Are Educated Leaders Good for Education? Evidence from India

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Abstract

The recent introduction of minimum education qualification for candidates contesting local body elections in India is based on the hypothesis that educated politicians are more competent. In this paper we investigate the linkage between education of the leader and competence by analyzing if educated political representatives in state legislatures result in better education outcomes for children. Using a large district representative annual survey of learning and schooling outcomes for children between 6 to 16 years of age over nine years, we show that college graduate political leaders are not more competent at delivering better education outcomes for their constituents than non-college graduate leaders. The identification strategy is based on a fuzzy regression discontinuity design (RDD) that exploits quasi-experimental election outcomes of close elections between college graduate and non-college graduate leaders. We extensively test our identification setup and fuzzy RDD assumptions. We also perform several robustness and heterogeneity analysis to verify our results. Across different specifications and different groupings of individuals, households and districts the basic result of no impact of education of politician holds. A possible explanation of our results is that formal education of the leader has little to do with leader's ability to empathize, address people's concerns and be more effective in lobbying on behalf of their constituents. Our results question the validity of the education mandate as we show that educated leaders are not necessarily more competent in improving one of the crucial development outcomes, namely elementary education.

Keywords: Education, Political Economy, Leaders, Schooling, Learning Outcomes, India

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> Those who insist on literacy as a test and insist upon making it a condition precedent to enfranchisement in my opinion, commit two mistakes. Their first mistake consists in their belief that an illiterate person is necessarily an unintelligent person… Their second mistake lies in supposing that literacy necessarily imports a higher level of intelligence or knowledge than what the illiterate possesses.
>
> *B.R.Ambedkar, Chief Architect of the Indian Constitution, 1928 to Simon Commission.*

> It is only education which gives a human being the power to discriminate between right and wrong, good and bad.
>
> *Supreme Court of India, 2015 upholding the law mandating minimum education level for candidates in local elections.*

1 Introduction

Recently two states in India - Rajasthan and Haryana - enacted ballot access restrictions for local body elections that are unprecedented for India or for any modern representative democracy[1]. Both states mandated minimum education requirements[2] for contesting local body elections[3]. In Haryana the education requirements were - class X for general candidates, Class VIII for women and Scheduled Caste men and Class V for Scheduled Caste women. These requirements disqualify more than 50 percent of women, 68 percent of scheduled caste women and 41 percent of scheduled caste men from contesting elections in Haryana (Bhaskar, 2016). This also led to higher proportion of elections being contested by one or no candidates and lower electoral competition. These laws were challenged in the Supreme Court of India which upheld the laws. The Court saw education as a precondition for efficiency and honesty arguing that education will "enable the candidates to effectively discharge duties of the panchayat".[4]

[1] No major democracy in the world, as far as we know, has any education requirements for contesting elections. In 2002 Pakistan's military dictator (then), General Pervez Musharraf mandated a requirement of a bachelor's degree for the contestants of the National Assembly elections in Pakistan. This was initially upheld by the country's court but in 2008 a full bench of the Pakistan Supreme court overturned the requirement arguing that it was not in pursuance of protecting the integrity and sovereignty of Pakistan. (For more details see here.)

[2] Other requirements include presence of a functioning toilet in house of candidates and no electricity or bank arrears

[3] The education mandate is internally discriminatory in that it applies only to the lowest level of elected leaders and there is no education requirement for the President, Prime Minister, Minister or national or state legislative leaders who have bigger roles to play in policy making. The Union Cabinet and Parliament has several members who have not completed Class X.

[4] The Supreme court judgment follows its earlier ruling in 2003 that upheld the requirement that the citizens who have more than two children cannot contest elections.

The education requirement and the Supreme Court judgment, which are rarely questioned in India, have been highly controversial. Many have argued in articles and debates that the law and decision are discriminatory, retrograde, disenfranchising, elitist, unconstitutional and undemocratic (Baxi, 2015; Abdul, 2015; Jaffrelot, 2016; NDTV, 2016). The harm, if any, caused by the mandate is irreversible till the next elections as the requirement was already imposed in this elections. Ambedkar, the architect of the Indian constitution, held several degrees including PhDs but was opposed to any sort of education requirement. He argued that educated class (which consisted mostly of upper caste at that point) would not necessarily use their intellectual powers to benefit the lower strata in the society as they did not necessarily share the aspirations and interests of the masses. Amartya Sen commenting on the requirement said that "we have to distinguish between what our objectives are and what the state of the country is. If you say that everyone should have toilets at home, that doesn't mean that until that happens, these people are not people".

There are several examples of school dropout politicians who are popular and have delivered on promises to their constituents, showing that education though useful is not necessary for being an effective politician. Norti Bai, a school dropout, became the first Dalit woman sarpanch in the village of Harmara in Rajasthan. She fought to remove gender pay gap as a construction worker, fought against upper caste discrimination, became computer literate, organized computer training lessons for the girls in the village, fought land mafia to build a hospital and had three thousand trees planted by villagers who she ensured were employed under the MNREGA scheme[5]. [6] Tamil Nadu, among the most developed states both in economic and social indicators has had three long serving chief ministers who were school dropouts (Jayalalithaa, Karunanidhi and Kamraj). Denying these and several others the right to contest elections would be denial of their democratic rights and also result in limiting the choice of voters. Ballot access restrictions have resulted in lowering of political competition measured by number of uncontested seats, number of candidates and vote shares of election winners (Linden, 2005; Ansolabehere and Gerber, 1996; Stratmann, 2005; Drometer and Rincke, 2009).

The argument for imposing education requirements on candidates contesting elections rests on the premise that formal education makes leaders competent, honest and accountable [7]. Formal education is seen as a "desirable" characteristic which is argued to increase

[5]http://thewire.in/35988/in-a-democracy-educational-qualifications-shouldnt-matter-so-why-is-no-one-talking-about-norti-bai/

[6]Rahti Devi, 62, from Santori village in Haryana http://timesofindia.indiatimes.com/home/sunday-times/deep-focus/Haryanas-Crane-Bedi-cant-contest/articleshow/50250607.cms, Man Singh, 65, from Dhani Mohabbatpur in Hisar district http://timesofindia.indiatimes.com/home/sunday-times/deep-focus/This-illiterate-paved-the-way-for-literacy/articleshow/50250586.cms are just select few examples of illiterate local body leaders who have worked to build schools, remove illegal encroachment and by any account are highly capable and effective leaders but wont be able to contest elections due to the formal education mandate.

[7]These arguments were explicitly used as justification by the Rajasthan and Haryana govern-

the quality of politicians. Educated politicians are seen as more effective at designing and implementing policy, understanding concerns of citizens, dealing with complex policy issues and are considered more accountable. If the goal of the elections is to select the most competent candidate[8], then one could argue that a priori disqualifications could be imposed on the basis of irrefutable evidence that these qualifications create a preliminary threshold of competence. But there is little to no existing evidence to support the claim that formal education increases competence of political leaders. Since important rights to contest elections and freedom of voters to select candidates of their choosing (part of freedom of expression) are being curtailed there is a heavy burden of justification on the state before restrictions on them can be imposed (Bhaskar, 2016).

Even though the impact of various characteristics of the leader such as gender, religion, caste etc on various policy outcomes has been extensively studied in the Indian context, almost nothing is known about what impact education level of the leader has on outcomes. Using data on education of national leaders in a cross-country database and random transitions a few studies have shown that educated leaders tend to increase economic growth, foreign investment and education attainment of citizens (Besley, Montalvo, and Reynal-Querol, 2011; Diaz-Serrano and Pérez, 2013; Congleton and Zhang, 2013). But these studies only analyze national leaders across countries where disparities across nations are difficult to account for and also they do not analyze impact of state or local leaders' education. Carnes and Lupu (2016) investigating impact of education of political leaders at national, state and local levels in different contexts find educated politicians to perform no better or worse than non-educated leaders across a range of outcomes.

The aim of the paper is to test the hypothesis that educated politicians are more competent and deliver better outcomes for their constituents. We investigate whether leaders (state legislative representatives in India) with college degree are better than leaders without college degree for elementary education outcomes in the districts from which they are elected. If college graduate leaders are more competent and utilize this for the benefit of their constituents then one might expect better education outcomes as compared to having a non-college educated leader. Data on schooling outcomes (learning outcomes in reading, arithmetic and english, school enrollment and attendance rates, school infrastructure and various grants for schools) annually for a period of nine years from a district representative sample was combined with education information on district leaders who could influence education policy to analyze the impact of educated leaders.

ment when introduction the education mandate. https://indconlawphil.wordpress.com/2015/10/01/election-disqualifications-and-the-constituent-assembly-debates/

[8]One other goal can be to give effect to the choice of the people, which would eliminate any justification for such mandates. The constituent assembly of India debated this topic extensively which is discussed here: https://indconlawphil.wordpress.com/2015/10/01/election-disqualifications-and-the-constituent-assembly-debates/

The main identification challenge is that education level of the leader could be correlated with voter preferences and hence endogenous. To identify the casual impact of educated politicians, we use a fuzzy regression discontinuity design where the proportion of leaders who have completed college is instrumented with the proportion of college graduate leaders who won in close elections against a non-college graduate leader. The identification strategy is valid because winner in a close election can be considered to be largely random and the preferences of voters who elect an educated politician in a close election can be assumed to be the same as the preferences of voters who elect a non-college graduate leader. We test these assumptions extensively and show that results of close elections cannot be predicted on any observable characteristics and are random. This strategy has been used extensively in the literature to study the impact of other characteristics of politicians on various outcomes.

In contrast to the beliefs of policymakers advocating the minimum education requirement for candidates in elections, we find no evidence that educated leaders are more competent and deliver better outcomes for their constituents on the measures we examine. Having a college graduate politician does not improve learning outcomes for children and school enrollment or attendance rates. College graduate politicians do not lead to better school infrastructure or more school grants. The results are robust to a number of specifications and alternative definition of key variables. We also test for heterogeneity of impact across different parameters. We test if districts with different levels of urbanization or adult education achievement or poverty levels have varying impacts, but overall college graduate politicians in most cases do not perform any better than non-college graduate politicians. We also test if the impact varies across individual and household characteristics (gender of the child or mothers education level or economic status of the household), but again we find no consistent impact of educated politicians.

Why do college graduate politicians not provide better education outcomes for children in their constituencies than non-college graduate politicians? It might be the case that formal education has little to do with ability of leader to empathize and address the concerns of people. Also there are avenues other than formal education to develop leadership qualities - through experience and grass-roots work. Understanding constituents' issues and lobbying on behalf of them can be done successfully even without formal education. An alternative explanation might be that we only examine impact of education of the leader on elementary education outcomes, and it maybe the case that educated politicians use their competence in other spheres like technical education, attracting investments or improving infrastructure to deliver better outcomes. This would not be captured in our analysis. More research is required to study if educated leaders perform better in other areas.

Our findings have immediate implications for policy makers. Restricting the choice of voters and denying citizens of their right to contest elections is bad for representative democ-

racy, but this is worse when there is no evidence to support the basic assumption underlying the minimum education mandate that education increases competency of leaders. Our results show that restricting choice of voters would not necessarily lead to higher quality leaders or better outcomes for the people. These findings could serve as inputs if the Supreme Court of India's constitutional bench [9] reviews its original decision upholding the restrictions on candidates or if lawmakers consider a pending bill in the Parliament to overturn the restrictions. It could also lead to rethinking on part of other state governments and policymakers who are planning to introduce such restrictions in their states. Going beyond that our results help reconsider how quality of leaders is defined in literature and understand how voters evaluate candidates.

The rest of the paper is organized as follows. Section 2 provides a background by linking the current context with the existing literature. Section 3 describes how different datasets have been collated for the purpose of our analysis. The empirical model including the method used for identification is illustrated in Section 4. In Section 5, we report the results on learning outcomes and also various robustness tests and heterogeneity analysis. The channels through which educated leaders can have an effect on elementary education are explored in Section 6. Section 7 concludes.

2 Background

Identity of Political Leader

Educated politicians might have a differential impact on children's education only if the identity of the political leader matters for policy making. In a world where candidates can fully commit to implementation of a specific set of policies when elected and care about getting reelected, then politicians' decisions would only reflect the preferences of the electorate (Downs, 1957). In this setting the characteristics of the individual person who wins elections will not matter. Education level, gender, religion, caste, involvement in criminal activities or other aspects of identity of the politician would not matter. But citizen-candidate models (Besley and Coate, 1997; Levitt, 1996; Osborne and Slivinski, 1996) have suggested that complete commitment to policy is not possible and the identity of the politician has an influence on the actual policies that are implemented. In this model voters take into account both policy preferences and other relevant characteristics as competency when casting their votes. If education of the politician increases their competency in implementing policy then we should observe better outcomes for constituencies with educated leaders than ones with leaders with no or less education. Also the preferences of educated leaders might be different

[9] Original decision to mandate minimum education for candidates was given by a two member bench which can be reviewed by a full constitutional bench.

than non-educated leaders and would influence policy choices. If leaders who are educated realize the benefits of education for their constituents better than non-educated leaders, they might prefer to implement policies oriented at improving education outcomes.

Empirical evidence also shows that identity of the politician matters for policies. Jones and Olken (2009) and Besley and Coate (1997) use random leadership transitions at national level to show that individual characteristics of the leader matter for economic growth of the country. Extensive literature on India have shown that gender, religion, caste and other characteristics of the political leader play an important role in determining policy outcomes in the fields of education, health, economic growth and public infrastructure (Asher and Novosad, 2013; Bhalotra and Clots-Figueras, 2014; Bhalotra, Clots-Figueras, and Iyer, 2013; Bhalotra, Clots-Figueras, Cassan, and Iyer, 2014; Burchi, 2013; Chattopadhyay and Duflo, 2004; Clots-Figueras, 2011, 2012; Ghani, Mani, and O'Connell, 2013; Halim, Yount, Cunningham, and Pande, 2016; Iyer, Mani, Mishra, and Topalova, 2012; O'Connell, 2015; Prakash, Rockmore, Uppal, et al., 2014).

Formal education, leadership and competency

Does having formal education increase the competency of political leaders in designing and implementing policies? Many argue that formal education increases human capital, a person's standing in the society and is essential to acquire information and knowledge. An educated politician is also considered to understand complex public policy issues better and formulate solutions to them. Education is also argued to provide greater exposure to the world and improve the ability to comprehend issues by providing a broader perspective. Education has also been used extensively in the literature to represent the quality of the politician (Besley and Reynal-Querol, 2011; Atkinson and Rogers, 2012). While acknowledging these arguments Carnes and Lupu (2016) argue that the link between formal education, competence and leadership is not as straightforward. It is possible to gain human capital and skills required for being a effective leader without formal education. Formal education does not just reflect human capital but also the privileges of being able to obtain education. Societal restrictions and economic hardship might hinder a talented person from obtaining formal education while a less talented person might be able to obtain formal education. There still exists widespread discrimination, though declining, in obtaining even elementary education by women and individuals from lower castes in India.

Carnes and Lupu (2016) also argue that human capital obtained through formal education alone does not necessarily improve quality of leaders. Crucial factors like character, personality, ability to listen and understand people's grievances and other leadership qualities are not the focus of formal education and could be obtained without it. Even basic reading and arithmetic skills could be obtained outside of formal schooling. In instances

where specialized skills are required leaders could rely on qualified bureaucracy to help formulate solutions. Several studies have also shown that most qualified and those with highest grades are not necessarily most successful people in the society (Gottesman and Morey, 2006; Clotfelter et al., 2007). Several studies in the 1960s and 70s and recent followups by Carnes (2012, 2013) which studied relationship between education level of leaders and their attitudes, choices and decisions when in office found no difference in behavior between more and less educated politicians (see Carnes and Lupu (2016) for details).

The empirical evidence on impact of education level of the leader on policies is thin and mixed. Dreher et al. (2009) find that professional and highly educated leaders are more likely to implement market-liberalizing reforms. Using random national leadership transitions studies have found that economic growth (Besley et al., 2011; Congleton and Zhang, 2013) and educational attainment of citizens (Diaz-Serrano and Pérez, 2013) are higher when leaders are educated and declines in society's achievement are larger when educated leader leaves office. On the other hand, Carnes and Lupu (2016) show that across contexts and wide range of outcome indicators politicians with a college degree perform the same or worse than non-college graduate politicians. Educated leaders at national level in a cross-country database, legislative leaders in the US and local municipal leaders in Brazil all perform no better than non-educated leaders. This holds across a range of outcomes including economic growth, inequality, social unrest, interstate conflict, unemployment, inflation, reelection, legislative productivity, and corruption.

Most of the studies which found a positive impact of education qualification of the leader analyze leaders at the national level but the impact of education of the leader might be different at lower administrative levels. Leaders at district or constituency level work more as "fixers" or lobbyists for their constituents and have smaller role to play in broader policy making (Chopra, 1996). Analyzing the activities of elected state constituency representatives across Indian states, Jensenius and Suryanarayan (2015) find that state leaders spend most time in their constituencies rather than debating legislation in state assemblies. The time spent by leaders debating legislation and making policies has also been declining over time - from 45 days per year in 1967 to about 34 days per year - and most legislation is passed without much debate. Politicians tend to spend most of their time in their constituencies addressing their constituents' complaints, attending social functions, being part of local government bodies, helping individuals in accessing various government schemes, lobbying the district and state administration to implement their favored schemes and use their networks to attract investment to their constituency (Chopra, 1996; Jensenius, 2015). Formal education might be helpful but is not essential to gain the skills required for these set of tasks.

State leaders and education policy

A related question is whether state legislative representatives in India are able to influence policy outcomes in general and specifically in the field of education. Education is on the concurrent list in the Indian constitution – where both the federal and state governments have jurisdiction, but state governments play a major role in education policy at the primary and secondary level. Legislators can influence state policy by participating in debates, and influencing other legislatures at the state level. They can also direct funds to the their districts' educational office and influence policy implementation through their participation in local government bodies (Singh and Cruz, 1997). Legislatures can monitor school infrastructure and progress, lobby the state government for funds to open new schools or help in accessing existing grants or programs for schools from state or federal government. State legislatures also have control over state bureaucracy through role in promotions and job assignments/transfers (Krishnan and Somanathan, 2013; Nath, 2015; Sukhtankar and Vaishnav, 2015; Asher and Novosad, 2013). This influence can be used by legislatures to push their specific policy priorities and also demand results. State legislative representatives can use their discretionary development funds for any development work. Empirical evidence also links various characteristics of state legislatures with differences in policy outcomes in various spheres (Bhalotra and Clots-Figueras, 2014; Bhalotra et al., 2013, 2014). Clots-Figueras (2012) shows that districts with higher proportion of women state legislative leaders have higher primary school completion rate than other districts. She argues that women leaders prefer to invest in children's education and are able to influence district policy outcomes. If educated leaders are more competent then they can, if desired, presumably improve education outcomes for their constituents.

In this paper we focus our analysis on determining whether educated political leaders have an impact on learning outcomes for children. With rapid expansion of elementary education in the last decade enrollment rates in primary schools have reached saturation levels (>95 percent enrollment across India), but learning outcomes among children have stayed low and declined in recent period. According to Annual Status of Education Report (ASER) only 40 percent of children in class III can read a class I level text and only 26 percent of children in class V can do subtraction in 2014. These levels have declined from 49 and 43 percent respectively in 2007 (ASER 2014). Basic knowledge and skills - not enrollment and years of schooling - are key to empower children to realize their potential in life (Pritchett, 2013). This has been recognized widely by non-government organizations (NGO) and state governments across the country. Pratham, a large education NGO, which first highlighted these issues has implemented several initiatives to improve learning outcomes since 2007. Pratham working in collaboration with state and local governments has organized short-duration intensive learning camps to improve basic skills for over 430,000 children in 2014-15. Randomized

evaluations of learning outcome improvement programs implemented by Pratham in collaboration with local governments in states of Bihar, Uttarakhand, Haryana, Gujarat and Maharashtra have found substantial improvements in reading and math skills among children (Banerjee, Cole, Duflo, and Linden, 2005; Banerji, Berry, and Shotland, 2013; Banerjee, Banerji, Duflo, Glennerster, and Khemani, 2010). These programs are simple, low cost interventions and usually involve village volunteers or hired young adult helping teachers 1-2 hours a day or through intensive learning camps to focus on teaching core competencies which are supposed to be taught in first and second grade. Several state governments have also implemented their own programs to improve reading and arithmetic skills (SSA report). If political leaders wish to improve learning outcomes or are more competent than other leaders, improving learning outcomes is not a far-fetched goal with the resources they have at their disposal.

3 Data and Summary Statistics

The empirical analysis investigates the causal relationship between being represented by college graduate politicians versus a non-college graduate politicians and learning outcomes of individuals of school age when those politicians were in power in their districts.

Education Data

We create a dataset that combines information on politicians standing in state assembly election in India with children's learning outcomes. We use data from the Annual Status of Education Report (ASER), an annual district representative survey that documents children's schooling status and basic learning levels in all rural districts in India. The survey has been conducted every year from 2005 to 2014 by a group of over 30,000 trained volunteers from over 700 partner organizations under the leadership of Pratham, an educational NGO. The survey is conducted between September-November, and covers a random sample of 20 households in 30 villages in each of India's rural districts (550) totaling about 300,000 households across the country each year and approximately 600,000 children in the age group of 3-16.

ASER tests all children in the household between the ages of 5 and 16 for basic arithmetic and basic reading proficiency in the vernacular language using rigorously developed testing tools[10]. The same test is given to all children across the years. The reading assessment has four levels: letters, words, a short paragraph (a class 1 level text), and a short story (a class 2 level text). Similarly, the arithmetic assessment consists of four levels: single-digit number recognition, double-digit number recognition, two-digit subtraction with carry over, and

[10]The tools are available at http://www.asercentre.org/p/141.html

three digit by one digit division (corresponding to what students are expected to know in grade 3 or 4). These levels are converted into a continuous scale of 0-4 in our main analysis. The highest level for which children are comfortable is marked. In years 2007, 2009, 2012 and 2014 children were also tested for their competency in basic English. In addition to learning outcomes, basic household information (household size, parental education and some information on household assets) and village infrastructure information (existence of electricity, permanent road, ration shop, bank, schools and health facilities) is also collected. In 2007 and every year since 2009 ASER has also collected data on school infrastructure, enrollment, attendance and fund flows from one government primary school in each surveyed village.

We use data for the years 2006 to 2014 for children between 6 to 16 years of age. We divide our sample into two groups – children between 6 to 10 years of age which corresponds to primary school age (grade 1 to 5) in India and children between 11 to 16 of age corresponding to middle and secondary school age (grade 6 and above) to study impact of educated politicians on their learning outcomes. Overall our sample includes 1.29 million children between 6-10 years of age and 1.3 million children between 11-16 years of age. Figures 1 and 2 show the evolution of learning scores for both 6-10 and 11-16 age group over the years. Though enrollment in India has increased over time learning levels have declined. Table 2 presents summary statistics for our estimation sample. The percentage of children in class VIII who can perform simple division has declined from 70 percent to 45 percent between 2010 and 2014.

Political Data

India is a federal republic with parliamentary system of government at the state and the national level. Several powers are devolved to the state, district and village level government. Each state has a legislative assembly (state governments) which plays a big role in educational policies and expenditures, especially at the primary and secondary level. States are divided into districts which are important administrative units for various decisions and districts in turn are divided into single-member constituencies in which candidates are elected in first-past-the-post elections. Each assembly constituency is designed so as to have almost the same number of inhabitants within the state. On average each district has about nine constituencies. The term of each elected state representative is five years, unless the assembly is dissolved before end of its term.

A dataset on politicians contesting state assembly elections in India between 2004 and 2014 was constructed using information obtained from the Election Commission of India (ECI) and the Association for Democratic Reforms (ADR). The ECI provides data on the number of votes, gender and party affiliation of all winner and runner-up candidates for all state assembly elections in India. Following a 2003 Supreme court judgment all individuals con-

testing elections have to file an affidavit with the election commission listing their education level, assets, criminal cases among other details. The Association for Democratic Reforms (ADR) has scanned all these affidavits and provided the information online for central and state elections from 2004 onwards. We combined this information from ECI and ADR to construct a detailed portrait of all winner and runner-up candidates for state assembly elections from 2004 to 2014 . Among winner and runner-up candidates about 39 percent have not completed college education. Table 3 presents summary statistics from the electoral data. Among close elections between educated (completed graduation) and less-educated candidates, almost equal number are won by both types of candidates (49 and 51 percent respectively).

Merged Data

ASER provides information on residence of a child only at the district level whereas political leaders are elected at the constituency level, which are below the district level. To merge the two datasets we aggregated the election data at the district level. For each child in the sample politicians who were in power in the year when the child's learning levels were tested and the two years prior to it are identified. ADR has data on candidate's education levels only for state elections conducted after 2004, when the law requiring candidates to publically report their education level came into force. Since the elections for state assemblies in different states are conducted in different years, the starting year of our data differs for each state - the first election year after 2004 for that state. For example, for Maharashtra which had election in 2004 we have data on politician's education level for all years from 2004 to 2014, but for Gujarat our data starts only in 2008 the first election year in Gujarat after 2004. Since we are using average value of three years for all political variables in our base specification the data used in the estimation for a state start two years after the start of election data for the state. For example, for all districts in Maharashtra our base estimation uses ASER data starting from 2006 whereas for districts in Gujarat estimation data starts only in 2010. A child living in rural areas of Jalna district of Maharashtra surveyed in 2007 will be impacted by politicians elected in the district from 2005 to 2007.

4 Empirical Strategy

In this section we lay out an econometric model to identify the causal effect of having a college educated versus non-college educated leader on the educational outcomes of children. We begin with a simple model which is estimated by Ordinary Least Squares (OLS) method:

$$Y_{idst} = \alpha_{ds} + \sigma_t + \beta G_{dst} + \gamma \mathbf{X}_{idst} + \delta_t \mathbf{Z}_{ds} + \eta_{st} + \varepsilon_{idst} \quad (1)$$

The education outcome of child i living in district d of state s in year t is given by Y_{idst}; and G_{dst} is the fraction of assembly constituency seats in the district held by a college-educated politician during the last three years.[11] [12] District specific time invariant unobserved heterogeneity is taken into account by including district fixed effects α_{ds}. Since districts are nested within states, therefore the district fixed effects also subsume the state fixed effects. The year fixed effects (σ_t) consider the overall changes in the economy including the impact of growth and various nationwide educational policies. Several observable characteristics at the level of child, household and village are included in the vector $\mathbf{X}_{idst}$. Child level covariates are gender and age-cohort specific dummy variables, and an indicator of whether child's mother attended school. Household level variables include household size, square of household size, dummy variables indicating the structure of the house[13], ownership of assets (television and mobile phones), and whether use of electricity was observed on the date of survey. The village specific variables capture access to electricity, paved (*pucca*) road, ration shop and bank. While the district fixed effects control for regional characteristics that do not change over time, there are factors such as demand for education or level of development that varies over time. Some of these district specific time varying effects are taken into account by interacting the year fixed effects with measures of baseline characteristics given by the vector $\mathbf{Z}_{ds}$. Using National Sample Survey data of 2004-05, district level sex ratio, adult primary education completion rates for males and females, caste composition in the population, and proportion of urban population are included in $\mathbf{Z}_{ds}$. Most of the education policies are implemented by the respective state governments; besides, there is a great deal of heterogeneity across Indian state economies which are likely to follow very different trajectories of development. We control for all time varying state level factors by including state specific year fixed effects (η_{st}) in the regression.

The main challenge of identifying β from Equation 1 is the possibility that some omitted variable which varies across districts and over time, may be correlated with both G_{dst} and Y_{idst}. While the district fixed effects take care of inherent differences that do not change over time, the presence of time varying unobservable effects at the district level cannot be ruled out. For instance, in regions that have experienced higher growth in demand for education, voters' preference for education may be manifested through higher propensity to elect college educated politicians in recent elections than in past elections. The fraction of

[11] Following Clots-Figueras (2012), the main specification considers the average fraction of seats held by a college educated politician over the past two years and the current year. In the robustness section, we consider alternative lag periods to calculate this variable, and our results remain unchanged in those specifications.

[12] A college educated individual with atleast a Bachelor's degree or diploma is referred to as graduate in the India.

[13] Depending on the building material, the structure of the house is measured by the following three categories, arranged in the increasing order of housing quality: *katcha*, *semi-pucca* and *pucca*. *Katcha* is considered as the base category in the regression.

seats held by college educated leaders may be endogenously determined due to the presence of such unobservable factors.

Identification

To tackle the endogeneity problem, we use the fraction of seats won by college educated politicians in *close* elections between a college educated and a non-college educated politicians (GC_{dst}) as an instrument for the overall fraction of seats held by college educated leaders (G_{dst}). Close elections are defined as those where the margin of victory is small. For the main specification, we consider an election to be close when the winner beats the runner-up by less than 3.5 percent of total votes, and measure the instrument accordingly.[14] Insofar as the vote difference between the top two candidates in an election is arbitrarily small, the winner will be determined by chance; hence the use of close election provides a plausible basis for constructing the instrument in this context.

This empirical strategy has been used in the literature to identify impact of other personal characteristics of leaders (e.g. gender, religion) on various development outcomes (Bhalotra and Clots-Figueras, 2014; Bhalotra, Clots-Figueras, Cassan, and Iyer, 2014; Clots-Figueras, 2011, 2012). Identification in this method relies on the quasi-randomness of the outcome of a close election. The Indian electoral system follows the first-past-the-post voting system where the candidate who gets more votes than any other candidate wins the election. The probability that a candidate will win is a function of the margin of votes between the winner and the runner-up, and this probability changes discontinuously at the point where the margin of votes is zero. Considering those elections where the contest takes place between a college educated and a non-college educated politician, in an arbitrarily small neighborhood around this point of discontinuity, the constituencies which elect a educated [15] leader versus those which elect a non-college educated leader are similar in all characteristics except the education level of the leader. Hence this discontinuity at zero margin of votes is essentially similar to random assignment of treatment. Since the main explanatory variable is at the district level, we aggregate over the constituency specific discontinuities in treatment assignment within district; thus we have a fuzzy regression discontinuity design in our empirical set up. The model is estimated through a two-stage least squares (2SLS) method and is given below:

[14] The margin of victory is defined as half of the difference in the share of votes between the winner and the runner-up, where the total turnout is used as the denominator to calculate the vote shares. Thus, for a given number of voter turnout, the margin of victory denotes the share of votes which the winner had to lose and the runner-up had to gain, in order to flip the outcome of the election between them. In the robustness section, we use various other levels of margin of victory to define close elections between a college educated and a non-college educated candidate.

[15] In the empirical analysis educated leader refers to a leader who has completed college and obtained a degree or a diploma.

$$Y_{idst} = \alpha_{ds} + \sigma_t + \beta G_{dst} + \lambda TC_{dst} + \sum_{j=1}^{N} \pi_j I_{jdst} \times F(M_{jdst}) + \sum_{j=1}^{N} \mu_j I_{jdst} + \mathbf{X}_{idst}\gamma + \mathbf{Z}_{ds}\delta_t + \eta_{st} + \epsilon_{idst} \quad (2)$$

$$G_{dst} = \omega_{ds} + \nu_t + \theta GC_{dst} + \rho TC_{dst} + \sum_{j=1}^{N} \phi_j I_{jdst} \times F(M_{jdst}) + \sum_{j=1}^{N} \psi_j I_{jdst} + \mathbf{X}_{idst}\xi + \mathbf{Z}_{ds}\zeta_t + \tau_{st} + e_{idst} \quad (3)$$

Equation 2 is the second stage and Equation 3 is the first stage. The main explanatory variable G_{dst} which is potentially endogenous, is instrumented by the proportion of educated leaders who win in close elections against a non-college educated candidate GC_{dst}. Note that unlike the outcome of a close election, the existence of close election may not be random: it may depend on the number of educated candidates or the prevailing political competitiveness in the district. Therefore we control for fraction of seats that had close elections between educated and non-college educated candidates in the district (TC_{dst}). This also captures any direct effect of having close elections, such as greater effectiveness of leaders due to higher political competitiveness in the region. The specification also controls for a third order polynomial in the victory margins of every educated versus non-college educated election (close or non-close) in the district. The margin of victory between a educated and a non-college educated candidate in election j is M_{jdst}. The polynomials, denoted by $F(M_{jdst})$, are interacted with I_{jdst} which is an indicator of whether there was a educated versus non-college educated election j in the district during the period considered. We also test if the results are robust to varying degrees of the polynomial function. Our model is based closely on model used to study impact of women leaders on health and education outcomes by Clots-Figueras (2012) and Bhalotra and Clots-Figueras (2014).

The rest of the variables included in the 2SLS analysis are same as in the OLS regression. In both these models, the standard errors are clustered at the district level to allow for any possible correlation in the error terms among observations within the same district.

5 Results

We present the results for learning outcomes in this section. We begin with the results from the OLS specification before discussing the 2SLS results that take into account the potential problem of endogeneity of the main explanatory variable. Table 4 and 5 present the results for reading and mathematics score respectively. For each of the dependent variables, we

present three different specifications where control variables are gradually added to investigate if the results remain comparable across these models. The main variable of interest is the fraction of seats in the district held by educated leaders. The common covariates included in all specifications are district fixed effects and year fixed effects. Beginning with the most parsimonious specification that excludes any other covariate, control variables at the level of individual/household/village and district are cumulatively added. The final model also includes state specific year fixed effects to consider time varying unobservables at the state level. The main two dependent variables measure cognitive outcomes in terms of standardized reading and mathematics score.[16] For a subset of the sample, data on english score is also available. Considering that children at the primary and post-primary levels may have very different learning trajectories, separate regressions are estimated for children in the age-group of 6–10 years and 11–16 years.

The OLS regressions show no significant effect of the proportion of college-educated leaders in the district on children's reading and mathematics scores. Only in one specifications that does not control for any observable covariates we find positive effect on reading score of 11–16 year old children. It shows that a 10 percentage point increase in the fraction of college graduate leaders in the district leads to 0.006 standard deviation increase in the reading score of children in this age-group. This effect is significant at 10 percent level. However, this regression does not control for any observable child, household, village, or district level characteristics, and once these control variables are included, the effect becomes insignificant and also reduces in magnitude. Thus, the OLS results do not show any systematic effect of college graduate leaders on learning outcomes of children. As discussed earlier, these regressions could suffer from endogeneity problem and not capture the causal effect of college graduate leaders on the outcomes, hence in the subsequent analysis we focus on the instrumental variable estimation in a fuzzy regression discontinuity setting.

5.1 Validity of Instrument

Before analyzing the effect of college graduate leaders on learning outcomes, it is imperative to test whether the instrument is a good predictor of the endogenous variable in the first stage of the 2SLS estimation. Corresponding to the reading score regressions, Table 6 presents the first stage regressions for 6–10 and 11–16 age-groups. The coefficient of the instrumental variable, i.e. fraction of seats won by a educated in close elections, is found to be statistically significant at 1 percent level in all specifications and for both the age-groups. The first stage

[16] We use age-wise standardized test scores as a measure of cognitive outcome. For any given age between 6–16, we consider children of that age from all the survey years, and calculate the mean and standard deviation of their test scores in a specific subject, and thus calculate the z-score for that subject. The implication of using these standardized test scores (z-scores) as outcomes is that the magnitude of effect from the regression can be interpreted in terms of standard deviation in test scores.

F-statistics for the instrumental variable ranges between 53 to 60 for 6–10 age-group and 60 to 66 for 11–16 age-group. The point estimate is also stable. Result from the final model for the sample of 6–10 age-group shows that holding the fraction of constituencies with close election constant, a 10 percentage point increase in the fraction of constituencies where a college-educated won against a non-college graduate in a close election will lead to 9.87 percentage point increase in the overall fraction of seats held by college graduate leaders in the district. The equivalent estimate for 11–16 age-group is 9.73.

We also provide graphical illustration of the first stage. We plot the overall fraction of college-educated legislators against the average vote margin across districts between college-educated and non-college graduate candidate. Figure 3 uses all the elections in districts with at least one close election (sample on which our identification is based), while Figure 4 restricts sample to districts which have exactly one election between college-educated and non-college graduate politicians. We use bin size of one percentage point as suggested by Imbens and Lemieux (2008), and we plot a lowess smoothing line on each side of the discontinuity. A college-educated politican winning a close election in a district increases the fraction of constituencies in the district won by a college-educated politicians by about 10 percentage points (Figure 3).

We make the assumption that the probability of winning a close election is the same for educated and non-educated candidates. This assumption might be violated if there is vote manipulation leading to bias in the outcome of close election. To verify that there is no maniuplation involved we check if the distribution of the vote margin is continuous around the neighborhood of zero (Fig. 5). We tested this formally by estimating the difference in the densities on either side of the zero point (McCrary, 2008). The estimated difference is 0.099 and is statistically insignificant.

In addition, to show that the outcome of close elections is random one must show that districts with more college graduate winners than non-college graduate winners in close election have similar characteristics to districts with more non-college graduate winners than college graduate winners in close elections. In Table 7 we compare various characteristics in the two types of districts. The districts with more college graduate winners do not differ significantly in any of the characteristics from districts with more non-college graduate winners in close elections.

Also if close election outcomes are random then constituency and candidate characteristics should be the same across constituencies where educated candidates win as compared to ones where non-educated candidates win in close elections. In Table 8 we show that various individual candidate and constituency characteristics are not significantly different across close elections where educated or non-educated candidates win.

Moreover, we test for the possibility that the outcome of a close election may be biased in

favour of the incumbent or a party that has strategic influence over the election process. In particular, we consider whether the college graduate candidate wins in a close election between college graduate and non-college graduate candidates, and regress this outcome on the party affiliation dummies of the candidates who fought in those elections, along with other constituency and district level characteristics (column 1 of Table 9). In another specification we also include the history of close elections and the proportion of college graduate winners in the past in the district as additional explanatory variables in this regression (column 2 of Table 9). We find that the outcome of a close election is not significantly predicted by any of the variables related to political parties or past election outcomes. Therefore, the analyses presented in this section give credence to the assumption that the outcome of a close election between a college graduate and a non-college graduate leader is random.

5.2 Impact of educated leaders

The second stage estimates for the effect on reading score is given in Table 10. In addition the the variables considered in the OLS specification, the 2SLS model includes fraction of seats that had close election between a college graduate and a non-college graduate in the district, third order polynomials in the vote margins in every college graduate and a non-college graduate election as additional covariates. We find that the fraction of seats won by a college graduate leader is statistically insignificant throughout all the specifications. Given that the dependent variable used is standardized reading score, the results from the final model shows that a 10 percentage point increase in the proportion of seats won by college graduate leaders will lead to a statistically insignificant increase in the reading score by 0.004 standard deviation for children aged 6-10 years of age. For children aged 11–16 years, the equivalent effect is positive and at 0.013 standard deviation, however, it is also statistically insignificant.

The results on mathematics score presented in Table 11 reveal that there is no significant effect of having a higher proportion of college graduate leaders in the district on the math score of children in either 6–10 or 11–16 years age-group. The same conclusion can be drawn from the findings on English scores presented in Table A2.

5.3 Robustness Analysis

We put our results to robustness checks in this section to check if varying the specification or range of political leaders who are supposed to have an impact changes our results.

Different Lag Periods

One can argue that the policies an educated leader implements may take time to show an effect on the outcomes. A priori it is not clear how long it takes for a policy to show effect after its implementation, therefore this remains an empirical issue. The main results discussed above consider the average education level (whether college graduate or not) of leaders in the district over the last three years (current year and the past two years). This measure is similar to the one used by Clots-Figueras (2012) who finds a significant positive effect of having female versus male politicians on education of citizens. As a robustness exercise, we use different lag periods, in particular the average over the last four years and two years, to measure the explanatory variable. Irrespective of the lag period used, the effect of college graduate leaders, in comparison with non-college graduate leaders, remains statistically insignificant for all the learning outcomes (Table 12).

Alternative Definition of Close Election

We define close elections as those where the margin of victory is less than 3 percent. We test whether the results are robust to alternative cut-off points of 1, 2, and 4 percent levels, and find that the results remain qualitatively unchanged (Table 13).

Varying Degrees of Polynomials in Vote Margins

Given the fuzzy regression discontinuity design of our empirical model, it is important to control for polynomials in the vote margins so that any effect of the vote margin itself is controlled in a flexible way. This ensures that the instrument exploits variation only in the close neighborhood around the discontinuity to justify a quasi-random assignment of treatment. While the main regressions include third order polynomials, our results (not shown here) are robust to first and second order polynomials as well.

Different Measures of Learning Outcomes

We have so far used the learning outcomes as continuous variable, but learning outcome is an ordinal variable. Estimating the regressions using ordered probit or ordered logit would be more appropriate but they are difficult to interpret and also limit the estimation models we can use. To test the robustness of our results to ordinal nature of the dependent variable we use binary variables indicating the level of learning as alternative dependent variable. For reading, these variables reflect whether a child can read letters, words, short paragraph and short stories. For mathematics, each of them measure one of the categories from single-digit number recognition, double-digit number recognition, two-digit subtraction with carry over, and three digit by one digit division. Linear probability models are estimated using 2SLS

method following the same specification as the main regressions presented above. Table 14 shows that there is no differential impact of having a college graduate leader over a non-college graduate leader on any of these outcomes.

5.4 Heterogeneity Analysis

We explore if the effect of educated politician is heterogeneous with respect to various district, household and child specific characteristics. Although we do not find any significant effect in the overall sample, it is possible that college graduate leaders are instrumental in implementing policies that benefit certain sections of the society. For instance, if educated leaders are motivated towards reducing inequality, it may benefit poorer regions. Such effects may not show up in the aggregate sample. Therefore, dividing the sample into subsamples, the 2SLS model with full set of control variables is estimated for each subsample.

Heterogeneity in poverty, urbanization and education levels in districts

The first analysis in this section tests if the effect varies with the baseline poverty rates in the districts. Based on estimates from the NSS 2004-05 data, we categorize the districts into high, medium and low poverty rate groups. High poverty districts are ones where more than 67percent of rural population is in the bottom 40th national consumption percentile. Rich poverty districts have less than 31 percent of the rural population in the bottom 40th percentile by consumption. Medium poverty districts are ones with between 31-67 percent of rural population in the bottom 40th consumption percentile. The results are presented in Table 15. Having college graduate leaders does not make any significant difference in math score irrespective of the district poverty rates. For reading score, we find slightly significant positive effect for 11–16 year old children residing in the poorest districts. But for most of the cases the effect is insignificant, we do not find any compelling evidence that college graduate leaders may be effective in either rich or poor districts.

Next we test heterogeneity with respect to the baseline rate of urbanization in the district. Districts with urbanization rate of 15 percent or less are categorized as low urbanization districts, while others are categorized as high urbanization. From Table 16, we find that there is no significant effect for both 6–10 and 11–16 year old children. Older children's reading score tend to increase when there are higher proportions of college graduate leaders in the district with higher rates of urbanization but it is not significant.

We also examine if the effect varies with the baseline average education level in the districts. We group the districts below and above median level of primary education completion rates of adults. The effect of having more college graduate leaders is found to be positive but insignificant in high education districts. However there is a significant negative effect in

districts that have lower initial level of education (Table 16). This negative effect is found on the reading and math score of younger children. These results suggest that college graduate leaders may implement policies that have potential to improve children's learning outcomes only when there is a complementary history of education in the community. Preference of college graduate politicians may also be more inclined towards improving higher education because it potentially affects growth in the short run. On the other hand, non-college graduate leaders may favor basic education more and implement policies that benefit school going children in less educated districts.

Heterogeneity in household status

Heterogeneity based on household level characteristics are explored next. There is a strong connection between household wealth and the type of residence, where the richest people live in a pucca house, while the poorest in a kutcha house. We categorize the households based on their type of residence and present the results in Table 17. College graduate politicians perform the same as non-college graduate leaders for all kinds of residence.

Heterogeneity in individual characteristics

Table 18 presents results of heterogeneity analysis based on child level characteristics: gender and whether mother went to school. If educated politicians are more aware of gender disparities in society and want to elevate those then we can expect to see bigger impact in education outcomes on girls than boys. Mother's education level is an important indicator of the household environment and has direct bearing on child's learning outcomes. Children with mothers who have not gone to school tend to have lower schooling outcomes and any improvement in schooling environment might have a differential impact on them as compared to other children. College graduate political leaders do not perform better than other politicians across these groupings.

6 Channels

In this section we investigate the mechanisms through which educated politicians can influence learning outcomes of children in elementary school. We analyze the impact of having educated representatives on a range of indicators including school enrollment, children's and teachers attendance in school, school physical infrastructure, financial grants and mid-day meal program in schools. Since our main results on learning outcomes point to no impact of educated politicians, this section helps in answering whether educated politicians have an

impact on other important aspects of schooling which might potentially lead to improvement in learning outcomes.

Enrollment rate

One possible way learning outcomes could be impacted is through higher school enrollment. ASER is a household level survey and it interviews and tests all children in the household irrespective of their school enrollment status. It also records if children are currently enrolled in school or if they dropped out or were never enrolled in school. Political leaders could increase enrollment by obtaining funds to open new schools or expanding schools in areas with low density of schools or by obtaining funds to improve infrastructure of schools or by running information campaigns to increase enrollment. We use a dummy variable indicating if child is currently not enrolled in school as dependent variable and run the same regressions as in Table 10. The results are presented in Table 20. For both age groups (6-10 and 11-16) we find educated leaders slightly increase the probability of the individual being out of school, but this is not significant in any of the models. This is in contrast to finding by Clots-Figueras (2012) who finds that female political representation decreases the chances that individual is out of school. This might partly be because enrollment levels in 2005-2010 period increased dramatically everywhere in India and are at saturation levels (greater than 95 percent) at most places with little scope for improvement.

Attendance in school

Educated politicians might be able to influence attendance rate of children and teachers through better monitoring of schools or other incentive programs. ASER interviewers visit one government school in each surveyed village to collect information on attendance, school infrastructure and grants.[17] Children and teachers attendance on the day of the survey is observed by the interviewer and recorded. The attendance ratio is defined as the ratio of total children attending the school on the day of the survey (teachers present) to the total number of enrolled students based on the register (appointed teachers). We run regression on the attendance ratios for children and teachers separately using the same model as the one in Table 10. The results are presented in Table 22. For children's attendance we do find a small negative but insignificant impact of having an educated politician, but impact on teacher's attendance is positive and insignificant.

[17] If the village has a government school for class 1 to 7/8 that is preferred over other schools to be visited. If village does not have school for classes 1 to 7/8 then the primary school (teaching classes 1 to 4/5) with highest enrollment is visited.

School infrastructure and funding

We also investigate if educated political leaders are effective in improving school infrastructure, obtaining more funds for schools and implementing midday meal schemes better. These might lead to improvement in the quality of schools and potentially impact learning outcomes. ASER collects data on several aspects of physical infrastructure of surveyed schools. We combine several of these to create an index for school physical infrastructure. The index weights are obtained from the first component of Principal Component Analysis (PCA). PCA is created using dummies for presence of blackboard and learning material in class 2 and class 4, drinking water, toilet and library books in school. We find small insignificant negative impact of educated politicians on school infrastructure (Table 23). We repeat these regressions for variables which capture usability of various physical infrastructure as well as which include separate variables indicating presence of girls and boys toilet. Those results (not shown here) are qualitatively similar.

ASER also collects data on Sarva Shiksha Abhiyan (SSA) grants obtained in the previous fiscal year by the school. We investigated whether having an educated politician results in more funds being diverted to school through these grants. We combine three grants (school development, school maintenance and teacher learning material) to generate a PCA which is used as the dependent variable. We find no evidence that graduate politicians result in any change in the extent of grants received by schools. (Table 23)

Finally we analyze if graduate politicians improve the prevalence of midday meal schemes in schools. Midday meal schemes have been found to play a role in improving the nutrition, learning outcomes, enrollment and attendance of children in school. ASER collects data on whether midday meal was served in school on the day of the survey. We find no significant impact of educated politicians on mid-day meal scheme.

Overall, educated political representatives do not make significant difference across a range of schooling outcomes. This finding is in line with our overall result that educated leaders are no better at improving learning outcomes than non-graduate leaders. Even if one considers learning outcomes as a difficult (unlikely) outcome to be impacted by political leaders, through funding and lobbying politicians can impact schooling facilities directly. But we do not find consistent impact of educated politicians on schooling services for their constituents.

7 Conclusion

We investigated whether having a college-educated state representative results in better learning and schooling outcomes. We find that college-educated politicians are no better at improving elementary education for their constituents than non-college graduate politi-

cians. Learning outcomes, enrollment, attendance, school infrastructure and funding are not significantly impacted if the elected representative is college graduate. In the field of elementary education college graduate politicians are not found to be more competent or effective.

To the best of our knowledge, this is the first paper that analyzes link between politician's education and competency in India. Our findings have immediate implications for policies which are under discussion or have imposed minimum education mandate on candidates contesting elections in India on the premise that educated politicians are more competent than less-educated politicians.

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Figure 1: Learning outcomes for children 6-10 years of age

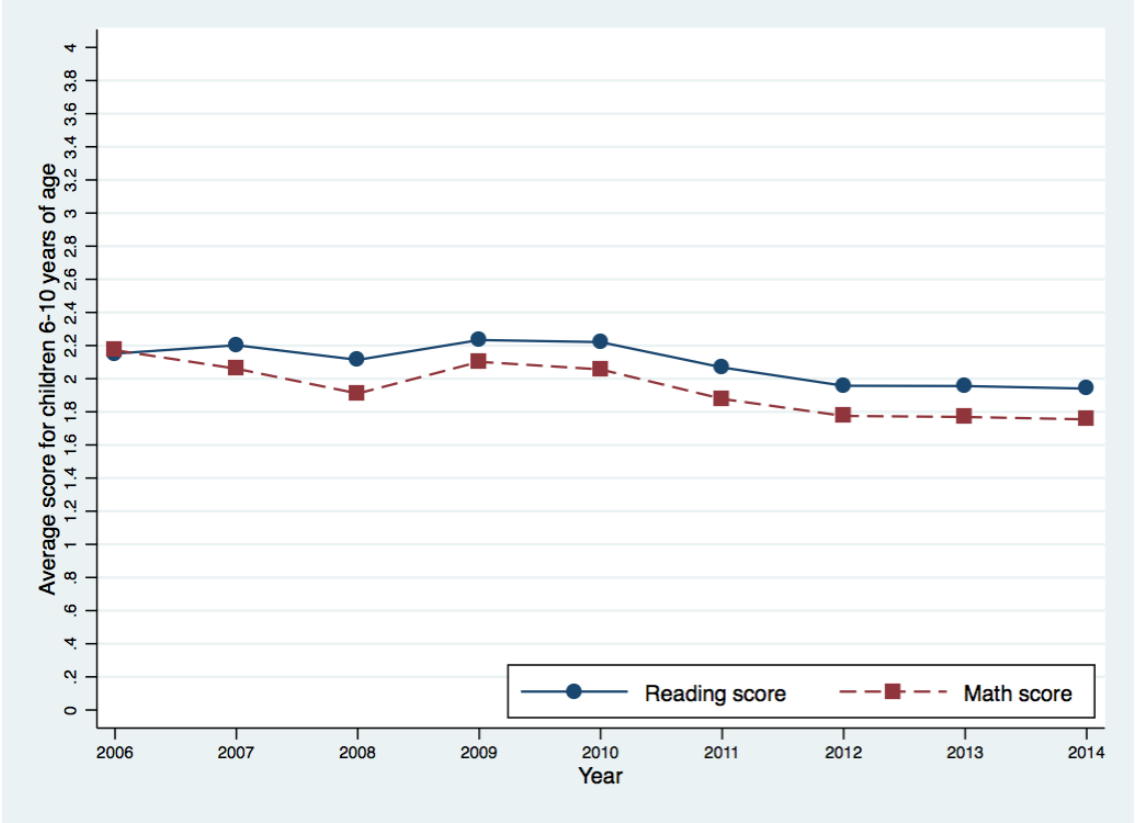

Figure 2: Learning outcomes for children 11-16 years of age

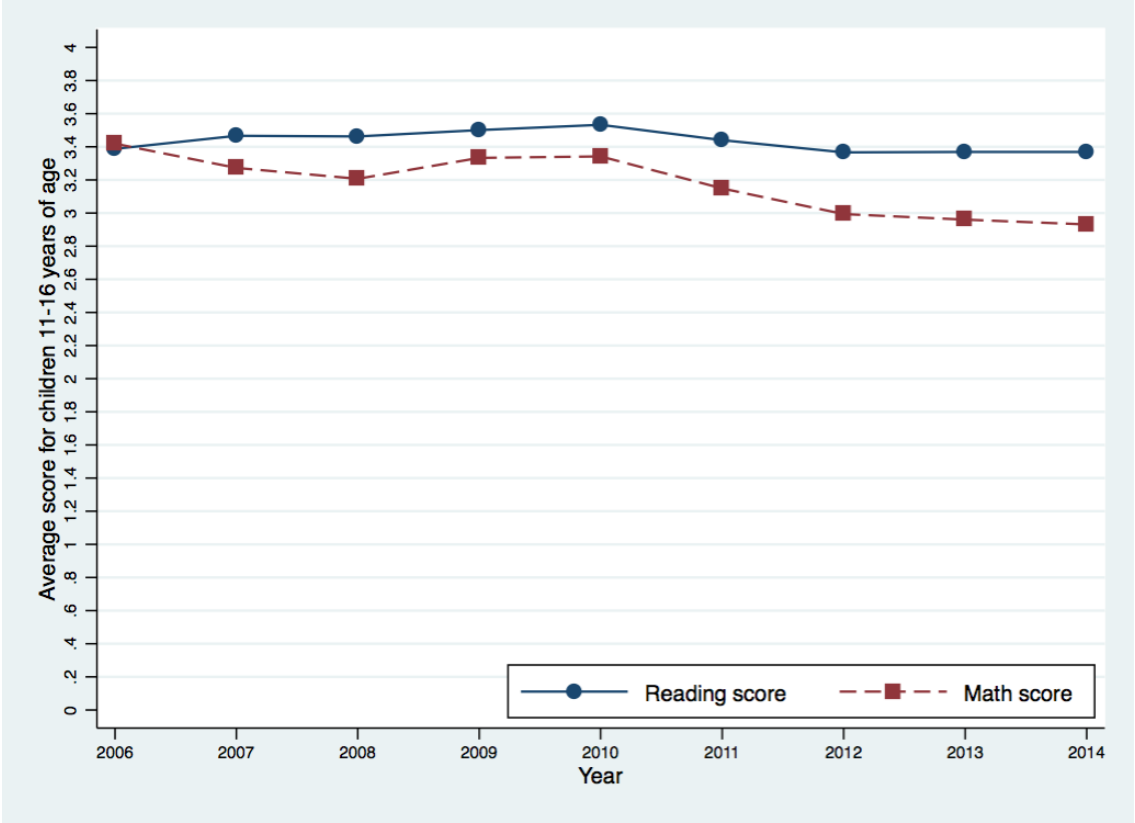

Figure 3: First stage illustration: Sample of all districts with close elections

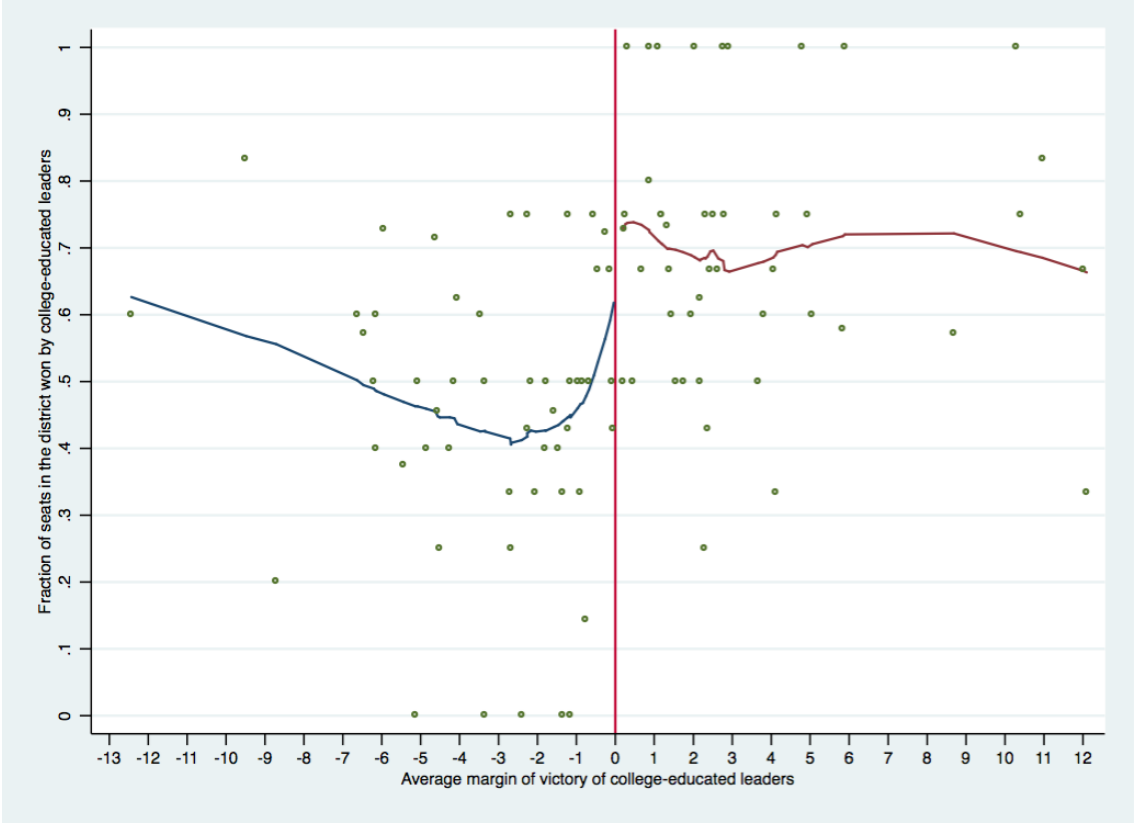

Figure 4: First stage illustration: Sample of all districts with at least one election between educated and non-educated candidates

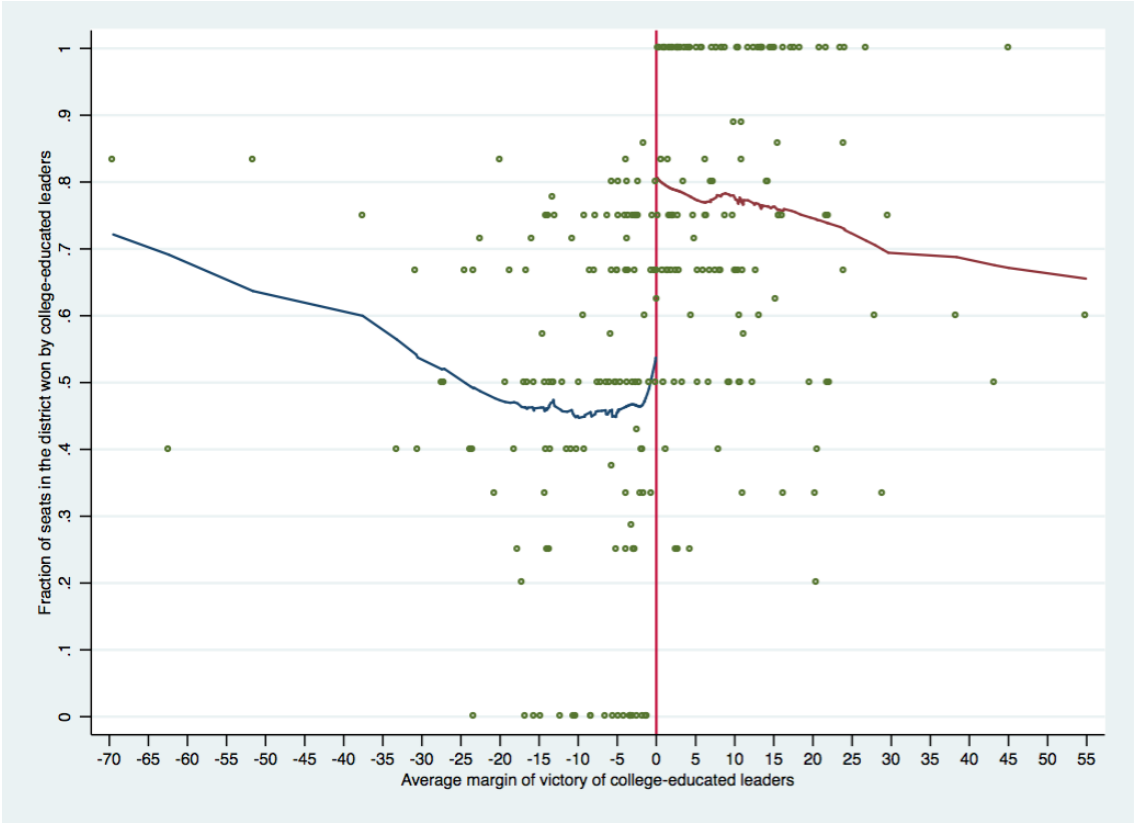

Figure 5: Continuity of vote margin between educated and non-educated (running variable)

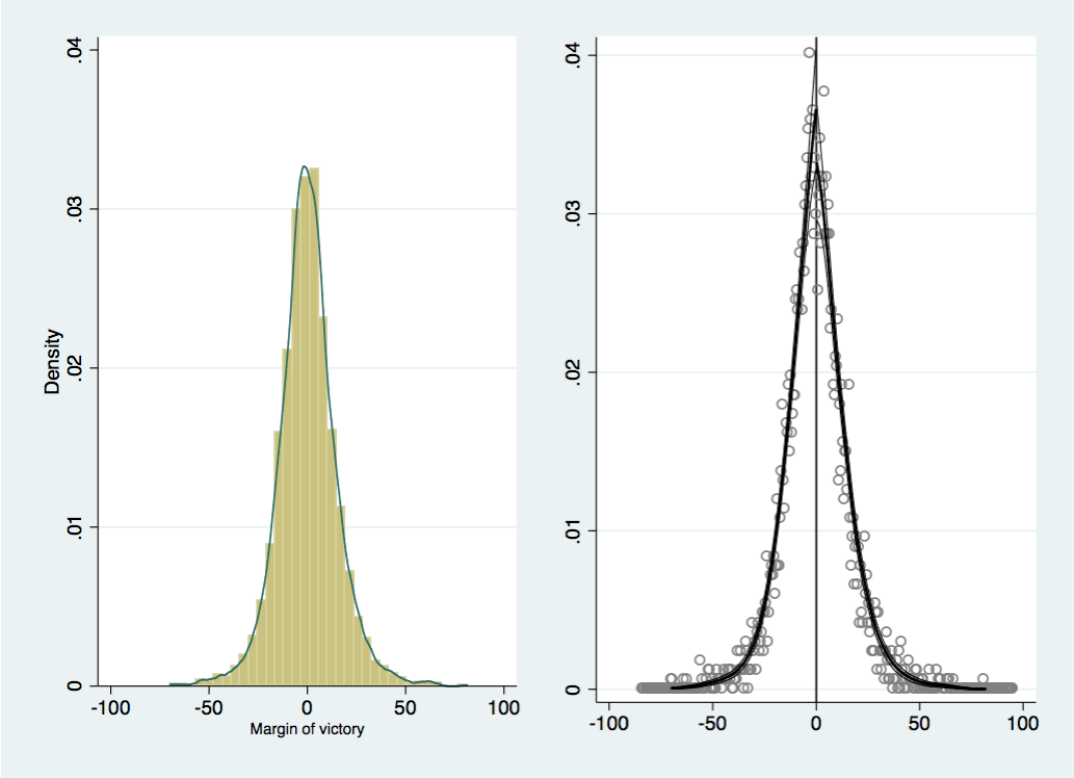

Table 1: Summary statistics from child level data

Variables	Children aged 6–10 years			Children aged 11–16 years		
	Obs.	Mean	SD	Obs.	Mean	SD
	(1)	(2)	(3)	(4)	(5)	(6)
Reading score	1,294,549	2.071	1.388	1,303,674	3.425	1.047
Math score	1,279,657	1.893	1.213	1,295,643	3.123	1.076
English score	567,828	2.678	1.386	576,782	3.959	1.270
Not enrolled in school	1,266,493	0.016	0.124	1,302,898	0.060	0.238
Age of child	1,294,549	8.113	1.428	1,303,674	13.291	1.624
Female child	1,294,549	0.467	0.499	1,303,674	0.478	0.500
Child's mother went to school	1,250,366	0.534	0.499	1,261,765	0.499	0.500
Household size	1,294,549	6.553	2.858	1,303,674	6.369	2.714
House katcha	1,214,531	0.368	0.482	1,228,590	0.338	0.473
House semi-pucca	1,214,531	0.305	0.460	1,228,590	0.306	0.461
House pucca	1,214,531	0.328	0.469	1,228,590	0.356	0.479
Household owns television	1,203,449	0.466	0.499	1,218,052	0.506	0.500
Household owns mobile phone	1,197,277	0.650	0.477	1,212,061	0.695	0.461
Household's electricity use observed	1,022,433	0.645	0.478	1,054,933	0.679	0.467
Village has electricity	1,207,515	0.909	0.287	1,221,079	0.927	0.261
Village has pucca road	1,202,562	0.746	0.435	1,216,265	0.766	0.423
Village has ration shop	1,200,705	0.703	0.457	1,214,089	0.718	0.450
Village has bank	1,199,046	0.240	0.427	1,212,105	0.258	0.438
District proportion of female population (2004)	1,258,269	0.487	0.027	1,271,747	0.488	0.028
District primary education rate - adult male (2004)	1,258,269	0.651	0.150	1,271,747	0.659	0.147
District primary education rate - adult female (2004)	1,258,269	0.374	0.199	1,271,747	0.384	0.198
District proportion of ST (2004)	1,258,269	0.156	0.266	1,271,747	0.148	0.254
District proportion of SC (2004)	1,258,269	0.197	0.122	1,271,747	0.201	0.122
District proportion of OBC (2004)	1,258,269	0.410	0.237	1,271,747	0.411	0.234
District proportion of other caste (2004)	1,258,269	0.237	0.204	1,271,747	0.241	0.206
District proportion of urban population (2004)	1,260,105	0.179	0.150	1,273,831	0.187	0.151
Year 2006	1,294,549	0.011	0.105	1,303,674	0.012	0.108
Year 2007	1,294,549	0.042	0.200	1,303,674	0.037	0.190
Year 2008	1,294,549	0.080	0.272	1,303,674	0.076	0.266
Year 2009	1,294,549	0.120	0.325	1,303,674	0.116	0.320
Year 2010	1,294,549	0.143	0.350	1,303,674	0.140	0.347
Year 2011	1,294,549	0.170	0.375	1,303,674	0.176	0.381
Year 2012	1,294,549	0.151	0.358	1,303,674	0.154	0.361
Year 2013	1,294,549	0.143	0.350	1,303,674	0.146	0.353
Year 2014	1,294,549	0.140	0.347	1,303,674	0.143	0.350

Source: ASER data except district specific variables which are obtained from NSS 2004-05 data.

Table 2: Education Qualification of Candidates in Elections

Education of the candidate	Sex of the candidate								
	Female			Male			Total		
	Num	Col %	Cum %	Num	Col %	Cum %	Num	Col %	Cum %
Illiterate	7	0.5	0.5	35	0.2	0.2	42	0.3	0.3
Literate	49	3.7	4.2	202	1.4	1.6	251	1.6	1.8
5th Pass	37	2.8	7.0	292	2.0	3.6	329	2.0	3.9
8th Pass	80	6.0	12.9	726	4.9	8.5	806	5.0	8.9
10th Pass	191	14.3	27.2	2147	14.6	23.1	2338	14.5	23.4
12th Pass	184	13.8	41.0	2341	15.9	39.0	2525	15.7	39.1
Graduate	291	21.8	62.8	4011	27.2	66.2	4302	26.8	65.9
Graduate Professional	131	9.8	72.6	2252	15.3	81.4	2383	14.8	80.7
Post Graduate	312	23.3	95.9	2414	16.4	97.8	2726	17.0	97.6
Doctorate	55	4.1	100.0	323	2.2	100.0	378	2.4	100.0
Total	1337	100.0		14743	100.0		16080	100.0	

Notes: Table based on information about winner and runner-up candidates. A person who has a Bachelor's degree or diploma is considered a Graduate in India.

Table 3: Summary statistics of district level variables from elections data

Variables	Obs.	Mean	SD
	(1)	(2)	(3)
Proportion of seats won by graduates	1,127	0.594	0.251
District with at least one graduate leader	1,127	0.953	0.212
Proportion of seats won by graduates in close elections against non-graduates	1,127	0.0394	0.0979
District with at least one graduate leader who won in close election against non	1,127	0.201	0.401
Proportion of seats with close election between graduate and non-graduate	1,127	0.0814	0.138
District with at least one close election between graduate and non-graduate	1,127	0.378	0.485
Proportion of seats with election between graduate and non-graduate	1,127	0.407	0.249
District with at least one election between graduate and non-graduate	1,127	0.876	0.330

Notes: The unit of observation is district in an electoral year. The sample corresponds to the full sample used in child level regressions. Close election is the one where the winner beat the runner up by less than 3 percent of votes.
Source: Authors' calculation from ADR and ECI data combined.

Table 4: OLS estimates of the effect on children's reading score

	Reading Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	0.027	0.010	0.034	0.061*	0.023	0.037
	(0.045)	(0.053)	(0.040)	(0.036)	(0.037)	(0.031)
Female child		0.007*	0.008*		-0.009**	-0.008*
		(0.004)	(0.004)		(0.005)	(0.005)
Child's mother went to school		0.258***	0.259***		0.221***	0.221***
		(0.006)	(0.006)		(0.006)	(0.006)
Household size		-0.037***	-0.036***		-0.030***	-0.030***
		(0.002)	(0.002)		(0.002)	(0.002)
Square of household size		0.002***	0.002***		0.001***	0.001***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		0.093***	0.090***		0.092***	0.091***
		(0.006)	(0.005)		(0.006)	(0.006)
House pucca		0.206***	0.200***		0.160***	0.158***
		(0.007)	(0.006)		(0.007)	(0.007)
Household owns television		0.141***	0.138***		0.104***	0.102***
		(0.005)	(0.005)		(0.005)	(0.004)
Household owns mobile phone		0.120***	0.129***		0.144***	0.150***
		(0.005)	(0.004)		(0.006)	(0.005)
Household's electricity use observed		0.030***	0.033***		0.034***	0.036***
		(0.005)	(0.005)		(0.005)	(0.004)
Village has electricity		0.030**	0.047***		0.027**	0.035***
		(0.012)	(0.012)		(0.012)	(0.013)
Village has pucca road		0.027***	0.028***		0.033***	0.032***
		(0.006)	(0.006)		(0.005)	(0.005)
Village has ration shop		0.025***	0.025***		0.021***	0.022***
		(0.006)	(0.006)		(0.005)	(0.005)
Village has bank		0.045***	0.042***		0.013***	0.013***
		(0.005)	(0.005)		(0.004)	(0.004)
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,262,927	896,820	869,544	1,272,189	928,499	904,149
Number of districts	563	563	545	563	563	545
R-squared (within)	0.005	0.051	0.058	0.002	0.040	0.044

Notes: Robust standard errors clustered at the district level are in parentheses. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 5: OLS estimates of the effect on children's mathematics score

	Mathematics Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.017	-0.012	0.032	0.012	-0.002	0.044
	(0.049)	(0.062)	(0.041)	(0.054)	(0.066)	(0.039)
Female child		-0.043***	-0.043***		-0.084***	-0.083***
		(0.004)	(0.004)		(0.006)	(0.006)
Child's mother went to school		0.251***	0.254***		0.258***	0.259***
		(0.006)	(0.006)		(0.005)	(0.005)
Household size		-0.036***	-0.035***		-0.036***	-0.035***
		(0.002)	(0.002)		(0.002)	(0.002)
Square of household size		0.002***	0.001***		0.002***	0.002***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		0.084***	0.084***		0.095***	0.097***
		(0.005)	(0.005)		(0.006)	(0.006)
House pucca		0.211***	0.202***		0.196***	0.189***
		(0.006)	(0.006)		(0.006)	(0.006)
Household owns television		0.139***	0.138***		0.127***	0.128***
		(0.005)	(0.005)		(0.005)	(0.004)
Household owns mobile phone		0.115***	0.124***		0.126***	0.136***
		(0.004)	(0.004)		(0.005)	(0.005)
Household's electricity use observed		0.034***	0.035***		0.039***	0.041***
		(0.005)	(0.005)		(0.005)	(0.004)
Village has electricity		0.033***	0.042***		0.029**	0.018
		(0.012)	(0.012)		(0.013)	(0.013)
Village has pucca road		0.027***	0.028***		0.028***	0.029***
		(0.006)	(0.005)		(0.005)	(0.005)
Village has ration shop		0.027***	0.029***		0.020***	0.024***
		(0.006)	(0.006)		(0.005)	(0.005)
Village has bank		0.046***	0.043***		0.018***	0.016***
		(0.005)	(0.005)		(0.005)	(0.004)
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,251,958	892,605	865,509	1,267,391	926,214	901,972
Number of districts	563	563	545	563	563	545
R-squared (within)	0.009	0.059	0.069	0.017	0.065	0.077

Notes: Robust standard errors clustered at the district level are in parentheses. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 6: First stage of the 2SLS estimates of the effect on children's reading score

	Fraction of seats won by a graduate					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	1.052***	1.035***	0.987***	1.039***	1.018***	0.973***
in close elections	(0.144)	(0.133)	(0.133)	(0.133)	(0.125)	(0.125)
Close election fraction	-0.499***	-0.463***	-0.515***	-0.493***	-0.463***	-0.510***
	(0.133)	(0.124)	(0.122)	(0.122)	(0.114)	(0.113)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,262,927	896,820	869,544	1,272,189	928,499	904,149
Number of districts	563	563	545	563	563	545
R-squared	0.387	0.399	0.433	0.392	0.401	0.438

Notes: Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the difference in vote share between the winner and the runner up is less than 3 percent. Individual level controls are dummy variables for children's age cohort and gender, and whether mother went to school. Household controls are household size, square of household size, type of building, whether household owns television or mobile phone, and whether use of electricity was observed in the household. Village controls include indicators of whether village has access to pucca road, electricity, ration shop, and bank. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 7: Comparing district specific characteristics across districts-election years with different number of educated politician winners in close elections
(Sample: District election years with close elections)

	More non-college educated winners in close elections	More college educated winners in close elections	Difference
Urban population (prop)	0.22	0.20	0.02
			(0.02)
Rural adult men primary completion rate	0.66	0.66	−0.00
			(0.02)
Rural adult women primary completion rate	0.40	0.39	0.01
			(0.02)
Rural ST population (prop)	0.13	0.14	−0.01
			(0.03)
Rural SC population (prop)	0.21	0.20	0.02
			(0.01)
Rural OBC population (prop)	0.41	0.42	−0.02
			(0.03)
Rural Female proportion	0.49	0.49	−0.00
			(0.00)
SC/ST seats proportion	0.29	0.31	−0.02
			(0.03)
Total seats	8.00	7.71	0.30
			(0.48)
Proportion of college educated leaders win in non-close elections	0.62	0.62	−0.00
			(0.03)
Proportion non-college educated leaders win in non-close elections	0.34	0.35	−0.01
			(0.02)
Number of district-election year with more non-college educated winners in close elections	220		
Number of district-election year with more college educated winners in close elections	185		
Number of district-election year with same number of college and non-college educated winners in close elections	40		
Total number of district-election year with close elections	445		

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 8: Comparing candidate and constituency characteristics across close elections with educated and non-educated winners

	Non-College educated winners	College educated winners	Difference
Proportion of winners who are women	0.067	0.050	0.017
			(0.019)
Proportion of winners with criminal cases	0.33	0.31	0.026
			(0.038)
Average number of college-educated candidates	3.55	3.43	0.12
			(0.21)
Average number of candidates contesting elections	9.18	8.86	0.32
			(0.50)
Proportion of winners who were incumbents	0.11	0.13	−0.019
			(0.049)
Average votes received by winners	48772.0	48693.7	78.3
			(1621.5)
Average total votes in the constituency	128010.7	126951.2	1059.4
			(3639.9)
Number of non-college educated winners in close elections	314		
Number of college educated winner in close elections	279		
Total close elections	593		

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 9: Probablity that college-educated candidate wins in close election
(Dependent Variable: Dummy indicating whether winner in close election is college-educated)

	(1)	(2)
Congress parties contesting election	0.136	−0.491
	(0.207)	(0.458)
Hindu parties contesting election	0.0410	−0.0312
	(0.150)	(0.381)
Regional parties contesting election	0.185	0.136
	(0.341)	(0.404)
Left parties contesting election	−0.0726	−0.219
	(0.153)	(0.321)
Independent or other parties contesting election	−0.115	−0.256
	(0.191)	(0.472)
Reserved constituency	−0.174	−0.0310
	(0.125)	(0.322)
Proportion of urban population in district in 2004-05	−0.223	−0.0436
	(0.347)	(1.001)
Proportion of adult men who have completed primary education in 2004-05	0	0
	(.)	(.)
Proportion of adult women who have completed primary education in 2004-05	0.00308	−1.432*
	(0.490)	(0.736)
Proportion of ST population in 2004-05	−0.0426	−0.625
	(0.187)	(0.581)
Proportion of SC population in 2004-05	−0.813	0
	(0.611)	(.)
Proportion of OBC population in 2004-05	−0.0481	−1.187**
	(0.434)	(0.585)
Proportion of female population in 2004-05	0	0
	(.)	(.)
Dummy if district had close elections in past		0.373
		(0.378)
Proportion of college educated winners in past in district		0.00662
		(0.766)
Constant	0.167	1.935**
	(0.392)	(0.891)
Observations	503	236

*** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 10: 2SLS estimates of the effect on children's reading score

	Reading Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.014	0.086	0.037	-0.020	0.085	0.134
	(0.123)	(0.124)	(0.104)	(0.096)	(0.098)	(0.103)
Close election fraction	0.021	0.000	-0.025	-0.069	-0.128**	-0.150**
	(0.069)	(0.065)	(0.053)	(0.048)	(0.055)	(0.060)
Female child		0.007*	0.008*		-0.009**	-0.008*
		(0.004)	(0.004)		(0.005)	(0.005)
Child's mother went to school		0.258***	0.258***		0.222***	0.221***
		(0.006)	(0.006)		(0.006)	(0.006)
Household size		-0.037***	-0.036***		-0.030***	-0.030***
		(0.002)	(0.002)		(0.002)	(0.002)
Square of household size		0.002***	0.002***		0.001***	0.001***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		0.093***	0.090***		0.093***	0.091***
		(0.005)	(0.005)		(0.006)	(0.006)
House pucca		0.206***	0.199***		0.161***	0.158***
		(0.007)	(0.006)		(0.007)	(0.007)
Household owns television		0.141***	0.138***		0.103***	0.102***
		(0.005)	(0.005)		(0.005)	(0.004)
Household owns mobile phone		0.120***	0.129***		0.144***	0.150***
		(0.005)	(0.004)		(0.006)	(0.005)
Household's electricity use observed		0.030***	0.033***		0.034***	0.036***
		(0.005)	(0.005)		(0.005)	(0.004)
Village has electricity		0.030**	0.046***		0.025**	0.034***
		(0.012)	(0.012)		(0.013)	(0.013)
Village has pucca road		0.027***	0.028***		0.033***	0.033***
		(0.006)	(0.006)		(0.005)	(0.005)
Village has ration shop		0.025***	0.025***		0.021***	0.022***
		(0.006)	(0.006)		(0.005)	(0.005)
Village has bank		0.044***	0.042***		0.013***	0.013***
		(0.005)	(0.005)		(0.004)	(0.004)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,262,927	896,820	869,544	1,272,189	928,499	904,149
Number of districts 563	563	545	563	563	545	
First Stage F-stat	53.68	60.36	55.37	60.98	66.03	60.88

Notes: Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the difference in vote share between the winner and the runner up is less than 3 percent. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 11: 2SLS estimates of the effect on children's mathematics score

	Mathematics Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.115	0.037	0.014	-0.164	0.007	0.108
	(0.150)	(0.155)	(0.112)	(0.168)	(0.179)	(0.131)
Close election fraction	0.009	-0.057	-0.082	-0.066	-0.141	-0.163**
	(0.077)	(0.077)	(0.055)	(0.078)	(0.091)	(0.063)
Female child		-0.043***	-0.043***		-0.084***	-0.082***
		(0.004)	(0.004)		(0.006)	(0.006)
Child's mother went to school		0.251***	0.253***		0.258***	0.259***
		(0.006)	(0.006)		(0.005)	(0.005)
Household size		-0.036***	-0.035***		-0.036***	-0.035***
		(0.002)	(0.002)		(0.002)	(0.002)
Square of household size		0.002***	0.001***		0.002***	0.002***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		0.084***	0.084***		0.095***	0.098***
		(0.005)	(0.005)		(0.006)	(0.006)
House pucca		0.209***	0.202***		0.196***	0.190***
		(0.006)	(0.006)		(0.006)	(0.006)
Household owns television		0.139***	0.138***		0.126***	0.128***
		(0.005)	(0.005)		(0.004)	(0.004)
Household owns mobile phone		0.116***	0.124***		0.127***	0.137***
		(0.004)	(0.004)		(0.005)	(0.005)
Household's electricity use observed		0.036***	0.035***		0.040***	0.041***
		(0.005)	(0.005)		(0.005)	(0.004)
Village has electricity		0.033***	0.042***		0.026*	0.019
		(0.012)	(0.013)		(0.014)	(0.013)
Village has pucca road		0.026***	0.027***		0.027***	0.029***
		(0.005)	(0.005)		(0.005)	(0.005)
Village has ration shop		0.027***	0.029***		0.020***	0.025***
		(0.006)	(0.006)		(0.005)	(0.005)
Village has bank		0.045***	0.043***		0.018***	0.016***
		(0.005)	(0.005)		(0.005)	(0.004)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,251,958	892,605	865,509	1,267,391	926,214	901,972
Number of districts	563	563	545	563	563	545
First Stage F-stat	53.68	60.30	55.25	60.94	65.93	60.77

Notes: Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the difference in vote share between the winner and the runner up is less than 3 percent. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 12: Robustness: different lag periods

Panel A: Impact on reading scores

	6–10 age-group		11–16 age-group	
	Lag 1	Lag 3	Lag1	Lag 3
	(1)	(2)	(3)	(4)
Fraction of seats won by a graduate	-0.003	0.002	0.103	0.117
	(0.089)	(0.148)	(0.085)	(0.127)
Observations	998,524	712,455	1,031,315	746,926
Number of districts	549	543	549	543
First Stage F-stat	55.48	50.67	62.35	53.93

Panel B: Impact on math scores

	6–10 age-group		11–16 age-group	
	Lag 1	Lag 3	Lag1	Lag 3
	(1)	(2)	(3)	(4)
Fraction of seats won by a graduate	-0.026	-0.018	0.108	0.046
	(0.095)	(0.154)	(0.114)	(0.161)
Observations	993,964	709,434	1,028,937	745,292
Number of districts	549	543	549	543
First Stage F-stat	55.50	50.41	62.25	53.80

Note: The regressions include the full set of controls as reported in Table 10. Robust standard errors clustered at the district level are in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. 'Lag 1' considers the average education of leaders in the district over the past 1 year and the current year (i.e., average over last 2 years). 'Lag 3' considers the average education of leaders over the past 3 years and the current year (i.e. average over last 4 years).

Table 13: Robustness: alternative definitions of close election margin

Panel A: Impact on reading scores

	6–10 age-group			11–16 age-group		
	Close election margin			Close election margin		
	1 %	2 %	4 %	1 %	2 %	4 %
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.041	0.069	0.085	0.154	0.110	0.138
	(0.182)	(0.106)	(0.091)	(0.129)	(0.094)	(0.085)
Observations	869,544	869,544	869,544	904,149	904,149	904,149
Number of districts	545	545	545	545	545	545
First Stage F-stat	43.02	83.66	75.16	43.43	88.94	79.56

Panel B: Impact on math scores

	6–10 age-group			11–16 age-group		
	Close election margin			Close election margin		
	1 %	2 %	4 %	1 %	2 %	4 %
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.022	0.101	0.043	0.126	0.166	0.097
	(0.181)	(0.109)	(0.095)	(0.191)	(0.124)	(0.107)
Observations	865,509	865,509	865,509	901,972	901,972	901,972
Number of districts	545	545	545	545	545	545
First Stage F-stat	42.82	83.25	74.96	43.28	88.68	79.44

Note: The regressions include the full set of controls as reported in Table 10. Robust standard errors clustered at the district level are in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 14: Robustness: binary indicators for different levels of learning as outcome variable

Panel A: Impact on various levels of reading skill

	6–10 age-group				11–16 age-group			
	Letter	Word	Paragraph	Story	Letter	Word	Paragraph	Story
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of seats won by a graduate	0.006	0.006	0.007	0.016	0.039	0.048	0.049	0.046
	(0.042)	(0.044)	(0.046)	(0.033)	(0.041)	(0.046)	(0.051)	(0.054)
Observations	951,476	951,476	951,476	951,476	1,016,266	1,016,266	1,016,266	1,016,266
Number of districts	545	545	545	545	545	545	545	545
First Stage F-stat	52.77	52.77	52.77	52.77	59.41	59.41	59.41	59.41

Panel B: Impact on various levels of math skill

	6–10 age-group				11–16 age-group			
	1 digit	2 digit	Subtraction	Division	1 digit	2 digit	Subtraction	Division
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of seats won by a graduate	0.025	-0.024	0.008	-0.013	0.035	0.038	0.036	0.023
	(0.042)	(0.051)	(0.047)	(0.025)	(0.042)	(0.047)	(0.062)	(0.069)
Observations	951,476	951,476	951,476	951,476	1,016,266	1,016,266	1,016,266	1,016,266
Number of districts	545	545	545	545	545	545	545	545
First Stage F-stat	52.77	52.77	52.77	52.77	59.41	59.41	59.41	59.41

Note: The regressions include the full set of controls as reported in Table 10. Robust standard errors clustered at the district level are in parentheses. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level. The dependent variables are binary indicators, hence the regressions are linear probability models. For reading skill, the different levels are reading letters, words, a short paragraph (a class 1 level text), and a short story (a class 2 level text). For math skill, the different levels are single-digit number recognition, double-digit number recognition, two-digit subtraction with carry over, and three digit by one digit division (corresponding to what students are expected to know in grade 3 or 4).

Table 15: Heterogenity in impact: poverty level in districts

Panel A: Impact on reading scores

	6-10 age-group			11-16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by women	−0.284	0.269	−0.845	0.072	−0.170	−0.741**
	(0.209)	(0.327)	(0.541)	(0.318)	(0.328)	(0.314)
Observations	224,090	430,746	214,708	237,137	440,698	226,314
Number of districts	143	267	135	143	267	135
First stage F statistics	219	29	25	208	31	23
Districts in sample	High Poverty	Medium Poverty	Low Poverty	High Poverty	Medium Poverty	Low Poverty

Panel B: Impact on math scores

	6-10 age-group			11-16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by women	−0.218	0.054	−0.197	0.089	−0.374	−0.477
	(0.243)	(0.339)	(0.413)	(0.308)	(0.402)	(0.370)
Observations	223,166	428,671	213,672	236,598	439,645	225,729
Number of districts	143	267	135	143	267	135
First stage F statistics	221	29	26	210	31	23
Districts in sample	High Poverty	Medium Poverty	Low Poverty	High Poverty	Medium Poverty	Low Poverty

Note: See notes to Table 10. All regressions include the full set of control variables as reported in Table 10. High poverty districts are ones where more than 67% of rural population is in the bottom 40th national consumption percentile. Rich poverty districts have less than 31% of the rural population in the bottom 40th percentile by consumption. Medium poverty districts are ones with between 31-67% of rural population in the bottom 40th consumption percentile.

* p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors clustered at the district level are in parentheses.

Table 16: Heterogenity in impact: urbanization and level of education in district

Panel A: Impact on reading scores

	6-10 age-group				11-16 age-group			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of seats won by women	−0.026	0.148	−0.102	0.075	−0.105	−0.148	−0.048	−0.046
	(0.198)	(0.537)	(0.213)	(0.345)	(0.264)	(0.476)	(0.286)	(0.332)
Observations	421,583	447,961	432,794	436,750	416,691	487,458	429,495	474,654
Number of districts	258	287	271	274	258	287	271	274
First stage F statistics	78	86	65	113	75	88	64	107
Districts in sample	Low urb.	High urb.	Low ed. level	High ed. level	Low urb.	High urb.	Low ed. level	High ed. level

Panel B: Impact on math scores

	6-10 age-group				11-16 age-group			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of seats won by women	0.076	0.161	0.155	−0.041	−0.112	−0.066	0.140	−0.186
	(0.212)	(0.431)	(0.202)	(0.281)	(0.303)	(0.470)	(0.309)	(0.332)
Observations	419,532	445,977	430,978	434,531	415,631	486,341	428,486	473,486
Number of districts	258	287	271	274	258	287	271	274
First stage F statistics	79	86	66	112	75	88	64	107
Districts in sample	Low urb.	High urb.	Low ed. level	High ed. level	Low urb.	High urb.	Low ed. level	High ed. level

Note: See notes to Table 10. All regressions include the full set of control variables as reported in Table 10. Districts with urbanization rate of 15 percent or less are categorized as low urbanization districts, while others are categorized as high urbanization. Districts where 51 or lower percentage of adults have completed primary education are low education level districts and other districts are classified as high education level districts.

* p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors clustered at the district level are in parentheses.

Table 17: Heterogenity in impact: type of residence

Panel A: Impact on reading scores

	6-10 age-group				11-16 age-group	
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by women	0.068 (0.181)	0.205 (0.210)	−0.022 (0.226)	−0.138 (0.260)	0.054 (0.220)	−0.265 (0.191)
Observations	280,040	268,224	321,280	270,405	277,659	356,085
Number of districts	545	545	545	545	545	545
First stage F statistics	222	115	55	189	113	57
Households in sample	Kutcha House	Semi Pucca House	Pucca House	Kutcha House	Semi Pucca House	Pucca House

Panel B: Impact on math scores

	6-10 age-group				11-16 age-group	
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by women	0.112 (0.209)	0.315 (0.209)	0.076 (0.273)	−0.180 (0.278)	0.168 (0.267)	−0.158 (0.232)
Observations	278,575	266,964	319,970	269,624	276,995	355,353
Number of districts	545	545	545	545	545	545
First stage F statistics	225	114	56	190	113	57
Households in sample	Kutcha House	Semi Pucca House	Pucca House	Kutcha House	Semi Pucca House	Pucca House

Note: See notes to Table 10. All regressions include the full set of control variables as reported in Table 10. A pucca house is one whose roof and walls are made of permanent material (brick, cement etc). A kutcha house is one whose roof and flooring are made of temporary material (mud, grass etc). A semi-pucca house is one that has fixed walls but roof is made of temporary material.

* $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Robust standard errors clustered at the district level are in parentheses.

Table 18: Heterogenity in impact: gender and mothers education

Panel A: Impact on reading scores

	6-10 age-group				11-16 age-group			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of seats won by women	0.077 (0.154)	0.085 (0.203)	0.088 (0.221)	0.021 (0.203)	−0.150 (0.189)	−0.041 (0.225)	−0.243 (0.249)	−0.071 (0.175)
Observations	462,741	406,803	363,983	505,561	471,751	432,398	416,941	487,208
Number of districts	545	545	545	545	545	545	545	545
First stage F statistics	114	115	114	99	111	105	111	96
Sample	Boys	Girls	Mother did not go to school	Mother went to school	Boys	Girls	Mother did not go to school	Mother went to school

Panel B: Impact on math scores

	6-10 age-group				11-16 age-group			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Fraction of seats won by women	0.101 (0.188)	0.148 (0.206)	0.184 (0.222)	0.007 (0.203)	−0.074 (0.229)	−0.084 (0.259)	−0.120 (0.290)	−0.120 (0.206)
Observations	460,608	404,901	362,266	503,243	470,663	431,309	415,837	486,135
Number of districts	545	545	545	545	545	545	545	545
First stage F statistics	114	116	115	98	111	105	112	96
Sample	Boys	Girls	Mother did not go to school	Mother went to school	Boys	Girls	Mother did not go to school	Mother went to school

Note: See notes to Table 10. All regressions include the full set of control variables as reported in Table 10.

* p < 0.1, ** p < 0.05, *** p < 0.01. Robust standard errors clustered at the district level are in parentheses.

Table 19: OLS estimates of the effect on children's enrollment

	Not enrolled in school					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	0.001	0.004	0.003	-0.008	-0.001	-0.006
	(0.005)	(0.005)	(0.004)	(0.007)	(0.006)	(0.006)
Female child		0.002***	0.002***		0.010***	0.010***
		(0.000)	(0.000)		(0.001)	(0.001)
Child's mother went to school		-0.013***	-0.013***		-0.050***	-0.049***
		(0.001)	(0.001)		(0.001)	(0.001)
Household size		0.002***	0.002***		0.008***	0.008***
		(0.000)	(0.000)		(0.001)	(0.001)
Square of household size		-0.000***	-0.000***		-0.000***	-0.000***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		-0.006***	-0.006***		-0.020***	-0.020***
		(0.001)	(0.001)		(0.001)	(0.001)
House pucca		-0.007***	-0.007***		-0.032***	-0.033***
		(0.001)	(0.001)		(0.002)	(0.001)
Household owns television		-0.005***	-0.005***		-0.022***	-0.021***
		(0.000)	(0.000)		(0.001)	(0.001)
Household owns mobile phone		-0.006***	-0.006***		-0.026***	-0.026***
		(0.001)	(0.001)		(0.001)	(0.001)
Household's electricity use observed		-0.003***	-0.003***		-0.008***	-0.009***
		(0.001)	(0.001)		(0.001)	(0.001)
Village has electricity		-0.012***	-0.011***		-0.011***	-0.009***
		(0.002)	(0.002)		(0.003)	(0.003)
Village has pucca road		-0.001	-0.001**		-0.006***	-0.006***
		(0.001)	(0.001)		(0.001)	(0.001)
Village has ration shop		-0.002**	-0.002***		-0.004***	-0.004***
		(0.001)	(0.001)		(0.001)	(0.001)
Village has bank		0.001***	0.001***		-0.005***	-0.005***
		(0.000)	(0.000)		(0.001)	(0.001)
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,350,258	954,395	925,237	1,437,873	1,042,675	1,015,167
Number of districts	563	563	545	563	563	545
R-squared (within)	0.001	0.008	0.010	0.001	0.063	0.066

Notes: Robust standard errors clustered at the district level are in parentheses. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 20: 2SLS estimates of the effect on children's enrollment

	Not enrolled in school					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	0.018	0.004	-0.004	0.023	0.013	0.008
	(0.012)	(0.009)	(0.009)	(0.017)	(0.016)	(0.017)
Close election fraction	0.007	0.012*	0.009	0.012	0.025**	0.013
	(0.008)	(0.006)	(0.006)	(0.011)	(0.011)	(0.011)
Female child		0.002***	0.002***		0.010***	0.010***
		(0.000)	(0.000)		(0.001)	(0.001)
Child's mother went to school		-0.013***	-0.013***		-0.050***	-0.049***
		(0.001)	(0.001)		(0.001)	(0.001)
Household size		0.002***	0.002***		0.008***	0.008***
		(0.000)	(0.000)		(0.001)	(0.001)
Square of household size		-0.000***	-0.000***		-0.000***	-0.000***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		-0.006***	-0.006***		-0.020***	-0.020***
		(0.001)	(0.001)		(0.001)	(0.001)
House pucca		-0.007***	-0.007***		-0.033***	-0.034***
		(0.001)	(0.001)		(0.002)	(0.001)
Household owns television		-0.005***	-0.005***		-0.022***	-0.021***
		(0.000)	(0.000)		(0.001)	(0.001)
Household owns mobile phone		-0.006***	-0.006***		-0.026***	-0.026***
		(0.001)	(0.001)		(0.001)	(0.001)
Household's electricity use observed		-0.002***	-0.003***		-0.008***	-0.008***
		(0.001)	(0.001)		(0.001)	(0.001)
Village has electricity		-0.012***	-0.011***		-0.010***	-0.009***
		(0.002)	(0.002)		(0.003)	(0.003)
Village has pucca road		-0.001	-0.001**		-0.006***	-0.007***
		(0.001)	(0.001)		(0.001)	(0.001)
Village has ration shop		-0.002***	-0.002***		-0.004***	-0.004***
		(0.001)	(0.001)		(0.001)	(0.001)
Village has bank		0.001***	0.001***		-0.005***	-0.005***
		(0.000)	(0.000)		(0.001)	(0.001)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	1,350,258	954,395	925,237	1,437,873	1,042,675	1,015,167
Number of districts	563	563	545	563	563	545
First Stage F-stat	51.33	56.62	52.67	59.68	64.08	59.28

Notes: Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the difference in vote share between the winner and the runner up is less than 3 percent. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 21: Descriptive Statistics for Schooling Outcomes

	Mean	Std.Dev.	Obs
Usable blackboard in class 2	0.94	0.23	40526
Usable blackboard in class 4	0.94	0.24	40526
Learning material in class 2	0.80	0.40	40526
Learning material in class 4	0.77	0.42	40526
Drinking water	0.76	0.42	40526
Usable toilet	0.79	0.41	40526
Usable library books	0.44	0.50	40526
PCA score for physical assets	0.04	1.50	40526
Schoool maintenance grant	0.89	0.31	50184
School development grant	0.82	0.39	50184
Teacher learning material grant	0.72	0.45	50184
PCA score SSA school grants	−0.03	1.28	50184
Mid-day meal	0.85	0.36	77692
Children's attendance	0.72	0.20	76730
Teacher's attendance	0.85	0.25	61641

Table 22: Impact on School Attendance

	Child Attendance Ratio		Teacher Attendance Ratio	
	(1)	(2)	(3)	(4)
Fraction of seats won by a graduate	-0.0216 (0.0303)	-0.0170 (0.0338)	0.0527 (0.0487)	0.0751 (0.0519)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
School type controls		Yes		Yes
Village controls		Yes		Yes
District controls		Yes		Yes
State by year fixed effects		Yes		Yes
Observations	76730	69906	61641	56096
Number of districts	563	544	563	544
First stage F statistics	67	61	71	62

Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the winner beat the runner up by less than 3 percent of votes. Controls at school level include dummies for if school is upto primary only - upto 4-5 or includes middle school - upto 7-8 or other. Controls for village include dummies for existence of electricity, permanent road, ration shop and bank. District controls are interacted with year dummies and include data from 2004-05 National Sample Survey on urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table 23: Impact on Schooling Inputs

	PCA for physical assets		PCA for grants		Midday meals	
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of	-0.207	-0.0859	-0.550*	-0.386	0.0423	0.103
seats won by a graduate	(0.303)	(0.317)	(0.282)	(0.240)	(0.0739)	(0.0738)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
School type controls		Yes		Yes		Yes
Village controls		Yes		Yes		Yes
District controls		Yes		Yes		Yes
State by year fixed effects		Yes		Yes		Yes
Observations	56262	51273	50184	47149	77692	69739
Number of districts	563	542	561	544	563	544
First stage F statistics	73	60	74	70	68	60

Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the winner beat the runner up by less than 3 percent of votes. Controls at school level include dummies for if school is upto primary only - upto 4-5 or includes middle school - upto 7-8 or other. Controls for village include dummies for existence of electricity, permanent road, ration shop and bank. District controls are interacted with year dummies and include data from 2004-05 National Sample Survey on urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Appendix

Table A1: OLS estimates of the effect on children's english score

	English Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	0.036	0.067	0.087	0.024	-0.002	0.025
	(0.056)	(0.075)	(0.067)	(0.054)	(0.067)	(0.054)
Female child		-0.043***	-0.043***		-0.062***	-0.062***
		(0.005)	(0.005)		(0.006)	(0.006)
Child's mother went to school		0.313***	0.315***		0.290***	0.291***
		(0.007)	(0.007)		(0.007)	(0.007)
Household size		-0.034***	-0.035***		-0.041***	-0.041***
		(0.003)	(0.003)		(0.003)	(0.003)
Square of household size		0.002***	0.002***		0.002***	0.002***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		0.081***	0.079***		0.092***	0.090***
		(0.006)	(0.006)		(0.007)	(0.007)
House pucca		0.265***	0.260***		0.226***	0.221***
		(0.008)	(0.008)		(0.009)	(0.008)
Household owns television		0.173***	0.174***		0.146***	0.144***
		(0.006)	(0.006)		(0.006)	(0.006)
Household owns mobile phone		0.142***	0.149***		0.158***	0.167***
		(0.006)	(0.006)		(0.007)	(0.007)
Household's electricity use observed		0.026***	0.026***		0.035***	0.031***
		(0.007)	(0.007)		(0.007)	(0.006)
Village has electricity		-0.019	0.010		-0.005	0.002
		(0.018)	(0.018)		(0.022)	(0.022)
Village has pucca road		0.033***	0.040***		0.037***	0.044***
		(0.009)	(0.009)		(0.008)	(0.008)
Village has ration shop		0.043***	0.040***		0.029***	0.032***
		(0.008)	(0.008)		(0.008)	(0.007)
Village has bank		0.078***	0.076***		0.029***	0.027***
		(0.007)	(0.008)		(0.007)	(0.007)
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	554,483	367,406	355,908	563,175	388,105	378,254
Number of districts	563	561	544	563	561	544
R-squared (within)	0.001	0.086	0.093	0.002	0.070	0.078

Notes: Robust standard errors clustered at the district level are in parentheses. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.

Table A2: 2SLS estimates of the effect on children's english score

	English Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	0.040	0.266	0.187	-0.062	0.119	0.175
	(0.152)	(0.176)	(0.157)	(0.166)	(0.173)	(0.136)
Close election fraction	0.099	0.065	0.016	0.058	0.024	-0.024
	(0.079)	(0.081)	(0.071)	(0.084)	(0.083)	(0.079)
Female child		-0.042***	-0.043***		-0.062***	-0.061***
		(0.004)	(0.005)		(0.006)	(0.006)
Child's mother went to school		0.312***	0.313***		0.290***	0.290***
		(0.007)	(0.007)		(0.007)	(0.007)
Household size		-0.034***	-0.035***		-0.041***	-0.041***
		(0.003)	(0.003)		(0.003)	(0.003)
Square of household size		0.002***	0.002***		0.002***	0.002***
		(0.000)	(0.000)		(0.000)	(0.000)
House semi-pucca		0.082***	0.081***		0.091***	0.090***
		(0.006)	(0.006)		(0.007)	(0.007)
House pucca		0.266***	0.261***		0.226***	0.221***
		(0.008)	(0.008)		(0.009)	(0.008)
Household owns television		0.173***	0.173***		0.146***	0.144***
		(0.006)	(0.006)		(0.006)	(0.006)
Household owns mobile phone		0.141***	0.148***		0.158***	0.166***
		(0.006)	(0.006)		(0.007)	(0.007)
Household's electricity use observed		0.027***	0.026***		0.035***	0.030***
		(0.007)	(0.007)		(0.007)	(0.006)
Village has electricity		-0.017	0.007		-0.004	-0.001
		(0.018)	(0.018)		(0.022)	(0.023)
Village has pucca road		0.034***	0.042***		0.038***	0.046***
		(0.009)	(0.009)		(0.008)	(0.008)
Village has ration shop		0.042***	0.040***		0.030***	0.033***
		(0.008)	(0.008)		(0.007)	(0.007)
Village has bank		0.077***	0.076***		0.030***	0.027***
		(0.008)	(0.008)		(0.007)	(0.007)
Vote margins: third order polynomial	Yes	Yes	Yes	Yes	Yes	Yes
District fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Age cohort fixed effects		Yes	Yes		Yes	Yes
Child, household & village controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	554,483	367,406	355,908	563,175	388,105	378,254
Number of districts	563	561	544	563	561	544
First Stage F-stat	64.76	69.21	63.71	70.49	72.68	66.67

Notes: Robust standard errors clustered at the district level are in parentheses. Close elections are defined as between a graduate and a non-graduate in which the difference in vote share between the winner and the runner up is less than 3 percent. District controls are baseline characteristics interacted with year dummies; they include urbanization rate, proportion of adult male and adult female in rural areas who have completed primary school, caste composition and proportion of females in rural areas estimated from 2004-05 National Sample Survey data. *** Significant at the 1 percent level. ** Significant at the 5 percent level. * Significant at the 10 percent level.