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

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Abstract

This paper shows that the gender of politicians affects the educational levels of individuals who grow up in the districts where these politicians are elected. 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. Caste also matters, as female politicians who won seats reserved for lower castes and disadvantaged tribes are those who mainly have an effect. In addition, both the gender and caste of politicians determine who benefits more from their policies: in urban areas female politicians increase educational achievements of those of their gender and caste. A unique dataset collected on politicians in India is matched with individual data by cohort and district of residence. The political data allow the identification of close elections between women and men, which yield quasi-experimental election outcomes used to estimate the causal effect of the gender of politicians.

1 Introduction

This paper studies the impact of the gender of politicians in the Indian state governments on the educational achievements of a sample of citizens who live in the districts where these politicians are elected. It then analyzes whether caste also matters by comparing the effect of female politicians who won seats reserved for lower castes and disadvantaged tribes with the effect of female politicians who won unreserved seats. Finally, it investigates whether female politicians favour more those individuals who belong to their gender and caste groups.

The motivation behind this study is twofold. First, India accounts for more than one-third of the world's poor and has very low educational attainments. The adult literacy rate in 2003 was 61%, approximately the same as that in Sub-Saharan Africa, an area which is 1.5 times poorer. Female literacy rate was 47%, lower than the 52% observed in Sub-Saharan Africa (Human Development Report 2005). Moreover, educational differences are large across genders, castes, and rural/urban areas.

Given that political institutions play a major role in providing education and are led by people of different political persuasions, it is important to understand whether characteristics of these politicians determine the type of policies applied.

Second, it is important to understand whether the gender of a politician makes a difference. The issue of female political representation has been increasingly important in India, as some positions in local governments are reserved for women. However, this has not yet been the case of state governments, which actually play the main role in primary and secondary education.

To assess whether the gender of politicians matters for educational outcomes, I use a detailed dataset that I collected with information about 29686 politicians, who contested seats in the 16 biggest states in India during 1967-2001. These data are combined with National Sample Survey data to estimate the effect on individuals' primary education attainment of the identity of the politicians who were in power in their districts in India when they were young. The district is the best unit of analysis because it allows me to estimate the effect of the gender of the politicians in the smallest possible area where their electoral constituency is located. Moreover, given that the 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 effect not only on their constituencies but also on the overall district.

The key challenge is to empirically identify the causal effect of female politicians on the education of an individual. This is difficult because omitted variables are likely to affect both electoral outcomes and policy. To identify the effect of female representatives the share of constituencies in the district won by a female politician is instrumented with the share of constituencies in the district won by a female politician in a close election, i.e. by a small percentage of votes, against a male politician. 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; 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 of a district if female political representation in this district is higher. 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 8 % of the probability of attaining primary education in an urban area. In contrast, female representation does not have an effect on individuals living in rural areas of the district.

A possible explanation for these results is based on the fact that female politicians may care about the needs of women. Education is more important for women in urban areas, because returns to education, proxied by wage differentials between educated and uneducated women are higher there. Men can benefit from education both in urban and rural areas, because wage differentials between educated and uneducated men are similar in rural and urban areas. Moreover, it will be easier for an educated man than for an educated woman in a rural area to move to an urban area in search of nonfarm employment, where their skills are required. So, female politicians will invest more in education in urban areas, whereas male politicians will invest both in rural and urban areas.

In the state governments some seats are reserved for Scheduled Castes and Scheduled

Tribes (SC/ST), which are at the bottom of the hierarchal caste system in India. Given that SC/ST female legislators could have different policy preferences from the rest, I use this institutional feature to identify gender effects by caste. In addition, to the extent that female politicians may belong to higher classes than male politicians[1], the estimated effect of gender might capture the effect of class as well as gender. By estimating separately the effects of SC/ST and general female legislators, in reserved and nonreserved[2] seats, I can account for this. After dividing female politicians on the basis of whether they contested for a SC/ST reserved seat or not, SC/ST female legislators have a positive effect on the education received by individuals living in urban areas but not in rural areas. Because SC/ST female politicians come from a more disadvantaged background than general female legislators, this confirms that the results obtained are due to gender, and not due to class differences.

The identity of the politicians, defined by gender and caste, is then matched with the identity of individuals who grow up in the districts where they are elected. Results show that female politicians increase the probability girls attain primary education in urban areas. When defining identity as gender and caste, results show that politicians target their own groups: SC/ST female politicians increase the probability that girls and SC/ST individuals attain primary education while general female politicians increase the probability that girls and general individuals attain primary education.

Finally, a last set of results show that the effect of female representation is stronger when they are more influential, either within the district or in the Legislative Assembly. For example, those female politicians belonging to the main party and belonging to the states where there are more female legislators are those who have the strongest effect. The effect is also stronger on individuals living in small districts, with fewer constituencies, capturing better the effect of a politician on its constituency. Moreover, the effect of female politicians is less when there is a political disruption, namely President's Rule, for a longer period in the state and when they may have to compete for funds in the district with other female politicians. This confirms that the effects found are more likely to be due to their political actions than to the role model

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[1]If the cost of contesting in elections is higher for women than for men.

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

they may play.

This paper combines the literature on the determinants of education and the one on the identity of the legislator. Recent studies on education focus on the evaluation of policies related to an increase in the number of educational inputs (Banerjee et al 2007 and Chin 2005), or on the effect of different household, labour market, village and school characteristics on educational attainments (Dreze and Kingdon 2001). Other papers study the impact of traditional institutions on education, see Munshi and Rosenzweig (2006) and Pandey (2005). This study complements the literature on education in developing countries by analyzing whether the identity of the politicians who decide the educational policies in India has an effect on educational outcomes.

Recent studies on the identity of the legislator in India analyze the effect of different reservation policies and conclude that the identity of the legislator matters for policy determination, as reservation has an effect on policy. Chattopadhay and Duflo (2004) show how the reservation of one-third of the seats for women in Panchayats (local rural self-government) in the states of West Bengal and Rajasthan has a positive effect on investment in infrastructure relevant to women's needs. Pande (2003) analyses how the reservation of seats for SC/STs in the State Assemblies increases the transfers that these groups receive. Besley et al (2004) study the effect of reservations for SC/STs in village councils on the public goods that lower castes receive. Bardhan et al (2005) examine the effect of reservations of Panchayat Pradhans on targeting to poor and SC/ST households.

The contributions of this paper to the literature are as following: it analyzes the effect of variation in female political representation due to electoral outcomes rather than reservation policies. It studies separately the effect of general and SC/ST female legislators, controlling for the class effect. It also focuses on the effect of politicians who contested seats in the State Assemblies during a long time period on individual educational outcomes in the districts where these politicians were elected rather than on the states as a whole. Finally, it studies whether female politicians benefit more those citizens of their gender and caste group than the others[3].

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[3]Literature from developed countries shows how female and male legislators make different policy decisions. 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. This paper contributes to this literature by analyzing gender effects controlling for the class effect.

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 concludes.

2 Background and Data

2.1 Political Organization

India is a federal country, and the constitution gives a significant control of their own government to the 28 states and 7 union territories. The State Legislative Assemblies are directly elected bodies set up to carry out the administration of the government in the states of India. State governments are those that mainly decide the educational policies and the expenditure on education and 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 the educational issues. Although education falls into the Concurrent List (matters shared between the central and the state governments), the states play the major role in educational policy, particularly at the primary and secondary levels.

There are some evidences that female politicians may care about the education received by children living in their constituencies in India. Pundir and Singh (2002) conducted a survey of female legislators in the Indian state of Uttar Pradesh and found that most of the female legislators who were in power between 1952 and 1996 were able to open schools in their areas. Moreover, some of them were also engaged in programs trying to improve education.

Given that the Indian districts have education offices, female politicians in the state governments could keep in close contact with these offices, and could influence the way expenditures are made there. They could also decide to transfer more funds to one district, in particular, if their constituency is located there.

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 state population. Districts are the administration unit at the lower level from the state. Each district includes between one and 37 constituencies. The median district has 9 electoral constituencies.

The Indian constitution (1950) provides political reservation for SC/STs. According to articles 330 and 332 of the constitution, before every national and state election, a number of jurisdictions will be reserved for these population groups. Both SC and ST tend to be socially and economically disadvantaged, and they constitute approximately 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.[4]

The Constitution (Scheduled Castes) Order and the Constitution (Scheduled Tribes) Order 1950 provide a list of SC/STs, respectively, for each Indian state. These lists have been occasionally modified, but with little variation.

According to Article 341 of the Constitution, the SC are the "castes, races or tribes or parts of or groups within castes, races or tribes deemed by public notification to be Scheduled Castes by the President in relation to that state or union territory". According to Article 342, the ST are the "tribes or tribal communities or part of or groups within these tribes and tribal communities which have been declared as such by the President through a public notification".

ST are generally poor, have primitive ways of life, live in isolated areas, have a distinct culture, and do not communicate much with the rest of the community. SC can not be served by clean Brahmans, or by those who serve the high-caste Hindus, as they are believed to pollute a high-caste Hindu by contact or proximity. They are prevented from using public services, such as roads and schools, and are not treated as equal by high-caste men with the same education[5].

In 1992, the 73rd amendment to the Constitution of India established that one-third of

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[4]There has almost never been a case in which an 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.

[5]Source: Source: www.indianngos.com, Pande (2003) and Jain & Ratnam (1994). This is based on the Census Report of 1931(1).

seats in the Panchayat councils (rural local governments) and one-third of Pradhan positions would be reserved for women. However, this was not the case in the State and Central Governments. 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 reaching an agreement. Women in India are underrepresented 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 SC/STs in the State Assemblies were won by a woman in a given year and state. In Figure 1, the fraction of seats in each state won by women between 1967 and 2001 is plotted. This figure shows significant differences across states on both the levels and trends of female representation. Figure 2 shows the fraction of constituencies in the different districts won by a woman by state and election year. There is significant district-time variation in female representation; even if for many district-year observations, the female representation is zero.

2.2   Theoretical Background

The theoretical background for this study comes from two sources. First, some models support the fact that the identity of the legislator matters for policy. Second, other models are able to explain why legislators care about policies implemented in the areas where they are elected.

If candidates could commit to implement specific policies when elected and only cared about winning the elections, political decisions should only reflect the preferences of the electorate, (Downs (1957)). If this were the case, female political representation would not matter for policy outcomes, because 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 the gender of the candidate. The same would apply to politicians belonging to a given caste. However, Besley and Coate (1997) and Osborne and Slivinski (1996) show how in the absence of complete policy commitment, the identity of the legislator matters for policy determination, as increasing political representation of a group would increase its influence in policy.

According to this set of models, if politicians' can not commit to implement a given set of policies once in power, the gender and caste of a politician would matter for policy.

Several models explain why legislators direct funds to their 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 not being again makes them perfect delegates for their constituencies. However, their power to do so will depend on their bargaining power in the legislature. 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, independent of the promises made by their political party. The extent of this will depend on the degree of party discipline.

In India, state legislators are elected in single-member constituencies. India has been characterized by a multiparty electoral system, the party who won more seats in the legislature being the one who forms government, with or without other parties in the coalition. Politicians in India represent the interests of their constituencies and may have incentives to provide public goods or expenditure there. If Indian political parties face costs of enforcing "party discipline", then individual legislators may have the power to implement policies in their constituencies, especially if they belong to the party with more seats in the legislature. According to citizen-candidate models, in the absence of complete policy comittment, if politicians of different identities have different preferences, then the type of expenditures and policies they will conduct in their constituencies will be different. Thus, the gender and caste of politicians may have an effect on the education and other public goods received in their constituency and

possibly as well in the whole district (through the district administrative offices).

2.3   Data

The empirical analysis focuses on the causal 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. To answer this question, I collected a unique dataset on Indian politicians which was then combined with National Sample Survey data (NSS). This section describes the data used and how the different data sources was combined.[6]

A very detailed dataset was collected on the State Legislatures in India during 1967-2001 from the pdf reports published by the Election Commission of India (ECI). The ECI provides information at the constituency level of the candidate who won, whether he contested in a SC/ST reserved constituency, his or her gender and political party. It also provides data on all female candidates who contested for election, their political parties[7] and the votes they obtained. For female and male politicians who won against a candidate of the other gender, the information was gathered regarding the runner-up in each particular election and regarding the votes obtained by him/her. Overall, these data give information on 29686 politicians who contested in the 16 larger states during 1967-2001.[8]

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, then 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. Female political representation has been low over the time period under consideration: approximately 3.8% of the seats per district and electoral year. Approximately 25% of seats are reserved for Scheduled Castes and Tribes and female representation in reserved seats is also low: approximately 3.7% of them are won by women. In addition, over this time period, Congress held most of the seats, followed by Janata, Hindu, and Regional Parties. Within districts in

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

[7]Details on the political parties and how are they grouped can be found in the Data Appendix.

[8]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.

which women won the elections, the majority of both women and men who won were from the Congress party, followed by Janata, Hindu, and regional parties. Thus, female politicians do not seem to be disproportionately representing a particular party, and all parties had female candidates winning seats in elections.

I combine these data on politicians with data from the 55th round of the 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. These contain information on 596688 individuals, 371188 in rural areas and 225500 in urban areas.[9]

The NSS gives information on personal characteristics such as age, gender and whether the individual is SC/ST. In addition, it provides information on the educational attainment of each individual. This information is used to create a variable that is equal to one if the individual completed primary education through formal education.[10]

Panel A in Table 2 gives descriptive statistics on several characteristics of the individuals in the sample used, classified by urban/rural status. A total of 37.8% of women and 61.3% of men living in rural areas completed primary education, whereas in urban areas they were 74.7% and 79.1% respectively. Thus, educational attainment is much lower and gender differences are much larger in rural areas. Differences between general and SC/ST individuals are also larger in rural than in urban areas.

Because the NSS data only provides information on individual residence up to the district level and the politicians are elected in constituencies, which are smaller in size than districts, to merge the two datasets the electoral data is aggregated up to the district level.

This is not a trivial task. To know which constituencies are included in each district for each electoral year, different constituency delimitation orders and the publications "State Elections in India", which lists the constituencies that are included in each district in each election year

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

[10]I then only consider individuals who attended formal education courses in my sample. Those who obtained education as adults are then considered as uneducated 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.

are used. Some districts have divided, have been newly created or have disappeared during the time period under consideration. The 1991 census district definition is then used and only those districts that did not split or disappear were included. Those districts which were newly created between 1967 and 2001 and those which include constituencies belonging to another neighboring district at the same time are not considered[11]. This procedure allows the aggregation of the electoral data into districts and to have information on 276 districts that include nearly 2761 electoral constituencies[12].

The electoral dataset is merged with the NSS data by district of residence and by the year in which each individual started primary school[13]. Thus, using information on the year each individual was born and his or her district of birth, one can know which politicians where in power before he or she started primary school.

For those individuals who migrated, the NSS does not provide information regarding the district of origin. Because an individual who migrated from another district after this age will not have benefited from the educational policies applied in the district where he is migrated, those who migrated after schooling age from another district, state or country are eliminated from the sample. Those who migrated from rural to urban areas or vice versa within the same district are also eliminated, because the educational policies and inputs may be different in rural than in urban areas[14].

Because primary school lasts for four or five years, depending on the state of residence and also because individuals usually start schooling at the age of six and finish at the age of 10-11[15], I restrict the sample to those individuals who were older than 13 at the time of the survey. This procedure takes into account differences across states and it also takes into

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[11]Some constituencies straddle a district bound.

[12]There are around 463 districts in the 16 biggest states in India. District characteristics for the districts included in the sample are not very different from the excluded ones. Results available from the author on request.

[13]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.

[14]Even if migration in India is generally low, migration is higher for women, because sometimes they move outside their district to get married. However, women who migrated at marriage do not display very different educational levels than the rest. Results available from the author upon request.

[15]Depending on the State. The Appendix provides more information on this.

account the fact that some individuals may have to repeat entire years and thus finish their education later.

The resulting sample size is 105208 individuals. The availability of political data allows me to include only individuals born after 1964 in the sample and the survey allows me to include individuals born before 1987 . Thus, political data from 1967-1992 is used to be merged with the individual data. With this information I can exploit variation across districts and cohorts, as different individuals in a cohort will have lived in different districts and thus, because politicians change over district and over time will have been exposed to different politicians.

I assign the politicians who were in power during the three years before he or she started primary education to each individual in the sample. Panel A in Table 3 gives an example of 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 or her 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, for this individual, three-year averages of the political variables (between 1967 and 1969) are taken[16].

3   Identification

The key identification challenge is to estimate the causal effect of the identity of politicians on education, by separating this effect from the effect of unobservable variables 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 and F_{dt} is the fraction of constituencies in the district held by female politicians during the three years before individual i started primary education. The coefficient β would not be consistently estimated by OLS if there is an omitted variable Q_{dt}, not included in the

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[16]Results are robust to taking longer time-periods, i.e. 6, 9 and 12 years, as a reference. This is available from the author on request.

model and correlated with F_{dt}.

The omitted variable could be electoral preferences in the district, which 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, but one can not rule out the fact that the omitted variable Q_{dt} may be district-specific and may change over time.

To identify the causal effect of female politicians, I take advantage of the existence of close elections between a female and a male candidate. Close elections are elections in which the vote difference between the winner and the runner-up is very small. The identification strategy used in this paper follows the same idea as the regression discontinuity design. This methodology has been widely used and has been first introduced in the context of elections by Lee (2001) for incumbency advantage and by Pettersson-Lidbom (2001) for the effect of party control on fiscal policies. In the field of development economics, Miguel and Zaidi (2003) use regression discontinuity to test for the "Patronage" hypothesis in Ghana. Regression discontinuity has also been used as an instrument by Angrist and Lavy (1999) to estimate the effect of class size on educational achievements and by Rehavi (2003), who uses close elections between women and men in the US as an instrument to estimate the effect of female politicians on expenditures at the state level.

In the same spirit, to identify the causal effect of female politicians, I use the fraction of constituencies in the district won by a woman in a close election against a man as an instrument for the fraction of constituencies in the district won by a female politician. 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", as the male politician could have won the election as well. These constituencies will be ex ante comparable to constituencies in which male candidates win in a close election against a woman.

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

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winner has to receive more votes than the runner-up 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 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. This discontinuity at the zero vote difference will provide a randomized treatment.

Thus, in elections in which the winner and the runner-up have different genders, when the difference in votes is very small, the gender of the winner will be randomized. This randomization implies that 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 unobservable variables, and they will only differ in the fact that by chance either a man or a woman won the election. I define close elections as elections in which the difference of the votes between the winner and the runner-up is less than 3.5% of the total votes in that particular constituency.[17]

Figure 3 shows that there is a significant variation in the fraction of constituencies that had close elections between women and men in each district and electoral year by state. In the sample used in this study 136 district-electoral years had close elections between women and men, while 1836 did not. 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 is a close election in his or her district of residence. This table shows that 12% of individuals in the sample were living in a district where close elections between men and women took place when they were young: 48.7% of them in districts where more men won in close elections than women, 3.2% in districts where the same number of women and men won in close elections, and 47.8% in districts where more women won in close elections than men. Thus, as expected,

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[17]In order to use close elections as an instrument I need to choose a cut-off point to define elections that are close. I chose 3.5% in order to have a sufficient number of close elections and because a 3.5% difference is sufficiently close zero. I perform the same exercise with smaller margins and results are unchanged (see the Placebos and Robustness section).

there is nearly the same fraction 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 equation (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 it takes 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. Because observations in the same district could be correlated, I compute the standard errors clustered at the district level. Regressions are weighted using the weights provided by the NSS.

The main variable of interest is F_{dt}, which is 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}, which is 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 elections may not be a random event. However, the outcome of a close election is random, meaning that the gender of the winner in close elections between women and men is random as well. In other words, the effect of the existence of close elections between women and men on education is controlled by in equation (1) and partialled out of the instrument in equation (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 exposed to different shocks or nationwide educational policies. X_{idt} is a vector of individual-level control variables. Z_{dt} are the set of other controls at the district level that vary over time and may have an effect on the dependent variable. These controls are discussed in the later sections.

In the appendix, I shown several facts that support the validity of the identification strategy used. First, I have provided some evidence supporting the fact that the outcome of a close election is indeed random, in the sense that it cannot be predicted by observables at the district level. Second, I have shown that the districts in which more female candidates won in close elections against men are similar in observables to those in which more male candidates won in close elections against women. Third, I have shown that female and male candidates who won in close elections against a candidate of the other gender receive the same percentage of votes, tend to be the incumbent with the same probability, and win in constituencies where electoral turnout, the number of close elections that took place in the past and the number of other female candidates contesting for the same seat, are the same. Finally, I have provided evidence that districts that had close elections between men and women are not systematically different from other districts in India. Districts that had more close elections between male and female candidates could be different from other districts as they would have more female candidates contesting elections, this is the reason why I control for TC_{dt} in specifications (1) and (2). The fact that they are quite similar than the rest further supports the external validity of the results obtained[18].

The dependent variable is a binary response variable, thus specification (1) is a linear probability model. One could then obtain fitted values that are outside the unit interval. However, Wooldridge(2002) states that estimating a linear probability model by 2SLS when there are continuous endogenous explanatory variables would provide a good estimation of the average effect, as it would still be a consistent and unbiased estimator.

For the main specifications, I compare the results from the linear probability model with the results obtained using a probit model with continuous endogenous explanatory variables,

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[18]In the appendix I could not exploit time variation due to lack of data. As differences in districts that have close elections and districts that do not have them could change over time I add TC_{dt} as a control in the regressions.

estimated with conditional maximum likelihood. This has to be done under the assumption that the error terms are independently and identically distributed multivariate normal for all observations.

4 Results

4.1 Baseline Results

4.1.1 The Effect of Female Legislators on Education

Results for the basic econometric specification are shown in Table 4. The dependent variable is a dummy variable equal to 1 if the individual obtained at least primary education and is 0 otherwise; the coefficient reported is the one corresponding to the proportion of constituencies in the district held by female politicians during the three years before an individual started primary education.

OLS results in columns (1)-(3) show that female representation is positively and significantly correlated with the probability that an individual attains primary education. When the sample is divided between those who live in urban and those who live in rural areas, the correlation is positive in both cases, see columns (2) and (3).

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 larger, 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 approximately 8% of the total probability that an individual obtains primary education in an urban area. 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 considered as an important magnitude[19]. Columns (7)-(9) show results for the probit with endogenous regressors[20]. The coefficients reported are the average marginal effects. Results for this specification are very similar to the 2SLS results, so

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[19]These coefficients are not reported in Table 4, but are available from the author on request.

[20]Using ivprobit in Stata.

I choose 2SLS as my preferred specification.

The first stage regression for this specification is shown in the first column of Table 5. 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. Holding the fraction of constituencies won 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 1 percentage point would increase female representation by 0.9 percentage points[21][22].

In these regressions, I control for individual characteristics. Because rural areas are likely to have lower literacy levels and educational inputs, a dummy for rural areas captures this effect. As caste, gender, and religion may be important determinants in the education of an individual, I also include dummies that indicate whether the individual is a woman, Hindu or Muslim, and whether the individual is an SC/ST.

To disentangle the identity of the legislator's effect from the political parties' effect, I include the average fraction of seats won by the different political parties in each district the three years before the individual started primary education as control variables. If female politicians have a differential effect compared with male politicians after controlling for party composition, this indicates that the results will be given by gender and not by party differences. As in Besley and Burgess (2002), I use seven main party groups: Congress, Hard Left, Soft Left, Janata, Hindu, Regional parties, and independents together with other small parties. I also include the fraction of SC/ST reserved seats in the district as a control variable, because this may also have an effect on the nature of political competition in each district.

I control for other variables that vary across districts and over time. I include female and male literacy rates to account for the fact that in districts were there are more literates, the preferences of the electorate may be different. In addition, it may as well be that in districts

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[21]The coefficient for the fraction of elections that are close elections between women and men is -0.3185 with a standard error of 0.0144.

[22]Both the instrument and the female representation variable vary at the district and cohort level, even if the dependent variable is at the individual level. When running the first stage regression at the district and year level without individual variables the coefficient for the fraction of constituencies in the district won by a woman in a close election against a man is 1.2025, with a standard error or 0.1992. Results for the pooled second stage regression are 0.4966 with a standard error of 0.2884 in urban areas and -0.0201 with a standard error of 0.1838 in rural areas.

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, because they may also have an effect 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 characteristics three years before the individual started primary education to account for the situation the legislator had in a particular district[23].

Discussion   Results show that female politicians have a significantly larger effect on the education obtained by individuals living in urban areas of their own district than male politicians (the reference category). However, this is not the case in rural areas.

2SLS coefficients are larger than the OLS coefficients. The fact that the OLS coefficients are downward biased suggests that the omitted variable is positively correlated with female representation and negatively correlated with education (or vice versa). For example, if female politicians are known to be effective for educational improvements, then in areas where educational levels are low, they will tend to elect female politicians. Another possibility is 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 one of the "elite" families in power. Bias for the rural sample is smaller; even if the 2SLS coefficient is very imprecisely estimated, OLS and 2SLS coefficients are very similar. This implies that by running the regressions with OLS, the fact that the effect of female representation in urban and rural areas is very different cannot be distinguished.

If both female and male politicians implement their own preferences when they are in power,[24] then it is 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, 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

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[23]Details on these variables can be found in the data appendix.

[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.

rural areas; hence demand for women's education is higher[25].

I have computed wage differentials for working women older than 15 with and without primary education. Data for these variables are shown in Panel A of Table 2. In urban areas, the wage of an educated woman is 3.5 times the wage of an uneducated woman. In rural areas, the wage of an educated woman is 1.5 times the wage received by an uneducated woman. 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, because their mobility may be 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 that in urban areas, 95% of working women with primary education work in the nonagricultural sector, whereas 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 1.9 times the wage of an uneducated man, whereas in rural areas, it is 1.5 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 that they can always move to work in urban areas, they will have more opportunities than women in rural areas. Thus, if they become educated they will be more able to take advantage of their skills.[26] [27]

Placebos and Robustness   In this section, I provide evidence supporting the identification strategy used in this study by performing two placebo tests and some checks on the main specification.

The primary education attainment of an individual should be determined by the policies

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[25]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.

[26]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 does not seem to be the case.

[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.

applied by the politicians in power in the district where the individual was living before he or she started primary education,[28] but should not be determined by policies applied by politicians who were in power when he or she finished primary education or by politicians who were in power somewhere else when these individuals were young. The fact that timing is so crucial for primary education can be used to perform two placebo tests.

I first use data on individuals who migrated from other districts or who migrated within the same district between rural and urban areas[29] after the age of 14. Individuals who migrated to the area when they were too old to achieve primary education can be used to perform a placebo test because they could not be affected by the policies applied by the female legislators who were in power there when they were young. Because primary school ends when an individual is 11 years old and because an individual aged 14 should be in secondary school, one should not observe any effect from female politicians on these individuals. For each individual, I use political characteristics and control variables corresponding to the new district of residence when the individual was 3-5 years as right hand side variables. Model (1)-(2) is then run on these individuals, using the same first stage as before. Results are shown in columns (1) and (2) of Table 6. 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).

Similarly, there should be no effect on individuals who have always lived in the district but who were too old to be affected by the policies applied by female politicians when they were in power. To conduct the second test, the politicians' data is combined with the data on individuals who were aged from 14 to 16 when the female politicians were in power[30]. The same exercise is done for these individuals. Results are shown in columns (3) and (4) of Table 6. In column (3), I restrict the sample to individuals living in urban areas. As before, 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

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

[29]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.

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

younger individuals. As it is shown in column (4), female representatives do not have any effect on individuals living in rural areas. Results of these two placebo tests are reassuring, as they confirm that the female representation variable is not proxying for another variable.

In the main specification, I define close elections as elections in which the vote difference between the winner and the runner-up is less than 3.5%. Here I check whether results are sensitive to this choice of vote margin. In columns (5)-(8) of Table 6, I test whether results are the same when close elections are defined as those in which the winner won the runner-up by smaller margins. In particular, in columns (5) and (6), I use a 3% margin as a cutoff point, whereas in columns (7) and (8), I use a 2.5% margin. Then I run the 2SLS specification as before. Now, however, the instrument will be defined in a different way, because some elections that were considered close before will not be considered now as such. Results for the urban and rural samples are very similar to those obtained in the previous section. The coefficient for the effect of female politicians in urban areas 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 female representation also trends upward, results obtained may be capturing this trend. Because 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 side variables. In columns (9) and (10) of Table 6 I control for the existence of state-specific trends. Results remain unchanged. In addition, in columns (11) and (12) of Table 6, I include district-specific trends in the regression. Reassuringly, results are also very similar to the ones obtained before.

4.1.2 The Effect of SC/ST and General Female Legislators

India provides the unique opportunity to analyze both the gender and the caste effect of politicians, which has not been previously analyzed. I take advantage of the fact that some seats in the State Assemblies are reserved for the SC/STs. SC/ST women are part of a socially and economically disadvantaged group, and may have different preferences from the rest. Taking advantage of this reservation, one can compare the female politicians who contested

for SC/ST reserved seats to female politicians who contested for unreserved (or general) seats. Considering SC/ST and general female legislators separately, one can then disentangle gender from caste effects. For all social groups, primary education is correlated with higher wages and household expenditure (see Figures 4 and 5), thus, education could potentially be beneficial for all citizens, irrespective of their caste.

If the cost of running for elections is higher for female than for male candidates, then female legislators would belong to richer economic backgrounds than male legislators. If this is the case, the gender effect could be contaminated by an "economic background" effect. SC/ST individuals are in general poorer than the rest, thus, if SC/ST female representatives have an effect on education, this will indicate that the coefficients obtained before are driven by gender differences, not by class differences between male and female politicians.

The female representation variable is divided according to whether female politicians contested for an SC/ST reserved seat or not. The specification that is going to be tested will then be:

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

Where the fraction of constituencies won by SC/ST women in a close election against an SC/ST man is used as an instrument for $Fscst_{dt}$, the fraction of constituencies won by SC/ST women. Similarly, the fraction of constituencies won in a close election by a general woman against a general man is used as an instrument for $Fgen_{dt}$, the fraction of constituencies won by general women[31].

Table 7 shows the results for the regressions in which the female representatives are divided according to whether they contested for an SC/ST reserved seat or not. In columns (1),(2), and (3), the OLS results for the whole sample, urban and rural individuals are reported, respectively. The coefficients for the fraction of constituencies in the district won by SC/ST female politicians and the fraction of constituencies in the district won by general female politicians is also reported. Results show a positive correlation between general female political

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[31] SC/ST reservations are decided according to these groups' populations. As before, I add as a control in the regressions the fraction of seats reserved for these groups and the fraction of the population they represent.

representation and education in urban areas. However, as before, these results could be contaminated by omitted variable bias.

First-stage regressions for the 2SLS specification are shown in Table 5. The fraction of constituencies in the district won in a close election by an SC/ST female politician against an SC/ST male politician is a very good predictor of the fraction of constituencies in the district won by an SC/ST female politician. The analogous is true for general female politicians. The cross-coefficients are also significant, but are smaller[32].

2SLS estimates of this specification are shown in columns (4)-(6) of Table 7. Results for the whole 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 from the one for SC/ST female representatives, even if it is smaller in magnitude. In fact, results in column (5) 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 only the sample of individuals who live in rural areas is considered, the effect of both general and SC/ST female politicians is not significant; see column (6).

Columns (7)-(9) report results for the specifications in which the second stage is estimated as a probit. For these specifications, the average marginal effects are reported. Results for these three specifications are very similar to those obtained before, even if now the coefficient for the effect of general female politicians in urban areas is significant. For simplicity, and

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[32]Since variation both in the instruments and the endogenous variables is at the district and year level, even if I use NSS weights in the individual regressions I should check whether results remain running the regressions at the district and year level, without controlling for individual characteristics. The first stage results are as well very similar. In the regression for SC/ST female politicians, the coefficient for SC/ST female politicians who won in close elections is 0.9825, with a standard error of 0.0448. In the regression for general female politicians, the coefficient for general female politicians who won in close elections is 1.1312, with a standard error of 0.0577. Moreover, coefficients for the second stage are as well very similar, whether I run the regression at the district level or at the individual level: in urban areas SC/ST female politicians have a coefficient of 1.008 with a standard error of 0.4315 and general female politicians politicians 0.2788 with a standard error of 0.3330. In rural areas SC/ST female politicians have a coefficient of -0.1883 with a standard error of 0.4132 and general female politicians have a coefficient of 0.0651 with a standard error of 0.2170.

given that results with a probit are very similar to the results for 2SLS, the latter is chosen as my preferred specification.

Division of female legislators between SC/ST and general helps in identifying the effects of class, which may be confused with gender. 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. In fact, their effect is stronger than the effect of female politicians obtained without taking the caste of the politicians into account. In conclusion, results in Table 7 are reassuring, because they indicate that results for female representatives obtained before were indeed driven by gender and not by class. Perceived returns to education may be higher for SC/ST female politicians than for general female politicians if their education, together with caste reservations allowed them to cross the caste barriers and enter them into politics; this may be one of the reasons why their effect on education is higher.

4.1.3 Effects of the Gender and Caste of the Politician on Individuals who Share their Identity.

This subsection aims to determine whether politicians tend to favor those who share their same identity, as defined by gender and caste, in policymaking. To do this, individuals are matched with politicians according to their identities. If female politicians promote policies that favour women's needs, they should increase girls' education. However, due to spillover effects boys' education could increase as well.

The first objective would be to estimate whether the effect of female politicians on the education received by girls is larger than their effect on the education received by boys, by matching female politicians with women and men who were living in the districts where these politicians were elected when they were young. This is done in specification (4):

$$Y_{idt} = \theta_d + \psi_t + \beta girl_{idt} * F_{dt} + \gamma boy_{idt} * F_{dt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \qquad (4)$$

F_{dt} is interacted with a dummy variable that is equal to one if the individual is a girl:

$girl_{idt}$ and another variable that is equal to one if the individual is a boy: boy_{idt}. As before, the fraction of seats in the district won by a female politician in a close election against a man is used as an instrument for the fraction of seats in the district won by a female politician [33].

Results are reported in Table 8. Given that results for the whole sample were never significant in the previous sections, I only report results for urban and rural areas separately. Results for the urban sample are shown in Panel A, whereas results for the rural sample are shown in Panel B. Horizontal lines separate different regressions.

In the first row of both panels, the coefficients reported are those for the fraction of constituencies in the district won by a woman interacted with two dummy variables: one that is equal to one if the individual affected is a girl and another one that is equal to one if the individual affected is a boy. The computed difference between these two coefficients is also reported. Results in the first row of Panel A indicate that female politicians have a positive effect on the education of both girls and boys; the coefficient for the effect on girls is 50% larger in magnitude than the one for the effect on boys, although the difference between these two coefficients is not significant. This difference in magnitudes may be due to the fact that women have lower primary education attainments than men to start with, or may be due to the fact that female politicians promote educational policies that increase girls' education but that also have spillover effects on boys. In Panel B, results for individuals living in rural areas are reported, here neither girls nor boys are affected by female politicians.

Given that SC/ST female legislators were those who had a larger effect on education in urban areas, the caste dimension is then taken into account to compare female politicians who contested for SC/ST reserved seats with female politicians who contested for unreserved (general) seats, and their effect is analyzed on individuals of different identitites.

To estimate the effect of both SC/ST and general female politicians on individuals of different identities, the female representation variables are interacted with dummy variables that will be equal to one if the individual belongs to a particular identity group. Thus, $ident_{idt}^{j}$ being equal to one indicates that individual i, born in district d and in cohort t has identity j. Dummies for gender, caste or gender and caste of the individuals, which are

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[33]In the first stage the instrument is also interacted with the dummy variables.

mutually exclusive, are used as identity variables. In this specification, the controls used are those used in the previous subsection, and include $ident_{idt}^{j}$. The specification that is going to be tested will then be:

$$
\begin{aligned}
Y_{idt} &= \theta_d + \psi_t + \sum_j \beta_{1j}(ident_{idt}^{j} * Fscst_{dt}) + \sum_j \beta_{2j}(ident_{idt}^{j} * Fgen_{dt}) + \\
&\quad + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt}
\end{aligned} \tag{5}
$$

As before, the fraction of constituencies in the district won by a woman in a close election against a man is used as an instrument for the fraction of constituencies in the district won by a woman. It is done both for women who won in reserved seats (SC/ST) and for women who won in nonreserved seats (general seats)[34].

It is first analyzed whether both SC/ST and general female politicians favor women more than men, by increasing the probability that a girl attains primary education more than the probability that a boy attains primary education. Results in the second rows of Panel A and B show the coefficients of the effect of SC/ST and general female politicians on girls and boys, for the urban and rural sample, respectively. The coefficients reported correspond to the interaction between the fraction of seats in the district won by an SC/ST (general) female politician, with two dummy variables, one that indicates whether the individual is a girl and another one that indicates whether the individual is a boy. The computed difference among the coefficients on girls and boys are also reported, both for SC/ST and for general female legislators.

Results show that both SC/ST and general female politicians have a positive effect on the probability that girls attain primary education in urban areas, while their effect on boys is not significant. By increasing SC/ST female representation by 10 percentage points, the probability that a girl living in an urban area attains primary education increases by 15 percentage points, whereas by increasing general female representation by 10 percentage points, the probability that a girl attains primary education in an urban area increases by 5 percentage

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[34]In order to estimate the model, the representation variables are interacted in the second and the first stages with the identity dummies.

points[35]. Consistently with results in Table 7, the effect of SC/ST female politicians on girls is larger than the effect of general female politicians. The coefficients on the effect on girls and boys are not significantly different, neither for general nor for SC/ST female politicians. Panel B shows that in rural areas the effect is not significant, neither for girls nor for boys. Thus far, results show that both general and SC/ST female politicians increase girls' education in urban areas. Even if the educational gender gap is not reduced, their effect on boys is not significant. Because the reference category are male politicians, results indicate that both general and SC/ST female politicians increase girls' education more than male politicians.

Given that SC/ST individuals attain primary education with lower probability than general individuals, then it is also interesting to see whether female politicians increase education for individuals of their own caste group. Results are shown in the third rows of panels A and B, for the urban and rural sample, respectively. In urban areas, SC/ST female politicians have a positive effect on SC/ST individuals, whereas general female politicians have a positive effect on general individuals. In fact, by increasing SC/ST female representation by 10 percentage points, the probability that an SC/ST individual attains primary education increases by 28 percentage points, which is 42% of the probability that an SC/ST individual attains primary education in an urban area. In addition, this coefficient is significantly different than the effect on general individuals. By increasing general female representation by 10 percentage points, the probability that a general individual attains primary education increases by 5.6 percentage points, 6.9% of the probability that a general individual attains primary education in an urban area. This coefficient is not significantly different from the one for SC/ST individuals, even if the latter is much smaller. This is the case because the latter is not precisely estimated.

In rural areas, SC/ST female politicians have a negative effect on the probability that SC/ST individuals attain primary education. Because the reference group is men, this means that SC/ST female politicians have a lower effect on education in rural areas than male politicians (the reference category), even after controlling for the fraction of seats in the district that are reserved for SC/STs. SC/ST female politicians do not affect general individuals. General female politicians do not have an effect on individuals living in rural areas, irrespective

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[35]The probability that a woman obtains primary education in an urban area is 74.7%.

of their caste.

Female politicians seem to induce educational policies that favor individuals of their gender and caste in urban areas. Because women benefit more from education in urban than in rural areas, the fact that female politicians benefit individuals of their same caste in urban areas but not in rural areas may indicate that they target individuals of their gender and caste.

To confirm this later statement, in the fourth row of Panels A and B results in which the female representation variables are interacted with four different dummy variables are shown: for SC/ST girls, SC/ST boys, general girls and general boys. This allows the identification of the effect of SC/ST and general female politicians on the different groups. In urban areas, SC/ST female politicians have a positive effect on the probability that both SC/ST girls and boys achieve primary education. Moreover, they also affect positively the probability that general girls achieve primary education. The coefficients for SC/ST girls and boys are not significantly different, but they are both different from the coefficients for general girls and boys. These results confirm that SC/ST female politicians target educational policies to individuals of their own group: women and the SC/STs. In fact, a 10 percentage points increase in the proportion of seats won by SC/ST female politicians increases the probability that SC/ST girls achieve primary education by 30 percentage points, which is a very large magnitude compared with the average probability of achieving primary education.

General female politicians also target their own group in policymaking, as they have a positive effect on the probability that general girls achieve primary education. However, this coefficient is not significantly different from the coefficient for SC/ST girls and boys and general boys, as these are not precisely estimated. As expected, results in panel B show no effect on individuals living in rural areas.

Even if results in the first row of Panel A could suggest that female politicians increase both girls and boys' educational attainment and their effect is larger on girls as they start from lower levels of education; this is contradicted by results in the third and fourth rows, where results suggest a targetting of policies towards the same caste and gender groups of the female politicians, and by the fact that general female politicians do not have an effect on SC/ST individuals, which start from lower levels of education.

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4.2   Measures of Political Influence

With respect to the interpretation that female politicians affect education because they act on policies, in this section, I check whether the effect of female representation is stronger when they are more influential, either within the district or in the legislature. This is specially important, as I do not have data on educational inputs at the district level[36], and it could be argued that the identity of the politician has an effect on education because they act as a role model for people living in their constituencies, not because of the policies they implement.

4.2.1   Does Being A Member of the Majority Party Matter?

A 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 because of the actions of the politician, 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. To test this, the female politicians are divided based on the criterion whether they belong to the party that had the majority of seats in the state or not. The specification used is then:

$$Y_{idt} = \theta_d + \psi_t + \beta_1 F_{1dt} + \beta_2 F_{2dt} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \tag{6}$$

Where F_{1dt}, 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, F_{2dt}, 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[37].

Results are shown in columns (1) and (2) of Table 9, for the urban and rural samples respectively. In urban areas, women who belong to the party who got the majority of seats in

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[36] I only have data for some years.

[37] The empirical strategy adopted here is analogous to the one in subsubsection 4.1.2., the difference is that now I divide female representatives according to whether they belong to the main party in the legislature or not.

the state are those who have an effect, whereas the coefficient for women belonging to other parties is not significant. For the rural sample, none of the coefficients is significant[38].

4.2.2 Does District Size Matter?

If the effects on education are caused by the actions of the politicians, one should observe that the effect of female politicians is larger in districts with fewer constituencies. This is the case because if legislators are more sensitive to the demands of their constituencies, they will be expected to have a larger effect on people living in the constituency where they were elected, more than on the district as a whole. In smaller districts, estimates of the effect of the legislator will be more accurate, and they will be a better approximation of the effect of the identity of the legislator 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, because the effect will be more diluted given that it will be shared among more constituencies. The districts are divided according to the number of constituencies they include. In particular, the average number of constituencies during the three years is computed for all districts [39] to create two dummy variables, indicating whether the individual lives in a small or a large district, i.e. if his or her district has more or less constituencies than the average district. The female representation variable is then interacted with these dummy variables. The specification tested is:

$$Y_{idt} = \theta_d + \psi_t + \beta_1 F_{dt} * D_{1d} + \beta_2 F_{dt} * D_{2d} + \lambda TC_{dt} + X_{idt}\eta + Z_{dt}\delta + \varepsilon_{idt} \qquad (7)$$

Where D_{1d} and D_{2d} are the dummy variables for the individual living in a large or a small district, respectively[40]. The coefficients are then reported for the 2SLS estimates of the total

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[38]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 9.

[39]The mean is 9.29 constituencies per district.

[40]These variables are district-specific and do not change over time. I do not include D_{1d} in the regression as the regression already has district fixed effects.

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 9, for the urban and rural sample, respectively. The effect of female representatives in small districts is positive and significant, and it is larger than the coefficient for female representatives obtained before. In large districts, the coefficient for female representatives is smaller. In rural areas, female representatives do not have any effect, neither in big nor in small districts. Results for small districts are now slightly stronger than results in Table 9 for the urban sample, which allows me to conclude that results obtained before are a lower bound of the real effect.

4.2.3 Does Political Disruption Matter?

One should expect that the effect of female politicians will be stronger in situations in which politicians have more time to implement their policies. To test this, one can 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 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 could have had less power than the rest, because they had less time to implement their policies. In those cases, the effect of female representation will be likely to be smaller, because female politicians will have been in power for a smaller amount of time.

There is information on how many months in each year each state was subject to President's rule. Then one can compute the total number of months with President's rule during the three years used to create the other political variables. Individuals in the sample are then classified 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.

Similar to what is done in the previous subsection, a dummy variable is created that is equal to one if the individual has been exposed to more months of President's rule than the

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mean[41] and another dummy that is equal to one if the individual has been exposed to less months of President's rule than the mean. These variables are then interacted with the female representation variable to estimate a model similar to specification (6). Now D_{1st} is the dummy variable indicating whether the individual has been exposed to more months of presidential rule and D_{2st} is the dummy variable indicating whether the individual has been exposed to less months of presidential rule[42]. The coefficients reported are those for the 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 9, for the urban and rural sample respectively. Coefficients in column (5) show that, in urban areas, female politicians have an effect only in cases where they are in power with less disruption (i.e. President's rule). The effect on 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 have an effect in cases in which they can exercise their power for a longer period, confirming the initial hypothesis that the effects found on education are due to their policy actions.

4.2.4 The Effect of Having More Female Politicians in the State or in the District

Female legislators may have more bargaining power in states where there are more female legislators. This could be the case if female legislators act as a group to fulfill their common interests. However, the fact that there are other female legislators in the same district could reduce the influence each one of them has, because they may be competing for the same educational resources, those assigned to their district educational office.

To test this, the mean number of other female candidates in the state and the district for each year is computed[43] and the female representation variable is divided according to

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[41] For States and years in which there has been President's rule, the mean is 7.59 months over the three years. 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.

[42] These dummy variables now vary across states and over time, the subscript s refers to a state. D_{1st} is now included as a control in the regression.

[43] The mean in the sample used is 0.71% for other female legislators in the district and 3.46% for other

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whether the female politicians have been in power in a state (district) with more female legislators than the mean or not. Then, as it is done with the rest of the political variables, three years averages of these two variables are taken. The specifications tested are similar to specification (6). Results for these specifications are shown in columns (7)-(10) of Table 9. The coefficients reported are those for the 2SLS estimates of the total effect on individuals living in states (districts) with many female legislators, β_1, and on individuals living in states (districts) with fewer female legislators, β_2.

Female legislators elected in states where there are more female legislators than the mean are those who have an effect in urban areas. As before, no effect is found in rural areas. This supports the idea that female legislators may act as a group, and their bargaining power increases the more of them there is in a legislature. By comparing districts with more and less female legislators, female legislators have an effect in urban areas in both cases. However, female legislators elected in districts where more women are elected have a smaller effect than the rest. If female legislators are competing for the districts' educational offices' funds, this is likely to be the case, as more female legislators will try to obtain funds to spend in education for their constituencies.

If female politicians act as a role model for citizens in their constituencies, it could be argued that female politicians of the majority party or in states where there are more female legislators are perceived as politicians who have more power and thus, their influence is stronger. This effect could be captured more precisely in smaller districts, and in situations where the duration of the President's rule was minimum. However, if female politicians have an influence because of the role model they play, then the number of other female legislators in the same district should not matter, or should have a positive effect on their effect, which is not what is found in this section.

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female legislators in the state. It should be noted that in many districts there is only one female legislator.

5   Conclusion

This paper shows that the gender of politicians affects educational outcomes of citizens living in the districts where these politicians are elected. Female politicians have a larger effect than male politicians on the education received by individuals living in urban areas but not by those living in rural areas. The difference between rural and urban areas can be explained by the fact that female politicians may invest more in education where women can benefit more from it.

It is difficult to estimate the causal effect of the gender of politicians on educational outcomes, as preferences of the electorate could be correlated both with female representation and with education. A detailed dataset on politicians allows me to estimate the causal effect of female legislators, by using quasi-experimental variation in female representation given by the existence of close elections between women and men.

Given 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. The Indian institutional setting allows me to disentangle the effect of gender from the effect of economic class, by dividing female representatives between those who contested for a seat reserved for SC/STs and those who did not. SC/ST female politicians have a positive effect on education in urban areas, but not in rural areas, whereas the effect of general female politicians is smaller and less significant, suggesting that results obtained are due to the gender of politicians, and not to their class.

There is little research on whether politicians target their policies to different groups in the population, and what are the effects on individuals of these groups. If the identity of a politician determines who the beneficiaries of the policies he or she implements are, increasing some groups' political representation may reduce inequality between these groups and the rest of the population. This is especially important if those groups are relatively disadvantaged with respect to the society as a whole. By matching politicians' with beneficiaries' identities, this paper provides evidence that politicians benefit those who share their same identity. The analysis focuses on caste reservations and on variations on female political representation and

analyzes their effects on the probability that individuals who have the same identity as the politicians attain primary education. It is found that female politicians tend to increase girls' educational attainment in urban areas; in fact, SC/ST female politicians favor education of girls and the SC/STs, while general female politicians favor education of girls and general individuals.

It is difficult to assert the specific policies applied by female legislators, as I do not have yearly data on schools and other educational inputs for each district. However, results show that the effect of female representation is stronger when they are more likely to be influential, either within the district or in the legislature.

Results obtained provide some evidence in favor of citizen-candidate models (Besley and Coate 1997 and Osborne and Slivinski 1996), as the identity of the legislator has an effect on policy. The issue of female political representation is increasingly important in India, and there are growing pressures for female political reservation in the Central Government and the State Assemblies. However, this proposal has been widely discussed in several parliamentary sessions, without reaching to an agreement. Those who are in its favor, argue that increasing female political representation will ensure a better representation of women's 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 considering the effect of the gender and caste of the politicians on education and on who receives this education. 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 the candidates' quality[44]. Therefore, reservation could 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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[44]See Chattopadhay,R. & Duflo,E (2004).

6 Data appendix

6.0.5 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. Three years averages for each district are then computed.

-*Proportion of seats reserved for SC/ST*: defined as the total number of seats reserved for SC/STs in the district divided by the total number of seats in the district. Three years averages for each district are then 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. Three years averages for each district are then 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. Three years averages for each district are then 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. Three years averages for each district are then 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. Three years averages for each district are then computed.

-*Proportion of seats won by each political party:* number of seats won by the political

party divided by total seats in the district. Three years averages for each district are then 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.

6.0.6   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 the SC/STs.

-*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 is 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 tertiary 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, including wages in kind and in cash.

6.0.7 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.

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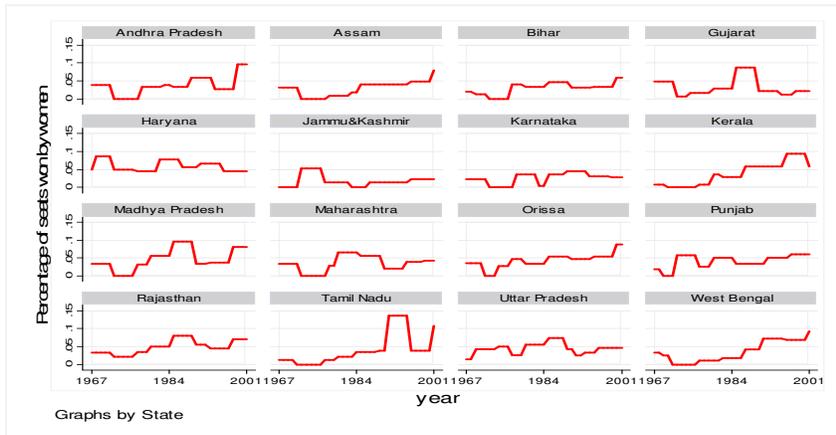
Figure 1: Female Political Representation by State 1967-2001
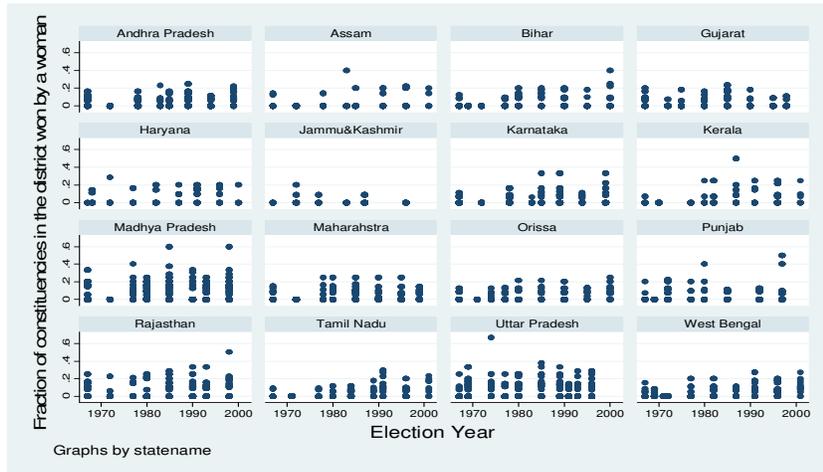
Figure 2: Female Political Representation in the Different Districts by State 1967-2001
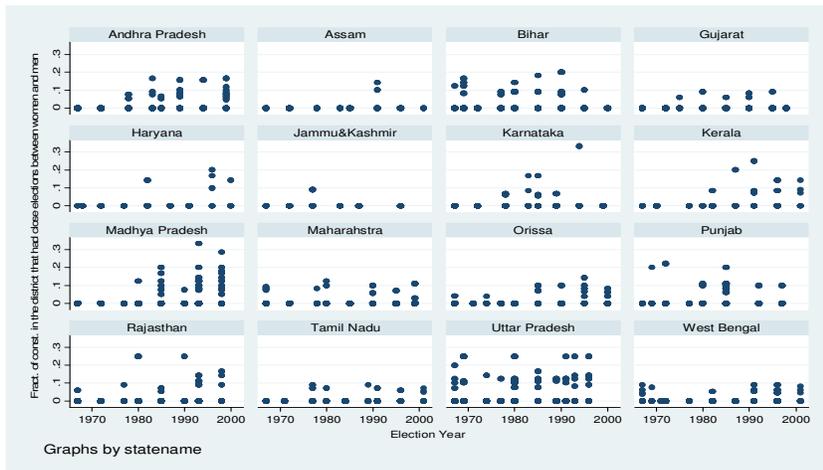
Figure 3: Fraction of Constituencies with Close Elections between Women and Men in the District by State and Year.

Individual benefits from primary education (NSS 55th Round)

Legend: wage differential if obtained primary education

X-axis categories: man General, woman General, man Scheduled Tribe, woman Scheduled Tribe, man Scheduled Caste, woman Scheduled Caste

X-axis label: **Identity**
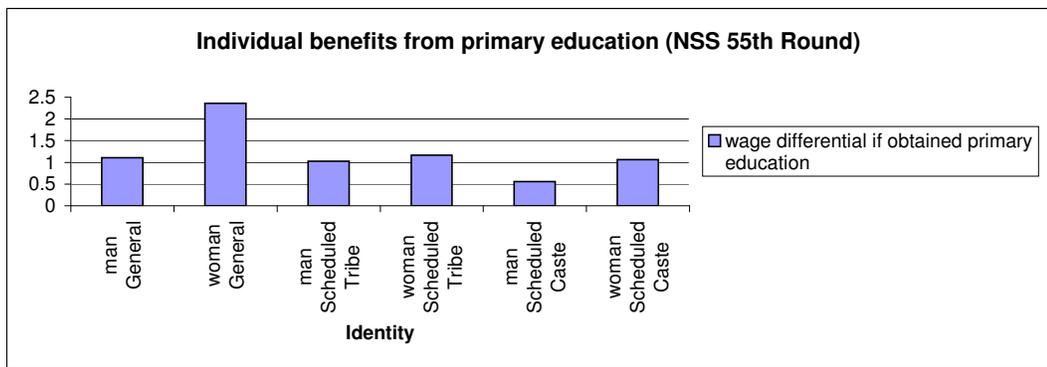
Figure 4 Primary Education and Wages

Household benefits from education (NSS 55th Round)

Legend: monthly per capita expenditure by caste and household head's education

X-axis categories: no prim General, prim General, no prim Scheduled Tribe, prim Scheduled Tribe, no prim Scheduled Caste, prim Scheduled Caste
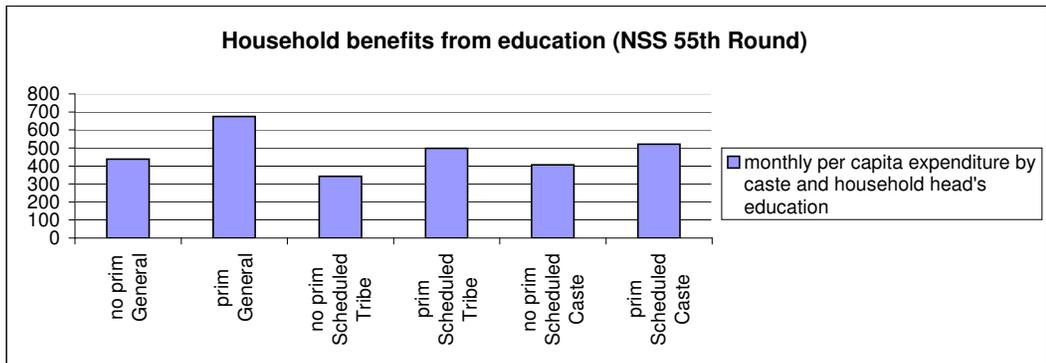
Figure 5 Primary Education and Household Expenditure

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

Variable (as a fraction of the total seats in the district) *1304 observations (full sample used in the regressions)*	Mean	Sd
Proportion of seats won by women	0.0375	0.0742
Proportion of seats won by SC/ST women	0.0092	0.0376
Proportion of seats won by general women	0.0283	0.0639
Proportion of seats won by women belonging to the main party in the state	0.0275	0.0648
Proportion of seats won by women belonging to others but the main party in the state	0.0100	0.0379
Proportion of seats won by Congress	0.4778	0.3372
Proportion of seats won by Hard Left	0.0572	0.1533
Proportion of seats won by Soft Left	0.0122	0.0692
Proportion of seats won by Hindu	0.1171	0.2229
Proportion of seats won by Janata	0.1823	0.2819
Proportion of seats won by Regional	0.0705	0.1920
Proportion of seats won by Others	0.0349	0.1167
Proportion of seats won by Independent	0.0480	0.0910
Proportion of seats reserved for SC/ST	0.2485	0.1884

Variable (as a fraction of the total seats in the district in districts where women were elected) *346 observations (full sample used in the regressions)*	Mean	Sd
Proportion of seats won by women in a close election against a man	0.0179	0.0453
Proportion of seats who had close elections between men and women	0.0212	0.0487
Proportion of seats won by women in a close election against a man (SC/ST)	0.0037	0.0248
Proportion of seats won by women in a close election against a man (general)	0.0141	0.0393
Proportion of seats won by women in a close election against a man (main party)	0.0119	0.0362
Proportion of seats won by women in a close election against a man (other parties)	0.0060	0.0292
Proportion of seats won by Congress women	0.0869	0.0918
Proportion of seats won by Congress men	0.4084	0.2858
Proportion of seats won by Hard Left women	0.0083	0.0405
Proportion of seats won by Hard Left men	0.0647	0.1619
Proportion of seats won by Soft Left women	0.0013	0.0151
Proportion of seats won by Soft Left men	0.0093	0.0644
Proportion of seats won by Hindu women	0.0131	0.0456
Proportion of seats won by Hindu men	0.0931	0.1672
Proportion of seats won by Janata women	0.0168	0.0443
Proportion of seats won by Janata men	0.1436	0.2232
Proportion of seats won by Regional women	0.0091	0.0329
Proportion of seats won by Regional men	0.0766	0.1896
Proportion of seats won by Others women	0.0018	0.0148
Proportion of seats won by Others men	0.0288	0.1089
Proportion of seats won by Independent women	0.0040	0.0231
Proportion of seats won by Independent men	0.0341	0.0657

Table 2: Descriptive statistics. NSS 55th Round and control variables.

Panel A: NSS individual variables and labor market characteristics

	RURAL			URBAN		
Variable	Obs	Mean	Sd	Obs	Mean	Sd
Women (proportion)	70604	0.4578	0.4982	34604	0.4105	0.4919
Men (proportion)	70604	0.5422	0.4982	34604	0.5895	0.4919
SC/ST (proportion)	70604	0.3328	0.4712	34604	0.1932	0.3948
Hindu (proportion)	70604	0.8485	0.3586	34604	0.7307	0.4436
Muslim (proportion)	70604	0.0974	0.2965	34604	0.1985	0.3989

Education by gender and SC/ST status						
Primary education or more (proportion)	70604	0.5056	0.5000	34604	0.7736	0.4185
Women: proportion with primary education or more	32198	0.3783	0.4850	14121	0.7477	0.4343
Men: proportion with primary education or more	38406	0.6131	0.4870	20483	0.7917	0.4061
SC/ST: proportion with primary education or more	21241	0.3835	0.4863	6150	0.6601	0.4737
General: proportion with primary education or more	49363	0.5665	0.4956	28454	0.8008	0.3994
SC/ST women: proportion with primary education or more	9754	0.2481	0.4319	2360	0.6211	0.4852
General women: proportion with primary education or more	22444	0.4436	0.4968	11761	0.7758	0.4171
SC/ST men: proportion with primary education or more	11487	0.4985	0.5000	3790	0.6845	0.4648
General men: proportion with primary education or more	26919	0.6701	0.4702	16693	0.8187	0.3853

Labour Market Characteristics by gender and education	RURAL			URBAN		
Women with primary education or more: proportion who work	20493	0.0763	0.2655	21090	0.0454	0.2083
Men with primary education or more: proportion who work	21300	0.3397	0.4736	17883	0.3642	0.4812
Women without primary education: proportion who work	39218	0.1553	0.3622	15098	0.0708	0.2566
Men without primary education: proportion who work	30717	0.2873	0.4525	12309	0.2275	0.4192
Women with primary edu who work: prop in nonfarm	1153	0.2877	0.4529	938	0.9547	0.2082
Men with primary edu who work: prop in nonfarm	6539	0.4412	0.4966	6218	0.9556	0.2061
Women without primary edu who work: prop in nonfarm	5122	0.0826	0.2753	976	0.6931	0.4615
Men without primary edu who work: prop in nonfarm	7896	0.1900	0.3923	2647	0.8520	0.3551
Women without primary education: wages received	5122	152.30	85.24	976	213.09	172.65
Men without primary education: wages received	7896	238.88	142.68	2647	358.15	254.51
Women with primary education: wages received	1153	221.32	286.79	938	736.10	856.40
Men with primary education: wages received	6539	367.28	374.26	6218	683.70	633.46

Panel B: Other variables

Variable	Obs	Mean	Sd
Urban population in the district	5463	0.1924	0.1098
SC/ST population in the district	5463	0.2561	0.1380
Women in the district	5463	0.4827	0.0150
Male literacy rate in the district	5420	0.5178	0.1472
Female literacy rate in the district	5420	0.2671	0.1602
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. Weighted using NSS weights.

Table 3: Data Issues

PANEL A: Data organization (examples)

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	92447	0.8787
Close elections	12761	0.1213

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 man	6123	0.4798
More men won against a woman	6225	0.4878
The same number of men and women won	413	0.0324

Table 4: Do Female Politicians Have an Effect on Education?

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

	1	2	3	4	5	6	7	8	9
	OLS	OLS	OLS	2SLS	2SLS	2SLS	IV-Probit	IV-Probit	IV-Probit
	All	Urban	Rural	All	Urban	Rural	All	Urban	Rural
	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals
Fraction of constituencies in the district won by a woman	0.0969*	0.1333**	0.1105*	0.1120	0.6377**	0.0123	0.0996	0.6062**	0.0021
	[0.0527]	[0.0661]	[0.0609]	[0.1581]	[0.2907]	[0.1914]	[0.1693]	[0.2610]	[0.2107]
Individual Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Demographic District Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Political Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
District fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Cohort fixed effects	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	105208	34604	70604	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. Columns 7-9 are IVprobit regressions, in which the second stage is run as a probit. For the probit regressions average marginal effects are reported, the standard errors of which are computed using bootstrap with 100 replications. 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. All these regressions also include as a control the fraction of constituencies in the district that had close elections between women and men.

Table 5: First Stage Regressions

Dependent variable: Fraction of constituencies in the district won by a woman

	1	2	3
	All seats	General seats	SC/ST seats
Fraction of constituencies in the district won by a woman	1.2196***		
in a close election against a man	[0.0278]		
Fraction of constituencies in the district won by a SC/ST woman		0.1935***	0.8250***
in a close election against a man		[0.0149]	[0.0536]
Fraction of constituencies in the district won by a general woman		1.1698***	0.1410***
in a close election against a man		[0.0168]	[0.0126]
Controls	yes	yes	yes
Observations	105208	105208	105208
First stage F-statistic	293.87	337.03	70.95
Joint Significance of Instruments		57.31	13.25
R-squared	0.5087	0.512	0.4785

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. All controls included in the second stage regressions are included here

Table 6: Robustness and Placebos

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

	1	2	3	4	5	6	7	8	9	10	11	12
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
	Placebo	Placebo	Placebo	Placebo	3%	3%	2.50%	2.50%	trends	trends	trends	trends
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]								
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	yes	yes	yes	yes
Close elections defined with a smaller margin	no	no	no	no	yes	yes	yes	yes	no	no	no	no
State specific trends	no	no	no	no	no	no	no	no	yes	yes	no	no
District specific trends	no	no	no	no	no	no	no	no	no	no	yes	yes
Observations	12338	7381	22124	37714	34604	70604	34604	70604	34604	70604	34604	70604
R-squared	0.2280	0.2517	0.2083	0.216	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 1-12 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. 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. Time trends are included in columns 9-12. All these regressions also include as a control the fraction of constituencies in the district that had close elections between women and men.

TABLE 7: Is caste important?

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

	1	2	3	4	5	6	7	8	9
	OLS	OLS	OLS	2SLS	2SLS	2SLS	Probit IV	Probit IV	Probit IV
	All	Urban	Rural	All	Urban	Rural	All	Urban	Rural
	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals
Fraction of constituencies in the district won by a SC/ST woman	0.1941	0.0868	0.2471	0.1333	1.2934*	-0.0823	0.1507	1.3354*	-0.1369
	[0.1426]	[0.1661]	[0.1697]	[0.3842]	[0.7379]	[0.4438]	[0.3647]	[0.8011]	[0.5213]
Fraction of constituencies in the district won by a general woman	0.0657	0.1475*	0.0662	0.1033	0.4235	0.0521	0.1076	0.5258*	0.0477
	[0.0541]	[0.0865]	[0.0596]	[0.1663]	[0.2813]	[0.1997]	[0.1938]	[0.2817]	[0.2136]
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	105208	34604	70604	105208	34604	70604	105208	34604	70604
R-squared	0.2541	0.1743	0.2471	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 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, both for general and SC/ST female legislators. Columns 7-9 are IVprobit regressions, in which the second stage is run as a probit. For the probit regressions average marginal effects are reported, the standard errors of which are computed using bootstrap with 100 replications.   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. Regressions also include as a control the fraction of constituencies in the district that had close elections between women and men.

Table 8 : Female Politicians on individuals with different identities

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

Indentity	girls	boys	SC/ST	general	girls SC/ST	girls general	boys SC/ST	boys general	difference	r-squared	observations
PANEL A: URBAN AREAS											
Fraction of constituencies in the district won by a woman interacted with dummy=1 if individual is of a given identity	0.7826*** [0.3086]	0.5140* [0.3089]							*0.2685* *[0.2231]*	0.1719	34604
Fraction of constituencies in the district won by a SC/ST woman interacted with dummy=1 if individual is of a given identity	1.4971*** [0.6605]	1.0746 [0.7747]							*0.4225* *[0.2638]*		34604
Fraction of constituencies in the district won by a general woman interacted with dummy=1 if individual is of a given identity	0.5349* [0.3220]	0.3392 [0.3151]							*0.1957* *[0.3090]*	0.1702	
Fraction of constituencies in the district won by a SC/ST woman interacted with dummy=1 if individual is of a given identity			2.8388*** [0.6526]	0.9281 [0.6307]					*1.9107**** *[0.2134]*		34604
Fraction of constituencies in the district won by a general woman interacted with dummy=1 if individual is of a given identity			0.0039 [0.6085]	0.5645* [0.2948]					*-0.5606* *[0.6308]*	0.1662	
Fraction of constituencies in the district won by a SC/ST woman interacted with dummy=1 if individual is of a given identity					3.0915*** [0.9093]	1.1880** [0.5147]	2.5989*** [0.4637]	0.6116 [0.6661]			34604
Fraction of constituencies in the district won by a general woman interacted with dummy=1 if individual is of a given identity					-0.2682 [0.7813]	0.7052* [0.3599]	0.1722 [0.6757]	0.46327 [0.3277]		0.1669	
PANEL B: RURAL AREAS											
Fraction of constituencies in the district won by a woman interacted with dummy=1 if individual is of a given identity	0.0435 [0.2332]	-0.0149 [0.2642]							*0.0584* *[0.3220]*	0.247	70604
Fraction of constituencies in the district won by a SC/ST woman interacted with dummy=1 if individual is of a given identity	0.0862 [0.3868]	-0.3474 [0.9558]							*0.4335* *[0.9785]*		70604
Fraction of constituencies in the district won by a general woman interacted with dummy=1 if individual is of a given identity	-0.0075 [0.2499]	0.1207 [0.2300]							*-0.1282* *[0.2314]*	0.2468	
Fraction of constituencies in the district won by a SC/ST woman interacted with dummy=1 if individual is of a given identity			-0.6228* [0.3723]	0.4294 [0.4986]					*-1.0521**** *[0.3612]*		70604
Fraction of constituencies in the district won by a general woman interacted with dummy=1 if individual is of a given identity			0.0165 [0.3338]	0.0492 [0.2028]					*-0.0326* *[0.3349]*	0.2462	
Fraction of constituencies in the district won by a SC/ST woman interacted with dummy=1 if individual is of a given identity					-0.2361 [0.3122]	0.0181 [0.6121]	-1.6939 [1.2435]	0.6223 [0.6779]		0.2448	70604
Fraction of constituencies in the district won by a general woman interacted with dummy=1 if individual is of a given identity					-0.2865 [0.3976]	0.1828 [0.3218]	0.3738 [0.4047]	-0.0034 [0.2177]			

Robust standard errors clustered at the district level are reported between parentheses. * Significant at the 10%, ** significant at the 5%, *** significant at the 1%. Close elections are defined as those in which the winner won the runner up by less than 3.5% of votes. All controls included in the previous tables are included here, together with dummies indicating individual identity.

Table 9: Measures of Political Influence

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

	1	2	3	4	5	6	7	8	9	10
	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS	2SLS
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals	individuals
Fraction of constituencies in the district won by a woman who belongs to the party who won the majority in the state	0.6945* [0.3609]	0.1015 [0.2207]								
Fraction of constituencies in the district won by a woman who does not belong to the party who won the majority in the state	0.5059 [0.5346]	-0.2431 [0.2998]								
Fraction of constituencies in the district won by a woman (effect on individuals living in small districts)			0.7846* [0.3987]	-0.1000 [0.2172]						
Fraction of constituencies in the district won by a woman (effect on individuals living in large districts)			0.5100 [0.3261]	0.2189 [0.2865]						
Fraction of constituencies in the district won by a woman (effect on individuals who were exposed to less months of President's rule)					0.6877** [0.2915]	0.0226 [0.1938]				
Fraction of constituencies in the district won by a woman (effect on individuals who were exposed to more months of President's rule)					-0.1339 [1.3357]	0.1076 [0.4037]				
Fraction of constituencies in the district won by a woman in states where more women are elected							0.6637** [0.2974]	0.0521 [0.1993]		
Fraction of constituencies in the district won by a woman in states where less women are elected							0.5475 [0.4304]	-0.1218 [0.2639]		
Fraction of constituencies in the district won by a woman where there are more women in the district									0.5436** [0.2130]	0.1932 [0.1555]
Fraction of constituencies in the district won by a woman where there are less women in the district									0.8112* [0.4736]	-0.2413 [0.2930]
Controls	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Observations	34604	70604	34604	70604	34604	70604	34604	70604	34604	70604
R-squared	0.1710	0.2470	0.3825	0.2467	0.1707	0.2470	0.172	0.247	0.1706	0.2464

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 1-10 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. 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. All these regressions also include as a control the fraction of constituencies in the district that had close elections between women and men.

A Appendix: Are Female Leaders Good for Education? Evidence from India. Author: Irma Clots-Figueras (Universidad Carlos III de Madrid)

A.1 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 that the outcome of a close election can not be predicted by observables, which supports the idea that the outcome of a close election is random . In addition, I show that districts and constituencies in which female candidates won in close elections against men are similar in observables to those in which male candidates won in close elections against women. Finally, I provide evidence that districts that had close elections between men and women are not systematically different from other districts in India.

A.1.1 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. To estimate the probability that women won in close elections in a district, I calculate the proportion of close elections won by women by district in each electoral year. I calculate this probability for all seats, and separately for SC/ST reserved seats and unreserved seats. 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 A1, and they confirm that none of the coefficients turn out to be significant, suggesting that the outcome of a close election is indeed random.

A.1.2 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 A2 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 in the district. Districts are classified in two groups, those in which more men won and those in which more women won. I then 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% of votes. Differences are computed for all seats and then separately for general seats and seats reserved for SC/ST. 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 proportion of villages with educational institutions and hospitals and the proportion of seats won by female and male candidates in elections that are not close. All columns 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, irrespective of the type of seat where the close elections take place.

One should also observe that constituency and individual characteristics of women and men winning in close elections are the same. I also analyze some of these characteristics that could compromise the comparability between close elections in which men won and close elections in which women won. I compare candidate and constituency characteristics for all seats and I also compare this separately for SC/ST reserved seats and unreserved seats.

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 A3, for any type of seat, the number of other female candidates contesting against women who won in close elections against a man is very small and not significantly different from 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 this 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 who won the elections again might be different from those of candidates who occupy the seat for the first time, because they will have more experience as legislators. 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 A3, 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, irrespective of the type of seat in which they were contesting.

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

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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 A3, 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 that the number of previous close elections is the same, whether a woman or a man won. This is the case for all seats, for SC/ST reserved seats and for general seats. 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 similar, they should have the same electoral turnout, otherwise, one type of constituency 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 A3 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. Because 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 approximately 40% of 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 with the winner. Thus, even if there was another strong candidate in the constituency, he or she did not have any chance of winning the election.[45]   As before, this is

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

the case for all types of seats.

A.1.3 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 from those that did, results obtained in this paper would not be representative for the entire India. Table A4 shows that districts that never had close elections and those that did are similar in observables. For districts that 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 when 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 A5 shows how the distribution of seats among 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, because the party composition in close elections reflects that of the overall parliaments in the States[46].

A.2 Education in India

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

The primary stage consists of classes I-V, in Andhra Pradesh, Bihar, Haryana, Jammu

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[46]Since this test is done at the district level and districts can have both general and reserved seats, I can not compare districts with and without SC/ST close elections between women and men and districts with and without general close elections between women and men.

& Kashmir, Madhya Pradesh, Orissa, Punjab, Rajasthan, Tamil Nadu, Uttar Pradesh, and West Bengal.[47] 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, 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.[48]

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

[48]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.

Table A1: 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 and electoral year	All	General	SC/ST
	1	2	3
Proportion of seats contesting close elections Congress	-1.412	-1.59	0.201
	(2.607)	(2.14)	(0.923)
Proportion of seats contesting close elections Regional Parties	-3.332	-3.235	0.026
	(4.882)	(5.297)	(1.427)
Proportion of seats contesting close elections Hindu	-1.247	-1.636	0.227
	(2.706)	(1.908)	(1.026)
Proportion of seats contesting close elections Janata	-1.81	-0.914	-0.212
	(2.075)	(2.37)	(1.403)
Proportion of seats contesting close elections Others	-0.433	-1.833	0.082
	(2.389)	(1.585)	(0.973)
Proportion of seats contesting close elections Independent	-1.546	-0.593	0.203
	(2.303)	(2.372)	(1.13)
Dummy=1 if the district never had close elections before	0.241	0.439	-0.175
	(0.635)	(0.619)	(0.268)
Proportion of urban population	12.587	9.872	0.905
	(12.85)	(12.87)	(4.877)
Number of times that a woman has won an election in the district in the past	-0.006	-0.018	0.019
	(0.051)	(0.051)	(0.032)
Proportion of SC/ST population	18.497	14.479	1.748
	(19.496)	(20.603)	(6.104)
Proportion of population that is female	-15.535	-16.19	-0.87
	(27.662)	(27.874)	(8.031)
Male literacy rate	-1.923	-5.524	2.915
	(10.817)	(11.364)	(4.376)
Female literacy rate	-0.494	2.343	-2.358
	(7.249)	(8.239)	(3.87)
Proportion of seats reserved for SC/ST's	-2.931	-1.849	-0.766
	(5.313)	(5.769)	(1.741)
Observations	164	164	164
Adjusted R-squared	-0.059	-0.1474	0.5242

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

Table A2: District Characteristics: Close Elections between Women and Men by type of seat

	General Seats	SC/ST Seats	All Seats
Differences in the proportion of urban population	0.0019	-0.0372	-0.01020
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0201]	[-0.0371]	0.0179]
Differences in male literacy rate	-0.0409	-0.0374	-0.02920
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0292]	[0.0474]	0.0255]
Differences in female literacy rate	-0.0415	-0.0249	-0.02820
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0345]	[0.0521]	[0.0296]
Differences in the proportion of villages with educational institutions	0.0275	-0.0548	0.01470
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0418]	[0.0601]	[0.0342]
Differences in the proportion of villages with hospitals	0.0067	0.0014	0.00550
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0136]	[0.0093]	[0.0107]
Differences in the proportion of SC/ST reserved seats	-0.0111	0.0467	-0.00380
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0203]	[0.0857]	[0.0272]
Differences in the proportion of women who won in elections that are not close	-0.0044	0.0005	-0.00130
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0091]	[0.0184]	[0.0083]
Differences in the proportion of men who won in elections that are not close	-0.0090	-0.0331	-0.01230
(Districts in which more men than women won compared to districts in which more women than men won)	[0.0112]	[0.0238]	[0.0103]
Number of districts with election-years	157	47	201

Table A3

Constituency and candidate characteristics: Close Elections between Women and Men

Group	Obs	All Mean	Std. Err.	Obs	General Mean	Std. Err.	Obs	SC/ST Mean	Std. Err.
Other female candidates in the constituency									
Man won in close election	120	0.1083	0.0370	91	0.1209	0.0464	29	0.0690	0.0479
Woman won in close election	110	0.2000	0.0480	92	0.1957	0.0541	18	0.2222	0.1008
Difference		-0.0917	0.0601		-0.0748	0.0713		-0.1533	0.0998
Winner was the incumbent									
Man won in close election	120	0.2167	0.0378	91	0.1868	0.0411	29	0.3103	0.0874
Woman won in close election	110	0.2182	0.0396	92	0.2065	0.0424	18	0.2778	0.1086
Difference		-0.0015	0.0547		-0.0197	0.0591		0.0326	0.1402
Number of close elections in the past									
Man won in close election	120	1.0750	0.0241	91	1.0769	0.0281	29	1.0690	0.0479
Woman won in close election	110	1.0727	0.0249	92	1.0870	0.0295	18	1.0000	0.0000
Difference		0.0023	0.0347		-0.0100	0.0408		0.0690	0.0610
Votes received by the winner									
Man won in close election	120	31894.1700	1328.4220	91	32270.3300	1546.5520	29	30713.7900	2616.1900
Woman won in close election	110	33596.4500	1330.2330	92	34100.9800	1467.4050	18	31017.7800	3155.1360
Difference		-1702.2880	1883.4150		-1830.6490	2131.3730		-303.9847	4149.1090
Total votes in the constituency									
Man won in close election	120	80188.3300	2769.9040	91	81835.1600	3064.8000	29	75020.6900	6239.4270
Woman won in close election	110	80947.2700	2655.8640	92	82061.9600	2878.3610	18	75250.0000	6886.6940
Difference		-758.9394	3851.7720		-226.7917	4203.1950		-229.3103	9606.6320

Table A4

Comparison: Districts with and without Close Elections

(District in an electoral year)		Close elections	No close elections
Urban population (prop)	mean	0.2149	0.1947
	sd	0.0052	0.0039
	observations	968	1124
Male literacy rate	mean	0.5241	0.5454
	sd	0.0054	0.0049
	observations	946	1098
Female literacy rate	mean	0.2878	0.2865
	sd	0.0059	0.0054
	observations	946	1098
SC/ST population (prop)	mean	0.2618	0.2443
	sd	0.0047	0.0038
	observations	968	1124
SC/ST seats proportion	mean	0.2564	0.2178
	sd	0.0055	0.0054
	observations	1223	1323
Seats total	mean	10.8397	7.9426
	sd	0.1382	0.1259
	observations	1223	1323
Any educational institution	mean	0.8212	0.7932
	sd	0.0079	0.0084
	observations	316	348
Hospitals	mean	0.0290	0.0262
	sd	0.0025	0.0025
	observations	736	812

Table A5

Proportion of Seats Won by Parties

Party	Close Elections Percent	No close elections Percent
Congress	40.43	41.16
Hard Left	7.83	8.17
Hindu	11.74	11.44
Independents	6.96	5.81
Janata	9.57	13.98
Regional	12.61	10.38
Soft Left	3.91	2.31
Others	6.96	6.75
Total	100	100