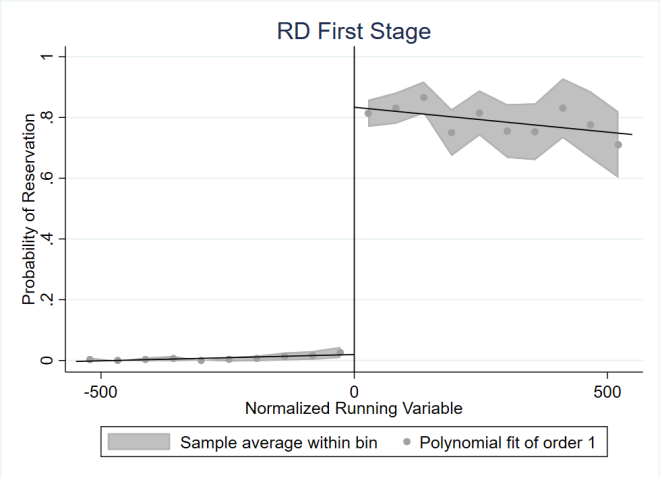
9 Figures



(a) Mccrary Test



(b) First Stage

Figure 1: Part (a) plots the density of the running variable around the RD threshold and displays results from a Mccrary test. The results indicate no discontinuity on either side of the RD threshold and allows us to reject the claim that the running variable is manipulated. 95% confidence intervals are also shown in the shaded region. Part (b) plots the likelihood of a GP being reserved on either side of the RD threshold. The probability of being reserved is nearly zero to the left of the threshold and jumps to over 0.8 to the right. 95% confidence intervals are also shown in the shaded region.

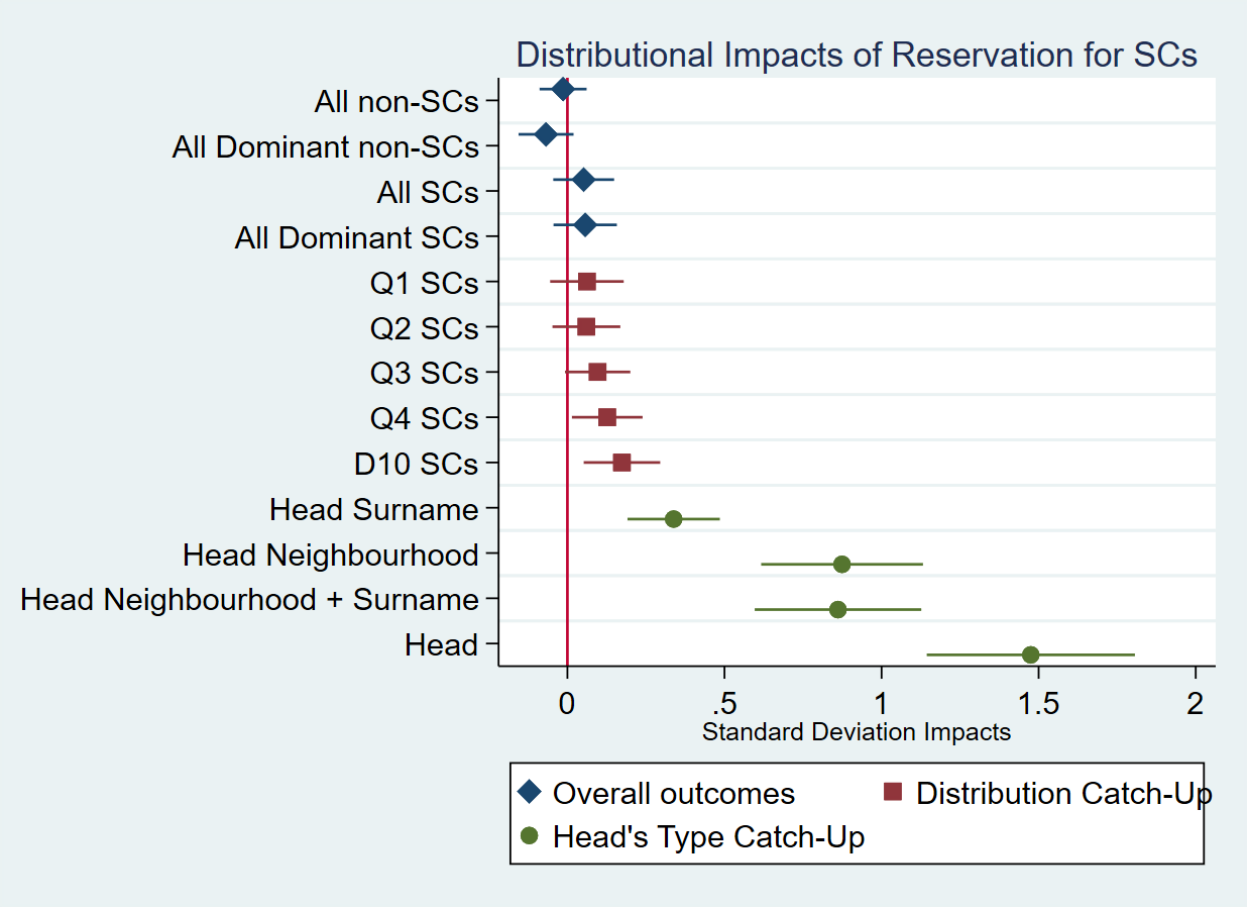


Figure 2: Figure shows SD impacts on asset scores across various sub-populations. The ones with diamond markers pertain to absolute scores: for instance, "all non-SCs" shows impact on the average asset scores of all non-SCs. The ones with a square marker delineate catch-up with the median non-SC quintile. Each marker looks at a different SC quartile. For instance, "Q1 SCs" indicates difference between the average SC in the bottom quartile and the average non-SC in the median quintile. The ones with a circular marker also delineate catch-up with the median non-SC quintile. However, in the reserved group, we only focus on individuals connected with the village head: "head surname" includes everyone who shares a surname with the head; "head neighbourhood" has everyone who lives within a 20-household distance from the head; "head neighbourhood + surname" has everyone within a 20-household distance from the head AND shares the head's surname; "head" includes only the head's household.

10 Tables

Table 1: Impact of SC Reservation on Overall Provision of Public Goods in the GP

	Private Assets			Public Goods		
	(1) **Overall (Short Run)**	(2) **SC-Others (Short Run)**	(3) **SC-Others (Long Run)**	(4) **Overall (Short Run)**	(5) **SC Village Short Run**	(6) **SC Village Long Run**
SC Reserved	0.002	0.084	0.786	0.015	0.199	0.161
	(0.039)	(0.049)	(0.293)	(0.044)	(0.074)	(0.075)
Observations	8170	7958	99	8171	8044	7856
Mean	.006	.022	-.008	0	-.001	-.006
Bandwidth	566	622	150	475	579	525
Block FE	YES	YES	YES	YES	YES	YES
	PANEL B: 0.5 BW					
	(1) **Overall (Short Run)**	(2) **SC-Others (Short Run)**	(3) **SC-Others (Long Run)**	(4) **Overall (Short Run)**	(5) **SC Village Short Run**	(6) **SC Village Long Run**
SC Reserved	0.025	0.092	1.043	0.047	0.303	0.203
	(0.056)	(0.064)	(0.317)	(0.059)	(0.097)	(0.098)
Observations	8170	7958	99	8171	8044	7856
Mean	0	0	-.067	0	0	-.001
Bandwidth	283	311	75	237	275	275
Block FE	YES	YES	YES	YES	YES	YES
	PANEL C: 1.5 BW					
	(1) **Overall (Short Run)**	(2) **SC-Others (Short Run)**	(3) **SC-Others (Long Run)**	(4) **Overall (Short Run)**	(5) **SC Village Short Run**	(6) **SC Village Long Run**
SC Reserved	-0.003	0.057	0.710	0.005	0.175	0.145
	(0.033)	(0.043)	(0.290)	(0.036)	(0.067)	(0.066)
Observations	8170	7958	99	8171	8044	7856
Mean	0	0	0	0	0	0
Bandwidth	849	933	225	712	725	725
Block FE	YES	YES	YES	YES	YES	YES

Table displays SD impacts of reservation on public goods and private assets in the short- and long-run. Private assets are covered in columns (1) - (3). Columns (3) - (6) pertain to public goods. Outcome variables are (in standardized units): (1) The average private asset score across all households in a GP in 2011-12 (measured via the Socioeconomic Caste Census) (2) the difference between private asset scores between SCs and non-SCs in a GP in 2011-12 (measured via the Socioeconomic Caste Census) (3) The difference between private asset scores between SCs and non-SCs in a GP in 2018-19 (Primary Survey) (4) Public good index from 4 main public goods in the GP from Census 2011 (we trim the top 1% of observations) (5) Normalized share of public goods to the main SC village in the GP from Census 2011 (we trim the top 1% of observations) (6) SC Proportion-normalized share of water and sanitation (WAS) public goods provided to SC wards up to 31st March 2018 (WAS Admin Data). We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 2 and 3). Only for Column (3), owing to the small number of GPs in our sample, we fix the bandwidth to be 150. We control for GP-level covariates and Block-fixed effects. All standard errors are indicated in brackets below the estimates and are clustered at the Block level. Panels (B) and (C) show estimates when bandwidth are halved or increased by a factor of 1.5 respectively.

Table 2: Impact of SC Reservation on Long-Run Political Participation of SCs

	GP		Ward		
	(1)	(2)	(3)	(4)	(5)
	Winner	**Candidates**	**Winner (Unreserved)**	**Candidate (Unreserved)**	**Placebo: Winner Reserved**
SC Reserved	0.116	1.311	0.254	0.917	-0.017
	(0.026)	(0.173)	(0.074)	(0.208)	(0.067)
Observations	4693	4730	7410	7410	7410
Mean	.019	.826	.841	3.115	2.25
Bandwidth	558	580	576	556	469
Block FE	YES	YES	YES	YES	YES
	PANEL B: 0.5 BW				
	(1)	(2)	(3)	(4)	(5)
	Winner	**Candidates**	**Winners (Unreserved)**	**Candidates (Unreserved)**	**Placebo: Winner Reserved**
SC Reserved	0.093	1.278	0.189	0.790	-0.055
	(0.037)	(0.252)	(0.100)	(0.287)	(0.085)
Observations	4693	4730	7410	7410	7410
Mean	.019	.935	.778	2.97	2.398
Bandwidth	275	275	275	275	275
Block FE	YES	YES	YES	YES	YES
	PANEL C: 1.5 BW				
	(1)	(2)	(3)	(4)	(5)
	Winner	**Candidates**	**Winners (Unreserved)**	**Candidates (Unreserved)**	**Placebo: Winner Reserved**
SC Reserved	0.111	1.315	0.245	0.899	-0.023
	(0.024)	(0.157)	(0.068)	(0.183)	(0.059)
Observations	4693	4730	7410	7410	7410
Mean	.017	.781	.833	3.091	2.036
Bandwidth	725	725	725	725	725
Block FE	YES	YES	YES	YES	YES

Table displays impacts of SC reservation on political outcomes in the long-run. Columns (1) and (2) pertain to GP-level outcomes; Columns (3) - (5) pertain to ward level outcomes. Outcome variables are: (1) An indicator of whether an SC won the 2016 GP elections (sample restricted to only unreserved GPs in 2016) (2) The number of SC candidates contesting elections in a GP in 2016 (sample restricted to only unreserved GPs in 2016) (3) The number of SC winners from unreserved wards in the 2016 ward elections (4) The number of SC candidates from unreserved wards in the 2016 ward elections (5) The number of winners from SC-reserved wards in the 2016 ward elections (this is called a 'placebo' because it should remain unchanged trivially). We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 2 and 3). We control for GP-level covariates and Block-fixed effects. All standard errors are clustered at the Block level. Panels (B) and (C) show estimates when bandwidth are halved or increased by a factor of 1.5 respectively.

Table 3: Mechanisms

	IAY (Housing)		NREGA (Work)		Electoral
	(1) **Houses Per SC**	(2) **Normalized SC Houses**	(3) **Persondays Per SC**	(4) **Normalized 100 Days Hhds**	(5) **Re-elected 2011**
SC Reserved	0.131	0.075	0.076	0.168	-0.136
	(0.060)	(0.049)	(0.053)	(0.063)	(0.047)
Observations	7390	7386	7856	7837	3423
Mean	.012	.027	-.003	.002	.267
Bandwidth	498	440	495	460	547
Block FE	YES	YES	YES	YES	YES
	Panel B: 0.5 Bandwidth				
	(1) **Houses Per SC**	(2) **Normalized SC Houses**	(3) **Persondays Per SC**	(4) **Normalized 100 Days Hhds**	(5) **Re-elected 2011**
SC Reserved	0.134	0.063	0.102	0.202	-0.193
	(0.076)	(0.059)	(0.068)	(0.087)	(0.066)
Observations	7390	7386	7856	7837	3423
Mean	-.001	-.001	.001	-.001	.269
Bandwidth	275	275	275	275	275
Block FE	YES	YES	YES	YES	YES
	Panel B: 1.5 Bandwidth				
	(1) **Houses Per SC**	(2) **Normalized SC Houses**	(3) **Persondays Per SC**	(4) **Normalized 100 Days Hhds**	(5) **Re-elected 2011**
SC Reserved	0.130	0.068	0.036	0.119	-0.115
	(0.052)	(0.041)	(0.047)	(0.051)	(0.041)
Observations	7390	7386	7856	7837	3423
Mean	0	0	0	0	.268
Bandwidth	725	725	725	725	725
Block FE	YES	YES	YES	YES	YES

Table shows the impact of SC reservation on scheme and electoral outcomes. Outcome variables are (in standardized units): (1) The number of houses constructed for SCs under the PMAY (IAY) scheme per SC individual in a GP (2) the SC proportion normalized share of scheme benefits (houses) received by SCs (3) The persondays generated per SC individual in a GP under the NREGA (4) The SC proportion normalized share of SC households receiving 100 days of work under the NREGA. In Column (5), we report a non-standardized outcome: an indicator for whether a leader was re-elected in the 2011 GP elections. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 2 and 3). We control for GP-level covariates and Block-fixed effects. All standard errors are clustered at the Block level. Panels (B) and (C) show estimates when bandwidth are halved or increased by a factor of 1.5 respectively.

Appendix

A Additional Figures

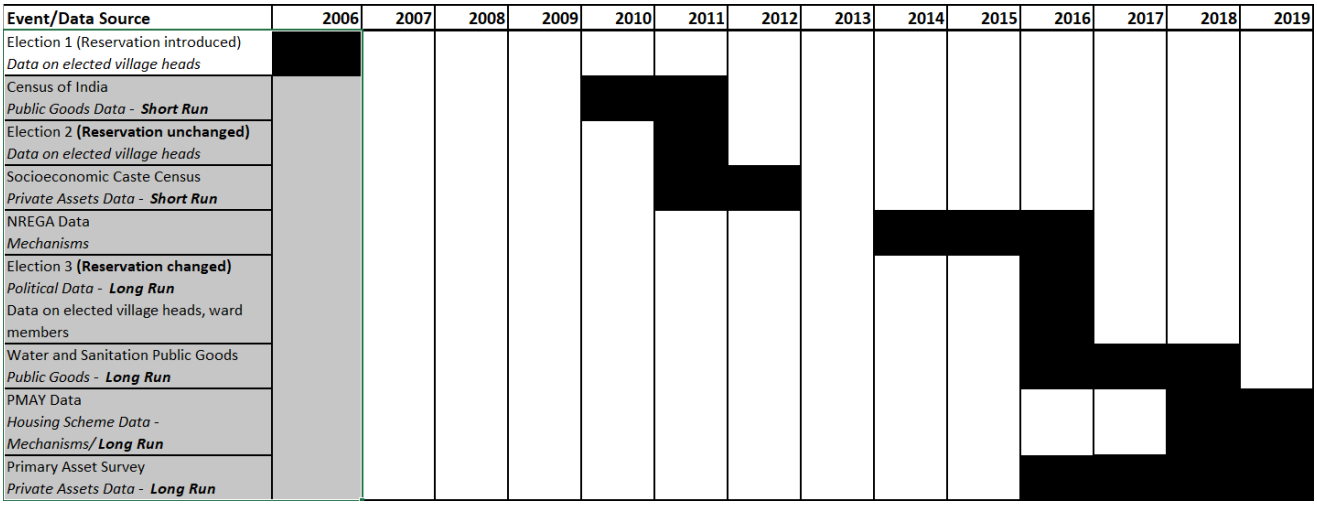
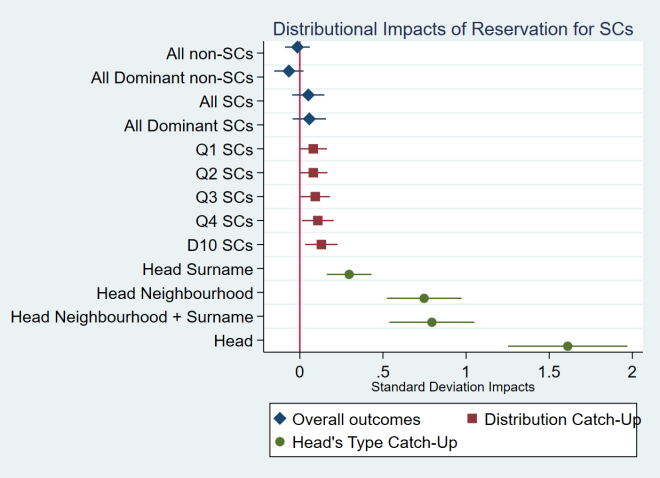
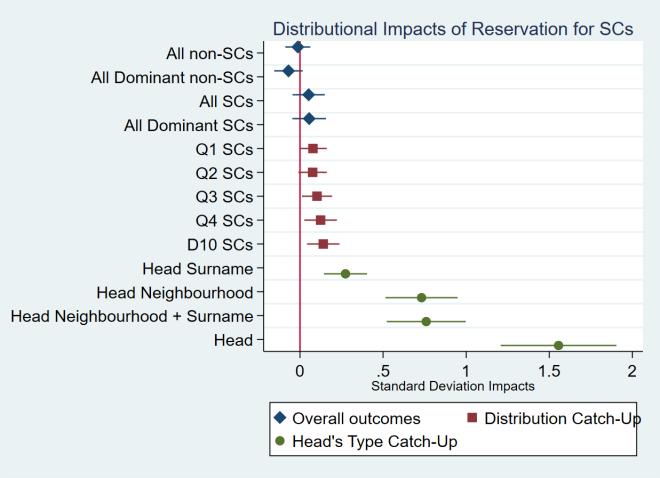


Figure A1: This figure presents a timeline for events and data sources used in this paper.



(a) Short-Run Distributional Impacts: RSOA scores



(b) Short-Run Distributional Impacts: PCA scores

Figure A2: Part (a) replicates figure 2, but uses RSOA asset scores instead. Part (b) replicates figure 2 with PCA asset scores

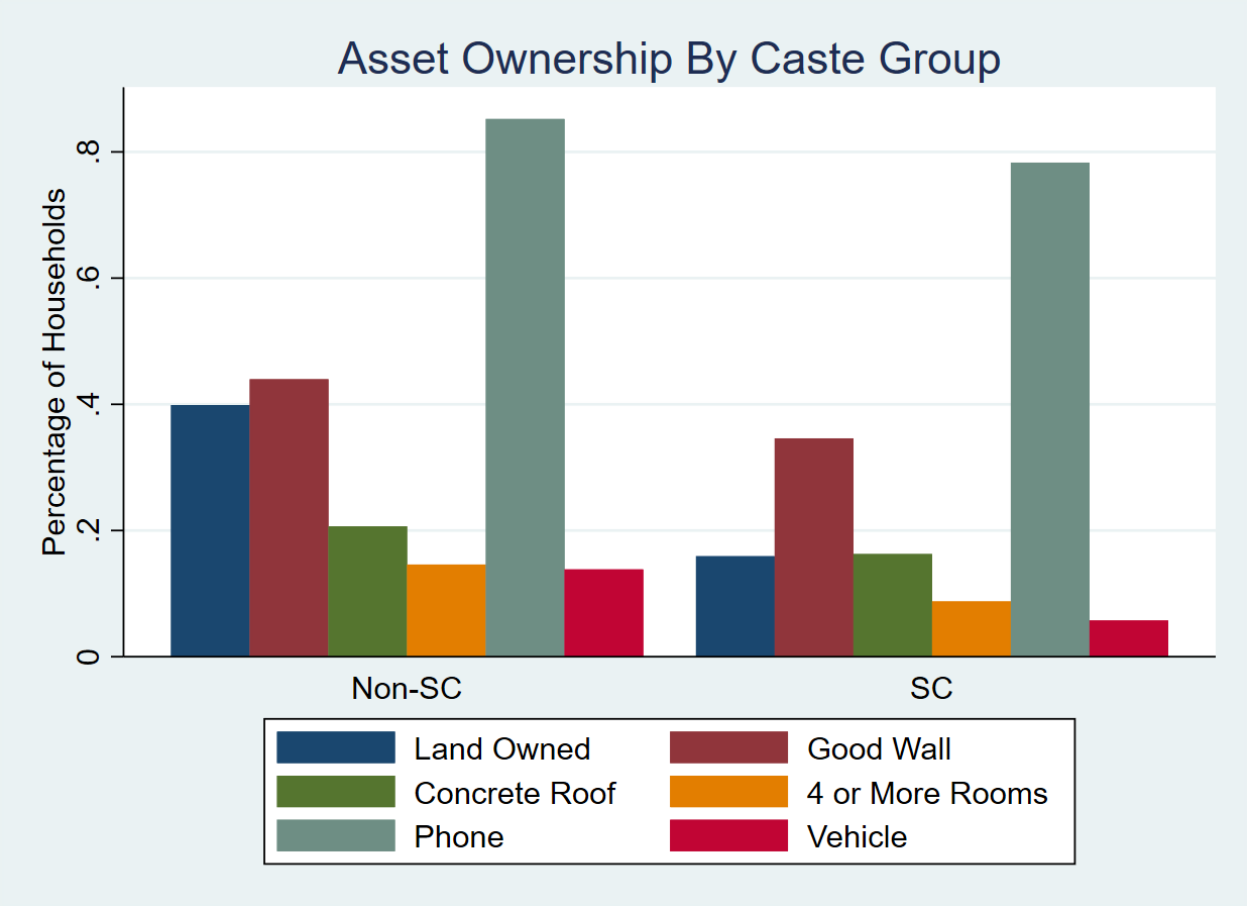


Figure A3: This figure shows us the share of households in the SECC data across SCs and non-SCs who own each of the 6 key assets used in the asset index.

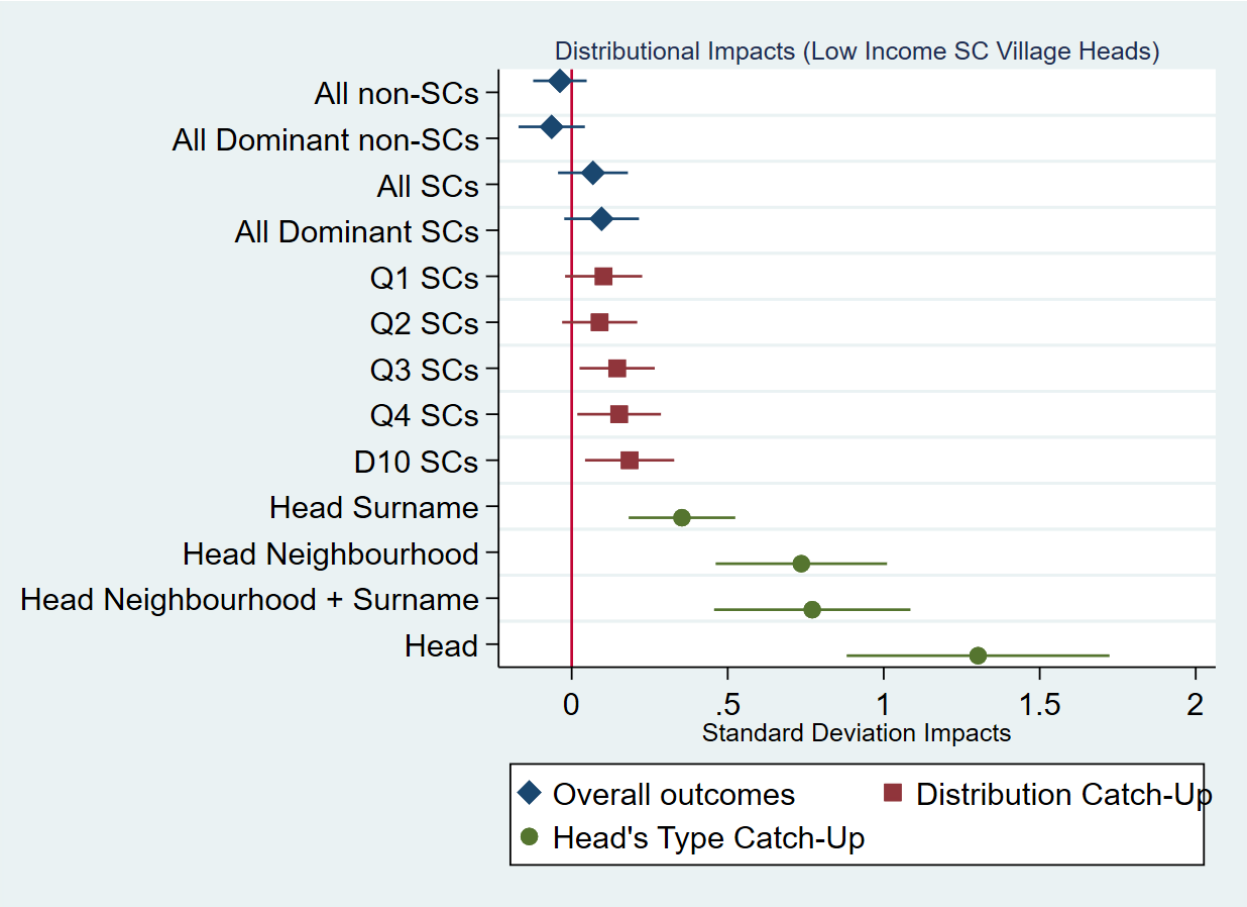


Figure A4: Figure shows SD impacts on asset scores across various sub-populations when **we restrict attention to only self-declared low-income class SC village heads**. The ones with diamond markers pertain to absolute scores: for instance, "all non-SCs" shows impact on the average asset scores of all non-SCs. The ones with a square marker delineate catch-up with the median non-SC quintile. Each marker looks at a different SC quartile. For instance, "Q1 SCs" indicates difference between the average SC in the bottom quartile and the average non-SC in the median quintile. The ones with a circular marker also delineate catch-up with the median non-SC quintile. However, in the reserved group, we only focus on individuals connected with the village head: "head surname" includes everyone who shares a surname with the head; "head neighbourhood" has everyone who lives within a 20-household distance from the head; "head neighbourhood + surname" has everyone within a 20-household distance from the head AND shares the head's surname; "head" includes only the head's household.

B Additional Tables

Table B1: Balance Across the RD Sample (GP-level Controls)

Variable	Reserved	Unreserved	Difference	SE
Proportion of SCs (Census 2001)	0.17	0.17	0.00	0.00
Distance to Nearest Statuatory Town (Census 2011)	20.93	20.52	0.41	0.43
Distance to District Headquarters (Census 2011)	32.14	31.64	0.50	0.49
Number of Villages in GP (Census 2011)	5.64	5.57	0.07	0.25
Total GP Area (Census 2011)	1,222.14	1,118.53	103.61	61.88
Total Population of GP (Census 2001)	9,667.35	9,537.61	129.74	275.31
Percentages of SCs in Main SC Village (Census 2011)	0.57	0.56	0.01	0.02
Female Reservation	0.06	0.42	-0.36	0.03

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 = 550. Standard errors are clustered at the Block level.

Table B2: Impact of reservation on differences in SC and non-SC asset scores

	Short Run			Long Run		
	(1)	(2)	(3)	(4)	(5)	(6)
	RSOA	**PCA**	**RSOA PCA (Mean)**	**RSOA**	**PCA**	**RSOA PCA Mean**
SC Reserved	0.091	0.095	0.084	0.929	0.885	0.908
	(0.050)	(0.049)	(0.049)	(0.295)	(0.286)	(0.291)
Observations	7959	7958	7958	99	99	99
Mean	-.024	.002	.022	-.258	-.263	-.26
Bandwidth	481	533	622	87	88	87
Block FE	YES	YES	YES	YES	YES	YES

Outcome variables all measure differences in SC and non-SC asset scores within a GP in standardized units. Columns (1) - (3) report results in the short run, using data from the SECC. Our main outcomes are (1) Average raw sum of assets (RSOA) scores (2) Average PCA score of assets (3) The mean of the RSOA and PCA scores. Columns (4) - (6) calculate the same scores as (1) - (3), but using data from our primary survey. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 2 and 3). We control for GP-level covariates and Block-fixed effects. All standard errors are clustered at the Block level.

Table B3: Impact of SC Reservation on Individual Public Goods

	Share of Public Goods in the Main SC Village			
	(1) **Government (Schools)**	(2) **PDS**	(3) **Anganwadi/ ICDS**	(4) **Paved Road**
SC Reserved	0.247	0.049	0.080	0.184
	(0.075)	(0.086)	(0.063)	(0.072)
Observations	7750	6829	8041	7369
Mean	.002	-.005	.01	-.007
Bandwidth	540	514	706	605
Block FE	YES	YES	YES	YES

Outcome variables measure the population normalized share of public goods accruing to the main SC village reported in standardized units. All outcomes are calculated from the Census Village Amenities List (2011). The public goods measured are: (1) The total number of government schools in the village (2) An indicator for whether there was a PDS (subsidized ration) shop in the village (3) An indicator for whether a child nutritional center (an Anganwadi Centre/ICDS) exists in the village (4) An indicator for whether there is a paved road in the village. We use CCT triangular bandwidths and estimate fuzzy RD specifications described in the paper (equation 2 and 3). We control for GP-level covariates and Block-fixed effects. All standard errors are clustered at the Block level.

Table B4: Impact of SC Reservation on Main Outcomes (No Controls)

	Private Assets			Public Goods		
	(1) **Overall**	(2) **SC-Others (Short Run)**	(3) **SC-Others (Long Run)**	(4) **Overall**	(5) **SC Village Short Run**	(6) **SC Village Long Run**
SC Reserved	-0.014	0.058	1.148	0.022	0.191	0.177
	(0.040)	(0.049)	(0.321)	(0.068)	(0.074)	(0.074)
Observations	8177	7965	99	8220	8044	7904
Mean	.006	.027	-.008	.001	-.002	-.005
Bandwidth	565	628	150	492	585	536
Block FE	YES	YES	NO	YES	YES	YES
	GP		Ward			
	(1) **Winner**	(2) **Candidates**	(3) **Winners (Unreserved)**	(4) **Candidates (Unreserved)**	(5) **Placebo: Winner Reserved**	
SC Reserved	0.126	1.386	0.209	0.766	-0.005	
	(0.026)	(0.179)	(0.073)	(0.207)	(0.067)	
Observations	4728	4765	7454	7454	7454	
Mean	.018	.845	.838	3.115	2.254	
Bandwidth	580	539	589	559	464	
Block FE	YES	YES	YES	YES	YES	

This table replicates exactly Panel (A) of 1 and Panel A of 2, but drops all controls.