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Panchali GUHA
Singapore Management University, panchaliguha@smu.edu.sg

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The effects of school-based management on Indian government schools

Panchali Guha

Lee Kong Chian School of Business, Singapore Management University, Singapore, Singapore

Correspondence
Panchali Guha, Lee Kong Chian School of Business, Singapore Management University, 50 Stamford Road, Singapore 178899, Singapore.
Email: panchaliguha@smu.edu.sg

Abstract

India institutionalized school-based management in 2009 by requiring all government schools to constitute school management committees, primarily staffed by parents, that would make decisions on school-related issues. This article utilizes school-level panel data from the state of Uttar Pradesh and uses a matched difference-in-difference estimation methodology to examine the effect of this policy on the provision of basic school infrastructure and services in government schools. It finds evidence that the policy resulted in improving the provision of libraries and medical checkups for students.

KEYWORDS

India, Right to Education, school-based management, school infrastructure, school management committee

1 | INTRODUCTION

Policies focused only on increasing school inputs in developing countries are often ineffective unless they are accompanied by governance and accountability changes (Kremer, Brannen, & Glennerster, 2013; Mbiti, 2016). One policy solution that explicitly targets governance and accountability changes in schools is school-based management (SBM). SBM aims to shift decision-making responsibility to the school level, typically through the creation of a school management body composed of the school principal, teachers, parents, and local community members, based on the expectation that locating decision-making power closer to the school and the local community it serves will result in improved oversight, accountability, and responsiveness to local circumstances. With its dual promise of school improvement and community empowerment, SBM has gained much traction internationally in the past few decades (Okitsu & Edwards Jr, 2017). Indeed, policymakers' enthusiasm for SBM may have tended to outstrip

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the development of the empirical evidence base: Ling, Khattri, and Jha (2010) note that the diversity of SBM reforms and the socioeconomic and institutional contexts in which they are implemented make it difficult to draw generalizable lessons about effects. Therefore, there is a continuing need to investigate SBM effectiveness in a variety of contexts.

The Indian government sought to institutionalize SBM in government schools, as part of a package of school reforms in the 2009 Right to Education (RTE) Act. The Act required all government schools to constitute school management committees (SMCs), composed principally of parents/guardians of students, to monitor school functioning and recommend school improvements. In this article, I examine whether SMC adoption resulted in improving the provision of school infrastructure and services in Indian government schools. Using school-level panel data from the state of Uttar Pradesh and a matched difference-in-difference (DiD) estimation framework, I estimate the effect of SMCs on those government schools that created them. Uttar Pradesh is used as the research setting because it has the largest number of government schools in the country and because SMC adoption proceeded relatively slowly there, providing large pools of both early and late adopters from which balanced treatment and comparison groups can be constructed using matching techniques.

Changes in provision of school infrastructure and services are measured by the percentage of classrooms in good physical condition; whether the school has an electricity connection; whether it has a library; whether it has a tap water connection; and whether it provides medical checkups for students. The results show that SMC adoption is associated with statistically significant increases in the provision of school libraries and medical checkups for students in government schools. However, there are no significant effects on the provision of electricity and tap water connections and on the proportion of classrooms in good condition.

This article makes the following contributions to the empirical literature on school improvement in developing countries. First, it adds to the evidence base on SBM effectiveness by focusing on the impact of SBM on school infrastructure, a surprisingly under-researched category of outcomes despite its poor provision in many developing countries (UNESCO, 2017) and its relevance to educational outcomes. Provision of adequate school infrastructure has been found to increase student enrollment and attendance and reduce student dropout (Drèze & Kingdon, 2001; Petrosino, Morgan, Fronius, Tanner-Smith, & Boruch, 2012), reduce teacher absenteeism (Alcázar et al., 2006; Chaudhury, Hammer, Kremer, Muralidharan, & Rogers, 2006), and aid student learning (Glewwe, Hanushek, Humpage, & Ravina, 2011). Despite this, relatively few studies report the effect of SBM on school infrastructure, although those that do generally find positive impacts. Second, it contributes systematic empirical evidence on the impact of SBM on Indian schools. This is important as empirical analyses of SBM effectiveness have tended to focus on Latin America (Carr-Hill, Rolleston, Schendel, & Waddington, 2018), with relatively little evidence from South Asia (Asim, Chase, Dar, & Schmillen, 2015). Third, it contributes to a small literature on infrastructure provision in Indian schools. As Chatterjee, Li, and Robitaille (2018) point out, few studies have examined the impact of Indian educational policies on the provision of school infrastructure.

This article is organized as follows. Section 2 reviews the SMC policy for Indian government schools. Section 3 briefly reviews the literature on SBM in developing countries. The data, variables, and methodology used for the empirical analysis are discussed in Section 4. Section 5 presents the results of the analysis. Section 6 discusses the empirical results in the context of what is known about SMC functioning in Indian schools, and Section 7 concludes.

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2 | THE POLICY CONTEXT

SBM has been defined as the "systematic decentralization to the school level of authority and responsibility to make decisions on significant matters related to school operations within a centrally determined framework" (Caldwell, 2005, p. 1). Therefore, SBM is essentially a decentralization initiative. While the decentralization can, in principle, take many forms—Patrinos, Barrera-Osorio, and Fasih (2009) distinguish between four SBM models, depending on whether decision-making authority is devolved to the school principal, teachers, parents, or a combination of teachers and parents—in practice it is common for SBM reforms to empower parents by mandating their involvement in school committees or councils. Therefore, parental participation has tended to be a common feature of SBM. The actual powers devolved to school committees vary widely across contexts but can include the authority to make budget allocations, hire and fire teachers and other school staff, develop curricula, procure instructional materials for schools, improve school infrastructure, and monitor and evaluate teacher performance and student learning (Patrinos et al., 2009).

The Indian SBM model emphasizes parental participation. Section 21 of the RTE Act mandated the formation of SMCs in all government schools and government-aided private schools and stipulated that at least three-fourths of SMC members should be parents/guardians of children, with the rest of the members drawn from the ranks of teachers, local authority representatives, and local educationists or children at the school.[1] In terms of functions, the Act stated that the main responsibility of the SMC would be to monitor school functioning, including aspects such as midday meal provision, toilet provision, teacher attendance, and punctuality. It would also be responsible for preparing and recommending school development plans (3-year plans for school improvement that serve as the basis for government grants), monitoring the utilization of government grants, preparing annual accounts of school receipts and expenditure, ensuring the enrollment and regular attendance of children living in the community, and ensuring that children with disabilities receive education. Overall, these powers appear limited and place Indian SMCs at the lower end of the SBM autonomy spectrum. SMCs do not, for instance, have a say in teacher hiring and firing or in monitoring educational outcomes (Chand & Deshmukh, 2019). Although the original RTE Bill of 2005 provided SMCs the power to disburse teacher salaries and to deduct wages if teachers were absent from school, political pressure from powerful teacher unions ensured that these powers were withdrawn from the final version of the Act (Matthey-Prakash, 2016).

The requirement for government schools to constitute SMCs followed in the footsteps of earlier educational decentralization initiatives in India, although most early efforts met with limited success (Varghese, 1996). The 1986 National Policy on Education included an implementation plan for decentralization, which included the creation of district education boards, but very little changed on the ground (Govinda & Bandyopadhyay, 2006). The District Primary Education Project, a central government scheme introduced in 1994 and aimed at universalization of primary education, introduced a new framework for planning and managing primary education at the district level, but this too did not take off. Neither did village education committees, which were introduced around the same time with the intention of creating more village-level control over educational planning. Govinda and Bandyopadhyay (2006) concluded that decentralization and community participation had become political tropes, invoked symbolically but with little attention paid to actual implementation. Given the long history of half-hearted implementation, there is a distinct possibility that schools constitute SMCs because

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they are directed to do so, yet SMCs fail to make any real contributions to school improvement. This underscores the need for an empirical investigation of SMC effects on Indian schools.

3 | LITERATURE REVIEW

As noted in Section 1, there is little empirical evidence on the effects of SBM on provision of school infrastructure. Notable exceptions are Heyward, Cannon, and Sarjono (2011), who found that an SBM program implemented in Indonesia resulted in increased availability of teaching resources such as computers, textbooks, and teaching aids in participating schools, and Asim and Dee (2016), who concluded that a low-cost program aimed at increasing SBM participation in Pakistan increased the probability that boys′ primary schools had functional school facilities such as tap water, electricity, and toilets.

Most empirical studies of SBM effectiveness instead focus on its effects on educational outcomes, including both intermediate indicators, such as attendance, retention, and grade passing rates, and final outcomes in educational attainment, usually measured by increases in test scores (Blimpo, Evans, & Lahire, 2011; Jimenez & Sawada, 1999; Jimenez & Sawada, 2014; Ling et al., 2010). A recent systematic review of the effects of SBM on educational outcomes in low- and middle-income countries concluded that the effects on student attendance and dropout were weak and sometimes inconsistent but that SBM tended to have negative significant effects on grade repetition and positive significant effects on test scores ranging between 0.10 and 0.20 standard deviations (Carr-Hill et al., 2018). The authors noted that these are relatively large effects in the education domain, where effect sizes tend to be fairly small in general.

What are the causal mechanisms via which SBM affects school infrastructure? Because decisions are made at school level, deficiencies in school infrastructure and resources can be more easily and speedily rectified relative to going through higher bureaucratic channels (Demas & Arcia, 2015; Di Gropello & Marshall, 2011). Giving school committees the authority to procure materials at local level potentially aids efficiency and yields cost savings that can be deployed for other school improvements, while allowing schools to make local decisions enables them to avoid waste by purchasing the inputs they actually require to meet student needs (Gershberg, Meade, & Andersson, 2009). Improvements in the provision of school resources and inputs also stem from the fact that school committees are often able to harness contributions in cash and kind from local communities (Blimpo et al., 2011; Patrinos et al., 2009). Masue and Askvik (2017) noted that one of the key objectives of school committees in Tanzania is to mobilize voluntary community contributions for school projects, Yamada (2014) observed that school committees in Ethiopia mobilized funds for school improvement via collective cultivation of school farms and the collection and sale of wood and grass, and Gershberg et al. (2009) documented that parents in community-managed Guatemalan schools were expected to contribute their labor to school construction and maintenance projects.

Community participation has typically been highlighted as one of the key strengths of SBM. The 2004 World Development Report (World Bank, 2003), for instance, noted that improving the quality of public services such as education conventionally involves a "long route" of accountability (citizens try to influence policymakers to institute improvements, who in turn influence schools) and that governance changes such as SBM are powerful because they introduce a "short route" to accountability by giving citizens the ability to influence providers directly. Such views were influential: while national governments took the initiative in some cases, international development agencies had a major role to play in the popularization of

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SBM reforms in developing countries, often making decentralization reforms a precondition for financial aid (Bjork, 2006). Patrinos et al. (2009) reported that SBM projects constituted about 10% of all World Bank education projects and 18% of its total education financing between 2000 and 2006.

Qualitative studies on SBM in developing countries have, however, highlighted concerns about the extent to which local communities play a meaningful role in school management. A common theme in several policy evaluations of SBM is that reforms are often less effective, or indeed completely ineffective, in socioeconomically disadvantaged communities (Galiani, Gertler, & Schargrodsky, 2008; Gertler, Patrinos, & Rubio-Codina, 2012; Murnane et al., 2006; Skoufias & Shapiro, 2006). Low education levels and low levels of social standing relative to school personnel are key constraints (Blimpo et al., 2011; Carr-Hill et al., 2018); these factors impede the ability of community members to participate effectively in school management decisions and hold school administrators and teachers to account. Poorer parents, and female parents in particular, often experience a lack of confidence that keeps them from actively participating in school council meetings (Okitsu & Edwards Jr, 2017). The opportunity costs of participation—in terms of both time and money—are also likely to be very high for poorer parents, thereby limiting participation (Essuman & Akyeampong, 2011).

4 | DATA, VARIABLES, AND METHODOLOGY

4.1 | Data

School-level data for the state of Uttar Pradesh were obtained from the District Information System for Education (DISE) maintained by the National University for Educational Planning and Administration.[2] DISE contains annual data from all public, private aided, and recognized private unaided schools in the country,[3] including detailed information on school location, resources and facilities, numbers and types of students enrolled, and teacher numbers and characteristics. The data set used for the analysis is constructed as follows. First, data on all government schools in Uttar Pradesh for each year between 2005 and 2012 are collated from the DISE database. Next, the following three categories of government schools are retained: (1) schools managed by state departments of education, (2) schools managed by tribal/social welfare departments, and (3) schools managed by local bodies. These three categories comprise almost all (99.95%) of government schools in the state. Any schools that do not have an elementary section (classes 1–8) are excluded, as the provisions of the RTE Act applied only to schools imparting elementary education.

As Section 4.3 explains in depth, the strategy for estimating the effect of SMCs exploits the fact that different schools adopted SMCs in different years. Briefly, I use schools that adopted SMCs in 2010 (the first year of SMC adoption) as treatment units and schools that adopted SMCs in 2012 as comparison units; employ a propensity score matching (PSM) procedure to match treatment schools to similar comparison schools; and compare school-level outcomes in 2011, when treatment schools had already been exposed to the treatment but comparison schools had not. Therefore, I retain only those schools that adopted SMCs either in 2010 or in 2012 and exclude all schools that either adopted in 2011 or had not adopted even by 2012.

To ensure like-for-like comparisons and avoid confounding the SMC effect with the effect of being a new school, I restrict the sample to those government schools that were in existence over the entire period 2005–2012. This also allows for multiple pretreatment periods (2005–

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2009) for testing whether the matched treatment and comparison groups exhibit parallel trends in the pretreatment period. I clean the sample of schools that revert from having an SMC in 2010 to not having one in 2011 or have missing values for SMC formation post-2009. Finally, I exclude anomalous observations of schools that report having created an SMC in a particular year but do not report having any SMC members, or holding any SMC meetings, that year. The final unmatched treatment and comparison groups consist of 3,293 and 26,472 schools, respectively. In other words, there are 3,293 schools that adopted SMCs in 2010 and 26,472 schools that adopted SMCs in 2012.

4.2 | Variables

The following five indicators are used to measure the provision of school infrastructure and services: (1) the percentage of classrooms in good physical condition (this is measured as the percentage of all classrooms in the school that are reported as either being in good condition or requiring minor repairs only), (2) whether the school has a functioning electricity connection, (3) whether the school has a library, (4) whether the school has a tap water connection, and (5) whether the school conducts medical checkups for students. Control variables used in the regressions include (1) the number of government visits per year, which includes the number of academic inspections as well as visits from Block Resource Centre (BRC) and Cluster Resource Centre (CRC) officers[4]; (2) the amount of funding received per year, including government grants for school development, school maintenance, and teaching and learning materials, and funds collected from students and from other sources; (3) the total number of teachers in the school; (4) total school enrollment; and (5) the share of socially disadvantaged students in total school enrollment, which is based on the number of students belonging to the officially designated socially disadvantaged groups of scheduled caste, scheduled tribe, and other backward classes.

TABLE 1 Summary statistics

	Mean	Standard Deviation
School infrastructure and services		
Classrooms in good condition (%)	93.97	20.18
Electricity dummy	0.14	0.35
Library dummy	0.59	0.49
Tap water dummy	0.01	0.07
Medical checkups dummy	0.38	0.49
Control variables		
Government visits	10.41	9.98
Government funding (₹ '000)	7.77	22.90
Total teachers	3.34	1.32
School enrollment	153.89	105.30
Social disadvantage in enrollment (%)	82.65	21.71

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Summary statistics for the sample are presented in Table 1.

4.3 | Methodology

Estimating the effect of SMCs on the provision of basic infrastructure and services in government schools is difficult because the RTE Act mandated all government schools to adopt them simultaneously. Although there was variation in the timing of SMC adoption in practice, a straightforward comparison of the outcomes of adopters and nonadopters would yield biased results due to self-selection bias. I employ a matched DiD approach here to mitigate this issue. Matched DiD uses a two-step procedure: treated units are first matched with untreated units to mitigate the effect of selection or self-selection and create a similar comparison group, following which DiD estimation is carried out on the matched treatment and comparison groups to identify the causal effect of treatment (Wing, Simon, & Bello-Gomez, 2018). Matched DiD is often used to resolve endogeneity issues resulting from self-selection into treatment (see Bauch, Sills, & Pattanayak, 2014; Kuijpers, 2020; Van Rijsbergen, Elbers, Ruben, & Njuguna, 2016).

As noted in Section 4.1, the unmatched treatment group (2010 adopters) consists of 3,293 schools, while the unmatched comparison group (2012 adopters) consists of 26,472 schools. In the first step of the analysis, I create matched treatment and comparison groups by using PSM and baseline school covariates from all years between 2005 and 2009. Nearest neighbor matching without replacement is used as the primary matching method, but I also reestimate the results using matching with three nearest neighbors within a caliper of 0.01 to demonstrate that the empirical results are robust to choice of matching procedure.

Next, I carry out a balance test to assess matching quality and parallel trends tests to assess the suitability for employing DiD. The balance test examines whether the matched treatment and comparison groups are similar in terms of levels of relevant variables. The parallel trends tests test whether the matched groups follow similar trends over time in the pretreatment period. Three parallel trends tests are used. The first tests whether the annual changes in the outcome variables in the pretreatment period are the same for both groups or whether the two groups follow different paths over time. This is done by regressing each of the outcome variables on year fixed effects and an interaction term that interacts treatment status with year fixed effects. Ideally, all or most of the interaction terms should be insignificant. The other two are placebo tests. Here, I use pretreatment (2005–2009) data only, assume placebo treatment in 2007 and 2008, and check whether the estimated effect of the placebo treatment is statistically insignificant.

Finally, I use DiD estimation to estimate the causal effect of SMC treatment using the following specification:

$$y_{it} = \beta_1 \mathrm{TREAT}_i \times \mathrm{POST}_t + \beta_2 \mathrm{POST}_t + X_{it}\gamma + \alpha_i + \mu_t + \varepsilon_{it} \quad (1)$$

where y_{it} represents the level of school infrastructure/services for school i in year t; POST_t is a dummy variable that takes the value 0 for years 2005–2009 and the value 1 for 2011 (2010 outcomes are not used in the estimation, as 2010 adopters may have adopted at different points during the year); X_{it} is a vector of time-varying school characteristics; and TREAT_i is a dummy variable that takes the value 1 for matched treatment schools and 0 for matched comparison schools. α_i and μ_t represent school and year fixed effects, respectively. β_1 is the parameter of interest and represents the average treatment effect on treated schools.

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Creating matched treatment and comparison groups based on the propensity score ensures that the two groups are similar on observable characteristics. When PSM is used on its own to estimate the treatment effect, it has a significant limitation, in that similarity on observable characteristics is assumed to imply similarity on unobserved characteristics, but this assumption cannot usually be tested. Combining PSM with DiD, as I do here, mitigates this issue by allowing me to difference out time-invariant unobserved characteristics of schools via inclusion of school fixed effects.

5 | RESULTS

Using school-level data from all years between 2005 and 2009, I estimate a logit regression to obtain the propensity scores (Appendix B, Table B1). I then use the STATA package psmatch2 (Leuven & Sianesi, 2003) to match treatment and comparison schools, retaining only those treatment schools that were on the common support (Appendix B, Figure B1). The imposition of common support means that treatment schools whose propensity score is larger than the largest propensity score in the comparison group are excluded, as it is not possible to find suitable matches for them.

Using nearest neighbor matching without replacement as the primary matching method, I obtain matched treatment and comparison groups consisting of 1,859 schools each. Table B2 (Appendix B) presents the results of the balance test on pre-2010 outcome variables and other school characteristics before and after matching. It shows that, while the unmatched groups were significantly different from each other with regard to pretreatment outcomes, they became much more similar after matching, although there is still a statistically significant difference between the two groups in terms of the prevalence of electricity connections. Achieving balance on pretreatment outcomes has the dual advantages of demonstrating matching quality as well as increasing the chances that the assumption of parallel trends between the matched groups will hold, given that they start from similar levels (Kahn-Lang & Lang, 2020). The matched groups are also more similar in terms of other school characteristics, relative to the unmatched groups. Covariates on which balance is not achieved will be included as control variables in the regressions.

Table 2 presents the results of the parallel trends tests between the matched treatment and comparison groups. Panel A provides the coefficients of the interaction terms interacting treatment status with year fixed effects. While most of the coefficients are statistically insignificant, the interaction terms for electricity connections and medical checkups for 2009 turn out to be significant. Panels B and C provide the results of the placebo tests assuming treatment occurred in 2007 and 2008, respectively. The results show that, with the exception of electricity connections, the outcome variables pass the placebo tests. Overall, the results in Table 2 support the parallel trends assumption for all outcomes other than electricity connections. Therefore, I allow for group-specific time trends in the matched DiD estimation for electricity connections.

The matched DiD estimation results are presented in Table 3. Panel A provides the results using nearest neighbor matching without replacement, while panel B provides the results using three nearest neighbors and a caliper of 0.01. Overall, the estimates obtained from both methods are similar and indicate that SMC adoption in government schools led to positive and statistically significant increases in the probability of creating school libraries and organizing medical checkups for students. Changes in the probability of electricity and tap water connections are statistically insignificant. While panel B provides a weak negative effect of SMC

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TABLE 2 Testing for parallel trends between matched treatment and comparison groups

A. Testing for differences in year fixed effects by group					
Variables	**1 Classrooms in good condition**	**2 Electricity**	**3 Library**	**4 Tap water**	**5 Medical checkups**
TREAT × 2006 dummy	−0.7860 (0.6962)	−0.0007 (0.0039)	−0.0132 (0.0152)	0.0011 (0.0015)	0.0255* (00148)
TREAT × 2007 dummy	0.2971 (0.7551)	0.0020 (0.0047)	−0.0083 (0.0164)	0.0011 (0.0015)	0.0137 (0.0173)
TREAT × 2008 dummy	−0.0343 (0.7751)	−0.0001 (0.0057)	−0.0105 (0.0165)	0.0005 (0.0016)	0.0132 (0.0176)
TREAT × 2009 dummy	0.2136 (0.8048)	0.0784*** (0.0130)	−0.0110 (0.0171)	0.0011 (0.0017)	0.0417** (0.0181)
Observations	18,551	18,573	18,576	18,586	18,563
Number of schools	3,718	3,718	3,718	3,718	3,718
School fixed effects	Yes	Yes	Yes	Yes	Yes
B. Testing for effect of placebo treatment in 2007					
Variables	**1 Classrooms in good condition**	**2 Electricity**	**3 Library**	**4 Tap water**	**5 Medical checkups**
TREAT × POST	0.5519 (0.5687)	0.0271*** (0.0054)	−0.0033 (0.0115)	0.0004 (0.0008)	0.0100 (0.0129)
Observations	18,551	18,573	18,576	18,586	18,563
Number of schools	3,718	3,718	3,718	3,718	3,718
School fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
C. Testing for effect of placebo treatment in 2008					
Variables	**1 Classrooms in good condition**	**2 Electricity**	**3 Library**	**4 Tap water**	**5 Medical checkups**
TREAT × POST	0.2525 (0.4627)	0.0387*** (0.0070)	−0.0036 (0.0085)	0.0001 (0.0008)	0.0143 (0.0096)
Observations	18,551	18,573	18,576	18,586	18,563
Number of schools	3,718	3,718	3,718	3,718	3,718
School fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes

Note: Numbers in parentheses are standard errors adjusted by clustering at school level.
***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

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TABLE 3 Matched difference-in-difference estimation

A. Nearest neighbor					
Variables	**1 Classrooms in good condition**	**2 Electricity**	**3 Library**	**4 Tap water**	**5 Medical checkups**
TREAT × POST	−0.1078 (0.5062)	−0.0013 (0.0133)	0.1098*** (0.0180)	0.0014 (0.0011)	0.0616*** (0.0154)
Observations	22,237	22,270	22,273	22,283	22,260
Number of schools	3,718	3,718	3,718	3,718	3,718
School fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	No	Yes	Yes	Yes
B. Three nearest neighbors with caliper					
Variables	**1 Classrooms in good condition**	**2 Electricity**	**3 Library**	**4 Tap water**	**5 Medical checkups**
TREAT × POST	−0.7978* (0.4784)	−0.0026 (0.0134)	0.1066*** (0.0182)	0.0009 (0.0014)	0.0757*** (0.0154)
Observations	22,115	22,154	22,160	22,169	22,152
Number of schools	3,699	3,699	3,699	3,699	3,699
School fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	No	Yes	Yes	Yes

Notes: All models control for number of annual government visits, annual government funding, number of teachers, student enrollment, and level of social disadvantage in student enrollment.
Group-specific time trends are used in the estimation of electricity provision, as it did not satisfy the parallel trends assumption.
Pretreatment period is 2005–2009 and posttreatment period is 2011; 2010 and 2012 outcomes are excluded as the treatment group received treatment in 2010 and the comparison group received treatment in 2012.
Numbers in parentheses are standard errors adjusted by clustering at school level.
***$p < 0.01$. *$p < 0.1$.

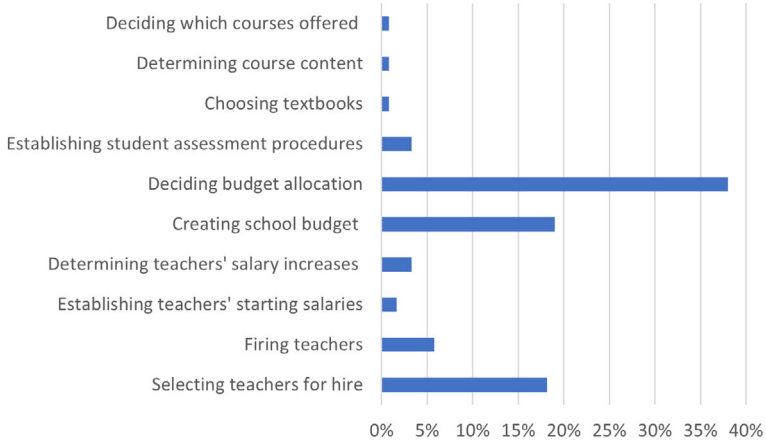

FIGURE 1 Areas of school management committee decision-making responsibility [Colour figure can be viewed at wileyonlinelibrary.com]

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adoption on the proportion of classrooms in good physical condition, its coefficient in panel A is insignificant.

6 | DISCUSSION

While the DISE data enable us to estimate the effect of SMCs on school infrastructure and services, they do not unfortunately permit a detailed examination of the mechanisms linking SMC constitution with improved outcomes. Results in some qualitative studies on Indian SMCs are, however, consistent with the empirical finding that SMCs have a positive effect on the provision of some forms of school infrastructure and services. While Jitendra et al. (2013) noted that many government school SMCs are inactive, they also pointed to success stories in which SMCs enabled school participation of marginalized children, pressured teachers to attend school regularly, and successfully lobbied for improvements in school infrastructure. A study that examined SMC functioning in five Indian states found that there was a large variation in SMC activity but that the most common issues discussed in meetings where SMCs were active included mid-day meal, children′s enrollment (particularly female enrollment), and school infrastructure (National Coalition for Education, 2017). A similar study that examined SMC functioning in the states of Andhra Pradesh, Bihar, Jharkhand, Odisha, and Uttar Pradesh concluded that SMCs played a role in ensuring that out-of-school children were enrolled and in monitoring mid-day meal and school construction but a less significant role in monitoring the school′s academic activities or finances (Jha, Ghatak, Chandrasekharan, Veigas, & Prasad, 2014).

Data from the Young Lives survey round of 2016–2017 in India also shed some light on the functioning of SMCs in government schools. Young Lives is an international longitudinal study of child poverty that has surveyed 12,000 children in Ethiopia, India, Peru, and Vietnam since 2002.[5] In India, its study sites are in the states of Andhra Pradesh and Telangana. As part of the 2016–2017 round, Young Lives surveyed about 8,355 secondary school (class 9) students in 205 schools, of which 121 were government schools. While the Young Lives results cannot be assumed to be nationally representative—schools were drawn only from Andhra Pradesh and Telangana, the survey has a pro-poor bias, and the number of government schools surveyed is small—they do provide insight into SMC functioning and the role they play within school decision-making.

School principals of each school were asked whether an SMC existed in the school and how often it met if it existed. They were also asked whether the SMC had considerable responsibility for the following tasks: (1) selecting teachers for hire, (2) firing teachers, (3) establishing teachers′ starting salaries, (4) determining teachers′ salary increases, (5) creating the school budget, (6) deciding where the budget is spent within the school, (7) establishing student assessment procedures, (8) choosing textbooks, (9) determining course content, and (10) deciding which courses are offered in the school.

The responses showed that almost all government schools (98.4%) had constituted SMCs and that SMCs were reasonably active in most schools, with 85% of schools having held SMC meetings at least once a quarter over the past year. The responses regarding areas of SMC decision-making responsibility in government schools are summarized in Figure 1. It indicates that the main contribution of SMCs to school decision-making lies in creating the school budget and deciding on budgetary allocations within the school, lending support to the notion that SMCs may exert a positive influence on the provision of basic school infrastructure and services. On

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the contrary, very few SMCs play a meaningful role in decision-making about student learning and assessment. Their role in determining teacher salaries and teacher firing is similarly limited, although they do get involved in teacher hiring decisions in nearly 20% of schools.

7 | CONCLUSION

Frustration with the state of government schools in India has led to an exodus of students away from them toward private schools (Kingdon, 2020), but there are indications that this is happening at the cost of further marginalization of the poorest and most disadvantaged children who have no option but to attend government schools (Woodhead, Frost, & James, 2013), exacerbating educational inequalities in the country. Improving the state of government schools is therefore imperative. An important aspect of this must be improvements in the provision of school infrastructure: far too many government schools remain poorly resourced, underequipped with basic school infrastructure such as electricity, water, and libraries.

The aim of this article was to examine whether governance changes in the form of SBM reforms in government schools resulted in improvements in the provision of school infrastructure and services. In an attempt to decentralize decision-making at the school level and give the local community a voice in school management, the Indian government mandated all government schools to form school committees, comprised primarily of parents and guardians of students. Using school-level data from the state of Uttar Pradesh, I compared the outcomes of government schools that had constituted SMCs with those of similar government schools that had not. The results indicated that the creation of SMCs led to statistically significant increases in the probability of providing libraries and medical checkups for students, while there were no significant improvements in the provision of electricity, tap water connections, and the physical condition of classrooms. Standardized effect sizes are about 0.22 standard deviations for libraries and 0.13 standard deviations for medical checkups.

The Indian SMC model has simultaneously been accused of attempting too little and too much. On the one hand, it has been critiqued for institutionalizing a "weak" form of SBM by giving little powers to SMCs in practice. Chand and Kuril (2018, p. 113) noted that the model "privileges participation over authority in matters of teacher and curriculum management," making for weak school accountability. On the other hand, there is skepticism about the extent to which SMCs can carry out even the limited functions they have been prescribed, particularly in schools that cater to socioeconomically disadvantaged and marginalized sections of the community (Chand & Deshmukh, 2019). Observers have also criticized the inadequate attention given to disseminating information and awareness among SMC members, particularly parents, about their roles and responsibilities (CSF, 2014), and the lack of training for SMC members to improve their decision-making capabilities (Chand & Deshmukh, 2019). The evidence presented in this article shows that, despite these problems, SMCs have had positive effects on the provision of some aspects of school infrastructure and services. Whether they have also influenced educational outcomes remains to be explored in future research.

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DATA AVAILABILITY STATEMENT

The data used for this analysis come from the District Information System for Education (DISE) maintained by the National University of Educational Planning and Administration (NUEPA) in India. Permission to access the data should be sought from NUEPA (see http://udise.in/contactus.htm).

ORCID

Panchali Guha https://orcid.org/0000-0001-8030-7798

ENDNOTES

[1] Note that SMC formation was only one component of the RTE Act; it included many other provisions such as provision of free and compulsory education to primary school-aged children, specification of infrastructural norms for schools, and prohibition on holding children in any grade until the completion of primary school. Appendix A lists the main provisions of the act that applied to government schools.

[2] *Source*: http://udise.in.

[3] There are three main categories of schools in India: government schools, private aided schools, and private unaided schools. Government schools are funded and operated by the government, private aided schools are operated by the private sector but receive some government funding, and private unaided schools are both funded and operated by the private sector. Private unaided schools include those that have received official recognition from the government as well as those that have not.

[4] BRCs and CRCs are resource centers established at the subdistrict level to conduct teacher training and provide academic support to schools and teachers.

[5] See https://www.younglives.org.uk/content/data-research.
Young Lives is a 20-year study of childhood poverty and transitions to adulthood in Ethiopia, India, Peru, and Vietnam. Young Lives is funded by UK aid from the Foreign, Commonwealth & Development Office (FCDO) and a number of further funders. The views expressed here are my own. They are not necessarily those of Young Lives, the University of Oxford, FCDO, or other funders.

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APPENDIX A: Main provisions of the Right to Education (RTE) Act that applied to government schools

Provision	Relevant section of RTE Act
Every child aged 6–14 years has the right to free and compulsory education in a neighborhood school, till completion of elementary education. The Act mandated state governments and local authorities to establish new schools as required. The model rules circulated to states suggested that there should be a school within 1 km for children in classes 1–5 and within 3 km for children in classes 6–8.	3, 6, 12
Out-of-school children are to be admitted to age-appropriate class, given special training to come up to par with other children in the class, and given free education till the completion of elementary education (even if after 14 years).	4
Children have the right to seek transfer from a government school without provision for completion of elementary education to a school with such provision.	5
Schools must ensure good-quality elementary education, conforming to specified norms and standards on (1) minimum teacher–student ratios; (2) minimum number of working days/instructional hours; (3) minimum number of working hours for teachers; and (4) provision of minimum materials and infrastructure, including at least one classroom for every teacher, a separate room for the head teacher, separate toilets for boys and girls, safe and adequate drinking water facilities, a playground, a library, and a boundary wall or fencing around the school.	8, 9, 19, 25
Schools cannot charge a capitation fee for admission.	13
Schools cannot use any screening procedures for admission.	13
Schools cannot deny admission to children due to lack of age proof (e.g., if the child does not have a birth certificate).	14
Schools cannot deny admission to children, even if they apply after the beginning of the academic year.	15
No child can be held back in any class or expelled from school until the completion of elementary education.	16
No child can be subjected to physical punishment or mental harassment.	17
Schools must establish a school management committee (SMC). At least three-fourths of SMC members must be parents/guardians of children; one-half must be women; proportionate representation must be given to weaker and disadvantaged groups. One of the primary responsibilities of the SMC must be to prepare the school development plan, which will serve as the basis for school improvements and government grants.	21, 22
School teachers must fulfill minimum qualifications set by the government.	23
All schools must comply with minimum teacher–student ratios. To achieve this, no teacher posted to a school can be made to serve in another school or office, or perform any noneducational duties apart from census, disaster relief, or government elections.	25, 27
Teacher vacancy in government schools must not exceed 10%.	26
Teachers must not provide private tuition.	28
No child can be required to pass any board examination till the completion of elementary education.	30

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APPENDIX B: Supplementary information on propensity score matching procedure

TABLE B1 Results of logit regression

Variables	School management committee adoption in 2010
Government visits in 2005	−0.0016 (0.0040)
Government visits in 2006	0.0042 (0.0039)
Government visits in 2007	0.0036 (0.0037)
Government visits in 2008	0.0009 (0.0031)
Government visits in 2009	−0.0036 (0.0036)
Government funding received in 2005	−0.0012 (0.0018)
Government funding received in 2006	0.0023 (0.0016)
Government funding received in 2007	0.0012 (0.0009)
Government funding received in 2008	0.0004 (0.0013)
Government funding received in 2009	0.0013 (0.0015)
Number of teachers in 2005	−0.0197 (0.0264)
Number of teachers in 2006	0.0100 (0.0274)
Number of teachers in 2007	−0.0025 (0.0267)
Number of teachers in 2008	−0.0273 (0.0270)
Number of teachers in 2009	−0.0193 (0.0280)
Total enrollment in 2005	0.0004 (0.0003)
Total enrollment in 2006	−0.0004 (0.0003)
Total enrollment in 2007	−0.0001 (0.0003)
Total enrollment in 2008	0.0003 (0.0003)
Total enrollment in 2009	0.0001 (0.0004)
Rural dummy 2005	0.1118 (0.1179)
Rural dummy 2006	0.0171 (0.1224)
Rural dummy 2007	0.0697 (0.1230)
Rural dummy 2008	0.1082 (0.1221)
Rural dummy 2009	0.1330 (0.1244)
Private school dummy 2005	−0.0417 (0.0723)
Private school dummy 2006	−0.0440 (0.0722)
Private school dummy 2007	−0.0515 (0.0722)
Private school dummy 2008	−0.0570 (0.0723)
Private school dummy 2009	−0.0429 (0.0719)
Headteacher dummy 2005	0.0947 (0.0806)
Headteacher dummy 2006	0.1530* (0.0826)
Headteacher dummy 2007	0.0731 (0.0808)
Headteacher dummy 2008	0.1132 (0.0790)
Headteacher dummy 2009	0.1807** (0.0759)
Nonteaching days per teacher in 2005	0.0061 (0.0081)
Nonteaching days per teacher in 2006	0.0107 (0.0167)

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TABLE B1 (Continued)

Variables	School management committee adoption in 2010
Nonteaching days per teacher in 2007	−0.0164 (0.0170)
Nonteaching days per teacher in 2008	0.0158 (0.0131)
Nonteaching days per teacher in 2009	−0.0197 (0.0225)
Proportion of teachers with nonteaching assignments in 2005	−0.0006 (0.0014)
Proportion of teachers with nonteaching assignments in 2006	−0.0013 (0.0025)
Proportion of teachers with nonteaching assignments in 2007	0.0025 (0.0021)
Proportion of teachers with nonteaching assignments in 2008	−0.0016 (0.0019)
Proportion of teachers with nonteaching assignments in 2009	0.0017 (0.0024)
Constant	−1.4066*** (0.2699)
Observations	63,499
District dummies	Yes
Pseudo R^2	0.473

Notes: The private school dummy takes the value 1 if there is at least one private school in the same town/village and 0 otherwise; the headteacher dummy takes the value 1 if the school has a headteacher and 0 otherwise; nonteaching days per teacher are calculated using data on the total number of teacher working days spent on nonteaching assignments in the previous academic year; the proportion of teachers with nonteaching assignments is calculated using data on the total number of teachers involved in nonteaching assignments in the previous academic year.
Standard errors are in parentheses.
***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

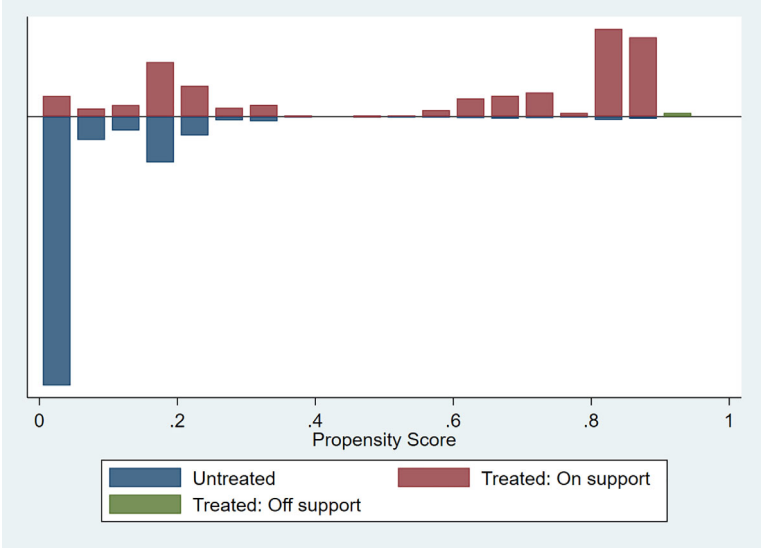

FIGURE B1 Imposition of common support [Colour figure can be viewed at wileyonlinelibrary.com]

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TABLE B2 Results of balance test before and after matching

Variable	Before matching			After matching		
	Treatment group mean	Comparison group mean	*t*-Statistic (*p*-value)	Treatment group mean	Comparison group mean	*t*-Statistic (*p*-value)
Outcome variables						
Percentage of classrooms in good condition	94.93	95.89	−2.37** (0.018)	94.92	94.21	1.17 (0.241)
Electricity connection	0.22	0.15	7.46*** (0.000)	0.22	0.15	6.05*** (0.000)
Library	0.48	0.51	−2.26** (0.024)	0.48	0.49	−0.20 (0.844)
Tap water	0.001	0.004	−2.39** (0.017)	0.001	0.002	−1.34 (0.180)
Medical checkups	0.36	0.46	−7.79*** (0.000)	0.36	0.37	−0.65 (0.519)
Other school characteristics						
Number of government visits	13.72	14.08	−1.39 (0.166)	13.77	12.69	3.42*** (0.001)
Government funding received	9.45	9.67	−0.37 (0.708)	9.35	8.79	0.87 (0.384)
Number of teachers	3.56	3.40	4.84*** (0.000)	3.55	3.33	4.79*** (0.000)
Total enrollment	151.15	140.40	4.67*** (0.000)	150.74	147.75	0.92 (0.359)
Social disadvantage in total enrollment	88.42	82.33	11.73*** (0.000)	88.45	85.86	4.85*** (0.000)
Rural dummy	0.96	0.94	3.61*** (0.000)	0.96	0.96	0.68 (0.494)
Private school dummy	0.35	0.38	−2.24** (0.025)	0.35	0.36	−1.16 (0.244)
Head teacher dummy	0.69	0.66	3.05*** (0.002)	0.69	0.70	−0.75 (0.455)
Nonteaching days per teacher	0.52	0.68	−2.19** (0.028)	0.52	0.57	−0.73 (0.463)
Teachers with nonteaching assignments (%)	6.12	6.74	−1.10 (0.270)	6.08	7.32	−1.68* (0.092)

***$p < 0.01$. **$p < 0.05$. *$p < 0.1$.

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