ECONSTOR
Make Your Publications Visible.

A Service of

ZBW Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Owens, Trudy; Upward, Richard; Vinod, Athira

Working Paper

From quotas to classrooms: The impact of minority representatives on development and education in India

CREDIT Research Paper, No. 26/01

Provided in Cooperation with:
The University of Nottingham, Centre for Research in Economic Development and International Trade (CREDIT)

Suggested Citation: Owens, Trudy; Upward, Richard; Vinod, Athira (2026) : From quotas to classrooms: The impact of minority representatives on development and education in India, CREDIT Research Paper, No. 26/01, The University of Nottingham, Centre for Research in Economic Development and International Trade (CREDIT), Nottingham

This Version is available at:
https://hdl.handle.net/10419/339508

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

WWW.ECONSTOR.EU

Mitglied der Leibniz-Gemeinschaft

CREDIT Research Paper

No. 26/01

From quotas to classrooms: the impact of minority representatives on development and education in India

by

Trudy Owens
University of Nottingham
trudy.owens@nottingham.ac.uk
Richard Upward
University of Nottingham
richard.upward@nottingham.ac.uk
Athira Vinod†
National Council of Applied Economic Research
avinod@ncaer.org

Abstract

We provide new evidence on the effect of minority elected state representatives on economic development and schooling in India. Using data on candidates in all state assembly elections from 1974 to 2017, we exploit two discontinuities in the reservation of constituencies for Scheduled Castes (SCs). As economic indicators, we use development outcomes from census data in 2001 and 2011, some 27 and 37 years after the reservation process was implemented. Consistent with Jensenius (2015), we find that the economic development of reserved constituencies continues to keep pace with that of unreserved constituencies. Importantly, we find evidence that SC reservation after 2008 had an effect on schooling outcomes by increasing the impact of the Right to Education Act, a policy that varied widely in its implementation across India. We also find that the reservation process after 2008 significantly increased female representation and increased affiliation with political parties.

JEL Classification: D72, I24, J15, O15

Keywords: Scheduled Castes, Political reservation, Economic development, Schooling outcomes

Centre for Research in Economic Development and International Trade, University of Nottingham

CREDIT Research Paper

No. 26/01

From quotas to classrooms: the impact of minority representatives on development and education in India

by

Trudy Owens
Richard Upward
Athira Vinod

Outline

1. Introduction
2. Related Literature
3. Methods
4. Data
5. Results
6. Conclusion

References

Appendices

The Authors
Trudy Owens, University of Nottingham, trudy.owens@nottingham.ac.uk
Richard Upward, University of Nottingham, richard.upward@nottingham.ac.uk
Athira Vinod (Corresponding Author), National Council of Applied Economic Research, avinod@ncaer.org

Acknowledgments
We would like to thank participants at the Nottingham Interdisciplinary Centre for Economic and Political Research Conference at the University of Nottingham in May 2023; and Professors Oliver Morrissey and Guilhem Cassan for their useful comments. We also thank the National Institute of Educational Planning and Administration (NIEPA) for making the raw school data available to us.

1 Introduction

Political representation is the cornerstone of every democracy, with empirical evidence showing that the characteristics of elected representatives can have profound effects on socioeconomic development (Ferreira & Gyourko 2009, Besley, Montalvo & Reynal-Querol 2011, Acemoglu, Egorov & Sonin 2013, Kim, Wang, Park & Petalcorin 2021) and the allocation of resources to particular interest groups (Chattopadhyay & Duflo 2004, Gilens 2005, Burgess, Jedwab, Miguel, Morjaria & Padró i Miquel 2015, Kramon & Posner 2016). India offers an important setting for examining these effects, in part because of its size, but also because of its long-standing and widespread system of political quotas for historically marginalised communities. Since the 1950s, seats at all three levels of government (central, state, and local) have been reserved for socially disadvantaged groups based on their proportion in the population, including Scheduled Castes (SCs) and Scheduled Tribes (STs), as well as for women at the local level.

These reservations have been widely viewed as a key mechanism for ensuring more equitable representation and influence for marginalised groups within legislative processes. Although a substantial body of research has explored the effects of local (village-level) representatives (Besley, Pande, Rahman & Rao 2004, Bardhan, Mookherjee & Parra Torrado 2010, Dunning & Nilekani 2013, Gulzar, Haas & Pasquale 2020), the impact of state-level representatives remains relatively understudied. This gap is notable given the significant authority that state representatives have over key policy areas such as education, health, and welfare — areas that directly affect the life chances of marginalised groups. Because caste-based social issues often vary regionally, state-level representation is also seen as important for tailoring development initiatives to local contexts. If state legislators are more accessible to the public than their national counterparts, they are in a position to bring about greater political accountability and visibility for minority communities.

In this paper we study the effect of having a state-level representative from a Scheduled Caste in India on economic development and education at the constituency level. At the state level, assembly elections take place every 5 years for representatives known as Members of the Legislative Assembly (MLAs). In the case of reserved assembly constituencies, only candidates who belong to that minority group can be nominated as candidates. The expectation is that Scheduled Caste representatives, who work predominately in their constituencies, will advocate for the interests of this large minority group through their political and

business connections to lobby bureaucrats (Chopra 1996, Bussell 2012, Jensenius 2015); they will be in a position to facilitate access to government and job assignments and transfers (Iyer & Mani 2012, Sukhtankar & Vaishnav 2015, Kapur, Mehta & Vaishnav 2018, Prakash, Rockmore & Uppal 2019); as well as being able to act as mediators between the government and private sectors (Prakash et al. 2019). All of which should lead to improved development outcomes or at least the redistribution of resources to Scheduled Caste constituents (Pande 2003, Chin & Prakash 2011).

However, while affirmative action policies have successfully increased the political representation of Scheduled Castes in India, concerns remain about their effectiveness in improving developmental outcomes. Critics argue that SC representatives may wield less influence due to lower levels of human capital or reduced bargaining power (Jensenius 2015). Further, Pande (2003) posits that individual state-level representatives in general have limited capacity to affect constituency outcomes because economically significant decisions are made collectively at the national and state level. Empirical evidence from Jensenius (2015), one of the few studies investigating state-level quotas and outcomes, reveals that from 1971 to 2001, SC-led constituencies did not experience significantly better development or redistributive outcomes. Jensenius (2015) argues that this can be attributed to the dominance of political parties and the electoral pressures faced by representatives to appeal to broader voter bases, including non-SC constituents. Despite greater representation, the political landscape in SC-reserved constituencies remains similar to that in non-reserved ones, potentially constraining the ability of SC representatives to advocate effectively for their communities.

To explore the impact and characteristics of state-level representatives, we first examine the development outcomes of Local Area Development (MLA-LAD) funds for MLAs introduced in 1994 in Delhi and rolled out to all states through the 1990s and early 2000s. The aim of the funds was to improve constituency infrastructure by financing projects such as streetlights, roads, schools, hospitals, sewage systems, public parks, and toilets. Using development indicators from the 2011 Census, we test whether access to these funds enabled MLAs to have a greater impact on local development outcomes. Specifically, we examine if the availability of MLA-LAD funds allowed SC representatives to initiate and influence development projects in ways that improved constituency outcomes.

Second, we use an education policy introduced by the national government that was targeted towards the SC population to study the effects of SC representatives

on primary schooling outcomes. In 2010, the Government introduced the Right to Education Act (RTE) which made primary education compulsory in India. It also mandated private schools to offer free education to children of poor families and minority groups (SC/ST) by reserving 25% of their primary school places. However, Vinod (2024*a*) finds that the implementation of RTE varied widely between and within states. We therefore test whether, with Government backing, SC representatives had differential effects on schooling outcomes after the introduction of the RTE Act.

To examine the causal effect of SC representatives we need to go beyond simply comparing reserved and unreserved constituencies. The selection of reserved constituencies is not random — most obviously, it is related to the proportion of SCs in a constituency — and therefore there may be confounding factors that could explain differences in outcomes between reserved and non-reserved constituencies. Instead, we use the fact that the probability of being a reserved constituency within a district jumps discontinuously as the proportion of SCs across constituencies increases, which enables us to use a regression discontinuity design (RD) to examine whether SC representatives were more or less effective in encouraging economic development and the allocation of private school places to disadvantaged groups.

Our first set of results reinforces the findings from Jensenius (2015). Replicating Jensenius' analysis using a standard regression discontinuity method, we find no significant difference in effectiveness between SC and non-SC representatives on overall development. Extending the time period by another decade by using more recent Census outcomes which covers the time when local development funds were more widely available does not substantively change our findings.

However, our second set of results shows that SC reservation positively affected the expansion of private education following the introduction of the RTE Act, especially for SC children. SC reservation increased private school enrolment by 1.6 percentage points for all children and by 0.8 percentage points for SC children. SC representatives also increased the overall share of private schools by 1.3 percentage points.

We also find that SC representatives are more likely to be female, younger, and affiliated with political parties. Jensenius (2016) finds this intersection of caste and gender in the context of national elections; our results show that it also exists in state elections. The positive effect of SC reservation on the expansion of private education, particularly for SC children, may therefore be the combined result of the higher probability of having an SC representative and other changes

in representative characteristics.

The rest of the paper is arranged as follows. Section 2 provides a review of the current literature. Section 3 describes the rules of reservation and our identification strategy. Section 4 gives details about the datasets we use and provides some descriptives from the data. Section 5.1 provides evidence that a comparison of outcomes at the discontinuity can identify a causal effect, Section 5.2 reports estimates of the effect of SC representation on development outcomes and Section 5.3 reports estimates of the effect of SC representation on schooling outcomes. Section 6 concludes.

2 Related literature

India has three levels of political representation: at the central level, Members of Parliament (MPs) represent parliamentary constituencies; at the state level, Members of the Legislative Assembly (MLAs) represent state assembly constituencies; and at the local level, village leaders represent their villages. The reservation of seats for SCs and STs in India takes place at all three levels. A number of studies consider the effect of SC or ST reservation at the village level (Besley et al. 2004, Bardhan et al. 2010, Dunning & Nilekani 2013, Gulzar et al. 2020), but there are fewer empirical studies that investigate the effect at the parliamentary or assembly constituency level. Nonetheless, existing evidence suggests that MLAs can influence outcomes at the state, district, and assembly constituency levels.

The studies that focus on outcomes at the state level tend to be identified by the variation in the share of SC and ST representatives over time (Pande 2003, Chin & Prakash 2011, Kaletski & Prakash 2016). Pande (2003) is one of the first in the literature to look at the effect of reservation for SCs and STs in state legislative assemblies on policies aimed at these groups. Using data on government spending and job quotas in states from 1960 to 1992 in a fixed effects regression model, Pande finds that SC and ST reservation resulted in an increase in the allocation of resources to these communities. After controlling for the respective population proportion of the two minority groups, a 1% increase in the reservation of seats for SCs increases job quotas by 0.6%, but has no effect on targeted spending. On the other hand, a 1% increase in the reservation of seats for STs increased welfare spending towards ST by 0.8pp but had no effect on job quotas.

Using the same identification strategy, Chin & Prakash (2011) study the effect of political reservations for ST and SC MLAs on state-level poverty. Chin &

Prakash use the headcount ratio, poverty gap index and squared poverty gap index as measures of poverty for nineteen major states in India for the period 1960 to 2000. The reservation of STs in state assemblies is estimated to significantly reduce poverty, but the reservation of SCs has no effect. They find that the effect is larger on rural poverty, which indicates larger benefits for ST communities, who tend to be concentrated in rural areas.

Reservation of seats for minorities in state assemblies is also found to have significant effects on child labour. Kaletski & Prakash (2016) use household data and exploit the same variation in the share of seats reserved for STs and SCs in state legislative assemblies over time. They find that increases in ST reservation decreased the number of children working in the household, whereas SC reservation led to an increase in child labour. The latter effect was potentially due to a transfer of resources towards economic activities with a higher demand for labour, including child labour.

Only three studies estimate the effect of individual representative characteristics on socioeconomic outcomes at the assembly constituency level (hereafter, constituency). Jensenius (2015) finds that representatives from socially disadvantaged backgrounds have no effect on overall economic development or redistribution. In contrast, Prakash et al. (2019) find that criminally accused representatives have large negative effects on constituency GDP growth. Finally, Baskaran, Bhalotra, Min & Uppal (2024) finds a significant, positive effect of female MLAs on constituency-level economic growth.

Jensenius (2015) is, at the time of writing, the only other constituency-level analysis of the effects of SC reservation. Comparing reserved and general constituencies that are matched on the proportion of SCs, she finds that quotas for SCs had no significant effect on development indicators at the constituency level. She argues that this may be the result of the fact that SC representatives typically face an electorate which is majority non-SC and are selected by national political parties. It is also possible that MLA representatives, in general, have little effect on constituency level outcomes. In contrast to Jensenius, we use a conventional regression-discontinuity method and update her results to include an additional 10 years of development outcomes, a period during which constituency representatives gained more access to development funding and a massive national programme of educational expansion took place whose implementation varied widely across constituencies.

Evidence against the hypothesis that MLA representatives have little effect on

constituency outcomes is provided by Prakash et al. (2019) and Baskaran et al. (2024), who also estimate the effects of development in India at constituency level as a function of representative characteristics. While Prakash et al. consider the effect of criminally-accused politicians, Baskaran et al. consider the effect of female representatives. Both studies use nightlight luminosity as a measure of development and exploit the discontinuity in close elections between winning and losing candidates. Prakash et al. find a very large and significant effect of electing a criminally accused candidate. The estimated effect is 24-percentage points lower yearly growth in the intensity of night-time lights, equivalent to about 2.4 percentage points lower GDP growth per year. The negative effect on nightlights was larger among representatives with multiple, serious charges and less education, with the effect concentrated in less developed and more corrupt states. In contrast, Baskaran et al. find a significant, positive effect of female MLAs on constituency-level economic growth. Constituencies led by female MLAs experienced a 2.3 percentage points higher growth than constituencies led by male MLAs. Female MLAs were also more likely to carry out road completion projects and were less likely to be corrupt than their male counterparts.

Our paper also relates to other work examining the impact of female political representation, as the reservation process for SCs influenced the gender composition of candidates, particularly following the redrawing of constituency boundaries in 2007. This research has considered both the village level (Chattopadhyay & Duflo 2004, Ban & Rao 2008, Bardhan et al. 2010, Pathak & Macours 2017, Priebe 2017) and state level (Clots-Figueras 2011, 2012, Bhalotra & Clots-Figueras 2014, Priyanka 2020, Baskaran et al. 2024). At the state level, female representatives were found to have a positive effect on targeted spending towards SC/ST communities. A finding that could be because female MLAs are more likely to be from SC/ST communities. There is also evidence of the impact of state-level female representatives on education at the district-level. For example, Clots-Figueras (2012) find a positive effect of female MLAs on primary educational attainment in a district. Moreover, female MLAs who are from SC/ST communities are found to invest more in education (Clots-Figueras 2011).

Our paper also considers the impact of MLA funding. Members of Legislative Assembly Local Area Development funds (MLA-LAD funds) were designed to enable legislators to recommend developmental projects in their constituencies, aimed at addressing local needs directly through small-scale infrastructure and public service investments. The expectation was that MLA-LAD funds would improve local development by providing flexible and swift financing for constituency-

specific issues (Chhibber 1999, Manor 1999). Launched in 1993, MLA-LAD funds were gradually introduced across states starting in Delhi in 1994 with the majority adopting in the late 1990s and early 2000s. However, there is little evidence on their effectiveness.[1]

Chayani (2021) shows a positive correlation between economic development undertaken by the MLAs using the funds with their electoral effectiveness. Wilkinson (2007, p. 128) finds a clear electoral cycle in spending MLA funds with immediate pay-offs being made after an election. After a decade of more consistent availability of funds across constituencies, we consider whether a difference has emerged between SC and non-SC constituencies.

Finally our paper also provides new evidence that SC reservation affected the implementation of the Right to Education (RTE) Act, which aimed to provide free and compulsory education to all children aged 6–14 in India. There is evidence that, while ambitious in scope, its success has varied significantly across states and in terms of impact. National-level studies report increases in enrolment, particularly for girls and SC/ST children (Malakar & Mahato 2015, Shah & Steinberg 2019), yet these gains were uneven — states like Bihar and Rajasthan saw improvements, while Assam and West Bengal experienced declines (Bhattacharjee 2019). The Act's reservation policy in private schools was poorly enforced, with only 29% of seats filled and participation from just 22% of private schools by 2013–14, reflecting weak compliance and significant interstate variation (Sarin, Kuhn, Singh, Khanghta, Dongre, Joshi, Sengupta & Rahman 2015). Further, implementation challenges such as low awareness among stakeholders (Ojha 2013), inadequate infrastructure, and a lack of clarity in financing hindered progress. While the Act did expand access to education indirectly (see Vinod 2024*b*), its effects on learning outcomes and educational quality remain limited and geographically inconsistent.

3 Methods

Reservation of constituencies for SCs in India began in the 1950s. Initially the reservation definition changed every ten years based on the most recent census,

[1] There are a number of studies which have considered the impact of Members of Parliament Local Area Development funds (MP-LAD) (see Jensenius & Chhibber 2023). Critical findings on MP-LAD funds, which could mirror concerns with MLA-LAD funds, point to concerns about misuse and underutilisation (Pal & Das 2008, Government of India 1998) and the politicisation of the funds and favouritism (Thomas 2018, Palaniswamy & Krishnan 2012, Keefer & Khemani 2009).

however, after the 1971 census, the government froze constituency boundaries. As a result, political boundaries and reserved constituencies remained fixed from 1974 to 2007. After 2007, the Delimitation Commission[2] redrew the boundaries of assembly constituencies based on 2001 census data. Following this redrawing the boundaries and the identity of reserved constituencies changed in 2008 but have remained fixed since.

The number of reserved constituencies in a district is given by $R_d = PSC_d \times N_d$ where PSC_d is the proportion of SCs in district d and N_d is the number of constituencies in district d. Constituencies are then ranked within a district by the proportion of SCs in that constituency and the highest R_d constituencies are reserved. An example is provided in Table 1. In this example, we consider three districts in the state of Punjab. Ropar had $N_d = 5$ constituencies in 1971, and $PSC_d = 0.226$ of the population in the district were SCs, so $0.226 \times 5 \approx 1$ constituency was reserved. Constituency 67 has the highest proportion of SCs, so this constituency is reserved. Ferozpur has $0.228 \times 9 \approx 2$ reserved constituencies, which are constituencies 98 and 90.

However, if multiple constituencies in a district were eligible for reservation but had a shared border, then the first non-contiguous constituency with the next highest proportion of SCs is reserved. In Table 1, two constituencies were to be reserved in Gurdaspur. These would have been Constituencies 11 and 9, with the highest SC population. But since these two constituencies shared a border, Constituency 8 replaced 11 as the second reserved constituency.[3]

To identify a causal effect of SC representatives, we use a regression discontinuity (RD) design that follows the rules of the reservation. We first arrange the constituencies in ascending order of their SC population percentage within each district. Then we calculate the cut-off as the average population percentage of the first reserved constituency and the previous unreserved constituency. The cut-off varies across districts. Finally, our running variable is normalized by subtracting the cut-off percentage from the SC percentage in each constituency. The calculation of the cut-off and the running variable is also illustrated in Table 1. The presence of contiguous consistencies means that we do not have a sharp RD design, but the threshold will be associated with a very large increase in the probability

[2]The Delimitation Commission is a government authority of India responsible for drawing the political boundaries of parliamentary and assembly constituencies. It ensures that each constituency within a state has roughly the same population.

[3]Tables A.1 and A.2 in Appendix A show the number of reserved constituencies and the number of districts with contiguous constituencies.

Table 1. Calculation of the cut-off and the running variable

District d	Constituency c	PSC_d	PSC_c	Reserved	Running variable R_c
Ropar	65	22.61	15.07	0	−12.230
Ropar	66	22.61	19.84	0	−7.461
Ropar	68	22.61	25.51	0	−1.794
Ropar	69	22.61	25.70	0	−1.598
Ropar	67	22.61	28.90	1	1.598
Ferozpur	93	22.79	9.31	0	−12.882
Ferozpur	94	22.79	15.40	0	−6.804
Ferozpur	92	22.79	16.02	0	−6.168
Ferozpur	95	22.79	17.18	0	−5.011
Ferozpur	97	22.79	17.30	0	−4.895
Ferozpur	91	22.79	18.65	0	−3.538
Ferozpur	96	22.79	21.49	0	−0.697
Ferozpur	98	22.79	22.89	1	0.697
Ferozpur	90	22.79	25.68	1	3.491
Gurdaspur	5	21.73	10.78	0	−14.091
Gurdaspur	1	21.73	12.00	0	−12.865
Gurdaspur	6	21.73	14.12	0	−10.750
Gurdaspur	4	21.73	17.07	0	−7.780
Gurdaspur	10	21.73	17.70	0	−7.170
Gurdaspur	2	21.73	19.95	0	−4.916
Gurdaspur	3	21.73	20.15	0	−4.718
Gurdaspur	7	21.73	20.69	0	−4.184
Gurdaspur	8	21.73	29.05	1	4.184
Gurdaspur	11	21.73	32.23	0	7.360
Gurdaspur	9	21.73	41.79	1	16.924

of reservation.

The value of the running variable for each constituency c in a district is given by

$$R_c = PSC_c - \left(\frac{PSC_{c0} + PSC_{c1}}{2}\right)$$

where PSC_c is the percentage of SCs in constituency c, PSC_{c1} is the percentage of SCs in the first reserved constituency and PSC_{c0} is the percentage of SCs in the previous unreserved constituency. In other words, constituencies that 'just missed' and 'just made' the reservation. Example values of R_c are shown in the final column of Table 1.

We then estimate models of the form

$$Y_c = \beta \mathbf{1}(R_c \geq 0) + f(R_c) + (\mathbf{1}(R_c \geq 0) \times g(R_c)) + \alpha_d + \epsilon_c \tag{1}$$

where Y_c is a series of development and schooling indicators in a constituency, $\mathbf{1}(R_c \geq 0)$ is an indicator variable for the threshold in the running variable, and $f()$ and $g()$ are flexible functions of the running variable which are allowed to differ above and below the threshold. The parameter of interest is β, the extent to which outcomes jump at the threshold. Note that in this setting $R_c > 0$ for all reserved constituencies and a small number of unreserved constituencies because of the shared border rule illustrated by district Gurdaspur in Table 1. On the other hand, all constituencies with $R_c < 0$ will be unreserved. We also include district fixed effects (α_d) in our model, which should not significantly change our estimates of β but may improve the accuracy of our estimates.

In the simplest case $f()$ and $g()$ are linear, in which case the model is

$$Y_c = \beta_0 + \beta \mathbf{1}(R_c \geq 0) + \beta_1 R_c + \beta_2 \left(\mathbf{1}(R_c \geq 0) \times R_c\right) + \alpha_d + \epsilon_c \tag{2}$$

However, a linear model gives equal weights to observations a long way from the cut-off where $R_c = 0$. If the relationship between reservation and the probability of SC representatives is non-linear, a linear model would produce imprecise estimates. Therefore, we use local linear and non-parametric estimation using the methodology of Calonico, Cattaneo & Titiunik (2014).

4 Data

We combine information on (a) election results and elected representative characteristics; (b) development indicators from the Indian Census; and (c) information on primary schooling outcomes from an administrative database. Our data covers the 17 largest states of India, all at the assembly constituency level.[4]

4.1 Election data

We obtain state-level election results for the period 1974–2017 from the Socioeconomic High-resolution Rural-Urban Geographic Platform for India (SHRUG)

[4]As per Census 2011, the population of the 17 largest states accounts for 95% of India's population.

(Asher, Lunt, Matsuura & Novosad 2021), which compiles election data from TCPD (2021). SHRUG is a village-level data repository created by the Development Data Lab. The data contains information on whether each assembly constituency was reserved for SCs[5] in period 1 (1974–2007) and period 2 (2008–2017).[6] As described in Section 3, the constituency boundaries changed after 2007, resulting in new constituencies and reservation statuses. Therefore, the election data is split into two time periods and used separately in our analysis. State elections usually take place every 5 years, giving us approximately nine state elections in each constituency over the entire sample period.

The election result data also contain information on the winning candidate and their characteristics for each constituency in each election year. For example, we know their age, gender, and whether or not they are affiliated with a political party. In period 2, we also know whether the winning candidate is SC.[7] Figures B.1 and B.2 in Appendix B show the location of all reserved constituencies in each period. In both periods, reserved constituencies for SCs are scattered, even within states. A comparison of these two maps shows that the boundaries of constituencies changed significantly in period 2.[8]

Our data consists of 2,892 constituencies in period 1, of which 480 are reserved for SCs and 2,411 are unreserved. In period 2, there are 2,895 constituencies, of which 537 are reserved for SCs and 2,358 are unreserved. Table 2 provides some descriptive statistics from the election data for the two reservation periods. In period 1, 17% of constituencies had an SC representative, which increased to 19% in period 2. The turnout percentage in assembly elections increased by almost 8pp in period 2 and the share of female representatives almost doubled.

[5]Between 7%–14% of constituencies in state assembly elections are also reserved for STs. However, for the purpose of this paper, we drop these constituencies and only compare SC constituencies with unreserved constituencies. ST constituencies are predominantly inhabited by STs and have different constitutional provisions and are therefore not a useful counterfactual.

[6]Although the election data for period 2 is available from 2008 to 2018, we drop 2018 from our sample in order to stay consistent with the school data, which is available up to 2017 (see Section 4.3).

[7]The Election Commission started collecting information on the caste of candidates only after 2003. Although we do not know the caste of the winning candidates in period 1, we do know that a constituency reserved for SC has an SC representative. For unreserved constituencies in period 1, we make an assumption that the elected representative is not SC. Given that in Period 2, only 0.9% of unreserved constituencies had an SC representative, this seems a reasonable assumption.

[8]One exception is the Northeastern region, which is not included in our sample.

Table 2. Election data

	Period 1 (1974–2007)		Period 2 (2008–2017)	
	Mean	*SD*	*Mean*	*SD*
SC representative %	16.62	37.20	18.91	39.08
Turnout %	62.37	9.63	70.23	10.87
Female representative %	5.11	12.07	8.78	25.23
Independent representative %	5.22	10.46	2.43	12.90
Age of representatives	48.88	10.08	51.50	8.57
Number of constituencies	2,892		2,895	
Number of elections	22,426		5,962	

Notes: SC representatives, female representatives, and independent representatives are measured as proportions of election years in which they were elected.

4.2 Census data

To examine the effect of reservation on economic development, we use census data, also from SHRUG. This includes development outcomes from the Indian Household Census 2001 and 2011 (CoI 2011), the Socioeconomic Caste Census 2011 (SECC 2011) and the Economic Census 1998 and 2013 (ECoI 2013). The Household Census includes measures of literacy and infrastructure; the Socioeconomic Caste Census includes measures of poverty and deprivation; the Economic Census includes measures of employment and business activity in manufacturing and service industries. We aggregate census outcomes to the constituency level using GIS tools and a weighted average method.[9]

For our analysis of census outcomes, we only use the reservation and discontinuity in period 1 (1974-2007). Period 2 reservation only started in 2008, and cannot therefore affect census outcomes in 2001 and seems unlikely to have affected census outcomes in 2011. Although we use the reservation in period 1, we examine outcomes from both the 2001 and 2011 censuses to account for the widespread implementation of the MLA-LAD funds across all states by the early 2000s. Any observed differences in outcomes between 2001 and 2011 may reflect differential impacts of the funds in constituencies with SC representatives.

We use seven development outcomes from the census. The first is *Literacy rate*,

[9]We first aggregate outcomes at the census block level using census block IDs in SHRUG. We then use GIS mapping to overlay the boundaries of census blocks and assembly constituencies. Details of how we calculate the weights and how we use the weighted average method to get constituency-level outcomes are provided in Appendix C.

which is defined as the percentage of population aged 7 and above that can read and write in any language. MLAs have the power to lobby schooling projects and school infrastructure developments, potentially affecting literacy (Jensenius 2015).

In principle, MLAs receive the discretionary funds for local (village-level) development. So we use two outcomes to capture development in villages: percentage of all *Villages with power supply* and percentage of all *Villages with tar roads*.

As noted in Section 1, MLAs can influence job assignments and transfers in their constituency. To examine this, we use employment outcomes, specifically, *Employment in manufacturing and services* drawn from the Economic Census of 1998 and 2013, which roughly align with the 2001 and 2011 censuses, respectively. Due to the lack of data on the working-age population in SHRUG, we calculate this as a percentage of total population.

The Economic Census does not include data on the agricultural sector. Therefore, we use the share of formal jobs in cultivation, available from the SECC 2011, as an approximate measure of *Employment in agriculture*.

Finally, the SECC 2011 provides measures of poverty, including both the *Rural poverty rate* and *Urban poverty rate*. These rates are calculated as the percentage of the population whose consumption expenditure falls below the official poverty line. As Chin & Prakash (2011) argues poverty is a key policy concern in India with the effects of affirmative action theoretically ambiguous: such policies can either reduce poverty by targetting disadvantaged groups — among whom the poor are overrepresented — or exacerbate inequality if the benefits accrue to the better-off within these groups. We test this relationship empirically by examining whether constituencies with reserved representation experience differential changes in poverty over time.

Descriptives from the census data are given in Table 3. Between 2001 and 2011 there was a notable improvement in literacy rates and basic infrastructure. While the employment in the manufacturing rate doubled, this is an underestimate since we calculate it as the a percentage of the total population instead of the working-age population, which is smaller. As expected the rural poverty rate is higher than the urban poverty rate.

Table 3. Census data

	Census 2001		Census 2011	
	Mean	*SD*	*Mean*	*SD*
Literacy %	54.49	12.51	63.51	10.42
Villages with power supply %	58.65	35.94	67.15	30.63
Villages with tar roads %	66.35	24.54	71.63	23.96
Employment in manufacturing and services %	5.34	3.44	9.08	8.78
Employment in agriculture %			40.14	16.48
Rural poverty %			27.72	14.30
Urban poverty %			12.76	8.23
Observations	2,892		2,892	

Notes: The number of observations is the number of constituencies in the election period 1974-2007. Employment in manufacturing and services is measured as the percentage of total population due to lack of data on those of working age. Employment in agriculture is the percentage of formal jobs in cultivation.

4.3 School data

We use primary school data from the Unified District Information System for Education (UDISE 2017) which is the administrative data of all registered schools in India and contains a wide range of information on enrolment, teachers, examination results and facilities. Using the raw data on schools from 2010 to 2017 to capture the effects of the Right to Education Act (RTE) implemented in 2010[10] we aggregate schooling outcomes to the constituency level (see Appendix C for details). Since the RTE Act was implemented in 2010, we use the discontinuity in SC representation that arises as a result of the period 2 (2008 onward) reservation rules.

To measure educational outcomes, we construct six indicators. Given the RTE Act mandates free primary education in all government schools in India, the first measure we use is the *Total enrolment rate* in primary schools which is calculated as the percentage of children aged 6-10 enrolled in grades 1-5.[11] Since MLAs have the ability to influence access to schooling (Jensenius 2015), their presence may affect enrolment outcomes. With enrolment rates tending to be lower among minority

[10]The administration of DISE was under NIEPA until 2017 so it is the last year in our data.

[11]We only have age-wise population data at the state level in the Census. To estimate the number of 6-10-year-olds in each constituency, we assume that the state-level proportion of this age group applies uniformly across constituencies and scale it by the total constituency population.

groups, if SC representatives are effective in improving access to education, we would expect to see higher enrolment rates in reserved constituencies following the implementation of the RTE Act.

The RTE Act also implemented an affirmative action policy, in which all private schools are required to reserve at least 25% of their primary school seats for socially disadvantaged groups. We assess the impact of this reservation in the private schooling sector by measuring the *Enrolment rate in private schools* which is calculated as the percentage of children aged 6-10 enrolled in private primary schools. Similarly, we also measure the SC enrolment rate and ST enrolment rate in private schools which are defined as the percentage of SC and ST children, respectively, within the same age group enrolled in private primary schools. Again, given SC MLAs have the ability to help SC children get access to schools (Jensenius 2015), if SC representatives are more effective, we would expect enrolment rates in private schools to be higher in reserved constituencies, especially among SC children.

DISE also includes information on the number of students directly enrolled in private schools under the RTE affirmative action policy. To capture this, we construct the *Share of RTE enrolment* defined as the percentage of children enrolled in grade 1 in private schools through the RTE policy.[12] If SC MLAs are successful in promoting compliance and uptake of the RTE policy, we would expect to observe a higher share of RTE enrolment in reserved constituencies.

Finally, we measure the *Share of private schools* as the percentage of all private schools. If SC MLAs are more effective in catering to private school demand, we would expect the share of private schools to be higher in reserved constituencies.

Table 4 shows descriptive statistics from the DISE data. While the total enrolment rate declines in government schools, the enrolment rate in private schools increases from 18% to 23% over the seven years from 2010 to 2017. Although it is the case that the enrolment rate for SC primary age children is lower in private schools, their enrolment also increases between 2010 and 2017 (by 4pp). It is notable that the share of RTE enrolment only reaches 9% in 2017, suggesting limited implementation of the policy (much lower than the required 25%).

[12]We consider grade 1 because the policy was administered at the entry level.

Table 4. School data

	2010		2010-2017		2017	
	Mean	*SD*	*Mean*	*SD*	*Mean*	*SD*
Total enrolment rate	71.79	51.27	72.54	48.78	68.91	48.51
Enrolment rate in private schools	18.16	25.55	20.80	27.54	22.85	32.15
SC enrolment rate in private schools	10.77	11.85	13.64	12.85	15.19	12.99
ST enrolment rate in private schools	13.09	18.45	25.09	30.00	18.32	18.91
Share of RTE enrolment in private schools	3.09	5.96	8.05	8.60	9.19	28.99
Share of private schools	16.57	11.86	19.27	13.33	22.20	14.87
Observations	2,895		2,895		2,895	

Notes: The number of observations is the number of constituencies in the election period 2008-2017. The schooling outcomes have been averaged across 8 years from 2010, the school year the RTE Act was implemented to 2017, the last school year in the DISE data.

5 Results

5.1 Validity of the regression discontinuity

Our claim that the discontinuity in SC representation can identify a causal effect relies on the assumption that potential outcomes are equal at $R_c = 0$ i.e. at the threshold between reserved and non-reserved constituencies. To implement this test, we estimate Equation (1) with Y_c replaced by a series of pre-determined characteristics. For period 1, we compare constituency characteristics from the 1971 census, before the 1974 reservation rules were implemented. For period 2, we compare school outcomes in DISE from 2005, before the RTE Act and 2008 reservation rules.[13] Table 5 shows that none of the pre-determined constituency characteristics significantly differ across the threshold, and the size of the differences are small.

In our setting, manipulation of the running variable seems unlikely: each district which has at least one reserved constituency must have a marginal constituency either side of the cut-off. Nevertheless, in Figure B.3 in Appendix B we plot the density of the running variable in each period. While almost all districts have a marginal constituency, only large districts with many constituencies have values for the running variable which are outside the [-5,5] bandwidth. The

[13]We thank Francesa Jensenius for making the Census 1971 data available to us at constituency level. For period 2 comparison we use schooling outcomes explained in Section 4.3 from DISE for school year 2005-06.

Table 5. Balance test of 1971 and 2001 characteristics

	Census 1971 (1)	DISE 2005 (2)
Percentage of STs	−0.002	
	(0.003)	
Literacy rate	−0.389	
	(0.541)	
Employment rate	0.189	
	(0.201)	
Agricultural labourers among SCs	1.010	
	(0.940)	
Agricultural labourers among non-SCs	−0.591	
	(0.543)	
Total enrolment rate		5.035
		(3.618)
Enrolment rate in private schools		1.983
		(1.205)
SC enrolment rate in private schools		0.665
		(0.512)
ST enrolment rate in private schools		1.642
		(1.508)
Share of private schools		0.753
		(0.571)
Observations	2,892	2,895

Notes: Table reports estimates of Equation (1) with each row showing the result for a different pre-determined constituency characteristic. All outcomes are measured in percentages. The running variable is based on the reservation in period 1 (1974–2007) in column (1) and on reservation in period 2 (2008–2017) in column (2). All estimates use the non-parametric method of Calonico et al. (2014) with a triangular kernel and include district fixed effects. Standard errors are clustered at the constituency level.

reported t-statistic is based on the density test proposed by Cattaneo, Titiunik & Vazquez-Bare (2020) which uses local polynomial density estimation to check the continuity of the running variable's density function at the cut-off. The test statistic measures the difference in the estimated densities from the left and right sides of the cut-off. The large p-values suggest that there is no evidence of discontinuity of the running variable's density at the cut-offs in both periods. This suggests that there was no manipulation of the cut-offs in either periods.

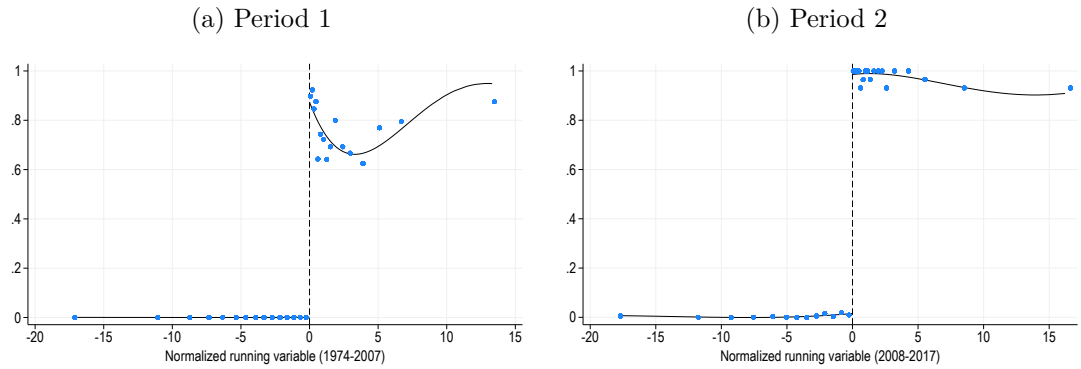
We also examine whether there is a correlation between reservation status in the two periods (see Figure B.4).[14] The points on the negative quadrants indicate regions that are unreserved and those on the positive quadrants indicate regions that are reserved. We see that there is a positive correlation in the value of the running variable in the two periods, but there is also a lot of variation between the two periods and little evidence that there is selection into reservation in period 2 based on the reservation in period 1. To test whether the discontinuity is independent between the two periods, we estimate a regression discontinuity model of the treatment indicator for period 1 on the running variable for period 2, and vice versa. There is no evidence of a jump in treatment probability in period 1 at the treatment cutoff for period 2, and no evidence of a jump in treatment probability in period 2 at the treatment cutoff for period 1.

Although we focus on the reduced form effect of the $R_c = 0$ cut-off on constituency outcomes, it is still informative to quantify the size of the first stage i.e. the increase in the probability of having an SC representative at the cut-off. Since states do not hold elections in the same year, the number of years each constituency has a particular representative varies. To capture this, we use as the first stage outcome the proportion of years each constituency has an SC representative. Figure 1 shows that the proportion of years with an SC representative increased by approximately 0.9 in period 1 and by more than 0.9 in period 2. The increase is not precisely equal to one because of shared borders, which means that not all constituencies with $R_c > 0$ are reserved for SC representatives (see Table 1 for an illustration).[15]

[14]Using GIS tools, we overlay the boundaries of constituencies in both periods. We find the overlapping area and plot the reservation status of all such regions in both periods. All overlapping areas within each constituency have the same reservation status and value of the running variable as the constituency itself depending on the reservation period.

[15]In period 1, approximately 23% of districts had at least one constituency which was unreserved despite $R_c > 0$. In period 2, there were only about 2% of such districts, suggesting that boundaries may have been redrawn in such a way as to avoid such boundaries. See Tables A.1 and A.2.

Figure 1. Proportion of years with SC representatives



Notes: binned scatterplot using IMSE-optimal quantile-spaced bins (Calonico et al. 2015). Fitted values from a fourth-order polynomial is also shown, although the estimates in Table 6 do not use this functional form. In period 1 we do not know the caste of representatives in unreserved constituencies until 2003, so we assume these constituencies do not have an SC representative, and as a result the proportion of SC representatives where $R_c < 0$ is almost zero by construction. In period 2 we do know the caste of representatives, which supports our assumption for period 1.

Estimates of the first stage effect of the cut-off on SC representation are reported in the first row of Table 6. Estimates are all above 0.9, regardless of functional form. The remaining rows of Table 6 show estimates of the effect of the cut-off on turnout and various other representative characteristics (these effects are also shown graphically in Figure B.5–B.8). SC reservation has a negative and significant effect on voter turnout, by about 5pp in period 1 and 3.5pp in period 2. Table 2 shows that turnout increased by nearly 8pp between the two periods. So while reserved constituencies have a lower turnout percentage, the effect of reservation fell in period 2, suggesting that turnout increased more in reserved than unreserved constituencies.

In period 1, reservation has a small effect on the proportion of years with a female representative, but this increases to around 8pp in period 2. Given that only 9% of representatives were females in period 2 (see Table 2), this is a large effect. The increased share of female representatives in SC constituencies could be strategic: political parties might choose female candidates in reserved constituencies in order to maintain male candidates in general constituencies, which are often wealthier and thus more influential (Jensenius 2016). On the other hand, it could indicate that political reservation for minority groups has led to increased inclusiveness of women. Reservation also has significant effects on representative age, reducing it by over 3 years in both periods. This effect may well be correlated with the gender effect, as found by Ban & Rao (2008) in the context of village elections

Table 6. Effect of reservation on representative characteristics

	Period 1 1974–2007			Period 2 2008–2017		
	Non-parametric	Non-parametric with FE	Local linear	Non-parametric	Non-parametric with FE	Local linear
	(1)	(2)	(3)	(4)	(5)	(6)
Proportion of years with SC representative	0.909***	0.972***	0.933***	0.977***	0.977***	0.971***
	(0.031)	(0.036)	(0.040)	(0.010)	(0.009)	(0.013)
Turnout percentage	−5.242***	−5.401***	−5.369***	−3.359***	−3.460***	−3.355***
	(0.966)	(0.477)	(0.559)	(1.189)	(0.390)	(0.486)
Proportion of years with female representative	0.011	0.029**	0.020	0.078**	0.077***	0.065*
	(0.012)	(0.012)	(0.016)	(0.033)	(0.027)	(0.033)
Proportion of years with independent representative	−0.020**	−0.013	−0.013	−0.019*	−0.003	−0.020
	(0.009)	(0.009)	(0.009)	(0.010)	(0.011)	(0.013)
Average age of representative	−3.377***	−3.546***	−3.308***	−3.410***	−3.308***	−3.213***
	(1.102)	(1.079)	(1.196)	(0.797)	(0.845)	(0.976)
District FE	No	Yes	Yes	No	Yes	Yes
Observations	2,892	2,892	2,892	2,895	2,895	2,895

Notes: Models (1) and (4) present results based on Calonico et al. (2014) with polynomial order one and a triangular kernel for weighting. Models (2) and (5) include district fixed effects. Models (3) and (6) indicate linear estimates that use an optimal bandwidth chosen by the non-parametric method of Calonico et al. (2014). Standard errors are clustered at the constituency level. *** p<0.01, ** p<0.05, * p<0.1

in South India.

The reduced form effect of reservation on economic and educational outcomes is therefore a combined effect of these changes in representative characteristics and turnout, as well as its effect on having an SC representative. Nevertheless, we would expect that the overall effect is predominantly driven by its effect on caste.

5.2 The effects of SC representation on census outcomes in 2001 and 2011

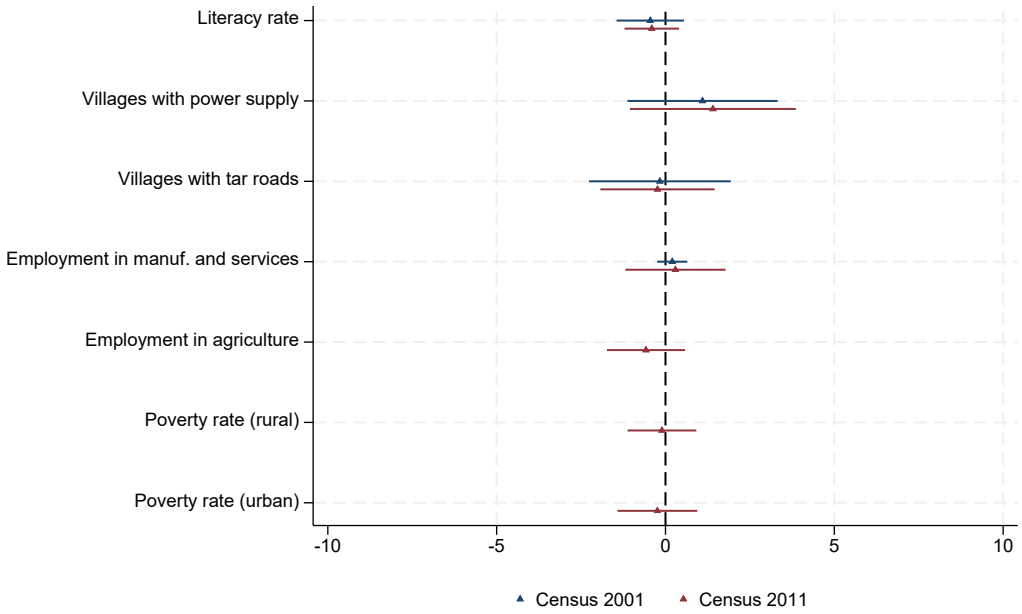
In Figure 2 we summarise estimates of the reduced form effect of the reservation cut-off on development outcomes measured in the Household Census, the SECC and the Economic Census (see Table 3). For each outcome we report estimates of β from Equation 1 using the non-parametric method of Calonico et al. (2014) with a polynomial of order one and a triangular kernel. We include district fixed effects to increase the precision of our estimates. We find that all estimates are small in magnitude and insignificantly different from zero.[16]

Our results from census outcomes in 2001 confirm the earlier findings of Jensenius (2015), who also finds no significant effect of SC representation. Instead of RD, she uses a method which pairs each reserved constituency with the unreserved constituency within the same district which has the closest value of PSC_c. Table A.4 replicates her findings using the same method and outcomes, and in Figure B.9, we compare the reduced form RD estimates with estimates from the matching method. Similar to Jensenius (2015), we include matching estimates both without and with a caliper of 0.5 on PSC_c.[17] The estimates from the matching method are also statistically insignificant. The sign and magnitude of the matching estimates are not very different from the RD estimates except for villages with power supply, employment in manufacturing and services (2001), and employment in agriculture. We find from the census 2001 data, the matching estimates have narrower confidence intervals relative to the RD estimates and are therefore more precise, except for employment in manufacturing and services. RD estimates of village-level development indicators in particular have much wider confidence intervals. For outcomes in census 2011, except for the village indicators and rural poverty rate, the RD estimates are more precise as they have relatively narrower confidence intervals.

[16] Table A.3 shows estimates from several different RD specifications, none of which indicate significant effects of SC representation.

[17] This means we exclude matches that are not equal to or within 0.5 SD of PSC_c.

Figure 2. Reduced form estimates of SC representation on constituency-level census outcomes



Notes: Results presented correspond to non-parametric estimates with district fixed effects. All estimates including estimates from other functional forms are reported in Table A.3.

Importantly, we find that SC representatives continue to exhibit little differential impact on census-based development outcomes in 2011. This holds even in the context of the MLA-LAD funds, which had been implemented across most states by the late 1990s and early 2000s. The absence of a significant effect can be interpreted in two ways: while it may suggest that SC representatives are no more effective than their non-SC counterparts in influencing development outcomes, it also implies that they are not performing worse — countering concerns about the potential inefficacy of SC representatives.

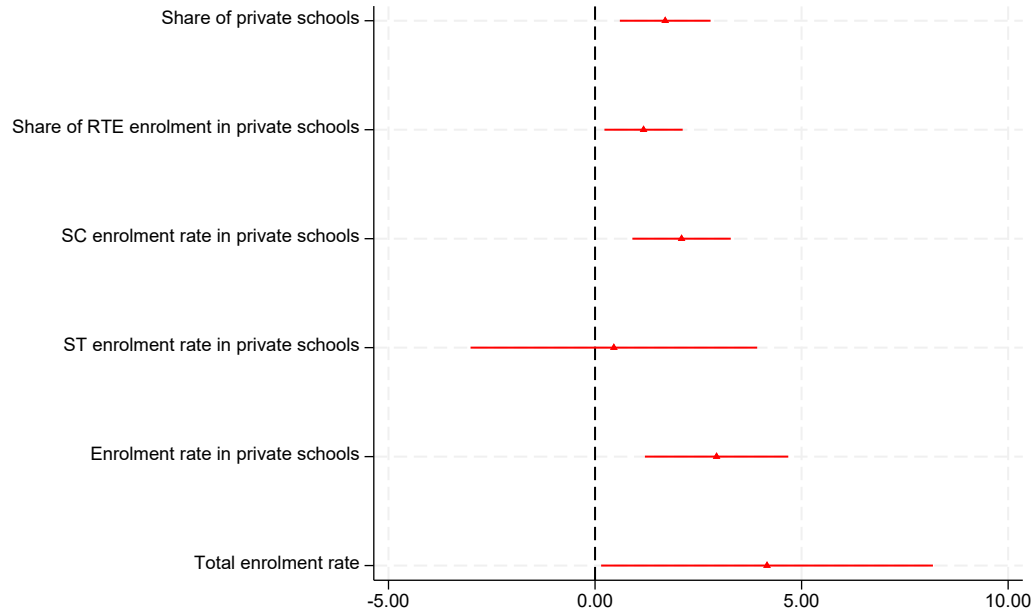
5.3 The effects of SC representation on schooling outcomes

Our second set of results refers to the effect of SC reservation on schooling outcomes following the implementation of the RTE Act (2010). For this, we make use of the discontinuity in the reservation in period 2, which started in 2008. Table 5 shows the results of the balancing test based on educational outcomes in 2005. We choose 2005 as it is the first year for which DISE data is available and is three years before period 2 reservation begins. Therefore, schooling outcomes in 2005 should

not be affected by reservation in period 2. All the results suggest that there were no meaningful or statistically significant differences in schooling outcomes at the cut-off between constituencies which are going to be reserved in 2008 and those which are not.

As the school data is available from 2010 to 2017, all outcomes have been averaged across 8 years. The reduced form estimates with schooling outcomes are summarised in Figure 3. Note that, as before, we report results from the non-parametric model with district fixed effects, which produces estimates with the lowest standard errors.

Figure 3. Reduced form estimates of schooling outcomes



Notes: Results presented correspond to non-parametric estimates with district fixed effects. All estimates including estimates from other functional forms are reported in Table A.5.

In contrast to the effects on census outcomes reported in Section 5.2, we find that SC reservation had positive effects on enrolment, and that the effects are statistically significant when using our preferred district fixed-effects specification. Constituencies reserved for SCs had a 4.2pp higher overall primary school enrolment. Given that total enrolment between 2010 and 2017 declined by 3pp (see Table 4), we conclude that the decline in enrolment was disproportionately concentrated in non-reserved constituencies.

We also find that reserved constituencies had a 2.9pp higher enrolment in

private schools between 2010 and 2017. At the same time, the average enrolment in private schools increased by 5pp (Table 4). This implies that almost 60% of the increase in private school enrolment was concentrated in constituencies reserved for SC. Furthermore, the average SC enrolment in private schools increased by 4pp between 2010 and 2017 (Table 4). We find that in reserved constituencies, SC enrolment in private schools was higher by 2.1pp or around 53%. In contrast, we find no effect on ST enrolment in private schools, although we note that the estimates on ST enrolment are imprecisely estimated.

Finally, we find that the share of RTE enrolment was 1.2pp higher and the share of private schools was 1.7pp higher in reserved constituencies. Between 2010 and 2017, the share of RTE enrolment and the share of private schools increased by 6pp and 5pp respectively (Table 4). This means that only 20% of the increase in RTE enrolment share can be attributed to reserved constituencies. Meanwhile, around 34% of the increase in private school share was concentrated in these constituencies.

There might be a concern that we overstate significance because we have six different dependent variables. In Table A.6 we compare the standard clustered p-values with so-called sharpened q-values (Benjamini, Krieger & Yekutieli 2006) and find that the significant effects on all six outcomes is preserved.

We find that the strongest effect of SC representatives is on the overall enrolment in private schools followed by SC enrolment in private schools. Following the policy there was a sharp increase in both private schools and disadvantaged childrens enrolment in private schools (Kingdon 2020, Vinod 2024*b*). We find that total enrolment in private schools and SC enrolment in private schools was higher in constituencies reserved for SCs after 2010. However, the increase in the enrolment of disadvantaged children in private schools was predominately indirect, with many of them not receiving free seats under the affirmative action policy but benefiting from a reduction of the costs of private schooling due to the growth in low-fee private schools (Vinod 2024*a*). Nonetheless, we find that reserved constituencies had a higher share of disadvantaged children enrolled under the policy.

Another potential channel that could explain better schooling outcomes in reserved constituencies is the higher proportion of female representatives. We find that compared to period 1 (1974-2007), reserved constituencies in period 2 (2008-2017) had 6pp higher share of female representatives. There are numerous studies that find a positive effect of women's empowerment on children's education outcomes (Behrman & Wolfe 1984, Ilon & Moock 1991, Lavy 1996, Currie & Moretti 2003, Chaudhry & Rahman 2009). Moroever, female MLAs in India have been

found to contribute significantly to improvements in education (Clots-Figueras 2011, 2012)

One possible concern with our identification method is that the existence of contiguous reserved constituencies (particularly in period 1) introduces some non-randomness in the allocation of treatment. Our balancing results (Table 5) suggests this is not a problem, but nevertheless in this section we also re-estimate our schooling outcome model using only districts with no contiguous constituencies. Doing this also ensures that first stage estimates are precisely equal to one, and so the reduced form estimates are equal to a causal effect of treatment. Table A.7 and Figure B.10 show RD estimates of educational outcomes after dropping constituencies that should have been reserved for SCs but were not because they shared a border with one or more reserved constituency. In line with our results on the full sample, we still find positive and significant effects using our preferred FE specification. SC representatives have positive effects on the enrolment rate in private schools, on the SC enrolment rate in private schools and the share of RTE enrolment in private schools. As before, the only negative effect is on enrolment in private schools for ST groups.

6 Conclusion

We provide evidence of the causal effect of political representatives on economic development and education in India. In particular, we investigate whether assembly constituencies reserved for disadvantaged communities such as Scheduled Castes (SCs) had differential development and schooling outcomes. Existing evidence for the effect of SC representatives at the constituency level in 2001 suggests that reserved constituencies matched unreserved constituencies in development outcomes (Jensenius 2015). We extend this analysis by looking at another decade of census outcomes, by using a conventional RD estimation approach, and by considering the effect of representative characteristics on schooling outcomes.

Pre-existing development and schooling outcomes are very similar at the threshold between reserved and unreserved constituencies (Table 5), suggesting that a comparison of subsequent outcomes is a causal estimate. Unsurprisingly, the threshold is associated with extremely large effects on the probability of having a constituency representative from a Scheduled Caste (Table 6). The threshold is also associated with a significant increase in the probability of having a representative who is female, younger and more likely to be affiliated with a political party.

We cannot therefore infer that the reduced form outcome is purely the result of SC representation, although this seems to be overwhelmingly the largest effect.

Our results on development outcomes support the earlier findings from Jensenius (2015). We use a conventional RD estimator rather than a matching approach and consider development outcomes a decade later, during which time representatives increasingly had access to development funds for their constituencies. In principle, the availability of these funds gave greater scope for representatives to effect outcomes in their constituencies and so it is of interest to see if SC representatives were able to use these funds more or less effectively than their non-SC counterparts. For each of the seven outcomes we measure, there is no significant difference between reserved and unreserved constituencies at the threshold (Figure 2 in either 2001 or 2011. From this, we conclude that SC representatives were equally effective in promoting development in their constituencies. However, it is still possible that this result obtains because, as suggested by Pande (2003), MLAs in general had limited capacity to affect constituency outcomes because economically significant decisions are made collectively at the national level.

Our results on schooling outcomes (Figure 3), however, suggest that reserved constituencies do have differential outcomes. We find a positive effect of SC MLAs on private education. The share of primary enrolment in private schools, as well as the share of total private schools, was higher in reserved constituencies by almost 2 percentage points. Moreover, the share of SC student enrolment in private schools was higher by almost 1 percentage point. This suggests that SC MLAs had a positive effect on private education after 2010, especially for SC children. The effects are potentially tied to the RTE Act, implemented in 2010, that made private education of disadvantaged groups a priority of the government. Our results are also in line with existing studies (Chattopadhyay & Duflo 2004, Gilens 2005, Burgess et al. 2015, Kramon & Posner 2016) that find a positive relationship between political representatives and the redistribution of resources to their interest groups.

An important question from our results on schooling outcomes is whether the differences between reserved and unreserved constituencies are the result of differences in the caste of the representative or other characteristic differences. Recall that representatives in reserved constituencies after 2008 were significantly more likely to be women. The increase in the share of female representatives from SC constituencies was much higher after 2008 than before. This could have resulted in more resources being diverted towards education. Female representatives might

have also more closely adhered to the guidelines of the RTE Act. At the same time, as highlighted in Section 2, studies have found that female representatives sometimes contribute more towards disadvantaged communities at the village-level. Thus, the positive effect on SC enrolment could be a combined effect of representatives being SC and females. One piece of evidence which suggests that it is an SC effect (rather than a female effect) is that the positive schooling outcomes are observed for SC children but not ST children.

One limitation of our study is that we do not directly observe the allocation of MLA funding which varies in amount, administration and monitoring by state. Collecting this data would provide more direct evidence on the effectiveness of MLA representatives in general and SC representatives in particular.

Nevertheless, our findings support the existing positive evidence that SC quotas did not inhibit development, and undoubtedly increased the representation of minority groups in politics. Quotas also appear to have increased representation of women, particularly since the boundary reclassification in 2008.

References

Acemoglu, D., Egorov, G. & Sonin, K. (2013), 'A political theory of populism', *Quarterly Journal of Economics* **128**(2), 771–805.

Asher, S., Lunt, T., Matsuura, R. & 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).

Ban, R. & Rao, V. (2008), 'Tokenism or agency? The impact of womens reservations on village democracies in South India', *Economic Development and Cultural Change* **56**(3), 501–530.

Bardhan, P., Mookherjee, D. & Parra Torrado, M. (2010), 'Impact of political reservations in west bengal local governments on anti-poverty targeting', *Journal of Globalization and Development* **1**(1).

Baskaran, T., Bhalotra, S., Min, B. & Uppal, Y. (2024), 'Women legislators and economic performance', *Journal of Economic Growth* **29**(2), 151–214.

Behrman, J. & Wolfe, B. (1984), 'Who is schooled in developing countries? The roles of income, parental schooling, sex, residence and family size', *Economics of Education Review* **3**(3), 231–245.

Benjamini, Y., Krieger, A. M. & Yekutieli, D. (2006), 'Adaptive linear step-up procedures that control the false discovery rate', *Biometrika* **93**(3), 491–507.

Besley, T., Montalvo, J. & Reynal-Querol, M. (2011), 'Do educated leaders matter?', *The Economic Journal* **121**(554), F205–227.

Besley, T., Pande, R., Rahman, L. & Rao, V. (2004), 'The politics of public good provision: Evidence from Indian local governments', *Journal of the European Economic Association* **2**(2-3), 416–426.

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

Bhattacharjee, S. (2019), 'Ten years of rte act: revisiting achievements and examining gaps', *ORF Issue Brief* **304**.

Burgess, R., Jedwab, R., Miguel, E., Morjaria, A. & 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), *Corruption and reform in India: Public services in the digital age*, Cambridge University Press.

Calonico, S., Cattaneo, M. D. & Titiunik, R. (2015), 'Optimal data-driven regression discontinuity plots', *Journal of the American Statistical Association* **110**(512), 1753–1769.

Calonico, S., Cattaneo, M. & Titiunik, R. (2014), 'Robust nonparametric confidence intervals for regression-discontinuity designs', *Econometrica* **82**(6), 2295–2326.

Cattaneo, M., Titiunik, R. & Vazquez-Bare, G. (2020), 'Analysis of regression-discontinuity designs with multiple cutoffs or multiple scores', *The Stata Journal* **20**(4), 866–891.

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

Chaudhry, I. & Rahman, S. (2009), 'The impact of gender inequality in education on rural poverty in Pakistan: an empirical analysis', *European Journal of Economics, Finance and Administrative Sciences* **15**(1), 174–188.

Chayani, B. S. (2021), 'Economic development and effectiveness of the political leaders: A study on the role of the elected representatives in india.', *ASBM Journal of Management* **14**.

Chhibber, P. K. (1999), *Democracy without Associations: Transformation of the Party System and Social Cleavages in India*, University of Michigan Press.

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

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

Clots-Figueras, I. (2011), 'Women in politics: Evidence from the Indian states', *Journal of Public Economics* **95**(7-8), 664–690.

Clots-Figueras, I. (2012), 'Are female leaders good for education? evidence from india', *American economic journal: applied economics* **4**(1), 212–244.

CoI (2011), 'Census of India', Office of the Registrar General and Census Commissioner, India. https://censusindia.gov.in/census.website/data/census-tables.

Currie, J. & Moretti, E. (2003), 'Mother's education and the intergenerational transmission of human capital: Evidence from college openings', *The Quarterly Journal of Economics* **118**(4), 1495–1532.

Dunning, T. & Nilekani, J. (2013), 'Ethnic quotas and political mobilization: caste, parties, and distribution in Indian village councils', *American Political Science Review* **107**(1), 35–56.

ECoI (2013), 'Economic Census of India', Central Statistics Organisation, Ministry of Statistics and Programme Implementation, Government of India. http://microdata.gov.in/nada43/index.php/catalog/ECO.

Ferreira, F. & Gyourko, J. (2009), 'Do political parties matter? Evidence from US cities', *The Quarterly Journal of Economics* **124**(1), 399–422.

Gilens, M. (2005), 'Inequality and democratic responsiveness', *Public Opinion Quarterly* **69**(5), 778–796.

Government of India (1998), 'Report of the comptroller and auditor general on mplads', https://cag.gov.in/uploads/old_reports/union/union_compliance/2001/Civil/2001_book3a/mplads.pdf. Accessed June 3, 2025.

Gulzar, S., Haas, N. & Pasquale, B. (2020), 'Does political affirmative action work, and for whom? Theory and evidence on Indias scheduled areas', *American Political Science Review* **114**(4), 1230–1246.

Ilon, L. & Moock, P. (1991), 'School attributes, household characteristics, and demand for schooling: A case study of rural Peru', *International Review of Education* **37**(4), 429–451.

Iyer, L. & Mani, A. (2012), 'Traveling agents: political change and bureaucratic turnover in India', *Review of Economics and Statistics* **94**(3), 723–739.

Jensenius, F. (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. (2016), 'Competing inequalities? On the intersection of gender and ethnicity in candidate nominations in Indian elections', *Government and Opposition* **51**(3), 440–463.

Jensenius, F. R. & Chhibber, P. (2023), 'Privileging ones own? voting patterns and politicized spending in india', *Comparative Political Studies* **56**(4), 503–529.

Kaletski, E. & Prakash, N. (2016), 'Does political reservation for minorities affect child labor? Evidence from India', *World Development* **87**, 50–69.

Kapur, D., Mehta, P. & Vaishnav, M. (2018), *Rethinking public institutions in India*, Oxford University Press.

Keefer, P. & Khemani, S. (2009), 'When do legislators pass on pork? the role of political parties in determining legislator effort', *American political Science review* **103**(1), 99–112.

Kim, J., Wang, M., Park, D. & Petalcorin, C. (2021), 'Fiscal policy and economic growth: some evidence from China', *Review of World Economics* **157**(3), 555–582.

Kingdon, G. G. (2020), 'The private schooling phenomenon in india: A review', *The Journal of Development Studies* **56**(10), 1795–1817.

Kramon, E. & Posner, D. (2016), 'Ethnic favoritism in education in Kenya', *Quarterly Journal of Political Science* **11**(1), 1–58.

Lavy, V. (1996), 'School supply constraints and children's educational outcomes in rural Ghana', *Journal of Development Economics* **51**, 291–314.

Malakar, R. & Mahato, A. (2015), 'Implementation status of right to education (rte) act 2009 in tripura: A critical analysis', *MGIRED Journal* **2**(1), 90–100.

Manor, J. (1999), *The political economy of democratic decentralization.*

Ojha, S. (2013), 'Implementing right to education: Issues and challenges', *Research Journal of Educational Sciences* **2321**, 0508.

Pal, R. & Das, A. (2008), 'Decentralisation and political business cycle: Fund utilization of the mp-lads in india'.

Palaniswamy, N. & Krishnan, N. (2012), 'Local politics, political institutions, and public resource allocation', *Economic Development and Cultural Change* **60**(3), 449–473.

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.

Pathak, Y. & Macours, K. (2017), 'Womens political reservation, early childhood development, and learning in India', *Economic Development and Cultural Change* **65**(4), 741–766.

Prakash, N., Rockmore, M. & Uppal, Y. (2019), 'Do criminally accused politicians affect economic outcomes? Evidence from India', *Journal of Development Economics* **141: 102730**.

Priebe, J. (2017), 'Political reservation and female empowerment: evidence from Maharashtra, India', *Oxford Development Studies* **45**(4), 499–521.

Priyanka, S. (2020), 'Do female politicians matter for female labor market outcomes? evidence from state legislative elections in india', *Labour Economics* **64**, 101822.

Sarin, A., Kuhn, S., Singh, B., Khanghta, P., Dongre, A., Joshi, E., Sengupta, A. & Rahman, F. (2015), 'State of the nation: Rte section 12 (1)(c)', *Available at SSRN 2637817* .

SECC (2011), 'Socio Economic and Caste Census', Ministry of Rural Development, Government of India.

Shah, M. & Steinberg, B. (2019), The right to education act: Trends in enrollment, test scores, and school quality, *in* 'AEA Papers and Proceedings', Vol. 109, American Economic Association 2014 Broadway, Suite 305, Nashville, TN 37203, pp. 232–238.

Sukhtankar, S. & Vaishnav, M. (2015), Corruption in India: Bridging research evidence and policy options, *in* 'India Policy Forum', Vol. 11, National Council of Applied Economic Research Delhi, India, pp. 193–276.

TCPD (2021), 'TCPD elections data v2.0 https://tcpd.ashoka.edu.in/lok-dhaba/', Trivedi Centre for Political Data, Ashoka University.

Thomas, A. (2018), 'Targeting ordinary voters or political elites? why pork is distributed along partisan lines in india', *American Journal of Political Science* **62**(4), 796–812.

UDISE (2017), 'District information system for education', Department of School Education and Literacy, Ministry of Education, Government of India. https://udiseplus.gov.in.

Vinod, A. (2024*a*), Affirmative action and private education expenditure by disadvantaged groups: evidence from india. National Council of Applied Economic Research Working Paper.

Vinod, A. (2024*b*), Direct and indirect effects of the right to education act on the enrolment of disadvantaged groups in india, Technical report, CREDIT Research Paper.

Wilkinson, S. I. (2007), 'Explaining changing patterns of party-voter linkages in india', *Patrons, clients and policies: Patterns of democratic accountability and political competition* pp. 110–40.

A Additional Tables

Table A.1. Reserved constituencies by districts in Period 1

No. reserved constituencies	No. districts	No. districts with contiguous constituencies
0	35	0
1	146	0
2	82	39
3	28	19
4	12	8
5	6	5
6	1	1
Total	310	72

Table A.2. Reserved constituencies by districts in Period 2

No. reserved constituencies	No. districts	No. districts with contiguous constituencies
0	76	0
1	261	0
2	67	0
3	27	6
4	4	1
5	4	1
7	2	0
9	1	0
Total	442	8

Table A.3. Effect of reservation on census outcomes: reduced form estimates

	Census 2001			Census 2011		
	Non-parametric	Non-parametric with FE	Local linear	Non-parametric	Non-parametric with FE	Local linear
	(1)	(2)	(3)	(4)	(5)	(6)
Literacy rate	−1.255	−0.450	−0.556	−0.872	−0.404	−0.636
	(1.176)	(0.499)	(0.546)	(0.867)	(0.403)	(0.443)
Villages with power supply	−1.882	1.097	0.478	−0.347	1.405	1.321
	(3.657)	(1.112)	(1.359)	(3.162)	(1.228)	(1.368)
Villages with tar roads	−2.159	−0.166	−0.422	0.711	−0.236	0.379
	(2.460)	(1.050)	(1.220)	(2.358)	(0.846)	(0.975)
Employment in manufacturing and services	0.218	0.201	0.181	0.352	0.295	0.016
	(0.318)	(0.223)	(0.241)	(0.872)	(0.742)	(0.835)
Employment in agriculture				−1.164	−0.577	−0.354
				(1.552)	(0.578)	(0.682)
Rural poverty rate				0.808	−0.104	−0.149
				(1.376)	(0.509)	(0.537)
Urban poverty rate				0.442	−0.241	−0.158
				(0.958)	(0.591)	(0.674)
District FE	No	Yes	Yes	No	Yes	Yes
Observations	2,892	2,892	2,892	2,892	2,892	2,892

Notes: Table reports estimates of β from Eqn (1) which are also shown graphically in Figure 2. The running variable and the discontinuity are based on the reservation in period 1 (1974-2007). Models (1) and (4) present results based on Calonico et al. (2014) with polynomial order one and a triangular kernel for weighting. Models (2) and (5) include district fixed effects. Models (3) and (6) indicate linear estimates that use an optimal bandwidth chosen by the non-parametric method of Calonico et al. (2014). Standard errors are clustered at the constituency level. *** p<0.01, ** p<0.05, * p<0.1

Table A.4. Replication of Jensenius' matching estimates

	Matching		Matching with caliper	
	Original	Replicated	Original	Replicated
	(1)	(2)	(3)	(4)
A. Overall				
Literacy rate	−0.18	−0.16	0.06	0.10
	(0.33)	(0.31)	(0.32)	(0.31)
Employment rate	−0.08	−0.05	−0.25	0.28
	(0.21)	(0.21)	(0.24)	(0.23)
Agricultural labourers	0.09	0.06	−0.19	−0.23
	(0.23)	(0.23)	(0.26)	(0.26)
Electricity in village	−1.19	−1.073	−0.79	−0.60
	(0.85)	(0.81)	(0.66)	(0.63)
School in village	−0.32	−0.33	−0.53	−0.51
	(0.34)	(0.48)	(0.42)	(0.65)
Medical facility in village	−0.26	−0.33	−1.03	−1.25
	(0.41)	(0.54)	(0.63)	(0.68)
Communication channel in village	−0.51	−0.59	−0.34	−0.29
	(0.76)	(0.82)	(0.99)	(1.053)
B. Gap b/w SCs and Non-SCs				
Literacy gap	−0.03	−0.04	0.01	0.03
	(0.20)	(0.17)	(0.20)	(0.19)
Employment gap	0.00	−0.02	−0.06	−0.08
	(0.00)	(0.08)	(0.13)	(0.13)
Agricultural labourers gap	0.02	−0.02	−0.04	−0.07
	(0.14)	(0.15)	(0.16)	(0.17)
Electricity in village gap	0.02	0.04	0.22	0.22
	(0.10)	(0.11)	(0.20)	(0.19)
School in village gap	−0.06	−0.03	−0.01	0.02
	(0.10)	(0.09)	(0.10)	(0.11)
Medical facility in village gap	−0.29	−0.26	0.33	0.40
	(0.34)	(0.37)	(0.31)	(0.31)
Communication channel in village gap	−0.31	−0.33	−0.20	−0.24
	(0.23)	(0.24)	(0.31)	(0.31)
Observations	896	904	648	646

Notes: Columns (1) and (3) report the original matching estimates from Jensenius (2015). Columns (2) and (4) report the replicated matching estimates. In columns (3) and (4), matches not equal to or within 0.5 SD of PSC_c are excluded. Standard errors are in parentheses.

Table A.5. Effect of SC reservation on schooling outcomes: reduced form estimates

	Non-parametric	Non-parametric with FE	Local linear
	(1)	(2)	(3)
Total enrolment rate	−0.197	4.164**	4.292
	(4.022)	(2.008)	(2.650)
Enrolment rate in private schools	2.351	2.942***	3.120**
	(1.760)	(0.868)	(1.234)
SC enrolment rate in private schools	1.779	2.095***	1.699**
	(1.207)	(0.596)	(0.814)
ST enrolment rate in private schools	−3.600	0.456	−1.652
	(2.978)	(1.735)	(2.332)
Share of RTE enrolment in private schools	0.326	1.175**	0.737
	(0.818)	(0.474)	(0.667)
Share of private schools	2.068*	1.699***	1.187*
	(1.204)	(0.549)	(0.708)
District FE	No	Yes	Yes
Observations	2,895	2,895	2,895

Notes: The running variable and the discontinuity are based on the reservation in period 2 (2008-2017). Model (1) presents results based on Calonico et al. (2014) with polynomial order one and a triangular kernel for weighting. Model (2) includes district fixed effects. Model (3) indicates linear estimates that use an optimal bandwidth chosen by the non-parametric method of Calonico et al. (2014). Standard errors are clustered at the constituency level. *** p<0.01, ** p<0.05, * p<0.1.

Table A.6. Results from the multiple model corrections

	Original p-values	Sharpened q-values
	(1)	(2)
Total enrolment rate	0.038	0.020
Enrolment rate in private schools	0.001	0.003
SC enrolment rate in private schools	0.000	0.001
ST enrolment rate in private schools	0.793	0.153
Share of RTE enrolment in private schools	0.013	0.010
Share of private schools	0.002	0.004

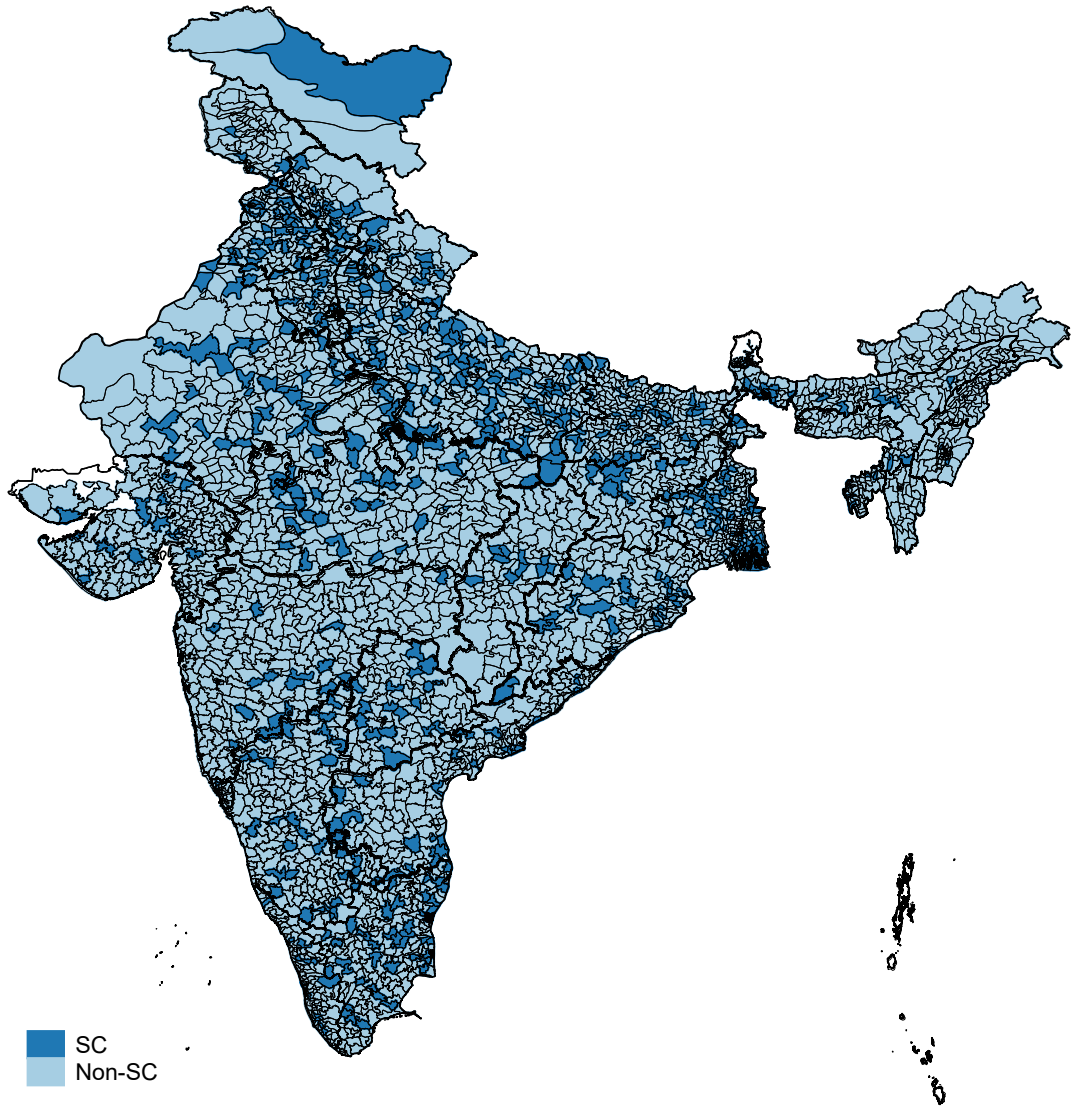
Notes: Column (1) reports the p-values from the original non-parametric estimation with district fixed effects. Column (2) reports the Benjamini et al. (2006) sharpened q-values to rectify the problem of multiple modelling.

Table A.7. Effect of reservation on schooling outcomes: non-contiguous constituencies

	Non-parametric	Non-parametric with FE	Local linear
	(1)	(2)	(3)
Total enrolment rate	−1.501	2.980*	1.640
	(3.933)	(1.803)	(2.490)
Enrolment rate in private schools	1.646	2.443***	1.913*
	(1.721)	(0.782)	(1.071)
SC enrolment rate in private schools	1.499	1.926***	1.422*
	(1.189)	(0.584)	(0.759)
ST enrolment rate in private schools	−5.053*	−1.267	−3.266
	(3.022)	(1.707)	(2.260)
Share of RTE enrolment in private schools	0.342	1.113**	0.638
	(0.802)	(0.477)	(0.674)
Share of private schools	1.940	1.576***	1.055
	(1.255)	(0.552)	(0.709)
District FE	No	Yes	Yes
Observations	2,796	2,796	2,796

Notes: The running variable and the discontinuity are based on the reservation in period 2 (2008-2017). Model (1) presents results based on Calonico et al. (2014) with polynomial order one and a triangular kernel for weighting. Model (2) includes district fixed effects. Model (3) indicates linear estimates that use an optimal bandwidth chosen by the non-parametric method of Calonico et al. (2014). Standard errors are clustered at the constituency level. *** p<0.01, ** p<0.05, * p<0.1

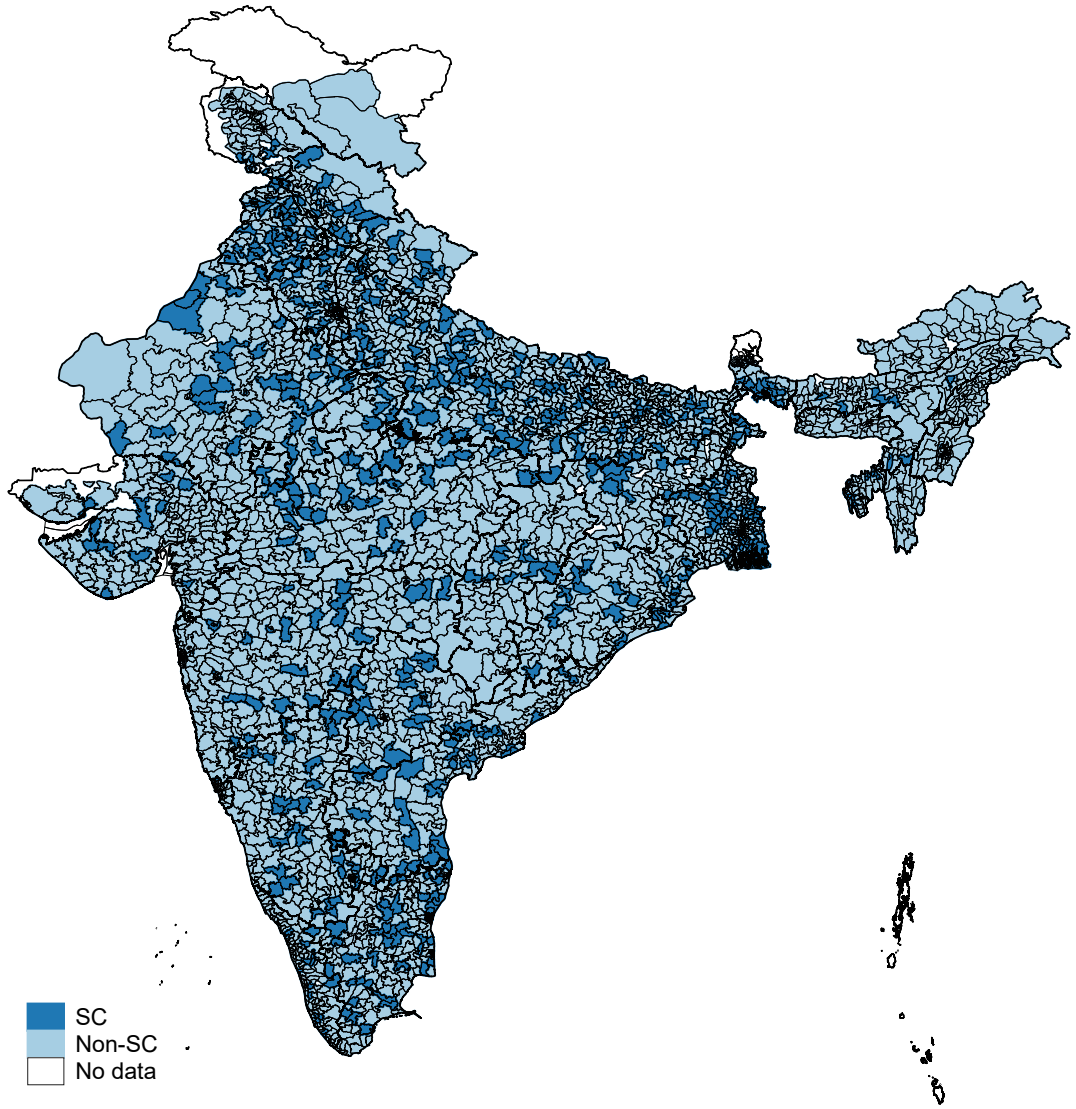
B Additional Figures



Data source: Election data from Development Data Lab and GIS coordinates of states and constituencies from GADM data

Figure B.1. Assembly constituencies in India in Period 1 (1974–2007)

Notes: Non-SC constituencies include General and ST constituencies



Data source: Election data from Development Data Lab and GIS coordinates of states and constituencies from GADM data

Figure B.2. Assembly constituencies in India in Period 2 (2008–2017)

Notes: Non-SC constituencies include General and ST constituencies

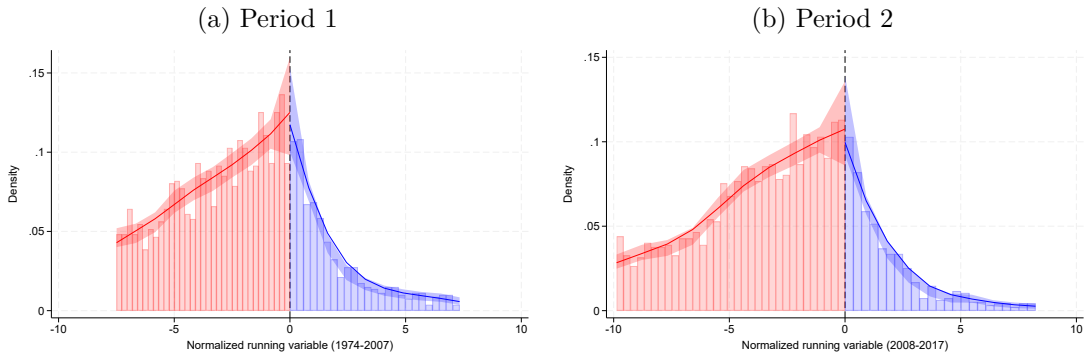


Figure B.3. Density of running variable

Notes: The bias-corrected t-statistic is -0.092 (p-value = 0.927) in Period 1, and 0.254 (p-value = 0.800) in Period 2.

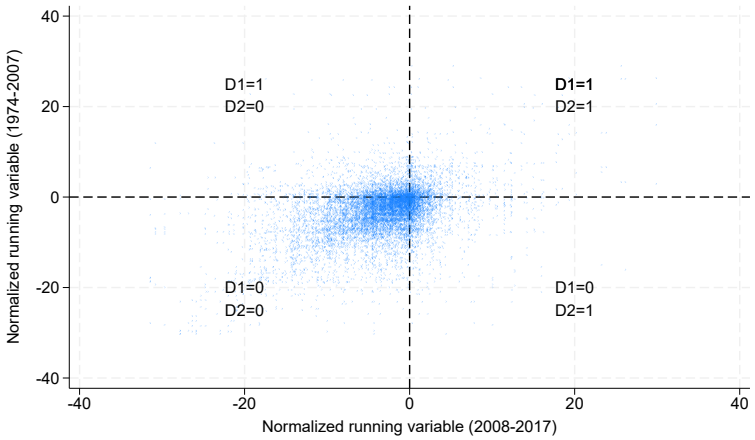


Figure B.4. Correlation between the running variables in both periods

Notes: The Y-axis denotes the running variable in Period 1. The X-axis denotes the running variable in Period 2. $D1 = 1$ and $D2 = 1$ indicate areas reserved in both periods. $D1 = 1$ and $D2 = 0$ indicate regions reserved in Period 1 and unreserved in Period 2 respectively. $D1 = 0$ and $D2 = 0$ indicate areas unreserved in both periods. $D1 = 0$ and $D2 = 1$ indicate areas unreserved in Period 1 and reserved in Period 2 respectively. Areas are defined by overlaying the constituencies boundaries in both periods.

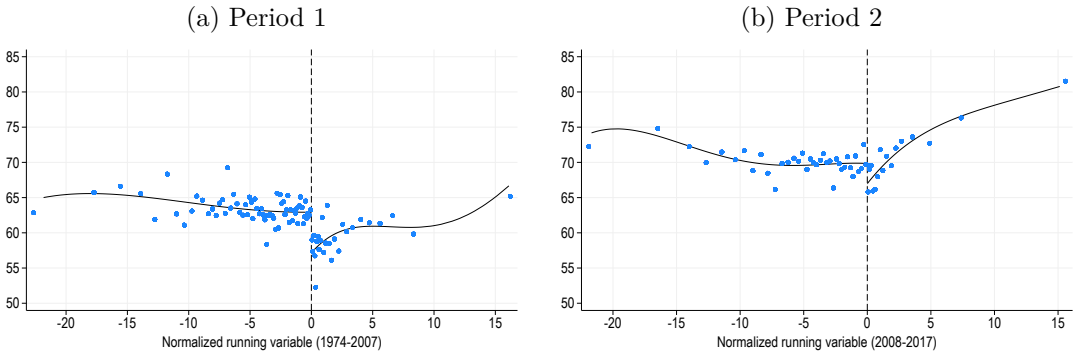


Figure B.5. Turnout percentage by running variable. See notes to Figure 1.

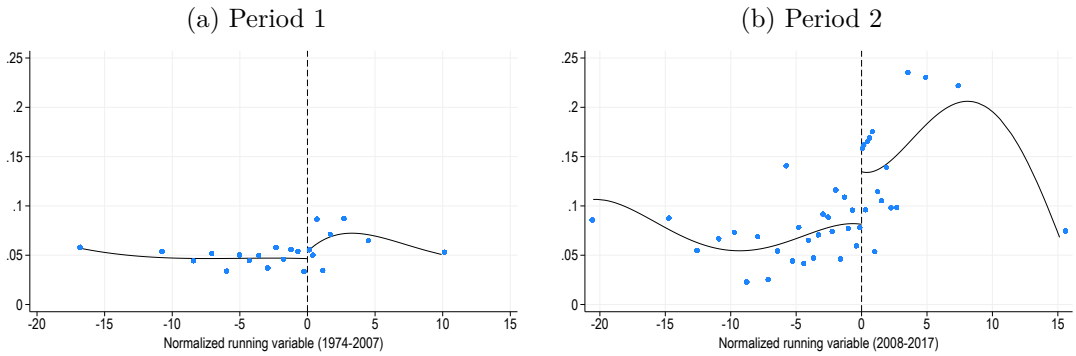


Figure B.6. Proportion of years with female representatives. See notes to Figure 1.

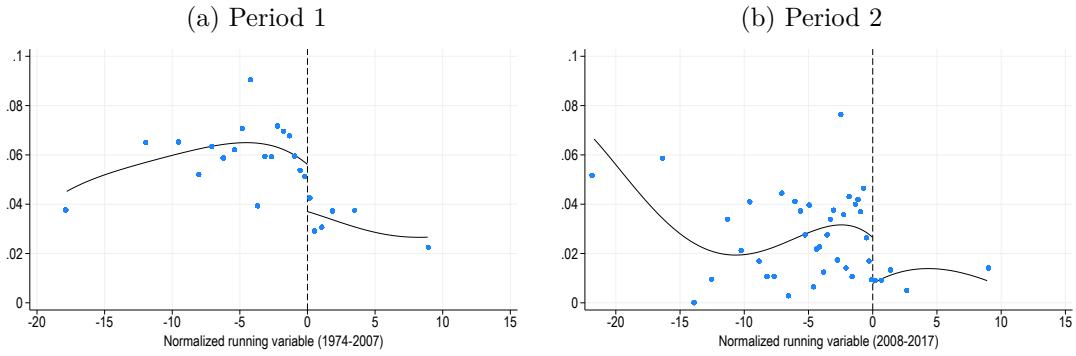


Figure B.7. Proportion of years with independent representatives. See notes to Figure 1.

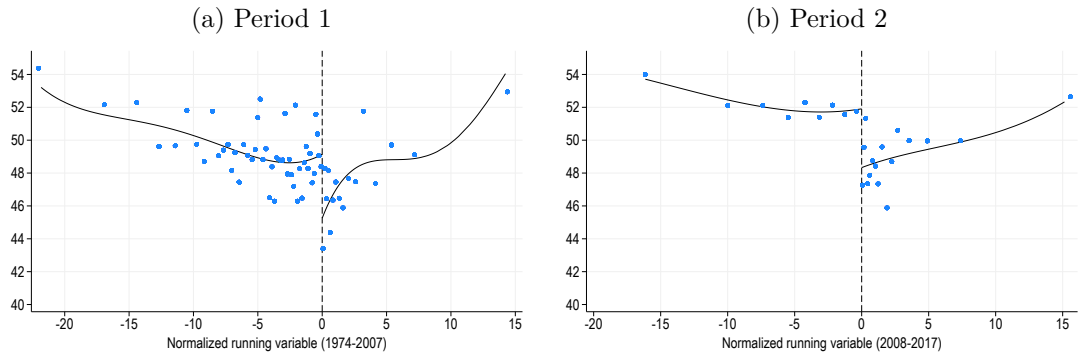
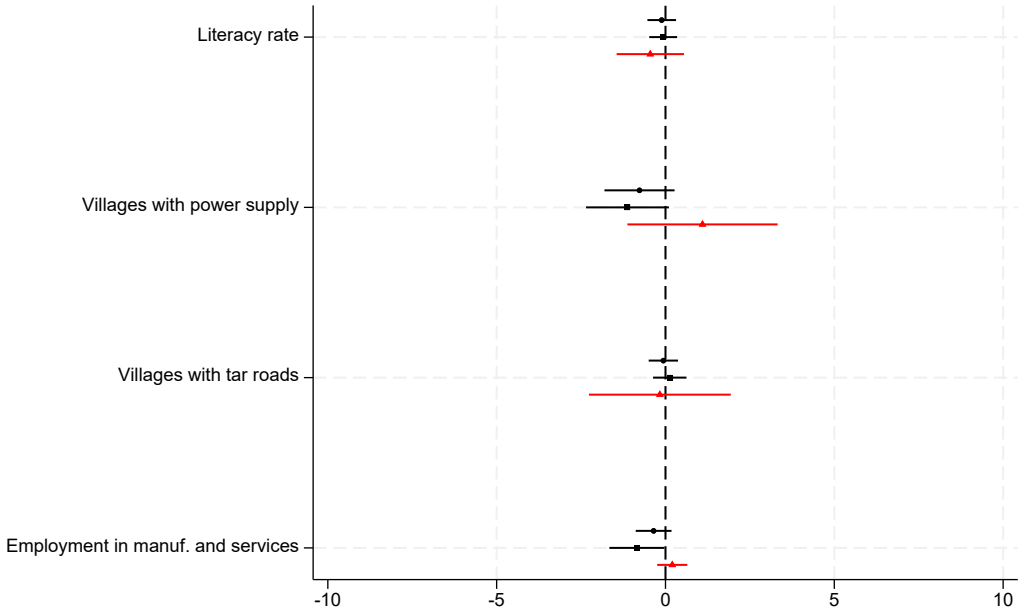


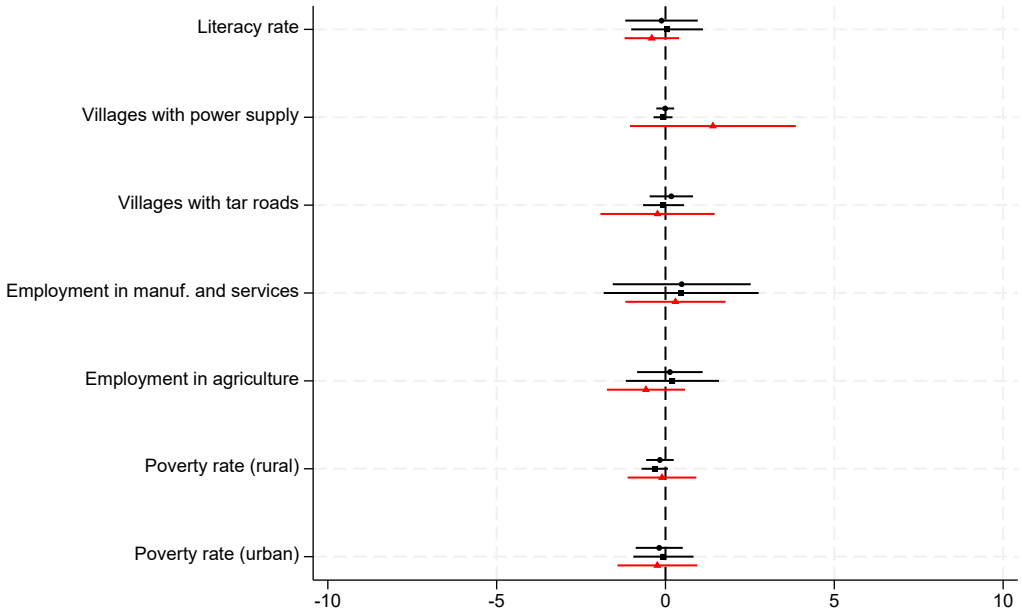
Figure B.8. Average age of representatives by running variable. See notes to Figure 1.

Figure B.9. Comparison of RD estimates and matching estimates

(a) Census 2001

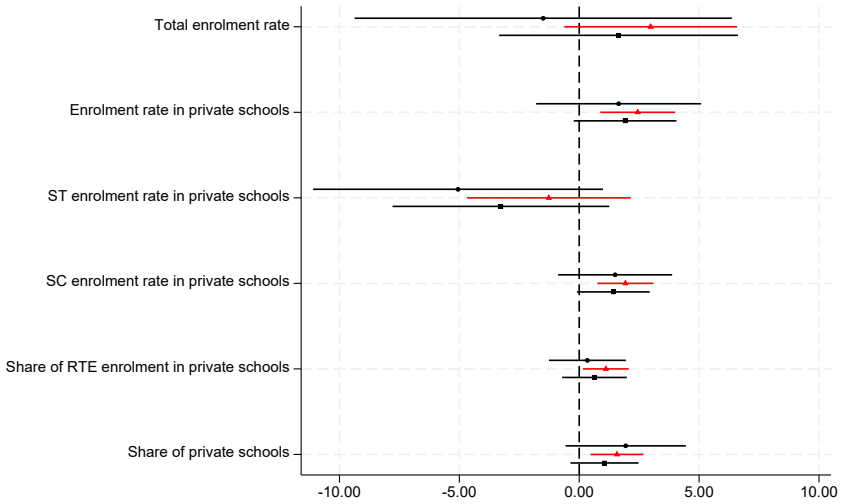


(b) Census 2011



Notes: Circle denotes matching estimates, square denotes matching estimates with caliper, and triangle denotes non-parametric estimates with district fixed effects.

Figure B.10. Reduced form estimates of education outcomes: non-contiguous constituencies



Notes: Circle denotes non-parametric estimates, triangle denotes non-parametric estimates with district fixed effects, and square denotes linear estimates with optimal bandwidth.

C Aggregation of census blocks to constituencies

We have blocks labelled $b = 1, \ldots, B$. For each block we have information x_b which contains, for example, a measure from Census or a measure from DISE in that block.

Constituencies are labelled $c = 1, \ldots, C$. Each block lies within one or more constituencies and each constituency lies within one or more blocks. Define $A_{b,c}$ to be the area of the region which lies within both block b and constituency c. The total area of constituency c is therefore

$$A_c = \sum_{b \in \mathcal{B}_c} A_{b,c}$$

where $\mathcal{B}_c$ is the set of blocks that have some area overlapping with constituency c. The share, or "area weight" of block b in contituency c is then $w_{b,c} = A_{b,c}/A_c$.

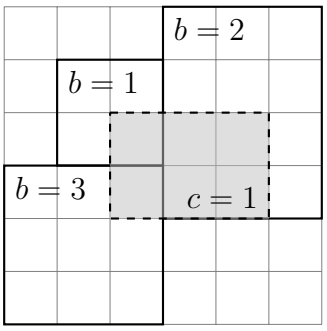
The estimated value of x_c for each constituency is the weighted sum of the x_b for all $b \in \mathcal{B}_c$, which is

$$\hat{x}_c = \sum_{b \in \mathcal{B}_c} w_{b,c} x_b.$$

For example, suppose x_b is the average age in block b. Then if a constituency covers two blocks $b = 1$ and $b = 2$, the average age in the constituency is the weighted average of x_1 and x_2.

However, if the information in x_b is a count or a total, we need to first divide it by the total area of each block. For example, consider Figure C.1

Figure C.1. Three census blocks overlapping with one constituency area



Suppose there are three blocks $b = 1,2,3$ with areas 4, 12 and 9. The constituency $c = 1$ overlaps each of these blocks with $A_{1,1} = 1$, $A_{2,1} = 4$ and $A_{3,1} = 1$. So our weights are $w_{1,1} = 1/6$, $w_{2,1} = 4/6$ and $w_{3,1} = 1/6$. Now suppose that x_b is

"miles of road in block b" and takes the value $x_1 = 10$, $x_2 = 15$, $x_3 = 20$. We can either normalise x_b by the area of each block, giving us "miles of road per km^2":

$$\hat{x}_{1.} = \left(\frac{1}{6}\right)\left(\frac{10}{4}\right) + \left(\frac{4}{6}\right)\left(\frac{15}{12}\right) + \left(\frac{1}{6}\right)\left(\frac{20}{9}\right) = 1.62,$$

or we can use weights for the proportion of each block in the constituency, which gives us an estimate of "miles of road":

$$\hat{x}_{1.} = \left(\frac{1}{4}\right)10 + \left(\frac{4}{12}\right)15 + \left(\frac{1}{9}\right)20 = 9.72.$$

Note that the first estimate (1.62) is just the second estimate (9.72) divided by the area of the constituency (6).