Who Governs the Forest? Politician Identity and Forest Conservation

Tanmay Singh[1]

Jönköping International Business School (JIBS), Jönköping University

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Abstract

This paper asks whether the identity of elected representatives affects how forests are governed. I exploit India's 2008 Delimitation, the world's largest redistricting exercise, as a natural experiment that changed the reservation status of state assembly constituencies from open competition to seats reserved exclusively for historically marginalized indigenous communities, thereby generating plausibly exogenous variation in politician identity. Using a staggered difference-in-differences design and satellite-derived forest cover data from 2001 to 2020, I find that indigenous political representation increases local forest cover by 10.5%. The effect is concentrated in villages with low baseline forest cover and is largest near mining sites, declining monotonically with distance. I also show that political quotas disrupt the political equilibrium: indigenous representation brings younger, more female winners into office through more competitive elections, reshaping who holds power, not just who holds office. I further find no evidence that these gains erode once electoral quotas are withdrawn. These findings speak to a fundamental question in political economy: who governs shapes what is governed, and democratic representation of historically excluded indigenous communities can deliver meaningful environmental dividends, with direct implications for climate policy and debates on indigenous governance across the developing world.

JEL Classification: Q23, Q28, D72, O13

Keywords: political reservation, indigenous representation, forest conservation, natural resource governance

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1. Introduction

Deforestation and forest degradation exacerbate climate change, accounting for 10 to 15 % of global carbon dioxide emissions (Asner et al., 2010). Forests are critical carbon sinks whose destruction accelerates global warming, undermines biodiversity, and devastates the livelihoods of hundreds of millions of people who depend on them for food, fuel, and income (Chhatre and Agrawal, 2009; Balboni et al., 2023). Recognising this, multilateral agreements, including the Kyoto Protocol and COP-26, have placed forest conservation at the centre of global climate policy. However, protecting forests is far from straightforward. For instance, forests are disproportionately located in regions with weak governance, large natural resource rents, and intense political competition over land, making them highly vulnerable to deforestation driven by illegal logging, mining extraction, and agricultural conversion (Burgess et al., 2012; Brollo et al., 2013; Ross, 2015). The communities most exposed to these pressures are indigenous and forest-dependent groups, who comprise only 5% of the global population yet inhabit an estimated 25% of the world's land surface and manage some 40% of its ecologically intact landscapes, supporting 80% of its biodiversity (Garnett et al., 2018)[2]. A long-standing argument in the environmental governance literature holds that giving these communities greater political voice is essential for effective conservation (Brundtland Report, 1987; Ostrom, 1990; Agrawal and Gibson, 2001). Whether formal political representation for such communities actually translates into better forest outcomes, however, remains an open empirical question.

This paper studies the causal effect of political representation on forest conservation in India, examining whether electing members of historically marginalised communities to state legislatures influences local forest cover. India is a federal democracy in which state assembly elections are held every five years under a first-past-the-post system, with the winning candidate serving as Member of the Legislative Assembly (MLA). Forests fall under the concurrent list of the Indian Constitution, giving both central and state governments legislative authority over forest governance, and MLAs could potentially influence forest conservation through legislation, budget allocation, and oversight of the state forest department[3]. Since independence, the Indian Constitution has

[2] In India, Indonesia, Nepal, the Philippines, Sri Lanka, and Thailand alone, approximately 447 million poor and marginalised individuals depend on forests for their livelihoods (Lynch and Talbott, 1995), underscoring the need to balance the economic dependence of these communities on forest resources with the urgency to conserve those resources for future generations.

[3] Prior to 1976, forests belonged exclusively to the state list of the Indian Constitution, giving state governments sole legislative authority over forest conservation. Although forests now fall under the

reserved a subset of state assembly seats for Scheduled Castes (SCs) and Scheduled Tribes (STs), communities that have historically faced severe social and economic exclusion. While both groups benefit from constitutional reservation, they differ sharply in their geographic concentration and relationship to forests. Scheduled Tribes are heavily concentrated in forested and mineral-rich regions and depend directly on forests for their livelihoods, whereas Scheduled Castes are more geographically dispersed and less directly dependent on forest resources (Jensenius, 2015; Kashwan, 2017). These differences make political reservation, which is a system of constitutionally mandated electoral quotas that reserve legislative seats exclusively for candidates from designated marginalised communities, a particularly interesting lens through which to examine how politician identity shapes environmental governance.

India provides a particularly important context to study the effects of political representation on forest conservation, as it is home to one of the largest forest-dependent populations in the world (World Bank, 2005; TEEB, 2009),[4] with approximately 275 million individuals depending on forest resources for their livelihoods (Choudhury, 2019). The vast majority of these forest-dependent communities belong to the Scheduled Tribe category, formally recognised indigenous communities in India's Constitution, who are over 100 million and represent, on average, the country's most economically vulnerable and politically excluded groups. These communities live in and around heavily forested areas and rely on forest produce for nutrition, sell minor forest products as a primary source of income, and practise sustainable agriculture in forest-adjacent areas (Zimmermann et al., 2001; Kashwan, 2017). If political representation for these forest-dependent communities leads to enhanced conservation, this would point to a policy win-win, offering a mechanism for simultaneously advancing social inclusion and forest protection. Such a finding would also carry important implications well beyond India. For instance, across the world's rainforest-rich regions, indigenous communities remain politically marginalised despite their direct dependence on and historical stewardship of forest ecosystems. For instance, Brazil holds 58 % of the Amazon rainforest basin yet has no

concurrent list, each state maintains a forest department headed by a cabinet minister responsible for implementing conservation policy. Consistent with this institutional role, state legislators appear more actively engaged on environmental issues than their national counterparts (https://india.mongabay.com/2022/08/parliamentary-discussions-related-to-climate-change-are-largely-missing-in-india-finds-study/.)

[4] Forest dependence is distinct from forest proximity, as not all individuals living near forests necessarily rely on them for their livelihoods. For instance, Newton et al. (2020) map forest-proximate people globally, providing a useful distinction between those who live near forests and those who directly depend on them.

formal political representation for indigenous communities in Congress (Castro et al., 2013). Understanding whether political representation for forest-dependent communities affects conservation outcomes in India thus offers lessons with direct relevance for environmental and indigenous rights policy across the developing world.

A large body of literature in economics has examined the socioeconomic consequences of a politician's identity. In the spirit of the work on group representation, it is widely argued that shared experiences lead members of groups to hold similar policy preferences, translating into systematic differences in policy priorities once in office (see, e.g. Phillips, 1995). Consistent with this, a substantial literature establishes that women politicians are more responsive to issues affecting women and children, influencing the distribution of public resources accordingly (Chattopadhyay and Duflo, 2004; Bhalotra and Clots-Figueras, 2014; Bhalotra et al., 2023; Bhalotra and da Fonseca, 2023). Similarly, evidence on ethnic and group favouritism shows that politicians systematically direct public resources toward their own communities (Franck and Rainer, 2012; Hodler and Raschky, 2014; Burgess et al., 2015; De Luca et al., 2018). In the spirit of the citizen-candidate model of Besley and Coate (1997), the empirical evidence from India broadly supports this view for ST politicians but not for SC politicians. For instance, ST reservation has been associated with increased welfare spending, greater public investment, and poverty reduction among ST communities, while SC reservation shows little or no effect on constituency-level development or redistribution (Pande, 2003; Chin and Prakash, 2010; Jensenius, 2015; Gulzar et al., 2020). Surprisingly, however, the impact of electing marginalised group politicians on environmental outcomes has remained largely understudied. To the best of my knowledge, Agarwal et al. (2026) is the only study examining this question, finding that village area under forest cover increases in ST-reserved assembly constituencies in the state of Chhattisgarh. It is in this context that I attempt to contribute and depart from this work in several important ways. First, while Agarwal et al. (2026) focus on a single state, I study the full national scope of the 2008 delimitation reform across 21 Indian states, substantially expanding the external validity of the findings. Second, I exploit the exogenous reassignment of constituencies from open competition (non-reserved) to seats reserved exclusively for historically marginalised communities, providing credible causal identification that is less susceptible to concerns about selective implementation. Third, by separately identifying the effects of ST and SC reservation, I examine how the specific identity and ecological context of the represented community shape environmental outcomes, a dimension absent from prior work. Together,

these features allow me to provide nationally representative causal evidence on the environmental consequences of political representation for forest-dependent indigenous communities in India.

Identifying the causal effect of political reservation on forest cover is challenging because reservation status may be correlated with unobserved village and constituency characteristics that independently affect forest outcomes, and a simple comparison of forest cover between reserved and non-reserved constituencies risks reverse causality and endogeneity concerns. A key concern is that political reservations are typically introduced in areas with distinctive characteristics, meaning that differences in outcomes over time may reflect pre-existing trends rather than the policy itself. I address these concerns by exploiting the 2008 delimitation reform, which changed the reservation status of state assembly constituencies from open competition (non-reserved) to seats reserved exclusively for historically marginalised communities based solely on a transparent demographic threshold based on the 2001 Census. This rule-based assignment, combined with the staggered timing of implementation across states between the 2008 and 2012 election cycles, provides both a credible source of variation in reservation status and a contemporaneous comparison group of constituencies that remained non-reserved throughout the period. Therefore, employing a staggered DiD, I compare forest governance outcomes between 2001 and 2020 in villages whose constituencies changed reservation status with those that remained non-reserved throughout.

For the analysis, I combine village-level panel data on annual forest cover for the period 2001 to 2020 with corresponding state assembly election data from the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG) (Asher et al., 2021). The main results show an increase of approximately 5 % in annual forest cover among villages in reserved constituencies relative to villages in always-general (non-reserved) constituencies. However, heterogeneity appears to be present when examined by reservation type, revealing a markedly different picture between ST and SC politicians: villages in ST-reserved constituencies experience an increase of approximately 10.5 % in annual forest cover relative to villages in always-general constituencies, whereas villages in SC-reserved constituencies show no statistically significant change. This divergence reflects the different electoral arithmetic facing the two groups: ST communities are geographically concentrated and form a majority within their reserved constituencies, giving ST politicians both the incentive and the political freedom to prioritise the forest-dependent interests of their constituents, while SC candidates represent

a minority share of their constituencies and must appeal to a broader non-SC electorate, limiting their ability to pursue community-specific environmental policies. I further document heterogeneity in the treatment effect: effects are concentrated in villages with low baseline forest cover, the ST reservation effect is largest in villages closest to mines and declines monotonically with distance from the nearest mine while the SC effect remains absent throughout, and the effect is larger for younger reserved politicians, patterns consistent with an elite capture mechanism operating specifically for ST politicians and career-related incentives for long-run environmental investment (Dahis et al., 2023; Bandyopadhyay et al., 2026). The estimates are robust to alternative outcome measures, alternative estimators, and sample restrictions. I also find no evidence that forest protection gains erode when electoral quotas are withdrawn, suggesting that ST political representation leaves durable institutional changes in forest governance that outlast the formal period of reservation.

The paper contributes to several strands of literature. First, it contributes to the political economy literature on identity-based political representation and affirmative action. Existing work shows that political reservation can affect redistribution, public goods provision, and welfare outcomes for marginalised groups (Pande, 2003; Chin and Prakash, 2011; Jensenius, 2015; Gulzar et al., 2020), but little is known about its consequences for environmental conservation. I show that the environmental effects of political representation depend critically on the interaction between politician identity and local ecological conditions. This finding extends the citizen-candidate framework beyond its traditional focus on socio-economic outcomes to environmental governance and suggests that theories of identity-based representation need to account for the ecological and economic context in which politicians operate. Second, the paper contributes to the growing literature on the political economy of deforestation. Prior work highlights how weak institutions, corruption, and resource rents shape environmental outcomes (Burgess et al., 2012; Balboni et al., 2023; Asher and Novosad, 2023). I contribute by demonstrating that political representation itself can influence forest outcomes, particularly in extractive environments where natural resource rents are large and local political actors possess substantial informal influence over enforcement and land access. Third, the paper contributes to the literature on natural resources, political incentives, and local governance in developing countries. A large body of work argues that resource-rich environments intensify political competition and elite capture (Brollo et al., 2013; Ross, 2015). My findings suggest that the environmental consequences of these pressures depend

importantly on who holds political power and to whom they are accountable. In particular, political representation for forest-dependent communities can shape how local governments respond to extraction pressures in ecologically sensitive areas.

The remainder of the paper is organised as follows. Section 2 describes the institutional background, covering India's political and reservation system, the role of forest governance in the Indian federal structure, and the 2008 delimitation reform. Section 3 presents the data sources and sample construction. Section 4 outlines the empirical strategy and identification assumptions. Section 5 reports the main results, heterogeneity analysis, robustness checks through which political representation affects forest cover. Section 6 concludes.

2. Institutional Background

2.1 India's Political and Reservation System

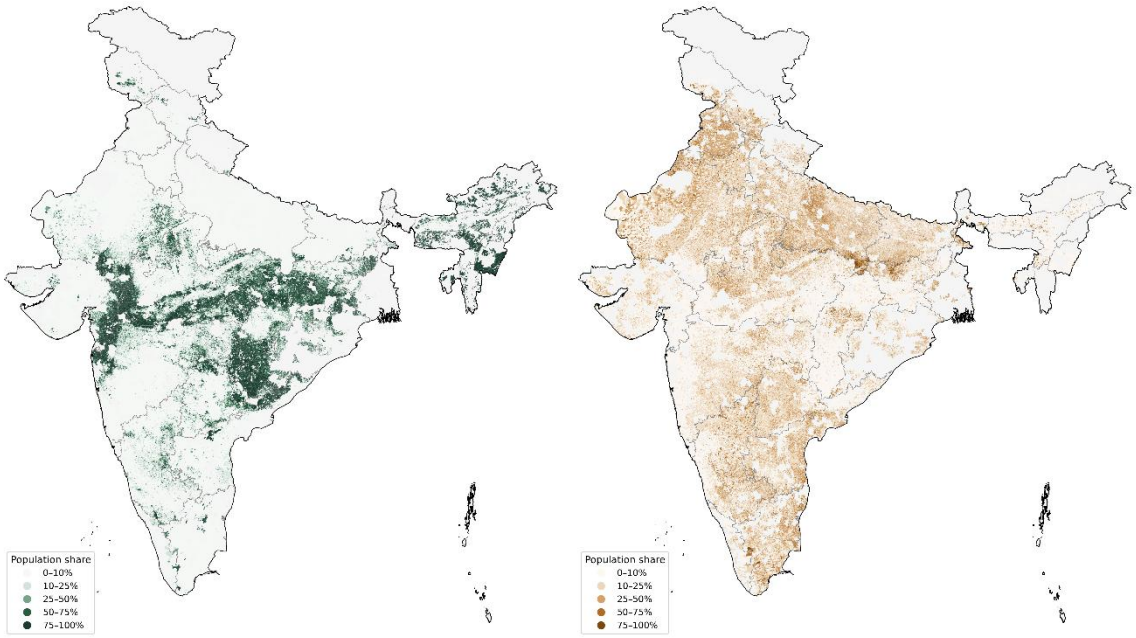
India is a parliamentary democracy and a federal system with a multi-tiered governance structure in which authority is distributed across different levels of administration. At the national level, Members of Parliament (MPs) are elected from parliamentary constituencies (PCs) to the Lok Sabha (the national legislature). At the state level, each state is divided into multiple Assembly Constituencies (ACs), each of which elects a representative to the Vidhan Sabha (state legislature) under a first-past-the-post electoral system, where the candidate receiving the highest number of votes wins the election regardless of whether they achieve a majority. These elected representatives are known as Members of the Legislative Assembly (MLAs). State assembly elections are typically held every five years; however, their timing varies across states and does not necessarily coincide with national parliamentary elections. Although the redistricting process affected both PCs and ACs, this study focuses on ACs because they are substantially smaller in population size, averaging around 350,000, compared to approximately 2.5 million in PCs. This smaller scale allows for greater variation in constituency composition and facilitates clearer identification of the effects of redistricting. In particular, changes in reservation status at the AC level provide a more credible setting to examine how such institutional shifts influence political incentives and local natural resource outcomes.

Each state is administratively organised into districts, which serve as key units for both governance and electoral administration. Districts are further subdivided into Assembly

Constituencies (ACs), each of which elects a representative to the state legislative assembly. These constituencies constitute the primary units through which local governance and state-level policy implementation are carried out. Importantly, AC boundaries are nested within district boundaries, ensuring alignment between administrative and electoral structures. At a finer level, ACs are further divided into urban wards (neighbourhoods) and villages. A simplified illustration of this multi-tiered institutional structure is provided in Figure B1.

Scheduled Castes (SCs) are communities that have historically occupied the lowest position in India's traditional caste hierarchy, defined by their association with occupations considered ritually impure, such as maintaining cremation grounds and manual scavenging, which were systematically discriminated against by higher-caste groups (Galanter 1984, p. 15). The nature and severity of this discrimination varied across regions, but commonly included denial of access to public spaces, water sources, educational institutions, places of worship, and legal institutions (Elayaperumal 1969, pp. 15-32). Scheduled Tribes (STs), by contrast, often referred to as Adivasis or original inhabitants, are officially recognised indigenous communities who reside predominantly in geographically remote forested and hilly areas and have faced historical marginalisation from the economic and legal systems that govern access to land, forests, and public resources. ST communities depend directly on forests for their livelihoods, relying on forest produce to meet nutritional needs, selling minor forest products as a primary source of income, and practising sustainable agriculture in forest-adjacent areas (Zimmermann et al., 2001; Kashwan, 2017). Despite decades of constitutional protections and targeted welfare programmes, both communities remain among the most economically vulnerable in India. According to the 2004-05 National Sample Survey, 46% of Scheduled Tribe households and 37% of Scheduled Caste households lived below the poverty line, compared to 23% of the rest of the population. These figures translate into a significant and disproportionate representation among India's poor: Scheduled Tribes constitute 8.6% of the total population but account for 14% of the poor, while Scheduled Castes make up 20% of the population but 27% of those living in poverty.

Figure 1: Scheduled Tribe and Scheduled Caste Population Shares (2001)



Panel a) Scheduled Tribe Panel b) Scheduled Caste

Notes: The figure shows the share of Scheduled Tribe (left) and Scheduled Caste (right) population in each village, based on the 2001 Census of India . Darker shading indicates a higher population share.

To address the historical marginalisation of SC and ST communities, the Indian Constitution instituted a range of affirmative action measures, including reservations in public sector employment and educational institutions. In the electoral domain, Article 332 of the Constitution provides for the reservation of assembly constituencies for SC and ST candidates, ensuring that members of these communities are directly represented in state legislatures and can participate in shaping legislation and policymaking. Reserved seats are allocated in proportion to each community's share of the state population, and only individuals belonging to the designated SC or ST community can contest elections in a reserved constituency, though all voters in that constituency cast their ballots regardless of community membership. A critical distinction between the two reservation types arises from the geographic distribution of the two communities. Because Scheduled Castes are dispersed across India, they typically constitute a minority even within constituencies reserved for them, meaning most SC legislators are elected primarily by non-SC voters, whereas Scheduled Tribes, being more geographically concentrated, tend to form a majority within their reserved constituencies and are therefore elected predominantly by members of their own community (Jensenius, 2015; see figure 1). The number of assembly constituencies changes over time through delimitation, a periodic process by which the Delimitation Commission redraws constituency boundaries and revises the allocation of

reserved seats to reflect changes in population size and composition. The most recent delimitation, based on the 2001 Census, took effect from the 2008 state assembly elections and altered the reservation status of a significant number of constituencies across all states. This reform is the source of identifying variation in this paper: by comparing forest governance outcomes between 2001 and 2020 in constituencies that changed reservation status with those that remained non-reserved throughout, I can causally estimate the effect of SC and ST political representation on forest cover.

2.2 Forest Governance in India and the Role of MLAs

India's relationship with forest governance has deep historical roots. Village communities historically held customary usufruct rights over local forests, using them for fuelwood, fodder, and other daily necessities. British colonial legislation systematically dismantled these rights: the Indian Forest Act of 1878 classified most forest land as reserved or protected, leaving residents with almost no formal use rights, while the 1927 Act further consolidated state control to enable commercial timber extraction and land clearance for agricultural and infrastructure purposes (Sivaramakrishnan, 1999; Guha, 1989). This centralised approach persisted in the post-Independence period. Since 1976, forests have been placed on the concurrent list of the Indian Constitution, granting both central and state governments legislative authority over forest governance, with central legislation taking precedence in cases of conflict. Acknowledging the limits of top-down management and responding to civil society pressure to recognise community rights, the Government of India revised its national forest policy in 1988 to emphasise both environmental conservation and the livelihood needs of rural and tribal populations. This shift paved the way for the Joint Forest Management (JFM) programme in 1990, under which degraded government forest land would be co-managed with village communities (Agarwal, 2010). Implementation varied substantially across states, with West Bengal, Tamil Nadu, Madhya Pradesh, and Odisha developing particularly strong frameworks[5]. Building on JFM, state governments subsequently introduced context-specific legislation targeting forest conservation in ecologically vulnerable areas and regions where populations depend heavily on forests for their livelihoods[6], recognising that a uniform national forest policy

[5] State-level legislative initiatives include the West Bengal Forest Policy (2004), the Madhya Pradesh Forest Policy (2005), and the Tamil Nadu Afforestation Project (1997).

[6] Examples include the Tamil Nadu Tree Cultivation in Private Lands Act, the Maharashtra Village Forest Rules, and the Social Forestry Programme for the Sunderbans introduced by the Government of West Bengal.

approach would be insufficient given the diversity of India's forest ecosystems and the communities that depend on them.

Regardless of reservation status, MLAs have access to multiple channels through which they can influence forest governance and broader sustainable development outcomes in their constituencies. Within the legislature, they can participate in debates, formulate legislation, and formally question government ministers on environmental matters. However, the time available for legislative work has declined considerably over time, with state assembly sitting days falling from around 45 days per year in the late 1960s to approximately 34 days per year by 2007 (Jensenius and Suryanarayan, 2015). As a result, constituency service has become an increasingly central part of the MLA's role. Politicians spend much of their time in their home constituencies working to expand their support base by facilitating access to government schemes, pressuring the bureaucracy to implement development works, and lobbying in an attempt to secure funding for various local sustainable development projects (Chopra, 1996; Bussell, 2012). A more direct avenue for constituency-level investment is the MLA Local Area Development (MLA-LAD) fund, an annual discretionary allocation provided to each MLA for development works tailored to local needs[7]. With respect to forest conservation specifically, MLAs can direct the allocation of compensatory afforestation funds, monitor the implementation of afforestation projects, and advocate against ecologically harmful development proposals within their constituencies. While state-level legislation applies uniformly across all constituencies, the quality of implementation varies substantially in practice, as the literature on developing country governance consistently documents a significant gap between de jure policy and de facto outcomes[8]. This variation in implementation is partly a function of electoral geography. Constituencies differ considerably in their internal composition[9], and legislators naturally direct greater attention toward communities that carry more electoral weight. Since over two-thirds of India's population resides in rural areas, villages that constitute a significant share of a constituency's electorate are more likely to receive political attention and development funds than those that are small or demographically isolated within their constituency.

[7] The MLA-LAD funds were introduced in 1993, and guidelines explicitly permit expenditure on environmental works, including tree plantations, making it a direct and visible channel through which legislators can influence local forest outcomes.
[8] See, for example, Agarwal (2010) and Kumar et al. (2017) provide systematic evidence of implementation failures in forest governance across Indian states and public service delivery more broadly (Jensenius 2015).
[9] Some encompass a few large villages, while others contain many small ones alongside semi-urban areas.

Constituencies reserved for SC and ST politicians receive the same annual MLA-LAD allocation as unreserved constituencies, and there is no constitutional requirement that SC or ST legislators' direct development works exclusively toward their own communities. However, the work on group representation argues that shared experiences lead members of marginalised groups to hold similar policy preferences, and that political representation for these groups influences development outcomes in practice (Phillips, 1995). The empirical evidence from India broadly supports this view for ST politicians but not for SC politicians. ST reservation has been associated with increased welfare spending, greater public investment, and poverty reduction among ST communities, while SC reservation shows little or no effect on constituency-level development or redistribution to SC communities (Pande, 2003; Chin and Prakash, 2010; Jensenius, 2015; Gulzar et al., 2020). The divergence between ST and SC reservation outcomes is best explained by the different electoral arithmetic facing the two groups. Because SC communities are geographically dispersed, SC candidates are almost always elected by a majority of non-SC voters, giving them limited scope to prioritise SC-specific interests without alienating their broader electorate. ST communities, by contrast, are geographically concentrated, and ST reserved constituencies have substantially higher proportions of tribal voters. On average, SC reserved constituencies have an SC population share of 26% while ST reserved constituencies have an ST population share of 55% (Election Commission of India, 2008 Delimitation), meaning ST politicians can rely far less on non-ST votes to secure election (Jensenius, 2015). This electoral insulation gives ST legislators both the incentive and the political freedom to prioritise the interests of their communities, including the protection of forests on which ST livelihoods directly depend. ST legislators are therefore better positioned than their SC counterparts to enforce forest protection legislation, promote agro-forestry and sustainable land use practices, and support local community governance of forest resources. The caste identity of the MLA may thus be a significant determinant of how forest-related policies are implemented at the constituency level.

2.3 The Delimitation Reform in 2008

Delimitation refers to the periodic redrawing of electoral constituency boundaries to reflect population change and uphold the democratic principle of equal representation. Without such adjustments, faster-growing areas would become underrepresented in legislatures while slower-growing regions would be overrepresented. In India, delimitation exercises

have been conducted under four major Delimitation Acts, in 1952, 1962, 1972, and 2002. Following the 1971 exercise, however, Parliament froze delimitation until after the 2001 Census, largely out of concern that states with higher population growth would gain additional seats at the expense of states that had successfully implemented family planning programmes. When the freeze was lifted in 2002, it applied only to the redrawing of internal constituency boundaries within states, not to changing the total number of seats allocated to each state, a restriction that remains in place until 2026.

The process is administered by the Delimitation Commission of India, an independent quasi-judicial body appointed by the President and chaired by a retired Supreme Court judge. This autonomous structure is designed to insulate boundary redrawing from partisan political influence. Consistent with this design, the empirical evidence suggests the process has been largely free from manipulation. Iyer and Reddy (2013) find no evidence that incumbent politicians influenced the redistricting process or that it introduced partisan bias in electoral outcomes. Kjelsrud et al. (2024) similarly find no evidence of gerrymandering, showing that potentially influential politicians did not receive more favourable redistricting outcomes and that areas reassigned to new constituencies were not systematically different from those that remained unchanged. Ahmed (2022) demonstrates that the primary objective of equalising voter populations across constituencies was largely achieved, with no evidence that politicians serving as associate members of the Commission used their position to their advantage.

Figure 2: Timeline of Delimitation Reform

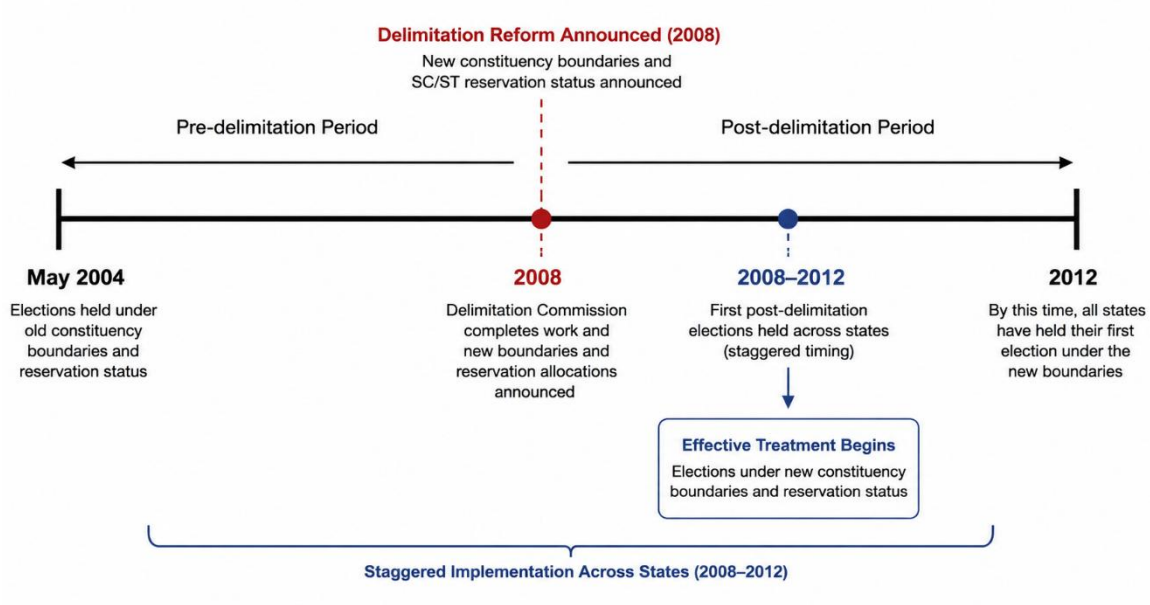
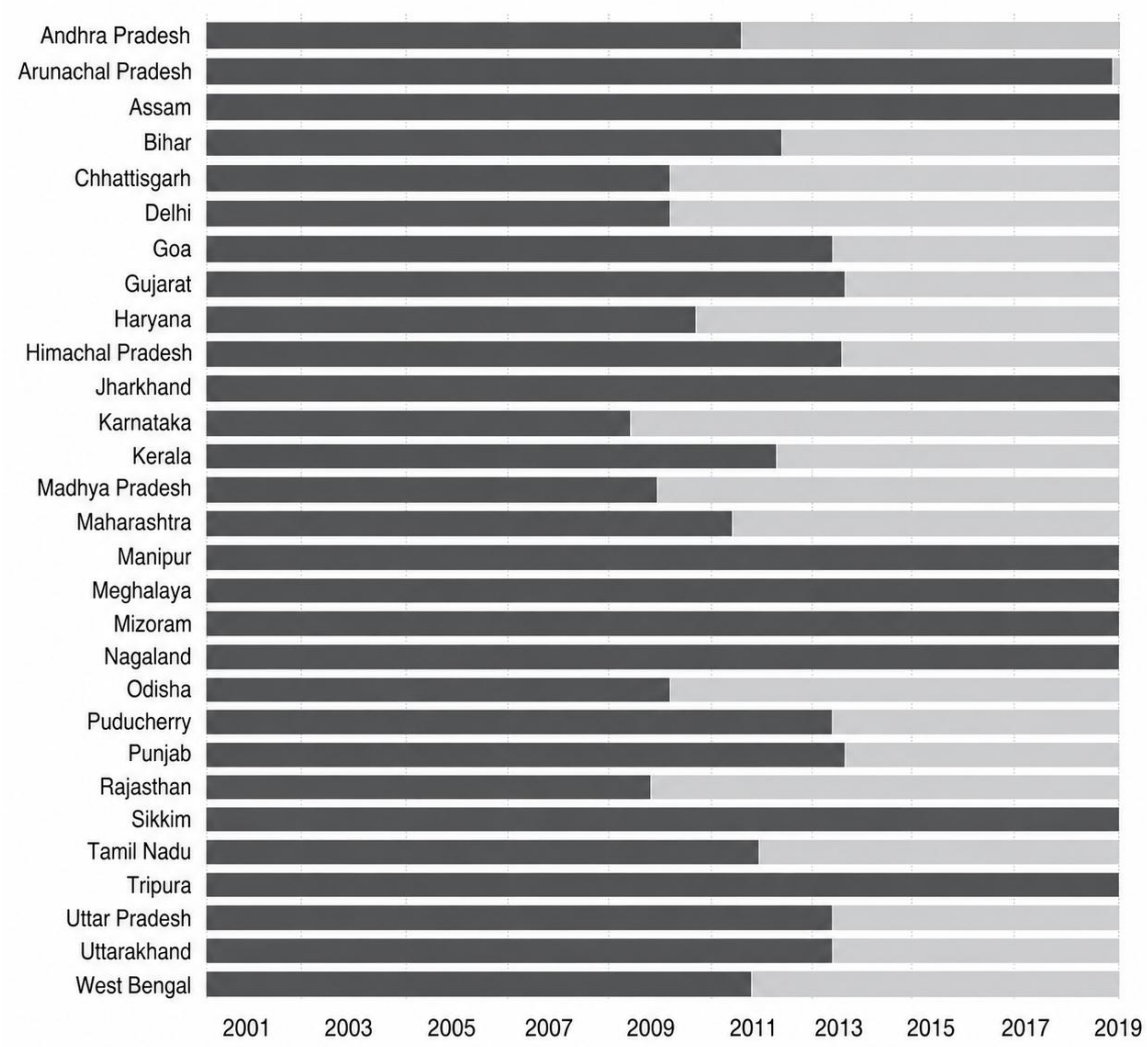


Figure 3: Timeline of Treatment by State



Notes: Delimitation was completed across all states by 2008, but effective treatment began only when each state held its first election under the new constituency maps. Since state elections occur at different times, this generates staggered treatment across states. States shaded in dark grey have not yet held their first post-delimitation election, while states shaded in light grey have already done so. Nine states were exempted from the delimitation exercise entirely: Arunachal Pradesh, Assam, Jharkhand, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim, and Tripura, and are therefore excluded from the analysis.

The Commission follows several key principles in redrawing boundaries. Population equality across constituencies is the primary objective, subject to a permissible margin of variation to respect administrative boundaries and geographic contiguity. Constituency boundaries must not cross district boundaries wherever possible. Crucially for my purposes, seats are reserved for Scheduled Castes and Scheduled Tribes in areas where their populations exceed a state-specific threshold based on the most recent census

data. The 2008 delimitation, the most recent and comprehensive boundary redrawing since independence, altered the reservation status of a significant number of constituencies across all states based on SC and ST population shares from the 2001 Census. Although the Delimitation Commission completed its work in 2008, the new boundaries and revised reservation allocations did not take effect immediately. Figure 2 illustrates the timeline of the reform: while new constituency boundaries and reservation allocations were announced in 2008, effective treatment began only when each state held its first election under the new constituency maps. Since state assembly elections are not held simultaneously across states, implementation varied depending on when each state's next scheduled election fell, with the reform taking effect between 2008 and 2012. For instance, while Uttar Pradesh's 403 assembly constituencies were delimited in 2008, the state's next election was not held until 2012, meaning the new reservation allocations had no practical effect until that point. Figure 3 shows the beginning of effective treatment by state.

I define the start of effective treatment as the year in which each state held its first election under the new delimitation boundaries. Where a state election occurred in the first half of the calendar year (Let's say April 2009), I assign treatment from that year onwards. Where the election occurred in the second half of the year (Let's say October 2009), I assign treatment from the following year, reflecting the fact that a politician elected in the second half of the year has limited influence over outcomes in that calendar year. I exploit this staggered timing as an additional source of identifying variation, comparing forest governance outcomes between 2001 and 2020 in constituencies that changed reservation status with those that remained non-reserved throughout.

While the primary goal of delimitation is demographic fairness, its consequences extend well beyond population accounting. By redrawing boundaries and revising the allocation of reserved seats, delimitation reshapes the demographic and social composition of constituencies, altering the electoral incentives facing legislators and ultimately influencing the distribution of public goods and policy attention. For SC and ST communities, these changes are particularly consequential. Where these communities are concentrated within a constituency, they constitute a larger share of the electorate, strengthening the incentive for their legislators to prioritise their interests. Conversely, demographic dilution within a larger or more heterogeneous constituency can reduce their political salience and limit their access to state resources. Understanding how delimitation shapes political accountability for historically marginalised communities is therefore

central to assessing its consequences for natural resource governance, which is the focus of this paper.

2.3.1 The Delimitation Exercise: Example

The mechanics of the delimitation process can be illustrated with the example of Adilabad district in Andhra Pradesh. The process operates in three steps.

Step 1: Allocating seats to districts

Assembly seats are distributed across districts in proportion to their population share. With a total of 294 assembly seats in Andhra Pradesh and a state population of 76,210,007, Adilabad district, with a population of 2,488,003, is entitled to approximately 10 seats (2,488,003 / 76,210,007 × 294 ≈ 9.6).

Step 2: Determining reserved seats for Scheduled Castes.

The number of SC-reserved seats in the state legislature is proportional to the SC population share. Since Scheduled Castes constitute 16.19 percent of Andhra Pradesh's population, the state is allocated 48 SC-reserved seats (0.1619 × 294 ≈ 48) out of 294 total assembly seats.

Step 3: Selecting which constituencies become reserved.

SC-reserved seats within each district are allocated in proportion to the district's share of the state's SC population. Adilabad district has an SC population of 461,214 out of a state total of 12,339,496, entitling it to approximately 2 SC-reserved seats (461,214 / 12,339,496 × 48 ≈ 1.79). The constituencies selected for reservation are those with the highest proportion of SC residents. In Adilabad, these are Chennur and Bellampalle, which have the first and second highest SC population shares in the district (Table 1).

This threshold-based rule is the source of identifying variation in this paper. Constituencies whose SC or ST population share ranked sufficiently high within their district to cross the reservation threshold received reserved status, while otherwise similar constituencies just below the threshold remained non-reserved. Crucially, this assignment was determined solely by population shares from the 2001 Census, with no reference to forest conditions, economic characteristics, or the preferences of incumbent politicians.

Table 1: Selection of SC Constituencies in Adilabad District, Andhra Pradesh

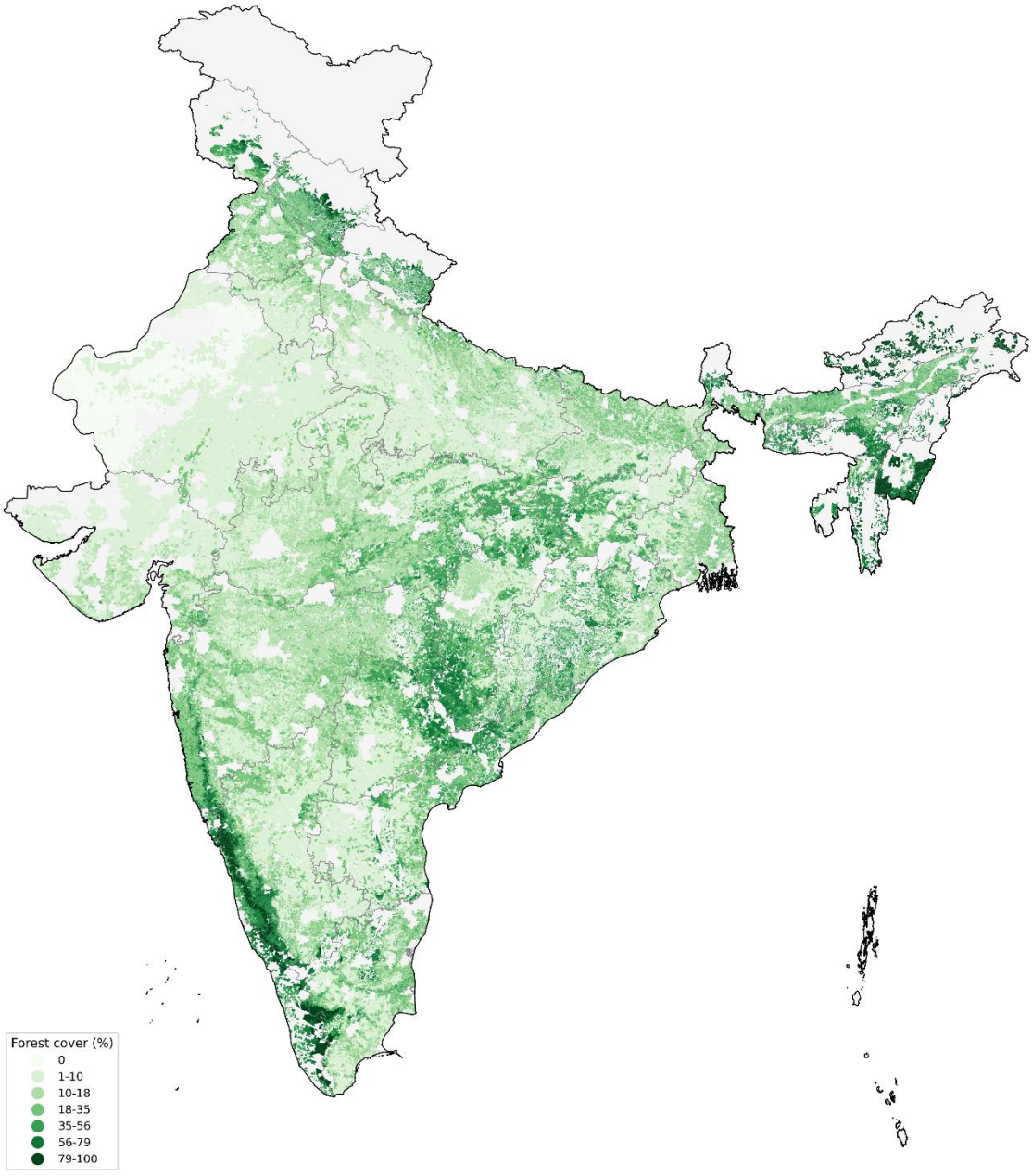
Sl. No.	No. & Name of Assembly Constituency	Total Population	SC Population	% of SCs	SC Seats
	ADILABAD	**2,488,003**	**461,214**	**18.54**	**TWO**
1	2 Chennur (SC)	251,989	72,911	28.93	**1**
2	3 Bellampalle (SC)	223,283	60,161	26.94	**2**
3	1 Sirpur	251,427	52,008	20.69	
4	4 Mancherial	276,425	51,904	18.78	
5	6 Khanapur (ST)	245,833	43,413	17.66	
6	10 Mudhole	259,141	43,847	16.92	
7	8 Boath (ST)	227,205	36,861	16.22	
8	5 Asifabad (ST)	245,803	33,842	13.77	
9	9 Nirmal	259,032	34,738	13.41	
10	7 Adilabad	247,865	31,529	12.72	

Source: Changing Face of Electoral India: Delimitation 2008, Volume - I , Page - 64

3. Data

The primary data source for the analysis is the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG), which integrates socioeconomic, demographic, environmental, and political datasets and is available at fine geographic units, including villages, towns, and assembly constituencies, in a time-consistent manner (Asher et al., 2021). I extract and combine village-level forest cover data available through SHRUG for the period 2001 to 2020 with corresponding state assembly election data, socioeconomic controls from India's decennial 2001 population census, and spatial information on constituency boundaries and village locations.

Figure 4: Forest Cover (2001)



Notes: This shows the heat map of forest cover in 2001. Areas are shaded according to the maximum share of each pixel that is covered by forest.

3.1 Forest Cover

My primary outcome variable is village-level forest cover extracted from the Vegetation Continuous Fields (VCF) dataset, a satellite-based measure of tree canopy cover available annually at a 250-metre resolution from 2000 onwards (Dimiceli et al., 2015). For each pixel, VCF provides an estimate of the percentage of land area covered by forest canopy, generated using a machine learning model trained on MODIS imagery combined with samples from higher-resolution satellites. This measure incorporates multiple spectral bands beyond the visible range, including thermal signatures, allowing it to distinguish forested areas from non-forest plantations on the basis that forests tend to be cooler than plantation areas (Asher et al., 2020). As a result, VCF is substantially more informative than the Normalised Difference Vegetation Index (NDVI), which cannot reliably differentiate forest cover from other forms of vegetation (Foster and Rosenzweig, 2003). Forest cover in India is also poorly characterised by binary deforestation indicators. Some studies have instead used the Global Forest Cover dataset at 30-metre resolution, which classifies a pixel as deforested once more than 90% of its baseline 2000 forest cover is lost (Hansen et al., 2013). However, this measure is less well suited to the Indian context, where forest change is typically gradual and multidirectional rather than driven by discrete clearing events, whereas VCF's continuous measure of canopy cover is better able to capture incremental changes in forest governance outcomes (Asher et al., 2020).

To the best of my knowledge, VCF has been used only sparingly in the economics literature. The most comprehensive assessment of its properties and advantages relative to alternative forest cover datasets is provided by Asher et al. (2020), whose evaluation motivates my choice of this measure. Bandyopadhyay et al. (2026) represent the only other study to employ VCF, examining the effect of female political representation on forest outcomes. In the baseline specification, forest cover is defined as the logarithm of the total maximum pixel value plus one within each village. I verify the robustness of the results using the average percentage of maximum forest cover within each village and the logarithm of the total average pixel value plus one within each village. Figure 4 presents a heat map of baseline forest cover across India. Although highly dense forest regions are clustered in specific geographic areas, regions with 20–40% forest cover are distributed across much of the country.

3.2 Village Shapefiles and Assembly Constituencies

To examine the spatial relationship between electoral constituencies and villages, I utilise shapefiles of pre- and post-delimitation assembly constituencies obtained from DataMeet, which delineate constituency boundaries before and after the 2008 delimitation exercise. Additionally, village-level shapefiles and demographic data are drawn from the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG), which provides fine-grained geographic and socioeconomic information at the village level based on India's 2001 population census (Asher et al., 2021). These shapefiles are spatially adjusted and overlaid to determine whether each village fell within a reserved or general constituency under both the pre- and post-delimitation boundary maps.

I perform a spatial merge between village and constituency shapefiles to assign each village to its pre-delimitation and post-delimitation constituency. Where a village overlaps with multiple constituency boundaries due to minor shapefile inaccuracies or projection discrepancies, I assign the constituency that contains the largest share of the village's total land area as the primary constituency. Additionally, village-to-constituency assignments are verified using SHRUG fragmentation weight files, which record the proportion of each village's land area falling within each constituency boundary and allow us to confirm that the assigned constituency accounts for the majority of the village's geographic extent under both pre and post-delimitation boundaries (Asher et al., 2021).

3.3 Electoral and Candidate Data

Election outcomes and candidate characteristics are obtained from two data sources available through SHRUG. Constituency-level electoral data comes from the Trivedi Centre for Political Data, which provides information on electorate size, valid votes cast, voter turnout, the number of contesting candidates, vote shares, and the reservation status of each constituency. Candidate-level characteristics, including party affiliation, constituency contested, and electoral outcome, are extracted from the same source. I combine this with information on candidate socioeconomic characteristics, including net asset ownership, educational attainment, age, and the number of criminal accusations filed against each candidate, contributed to SHRUG by Prakash et al. (2019).

3.4 Mining Locations

To examine the channel through which political reservation affects forest outcomes, I use data from the Indian Mining Census compiled by Asher and Novosad (2023), which lists the location and mineral type of every known mine in India. I compute the straight-line distance from each village centroid to the nearest mine of any type, using the minimum of these distances as a continuous measure of mining proximity. This classification allows me to test whether the treatment effect is concentrated near mines where the financial incentives for elite capture are strongest.

3.5 Socioeconomic Characteristics

Village-level socioeconomic indicators are obtained from the SHRUG platform, which extracts information from India's decennial population censuses (Asher et al. 2021). From the 2001 Census, I obtain village population, SC and ST population shares, access to electricity, access to paved road and distance to the nearest town.

3.6 Sample Construction

The main analysis sample is constructed through a sequence of restrictions designed to ensure clean identification of the treatment effect. I applied four restrictions in turn. First, I retain only villages that had non-zero forest cover in 2000, the earliest year for which forest cover data are available[10]. Second, I restrict villages that are spatially stable across the pre- and post-delimitation boundaries. This restriction is a fundamental design choice rather than a data quality filter. The identifying variation in the study is a change in the reservation status of the constituency governing a village, and for this variation to be clean, the constituency governing the village must be the same before and after the reform. Villages that move from one constituency to another as a result of boundary redrawing experience two simultaneous changes: a change in reservation status and a change in constituency identity, conflating the effect of politician identity with the effect of being governed by an entirely different administrative unit with different political networks, spending histories, and local economic conditions. I therefore restrict to villages that remained within the same constituency before and after the 2008 boundary redrawing under both boundary systems. This restriction is applied symmetrically to both the

[10] Fewer than 10% of villages have zero forest cover in 2000.

treatment and control groups, so that the only difference between treated and control villages after 2008 is whether their constituency changed reservation status[11].

Third, I restrict the treatment group to constituencies that switched from general to ST or SC reserved status after the 2008 delimitation, excluding constituencies that lost reservation status as a result of the reform. Constituencies that transitioned from reserved to general status experienced the reverse of my treatment, and including them in the treatment group would conflate the effect of gaining and losing reservation status. Lastly, I restrict the control group to constituencies that remained general under both pre and post-delimitation boundaries, excluding constituencies that were reserved both before and after the reform. Since always-reserved constituencies had ST or SC politicians throughout the entire study period and cannot serve as clean counterfactuals, as any observed difference in outcomes between them and newly reserved constituencies would reflect the cumulative effect of long-run historical reservation rather than the specific effect of the 2008 reform[12]. The main analysis sample comprises 26,662 villages observed annually over the period 2001 to 2020, yielding a total of 533,240 village-year observations.

4. Empirical Strategy

Estimating the causal effect of political reservation on forest cover is challenging because reservation status may be correlated with unobserved village and constituency characteristics that independently affect forest outcomes. A naive comparison of forest cover between villages in reserved and non-reserved constituencies risks reverse causality and endogeneity concerns and therefore cannot be given a credible causal interpretation. A key concern is that political reservations are typically introduced in areas with distinctive characteristics, meaning that differences in outcomes over time may reflect pre-existing trends rather than the policy itself. Moreover, when implemented simultaneously across large administrative units, the absence of a contemporaneous comparison group makes it

[11] This approach follows the standard practice in the redistricting literature of restricting comparisons to units that experienced a change in policy rather than a change in the administrative unit governing them. Dube, Lester and Reich (2010) apply an analogous restriction in their study of minimum wage effects, retaining only counties that did not cross state borders so that the only source of variation is the policy change rather than a change in the governing jurisdiction.

[12] Ahmed (2022), who also uses the 2008 Indian delimitation, does not restrict to villages that remained within the same constituency across boundary systems and instead includes all villages that were reassigned to new constituencies as a result of boundary redrawing. By contrast, I restrict to villages whose constituency assignment is stable across both boundary systems, ensuring that the treatment captures only the change in reservation status rather than a simultaneous change in the governing constituency.

difficult to credibly attribute observed changes in forest cover to the reform itself rather than to other concurrent factors. I address these concerns by exploiting the 2008 delimitation reform, which reassigned reservation status of constituencies from open competition (non-reserved) to seats reserved exclusively for historically marginalised communities based solely on a transparent demographic threshold: constituencies where SC or ST population shares exceeded a state-specific threshold, as determined by the 2001 Census, received reserved status. This rule-based assignment, combined with the staggered timing of implementation across states between 2008 and 2012, provides both a credible source of variation in reservation status and a contemporaneous comparison group of constituencies that remained non-reserved throughout the period. The integrity of this process is further supported by consistent evidence that incumbent politicians did not manipulate constituency boundaries (Iyer and Reddy, 2013; Ahmed, 2022; Kjelsrud et al., 2024). I define the start of effective treatment, accordingly, assigning treatment from the election year if held in the first half of the calendar year and from the following year otherwise, and compare forest governance outcomes between 2001 and 2020 in villages whose constituencies changed reservation status with those that remained non-reserved throughout.

Under the parallel trends assumption, the staggered rollout of the post-delimitation election across states enables me to estimate the causal effect of political reservation on forest cover using a difference-in-differences (DID) approach. Formally, I estimate the effects using the following two-way fixed effects (TWFE) model:

$$Forest_{vct} = \beta(Post_t \times Treated_{vc}) + \alpha_v + \gamma_{st} + X_V \times v_t + \varepsilon_{vct} \quad (1)$$

where $Forest_{vct}$ is a measure of forest cover in village v in assembly constituency c in year t[13]. $Treated_{vc}$ is a dummy equal to 1 if village v in constituency c has been changed from general to reserved status (GEN → SC or GEN → ST) and 0 for villages in always general constituencies (GEN → GEN). $Post_t$ is a binary indicator equal to 1 after the delimitation (2008-20) and 0 before (2001-07)[14]. Village fixed effects (α_v)

[13] In the baseline specification, forest cover is defined as the logarithm of the total maximum pixel value plus one within each village. I also present the results using the average percentage of maximum forest cover within each village and the logarithm of the total average pixel value plus one within each village.

[14] $Post_t$ uses constituency-specific treatment timing, defined as the year following each state's first post-delimitation election, which varies across states between 2008 and 2012, rather than a common post-2008 indicator. Where a state election occurred in the first half of the calendar year, treatment is assigned from that year onwards; where the election occurred in the second half, treatment is assigned from the following year.

control all village-level time-invariant unobservables, while state-year fixed effects (γ_{st}) control for any pattern of state-specific shocks. I also interact a vector of baseline village controls X_V (baseline forest cover, village population), with year fixed effects. These control for any differential time path of forest cover that is correlated with baseline village characteristics. In all estimations, I cluster standard errors at the assembly constituency level, allowing for an arbitrary covariance structure over time within each constituency, and accounting for the serial correlation in the error term (Bertrand et al., 2004; Miller, 2023).

4.1 Identification Assumption

The identifying assumption underlying the difference-in-differences design is that, in the absence of the 2008 delimitation reform, forest cover in villages in treated constituencies would have evolved along the same trajectory as villages in always-general (non-reserved) constituencies (Meyer 1995). A violation of this assumption would imply that the post-reform divergence I observe reflects pre-existing differential trends rather than the causal effect of political reservation. To assess the validity of this assumption, I estimate a fully dynamic version of my baseline specification and check for potential pretrends. The event study specification is as follows:

$$Forest_{vct} = \beta_k \times \sum_{k,k\neq -1}^{K} \mathbf{1}\{t - t_{vc} = k\} + \alpha_v + \gamma_{st} + X_V \times v_t + \varepsilon_{vct} \qquad (2)$$

Where $\mathbf{1}\{t - t_{vc} = k\}$ refers to a set of indicator variables that are assigned a value of 1 if village v in constituency c in period t is k years away from the first post-delimitation election ($\boldsymbol{t_{vc}}$). Under the dynamic TWFE model, I treat the year just before the first post-delimitation election as the omitted category and compare it with the years exposed to the delimitation in other relative years. The tail at k ≤ -4 is binned at k = - 4, and the tail at k ≥ 8 is binned at k = 8. All other specifications align with those outlined in Eq. (1).

Recent work in econometric theory raises concerns about the validity of the two-way fixed effects estimator in staggered adoption settings. For instance, when treatment effects vary over time and across units, already-treated constituencies can serve as effective comparison units for later-treated constituencies, potentially generating negative weights on cohort-specific average treatment effects and producing misleading estimates of the overall treatment effect (Goodman-Bacon, 2021; Callaway and Sant'Anna, 2021; Sun and Abraham, 2021; Borusyak et al., 2024). This concern is partially mitigated in my setting

because my control group consists entirely of never-treated, always-general constituencies, eliminating the problematic comparisons between already-treated and not-yet-treated units that are the primary source of bias identified by Goodman-Bacon (2021). Nevertheless, treatment effects may still vary across my 2008 to 2012 treatment cohorts, as constituencies in states that implemented the reform earlier may respond differently from those in later-implementing states, which could affect the interpretation of my TWFE estimates. As a robustness check, I therefore implement the interaction-weighted estimator developed by Sun and Abraham (2021), which delivers consistent cohort-specific average treatment effects even in the presence of heterogeneous treatment effects across cohorts and over time. By relying on different identification assumptions from my baseline TWFE estimator, this approach allows me to assess whether my results are robust to treatment-effect heterogeneity arising from the staggered implementation of the 2008 delimitation reform.

A further potential threat to identification is the presence of time-varying omitted variables that are correlated with both the delimitation reform and forest cover outcomes. Specifically, the identifying assumption requires that villages in treated and control constituencies follow similar trajectories in both observed and unobserved time-varying characteristics. Two pieces of evidence support this assumption. First, including time-varying controls leaves my estimates largely unchanged, suggesting that observable confounders do not drive the results. Second, Table 2 presents balance tests comparing baseline characteristics of treated and control villages. The two groups are broadly balanced across forest cover and village characteristics, with all variables showing p-values above 0.10 and no economically meaningful differences in pre-reform trends. Notably, forest cover levels and pre-reform forest cover trends are statistically indistinguishable between treated and control villages, providing direct evidence that the delimitation reform did not systematically select constituencies based on their pre-existing forest trajectories.

Table 2. Summary Statistics

Variable	(1) Treated Mean (SD)	(2) Control Mean (SD)	(3) p-value (difference)
Forest Cover			
Average Forest Cover (2000)	5.61	6.36	0.31
	(4.59)	(4.79)	
Maximum Forest Cover (2000)	13.22	14.04	0.44
	(11.11)	(10.36)	
Log of Maximum Forest Cover (2000)	2.38	2.49	0.39
	(0.75)	(0.68)	
Change in Forest Cover (2000-2007)	1.75	1.99	0.96
	(7.60)	(7.68)	
Village-level Characteristics			
ST Population Share (2001)	0.11	0.08	0.30
	(0.22)	(0.20)	
SC Population Share (2001)	0.19	0.17	0.48
	(0.18)	(0.18)	
Distance to Nearest Mine (km)	56.00	56.52	0.88
	(67.20)	(53.63)	
Access to Electricity (2001)	0.66	0.65	0.31
	(0.47)	(0.48)	
Distance to Nearest Town (2001)	26.72	23.49	0.45
	(21.86)	(17.80)	
Access to Paved Road (2001)	0.53	0.51	0.60
	(0.50)	(0.50)	
Number of villages	2839	23823	
F-test of joint significance (p-value)			0.40
F-test, number of villages			26662

Notes: This table presents summary statistics for the sample used for village-level analysis. Columns (1) and (2) show the mean and standard deviation in parentheses. Treated observations are those where there is a change in reservation status from general to reserved (SC or ST) after delimitation, while control observations are those which remained always general both pre and post delimitation. The p-values in column (3) are calculated after residualizing each variable on village and state fixed effects.

5. Results: Impact of political representation on forest cover

5.1 Main Results

Table 3 presents the estimated impact of political representation on the local forest cover (i.e., the log maximum village forest cover), employing β from Eq. (1) as the parameter of interest. All estimations include village, state × year fixed effects and baseline village controls (baseline forest cover, village population) interacted with year fixed effects. Column 1 shows the results for all villages in reserved constituencies against villages in always-general (non-reserved) constituencies. I find a positive and statistically significant impact on forest cover following delimitation in treated villages. I observe an increase of 0.049 log points (approximately 5%) in annual forest cover among treated villages in constituencies led by reserved politicians, relative to non-treated villages in constituencies

led by general politicians, which is statistically significant at the 5% level. However, heterogeneity appears to be present in the impact of reserved politicians on forest cover when examined by reservation type, comparing villages in ST-reserved and SC-reserved constituencies separately against villages in always-general (non-reserved) constituencies.

The results reveal a markedly different picture between ST and SC politicians. Column (2) shows the results for the villages in the ST reserved constituencies. I find a positive and significant impact on forest cover after delimitation for treated villages, with an increase of 0.100 log points (approximately 10.5%) in annual forest cover among treated villages relative to non-treated villages in always-general constituencies, significant at the 1% level. These findings are consistent with Agarwal et al. (2026), who find that village area under forest cover increases in ST-reserved assembly constituencies in the state of Chhattisgarh in India. By contrast, Column 3 shows that villages in SC-reserved constituencies exhibit no statistically significant change in forest cover, with a coefficient of 0.033 log points indistinguishable from zero. This is consistent with the broader literature showing that ST reservation improves community welfare outcomes while SC reservation has limited redistributive effects (Pande, 2003; Chin and Prakash, 2010; Jensenius, 2015; Gulzar et al., 2020) and reflects the different electoral arithmetic facing the two groups. For instance, ST communities are geographically concentrated, which means ST reserved constituencies have substantially higher proportions of tribal voters, giving ST politicians both the incentive and the political freedom to prioritise the interests of their communities, including the protection of forests on which ST livelihoods directly depend. SC candidates, by contrast, represent a minority share of their constituencies and must appeal to a broader non-SC electorate, which limits their ability to pursue SC-specific policies (Jensenius 2015). Thus, in line with my results, the caste identity of the legislator is a significant determinant for natural resource governance.

The credibility of the difference-in-differences estimation depends crucially on the parallel trends assumption. That is, in the absence of the delimitation reform, villages in constituencies that changed from general to SC or ST reserved status would have followed similar forest cover trends to villages in constituencies that remained general throughout before 2008. To assess the validity of this assumption and examine the temporal dynamics of forest outcomes following the delimitation, I estimate a dynamic version of the baseline specification as defined in Eq. (2). Figure 5 reports the dynamic treatment effects using the same controls and fixed effects as in Table 3. The coefficients in the pre-treatment period

provide a direct test of parallel pre-trends between treated and control villages. The pre-treatment coefficients are generally small and statistically indistinguishable from zero, providing evidence consistent with the parallel trends assumption. There is no indication of systematic divergence in forest cover trajectories between treated and control villages prior to the first election under the new delimitation rules, supporting the validity of the difference-in-differences design.

Table 3: Political Representation and Forest Cover

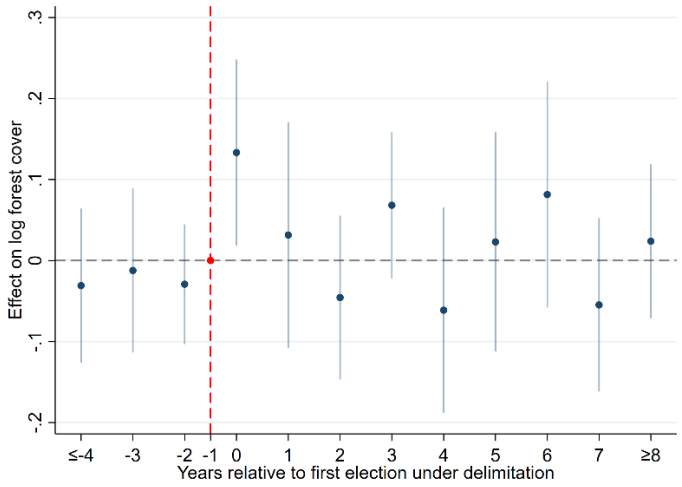
	(1) All reserved	(2) ST reserved	(3) SC reserved
Post*Treated	0.0487**	0.100***	0.0327
	(0.0211)	(0.0281)	(0.0205)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531,640	487,680	518,920
No. of villages	26,069	23,902	25,455
R2	0.709	0.709	0.701
Within R2	0.012	0.011	0.011

Notes: The table shows the difference-in-differences estimates using the TWFE method of the impact of political representation on local forest cover. I define forest cover as the log maximum village forest cover. Post is a binary indicator equal to 1 after the delimitation (2008-20) and 0 before (2001-07). Treated is a dummy equal to 1 if villages in the constituency that have been changed from general to reserved status (GEN → SC or GEN → ST) and 0 for villages in always general constituencies (GEN → GEN): all reserved in Column 1, ST-reserved in Column 2, and SC-reserved villages in Column 3. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.

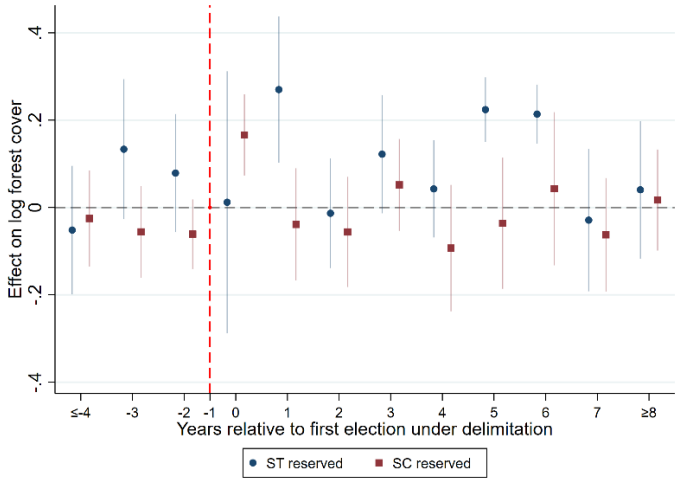
*** p<0.01 ** p<0.05 * p<0.10.

Panel A shows the dynamic effects for all villages in reserved constituencies against villages in always-general constituencies. The pooled post-treatment effects remain relatively imprecise, suggesting substantial heterogeneity by reservation type. Panel B, therefore, separately estimates dynamic effects for villages in constituencies that changed from general to ST reserved and those that changed from general to SC reserved. The disaggregated estimates reveal markedly different post-treatment trajectories across the two groups. Villages in ST-reserved constituencies show positive and persistent post-treatment increases in forest cover relative to always-general constituencies, with effects emerging shortly after the first post-delimitation election and persisting across several subsequent periods. By contrast, villages in SC-reserved constituencies display post-treatment coefficients that are small and generally centred around zero. These findings complement the baseline results in Table 3, confirming positive and persistent effects of ST reservation on forest cover and null effects for SC reservation.

Figure 5: Event Study of the impact of political representation on forest cover



Panel (a) All Reserved



Panel (b) ST and SC Reserved

Notes: The figure shows year-by-year estimates of log forest cover in villages in which there is a change in reservation status after delimitation implementation. Villages are grouped on the *X* axis according to the year relative to the first election after delimitation. Each point thus shows the average value of log forest cover in villages in a given year relative to the treatment year, controlling for village fixed effects, state × year fixed effects, baseline population × year, and baseline log forest cover × year interactions. Standard errors are clustered at the assembly constituency level. Panel (a) shows the estimates for all reserved cases, while Panel (b) shows the estimates for SC and ST separately. The year before delimitation implementation is omitted (t = -1); forest cover is thus shown relative to this period. Far periods are pooled such that years $k \leq -4$ are binned and plotted at -4, and $k \geq 8$ are binned and plotted at $k = 8$.

5.2 Heterogeneity Checks

5.2.1. Heterogeneity by initial forest cover

It would be interesting to examine whether there is any heterogeneity in my findings obtained in Table 3. It is plausible that the environmental consequences of a politician's identity depend on the initial distribution of forest resources across villages. For instance, political incentives surrounding forest extraction and conservation are likely to differ between densely forested and sparsely forested areas, where the economic value of forest land, extraction opportunities, and monitoring challenges vary substantially. Following related work disentangling heterogeneity by baseline forest endowments (Asher et al., 2020; Bandyopadhyay et al., 2026), I examine whether the estimated effects differ across villages with varying initial levels of forest cover. I classify villages according to the extent of forest cover at the beginning of the study period in 2000, dividing them based on whether village-level baseline forest cover falls below or above the 75th percentile of the baseline forest cover distribution. Villages above this threshold are considered densely forested, while those below are considered sparsely forested at baseline. To explore the heterogeneity effects, I interacted the treatment indicator in Eq. (1) with a dummy equal to one for villages above the 75th percentile of baseline forest cover, replacing $Post_t \times Treated_{vc}$ with $Post_t \times Treated_{vc} \times \geq 75\text{th percentile}_{vct}$.

Table 4 reports the results. Column 1 shows that among sparsely forested villages, exposure to reserved politicians increases forest cover by approximately 6.5%. However, for densely forested villages, the effect is substantially attenuated and statistically indistinguishable from zero (0.061 - 0.065 = - 0.004, p = 0.858), indicating that reservation has no meaningful impact on forest cover in already densely forested areas. A similar pattern emerges when disaggregating by reservation type. Column 2 shows that villages in ST-reserved constituencies experience an increase of approximately 11.5 % in sparsely forested areas, while the marginal effect in densely forested villages is close to zero and statistically insignificant (0.109 - 0.118 = - 0.009, p = 0.485). Column 3 shows that villages in SC-reserved constituencies experience an increase of approximately 4.5 % in sparsely forested areas, while the corresponding effect in densely forested villages is again economically small and statistically indistinguishable from zero (0.043 - 0.048 = -0.005, p = 0.869). The dynamic evolution of these heterogeneous effects is presented in Appendix

Figure B2[15]. Taken together, these results suggest that the forest protection effect of political reservation is concentrated in villages where encroachment pressure is greatest. In sparsely forested villages, where forest land sits at the margin of conversion to agricultural or extractive uses, reserved politicians resist encroachment and preserve remaining tree cover. This is consistent with evidence that political incentives are most consequential for forest outcomes at the deforestation frontier, where rents from illegal extraction and land conversion are most actively pursued (Burgess et al., 2012; Balboni et al., 2023). By contrast, in densely forested villages, ecological conditions and geographic remoteness sustain forest cover regardless of politician identity, leaving little scope for political action to generate additional gains.

Table 4: Heterogeneity by Initial Forest Cover

	(1) All reserved	(2) ST reserved	(3) SC reserved
Post*Treated	0.0607***	0.109***	0.0429**
	(0.0222)	(0.0252)	(0.0217)
Post*Treated* ≥75th percentile	-0.0654**	-0.118***	-0.0476*
	(0.0262)	(0.0274)	(0.0250)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531640	487680	518920
No. of villages	26,069	23,902	25,455
Marginal effect for ≥75th percentile	-0.0046	-0.0087	-0.0046
Marginal effect for ≥75th percentile (p-value)	0.858	0.485	0.869
R2	0.71	0.71	0.70
Within R2	0.012	0.011	0.011

Notes: The table shows the heterogeneous impact of political representation on local forest cover by initial forest cover distribution. Post*Treated captures the treatment effect for villages below the 75th percentile of the 2000 village-level baseline forest cover distribution. Post*Treated* ≥75th percentile captures the additional effect for villages at or above the 75th percentile. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

5.2.2 Heterogeneity by Mining Proximity

A further dimension of heterogeneity relates to the empowerment of forest-dwelling communities to resist large-scale extractive activity, of which mining is the most prominent example. The motivation for community resistance is well established. Mining operations have been associated with deteriorating health outcomes among nearby residents,

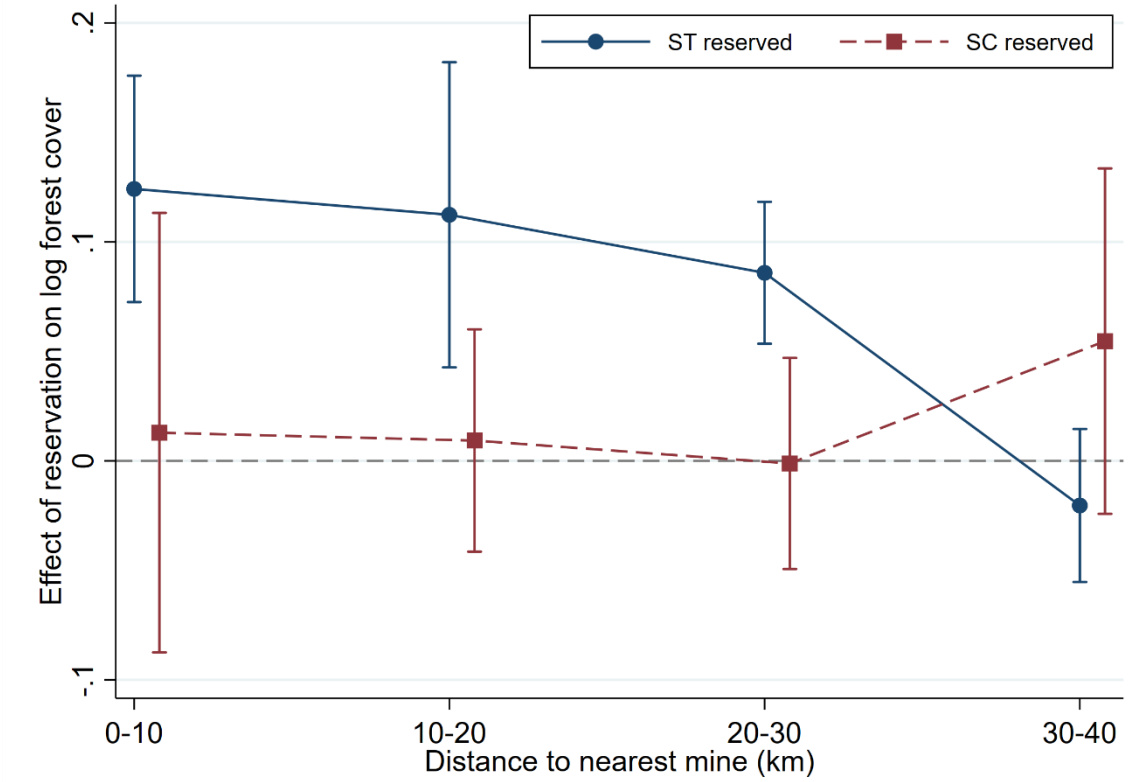
[15] Appendix Figure B2 reports event-study estimates separately for villages above and below the 75th percentile of baseline forest cover. Consistent with the baseline heterogeneity results, the post-treatment effects are concentrated among initially sparsely forested villages, while densely forested villages exhibit substantially attenuated and statistically insignificant effects.

including elevated rates of respiratory illness (Saha et al., 2011), accelerated deforestation, declining vegetation quality, and increased forest fragmentation (Areendran et al., 2013), as well as large-scale forced displacement. For instance, Downing (2002) estimates that mining in India displaced approximately 2.5 million individuals between 1950 and 1990.

Building upon this, since the mining operations in India are heavily concentrated in forested tribal belts and Scheduled Areas, regions characterised by intense conflicts over land acquisition, displacement, and forest access, thereby making the identity of the elected representative, particularly consequential for forest governance outcomes. A large body of literature shows that resource extraction generates significant local rents and intensifies political competition over land, regulation, and bureaucratic control (Brollo et al., 2013; Ross, 2015). In the Indian context, Asher and Novosad (2023) show that mining booms increase the election of criminal politicians and induce incumbents to accumulate wealth and criminal charges while in office. Politicians in such settings routinely function as intermediaries between mining firms and the state, influencing environmental clearances, land access, and bureaucratic coordination. As ST politicians are more electorally accountable to forest-dependent tribal communities whose livelihoods depend on forests, common lands, and minor forest products, they face stronger incentives to resist such extractive encroachment. For instance, prior work shows that political reservation increases the responsiveness of elected representatives to the interests of marginalised communities (Pande, 2003; Jensenius, 2017), and related evidence from tribal governance reforms shows that greater tribal political representation strengthens community influence over local institutions in Scheduled Areas (Gulzar et al., 2020). More broadly, the decentralised environmental governance literature argues that local communities possess strong incentives to conserve forests when political institutions provide them with greater bargaining power and voice (Ostrom, 1990; Chhatre and Agrawal, 2009). If this mechanism is operative, ST political representation should generate the largest forest protection gains in villages closest to mines, where extractive pressure and the potential for elite capture are greatest.

To assess this prediction, I examine whether treatment effects vary with proximity to mining sites using distance-to-mine data from the Indian Mining Census compiled by Asher and Novosad (2023), which records the location and type of every known mine (see Figure B3) and allows me to compute the distance from each village to its nearest mine.

Figure 6: Impact of political representation on forest cover by proximity to mining



Notes: This figure shows a binned regression that estimates the treatment effect in villages at different values of the moderator (distance to mines). Each point shows the estimated DiD coefficients for villages in the indicated distance ring, with villages between 40-60 km as the reference category, controlling for village fixed effects, state × year fixed effects, baseline population × year, and baseline log forest cover × year interactions. Standard errors are clustered at the assembly constituency level.

Figure 6 presents the results. Villages closest to mines experience the largest forest cover gains following the election of an ST politician, with effects that are positive and statistically significant, while effects for SC politicians are consistently close to zero and statistically insignificant across all distance bins. I report additional estimates by tercile of distance to mines reported in Table A1. I find that in ST-reserved villages, the closest to mines show the largest forest cover gains, with effects declining across terciles, while SC-reserved villages show statistically insignificant effects. This pattern is consistent with the institutional and geographic concentration of mining activity in India's forested tribal regions, where the political salience of forest governance is greatest. The absence of comparable effects among SC politicians is also informative: SC constituencies are substantially less concentrated in forest and mineral-rich regions and are generally less dependent on forests for livelihoods, making mining-related land conflicts less electorally salient in SC-reserved constituencies. Taken together, these findings suggest that ST

political representation plays a particularly protective role for forest-dependent communities facing intensive extractive pressure, consistent with an elite capture mechanism whereby ST politicians weaken collusive politician-firm networks, strengthen bureaucratic monitoring, and increase resistance to forest diversion and illegal extraction precisely where natural resource rents and encroachment pressures are greatest.

5.2.3 Heterogeneity by Legislators Age

Finally, I examine whether the effects of political reservation vary with the age of elected legislators. For instance, younger politicians may have stronger incentives to invest in long-term public goods such as environmental conservation, reflecting both longer time horizons and greater responsiveness to community demands. Consistent with this argument, Dahis et al. (2023) find that younger politicians elected in Brazilian mayoral races significantly reduce deforestation rates, and Bandyopadhyay et al. (2026) find that younger female legislators are more likely to have higher forest cover growth in India. In the spirit of this evidence, I examine whether variation in legislator age helps explain my findings.

Although the minimum age for election to state legislatures in India is 25 years, most MLAs are considerably older[16]. For my purpose, I use two age thresholds to demarcate younger and older legislators: a fixed cutoff of 50 years and, alternatively, the median age of winning politicians in the sample[17]. Table A2 reports the results for all villages in reserved constituencies. Across both thresholds, the forest protection effect of the reservation is concentrated among younger legislators and is statistically indistinguishable from zero for older legislators. Using the 50-year cutoff, villages in constituencies won by younger legislators, i.e., those below 50 years, show a forest cover increase of approximately 7.7 % relative to non-reserved villages, significant at the 5 % level. By contrast, villages in constituencies won by older legislators, i.e., those above 50 years, show a smaller and statistically insignificant effect. The pattern is qualitatively similar and even stronger using the median age cutoff: below-median legislators show a forest cover increase of approximately 8.7%, significant at the 1 % level, while above-median legislators show a smaller and insignificant effect. The consistent attenuation of

[16] See, for example, the following media reports on different state legislatures from the recent past: Age profile of politicians across all levels of government.
[17] These choices of these age cutoffs largely ensure that similar numbers of observations are available on either side of these age cutoffs, while also being largely representative of the age profile of the MLAs.

the treatment effect among older legislators across both thresholds suggests that the forest protection gains from political reservation are driven primarily by relatively younger reserved politicians, consistent with career concerns and longer time horizon arguments from the political economy literature.

5.3 Robustness Checks

The baseline findings hold across a wide range of robustness checks reported in the appendix. The first set of checks concerns the measurement of the outcome variable. Tables A3 and A4 replace the baseline measure, the logarithm of the maximum pixel value within each village, with two alternatives: the logarithm of the average pixel value and the average percentage of maximum forest cover. In both cases, the estimates remain consistent with the baseline results in Table 3, confirming that the findings are not an artefact of how forest cover is operationalised. The second set of checks addresses the parallel trends assumption and the temporal dynamics of treatment effects. Figure B4 present event-study estimates for both alternative outcome measures. Across both specifications, the pre-treatment coefficients are small and statistically indistinguishable from zero, supporting the validity of the parallel trends assumption. The post-treatment trajectories mirror the baseline pattern in Figure 5: villages in ST-reserved constituencies exhibit positive and persistent gains in forest cover, while those in SC-reserved constituencies show effects that are small and centred around zero.

The third check concerns the estimator itself. Table A5 implements the heterogeneity-robust difference-in-differences estimator of Sun and Abraham (2021), which accounts for treatment-effect heterogeneity arising from the staggered implementation of the 2008 delimitation reform. The estimates are virtually unchanged relative to the baseline, cross-validating the two-way fixed effects results and confirming that the findings are not driven by biases introduced by the staggered rollout. The corresponding event study in Figure B5 mirrors the baseline pattern in Figure 5: villages in ST-reserved constituencies exhibit positive and persistent gains in forest cover, while those in SC-reserved constituencies show effects that are small and centred around zero. Finally, Table A6 examines sensitivity to outliers in the forest cover distribution. The results are presented in Table A6. For instance, the Above 5% and 10% in columns (2) and (3) include villages whose forest cover is at least as large as 5% and 10% of the average forest cover over all villages in 2000, respectively. Additionally, within 3 SD in column

(4) includes only villages whose forest cover in 2000 is within 3 standard deviations of the mean of the forest cover over all villages in 2000. Lastly, within p5-p95 in column (5) includes villages whose forest cover in 2000 is at least as large as the 5th percentile but no larger than the 95th percentile of the distribution of forest cover over all villages in 2000 while within p1-p99 in column (6) includes villages whose forest cover in 2000 is at least as large as the 1st percentile but no larger than the 99th percentile of the distribution of forest cover over all villages in 2000. The coefficient estimate and statistical significance continue to be similar to the baseline estimates in Table 3.

A further concern is that villages with higher ST population shares may follow different forest cover trajectories, either because ST communities are concentrated in areas facing distinctive ecological pressures or because the Forest Rights Act (2006), implemented from 2008, disproportionately benefited these villages. To address this, Table A7 adds baseline ST and SC population shares interacted with year fixed effects, allowing forest cover to evolve flexibly with village community composition. The ST reservation coefficient remains positive, statistically significant, and similar in magnitude to the baseline, and the SC coefficient remains close to zero. The corresponding event study in Figure B6 shows no pre-reform divergence and a post-reform pattern that closely mirrors the baseline. These results indicate that the main findings are not driven by trends correlated with ST concentration or by differential FRA implementation.

5.4 Welfare Effects of Political Reservation

It may also be important to understand the economic significance of the findings reported in Table 3 in terms of a rough estimate of carbon sequestration benefits from improved forest cover. The average Indian village covers approximately 3.5 square kilometres[18]. Among villages in reserved constituencies during the study period, average forest cover is around 15% of village area, implying approximately 52.5 hectares of average forest area in such villages. Following Mendelsohn et al. (2012), who note that tropical forests can sequester up to 11 tonnes of carbon dioxide per hectare per year, a 5-percentage point increase in forest cover implies approximately 17.5 additional hectares and around 193 additional tonnes of carbon dioxide sequestered per village annually. While these are very rough estimates and actual figures would vary given the exact area of a village, the age and type of forest, and consumption-based emissions per person, this computation provides an

[18] 1 km² = 100 hectares.

important perspective. During the study period, the average annual carbon dioxide emission per person in India is approximately 1.6 tonnes[19], indicating that the reforestation estimated in this paper offsets the carbon dioxide emissions of approximately 120 individuals per village. With an average village population of approximately 2,200, reforestation mitigates roughly 5.5% of the annual carbon dioxide emissions of a village.

5.5 What Happens When Electoral Quotas Are Withdrawn?

The main results establish that ST reservation increases local forest cover. A natural follow-up question is whether these gains persist once the quota is removed. This connects to a broader debate on the persistence of affirmative action effects. Bhavnani (2009) shows that past quotas for women in India have significant positive long-run effects, increasing the likelihood that women are elected even after reservations end, whereas Bhavnani (2017) finds no such persistence for Scheduled Caste quotas. In this setting, de-reservation may weaken the accountability mechanism through which ST politicians protect forests, as the community loses its guaranteed legislative voice.

To examine this, Table A8 compares villages in constituencies that lost reservation status after the 2008 delimitation reform with villages in constituencies that remained reserved throughout. If forest protection gains dissipate once the quota is withdrawn, de-reserved constituencies should show a relative decline in forest cover. If gains are durable, reflecting investments in community monitoring or bureaucratic accountability that outlast the electoral cycle, de-reserved constituencies should perform no worse than always-reserved ones. The results in Table A8 show no statistically significant negative effect of de-reservation, with small and insignificant coefficients across all three columns. The corresponding event study in Figure B7 shows a similar pattern: post-reform coefficients fluctuate around zero for both ST and SC de-reserved constituencies, with no systematic decline in forest cover over time. These results are consistent with two interpretations. Forest protection gains may reflect durable institutional changes that persist beyond formal reservation, or the eight- to ten-year post-reform window may be too short to detect gradual erosion of a slow-moving stock variable such as forest cover. The null result does not imply permanence but suggests that any erosion of forest gains following quota withdrawal occurs slowly, if at all.

[19] Average per capita carbon dioxide emissions in India over the study period 2001 to 2020 are approximately 1.6 tonnes per year, computed from annual per capita emissions data reported by Worldometers (https://www.worldometers.info/co2-emissions/india-co2-emissions/).

6. Conclusion

In this paper, I provide causal evidence that elected representatives' identities shape forest governance by exploiting India's 2008 delimitation reform, which changed the reservation status of state assembly constituencies and generated plausibly exogenous variation in politician identity. I find that political reservation increases forest cover by approximately 5 % on average; however, this masks striking heterogeneity by reservation type: ST reservation increases forest cover by approximately 10.5 % relative to villages in non-reserved constituencies, while SC reservation has no statistically significant effect. This asymmetry reflects the different electoral arithmetic facing the two groups. ST politicians are more electorally accountable to forest-dependent indigenous communities, who form a majority of their electorate, while SC politicians must appeal to a broader non-SC electorate that limits their ability to prioritise community-specific interests. I also document heterogeneity in the treatment effect: effects concentrate in villages with low baseline forest cover; the ST reservation effect is largest near mining sites and declines monotonically with distance, while the SC effect remains absent throughout; and the effect is stronger among younger legislators. I also find no evidence that these gains erode when electoral quotas are withdrawn, suggesting that ST political representation leaves durable institutional changes in forest governance that outlast the formal period of reservation. The back-of-the-envelope calculations suggest that the implied forest gains sequester approximately 29 additional tonnes of carbon dioxide per village annually, offsetting the emissions of approximately 18 individuals and mitigating roughly 0.8 % of annual village-level carbon dioxide emissions.

These findings carry broad implications. For India, they suggest that political reservation for forest-dependent indigenous communities delivers environmental co-benefits well beyond its direct redistributive objectives, offering a mechanism for simultaneously advancing social inclusion and forest conservation. More broadly, they speak to ongoing global debates about the relationship between indigenous political representation and environmental sustainability. Across rainforest-rich regions from the Amazon to Southeast Asia, indigenous communities face growing extractive pressures while often lacking the formal political power to resist them. The Indian experience suggests that granting these communities formal legislative representation can be an effective instrument for forest protection, with potentially significant implications for climate policy, biodiversity conservation, and sustainable development goals. More

fundamentally, the findings contribute to a core question in political economy: who governs shapes what is governed, and democratic representation of historically excluded communities can deliver meaningful environmental dividends.

References

Agarwal, B. (2010). Gender and green governance: the political economy of women's presence within and beyond community forestry. Oxford University Press.

Agarwal, B., Roy, S. N., & Sharma, S. C. (2026). Can indigenous political representation improve forest conservation? India's experience. World Development, 201, 107295.

Agrawal, A., and Gibson, C. C. (Eds.). (2001). Communities and the environment: ethnicity, gender, and the state in community-based conservation. Rutgers University Press.

Ahmed, R. (2022). Does political quotas lead to development? evidence from india. In ISI Delhi Conference.

Areendran, G., Rao, P., Raj, K., Mazumdar, S., and Puri, K. (2013). Land use/land cover change dynamics analysis in mining areas of Singrauli district in Madhya Pradesh, India. Tropical Ecology, 54(2), 239-250.

Asher, S., and Novosad, P. (2023). Rent-seeking and criminal politicians: Evidence from mining booms. Review of Economics and Statistics, 105(1), 20-39.

Asher, S., Garg, T., and Novosad, P. (2020). The ecological impact of transportation infrastructure. The Economic Journal, 130(629), 1173-1199.

Asher, S., Lunt, T., Matsuura, R., and Novosad, P. (2021). Development research at high geographic resolution: an analysis of night-lights, firms, and poverty in India using the shrug open data platform. The World Bank Economic Review, 35(4), 845-871.

Asner, G. P., Powell, G. V., Mascaro, J., Knapp, D. E., Clark, J. K., Jacobson, J., et al. (2010). High-resolution forest carbon stocks and emissions in the Amazon. Proceedings of the National Academy of Sciences, 107(38), 16738-16742.

Balboni, C., Berman, A., Burgess, R., and Olken, B. A. (2023). The economics of tropical deforestation. Annual Review of Economics, 15, 723-754.

Bandyopadhyay, S., Dutta, P. P., Hari, N., and Maity, B. (2026). Female legislators and forest conservation in India. Journal of Economic Behavior & Organization, 241, 107375.

Bertrand, M., Duflo, E., and Mullainathan, S. (2004). How much should we trust differences-in-differences estimates?. The Quarterly journal of economics, 119(1), 249-275.

Besley, T., and Coate, S. (1997). An economic model of representative democracy. The quarterly journal of economics, 112(1), 85-114.

Bhalotra, S., and Clots-Figueras, I. (2014). Health and the political agency of women. American Economic Journal: Economic Policy, 6(2), 164-197.

Bhalotra, S., and da Fonseca, M. L. (2023). Women politicians and public health. In Handbook on the Political Economy of Health Systems (pp. 157-176). Edward Elgar Publishing.

Bhalotra, S., Clarke, D., Gomes, J. F., and Venkataramani, A. (2023). Maternal mortality and women's political power. Journal of the European Economic Association, 21(5), 2172-2208.

Bhavnani, R. R. (2009). Do electoral quotas work after they are withdrawn? Evidence from a natural experiment in India. American Political Science Review, 103(1), 23-35.

Bhavnani, R. R. (2017). Do the effects of temporary ethnic group quotas persist? Evidence from India. American Economic Journal: Applied Economics, 9(3), 105-123.

Borusyak, K., Jaravel, X., and Spiess, J. (2024). Revisiting event-study designs: robust and efficient estimation. Review of Economic Studies, 91(6), 3253-3285.

Brollo, F., Nannicini, T., Perotti, R., and Tabellini, G. (2013). The political resource curse. American Economic Review, 103(5), 1759-1796.

Brundtland, G. H. (1987). Our common future world commission on environment and developement.

Burgess, R., Hansen, M., Olken, B. A., Potapov, P., and Sieber, S. (2012). The political economy of deforestation in the tropics. The Quarterly Journal of Economics, 127(4), 1707-1754.

Burgess, R., Jedwab, R., Miguel, E., Morjaria, A., and Padró i Miquel, G. (2015). The value of democracy: evidence from road building in Kenya. American Economic Review, 105(6), 1817-1851.

Bussell, J. (2012). Representation between the votes: Informal citizen-state relations in India. Paper prepared for APSA 2012.

Callaway, B., and Sant'Anna, P. H. (2021). Difference-in-differences with multiple time periods. Journal of econometrics, 225(2), 200-230.

Castro, A.C., Reymondin, L., Bellfield, H., and Hyman, G. (2013). 'Land use status and trends in Amazonia: A Report for the Amazonia Survey Agenda Project'.

Chattopadhyay, R., and Duflo, E. (2004). Women as policy makers: Evidence from a randomized policy experiment in India. Econometrica, 72(5), 1409-1443.

Chhatre, A., and Agrawal, A. (2009). Trade-offs and synergies between carbon storage and livelihood benefits from forest commons. Proceedings of the national Academy of sciences, 106(42), 17667-17670.

Chin, A., and Prakash, N. (2011). The redistributive effects of political reservation for minorities: Evidence from India. Journal of Development Economics, 96(2), 265-277.

Chopra, V. K. (1996). Marginal players in marginal assemblies: The Indian MLA. Orient Longman.

Choudhury, C. (2019). A 56,000-Crore Rupee 'Afforestation'Fund Threatens India's Indigenous Communities. Pulitzer Center for Shorthand Stories.

Dahis, R., de las Heras, I., and Saavedra, S. (2024). Young politicians and long-term policy. Available at SSRN 4265051.

De Luca, G., Hodler, R., Raschky, P. A., and Valsecchi, M. (2018). Ethnic favoritism: An axiom of politics?. Journal of Development Economics, 132, 115-129.

DiMiceli, C., Carroll, M., Sohlberg, R., Kim, D. H., Kelly, M., and Townshend, J. (2015). MOD44B MODIS/Terra vegetation continuous fields yearly L3 global 250m SIN grid V006. NASA EOSDIS Land Processes Distributed Active Archive Center (DAAC) data set, MOD44B-006.

Downing, T. (2002). Avoiding new poverty: Mining-induced displacement and resettlement. Mining, Minerals and Sustainable Development.

Dube, A., Lester, T. W., and Reich, M. (2010). Minimum wage effects across state borders: Estimates using contiguous counties. The review of economics and statistics, 92(4), 945-964.

Elayaperumal, L. 1969. Report of the Committee on Untouchability, Economic and Educational Development of the Scheduled Castes and connected documents, 1969. Department of Social Welfare.

Franck, R., and Rainer, I. (2012). Does the leader's ethnicity matter? Ethnic favoritism, education, and health in sub-Saharan Africa. American Political Science Review, 106(2), 294-325.

Galanter, M. (1984). Competing Equalities: Law and the Backward Classes in India.

Garnett, S. T., Burgess, N. D., Fa, J. E., Fernández-Llamazares, Á., Molnár, Z., Robinson, C. J., et al. (2018). A spatial overview of the global importance of Indigenous lands for conservation. Nature Sustainability, 1(7), 369-374.

Goodman-Bacon, A. (2021). Difference-in-differences with variation in treatment timing. Journal of econometrics, 225(2), 254-277.

Guha, R. (1989). The unquiet woods: ecological change and peasant resistance in the Himalaya. Univ of California Press.

Gulzar, S., Haas, N., and Pasquale, B. (2020). Does Political Affirmative Action Work, and for Whom? Theory and Evidence on India's Scheduled Areas. American Political Science Review, 114(4), 1230-1246.

Hansen, M. C., Potapov, P. V., Moore, R., Hancher, M., Turubanova, S. A., Tyukavina, A., Thau, D., Stehman, S.V., Goetz, S.J., Loveland, T.R., Kommareddy, A., Egorov, A., Chini, L., Justice, C.O. and Townshend, J. R. (2013). High-resolution global maps of 21st-century forest cover change. science, 342(6160), 850-853.

Hodler, R., and Raschky, P. A. (2014). Regional favoritism. The Quarterly Journal of Economics, 129(2), 995-1033.

Iyer, L., and Reddy, M. (2013). Redrawing the Lines: Did Political Incumbents Influence Electoral Redistricting in the World's Largest Democracy?. Harvard Business School.

Jensenius, F. R. (2015). Development from representation? A study of quotas for the scheduled castes in India. American Economic Journal: Applied Economics, 7(3), 196-220.

Jensenius, F. R. (2017). Social justice through inclusion: The consequences of electoral quotas in India. Oxford University Press.

Jensenius, F. R., and Suryanarayan, P. (2015). Fragmentation and Decline in India's State Assemblies: A Review, 1967–2007. Asian Survey, 55(5), 862-881.

Kashwan, P. (2017). Democracy in the woods: Environmental conservation and social justice in India, Tanzania, and Mexico. Oxford University Press.

Kjelsrud, A., Moene, K., and Vandewalle, L. (2024). Political competition over life and death: Social provision and infant mortality in India. Journal of Human Resources.

Kumar, K., Singh, N. M., and Rao, Y. G. (2017). Promise and performance of the Forest Rights Act. Economic & Political Weekly, 52(25-26).

Lynch, O. J., and Talbott, K. (1995). Balancing Acts: Community-Based Forest Management and National Law in Asia and the Pacific. Washington, DC: World Resources Institute.

Mendelsohn, R., Sedjo, R., & Sohngen, B. (2012). Forest carbon sequestration. In Fiscal Policy to Mitigate Climate Change. International Monetary Fund.

Meyer, B. D. (1995). Natural and quasi-experiments in economics. Journal of business & economic statistics, 13(2), 151-161.

Miller, D. L. (2023). An introductory guide to event study models. Journal of Economic Perspectives, 37(2), 203-230.

Ostrom, E. (1990). Governing the commons: The evolution of institutions for collective action. Cambridge university press.

Pande, R. (2003). Can mandated political representation increase policy influence for disadvantaged minorities? Theory and evidence from India. American Economic Review, 93(4), 1132-1151.

Phillips, Ann. 1995. The Politics of Presence: Democracy and Group Representation.Oxford University Press.

Prakash, N., Rockmore, M., and Uppal, Y. (2019). Do criminally accused politicians affect economic outcomes? Evidence from India. Journal of Development Economics, 141, 102370.

Ross, M. L. (2015). What have we learned about the resource curse?. Annual review of political science, 18(1), 239-259.

Saha, S., Pattanayak, S. K., Sills, E. O., and Singha, A. K. (2011). Under-mining health: environmental justice and mining in India. Health & Place, 17(1), 140-148.

Sivaramakrishnan, K. (1999). Modern forests: statemaking and environmental change in colonial Eastern India. Stanford University Press.

Sun, L., and Abraham, S. (2021). Estimating dynamic treatment effects in event studies with heterogeneous treatment effects. Journal of econometrics, 225(2), 175-199.

The Economics of Ecosystems and Biodiversity (TEEB) (2009). The Economics of Ecosystems and Biodiversity. Report. Nairobi: UNEP.

World Bank (2005). India: Unlocking Opportunities for Forest-dependent People in India. Volume 1: Main Report. Washington DC: World Bank.

Zimmerman, B., Peres, C. A., Malcolm, J. R., & Turner, T. (2001). Conservation and development alliances with the Kayapó of south-eastern Amazonia, a tropical forest indigenous people. Environmental Conservation, 28(1), 10-22.

A. Appendix: Additional Tables

Table A1: Impact of political representation on forest cover by distance to mines

	(1) ST reserved	(2) SC reserved
Post*Treated*1st Tercile	0.109***	0.004
	(0.0240)	(0.0338)
Post*Treated*2nd Tercile	0.064**	0.0102
	(0.0256)	(0.0196)
Post*Treated*3rd Tercile	0.007	0.0633
	(0.0166)	(0.0505)
Village FE	Yes	Yes
State-year FE	Yes	Yes
Observations	309720	324380
No. of villages	15,194	15,930
R2	0.746	0.738
Within R2	0.016	0.016

Notes: The table shows the impact of political representation on local forest cover by tercile of distance to the closest mine. Sample restricted to villages within 60 km of the nearest mine. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

Table A2: Political Representation and Forest Cover by Legislator Age (All Reserved)

	(1) < 50 years	(2) ≥ 50 years	(3) Below median	(4) Above median
Post*Treated	0.0742**	0.0371	0.0834***	0.0316
	(0.0292)	(0.0293)	(0.0301)	(0.0288)
Village FE	Yes	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes	Yes
Observations	273080	258560	230120	301520
No. of villages	13,393	12,679	11,276	14,795
R2	0.726	0.690	0.730	0.692
Within R2	0.014	0.009	0.017	0.009

Notes: The table shows the impact of political representation on local forest cover by legislator age. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

Table A3: Political Representation and Forest Cover (Alternative Treatment)

	(1) All reserved	(2) ST reserved	(3) SC reserved
Post*Treated	0.0362*	0.0409***	0.0341
	(0.0188)	(0.0152)	(0.0231)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531640	487680	518920
No. of villages	26,069	23,902	25,455
R2	0.755	0.755	0.750
Within R2	0.007	0.006	0.007

Notes: The table shows the difference-in-differences estimates using the TWFE method of the impact of political representation on local forest cover. I define forest cover as the logarithm of the total average pixel value within each village. Post is a binary indicator equal to 1 after the delimitation (2008-20) and 0 before (2001-07). Treated is a dummy equal to 1 if villages in the constituency that have been changed from general to reserved status (GEN → SC or GEN → ST) and 0 for villages in always general constituencies (GEN → GEN): all reserved in Column 1, ST-reserved in Column 2, and SC-reserved villages in Column 3. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

Table A4: Political Representation and Forest Cover (Alternative Treatment)

	(1) All reserved	(2) ST reserved	(3) SC reserved
Post*Treated	0.717**	0.725**	0.695*
	(0.320)	(0.281)	(0.393)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531640	487680	518920
No. of villages	26,069	23,902	25,455
R2	0.705	0.702	0.702
Within R2	0.011	0.009	0.011

Notes: The table shows the difference-in-differences estimates using the TWFE method of the impact of political representation on local forest cover. I define forest cover as the average percentage of maximum forest cover within each village. Post is a binary indicator equal to 1 after the delimitation (2008-20) and 0 before (2001-07). Treated is a dummy equal to 1 if villages in the constituency that have been changed from general to reserved status (GEN → SC or GEN → ST) and 0 for villages in always general constituencies (GEN → GEN): all reserved in Column 1, ST-reserved in Column 2, and SC-reserved villages in Column 3. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

Table A5: Political Representation and Forest Cover (Sun and Abraham estimator)

	(1) All reserved	(2) ST reserved	(3) SC reserved
Post*Treated	0.0452**	0.095***	0.030
	(0.0186)	(0.0223)	(0.0204)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531,640	487,680	518,920
No. of villages	26,069	23,902	25,455
R2	0.709	0.709	0.701

Notes: The table shows the difference-in-differences estimates using the Sun and Abraham (2021) estimator of the impact of political representation on local forest cover. I define forest cover as the log maximum village forest cover. Post is a binary indicator equal to 1 after the delimitation (2008-20) and 0 before (2001-07). Treated is a dummy equal to 1 if villages in the constituency that have been changed from general to reserved status (GEN → SC or GEN → ST) and 0 for villages in always general constituencies (GEN → GEN): all reserved in Column 1, ST-reserved in Column 2, and SC-reserved villages in Column 3. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

Table A6: Political Representation and Forest Cover (Robustness Results)

Panel A:	(1) Baseline	(2) Above 5%	(3) Above 10%
Post*Treated	0.049**	0.049**	0.049**
	(0.021)	(0.021)	(0.021)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531640	531620	531620
No. of villages	26,069	26,068	26,068
Within R2	0.012	0.012	0.012

Panel B:	(4) Within 3 SD	(5) Within p5-p95	(6) Within p1-p99
Post*Treated	0.049**	0.049**	0.049**
	(0.021)	(0.021)	(0.021)
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
Observations	531620	496560	526620
No. of villages	26,068	24,399	25,837
Within R2	0.012	0.007	0.011

Notes: The table shows the difference-in-differences estimates of the impact of political representation on local forest cover. I define forest cover as the log maximum village forest cover. Baseline: main analysis sample with positive forest cover in 2001. Above 5% and 10% samples include villages whose forest cover is at least as large as 5% and 10% of the average forest cover over all villages in 2000, respectively. Within 3 SD includes only villages whose forest cover in 2000 is within 3 sd of the mean of the forest cover over all villages in 2000. Within p5-p95 includes villages whose forest cover in 2000 is at least as large as the 5th percentile but no larger than the 95th percentile of the distribution of forest cover over all villages in 2000. Within p1-p99 includes villages whose forest cover in 2000 is at least as large as the 1st percentile but no larger than the 99th percentile of the distribution of forest cover over all villages in 2000. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.
*** p<0.01 ** p<0.05 * p<0.10.

Table A7: Political Representation and Forest Cover (Community Share × Year Fixed Effects)

	(1) All reserved	(2) ST reserved	(3) SC reserved
Post*Treated	0.0485**	0.115***	0.0310
	(0.0222)	(0.0277)	(0.0204)
Observations	531640	487680	518920
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
ST share x year FE	Yes	Yes	No
SC share x year FE	Yes	No	Yes
No. of villages	26,069	23,902	25,455
Within R2	0.011	0.010	0.011

Notes: The table shows the difference-in-differences estimates using the TWFE method of the impact of political representation on local forest cover, controlling for differential trends by village community composition. I define forest cover as the log maximum village forest cover. Post is a binary indicator equal to 1 from the first post-delimitation election onwards and 0 before. Treated is a dummy equal to 1 if villages in the constituency that have been changed from general to reserved status (GEN → SC or GEN → ST) and 0 for villages in always general constituencies (GEN → GEN): all reserved in Column 1, ST-reserved in Column 2, and SC-reserved villages in Column 3. Column 1 includes both baseline ST population share × year and SC population share × year fixed effects; Column 2 includes ST population share × year fixed effects; Column 3 includes SC population share × year fixed effects. Population shares are measured at the village level from the 2001 Census. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation. *** p<0.01 ** p<0.05 * p<0.10.

Table A8: Effect of Losing Reservation Status vs Always-Reserved

	(1) Quota Withdrawn (All)	(2) Quota Withdrawn (ST)	(3) Quota Withdrawn (SC)
Post*Treated	0.0254	0.0621	-0.000327
	(0.0304)	(0.0564)	(0.0379)
Observations	230140	106560	123580
Village FE	Yes	Yes	Yes
State-year FE	Yes	Yes	Yes
No. of villages	11,339	5,265	6,074
Within R2	0.006	0.012	0.003

Notes: The table shows the difference-in-differences estimates using the TWFE method of the impact of losing political reservation on local forest cover. I define forest cover as the logarithm of the total maximum pixel value within each village. Post is a binary indicator equal to 1 after the delimitation (2008-20) and 0 before (2001-07). Treated is a dummy equal to 1 if villages in the constituency that have been changed from reserved to general status (ST → GEN or SC → GEN) and 0 for villages in always-reserved constituencies (ST → ST or SC → SC): all de-reserved in Column 1, ST de-reserved in Column 2, and SC de-reserved villages in Column 3. All regressions include state × year fixed effects, village fixed effects, baseline population × year fixed effects, and baseline forest cover × year fixed effects. Standard errors clustered at the assembly constituency level to correct for serial correlation.

*** p<0.01 ** p<0.05 * p<0.10.

B. Appendix: Additional Figures

Figure B1: Multi-tiered political and administrative structure in India

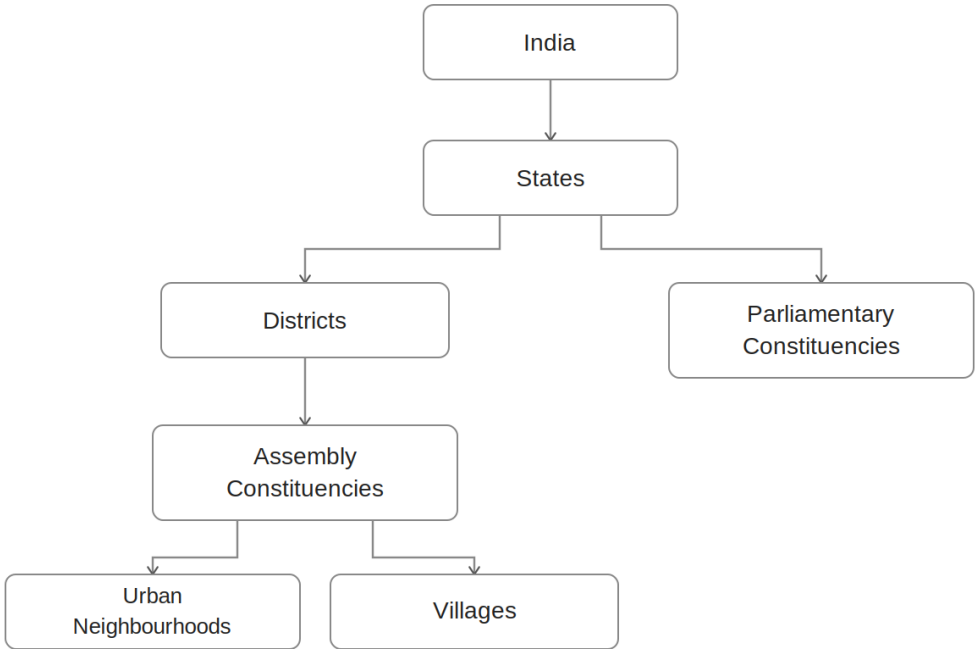
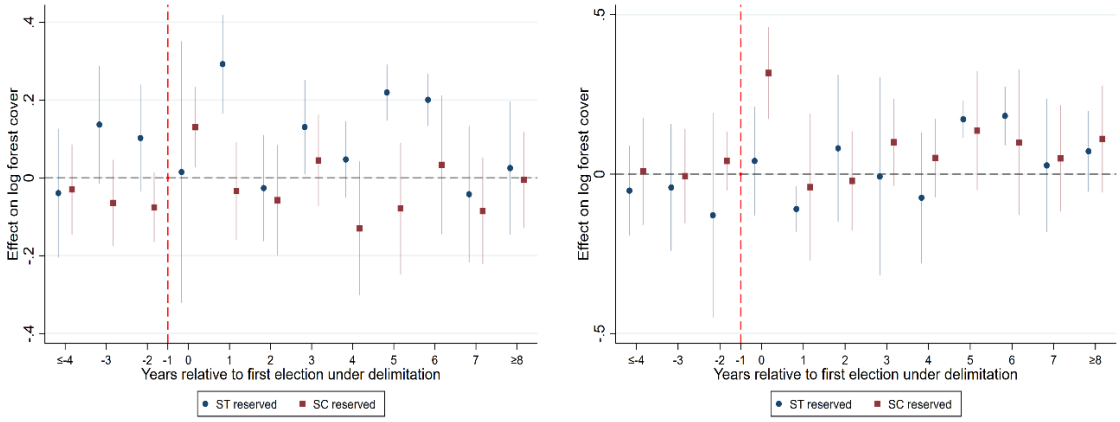


Figure B2: Event Study of Heterogeneity by Initial Forest Cover



Panel a) Low Baseline Forest (< 75th percentile) Panel b) High Baseline Forest (≥75th percentile)

Notes: The figure shows the year-by-year heterogeneous impact of political representation on local forest cover by initial forest cover distribution. Villages are grouped on the *X* axis according to the year relative to the first election after delimitation. Each point thus shows the average value of log forest cover in villages in a given year relative to the treatment year, controlling for village fixed effects, state × year fixed effects, baseline population × year, and baseline log forest cover × year interactions. Standard errors are clustered at the assembly constituency level. Panel (a) shows the estimates for low baseline forest cover, while Panel (b) shows the estimates for high baseline forest cover. The year before delimitation implementation is omitted (t = -1); forest cover is thus shown relative to this period. Far periods are pooled such that years k ≤ −4 are binned and plotted at – 4, and k ≥ 8 are binned and plotted at k = 8.

Figure B3: Location of the 20 most common minerals

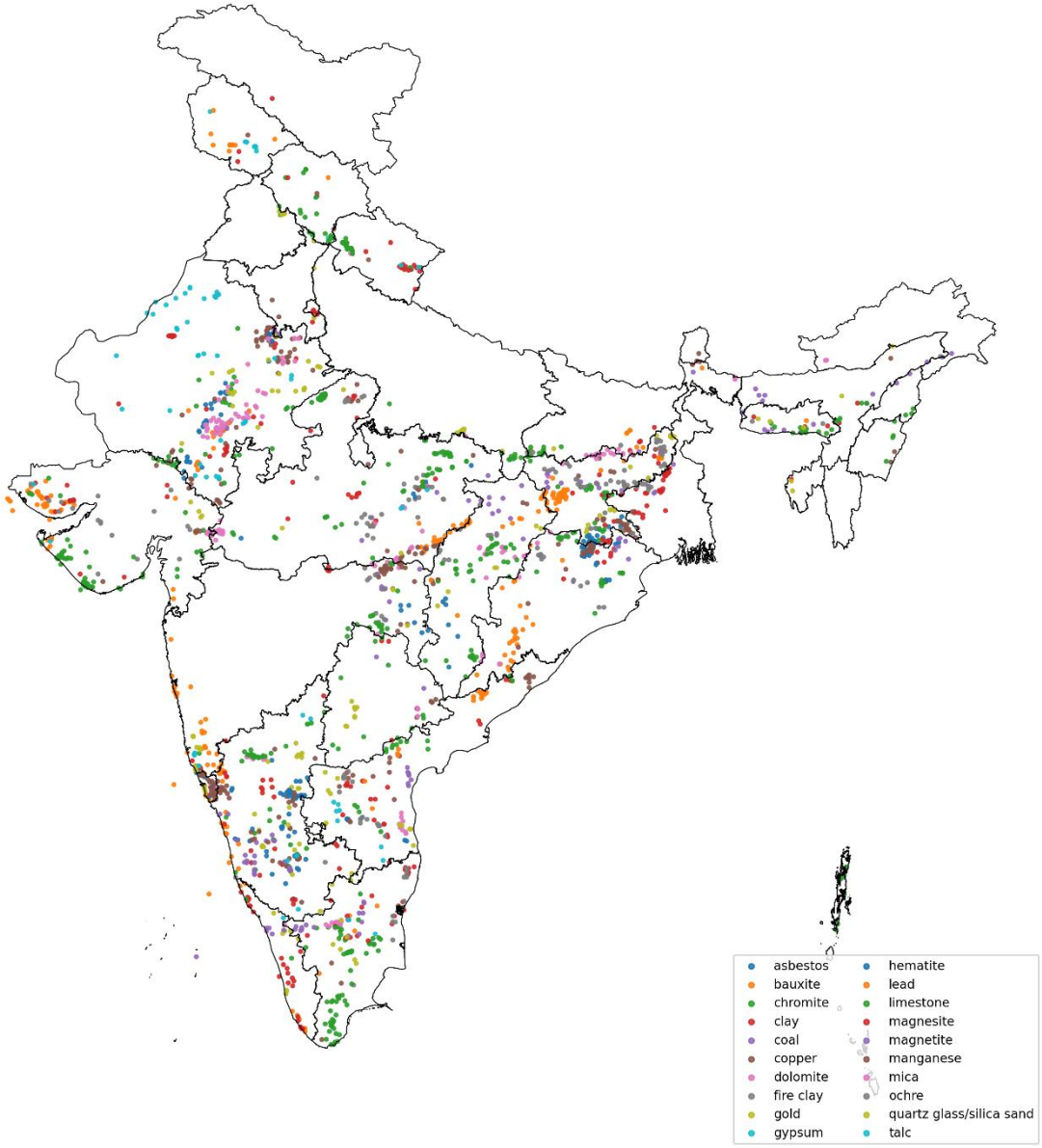
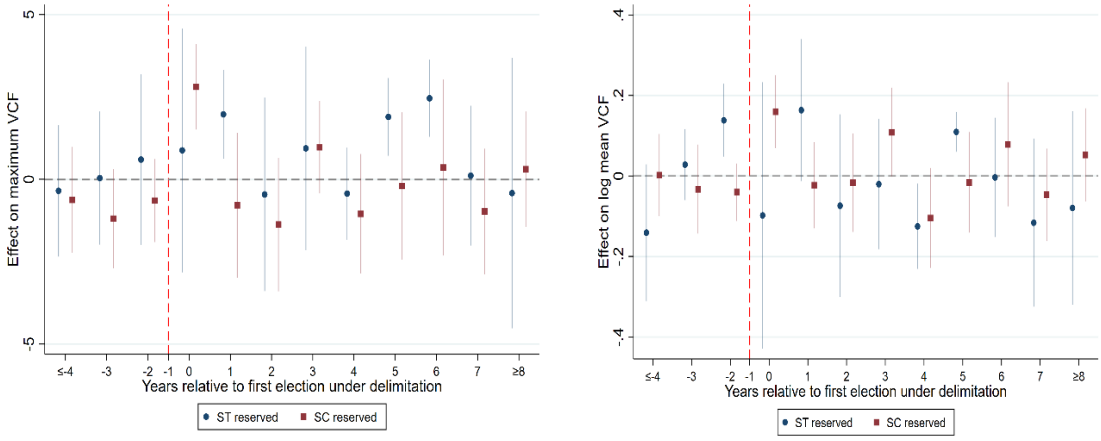


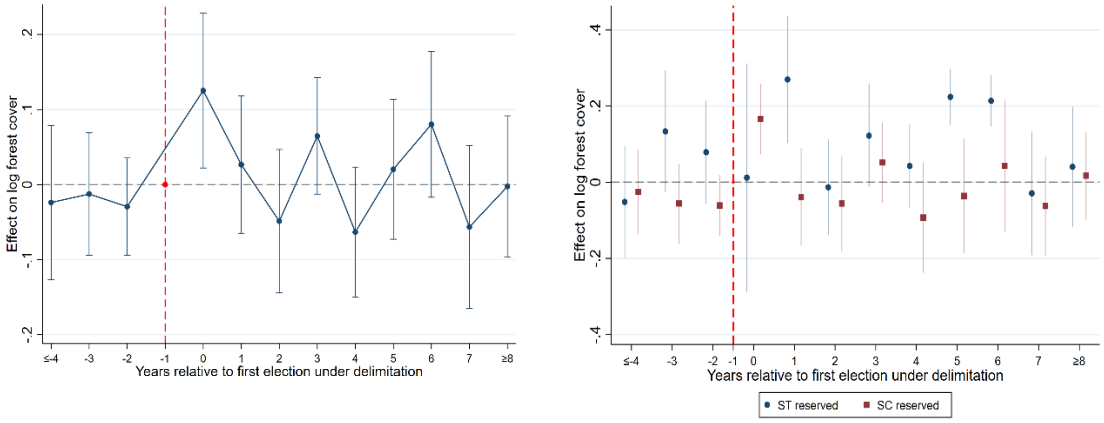
Figure B4: Event Study of the impact on forest cover (Alternative Treatment)



Panel a) Average maximum forest cover Panel b) Log of average forest cover

Notes: The figure shows year-by-year estimates of log forest cover in villages in which there is a change in reservation status after delimitation implementation, using alternative measures of forest cover. Villages are grouped on the X axis according to the year relative to the first election after delimitation. Each point thus shows the average value of log forest cover in villages in a given year relative to the treatment year, controlling for village fixed effects, state × year fixed effects, baseline population × year, and baseline log forest cover × year interactions. Standard errors are clustered at the assembly constituency level. Panel (a) shows the estimates using the average percentage of maximum forest cover within each village, while Panel (b) shows the estimates using the logarithm of the total average pixel value within each village. The year before delimitation implementation is omitted (t = -1); forest cover is thus shown relative to this period. Far periods are pooled such that years $k \leq -4$ are binned and plotted at -4, and $k \geq 8$ are binned and plotted at $k = 8$.

Figure B5: Event Study of political representation on forest cover (Sun and Abraham)

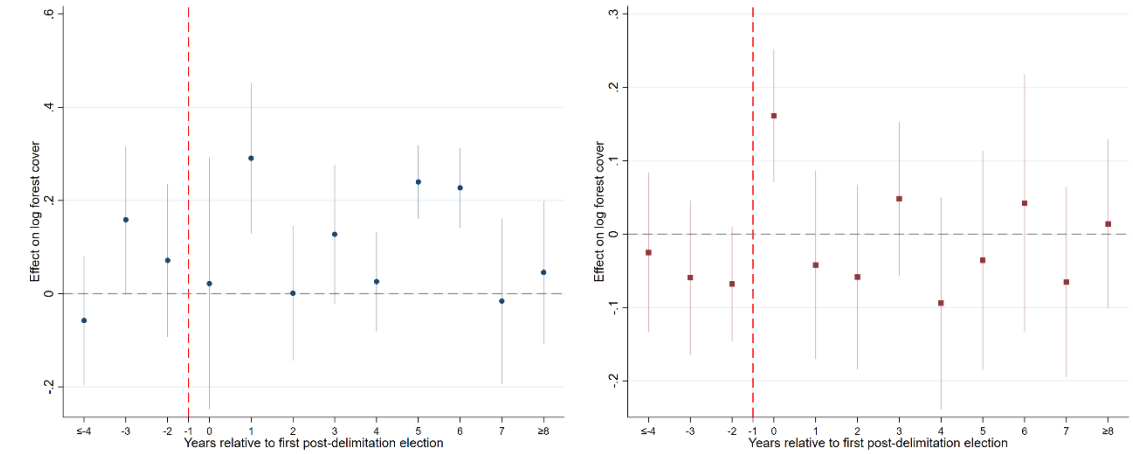


Panel a) All reserved

Panel b) ST and SC Reserved

Notes: The figure shows year-by-year estimates of log forest cover in villages in which there is a change in reservation status after delimitation implementation. Villages are grouped on the *X* axis according to the year relative to the first election after delimitation. Each point thus shows the average value of log forest cover in villages in a given year relative to the treatment year, controlling for village fixed effects, state × year fixed effects, baseline population × year, and baseline log forest cover × year interactions. Standard errors are clustered at the assembly constituency level. Panel (a) shows the estimates for all reserved cases, while Panel (b) shows the estimates for SC and ST separately. The year before delimitation implementation is omitted (t = -1); forest cover is thus shown relative to this period. Far periods are pooled such that years $k \leq -4$ are binned and plotted at – 4, and $k \geq 8$ are binned and plotted at k = 8.

Figure B6: Political Representation and Forest Cover (Community Share × Year Fixed Effects)

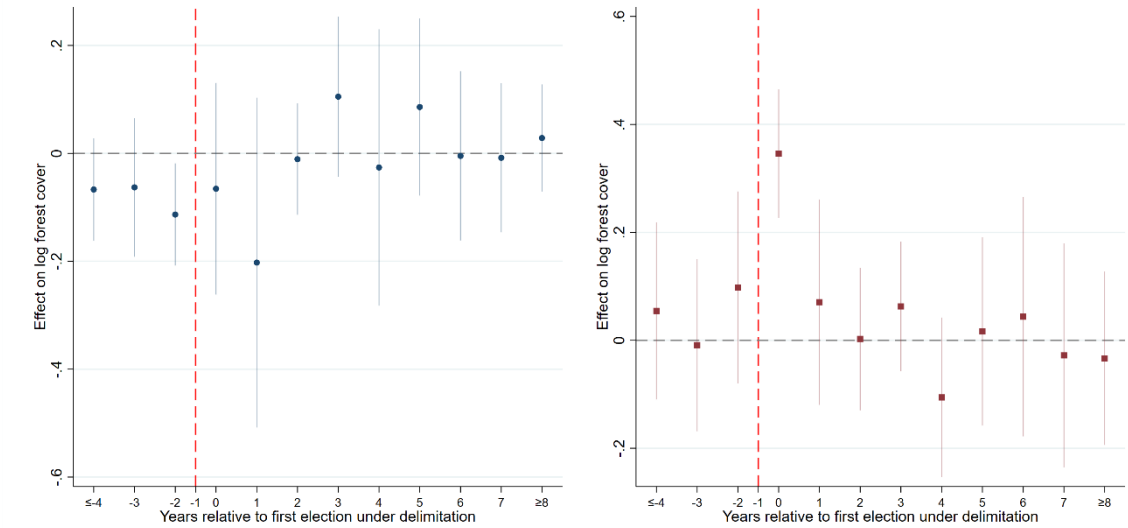


Panel a) All reserved

Panel b) ST and SC Reserved

Notes: The figure shows year-by-year estimates of the impact of political representation on log forest cover in villages in which there is a change in reservation status after delimitation implementation, controlling for differential trends by village community composition. Villages are grouped on the X axis according to the year relative to the first election after delimitation. Each point shows the estimated difference in log forest cover between treated and control villages in a given year relative to the treatment year, controlling for village fixed effects, state × year fixed effects, baseline population × year, baseline log forest cover × year, and baseline ST and SC population share × year interactions. Population shares are measured at the village level from the 2001 Census. Estimates are shown separately for ST-reserved and SC-reserved constituencies. Standard errors are clustered at the assembly constituency level. The year before delimitation implementation is omitted ($t = -1$); forest cover is thus shown relative to this period. Far periods are pooled such that years $k \leq -4$ are binned and plotted at -4, and $k \geq 8$ are binned and plotted at $k = 8$.

Figure B7: Effect of Losing Reservation Status vs Always Reserved



Panel a) ST reserved Panel b) SC Reserved

Notes: The figure shows year-by-year estimates of log forest cover in villages in which there is a change in reservation status from reserved to general after delimitation implementation. Villages are grouped on the X axis according to the year relative to the first election after delimitation. Each point thus shows the average value of log forest cover in villages in a given year relative to the treatment year, controlling for village fixed effects, state × year fixed effects, baseline population × year, and baseline log forest cover × year interactions. Standard errors are clustered at the assembly constituency level. Panel (A) shows the estimates for constituencies that lost ST reservation status, while Panel (B) shows the estimates for constituencies that lost SC reservation status. The comparison group in both panels is always-reserved constituencies that retained their reservation status throughout the sample period. The year before delimitation implementation is omitted (t = -1); forest cover is thus shown relative to this period. Far periods are pooled such that years $k \leq -4$ are binned and plotted at -4, and $k \geq 8$ are binned and plotted at $k = 8$.