Are Female Leaders Good for Education? Evidence from India.*

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Abstract

This paper studies the impact of a politician's gender on the educational achievements of a representative sample of Indian citizens aged 13-39 in 1999/2000. For this purpose I collected a unique and detailed dataset on politicians in India who contested in elections between 1967-2001 and I matched them to individuals by district of residence. These data allows me to identify close elections between women and men, which yield quasi-experimental election outcomes used to estimate the causal effect of a politician's gender. I find that increasing female political representation by 10 percentage points increases the probability that an individual attains primary education in urban areas by 6 percentage points, which is 21% of the difference in primary education attainment between the richest and the poorest Indian states.

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1 Introduction

This paper studies the impact of a politician's gender on the educational achievements of a representative sample of Indian citizens aged 13-39 in 1999/2000. The motivation behind the paper is twofold. First, education is very important for growth in developing countries; in light of this, the Millennium Development Goals want to ensure universal primary education by 2015. India accounts for more than one third of the world's poor and it has very low educational attainments. The adult literacy rate in 2003 was 61%, roughly the same as that in Sub-Saharan Africa, an area which is 1.5 times poorer. Moreover, the female literacy rate was 47%, lower than the 52% observed in Sub-Saharan Africa (Human Development Report 2005). Educational differences are not only large across genders, but across states and rural/urban areas.

Education is mainly provided by the government, which can increase levels of education by implementing appropriate policies. Therefore, given that political institutions are key for education and are formed by different types of politicians, it is important to understand whether some characteristics of these politicians determine the type of policies applied.

Second, it is important to study whether a politician's gender does make a difference. The issue of female political representation has been increasingly important in India. In fact, reservation for women both in the national and the states' governments has been debated since 1996, even if it has already started in local governments. According to citizen-candidate models (Besley and Coate 1997 and Osborne and Slivinski 1996), the legislator's identity matters for policy determination. The evidence from developed countries shows that female and male legislators make different policy decisions.[1] In a traditional society like India's, where gender roles are very different, these roles are likely to shape women's preferences and therefore lead to different behaviour once in government.

To assess whether a politician's gender matters for educational outcomes I collected a detailed dataset on 29686 politicians who contested seats in the 16 biggest states in India during 1967-2001. I combine these data with NSS survey data to estimate the impact on an individual's primary school attainment of the gender of the politicians who were

[1] For example, see Thomas (1991), Thomas and Welch (1991), Case (1998 & 2000), Besley and Case (2000 & 2002) and Rehavi (2003) for the US and Svaleryd (2002) for Sweden.

in power in his or her district in India when he or she was young. The district is the best unit of analysis because it allows me to estimate the effect of female politicians in the smallest possible area where their electoral constituency is located. Moreover, given that Indian districts are the lower level of administration and have educational offices, legislators in a particular district could also direct funds to these offices, having an impact not only on their constituencies but on the overall district.

The key challenge is to identify empirically the causal effect of female politicians on an individual's education. This is difficult because omitted variables are likely to affect both electoral outcomes and policy. To identify the effect of female representation I instrument the share of constituencies in the district won by a female politician with the share of constituencies in the district won by a female politician in a close election against a male politician. Close elections are defined as those in which the winner led the runner-up by very few votes. The instrument is valid because the fact that a male or a female candidate won in a close election can be considered to be largely random, and therefore female candidates who won in a close election against a man will be elected in similar constituencies and under similar circumstances as male candidates who won in a close election against a woman.

I find that the politician's gender matters for educational achievements. In particular, primary educational attainment is higher in urban areas when female political representation is higher. In contrast, female representation does not have an effect on individuals living in rural areas. Increasing female political representation by 10 percentage points increases the probability that an individual attains primary education in urban areas by 6 percentage points, which is 21% of the difference in primary education attainment between the richest and the poorest Indian states.

The identification strategy allows me to estimate the causal effect of female representation. To the extent that female politicians may belong to higher classes than male politicians, the estimated effect of gender might capture the effect of class as well as gender. To address this concern I exploit an institutional feature of Indian elections that reserves some seats for Scheduled Castes and Scheduled Tribes (SC/ST), the most disadvantaged group in India. By looking separately at SC/ST and female legislators in non-reserved[2] seats I can then control for the fact that female politicians may belong

[2] These are called "general seats". I will use this terminology from now on in the paper.

to higher classes than male politicians. I find that SC/ST female politicians have a positive effect on the education received by individuals living in urban areas, but not in rural areas. Since they come from a more disadvantaged background than general female legislators, this confirms that the results obtained are due to gender, not to class differences.

One may expect that female legislators belonging to the party that won most of the seats could have more bargaining power than the rest. When dividing female legislators according to whether they belong to the party in power in the legislature or not I find that those in the party that has the majority of seats are the ones who have the strongest effect.

Results are consistent with the citizen candidate model, since a politician's identity, here defined by gender, has an impact on policy. If female politicians care about women's needs, education will be more important for women in urban areas, since the returns to education, proxied by the wage differentials between educated and non-educated women are higher there. Moreover, in urban areas it will be easier for them to find employment in the non-agricultural sector, where their skills are required. Men can benefit from education both in urban and rural areas, since wage differentials between educated and non-educated men are similar in rural and urban areas and they may have higher mobility to move to urban areas in search of non-farm employment. According to this, female politicians will invest more in education in urban areas, while male politicians will invest both in rural and urban areas. This can explain why female representation matters in urban but not in rural areas.

This paper brings together two strands of the literature, the literature on the determinants of education and the literature on the identity of the legislator. There is a large amount of literature on education. It focuses on the evaluation of policies related to an increase in the number of teachers and educational inputs (Banerjee et al 2004 and Chin 2002), or on the impact of different household, labour market, village and school characteristics on educational attainment (Dreze and Kingdon (2001)). Other papers focus on the impact of traditional institutions on education: Munshi and Rosenzweig (2005) study how a traditional institution like caste affected schooling choices in the 1990's, Pandey(2005) shows how in villages in North India with a history of elite control teacher's and student's performances are lower, while caste reservation in the village did not seem to reverse it. This paper complements the literature on education in developing

countries by studying whether the gender of the politicians who decide the educational policies in India has an impact on educational outcomes.

The existing literature on the identity of the legislator in India focuses on the effect of different reservation policies and shows that the identity of the legislator matters for policy determination. Chattopadhay and Duflo (2004) show how the reservation of one third of the seats for women in Panchayats (local rural self-government) of West Bengal and Rajasthan has a positive impact on investment in infrastructure relevant to women's needs. Pande (2003) analyses how the reservation of seats for scheduled castes and scheduled tribes in the State Assemblies increases the volume of transfers that these groups receive. This paper complements this literature by studying the effect on educational outcomes of variation in female political representation due to electoral outcomes rather than reservation policies and by focusing on politicians who contested seats in the State Assemblies between 1967 and 2001.

The remainder of the paper is organized as follows: Section 2 explains the institutional context, the theoretical background and describes the data used. Section 3 explains the identification strategy used. Section 4 shows the results obtained and Section 5 discusses the results obtained and concludes.

2 Background and Data

2.1 Political Organization

India is a federal country, and the constitution gives the States and Union Territories significant control over their own government. The State Legislative Assemblies are directly elected bodies set up to carry out the administration of the government in the 25 States of India. In some states there is a bicameral organization of legislatures, with both an upper and lower house. However, the lower house (Legislative Assembly) takes the final decisions.

The State Legislative Assemblies are those that mainly decide on educational policies and the expenditure devoted to education. They have Education Departments, which are administrative bureaucracies to control and implement these activities. Article 246 of the Constitution gives the Legislature of any State powers to make laws dealing with educational issues. Even though education falls into the Concurrent List (matters shared

between the central and the state governments), the state government plays the major role in educational policy, particularly at the primary and secondary levels.

India is a parliamentary democracy. The States and Union Territories are divided into single-member constituencies where candidates are elected in first-past-the-post elections. The boundaries of assembly constituencies are drawn to make sure that there are, as near as practicable, the same number of inhabitants in each constituency. The assemblies vary in size, according to population. The districts are the administration unit at the lower level from the state. Each one includes between one and 37 constituencies. The median district contains 9 electoral constituencies. The voting system in India is based on the principle of universal adult suffrage, and any Indian citizen who is registered as a voter and is over 25 years of age is allowed to contest elections for the State Assemblies.

The 1950 Indian constitution provides for political reservation for Scheduled Castes and Scheduled Tribes. According to articles 330 and 332 of the constitution, prior to every national and state election, a number of jurisdictions will be reserved for these population groups. Both Scheduled Castes and Scheduled Tribes tend to be socially and economically disadvantaged, and they constitute about 25% of the total population in India. Scheduled Tribe (ST) seats are reserved according to the concentration of ST population in that particular constituency. Scheduled Caste (SC) seats are reserved according to two standards: the concentration of SC population and the dispersal of reservations in a given state.[3]

In September 1996, the Government introduced a parliamentary bill that proposed the reservation of one third of the seats for women in the Central Government and the State Assemblies. Since then, this proposal has been widely discussed in several parliamentary sessions, without an agreement being reached. Women in India are under-represented in all political positions. Between 1967 and 2001 in the 16 main states at most 14% of the general seats and 24% of the seats reserved for Scheduled Castes and Tribes in the State Assemblies were won by a woman in a given year and state. In Figure 1 I plot the fraction of seats in each state won by women between 1967 and 2001. This figure shows significant differences across states on both the levels and trends of female representation, which provides the variation exploited in the empirical analysis.

[3]There has almost never been a case in which a SC/ST legislator won a non-reserved seat. Thus, knowing whether a seat is reserved or not one can know the caste of the legislator who wins that seat.

2.2 Theoretical Background

In political economy models where candidates can commit to implement specific policies when elected and only care about winning the elections, political decisions should only reflect the electorate's preferences. (Downs (1957)). If this were the case, female political representation would not matter for policy outcomes, since equilibrium policies would follow the preferences of the median voter. Thus, as long as women could vote in the elections, their preferences would be represented by the candidate elected, irrespective of this candidate's gender. Nevertheless, in the absence of complete policy commitment the identity of the legislator matters for policy determination. (Besley and Coate (1997)) and Osborne and Slivinski (1996)) show how increasing a group's political representation would increase its influence in policy.

Individual legislators are elected in single-member constituencies. They belong to different political parties, but represent the interest of the constituencies in which they were elected in the State Assembly. India has been characterized by a multiparty electoral system, the party who won more seats in the legislature being the one that forms government, with or without other parties in the coalition.

Several models explain why legislators direct funds to his or her own constituency and why individual legislators may have preferences towards the type of policies applied in their constituencies. Alesina (1988) shows how different parties may have different preferences because they represent different constituencies and care about being elected and about the policies they will implement once elected in their constituencies. Persson et al (2000) compare a parliamentary regime with a presidential-congressional regime and show how in a parliamentary regime, if all agents are self-motivated, citizens delegate their decisions to their representatives and political candidates cannot commit to policy platforms before the elections, there will be more redistribution and public goods provision towards the citizens represented by the coalition in government. In fact, they show how, as legislators value holding office, the threat of being voted out makes them perfect delegates for their constituencies. However, their power to do so will depend on their bargaining power in the legislature.

In a similar spirit, Grossman and Helpman (2005) show how there may be conflicts of interest between political parties and individual legislators. Once their party is in power, individual legislators will want to provide public goods to their constituents,

independently of the promises made by their political party. The extent of this will depend on the degree of party discipline. According to this, both female and male politicians may want to direct funds to their own constituencies, independently of what was promised by their party. It is plausible to assume that Indian political parties will face costs of enforcing "party discipline", implying that individual legislators may have the power to implement their policies in their constituencies, especially if they are part of the parties with more power in the legislature. However, if female legislators also have different preferences from male legislators, then the type of expenditures and policies they will conduct will be different.

Thus, politicians in India will have incentives to provide public goods or expenditure to their constituencies. According to this, female politicians may have an impact on the education received in their constituency and possibly as well in the whole district. This is the case because, given that Indian districts usually have education offices, these politicians could keep in close contact with these offices and influence the way expenditures are made there. They could also decide to transfer more funding to one district, in particular if their constituency is located there.

2.3 Data

The empirical analysis focuses on the relationship between the education received by an individual and the identity of the politicians who were in power in his or her district when he or she was young. In this section I will describe the data used and how I combined different data sources.[4]

2.3.1 Electoral Data

I use a very detailed dataset I collected on the State Legislatures in India during the period 1967-2001 from the reports published by the Election Commission of India. I collected data at the constituency level of the candidate who won, his or her gender and political party. I also collected data on all female candidates who contested for election, their political parties and the votes they obtained. For those women and men who won against a candidate of the other gender, I have data on who was the runner-up in each

[4] For more detailed information on the variables used and the data sources see the data appendix.

particular election and the votes obtained by him/her. Overall I have information on 29686 politicians who contested on the 16 main States during the period 1967-2001.[5]

Each one of these candidates was elected in a single-member constituency and then occupied a seat in the State Legislative Assembly. Given that each district has from 1 to 37 electoral constituencies, each district will have from 1 to 37 representatives in the Assembly.

Table 1 provides descriptive statistics on the political variables used in this study. It includes information on the proportion of seats won by women, both in general and in SC/ST seats, the proportion of reserved seats and the proportion of seats won by each political party, as well divided by gender.[6] It also gives information on the fraction of seats won by women belonging to the party that had the majority of seats in the state and those who did not. For those districts in which women were elected, I provide information on the proportion of constituencies in the district won by women in close elections against men and the proportion of constituencies that had close elections between women and men. Information on general and SC/ST female politicians who won in close elections against men is also provided, together with the fraction of constituencies won by the different parties disaggregated by gender.

Descriptive statistics show how female representation has been low over the time period under consideration: around 4% of the seats per district and electoral year. Around 24% of seats are reserved for Scheduled Castes and Tribes and female representation in reserved seats is also low: around 4% of them are won by women. In addition, over this time period Congress parties are those who have held most of the seats, followed by Janata, Hindu and Regional Parties. Within districts in which women won the elections, the majority of both women and men who won were from the Congress

[5] These 16 states account for more than 90 per cent of the total population in India, about 935 million people. They are Andhra Pradesh, Assam, Bihar, Gujarat, Haryana, Jammu & Kashmir, Karnataka, Kerala, Madhya Pradesh, Maharashtra, Orissa, Punjab, Rajashtan, Tamil Nadu, Uttar Pradesh and West Bengal.

[6] There are eight main party groups: Congress, Hard Left, Soft Left, Janata, Hindu, Regional, Independent candidates and other parties. Congress parties include Indian National Congree Urs, Indian National Congress Socialist Parties and Indian National Congress. Hard Left parties include Communist Party of India and Communist Party of India Marxist Parties. Soft Left parties include Praja Socialist Party and Socialist Party. Janata parties include Janata, Lok Dal, and Janata Dal parties. Hindu parties include the Bharatiya Janata Party. Regional parties include Telegu Desam, Asom Gana Parishad, Jammu & Kashmir National Congress, Shiv Sena, Uktal Congress, Shiromani Alkali Dal and other state specific parties.

party, followed by Janata, Hindu and regional parties. Thus, female politicians are not disproportionately representing a particular party and all parties had female candidates winning seats.

2.3.2 NSS Data

I combine this dataset with data from the 55th round of National Sample Survey (NSS). This is a nationally representative household survey that provides information at the household and the individual level. The survey was conducted in India between July 1999 and June 2000 on a sample of randomly selected households.

I use the Employment and Unemployment schedules of the 55th round of the NSS. They contain information on 596688 individuals, 371188 in rural areas and 225500 in urban areas.[7]

The NSS gives information on personal characteristics such as religion, gender and whether the individual belongs to the Scheduled Castes or Tribes. It also gives information on whether the individual migrated from another area, her employment status, and district of residence. It also provides information on the individual's educational attainment. I use this to create a variable that is equal to one if the individual obtained primary or a higher level of education through formal education.[8]

Panel A in Table 2 gives descriptive statistics on some characteristics of the individuals in the sample used, classified by urban/rural status. There is data on the number of men, women, SC/ST individuals, the fraction of individuals who obtained at least primary education disaggregated by gender, and the fraction of Hindu and Muslim individuals. While 43.9% of women and 63.9% of men living in rural areas completed primary education, in urban areas they are 75.5% and 79.8% respectively. Thus educational attainment is much lower in rural areas, and gender differences are much larger there.

[7] The NSS uses the Indian Census definition of urban and rural areas.

[8] I then only consider individuals who attended formal education courses in my sample. Those who obtained education as adults are then considered as non-educated since they did not pass the primary standard examination when they were young. Nevertheless, there are only 987 individuals in these category, and results do not change after dropping these individuals from the sample.

2.3.3 Combining Data Sources

Since the NSS data provides information on individual's residence up to the district level only and politicians are elected in constituencies, to merge the two datasets I have aggregated the electoral data up to the district level.

This is not a trivial task. In order to know which constituencies are included in each district for each electoral year between 1967 and 2001, I looked at different constituency delimitation orders and the publications "State Elections in India", which lists the constituencies that are included in each district for each election. Once I had the list of constituencies in each district for each electoral year I had to take into account that some districts have split, have been newly created or have disappeared during the time period under consideration. I then used the 1991 census district definition and I only included those districts that did not split or disappear. As well, I did not consider those districts which were newly created between 1967-2001 and those which include constituencies belonging to another neighboring district at the same time.[9] In this way, I aggregated all the data into districts. This procedure allowed me to have information on 276 districts, that include around 2761 electoral constituencies.[10]

I merge these two datasets by the district of residence and by the year in which each individual started primary school[11]. Thus, using information on the year each individual was born and his or her district of birth I can know which politicians where in power before he or she started primary school.

Since an individual who migrated from another district after this age will not have benefited from the educational policies applied in the district of destination, I eliminate those who migrated after schooling age from another district, state or country from the sample. I also eliminate those who migrated from rural to urban areas or vice versa within the same district, since educational policies may be different in rural than in urban areas.[12]

[9] Some constituencies straddle a district bound.

[10] There are around 463 districts in the 16 biggest states in India.

[11] I consider it to be 6 years of age. The NSS provides information about an individual's age and the time the individual was interviewed. Since the individual could have been sampled either in 1999 or 2000 and this sample year is given by the NSS, I take this into account when I compute the age at which an individual started primary school.

[12] Even if migration in India is generally low, migration is higher for women, especially because sometimes they move outside their district to get married.

Since primary school lasts four or five years depending on the state of residence and individuals usually start schooling at the age of six, I restrict the sample to those individuals who are older than 13 at the time of the survey, to allow for differences in states and for individuals having to repeat entire years and thus finishing late.

The resulting sample size is 105208 individuals. The availability of political data allows me to include in the sample only individuals born after 1964. Thus, I can perform a cohort analysis in which individuals in each cohort will have lived in different districts and thus, since politicians change over district and over time, will have been exposed to different politicians.

To each one of the individuals in the sample I assign the politicians who were in power during the three years before he or she started primary education. Panel A in Table 3 gives an example how the data is organized: individual 1, who lives in district A and was born in 1964, should have started primary education in 1970, which means that the politicians in his district that could have had an effect on his or her education will be those in power between 1967 and 1969, before he or she started primary education. Thus, I take averages of the political variables between 1967 and 1969.

3 Identification

3.1 Identification Strategy

The key identification challenge is to estimate the causal effect of a politician's identity on education, by separating this effect from the effect of unobservables that drive both education and female representation. To illustrate this, assume that one estimates the equation:

$$Y_{idt} = \alpha + \beta F_{dt} + \varepsilon_{idt}$$

Where Y_{idt} is the educational outcome for individual i, living in district d and born in cohort t. F_{dt} is the fraction of constituencies in the district held by female politicians during the three years before individual i started primary education. Then, the coefficient β would not be consistently estimated by OLS if there is an omitted variable Q_{dt}, not included in the model and correlated with F_{dt}.

Politicians in a given district and year are elected by the population in their constituencies. Thus, the fact that a woman or a man wins the election in a given seat cannot be considered a random event as it is determined by the electorate's preferences. The omitted variable could be electoral preferences in the district, that may be correlated both with female political representation and with educational attainments in the district. Even if district fixed effects are included in the regression, these control only for permanent differences across districts in female representation and the outcome variables. One can not rule out the fact that the omitted variable Q_{dt} may be district-specific and change over time.

To identify the causal effect of female politicians I use as an instrument for female representation the fraction of constituencies in the district won by a woman in a close election against a man. Close elections are elections in which the vote difference between the winner and the runner up is very small.[13] The reason why the instrument is valid is that female candidates who barely win the elections against a man do it in constituencies where there is no clear "preference for female politicians". This constituencies will be ex ante comparable to constituencies in which male candidates win in a close election against a woman. If we consider that the last few votes received by both candidates are random, both the female and the male candidates could have won the elections and, thus, the fact that the female candidate won the seat instead of the male is random as well. In other words, constituencies in which a woman won in a close election against a man and constituencies in which a man won in a close election against a woman will be similar in all the unobservables, they will only differ in the fact that by chance either a man or a woman won the election. The fact that a candidate is elected in first-past-the-post elections held in single-member constituencies is a function of the vote difference between the winner and the runner up. This function has a discontinuity when the vote difference is zero; this is the case because the winner has to receive more votes than the runner up in order to win the election. Thus, the fact that the candidate is elected or not changes discontinuously as this vote difference is zero. In elections in which the winner and the runner up have different genders, as the vote difference becomes smaller and approaches the discontinuity, constituencies in which the vote difference is very

[13] The identification strategy used in this paper follows the same idea as the regression discontinuity approach. This methodology was first used in the context of elections by Lee(2001) for incumbency advantage and Pettersson-Lidbom(2001) for the effect of party control on fiscal policies. Rehavi (2003) uses a very similar approach, using close elections between women and men in the US.

small and a woman won will be more and more similar to constituencies in which the vote difference is very small and a man won. Thus, this discontinuity at the zero vote difference will provide a randomized treatment. Since I consider elections in which the winner and the runner up have different genders, when the difference in votes is very small the winner's gender will be randomized. I define close elections as elections in which the votes difference between the winner and the runner-up is less than 3.5% of the total votes in that particular constituency.[14]

Panel B in Table 3 shows how individuals in the sample are classified according to whether there were close elections between men and women in their district during the three years before they started primary education. There are several constituencies in each district, which means that an individual will be affected by a close election if there has been any close election in his or her district of residence. This table shows that 18% of individuals in the sample have been affected by close elections between a man and a woman, in other words, have been living in a district where close elections between men and women took place when they were young. If one then looks at individuals that have been affected by close elections: 6.7% of the whole sample have been in districts where more men than women won in close elections, 4.6% have been in districts where the same number of women and men won in close elections and 6.8% in districts where more women than men won in close elections. Thus, as expected, there is about the same number of individuals affected by men winning in close elections as by women winning in close elections.

The model to be estimated is:

$$Y_{idt} = \theta_d + \psi_t + \beta F_{dt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \tag{1}$$

$$F_{dt} = \theta_d + \psi_t + \kappa FC_{dt} + \mu TC_{dt} + X_{dt}\sigma + Z_{dt}\varsigma + u_{dt} \tag{2}$$

In specification (1), Y_{idt} takes the value of 1 if individual i belonging to cohort t, and born in district d has obtained at least primary education and 0 otherwise. I estimate the model using two stage least squares, where equation (1) is the second stage and equation (2) is the first stage. Since observations in the same district could be

[14] I perform the same exercice with smaller margins and results are unchanged. See the Robustness Checks section.

correlated, I compute the standard errors clustered at the district level.

The main variable of interest, F_{dt}, is the fraction of constituencies in the district that were won by a female politician during the three years before individual i started primary education. The instrument for this variable is FC_{dt}, the fraction of constituencies in the district won by a woman in a close election against a man during the same time period. I control for TC_{dt}, the fraction of constituencies in the district in which there were close elections between women and men, as well during the same time period. The fraction of constituencies that had close elections between men and women controls for the fact that the existence of this type of close elections may not be a random event. However, the outcome of a close elections is random, meaning that the winner's gender in close elections between women and men is random as well. In other words, the impact of the existence of close elections between women and men on education is controlled by in specification (1) and partialled out of the instrument in specification (2).

θ_d are district fixed effects, which account for district-specific characteristics that do not change over time. ψ_t are the cohort fixed effects, which account for the fact that individuals born in different years may have been subject to different shocks or nationwide educational policies.

X_{idt} is a vector of individual-level control variables. I use different dummy variables for rural areas and Scheduled Caste or Scheduled Tribe individuals. Since rural areas are likely to have lower literacy levels and educational inputs than urban areas, a dummy for rural areas captures this effect. Similarly, SC/ST individuals seem to be those who have less access to education in India. I also include dummies that indicate whether the individual is a woman or whether the individual is Hindu or Muslim. As before, gender and religion may be important determinants of an individual's education.

Z_{dt} are the set of district characteristics that vary over time and may have an effect on the independent variable. In order to be able to disentangle the identity of the legislator effect from the political parties' effect, I include as control variables the average fraction of seats won by the different political parties in each district the three years before the individual started a given level of education. If female politicians have a differential effect compared to male politicians after controlling for party composition, this will mean that the results will be given by gender and not party differences. These variables vary across districts and across time. As in Besley and Burgess (2000) I use six main party groups: Congress, Hard Left, Soft Left, Janata, Hindu and Regional parties. Thus, independent

candidates and other very small parties are the reference category. I also include as a control variable the fraction of reserved seats in the district, since this may also have an impact on the nature of political competition in each district.

I control for other variables that vary across districts and time. For example, I include female and male literacy rates in order to control for the fact that in districts were there are more literates the electorate's preferences may be different. At the same time, it may as well be that in districts where literacy rates are higher parents are more likely to bring their children to school. I have also included the share of SC/ST, and urban and female population in the regression, since they may also have an impact on both educational and electoral outcomes. Descriptive statistics for these variables are shown in Panel B of Table 2. For these control variables, I use information on district and state characteristics when the legislators included in these three years were elected, or, if there were elections in the middle of these three years, characteristics when the first set of legislators were elected, to account for the situation the legislator found in a particular district when he or she was elected.

3.2 Checks on the Identification Strategy

In this section I show some facts that support the validity of the identification strategy used. I address three issues. First of all, I provide evidence supporting the fact that the outcome of a close election is indeed random. In addition, districts and constituencies in which female candidates won in close elections against men should be similar in observables to those in which male candidates won in close elections. Finally, I provide evidence that districts that had close elections between men and women are not systematically different than other districts in India.

3.2.1 Randomness of Close Election Outcomes

If there are political or demographic characteristics that predict the probability that women win in close elections in the district, the outcome of the close elections and, thus, the gender of the winners cannot be considered random. In order to estimate the probability that women won in close elections in a district, I have calculated the proportion of close elections won by women by district in each electoral year. I then

regress this probability on the fraction of seats contested by the different party groupings in close elections, the proportion of urban population, the proportion of female and SC/ST population, male and female literacy rates, the number of times that women have won elections in the past in that district and the proportion of reserved seats. Results are shown in Table 4, and confirm that none of the coefficients turn out to be significant, suggesting that the outcome of a close election is indeed random.

3.2.2 Comparing on Observables

If the winner's gender in a close election between a man and a woman is random, we expect that districts in which more women won in close elections should be very similar to districts in which more men won in close elections.

Table 5 provides information on the differences in district characteristics according to the number of women who won against men and number of men who won against women. Districts are classified in two groups, those in which more men won and those in which more women won. Then I compute the differences in district characteristics between these two groups. I do this considering the elections in which the winner has lead over the runner-up by margins of 3.5%, 3% and 2.5% of votes. I use information at the district level on the proportion of urban and SC/ST population, male and female literacy rates, the number of seats, the fraction of seats reserved for SC/STs, the number of educational institutions and hospitals weighted by the population and the proportion of seats won by female and male candidates in elections that are not close. The columns corresponding to margins of less than 3.5%, 3% and 2.5% show that districts in which more men won in close elections with this or a smaller margin and districts where more women won in close elections with this or a smaller margin are very similar in all these variables.

In summary, districts in which more women won in close elections are very similar to districts in which more men won in close elections. One should also observe that constituency and individual characteristics of women and men winning in close elections are the same. In the remainder of this section I analyze some of these characteristics, that could compromise the comparability between close elections in which men won and close elections in which women won.

First of all, there might be concerns that two different constituencies in which a

woman contested in a close election against a man might not be similar if in one of them there were many other women candidates, apart from the winner or the runner up, contesting for the same seat. This would be a case in which political parties perceive the constituency as one in which there is "preference for female politicians" and tend to field female candidates there. If the number of female candidates contesting for the same seat as the two close candidates is significantly different for constituencies in which a man won in a close election against a woman and constituencies in which a woman won in a close election against a man, these two types of constituencies might have different characteristics. I have data on all the female candidates contesting in a particular constituency, apart from the winner and the runner up. As shown in the top panel of Table 6, the number of other female candidates contesting against women who won in close elections against a man is not significantly different than that for men who won in close elections against a woman.

It might also be that one of the candidates in a close election is in this situation because he or she is the incumbent for that seat in that particular constituency. This would make constituencies in which women and men won in close elections against a candidate of the other gender different in observables if men (or women) are those who tend to be the incumbent. Moreover, if there is incumbency advantage (or disadvantage) in these elections, more women (or men) would win in these type of elections and one could question the extent to which the outcome of a close election is random. It should also be taken into account that the policies applied by candidates who were the incumbent and won the elections again might be different than those of candidates who occupy the seat for the first time, since they will have more experience as legislators. In order to address this concern I use the fact that I have information on the candidate's names, thus, I can know whether a particular candidate was already in power in the same constituency where he or she is contesting now during the previous electoral year. I then create a dummy variable that is equal to one if the individual was the incumbent for that seat. However, as it is shown in the second panel of Table 6, the percentage of winners in close elections who were the incumbent is statistically the same for female and male legislators who won in close elections.

Another concern that needs to be addressed is that maybe there are some constituencies in which there have been more close elections between men and women in the past than in others. If this happens more often in constituencies where women won the close

election than in constituencies in which men won, then these two types of constituencies would not be comparable, since in the one where there have been more close elections there would probably be more "preference for female politicians". In the third panel of Table 6 I test whether constituencies in which a man or a woman won in a close election are different in terms of how many times the particular constituencies have had close elections between men and women. However, results show how the number of previous close elections is the same, whether a woman or a man won. Thus, women won in close elections in situations in which the electoral preferences for female politicians are similar as situations in which men won in close elections.

Finally, if elections in which men and women won in close elections are really similar, they should have the same electoral turnout, otherwise, one type of constituencies would be more active in electoral terms than the other. And, more importantly, the distribution of votes between the first two candidates and the rest should be the same. This is the case because if in one case the total votes were distributed among many candidates, these could not be considered as close elections between the winner and the runner up. The last two panels of Table 6 show that women who won in close elections won by the same number of votes as men who won in close elections, and in constituencies where the total number of votes was the same. Since constituencies in India were designed to have the same population, this means that turnout was the same, and the distribution of votes between the first candidate and the rest was the same as well. This further corroborates that constituencies in which a man or a woman won in a close election are perfectly comparable and thus, the gender of the winner is, indeed, random. These two panels also eliminate concerns that, if in a constituency there were three candidates with almost the same number of votes, one could not consider the election between the winner and the runner up as a close election. In fact, the winners in close elections tend to receive around 40% or votes, which means that the runner up will receive a minimum of 36.5% of votes. This leaves the other candidates with 23.5% of votes, which is a very big difference compared to the winner. Thus, even if there was only one other candidate in the constituency, he or she did not have any chance of winning the election.[15]

[15] As it was proven before, there are no concerns regarding the gender of these other candidates.

3.2.3 External Validity

Overall, 141 out of 297 districts never had a close election between a man and a woman, which is slightly less than half the districts in my sample. However, it could be argued that close elections between men and women take place in districts that are different, or more progressive, than the average district in India. Even if there is a significant amount of individuals affected by close elections, if districts that never had close elections are very different than those that did, results obtained in this paper would not be representative for all of India. Table 7 shows that districts that have never had close elections and those that did are similar in observables. For districts that have never had close elections and districts that did, it shows descriptive statistics for population characteristics, the proportion of reserved seats, the total number of seats, and public goods like hospitals and educational institutions weighted by the population in the years that elections took place.

Finally, there might be concerns that the probability of contesting a close election between a woman and a man is different for each political party. If this were the case close elections would not reflect the overall situation in the parliament because only a few parties would be involved. Table 8 shows how the distribution of seats between the different party groupings is the same for close elections between men and women as for the rest. Thus, party composition seems not to be a concern, since the party composition in close elections reflects that of the overall parliaments in the States.

4 Results

4.1 Baseline Results

Results for the basic econometric specification are shown in Table 9. The dependent variable is a dummy variable equal to one if the individual obtained at least primary education and zero otherwise. The coefficient for the proportion of constituencies in the district held by women during the three years before an individual started primary education is reported. In columns (1)-(3) I report results for the OLS regressions, while in columns (4)-(6) I show results for the 2SLS regressions.

OLS results in columns (1)-(3) female representatives have a positive and significant effect on the probability that an individual attains primary education. When I divide

the sample among those who live in urban and rural areas, female representatives have a positive and significant effect on individuals living both in urban and in rural areas, see columns (2) and (3). The 2SLS estimates in columns (4)-(6) show a very different picture, the female representation effect is now only significant for the urban sample and it is very large, see column (5). The magnitude of this coefficient implies that, by increasing female representation in the district by 10 percentage points, the probability that an individual attains primary education in an urban area increases by 6 percentage points, which is around 8% of the total probability that an individual obtains primary education in urban areas. In addition, given that being a woman reduces the probability of attaining primary education by 6 percentage points and being SC/ST reduces it by 18 percentage points, this is an important amount.[16]

The first stage regression for these specifications is shown in Table 10. Results show how the fraction of constituencies in the district won by a woman in a close election against a man is indeed a very good predictor of the fraction of constituencies in the district won by a woman. Keeping the fraction of constituencies held by men who won in close elections against a woman constant, increasing the fraction of constituencies won by women in close elections against men by one percentage point would increase female representation by 0.83 percentage points.

Results show how female politicians have a positive impact on the education obtained by individuals living in urban areas of their own district. Since the reference category is male politicians, the fact that female politicians have a positive and significant effect means that they have a significantly larger effect on education in urban areas than male politicians. However, this is not the case in rural areas. The coefficient for the 2SLS estimates in the urban sample is much larger than the one in the OLS regression using the same sample. This indicates that the OLS coefficients are downward biased, suggesting that the omitted variable is positively correlated with female representation and negatively correlated with education (or vice versa). For example, it may be that, if female politicians are known to be effective for educational improvements, in areas where educational levels are low they will tend to elect female politicians. Moreover, it may as well be that in very backward areas where educational levels are very low they elect female representatives because they are the family member of an important male politician, or they belong to the "elite" family in power. For the rural sample the OLS

[16] These coefficients are not reported in Table 9, but are available from the author upon request.

coefficient is bigger than the 2SLS one, but it is very imprecisely estimated. In addition, the OLS coefficients both for urban and rural areas are very similar. This implies that, by running the regressions with OLS one would not be able to distinguish the fact that the effect of female representation in urban and rural areas is very different. In other words, the omitted variable makes the OLS coefficient for the rural sample significant, when in reality female representation has no effect in rural areas.

These results show an improvement in primary education attainments in urban areas when female representation is higher. It also interesting to study whether the effect of female politicians is different on girls than on boys. For this I interact the female representation variable with a dummy variable that is equal to one if the individual is a woman and zero otherwise and with a dummy variable that is equal to one if the individual is a man and zero otherwise.

Results are shown in Table 11. I report the coefficients for the effect of female representation on women and on men, together with the difference between the two. In column (1) I report results for the whole sample, while in columns (2) and (3) I restrict the sample to urban and rural areas, respectively. Female representation does not have a significant effect, neither on women nor on men in the overall sample. In contrast, female representation has a positive and significant effect in urban areas, both for women and for men; see column (2). The coefficient for the effect on women is larger in magnitude than the one for the effect on men, although the difference between these two coefficients is not statistically significant. The difference in magnitudes may be due to the fact that women have lower primary education attainments than men to start with. Column (3) shows that in rural areas, female representation does not have an effect, neither on women nor on men.

In summary, female representation has a positive effect on the probability that individuals living in urban areas achieve primary education. Moreover, within urban areas female representation affects positively both women and men.

4.2 Is Caste Important?

If the cost of running for elections is higher for female than for male candidates, female legislators will tend to belong to richer economic backgrounds. If this is the case, the female representation variable may then proxy for class rather than gender preferences.

In India, some seats are reserved for Scheduled Castes and Scheduled Tribes (SC/ST). By looking separately at SC/ST and general female legislators I can then disentangle gender from class effects. Scheduled Caste and Tribe women are part of a socially and economically disadvantaged group, then, if SC/ST female representatives do have an effect on education, this will indicate that the coefficients obtained before are not driven by class differences between men and female politicians, but by gender differences. SC/ST politicians may have different preferences and may behave differently from general legislators due to their lower social and economic position, but it is interesting to see whether, once controlling for caste, gender also matters.

I instrument the fraction of constituencies in the district won by a woman with the fraction of constituencies in the district won by a woman in a close election against a man. I do this both for reserved seats (SC/ST) and for non-reserved seats (general seats). The specification that is going to be tested will then be:

$$Y_{idt} = \theta_d + \psi_t + \beta_1 Fscst_{dt} + \beta_2 Fgen_{dt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \tag{3}$$

Where $Fscst_{dt}$, the fraction of constituencies won by SC/ST women is instrumented with the fraction of constituencies won by SC/ST women in a close election against a SC/ST man. Similarly, $Fgen_{dt}$, the fraction of constituencies won by general women is instrumented with the fraction of constituencies won by general women against general men.

In Table 12 I report results for the 2SLS estimates of this specification. In column (1) I show results for the whole sample, while in columns (2) and (3) I restrict the sample to urban and rural individuals, respectively. I report the coefficients for the fraction of constituencies in the district won by SC/ST women and the fraction of constituencies in the district won by general women. I also report the coefficient of the difference between these two coefficients.

Results for the overall sample show that neither SC/ ST nor general female representatives have an effect on primary education attainment. In contrast, in urban areas SC/ST female representatives have a positive and significant effect on the probability that an individual attains primary education. The coefficient for general female representatives is marginally insignificant, but is not statistically different than the one for SC/ST female representatives, even if it is smaller. In fact, results in column (2) show

that by increasing SC/ST female representation by 10 percentage points, the probability that an individual attains primary education in an urban area increases by 12.9 percentage points, which is 16.6% of the total probability that an individual attains primary education in an urban area. When I only consider the sample of individuals who live in rural areas, here the effect of both general and SC/ST female politicians is not significant; see column (3).

In summary, SC/ST female legislators have a positive and differential effect on an individual's education in urban areas, but not in rural areas. The coefficients for general female legislators are not statistically different than those of SC/ST female legislators, but they are slightly smaller and never significant.

Dividing female legislators among SC/ST and general helps in identifying the effects of class, which may have been confused with gender otherwise. In other words, SC/ST women will surely have a lower class background than the rest, and however, they still have a significant effect on the education received by individuals living in urban areas. Their effect is stronger than the female politicians' effect obtained without taking the politicians' castes into account. As a conclusion, results in Table 12 are reassuring, since they indicate that the results for female representatives obtained before were not driven by class and were indeed driven by gender.

4.3 Placebo Tests

In this section I perform two placebo tests using migrants and individuals who were too old to achieve primary education when female politicians were in power in the district. Policies implemented by these politicians could not have affected these individuals. If this were the case, results obtained could indicate that female representation is in fact proxying for another variable.

4.3.1 Placebo 1: Are Late Migrants Affected?

If an individual's primary education attainment is really affected by the identity of the politicians who were in power in his or her district when he or she was young, we should not observe any effect on individuals who were not living there when the politicians were in power. In other words, individuals who migrated to the area when they were too old to achieve primary education can be used to perform a placebo test since they

could not have been affected by the policies applied by the female legislators who were in power there when they were young. Thus, one should not observe any effect from female politicians on these individuals, since primary school ends when an individual is 11 years of age and an individual aged 14 should already be in secondary school.

In order to test for this I use data on individuals who migrated from other districts or who migrated within the same district between rural and urban areas[17] after the age of 14. For each individual I use as right hand side variables the political characteristics and control variables of the new district of residence when the individual was aged 3-5.[18] I then run specification (1) on these individuals, using (2) as a first stage, as before.

Results are shown in columns (1) and (2) of Table 13, that show results for the rural and urban sample, respectively. I report the coefficient for the fraction of constituencies in the district in which a woman won the election. Column (1) shows results for the urban sample. In this case the sample size is much smaller, but the effect of female politicians on individuals who arrived in the area when they were too old to achieve primary education is very small and not significant. The effect in rural areas is as well not significant, see column (2). Given that those who should not have been affected are, indeed, not affected this corroborates the notion that results on education found before really come from the identity of the politicians in power in the district when the individuals were young.

4.3.2 Placebo 2: Are Older Children Affected?

If an individual's primary education attainment is really affected by having a female politician in his or her district before he or she started primary education, we should not observe any effect of female politicians on individuals who were too old to be affected by their policies when they were in power. In fact, an individual's primary education attainment can be determined by the policies applied by the politicians in power before he or she started primary education,[19] but should not be determined by politicians in power when he or she should have finished primary education. If this were the case,

[17] Since policies are different in urban than in rural areas, an individual who migrated from a rural to an urban area will not have been affected in the same way as the "urban" individuals. Thus, it is a valid placebo.

[18] The NSS does not give information on which district were they coming from, I only know whether they were coming from another district or not.

[19] Or maybe even during his or her first years of primary education.

this would indicate that results for the estimated effect of female politicians is in fact proxying for another variable that has a wider time-span. In other words, one should not observe an effect from female representatives on the education of older individuals.

In order to test for this I combine data on the politicians' identity variables used in the previous specification with data on individuals who were aged 14 to 16 when they were in power.[20] I then run specification (1) on these individuals, using (2) as a first stage.

Results are shown in Columns (3) and (4) of Table 13. I report coefficients for the fraction of constituencies in the district won by women. In Column (3) I restrict the sample to individuals living in urban areas. In this case the sample is much smaller, but female representatives do not have any effect on these individuals. Moreover, the coefficient is negative and much smaller than that obtained for younger individuals. As it is shown in column (4), female representatives do not have any effect on individuals living in rural areas.

4.4 Measures of Political Influence

In line with the interpretation that female politicians affect education because they act on policies, In this section check whether the effect of female representation is stronger when they are more influential, either within the district or in the legislature.

4.4.1 Does Being A Member of the Majority Party Matter?

In line with existing theoretical models, a single legislator will have more power to implement policies or to direct funds to his or her own constituency if he or she has more bargaining power within the legislature. This is likely to be the case if he or she belongs to the party that has the majority of seats in the legislature. Thus, if the effects observed are due to the politician's actions, one should observe that female legislators who belong to the party that won the majority in the state have a stronger effect than the rest. In order to test for this I have divided female politicians according to whether they belong to the party that had the majority of seats in the state or not. I then run the specification:

[20] As before, this individuals should be in secondary schooling age.

$$Y_{idt} = \theta_d + \psi_t + \beta_1 Fmain_{dt} + \beta_2 Fnomain_{dt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \quad (4)$$

Where $Fmain_{dt}$, the fraction of constituencies won by women of the main party is instrumented with the fraction of constituencies won by women of the main party in a close election against a man. Similarly, $Fnomain_{dt}$, the fraction of constituencies won by women belonging to other parties is instrumented with the fraction of constituencies won by women belonging to other parties against men.

Results are shown in columns 1 and 2 of Table 14, for the urban and rural samples respectively. I report coefficients for the fraction of constituencies won by women of the main party and the fraction of constituencies in the district won by women of the other parties. In urban areas, women of the party who got the majority of seats in the state are those who have an effect, while the coefficient for women belonging to other parties is not significant. For the rural sample none of the coefficients is significant.[21]

4.4.2 Does District Size Matter?

If the effects on education are coming from the politician's actions, one should observe that the effect of female politicians is bigger in districts that contain fewer constituencies. This is the case because, if legislators are more sensitive to their constituencies' demands, they will be expected to have a bigger impact on people living in their constituency, more than on the district as a whole. In smaller districts estimates of the impact of the legislator will be more accurate, and they will be a better approximation of the identity of the legislator's effect on people living in his or her constituency. In contrast, in larger districts, the estimates of the differential effect of female legislators will presumably be lower, since the effect will be more diluted given that the effect is shared among more constituencies. Thus, the estimates obtained in the previous section will be a lower bound of the actual effect.

[21] Female politicians who belong to other parties that did not get the majority of seats in the state but that are part of the coalition in power could have the same bargaining power as female politicians from the main party. I do not have data on the different coalitions that have had power over time in the different states in India Women in the party who got the majority of seats will almost surely be in the coalition, so they will have more power than the rest. Presumably, if I could divide female representatives among those who belong to the coalitions in power and those who do not, the difference between those coefficients would be even larger than the difference obtained in Table 14.

In order to test whether the effect is indeed bigger in smaller districts I have divided the districts according to the number of constituencies they include. In particular, I have computed the mean number of constituencies in all districts for the three years averages[22] and I have created a dummy variable equal to one if an individual lives in a large district, i.e. if his or her district has more constituencies than the mean and zero otherwise. I have then created another dummy that is equal to one if the individual lives in a smaller district. I then interact the female representation variable these dummy variables. The specification tested is:

$$Y_{idt} = \theta_d + \psi_t + \beta_1 F_{dt} * l_{idt} + \beta_2 F_{dt} * s_{idt} + \beta_3 l_{idt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \quad (5)$$

Where l_{idt} and s_{idt} are the dummy variables for whether the individual lives in a large or a small district, respectively. I then report the coefficients for the 2SLS estimates of the total effect on individuals living in large districts, β_1, and on individuals living in small districts, β_2. Results are shown in columns 3 and 4 of Table 14, for the urban and rural sample respectively. Column 3 shows results for the urban sample. The effect of female representatives in small districts is positive and significant, plus, it is larger than the coefficient for female representatives obtained before. In large districts the coefficient for female representatives is smaller. Column 2 shows results for individuals living in rural areas, here female representatives do not have any effect, neither in big nor in small districts. Since results for small districts are now slightly stronger than results in Table 9 for the urban sample, one can conclude that results obtained before are indeed a lower bound of the real effect.

4.4.3 Does Political Disruption Matter?

One should expect that the effect of female politicians will be stronger in situations in which politicians have had more time to implement their policies. To test for this I exploit the variation created by the fact that some states have been under President's rule in different years and for different periods of time.

President's rule is the term used in India to describe a situation in which a state government is dissolved by its governor and it is placed under direct federal rule. Article

[22] The mean is 9.29 constituencies per district.

356 of the Indian Constitution enables President's rule and gives the central government the authority to invalidate any state government if the constitutional machinery in the state fails.

Politicians who were in power when the state was under President's rule should have had less power than the rest, since they had less time to implement their policies. In those cases the effect of female representation will be likely to be smaller, since female politicians will have been in power for less time.

I have information on how many months of each year were subject to President's rule for each State. Then I compute the total number of months with President's rule during the three year averages used to create the other political variables. I can then classify individuals in the sample according to length of the time period during which the legislature was under President's rule within the three years before they started primary education.

I create a dummy variable that is equal to one if the individual has been exposed to more months of President's rule than the mean[23] and another dummy that is equal to one if the individual has been exposed to less months of President's rule than the mean. I then interact these variables with the female representation variable. The specification to be tested will then be:

$$Y_{idt} = \theta_d + \psi_t + \beta_1 F_{dt} * Mpr_{idt} + \beta_2 F_{dt} * Lpr_{idt} + \beta_3 Mpr_{idt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \quad (6)$$

Where Mpr_{idt} is the dummy variable indicating whether the individual has been exposed to more months of presidential rule and Lpr_{idt} is the dummy variable indicating whether the individual has been exposed to less months of presidential rule. I then report the coefficients for 2SLS estimates of the total effect on individuals that were affected by more President's rule than the mean, β_1, and on individuals that were affected by less than the mean, β_2.

Results are shown in Columns 5 and 6 of Table 14, for the urban and rural sample respectively. Coefficients in Column 5 show how, in urban areas, only in cases where politicians had sufficient power do female representatives have an effect. The effect on

[23] For States and years in which there has been President's rule, the mean is 7.59 months over the three years averages. The distribution is quite skewed to the left, with a minimum of 0.25 months in the three years period and a maximum of 36 months.

individuals affected by a longer period of President's rule is smaller and not significant. Results for the rural sample are presented in Column 6, where none of the coefficients is significant.

Thus, results suggest that female representatives will have an effect in cases in which they can exercise their power for longer, confirming the initial hypothesis that the effects found on education are due to their policy actions.

4.5 Robustness checks

In this section I provide some more evidence supporting the identification strategy used in this study and I include time trends in the regressions.

In this paper I have defined close elections as elections in which the votes difference between the winner and the runner up is less than 3.5%. Here I check whether the results are sensitive to this choice of vote margin. In columns 1-4 of Table 15 I test whether results are the same when I define close elections as those in which the winner won the runner-up by smaller margins. In particular, in columns 1 and 2 I use a 3% margin as a cutoff point, while in columns 3 and 4 I use a 2.5% margin. I then run the 2SLS specification (1) as before. Now, however, the instrument will be defined in a different way, since some elections that before were considered close now will not be. As before, I report results for both the urban and rural samples and the coefficient for the fraction of constituencies in the district won by women. Results in columns 1-4 are very similar to those obtained before. The coefficient for the effect of female politicians seems to increase slightly as the margin is reduced, but it is still in the same confidence interval as the coefficient for the 3.5% margin.

The probability that an individual attains primary education in a state or district may change across generations, in fact, it may increase over time. If, on the other hand the right hand side variables in the regression also trend upwards, results obtained may proxy for this trend. Since elections are held at the state level, different states may have different trends. In addition, different districts may have different trends in both educational attainments and the right hand variables. In columns 5 and 6 of Table 15 I control for the existence of state-specific trends. Results remain unchanged. In addition, in columns 7 and 8 of Table 15 I include district-specific trends in the regression. Results are also very similar to the ones obtained before.

5 Discussion and Conclusion

Results in this paper show that the identity of the legislator affects educational outcomes. Female politicians have a bigger effect than male politicians on the education received by individuals living in urban areas but not by those living in rural areas. By increasing female representation in the district by 10 percentage points, the probability that an individual attains primary education in an urban area increases by 6 percentage points, which is around 8% of the total probability that an individual obtains primary education in urban areas. In addition, given that being a woman reduces the probability of attaining primary education by 6 percentage points and being SC/ST reduces it by 18 percentage points, this is an important amount.

In order to disentangle the effect of gender from the effect of economic class I divide female representatives among those who belong to the Scheduled Castes and Tribes and those who do not. I find that SC/ST women have a positive effect on education in urban areas, but not in rural areas. In line with the interpretation that female politicians affect education because they act on policies, I find that the effect of female representation is stronger when they are more influential, either within the district or in the legislature. For example, female politicians belonging to the party who has the majority of seats are those who have the strongest effect. The effect is also stronger on individuals living in small districts, that contain less constituencies. This confirms that results obtained before are in fact a lower bound of the actual effect. Moreover, the effect of female politicians is smaller when there has been political disruption, namely President's Rule, for a longer period in the state. Reassuringly, two placebo tests, using migrants and individuals who were too old to achieve primary education when the female legislators were in power show that female representation did not have any effect on these individuals.

If both female and male politicians implement their own preferences when they are in power,[24] it is then reasonable to assume that these politicians will care about the needs of those who share their identity. One possible explanation for the results obtained is that,

[24] In fact, if there are two types of citizen-candidate, women and men, and they have different preferences, once they decide to contest for election and win they will implement their own preferences. This will be true if they can not commit to implement a specific policy ex ante, which is likely to be the case in India. If politicians are self-interested, they will try to improve their economic opportunities, which will coincide with the economic opportunities of their groups.

if female politicians care about empowering those who share their identity, then they would choose to invest in education in urban areas as returns for women are higher there than in rural areas and hence demand for women's education is higher. Education is not gender specific so greater investment by female politicians in urban areas is enjoyed by both men and women. Indeed, it is difficult to target specific expenditures and investments to specific groups of the population.[25] [26]

I have computed the wage differentials for women older than 15 who are working with and without primary education. Data for these variables is shown in Panel A of Table 2. In urban areas, the difference between the wage of an educated and an uneducated woman is 2.7 times the wage of an uneducated woman. In rural areas, the wage differential due to education is 1.9 times the wage received by an uneducated woman.[27] Thus, the difference in wages between educated and non-educated women is much larger in urban areas. In addition, educated women living in rural areas will have to take opportunities to work in non-farm employment in rural areas, since their mobility is reduced by social constraints. In urban areas, women can take advantage of more opportunities to work in activities that require their education skills (see Chadha 1997). Table 2 shows how in urban areas 92% of working women that have primary education work in the non-agricultural sector, while this is only 29% in rural areas. These facts may explain why education is more important for women in urban than in rural areas. In contrast, men can benefit from education both in rural and urban areas. In fact, in urban areas, the wage of an educated man is 1.94 times the wage of an uneducated man, while in rural areas, it is 1.71 times the wage of an educated man, so the difference between rural and urban areas is smaller than for women. Taking into account that men have higher mobility than women and can always move to work in urban areas, they will have more opportunities than women in rural areas, and, if they get educated they will be more able to take advantage of their skills.[28]

[25] Some programs like the District Primary Education Programme, with clauses designed to target girls and lower castes, seem to have affected everyone in the population. This programme was launched in 1994, which means that it could not affect individuals in my sample.

[26] In rural areas they may invest in different public goods (for example, access to roads or drinking and water facilities), which are more valuable to women there.

[27] Berhman, Foster, Rosenzweig and Vashishtha (1999) do not find labour market returns to schooling for women in rural areas, which is consistent with the explanation provided here.

[28] Kochar (2004) finds that urban returns to education have a positive impact on boys education living in rural areas. This is especially the case for landless households. In the limit, and, if there was perfect mobility, returns to education could be equal for men in rural and urban areas, but she shows how this

This paper complements the literature on education in developing countries by studying whether the gender of a politician who is in charge of implementing educational policies has an impact on educational outcomes. This paper is also related to the existing literature on the effects of the identity of the legislator in India, and complements it by exploring the effect of an exogenous increase in female representation that took place without reservation, and allows me to clearly identify the effect of female legislators on the education received by individuals who were young in the district when these legislators were in power. It also complements the growing literature on the identity of the legislator in other countries by providing additional evidence that identity does indeed matter for policy decisions, since women and male politicians have different effects on education. Moreover, one big advantage of using Indian election data is that the caste reservation system allows me to control for the legislator's class.

Finally, results obtained also provide evidence in favour of citizen-candidate models (Besley and Coate 1997 and Osborne and Slivinski 1996). The fact that the identity of the legislator has an impact on policy suggests that Downsian models could not be used to explain the results obtained and that indeed, candidates cannot commit in advance to implement specific policies once elected.

The fact that the identity of the legislator matters along gender lines may have policy implications. The issue of female political representation has been increasingly important in India and there have been growing pressures for female political reservation. In September 1996, the Government introduced a Bill in Parliament, proposing the reservation of one third of the seats for women in the Central Government and the State Assemblies. Since then, this proposal has been widely discussed in several parliamentary sessions, without an agreement being reached. Those in favour argue that increasing female political representation will ensure a better representation of their needs. Even those who oppose the reservation acknowledge the fact that female politicians behave differently than male politicians. This paper corroborates these views with empirical evidence and may shed some light on these issues, by looking at the effect of the politicians' gender on education. Clearly, reservation would increase female representation, but it would as well change the nature of political competition, either by changing the set of candidates available for each seat, by altering voters' preferences or by changing

does not seem to be the case.

the candidates' quality. Therefore, reservation may change other variables, but it is an increase in female representation. The fact that female representatives of the party that has the majority have more bargaining power to implement their policies and that, once controlling for caste differences, SC/ST female politicians are those who mainly have an effect should also be taken into account when considering reservation for women.

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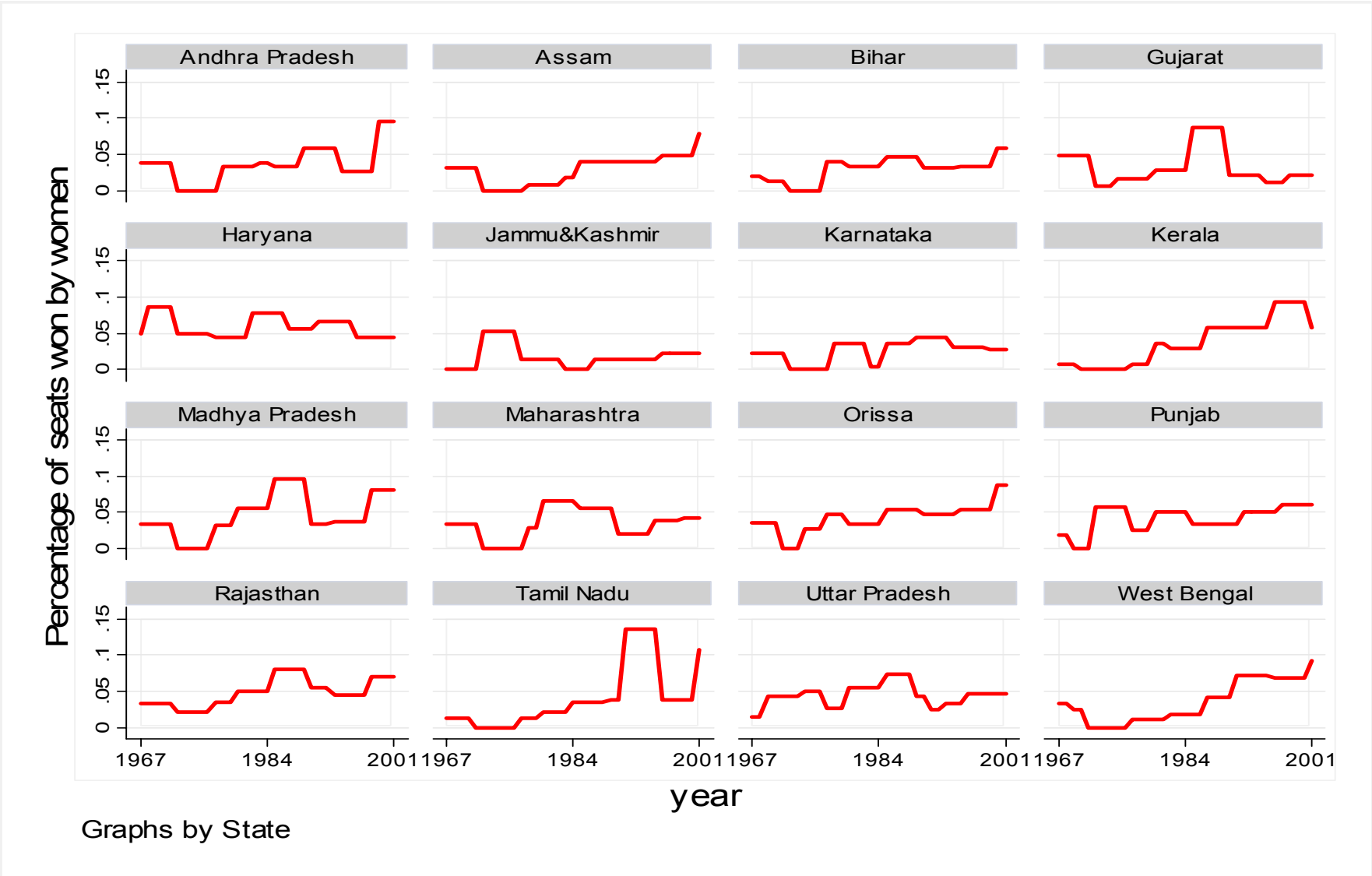

Figure 1: Female Political Representation by state 1967-2001

TABLE 1: Descriptive statistics: District Political Dataset
Unit of observation: district in an electoral year

Variable (total seats in the district)	Obs.	Mean	Sd
Proportion of seats won by women	2546	0.0387	0.0750
Proportion of seats reserved for SC/ST	2546	0.2363	0.1948
Proportion of seats won by SC/ST women	2546	0.0103	0.0404
Proportion of seats won by general women	2546	0.0285	0.0632
Proportion of seats won by women belonging to the main party in the state	2546	0.0268	0.0643
Proportion of seats won by women belonging to others but the main party in the state	2546	0.0119	0.0409
Proportion of seats won by Congress	2546	0.4359	0.3289
Proportion of seats won by Hard Left	2546	0.0599	0.1475
Proportion of seats won by Soft Left	2546	0.0245	0.0916
Proportion of seats won by Hindu	2546	0.1336	0.2344
Proportion of seats won by Janata	2546	0.1489	0.2631
Proportion of seats won by Regional	2546	0.0800	0.2047
Proportion of seats won by Others	2546	0.0594	0.1600
Proportion of seats won by Independent	2546	0.0578	0.1114

Variable (total seats in the district in districts where women were elected)	Obs.	Mean	Sd
Proportion of seats won by women in a close election against men	708	0.0163	0.0416
Proportion of seats who had close elections between men and women	708	0.0225	0.0488
Proportion of seats won by women in a close election against a man (SC/ST)	708	0.0032	0.0207
Proportion of seats won by women in a close election against a man (general)	708	0.0130	0.0372
Proportion of seats won by women in a close election against a man (main party)	708	0.0116	0.0363
Proportion of seats won by women in a close election against a man (other parties)	708	0.0058	0.0274
Proportion of seats won by Congress women	708	0.0782	0.0915
Proportion of seats won by Congress men	708	0.3575	0.2738
Proportion of seats won by Hard Left women	708	0.0088	0.0350
Proportion of seats won by Hard Left men	708	0.0674	0.1554
Proportion of seats won by Soft Left women	708	0.0014	0.0140
Proportion of seats won by Soft Left men	708	0.0184	0.0788
Proportion of seats won by Hindu women	708	0.0121	0.0434
Proportion of seats won by Hindu men	708	0.0902	0.1578
Proportion of seats won by Janata women	708	0.0123	0.0386
Proportion of seats won by Janata men	708	0.1180	0.2071
Proportion of seats won by Regional women	708	0.0113	0.0409
Proportion of seats won by Regional men	708	0.0917	0.2027
Proportion of seats won by Others women	708	0.0107	0.0400
Proportion of seats won by Others men	708	0.0685	0.1651
Proportion of seats won by Independent women	708	0.0044	0.0254
Proportion of seats won by Independent women	708	0.0490	0.0930

TABLE 2: Descriptive statistics NSS 55th Round and control variables

Panel A: NSS individual variables and labour market characteristics

	RURAL			URBAN		
Variable	Obs	Mean	Sd	Obs	Mean	Sd
Women	96545	0.4599	0.4984	45657	0.4177	0.4932
Men	96545	0.5401	0.4984	45657	0.5823	0.4932
SC/ST	96545	0.2986	0.4577	45657	0.1750	0.3800
Hindu	96545	0.8349	0.3713	45657	0.7259	0.4460
Muslim	96545	0.1001	0.3001	45657	0.1993	0.3995
Primary education or more	96545	0.5473	0.4978	45657	0.7805	0.4139
Women with primary education or more	44399	0.4392	0.4963	19072	0.7550	0.4301
Men with primary education or more	52146	0.6394	0.4802	26585	0.7988	0.4009
Women with primary education or more who work	16183	0.1641	0.3704	17532	0.0863	0.2808
Men with primary education or more who work	24642	0.6922	0.4616	18912	0.6269	0.4837
Women with primary education or more working in non-agriculture	2656	0.2854	0.4517	1513	0.9227	0.2672
Men with primary education or more working in non-agriculture	17057	0.3657	0.4816	11855	0.9371	0.2428
Women without primary education who work	23556	0.4069	0.4913	7477	0.2200	0.4143
Men without primary education or more who work	14502	0.9410	0.2357	4733	0.8927	0.3096
Women without primary education who work in non-agriculture	9584	0.1133	0.3170	1645	0.6778	0.4675
Men without primary education who in non-agriculture	13646	0.2138	0.4100	4225	0.8618	0.3452
Women without primary education: wages received	5635	125.32	106.44	1025	190.46	192.58
Men without primary education: wages received	7942	221.71	165.85	2651	346.16	261.05
Women with primary education: wages received	1255	249.18	389.31	993	702.08	809.97
Men with primary education: wages received	6792	380.07	429.18	6452	674	668.56

Panel B: Other control variables

Variable	Obs	Mean	Sd
Urban population in the district	7808	0.2045	0.1442
SC/ST population in the district	7808	0.2525	0.1367
Women in the district	7808	0.4819	0.0161
Male literacy rate in the district	7642	0.5272	0.1572
Female literacy rate in the district	7642	0.2782	0.1706
Number of months with President's Rule in the state	560	0.8576	2.5090

Data on workers refers to their usual activity. Workers are classified as people older than 15 years of age in the labour force not currently looking for employment. Wages are computed from individuals older than 15 years of age who are working and are not self-employed.

TABLE 3: Data issues

PANEL A: Data organization

Individual	District	Cohort	Started Primary	Politicians (average)
1	A	1964	1970	in power during 1967-1969 in district A
2	A	1965	1971	in power during 1968-1970 in district A
3	A	1987	1993	in power during 1990-1992 in district A
4	B	1964	1970	in power during 1967-1969 in district B
5	B	1965	1971	in power during 1968-1970 in district B
6	B	1987	1993	in power during 1990-1992 in district B

PANEL B: Individuals affected by close elections

Classification of individuals according to close elections between men and women in their district of residence

	Individuals	Fraction
No close elections	178323	0.819484
Close elections	39281	0.180516

Classification of individuals according to the number of men and women winning in close elections in their district of residence

	Individuals	Fraction
More women won against a men	14452	0.066414
More men won against a woman	14713	0.067614
The same number of men and women won	10116	0.046488

TABLE 4: Probability that a woman wins in a close election against a man

Dependent variable: proportion of women who won in a close election against a man per district	
	1
Proportion of seats contesting close elections Congress	0.6614
	[0.8127]
Proportion of seats contesting close elections Soft Left	1.7132
	[1.501]
Proportion of seats contesting close elections Regional Parties	0.4901
	[2.7951]
Proportion of seats contesting close elections Independents	0.9219
	[1.0248]
Proportion of seats contesting close elections Hindu	0.8988
	[0.8759]
Proportion of seats contesting close elections Janata	0.7324
	[1.1341]
Proportion of seats contesting close elections Others	1.6363
	[1.2054]
Proportion of urban population	8.1063
	[10.1935]
Proportion of population that is female	-1.6915
	[37.0020]
Male literacy rate	3.4601
	[12.6017]
Female literacy rate	-0.8688
	[7.4658]
Number of times that a woman has won an election in the district in the past	0.01403
	[0.04996]
Proportion of seats reserved for SC/ST's	-2.5949
	[5.8961]
Proportion of SC/ST population	-2.5949
	[5.8961]
Observations	164
Adjusted R-squared	0.04

Robust standard errors clutered at the district level. District and year fixed effects are included in the regression.

TABLE 5: District Characteristics: men contesting against women and women contesting against men with difference votes' margins

	3.50% margin	3% margin	2.50% margin
Differences in the proportion of urban population	-0.00980	-0.01850	-0.01750
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0175]	[0.01840]	[0.0209]
Differences in male literacy rate	-0.02472	-0.02840	-0.03980
(Districts in which more men than women won compared to districts in which more women than men won)	[0.02484]	[0.02638]	[0.02884]
Differences in female literacy rate	-0.02244	-0.02496	-0.04801
(Districts in which more men than women won compared to districts in which more women than men won)	[0.02871]	[0.03015]	[0.03301]
Differences in the number of villages with educational institutions	0.10282	0.02630	0.02207
(Districts in which more men than women won compared to districts in which more women than men won)	[0.07399]	[0.08306]	[0.09040]
Differences in the number of villages with hospitals	0.00023	0.00009	-0.00004
(Districts in which more men than women won compared to districts in which more women than men won)	[0.00021]	[0.00023]	[0.00027]
Differences in the total number of seats	-0.63670	-0.53370	-0.33024
(Districts in which more men than women won compared to districts in which more women than men won)	[0.62049]	[0.64258]	[0.70090]
Differences in the proportion of SC/ST reserved seats	0.00125	-0.01837	-0.03110
(Districts in which more men than women won compared to districts in which more women than men won)	[0.02609]	[0.02792]	[0.02965]
Differences in the proportion of women who won in elections that are not close	-0.00096	-0.00338	-0.00340
(Districts in which more men than women won compared to districts in which more women than men won)	[0.00804]	[0.00875]	[0.00959]
Differences in the proportion of men who won in elections that are not close	-0.01390	-0.01284	-0.00664
(Districts in which more men than women won compared to districts in which more women than men won)	[0.010004]	[0.01087]	[0.01174]
Number of election-years	212	186	157

TABLE 6

Constituency and candidate characteristics: close elections

Group	Obs	Mean	Std. Err.	[95% Conf.	Interval]
Other female candidates in the constituency					
Man won in close election	156	0.12821	0.033685	0.061665	0.19475
Woman won in close election	138	0.21014	0.042968	0.1251779	0.29511
Difference		-0.08194	0.053997	-0.1882125	0.02433
Winner was the incumbent					
Man won in close election	156	0.22436	0.033507	0.1581696	0.29055
Woman won in close election	138	0.21739	0.03524	0.1477071	0.28708
Difference		0.00697	0.048659	-0.0887997	0.10274
Number of close elections in the past					
Man won in close election	156	1.13462	0.028884	1.077558	1.19167
Woman won in close election	138	1.13768	0.032836	1.072751	1.20261
Difference		-0.00307	0.043553	-0.0887826	0.08265
Votes received by the winner					
Man won in close election	156	32411.8	1221.605	29998.65	34824.9
Woman won in close election	138	33617.5	1275.264	31095.77	36139.3
Difference		-1205.73	1767.948	-4685.264	2273.81
Total votes in the constituency					
Man won in close election	156	83402.1	2535.638	78393.24	88411
Woman won in close election	138	81680.9	2521.547	76694.69	86667.1
Difference		1721.23	3590.683	-5345.667	8788.13

TABLE 7

Comparison: districts with and without close elections

		Close elections	No close elections
Urban population (prop)	mean	0.1975	0.1961
	sd	0.0035	0.0039
	observations	927	1087
Male literacy rate	mean	0.5250	0.5481
	sd	0.0054	0.0049
	observations	927	1087
Female literacy rate	mean	0.2854	0.2890
	sd	0.0058	0.0054
	observations	927	1087
SC/ST population (prop)	mean	0.2668	0.2430
	sd	0.0047	0.0037
	observations	945	1116
SC/ST seats proportion	mean	0.2610	0.2191
	sd	0.0055	0.0054
	observations	1196	1315
Seats total	mean	10.5895	7.9529
	sd	0.1276	0.1269
	observations	1196	1315
Any educational institution	mean	0.5245	0.6834
	sd	0.0200	0.0200
	observations	294	332
Hospitals	mean	24.1167	19.3573
	sd	1.0326	0.7396
	observations	726	808

TABLE 8

Proportion of seats won by parties

	Close Elections	No close elections
Party	Percent	Percent
Congress	40.25	41.05
Hard Left	8.47	8.04
Hindu	11.44	11.58
Independents	6.78	5.8
Janata	10.17	14.26
Regional	12.29	10.17
Soft Left	3.81	2.31
Others	6.78	6.78
Total	100	100

TABLE 9: Do female politicians have an effect on education?

Dependent variable: primary education attainment (1=primary education or higher, 0=otherwise)

	1 OLS All individuals	2 OLS Urban individuals	3 OLS Rural individuals	4 2SLS All individuals	5 2SLS Urban individuals	6 2SLS Rural individuals
Fraction of constituencies in the district won by a woman	0.0969*	0.1333**	0.1105*	0.1120	0.6377**	0.0123
	[0.0527]	[0.0661]	[0.0609]	[0.1581]	[0.2907]	[0.1914]
Individual Controls	yes	yes	yes	yes	yes	yes
Demographic District Controls	yes	yes	yes	yes	yes	yes
Political Controls	yes	yes	yes	yes	yes	yes
District fixed effects	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes
Observations	105208	34604	70604	105208	34604	70604
R-squared	0.2541	0.1743	0.247	0.2541	0.1714	0.247

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1-3 are OLS regressions. Columns 4-6 are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. For these regressions I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include district and cohort fixed effects, as well as the following controls: the fraction of seats won by each political party grouping, the fraction of reserved seats, the fraction of urban, SC/ST and female population, male and female literacy rates and dummy variables for whether the individual is a woman, Muslim, Hindu, SC/ST or lives in a rural area where applies.

TABLE 10: First stage regression

Dependent variable: Fraction of constituencies in the district won by a woman	1
Fraction of constituencies in the district won by a woman in a close election against a man	1.2025***
	[0.1992]
Fraction of constituencies in the district that had close elections between women and men	-0.3731***
	[0.1738]
Controls	yes
Observations	5905
R-squared	0.4551

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. This is the first stage regression in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. For this regression I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. It includes district and cohort fixed effects, as well as the other controls described in Table 9.

TABLE 11: Effect on women and men

Dependent variable: primary education attainment (1=primary education or higher, 0=otherwise)	1 2SLS All individuals	2 2SLS Urban individuals	3 2SLS Rural individuals
Fraction of constituencies in the district won by a woman (effect on women)	0.1704	0.7826***	0.0435
	[0.2053]	[0.3086]	[0.2332]
Fraction of constituencies in the district won by a woman (effect on men)	0.0617	0.5140*	-0.0149
	[0.2237]	[0.3089]	[0.2642]
Controls	yes	yes	yes
Computed difference between the effect on women and men	*0.1087*	*0.2685*	*0.0584*
	[0.2927]	*[0.2231]*	*[0.3220]*
Observations	105208	34604	70604
R-squared	0.2541	0.1719	0.247

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1-3 are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. For these regressions I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include district and cohort fixed effects, as well as the following controls: the fraction of seats won by each political party grouping, the fraction of reserved seats, the fraction of urban, SC/ST and female population, male and female literacy rates and dummy variables for whether the individual is a woman, Muslim, Hindu, SC/ST or lives in a rural area where applies.

TABLE 12: Is caste important?

Dependent variable: primary education attainment (1=primary education or higher, 0=otherwise)

	1 2SLS All individuals	2 2SLS Urban individuals	3 2SLS Rural individuals
Fraction of constituencies in the district won by a SC/ST woman	0.1333	1.2934*	-0.0823
	[0.3842]	[0.7379]	[0.4438]
Fraction of constituencies in the district won by a general woman	0.1033	0.4235	0.0521
	[0.1663]	[0.2813]	[0.1997]
Controls	yes	yes	yes
Computed difference between the effect of SC/ST and general women	*0.0299*	*0.8698*	*-0.1344*
	[0.4268]	*[0.7796]*	*[0.4891]*
Observations	105208	34604	70604
R-squared	0.2541	0.1696	0.2469

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1-3 are 2SLS regressions, in which the fraction of constituencies in the district won by a SC/ST woman in a close election against a SC/ST man is used to instrument the fraction of constituencies in the district won by a SC/ST woman. The fraction of constituencies in the district won by a general woman in a close election against a general man is used to instrument the fraction of constituencies in the district won by a general woman I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include district and cohort fixed effects, as well as the following controls: the fraction of seats won by each political party grouping, the fraction of reserved seats, the fraction of urban, SC/ST and female population, male and female literacy rates and dummy variables for whether the individual is a woman, Muslim, Hindu, SC/ST or lives in a rural area where applies.

TABLE 13: Placebo tests

Dependent variable: primary education attainment (1=primary education or higher, 0=otherwise)

	1 2SLS Urban individuals	2 2SLS Rural individuals	3 2SLS Urban individuals	4 2SLS Rural individuals
Fraction of constituencies in the district won by a woman	-0.0549	0.3322		
(effect on individuals who migrated to the area after the age of 14)	[0.4851]	[0.4783]		
Fraction of constituencies in the district won by a woman			-0.0546	-0.3161
(effect on individuals aged 14-16 when they were in power)			[0.2733]	[0.1941]
Controls	yes	yes	yes	yes
Observations	12338	7381	22124	37714
R-squared	0.2280	0.2517	0.2083	0.216

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1-4 are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. For these regressions I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include district and cohort fixed effects, as well as the following controls: the fraction of seats won by each political party grouping, the fraction of reserved seats, the fraction of urban, SC/ST and female population, male and female literacy rates and dummy variables for whether the individual is a woman, Muslim, Hindu, SC/ST or lives in a rural area where applies.

TABLE 14: Measures of political influence

Dependent variable: primary education attainment (1=primary education or higher, 0=otherwise)

	1 2SLS Urban individuals	2 2SLS Rural individuals	3 2SLS Urban individuals	4 2SLS Rural individuals	5 2SLS Urban individuals	6 2SLS Rural individuals
Fraction of constituencies in the district won by a woman	0.6945*	0.1015				
who belongs to the party who won the majority in the state	[0.3609]	[0.2207]				
Fraction of constituencies in the district won by a woman	0.5059	-0.2431				
who does not belong to the party who won the majority in the state	[0.5346]	[0.2998]				
Fraction of constituencies in the district won by a woman			0.7853*	-0.1019		
(effect on individuals living in small districts)			[0.4047]	[0.2186]		
Fraction of constituencies in the district won by a woman			0.5098	0.2296		
(effect on individuals living in large districts)			[0.3263]	[0.2922]		
Fraction of constituencies in the district won by a woman					0.6877**	0.0226
(effect on individuals who were exposed to less months of President's rule)					[0.2915]	[0.1938]
Fraction of constituencies in the district won by a woman					-0.1339	0.1076
(effect on individuals who were exposed to more months of President's rule)					[1.3357]	[0.4037]
Controls	yes	yes	yes	yes	yes	yes
Observations	34604	70604	34604	70604	34604	70604
R-squared	0.1710	0.2470	0.1707	0.2467	0.1707	0.2470

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1-6 are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. In columns 1 and 2 the fraction of constituencies in the district won by a woman from the party that had the majority in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman from the party that had the majority. The same is true for women legislators who belong to the party that did not have the majority. I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. Regressions include district and cohort fixed effects, as well as the following controls: the fraction of seats won by each political party grouping, the fraction of reserved seats, the fraction of urban, SC/ST and female population, male and female literacy rates and dummy variables for whether the individual is a woman, Muslim, Hindu, SC/ST or lives in a rural area where applies.

TABLE 15: Robustness checks

Dependent variable: primary education attainment (1=primary education or higher, 0=otherwise)

	1	2	3	4	5	6	7	8
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals
	3% margin	3% margin	2.5% margin	2.5% margin				
Fraction of constituencies in the district won by a woman	0.6777*	0.0075	0.7036**	0.0846	0.7087**	-0.0521	0.6668**	-0.1519
	[0.3458]	[0.2227]	[0.3261]	[0.2246]	[0.3420]	[0.1731]	[0.3319]	[0.2171]
Controls	yes	yes	yes	yes	yes	yes	yes	yes
Close elections defined with a smaller margin	yes	yes	yes	yes	no	no	no	no
State specific trends	no	no	no	no	yes	yes	no	no
District specific trends	no	no	no	no	no	no	yes	yes
Observations	34604	70604	34604	70604	34604	70604	34604	70604
R-squared	0.1708	0.247	0.1704	0.247	0.1722	0.2494	0.1878	0.2547

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Columns 1-8 are 2SLS regressions in which the fraction of constituencies in the district won by a woman in a close election against a man is used to instrument the fraction of constituencies in the district won by a woman. For these regressions I also include as a control the fraction of constituencies in the district that had close elections between women and men. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes unless indicated otherwise. Regressions include district and cohort fixed effects, as well as the following controls: the fraction of seats won by each political party grouping, the fraction of reserved seats, the fraction of urban, SC/ST and female population, male and female literacy rates and dummy variables for whether the individual is a woman, Muslim, Hindu, SC/ST or lives in a rural area where applies.

6 Appendix

6.1 Education in India

In India there is a uniform structure of school education, although within the States and Union Territories there are differences in the number of years constituting primary, middle and secondary education.

The primary stage consists of classes I-V, in Andhra Pradesh, Bihar, Haryana, Jammu & Kashmir, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal.[29] On the other hand, it consists of classes I-IV in Assam, Gujarat, Karnataka, Kerala and Maharashtra.

The middle stage consists of classes VI-VIII in Bihar, Haryana, Jammu & Kashmir, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. Classes V-VII in Assam, Gujarat, Karnataka, Kerala and Maharashtra. And classes VI-VII in Andhra Pradesh and Orissa.

The secondary stage consists of classes IX-X in Bihar, Haryana, Jammu & Kashmir, Madhya Pradesh, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh and West Bengal. And classes VIII-X in Assam, Gujarat, Karnataka, Kerala and Maharashtra, Andhra Pradesh and Orissa.

The minimum age for admission in the first class of the primary stage is 5 or 6 years of age, depending on the State or Union Territory. The majority of States and Union Territories have established free education, however, in some States education is not free for classes IX and above.[30]

[29] Among others. Only the 16 main states in India are considered in this study.

[30] The highest annual fee is Rs. 360 in Meghalaya, when the lowest is Rs. 48 in Assam. Mean annual household income lies arund Rs. 34551.

6.2 Data appendix

Electoral data:

Collected from different volumes of the Statistical Reports on the General Elections to the Legislative Assemblies. The election commission of India publishes one report for every election in each state. There is data at the constituency level for the 16 main states in India for elections held during 1967-2001.

-*Proportion of seats in the district won by women*: defined as the total number of seats in which a woman won the election in the district divided by the total number of seats in the district. Then three years averages for each district are computed.

-*Proportion of seats reserved for SC/ST*: defined as the total number of seats reserved for Scheduled Castes and Tribes in the district divided by the total number of seats in the district. Then three years averages for each district are computed.

-*Proportion of seats won by women in a close election against a man*: defined as the number of women in the district who won by less than 3.5% of votes against a man over the total number of seats in the district. Then three years averages for each district are computed.

-*Proportion of seats in which a man and a woman contested in a close election*: defined as the number of men and women in the district who won by less than 3.5% of votes against a candidate of the other gender over the total number of seats in the district. Then three years averages for each district are computed.

-*Proportion of seats won by SC/ST women in a close election against a SC/ST man*: defined as the number of SC/ST women in the district who won by less than 3.5% of votes against a SC/ST man over the total number of seats in the district. Then three years averages for each district are computed.

-*Proportion of seats won by general women in a close election against a general man*: defined as the number of general women in the district who won by less than 3.5% of votes against a general man over the total number of seats in the district. Then three years averages for each district are computed.

-*Proportion of seats won by each political party:* number of seats won by the political party divided by total seats in the district. Then three years averages for each district are computed. Congress parties include Indian National Congree Urs, Indian National Congress Socialist Parties and Indian National Congress. Hard Left parties include Communist Party of India and Communist Party of India Marxist Parties. Soft Left parties include Praja Socialist Party and Socialist Party. Janata parties include Janata, Lok Dal, and Janata Dal parties. Hindu parties include the Bharatiya Janata Party. Regional parties include Telegu Desam, Asom Gana Parishad, Jammu & Kashmir National Congress, Shiv Sena, Uktal Congress, Shiromani Alkali Dal and other state specific parties.

NSS Data:

55th Round of the National Sample Survey Organization Data. Household Schedule 10: Employment and Unemployment. The survey was conducted in India between July 1999 and June 2000. I use the questions asked to individual members of each household.

-*Primary education attainment*: There is a question that classifies individuals according to whether they are illiterate, literate through attending non-formal education courses or adult education centers, literate through the Total Literacy Campaign or other programmes, literate below primary education, individuals who achieved primary education and individuals who achieved middle, secondary, higher secondary or graduate education. I then create a variable that is equal to one if the individual obtained primary or a higher level of education

-*Gender:* Question about gender. I create a dummy variable that is equal to one if the individual is a woman.

-*Caste:* Question about the individual's social group. Dummy variable that is equal to one if the respondent belongs to Scheduled Castes or Tribes.

-*Religion*: Question about the individual's religion. Dummy variable that is equal to one if the respondent is Muslim or Hindu.

-*Migration:* Question about the last usual residence. There are various possibilities: same district (urban/rural), same state but another district (rural/urban), another state(urban/rural) and another country. There is another question about the period in years since the individual left the last usual residence.

-*Workers:* Individuals older than 15 who are employed according to "Usual Activity Status" defined by the NSS. I create a variable that is equal to one if the individual falls in this category and zero otherwise.

-*Non-agricultural workers:* Classified according to NIC code of the "Usual Activity Status". Workers (as before) who did not work in the primary sector. I create a dummy equal to one if the individual works in the secondary or terciary sectors and zero if the individual works in the primary sector.

-*Wages:* Wages received for the work done during the reference week as reported by the respondent. Includes wages in kind and in cash.

Demographics:

Data from 1961-1991 were obtained from the Indian district database created by Vanneman and Barnes. Data from the Indian Census 2001 comes from the webpage "Education For All in India".

-*Data on male and female literacy rates:* literate males (and females) older than 5 over total population of males (and females) older than 5 in the district.

-*Data on SC/ST population:* number of SC/ST individuals over the total population in the district.

-*Data on female population:* number of women over total population in the district.

-*Data on urban population:* number of individuals living in urban areas over total population in the district.

President's rule:

Collected from Arora (1990), Kumar Sethy (2003) and web pages of the State Governments in India. Data on the number of months with President's rule per State and year.