Female representation in school management and school quality

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Abstract

Using administrative data (2012-18) of schools in India, in this paper we construct a large panel comprising of more than 6 million observations to examine the extent to which female representation in school management is associated with improvement in school quality. We exploit the variation in number of female members in committees that govern government funded school activity to study our research question. Using a fixed effects methodology, we show that increased female representation in school management committees is associated with improvement in school quality, measured in terms of number teachers hired, qualification of teachers, academic resources and student enrollment. The results are robust to including initial school characteristics interacted with year. Besides, using individual level data on learning outcomes for rural India, we provide suggestive evidence of positive association between female representation in schools management committees and learning outcomes of children, particularly for girls.

Keywords: school management; school quality; female; public schools; local community

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1 Introduction

Women have been underrepresented in management and leadership positions for a long time. There is also emerging evidence that women have different policy preferences as compared to men (Miller, 2008; Edlund and Pande, 2002), and therefore this underrepresentation has the potential to skew outcomes away from women's preferences. For this reason assessing the implications of improvement in their socio-economic and political representation is critical. There is a large political economy literature that has found significant impact of increasing political representation of women on public policy outcomes in favour of women's preferences (Chattopadhyay and Duflo, 2004; Baskaran, Bhalotra, Min and Uppal, 2018; Bhalotra and Clots-Figueras, 2014). Corporate governance literature has suggested that increase in women board members has a positive impact on financial performance as well as corporate social responsibility policies of the firm (Larrieta-Rubín de Celis, Velasco-Balmaseda, Fernández de Bobadilla, Alonso-Almeida and Intxaurburu-Clemente, 2015; Cook and Glass, 2018; Salloum, Azzi, Mercier-Suissa and Khalil, 2016). This paper also takes up the issue of women representation and focuses on the impact of increasing women representation in school management on school quality in India.

There are two reasons why we focus on women representation in school management. One, we believe that, as compared to men, women participation in school management is likely to have a higher positive influence on school quality. There is extensive evidence that women care more about investment in education and health of children than men (Duflo, 2003; Thomas, 1990; Miller, 2008; Lundberg, Pollak and Wales, 1997; Kumar and Prakash, 2017). In addition, because of traditional gender roles specially in a developing country like India, women tend to be more involved with child rearing than men and therefore are likely to have better idea about the problems that children face at school. Two, while the existing work has looked at increase in their representation as legislators or board members, their involvement in community decision making, such as school management, has not been given enough attention. Representation in political positions, though extremely important, is not sufficient to affect policy outcomes if women continue to be inactive participants in the society.

We study this research question in the backdrop of the Right to Education (RTE) legislation which was introduced in 2009 to provide universal access to free of cost elementary education for children between the ages of 6 to 14. The legislation not only aimed at universalising elementary education but also at improving the existing quality of public schools. One such provision of the RTE was to make it mandatory for all public and public aided schools[1] to constitute a School Management Committee (SMC). SMC is an association of community members with representation from parents, local government representatives, local bureaucrats and members from disadvantaged communities. The main role of SMCs is to to oversee school activities, prepare reports of academic and teacher requirements of school in the next academic year, monitor teacher activity and student enrollment and assess infrastructure needs of the schools.

Constitution of SMC was mandated primarily to increase accountability in public schools through local community participation. This was specially important because of the dismal state of school quality in India where public schools have poor school infrastructure, low student enrollment, frequent teacher absence and low student learning levels. In order to have equal representation of women in these committees, the legislation prescribed that 50% of members in SMCs have to be women. Thus RTE brought in decentralised school management for public schools with mandated representation from women. However, as we explain in detail later in the paper, compliance with the reservation guideline is not perfect and we exploit the variation in number of female members within schools over time to study if increase in female representation is associated with improvement in school quality.

We measure school quality both using variables that are considered school inputs in the education production function as well as school outcomes (Bowles, 1970). Indicators of school inputs include teacher quality and availability of infrastructure facilities and indicators of outcomes include student enrollment and student leaning outcomes. We make use of multiple rounds of Unified District Information System for Education (UDISE) data for information on school quality variables and participation in SMCs. Inititated in 2012-13, UDISE is a census of all registered school in the country which collects self-reported information on a range of school characteristics includ-

ing infrastructure, enrollment, number and qualification of teachers, details of SMC meetings and SMC members among others. We create a school level panel for public and public aided schools (private schools were not mandated to form SMCs) from 2012-13 to 2017-18 for our analysis[2] which gives us around 6.5 million observations.

However, UDISE does not have data on learning outcomes for students in primary and upper primary classes[3] and we therefore make use of Annual status of Education Report (ASER) survey data to perform ou analysis with learning outcomes. ASER is a household survey conducted every year since 2005 which collects information on student learning levels for each rural district in India. We use the survey conducted between 2012 to 2016 for our analysis. Since ASER is a household based survey rather than a school based survey it does not have information on SMC exposure of children. Therefore the analysis with student learning outcomes is performed by merging the SMC information aggregated at the district level from UDISE with the student learning outcomes available in ASER.

We use these datasets to estimate the association between increasing women representation on school quality, conditional on the school having an SMC. There are obvious endogeneity concerns with estimating our research question. Schools which have better women representation in SMCs are likely to be inherently different on a number of factors some of which are also expected to affect school quality. Additionally, since both school quality and gender composition of SMC are the outcomes of the decision of a school, it is possible that a school which has better quality decides to increase women members in SMC resulting in reverse causality.

To address these concerns, we use school fixed effects in our regressions and therefore account for school level time invariant factors that are likely to affect both women participation in SMC and school quality. We use the one and two year lag of number of female members in SMC to reduce reverse causality concerns. The lags also recognise that the effect of female SMC members on school quality might take some time to show up. In addition, we interact initial school facilities (like infrastructure or number of female teachers) with time dummies and use them as controls. Thus initial school characteristics, which are likely to be correlated with school quality and SMC

female membership in subsequent years, have been controlled for. However, we acknowledge that these controls may not fully address the endogeneity concern and so caution should be observed in causal interpretation of our results.

We first report the association with school inputs and our findings show that increase in female representation in SMCs, keeping the size of SMC fixed, is associated with increase in number of female teachers. We also show that there is increase in qualified teachers as women representation increases. Our findings on school infrastructure, however, indicates that there is no association between female SMC members and availability of infrastructure with the exception of electricity facility and books in the library. We find positive association between female SMC members and likelihood of school having electricity connection and number of books in library. These findings could indicate that women SMC members consider improvement in number and quality of teachers more important than improving classroom conditions or constructing playground, etc. One of the reasons for this could be that an average school in our sample, for a given size, has much lower number of teachers than classrooms and other infrastructure facilities.

We then examine the association between gender composition in SMC and student enrollment - an important school school outcome. We show that increase in female members in SMCs, without increasing the size of these committees, results in increase in student enrollment. An important role of SMC is to encourage out of school children to enrol themselves and to oversee that elementary school children are not denied admission to school. This finding, thus, indicates that SMC members, particularly women are doing their job well. However, the reported result is driven by increase in enrollment for boys without any change in enrollment for girls suggesting that increasing enrollment for girls is much more challenging.

In addition to looking at the association with enrollment and school inputs (teacher quality, infrastructure availability), we present the association between learning outcomes and female representation in SMC. Our results suggest a positive correlation between average number of female SMC members in a district and likelihood of children completing grade two equivalent reading, math and english learning assessments. We find that while female members positively affect the

learning outcomes of all students, girl children differentially benefit from having female SMC members.

The documented positive association with student enrollment and learning outcomes could be a result of higher number of female and qualified teachers as well as more number of books in library as proportion of females in SMCs increases. Existing work has documented that (Muralidharan and Sheth, 2016; Adukia, 2017) increase in female teachers in a school is particularly beneficial for female students in terms of improved enrollment and learning outcomes. The observed positive association between participation of females in SMCs and learning outcomes for girls is particularly important given that girls have been documented to exhibit poorer learning outcomes as compared to boys (Jain, 2019; Muralidharan and Sheth, 2016).

We also examine the potential channel driving the reported positive association between female representation in SMC and teacher quality, enrollment and learning outcomes. We show that higher female representation in SMC increases the number of SMC meetings conducted in an academic year as well as the likelihood of formation of school development plan. SMC meetings represent the first step of the process by which SMC members discuss school requirements and take decisions relating to the functioning and management of the school. School development plan is prepared by SMC members which provides estimates of infrastructure and teacher requirements of school in the coming academic year and thus forms the basis of the grants that school receives from the government. These two variables are important indicators of how active SMC is in monitoring school activities and communicating school requirements to local authorities. Thus the positive association with SMC meetings and school development plan is a possible driver of the observed impact on school quality.

1.1 Literature review

The paper contributes to two larges strands of literature: One, which looks at the policy implications of improvement in representation of females in leadership positions and the other which studies the impact of interventions to improve the quality of education provision. Following semi-

nal work by (Chattopadhyay and Duflo, 2004) which showed that political reservation for women increased investments in public goods preferred by women, a number of papers have shown that increase in women legislators has a positive influence on children's and women's outcomes as well as overall economic growth (Baskaran, Bhalotra, Min and Uppal, 2018; Bhalotra and Clots-Figueras, 2014). In addition, there is work that has shown that females have higher preference for investment in child health and education and therefore increase in cash transfers to mothers results in differential increase in spending on children as well as improved child health outcomes as compared to transfers to fathers. The literature has also looked at the effect of involvement of mothers on academic performance of children (Topor, Keane, Shelton and Calkins, 2010; Chen and Chandler, 2001) and found positive differential impact of involvement of mothers on student achievement (Cabus and Ariës, 2017; McBride, Dyer, Liu, Brown and Hong, 2009). We contribute to this literature by studying the implications of increase in women representation in school management decisions for school quality.

This paper also speaks to a large body of work on improving school quality in developing countries where school enrollment and student leaning outcomes continue to remain poor. India particularly is facing this problem where schools have poor school infrastructure, frequent teacher absence and low student learning levels. Existing work in this area has considered a number of interventions including improvement in pedagogy, monitoring teacher activity and hiring contractual teachers, improving infrastructure, introducing technology aided leaning among others (Muralidharan and Sundararaman, 2013; Muralidharan and Singh, 2020; Muralidharan, Singh and Ganimian, 2019; Glewwe and Muralidharan, 2016; Muralidharan and Sundararaman, 2011, 2010; Adukia, 2017). Most of these interventions result in improvements in enrollment and learning outcomes for students. However, these interventions are costly and therefore the benefits have to be assessed against the huge cost of introduction of such interventions. The policy intervention that we consider is relatively inexpensive which aims at increasing accountability and efficient utilisation of funds through community participation in school management.

The rest of the paper is structured as follows: section 2 provides a background to the RTE

legislation and the roles and responsibilities of SMCs, section 3 discusses the data sources and empirical methodology, section 4 presents results and section 5 concludes.

2 Background

The Indian government enacted the RTE act in 2009 to provide universal access to free of cost elementary education for children between the ages of 6 to 14. The act made access to elementary education a constitutional right of children and prescribed guidelines for local governments and authorities to achieve this objective. In addition to universalising elementary education[4], the legislation prescribed guidelines to improve the quality of schools. One such guidelines of RTE was to mandate all public and private aided[5] schools to constitute School Management Committees (SMCs) which would be responsible for monitoring school functioning. SMC is an association of elected representatives from local authority, parents and teachers. The main role of these committees as per Section 21 of the act is to:

1) *Monitor the functioning of school* - The SMCs are expected to monitor school activities particularly with regard to teacher and students absenteeism, to take efforts to enrol out of school children between the age of 6 to 14, to oversee that the school is implementing the quality norms prescribed by RTE and bring to the notice of local authority any deviation in the rights of children prescribed by RTE.

2) *Prepare School Development Plan (SDP)* - Every SMC is required to prepare a school development plan which provides estimates of classwise enrollment expected in the coming year, requirement of additional teachers to maintain the pupil teachers ratio prescribed in RTE, additional infrastructure and financial requirements of the school. SDP forms the basis of release of school grants by government or local authority.

3) *Monitor the utilisation of grants received from the government* - The SMC is also required to oversee if the grants received by the school for infrastructure improvement, hiring of teachers and student development is utilised in an efficient manner.

The RTE requires three fourth of members of SMCs to be parents (preference to be given to parents of children belonging to disadvantaged groups) and one fourth members to be representatives from local authority, educationalists and teachers[6]. In addition, to ensure equal representation of women in these committees, RTE encourages schools to reserve 50% of SMC positions for women. However, it is important to note that the legislation is vague regarding the cost of not complying with this guideline and this seems to be one of the reasons that around 25% of schools in our sample do not comply with this guideline. SMC performs its functions by holding committee meetings where school requirements are discussed. States have their own regulations regarding the number of times SMCs are required to meet ranging from four to twelve times in a year[7].

The RTE introduced SMCs to decentralise management of public schools with involvement from all stakeholders including parents and local community members. Since public schools suffer from serious lack of accountability in India, involvement of local community members in monitoring school functions is considered a way to improve accountability and consequently school quality. However, this can only happen if SMCs actively perform their functions. A few qualitative studies have pointed that SMCs are not active in monitoring school functioning and there is lack of awareness amongst parents about their role in school management. Anecdotal instances suggest that schools do not have functional school development plans and so school grants are not aligned with SDPs Sethi and Muddgal (2017)[8]. This has resulted in SMCs being non-functional and ineffective in many cases[9]. Women are expected to be even less aware of their role in school management since they lack agency and are less socially active than men. Women also have lower education levels than men and therefore might not understand the requirements of the school and students. Thus even though women might care more about child's investment in education, as explained in the introduction, they are likely to face social constraints which can hinder their active involvement in SMCs. Given these observations, using a large administrative data on schools, we empirically examine the extent of paticipation of women in SMCs and the impact of that on school quality.

3 Data and methodology

We use administrative data on schools from multiple rounds of Unified District Information System for Education (UDISE) for information on school related outcomes and school management committees. Initiated in 2012-13, UDISE is an annual census of recognized and unrecognized schools in India which collects information on a wide range of school related outcomes such as type of school management, year of establishment, facilities and infrastructure, number of teachers, teacher qualification, student enrollment, SMC meetings held among others. As per government's mandate, all recognized and unrecognized schools are required to report information on various school characteristics which is compiled by UDISE on an annual basis [10]. This is the largest and most comprehensive dataset on school level facilities in India. On average, a single round of UDISE has information on close to around a million schools and in this paper we use UDISE data from 2012-13 to 2017-18. As per the RTE Act, private schools and, public schools with only secondary and/or senior secondary classes are not mandated to constitute an SMC and therefore not included in our analysis. Our sample, thus is a panel of public and private aided schools which have primary and upper primary classes which gives us around 6.5 million observations[11]. Since the data is self-reported, there are some concerns regarding the quality of UDISE data. We discuss this in detail in the Results section.

Even though UDISE has information on a range of school characteristics, it does not collect detailed data on learning outcomes. Therefore, for our analysis on learning outcomes, we use child level data on learning outcomes from the Annual State of Education Report (ASER). ASER is a nationally representative survey of learning and is conducted annually across rural areas of almost all districts in India. Unlike UDISE, ASER is a household level survey and it collects information on childrens schooling status and basic learning outcomes. For our analysis, we use data from multiple rounds of the ASER survey, including 2012, 2013, 2014 and 2016. ASER data is not available for the year 2015 and therefore is not part of our sample. Note that the ASER survey is a repeated cross section at the household level and accordingly individuals or households surveyed across different rounds over time are not necessarily the same.

In the ASER survey, children in the age group 5 to 16 are tested on basic reading and math skills. The test is administered in a number of regional languages and the highest level of reading tested corresponds to reading level expected in grade 2 and highest level arithmetic tested corresponds to what is expected in class 3 or 4. The test is administered to all the children in the sampled household irrespective of whether they attend school or not. Children were also tested on their English ability for all years in our sample other than 2013. In addition to collecting data on learning outcomes, ASER survey also collects basic household information as well as availability of basic public services in a village.

For each round, ASER collects information on around half a million children in the 5-16 year age group, our combined sample for ASER contains information on 2.3 million public school going children surveyed between 2012 and 2016. However, since ASER is a household survey and not a school survey, from ASER, we do not have information on SMCs in the school that the surveyed children attend. We therefore use the UDISE to construct the average number of female members in a SMC in a district and we merge this information with the data on learning outcomes from ASER to study the relationship between the number of female members in SMC and learning outcomes. Therefore tests with ASER data are only indicative of a possible relationship between student learning outcomes and SMC female representation.

3.1 Summary statistics

Summary statistics in Table 1 report the percentage of schools that have constituted SMCs (row 1). We also report this percentage for rural and urban schools (rows 2, 3) and public and aided schools (rows 4, 5) separately. Our results suggest that the percentage of schools constituting SMC has gradually increased from 89% in 2012 to 94% in 2017. However, this percentage is much lower for urban schools as compared to rural schools. Amongst the type of schools, even though the percentage of private aided schools constituting SMC has increased over time, it is significantly lower than percentage of public schools constituting SMCs.

Rows 5 and 6 show that on average there are six male members and slightly more than six

female members in SMC. Row 7 reports that, on average, there are about 50% female members in these committees which is in line with what is prescribed by the legislation. We also see that female members in SMCs in urban schools slightly exceed the prescribed 50%. Public aided schools have lower than the prescribed percentage of female members in their SMC. Even though, on average, it seems that schools are complying with the legislation, there is a lot of variation in this variable as reported in Figure 1. Around 10% of schools have less than 36% female SMC members, 25% have less than 46% representation and 10% schools have more than 70% female members. This suggests that around 25% schools are not complying with the legislation[12] whereas there are schools which are doing much better than what is prescribed. This points towards inherent differences in schools which is likely driving differences in SMC composition. There is also temporal variation in gender composition in these meetings as well. This is driven by the RTE suggestion that SMCs be reconstituted after two years[13].

We report summary statistics for school characteristics in Table 2. The table suggests that an average school-year in our sample has just 1.5 teachers and there are more number of male teachers than female teachers. We also see that on average 62% of teachers have graduate or above degrees and 86% of them are professionally qualified. Teachers who wish to have a regular job in public schools are required to have a professional degree in education (Bachelors in Education or equivalent or higher). The data shows that 15% of teachers in a school does not have a professional degree[14]. Only 30% of schools have a head teacher in our sample. On average a school has 4 classrooms and 73% of the classrooms are in good condition and one toilet each for boys and girls. Around 10% of schools have computer aided learning centers and only 50% of them have electricity. The table shows that on average six SMC meetings are conducted in a school in a year. We also see that, on average, a school has 114 students in elementary classes. The table also reports the average percentage of children completing grade two equivalent assessment tests. The numbers suggest extremely low learning levels of students. Only about 50, 28 and 30% of students between the age of 7 and 16 can complete grade two equivalent reading, artithimetic and english assessment tests[15].

3.2 Methodology

We estimate the following regression equation to examine the extent to which increase in women representation in SMCs is associated with improvement in enrollment and availability of various school inputs:

$$Y_{ist} = \alpha_i + \gamma_t + \theta_s * \gamma_t + \beta_1 Female_{i,s,t-1} + \beta_2 Totalmembers_{i,s,t-1} + \delta^{`} Z_{i,s} * \gamma_t + \epsilon_{ist} \quad (1)$$

Here Y_{ist} is a measure of school quality in school i in state s and at time t. $Female_{ist-1}$ measures the number of female members in the SMC in school i at time $t-1$. We use one year lag of this variable because we expect some lag in the impact of these committees on school inputs. We also estimate the regression with two year lags and results (not reported) remain robust. In addition, we control for total number of members in SMC ($Totalmembers_{ist-1}$), this is to partial out the effect of increasing size of these committees while estimating the impact of increasing women representation in SMC. We include year fixed effects (γ_t) to control for any year wide shocks to school quality variables. In addition, we allow for state-year fixed effects to capture the effect of any state specific changes over time like change in policy, political enironment, etc. To control for school level time invariant characteristics, in all our specifications, we allow for school level fixed effects. The above equation thus exploits the variation in school quality and SMC members in a school over time.

$Z_{i,s} * \gamma_t$ denotes the interaction of baseline school characteristics (that are used as measures of school quality) (Z_{is}) with year fixed effects. This allows us to partial out the effect of initial school characteristics (some of which can be correlated number of females in SMC) on future school quality. The standard errors are clustered at the school level to allow shocks to school inputs to be correlated within a school over time[16]. The coefficient of interest here is β_1 which measures the association between increase in number of females in SMC, without changing the size of the committee, and school quality. In other words, β_1 captures the effect of changing

gender composition of SMCs in favour of females after partialling out the impact of time invariant school level factors, initial school characteristics, state-year and year specific factors. A positive β_1 would mean that replacing a male member by female member in SMC results in improvement in school quality.

4 Results

We begin by examining the association between number of female members in SMC and school input variables. Table 3 looks at the relationship between gender of SMC members and number of teachers in a school. Dependent variables in all columns in this table are log transformed[17]. Column 2 shows that the coefficient for the number of female members in SMC is positive and statistically significant and the magnitude of the coefficient suggests that ten additional female members in the SMC in the previous year is associated with a 0.2 percent increase in the total number of teachers in current academic year. Whereas there is no impact of increase in the size of SMCs on the number of teachers.

We also examine if the increase in number of teachers reported above is driven by male or female teachers or both. Columns 3 to 6 suggest that an increase in number of female members in SMC results in an increase in the number of female teachers and a decrease in the number of male teachers in the school. However, we find the opposite effect when SMCs are expanded by increasing male members. Given that, on average, there are lower number of female teachers in schools (Table 2), an increase in female SMC members is favorable for gender equality in teachers in schools. Note that this finding does not imply that SMCs have the power to hire teachers and that female SMC members are more active in hiring female teachers. We believe this result is driven by better communication of school requirements, including teachers, to the local athorities and governments (as is the mandate of the SMC) which have the authority to hire teachers for schools.

Next, we examine the association between gender composition of SMCs and quality of teachers in the school. From the DISE dataset, for each school we have information on the number of

teachers who - a) are at least graduate, and b) have a professional degree. With the assumption that better teacher qualification is an indicator of better teacher quality, for each school, we calculate the proportion of teachers that have at least completed a graduation degree and proportion of teachers that are professionally qualified. Columns 1 and 2 in table 4 present the estimated results for the proportion of teachers that are at least graduate, whereas the estimated results for proportion of teachers that are professionally qualified are presented in column 3 and 4. Besides, in columns 5 and 6, we present results for whether the school has a headmaster or not. Our results show that an increase in the number of female members in SMCs by ten is associated with 16.8% points increase in the proportion of teachers who are graduate and 9% increase in the proportion of teachers who have professional qualification. As compared to average, this amounts to 27% increase in graduate teachers and 10% increase in professionally qualified teachers in a school. With regard to the school having a head teacher, the likelihood is higher by 3% if female members increase by ten in an SMC, an increase of 10% as compared to average.

The previous tables suggest that increasing number of female representatives in SMCs results in higher student enrollment as well as number of female and qualified teachers. Since the RTE legislation has entrusted SMCs with the responsibility of taking steps to improve student enrollment and informing local governments the need for additional teachers in a school, this result suggests that SMCs infact seem to be doing their job. These results also point that SMCs with higher proportion of females are working even more efficiently. However, an important concern is that U-DISE is a self reported data and schools have the incentive to report increased school enrollment and better teacher qualification, particularly because some of the government grants to schools are tied to enrollment and infrastructure facilities in the school. However, presence of school fixed effects imply that we are not comparing outcomes across schools which have a higher tendency to overreport quality with the rest. Even with school fixed effects, our resuts can be biased if the likelihood that a given school reports better enrollment and teachers increases with increase in women representation in SMC. We believe that it is unlikely that that the school's incentive to overreport quality increases when gender composition of SMC moves in favour of women but the size of SMC

remains unchanged. To the extent that we have initial school characteristics interacted with year dummies, any impact of initial school characteristics on likelihood of future overreporting (which is also correlated with increase in female SMC members) has also been controlled for.

Tables 5 and 6 look at the relationship between gender of SMC members and school infrastructure variables. Column 1 shows that increased female membership is negatively correlated with number of classrooms but the correlation turns positive with adition of initial school characteristics. This possibly suggests that column 2 corrects for possible negative bias in the estimation of the coefficient. However, even though positive and significant, the size of the effect of female SMC members on number of classrooms is negligible. Columns 3 and to 4 show that increased female membership is negatively correlated with proportion of classrooms that are in good condition even though there is slight increase in the number of classrooms. Columns 5 to 8 show that increasing female members in SMCs has no relationship with number of toilets for girls but is negatively correlated with more number of toilets for boys.

Results, reported in Table 6, show that increase in female SMC members by ten increases the likelihood that school has electricity by 0.4% and decreses the likelihood of shool having playground by 0.2%. On the other hand increasing the size of SMCs by 10, keeping female members the same, increases the likelihood of school having a ground by 0.1%. Columns 5 to 8 look at the association between increasing female members in SMC and the likelihood that school has a computer aided learning center[18] and number of books in library. While increasing female members without increasing the size of the SMC results in more number of books in library, it has no correlation with computer aided learning center.

To summarise the findings on school inputs, we find that while female members have a positive effect on number and qualification of teachers numbers, women members do not seem to demand funds to make infrastructure improvements, other than a few exceptions like electricity provision and books in library. This possibly reflects that women consider teachers as more important school inputs than infrastructure for improving school quality and since funds provided to school are limited women SMC members choose to spend less on infrastructure and more on hiring better

qualified teachers. This result should also be interpreted in the context of the summary statistics reported in Table 2 which suggest that, in an average school with size of 114 students in elementary classes, the student teacher ratio is very high at 77 and student classroom ratio is much more reasonable at 29 students per classroom and 74% of the classrooms are in good condition. This suggests that priorities of women SMC members seem to be directed towards those inputs which require most funds and attention.

Implications of findings

Our findings have important implications for student enrollment and test scores. There is an extensive literature that has shown that increase in female teachers is beneficial for improving enrollment and test scores, particularly of girls(Muralidharan and Sheth, 2016; Lim and Meer, 2017). Female teachers are also associated with improvement in non-cognitive development of girls as well (Gong, Lu and Song, 2018). This has the potential to reduce the exiting gap in learning outcomes between girls and boys. Better qualified teachers are also shown to result in improvement in test scores(Clotfelter, Ladd and Vigdor, 2010; Glewwe, Hanushek, Humpage and Ravina, 2011).

Even though we do not find significant association with most of the infrastructure variables, the reported positive association with electricity and textbooks is important for improvement in school quality. Electricity provision which provides a comfortable reading and learning environment for students has been shown to have a positive impact on student learning outcomes (Murillo and Román, 2011). Availability of textbooks and other learning material in school has also been associated with improved student test scores (Lockheed and Hanushek, 1988; Glewwe, Hanushek, Humpage and Ravina, 2011).

4.1 School outputs

Enrollment

Our results on school inputs suggest that an increase in female representation in the SMC is associated with improvements in functioning of SMC and number and quality of teachers. With

improvement in school quality, one might expect school enrolment to improve. Besides, directly as well SMCs are tasked to improve school enrollment by - a) encouraging out of school children in the 6-14 year age group to enroll themselves in school, and b) reporting to the local authorities any case where children might be denied admission to school. The estimation results for school enrollment are presented in Table 7. Column 1 shows that increase in female members in a SMC by 10 results in 0.3% improvement in elementary enrollment and this result remains robust to addition of initial school characteristics interacted with year dummies. This amounts to around four million additional children in school given that there are 135 million children enrolled in elementary public and private aided schools in 2012. Columns 3 to 6 present the relation for school enrollment of boys and girls and the estimated coefficients suggest that enrollment of boys improve but the effect is only weak for girls (the coefficient reduces by half when intital school characteristics are controlled) when there is an increase in female SMC members. This is a possible indication that improving school enrollment of girls is far more challenging than boys. Row 2 indicates that it is possible to increase school enrollment by 0.3% without increasing female SMC members, only when the size of SMC goes up by ten.

Learning Outcomes

In addition to estimating the association between SMC female members and school inputs (teacher quality and infrastructure) and student enrollment, we provide suggestive evidence of the impact on learning outcomes. It has been observed that many demand side interventions like cash transfer and nutrition programs, while result in improvement in enrollment, have no positive influence learning outcomes (Miguel and Kremer, 2004; Vermeersch and Kremer, 2005). It is therefore informative to know whether improvement in women participation in SMCs has been beneficial for an important school ouput, learning outcomes. We estimate the following regression equation to examine the extent to which increase in women representation in SMCs is associated with improvement in learning outcomes:

$$Y^a_{jhdt} = \alpha_d + \gamma_t + \phi_l + \beta_1 Female_{d,t-1} + \beta_2 Total_{d,t-1} + \delta_1^{'} X_{jhdt} + \delta_1^{'} X_{d0} Xt + \epsilon_{jdst} \qquad (2)$$

Y^a_{jhdt} represents whether child j in household h in district d at time t has completed grade two equivalent problem in assessment test a ($a \in (Reading, Math, EnglishReading)$). As discussed before, ASER is a household level survey, and it does not collect any information on SMCs. We use the UDISE to construct the average number of female and male members in a SMC in the district. Accordingly, $Female_{d,t-1}$ and $Total_{dt-1}$ is the average number of female and total members in SMC in district d at time $t-1$ respectively. X_{jhdt} consists of child, parent, household, and village level controls from the ASER data. At the child level we control for child's gender, age, standard in which the child is enrolled, and the test language. Parent level controls includes mother's and father's age and education, whereas household level controls include availability of amenities such as electricity, toilet, tv, computer, and mobile and whether the house has a permanent (pucca) or a temporary (kutcha) structure. At the village level, we control for village level infrastructure including schools, road, electricity, and health facilities. The specification also has state-year and district fixed effects and we cluster standard errors at district level. We estimate this specification only for those children who are enrolled in government schools. As before we are interested in the coefficients β_1.

Table 8 reports the correlation between learning outcomes and average gender composition in a SMC in a district. Contrary to the previous tables where we used the school level DISE dataset, these results are performed using individual child level data from the ASER dataset. The dependent variables indicate whether the child has completed a grade two level equivalent problem in reading, arithmetic and english assessment tests, respectively. From columns 1, 2 and 3, we find that that estimated coefficient for the average number of female members in a SMC is positive, whereas it is negative and significant for the total members in a SMC in the district. This thus suggests that female membership has a positive correlation with childs learning level, whereas this correlation is negative when there is increase in size of SMCs, without increasing female members.

The magnitude of the coefficients suggest that ten more female members in SMCs, without increasing the size, is correlated with a 13 percent higher likelihood of the child completing reading

and arithimetic assessment tests and 23 percent higher likelihood that the child completes English assesment test. Quantitatively, this amounts to 30, 54 and 88 percent increase in students completing grade two equivalent reading score, arithimetic and english assessment test, respectively. This shows that increasing total members in SMCs without increasing male participation significantly positively impacts student learning outcomes.

Columns 4, 5 and 6 report the differential impact of female SMC members on learning levels by child's gender. As expected, girls have lower likelihood of completing assesment tests, however, this likelihood improves with increase in female SMC members. Row 2 suggests that the likelihood of girls finishing arithimetic assesment test is lower by 8.6% as compared to boys when there are no female members in SMC but this difference reduces by 8% when ten males are replaced by females. Similarly, we find improvement in reading and English assesment completion likelihood by 7 to 8% when female SMC members increase by ten. We also find positive association between learning outcomes for boys for reading and English assesments, but a positive different coefficient of interaction between girl student and SMC female members suggest that girl children differentially benefit from having more female SMC members.

5 Possible channel

This section explores the potential channel driving the reported positive association between female representation in SMC and teacher quality, enrollment and learning outcomes. We are particularly interested in examining if involvement of women makes these committees more active in montiring school activities and requirements. We do that by studying the association between number of female members in SMC and number of SMC meetings conducted in an academic year as well as the likelihood of formation of school development plan. As explained earlier, SMC meetings represent the first step of the process by which SMC members take decisions relating to the functioning and management of the school. School development plan is prepared by SMC members which provides estimates of requirements of school in the coming academic year and thus forms

the basis of the grants that school receives from the government. These two variables are thus important indicators of how active SMC is in monitoring school activities and communicating school requirements to local authorities. Results are presented in table 9 and our preferred specification, with baseline school charactristics interacted with year dummies, is reported in columns 2 and 4. The estimated coefficient in column 2 suggest that, keeping the total number of members in the SMC fixed, an additional female member in an SMC in the previous academic year in a school is associated with almost 0.01 increase in the number of SMC meetings conducted in the current academic year.

Quantitatively, this implies that if we replace ten males by ten females in SMC, there would be 0.1 additional meetings (A two standard deviation increase in female SMC members corresponds to inreasing female members by around 9. For ease of interpretation of our results, we present the results respect to change in female SMC members by 10.). Given that the mandated number of meetings varies from 4 to 12 in a year and the average number of meetings is 6 in a year, the marginal effect implies 2% increase in the number of meetings. Row 2 shows that if we were to keep the number of female members the same, the same increase in SMC meetings (0.1) can be brought only if we increase the size of SMCs by ten. Column 4 shows that, keeping the size fixed, an increase in female SMC members by ten results in a 0.3% higher likelihood that the school has a school development plan. Like column 2, in the absence of increase in female members, this effect can only be reached if the size of SMC is increased by 10. This suggests that the marginal effect of female members on frequency of SMC meetings and formation of school development plans is much larger than male members. This finding therefore suggests that involvement of women in SMCs increases their active functioning and which is possibly driving the positive impact on school quality.

6 Conclusion

This paper examines the implications of increasing women representation in school management for school quality. We study this question in the context of introduction of the Right to Education act in India in 2009 which mandated government funded schools to constitute School Management Committees (SMCs). An SMC is an association of community members which is responsible for overseeing school performance and assessing teacher and infrastructure needs of the school. SMCs were introduced to improve accountability in public schools and facilitate better communication of school needs to government authorities through local community participation. RTE mandated 50% representation of women in these committees thereby ensuring equal representation of women in the decentralised governance of schools.

However, we observe that compliance with the law is not perfect and there is variation in the number of female members in SMC across schools and over time. We exploit this variation to study the association between increase in female members in SMC and school quality. Since existing work has shown that women have higher preference for investment in education and health of children than men, we expect improved representation of women in management committees have a positive influence on school quality. Controlling for school time invariant factors, initial school facilities and state-year factors, we find that increase in women representation, while keeping the size of SMCs fixed, is associated with increase in number of female teachers, better qualified teachers, improvement in some infrastructure facilities, increase in student enrollment and improved learning outcomes for girls. Absence of strong association with availability of school facilities indicates that women SMC members tend to prefer investment in teacher quality than improvement in infrastructure facilities. This paper thus documents that participation of women in decisions concerning education of children is beneficial for the school as well as the child. We show that the potential channel driving the beneficial effect of women participation is increased activity of SMC, measured by frequency of SMC meetings, as well as better communication of school requirements to local authorities, measured by likelihood of formation of school development plans.

This paper has important policy implications for both India and other developing countries

which are struggling with ways to improve school quality. The findings of the study shows that decentralised school management, particularly with involvement of women, has a lot of potential to improve school quality on various dimensions including school inputs as well as enrolment and learning outcomes. it is therefore important to increase awareness in the community about the role of SMCs and encourage participation of women to fully reap the benefits of SMCs. This, when compared with, existing school quality improving interventions like construction of toilets, cash transfer and nutrition programs which improve student enrolment but have no beneficial impact on student learning outcomes, is an important policy input. Additionally, these policy interventions are very expensive needing millions of dollars, whereas our study shows that community participation, particularly through involvement of women, is a relatively inexpensive cost effective way of improving government school quality.

Table 1: Summary statistics

	2012	2013	2014	2015	2016	2017	Mean
SMC const	89.2	91	93.1	93.8	94	94.3	92.5
SMC const (rural)	90.2	91.8	93.8	94.4	94.6	94.9	93.3
SMC const (urban)	78.7	83	85.6	86.8	86.7	87.6	84.7
SMC const (aided)	69.4	69.7	76.2	79	79.6	81	75.9
SMC const (Public)	90.4	92.3	94.1	94.7	94.8	95.1	93.6
Male members (number)	6.5	6.2	6.3	6.3	6.3	6.4	6.3
Female members (number)	6.3	6.4	6.7	6.7	6.8	6.9	6.6
Female members	50	51	52	51	51	52	51
Female members (rural)	49	51	51	51	51	51	51
Female members (urban)	54	55	56	55	55	55	56
Female members (aided)	45	46	47	46	46	46	46
Female members (public)	50	51	52	51	52	52	51

Notes:SMC const is a dummy variable indicating if SMC has been constituted in a school-year. Row 1 reports summary statistics for SMC constituted for the entire sample. Rows 2 and 3 report the averages for rural and urban sample respectively. Rows 4 and 5 report the summary statistics for aided and public schools respectively. *Female members (number)* is the number of female members in a SMC. *Female members* is the percentage of female members in a SMC. Row 6 reports summary statistics for Female members for the entire sample. Rows 7 and 8 report the averages for rural and urban sample respectively. Rows 9 and 10 report the summary statistics for aided and public schools respectively.

7 Tables

Table 2: Summary statistics

Variables	Average	Standard deviation	Observations (in lakhs)
Meetings	6.6	5.2	36.4
Teachers	1.5	0.6	46.4
Teachers F	0.8	0.7	46.4
Teachers M	1.1	0.7	46.4
Graduate	62.4	37.8	46.0
Professional	85.7	28.1	46.0
Head teacher	0.3	0.5	46.4
Books	383.9	1691	46.4
Clrooms	4.1	3.12	46.4
Clgood	72.8	35.9	43.6
Workdays Pr	217.6	45.1	38.5
Toilet G	1.3	2.0	46.4
Toilet B	1.2	1.7	46.4
CAL	0.1	0.3	46.4
Elecricity	0.5	0.5	46.4
Ground	0.6	0.5	46.4
Enrollment	114.6	143	54.2
Reading	0.50	0.49	12.4
Math	0.28	0.45	12.4
English	0.30	0.46	9.2

Notes: Column 1 reports the average, column 2 reports the standard deviation and column 3 reports the number of observations. *Meetings* is the number of SMC meetings held in a school year. *Teachers* is the number of teachers in a school year. *Teachers F* is the number of female teachers in a school year. *Teachers M* is the number of male teachers in a school year. *Graduate* is the proportion of teachers with an undergradute (or above) degree in a school year. *Professional* is the proportion of teachers with professional degree in a school year. *Head teacher* is a dummy variable indicating if the school has a head teacher. *Books* is the number of books in library in a school. *Clroom* is the number of classrooms in a school. *Clgood* is the proportion of classrooms in good condition. *Workdays Pr* is the number of workdays in a primary school. *Toilet G* is the number of toilets for girls. *Toilet B* is the number of toilets for boys. *Electricity* is a dummy variable indicating if the school has electricity. *Ground* is a dummy variable indicating if the school has a play ground. *Enrollment* is the average enrollment in elementary classes in a school. *Reading* is the average likelihood that the child completes grade two level reading assesment test constructed using ASER data. *Math* is the average likelihood that the child completes grade two level math assesment test constructed using ASER data. *English* is the average likelihood that the child completes grade two level english assesment test constructed using ASER data.

Figure 1: Percentage of female members in SMC meetings

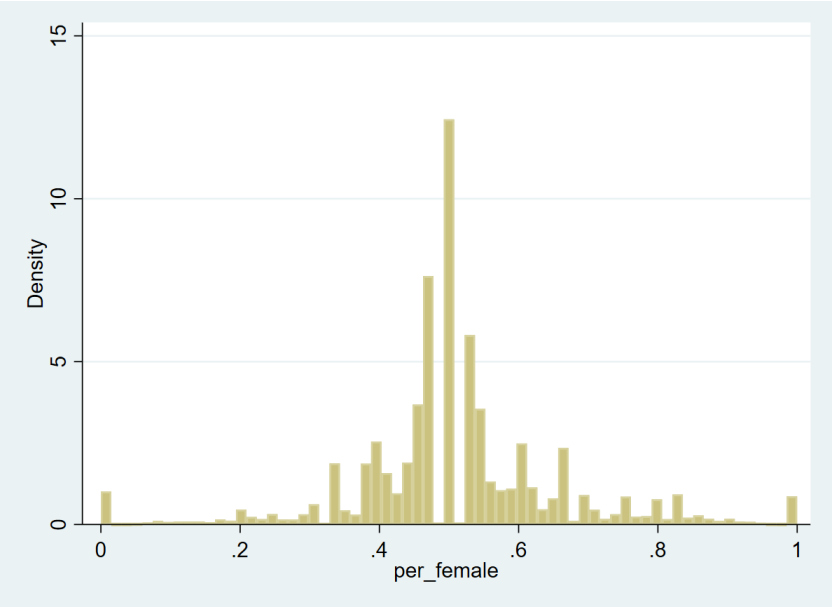

Table 3: Teachers

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	Teachers	Teachers	Teachers F	Teachers F	Teachers M	Teachers M
L.female	0.0000	0.0002**	0.0008***	0.0011***	-0.0007***	-0.0007***
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
L.total	0.0003***	-0.0000	-0.0001**	-0.0005***	0.0006***	0.0004***
	(0.0001)	(0.0000)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	4,702,415	3,703,779	4,702,415	3,703,779	4,702,415	3,703,779
R-squared	0.0184	0.0468	0.0122	0.0541	0.0065	0.0493
School FE	Yes	Yes	Yes	Yes	Yes	Yes
State x Time	Yes	Yes	Yes	Yes	Yes	Yes
Baseline x Time	No	Yes	No	Yes	No	Yes

Notes:Teachers is the log of number of teachers in a school. *Teachers F* is the log of number of female teachers in a school. *Teachers M* is the log of number of male teachers in a school.*L.female* is the number of female members in SMC in the previous year. *L.total* is thetotal number of members in SMC in the previous year. Standard errors are clustered at the school level in all specifications.

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Teacher qualification

VARIABLES	(1) Graduate	(2) Graduate	(3) Professional	(4) Professional	(5) Head teacher	(6) Head teacher
L.female	0.0104	0.0158**	0.0019	0.0090**	0.0004***	0.0003***
	(0.0070)	(0.0075)	(0.0042)	(0.0043)	(0.0001)	(0.0001)
L.total	-0.0019	-0.0080*	-0.0014	0.0007	0.0003***	0.0002***
	(0.0038)	(0.0044)	(0.0027)	(0.0029)	(0.0001)	(0.0001)
Observations	4,661,422	3,687,090	4,661,422	3,687,090	4,702,415	3,703,779
R-squared	0.1429	0.2078	0.1198	0.2952	0.0335	0.1279
School FE	Yes	Yes	Yes	Yes	Yes	Yes
State x Time	Yes	Yes	Yes	Yes	Yes	Yes
Baseline x Time	No	Yes	No	Yes	No	Yes

Notes:Graduate is the proportion of teachers with graduate or above degree in a school. *Professional* is the proportion of teachers with professional degree in a school. *Head teacher* is a dummy variable indicating if the school has a head teacher. *L.female* is the number of female members in SMC in the previous year. *L.total* is the total number of members in SMC in the previous year. Standard errors are clustered at the school level in all specifications.

*** p<0.01, ** p<0.05, * p<0.1

Table 5: Infrastructure

VARIABLES	(1) Clroom	(2) Clroom	(3) Clgood	(4) Clgood	(5) Toilet G	(6) Toilet G	(7) Toilet B	(8) Toilet B
L.female	-0.0010**	0.0008**	-0.0125*	-0.0215***	0.0002	0.0000	-0.0005*	-0.0007**
	(0.0004)	(0.0003)	(0.0074)	(0.0077)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
L.total	-0.0001	-0.0003*	-0.0069	-0.0031	0.0011***	0.0007***	0.0010***	0.0013***
	(0.0003)	(0.0002)	(0.0043)	(0.0045)	(0.0002)	(0.0002)	(0.0002)	(0.0002)
Observations	4,702,415	3,703,779	4,424,047	3,636,470	4,702,415	3,703,779	4,702,415	3,703,779
R-squared	0.1448	0.1810	0.0122	0.0710	0.0189	0.0303	0.0210	0.0399
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State x Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline x Time	No	Yes	No	Yes	No	Yes	No	Yes

Notes:Clroom is the number of classrooms in a school. *Clgood* is the proportion of classrooms in good condition. *Toilet G* is the number of toilets for girls. *Toilet B* is the number of toilets for boys. *L.female* is the number of female members in SMC in the previous year. *L.male* is the number of male members in SMC in the previous year. Standard errors are clustered at the school level in all specifications.

*** p<0.01, ** p<0.05, * p<0.1

Table 6: Infrastructure

Variables	(1) Ground	(2) Ground	(3) Electricity	(4) Electricity	(5) CAL	(6) CAL	(7) Books	(8) Books
L.female	-0.0001*	-0.0002**	0.0004***	0.0004***	-0.0000	-0.0000	0.8807**	0.6864**
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0000)	(0.0000)	(0.4483)	(0.2820)
L.total	0.0002***	0.0001***	-0.0001	-0.0001	-0.0000	0.0000	-0.0457	0.1166
	(0.0000)	(0.0000)	(0.0000)	(0.0001)	(0.0000)	(0.0000)	(0.2251)	(0.1453)
Observations	4,702,415	3,703,779	4,702,415	3,703,779	4,699,118	3,701,172	4,702,415	3,703,779
R-squared	0.0348	0.0805	0.1175	0.1913	0.0081	0.0381	0.0015	0.1369
School FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
State x Time	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Baseline x Time	No	Yes	No	Yes	No	Yes	No	Yes

Notes: Ground is a dummy variable indicating if the school has a play ground. *Electricity* is a dummy variable indicating if the school has electricity. *CAL* is a dummy variable indicating if the school has a computer aided learning center. *Books* is the number of books in library in a school. *L.female* is the number of female members in SMC in the previous year. *L.male* is the number of male members in SMC in the previous year. Standard errors are clustered at the school level in all specifications.

*** p<0.01, ** p<0.05, * p<0.1

Table 7: Enrollment

VARIABLES	(1) Log enrol	(2) Log enrol	(3) Log enrol boys	(4) Log enrol boys	(5) Log enrol girls	(6) Log enrol girls
L.female	0.0003**	0.0003**	0.0004***	0.0002**	0.0003**	0.0002
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
L.total	0.0003***	0.0001	0.0003***	0.0002**	0.0003***	0.0001
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Observations	4,702,415	3,703,779	4,702,415	3,703,779	4,702,415	3,703,779
R-squared	0.0972	0.1226	0.0713	0.0954	0.0616	0.0790
School FE	Yes	Yes	Yes	Yes	Yes	Yes
State x Time	Yes	Yes	Yes	Yes	Yes	Yes
Baseline x Time	No	Yes	No	Yes	No	Yes

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 8: Learning outcomes

VARIABLES	(1) Reading	(2) Arithimetic	(3) English	(4) Reading	(5) Arithimetic	(6) English
L1.female	0.013**	0.013**	0.023***	0.010*	0.008	0.018***
	(0.014)	(0.031)	(0.000)	(0.070)	(0.156)	(0.005)
girl*L1.female				0.007***	0.008***	0.008***
				(0.000)	(0.000)	(0.000)
girl	0.007***	-0.035***	-0.020***	-0.035***	-0.086***	-0.074***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
L1.total	-0.007**	-0.008***	-0.016***	-0.007**	-0.008***	-0.016***
	(0.011)	(0.003)	(0.000)	(0.011)	(0.003)	(0.000)
Observations	450,391	450,015	287,019	450,391	450,015	287,019
R-squared	0.384	0.257	0.304	0.384	0.257	0.305
Year FE	YES	YES	YES	YES	YES	YES
Controls	YES	YES	YES	YES	YES	YES
Language FE	YES	YES	YES	YES	YES	YES
StateXYear FE	YES	YES	YES	YES	YES	YES

Notes:Reading is the reading score constructed using ASER data. *Math* is the math score constructed using ASER data. *English* is the score on English test constructed using ASER data. *L1.female* is the average number of female members in SMC in a district the previous year. *girl* is a dummy variable indicating that the child is a female. *girlXL1.female* is the interaction between the varible *girl* and *L.female*. *L1.total* is the average total number of members in SMC in a district in the previous year. *girlXL1.male* is the interaction between the varible *girl* and *L.male*. Standard errors are clustered at the school level in all specifications.

*** p<0.01, ** p<0.05, * p<0.1

Table 9: Potential channel

VARIABLES	(1) SMC meetings	(2) SMC meetings	(3) SDP	(4) SDP
L.female	0.0093***	0.0081***	0.0002***	0.0003***
	(0.0024)	(0.0025)	(0.0001)	(0.0001)
L.total	0.0094***	0.0093***	0.0002***	0.0002***
	(0.0014)	(0.0013)	(0.0000)	(0.0000)
Observations	4,702,415	3,703,779	4,461,460	3,526,426
R-squared	0.0664	0.0719	0.0314	0.0341
School FE	Yes	Yes	Yes	Yes
State x Time	Yes	Yes	Yes	Yes
Baseline x Time	No	Yes	No	Yes

Notes:SMC meetings is the number of SMC meetings conducted in a year in a school. *SDP* is a dummyvariable indicating the SMC has formed a school development plan in a given year. *L.female* is the number of female members in SMC in the previous year. *L.total* is the total number of members in SMC in the previous year. Standard errors are clustered at the school level in all specifications.

*** p<0.01, ** p<0.05, * p<0.1

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Notes

1. Public aided schools have a private management body but receive financial aid from the government for their operation. They follow government mandated rules for hiring teachers, setting curriculum and are not allowed to charge fees.

2. The U-DISE collects data on schools for an academic year which begings in April and ends in March in India.

3. U-DISE does have information on performance of students in class 10 and 12 board examination.

4. Elementary education corresponds to completing grade 8 in the school.

5. Private aided schools have a private management body but receive financial aid from the government for their operation. They follow government mandated rules for hiring teachers and are not allowed to charge fees.

6. In our sample, on average, the percentage of parents in an SMC is 82%.

7. Based on these guidelines prescribed in the RTE act, Indian states enacted their respective state RTEs which have with specific details about constitution of SMC members and frequency of SMC meetings. For example, Andhra Pradesh RTE requires SMC meetings to be held once a month whereas Gujarat RTE prescribes SMC meetings four times in a year. The guideline pertaining to total number of SMC members and frequency of reconstitution of SMCs is also different for states however, role and responsibilities of SMCs in all states are derived from the guidelines of central RTE act.

8. However, the experience of states has been varied with active participation of SMCs in school management in some states.

9. https://tiss.edu/uploads/files/SMC_september_Web_2019_compressed.pdf.
https://ccs.in/internship_papers/2012/271_how-functional-are-school-management-commitees-in-the-present-context_sijan-thapa.pdf

10. UDISE integrates District Information System for Education (DISE) data on elementary and secondary schools. Before 2012-13, DISE data only covered elementary schools.

11. Note that the identifier code for the school in U-DISE changes following new district or state fomation from existing districts/states. We correct the school codes of such schools and make sure that the school code does not change for the same school.

12. This is not surprising given that there is no cost for not complying with the 50% reservation for women rule.

13. However states have their own rules for reconstitution of SMCs. For example, SMCs in Chhattisgarh are supposed to be reconstituted after every year whereas schools in Bihar and Karnataka can reconstitute these committees after three years.

14. This suggests that some teachers might be hired on a contract who then do not need to fulfill the professional qualification requirement.

15. Children usually start class 1 around the age of six in India. We therefore restrict our sample 7 year and older students for assessing their performance in grade two assessment tests.

16. We also check the robustness of our results to a much stricter specification where we cluster our standard errors at the district level.

17. We transform the variables with 0 values to 1 before taking the log tranformation.

18. Computer aided learning centers have been set up in Upper Primary Schools under *Sarv Shiksha Abhiyan* or by the State