Female Leaders and Educational Infrastructure Investments: Evidence from Rural India

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Abstract

Participation of women in politics is known to bring in more pro-social, redistributive, and welfare-improving policies, especially for children in terms of their health and education outcomes. In this paper, I look at the impact of female politicians on school construction in rural India. I combine administrative data on all the government schools ever built in the country and the elections held in the State Legislative Assemblies. Using a close election regression discontinuity design, I find that the growth in new schools in constituencies where a woman is elected is no different from that in constituencies where a man is elected. Using descriptive administrative data on politicians' expenditures from two states, I argue that a potential reason behind this null effect may be that women may have lower political agency. I find that women get allocated fewer projects and funds on average as compared to men. While there seems no difference in the number of education projects led by men and women, the education expenditure is lower for women.

Keywords: Female Leaders, Education Outcomes, Rural India

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1 Introduction

As per the Inter-Parliamentary Union, the share of women as members of parliament in the world currently stands at 25.5 percent, which is lower than the share of women in the total world population. While the representation of women has increased from 11.7 percent in 1997, the low level of current representation is worrisome not just for egalitarian reasons, but also for policy determination. Equal representation of women in leadership roles is important for child welfare as women are more pro-social and tend towards redistribution.

In this paper, I ask if electing female leaders impacts education infrastructure outcomes in rural India. The Government of India has focused on increasing school building and improving education outcomes since the 2000s. The scale of this flagship program has been massive and concerted efforts have been taken to address the needs of over 190 million children in the country. In this context, I aim to understand if female leaders are able to channel funds into their electoral constituencies more than male leaders. Using a close election regression discontinuity design between men and women who are appointed as the Members of Legislative Assemblies (MLA) at the State Legislative Assemblies, I find that there is no difference in the education infrastructure investment in constituencies where a female won narrowly against a man. In the long term, there is also no impact on the gender gap in enrolment in the schools built during these leaders' electoral tenure.

I rule out possible mechanisms like a lower political network of women politicians and differences in candidate quality in explaining these differences across constituencies where a man or a woman won. Using MLA and constituency-level project expenditure data from two large states in the country, I find anecdotal evidence for the case that women may have lower political agency. They get fewer projects sanctioned and on average get lower money sanctioned for these projects as compared to male MLAs. Even though the number of projects for education as similar across constituencies where a man and a woman won, the amount sanctioned for education-related projects to women is on average 8000 USD less than the amount sanctioned for education-related projects to men.

I make three key contributions to the literature. First, I extend the existing knowledge about the link between female politicians and education by examining the data in a modern context. Prior evidence on the impact of female leaders is mixed. One part of the literature finds that female leaders impact

education through the expenditure channel. Svaleryd (2009) and Chen (2013) find that having more women in local council impacts social welfare expenditure including education. However, Ferreira and Gyourko (2014) find no impact of female US Mayors on public spending; and that the context of the study is very important and women may face several barriers. Specific to the literature in India, there is evidence that the role model effect operates more. Beaman et al. (2009) find that female leaders impact the aspirations of girl students and there is also a reduction in the gender gap in enrolment for adolescent children in areas where exposure to female leaders is high (O'Connell, 2018). These studies, however, focus on the local village-level leaders who do not have any spending power. Chattopadhyay and Duflo (2004), in fact, find that there is a reduction in the number of informally run panchayat schools as women focus on other issues. With the state-level leaders having more fiscal powers, the closest paper to mine is that of Clots-Figueras (2012) which finds that districts where there is a higher share of female leaders elected at the constituency level have a higher rate of primary completion in urban areas during 1967-1992. But they don't find any changes to the infrastructure, and they do not find anything in rural areas. The Indian Government has taken several fiscal initiatives to expand the education sector in the country since the late 90s, especially in rural areas.

Second, I use the annual census of schools in India and map them to constituency maps to conduct the analysis at the constituency level - which is the level of the treatment. Prior work, in the absence of this data, aggregates the data at the district level and uses a fuzzy regression discontinuity design. This is the first paper to estimate the impact of female leaders on education at the electoral constituency level which allows us to directly compare constituencies where a woman nearly won against a man to constituencies where a woman nearly lost to a man.

Third, I combine my quantitative analysis with qualitative evidence on project expenditure by the MLAs in each constituency yearly for two states in the country. While older qualitative evidence (*cite*) finds that women raise questions related to education more than men, this data allows us to see if there's an actual change in expenditure and assess if women also have the agency to translate those preferences to actual work.

The rest of the paper is organized as follows: Section 2 discusses the institutional setup in the country and the education policy during the time frame considered. In Section 3, I discuss the empirical strategy adopted to study the impact of female politicians on education. In Section 4, I discuss the data sources

used for this study and explain the resultant sample from mapping schools to constituencies. In Section 5, I discuss the results and discuss possible mechanisms. Finally, I conclude in Section 6.

2 Background

2.1 *Sarva Shiksha Abhiyan* (SSA) or Education for All

The centrally sponsored programme aimed at the universalization of elementary education "in a time bound manner", the 86th Amendment to the Constitution of India making free and compulsory education to children between the ages of 6 to 14 (estimated to be 205 million children in 2001) a fundamental right. The programme sought to open new schools in those habitations which do not have schooling facilities and strengthen existing school infrastructure through the provision of additional classrooms, toilets, drinking water, maintenance grants, and school improvement grants. SSA has a special focus on girls' education and children with special needs[1]. The SSA, however, had no legal backing. In April 2010, the Right to Education (RTE) Act, 2009 came into force which made it legally binding for states and local governments to provide free and compulsory education for children aged 6-14 years[2].

In phase I of this program (2003-2007), World Bank invested $500 million to expand facilities and improve infrastructure, get children to school, and set up a system to assess learning. In phase II of the program (2007-2012) the World Bank provided a total of $1.35 billion to expand access to upper primary education, increase retention of all students until completion of elementary education (Grade 8), and improve learning levels.

Studying the question of the impact of female legislatures on education during the time of implementation of this scheme, therefore is interesting because there is an increase in funds available for education expenditure and therefore allows us to evaluate if women can impact the way in which these funds are being spent in building schools in their constituencies.

[1]Information accessed from : https://www.aicte-india.org/reports/overview/Sarva-Shiksha-Abhiyan on 20th March,2019

[2]https://timesofindia.indiatimes.com/home/education/news/Will-RTE-fulfil-the-SSA-dream/articleshow/5761551.cms

2.2 Elections

In India, the Constitution allows the State Legislative Assemblies to determine the educational policies and expenditures. The states have their own education department and the districts have education offices that organize school education in the district. Although education falls into the Concurrent List - that is, matters shared between the central and the state governments, the states play a major role in educational policy. Whenever elections take place, the states and union territories are divided into single-member constituencies. The districts within a state are divided into 1-37 constituencies. A representative is elected directly by the people of the constituency by a first past the post system, and the elected representative becomes a Member of Legislative Assembly or MLA of that constituency. An MLA is elected for a term of 5 years after which the elections in a state are held again. The elections in State Legislative Assemblies do not happen together across the country and each state has its own 5 year cycle.

These MLAs have legislative, financial, and executive powers. The primary function of these MLAs is law-making, while their powers are not absolute. They can take care of matters that fall under the State List and Concurrent List. The State List consists of subjects that are of importance to the individual state such as trade, commerce, development, irrigation, and agriculture, while the Concurrent List contains items of importance to both the Union Government and the State Government such as succession, marriage, education, adoption, forests and so on.

The MLAs can impact the implementation of education policy in several ways. Firstly, in addition to the constitutional powers, they can also affect the state bureaucracy - whether it is promotions and job assignments or transfers of government-appointed officials (Asher and Novosad 2015, Iyer and Mani 2012, Krishnan and Somanathan 2013, Nath 2014, Sukhtankar and Vaishnav 2015). This allows them to play a role in the allocation of funds for several development projects and can affect access to government schemes. They can also use their political powers by mediating between the private sector and government to lobby for projects in their constituencies (Bussell 2012, Chopra 1996, Jensenius 2013).

Secondly, the government introduced an MLA Local Area Development Scheme (MLA-LADS) in 2000-01 in which the MLAs are able to recommend small development works. Under the scheme, each MLA

has the choice to suggest to the Deputy Commissioner of his/her district, every year, an allocation to be taken up in his/her constituency. Each MLA is sanctioned Rs. 2 crore per annum (about USD 270,100) for their respective constituency by the central government. The list of work allowed under this scheme includes the construction of buildings for schools, hostels, libraries, and other buildings of educational institutions belonging to the government; construction of village roads, bridges, public irrigation channels, and public drainage schemes; providing drinking water to the people in the area by digging tube-wells or other works that may help in this respect; construction of public health care buildings, public toilets, and bathrooms, footpaths, pathways and footbridges amongst other.

3 Empirical Specification

Using a regression discontinuity design, I estimate the following equation for mixed-gender elections (between the winner and 2nd runner-up; and between the winner and the next person of the opposite gender) :

$$Y_{i,t} = \alpha + \beta_1.WomanWon_{i,t} + \beta_2.MarginOfVictory_{i,t} + \beta_3.WomanWonXMarginOfVictory_{i,t} + X_{i,t} + StateFE + YearFE + \epsilon \quad (1)$$

Where:$Y_{i,t}$ is the growth in outcome variable in constituency i over the electoral term t measured as $(log(Outcome_{i,t+1}+1) - log(Outcome_{i,t}+1)) * 100$; $WomanWon_{i,t}$ is 1 if a woman wins against a man. $MarginOfVictory_{i,t}$ is the difference in share of votes received by winner and next runner-up of the opposite gender . Bandwidth considered: 10%. It is positive for women, and negative for men; $X_{i,t}$ includes constituency-year level covariates: number of electors, candidates, turnout percentage, whether the constituency was reserved for SC/ST candidates, whether the constituency is aligned with the state govt. Standard errors are clustered at the constituency level.

4 Data

4.1 Election Data

I use the Socio-Economic High Resolution Geographic (SHRUG) data set for election results of the State Legislative Assemblies. This data contains information on candidates who contested the elec-

tion, the votes received by each, winner of the election, number of electors, election year, state and constituency identifier. The data also includes information on the gender of the candidates, the party they are associated with and if the constituency for reserved for a Scheduled Caste or Tribe candidate in that particular election year. It includes elections from the year 1974 - 2018. In 2008, however, the constituency boundaries were redrawn. The fourth Delimitation Commission empowered by the Delimitation Act of 2002 had set out to redraw boundaries based on the 2001 census population data. The Commission's order was, however, only accepted in 2008. The constituencies before 2008 and after 2008 are therefore not comparable. I use only the post-delimitation elections held after 2007. Post 2007, there are 4020 unique constituencies in the states post-2008.

4.2 School-level Outcomes

I use detailed school infrastructure data from the annual census of primary and middle schools in India from the District Information System for Education (DISE). It includes information on gender and grade wise student enrolment in each school, school receipts under several education grants, classroom and building infrastructure including presence of piped water, sanitation facilities, electricity, library, a computer, boundary wall, and a playground; number of teachers by gender and qualification, among other infrastructure related information. The DISE data classifies schools by the type of management: state government, local body, private aided and unaided, central government etc. The data covers every registered Indian government primary and middle school since 2005. This data are filled in the required format by school headmasters every year. At the time of downloading the data, the data are available upto 2017-18. The data mentions the school code, village, block and district name. Post-2007, the data also includes the pincode in which the school is situated. I use variables that are present consistently across 2008-2017. In total, there are about 2,311,500 schools in all states in the country during this time period.

4.3 MLA Level Expenditure

4.4 Mapping between Schools and Constituencies

In order to conduct that analysis at the constituency level, I need to map schools to constituency. I follow several steps to do that.

The GIS location of schools was obtained from the website for school location mapping (School-GIS) and the pincode of schools were also used to geolocate schools[3]. These geocoded locations were mapped onto constituency maps obtained from Datameet (2017). I conducted several checks to improve this mapping.

First, I checked the district names from DISE matched with the district name from the constituency shapefiles. Second, I use the school-village to census village mapping data from the replication files of Adukia et al. (2020), which used a fuzzy name matching algorithm to match the villages. This data has schools in 368,533 villages (roughly half) mapped to the list of villages in the Census of India. These villages were mapped to constituencies using village- pre-delimitation constituencies matches made available by Jensenius (2015) and then matched to the post-delimitation constituency boundary using mapping made available by Raphael Susewind[4].

4.4.1 Resultant Sample

I restrict the analysis to only the 14 largest states in the country [5]. These states have 80% of the schools in the country. I am ultimately able to map 66.5% of the schools in rural areas in 93.7% of the constituencies in these states.

5 Results

5.1 Validity of RD Design

A potential concern in the RD design is that there is sorting around the cutoff, meaning that even in close elections, the probabilities of a woman or a man winning are not equal. To investigate this, Figure 1 shows the density of the margin of victory. There is no apparent discontinuity in the density around the cutoff. The figure also shows, using the McCrary test, the distribution of the margin by which a woman won is broadly similar to the distribution of the margin by which a man won in mixed-gender election.

[3] I am extremely grateful to Sourav Sarkar for sharing this mapping with me.

[4] Accessed at https://github.com/raphael-susewind

[5] These states make up for more than 90% of the total population in the country. This includes Punjab, Haryana, Rajasthan, Uttar Pradesh, Bihar, West Bengal, Orissa, Madhya Pradesh, Gujrat, Maharashtra, Andhra Pradesh and Telangana, Kerala, Tamil Nadu. Jammu & Kashmir and Assam, while being large states are excluded from the analysis, since the constituency shapefiles corresponded to old constituency boundaries.

The validity of an RD design requires the continuity of predetermined characteristics of constituencies around the threshold of a zero victory margin. I use a rich set of variables determined during the election year t as well as during the year before the election. These include changes in the number of schools built in the year t-1, having an incumbent win the election, and whether a woman was in power in t-1 or not. I also look at the number of candidates, number of electors, voter turnout, and whether the seat is reserved for a Scheduled Caste or Scheduled Tribe candidate in year t. Figure 2 shows graphically the validity of this continuity assumption. For instance, 3(g) shows the plot of change in the number of schools in the previous electoral term against the margin of victory in t. The scatter plot depicts the local averages of change in the number of schools in each successive interval of the margin of victory. The linear polynomial curve is estimated using a uniform kernel is shown. The average change in the number of schools in the previous electoral term is a continuous function of the margin of victory, as the discontinuity is not statistically significant. Similarly, I find balance in other constituency characteristics. This suggests that only the gender of the legislature changes abruptly at zero margin of victory and therefore, the regression discontinuity design can be taken as identifying the causal impact of electing a woman legislature on school infrastructure.

5.2 School Level Outcomes

I look at the growth in schools during the electoral tenure of the leaders. In Figure 3, I show the discontinuity in the outcomes around the cut-off and the sensitivity of the estimates to varying bandwidth. A priori, I find that in constituencies where women are elected, there is a higher growth in the number of schools built during their constituencies. I show that these results are robust to varying bandwidths between 5 and 25. However, these estimates do not account for the state and year-fixed effects. In my preferred specification, I include the state and year fixed effects.

As shown in Table 1, I find that the growth in the number of schools in constituencies where a woman won narrowly against a man is not significantly different from the number of schools built during the electoral tenure of the men who narrowly won against a man. This result holds despite accounting for constituency level and other candidate-level characteristics.

Next, I check for the long-run gender gap in primary and upper primary enrolment in the schools that were built during the women's electoral tenure. While the average gender gap in primary and upper

primary enrolment in the new schools as of 2017 is negative (more boys than girls), the difference between schools built in women's and men's constituencies is negligible.

These results are also robust to expanding the sample to include not just the mixed-gender elections with the winner and the runner-up, but looking at the margin of victory between the first woman(man) and the next mixed-gender runner-up.

5.3 Mechanisms - Political Agency and Fiscal Capacity

Despite the expansive literature suggesting that women have a preference for education-related expenditure, I find that there is no difference in the education infrastructure investments in constituencies where women are elected, as compared to those where men are elected. To explore the plausible channel that might explain this null result, I use detailed project-level expenditure data for all MLAs elected in two states of the country - Karnataka and Orissa. Under the MLA-Local Area Development Fund, the MLAs can request funds from the State to fund small development projects in their constituencies. Each MLA is entitled to INR 2 crores (approx 0.2 million USD) annually.

I use the project-level data in rural Karnataka and Orissa to explore the differences in spending between male and female politicians elected in these states. As shown in Tables 4 and 5, overall women get 30 fewer projects funded as compared to all other male politicians. While the sample is underpowered to pick any significant differences, it is interesting to note that women allocate more projects towards education as compared to men. While men invest 3% of their projects in education, women invest 6% of their projects in education. Further, for all the projects that are funded, in absolute terms, women get less amount sanctioned for these projects by approximately 60,000 USD overall, and get 8000 USD less for education-related projects as compared to male politicians. These descriptive results shed some light on the lower political agency of women in channelizing funds into their constituencies as compared to men. This might be a key reason behind female politicians not being able to influence policy implementation in their constituencies as per their preferences. These results are in line with the findings of Purohit (2023) who did a survey of bureaucrats in India and finds that they perceive female politicians to have low competence and low mobilization capacity, which leads to female politicians finding lower assistance from bureaucrats for policy-related requests.

6 Conclusion

With an increasing number of women in politics and leadership positions, there is a growing amount of research looking at the impact of women politicians and leaders on policy decisions. Several political economy models argue that the preference of politicians varies by gender and they matter especially when policy commitment is lacking. Participation of women in politics is known to bring in more pro-social, redistributive, and welfare-improving policies, especially for children in terms of their health and education outcomes. In developing countries, there are large gaps in education access and attainment, especially by gender, which are bad for optimal productivity levels and skill allocation. Several studies have hypothesized that as female politicians gain power, these gaps may narrow because of varied mechanisms like the role model effect, or the public expenditure channel. While this seems theoretically reasonable, the empirical evidence is mixed. Most studies also exist in settings where budget constraints may have limited the scope for key improvements in the school environment that may (disproportionately) benefit girls.

Using a regression discontinuity design, I find that constituencies where a female leader is narrowly elected against a man, do not see any differences in school construction compared to constituencies where a female leader narrowly lost to a man. Using detailed community development project expenditure data by these leaders from two states in the country, I find descriptive evidence that, on average, female leaders get a lower number of community development projects sanctioned than male leaders. They also get less money approved for these projects. This may be suggestive of the lower political agency of women. These results extend the narrative on women's performance in competitive and male-dominated environments.

7 Tables

Table 1: Growth in Schools

	(1)	(2)	(3)	(4)	(5)
Woman Won	0.868	0.880	0.910	0.973	1.226
	(1.091)	(1.050)	(1.044)	(1.047)	(1.178)
Vote Margin	0.054	0.034	0.039	0.032	0.055
	(0.072)	(0.074)	(0.075)	(0.074)	(0.088)
Woman Won × Vote Margin	-0.243	-0.251	-0.258	-0.252	-0.310
	(0.187)	(0.190)	(0.188)	(0.188)	(0.210)
Observations	383	383	383	383	328
Constituency Char.	No	Yes	Yes	Yes	Yes
Incumbent	No	No	Yes	Yes	Yes
Party Alignment	No	No	No	Yes	Yes
Candidate Char.	No	No	No	No	Yes

Standard errors are clustered at constituency level. These specifications include State and Year fixed effect. Mean growth is 4.651 Mean growth for men is 4.236. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 2: Gender Gap in Primary Enrolment

	(1)	(2)	(3)	(4)	(5)
Woman Won	-0.001	-0.002	-0.001	-0.002	-0.007
	(0.056)	(0.056)	(0.056)	(0.055)	(0.063)
Vote Margin	-0.002	-0.004	-0.004	-0.003	-0.003
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)
Woman Won × Vote Margin	0.003	0.006	0.006	0.006	0.006
	(0.014)	(0.014)	(0.014)	(0.014)	(0.015)
Observations	273	273	273	273	236
Constituency Char.	No	Yes	Yes	Yes	Yes
Incumbent	No	No	Yes	Yes	Yes
Party Alignment	No	No	No	Yes	Yes
Candidate Char.	No	No	No	No	Yes

Standard errors are clustered at constituency level. These specifications include State and Year fixed effect. Mean growth is -0.244 Mean growth for men is -0.237. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 3: Gender Gap in Upper Primary Enrolment

	(1)	(2)	(3)	(4)	(5)
Woman Won	-0.068	-0.063	-0.084	-0.034	-0.141
	(0.319)	(0.310)	(0.320)	(0.296)	(0.356)
Vote Margin	-0.046	-0.050	-0.053	-0.055	-0.072
	(0.039)	(0.040)	(0.041)	(0.042)	(0.047)
Woman Won × Vote Margin	0.076	0.083	0.088	0.088	0.101
	(0.052)	(0.056)	(0.060)	(0.059)	(0.065)
Observations	247	247	247	247	213
Constituency Char.	No	Yes	Yes	Yes	Yes
Incumbent	No	No	Yes	Yes	Yes
Party Alignment	No	No	No	Yes	Yes
Candidate Char.	No	No	No	No	Yes

Standard errors are clustered at constituency level. These specifications include State and Year fixed effect. Mean growth is -0.045 Mean growth for men is 0.046. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 4: Number of development activities

Activity	Overall	Men	Women	Diff
All projects	143.356	144.547	115.333	29.213
	(6.884)	(7.059)	(30.661)	(34.829)
Community	24.231	24.867	9.267	15.600
	(2.333)	(2.417)	(5.286)	(11.789)
Roads	29.739	29.754	29.400	0.354
	(2.202)	(2.204)	(15.602)	(11.152)
Religious	8.861	8.844	9.267	-0.422
	(1.068)	(1.103)	(3.715)	(5.410)
Education	5.130	5.088	6.133	-1.046
	(0.413)	(0.412)	(2.985)	(2.089)
Water	5.546	5.680	2.400	3.280
	(0.626)	(0.650)	(1.253)	(3.167)
Electricity	0.617	0.606	0.867	-0.260
	(0.141)	(0.145)	(0.608)	(0.713)
Transportation	1.948	1.943	2.067	-0.123
	(0.219)	(0.224)	(1.071)	(1.109)
Sanitation	0.598	0.592	0.733	-0.141
	(0.102)	(0.104)	(0.597)	(0.519)
Sports	0.318	0.329	0.067	0.262
	(0.070)	(0.073)	(0.067)	(0.355)
Agriculture	0.182	0.164	0.600	-0.436**
	(0.036)	(0.032)	(0.476)	(0.182)
N	368	353	15	368

These categories are not mutually exclusive.

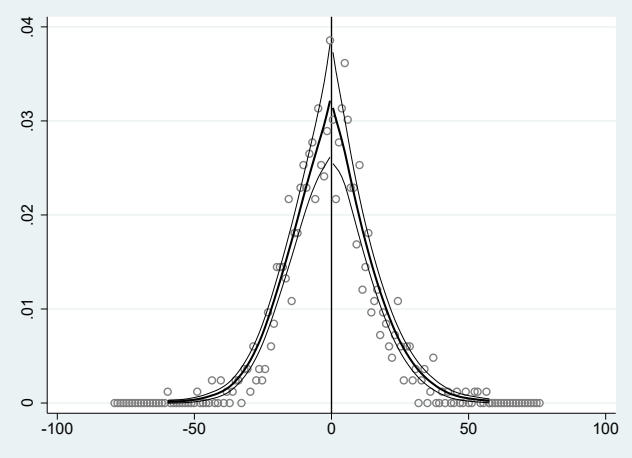
Table 5: Amount sanctioned for development activities (measured in 10,000 USD)

Activity	Overall	Men	Women	Diff
All projects	35.780	36.034	29.803	6.232
	(1.189)	(1.200)	(7.380)	(6.012)
Community	7.868	8.041	3.803	4.238
	(0.614)	(0.632)	(2.231)	(3.100)
Roads	11.987	11.974	12.288	-0.314
	(0.874)	(0.873)	(6.398)	(4.427)
Religious	2.851	2.803	3.965	-1.162
	(0.252)	(0.253)	(1.695)	(1.274)
Education	1.996	2.002	1.853	0.148
	(0.168)	(0.172)	(0.792)	(0.852)
Water	1.887	1.931	0.852	1.079
	(0.200)	(0.207)	(0.485)	(1.012)
Electricity	0.153	0.153	0.151	0.002
	(0.029)	(0.030)	(0.104)	(0.146)
Transportation	0.666	0.656	0.892	-0.235
	(0.077)	(0.077)	(0.461)	(0.387)
Sanitation	0.196	0.199	0.145	0.054
	(0.038)	(0.039)	(0.109)	(0.191)
Sports	0.124	0.129	0.009	0.120
	(0.032)	(0.033)	(0.009)	(0.162)
Agriculture	0.062	0.054	0.255	-0.201***
	(0.013)	(0.010)	(0.191)	(0.063)
N	368	353	15	368

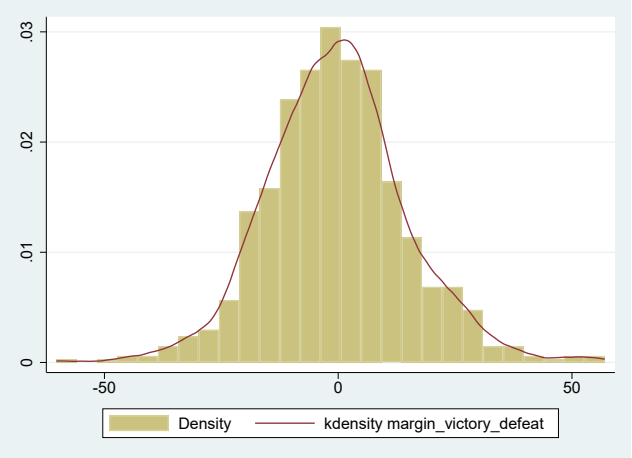
These categories are not mutually exclusive.

8 Figures

Figure 1: Density of the Forcing Variable



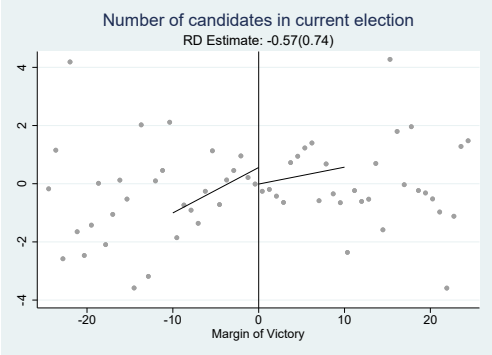
(a) McCrary Density Test



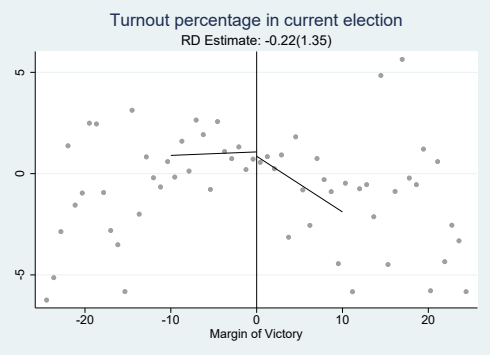
(b) Density of Victory Margin

These figures plot the density of the margin of victory, which is the difference between the vote shares of the top two female and male candidates in close elections. This margin is positive for elections where a woman won, and negative where a man won. The discontinuity is -.02 (with a standard error of 0.05)

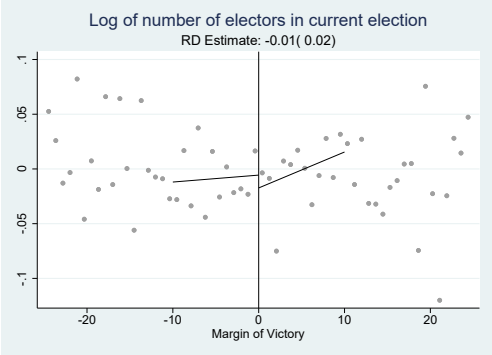
Figure 2: RD Validity: Continuity Checks



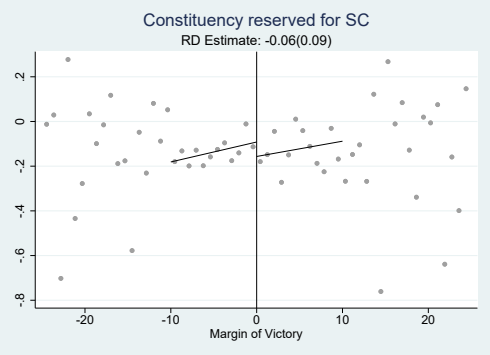
(a)



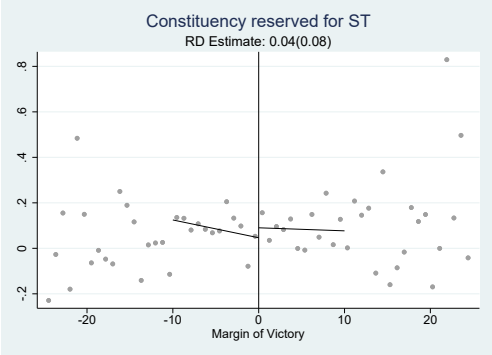
(b)



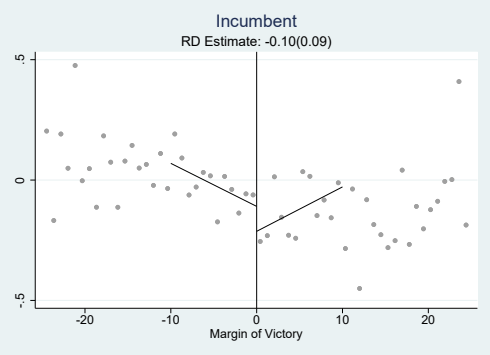
(c)



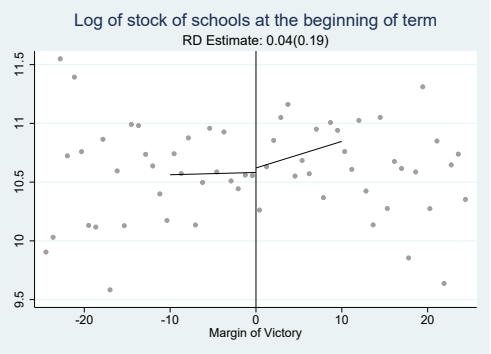
(d)



(e)



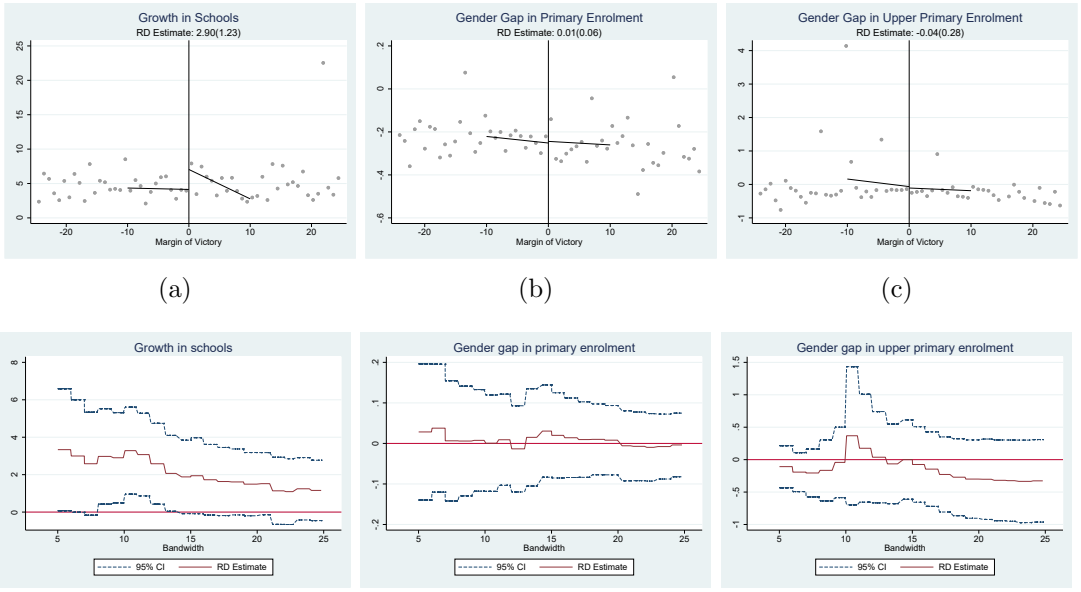
(f)



(g)

These plots show the continuity in the residualized variable against the margin of victory for females in close elections, using a linear fit and a bandwidth of 10. The residuals are calculated for each variable using an OLS regression of the variable on state and year fixed effects.

Figure 3: Reduced Form - Education Outcomes



The dependent variable, or the Y axis, is the growth in the number of schools or growth in the gender gap in primary (grades 1-5) and upper primary (grades 6-8) enrolment. The margin of victory is the difference between the number of votes earned by the first and second runner-up in mixed-gender elections. By construction, in elections where a female politician wins against a male politician, the margin of victory is positive and negative if she loses. The specification used for these figures do not include the state and year fixed effects, adding which, the magnitude of the effect in growth in schools decreases and is in line with the results in Table 1, and the impact is not significantly different from 0.

9 Appendix Tables- Mixed Gender Elections

Table 6: Growth in Schools - Mixed Elections

	(1)	(2)	(3)	(4)	(5)
Woman Won	0.554	0.607	0.634	0.690	1.068
	(1.085)	(1.060)	(1.053)	(1.053)	(1.174)
Vote Margin	0.106	0.084	0.086	0.081	0.086
	(0.076)	(0.074)	(0.074)	(0.074)	(0.084)
Woman Won × Vote Margin	-0.294	-0.295	-0.298	-0.295	-0.323
	(0.185)	(0.182)	(0.181)	(0.182)	(0.198)
Observations	414	414	414	414	350
Constituency Char.	No	Yes	Yes	Yes	Yes
Incumbent	No	No	Yes	Yes	Yes
Party Alignment	No	No	No	Yes	Yes
Candidate Char.	No	No	No	No	Yes

Standard errors are clustered at constituency level. Mixed Elections include elections in which I consider the vote difference between woman(man) winner to the next man(woman) candidate who was not necessarily the second runner-up. These specifications include State and Year fixed effect. Mean growth is 4.735 Mean growth for men is 4.447. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 7: Gender Gap in Primary Enrolment - Mixed Elections

	(1)	(2)	(3)	(4)	(5)
Woman Won	-0.006	-0.010	-0.009	-0.012	-0.016
	(0.054)	(0.053)	(0.053)	(0.053)	(0.060)
Vote Margin	-0.002	-0.003	-0.003	-0.002	-0.003
	(0.005)	(0.006)	(0.006)	(0.006)	(0.007)
Woman Won × Vote Margin	0.002	0.005	0.005	0.004	0.007
	(0.013)	(0.013)	(0.013)	(0.013)	(0.015)
Observations	298	298	298	298	254
Constituency Char.	No	Yes	Yes	Yes	Yes
Incumbent	No	No	Yes	Yes	Yes
Party Alignment	No	No	No	Yes	Yes
Candidate Char.	No	No	No	No	Yes

Standard errors are clustered at constituency level. Mixed Elections include elections in which I consider the vote difference between woman(man) winner to the next man(woman) candidate who was not necessarily the second runner-up. These specifications include State and Year fixed effect. Mean growth is -0.239 Mean growth for men is -0.228. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Table 8: Gender Gap in Upper Primary Enrolment - Mixed Elections

	(1)	(2)	(3)	(4)	(5)
Woman Won	-0.080	-0.083	-0.102	-0.058	-0.153
	(0.301)	(0.290)	(0.300)	(0.275)	(0.340)
Vote Margin	-0.038	-0.040	-0.041	-0.042	-0.065
	(0.033)	(0.034)	(0.035)	(0.034)	(0.042)
Woman Won × Vote Margin	0.067	0.073	0.076	0.074	0.100*
	(0.045)	(0.049)	(0.050)	(0.050)	(0.059)
Observations	271	271	271	271	230
Constituency Char.	No	Yes	Yes	Yes	Yes
Incumbent	No	No	Yes	Yes	Yes
Party Alignment	No	No	No	Yes	Yes
Candidate Char.	No	No	No	No	Yes

Standard errors are clustered at constituency level. Mixed Elections include elections in which I consider the vote difference between woman(man) winner to the next man(woman) candidate who was not necessarily the second runner-up. These specifications include State and Year fixed effect. Mean growth is -0.054 Mean growth for men is 0.025. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

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