Are educated leaders good for education? Evidence from India

Rahul Lahoti and Soham Sahoo

University of Goettingen

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Broad Research Questions

- Are educated politicians better than non-educated politicians?
- Are politicians' intentions, competency, intelligence, leadership qualities, honesty, comprehension and ability to resolve public policy issues intrinsically linked to her/his formal education?
- Does formal education level of the politician help us determine the quality of the politician?
- Is there enough evidence to justify a minimum education requirement for candidates contesting elections?

Narrower Research Questions .. Addressed in this paper

- Are educated politicians able to deliver better in terms of improving education outcomes of their constituents?
- Are college graduate politicians able to improve schooling outcomes (learning levels, enrollment, attendance and schooling inputs) for their constituents' children more than non-college graduate politicians?

Policy Motivation

- Two states in India (Haryana and Rajasthan) mandated minimum education requirements for contesting in local body elections in 2015. Requirements were completion of formal education upto grade 5 to 10, varying by groups.
- Requirements disqualify a large fraction of the population from contesting elections. In Haryana more than half of the upper caste women, 68 percent of lower caste women and 41 percent of lower caste men are disqualified from contesting elections.
- Supreme Court of India upheld the education mandate arguing that education is a precondition for efficiency, honesty and requirement for candidates to discharge their duties.

Debate on Education Mandate

- The case against it: undemocratic, disenfranchising, elitist, unconstitutional... (Baxi 2015, Abdul 2015, Jaffrelot 2016, Bhaskar 2016).
- The case for it: Formal education makes leaders competent, honest and accountable.
- If the goal of elections is to select the most competent candidate and not necessarily give voters free choice, then one could argue that a prior disqualification could be imposed on the basis of irrefutable evidence that these qualifications create a preliminary threshold of competence.
- But empirical evidence evaluating the impact of education of the leader on competency is missing.

Outline

Impact of Individual Characteristics of Leaders

- Citizen-candidate models and empirical evidence suggests that identity of politician matters for actual 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 has 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 2015; Bhalotra and Clots-Figueras, 2014; Bhalotra, Clots-Figueras, and Iyer, 2013; Chattopadhyay and Duflo, 2004; Clots-Figueras, 2011, 2012; Halim, Yount, Cunningham, and Pande, 2016; Iyer, Mani, Mishra, and Topalova, 2012; Prakash, Rockmore, Uppal, et al., 2014).

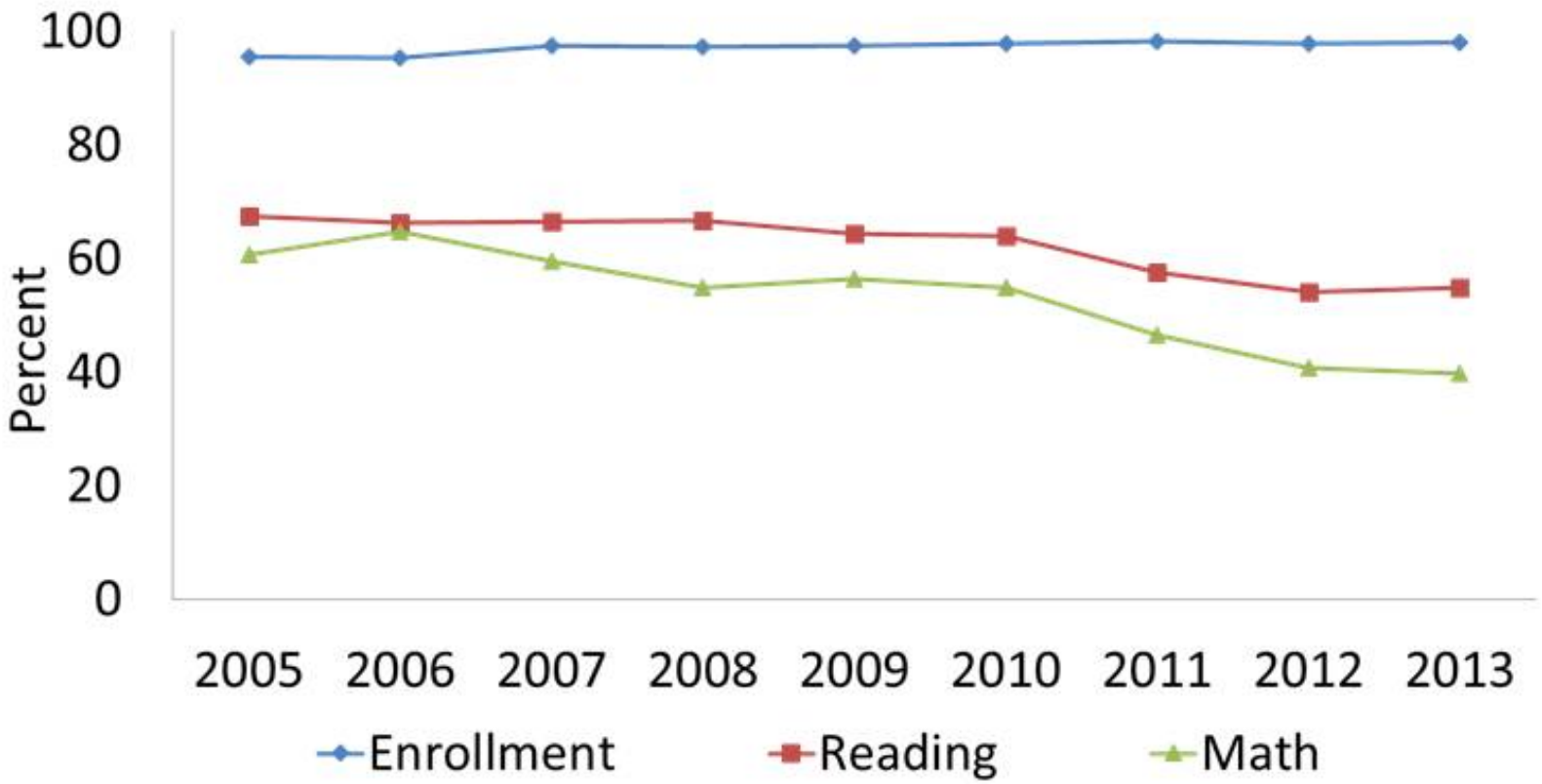
Impact of Education of the Leader

- 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 Prez, 2013) are higher when leaders are educated and declines in societys achievement are larger when educated leader leaves office.
- Educated leaders at national level, legislative leaders in the US and local municipal leaders in Brazil all perform no better than non-educated leaders across a range of outcomes including economic growth, inequality, social unrest, interstate conflict, unemployment, inflation, reelection, legislative productivity, and corruption (Carnes and Lupu 2016).
- No literature on impact of educated leader in India or at local levels.

Political System in India

- Each state has a directly elected legislature that has elections every five years.
- States are divided into districts which form an important administrative units where several decisisons including relating to education are made.
- Each district is divided into multiple constituencies (9 on average) each of which is represented by a single representative chosen in first-past the post elections.

Status of Elementary Education in India



Enrollment: Percent children enrolled in the age group 7-10.
Reading: Percent children in grade III-V who can read grade I level text.
Math: Percent children in grade III-V who can do subtraction.

Political Leaders and Education Outcomes

- How can state representatives impact education outcomes?
  - Influencing education policy in legislature at state level.
  - Direct funds to their district's educational office.
  - Influence policy implementation through participation in local government bodies and lobbying state and federal government (Singh and Cruz, 1997).
  - Influence bureaucracy through control over promotions and job assignments transfers (Krishnan and Somanathan, 2013; Nath, 2015; Sukhtankar and Vaishnav, 2015; Asher and Novosad 2015).
  - Use their discretionary development funds.

Political Leaders and Education Outcomes

- Women leaders in India have been shown to be more successful at improving education outcomes (Clots-Figueras 2012).
- Simple, short term and low cost interventions have proven to substantially improve learning outcomes in schools and are being implemented in several states (Banerjee, Cole, Duflo, and Linden, 2005; Banerji, Berry, and Shotland, 2013; Banerjee, Banerji, Duflo, Glennerster, and Khemani, 2010).

Outline

Data

- Political Data: Data on gender, education level, and votes obtained by all candidates contesting state assembly elections for 2004 to 2014 from Election Commission (ECI) and Association for Democratic Reforms (ADR).
- Education Data: Annual data on learning levels, enrollment, school infrastructure, grants for 2006 to 2014 for children in Rural Areas 6 to 16 years of age from Annual Status of Education Report (ASER).
- Enrollment Rates from multiple rounds of NSS data - 2009-10, 2011-12 Employment & Unemployment Rounds, 2007-08 and 2014 Education Round for both Urban and Rural areas.
- Merge education, political and district characteristics data to create a district panel with observations on 2.6 million children from 2006-2014 from ASER and 240K observations from NSS.

Empirical Strategy

- Basic OLS Model

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

- 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-graduate politician during the last three years.
- District fixed effects α_{ds}, year fixed effects σ_t, several observable characteristics at the level of child, household and village are included in the vector $\mathbf{X}_{idst}$.
- District specific time varying effects are included by interacting the year fixed effects with measures of baseline characteristics given by the vector $\mathbf{Z}_{ds}$. State specific year fixed effects η_{st} are also included.
- Note: 60 percent of the leaders (MLA) are college graduate.

Potential Endogenity

- Unobservable factors that vary across districts and over time are correlated with both politicians education and childrens education?
- Possible if in regions that have higher demand for education, voters preference are manifested through higher propensity to elect educated politicians over time.

Identification Strategy

- Fuzzy Regression Discontinuity Design (RDD)
- Close elections: When the vote difference between the winner and runner up in an election is arbitrarily small, the election result can be considered quasi-random.
- We can assume that on average in close elections between a college graduate and a non-college graduate politician the constituencies which elect them are similar in all characteristics except the education level of the leader.
- Instrument overall fraction of seats held by college graduate leaders in a district by fraction of seats won by college-graduate politicians in close elections with non-college graduate politicians.

Fuzzy RDD Model

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

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

The existence of close election may not be random so we control for fraction of seats that had close elections TC_{dst}.

We also control for a third order polynomial in the victory margins M_{jdst}. The polynomials $F(M_{jdst})$ are interacted with I_{jdst} which is an indicator of whether there was a college graduate versus non-college graduate elections j in the district.

Our model is based closely on model used to study impact of women leaders on health and education outcomes by Clots-Figueras(2012); Bhalotra and Clots-Figueras(2014).

Outline

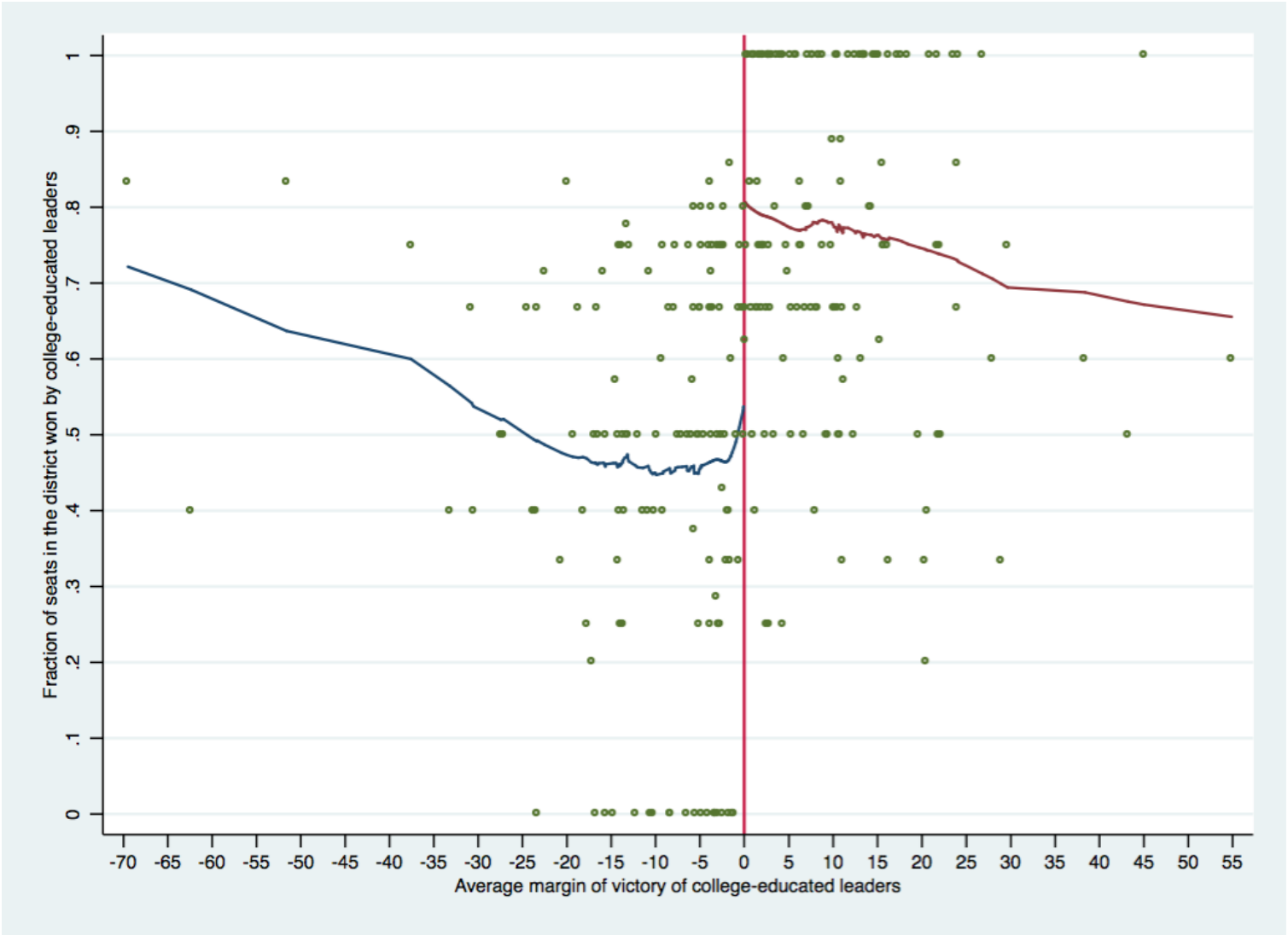
OLS Results of Impact on Reading Score

	Standardized 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)
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.

Also no significant effect for other outcomes such as math score, english score and enrollment

Validity of Regression Discontinuity



First Stage

	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 in close elections	1.133***	1.083***	0.972***	1.117***	1.056***	0.954***
	(0.194)	(0.180)	(0.135)	(0.181)	(0.172)	(0.127)
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	0.502	0.479	0.721	0.530	0.497	0.739

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.

Impact on Reading Score

	Standardized Reading Score					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.056	0.039	-0.030	-0.047	0.058	0.103
	(0.108)	(0.110)	(0.100)	(0.085)	(0.089)	(0.106)
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	34.23	36.09	52.04	37.96	37.85	56.45

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.

Impact on Mathematics Score

	Standardized 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)
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.

▸ Impact on English Score

NSS: Impact on Enrollment Rates (Both Urban and Rural Areas)

	Enrollment Rate					
	6–10 age-group			11–16 age-group		
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	0.032	0.028	0.021	0.055	0.056	0.045
	(0.043)	(0.043)	(0.038)	(0.038)	(0.038)	(0.036)
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 controls		Yes	Yes		Yes	Yes
District controls			Yes			Yes
State by year fixed effects			Yes			Yes
Observations	108,521	108,493	108,493	131,693	131,651	131,651
Number of districts	574	574	574	574	574	574
First Stage F-stat	75.65	75.75	75.52	80.17	80.27	82.38

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.

Outline

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.

Impact on Schooling Inputs

	PCA for physical assets		PCA for grants		Midday meals	
	(1)	(2)	(3)	(4)	(5)	(6)
Fraction of seats won by a graduate	-0.207 (0.303)	-0.0859 (0.317)	-0.550* (0.282)	-0.386 (0.240)	0.0423 (0.0739)	0.103 (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.

Outline

Heterogeneity in Impact

- Poverty in districts ▸ Different Poverty levels
- Type of Residence ▸ Kutcha, Semi-Pucca and Pucca House
- Urbanization and Education ▸ Low and High Levels
- Gender and Mother Education ▸ Boys, Girls and if Mother went to School
- Across different sub-samples we do not find any consistent significant impact of college graduate leaders on learning outcomes.

Robustness of Results

- Different Lag Periods: Vary the leaders (number of years prior to the outcome) who matter for the outcome ▸ Tables for different lag periods
- Specification of Dependent Variable: Instead of total score consider levels. ▸ Tables for alternative specification of dependent variable
- Varying the definition of close elections: Margin 1, 2 or 4 percent. ▸ Tables for alternative close election margin
- Our result of no significant differences between college graduate and non-college graduate leaders is robust to any of these changes.

Conclusion

- We find no evidence that college graduate leaders are more competent and deliver better outcomes for their constituents on a range of education outcomes.
- Why are college graduates not more competent?
  - Formal education might not make someone more empathetic, or develop leadership and other skills required to be a leader.
  - Educated leaders might prioritize other sectors.
  - Impact of educated leaders might be present at other levels of governance (local or national).
  - Our model involves averaging at district level and across potenitally different leaders that might result in insignificant results.
- We find no evidence in our analysis to support the policy of minimum education mandate for contesting elections

Summary Statistics for Political Data

Variables	Mean
Proportion of graduates among winner and runner up candidates	0.61
Proportion of seats won by graduates	0.594
District with at least one graduate leader	0.953
Proportion of seats with close election between graduate and non-graduate	0.081
District with at least one close election between graduate and non-graduate	0.378
Proportion of seats won by graduates in close elections against non-graduates	0.039
District with at least one graduate leader who won in close election against non-graduate	0.201
Proportion of seats with election between graduate and non-graduate	0.407
District with at least one election between graduate and non-graduate	0.876

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.

Robustness: Impact of different lag period

*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 **??**. 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).

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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 **??**. 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.

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Robustness: Binary indicators for learning outcomes

*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. 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).

◂ Back

Impact on 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)
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.

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Heterogeneity 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 (0.209)	0.269 (0.327)	−0.845 (0.541)	0.072 (0.318)	−0.170 (0.328)	−0.741** (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 (0.243)	0.054 (0.339)	−0.197 (0.413)	0.089 (0.308)	−0.374 (0.402)	−0.477 (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: 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.

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Heterogeneity 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: 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.

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Heterogeneity 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 (0.198)	0.148 (0.537)	−0.102 (0.213)	0.075 (0.345)	−0.105 (0.264)	−0.148 (0.476)	−0.048 (0.286)	−0.046 (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 (0.212)	0.161 (0.431)	0.155 (0.202)	−0.041 (0.281)	−0.112 (0.303)	−0.066 (0.470)	0.140 (0.309)	−0.186 (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: 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.

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Heterogeneity 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

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Comparing Districts with different number of educated politician winners in 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		

Probability of Winning Close Elections

	(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

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Comparing constituencies with educated and non-educated winners in close elections

	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		

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