Impact Of Vertical School Consolidation On School Choice, Dropouts, Exam Taking And Achievement

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Abstract

I examine the impact of vertical school consolidation on school choice, dropouts, exam taking, and achievement by exploiting its staggered roll-out in the Indian state of Rajasthan. My analysis reveals that consolidation of government grade 1–5 schools with government grade 6–10 schools increases the average school size, number of classrooms, teachers, and grades in government schools. Furthermore, I find that the preference for government schools declines, particularly among grade 1–5 children, and the number of dropouts among grade

1-5 children increases. My results also demonstrate that consolidation does not affect the number of takers or high scorers in primary and middle school completion exams. My heterogeneity analyses show that the impact of consolidation does not vary by gender or by grade within the grade 1-5 or grade 6-8 groups. However, the negative impacts of school consolidation are more pronounced among children from Scheduled Caste households.

JEL codes: I24; I25; I28; I38

Keywords: consolidation, children, education, enrollment, schooling

1 Introduction

School consolidation entails merging smaller schools to create large schools. Advocates of school consolidation maintain that larger schools offer cost savings per student, specialized teachers, and better resources for a greater number of children. Opponents of school consolidation, on the other hand, argue that small schools are more conducive to enhanced learning outcomes. They also contend that shutting down small schools would increase the distance to the new school and result in more students dropping out.

Previous studies have examined the effects of school consolidation on educational attainment and learning outcomes across various countries. Recent research, conducted in China, has found that school consolidation has a negative impact on educational attainment due to the increased distance to the new schools (Hannum et al., 2021; Hannum and Wang, 2022). Studies that have investigated the impact of consolidation on learning outcomes have yielded mixed results. For example, Berry and West (2010), Liu et al. (2010), Beuchert et al. (2018) and Taghizadeh (2020) have found negative impacts in U.S., China, Denmark and Sweden, respectively. Conversely, De Haan et al. (2016) observed a positive impact in the Netherlands, while Izadi (2015) found null effects in Finland. However, none of these studies have explored vertical school consolidation, which is the focus of my research. While previous literature has looked at across-village consolidations, school-district

consolidations, and the merging of multiple elementary schools, my study examines the impact of merging elementary and high schools within the same village. Furthermore, none of the previous studies have addressed the pertinent question of school choice, which is crucial in my research context, where private and government schools are close substitutes.

In this paper, I exploit the staggered implementation of vertical school consolidation in the Indian state of Rajasthan to assess its effects on enrollment and achievement outcomes. The government issued orders to merge an elementary school and a high school within the same village. An elementary school is any school which caters to any grades below nine and a high school is any school which caters to grade nine and above. As per the mandate, teachers from the closed elementary school were relocated to the recipient high school. While children from the closed school were not obligated to move to the recipient school, they were strongly urged to do so. By linking government consolidation orders with comprehensive administrative data encompassing the entire state of Rajasthan, I am able to analyze village-level enrollment and achievement data for grades one through eight. This allows me to gauge the impact of vertical school consolidation on school choice, dropout rates, exam participation, and academic performance among elementary grade students.

The school consolidation process typically entailed combining a government-run grade 1-5 school with a government-run grade 6-10 school in

the same village, thereby establishing a government-run grade 1-10 school. The grade 1-5 school before consolidation was relatively small, with about 70 students, 2 teachers, and 3 classrooms. Following consolidation, these students were expected to attend a larger school covering grades 1-10, with more teachers and classrooms.

A major challenge to estimating the impact of vertical consolidation in Rajasthan is that it was preceded by a nationwide school expansionary policy called the Right to Education Act of 2009. To ensure the generalizability of my findings to contexts where such policies did not precede consolidation, I conduct my analyses on villages that had the potential for consolidation even before the passage of the RTE Act. I classify a village as having consolidation potential if it had at least one "small" government elementary school, with low enrollment, few teachers, or inadequate infrastructure, and a government high school before 2009.

I adopt a heterogeneity-robust differences-in-differences estimator developed by Callaway and Sant'Anna (2021) to estimate the impact of vertical consolidation on school choice, dropouts, exam taking, and achievement outcomes. The identifying assumption of this strategy is that, in the absence of consolidation, outcomes would have evolved similarly across villages that experienced consolidation in earlier versus later years. By accounting for treatment heterogeneity and dynamic treatment, this strategy outperforms the two-way fixed effects estimator. Notably, the type of closed and recipient

schools varied by village in the Rajasthan consolidation, and follow-up consolidations occurred in some villages, rendering the Callaway and Sant'Anna (2021) estimator a reliable choice for my study.

This paper makes significant contributions to multiple strands of literature. First, it advances the research on the impacts of school access. While extensive literature exists on the impact of school expansion, as demonstrated by studies such as Duflo (2001), Andrabi et al. (2013), Burde and Linden (2013), Kazianga et al. (2013) and Neilson and Zimmerman (2014), there are comparatively limited studies on school contraction. School consolidations that have been evaluated previously occurred across school districts or villages. In contrast, my study evaluates the effects of school mergers within villages, which may have different implications. Additionally, previous studies have focused solely on schools directly affected by consolidation when determining school access. However, my study considers the presence of private schools as close substitutes to consolidated schools, an opportunity that has not previously been explored. Second, this paper advances the research on the impacts of grade configurations. Prior work on this topic has produced mixed results. For example, Anderson et al. (2020) found positive effects of combining primary and middle graders in a single school in China, while Cook et al. (2008) and Rockoff and Lockwood (2010) found negative impacts in the U.S., and Holmlund and Böhlmark (2019) found null impacts in Sweden. However, all of these studies explored the effects of moving from

separate primary and middle schools to a K-8 configuration on academic achievement. In contrast, my study examines the impact of moving to a grade 1-10 school, in a context where the completion of secondary education is highly valued, which is expected to yield different implications. Third, this paper contributes to the research on the impacts of school size. Prior studies in this area have produced mixed results. While some studies, such as Andrews et al. (2002), Leithwood and Jantzi (2009) and Kuziemko (2006), found that small schools contribute to better learning outcomes, others such as Lamdin (1995), Borland and Howsen (2003), and Crispin (2016), favored larger schools. My study extends this area of research by examining the impacts of school size in a context that has not been explored previously. Finally, this paper also contributes to the growing literature on consolidation in India. While Bhatnagar and Bolia (2019) provides a mathematical programming model for efficient school consolidation in India and, Bordoloi and Shukla (2019) offers a correlational study on the effect of consolidation in Rajasthan, my study advances this field by providing causal estimates for its impacts across several policy-relevant outcomes.

I present evidence that consolidation in Rajasthan complied with government orders, enabling me to interpret my estimates as average treatment-on-the-treated effects. My findings reveal that vertical school consolidation increases the average school size of government schools by thirty percent, the number of classrooms by one, the number of teachers by two, and the num-

ber of grades by two. Additionally, consolidation results in a decrease in the number of children enrolled in government schools, particularly among grade 1-5 students. Suggestive evidence indicates that this could be due to private schools being more conveniently located than consolidated schools or could be caused by a simultaneous increase in the number of private schools due to the spillover effects of consolidation or because the quality of the consolidated schools is perceived to be unsatisfactory.

I also find that consolidation leads to an increase in the number of school dropouts among grade 1-5 students. This could be driven by the larger distance to the consolidated school or because children who previously attended small schools perceive the atmosphere of the large consolidated schools as unwelcoming. Moreover, I demonstrate that the number of takers of primary and middle school completion exams is not affected by school consolidation. I show that consolidation decreases the pupil-teacher ratio and the prevalence of multi-grade teaching, but there is an increase in the number of children per classroom. Nevertheless, I demonstrate that consolidation does not affect the number of high scorers in the primary and middle school completion exams.

My heterogeneity analysis reveals that the impact of consolidation on school choice or dropouts does not differ by gender, or by grade within each of the grade 1-5 or grade 6-8 groups. However, consolidation has a differential impact on children based on their social status, with consolidation leading

to a higher preference for private schools and a greater impact on dropouts among children from Scheduled Caste households. In addition, I demonstrate the robustness of my estimates by excluding villages where multiple schools were closed, as well as high-quality public schools at the block (cluster of villages) level.

2 Background and Institutional Detail

The majority of children in Rajasthan, as in all Indian states, attend government schools. However, the types of schools they attend vary widely. There are schools which cater to only grades 1-5, grades 6-10, grades 1-10, grades 1-8, grades 9-10 and grades 6-8. The number of grade 1-5 schools exceeds all other types, owing to India's historical focus on universalizing primary education.

The types of schools that students can potentially enroll in can have a significant impact on their school choice, dropout decisions, exam participation, and academic achievement. Since 2009, the government has mandated that education be provided for free in government schools up to grade 8, but enrollment is not compulsory. Children are free to choose between attending government or private schools, dropping out at any grade, or taking primary or middle school completion exams. In any grade, children cannot be held

back, and it is reasonable to assume that every child who takes the exams passes. However, there may be variation in the scores they obtain.

Rajasthan became the first Indian state to implement school consolidations at scale in 2014. Typically, a village would have multiple government grade 1-5 schools and one government grade 6-10 school, in addition to several non-government schools. Often, resources are stretched thin across the government grade 1-5 schools, resulting in low enrollment, few teachers since teacher appointments in primary schools are proportional to enrollment, and inadequate infrastructure (Bhatnagar and Bolia, 2019). The Rajasthan government decided to implement vertical consolidations across its villages, whereby a government elementary school would be merged with a government high school.

Vertical consolidation meant the closure of at least one government elementary school in each village coupled with ensuring a government grade 1-10 school. Figure 1 shows that there has been a 21% decline in the number of government schools in Rajasthan since the onset of consolidation. Moreover, Figure 2 illustrates a decline in the number of government grade 1-5 and grade 6-10 schools since 2014, accompanied by an increase in the number of government grade 1-10 schools. The teachers from the closed schools were mandated to relocate to the recipient schools, and children were strongly encouraged to transfer, although it was not mandatory. Under the consolidation plan, all infrastructure of the recipient schools was made available

to children and teachers from the closed schools. The government aimed to establish the consolidated school as a 'model' for other schools in the village, and committed to appointing a principal in each consolidated school. Consolidation provided children with access to a larger school that offered more grades and teachers.

The potential decrease in access to primary schooling is a common concern regarding vertical school consolidations. Previous consolidations in other developing countries have indeed been shown to reduce school access (Hannum et al., 2021; Hannum and Wang, 2022). However, this worry is less relevant in the Indian context, given the vast number of schools available. According to CPI (2018), there is one school for every 187 children in India. Moreover, I show in Appendix Figure A.I that the distance to the nearest school catering to grades 1-5 remains within 3 kilometers (1.8 miles) for all households in Rajasthan, even after consolidation.

It is important to note that the school consolidation process in Rajasthan was not a one-time event and that there was variation in the types of consolidations across villages. Some villages underwent subsequent consolidations where additional elementary schools were merged with previously consolidated grade 1-10 schools. While recipient schools mostly served grades 6-10 prior to consolidation, there were also grade 9-10 or grade 1-10 recipient schools. While the majority of the closed schools were grade 1-5, there were instances where grade 1-8 or grade 6-8 schools were also closed. Additionally,

while most consolidations involved the closure of a single grade 1-5 school, there were cases where multiple schools were closed in the same consolidation event.

3 Data

I use a panel dataset at the village level, which links government orders on school consolidation to primary and middle school data from the Unified District Information System for Education (U-DISE) between 2008 and 2017. The government orders provide the year in which consolidation was intended to happen in a village. The U-DISE data covers enrollment information by school type, grade, gender, and social class, as well as exam taking and achievement at primary and middle school completion. Additionally, U-DISE provides information on school inputs, including teachers and classrooms.

One of the major challenges in estimating the impact of vertical consolidation in Rajasthan is that it was preceded by a nationwide school expansionary policy. In 2009, the Right to Education (RTE) Act was passed in India with the objective of ensuring access to schooling in every neighborhood by 2013. As a result, the number of elementary and high schools increased across the country. Appendix Figure A.1 shows that there was an increase in the number of government grade 1-5, grade 6-10, grade 1-10, and grade 9-10 schools in Rajasthan between 2009 and 2013. This increase in schools could have

influenced consolidation decisions, as more villages had newer elementary and high schools to merge. To ensure that my findings can be generalized to contexts where it was not preceded by any school expansionary policies, I conduct my analyses on villages which had the potential for consolidation even prior to the passing of the RTE Act.

I define a village as having consolidation potential in a year if the village has a government high school and at least one "small" government elementary school in that year. I categorize an elementary school as "small" if it has (1) low enrollment or (2) one or two teachers or (3) bad infrastructure, consistent with prior literature (Diwan, 2012). I consider the enrollment in an elementary school to be low if it has less than 100 children. I consider the infrastructure in an elementary school to be bad if more than 50% of its classrooms need major repairs. Figure 3 presents the number of villages with consolidation potential by year. I estimate the impact of vertical consolidation using the 5803 villages that had the potential for consolidation in the baseline year of 2008, which was prior to the passing of the RTE Act. I report the sample size changes resulting from these sampling restrictions in Appendix Table A.II.

I analyze various outcomes of consolidation. To begin, I investigate five intermediate outcomes, which consist of the proportion of government schools with a principal, school size, number of classrooms in a government school, number of teachers in a government school, and number of grades in a gov-

ernment school. These outcomes are expected to be immediately impacted by consolidation. Moving forward, I assess school choice, which is measured as the proportion of school-enrolled children who attend government schools. State government-run schools, which comprise 73% of all schools at baseline, and private schools, which make up 25% of schools, are the two primary options available to students, with the former being the more prevalent choice. Additionally, I explore dropouts, which are measured as the proportion of children who have left school. While the ideal way to calculate the number of school dropouts is by determining the difference between the number of school-aged children in a village and the number of school-enrolled children, the U-DISE lacks information on the former. To address this limitation, I employ the number of school-enrolled children in the preceding year as a proxy for the total number of school-aged children in a village. The number of dropouts in year t is then computed as the difference between the number of school-enrolled children in the previous year *t-1* and the current year t. In addition, I examine exam-taking behavior, measured as the proportion of children who take the primary school and middle school completion exams. Lastly, I investigate achievement, measured by the proportion of high scorers in the primary and middle school completion exams. Although U-DISE data does not reveal exam scores, it does report the number of children who score more than 60% in the grade 5 and grade 8 completion exams.

Table I displays baseline summary statistics of my sample. On average, each village has six schools, of which three are government elementary schools, one is a government high school, and two are non-government schools. About 91% of the non-government schools are private schools that do not receive any aid from the government. I discuss the composition of non-government schools in more detail in a later section under Falsification checks. There are around 821 children enrolled in schools within a village, with 66% of them enrolled in government schools. Additionally, 12% of children who were enrolled in schools the previous year dropped out of schools. Grade 5 and grade 8 exams mark the completion of primary and middle school, respectively, and there are 181 potential grade 5 and grade 8 exam takers in a village. About 83% of them take the exams, and 52% of them score more than 60% on the exams. In Appendix Table A.III, I present baseline summary statistics separately for the four types of villages that are categorized by consolidation status. It seems that across consolidation years, the smaller villages with lower enrollment and fewer schools were intended to get consolidated in earlier phases than larger villages. Apart from this, most of the baseline characteristics are similar across the four types of villages, although this is not necessary for my empirical strategy to generate unbiased estimates.

4 Empirical Strategy

I employ a heterogeneity-robust differences-in-differences (DID) strategy to identify the impact of vertical consolidation on school choice, dropouts, exam takers, and achievement outcomes. The changes in outcomes are compared between villages that are affected by the policy and those that are not affected.

The government orders on consolidation provide information on the year in which consolidation was intended to happen in a village, and there were three such years between 2008 and 2017 namely 2014, 2016, and 2017. Therefore, my sample comprises four types of villages: those where consolidation was intended to happen in 2014, 2016, 2017, and those that were never consolidated.

My key identifying assumption is that outcomes for the four types of villages would have evolved similarly if consolidation orders were not passed. Although I cannot test this assumption directly, I present suggestive evidence of its validity across all outcomes of interest. Changes in relative outcomes coincide with the consolidation years, with few changes in the preceding or subsequent years.

I use the two-way fixed effects (TWFE) regressions to present a visual preview of the impact of consolidation on all outcomes of interest in an

event study framework. TWFE estimations are the most-commonly used technique to estimate the effect of a policy by exploiting the differential timing of exposure to the policy by different groups (Chaisemartin and D'Haultfœuille, 2022). This is implemented by regressing the outcome in group g at period t on group fixed effects, period fixed effects and $D_{g,t}$ which is the treatment status of group g in period t. For my purpose, the estimating equation takes the following form:

$$Y_{vt} = \alpha_0 + \sum_{j=-m}^{-2} \beta_j D_{v,t+j} + \sum_{j=0}^{n} \beta_j D_{v,t+j} + \gamma_v + \mu_{dt} + \epsilon_{vt} \tag{1}$$

where the outcome of interest in village v in year t is denoted by Y_{vt}. Village fixed effects γ_v are included to account for time-invariant village-specific confounders, and district-year fixed effects μ_{dt} are included to account for district-year specific confounders that are village-invariant. In India, a district is an administrative division within states that consists of multiple villages. An indicator $D_{v,t+j}$ turns on when village v at time t has been consolidated for j years. For non-consolidated villages, $D_{v,t+j}$ remains 0 across all years.

Recent research has shown that if the treatment effect is not constant between groups and over time, TWFE estimators are biased for an average treatment effect (Chaisemartin and D'Haultfœuille, 2022). In the earlier sec-

tion on Background and Institutional Detail, I presented that consolidation is not constant between groups. For instance, the effect of consolidation is likely to be different in villages where multiple grade 1-5 schools closed than in villages where a single grade 1-5 school closed. Similarly, the effect of consolidation is likely to be different in villages where the recipient schools are grade 6-10 schools than in villages where the recipient schools are grade 1-10 schools. Thus, there is heterogeneity in treatment between villages in my sample.

I visually preview the effect of intent to consolidate on actual consolidation in an event study framework as estimated by Equation 1. This allows me to observe if the treatment effect is constant over time. Figure 4 demonstrates that consolidation occurred in accordance with government orders and that the treatment is not constant over time. I analyze an indicator variable that identifies whether a village possessed a government grade 1-10 school and experienced at least one government school closure in a given year. My findings indicate that the probability of a village meeting these criteria increased by 95% in the year of consolidation, which allows me to interpret the estimates as the average treatment-on-the-treated (ATT) effects rather than as the intention-to-treat (ITT) effects. The remaining 5% of cases involved mergers across elementary schools, and, in some instances, school closures without associated mergers. Furthermore, my analysis reveals that two years after consolidation, the probability of a village having a gov-

ernment grade 1-10 school and experiencing at least one government school closure increased by 16%, while this figure rose by 4% three years after consolidation. I attribute this increase to follow-up consolidations within the same village in subsequent waves of consolidation, which I explain in detail. For the purposes of my study, I consider the first year in which consolidation occurs in a village as its consolidation year. To illustrate, I label a village as a 2014 consolidated village if it underwent school consolidation for the first time in that year. It is important to note that subsequent government orders in 2016 and 2017 may have led to additional government schools being merged into the same government grade 1-10 school that was consolidated in 2014. In my sample, 13% of 2014 consolidated villages underwent follow-up consolidations in 2016, while 7% experienced them in 2017. Additionally, 5% of 2016 consolidated villages underwent follow-up consolidations in 2017. This shows that treatment is not constant over time in my sample.

As consolidation varies over time and between groups, I opt not to use the TWFE estimators for the ATT estimates. Instead, I present heterogeneity-robust DID estimates for the ATT that account for dynamic effects, as offered by Callaway and Sant'Anna (2021). Nevertheless, I utilize the TWFE coefficients estimated by Equation 1 to provide a visual preview of all the outcomes of interest in an event study framework.

5 Results

Across all the intermediate and main outcomes, I first preview the TWFE coefficients visually in an event study framework following which I report the Callaway and Sant'Anna (2021) estimates.

The event study specifications are useful for assessing my assumption that the villages consolidated across years and the non-consolidated villages would have moved in a parallel manner in the absence of consolidation. This assumption would be less credible if all the villages were not moving in a parallel manner prior to consolidation. In each of the event study figures, I see that outcomes across all villages trend similarly prior to consolidation. This suggests that my underlying assumption of similar outcomes across all villages in the absence of consolidation, is reasonable. Following consolidation, I find that a government school in a village has higher enrollment, has more number of teachers, classrooms and grades. Further, I also find that consolidation increases the number of students switching from government to private schools and the number of dropouts among grade 1-5 children. Consolidation does not impact exam taking behavior or the number of high scorers in a village. The number of children switching from government to private schools and the number of school dropouts are higher among Scheduled Caste (SC) groups.

Intermediate outcomes: I find that vertical school consolidation increases the average school size by 29%, the average number of classrooms in a government school by one, the average number of teachers by two and the average number of grades by two. Figure 5 presents the TWFE estimates of the impact of consolidation on intermediate outcomes, specifically on the presence of a principal in a school, the average school size, the average number of classrooms, the average number of teachers, and the average number of grades in government schools. The primary objective of consolidation was to provide better resources to a larger number of children. Initially, children attending closed schools had access to a mere two teachers and three classrooms on average, whereas recipient schools had six teachers and six classrooms. Consolidation aimed to broaden access to superior school inputs, including principals, more classrooms, and more teachers in the recipient schools, for children from the closed schools. Furthermore, consolidation aimed to enhance the number of grades available within government schools by merging grade 1-5 schools with grade 6-10 schools to establish grade 1-10 schools. The results of my analysis evince that consolidation had a salutary effect on the number of government schools with a principal, which rose by 2 percentage points after the first year and by 8 percentage points after three years. The average size of government schools also ascended by 31 students in the consolidation year, translating to a 30% increase from the baseline mean of 102 students. Moreover, the average number of classrooms increased by one, the average number of teachers by two after the first round of consolidation,

and by three after follow-up rounds, and the average number of grades by two across government schools in a village.

In Panel 1 of Table II, I present estimates for the impact of school consolidation on intermediate outcomes using the methods proposed by Callaway and Sant'Anna (2021) which is my preferred specification. My findings suggest that the number of government schools with a principal increased by 3 percentage points, although this increase is not statistically significant. I also find that consolidation augmented the average school size of government schools by 30 children, the average number of classrooms in a government school by one, the average number of teachers in a government school by two, and the average number of grades in a government school by two. These results underscore that amalgamating multiple schools as part of consolidation resulted in larger government schools within villages in terms of enrollment, number of classrooms, number of teachers, and number of grades.

School choice: I find that vertical school consolidation decreases the number of children enrolled in government schools by 4 percentage points, with a decline of 6 percentage points for grade 1-5 children and 2 percentage points for grade 6-8. Figure 6 depicts the TWFE estimates of the effect of consolidation on the proportion of children enrolled in government schools out of the total enrollment in a village. India has recently witnessed a significant reduction in the government school sector, favoring private schools (Kingdon, 2020). As consolidation continues to be implemented in various Indian states

(Goyal, 2018) and nationally through the National Education Policy (NEP) 2020 (Kumar and Varghese, 2022), it is crucial to comprehend its role in this shift. Despite aiming to enhance the appeal of government schools, my TWFE estimates suggest that consolidation has exacerbated the transition towards private schools, leading to a 4 percentage point decline in government school enrollment within a village. With a baseline enrollment of 821 children in a village, this implies that 33 students have switched from government to private schools. Additionally, this trend was more pronounced among grade 1-5 students, who encountered a 5 percentage point decline in government school enrollment, compared to a 3 percentage point drop among grade 6-8 students. Appendix Figure A.2 illustrates that within a village, 27 grade 1-5 students and 8 grade 6-8 students moved from government to private schools during the consolidation year. The Callaway and Sant'Anna (2021) estimates presented in Panel 2 of Table II indicate that the number of children enrolled in government schools declined by 4 percentage points (33 children), with grade 1-5 children experiencing a 6 percentage point (33 children) decline, and grade 6-8 children experiencing a 2 percentage point (5 children) decline. These estimates are robust even when accounting for any consolidation-related school dropouts by examining the impact of consolidation on the proportion of children enrolled in government schools out of potential enrollees.

My findings indicate that consolidation serves as a crucial decision point for parents who teetered on the brink of switching their children from government schools to private schools. This suggests the possibility of multiple channels at play. Firstly, the closure of government elementary schools may have rendered private schools more conveniently located than the recipient schools. Consequently, children who attended closed grade 1-5 schools may prefer enrolling in a private school than attending the recipient 'model' school. I present suggestive evidence supporting this possibility in Panel 1 of Appendix Table A.IV. Although not statistically significant, I show that the number of people who cite having a private school more conveniently located as the primary reason for sending their grade 1-5 child to a private school increases by 4 percentage points after consolidation. Secondly, the establishment of grade 1-10 government schools in a village may have prompted the opening of new grade 1-10 private schools. Parents may consider a grade 1-10 government school more desirable because their children can complete their secondary education in the same institution without having to apply to a new school after a few grades. This may present a challenge to private schools, prompting them to convert their schools to grade 1-10 or open new grade 1-10 schools. This, in turn, may encourage parents to send their children to private schools if the only reason they would have preferred a government school to a private school was the latter's inability to cater to high school grades. In Panel 2 of Appendix Table A.IV, I show that this channel is plausible. As a spillover effect of consolidation, the number of grade 1-10 private

schools in a village increases by 0.24. I also show that the magnitude of the impact of consolidation on private school preference is twice as much in villages where new grade 1-10 private schools were established versus other villages. Thirdly, parents may perceive consolidation as a compromise on quality, given that more children are being accommodated in existing infrastructure. Such a perception could prompt children in grades 1-5 and 6-8 to switch to private schools, which are generally deemed to offer higher quality education. In Panel 3 of Appendix Table A.IV, I provide suggestive evidence that this channel is plausible. Although not statistically significant, there is 2 percentage point increase in the number of people who cite unsatisfactory quality in nearby government school as the primary reason for sending their grade 1-5 or grade 6-8 child to a private school.

Consolidation's impact on school choice has financial implications on parents of children who switch from government to private schools. As reported by Kelly et al. (2016), the average annual fee for a grade 1-5 child in a government school in Rajasthan is INR 190.7 (USD 2.32), while in a non-government school, it amounts to INR 2522.5 (USD 30.66). Similarly, for a grade 6-8 child, the average annual fee in a government school is INR 318.5 (USD 3.87), while in a non-government school, it stands at INR 3879.65 (USD 47.15). Due to consolidation, there is an annual increase of INR 2,331.8 (USD 28.34) for 33 grade 1-5 children and INR 3,561.15 (USD 43.28) for 5 grade 6-8 children in each village.

School dropouts: I find that vertical school consolidation heightens school dropouts among grade 1-5 children by 2 percentage points. Figure 7 illustrates the TWFE estimates of the impact of consolidation on the proportion of school dropouts among potential enrollees within a village. While achieving near-universal access to basic education, high dropout rates remain a significant challenge for the education sector in contemporary India (Nakajima et al., 2018). In the baseline year, 12% of grade 1-8 children drop out of school in a village, which is similar to the 11.5% rate reported by Gouda and Sekher (2014) for the state of Rajasthan using the National Family Health Survey - 3 dataset from 2005-06. Given the pressing concern of school dropouts in India, it is crucial that current policies do not exacerbate this problem. However, my TWFE estimates reveal that consolidation leads to a 2 percentage point increase in the number of school dropouts within a village. I calculate this number by subtracting the number of grade 1-7 school enrolled children in the village in year *t-1* from the number of grade 2-8 school enrolled children in the village in year *t*. The outcome of interest is the proportion of school dropouts in year t out of the total number of grade 1-7 school enrolled children in year *t-1*. Note that the year 2008 which corresponds to event year=-9 in the figure, thus does not have any observations. With a baseline mean of 729 grade 1-7 school enrolled children in a village, my estimates indicate an additional 15 children drop out of school in a village due to consolidation. This effect is more pronounced among grade 1-5 students (3 percentage points, or 17 dropouts) than among

grade 6-7 students (1 percentage point, or 2 dropouts). Panel 3 of Table II presents the estimates from Callaway and Sant'Anna (2021), indicating that consolidation did not result in a statistically significant change in the number of dropouts across all grades or for grades 6-7 children. However, I find that consolidation increases school dropouts by 2 percentage points (11 children) among grade 1-5 children, which is comparable to the impact of lack of parental involvement on the likelihood of children dropping out of school (Paul et al., 2021).

My findings reveal that consolidation can be a reason for some grade 1-5 students dropping out of school, driven by various channels that I analyze in Appendix Table A.V. Firstly, some grade 1-5 students may have to travel farther to reach the school post-consolidation, which could discourage some of them from continuing their education. While I have previously demonstrated that every household in Rajasthan has access to a school catering to grades 1-5 within a 1.8-mile radius even after consolidation, some students may find the relatively larger distance to the new school compared to the closed ones daunting (DailyO, 2014). In the first row of Appendix Table A.V, I present suggestive evidence that this may be the case. Although not statistically significant, there is a 2 percentage point increase in the number of grade 1-5 dropouts who indicate that the primary reason for leaving school is the long distance to the school. I obtain this estimate by comparing responses from grade 1-5 dropouts and grade 6-8 dropouts in Rajasthan

and other Indian states before and after consolidation. Secondly, I find that the financial constraints imposed by increased preference for private schools among grade 1-5 students may not be a significant reason for dropping out, which I explore in the second row of Appendix Table A.V. I find that the number of grade 1-5 students who left school due to financial constraints decreased. Thirdly, my research suggests that the transition from a smaller grade 1-5 school to a larger grade 1-10 one may make the school seem less welcoming to the students, potentially leading to increased dropouts among grade 1-5 students. In the final row of Appendix Table A.V, I present evidence supporting this channel. Although not statistically significant, there is a 0.1 percentage point increase in the proportion of students who cite an unfriendly school atmosphere as the primary reason for dropping out of school.

Exam takers: I find that vertical school consolidation does not affect grade 5 or grade 8 exam taking behavior. Grade 5 denotes the culmination of primary school (grades 1-5), while grade 8 signifies the end of middle school (grades 6-8). Although U-DISE provides data on the number of grade 5 and grade 8 exam takers annually, the total number of grade 5 and grade 8 aged children in a village by year is unknown. To address this limitation, I estimate exam-taking behavior among potential exam takers by focusing on the proportion of grade g exam takers in year t relative to the number of children enrolled in grade *g-1* in year *t-1*. By considering potential grade g

exam takers in year t as those who were in grade *g-1* in year *t-1* rather than those who were in grade g in year t, I can eliminate the impact of selection into schooling in year t due to consolidation. This is critical because I find earlier that some children dropped out of school due to consolidation.

Exam-taking behavior varies by school type. In government grade 1-10 schools, 94% of potential exam takers take the grade 5 exams, while only 43% take these exams in government grade 1-5 schools. Similarly, in government grade 1-10 schools, 100% of potential exam takers take the grade 8 exams, while only 95% take these exams in government grade 6-10 schools. Given that children transition from government grade 1-5 and grade 6-10 schools to a more structured grade 1-10 school as a result of consolidation, I expect exam-taking behavior to be affected.

Figure 8 depicts the TWFE estimates of the impact of consolidation on the proportion of potential grade 5 and grade 8 exam takers in a village. My TWFE estimates reveal a 12 percentage point increase in the number of grade 5 exam takers, a year after consolidation and no change in the number of grade 8 exam takers. It is important to note that data on exam takers are only available for the years 2008, 2013, 2014, 2015, and 2016, and therefore, the coefficients in event years -9, -8, -7, -6, -5, and 3 are missing. Panel 4 of Table II presents Callaway and Sant'Anna (2021) estimates indicating that consolidation does not lead to a statistically significant change in the number of grade 5 or grade 8 exam takers within a village.

High scorers: I find that vertical school consolidation has no effect on the number of high-scoring grade 5 or grade 8 exam takers in a village. Figure 9 displays the TWFE estimates that demonstrate the impact of consolidation on the proportion of high-scorers among potential exam takers in a village. Although consolidation policy did not claim to improve academic outcomes, it is still of interest whether studying in a school with more teachers, classrooms, and grades can affect academic performance. My findings indicate that consolidation does not affect the number of high scorers among grade 5 or grade 8 exam takers. Panel 5 of Table II displays the estimates by Callaway and Sant'Anna (2021) which also confirm that consolidation has no impact on the proportion of high scorers among potential exam takers in grades 5 and 8.

Consolidation improved teacher availability per child, but it also reduced classroom availability. However, my finding, which is consistent with prior literature (Muralidharan and Prakash, 2017; Borkum et al., 2012; Kingdon and Teal, 2010; Muralidharan and Sundararaman, 2011), is that these changes did not affect learning outcomes. Government grade 1-5 schools had an average of 70 children across 5 grades, 2 teachers, and 3 classrooms at baseline. After consolidation, these children and teachers were relocated to recipient schools that had an average of 121 children across 7 grades, 6 teachers, and 6 classrooms at baseline. The average pupil-teacher ratio in government schools at baseline was 29:1, and each teacher had to teach at least two grades simul-

taneously. Government schools in the villages had an average of 26 children per classroom. Appendix Table A.VI shows that consolidation reduced the pupil-teacher ratio by 2 and the number of grades each teacher had to teach at the same time by 0.4. The number of children per classroom increased by 3. Nevertheless, these changes did not translate into any changes in the number of high scorers in the village.

Heterogeneity: Table III investigates whether consolidation had a heterogeneous impact on school preference and dropouts based on gender and social class (proxied by an indicator of whether the student belongs to a SC household [1]), as the effects of consolidation may vary based on student characteristics.

In the first two columns of Table III, I examine whether the impact of consolidation varied by gender of the children. Gender inequality is a pressing issue in Rajasthan, which ranks among the bottom four Indian states on the Gender Equality Index (National Institution for Transforming India, 2023). Notably, girls are less likely to be enrolled in private schools than boys (Kumar and Choudhury, 2021). Baseline data indicates that among grade 1-5 children, 30% of girls attended private schools compared to 41% of boys. Among grade 6-8 children, the respective figures were 25% and 34%. Girls also lag behind boys in educational attainment (Goel and Husain, 2018), with

[1]Scheduled Caste households are those who have historically faced social, educational and economic deprivation due to their perceived 'low status' in the Indian caste hierarchy

15% of girls dropping out from school compared to 14% of boys in grade 1-5, and 12% of girls dropping out compared to 11% of boys in grade 6-8 at baseline. Given that consolidation resulted in some children switching from government to private schools and others dropping out, it was expected that more boys would switch to private schools and more girls would drop out. Surprisingly, however, the proportion of girls in government schools declined similarly to that of boys across both grade groups, while the increase in the proportion of dropouts among girls was similar to that of boys.

In the last two columns of Table III, I investigate whether the impact of consolidation varied by social class of the children. In this context, a child's caste is a key predictor of the type of school they attend, with SC children more likely to attend government schools (Kelly et al., 2016). At baseline, 74% of grade 1-5 SC children attended government schools compared to 61% of non-SC children, while 77% of grade 6-8 SC children attended government schools compared to 68% of non-SC children. Unfortunately, SC children also have a higher dropout rate (Gouda and Sekher, 2014). One would expect that consolidation would have resulted in more non-SC children switching to private schools and more SC children dropping out of school. However, the data provides some surprising results. The number of grade 6-8 children switching from government to private schools was similar across both SC and non-SC groups, as was the number of dropouts. Interestingly, the proportion of grade 1-5 children in government schools declined by 8 percentage points

among SC children, compared to a 6 percentage point decline among non-SC children. The proportion of grade 1-5 dropouts increased by 2 percentage points among SC children, compared to a 1 percentage point increase among non-SC children. When consolidation necessitates children to move to larger schools that are more diverse in terms of social class, SC children may prefer attending private schools instead or drop out of school.

In Appendix Table A.VII, I also demonstrate that there are no varied effects of consolidation on school preference or dropouts by grade level within the grade 1-5 and grade 6-8 groups. Unfortunately, data limitations prevent me from exploring whether consolidation had diverse effects on the number of exam takers and high scorers by gender and social class. Overall, the impact of consolidation on school preference and dropouts appears to be relatively uniform across gender and social class, with the exception of a higher percentage of grade 1-5 SC children switching from government to private schools and dropping out of school.

6 Falsification and Robustness Checks

Falsification check: I use Figure 10 as a falsification check to school consolidation. The figure displays how the probability of a village having a non-government grade 1-10 school and experiencing a non-government school closure changes with consolidation orders pertaining to that village. Private

unaided schools make up 91% of the non-government schools at baseline, while 3% are madrasas (centers where basic literacy and Islamic education are provided to Muslim students), 0.2% are central government schools, and the remaining 5.8% are social welfare schools (residential schools established for children from poor Scheduled castes, Scheduled tribes and Other Backward Class communities), unrecognized schools, private aided schools, and so on. Since consolidation aimed to merge only government schools in a village, one would not expect any impact of intent to consolidate on consolidation among non-government schools. This expectation holds true here. In Appendix Figure A.3, I provide additional supportive evidence that vertical consolidation does not affect any of the intermediate outcomes among non-government schools.

Multi-closure villages: In the first column of Table IV, I examine whether my estimates remain robust if I exclude villages with multiple school closures. 22% of the sampled villages experienced closure of multiple grade 1-5 schools during a consolidation event. One would worry that villages with multiple school closures may lead to larger inequality in access to schools (Lee and Lubienski, 2017) which may be driving my results. However, I find that my estimates remain unchanged even after excluding such villages.

Block level model schools: In the second column of Table IV, I investigate whether my estimates are robust if I exclude block level model schools. A key assumption underlying my empirical specification is that there are no

concurrent policy changes that affect the outcomes of interest. However, the initiation of block level model schools, which are high-quality public schools, can potentially influence academic outcomes positively (Reddy, 2020), and thus, violate this assumption. I present results after excluding block level model schools and my results are unchanged.

7 Discussion/Conclusion

My findings demonstrate that vertical school consolidation successfully merged schools within a village, creating larger schools with more classrooms and teachers, and the capacity to cater to more grades. Consolidation increased the average size of government schools in Rajasthan by 30 students, leading to a cost savings of INR 131.59 (USD 1.6) per student for the government, which is equivalent to 1% of the government's total per-pupil expenditure.

Moreover, my analysis reveals that consolidation has significant implications for school choice, as it often drives children away from government schools towards private schools. Although the financial cost of sending a child to a private school is only about 9% of the annual lowest possible individual wage (Kingdon, 2020), there is no evidence to suggest that these low-fee private schools offer better learning outcomes than government schools (Chudgar and Quin, 2012). Therefore, it is crucial for policymakers to take

steps to ensure that consolidation does not trigger an exodus of children from government schools. These steps could include bundling consolidation orders with regulations on simultaneous private school expansion, highlighting the benefits of model schools to parents, and encouraging children from closed schools to transfer to the consolidated schools.

I also find that consolidation increases school dropouts among grade 1-5 children. Despite the availability of adult education programs that specifically target school dropouts like these children, research has shown that these programs have not been successful in improving literacy (Deshpande et al., 2023). Therefore, it is essential for policymakers to take measures to prevent such an outcome. In choosing which schools to close down, it is important to engage in conversations with the affected community to determine whether the relative distance to the consolidated school is an inconvenience. Additionally, initiatives should be implemented during the consolidation process to create a more welcoming environment for children who are transitioning from closed schools.

Overall, my research suggests that while consolidation creates larger schools and reduces the government's per-pupil expenditure, it also leads to a decline in the number of children studying in government schools and an increase in school dropouts. Additionally, there is no change in exam taking or achievement of children. To mitigate these negative effects, government officials must take a series of steps, including having conversations with po-

tentially affected communities, bundling consolidation with regulation on private school expansion, increasing awareness campaigns on the quality of school inputs, and initiating nudges to children to transfer from closed to consolidated schools. Future research should examine the long-term impacts of consolidation on student learning.

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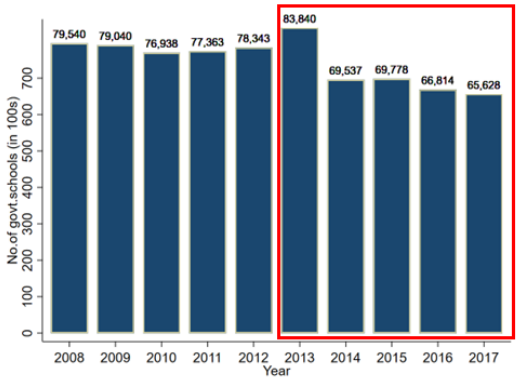
Tables & Figures

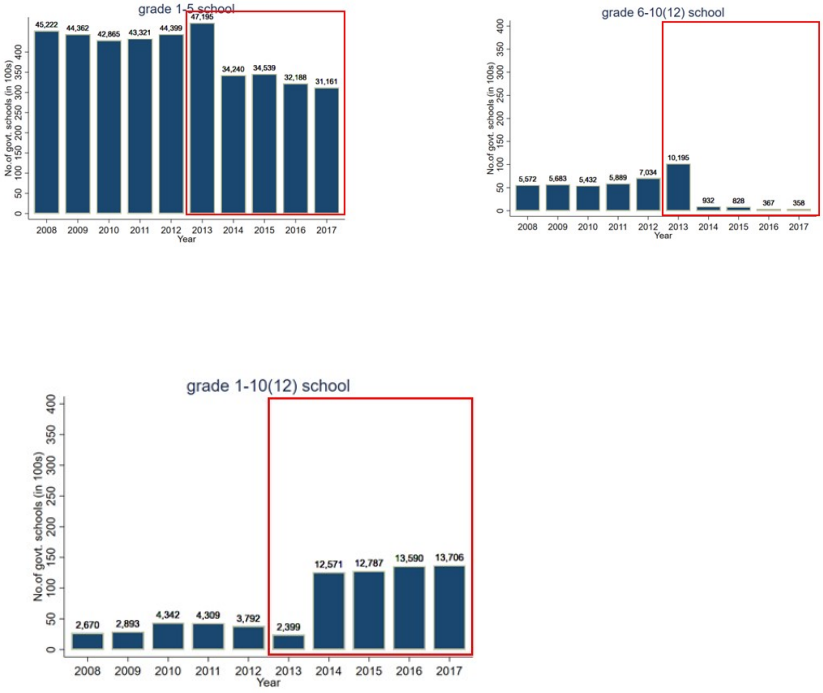
Figure 1: Number of govt.schools over years: Rajasthan



Notes: This figure presents the number of government schools in Rajasthan during the period of analysis. The years of particular interest are 2014, 2016 and 2017 where number of government schools in Rajasthan declined. These years correspond to the three waves of school consolidation.

Source: U-DISE data from 2008-2017.

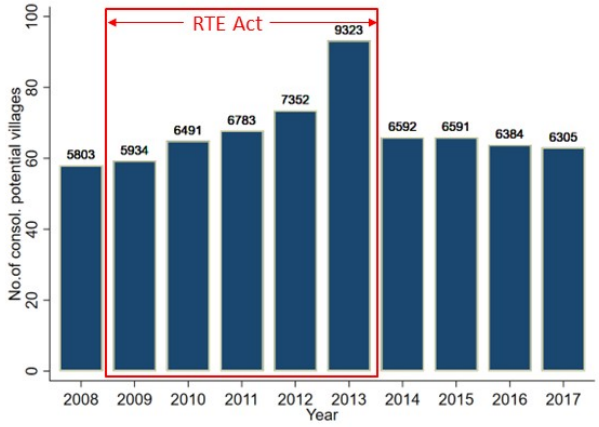
Figure 2: Number of govt. schools by type over years: Rajasthan



Notes: These figures present the number of government schools by type, during the period of analysis. The schools are categorized into types based on the grades to which they cater to. The years of particular interest are 2014, 2016 and 2017 which correspond to the three waves of school consolidation. Appendix Figure A.1 presents the number of government schools for more types of schools.

Source: U-DISE data from 2008-2017.

Figure 3: Number of villages with potential for consolidation over years: Rajasthan



Notes: This figure presents the number of villages which had the potential for consolidation over years. I define a village as having consolidation potential in a year if the village has a government high school and at least one "small" government elementary school in that year. I categorize an elementary school as "small" if it has (1) low enrollment or (2) one or two teachers or (3) bad infrastructure. I label a school as having bad infrastructure if more than 50% of the school's classrooms need major repair.

Source: U-DISE data from 2008-2017. Sample restricted to a balanced panel of villages.

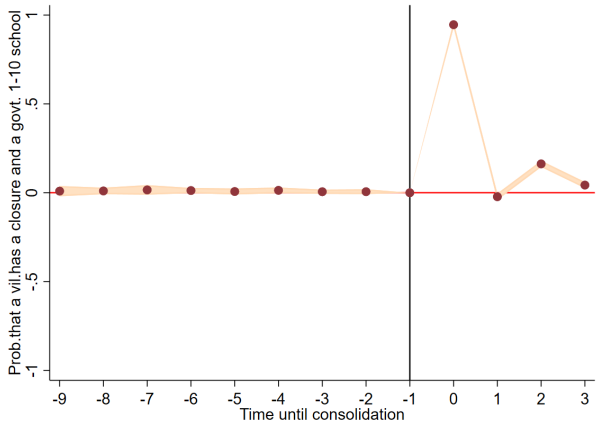
TABLE I: BASELINE VILLAGE-LEVEL SUMMARY STATISTICS

	Mean (sd)
No. of schools in a vil.	6.713
	(6.894)
No. of govt. elementary schools in a vil.	3.395
	(3.109)
No. of govt. high schools in a vil.	1.105
	(0.380)
No. of non-govt. schools in a vil.	2.213
	(4.507)
No. of school enrolled children in a vil.	821.249
	(1,038.275)
Prop. of total enrollment in govt. schools	0.662
	(0.259)
Prop. of school dropouts in a vil. (2009)	0.124
	(0.124)
No. of potential grade 5 and 8 exam takers in a vil. (2013)	181.339
	(199.442)
Prop. of grade 5 and 8 exam takers in a vil. (2013)	0.826
	(0.386)
Prop. of grade 5 and 8 exam high scorers in a vil. (2013)	0.521
	(0.423)
Observations	5803

Notes: This table present baseline village-level summary statistics for the 5803 villages in the sample. In Appendix Table A.III, I have presented a more detailed version of this table, including baseline summary statistics of the four types of villages categorized by their consolidation status.

Source: U-DISE data in 2008 for all variables except the variable on dropouts which is first available in 2009 and the variables on exam takers and high scorers which are first available in 2013. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

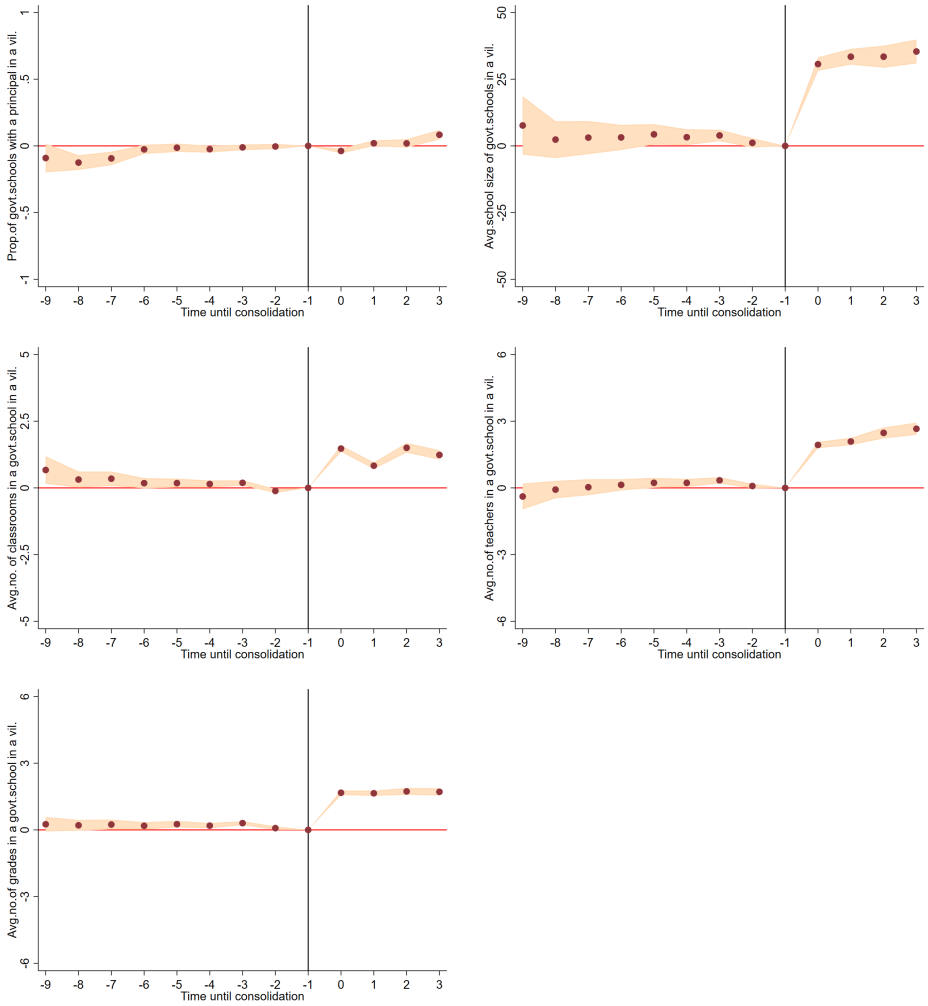
Figure 4: Impact of intent to consolidate on actual consolidation



Notes: This figure presents the estimates of the impact of school consolidation on the probability that the village has a govt. grade 1-10 school and had a school closure, as estimated by Equation 1. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

Figure 5: Intermediate outcomes of consolidation



Notes: This figure presents the estimates of the impact of school consolidation on intermediate outcomes as estimated by Equation 1. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

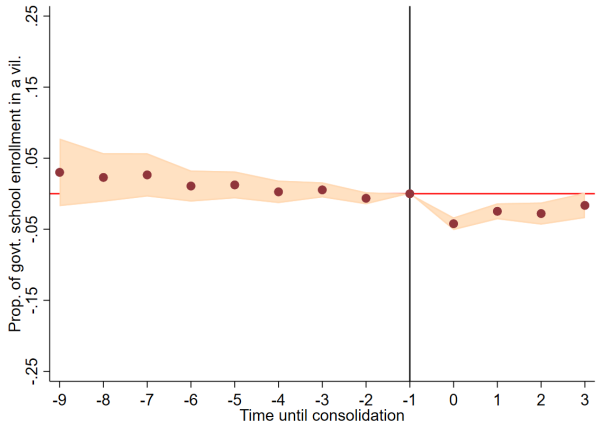
Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

TABLE II: RESULTS - Callaway and Sant'Anna (2021) ESTIMATES OF THE IMPACTS OF CONSOLIDATION

	CSDID estimates	Baseline mean	N
Panel 1: Intermediate outcomes			
Prop. of govt. schools with a principal	0.028	0.424	58,030
	(0.015)		
School size of a govt. school	29.839***	101.909	58,030
	(1.933)		
No. of classrooms in a govt. school	1.150***	4.138	58,030
	(0.086)		
No. of teachers in a govt. school	2.407***	4.142	58,030
	(0.105)		
No. of grades in a govt. school	1.521***	6.076	58,030
	(0.077)		
Panel 2: School choice			
Prop. of total enrollment in govt. schools	-0.038***	0.662	58,030
	(0.008)		
Prop. of grade 1-5 enrollment in govt. schools	-0.062***	0.643	58,030
	(0.011)		
Prop. of grade 6-8 enrollment in govt. schools	-0.025**	0.701	58,030
	(0.008)		
Panel 3: Dropouts			
Prop. of dropouts among enrolled children	0.014	0.124	52,227
	(0.008)		
Prop. of dropouts among grade 1-5 enrolled children	0.019*	0.139	52,227
	(0.009)		
Prop. of dropouts among grade 6-7 enrolled children	0.006	0.105	52,227
	(0.008)		
Panel 4: Exam takers			
Prop. of grade 5 exam takers among potential takers	0.049	0.813	23,212
	(0.044)		
Prop. of grade 8 exam takers among potential takers	0.018	0.854	23,212
	(0.044)		
Panel 5: High scorers			
Prop. of high scorers among grade 5 potential exam takers	0.030	0.554	23,212
	(0.036)		
Prop. of high scorers among grade 8 potential exam takers	0.005	0.497	23,212
	(0.030)		

Notes: Each row represents a separate outcome. Standard errors clustered at the village level are reported in parentheses. Baseline mean of the outcome variables are reported.

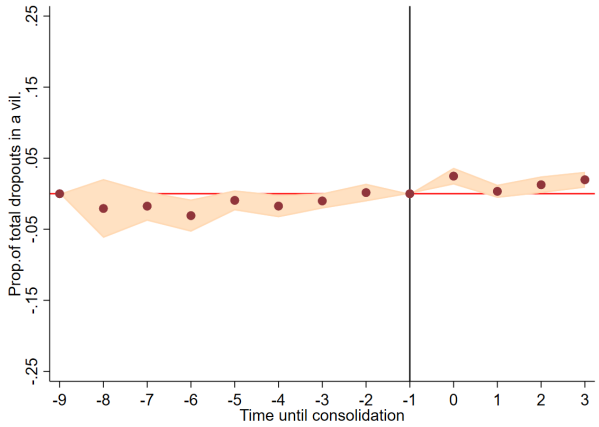
Figure 6: The impact of consolidation on the proportion of children enrolled in government schools in a village



Notes: This figure presents the estimates of the impact of school consolidation on the proportion of children enrolled in government schools out of total enrollment, within a village as estimated by Equation 1. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

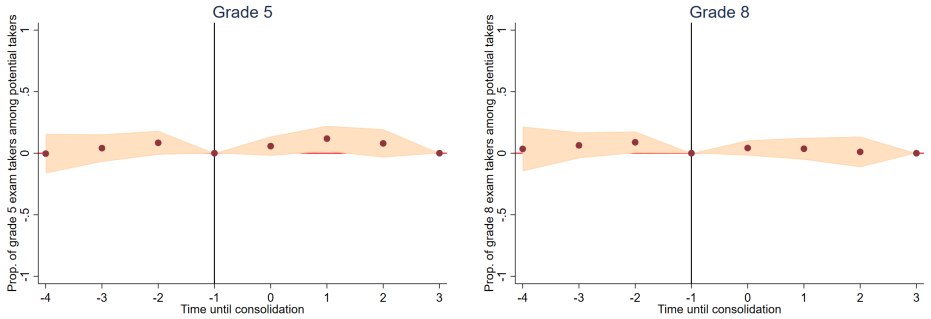
Figure 7: The impact of consolidation on the proportion of school dropouts in a village



Notes: This figure presents the estimates of the impact of school consolidation on the proportion of school enrolled children who dropped out of school, within a village as estimated by Equation 1. The number of children who dropped out of school in a village in a year t is calculated as the difference in the number of grade 2-8 school enrolled children in the village in t and the number of grade 1-7 school enrolled children in *t-1*. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

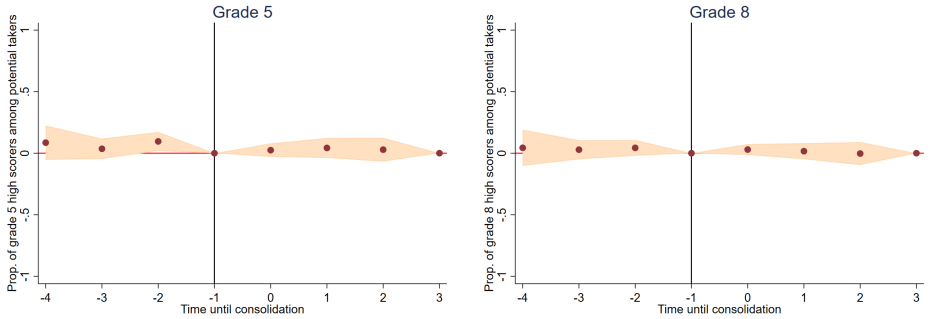
Figure 8: The impact of consolidation on the proportion of grade 5 and grade 8 exam takers among potential takers in a village



Notes: These figures present the estimates of the impact of school consolidation on the proportion of exam takers among children enrolled in grade 4 and grade 7 the previous year, within a village as estimated by Equation 1. The data on grade 5 and grade 8 exam takers are available only in years 2008, 2013, 2014, 2015 and 2016 and hence the outcome variables are available only in years 2013, 2014, 2015 and 2016. Thus coefficients in event years -9, -8, -7, -6, -5 and 3 are missing. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

Figure 9: The impact of consolidation on the proportion of grade 5 and grade 8 high scorers among potential exam takers in a village



Notes: These figures present the estimates of the impact of school consolidation on the proportion of high scorers among children enrolled in grade 4 and grade 7 the previous year, within a village as estimated by Equation 1. The data on grade 5 and grade 8 high scorers are available only in years 2008, 2013, 2014, 2015 and 2016 and hence the outcome variables are available only in years 2013, 2014, 2015 and 2016. Thus coefficients in event years -9, -8, -7, -6, -5 and 3 are missing. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

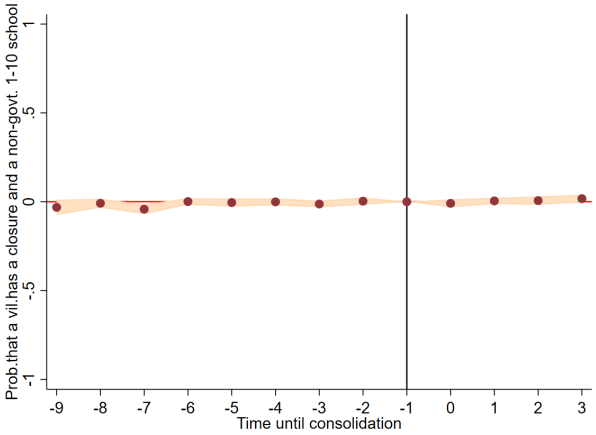
Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

TABLE III: HETEROGENEITY BY GENDER AND SOCIAL CLASS

	Girls	Boys	SC	non-SC
Panel 1: School choice				
Prop. of grade 1-5 enrollment in govt. schools	-0.064***	-0.063***	-0.080***	-0.057***
	(0.011)	(0.012)	(0.015)	(0.012)
Prop. of grade 6-8 enrollment in govt. schools	-0.027**	-0.023*	-0.020	-0.024**
	(0.008)	(0.009)	(0.011)	(0.008)
Panel 2: Dropouts				
Prop. of dropouts among grade 1-5 enrolled children	0.021*	0.016	0.018	0.010
	(0.009)	(0.009)	(0.010)	(0.015)
Prop. of dropouts among grade 6-7 enrolled children	0.008	0.002	0.000	0.006
	(0.009)	(0.008)	(0.011)	(0.008)

Notes: Each row represents a separate outcome. Standard errors clustered at the village level are reported in parentheses. N=58,030 for Panel 1 and N=52,227 for Panel 2.

Figure 10: Falsification check: Probability that a village has a non-government grade 1-10 school and had a non-government school closure



Notes: This figure presents the estimates of the impact of school consolidation on the probability that the village has a non-government grade 1-10 school and had a non-government school closure, as estimated by Equation 1. This figure presents falsification check to school consolidation during which only government schools were meant to be consolidated. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

TABLE IV: ROBUSTNESS CHECKS - EXCLUDING VILLAGES WITH MULTIPLE SCHOOL CLOSURES AND BLOCK LEVEL MODEL SCHOOLS

	Excl. multi closure vils.	Excl. block model schools
Panel 1: School choice		
Prop. of grade 1-5 enrollment in govt. schools	-0.060***	-0.062***
	(0.011)	(0.011)
Prop. of grade 6-8 enrollment in govt. schools	-0.027**	-0.022**
	(0.008)	(0.008)
Panel 2: Dropouts		
Prop. of dropouts among grade 1-5 enrolled children	0.020*	0.018*
	(0.009)	(0.009)
Prop. of dropouts among grade 6-7 enrolled children	0.006	0.005
	(0.008)	(0.008)
Panel 3: Exam takers		
Prop. of grade 5 exam takers among potential takers	0.040	0.051
	(0.044)	(0.044)
Prop. of grade 8 exam takers among potential takers	0.015	0.023
	(0.044)	(0.043)
Panel 4: High scorers		
Prop. of high scorers among grade 5 potential exam takers	0.028	0.031
	(0.036)	(0.036)
Prop. of high scorers among grade 8 potential exam takers	0.001	0.005
	(0.031)	(0.030)

Notes: Each row represents a separate outcome. Standard errors clustered at the village level are reported in parentheses.

APPENDIX

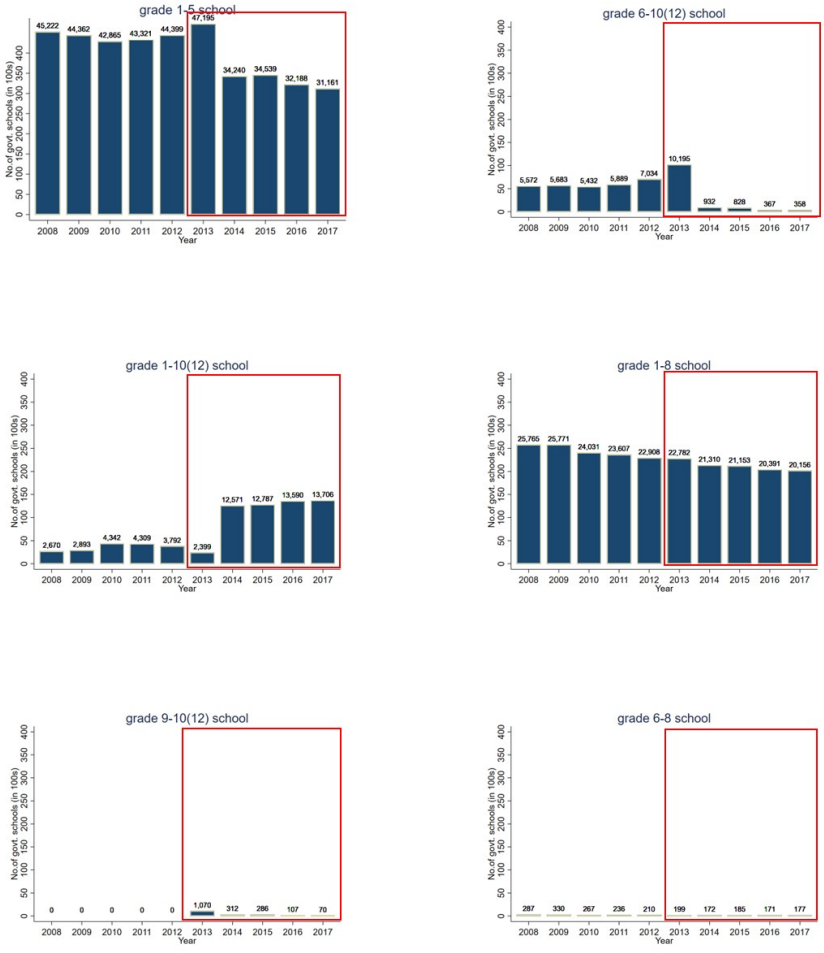
TABLE A.I: CHANGE IN DISTANCE TO NEAREST SCHOOL BETWEEN 2014 AND 2017 IN RAJASTHAN

	(1)	(2)	(3)
Variable	2014	2017	Difference
School with grades 1-5			
dist. <1km	0.94	0.93	-0.01
	(0.24)	(0.25)	(0.01)
1km<=dist.<2km	0.05	0.06	0.01
	(0.22)	(0.23)	(0.01)
2km<=dist.<3km	0.01	0.01	0.00
	(0.10)	(0.10)	(0.00)
3km<=dist.<5km	0.00	0.00	-0.00*
	(0.04)	(0.02)	(0.00)
5km<=dist.	0.00	0.00	0.00
	(0.00)	(0.00)	(0.00)
School with grades 6-8			
dist. <1km	0.82	0.84	0.02**
	(0.39)	(0.37)	(0.01)
1km<=dist.<2km	0.11	0.09	-0.02***
	(0.31)	(0.28)	(0.01)
2km<=dist.<3km	0.05	0.04	-0.01*
	(0.22)	(0.20)	(0.00)
3km<=dist.<5km	0.02	0.02	-0.00
	(0.13)	(0.12)	(0.00)
5km<=dist.	0.01	0.02	0.01***
	(0.10)	(0.14)	(0.00)
Observations	2,917	5,042	7,959

Notes: This table provides information about the proportion of households in Rajasthan, whose nearest school which caters to grade 1-5 and grade 6-8 are within the stated distance in years 2014 and 2017. 1 kilometer is equivalent to 0.6 miles. The first column corresponds to year 2014, before school consolidation was implemented in Rajasthan. The second column corresponds to year 2017, after the third wave of school consolidation. The last column indicates the difference between the first and second columns and the statistical significance of the differences.

Source: National Sample Survey (NSS) 71st and 75th rounds. NSS 71 round was collected between January and June, 2014 prior to the first wave of consolidation in Rajasthan. NSS 75 round was collected between July, 2017 and June, 2018 after the third wave of consolidation in Rajasthan.

Figure A.1: Number of govt. schools by type over years: Rajasthan



Notes: These figures present the number of government schools by type, during the period of analysis. The schools are categorized into types based on the grades to which they cater to. The years of particular interest are 2014, 2016 and 2017 which correspond to the three waves of school consolidation. These figures show that there was a large number of grade 1-5 and grade 1-8 schools, relative to schools catering to secondary grades (9,10,11,12) at baseline. The number of grade 1-5 schools, grade 6-10 schools, grade 1-8 schools and grade 9-10 schools declined between 2013 and 2017 while the number of grade 1-10 schools increased. Grade 6-8 schools were few at baseline which hasn't changed much between 2013 and 2017.

Source: U-DISE data from 2008-2017.

TABLE A.II: SAMPLE CONSTRUCTION

Sampling restrictions	Total		2014 consol.		2016 consol.		2017 consol.		Non-consol.	
	N	%	N	%	N	%	N	%	N	%
Villages reported by U-DISE	48385	100	11699	100	2114	100	1001	100	33571	100
Balanced panel of villages	30150	62.31	9415	80.48	981	46.40	347	34.67	19407	57.81
Villages with consol.potential	5803	11.99	5148	44.00	281	13.29	30	3.00	344	1.02

Notes: This table reports changes in sample size when applying the sample restrictions. Across consolidation status, the table reports the number of observations and the share as a percentage of the total number of observations reported in the first row.

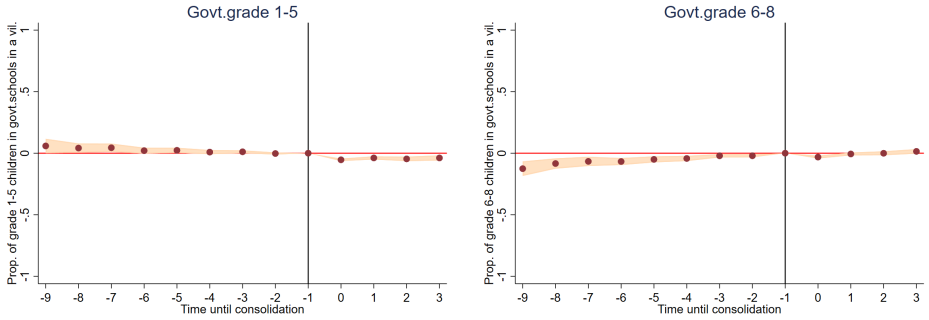
TABLE A.III: BASELINE VILLAGE-LEVEL SUMMARY STATISTICS ACROSS THE FOUR TYPES OF VILLAGES

Variable	(1) Non-consol.	(2) 2014 consol.	(3) 2016 consol.	(4) 2017 consol.	(5) 2014 vs non	(6) 2016 vs non	(7) 2017 vs non	(8) 2014 vs 2016	(9) 2016 vs 2017	(10) 2014 vs 2017
No. of schools in a vil.	8.02	6.62	6.74	7.93	-1.40***	-1.27*	-0.08	-0.13	-1.19	-1.32
	(11.92)	(6.50)	(5.34)	(5.98)	(0.39)	(0.77)	(2.20)	(0.39)	(1.04)	(1.19)
No. of govt. elementary schools in a vil.	3.25	3.39	3.59	4.10	0.14	0.34	0.85	-0.20	-0.51	-0.71
	(3.71)	(3.07)	(2.99)	(2.95)	(0.17)	(0.27)	(0.70)	(0.19)	(0.57)	(0.56)
No. of govt. high schools in a vil	1.13	1.11	1.07	1.07	-0.02	-0.06	-0.06	0.03	0.00	0.04
	(0.55)	(0.37)	(0.27)	(0.25)	(0.02)	(0.04)	(0.10)	(0.02)	(0.05)	(0.07)
No. of non-govt. schools in a vil.	3.64	2.12	2.08	2.77	-1.52***	-1.56***	-0.87	0.04	-0.68	-0.65
	(8.90)	(4.09)	(3.41)	(3.42)	(0.25)	(0.56)	(1.64)	(0.25)	(0.66)	(0.75)
No. of school enrolled children in a vil.	1,079.51	803.92	799.48	1,037.20	-275.59***	-280.03**	-42.31	4.44	-237.72	-233.28
	(1,830.52)	(974.32)	(771.63)	(956.26)	(58.39)	(116.87)	(338.45)	(59.11)	(151.89)	(178.39)
Prop. of total enrollment in govt. schools	0.66	0.66	0.66	0.62	-0.00	-0.00	-0.04	0.00	0.04	0.04
	(0.29)	(0.26)	(0.25)	(0.26)	(0.01)	(0.02)	(0.06)	(0.02)	(0.05)	(0.05)
Prop. of school dropouts in a vil. (2009)	0.14	0.12	0.12	0.13	-0.02**	-0.02*	-0.01	0.00	-0.01	-0.01
	(0.17)	(0.12)	(0.13)	(0.11)	(0.01)	(0.01)	(0.03)	(0.01)	(0.02)	(0.02)
No. of potential grade 5 and 8 exam takers in a vil. (2013)	207.06	178.63	195.21	221.57	-28.43***	-11.84	14.51	-16.58	-26.35	-42.94
	(361.33)	(180.94)	(237.65)	(213.03)	(10.98)	(25.08)	(67.01)	(11.29)	(45.22)	(33.17)
Prop. of grade 5 and 8 exam takers in a vil. (2013)	0.87	0.82	0.81	0.84	-0.04**	-0.06	-0.03	0.01	-0.03	-0.02
	(0.56)	(0.38)	(0.30)	(0.24)	(0.02)	(0.04)	(0.10)	(0.02)	(0.06)	(0.07)
Prop. of grade 5 and 8 exam high scorers in a vil. (2013)	0.54	0.52	0.48	0.58	-0.02	-0.06**	0.04	0.04	-0.10**	-0.06
	(0.42)	(0.43)	(0.24)	(0.26)	(0.02)	(0.03)	(0.08)	(0.03)	(0.05)	(0.08)
Observations	344	5,148	281	30	5,492	625	374	5,429	311	5,178

Notes: Columns (1) - (4) of this table present village level summary statistics at baseline in villages first consolidated in 2014, in villages first consolidated in 2016, in villages first consolidated in 2017 and in non-consolidated villages. Columns (5) - (10) present differences and the statistical significance of the differences in baseline characteristics across villages with different consolidation status.

Source: U-DISE data in 2008 for all variables except the variable on dropouts which is first available in 2009 and the variables on exam takers and high scorers which are first available in 2013. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

Figure A.2: The impact of consolidation on the proportion of grade 1-5 versus grade 6-8 children in government schools in a village



Notes: These figures present the estimates of the impact of school consolidation on the proportion of grade 1-5 versus grade 6-8 children enrolled in government schools in a village as estimated by Equation 1. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.

TABLE A.IV: MECHANISMS FOR THE IMPACT OF VERTICAL CONSOLIDATION ON SCHOOL CHOICE

	Estimates
Panel 1	
Prop. of HHs who prefer private schools because it is more conveniently located (DDD)	0.037
	(0.024)
Panel 2	
No. of grade 1-5 private schools in a vil. (CSDID)	0.027
	(0.055)
No. of grade 1-8 private schools in a vil. (CSDID)	0.079
	(0.109)
No. of grade 1-10 private schools in a vil. (CSDID)	0.240*
	(0.107)
Prop. of enrollment in govt. schools in vils. where grade 1-10 pvt. schools did not increase (CSDID)	-0.035***
	(0.008)
Prop. of enrollment in govt. schools in vils. where grade 1-10 pvt. schools increased (CSDID)	-0.057**
	(0.018)
Panel 3	
Prop. of HHs who prefer private schools because of unsatisfactory quality in nearby govt. school (DD)	0.022
	(0.017)

Notes: Each panel illustrates a distinct channel through which vertical consolidation reduces the proportion of enrollment in government schools. Panel 1 presents a 2X2X2 triple difference estimate of the proportion of households that identify a more convenient location as the primary reason for sending their grade 1-5 child to a private school. This estimate takes into account three differences: between grade 1-5 and grade 6-8 private school enrollment, between Rajasthan and other Indian states, and between 2014 and 2017. Panel 2 reports the impact of consolidation on the number of private schools catering to grade 1-5, grade 1-8, and grade 1-10 students, as well as the proportion of enrollment in government schools. The estimates are based on Callaway and Sant'Anna (2021) and compare villages where the number of grade 1-10 private schools increased with those where it did not. Panel 3 shows a 2X2 differences-in-differences estimate of the proportion of households that identify unsatisfactory quality in nearby government schools as the primary reason for sending their child to a private school. This estimate takes into account the differences between Rajasthan and other states, and between 2014 and 2017.

Notes: Panel 1 and 3 use National Sample Survey (NSS) 71st and 75th rounds. The NSS 71 round was conducted between January and June, 2014, which was prior to the first wave of consolidation in Rajasthan, while the NSS 75 round was conducted between July, 2017 and June, 2018, after the third wave of consolidation in Rajasthan. Panel 2 uses U-DISE from 2008-2017 where sample is restricted to villages with potential for consolidation, among a balanced panel of villages.

TABLE A.V: MECHANISMS FOR THE IMPACT OF VERTICAL CONSOLIDATION ON DROPOUTS

	Estimates
Prop. of children whose primary reason is distance to the school (DDD)	0.019
	(0.011)
Prop. of children whose primary reason is financial constraints (DDD)	-0.052
	(0.030)
Prop. of children whose primary reason is unfriendly school atmosphere (DDD)	0.001
	(0.010)

Notes: Each row in the table represents a distinct channel through which vertical consolidation reduces the proportion of dropouts among grade 1-5 students. The first row reports a 2X2X2 triple difference estimate of the percentage of grade 1-5 students who cited the distance of the school as their primary reason for dropping out. The triple difference is obtained by comparing grade 1-5 dropouts versus grade 6-8 dropouts, Rajasthan versus other Indian states, and 2014 versus 2017. The second row reports a similar estimate of the percentage of grade 1-5 students who cited financial constraints as their primary reason for dropping out. The third row reports the triple difference estimate of the percentage of grade 1-5 students who cited an unfriendly atmosphere at school as their primary reason for dropping out.

Source: National Sample Survey (NSS) 71st and 75th rounds. The NSS 71 round was collected between January and June 2014, prior to the first wave of consolidation in Rajasthan, while the NSS 75 round was collected between July 2017 and June 2018, after the third wave of consolidation in Rajasthan.

TABLE A.VI: THE IMPACT OF CONSOLIDATION ON PUPIL TEACHER RATIO, GRADES PER TEACHER AND NUMBER OF CHILDREN PER CLASSROOM IN GOVERNMENT SCHOOLS WITHIN A VILLAGE

	(1)	(2)	(3)
	Pupil-teacher ratio	Grade-teacher ratio	Children per classroom
ATT	-2.14***	-0.36***	2.69***
	(0.40)	(0.03)	(0.64)
Baseline mean	29.11	2.11	25.64
N	58,030	58,030	58,030

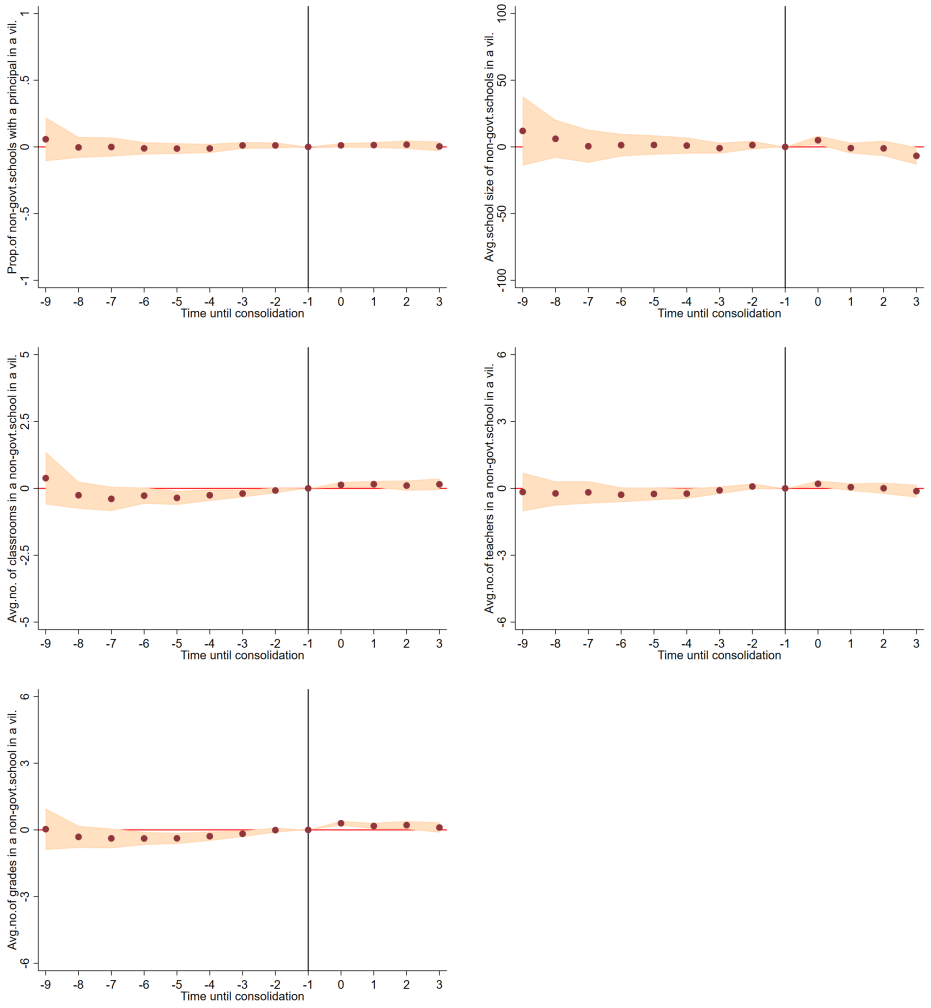
Notes: This table presents ATT estimates of the impact of school consolidation on teacher and classroom availability, using Callaway and Sant'Anna (2021) methods. Column (1) corresponds to average pupil teacher ratio in a government school within a village. Column (2) corresponds to average grade teacher ratio in a government school within a village. Column (3) corresponds to number of children per classroom across government schools within a village. Baseline means of the outcome variables are reported. Standard errors clustered at the village level are reported in brackets.

TABLE A.VII: HETEROGENEITY BY GRADE

	(1) Grade 1	(2) Grade 2	(3) Grade 3	(4) Grade 4	(5) Grade 5	(6) Grade 6	(7) Grade 7	(8) Grade 8
Prop. of total enrollment in govt. schools	-0.05***	-0.06***	-0.07***	-0.07***	-0.06***	-0.03**	-0.03**	-0.03**
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)
Prop. of dropouts among enrolled children	0.03**	0.03**	0.03**	0.04***	-0.01	0.01	0.00	
	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	(0.01)	

Notes: This table presents ATT estimates of the heterogeneous impact of school consolidation on school preference and dropouts by grade, using Callaway and Sant'Anna (2021) methods. Standard errors clustered at the village level are reported in brackets.

Figure A.3: More falsification checks: Intermediate outcomes among non-government schools



Notes: These figures present the estimates of the impact of school consolidation on the intermediate outcomes of school consolidation among non-government schools in a village as estimated by Equation 1. These figure present falsification checks to school consolidation which was meant to affect only government run schools in a village. The specification includes year fixed effects, village fixed effects and district*year fixed effects. s.e are clustered at the village level.

Source: U - DISE from 2008 - 2017. Sample restricted to villages with potential for consolidation at baseline, among a balanced panel of villages.