Women's Political Empowerment and Primary Schooling in India

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Abstract

Background: In the last half century, levels of literacy and primary schooling have increased markedly in India, but large gender gaps in primary schooling persist. Scholars have argued that gender gaps in human resources are not simply phenomena of poverty. Understanding the causes of such disparities in South Asia is among the more pressing questions for research on gender and development. **Objectives**: Our analysis builds on development and feminist theories of women's political empowerment to estimate, at the district level, the associations of women's *representation* in State Legislative Assemblies (SLAs) and *voting participation* in these elections inputs into primary schooling and the primary schooling outcomes of boys and girls. **Sample**: The unit of analysis for this study is the district, which permits estimation of the effects of women's political empowerment in the smallest possible area where electoral constituencies are located. The district also is the most germane *operational* level at which to study school policies and inputs. We created a complete national panel of 307 districts with unchanged territorial boundaries since the last political delimitation in 1985, permitting the linkage of three time-series data sources. **Data**: Our sources of data for this study were the District Information Survey for Education (**DISE**, 2007/8), the Election Commission of India (**ECI**, 2002–2006), and the 2001 India Census (**IC,** available in the DISE). The **DISE** provides rich district-level data on inputs into schooling and children's schooling outcomes for recognized schools that impart primary education in all districts in all States and Union Territories. The **ECI** reports on the results of all elections since 1951 to the Lower House of Parliament and SLAs, including constituency-level information on the contestants' backgrounds and votes won, as well as counts of all electors and voters overall and by gender. The latter information was aggregated into a national panel of 307 districts, and then matched to similarly created geographic areas in the **DISE**. **Method**: After exploratory data analysis (EDA), principle components analysis (PCA) was used to create component scores that represented the indicators for schooling inputs and outcomes. EDA and PCA were conducted using STATA 11. We then examined the influence of measures for women's political empowerment on inputs into schooling and on children's primary schooling outcomes. **Results:** XXX **Implications**: These analyses inform development and feminist theories of the pathways by which women's political empowerment may influence the primary schooling outcomes of children, and especially girls. These analyses also inform contemporary debates in India about the representation of women in state governments, where the primary responsibility for educational policies and expenditures lies. Finally, this analysis helps to answer persistent questions about the causes of gender gaps in human resources in India and South Asia, where variation in such gaps can exceed that across the world's nations.

Differences in gender disparity among Indian states…are typically greater than those among the world's nations (Filmer, King, & Pritchett, 1998).

An apt example of this argument is the variation in gender gaps in primary schooling in India. Levels of literacy and primary schooling have increased markedly in the last half century (IIPS & ORC Macro, 2007; Kingdon, 2007), but large gender gaps in primary schooling persist. Selected northern states retain the largest gender gap in attendance (15%–24%), and some gender gap is evident in all but five states (IIPS & ORC Macro, 2007). The gap in schooling attainment also is pronounced, with boys attaining a median of 5 grades in 14 states and girls attaining fewer grades in all but three states. In six of the poorest and most populous states of the North and East, women do not complete a single grade of schooling (IIPS & ORC Macro, 2007). In fact, the deficit in girls' current primary enrollment in India is larger than that in a wide range of poorer countries around the world (Filmer, 2008).

Such gender gaps in human resources do not result from poverty alone (Filmer et al., 1998; Filmer, 2008), and understanding their causes is among the more pressing questions for research on gender and development (Filmer et al., 1998). Here, we explore, using a national district panel, the influences of *women's political empowerment* on the primary-school outcomes of girls and boys in India, directly and indirectly through inputs into primary schooling.

Our analysis builds on feminist theories of women's political empowerment (Phillips, 1995, 1998), which posit that men and women have distinct political interests arising from distinct life histories and identities. As such, women's participation in politics may be needed to enact the policies that most benefit women. Our analysis also builds on evidence from parts of India, showing differences in the policy preferences of men and women *village* council members and a tendency for village councils with greater female representation to realize policies that promote women's interests (Chattopadhyay & Duflo, 2004).

Our analysis extends this literature in four ways. First, we focus on women's participation in elections to India's *State Legislative Assemblies* (SLA). This focus is crafted to inform political debates about proposed, but not ratified, amendments to the Indian constitution to reserve a portion of State and Parliamentary seats for women. Second, we include multiple measures of women's political participation, including their *contestation* for SLA seats, *voting participation* in SLA elections, and their actual *representation* in SLAs, which are publicly available from India's Election Commission (**ECI**). Third, we capitalize on a rich national time-series dataset on inputs into schooling and primary schooling outcomes, newly available from India's District Information Survey on Education (**DISE**). Lastly, our linkage of these sources into a district panel creates a uniquely rich archive for this and future analyses.

Conceptual Framework

Fig 1 depicts our conceptual framework, which we operationalize at the district level. First, we expect that increases in women's political empowerment (WPE) will be associated with increases in the quantity and quality of schooling (H1). Second, the increases in schooling inputs will be associated with improved participation, performance, and completion in primary school, especially for girls. Thus, women's political empowerment will operate indirectly on children's primary schooling outcomes through inputs into schooling (H2). Lastly, women's political empowerment will be directly, positively associated with primary-school participation, performance, and completion, especially for girls (H3).

Before clarifying the theoretical basis for these pathways, a definition of *women's political empowerment* is needed. The term refers to the *process by which women acquire and enact the ability to influence policy decisions that enhance human well-being, especially of women* (e.g., Kabeer, 2001; Malhotra & Schuler,

2005; Moghadam, 2005; Phillips, 1995, 1998). Inherent in this definition are four basic elements. First, women's political empowerment is a *process of change*. Second, women themselves are *agents* in this process, in that they are able "to formulate strategic choices and to control resources and decisions that affect important life outcomes" (Malhotra & Schuler, 2005, p. 73). Third, women's political empowerment includes both "top-down changes in institutions," such as increases in women's political representation, as well as "bottom-up changes in people's organizations, networks, and assets," such as proportional increases in the voting female electorate (Narayon, 2005, p. 6). Lastly, the membership of politically empowered women in other social groups may shape their political interests, and ultimately, their policy decisions (Phillips, 1995, 1998). With this definition of women's political empowerment, we discuss the underlying theory that predicts its pathways of influence on primary schooling.

Influence of Women's Political Empowerment through Educational Policies and Inputs

The literature reveals considerable debate about the influence of women politicians on development policy. Scholars have disagreed, specifically, about the extent to which women politicians promote women's interests (Malhotra & Schuler, 2005; Opello, 2006; Wängnerud, 2002). At its core, this debate centers on two questions: first, to what extent does the *gendered identity* of women political actors influence their political interests and decisions, and second, to what extent is a *critical mass* of women political actors needed for them to articulate and translate their interests into policy (e.g., Opello, 2006)?

Feminist theorist Anne Phillips (1995, 1998) has argued that liberal democracies have focused on the representation of *ideas*, with little regard for the *identities* of the representatives. Yet, she argues that women bring, in comparison to men, different values, life experiences, and expertise to politics. As a result, women may have distinct political interests. Indeed, in the U.S. and Western Europe, the policy preferences of women and men are found to differ, with women more likely to support liberal policies, such as spending on child care and other child-related issues (e.g., Lott & Kenny, 1999; Edlund & Pande, 2001; Edlund, Haider & Pande, 2005). Evidence from household surveys, moreover, reveals that income or assets in the hands of women tends to raise household spending on education, nutrition, and health (e.g., Lundberg, Pollak, & Wales, 1997; Thomas, 1990, 1997; Duflo, 2003). Thus, women's representation in political institutions may be critical for the promotion of women's and children's interests in development policies.

That said, evidence from India is mixed on the role of women's representation in SLAs. A state-level panel for 1960–92 showed no associations between public development, non-development, and education spending on the one hand and the proportion of women in the ruling party out of seats won by the ruling government on the other (Pal & Ghosh, 2008). Yet, panel data at the district level has shown important differences in the policy preferences of male and female State Legislators (Clots-Figueras, 2005), with the political interests of *general* women legislators in India differing from women legislators in the U.S. Namely, general women legislators in India have no impact on "women-friendly" laws, favor pro-rich expenditures, oppose redistributive policies such as land reforms, invest in high tiers of education, and reduce social expenditures (Clots-Figueras, 2005).

Such evidence suggests two qualifications to our argument. First, the *concentration* of women political actors may matter for the translation of their political interests into policies. This qualification also stems from conflicting evidence in wealthier settings, showing that some women leaders promote women's interests while others do not (Opello, 2006). Such findings have led scholars to explore the institutional conditions that may help or hinder the agenda-setting and policy-making of women politicians. Namely, when such women represent a small minority, they may be considered a "token" group, and so would be unlikely to pursue their political interests. Yet, if such women comprise a *critical mass*, they may be more able to translate their interests into policy

(Opello, 2006). Findings from policy experiments in the Indian states of West Bengal and Rajasthan support a *critical mass* theory of women's political representation. Namely, Village Councils in which 30% of seats were randomly reserved for women have shown differences in the policy preferences of male and female members and a greater tendency to implement the latter's preferences to invest in drinking water (Chattopadhyay & Duflo, 2004).

A second qualification to our basic argument is that "women's political interests" may be heterogeneous, varying by their ethnic, religious, class, or caste identities (Phillips, 1995, 1998). Related evidence from India is mixed, however. District-level panel analyses show that, unlike *general* women SLA legislators, those from scheduled castes or tribes have favored capital investments in irrigation and lower-level schooling as well as increased revenue expenditure on water supply (Clots-Figueras, 2007). The latter also have favored "women-friendly" laws, such as amendments to the Hindu Succession Act, proposed to give women the same inheritance rights as men (Clots-Figueras, 2007). Yet, the evidence from village-level policy-experiments in West Bengal and Rajasthan is contradictory. Namely, the male-female differences in policy preferences and decisions observed between all Village Councils with and without 30% reservation for women are similar to the differences observed among scheduled-caste-or-tribe Village Councils with and without 30% reservation for women (Chattopadhyay & Duflo, 2004). Thus, any effects of the joint identities of women politicians require further investigation.

Here, we extend the foregoing analyses in several ways. First, we focus on the district-level representation of women in India's SLAs. This decision is motivated by the facts that constitutional amendments reserve Parliamentary (*Lok Sabha*) and SLA seats for Scheduled Castes or Tribes, and such reservations have led to increases in transfers to these groups (Pande, 2003). Also, amendments to reserve such seats for women have repeatedly been proposed, without ratification (see below) (Sanyal, 2008). Moreover, although education is a concurrent responsibility of the central and state governments, primary legislative and fiscal responsibility rests with the latter (see below). So, the potential effect on inputs into schooling of women's representation in SLAs informs feminist theory and current policy debates in India. Second, we use a wider range of indicators for women's political empowerment, which reflect their representation in the SLAs *as well as* their participation as contestants and voters in these elections. Third, we use a wider range of measures for inputs into schooling that capture the availability *and* quality of schools. By including a broad array of inputs into schooling, we better describe the nature of any effects of women's political empowerment on primary schooling at the district level.

Influence of Educational Policies and Inputs on Gender Gaps in Primary Schooling

The direct influences of various educational policies and programs also have received attention; yet, there are few evaluations to assess whether such inputs affect schooling outcomes, if at all, and especially for girls (Kingdon, 2007). Prior studies have used such a variety of indicators, datasets, and methods that it is difficult to arrive at an unequivocal conclusion. Researchers find positive (Kingdon, 2007) and negative or negligible (Dreze & Kingdon, 1999; Filmer & Pritchett, 1999; Filmer, 2007) effects of school infrastructure or access on schooling as a whole, but a positive effect of some infrastructural variables on girls' schooling (e.g., Dreze & Kingdon, 1999). Studies suggest that teacher quality, teacher incentives, and student-to-teacher ratios are critical inputs, and that the presence of female teachers, and of trained teachers, is especially important for girls (UNESCO, 2006; Velkoff, 1998; Murlidharan & Sundararaman, 2008; Dreze & Kingdon, 1999). Yet, most studies examine a select subset of variables reflecting the attributes of teachers or schools. Here, we explore the intervening roles of a range of district-level indices for the availability and quality of the schooling infrastructure.

Direct Influence of Women's Political Empowerment on Schooling Outcomes

As **Fig 1** shows, women's political empowerment also may affect children's primary schooling outcomes directly. In particular, women's representation in political office, as well as their participation as voters in elections, may allow lay people to learn about women's political efficacy (Duflo, 2004). This knowledge may change lay attitudes about the value and power of women. Ultimately, such changes may encourage parents and teachers to invest especially in girls' schooling, reducing any gender gaps in attendance, performance, and completion. On the other hand, women may be less effective officials and voters at least initially, or lay people may require time to adjust their attitudes to observed changes in women's political behavior (Duflo, 2004). At the extreme, women political leaders may even face "backlash," such as social and economic reprisals for violating norms of femininity (Rudman, 1998). Such a reaction may require an extended period in which some threshold of women's political participation exists before investments by parents and teachers especially in girls' schooling would change. To our knowledge, little research has estimated these direct effects of women's political empowerment, controlling for its possible indirect effects through inputs into schooling.

Other Determinants of Primary Schooling

Finally, in this analysis, we control for selected demand and supply factors that are believed to be associated with levels of and gender gap in primary schooling. Candidate demand-side factors include aggregate measures for household economic status, adult schooling, caste, and religion. Household poverty is strongly associated with lower levels of schooling, especially for girls (Ramachandran, 2003; Desai & Kulkarni, 2009). Parental schooling also is important, with the sons and daughters of more-schooled parents more likely to attend school and complete more grades (Filmer, 2000; Borooah & Iyer, 2005). The effect–especially of maternal schooling–may be especially strong for girls' schooling (Dreze & Kingdon, 1999; Ramachandran, 2003). The effects of caste and religion are variable, and so harder to interpret. Historically, scheduled castes and tribes had very low attendance and attainment, and low-caste girls were more disadvantaged than same-caste boys (Dreze & Kingdon, 1999). Yet, this historical disadvantage in schooling attainment has decreased for girls and boys (Desai & Kulkarni, 2008). Some (Asadulla et al., 2009; Borooah & Iyer, 2005; Desai & Kulkarni, 2008) but not all (Dreze & Kingdon, 1999) studies show a continued educational disadvantage for Muslim children, or find that, despite this disad-vantage, the gender gap in enrollment is smaller for Muslim than Hindu children (Borooah & Iyer, 2005).

Summary and Significance

In sum, much of the survey-based research on schooling in India has focused on individual-, household-, and/or village-level influences on primary-school outcomes. Much of the state-level research on schooling in India has focused on the determinants of state-level inputs into schooling, without assessing pathways to schooling outcomes. This district-level analysis bridges this divide by exploring (1) how women's institutional and grassroots political empowerment may influence inputs into schooling; and (2) together, how these factors may influence levels of and gender gaps in primary schooling in India. Such analyses are important for development and feminist theories and inform contemporary debates in India about women's representation in state governments, where the primary responsibility for educational policies and expenditures lies. This research also informs persistent questions about the causes of gender gaps in human resources in South Asia, where variations in such gaps can exceed those across the world's nations.

The Indian Context

Trends in Literacy and Primary Schooling

In 1951, only 9% of women and 27% of men were literate (Kingdon, 2007); yet, gains in literacy have been substantial in recent decades. During the 1990s, levels of literacy among those 7 years and older rose from 52% to 65%, the highest decadal increase since records began in 1881 (Kingdon, 2007). This increase occurred in most states across India. Still, by the late 1990s, only 48% of adult women versus 73% of adult men were literate, the second-largest gap among countries with high rates of illiteracy (UNESCO, 2005).

Trends and gaps in schooling follow similar patterns. During the 1990s, the percentage of children 6–14 years who were attending school increased from 68% to 79% (IIPS, 1995; IIPS & ORC Macro, 2000). Today, in every state except Bihar, more than three fifths of children 6 – 17 years attend school. Kerala in the South and Himachal Pradesh in the North have the highest such percentages, at 90% and 89%, respectively (IIPS & ORC Macro, 2007). Still, large gender gaps in schooling persist. In 1998–9, 83% of boys 6 – 14 years were attending school, compared to 74% of same-aged girls. Also, 41% of boys finished primary school by age 14, compared to 36% of girls. The median number of grades of schooling was 5.5 for boys and 1.6 for girls (IIPS & ORC Macro, 2000). Still, from 1991 to 2006, the national gender gap in schooling declined because of faster gains among girls than boys. From 1999 to 2006, for example, school attendance for boys 6 – 10 years stabilized at ~85%, while girls' attendance rose from 78% to 81% (IIPS & ORC Macro, 2000, 2007). Still, large state-level variations in the schooling gender gap exist. The northern states of Rajasthan, Bihar and Jharkhand have the largest gender gap in attendance (15% – 24%), and some gap is evident in all but 5 states (Delhi, Meghalaya, Nagaland, Sikkim, and Kerala). The number of grades of completed schooling also differs. In half of states, boys finish a median of 5 or more grades; but in all states except Kerala, Goa and Delhi, girls have fewer grades. In six of the poorest, most populous states of the North and East, the average woman completes no schooling (IIPS & ORC Macro, 2007).

Total increases in access to primary schooling, however, have not led to higher student achievement (Wu, Goldschmidt, Boscardin, & Azam, 2007). Among 88,000 fifth-graders in government schools in 30 States and Union Territories (UTs), the average student responds correctly to only 45% of math questions and 58% of language questions (National Council of Education Research & Training, 2003). Gender gaps in average scores and their standard deviations are small, but these gender gaps vary across states, especially in the Hindi heartland, where son preference is stronger (Wu et al., 2007).

The Indian Political System and Women's Political Participation

Concurrent with changes in literacy and schooling have been changes in women's political empower-ment. India's political system is a federalist one, and the constitution gives much political control to the 28 states and 7 UTs. The SLAs are directly elected bodies that perform the administrative functions of the state governments. Although education is on the Concurrent List of matters shared by the central and state governments, states play the major role in educational policy and expenditures, especially at the primary and secondary levels. Article 246 of India's Constitution gives SLAs the power to enact laws dealing with educational issues. State governments also have Departments of Education, which are administrative bureaucracies that control and implement these activities.

The 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 occurring before 2008, delimitations rules enacted in 1985 assigned these constituencies to parent districts. The median number of constituencies per district is 11.

Articles 330 and 332 of the constitution provide political reservation for scheduled castes (SC)

and scheduled tribes (ST), who make up 25% of the population (Census of India, 2001) and tend to be socio-economically disadvantaged and geographically isolated. Jurisdictions are reserved for these groups before national and state elections. ST seats are reserved according to the concentration of the ST popul-ation in a constituency. SC seats are reserved on this basis, and on the dispersal of reservations in a state.

India's constitution directs the government to establish district infrastructures to serve as institutions of local self-government. These *Panchayat* include village, block, and district councils of elected members, who administer local public goods. In 1992, the 73rd amendment to India's constitution established that one third of seven seats in the Panchayat Councils and one third of Pradhan positions would be reserved for women. These Panchayat Councils are linked to the SLAs, who are charged with devolving develop-ment programming to the districts and decide on the budget for such programs, including education. Districts also have educational offices, to which SLA legislators could direct funds, affecting the district.

To date, India's State and Central Governments do not reserve seats for women. In 1996, a parliamentary bill was proposed to reserve one third of seats in the *Lok Sabha* and *Vidhan Sabha* for women. Since then, this proposal has been debated in several parliamentary sessions, but has not yet been ratified. As such, women are underrepresented in all political positions. From 1967 to 2001 in India's 16 main states, for example, at most 14% of the general SLA seats and 24% of SC/ST seats were won by a woman (Clots-Figueras, 2007). Still, levels of and trends in women's political representation in the SLAs differed across these states and districts during this period (Clots-Figueras, 2007). Moreover, there is evidence that women politicians in India care about the education of children in their constituencies. In Uttar Pradesh, most female legislators in power during 1952 – 1996 were able to open schools in their areas, and some were engaged in programs to improve education (Pundir & Singh, 2002). Still, voting trends in general elections reveal lower participation of women than men; yet, this gender gap decreased from 12% in 1971 (61% versus 49%) to 8% in 2004 (62% versus 54%) because of greater increases in women's than men's rate of participation (ECI website, 2009).

Data Sources

This analysis relies on three main sources of data, the **District Information Survey for Education (DISE),** the **Election Commission of India (ECI)**, and the **2001 India Census (IC)**.

The **DISE**, a premier source for educational statistics in India, provides state- and district-level data on inputs into schooling and children's schooling outcomes. NUEPA created the **DISE** as a corollary to the District Primary Education Program (est. 1994). The **DISE** collects data from recognized schools that impart primary education and pertains to children aged 6 – 14 enrolled in grades I – VII in such schools. The **DISE** is a complete data system for the elementary stage and is growing to cover all stages of education. It is a major innovation over prior systems, and a technological leader in data compilation and management. **DISE** data are transparent, and raw datafiles are available to all users.

The **DISE** operates, with support from NUEPA, through the States and State Education Departments. Lists of all schools are maintained at the *taluka/tehsil* level, below the district. Instructions and forms are sent every fall to each school, to be filled by one teacher. Data are collected on: (1) number and type of schools and teachers; (2) school quality, such as number and condition of classrooms, teacher-to-pupil ratio, and availability of female teachers, toilet facilities, and pre-primary programs; (3) qualification, gender, and scheduled affiliation of regular and para-teachers; (4) number of students receiving incentives and schools receiving development grants and materials; (5) grade- and level-wise enrollment, including that of SC/ST, other backward classes, Muslims, girls, and disabled children; (6) exam results for the terminal class; (7) grade-specific

promotion, repetition, and drop-out rates and (8) transition to upper primary level and retention rate. The data are compiled and reviewed at each *tehsil/taluka*, then are passed to the district, State headquarters, and State Education Department. Until 2005, data were collected from 581 districts across 29 States and UTs. Now, the **DISE** covers all 624+ districts in all States and UTs. The **DISE** follows census codes for states and districts, for easy merging with other sources.

DISE coverage and quality are high; yet, four features of the **DISE** are notable. First, it does not cover unrecognized schools, Education Guarantee Schools, and alternative learning centers, and coverage of private schools is incomplete but increasing. We will consider the implications of these exclusions in interpreting our results. Second, although the **DISE** covers every child in enrollment and school progress, it is a survey of schools, and so does not gather data on attendance, habitations without schools, and non-attending school-aged children. To fill this gap, the **DISE** includes census data when possible. Third, to achieve high data quality of the **DISE**, state project officers work to ensure the data's completeness and accuracy, and a 5% random-sample checking by another party is undertaken in 10% of districts. The level of non-response is estimated and has decreased over time. We will assess any effects of non-response on the results. Lastly, the **DISE** uses only measures that are comparable across the 35 States and UTs.

The **ECI** produces, and makes publicly available, reports on the results of all elections since 1951 to the *Lok Sabha* and *Vidhan Sabha*. These reports include information for all electoral constituencies on: contestant's background, including gender, political party, and membership in a SC/ST; his or her performance, including votes won in absolute and relative number; and counts of all electors and voters, overall and by gender. To link and then aggregate constituency-level data to districts, we will follow the guidelines in Bose and Singh (1988 a, b, c; 2000 a, b), who list all constituencies by their assigned district. These assignments are based on delimitation rules set in 1985, which were not updated again until 2008, and so hold for the election years that are the focus of this study (2001 – 2007). Accordingly, districts have between 1 and 55 electoral constituencies. These data on women's political empowerment will be aggregated into a national district panel, as described in the section below on our sample.

The **India Census,** last occurring in 2001, takes place decennially by the Office of the Registrar General and Census Commissioner. The data collected increased between 1991 and 2001, and include information on public services, markets, work sectors, standard of living, demographics, and education.

Sample and Rationale for the Unit of Analysis

We selected the district as our unit of analysis for two reasons (Chamarbagwala & Ranger, 2006; Clots-Figueras, 2005, 2007). First, it permits estimation of the effects of women's political empowerment in the smallest possible area where electoral constituencies are located. Second, as described above, the district is the most germane *operational* level at which to study school policies and inputs. For each data source, we created, based on published guidelines (Kumar & Somanathan, 2009), a dataset of the districts of which India consisted in 1981, the census year reflecting the district boundaries that existed when the 1985 delimitation rules linked electoral constituencies districts.[1] Specifically, districts were grouped into three sets: (1) those with unchanged boundaries for the period, (2) those that were cleanly partitioned during the period, and (3) adjacent districts with more complex changes to their boundaries. Of the 593 existing districts in 2001, 36% had unchanged boundaries between 1981 and 2001, 34% were cleanly partitioned after 1981, and 31%

[1] The 1981 census is closest to the year 1985 in which delimitation rules assigned constituencies to districts. These rules changed only in 2008, and so the rules set in 1985 hold for almost all elections in this analysis. Also, the 2007/8 DISE data include 624 districts, suggesting some partitioning of districts after 2001. We will aggregate these districts to their 2001 and then 1981 boundaries.

were adjacent districts having more complex boundary changes. In the case of districts in set (3), we assumed that complex boundary changes resulting in a change of less than 5% of the district population sizes were effectively unchanged districts over the period. We then matched districts or district composites in sets (1) and (2) across data sources. These procedures resulted in an almost complete match across the **DISE** and **ECI** for elections in the closest year (2002 – 2006) prior to the 2007/8 academic year. Namely, 317 of the total 307 districts matched. The ten non-matched districts, including two in the states of Haryana and Andhra Pradesh and eight from the Union Territories, were missing from the ECI. There were no significant differences between the 307 matched districts and districts that would comprise the 17 composites with complex boundary changes that were not included in this analysis.[2]

Variables

School Outcomes

The outcomes for this analysis come from the **DISE**. The outcomes focus on children 6 – 11 years, the age-appropriate population for primary school. We considered three sets of indicators, each measured on an interval/ratio scale, which captured: (1) participation (8 indicators), (2) performance (5 indicators), and (3) completion (4 indicators) in primary schooling. The final list of outcome variables were (1) gross enrollment in primary school, (2) net enrollment in primary school, (3) male and female gross and net enrollment in primary schooling, as well as male-to-female ratios of gross and net enrollment in primary school, (4) a measure of "excess" male enrollment (the difference in the 0 – 6 male-to-female sex ratio for the district and the male-to-female net enrollment ratio, and (e) male and female primary-school performance and completion, as well as the difference in male and female primary-school performance and completion.

Inputs into Schooling

Items measuring inputs into schooling were selected from the **DISE** based on their availability at the district-level and theoretical importance, including expectations about their effects on schooling outcomes and their correspondence with one of the following three mutually exclusive sets of items measuring: (1) inputs into *teachers* versus inputs into *schools*; (2) the *quality of schools* versus *access to schools*; and (3) *gender-specific inputs into schools* versus *gender-neutral inputs into schools*. Because many of the items within any one group were highly correlated, we used Principal Components Analysis (PCA) to create composite scores based on the scoring coefficients for the first principal components. We used Chronbach's alpha and the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy to assess the scale reliability for each first component. When these checks indicated a poor fit, less theoretically important items were dropped until the fit was optimal for the remaining set. Also, theoretically important items were retained, even if their inclusion entailed a slightly lower alpha. Most component scores have adequate or better alphas (> 0.60) and KMO scores (> 0.51).

Women's Institutional and Grassroots Political Empowerment

Indicators for *women's political empowerment* covered the period 2002 – 2006, preceding the academic year (2007/8) for which our schooling indicators were measured. We captured *women's institutional political empowerment* with ratio/interval, district-level indicators for their participation and performance in the most recent prior SLA elections in each state. We considered 10 indicators reflecting, for each election year, women's representation in the pool of SLA candidates and their performance as winner or runner-up for *all* SLA seats, *general* (non-reserved) SLA seats, SLA seats

[2] We plan to include all of the districts with complex boundary changes in subsequent analyses.

reserved for SC/ST, and SLA seats reflecting dominant[3] or left-wing political parties. Our addition of measures for the proportion of general and SC/ST SLA seats *contested* by women extends prior efforts to measure women's institutional political empowerment (e.g., Clots-Figueras, 2005, 2007). The final measures of women's institutional political empowerment included the (1) proportion of all SLA seats in the district won by woman contestants, (2) proportion of all SLA seats in district in which a woman contestant took second, (3) proportion of SC/ST SLA seats in the district won by woman contestants, (4) proportion of SLA SC/ST seats in the district in which a woman contestant took second, and (e) proportion of woman SLA contestants among all contestants in the district. We captured *women's grassroots political empowerment* with ratio/interval, district-level indicators for their voting participation in the SLA election just prior to 2007/8. To capture this construct, we considered four measures reflecting, for each election year, (1) women electors as a proportion of all electors, (2) women voters as a proportion of all electors, (3) women voters as a proportion of women electors, and (4) women voters as a proportion of all voters.

Control Variables

For the purposes of the present analysis, the control variables that we included were those from the 2001 Census that were readily available from in the 2007/8 DISE dataset. These variables consisted of the percentage of the population in each district that was urbanized and the sex ratios of the total population and the population aged 0 – 6 years in each district. In future iterations of this analysis, we will experiment with the other control variables that are discussed in the background.

Analyses

Exploratory Data Analysis

We conducted extensive exploratory data analyses (EDA), using visual and statistical methods, to assess the completeness and distributional properties of all variables. This process include the exploration of location (e.g., mean, median), spread (e.g., variability across districts) and shape (e.g., normal, skew). Bivariate tests were examined for differences that are a focus of this project.

After EDA was completed, principle components analysis (PCA) was used to create component scores to represent the indicators for schooling inputs and outcomes. Theoretical and empirical guidelines informed the construction of these components, as discussed above. EDA and PCA were conducted using STATA version 11.0 and SAS version 9.2 (SAS Institute, Cary, NC).

Multivariate Analyses

XXX

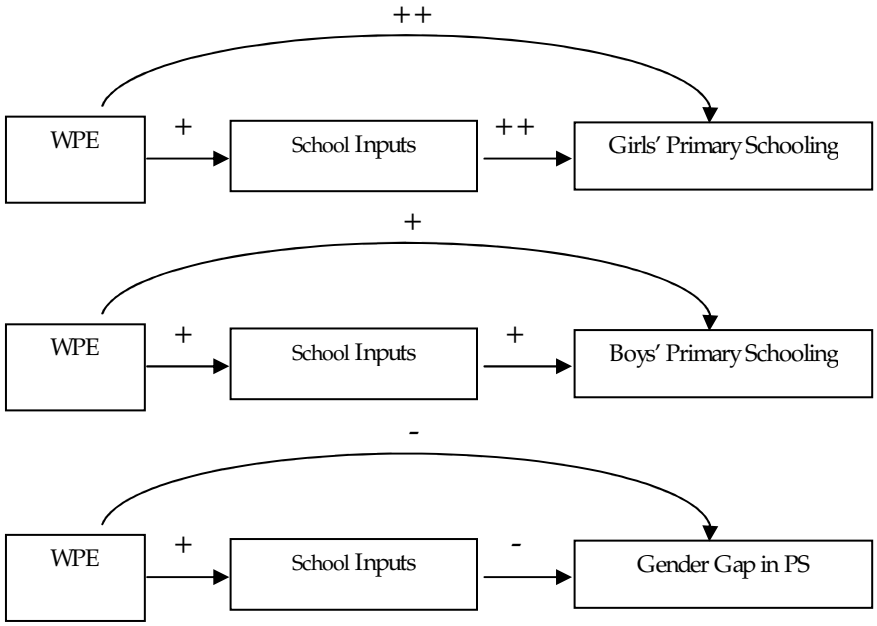
To correct for variation in district and state population size, weights will be calculated and used in all analyses. Weights will be based on census data using methods developed by Pfefferman and colleagues (1998). These weights can be applied to both HLM and SEM analyses (e.g., Asparouhov, 2006).

Results

Discussion

[3] As defined by their proportionate representation among all seats in the SLA. In subsequent analyses, we will experiment with this definition by considering coalition parties that together occupy the highest proportion of seats.

Figure 1. Hypothesized Relationships between Women's Political Empowerment (WPE), Inputs into Schooling, and Gender Gaps in Primary Schooling (PS)



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