Women's Political Empowerment and Investments in Primary Schooling in India

**Nafisa Halim · Kathryn M. Yount ·
Solveig A. Cunningham · Rohini P. Pande**

Abstract   Using a national district-level dataset of India composed of information on investments in primary schooling [data from the District Information Survey for Education (DISE, 2007/8)] and information on demographic characteristics of elected officials [data from the Election Commission of India (ECI, 2000/04)], we examined the relationship between women's representation in State Legislative Assembly (SLA) seats and district-level investments in primary schooling. We used OLS regressions adjusting for confounders and spatial autocorrelation, and estimated separate models for North and South India. Women's representation in general SLA seats typically was negatively associated with investments in primary-school amenities and teachers; women's representation in SLA seats reserved for under-represented minorities, i.e., scheduled castes and scheduled tribes, typically was positively associated with investments in primary schooling, especially in areas addressing the basic needs of poor children. Women legislators' gender and caste identities may shape their decisions about redistributive educational policies.

N. Halim (✉)
Center for Global Health and Development, Department of Global Health, School of Public Health, Boston University, 801 Massachusetts Ave, Crosstown Center, 3rd Floor, Boston, MA 02118, USA
e-mail: nhalim@bu.edu

K. M. Yount · S. A. Cunningham
Hubert Department of Global Health, Rollins School of Public Health, Emory University, 1518 Clifton Rd. NE, Atlanta, GA 30322, USA
e-mail: kyount@emory.edu

K. M. Yount · S. A. Cunningham
Department of Sociology, Emory University, 1555 Dickey Drive, Atlanta, GA 30322, USA

R. P. Pande
7118 Willow Avenue, Takoma Park, MD 20912, USA

1 Introduction

At independence, India made a pledge to legislate *redistributive policies*[1] to improve the wellbeing of its disadvantaged groups, including scheduled castes and scheduled tribe (SC/ST) members and women (Besley and Coate 1997; Pande 2003; Chattopadhyay and Duflo 2004). Constitutional mandates ensure that women and SC/ST members are present in the legislature to help shape policies representing the interests of these groups. India reserved up to one-fourth of the seats in the national and state legislatures for SC/ST members, and one-third of all positions of chief in village councils for women (Pande 2003; Chattopadhyay and Duflo 2004). Moreover, in 1996, Indian legislators proposed the *Women's Reservation Bill*, a constitutional amendment to reserve one-third of the seats in the national and state legislatures for women (Sanyal 2008). The amendment has since been under political deliberation in the Lower House of India's bipartite parliament; in 2010, it was approved by the Upper House (Clots-Figueras 2011; The Hindu 2014).

Constitutional mandates to increase the representation of women and SC/ST individuals in the legislatures are predicated on the idea that legislators seek to improve the wellbeing of the groups with which they identify. Legislators' identities, defined as their "internalized positional designation" with respect to gender, religion, caste, class, race, ethnicity, sexuality, or other designation (Stryker 1980: 60) are expected to matter for their political priorities and decisions (e.g., Phillips 1995, 1998). Thus, legislators' identities should lead them to promote redistributing resources to the social groups with which they identify (Pande 2003; Chattopadhyay and Duflo 2004; Clots-Figueras 2011). Further, systematic differences between men and women have been noted in the literature in spending on child-related issues (e.g., Lott and Kenny 1999; Edlund and Pande 2001; Edlund et al. 2005), indicating that women may legislate more for redistributive policies, including those to improve and expand primary schooling (Lundberg et al. 1997; Thomas 1990, 1997; Duflo 2003; Rubalcava et al. 2009).

At the same time, legislators, like other people have multiple *intersecting* identities (e.g., Frederick 2010; Hill Collins 2000; Phillips 1995, 1998), and legislators' intersectional political consciousness can entail "simultaneous expression of solidarity with women, racial and ethnic minorities, and poor and working-class voters as well as concern for the socio-political status of these groups" (Frederick 2010: 478). Therefore, in comparative research on gender and *redistributive policy*, questions persist about "which identity matters? and how?" (Clots-Figueras 2011; Garcia et al. 2005; Delaney and O'Toole 2008; Moghadam 1991; Saidel and Loscocco 2005; Zhou et al. 1998).

In this study, we use theories of intersectionality (Frederick 2010; Hancock 2007; McCall 2005) to examine the relationship between legislators' intersecting gender and caste identities and redistributive education policies in India. India is an important case study for testing this relationship, being a country where women with diverse backgrounds are securing an increasing number of political offices in the country (Mohanty 1995; Randall 2006). Important to know is to what extent gender and caste/tribe identities tend to inform women legislators, as they make redistributive policy decisions (Crenshaw 1991; Sen 2005; Drèze and Sen 1995, 2002; Frederick 2010). India's gender and caste systems[2] dominate the country's social stratification, ascribing to all a position in rigid social

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[1] *Redistributive policy* refers to measures paid by one group to grant goods and services to other, relatively disadvantaged groups.

[2] The Indian government recognizes scheduled tribes, scheduled castes (*Shudras*), other "backward" (occupational) castes and "general" castes (*Brahaman*, *Kshatriya*, *Vaishayas*). The first three groups are defined as socially and economically disadvantaged and deserving of special protections.

hierarchies by birth, and, thereby, limiting for women (Miller 1989; Murthi et al. 1995; Jeffrey and Basu 1996) and SC/ST members (Beteille 1969; Fürer-Haimendorf 1982; Galanter 1984; Omvedt 1993) opportunities for social mobility. Both groups also have a long history of grassroots activism to redress oppression directed at them based on their gender and caste identities. In the 19th century, non-Brahmin castes agitated for reforms to remove the monopoly of the higher castes (Srinivas 1957), while women's participation in the nationalist struggle for independence helped to expand women's roles and opportunities (Anandhi 1991; Thapar 1993).

Of course, women are not a homogenous group. Holding divergent positions in India's caste-based hierarchies, high- and low-caste women tend to experience divergent privileges or wants (Crenshaw 1991; Frederick 2010; Hill Collins 2000; Phillips 1998). This may divide SC/ST members and women rather than uniting them in a common struggle (Jenkins 1999). Indeed, Indian scholars have argued that low-caste women experience disadvantages, including lack of opportunities for schooling, health care, economic mobility and political participation, arising from *simultaneous* gender and caste oppression (Deshpande 2007; Mehrotra 2006).

Using rich district-level data, comprehensive district-level data on investments in primary schooling available for the 2007/8 school year and on state legislators' gender and caste from years immediately prior (2000–2004) SLA elections from all but one state, we assess to what extent women's representation in State Legislative Assembly (SLA) seats, reserved and not reserved for SC/ST, is associated with investments in primary school amenities and teachers, two domains of educational policy associated with children's primary schooling in India (Greenwald et al. 1996; Hannaway and Woodroffe 2003). Investments in primary school amenities and teachers are redistributive, since, unlike the non-poor, who tend to turn to the private sector for primary education, the poor rely on government-run primary-schools (Bardhan 1996). We explore whether the magnitude by which women's SLA representation is associated with primary-school investments vary between North India—known for patriarchy and caste rigidity—and South India—known for gender equity and caste activism. Differences in gender norms and caste activism between North and South India may limit or expand the ability of women, as legislators, to influence redistributive education policies.

2 Gender, Identity Politics, and Redistributive Policy

Despite dramatic global change in women's political representation (Paxton et al. 2006, 2007), gender gaps, especially at higher levels of government, persist (Coffé and Bolzendahl 2010; Kenworthy and Malami 1999; Kunovich and Paxton 2005; Paxton and Kunovich 2003). Debate also persists about the extent to which women politicians can and do promote redistributive policies favoring women's and children's interests (Malhotra and Schuler 2005; Wängnerud 2002).

2.1 Theories of Gender and Redistributive Policy

Feminist theorists have argued that liberal democracies have privileged the *representation of ideas* over the *identities of representatives* (Phillips 1998). Given the different values, life experiences, and expertise that women bring to politics, they may distinctly favor redistributive measures aimed at women and children. In the household, income or assets

controlled by women have raised household spending on human capital across diverse contexts (Lundberg et al. 1997; Thomas 1990, 1997; Duflo 2003; Rubalcava et al. 2009). In the U.S. and Western Europe, women have been more likely than men to support public spending on childcare and child-related issues (Lott and Kenny 1999; Edlund and Pande 2001; Edlund et al. 2005; Miller 2008; Svaleryd 2009). In the U.S., women's representation in 12 state legislatures has been positively associated with the sponsorship and passage of bills concerning women, children and families (Thomas 1991, 1994; Thomas and Welch 1991). In Norway, women's representation in municipal government has been positively associated with the provision of public childcare (Bratton and Ray 2002). In the Mexican congress, women's representation of as little as 13 %, combined with other facilitating conditions, has enabled legislation against sex crimes and for affirmative action (Stevenson 1999). Finally, cross-nationally in the 1980s and 1990s, the percentage of women in national legislatures has been positively associated with social welfare spending, especially on the family (Bolzendahl 2011).

Likewise, in India, the policy interests of men and women state legislators vary across the 16 largest states (Clots-Figueras 2011), with women politicians more likely than men to promote education in their constituencies. In Uttar Pradesh, the most populous state in India and home to the largest number and fourth largest share of SC people (Census of India 2011), most women legislators during 1952–1996 opened schools in their areas, and some engaged in programs to improve education (Pundir and Singh 2002).

2.2 Intersectionality, Identity Politics, and Redistributive Policy

Women politicians may not be a homogenous group, and may hold differing positions in social hierarchies, entailing differing experiences and allegiances (Crenshaw 1991; Frederick 2010; Hill Collins 2000; Phillips 1998). Some women politicians, who may be proxies for their husbands or their elite families (Baviskar 2005), may be no more likely than their male colleagues to support women's interests (Franceschet and Piscopo 2008; Gotell and Brodie 1996; Schwindt-Bayer 2011). Conversely, members of historically marginalized groups may promote more strongly the interests of these groups (Pande 2003; Besley et al. 2004); and women from these groups may do the same. In the U.S., black women legislators aligned with non-black women to support pro-women policies, with black men to support pro-minority policies, and with fellow black women legislators on the policies that most affected them, including on education, health care, employment, and economic growth (Barrett 1995).

3 Indian Context

Three aspects of the Indian context are relevant to this discussion: trends in primary schooling, the political system and women's representation in it, and legislative and programmatic efforts to enhance schooling.

3.1 Trends in Primary Schooling

Primary education in India is intended to give students 6–11 years a foundation in reading, writing, mathematics, and social studies. Primary programs generally require no prior schooling, although children increasingly attend pre-primary programs. Gains in primary schooling in India have been marked. In the 1990s, the percentage of children 6–14 years

who were attending school increased from 68 to 79 % (International Institute for Population Sciences (IIPS) 1995; IIPS and Macro International 2000). Still, in 1998–1999, only 83 % of boys and 74 % of girls 6–14 years were attending school, a minority of boys (41 %) and girls (36 %) finished primary school by age 14, and the median completed grades of schooling was 5.5 for boys and 1.6 for girls (Wu et al. 2007; IIPS and ORC Macro 2000). Six states accounted for three-fourths of the 40 million children 6–11 years who were out of school (Mehrotra 2006). During the 1990s and early 2000s, gains in schooling were faster for girls than for boys, such that from 1999 to 2006, attendance for boys 6–10 years stabilized at 85 %, while that for girls rose from 78 to 81 % (IIPS and Macro International 2000, 2007). By 2005/6, the period for this analysis, in every state except Bihar, more than three-fifths of children 6–17 years were attending school, with Kerala (90 %) and Himachal Pradesh (89 %) having the highest percentages (IIPS and Macro International 2007).

3.2 Political System and Political Reservations for Women and Scheduled Castes/Scheduled Tribes

India's political system is a federalist one, and the constitution gives much political control to the 28 states and 7 Union Territories (UTs). The State Legislative Assemblies (SLAs) are directly elected bodies that perform the administrative functions of state governments. Administratively, states are divided into districts, which are subdivided into *tehsils* or *talukas*. Politically, states and UTs are divided into single-member constituencies in which SLA contestants are elected in first-past-the-post elections. Geographic boundaries are drawn to ensure an equal number of inhabitants per constituency. For elections before 2008, delimitation rules enacted in 1985 assigned these constituencies to parent districts. The median number of constituencies per district is nine.

India's constitution directs the government to establish district infrastructures for local governance, called *Panchayat*. These *Panchayats* comprise elected village, block, and district councils that administer local public goods, albeit with mixed success (Bonu et al. 2011; Meenakshisundaram 2005). The SLAs devolve development (including educational) programming to the Panchayat and decide the budget for such programs. SLA legislators may direct funds to district educational offices.

For decades, attempts to secure adequate political representation for non-Brahmin castes failed (Srinivas 1957). At independence, the Indian constitution provided political reservation for SC/ST, who are ~25 % of the population, often geographically concentrated, and socio-economically disadvantaged (Census of India 2011). In 1950, India reserved up to one-fourth of the seats in the national and state legislatures for SC/ST members (Pande 2003). Constitutionally, jurisdictions in national and state legislatures are reserved for these groups before national and state elections (Constitution of India 1949; Library of Congress and Federal Research Division 2004), proportional to groups' shares in the national and state populations, according to the most recent census preceding the election.

Debates over political reservations for women have occurred since British rule. In the 1920s and 1930s, the British placed a lower priority on reservations for women than on reservations for particular religious and caste groups (Jenkins 1999). In 1935, seats were reserved for women in provincial legislatures, but the Indian government removed these reservations at Independence (Jenkins 1999). After decades of debate, the 73rd amendment to India's constitution established in 1992 that one-third of seats in the *Panchayat* and one-third of Head-of-*Panchayat* positions would be reserved for women (Baviskar 2005; Ban and Rao 2008). In 1996, a parliamentary bill was proposed to reserve one-third of seats for

women in the SLAs and the lower house of the federal Parliament. This bill was debated in several parliamentary sessions but not ratified (Sanyal 2008).

Partly as a result of these efforts, at the national parliamentary level, women with more diverse backgrounds are entering politics. However, most women (and men) politicians still originate from elite families (Randall 2006; Richter 1990). After the Indian government mandated a 30 % reservation for women in the *Panchayat*, many newly elected women were from elite castes (Mohanty 1995). Over time, poorer and less politically connected women have held office at this level (Ban and Rao 2008; Baviskar 2005). On the whole, however, women's political representation at the state and national levels remains low. During 1967–2001, women won at most 14 % of the general SLA seats and 24 % of SC/ST seats in India's 16 largest states (Clots-Figueras 2007).

3.3 Legislative Efforts to Expand and Improve Schooling

Several constitutional amendments deal directly with education, but the SLAs play the major role in educational policy and expenditures, especially at the primary and secondary levels (Mehrotra 2006). State governments have Departments of Education, which control and implement these activities. States and four UTs have passed acts making primary education compulsory,[3] with *compulsion* referring to the government's provision of schooling, not families' duties to send children to school.

The government has aimed to enhance educational infrastructure over time. Under the 1986 National Policy on Education, the Central Government established *Operation Blackboard*, under which every primary school was to have at least two teachers, two classrooms, and the equipment and aids needed to teach at the primary level. *National Norms* established that a primary school be provided within 1 km of habitations with 200–300 persons. In 2001, *Education for All* was initiated as the main governmental program to achieve universal primary education of satisfactory quality by 2010. The program comprises 15 interventions, including the provision of free textbooks, grants to schools, grants to teachers, and teacher training. In 2009, the Right of Children to Free and Compulsory Education Act was passed to provide universal (except Jammu and Kashmir) free and compulsory education to all children 6–14 years (or until completing primary school). The Act required that private schools reserve 25 % of admissions for poor children, mandated improvements to school infrastructure, teacher training, and pupil-to-teacher ratios, and provided models to plan and monitor progress toward these goals (India Development Gateway 2009).

3.4 Intersectionality in Indian Politics and Redistributive Education Policies

In India, legislators' gender and caste identities have been associated with redistributive-policies. In district-level data from 16 states, the policy interests of men and women state legislators differed markedly overall (Clots-Figueras 2011); yet, *general* women legislators, who hold seats *not reserved* for SC/ST and who often come from elite families of privileged castes, have not supported policies representing women's interests (Clots-Figueras 2011). They have not promoted laws to equalize women's and men's rights to inheritance, have favored pro-rich expenditures, have opposed redistributive land reforms, have invested in

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[3] The States are Assam, Andhra Pradesh, Bihar, Gujarat, Haryana, Jammu and Kashmir, Karnataka, Madhya Pradesh, Maharashtra, Punjab, Rajasthan, Tamil Nadu, Kerala, and West Bengal. The UTs are Chandigarh, Delhi, Pondicherry and Andaman and Nicobar Islands.

higher (rather than lower) tiers of education, and have reduced social expenditures (Clots-Figueras 2011). In contrast, SC/ST women state legislators have favored redistributive policies, such as capital investments in irrigation, have supported revenue expenditures on water supply, some aspects of lower-level schooling,[4] and laws to equalize women's and men's inheritance rights (Clots-Figueras 2011).

Other studies show different results. In village-level experiments in West Bengal and Rajasthan, women *Panchayat* heads, SC/ST and non-SC/ST alike, invested more in drinking water and roads—public goods linked to women's concerns at the local level (Chattopadhyay and Duflo 2004). Proceedings from 155 rural village-assembly meetings in Rajasthan have shown a relative neglect of health, education, and gender issues; yet, SC/ST chairpersons of both genders have been more likely than their higher-caste counterparts to raise SC/ST-related issues (Bonu et al. 2011). In four Southern states, women *Panchayat* heads have resembled their male counterparts in willingness to provide public goods (Ban and Rao 2008).

The range of findings with respect to intersectionality of gender and caste in policy-making suggests that this relationship is still unresolved and needs further study. In addition, the variation across states suggests that the context may matter for this relationship, an issue we start to address with our analysis by North and South regions of India, as described below.

3.5 Women's Intersectional Political Interests in Social Context

The nature and magnitude of gender and caste gaps in redistributive investments may depend on the broader social context (Ban and Rao 2008; McCall 2005). Variations in gender norms and caste activism across the Northern and Southern states offer an interesting example. Southern Indian states have been characterized as less patriarchal than Northern states, with more egalitarian norms about gender (Dyson and Moore 1983). While Southern states such as Tamil Nadu and Kerala historically have had more rigid caste hierarchies and lower-caste discrimination than some Northern states, many Southern states also have had a long history of relatively successful activist social and political movements *against* caste discrimination (Anandhi 1991; Franke and Chasin 1994; Jadhav 1986; Ratnam 2008). In some Southern states, such as Tamil Nadu, women's and lower-caste's movements were allied (Anandhi 1991). Thus, in the Southern states, where people are currently more attuned to lower-caste needs, lower-caste women may be more effective in furthering redistributive policies. In the North, higher-caste women may be more effective in maintaining an elitist status quo.

3.6 Implications and Hypotheses

To date, studies of women in formal politics have focused on western nations (Kenworthy and Malami 1999; Paxton et al. 2007). Also, studies often have compared the political influence of women and men, ignoring potential distinctions among women (Paxton et al. 2007; Hughes and Paxton 2008). Less is known about how women's intersecting identities shape their political interests, influence, and decisions (Crenshaw 1991; Frederick 2010). Moreover, studies of women's political influence (Ban and Rao 2008; Clots-Figueras 2007, 2011) have considered relatively few indicators of investments in schooling. This district-level analysis

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[4] Clots-Figueras (2011) finds that, in India, SC/ST women legislators have a strong effect on primary schools and general women legislators have a strong effect on middle schools.

extends others in India focused on the reservation of local seats for women (Chattopadhyay and Duflo 2004) as well as state and local seats for SC/ST legislators (Chin and Prakash 2011; Munshi and Rosenzweig 2008; Pande 2003).[5] This analysis helps to shed some light on the reasons for inequities in the distribution of a mandated public good in a setting where inequities in human resources can exceed those across the world's nations.

Two hypotheses follow. First, the political representation of women in seats reserved for SC/ST in India's SLA will be positively associated with investments in primary schooling, especially in the historically less patriarchal South, where low-caste activism has been more prominent. Second, the political representation of women in non-reserved or general SLA seats will be negatively associated with investments in primary schooling, especially in the historically more patriarchal North, where low-caste activism has been less prominent.

4 Data and Methods

4.1 Sample Construction and Data Sources

The district was our unit of analysis, as it permitted estimation of associations between women's political representation in the smallest possible geographic area in which electoral constituencies are located. The district also is a germane *operational* level at which to study investments in schooling. Although the central and state governments in India control educational funding (Mehrotra 2006), its uses are determined partly at the district and lower administrative and political levels by decisions that constituent state representatives may influence.

The analysis was based on data from the District Information Survey for Education (DISE) and the Election Commission of India (ECI). The DISE provides state- and district-level data on schools and their pupils. The DISE does not cover Education Guarantee Schools, alternative learning centers, or unregistered schools; private-school coverage is increasing.[6] The DISE operates through State Education Departments. Officials at the *taluka/tehsil* level maintain lists of all schools; they send forms and instructions annually for each school to complete, review and compile the data, and pass it to the district, State headquarters, and State Education Department. In 2008, the DISE covers all 624 districts in all States and UTs, and all public schools in those districts participated in the DISE survey. Data quality is monitored, and the data are generally high quality and complete (United Nations Children's Fund 2011). The data relevant for this analysis include indicators of: (1) primary-school amenities, including school availability and school quality; and (2) primary-school teachers, including counts per school and per student population, qualifications, gender, and caste affiliation.[7]

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[5] For SC/ST officials, investment in the number of primary schools has been positive where the SC/ST population has been concentrated Crost and Kambhampati (2010). Also, the effects of political reservation for SC have differed from those for ST, with the latter more aligned with concerns of the poor (Chin and Prakash 2011; Pande 2003).

[6] EGS are established in habitations where no formal school exists within 1 km and at least 15–25 children 6–14 years are out of school. Alternative learning centers serve deprived (e.g., street, migrating) children (National Portal Content Management Team 2009).

[7] The DISE also collects data on *grants* to schools, *incentives* per 100 enrolled pupils, and pupils, including enrollment, exam results, and grade-specific promotion, repetition, and drop-out.

Since 1951, the ECI has produced public reports on the results of all elections to the lower house of the national Parliament and SLAs. The reports include data for all electoral constituencies on counts of all electors and voters, overall and by gender, as well as attributes of the contestants (gender, political party, performance in elections, including absolute and relative number of votes won for seats indicated as reserved or not-reserved for SC/ST). To link and aggregate constituency-level data from the ECI to districts, we followed published guidelines listing all constituencies by their assigned district based on delimitation rules set in 1985, which held for the election years relevant for this study (2000–2004) (Bose and Singh Bose and Singh 1988a, b, c, Bose and Singh 2000a, b).

For each data source, we created a dataset of the districts comprising India in 1981, the census year reflecting the district boundaries that existed when the 1985 delimitation rules linked electoral constituencies to districts. We grouped districts into three sets: (1) those with unchanged boundaries for the period between 1981 and 2008, (2) those that were cleanly partitioned during the period, and (3) adjacent districts with more complex boundary changes. Of the 624 districts in 2008, 171 (27 %) had unchanged boundaries, 165 (24 %) were cleanly partitioned, and 288 (46 %) were adjacent districts that underwent complex boundary changes. Following procedures for weighting from Kumar and Somanathan (2009), we created a DISE dataset of matched districts or district composites that were unchanged since 1981. These procedures yielded a dataset of 328 districts and district composites (hereafter called district composites), accounting for all 624 districts of India in 2008. Of the 328 district composites, two with missing data in the DISE were dropped. We merged the remaining 326 district composites with ECI data for elections in the closest year (2000–2004) preceding the 2007/8 academic year, and 316 of these district composites matched. The ECI's exclusion of UTs accounted for 7 of the 10 non-matching district composites. The three other non-matching district composites also were absent from the ECI. These 316 district composites have 1–104 electoral constituencies.

4.2 Outcomes

Twenty interval- or ratio-level outcomes captured district-level investments to (1) *school amenities* and (2) *teacher quantity and quality*. Unless stated, all measures refer to *primary-only schools*, which do not have upper-primary and secondary sections and represent 75 % of schools with a primary section in the average district. Using indicators in each domain (noted in Table 1), we conducted principal components analysis (PCA) to generate scores from the first component to reflect the overall level of investment in each domain. The Chronbach's alphas and Kaiser–Meyer–Olkin (KMO) measures of sampling adequacy for each of these scores were, respectively: 0.74 and 0.78 for school amenities and 0.21 and 0.52 for teacher quantity and quality.

In the average district in 2007/8 (Table 1), 11 % of government schools were established since 2003, suggesting rapid expansion in school infrastructures. Most schools (94 %) had a school building, two-thirds had a *pucca* or cement building (reflecting higher-quality construction), and two-thirds had classrooms that were in *good condition* or not needing repair. Most (84 %) schools had a drinking fountain, 59 % had common toilets and 42 % had girls' toilets, 31 % had a kitchen, and 31 % had a pre-primary program for children 3–5 years. The prevalence of schools with each of these amenities varied across districts, from nearly 0 % to nearly 100 % for most amenities. The ratio of classrooms per

Table 1 Univariate statistics for district-level investments into primary schooling, women's political representation, and control variables, N = 316 District Composites in India

	Mean	(SD)	Min	Max
Inputs into primary-school[a] amenities				
% of government schools established since 2003[b]	10.7	(12.4)	0.0	85.1
% of primary-only schools with a building	93.5	(11.3)	7.9	100.0
% of primary-only schools with *pucca* or cement building[b]	68.3	(26.7)	0.4	99.8
% of primary-only schools with more than one classroom	90.4	(14.2)	17.0	100.0
% of primary-only schools with classrooms in *good condition* or not needing repair[b]	68.1	(17.1)	9.6	104.9
% of primary-only schools with drinking water[b]	84.2	(14.4)	23.9	100.0
% of primary-only schools with a common toilet	59.3	(25.3)	3.9	100.0
% of primary-only schools with a girls' toilet[b]	42.1	(27.1)	0.0	99.7
% of primary-only schools with a kitchen[b]	31.3	(23.9)	0.0	91.2
% of primary-only schools with pre-primary programs	30.5	(25.3)	0.6	100.0
Number of classrooms per 100 pupils in primary-only schools[b]	3.8	(2.2)	0.7	18.4
Principal Component 1—Primary-school amenities	0.01	(1.74)	−5.35	3.00
Inputs into primary-school-teacher quantity and quality				
% of primary-only schools with more than one teacher[c]	87.1	(12.9)	21.9	100.0
% of primary-only schools with at least one female teacher[c]	73.3	(12.8)	36.1	100.0
% of teachers in primary-only schools who are female[c]	37.1	(17.7)	5.3	95.0
% of para-teachers in primary-only schools who are female[c]	41.8	(23.9)	0.0	100.0
% of teachers in primary-only schools who are regular or permanent teachers[c]	86.3	(16.0)	21.5	100.0
% of teachers in primary-only schools with at least secondary school qualifications[c]	96.7	(4.7)	56.6	100.0
% of teachers in primary-only schools with in-service training[c]	44.6	(23.7)	0.0	93.7
% of female teachers in primary-only schools with in-service training[c]	39.6	(16.4)	0.0	100.0
% of teachers in primary-only schools with graduate qualifications[c]	36.0	(15.9)	2.6	79.5
Number of teachers per 100 pupils in primary-only schools[c]	3.8	(2.2)	1.4	18.0
Principal Component 2—Primary-school teacher quantity and quality	−0.04	(1.62)	−4.33	4.95
Women's representation in State Legislative Assemblies (SLAs)				
% of *general* non-scheduled caste or tribe SLA seats held by women	5.7	(9.6)	0.0	66.7
% of *reserved* scheduled caste or tribe SLA seats held by women	8.5	(20.5)	0.0	100.0
Sociodemographic characteristics of districts				
% of population living in urban areas	23.3	(17.6)	0.0	100.0
Decennial growth rate	22.5	(9.6)	4.3	76.3
Literacy rate among females aged 7 years or older	51.9	(14.9)	21.4	94.3
% of population scheduled caste or scheduled tribe (SC/ST)	30.7	(20.3)	0.3	96.5
Sex ratio, 0–6 years (female:male)	935.6	(37.5)	783.9	1,004.4
Region				
North	0.16	(0.37)	0.00	1.00
Northeast	0.10	(0.30)	0.00	1.00
South	0.20	(0.40)	0.00	1.00
East	0.18	(0.38)	0.00	1.00
West	0.10	(0.30)	0.00	1.00

Table 1 continued

	Mean	(SD)	Min	Max
Central	0.27	(0.44)	0.00	1.00

[a] For most variables, as indicated, data pertain to primary-only schools, that is, schools that do not include upper primary and secondary sections 75 % of schools that include a primary section are primary-only schools

[b] Indicators included in Principal Component 1

[c] Indicators included in Principal Component 2

[d] # Districts report more classrooms in good condition than the total number of classrooms

100 pupils in the average district was 3.8 (about 26 pupils per classroom) but ranged from 0.7 to 18.4 across districts.

Average investments in the *quantity and quality of teachers* in primary-only schools were high but also varied across districts (Table 1). In the average district, most schools had more than one teacher (87 %) and almost three-fourths (73 %) had at least one woman teacher. More than one-third of all teachers (37 %) and *para-teachers*[8] (42 %) were women. Most teachers (86 %) were regular or permanent employees and had at least secondary-school training (97 %), but fewer teachers had in-service training (45 %) or graduate qualifications (36 %).

4.3 Explanatory Variables

Four district-level variables captured legislators' intersectional gender and caste identities. These variables measured (1) the percentage of *general* SLA seats (not reserved for SC/ST) in the district held by women, (2) this percentage squared, (3) the percentage of SLA seats *reserved* for SC/ST held by women[9] and (4) this percentage squared. Women legislators holding general SLA seats are likely to belong to non-SC/ST castes, and women legislators holding SLA seats *reserved* for SC/ST are members of SC/ST castes.[10]

Inclusion of the quadratic terms permitted non-linear relationships between women's political representation in specified seats and various investments in primary schooling without specifying threshold levels for the relationship between women's representation

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[8] Para-teachers are full-time employees but need not be professionally qualified as teachers and are paid at a lower rate than full-time teachers.

[9] In India, scheduled caste is further subdivided into many sub groups. Since the ECI collects data on membership in the scheduled caste, as opposed to a specific denomination within scheduled caste, we treat all scheduled caste women as one.

[10] According to the *Handbook for Candidates*, an online publication by the Election Commission of India (ECI), both general and SC/ST women are eligible to compete from a general seat. The *Handbook for Candidates* says, "if you are a candidate for a general seat, that is to say, for a seat not reserved for the Scheduled Castes or Scheduled Tribes as mentioned in the preceding sub-clauses, then you must be an elector for any parliamentary constituency (vide section 4 of the Representation of the People Act, 1951)" (page 10). However, ECI reports on election results do not provide information on caste membership of those who have won general SLA seats (reports provide data on gender, political party, and performance in elections, including absolute and relative number of votes won for seats indicated as reserved or not-reserved for SC/ST). Therefore, in the current analysis, we assumed that women who won general seats in the SLAs during the years for which we have data in this analysis were not SC/ST women. Our assumption

and investments in schools (Bratton and Ray 2002). We derived four measures from SLA elections that had occurred in 2000–2004, a mean of 5 years before the 2007–2008 academic year for which school measures were taken, assuming that 5 years is a suitable time for newly elected (or reelected) politicians to make policy decisions and for these decisions to manifest in schools (Bratton and Ray 2002). During these years, women's political representation in India's SLAs was low, with 6 % of general seats and 9 % of reserved seats held by women (Table 1). These percentages, however, varied across the districts, from zero to two-thirds of general seats and from zero to all reserved seats.

4.4 Control Variables

We included five control variables from the 2001 Census projected in the DISE dataset to 2007/8 to capture district-level attributes that may confound the relationship between women's political representation and investments in primary schooling. These were the percentage of the population that was urban to capture the overall level of industrialization (Meyer et al. 1979), decennial population growth rate to capture the rate of change in population size (Clots-Figueras 2011; McLendon et al. 2005; Pal and Ghosh 2008), rate of literacy for women 7 years and older to capture *pre-existing* levels of education (Dye 1966, 1969), percentage of the population that was from SC/STs (Pal and Ghosh, 2008), and ratio of girls to boys 0–6 years in the population to capture gender discrimination (Echávarri and Ezcurra 2010). In sensitivity analyses (see "Analysis"), we added a sixth control variable of region to adjust for fixed, unmeasured regional attributes (like religious composition, culture, language, or economic infrastructure) that may be related to the explanatory variables and outcomes (Meyer et al. 1979; Renzulli and Roscigno 2005; Roy et al. 2000).

In the average district, 23 % of the population lived in urban areas, the decennial growth rate was 23, 52 % of women 7 years or older were literate, one-third (31 %) of the population was SC/ST, and the sex ratio of girls to boys aged 0–6 years was below parity (936 girls per 1,000 boys). Districts varied on all of these attributes (Table 1). Districts were distributed across regions as follows: 16 % in the North, 10 % in the Northeast, 20 % in the South, 18 % in the East, 10 % in the West, and 27 % in the Central Region.

4.5 Analysis

We conducted univariate explorations to assess the completeness and distributions of all variables (Table 1). We estimated Pearson pairwise correlations to explore unadjusted associations of the explanatory variables and outcomes as well as potential collinearities among the explanatory variables and covariates (Tables 2 and 3). We used multivariate ordinary least squares (OLS) regression with spatially-corrected standard errors to estimate Eqs. 1 and 2 below, measuring the relationship of women's representation in general and reserved SLA seats with each of the 22 school investment indicators described in the preceding section, pertaining to school amenities and teacher quantity and quality (Table 4). We analyzed each outcome separately as well as in two overall measures. Let i denote district, $\mathbf{Y}_i$ a vector of continuous variables reflecting district-level inputs to primary

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Footnote 10 continued

is likely to reflect the reality given that, for general SLA seats, non SC/ST candidates are likely to secure party nominations and, ultimately, win elections since the constituencies of the general SLA seats are predominantly non SC/ST. To the best of our knowledge, all prior research on general and SC/ST women legislators made the same assumption (Clots-Figueras 2011; Bhalotraa et al. 2014).

schooling, GW_i the percentage of general SLA seats in the district held by women and GW_i^2 this percentage squared, RW_i the percentage of reserved SLA seats in the district held by women and RW_i^2 this percentage squared,[11,12] and $\mathbf{X}_i$ a vector of district-level controls. We estimated two models for each outcome. The first model included only the controls, and the second model also included the measures for women's representation in general and reserved SLA seats, as follows:

$$\mathbf{Y}_i = \beta_o + \beta_{1-5}\mathbf{X}_i + \varepsilon_i \tag{1}$$

$$Y_i = \beta_0 + \beta_{1-5}X_i + \beta_6 W_i + \beta_7 GW_i^2 + \beta RW_i + \beta_9 RW_i^2 + \varepsilon_i \tag{2}$$

We used the R^2 values from the restricted model (1) and full model (2) to compute the percentage of the explained variance in each outcome accounted for by measures of women's political representation. To explore whether SC/ST and non-SC/ST women's political representation operated differently in regions characterized broadly by less (North) and more (South) activism and social reform with respect to women and disadvantaged groups, we re-estimated the models stratifying the sample into Northern and Southern districts.

In all models, we used spatially-corrected standard errors to account for any cross-sectional data dependencies among clustered districts. All districts in India likely have some inter-dependence because all operate within the national political commitment to compulsory primary schooling; yet, measures of interest may co-vary more closely across adjacent than non-adjacent districts because (1) districts in the same state are subject to the same state-legislative processes and outcomes, (2) residents of adjacent districts may be part of shared social units that traverse state or other political boundaries, and (3) districts that had landlord-based systems to collect land revenue under colonialism now invest less in health and education than districts that had cultivator-based systems (Anselin 1988; Banerjee and Iyer 2005; Banerjee et al. 2007). With these possibilities in mind, we created as large a sample of districts as possible to mitigate the fact that spatially dependent observations contain less information than do independent observations (Anselin 1988). We also used the Cluster Covariance Estimator (CCE) to estimate spatially-corrected OLS models following Eqs. (1) and (2) (Bester et al. 2011; Conley 1996, 1999). The CCE allays the dual threats of autocorrelation and heteroskedasticity in cross-sectional data (Bester et al. 2011; Conley 1996, 1999) and provides more robust spatially-corrected standard errors than would standard OLS techniques or alternative methods for spatial analysis (Anselin 1988; Bester et al. 2011; Loftin and Ward 1983). The CCE approach tracks the source of dependence across observations to the cluster to which subsets of observations mainly belong (Bester et al. 2011), assuming that clusters are approximately independent (e.g., there are relatively few clusters that, on average, are normally distributed by containing many observations). We treated the following six regions as clusters: North (50 districts), Northeast (31), South (63), East (56), West (32), and Central (84). With relatively few regions and a large number of districts per region (52.7, on average), our test statistics using CCE are robust to spatial dependence. We calculated t-statistics with the STATA 11.0 cluster command (Bester et al. 2011).

Our discussion stresses associations that are significant at p value ≤ 0.05 and marginally significant results ($p \leq 0.10$).

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[11] Replacing the squared term with a variable for whether thresholds were reached (12.5, 16.0 %) for women's district-level representation in SLA seats yielded similar results (available on request).

[12] Pairwise correlations among the explanatory variables were −0.03 to 0.93. Estimated variance inflation factors for these variables were 4.42–7.56, mitigating concerns of collinearity.

Multicollinearity in the control variables was not a concern, as the highest correlation among these variables (0.51) was that between the percentage of the population urban and the rate of literacy among women (Tables 2 and 3).

Our dependent variables represent a period of time 5 years after the estimates we use for explanatory variables. While establishing such appropriate temporality between the explanatory variables and outcomes and controlling for pre-existing confounders of this relationship did not permit us to make claims of causality, these steps did permit us to present the direction and magnitude of association with more confidence.

Finally, we conducted sensitivity analyses to assess the robustness of our findings (available upon request). First, we added design variables for region to account for fixed, unobserved regional attributes that may be associated with women's political representation and inputs to primary schooling. These controls did not markedly alter either the patterns of association or the inferences for our explanatory variables, so the more parsimonious models are presented. Second, we conducted outlier analyses and re-estimated all of the full multivariate regression models excluding districts with high influence on the regression coefficients (sample sizes of 290–304). In general, the magnitudes of and inferences for the coefficients for women's political representation were robust to the removal of outlying districts.

After estimating all multivariate models, we used those to generate predicted scores for the two principle components for school amenities and teacher quality and quantity. We generated these scores setting all covariates to their means and varying the values of women's political representation in general seats and in reserved seats between 0 and 35 %, within which most of the district observations fall. These predictions illustrate the patterns of association of women's representation in general and reserved SLA seats with redistributive investments in primary schooling, broadly speaking. We conducted all analyses using STATA 11.0 and SAS 9.2 (SAS Institute, Cary, NC, USA).

5 Results

5.1 Bivariate Results

Pearson pairwise correlations indicated unadjusted associations of women's political representation with primary-school amenities and primary-school teacher quantity and quality (Tables 2 and 3). A higher percentage of general seats held by women was associated with a lower percentage of schools with a building ($r = -0.12$) and a pre-primary program ($r = -0.14$), as well as fewer class-rooms per 100 pupils ($r = -0.14$), fewer teachers per 100 pupils ($r = -0.12$), and a (marginally) higher percentage of para-teachers in the district who were women ($r = 0.10$). Yet, the percentage of general seats held by women also was associated with a higher percentage of teachers ($r = 0.13$) (Table 2).

A higher representation of women in reserved seats tended to be associated with higher schooling investments, especially related to meeting children's basic needs, specifically, marginally higher percentages of schools with a drinking fountain ($r = 0.10$) or a kitchen ($r = 0.09$), and a higher percentage of teachers with graduate qualifications ($r = 0.15$). However, the percentage of reserved seats held by women was associated with a marginally lower percentage of schools in the district with pre-primary programs ($r = -0.10$), as well as fewer classrooms per 100 pupils ($r = -0.13$) and fewer teachers per 100 pupils ($r = -0.12$).

Table 2 Pearson correlation coefficients for district-level measures of investments in primary schooling, women's political representation, and control variables, N = 316 District Composites in India

	Wn's pol. rep.		Primary-school amenities[a]											Sociodemographic controls					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(1)	1.00																		
(2)	-0.03	1.00																	
(3)	-0.06	-0.04	1.00																
(4)	-0.12*	-0.04	-0.35**	1.00															
(5)	0.00	-0.01	-0.23**	0.32**	1.00														
(6)	-0.04	0.01	-0.31**	0.08	0.41**	1.00													
(7)	-0.04	0.01	-0.23**	0.15**	0.63**	0.27**	1.00												
(8)	-0.07	0.10†	-0.43**	0.25**	0.39**	0.42**	0.46**	1.00											
(9)	0.00	-0.02	-0.44**	0.30**	0.33**	0.37**	0.41**	0.59**	1.00										
(10)	-0.04	0.04	-0.33**	0.31**	0.58**	0.37**	0.54**	0.60**	0.59**	1.00									
(11)	-0.06	0.09†	-0.25**	0.22**	0.20**	0.18**	0.19**	0.34**	0.30**	0.27**	1.00								
(12)	-0.14*	-0.10†	0.07	0.30**	-0.09	-0.11†	-0.10†	-0.14*	0.17**	-0.05	-0.05	1.00							
(13)	-0.14*	-0.13*	-0.05	0.34**	-0.23**	-0.09†	-0.22**	-0.11†	-0.06	-0.15**	-0.22**	0.35**	1.00						
(14)	-0.02	0.07	-0.52**	0.32**	0.76**	0.47**	0.76**	0.77**	0.62**	0.82**	0.48**	-0.15**	-0.32**	1.00					
(15)	0.03	0.03	-0.15**	0.18**	0.14*	0.09	0.35**	0.20**	0.22**	0.29**	0.03	0.13†	0.00	0.28	1.00				
(16)	-0.06	-0.07	0.20**	-0.06	-0.02	0.16**	-0.20**	-0.19**	-0.04	-0.05	-0.08	0.35**	-0.02	-0.16	0.00	1.00			

Table 2 continued

	Wn's pol. rep.		Primary-school amenities[a]											Sociodemographic controls					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
(17)	0.02	−0.06	−0.42**	0.34**	−0.07	0.05	0.05	0.17**	0.27**	0.12*	−0.06	0.17**	0.35**	0.10	0.51**	−0.27**	1.00		
(18)	−0.16**	−0.08	−0.04	0.10†	−0.40**	−0.07	−0.45**	−0.27**	−0.19**	−0.32**	0.07	0.24**	0.37**	−0.39**	−0.27**	0.29**	−0.06	1.00	
(19)	−0.11*	0.00	0.10†	−0.16**	−0.46**	−0.26**	−0.39**	−0.25**	−0.17**	−0.39**	0.12*	0.04	0.10†	−0.39**	−0.18**	−0.10†	−0.09	0.32**	1.00

(1) Women's representation in general (non-scheduled caste or tribe) SLA seats (2) women's representation in reserved (scheduled-caste or tribe) SLA seats (3) % of government schools established since 2003, (4) % of primary-only schools with a building, (5) % of primary-only schools with *pucca* or cement building, (6) % of primary-only schools with more than one classroom, (7) % of primary-only schools with classrooms in *good condition* or not needing repair, (8) % of primary-only schools with drinking water, (9) % of primary-only schools with a common toilet, (10) % of primary-only schools with a girls' toilet, (11) % of primary-only schools with a kitchen, (12) % of primary-only schools with pre-primary programs, (13) Number of classrooms per 100 pupils in primary-only schools, (14) Principal Component 1, (15) % of population living in urban areas, (16) Decennial growth rate, (17) Literacy rate among females aged 7 years or older, (18) % of population scheduled caste or scheduled tribe (SC/ST), (19) Sex ratio, 0–6 years (female:male)

† $p \leq .10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

[a] See foonote b of Table 1 for the subset of indicators included in Principal Component 1

Table 3 Pearson correlation coefficients for district-level measures of investments in primary schooling, women's political representation, and control variables, N = 316 district composites in India

	Wm's pol. rep.				Primary-school teacher quantity and quality[a]									Sociodemographic controls				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1)	1.00																	
(2)	−0.03	1.00																
(3)	0.07	0.03	1.00															
(4)	−0.02	0.03	0.15**	1.00														
(5)	0.04	−0.01	0.24**	0.61**	1.00													
(6)	0.10†	0.03	0.40**	0.50**	0.36**	1.00												
(7)	0.13*	0.04	0.06	0.05	0.59**	−0.02	1.00											
(8)	−0.03	0.08	0.06	−0.04	−0.03	−0.15**	−0.09	1.00										
(9)	0.08	0.01	−0.05	−0.11†	0.15**	−0.03	0.17**	0.13*	1.00									
(10)	−0.04	0.01	0.31**	0.73**	0.76**	0.49**	0.13*	0.03	0.08	1.00								
(11)	0.03	0.15**	−0.06	0.05	0.09†	0.00	0.13*	0.37**	0.18**	0.09	1.00							
(12)	−0.12*	−0.12*	−0.06	0.12*	0.25**	0.08	0.09	−0.31**	−0.11†	0.04	−0.25**	1.00						
(13)	0.04	0.02	0.38**	0.70**	0.93**	0.57**	0.52**	−0.08	0.16**	0.77**	0.08	0.26**	1.00					
(14)	0.03	0.03	0.16**	0.32**	0.55**	0.24**	0.23**	0.01	−0.08	0.49**	0.21**	−0.03	0.50**	1.00				
(15)	−0.06	−0.07	−0.09	0.00	−0.24**	−0.05	−0.11	−0.28**	−0.34**	−0.24**	−0.09	0.01	−0.18**	0.00	1.00			
(16)	0.02	−0.06	0.24**	0.30**	0.66**	0.29**	0.43**	−0.12*	0.10†	0.49**	−0.04	0.30**	0.63**	0.51**	−0.27**	1.00		

Table 3 continued

	Wm's pol. rep.		Primary-school teacher quantity and quality[a]											Sociodemographic controls				
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(17)	−0.16**	−0.08	−0.24***	−0.20***	−0.20***	−0.11*	−0.01	−0.44**	−0.06	−0.21**	−0.28**	0.35**	−0.20**	−0.27**	0.29**	−0.06	1.00	
(18)	−0.11*	0.00	−0.07	−0.05	−0.05	−0.06	−0.01	−0.02	0.03	−0.12*	−0.22**	0.18**	−0.03	−0.18**	−0.10†	−0.09	0.32**	1.00

(1) Women's representation in general or non-scheduled caste or tribe SLA seats (2) women's representation in reserved or scheduled-caste or tribe seats (3) % of primary-only schools with more than one teacher, (4) % of primary-only schools with at least one female teacher (5) % of teachers in primary-only schools who are female, (6) % of para-teachers in primary-only schools who are female, (7) % of teachers in primary-only schools who are regular or permanent teachers, (8) % of teachers in primary-only schools with at least secondary school qualifications, (9) % of teachers in primary-only schools with graduate qualifications, (10) % of female teachers in primary-only schools with in-service training, (11) % of teachers in primary-only schools with in-service training, (12) Number of teachers per 100 pupils in primary-only schools, (13) Principal Component 2, (14) % of population living in urban areas, (15) Decennial growth rate, (16) Literacy rate among females aged 7 years or older, (17) % of population scheduled caste/scheduled tribe (SC/ST), (18) Sex ratio, 0–6 years (female:male)

† $p \leq 0.10$; * $p \leq .05$; ** $p \leq .01$; *** $p \leq .001$

[a] See foonote c of Table 1 for the subset of indicators included in Principal Component 2

5.2 Multivariate Results for Women's Political Representation

Table 4 presents multivariate results. Each row represents a regression model that includes all explanatory variables and district-level controls. The first two sets of columns show the estimated coefficients (βs) and standard errors (SE) from these full models for the four terms capturing women's political representation. The third column shows the R^2 values for these models (estimated coefficients for the control variables are available upon request). For comparison, the fourth column shows the R^2 values for the "restricted" models that included only the control variables (estimated coefficients for these models also are available upon request). The last column provides the percentages of the explained variances in the outcomes accounted for by the four measures of women's political representation.

The percentage of general seats held by women was negatively associated with several measures of school amenities and teacher quantity and quality. An increase of one percentage point in the representation of women in general seats was associated with lower percentages of schools in the district with a *pucca* or cement building, a pre-primary program, and at least one woman teacher, as well as a lower percentage of women teachers in the district with in-service training. For three of these investments (schools with a pre-primary program, schools with at least one woman teacher, and women teachers with in-service training), the negative associations diminished at higher levels of women's representation in general seats, as reflected by the significant, positive quadratic terms (Table 4). For several other investments in primary schooling, the negative coefficients for the linear terms and the positive coefficients for the quadratic terms for women's representation in general seats were jointly significant, as reflected by the *p* values for F-tests of joint significance in Table 4. These investments included the percentage of schools with: *pucca* or cement buildings, with classrooms in good condition, and with pre-primary programs; the PC score for primary-school amenities; and the number of teachers per 100 pupils. Thus, for all these investments, the estimated relationship with women's representation in general seats was, again, a diminishing negative one.

Complementing the above patterns, several inputs to primary schooling were at least marginally ($p \leq 0.10$) negatively associated with women's representation in general SLA seats. These included the percentage of primary-only schools with a building and a girls' toilet and the percentage of teachers with at least secondary-school qualifications. Only the percentage of teachers in primary-only schools who were regular or permanent teachers had a marginally positive joint association with women's representation in general seats.

Thus, we find that women's representation in general SLA seats had significant associations at $p \leq 0.10$ with 11 of 22 measures of primary-school amenities and teacher quantity/quality; out of these 11 associations, 10 were negative, with negative relationships being somewhat smaller at higher levels of women's representation in these seats.

The percentage of women in SLA seats reserved for scheduled caste and scheduled tribe representatives was positively associated with several measures of school amenities and teacher quantity and quality (Table 4). An increase in the percentage of reserved seats held by women was associated with higher percentages of schools having a drinking fountain, a higher percentage of para-teachers who were women, and a higher percentage of women teachers with in-service training. All of these positive associations tended to be smaller at higher levels of women's representation in reserved seats, as reflected by the negative coefficients for the quadratic terms for women's representation in these seats (Table 4).

For nine other investments in primary schooling, the coefficients for women's representation in reserved seats were at least marginally (jointly or independently) significant, showing positive (linear term) but in most cases diminishing (quadratic term) relationships,

Table 4 Estimates for adjusted spatial regressions of district-level investments into primary schooling on women's political representation (WPR), N = 316 district composites in India

| | % *general* (non-SC/ST) SLA seats held by women | | | | | | | % *reserved* (SC/ST) SLA seats held by women | | | | | | | R^2_F (full)[3] | R^2_R (restrict)[4] | % of R^2_F accounted for by WPR |
| | Linear | | | Quadratic | | | | Linear | | | Quadratic | | | | | | |
	β	(SE)	p	β	(SE)	p	p > F	β	(SE)	p	β	(SE)	p	p > F			
Inputs into primary-school amenities																	
% of government schools established since 2003	−0.008	(0.187)		−0.002	(0.005)			−0.102	(0.057)		0.001	(0.001)		†	0.21	0.20	4.25
% of primary-only schools with a building	−0.251	(0.126)	†	0.003	(0.003)			0.017	(0.044)		−0.000	(0.001)			0.18	0.17	9.33
% of primary-only schools with *pucca* or cement building	−0.711	(0.260)	*	0.014	(0.007)		**	−0.216	(0.233)		0.002	(0.002)			0.32	0.30	6.38
% of primary-only schools with more than one classroom	−0.130	(0.115)		0.001	(0.002)			−0.098	(0.087)		0.001	(0.001)			0.10	0.09	8.60
% of primary-only schools with classrooms in *good condition or not needing repair*	−0.412	(0.276)		0.005	(0.007)		**	−0.070	(0.087)		0.000	(0.001)			0.39	0.37	5.46
% of primary-only schools with drinking water	−0.289	(0.182)		0.003	(0.004)			0.229	(0.088)	*	−0.002	(0.001)	*		0.18	0.14	18.37
% of primary-only schools with a common toilet	−0.330	(0.217)		0.006	(0.003)			0.263	(0.164)		−0.004	(0.002)		†	0.13	0.12	8.96
% of primary-only schools with a girls' toilet	−0.543	(0.277)		0.007	(0.005)		†	0.207	(0.220)		−0.003	(0.003)			0.25	0.23	7.00
% of primary-only schools with a kitchen	−0.065	(0.322)		−0.001	(0.006)			0.391	(0.180)	†	−0.004	(0.002)		†	0.06	0.04	29.68
% of primary-only schools with pre-primary programs	−0.805	(0.145)	**	0.016	(0.001)	***	***	0.010	(0.182)		−0.001	(0.002)			0.25	0.22	9.84
Number of classrooms per 100 pupils in primary-only schools	−0.031	(0.017)		0.000	(0.000)			−0.025	(0.014)		0.000	(0.000)	*		0.31	0.29	5.99
Principal Component 1—Primary-school amenities[a]	−0.038	(0.025)		0.001	(0.001)		**	0.014	(0.007)	†	−0.000	(0.000)			0.30	0.28	5.88

Table 4 continued

	% general (non-SC/ST) SLA seats held by women							% reserved (SC/ST) SLA seats held by women							R^2_F (full)[3]	R^2_R (restrict)[4]	% of R^2_F accounted for by WPR
	Linear			Quadratic				Linear			Quadratic						
	β	(SE)	p	β	(SE)	p	p > F	β	(SE)	p	β	(SE)	p	p > F			
Inputs into primary-school-teacher quantity and quality																	
% of primary-only schools with more than one teacher	0.131	(0.090)		−0.003	(0.003)			0.144	(0.082)		−0.002	(0.001)	†		0.12	0.11	8.91
% of primary-only schools with at least one female teacher	−0.281	(0.089)	*	0.006	(0.002)	*	†	0.117	(0.051)	†	−0.001	(0.001)			0.17	0.16	7.99
% of para-teachers in primary-only schools who are female	0.372	(0.360)		−0.005	(0.011)			0.450	(0.084)	***	−0.005	(0.001)	***	**	0.13	0.10	21.36
% of teachers in primary-only schools who are regular or permanent teachers	0.325	(0.214)		−0.003	(0.004)		†	−0.051	(0.069)		0.001	(0.001)			0.21	0.18	12.43
% of teachers in primary-only schools with at least secondary school qualifications	−0.018	(0.050)		−0.001	(0.001)		†	0.019	(0.016)		−0.000	(0.000)		†	0.28	0.27	3.95
% of teachers in primary-only schools with in-service training	0.328	(0.372)		−0.005	(0.009)			0.256	(0.261)		−0.003	(0.003)			0.14	0.13	9.71
% of female teachers in primary-only schools with in-service training	−0.387	(0.119)	*	0.007	(0.003)	*	†	0.192	(0.076)	*	−0.003	(0.001)	†		0.36	0.34	5.65
% of teachers in primary-only schools with graduate qualifications	−0.090	(0.170)		0.002	(0.004)			0.120	(0.130)		−0.000	(0.001)	†		0.16	0.15	7.72
Number of teachers per 100 pupils in primary-only schools	−0.019	(0.025)		0.000	(0.000)	***		−0.024	(0.009)	*	0.000	(0.000)	†		0.26	0.25	4.79

Table 4 continued

	% general (non-SC/ST) SLA seats held by women						% reserved (SC/ST) SLA seats held by women						R^2_F (full)[3]	R^2_R (restrict)[4]	% of R^2_F accounted for by WPR
	Linear			Quadratic			Linear			Quadratic					
	β	(SE)	p	β	(SE)	$p > F$	β	(SE)	p	β	(SE)	$p > F$			
Principal Component 2—Teacher quantity and quality in primary-only schools[b]	0.002	(0.018)		0.000	(0.000)		0.015	(0.007)	†	−0.000	(0.000)		0.46	0.46	0.00

Robust standard errors, adjusting for regional clustering, are in parentheses. *SCST* Scheduled Caste/Scheduled Tribe, *SLA* State Legislative Assembly. All estimates from the full (adjusted) models include controls for the percentage of the district's: population living in urban areas, decennial growth rate, rate of literacy among females aged 7 years or older, percentage of the population

Scheduled Caste or Scheduled Tribe (SC/ST), and female-to-male ratio of children 0–6 years. All estimates in restricted models include only the control variables in full models

† $p \leq 0.10$, * $p \leq 0.05$, ** $p \leq 0.01$, *** $p \leq 0.001$

[a] See foonote 2 of Table 1 for the subset of indicators included in Principal Component 1

[b] See foonote 3 of Table 1 for the subset of indicators included in Principal Component 2

[c] Full model: Both WPR and control variables

[d] Restricted model: Only control variables

specifically with the percentage of primary-only schools with: a common toilet, a kitchen, more than one teacher, and at least one woman teacher; the PC score for primary-school amenities; the percentage of teachers with at least secondary-school qualification and with graduate qualifications; and the PC score for teacher quantity and quality. Unexpectedly, women's representation in reserved SLA seats was at least marginally negatively associated with three inputs: the percentage of government schools established since 2003, the number of classrooms per 100 pupils, and the number of teachers per 100 pupils.

Thus, we find that women's representation in reserved SC/ST seats had associations at $p \leq 0.10$ with 14 of 22 measures of primary-school amenities and teacher quantity/quality; out of these 14 associations, 11 were positive, with positive associations being somewhat smaller at higher levels of women's representation in reserved seats. We can conclude that women's representation in reserved SLA seats was generally positively associated with primary-school amenities and teacher quantity/quality.

5.3 Summary of Multivariate Results for the Control Variables

Several control variables also were associated, in the expected directions, with investments in primary schooling (available on request). The percentage of the district population that was urban was positively associated with three primary school amenities (percentage of schools with classrooms in good condition, girls' toilet, and a kitchen), the PC score for school amenities, and two measures of teacher quantity and quality (percentages of teachers with in-service training and with graduate qualifications). The decennial growth rate was negatively associated with two primary-school amenities and teacher quantity and quality (percentage of schools with classrooms in good condition, PC score for primary-school amenities, and percentage of teachers with secondary-school qualifications and with in-service training) but was positively associated with the percentage of primary schools with pre-primary programs. Women's literacy rate was positively associated with one primary-school amenity (classrooms per 100 pupils) and five measures of teacher quality and quantity (percentage of teachers and para-teachers who were women, percentage of permanent teachers, teachers per 100 pupils, and PC score for teacher quality and quantity). Women's literacy rate was negatively associated with percentage of government schools established since 2003. The percentage of the district population that was SC/ST was negatively associated with the percentage of classrooms in good condition and with three measures of teacher quantity and quality (percentage of schools with more than one teacher; and percentage of teachers with more than secondary/graduate qualifications; number of teachers per 100 pupils in primary-only schools); yet, the percentage of the district population that was SC/ST was positively associated with the numbers of classrooms and teachers per 100 pupils. Finally, the sex ratio of the 0–6 year-old population was negatively associated with four primary-school amenities (percentage of schools with a cement building, classrooms in good condition, girls' toilet, and the PC score for school amenities).

5.4 Predicted Scores for Investments in Primary Schooling and Women's Political Representation

Based on the adjusted models in Table 4, Fig. 1 presents the predicted PC scores for primary-school amenities and teacher quality and quantity at levels of women's representation in general seats and in reserved SLA seats ranging from 0 to 35 %, holding all covariates at their means. These figures show negative or negligible associations of these
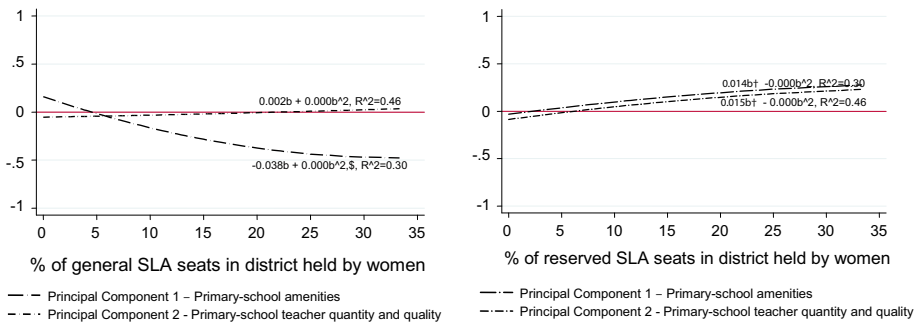
Fig. 1 Direction of associations between percentages of general and reserved State Legislative Assembly Seats Held by Women and Predicted Principal Components for Inputs to Primary Schooling, 316 districts in India. *Note*: $^{\dagger}p \leq 0.10$, $*p \leq 0.05$, $**p \leq 0.01$, $***p \leq 0.001$. $ The null hypothesis of no joint significance, H_0: $b = b^2 = 0$, is rejected at $p \leq 0.01$

scores with women's representation in general seats. They also show generally positive associations of these scores with women's representation in reserved seats.

5.5 Comparison Between Northern and Southern India

Table 5 presents multivariate results stratified by Northern (= 233) and Southern (= 83) districts in India.[13] Following Dyson and Moore (1983), we considered as Northern India the regions of North, Northeast, East and Central in the country; we considered the South region as Southern India. As for the West region, we considered Gujarat as Northern India, and Maharashtra and Goa as Southern India. The *p*-values shown in the top panel indicate the significance of the differences in estimated coefficients for each measure of women's political representation across the models estimated for Northern and Southern districts. In almost all cases, the coefficients for women's representation in general seats do not differ across Northern and Southern districts. Thus, the often negative associations of women's representation in general seats with investments in primary schooling appear to be a common pattern across the broad regions of India that historically have had distinctive environments of activism with regard to the concerns of women and lower-castes. By contrast, 11 coefficients for women's representation in reserved seats differ statistically across Northern and Southern districts. Nine of these differences pertain to the positive coefficients, and in six cases, the positive coefficients are larger in magnitude in the Southern districts. Although this pattern of difference is not large, it is suggestive that women's representation in SC/ST seats may be associated with more investments in schooling in the Southern region of India that historically has been characterized by greater activism and social reform in the interests of women and the lower castes.

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[13] Northern districts in India were those, which belonged to the states of Arunachal Pradesh, Assam, Bihar, Delhi, Gujarat, Haryana, Himachal Pradesh, Jammu & Kashmir, Madhya Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Orissa, Punjab, Rajasthan, Sikkim, Tripura, Uttar Pradesh, and West Bengal. Southern districts were those, which belonged to the states of Andhra Pradesh, Goa, Karnataka, Kerala, Maharashtra, Pondicherry, and Tamil Nadu.

Table 5 Estimates for adjusted spatial regressions of district-level investments into primary schooling on women's political representation (WPR), N = 316 district composites by REGION in India

| | % general (non-SC/ST) SLA seats held by women | | | | | | % reserved (SC/ST) SLA seats held by women | | | | | | R_F^2 (full)[b] | R_R^2 (restrict)[c] | % R_F^2 accounted for by WPR |
| | Linear | | | Quadratic | | | Linear | | | Quadratic | | | | | |
	β	(SE)	P(β$_S$ = β$_N$)[a]	β	(SE)	P(β$_S$ = β$_N$)	β	(SE)	P(β$_S$ = β$_N$)	β	(SE)	P(β$_S$ = β$_N$)			
South India (n = 83)															
Inputs into primary-school amenities															
% of government schools established since 2003	−0.137	(0.156)		−0.002	(0.006)		−0.067	(0.034)		0.000	(0.001)		0.31	0.23	26.69
% of primary-only schools with a building	0.060	(0.123)		−0.001	(0.005)		0.008	(0.036)	*	0.000	(0.001)	*	0.09	0.09	0.70
% of primary-only schools with *pucca* or cement building	−1.372	(0.003)	*	0.080	(0.006)	*	−0.464	(0.199)	*	0.002	(0.003)	†	0.37	0.29	21.07
% of primary-only schools with more than one classroom	−0.138	(0.264)	†	0.005	(0.008)		0.114	(0.143)		−0.002	(0.003)		0.44	0.43	2.37
% of primary-only schools with classrooms in good condition or not needing repair	−0.416	(0.063)		0.015	(0.002)		0.173	(0.013)	*	−0.004	(0.001)	†	0.43	0.34	21.71
% of primary-only schools with drinking water	0.327	(0.155)		−0.018	(0.005)		0.607	(0.120)		−0.009	(0.002)		0.39	0.29	27.05

Table 5 continued

| | % general (non-SC/ST) SLA seats held by women | | | | | | % reserved (SC/ST) SLA seats held by women | | | | | | | R_F^2 (full)[b] | R_R^2 (restrict)[c] | % R_F^2 accounted for by WPR |
| | Linear | | | Quadratic | | | Linear | | | Quadratic | | | | | | |
	β	(SE)	$P(\beta_S = \beta_N)$[a]	β	(SE)	$P(\beta_S = \beta_N)$ $p > F$	β	(SE)	$P(\beta_S = \beta_N)$	β	(SE)	$P(\beta_S = \beta_N)$	$p > F$			
% of primary-only schools with a common toilet	−0.152	(0.737)		0.014	(0.028)		0.144	(0.060)		−0.002	(0.000)			0.41	0.40	3.36
% of primary-only schools with a girls' toilet	−0.856	(0.167)		0.050	(0.006)		0.176	(0.023)		−0.003	(0.001)		†	0.62	0.59	3.97
% of primary-only schools with a kitchen	−0.559	(0.268)		0.022	(0.006)		0.883	(0.187)	†	−0.011	(0.003)	*		0.28	0.19	34.35
% of primary-only schools with pre-primary programs	−0.825	(0.057)	*	0.027	(0.001)		−0.273	(0.043)		0.000	(0.001)		†	0.47	0.39	18.77
Number of classrooms per 100 pupils in primary-only schools	−0.067	(0.040)		0.003	(0.002)	†	0.001	(0.006)	**	0.000	(0.000)	***		0.19	0.13	29.22
Principal Component 1—Primary-school amenities[d]	−0.035	(0.010)		0.002	(0.000)		0.030	(0.001)		0.000	(0.000)	*		0.58	0.48	17.19
Inputs into primary-school-teacher quantity and quality																
% of primary-only schools with more than one teacher	0.247	(0.091)		−0.008	(0.006)		0.062	(0.056)		0.000	(0.001)			0.27	0.25	9.73

Table 5 continued

	% general (non-SC/ST) SLA seats held by women						% reserved (SC/ST) SLA seats held by women						R_F^2 (full)[b]	R_R^2 (restrict)[c]	% R_F^2 accounted for by WPR
	Linear			Quadratic			Linear			Quadratic					
	β	(SE)	P(β_S = β_N)[a]	β	(SE)	P(β_S = β_N) p > F	β	(SE)	P(β_S = β_N)	β	(SE)	P(β_S = β_N) p > F			
% of primary-only schools with at least one female teacher	−0.382	(0.003)		0.010	(0.002)	**	0.128	(0.103)		−0.001	(0.001)		0.59	0.58	2.30
% of para-teachers in primary-only schools who are female	1.125	(0.266)		−0.037	(0.006)	*	0.877	(0.195)	*	−0.010	(0.003)		0.20	0.14	29.22
% of teachers in primary-only schools who are regular or permanent teachers	−0.305	(0.118)		0.011	(0.004)		−0.030	(0.014)	**	0.000	(0.000)	**	0.42	0.39	6.93
% of teachers in primary-only schools with at least secondary school qualifications	−0.039	(0.009)		0.002	(0.000)		−0.023	(0.010)	**	0.000	(0.000)	*	0.40	0.37	8.50
% of teachers in primary-only schools with in-service training	0.766	(0.124)		−0.028	(0.003)	†	0.810	(0.328)		−0.010	(0.005)		0.44	0.36	17.78

Table 5 continued

	% general (non-SC/ST) SLA seats held by women						% reserved (SC/ST) SLA seats held by women						R^2_F (full)[b]	R^2_R (restrict)[c]	% R^2_F accounted for by WPR
	Linear			Quadratic			Linear			Quadratic					
	β	(SE)	P(βS = βN)[a]	β	(SE)	P(βS = βN) p > F	β	(SE)	P(βS = βN)	β	(SE)	P(βS = βN) p > F			
% of female teachers in primary-only schools with in-service training	−0.368	(0.081)		0.010	(0.006)		0.486	(0.161)	*	−0.007	(0.002)	*	0.64	0.60	5.69
% of teachers in primary-only schools with graduate qualifications	0.918	(0.018)		−0.043	(0.002)	*	0.402	(0.172)	*	−0.004	(0.003)	*	0.32	0.27	15.73
Number of teachers per 100 pupils in primary-only schools	−0.053	(0.022)		0.003	(0.001)		−0.009	(0.004)	*	0.000	(0.000)	†	0.22	0.19	15.79
Principal Component 2—Teacher quantity and quality in primary-only schools[e]	−0.004	(0.009)		0.000	(0.000)		0.043	(0.014)	***	−0.001	(0.000)	***	0.56	0.53	5.43
North India (n = 233)															
Inputs into primary-school amenities															
% of government schools established since 2003	0.020	(0.267)		−0.003	(0.006)		−0.102	(0.077)		0.001	(0.001)		0.17	0.16	5.11
% of primary-only schools with a building	−0.375	(0.099)		0.006	(0.002)	*	0.024	(0.053)	*	0.000	(0.001)	*	0.24	0.20	14.84

Table 5 continued

	% general (non-SC/ST) SLA seats held by women						% reserved (SC/ST) SLA seats held by women						R_F^2 (full)[b]	R_R^2 (restrict)[c]	% R_F^2 accounted for by WPR
	Linear			Quadratic			Linear			Quadratic					
	β	(SE)	$P(\beta_S = \beta_N)$[a]	β	(SE)	$P(\beta_S = \beta_N) = p > F$	β	(SE)	$P(\beta_S = \beta_N)$	β	(SE)	$P(\beta_S = \beta_N) = p > F$			
% of primary-only schools with *pacca* or cement building	−0.722	(0.379)		0.014	(0.010)	**	0.023	(0.130)	*	0.000	(0.002)	†	0.45	0.43	3.75
% of primary-only schools with more than one classroom	−0.096	(0.110)		0.000	(0.002)		−0.069	(0.105)		0.001	(0.001)		0.07	0.06	9.76
% of primary-only schools with classrooms in *good condition* or not needing repair	−0.348	(0.346)		0.004	(0.008)	***	−0.135	(0.135)		0.001	(0.001)	†	0.41	0.39	3.95
% of primary-only schools with drinking water	−0.339	(0.223)		0.003	(0.004)		0.152	(0.086)		−0.001	(0.001)		0.20	0.17	16.38
% of primary-only schools with a common toilet	−0.432	(0.272)		0.008	(0.003)	†	0.324	(0.206)		−0.004	(0.002)	*	0.11	0.09	12.35
% of primary-only schools with a girls' toilet	−0.445	(0.432)		0.004	(0.008)	*	0.262	(0.264)		−0.003	(0.004)		0.31	0.29	5.06
% of primary-only schools with a kitchen	−0.258	(0.459)		0.002	(0.008)		0.241	(0.154)	†	−0.002	(0.001)	*	0.08	0.06	16.93

Table 5 continued

| | % general (non-SC/ST) SLA seats held by women | | | | | | % reserved (SC/ST) SLA seats held by women | | | | | | R_F^2 (full)[b] | R_R^2 (restrict)[c] | % R_F^2 accounted for by WPR |
| | Linear | | | Quadratic | | | Linear | | | Quadratic | | | | | |
	β	(SE)	P(β$_S$ = β$_N$)[a]	β	(SE)	P(β$_S$ = β$_N$) p > F	β	(SE)	P(β$_S$ = β$_N$)	β	(SE)	P(β$_S$ = β$_N$) p > F			
% of primary-only schools with pre-primary programs	−0.856	(0.175)		0.017	(0.002)	***	0.208	(0.194)		−0.003	(0.002)		0.22	0.20	11.25
Number of classrooms per 100 pupils in primary-only schools	−0.044	(0.027)		0.000	(0.000)	†	−0.038	(0.019)	**	0.000	(0.000)	***	0.35	0.33	7.83
Principal Component 1—Primary-school amenities[d]	−0.038	(0.039)		0.001	(0.001)		0.015	(0.009)		0.000	(0.000)		0.32	0.30	4.99
Inputs into primary-school-teacher quantity and quality															
% of primary-only schools with more than one teacher	0.093	(0.108)		−0.002	(0.003)		0.189	(0.083)		−0.002	(0.001)	*	0.10	0.09	11.80
% of primary-only schools with at least one female teacher	−0.156	(0.089)		0.004	(0.003)		0.107	(0.056)		−0.002	(0.001)		0.14	0.13	7.66
% of para-teachers in primary-only schools who are female	0.333	(0.410)		−0.004	(0.013)	*	0.353	(0.061)	*	−0.004	(0.001)	*	0.10	0.07	28.44
% of teachers in primary-only schools who are regular or permanent teachers	0.587	(0.329)		−0.007	(0.006)	*	−0.015	(0.109)	**	0.001	(0.001)	**	0.17	0.12	33.49

Table 5 continued

| | % general (non-SC/ST) SLA seats held by women | | | | | | % reserved (SC/ST) SLA seats held by women | | | | | | R_F^2 (full)[b] | R_R^2 (restrict)[c] | % R_F^2 accounted for by WPR |
| | Linear | | | Quadratic | | | Linear | | | Quadratic | | | | | |
	β	(SE)	P(βs = βN)[a]	β	(SE)	P(βs = βN)	β	(SE)	P(βs = βN)	β	(SE)	P(βs = βN) p > F			
% of teachers in primary-only schools with at least secondary school qualifications	−0.008	(0.049)		−0.001	(0.001)		0.030	(0.024) **		0.000	(0.000) *	†	0.26	0.25	4.18
% of teachers in primary-only schools with in-service training	0.147	(0.452)		−0.003	(0.010)		0.022	(0.299)		−0.001	(0.004)		0.12	0.12	3.41
% of female teachers in primary-only schools with in-service training	−0.216	(0.125)		0.004	(0.004)		0.137	(0.069) *		−0.002	(0.001) *		0.21	0.20	8.21
% of teachers in primary-only schools with graduate qualifications	−0.296	(0.262)		0.005	(0.006)		−0.048	(0.115) *		0.001	(0.001) *		0.27	0.25	8.31
Number of teachers per 100 pupils in primary-only schools	−0.031	(0.039)		0.000	(0.001)		−0.034	(0.012) *		0.000	(0.000) †		0.29	0.28	6.28

Table 5 continued

	% general (non-SC/ST) SLA seats held by women						% reserved (SC/ST) SLA seats held by women						R^2_F (full)[b]	R^2_R (restrict)[c]	% R^2_F accounted for by WPR
	Linear			Quadratic			Linear			Quadratic					
	β	(SE)	$P(\beta_S = \beta_N)$[a]	β	(SE)	$P(\beta_S = \beta_N)$ $p > F$	β	(SE)	$P(\beta_S = \beta_N)$	β	(SE)	$P(\beta_S = \beta_N)$ $p > F$			
Principal Component 2—Teacher quantity and quality in primary-only schools[e]	0.018	(0.023)		0.000	(0.001)		0.008	(0.006) ***		0.000	(0.000) ***		0.32	0.31	2.42

Robust standard errors, adjusting for regional clustering, are in parentheses. *SCST* Scheduled Caste/Scheduled Tribe, *SLA* State Legislative Assembly. All estimates from the full (adjusted) models include controls for the percentage of the district's: population living in urban areas, decennial growth rate, rate of literacy among females aged 7 years or older, percentage of the population Scheduled Caste or Scheduled Tribe (SC/ST), and female-to-male ratio of children 0–6 years. All estimates in restricted models include only the control variables in full models

† $p \leq 0.10$; * $p \leq 0.05$; ** $p \leq 0.01$; *** $p \leq 0.001$

^{a} Significance of difference in coefficients for variables in South versus North India

^{b} Full model: Both WPR and control variables

^{c} Restricted model: Only control variables

^{d} See foonote b of Table 1 for the subset of indicators included in Principal Component 1

^{e} See foonote c of Table 1 for the subset of indicators included in Principal Component 2

6 Discussion and Conclusion

In this analysis, we have assessed whether and how women's district-level representation in SLAs is associated with investments in primary schooling in India. This work makes several contributions. First, we address a gap in the international literature on women's political representation (Paxton et al. 2007). Second, we address persistent questions in feminist theory about the influences of intersecting gender and caste identities on redistributive policies aimed at aiding children (Frederick 2010; Paxton et al. 2007). The "double" burden of disadvantage among low-caste women in India (Deshpande 2007) and the implications of this experience for their interests in redistributive policy have not been extensively studied (see also Hancock 2007). Third, this work fills gaps in the literature on women's empowerment and child well-being in South Asia, which either has focused on women's micro-level social and economic empowerment or has shown mixed results with respect to women's representation and redistributive policies in India (Chattopadhyay and Duflo 2004; Clots-Figueras 2007, 2011; Pal and Ghosh 2008). Fourth, our use of comprehensive district-level data on inputs to primary schooling available for the 2007/8 school year and on prior (2000–2004) SLA elections from all but one state in India extends prior analyses, which have focused on women's representation in SLAs in selected states and on selected investments in schooling (Clots-Figueras 2007, 2011). Lastly, this research is timely, given extended and recent debates in India's parliament about the reservation of seats for women in central and state governments (see Clots-Figueras 2011).

In line with our hypotheses, the representation of women in SLA seats reserved for scheduled caste and schedule tribe representatives was significantly and positively associated with several investments in primary schooling amenities and teacher quantity and quality. Of these positive associations, two notable ones were those between women's representation in reserved seats and school amenities that help to meet poor children's basic needs–drinking fountains and kitchens. These findings corroborate and extend findings from selected regions of India, which have shown that SC/ST state legislators have favored capital investments in basic aspects of lower-level schooling as well as increased revenue expenditures on water supply (Clots-Figueras 2007).

The general pattern of positive associations between SC/ST women's representation and redistributive, pro-woman-and-child policies may have other, competing explanations. Namely, the political resources that translate interests into action may be unequally distributed among politicians, relegating SC/ST women to so-called feminine issues (Diamond 1977). *Inequality regime* describes the practices and processes that maintain race, ethnic, class, caste, and gender disparities in power and control over goals, resources, and outcomes among participants within organizations (Acker 2006). The gendered distributions of political resources in Argentinean, Colombian, and Costa Rican legislatures have demonstrated this point (Schwindt-Bayer 2006). On the one hand, women legislators in these countries have prioritized and initiated more bills concerning women, children, and families than concerning agriculture. On the other hand, gender gaps are small in legislators' attitudes on education, health, and the economy, but men legislators more often initiate bills in these areas. Schwindt-Bayer (2006) attributes this discrepancy to gender gaps in committee membership. Thus, SC/ST women's apparent "success" in championing investments in primary schooling may reflect their marginalization in other legislative arenas, precluding them from translating all of their interests into action. Qualitative research with SC/ST and non-SC/ST men and women legislators could help to unpack the existence, nature, and extent of inequity in the distribution of political resources among them and the influences of these inequities on the policies they can affect.

Several negative coefficients for the quadratic term for women's representation in reserved seats suggest that the interpretations require nuance. Namely, the *positive* relationship of women's representation in reserved seats with (selected) schooling inputs is somewhat *lower* at *higher* levels of their representation. As SC/ST women legislators gain representation, their growing presence may threaten the gender-caste status quo in SLAs, causing a backlash that inhibits the pursuit of their political priorities. Alternatively, as SC/ST women gain representation (at these lower levels), they may begin to think and act more like their other colleagues. Longitudinal follow-up of SC/ST men and women legislators would help to discern the merits of these explanations.

Finally, there is modest evidence of positive associations of women's representation in reserved seats with selected schooling inputs in South India. These findings provide some support for the idea that low-caste women politicians have more capacity to enact redistributive educational policies in the regions with a stronger and longer-standing political culture of activism and social reform to redress historical disadvantages of women and lower-castes. Thus, a broader culture favoring redistribution may enable low-caste women politicians to implement their political interests.

As expected, women's representation in general SLA seats is *negatively* associated with several investments in primary-school amenities and teacher quality and quantity. Yet, at higher levels of women's representation in these seats, this negative association is smaller, as reflected in several positive coefficients for the quadratic term for women's representation in general seats. One reading of this pattern is that, at the lowest levels of representation in general seats (e.g., from 0 to 35 %, as in Fig. 1), women align to their privileged caste interests and so invest even less in public primary schooling; yet, as women's representation in general seats increases, their interests may shift to align more with women and children, and they become more willing (or less unwilling) to invest in public primary schooling. The absence of significant differences in these patterns across North and South India suggests that the broader culture of social activism may not influence the political interests and decisions of elite women politicians. Longitudinal follow-up of non-SC/ST men and women representatives would help to assess the merits of this explanation.

Together, our findings suggest, at a minimum, that the dynamics and implications for redistributive educational policies may differ for high- and low-caste women legislators in India. This difference may adhere *despite* the fact that high- and low-caste women's representation in India's SLAs was low, on average, with 6 % of general seats and 9 % of reserved seats held by women. Despite low representation, women legislators, of general and SC/ST backgrounds alike, can convince their male colleagues to introduce in the SLAs proposals on redistributive policies to be voted on by the legislatures or to vote affirmatively on the ones introduced by women legislators. For instance, in the Orissa Legislative Assembly, women legislators convinced their men counterparts of their ideas as well as introduced proposals to be voted on in the legislature (Mishra 2000).

Still, women's representation beyond 35 percent remains rare, especially for general seats in the SLAs in India. An important area for future research is to explore the implications for redistributive, pro-woman-and-child policies of "critical mass" of SC/ST and non-SC/ST women legislators on redistributive, pro-woman-and-child policies. When women politicians are a small minority, they may lack the collective power to pursue their political interests; yet, when women comprise a critical mass, of say 15–30 %, they may be able to translate their interests into policy (Paxton et al. 2007). Findings from the Indian states of West Bengal and Rajasthan corroborate a critical mass theory of women's political representation. Namely, Village Councils in which 30 % of seats were randomly

reserved for women showed differences in the policy interests of men and women members and a greater tendency for women to implement their preference to invest in drinking water (Chattopadhyay and Duflo 2004). Yet, collectively, the evidence is thin that reaching a critical mass matters, and in some wealthier settings, women's increasing representation has provoked hostility and discriminatory backlash (Paxton et al. 2007). Currently, women's low average numeric representation in Indian districts precludes a thorough analysis of critical mass theory. As women's political representation increases, this theory should be fully explored.

Future research also might explore other identities among women state legislators to further differentiate political support for redistributive policies. Our focus on the gender and caste identities of state legislators stemmed from assertions by Indian scholars that low-caste women have experienced unique forms of oppression (Deshpande 2007; Mehrotra 2006), and so their political empowerment may give voice to distinct political interests that align with redistributive investments in education better than do the interests of higher-caste women. To undertake a more refined inter-categorical, comparative analysis (McCall 2005), we would need more detailed information on group identity. For instance, the ECI does not contain information on the candidate's religion. Religion might be inferred from a candidate's family name, but this method of assignment would produce errors, and so other data sources would be required. Finally, an Indian politician's party affiliation may be correlated with his or her caste identity. Research on the influence of other identities would enhance our understanding of the heterogeneity of women's political interests.

This analysis is cross-sectional, but does take advantage of appropriate temporality between covariates and outcomes. This paper lays the foundation for future research and contributes evidence to debates about the role of reservations for disadvantaged groups. At least at the lower levels of representation, SC/ST women may foster investments in the amenities of schools that address the basic needs especially of poor children. Yet, the benefits of reservations may differ between policies, with the representation of SC/ST women potentially investing only in some domains. Such variation is likely for other redistributive policies and it will be important to understand the outcomes and contexts in which gender-by-caste reservations are "net" welfare enhancing for women, children, and girls.

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