A study of access, transition and learning in secondary schools

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Contents

List of tables

List of figures

Acknowledgements

Executive Summary

This study was conceived and implemented with the objective of providing an in-depth understanding of the issues that influence children's transition from elementary to secondary school. Specifically, the study attempted to generate findings on: (i) school provisioning trends at the elementary and secondary level; (ii) transition patterns after elementary (Std VIII); and (iii) student learning outcomes at the end of elementary (Std VIII) and at the start of secondary school (Std IX).

The study was designed as a block-level census of Std VIII children in two rural blocks each of Hardoi district, Uttar Pradesh and Sambalpur district, Odisha (4 blocks in all).[1] One of the prime motivations for selecting these sites was that the Kusuma Trust (UK) and Kusuma Foundation (India) had begun implementing a Secondary School Readiness Program (SSRP) in these locations and a focused research study on the situation in secondary education in these areas would be useful for both generating knowledge and developing program strategies. Two blocks in each district were selected by comparing key demographic indicators such as population distribution by gender and caste as well as logistical considerations of connectivity to block and district headquarters. The final selection comprised the blocks of Sursa and Bawan in Hardoi district (Uttar Pradesh) and Rairakhol and Naktideul in Sambalpur district (Odisha).

Data collection was conducted between 2014 and 2016. In the first phase, all educational and vocational centres located in selected blocks were mapped. In the second phase, a school-based survey and baseline learning assessments of Std VIII students were conducted. In the third phase, conducted one

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[1]The term block connotes one of the sub-divisions of a district in India. India comprises of 29 states and 7 union territories which are divided into districts. Each district is further divided in to sub-districts, which are known differently in different parts in the country (e.g., tahsil, taluka, community development (CD) block, Police station, Mandal, revenue circle, etc.). For more, see http://censusindia.gov.in/Census_And_You/Administrative_division.aspx

year later, these students were tracked to conduct a household survey, record their enrollment status, and administer an end line learning assessment.

Findings from this study have implications for many aspects of educational planning, such as provisioning of elementary and secondary schools; quality of education imparted at the elementary level in both government and private schools; and above all, the need to ensure that all children completing elementary education have at least the minimal academic skills and competencies that are required to be able to cope with secondary education as well as routine non-academic activities. Evidence from this study suggests that the achievement of universal and quality secondary school education under the Rashtriya Madhyamik Shiksha Abhiyan (2009) will depend on concerted efforts that begin much earlier in students' educational trajectories.

Trends in school provisioning

- Government provisioning of schools reduces sharply at the upper-primary and secondary stage. For instance, in surveyed blocks, while government schools account for well over three-quarters of schools providing education in the primary grades (Std I-V) at the upper-primary level (Std VI-VIII), this proportion reduces to 30 percent. Less than 5 percent of government schools provided education in secondary grades (Std IX and/or above). At each stage of schooling, private school provisioning is higher, although this too reduces at each successive stage – 80 percent of private schools provided education in the primary grades, about 45 percent provided the same in upper-primary grades and less than a third (about 29 percent) provided education in the secondary grades. These data highlight the contrast between government and private provisioning of schools, with a greater reliance on private provisioning at higher stages of schooling.

School continuation rates and transition from elementary to secondary

- At baseline, 11,264 students enrolled in Std VIII in study locations were included in the study. By end line conducted one year later, close to a third of the children for whom enrollment data could be collected (N=9,873) reported having dropped out of school. However, there are enormous differences across study locations. In Hardoi, 38 percent children discontinued education by end line while the corresponding proportion for Sambalpur is 8 percent.

- Among children who continued in school, transition is not always linear. While majority of the children did indeed transition to secondary grades, about 8 percent children were found to either be in the same grade as baseline (Std VIII) or in a lower grade. The proportion of children making unexpected grade transitions is higher in the surveyed blocks of Hardoi compared to Sambalpur.

- For the cohort progressing to secondary grades, school type trends between baseline and end line reflect the secondary school provisioning trends in the surveyed sites. In Hardoi, with fewer government secondary schools, less than 20 percent children were in government schools at end line whereas in Sambalpur, with higher government provisioning at the secondary level, the corresponding proportion was 67 percent.

- School continuation rates for girls in the study are much lower than those for boys; 37.5 percent of girls dropped out in the second year of the study compared to 26.2 percent boys.

- About 10 percent of children (N=940) reported to be married during the end line phase of the study and this proportion is higher in the surveyed blocks of Hardoi (12 percent compared less than 2 percent in Sambalpur) as well as among girls in the study. Marital status was found to be inversely related to schooling status at end line: over 90 percent of both boys and girls who reported to be married had dropped out by end line.

- Among children who dropped out of school, the most commonly cited cause for dropping out had to do with the financial implications of continuing to study. This was the case in both locations as well as for both genders. However, these reasons were cited more often in Sambalpur than in Hardoi and in cases where the drop out child was a girl. Distance to school, parental disinterest in education, safety concerns and marriage were also cited more in cases where the drop out was a girl. In comparison, the child's disinterest in studying further was reported as a reason in a far higher proportion of cases when the child dropping out was a boy.

Learning levels of children in language, English and arithmetic

- Most children do not acquire even the most basic competencies in language and math by the end of Std VIII. Although improvements in outcomes are visible from baseline to end line, children's overall proficiency was much below expected curricular levels.

- At end line, of the children who progressed to secondary grades, about 18 percent children in Sambalpur and 26 percent children in Hardoi were unable to read a Std II level text. Despite marginal improvements in the written assessments in language during the intervening year between baseline and end line, children's ability in reading comprehension, critical thinking and writing tasks remain far short of grade-level expectations. More students could correctly answer direct questions, the answers for which were available in the text, than those that required interpretation of the information provided. The arithmetic assessment that tested children's ability on a range of tasks like basic numeric and word problems, geometry and metric calculations among others, reveals even poorer proficiency levels than in language. At end line, only a third of the children who progressed to secondary grades could solve a 3-digit by 2-digit division sum. These data indicate that children entering secondary grades in these locations lack critical abilities in language and arithmetic. This situation will not only hinder students' ability to transact curricula of far greater difficulty than the concepts tested in this study, but also seriously overburden secondary schools with the cumulative burden of children's learning deficits.

- A comparison of learning outcomes by children's enrollment status reveals enormous differences. Children who dropped out of school have significantly lower learning levels in all subjects compared to children who continued to be enrolled at end line. Over 60 percent of children who discontinued school were unable to read a Std II level text and their performance in the written assessments was also poorer compared to students who continued in school. There is an urgent need to provide remedial educational support to children.

Factors affecting school continuation and learning

- Multivariate analysis of factors influencing children's end line enrollment status indicates that children's prior learning outcomes are a significant predictor of their enrollment status. Children with better learning levels in language and arithmetic at baseline were less likely to have dropped out one year later. Gender also emerges as an important factor: girls in the study were likelier than boys to drop out of school, thus indicating an area for both policy and programmatic interventions. Our findings also suggest that children from schools offering education in both elementary and secondary grades were less likely to drop out than those going to schools without continuous grades.

- Multivariate regression analysis also confirms that in addition to children's individual, socio-economic and school characteristics, children's end line learning outcomes are significantly influenced by their prior learning levels at baseline. In other words, enabling children's learning earlier rather than later can help improve both school enrollment rates at the secondary stage as well as children's learning outcomes.

The 4th Joint Review Mission report of the Rashtriya Madhyamik Shiksha Abhiyan, while discussing the issue of learning levels at the end of elementary school, noted that there is an imperative to "shift the large numbers of students that fall in the lowest levels of performance. To do this will require action that takes in account the realities of their current learning level and is not designed from an assumption that children are at the levels of learning expected by the curriculum." The issue of learning is even more critical for children who discontinue schooling – these children often leave the schooling system without acquiring even the most basic reading and arithmetic abilities. If school transition rates between elementary and secondary grades are to be improved, learning interventions at the upper primary level must address children's current learning levels.
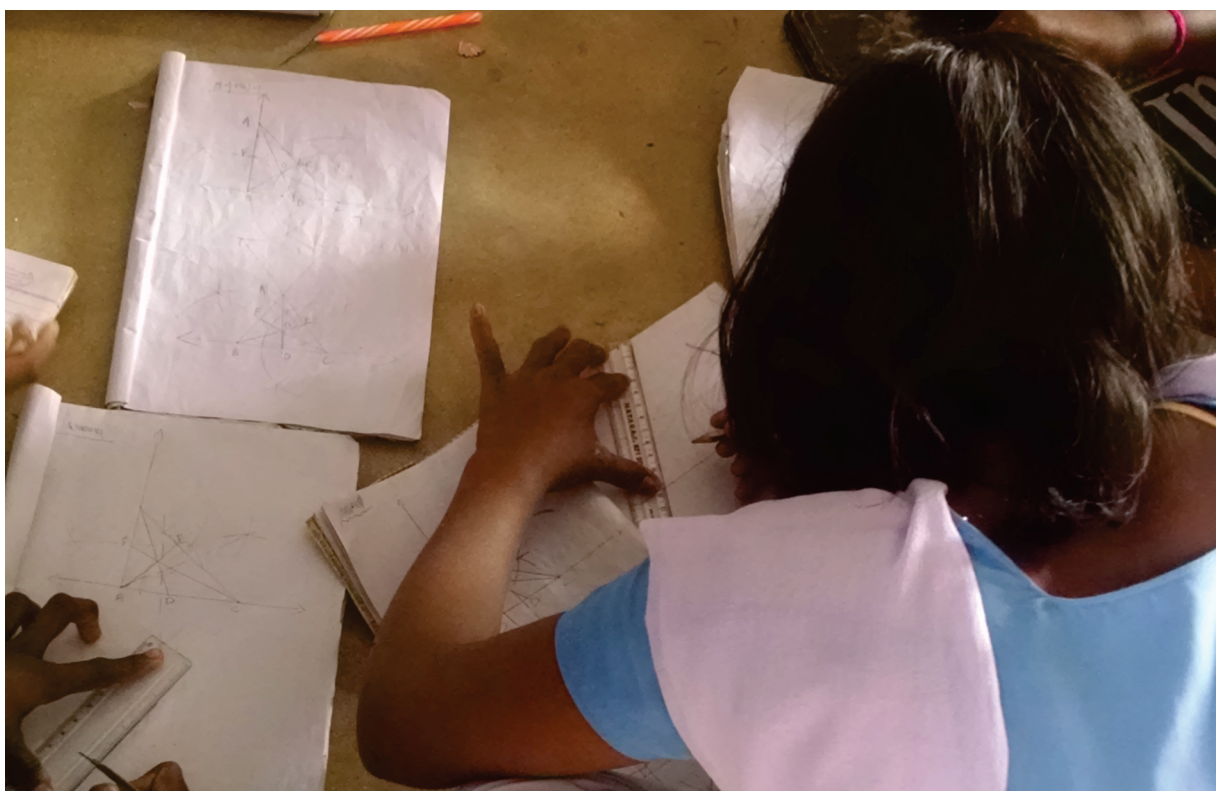
Introduction

1.1. Background

In India, major initiatives in the education sector, from the District Primary Education Programme in the 1990s to the Sarva Shiksha Abhiyan which started in 2000, have aimed for and achieved near universal access to and enrollment in elementary education. In 2009, The Right of Children to Free and Compulsory Education Act (RTE) bolstered efforts in this direction by making education compulsory and free for all children in the age group of 6-14 years or up to Std VIII (GOI, 2009). According to the National Sample Survey Organisation, 99 percent and 79 percent of rural households surveyed in 2007-2008 had access to primary and middle schools respectively within two kilometres (MOSPI, GOI 2010, p.18); while the proportion of out of school children in the age group of 6-14 years in rural India has declined from 6.6 percent in 2006 to 3.1 percent in 2016 (ASER Centre, 2006-2016).

Notwithstanding the implementation of the Rashtriya Madhyamik Shiksha Abhiyan (RMSA) in 2009 - a separate programme to oversee and undertake focussed efforts in the secondary education space in India it is questionable whether the gains made at the elementary level have accrued to the secondary school stage. For example, data from the Unified District Information System for Education (U-DISE) indicates that school provisioning at the secondary stage is low: in 2015-2016, while approximately 80 percent and 40 percent of schools in India offered education in the primary grades (Std 1-5) and upper primary grades (Std 6-8) respectively, only 16 percent schools offered secondary school grades (NUEPA, 2015). Lower enrollments are also seen among older children, reported in both government and non-government studies (ASER, 2016; MOSPI, GOI, 2010).

Additionally, the focus of educational planning in India has for long been input related rather than outcome related. While the RTE Act specifies provisions in terms of inputs (in the form of buildings, facilities, teachers, etc.), it has until recently been silent on the desired outcomes, particularly with respect to student learning. As per the Government of India's Twelfth Five Year Plan document for the period 2012-2017, "the biggest concern in elementary education is the poor level of student learning" (Planning

Commission, GOI 2013). India emerged 72nd among 74 participating countries in the Programme for International Student Assessment (PISA) in 2009, which tested 15-year old students in two states of the country in reading, mathematics and science. In 2016, 27 percent of Std VIII students in rural India could not read a Std 2-level text while over 55 percent of students in Std VIII could not solve a 3 by 1-digit division problem (ASER 2016). In other words, despite seven years of school, 1 in every four children in Std VIII was unable to read a text six grade levels below and more than half could not solve an arithmetic sum usually taught in Std III or IV. Inadequate learning levels at the end of elementary school have been identified repeatedly as a serious challenge to secondary education, both with respect to transition of students from elementary to secondary grades as well as retention and completion of secondary education (see the Rashtriya Madhyamik Shiksha Abhiyan Joint Review Mission Reports No. 3 – 8).

Compared to elementary education, where there are several estimates of learning outcomes like the Annual Status of Education Report (ASER) or the National Achievement Surveys (NAS) conducted by the National Council of Educational Research and Training, there is relatively little empirical evidence with respect to secondary education in India. Any concerted effort to universalize quality secondary schooling needs to be based on evidence on key issues such as transition rates of students from elementary to secondary school and student learning levels at the time of transition.

1.2. The study and its objectives

This study was conceived and implemented in context of the growing need for empirical evidence on patterns of access, transition and learning in secondary education. The study was initiated by ASER Centre with support from Kusuma Trust (UK) with the aim of understanding issues of access, learning and transition of children moving from elementary (Std VIII) to secondary (Std IX).

In particular, the objective was to understand the current situation with regards to (i) school provisioning trends at the elementary and secondary level; (ii) transition patterns after elementary (Std VIII); and (iii) student learning outcomes at the end of elementary (Std VIII) and at the start of secondary school (Std IX).

1.3. Design and methodology

The study was designed as a block-level census of the status of provisioning and learning at the end of elementary and beginning of secondary school, and was conducted in two rural blocks each of Hardoi district (Uttar Pradesh) and Sambalpur district (Odisha).

The four blocks (two in each district) were selected by comparing key demographic indicators such as population distribution by gender, caste, education attainment, as well as logistical considerations of connectivity to block and district headquarters. The final selection comprised the blocks of Sursa and Bawan in Hardoi district and Rairakhol and Naktideul in Sambalpur district.[2] Data collection was conducted in three inter-linked phases:

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[2] Village lists secured from the block administrative offices were utilized in this study as data from the Census of India (2011) was unavailable at the time of field work.

1) Phase 1: GPS mapping of all educational and vocational centres

The first phase of data collection (May 2014) was designed to explore educational provisioning, specifically school provisioning at the block-level and entailed mapping all educational and vocational centres located in the selected blocks. Mobile phones with digital questionnaires were used to record basic information on the villages (availability of roads, electricity, distance from block and district headquarters, etc.) and institutions (management type, year of establishment, highest and lowest grade offered, etc., along with the GPS coordinates of the institution). This activity was linked to the second phase of the study.

2) Phase 2: School based survey and student learning in Std 8 (Baseline)

In this phase (October 2014 – February 2015), a school-based survey and baseline learning assessment was conducted in the 282 schools offering Std VIII that had been mapped in phase 1. The objective of this activity was to collect school-level information as well as baseline data on children's learning levels in Std VIII. In each school, investigators first conducted a survey of facilities and thereafter administered learning assessments to all Std VIII students present. The survey was conducted over a two-day period using the following instruments:

- *Child tracking tool:* Used to record the names of all students enrolled in Std VIII in the surveyed schools[3] along with basic details like gender, age, village of residence as well as daily attendance over two days of the survey. This generated the child-level frame for the study.

- *School information tool:* Captured information on various school-level indicators like management type, grade-wise enrollment, teacher appointment, student and teacher attendance (reported and head-count), infrastructure and facilities.

- *Learning assessments:* Std VIII students were administered learning assessments in three subjects - language (Hindi or Odia), English and arithmetic. These assessments were conducted during school hours and included a written test conducted in a group, followed by one-on-one oral assessment in the three subjects.[4] The duration of the language written assessment, which included Hindi/Odia and English, was 1 hour 30 minutes while the math written assessment was an hour long. Since the baseline learning assessments were administered in school, only those students who were present on the survey days could be tested (See Table 1.2).

3) Phase 3: Student tracking, household survey and (end line) learning assessment

Conducted one calendar year after phase 2 (October 2015 – February 2016), this last phase comprised tracking students to their households in order to conduct a household survey and record their current enrollment status. Students were thereafter organised into groups and administered the end line learning assessments in the same subjects as in the baseline. The following tools were used in this phase:

I. *Household survey tool:* Information on parent' education, household assets, children's current enrollment status as well as reasons for either school selection or for dropping out.

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[3] Names of the enrolled students were recorded from the enrollment register of schools. If the enrollment records were unavailable, the attendance register was used to obtain this information.
[4] The language written paper began with the section in Hindi or Odia followed by English.

ii. *Learning assessments:* As in the baseline, written and oral assessments in language (Hindi or Odia), English and arithmetic were administered to children. The same tool as in the baseline were used so as to allow for measurement of change in learning levels over a period of one year. However, unlike the baseline survey, where testing was conducted in schools and thus restricted to students who were present on the survey days, the end line assessments were conducted in the community on a school holiday (either on Sundays or on other non-school days). The number of children tested at end line is therefore much higher than at baseline[5] (See Table 1.2 for details).

Table 1.1 provides the timeline for the above-mentioned phases of data collection spread over two years (2014-2016) and Table 1.2 presents the sample numbers for the different phases as well as for the study as a whole.

Table 1.1: Timeline of field work		
Field work phase	**Activity**	**Timeline**
1.	GPS Mapping of all educational and vocational institutes in study sites	May 2014
2.	Survey of all schools with Std VIII	October 2014 - February 2015
	Baseline assessment of Std VIII students who were present in surveyed schools	
3.	Student tracking	October 2015 - February 2016
	Household survey	
	End line learning assessment administered in the community	

1.4. This report

This report presents the consolidated findings from the different phases of this study, implemented over two years of field work. It is organised into several chapters, as follows:

Chapter 2 unpacks the provisioning landscape in the study areas, with a special focus on schools, particularly secondary schools. Chapter 3 presents transition trends for children after elementary school while chapter 4 takes a deep dive into the issue of learning and presents findings on children's learning levels. We analyse learning levels in three tested subjects (language - Hindi/Odia, English and arithmetic) and relate these data to students' end line enrollment status. In Chapter 5, we examine factors that influence children's post-elementary school continuation status and learning levels. Specifically, we look at how various factors such as children's individual characteristics (age and gender), household characteristics (caste, economic affluence and parental education) and school related characteristics (management type) influence their post-elementary school continuation as well as learning outcomes.

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[5] Unlike in most research studies, where sample sizes suffer from attrition over time. This difference highlights the importance of using community-based rather than school-based sampling to generate estimates that are representative of all children in the selected target group, since schools in many states in India are characterized by high enrollments but low attendance.

Table 1.2: Sample description for the study

Block	Phase 1: GPS mapping	Phase 2: Baseline school survey and learning assessment				Phase 3: End line tracking, household survey and learning assessment			Of all children enrolled in Std VIII at baseline, % children tracked at end line	Children tested in language in both baseline and end line		Children tested in arithmetic in both baseline and end line	
	No. of villages	No. of Schools with Std VIII classes surveyed	No. of children enrolled in Std VIII	No. of children tested in language written assessment	No. of children tested in arithmetic written assessment	No. of children tracked	No. of children tested in language written assessment	No. of children tested in arithmetic written assessment		N	%	N	%
Sursa	82	99	4,422	1,090	1,450	3,773	2,612	2,611	85.3	836	18.9	1097	24.8
Bawan	125	107	4,765	1,469	1,798	4,171	2,741	2,753	87.5	1,095	23.0	1,370	28.8
All: Hardoi	207	206	9,187	2,559	3,248	7,944	5353	5,364	86.5	1,931	21.0	2,467	26.9
Rairakhol	197	48	957	693	732	909	788	788	95.0	588	61.4	630	65.8
Naktideul	188	28	1,120	741	778	1,020	825	818	91.1	603	53.8	616	55.0
All: Sambalpur	385	76	2,077	1,434	1,510	1,929	1,613	1,606	92.9	1,191	57.3	1,246	60.0
All Children	592	282	11,264	3,993	4,758	9,873	6,966	6,970	87.7	3,122	27.7	3,713	33.0

Trends in school provisioning

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This chapter presents findings from the first phase of the study, which entailed a village facilities survey and mapping of all educational and vocational institutions located in the surveyed villages across the four selected blocks. All educational institutions like schools, private tuition centres, colleges and vocational training institutes (like Industrial Training Institutes or ITIs) in these villages were listed to provide a holistic understanding of the broad educational landscape, particularly at the secondary school stage. We begin with a brief description of village level characteristics and then proceed to a description of the educational institutions surveyed in these villages.

2.1. Villages and institutions surveyed

Table 2.1 presents the number of villages that were covered in this first phase of field work. Out of a total of 592 villages located in these four blocks, 4 percent villages could not be located and surveyed[6] while in 72 percent villages, at least one educational institution was mapped. It is surprising to note that in 24 percent of villages, not a single educational institution was found. There is also considerable variation between the two locations of the study (Hardoi and Sambalpur). Close to a third of the villages in

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[6] During field work it was discovered that some villages had been merged with other habitations while in other instances, some villages had been converted to urban municipalities and thus were removed from the frame. In a few cases, villages could not be located. All such cases have been combined into the category of 'Not surveyed' villages.

Sambalpur did not have a single educational institution within the village boundaries compared to less than 6 percent of villages in Hardoi. While outside the scope of this report, it is nevertheless important that trends in provisioning also be understood in the context of broader demographic patterns like population density, age composition of the population, and the impact of such considerations on educational planning and provisioning on the ground (Mohanty, 2017).

Table 2.1: Number and percentage of villages surveyed in phase 1						
Location	Block	Number of villages	% Villages:			Total
			Surveyed & institutions found	Surveyed but no institutions found	Not surveyed	
Hardoi	Sursa	82	97.6	2.4	0.0	100
	Bawan	125	90.4	8.0	1.6	100
	Total	207	93.2	5.8	1.0	100
Sambalpur	Rairakhol	197	59.9	35.0	5.1	100
	Naktideul	188	61.2	31.9	6.9	100
	Total	385	60.5	33.5	6.0	100
Total		592	72.0	23.8	4.2	100

Table 2.2 presents data on village level facilities (availability of electricity and tarred road) and distance from the block headquarters (BHQ) for the surveyed villages. Data on the first two indicators was recorded through investigators' own observations during field work while information on distance was self-reported by the Sarpanch (village head).

While villages in both locations were found to have comparable provisioning of facilities like electricity, they differ widely in measures of connectivity (availability of pucca roads) and remoteness (distance from block headquarters). While about 90 percent villages in both locations had electricity, many more villages in the surveyed blocks of Hardoi district reported the availability of a tarred road as well as more proximity to the block headquarters than those in Sambalpur. For example, almost four out of every ten villages in Hardoi was reported to be located within 10 kilometres of the block headquarters; on the other hand close to six in every ten villages in Sambalpur reported being over 20 kilometres away from the same. These data provide background for understanding the differences in the geographical spread and remoteness of villages in the two locations of the study.

Table 2.2: Physical infrastructure in surveyed villages							
Location	Number of villages	% Villages with:		% Villages by distance from block headquarters:			
		Electricity	Tarred road	Up to 10 kms	Between 11-20 kms	Above 20 kms	Total
Hardoi	205	94.2	96.1	37.6	49.8	12.7	100
Sambalpur	362	89.8	55.5	8.6	32.3	59.1	100
Total	567	91.4	70.2	19.1	38.6	42.3	100

A total of 1,063 educational institutions were mapped across 426 villages in the four selected blocks of the study (Table 2.3). Not surprisingly, schools comprise the bulk of all educational institutions in the surveyed sites.

Table 2.3: Distribution of educational institutions in surveyed villages									
Location	Block	No. of villages	Total number of institutions	Percentage of educational institutions mapped by category:					
				School	Tuition centre	College	Vocational institute	Madrasa	Total
Hardoi	Sursa	80	368	93.2	3.8	1.9	1.1	0.0	100
	Bawan	113	379	94.2	1.6	1.8	1.1	1.3	100
	Total	193	747	93.7	2.7	1.9	1.1	0.7	100
Sambalpur	Rairakhol	118	163	85.9	11.7	1.2	0.6	0.6	100
	Naktideul	115	153	95.4	1.3	2.0	1.3	0.0	100
	Total	233	316	90.5	6.6	1.6	0.9	0.3	100
Total		426	1,063	92.8	3.9	1.8	1.0	0.6	100

Given that the first objective of this study is to examine school provisioning particularly at the secondary level, in the subsequent sections of this chapter the analysis is restricted to schools mapped in the surveyed locations. Data is reported for both the surveyed blocks together in each district; however, these data should not be interpreted as district-level estimates of school provisioning but only of the two surveyed blocks in each district.

2.2. Patterns in school provisioning

Overall trends

Table 2.4 presents school provisioning across the surveyed blocks as well as the distribution of these schools by management type.[7] Villages in the two blocks of Hardoi had more schools on average than those in Sambalpur – close to a third of the villages in the surveyed blocks of Hardoi had 4 or more schools within its village boundaries. On the other hand, over 80 percent villages in the surveyed blocks of Sambalpur had only one school compared to less than 30 percent such villages in Hardoi.

Overall, government schools comprise a majority of all schools mapped in these locations. However, there are differences across the two locations. About 95 percent schools mapped in the selected blocks of Sambalpur were government schools, while Hardoi has greater private provisioning - 1 in every 4 schools mapped in Hardoi was privately managed.

Table 2.4: Density of school provisioning and management type									
Location	No. of villages surveyed	% Villages with:				Total no. of schools mapped	% Schools by management type:		
		1 school	2-3 schools	4 or more schools	Total		Government	Private & others	Total
Hardoi	185	28.7	35.7	35.7	100	700	73.3	26.7	100
Sambalpur	223	86.6	12.6	0.9	100	285	95.8	4.2	100
Total	408	60.3	23.0	16.7	100	985	79.8	20.2	100

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[7] Management type of schools was self-reported by respondents (Head masters or teachers) in the schools mapped.

Schools available at different educational levels

In India, schools are categorized depending on the grades they offer. Typically, schools offering Std I-V are called primary schools, those offering Std VI-VIII are called upper primary schools while schools offering Std I-VIII are called elementary schools. Secondary schools in India can be categorised as lower secondary, offering Std IX-X; or higher/senior secondary offering Std XI-XII. This section examines school provisioning trends in the surveyed locations across different stages of schooling in the study locations.

Self-reported data on the lowest and highest grade offered in schools has been used to divide schools into different categories as per the grades offered (Table 2.5).[8] Given the wide range of grade combinations reported by schools and to effectively examine broad patterns at different levels of schooling, in the current analysis a school is counted more than once if it offered education beyond primary. For instance, schools offering Std I-V are counted once in this analysis, under the category of schools offering *primary sections*. But schools offering Std I-XII are counted thrice – once each under schools offering *primary sections*, *upper primary sections* and *secondary sections*.[9] Given this background, we turn to the data presented in Table 2.5.

The number of schools available at each subsequent level of the school education chain decreases drastically. This trend holds true for both study locations as well as by school type (government and private sector). Schools offering primary sections comprise the bulk of provisioning at over 75 percent of all schools. This proportion reduces to 33 percent for schools with upper primary sections, and further to under 10 percent for schools with secondary sections. Even though Sambalpur has a slightly higher proportion of schools offering the secondary sections compared to Hardoi, in both locations, the number of schools available in each location at each successive level of schooling reduces by twenty to fifty percentage points.

These data also highlight the contrast between government and private provisioning, particularly the increasing share of private schools at higher stages. Although schools offering primary sections comprise the largest share in each sector, the contrast in the ratio of schools with secondary sections is striking - less than 5 percent of all government schools offered education in the secondary sections compared to about 30 percent of private schools. These results are worrisome as they not only indicate a drastic reduction in the number of schools available at successive levels of schooling but also a greater shift to the private sector.[10]

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[8]This analysis excludes 6 schools with missing information on lowest and highest grade.

[9]Due to the numerous grade combinations reported by schools, each of the three categories may also include schools offering fewer than the specified grades at that level. For example, a school with Std I-IV is categorised as offering 'primary sections' despite not having Std V. Similarly, a school with Std I-VII is categorised as offering 'upper primary sections' despite not containing Std VIII.

[10]Another way to examine the difference between government and private school provisioning would be to calculate the percentage of schools available in each category as a proportion of total schools available in that category. Thus, of the 90 schools that provided education in secondary section, a third were government schools (33) while two-thirds were private schools (57).

Table 2.5[11]: Percentage of schools offering education in different grades, by location and management type

Location		All schools	By location		By management type	
			Hardoi	Sambhalpur	Government	Private & others
Primary sections	N	760	519	241	603	157
	%	77.6	74.7	84.6	76.7	80.9
Upper primary sections	N	326	227	99	239	87
	%	33.3	32.7	34.7	30.4	44.8
Secondary sections	N	90	57	33	33	57
	%	9.2	8.2	11.6	4.2	29.4
Total		980	695	285	786	194

Figure 2.1: Percentage of schools offering education in different grades, by location and management type
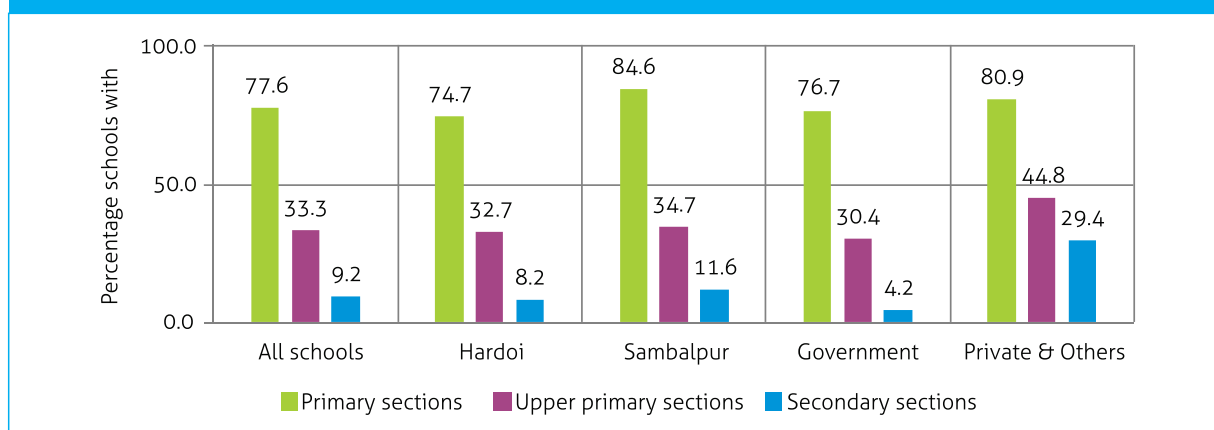
2.3. Summary and concluding thoughts

Data in the preceding pages reflect the differences between the two locations in this study with respect to village level characteristics and educational provisioning. While villages in both locations were found to have comparable provisioning of facilities like electricity, they differ widely on measures of connectivity (availability of pucca roads) and remoteness (distance from block headquarters).

Furthermore, villages in Hardoi not only had more schools on average than those in Sambalpur, but also greater private school provisioning. While government schools do comprise the bulk of school provisioning in both study sites, the proportion reduces systematically and starkly at higher levels of schooling. At the secondary level, much of the available provisioning is privately managed, with very few government schools offering education in secondary grades. These data have obvious implications for access to post elementary education, particularly for children from disadvantaged backgrounds and suggest that much progress is yet to be made before we achieve one of the key objectives of universal access to secondary education under the Rashtriya Madhyamik Shiksha Abhiyan.

[11]The percentages in this table do not add up to 100 as this table presents the percentage of schools offering different grades as a proportion of the total number of schools available in each column, that is, overall, in each location of the study as well as by management type. Thus, out of all 980 schools, 760 schools (77.6 percent) offered primary sections, 326 schools (33.3 percent) offered upper primary sections, while 90 schools (9.2 percent) offered secondary sections.

Post elementary transition

This chapter begins with a description of the baseline and end line surveys and thereafter examines trends in transition between two consecutive academic years, along with selected characteristics of children based on their end line enrollment status, i.e. children who continued schooling after elementary school and those who did not.

3.1. Baseline to end line tracking

Out of a total of 986 schools mapped in the GPS exercise (phase 1), 301 schools were identified as offering education in Std VIII across the four surveyed blocks. 7 additional schools were added to this list based on cross-referencing with the DISE database of schools in the surveyed blocks. Thus, the final frame for the baseline school survey and learning assessments in Std VIII (phase 2) comprised 308 schools. Of these, the baseline survey was conducted in 282 schools with a total of 11,264 students recorded as enrolled in Std VIII for the academic year of 2014-2015.[12] Data collection during the baseline was done within schools and entailed a school survey along with administering learning assessments to all Std VIII students who were present in schools during the survey days. (See Appendix Table 1- Table 5 - for more details of baseline school survey).

One calendar year later, investigators tracked the same cohort of students to conduct a household survey and record enrollment information for the academic year of 2015-2016. Trained survey teams visited multiple villages located in the vicinity of each surveyed school in order to locate students' households. They then recorded household and current enrollment information, primarily interviewing parents or guardians of children. While attempts were made to track all children, as mentioned in Table 1.2, 9873 out 11264 students (87 percent) from the baseline cohort could be tracked at end line. In this section we present data on 9623 students (7700 and 1923 in the surveyed blocks of Hardoi and Sambalpur respectively) for whom we have information on three key indicators – whether the student was enrolled at the time of the end line survey and if so, the grade and type of school s/he was in.[13]

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[12] The baseline survey could not be conducted in 26 schools as they had either closed at the time of the survey, had no enrollment in Std VIII or did not permit the survey to be conducted.

[13] Of the total 9873 children for whom the household survey was conducted, respondents were unaware of the child's current enrollment status in 250 cases. These observations, coded as 'Don't know' are excluded from this analysis

3.2. Transition trends

Table 3.1 presents children's enrollment status as reported at end line. These data starkly reveal that close to a third of the children tracked at end line dropped out in the year after the baseline survey. However, major differences are seen across the two locations. The proportion of children who had dropped out is almost five times higher in Hardoi (38 percent) than in Sambalpur (8 percent).

Even among children who remained enrolled in the second year of the study, there are differences with respect to the grades to which they transitioned. Since all children in this study were enrolled in Std VIII at baseline, one would have expected them to transition to the next grade, i.e. Std IX at endline. However, this is not true for all children. While 60 percent of children did indeed progress to the secondary grades (Std IX or higher) at end line, about 8 percent of children either remained in Std VIII or were enrolled in lower grades. Here too we see differences between the two locations. In Hardoi, half of all children progressed to secondary grades at end line while 10 percent children reported to be enrolled in either Std VIII or lower. In comparison, over 90 percent children in Sambalpur progressed to secondary grades with far fewer children reporting unexpected grade transitions. In other words, elementary to secondary transition rates were much higher in the surveyed blocks of Sambalpur compared to Hardoi, both with respect to fewer drop-outs as well as those making the expected transition post Std VIII.

Table 3.1: End line enrollment status for tracked children, by location					
Location	N	At end line, % children who:			
		Had dropped out	Were enrolled in:		Total
			Std VIII or lower	Std IX or higher	
Hardoi	7,700	37.8	10.3	51.9	100
Sambalpur	1,923	7.6	0.3	92.1	100
Total	9,623	31.8	8.3	60.0	100

The following section analyzes data for students who remained enrolled at end line, including various features of their transition such as school trends between baseline and end line as well as reasons for school selection. Data for students who dropped out of school is presented thereafter.

3.3. Currently enrolled students

The analysis in this section is restricted to 6,567 students who were enrolled at end line. Data is presented on schooling trends by management type, criteria for school selection and whether children were taking paid private tuition.

School type and transition

Table 3.2 presents proportion of children by school type (government or private) at baseline and end line; these data are reported separately for children enrolled in Std IX or above and those in Std VIII or lower.

At baseline, of the 11,264 children enrolled in Std VIII, a large majority in both locations were enrolled in government schools.[14] However, in Hardoi, where government school provisioning reduces drastically at the secondary stage, enrollment in private schools increased from less than half of all children at baseline

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[14] Of all children enrolled in Std VIII in Hardoi, two-thirds were from government schools and a third were in private or other schools. In Sambalpur, over three-quarters of all children were in government schools while the remaining were in private or other schools. See Appendix Table 1 for details.

to over 80 percent a year later. In the surveyed blocks of Sambalpur, on the other hand, which had relatively greater government provisioning at the secondary stage, over two-thirds of the cohort progressing to secondary grades at end line was enrolled in government schools.

Children making unexpected grade transitions (that is, transitioning to Std VIII or lower) were also more likely to be in private schools at end line.[15] While the survey did not include specific questions to explore reasons behind grade demotions, field notes and discussions with respondents suggest that this practice is not uncommon in private schools, with students scoring low marks in Std VIII or in the school entrance examinations for Std IX being sent back to lower grades.

Table 3.2: Baseline and end line school type of currently enrolled children, by transition status and location							
Location	N	School type at baseline: % students enrolled in:			School type at end line: % students enrolled in:		
		Government schools	Private/other schools	Totel	Government schools	Private/other schools	Totel
Students in grade 9 or higher					Students in grade 9 or higher		
Hardoi	3,976	53.4	46.6	100	17.6	82.4	100
Sambalpur	1,767	77.7	22.3	100	67.5	32.5	100
Total	5,743	60.9	39.1	100	32.9	67.1	100
Students in grade 8 or lower							
Hardoi	784	85.0	15.1	100	12.2	87.8	100
Sambalpur	6	*					
Total	790	85.1	14.9	100	12.7	87.3	100

Proportions for cells with insufficient observations have not been reported

The trends for the cohort in secondary grades are indicative of school provisioning patterns at the secondary level across the locations; while data for students with unexpected grade transitions at end line suggest that private schools may be less rigid about enforcing age-grade mainstreaming.

School selection and distance

Several studies (Lewin, 2011; Siddhu, 2011) have examined school choice in secondary education in India. These studies have found that while parents prefer private schools, the cost to the household is often a limiting factor in access to these institutions. Additionally, distance has also been found to be an important detrimental factor, particularly for girls and children from disadvantaged groups.

To explore these issues, the household schedule included a question where respondents were asked to select reasons for enrolling their child into a particular school. This was a multiple-response question, where up to 3 reasons per child were recorded. Table 3.3 presents the proportion of respondents who selected each listed reason, and provides interesting comparisons between the two locations.

Distance to school emerges as a key reason for school selection with close to two-thirds of all respondents citing this as a reason. This also seems to be a far more important reason for school selection in Sambalpur with close to three quarters of respondents selecting the same. Over half of all respondents in both locations said that the current school was selected because it was perceived to have 'better teaching'. Another school based reason, that of the school having 'better facilities', was selected by 8 in every 10 respondents in Sambalpur compared to just over 5 percent respondents in Hardoi. In Hardoi, the reason of 'schools attended by siblings', 'lower fees' and 'school discipline' were cited more often than in Sambalpur, while in the latter close to a third of respondents said that the current school was selected because it offered 'subjects of interest' for the child.

[13] In Sambalpur, only 6 students were reported enrolled in Std VIII or lower at end line. Due to insufficient observations, trends for Sambalpur are not reported in the Table 3.2.

Table 3.3: Self-reported reasons for school choice: % respondents selecting the following responses, by location (multiple choice)				
Reasons for selecting the current school		**Hardoi**	**Sambalpur**	**Total**
		N=4,790	**N=1,777**	**N=6,567**
1	School is close	60.8	74.1	64.4
2	Better teaching	51.5	52.3	51.7
3	School has better facilities	5.2	78.8	25.1
4	Siblings have or are studying in same school	19.1	7.8	16.0
5	Fees are low	15.9	5.9	13.2
6	School has discipline	12.7	9.5	11.9
7	Choice of subjects available	*	36.0	9.9
8	English is taught / English is medium of instruction	2.5	1.6	2.2
9	School had appropriate grades	3.7	3.5	3.6
10	School for girls	*	2.0	0.6

Proportions for cells with insufficient observations have not been reported

Given that distance to school emerges as the most cited reason for school choice among families of children who remained enrolled at end line, we examine data on distance to school as reported for all enrolled children during the household survey at end line. This analysis is restricted to the cohort progressing to secondary grades at end line.

RMSA norms with respect to school distance aim to provide "a secondary school within a reasonable distance of any habitation"[16] which has been specified as 5 kilometres for secondary schools and 7-10 kilometres for higher secondary schools.[17] As per Table 3.4, overall, about half of the children in secondary grades reported travelling less than 2 kilometres to reach school, while a third reported travelling between 3-5 kilometres. While these broad trends seem to meet the norms laid down in RMSA, there are differences across the two locations as well as by management type. Compared to their peers in Hardoi, a higher proportion of secondary school students in Sambalpur reported travelling greater distances to reach school. Also, students in government secondary schools reported greater distances than those in privately managed schools.

Table 3.4: Percentage children enrolled in secondary grades by distance to school at end line, location and management type					
	N	**Distance to school at end line (in kilometres):**			
		0-2	**3-5**	**Over 6**	**Total**
By location					
Hardoi	3,800	49.2	38.2	12.6	100
Sambalpur	1,728	45.6	33.9	20.5	100
Total	5,528	48.1	36.9	15.1	100
By school management type					
Government	1,860	44.7	35.4	19.9	100
Private & Others	3,643	49.9	37.7	12.4	100
Total	5,503	48.1	36.9	14.9	100

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[15]See http://mhrd.gov.in/rmsa
[16]See Framework for implementation of Rashtriya Madhyamik Shiksha Abhiyan, Section 1.3, pp. 4, accessed from http://mhrd.gov.in/sites/upload_files/mhrd/files/upload_document/Framework_Final_RMSA_3.pdf

Several Joint Review Mission (JRM) reports of the RMSA have recommended that the distance and access norm as stated in the mission statement be reviewed, particularly with regards to issues of school size and adequate resource management. Referred to as the 'economies of access' in the 2nd Joint Review Mission, Aide Memoire (GOI, 2013, pp. 14), it has been argued that the distance norm may not be an appropriate indicator for secondary school provisioning if it leads to an increase in the number of smaller schools with unviable pupil-teacher ratios, lacking important infrastructure like laboratories and, most importantly, trained teachers. As per the reports, such consequences would negatively impact the policy objective of providing quality secondary education to all students. Given that data from this study indicate that distance to school is an important factor of consideration for families, it is important that policy and planning for secondary education take this into account while also ensuring that quality and infrastructure requirements are met.

Private tuition

Last, we look at the proportion of enrolled children who reported to be taking private tuition during the end line household survey (Table 3.5). Overall, less than 20 percent of enrolled children reported to be taking private tuition at the time of the end line survey. This proportion is marginally higher in Sambalpur than Hardoi. English and math were the two of the most reported subjects in which children took paid tuition.

Table 3.5: Proportion of children taking private tuition, by location			
	Hardoi	**Sambalpur**	**Total**
	N=4,790	**N=1,777**	**N=6,567**
% enrolled children taking paid tuition	15.4	17.3	15.9
% enrolled children taking private tuition in:			
English	10.7	15.5	12.0
Math	9.0	15.2	10.7
Physics	2.1	10.5	4.3
Chemistry	1.8	8.7	3.6
Biology	1.8	6.9	3.2
History	*	5.9	1.7
Geography	*	5.2	1.5
Political Science	*	4.2	1.2
Language (Hindi / Odia)	0.0	0.0	0.0

Proportions for cells with insufficient observations have not been reported

3.4. Drop-out students

This section presents an analysis of children who dropped out of school by end line. First, an analysis is presented in terms of their individual characteristics like age, gender and marital status and thereafter their reported reasons for having dropped out.

Age[18]

The Right to Education (RTE) Act, 2009 provides a useful framework to examine children's enrollment status with respect to their age. Using the RTE Act as a reference, a child of age 6 ought to be in Std I and assuming a linear progression without any out of turn promotion or demotion in grade, a child in Std VIII ought to be 14 years old. Children's transition status by age (Table 3.6) indicates that drop-out rates increase by children's age, highest among those age 15.[19]

Table 3.6: End line enrollment status by age and location												
Age category	Hardoi				Sambalpur				All children			
	N	Currently enrolled	Drop out	Total	N	Currently enrolled	Drop out	Total	N	Currently enrolled	Drop out	Total
13 years or below	1,487	75.3	24.7	100	835	95.7	4.3	100	2,322	82.6	17.4	100
14 years	4,050	59.6	40.4	100	777	91.8	8.2	100	4,827	64.7	35.3	100
15 years or below	1,802	56.0	44.0	100	304	85.5	14.5	100	2,106	60.3	39.7	100
Total	7,339	61.9	38.1	100	1,916	92.5	7.5	100	9,255	68.2	31.8	100

Gender[20]

Data on enrollment trends by children's gender (Table 3.7) reflect gender disparity. More girls than boys dropped out by end line. The drop-out rate among girls was 10 percentage points higher than those for boys, and this gender disparity is starker in Hardoi, with a fifteen-percentage points difference between the two genders. In Sambalpur, on the other hand, we find that a slightly higher proportion of boys compared to girls had dropped out.

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[18]Children's date of birth was recorded at baseline from the enrollment records of schools. Where these details were unavailable, children were asked for their age in years and the same was noted down. During end line, we attempted to collect the same information from children's households; however, in a majority of cases the responses to this question were returned under the 'Don't know' category. In cases where responses were available, the age data received from households did not match with the information obtained from schools in the baseline round. Thus, for the sake of the current analysis, we use age information obtained from school records collected during baseline round and compute children's age at end line. As per these, at end line, 25.1% children were 13 years old or younger, 52.2% were 14 years old and 22.8% were 15 years or older. Hardoi had more older children (55.2% age 14 and 24.6% age 15 or above) while Sambalpur had almost equal proportions of those age 14 or younger (40% each).

[19]National level datasets like ASER also report high drop-out rates among older children, particularly age 15-16 years (See ASER Reports 2005-2016).

[20] The study included 48.2% girls and 51.6% boys. The surveyed blocks of Sambalpur had an even split among the two genders while Hardoi had fewer girls (47.7%).

Table 3.7: End line enrollment status by gender and location					
Location	Sex	N	% Children:		Total
			Currently enrolled	Dropped out	
Hardoi	Boys	3,930	69.6	30.4	100
	Girls	3,761	54.4	45.6	100
Sambalpur	Boys	932	91.5	8.5	100
	Girls	988	93.2	6.8	100
Total	Boys	4,862	73.8	26.2	100
	Girls	4,749	62.5	37.5	100

Marital Status

Surprisingly, as is shown in Table 3.8, 10 percent of children were married during the end line round of data collection.[21] This proportion is higher in Hardoi, among girls as well as among children who dropped out in the second year of the study. In fact, of students who dropped out by end line, about 30 percent reported to be married.

Table 3.8: Children's marital status by location, gender and end line enrollment status				
	N	Unmarried	Married	Total
All children	9,401	90.0	10.0	100
By location				
Hardoi	7,493	87.9	12.1	100
Sambalpur	1,908	98.4	1.6	100
By gender				
Boys	4,734	92.7	7.3	100
Girls	4,657	87.3	12.7	100
By end line enrollment status				
Currently enrolled	6,299	99.5	0.5	100
Drop-out	3,043	70.2	29.8	100

Table 3.9 presents enrollment status for children in four categories: unmarried girls, unmarried boys and married girls and married boys. Among unmarried boys and girls, the proportion of those who had dropped out was between 21 for boys and 30 percent for girls; however, among those who were married, over 95 percent boys and girls dropped out of school.

Table 3.9: End line enrollment status by gender and marital status				
Marital status	N	Currently enrolled	Drop-out	Total
Unmarried girls	4,045	70.5	29.5	100
Unmarried boys	4,349	78.3	21.7	100
Married girls	591	2.4	97.6	100
Married boys	347	4.9	95.1	100
Total	9,332	67.4	32.6	100

[21]The category of 'Married' includes a higher proportion of children who were reported married but residing in the parental home (9.5%) along with those who were married and residing with the family of the husband (0.5%). For the purposes of this report, these two categories have been combined.

The analysis of the individual characteristics of children who dropped out of school by end line shows that older children, girls as well as children who were married had higher drop-out rates compared to their peers. We now turn our lens on the group of 3,056 children to report findings from the household survey regarding the decision to drop out.

Decision to drop out

In households of drop out children, respondents were asked whose decision it was that the child should drop out from school and the reasons for the decision. Similar to the question on school choice and decision making, this was a multiple-choice question where up to 3 reasons per child were recorded.

Table 3.10 presents proportion responses to the question regarding who decided that the child should drop out. According to these data, in about 6 in every 10 cases, the decision to drop out of school was taken by parents (or other adults);[22] in the remaining 4 out of 10 cases, the decision was reported to be the child's own. However, clear differences are seen between the study locations as well as by children's gender.

Parents and other adults were reported as decision makers in a higher proportion of cases in Hardoi while in Sambalpur, children themselves were reported to have taken the decision. Gender disaggregated data reveals, perhaps unsurprisingly, that parents were the decision makers for more girls (70 percent) than boys (44 percent). On the other hand, among boys who had dropped out, in over half of the cases the decision was reported to have been their own.

Table 3.10: (Self-reported) Decision to drop out of school				
	N	Child's	Parent or another adult	Total
All children	2,897	40.2	59.8	100
By location				
Hardoi	2,751	39.2	60.8	100
Sambalpur	146	58.2	41.8	100
By gender				
Male	1,191	55.8	44.3	100
Female	1,705	29.3	70.7	100

The reasons offered by households for children dropping out of school are now examined. As mentioned earlier, this was a multiple-choice question where respondents could state up to 3 reasons per child. Table 3.11 presents the proportion of respondents who agreed with each individual reason by location and gender.

Although far fewer children dropped out in Sambalpur compared to Hardoi, a higher proportion of households in Sambalpur reported reasons that indicated financial constraints - *'financial difficulties at home', 'school was expensive, or fees were high'* as well as *'child needed to work to earn money'*.[23] Over a quarter of respondents in both locations reported the child's disinterest in continuing schooling while a higher proportion in Sambalpur, close to half of the respondents offered 'school distance' as a reason for dropping out.

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[22]The category of 'Other adults' includes teachers or other adult family members and has been merged along with the category of 'Parents' due to insufficient cell sizes.
[23]Overall, 5 percent children reported that they were working (19.2 percent in Sambalpur and 4.4 percent in Hardoi). Although the survey did not collect detailed work information, given that these were young adolescents with low academic completion levels, it can be reasonably surmised that most of these were low skilled jobs in the informal sector.

Gender disaggregated data indicates that reasons of financial distress were reported by higher proportions of households where the drop-out child was a girl. A larger proportion of girls reported to have dropped out of school due to home and care-related duties while more boys reported working to contribute to the household income as a reason. Distance to school, adult disinterest in education, safety concerns and marriage were also cited more for girls than boys. Interestingly, children's disinterest in studying further was reported in a higher proportion of cases where the drop out was a boy; there is an 18-percentage points difference between the two genders. Reports from the National Sample Survey and the National Family Health Survey also record similar differences in schooling leaving across the two genders.[24]

Table 3.11: Reasons for dropping out: % respondents saying 'yes' for following responses, by location and gender						
Reasons for dropping out:		**By location**		**By gender**		**All children**
		Hardoi	**Sambalpur**	**Male**	**Female**	
N		**2,910**	**146**	**1,273**	**1,781**	**3,056**
1	Financial difficulties at home	51.3	77.4	49.1	55.0	52.5
2	Child was not interested in studying further	28.1	26.0	38.3	20.7	28.0
3	School was expensive, or fees was high	9.8	30.8	9.0	12.1	10.8
4	School was far	7.2	48.0	5.6	11.7	9.1
5	Child needed to help with siblings or sick members or at home	8.8	*	6.8	10.1	8.7
6	Adults did not feel education is important	7.9	*	4.1	10.3	7.7
7	Child needed to work to earn money	4.4	19.2	10.1	*	5.1
8	Child's illness	3.4	*	3.9	3.5	3.6
9	Child was of marriageable age	2.9	*	*	4.7	3.0
10	Because it is not safe for girls	2.3	*	*	3.9	2.3
11	Child did not have school leaving documents or Transfer Certificate (TC)	1.1	*	*	*	1.1

Proportions for cells with insufficient observations have not been reported

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[24]See 'Social Consumption: Education, [NSS KI (71/25.2)]', pg. 26; available at:
http://mospi.nic.in/sites/default/files/publication_reports/nss_71st_ki_education_30june15.pdf and NFHS-2; pg. 25; available at: http://rchiips.org/nfhs/data/ka/kachap2.pdf

3.5. Summary and concluding thoughts

As has been mentioned earlier, at baseline all children in this study were enrolled in Std VIII. Data on children's end line enrollment status, however, presents a troubling picture with substantial proportions of children dropping out in the second year of the study. However, far higher proportions of children dropped out in the surveyed blocks of Hardoi compared to Sambalpur: in Hardoi, about 4 in every 10 children had dropped out by end line while in Sambalpur less than 1 in every 10 had done so.

Unexpected grade transitions are also seen among children who remained enrolled in school at end line. About 10 percent children either remained enrolled in the same grade as baseline (Std VIII) or moved to lower grades and the proportion of such transitions are higher in Hardoi than Sambalpur. Schooling trends for children who progressed to secondary grades reflect the patterns in secondary school provisioning as seen in Chapter 2. At baseline in both locations, large proportions of children were enrolled in government schools in Std VIII. At end line, however, in Hardoi, where government provisioning reduces drastically at the secondary stage, well over three-quarters of children were enrolled in private secondary schools while in Sambalpur, where there was relatively greater government provisioning at the secondary stage, a substantial proportion of children remain in government schools even at end line.

A higher proportion of girls and older children dropped out by end line. Also, a substantial proportion of children, particularly in Hardoi were married at end line. Importantly, the proportion of drop-outs among children who were married was over 90 percent for both boys and girls. Data on reasons for dropping out reveal differences by gender with families of girls who dropped out citing reasons indicating financial distress, adult disinclination in further education of the child, distance and safety considerations. On the other hand, child's own disinterest in studying further along with need for income generation was cited more for boys who dropped out.

Given these trends, it is evident that measures to increase secondary transition rates require interventions that are contextual for each location as well as each group. Constant monitoring of these trends on the ground, at the block, district or state level to mitigate the situation is fundamental.

Chapter

Learning outcomes

4

As seen in the previous chapter, only 6 in every 10 children who were enrolled in Std VIII during the baseline survey transitioned to secondary grades (Std IX or above) the following year. About 30 percent children (38 percent in Hardoi and 8 percent in Sambalpur) dropped out while less than 10 percent children either remained in Std VIII or transitioned to lower grades. As noted earlier, the proportion of children making these unexpected transitions is much higher in Hardoi as compared to Sambalpur (Table 3.1).

In this chapter, data on children's learning levels is presented with a comparison of their performance on the assessments administered at baseline and end line. To recap, at baseline, children were in Std VIII and were tested in language (Hindi or Odia), English and arithmetic. The assessments in each subject comprised a written test conducted in a group followed by a one-on-one oral test. One year later, during the end line survey, children were administered similar tests again. In this chapter we examine the improvement in children's learning in the intervening year between the two rounds of assessment. The chapter answers questions as: among the cohort that transitioned to secondary grades at end line, are children's learning levels adequate for them to successfully engage with secondary curricula that is of greater complexity than at the elementary stage? How do children's learning outcomes at baseline and end line relate to their transition status at end line?

First, a brief overview of the assessment methodology is presented followed by findings from the assessments in language, arithmetic and English. This analysis is presented first for the group of students who progressed to secondary grades (Std IX or above) and thereafter for the cohort that dropped out by end line.

4.1. Methodology and sample

As mentioned in Chapter 1, the baseline assessments were conducted in schools while the end line assessments were organized at the community level and carried out on a school holiday, in venues such as schools, village panchayat buildings or community halls. In both rounds, students were first administered

the written assessments in language and English followed by one-on-one oral assessments in both subjects. After a short interval, the written test in arithmetic was administered followed by the one-on-one oral assessment.

Table 4.1 presents the number and proportion of students tested in each location, in individual assessment rounds and cumulatively. At baseline, out of 11,264 children enrolled in Std VIII, 35 percent children were tested in language and 42 percent children in arithmetic.[25,26] In comparison, far more children could be tested at end line in each subject and this was probably the result of organising these assessments at the community level on holidays. At end line, about 60 percent children were administered the assessments in language and arithmetic. Overall however, only 27 and 33 percent of all children were tested in language and arithmetic assessments respectively, at both baseline and end line. It is worth pointing out that substantially greater proportion of children in Sambalpur were tested in both assessment rounds compared to Hardoi.[27]

Table 4.1: Number and proportion of students tested in each test round													
	Children enrolled in Std VIII at baseline (N)	Tested in baseline				Tested in end line				Tested in both rounds			
		Language		Arithmetic		Language		Arithmetic		Language		Arithmetic	
		N	%	N	%	N	%	N	%	N	%	N	%
Hardoi	9187	2,559	27.9	3,248	35.4	5,353	58.3	5,364	58.4	1,931	21.0	2,467	26.9
Sambalpur	2077	1,434	69.0	1,510	72.7	1,613	77.7	1,606	77.3	1,191	57.3	1,246	60.0
Total	11264	3,993	35.4	4,758	42.2	6,966	61.8	6,970	61.9	3,122	27.7	3,713	33.0

Table 4.2 presents the number and proportion of children tested in both assessment rounds by their end line enrollment status. Of all students tested at baseline and end line in language and arithmetic, over three-quarters transitioned to secondary grades (Std IX or above) at end line while 6 percent children remained in Std VIII or moved to lower grades. Around 12 percent of children tested in language 15 percent of children tested in arithmetic at both baseline and end line had dropped out.

Table 4.2: Number and proportion of students tested in both test rounds, by location and enrollment status at end line													
	Tested in both baseline and end line		Of children tested in baseline and end line, those who:											
			Were enrolled in Std IX or above at end line				Were enrolled in Std VIII or lower at end line				Dropped out			
Location	Language	Arithmetic	Language		Arithmetic		Language		Arithmetic		Language		Arithmetic	
	N	N	N	%	N	%	N	%	N	%	N	%	N	%
Hardoi	1,931	2,467	1,361	70.5	1,654	67.0	165	8.5	233	9.4	355	18.4	512	20.8
Sambalpur	1,191	1,246	1,166	97.9	1,220	97.9	4	*	3	*	17	*	17	*
Total	3,122	3,713	2,527	80.9	2,874	77.4	169	5.4	236	6.4	372	11.9	555	14.9

* Proportions for cells with insufficient observations have not been reported

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[25] The number of children tested in language and English is the same as the written assessment paper began with the language section (in Hindi or Odia) followed by questions in English. However, learning results in this chapter have been presented separately for all three subjects.

[26] At baseline, a higher proportion of students were tested in arithmetic due to improved attendance rates in schools on the second day of the survey. See Appendix Table 5 for more details.

[27] This is due to better school attendance rates observed in Sambalpur during the baseline school survey. See Appendix Table 5.

4.2 Learning levels of children who transitioned to secondary grades at end line

This section presents data on children's learning levels for the cohort transitioning to secondary grades (Std IX or above) at end line. The learning tests in the three subjects tested - language (Hindi/Odia), English and arithmetic - comprised an oral and written assessment component. The oral assessment tested children's foundational learning levels in basic reading and numeracy while the written assessments tested them on higher-level competencies. However, the assessments were not grade-level tests but benchmarked to several grades lower than Std VIII.[28]

The sections below present data on children's performance in foundational and higher-level assessments in each subject separately.

Learning outcomes in language (Hindi/Odia)

Mastery of language in various forms – speech, reading and writing - is an important part of an individual's overall development. Considering that we use language to communicate and exchange information in an array of situations, the importance of language skills cannot be overemphasised. The reverse is equally true: a child with inadequate language skills may continue to fall behind and be unable to grasp content that increases in difficulty as she progresses through school.

Before presenting findings from children's performance in the language tests, it is useful to look at what the curriculum expects students to be able to do at the end of elementary school (Std VIII). As per the National Council of Educational Research and Training (NCERT, 2014), the Std VIII language curriculum is designed to develop children's ability in reading, writing, listening and speaking. Students are expected to be familiar with various genres of prose ranging from fiction, travelogue, one-act plays, memoirs and satires, vocabulary and grammatical concepts. They are expected to grasp the meaning of difficult words, understand central ideas in the text as well as use critical thinking to read between the lines and go beyond the text. Children should be able to narrate simple and complex experiences; describe objects and people; report events; speak and write clearly; write simple messages, invitations, paragraphs, letters (both formal and informal) and applications; use various sentence types (simple, compound and complex), parts of speech, compound words and figures of speech, etc. Students in secondary grades are expected to demonstrate ability in all of the above mentioned competencies and develop mastery over other concepts introduced in secondary grades.

Reading assessment

For the one-on-one language reading test which assessed children's foundational reading ability, this study utilised a modified version of the reading tool used in the Annual Status of Education Report survey.[29] In this reading test, children can be marked at 5 different levels corresponding to the highest level at which they can read comfortably. These levels are – (i) Std II level (story), (ii) Std I level (paragraph), (iii) Word level, (iv) Letter level and (v) Beginner level (where the child cannot even read letters).

Data on children's reading ability in Std VIII (Table 4.3) show that although children's reading abilities improve between the two assessments, there are important differences between the locations. In both

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[28] The assessments designed at the start of the study included grade level competencies. However, the results from the piloting of these tools in both locations were found to be much lower than what Std VIII textbooks expected, thus requiring considerable modifications. The final written assessment in language and English were benchmarked to Std IV to Std V levels while those in arithmetic included competencies from Std IV to Std VII level.

[29] The ASER reading tool, developed by ASER Centre is used in the Annual Status of Education Report to assess foundational reading abilities among children across rural India. For more information, see http://www.asercentre.org/p/141.html

assessment rounds, a higher proportion of children in Sambalpur could read the Std II level text compared to counterparts in Hardoi. These estimates quite closely match those generated by successive ASER reports for the country as a whole.

Table 4.3: Reading ability of children, by location and test round								
Of children who transitioned to Std IX or above at end line:								
Location	N	Test round	% of children who could read:					
			Not even letter	Letter	Word	Std I level text	Std II level text	Total
Hardoi	1,356	Baseline	1.0	10.7	3.2	14.8	70.3	100
		End line	1.3	7.4	4.8	12.9	73.7	100
Sambalpur	1,161	Baseline	2.2	6.9	3.8	8.0	79.2	100
		End line	3.1	4.5	3.9	6.2	82.3	100
Total	2,517	Baseline	1.6	8.9	3.5	11.7	74.4	100
		End line	2.1	6.0	4.4	9.8	77.7	100

However, the data above does not permit the identification of which children showed improvements in reading ability. For instance, could children at word-level in baseline improve their ability and read the Std II level text at end line? To examine this point, children's end line reading results are analysed in conjunction with their baseline outcomes (Table 4.4).

Improvement is seen in the reading ability primarily among those children who could already read at least words at baseline. More than a third of children who could read at word level at baseline were able to read a Std II level text at end line; this proportion increases to almost half of those who could read Std I level text at baseline. However, those who could read letters or less were not able to catch up. Of the 39 students who were at 'Beginner' level in Std VIII at baseline, for example, over half remained at the same level one year later, while over a quarter of these children were able to read letters but not more.

Additionally, some children seem to experience "learning loss" between baseline and end line, that is, at end line, they could not read at the same level as they could at baseline. These proportions are largest for children at word level and Std I level text at baseline. For example, of children at Std I level in the baseline assessment (N=294), 19 percent children could not read at the same level at end line. These results suggest that children may need to acquire a minimum threshold of basic reading ability in order to sustain this ability over time. The data also reinforces findings from other research showing that if such skills are not acquired early, they are likely to be more difficult to acquire at later stages.

Table 4.4: End line reading ability by baseline reading ability							
Baseline reading ability: children who could read	N	End line reading ability: % children who could read:					
		Not even letter	Letter	Word	Std I level text	Std II level text	All
Not even letter	39	56.4	25.6	7.7	2.6	7.7	100
Letter	225	9.8	42.7	18.2	20.0	9.3	100
Word	87	2.3	23.0	18.4	21.8	34.5	100
Std 1 level text	294	1.7	5.4	12.2	31.0	49.7	100
Std 2 level text	1,872	0.1	0.5	0.8	4.9	93.8	100
Total	2,517	2.1	6.0	4.4	9.8	77.7	100

Written assessment

The written assessment in language tested children's grasp over a range of skills like reading comprehension, grammar and vocabulary. These tests were administered in Hindi to children in Hardoi and in Odia in Sambalpur.[30]

Figure 4.1 presents the density distribution of the baseline and end line percentage scores in the language written assessment for both the study locations. As these indicate, in Hardoi the end line distribution of percentage scores for children shifts to the right, implying an improvement in scores, while in Sambalpur, the score distribution remains more or unchanged between the two tests.

Figure 4.1: Kernel density estimates of percentage scores in language written assessment, by location and test round
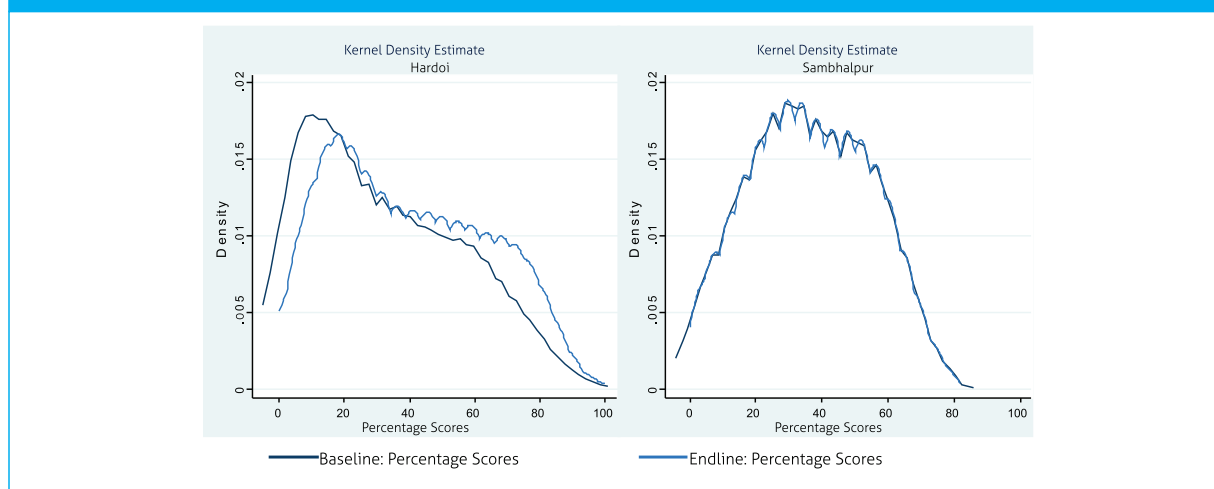
Table 4.5 presents the average percentage scores of children in both locations and test rounds. Although children in Sambalpur scored slightly better than children in Hardoi at baseline, those in Hardoi outperform students in Sambalpur at end line. In Hardoi, children's mean percentage scores increased by 7 percentage points between the baseline and end line tests while those for children in Sambalpur only increased by 2 percentage points. Further, at both baseline and end line, the range of mean percentage scores for children in Hardoi is greater than in Sambalpur. For instance, at end line, the percentage scores for children in Hardoi range from 0 to 100 while the corresponding percentage score in Sambalpur varies from 0 to 82. This implies that a relatively small number of children in Hardoi who obtained higher percentage scores at end line pulled up the average means for the entire cohort as compared to Sambalpur.

Table 4.5: Mean percentage scores in language written assessment, by location and test round

Location	Test round	Mean percentage scores for:	Maximum percentage score
		All children	
Hardoi	Baseline	32.2	95.5
	End line	39.4	100
Sambalpur	Baseline	34.0	81.8
	End line	36.2	81.8

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[30]Appendix Table 6 lists the questions included in both the baseline and end line assessments along with the nature of the question asked and response expected from the child.

Given the variations in scores between the two locations as well among children, it is worthwhile to explore children's average scores in greater detail. We do this by dividing children into 4 quartiles based on the distribution of the baseline scores in the written assessment. Figure 4.2 presents the mean percentage scores that children in different quartiles obtained at baseline and the gains in scores at end line. These data reveal several noteworthy details.

In both locations, children in the lowest score quartile at baseline (Q1) have the biggest gains in scores at end line. In Hardoi, such children improved their end line scores by 12 percentage points and in Sambalpur by 10 percentage points. In Sambalpur, children in the highest score quartile at baseline (Q4) score negatively, that is, their average percentage scores at end line reduces by almost 7 percentage points.

These data indicate that while there are incremental improvements in children's learning outcomes between baseline and end line, there are learning losses as well. The fact that the learning assessments in the study tested competencies from grades below Std VIII while children had successfully transitioned to secondary grades at end line, these outcomes are woefully low relative to curricular expectations at both the elementary and secondary stage.

Figure 4.2: Percentage scores in language written assessment at baseline and gains at end line, by baseline score quartiles and location
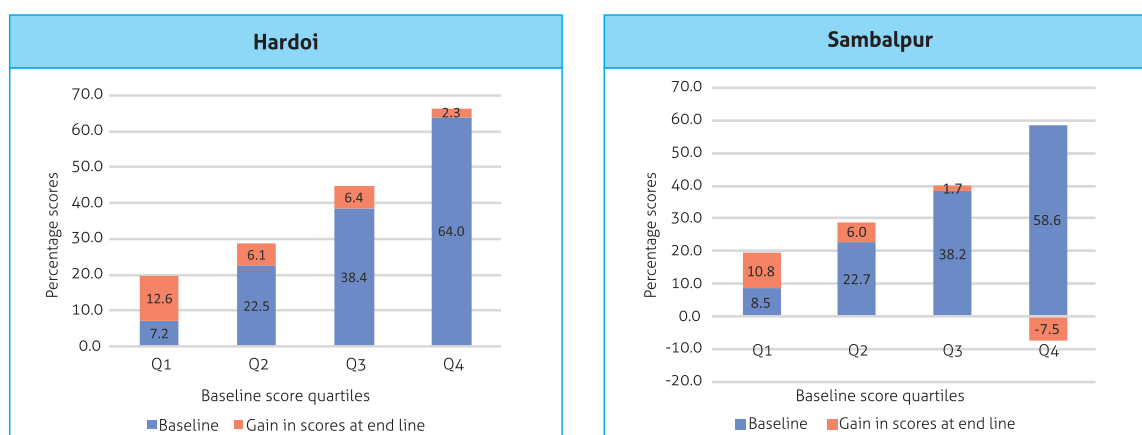
While these data are helpful in understanding broad trends in children's language learning levels, they do not reveal the extent to which children could or could not do specific kinds of tasks in the written test. To understand this learning data better, specific questions from the language assessment tests are examined to see children's performance in both test rounds.

We examine at data on the reading comprehension task, i.e. the ability to read a text and answer questions based on the same. The baseline and end line language assessments consisted of two reading comprehension passages (one narrative text and one informative text), each followed by a set of questions. The narrative text was pegged at Std IV level and the informative text at Std V level.

Table 4.6 presents the proportion of children who correctly answered questions based on the narrative text which included three objective questions (multiple-choice or MCQs) and two subjective questions (written response based). Of the three MCQs, one was of a 'direct-retrieve' nature and one each of the 'integrate' and 'interpret' category. Below is a brief explanation of the types of comprehension questions asked.

- **Direct retrieval (DR) or locate:** Answers to such questions are available directly in the passage and do not require the student to assimilate the answer from multiple lines in the passage.

- **Indirect retrieval (IR):** The answers to such questions are not directly available in the text; the student is required to understand the passage and then derive the correct answer from it.

- **Integrate:** The answers to such questions are scattered across the text and the student is required to assimilate and integrate the answer from various lines.

- **Interpret or reflect and evaluate:** In such questions, students were required to interpret the question statement and then either select the appropriate response from the given options or write down the answer, providing their reasons for the same. Such questions require students to go beyond the passage and draw on their own individual opinions and experiences.

Looking at the results in Table 4.6, in both locations, we see that more children could answer the comprehension questions correctly at end line compared to baseline. However, there are crucial differences based on the type of question. While over 60 percent children could correctly answer the direct-retrieval question at end line, less than a third could do the same in the question requiring some interpretation.

Among the set of written questions, at end line, less than half of all children transitioning to secondary grades could correctly answer the question that required them to 'locate' the answer from the text and write it down (akin to the direct-retrieve MCQ). The question requiring reflective thinking was one of the most difficult for children in both locations – less than one-third of children in Sambalpur and one-fifth of children in Hardoi could do this despite having moved to Std IX or above.

Table 4.6: Proportion of children who could correctly answer selected reading comprehension questions, by location and test round

Location	N	Test round	% Children who correctly answered:				
			MCQs			Written	
			Direct retrieve	Integrate	Interpret	Locate	Reflect and evaluate
Hardoi	1361	Baseline	56.9	34.5	23.4	31.9	10.5
		End line	65.6	46.2	30.9	46.0	20.2
Sambalpur	1166	Baseline	56.8	38.4	26.2	33.3	29.0
		End line	61.2	46.0	35.3	52.4	32.8
Total	2527	Baseline	56.9	36.3	24.7	32.5	19.0
		End line	63.6	46.1	33.0	49.0	25.6

We now examine children's performance on different categories of competencies assessed in the baseline and end line written assessments.[31] Figure 4.3 helps understand how children who transitioned to secondary grades at end line fared in various tasks.

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[31]Scores for task categories were calculated by combining the scores for individual sub-questions under each category of task.

The blue bars in the graphs below indicate the weight of individual tasks in the total score. For example, questions under 'comprehension narrative text' comprised the highest proportion of total scores in the language written assessment (36.4 percent), followed by grammar related questions (27.3 percent). The orange and grey bars represent the actual share of these tasks in the baseline and end line mean percentage scores respectively. The blue bars across all task-categories add up to 100 percent while the orange and grey bars add up to the baseline and end line mean percentage scores respectively. In Hardoi, as shown in Table 4.5, the mean percentage score for children who transitioned to secondary grades was 32.2 percent at baseline and 39.4 percent at end line - the orange and gray bars in Fig. 4.3 add up to their respective figures. So, children in Hardoi scored an average of 32.2 percent at baseline by answering correctly 28 percent of the narrative text questions (10.2), 23 percent of the informative text questions (4.2), 30 percent of vocabulary (5.6) and 44 percent of grammar questions (12.2). If children had answered all questions under each task category correctly, the orange/grey bars would have coincided with the blue bar. In other words, the higher the gap between the blue and orange/grey bar for a task, the poorer the children have performed in that task-category.

These data indicate that basic reading comprehension and analytical abilities are low among children, with the poorest performance in the comprehension of informative text; on average, children could only answer a third of these questions correctly. On the other hand, although the narrative text did not contain any technical information, children's performance in both locations is again woefully short of expectations. In both locations, children perform relatively better on grammar related questions compared to other tasks; but even here, less than half of the grammar questions could be answered correctly by children in both locations.

Figure 4.3: Task-wise mean percentage scores in different domains of the language written assessment, by location and test round
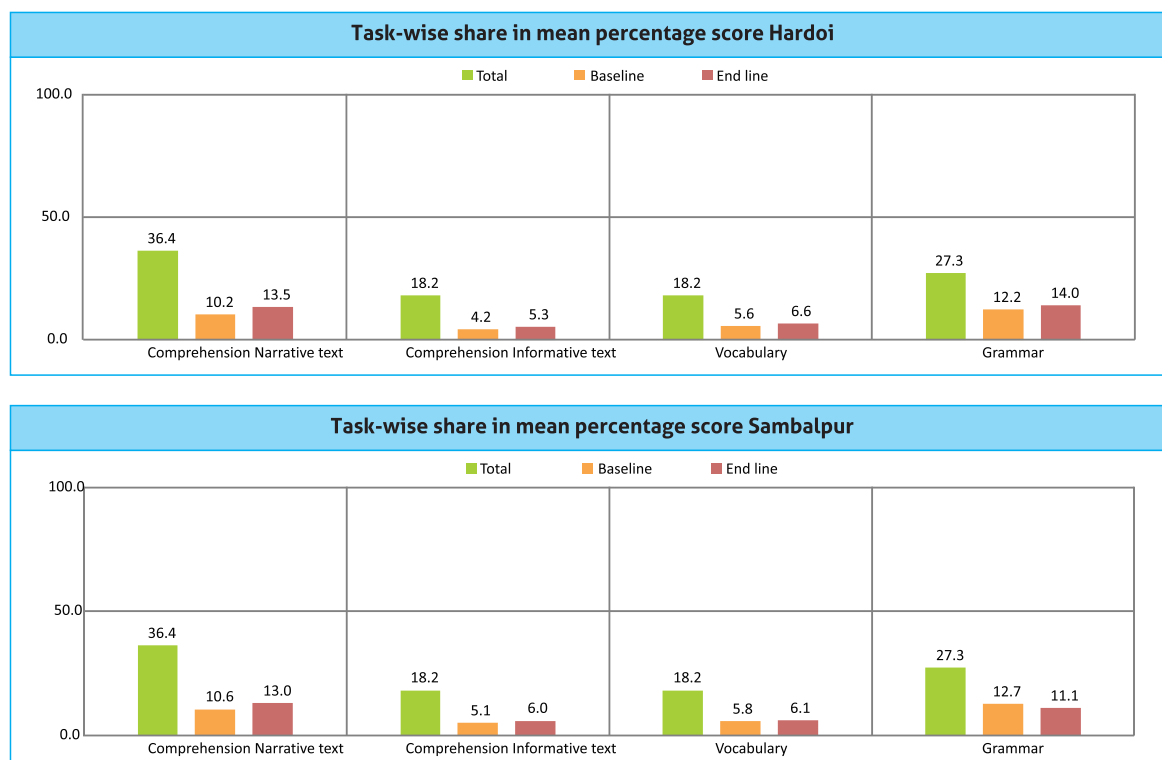
The results above indicate that despite improvements in basic reading levels and performance in the written tests, overall children's performance in language remains low. Given that these assessments were not grade level tests but included items from several grades below, such poor performance after eight years of schooling raise serious questions about the quality of elementary education in the study sites. It also raises questions regarding the ability of these children to understand content that is of higher difficulty levels as they progress through the secondary school system.

Learning outcomes in arithmetic

According to the NCERT, the main goal of math in the school curriculum is to enhance children's ability to think and reason, visualise and handle abstractions, formulate and solve problems. Math is a compulsory subject in schools beginning from primary grades. At the upper-primary level students move from number sense to number patterns with the introduction of a new mathematical language or terms like variable, expression, equation, identities; in many ways, this marks a transition from the understanding of abstract concepts to its application. By the end of Std VIII, the math curriculum covered includes concepts like rational numbers and integers, ratio and proportion, algebraic and linear equations, percentage, profit, loss and discount calculations, mensuration and geometry (NCERT, 2014). The curriculum in secondary grades builds upon these concepts and thus a strong foundation in basic numeracy and operations is a prerequisite for learning higher order arithmetic concepts and topics.

Basic numeracy

The one-on-one test in arithmetic assessed children's ability to recognize numbers. Children were first asked to identify at least four of the six 4-digit numbers provided; if they could do so, they were marked at '4-digit number recognition level'. If they were unable to do this, they were asked to recognise a similar number of 3-digit numbers; the grading ensued in the same manner till the level of 2-digit number recognition. If the child could not even recognise 2-digit numbers, was marked at the 'beginner' level.[32] Table 4.7 presents proportion of children who progressed into secondary grades at each of the abovementioned levels, across both locations and assessment rounds respectively.

At baseline, only about six in every ten children who were in Std VIII could recognize 4-digit numbers correctly. Despite an improvement of 7 percentage points at end line, about a third of the children in secondary grades still could not identify 4-digit numbers correctly.

Table 4.7: Proportion of children at different levels in baseline and end line arithmetic oral assessment, by location							
			% of children who could recognize:				
Location	N	Test round	Not even 2-digit numbers	2-digit numbers	3-digit numbers	4-digit numbers	Total
Hardoi	1,651	Baseline	8.2	13.4	20.2	58.2	100
		End line	4.8	10.3	18.7	66.2	100
Sambalpur	1,218	Baseline	7.8	11.1	22.3	58.9	100
		End line	4.9	10.1	20.9	64.2	100
Total	2,869	Baseline	8.1	12.4	21.1	58.5	100
		End line	4.8	10.2	19.6	65.3	100

[32] The first arithmetic oral test developed included subtraction and division sums. Similar tools have been used for comparable age groups in other studies at ASER Centre. However, extensive pre-study pilots indicated that Std VIII students in the study sites were unable to do even basic operations. Thus, for this study, the final oral assessment in arithmetic only contained number recognition tasks.

As seen in the language reading results, children's abilities in basic numeracy is also a function of their previous skill or performance (Table 4.8). Of the students who could not even recognise two-digit numbers at baseline, over 35 percent remained at the same level, not showing any improvement between baseline and end line. Of the remaining, maximum proportion children progressed one level up, to be able to recognize two-digit numbers at end line.

Table 4.8: End line ability by baseline ability in arithmetic oral test						
Baseline ability: Children who could recognise:	N	End line reading ability: % children who could read:				
		Not even 2-digit numbers	2-digit numbers	3-digit numbers	4-digit numbers	Total
Not even 2-digit numbers	231	37.2	40.7	19.9	2.2	100
2-digit numbers	356	10.7	34.0	33.4	21.9	100
3-digit numbers	604	1.5	8.6	38.1	51.8	100
4-digit numbers	1,678	0.4	1.6	10.0	88.1	100
Total	2,869	4.8	10.2	19.6	65.3	100

Arithmetic written assessment

The final written assessment in math comprised 17 questions (see Appendix Table 7 more details). As Figure 4.4 which presents the kernel density distribution of the arithmetic written test scores show, in Hardoi, children's performance in arithmetic improve at end line, with a shift to the right in the distribution of scores. In Sambalpur on the other hand, children's performance remains the same across both assessment rounds, as is evident from the overlapping of baseline and end line score distributions.

Figure 4.4: Kernel density estimates of percentage scores in arithmetic written assessment, by location and test round
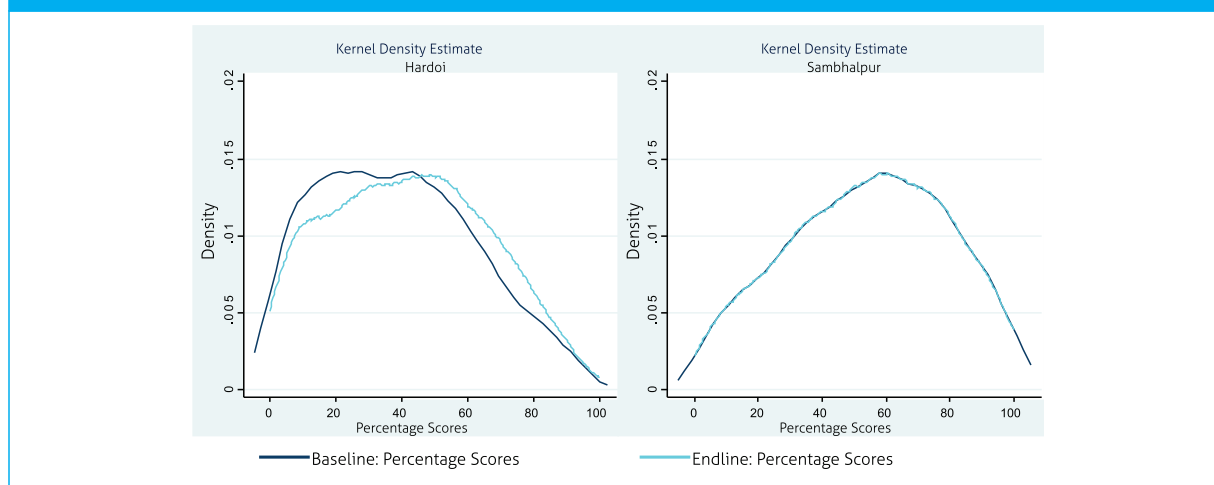
These trends are clearer through an examination of children's average scores in the written assessment (Table 4.9). While the average percentage scores for children progressing to the secondary grades in Hardoi improved by about 4 percentage points, from 39 percent at baseline to 42 percent at end line, those for the cohort in Sambalpur remained the same.

Table 4.9: Mean percentage scores in arithmetic written assessment, by location and test round			
Location	**Test round**	**Mean percentage scores for:**	**Maximum percentage score**
		All children	
Hardoi	Baseline	38.6	97.4
	End line	42.3	100
Sambalpur	Baseline	54.3	100
	End line	54.1	100

Figure 4.5 presents the arithmetic mean percentage scores that children in different quartiles (based on baseline scores) obtained at baseline and the gains in scores at end line. In both locations, improvements in scores are the largest for children in the lowest score quartile at baseline (Q1), particularly in Sambalpur where end line scores improved by 13 percentage points. On the other hand, in both locations, children in the highest score quartile at baseline (Q4) score negatively, that is, their average percentage scores at end line reduces – the reduction is by approximately 2 and 7 percentage points respectively in Hardoi and Sambalpur.

Figure 4.5: Percentage scores in arithmetic written assessment at baseline and gains at end line, by baseline score quartiles and location
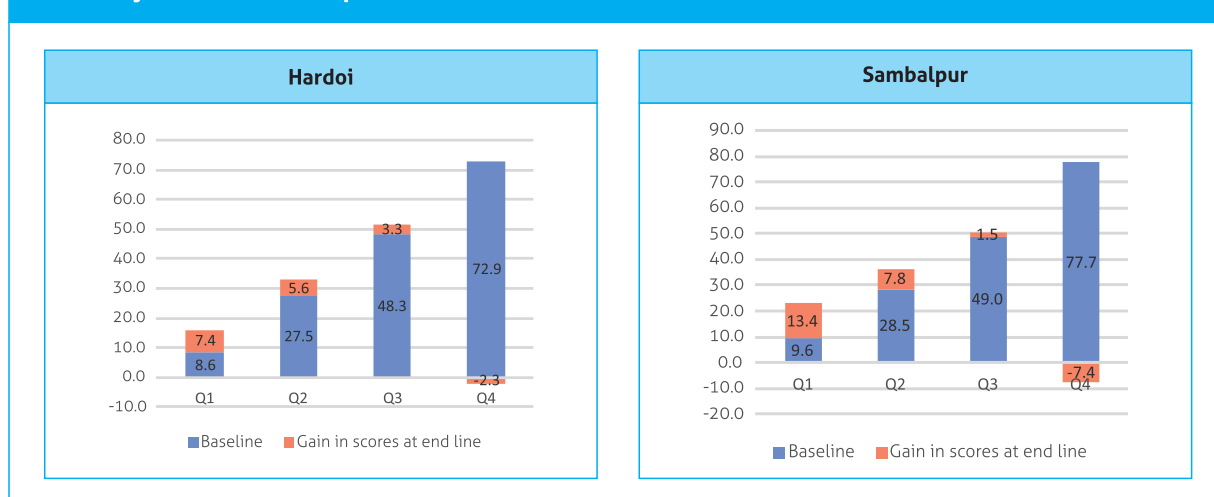
Next, we examine children's performance on selected questions from the arithmetic written assessment, beginning with 4 questions that tested basic numeric operations and word problems (Table 4.10). Slight improvements are seen in children's performance in Hardoi, but in Sambalpur the proportion of correct responses actually declines at end line. Overall, about a third of children could do these basic arithmetic problems. Not surprisingly then, the word problem in which children were required to calculate percentage proved to be much more difficult for children in both locations.

Table 4.10: Percentage of children who could correctly answer selected questions in the arithmetic written assessment, by location and test round

Location	N	Test round	% Children who correctly answered:			
			Basic operations		Word problems	
			4-digit by 3-digit subtraction	3-digit by 2-digit division	Unitary method	Percentage
Hardoi	1,654	Baseline	28.7	31.7	26.1	9.3
		End line	31.3	36.7	30.2	11.9
Sambalpur	1,220	Baseline	37.1	29.0	37.1	20.2
		End line	36.7	27.2	33.9	19.8
Total	2,874	Baseline	32.2	30.6	30.8	13.9
		End line	33.6	32.7	31.8	15.2

If children's performance on basic numeric operations and word problems are low, how did they perform on slightly more complex concepts like geometry, mensuration or metric conversion? Table 4.11 presents the proportion of correct responses on another set of questions from the arithmetic written assessment: two questions that tested concepts in geometry, one in metric conversion, and one mensuration question where children had to calculate the area of a given shape.

Among these questions, the one on mensuration seemed to be the most difficult for children to do: in Sambalpur, less than a third of all children who had transitioned to secondary grades could correctly solve this question at end line while the corresponding proportion in Hardoi is less than 20 percent. In geometry too, children in Sambalpur performed better than their peers in Hardoi – there is a twenty to twenty-seven percentage point difference in the proportion of children who could correctly answer these questions in Sambalpur and Hardoi respectively. The question on metric conversion could be solved by over half on all children in both locations.

Table 4.11: Percentage of children who could correctly answer selected questions in the arithmetic written assessment, by location and test round

Location	N	Test round	% Children who correctly answered			
			Mensuration (Area)	Geometry		Metric system
				Identify the larger angle	Classification of triangle based on length of the side	Kilogram to gram conversion
Hardoi	1,654	Baseline	15.2	25.6	26.9	46.4
		End line	17.8	35.0	27.2	51.5
Sambalpur	1,220	Baseline	28.9	57.8	53.9	60.1
		End line	30.8	62.2	47.7	59.3
Total	2,874	Baseline	21.0	39.3	38.4	52.2
		End line	23.3	46.6	35.9	54.8

We now present an overall picture of children's performance on various categories of tasks assessed in the baseline and end line arithmetic written test. The arithmetic assessment had more categories of questions and tasks compared to the language written test.

Figure 4.6 presents the share of different task-categories in the overall total score as well as the actual share of these tasks in the baseline and end line mean percentage scores respectively, separately for each location. As explained earlier, the blue bars represent the weight of questions in each task-category in the total score, while the orange/grey bars illustrate how children actually performed on these particular tasks at baseline and end line respectively. Thus, for Hardoi, the orange bars in add up to 38.6 percent, which was the baseline mean percentage score of the children tested in Hardoi; and the grey bars sum up to 42.3 percent, which is the average end line arithmetic score in Hardoi.

In both locations, children seemed to be able to do tasks that assessed basic number recognition and comparison, especially in Sambalpur. Except for questions on mensuration and word problems, children in Sambalpur could also answer at least half of the questions under each of the other tasks correctly. In word problem and mensuration, where children were required to understand the problem statement and decide an appropriate mathematical operation to solve the problem, only a third of the questions under these tasks could be solved correctly by children. In Hardoi, on the other hand, children performed relatively better in basic number recognition, operations and metric system with children being able to answer a little over half of the questions under each of these tasks correctly. In all other tasks, children answered less than 40 percent of questions in the category. In Hardoi too children performed the poorest in the mensuration task, a concept generally taught in Std VII.

Figure 4.6: Task-wise mean percentage scores of children in different domains of the arithmetic written assessment, by location and test round

Task-wise share in mean percentage score, Hardoi

Task-wise share in mean percentage score, Sambalpur
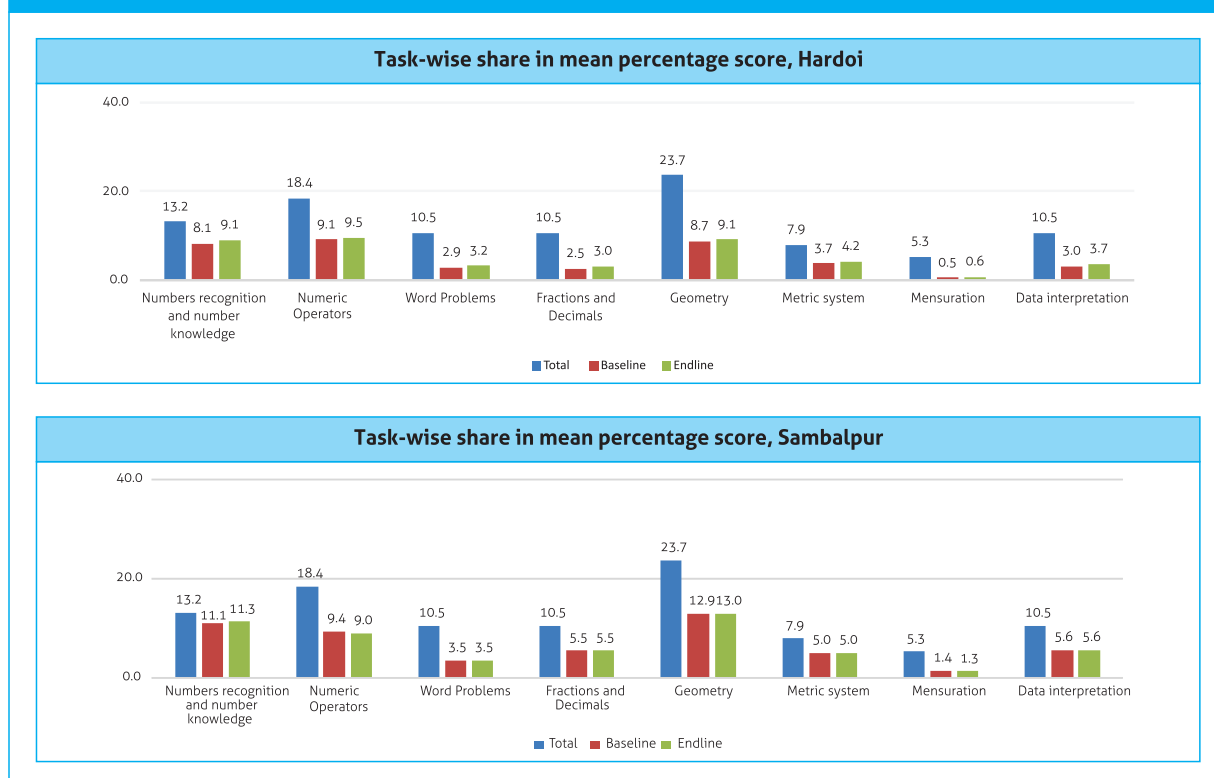
Learning outcomes in English

In India, English is the language of aspiration, perceived to be advantageous, and a desired skill at the stage of employment. The curriculum expectations laid down by NCERT emphasises all parts of language development in English – reading, writing, listening and speaking. In reading, they are expected to understand the central idea of a text (both seen and unseen) and go beyond the text to read between the

lines. In writing, they are expected to write simple messages, invitations, short paragraphs, letter (formal and informal), applications, simple narrative and descriptive pieces. Students are also expected to develop mastery over verbal communication by being able to narrate simple experiences, describe objects and people, report events to peers and speak accurately with proper intonation (NCERT, 2014).

In this study, children were assessed on their ability to read, understand and write simple English. As in the preceding section, the results of the reading tests in English are examined first followed by results in the written assessment test.

English reading assessment

In the English reading test, children were tested in their ability to recognize English alphabets, read words and simple sentences of Std 1 level. Modelled on the ASER English reading tool, children could be marked at five different levels based on their highest reading ability, i.e. those who could read simple sentences, words, small letters, capital letters or were at the beginner level. Table 4.12 presents the proportion of children at different reading levels at baseline and end line respectively.

Similar to the results in language reading ability, children's reading abilities in English also improved between the two assessment rounds; but reading levels in English are much poorer than those in the state language (Hindi or Odia). At end line, over half of all children who transitioned into secondary grades could not read simple sentences in English while a third of all children could not even read simple, three-letter, English words. The reading levels among children in Sambalpur were marginally better than in Hardoi with approximately a ten-percentage point difference in the proportion of children who could read simple English sentences at end line.

Table 4.12: Reading ability in English, by location and test round							
Of children who transitioned to Std IX or above at end line:							
Location	N	Test round	% of children who could read:				
			Not even letter	Capital letters	Small letters	Words	Sentences	Total
Hardoi	1352	Baseline	6.4	5.7	33.4	21.2	33.3	100
		End line	3.9	5.8	28.1	19.9	42.2	100
Sambalpur	1163	Baseline	6.0	5.1	26.1	19.2	43.7	100
		End line	4.1	3.3	22.9	18.1	51.6	100
Total	2515	Baseline	6.2	5.4	30.0	20.3	38.1	100
		End line	4.0	4.7	25.7	19.1	46.6	100

Table 4.13 examines children's end line English reading abilities by their performance in the baseline. Over 40 percent children who were at the 'beginner' level at baseline had not learned to read English letters even a year later. However, of those who could recognise capital letters at baseline, over 50 percent could recognise small letters by end line while about 13 percent could read simple words. The transition from being able to recognise small letters to reading words or simple sentences seems to be the most difficult with over half of the children in this category remaining at the same level even at end line. Like the language reading test, varying proportions of children also experience "learning loss" in English reading, that is, at end line they were unable to read at the level they had demonstrated at baseline.

Table 4.13: End line reading ability by baseline reading ability in English							
Baseline reading ability: Children who could read	N	End line reading ability: % children who could read:					
		Not even letters	Capital letters	Small letters	Words	Sentences	Total
Not even letters	156	42.3	23.1	25.6	7.1	1.9	100
Capital letter	136	13.2	16.2	55.9	8.8	5.9	100
Small letter	755	1.5	6.1	55.0	26.4	11.1	100
Words	510	0.2	1.8	18.0	35.9	44.1	100
Sentences	958	0.5	0.4	2.4	7.8	88.8	100
Total	2,515	4.0	4.7	25.7	19.1	46.6	100

English written assessment

In both assessment rounds, the written assessment in English consisted of two types of questions. The first four questions were picture identification tasks where children were required to write down the name of each picture correctly in English (for example: table, chair, grapes etc.). This question tested simple vocabulary and writing ability. The next two questions, a reading comprehension task, were based on a four-line text and tested children's basic comprehension and writing in English. (See Appendix Table 8 for details).

Table 4.14 below shows children's performance on the picture identification task in both assessment rounds. Since the task comprised of four sub-parts, correct answers could range from 0 to 4. At baseline, over half of all children in Hardoi and a little over a third in Sambalpur got all parts of the question wrong; at end line, this percentage reduces for Hardoi but remains unchanged in Sambalpur. Overall more children in Sambalpur could answer this question correctly than in Hardoi at both baseline and end line. Nevertheless, the fact remains that only about 1 in every 4 children who entered secondary grades could correctly name and write down 4 simple words in English.

Table 4.14: Proportion of children who could answer the picture identification task in the English written assessment, by location						
Location	N	Test round	0 correct	1-2 correct	3-4 correct	Total
Hardoi	1,361	Baseline	54.1	27.2	18.7	100
		End line	48.6	29.2	22.2	100
Sambalpur	1,166	Baseline	36.6	37.4	26.0	100
		End line	36.8	36.7	26.5	100
Total	2,527	Baseline	46.0	31.9	22.1	100
		End line	43.2	32.7	24.2	100

Similarly, children's ability to answer simple comprehension questions in English is poor (Table 4.15). The comprehension section in English comprised two questions based on a four-line long text. Both questions required children to write down their responses in the space provided – while the first question was of a direct-retrieve nature - whose answer was located in the passage - the second was an indirect-retrieve

question. Far higher proportions of children could answer the first direct-retrieve question (about 6 in every 10 children) as compared to the indirect-retrieve question (less than 1 in every 10 children).

Table 4.15: Proportion of children who could correctly answer reading comprehension questions in the English written assessment, by location and test round				
Location	N	Test round	Question 1 (Direct Retrieve)	Question 1 (Indirect Retrieve)
Hardoi	1,361	Baseline	40.6	4.0
		End line	53.9	4.6
Sambalpur	1,166	Baseline	51.1	14.2
		End line	62.3	11.8
Total	2,527	Baseline	45.4	8.8
		End line	57.8	7.9

Although the reading and written assessments in English included fewer and much simpler tasks than the language written assessment, extremely poor levels of reading are seen in writing and comprehension among children who progressed to secondary grades at end line. The emphasis on English as a language of aspiration and opportunity does not match the realities on the ground, at least with respect to what children in secondary grades in the surveyed sites are able to do.

The findings presented above for children who transitioned to secondary grades at end line indicate poor proficiency levels in all three assessed subjects, both in the oral and written tests. In each subject, the analysis of children's performance on individual items tested make it clear that children progressing into secondary schools demonstrated low mastery of skills and concepts from elementary grades. Despite having spent 8 years in the school education system, many children could not answer questions from several grade levels below.

4.3 Comparison of learning outcomes by children's end line enrollment status

If the outcomes for children who transitioned into secondary grades are so poor, what of those who either remained in the same grade as baseline or moved to lower grades, as well as those who dropped out of school?

Learning results for children in three categories based on their end line enrollment status are compared–those who transitioned to secondary grades, those who either remained in Std VIII or moved to lower grades, and those who dropped out of school. This analysis is restricted to children in Hardoi given that far fewer children in Sambalpur either dropped out by end line or made unexpected grade transitions is low (Table 4.16).

Table 4.16: Number of students by their end line enrollment categories who were tested in both baseline and end line language and arithmetic assessments, by location

End line enrollment status:	Total children	Children tested at baseline and end line language written assessment:			Children tested at baseline and end line arithmetic written assessment:		
		All children	Hardoi	Sambalpur	All children	Hardoi	Sambalpur
Enrolled in Std IX or above	5770	2527	1361	1166	2874	1654	1220
Enrolled in Std VIII or below	797	169	165	4	236	233	3
Dropped out	3,056	372	355	17	529	512	17
Total	9,623	3068	1881	1187	3639	2399	1240

We first compare children's results in the one-on-one oral assessments in all three subjects by presenting the proportion of children who were at the highest two levels in each oral assessment test in language, English and arithmetic (Figure 4.7). In all the three assessments, the proportion of children who could do the specified task declines with each enrollment category. In other words, in comparison to children who transitioned into secondary grades at end line, the results are successively poorer for children who were enrolled in Std VIII or lower and for those who dropped out. For instance, at end line, over 7 in every 10 children enrolled in secondary grades could at least read a Std II level text; in comparison, less than 5 in every 10 children who made unexpected grade transitions and less than 3 in every 10 children who dropped out could do so. Similar trends are visible for English and arithmetic results as well.

Figure 4.7: Results of oral assessment for children in Hardoi by end line enrollment status, for each test round
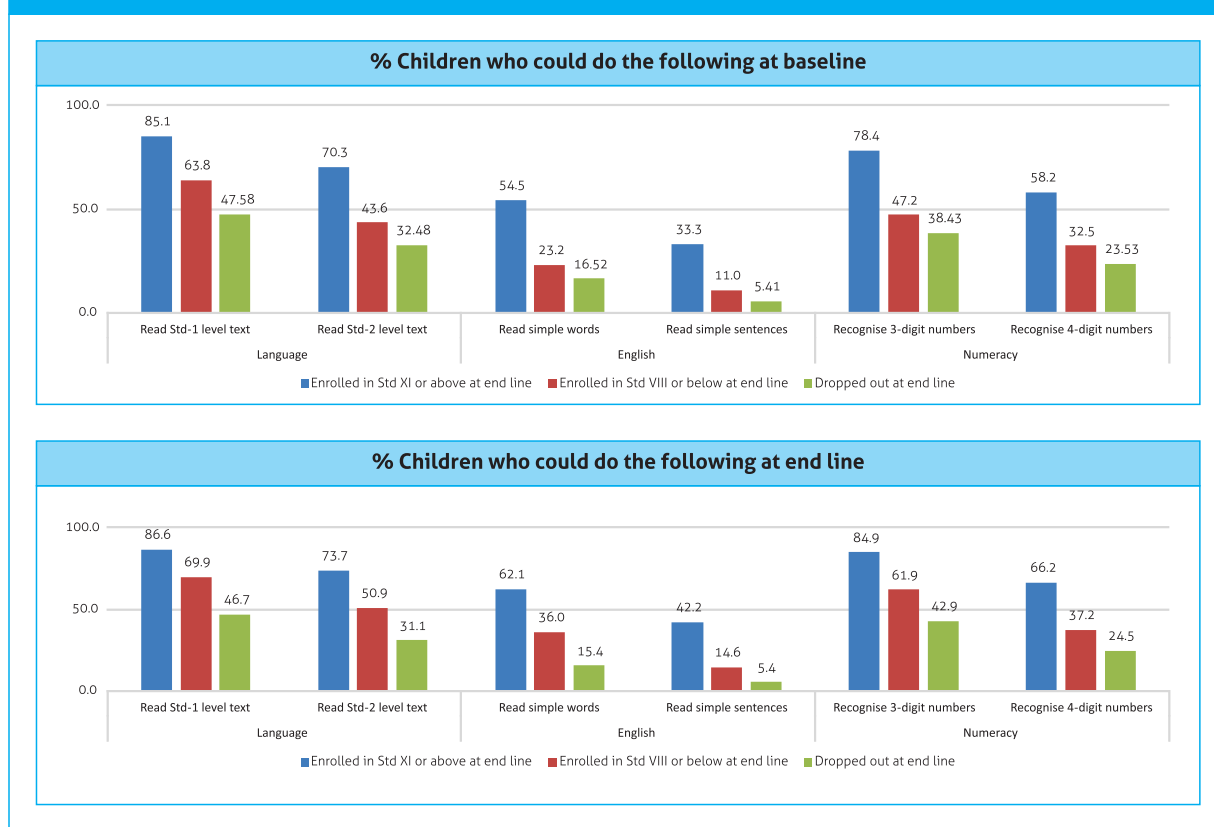
What are the differences in the written assessments which tested children on several higher-level competencies and items? Children who dropped out also had the lowest mean percentage scores in all the three assessments and in each round compared to peers who remained enrolled in various grades (Appendix Table 9). At end line, there is a difference of nineteen to twenty-three percentage points in the mean scores of the language and arithmetic written assessments respectively, between children who were enrolled in secondary grades and those who dropped out.

4.4   Summary and concluding thoughts

This chapter unpacked the learning outcomes of children in the three tested subjects by their end line enrollment status. Overall, the data presented above points to a learning crisis of enormous proportions.

The analysis presented for children who progressed to secondary grades at end line shows that in both locations, children are entering secondary grades with poor mastery of basic skills in language and arithmetic. A scenario in which children are unable to read simple text and answer comprehension questions indicates serious deficiencies in their ability to both understand the text and write effectively. The inability to solve simple mathematical operations, word problems or geometry related tasks are similarly problematic. Particularly for children entering secondary grades, these deficiencies are likely to hinder their ability to transact content that is of far greater difficulty than the concepts tested in this study.

In Hardoi, significant differences are also seen between the learning outcomes of children with different enrollment trajectories at end line. Those who had dropped out by end line have the poorest learning levels in all three subjects, while those who either remained in Std VIII or progressed to lower grades performed only marginally better. Taken as a whole, these data point to severe challenges for the school education system. The fact that even after eight years in school, substantial proportions of children in this study were unable to read simple text and answer related questions or solve simple arithmetic operations is a serious indictment of the elementary schooling system in the study sites.

Factors influencing children's school continuation and learning outcomes

Having examined children's enrollment status at end line and their learning outcomes in language, English and arithmetic, we now turn to the two questions that are at the heart of this study. First, what factors influence children's enrollment status at end line, i.e. which factors either aid or act as barriers in their continuation with schooling after elementary school? And second, what factors affect children's learning outcomes at end line? For each question, the analysis is undertaken in a multivariate framework.

According to the literature, parents and families are important factors influencing children's educational attainment. In many studies, parents' choices regarding their children's education are shaped by numerous factors, such as their own educational attainment, socioeconomic status, place of residence, cultural norms and personal preferences regarding education; accessibility and condition of school facilities; and the opportunity costs of their children's time. A study in Uttar Pradesh and Bihar found that school enrollment increased with parental education and wealth, as well as with school quality (Dostie & Jayaraman, 2006). This study also found maternal education to be a stronger predictor of girls' enrollment decisions than paternal education. Other studies in India have drawn similar conclusions with regards to the effects of parental educational levels in children's enrollment status (for example Jayachandran 1997; Dreze & Kingdon, 1999).

Household wealth, measured by asset proxies, also has a positive relationship with school enrollment. In Siddhu's (2011) study on the determinants that enable or restrict transition of children in rural India to secondary schooling, the number of children dropping out increases as wealth decreases. 33 percent of children in the lowest wealth quintile dropped out after Std VIII, while the proportion was only 3 percent for those in the highest quintile. In addition, the study found that more than twice as many girls dropped out of schools after completing upper primary schooling (Std VIII) in families where the main source of income was unskilled manual labour as compared to families where the main source of income was either skilled labour or farming.

On the issue of caste in India, children belonging to Scheduled Castes and Scheduled Tribes and Other Backward Caste in the PROBE survey were found to be less likely to attend school than their counterparts

in the general castes, even when the authors controlled for several other characteristics. This was particularly relevant for girls both in terms of initial enrollment and grade attainment (Dreze & Kingdon, 1999). Dostie and Jayaraman, however, found mixed results regarding caste and enrollment. In their study, caste affiliation had "no significant effect on enrollment" when accounting for village-level caste composition (Dostie & Jayaraman, 2006). However, boys aged 11-14 were more likely to be enrolled in villages with a larger proportion of high castes. In Bihar, higher caste fractionalisation was "associated with a higher probability of school enrollment among members of the older cohort of both genders". Yet, this was not the case for U.P. Interestingly, when the authors omitted the measures of village caste composition from their analysis, belonging to a Scheduled Caste significantly reduced the probability that young girls were enrolled in school. As this finding is at odds with much of the literature, Dostie and Jayaraman posit that "village caste relations, rather than individual caste identity viewed in isolation, may be more central to school enrollment". In his study on the transition to secondary schooling in rural India, Siddhu found that membership in a Scheduled Caste had "virtually no relationship with transition to secondary schooling" (Siddhu, 2011: p. 397). Nonetheless, when disaggregating by gender, 22 percent of Scheduled Caste girls dropped out versus only 14 percent of Scheduled Caste boys.

On the issue of gender, numerous studies have explored how gendered practices in the household may influence the link between marriage and parents' investment in education (Boyle et al., 2002; Chowdhury, 1994; Colclough et al., 2000; Rose & Al Samarrai, 2001; Sengupta & Guha, 2002). Another reason cited in the literature is that parents express concern about not finding partners for educated daughters. According to Chowdhury (1994), sometimes parents perceive that education changes girls' behaviour, making marriage prospects difficult. Additionally, in many societies, it is socially undesirable for girls to travel unaccompanied, particularly as they reach puberty, which affects their ability to access schooling (Siddhu, 2011).

In this chapter, we look at children's individual characteristics viz., gender and age; household characteristics like caste, class and parental education; and school level factors as management type and whether children's baseline school provided continuous education in elementary and secondary grades. For each of the two key questions posed in the chapter (factors influencing whether the child continues with schooling or not and learning levels), we first analyse the 'uncontrolled' relationship between these and thereafter we explore the relationship in a multivariate framework.

5.1. Factors influencing children's school continuation rates

What do we know about children who dropped out after Std VIII? Of the children who were successfully tracked at end line, the majority of children who had dropped out were in the surveyed blocks of Hardoi. Close to 4 in every 10 children in these blocks had dropped out by the end line visit, whereas less than 1 in 10 had dropped out in Sambalpur (Table 5.1).

Table 5.1: Number and proportion of children by end line enrollment status and location						
Enrollment status at end line	Hardoi		Sambalpur		Total	
	N	%	N	%	N	%
Currently enrolled	4,790	62.2	1,777	92.4	6,567	68.2
Dropped out	2,910	37.8	146	7.6	3,056	31.8
Total	7,700	100	1,923	100	9,623	100

What factors enable children to continue within the schooling system or conversely, lead to their dropping out? The distribution of various individual, household and school related characteristics is first examined for children who were enrolled or dropped out by end line in each location. Table 5.2 presents the proportion of children who were enrolled or dropped out at end line by their individual characteristics.

In Hardoi, girls comprised a higher proportion of children who dropped out by end line; 6 in every 10 children who dropped out by end line were girls (Table 5.2). In comparison, in Sambalpur, a higher proportion of boys than girls discontinued schooling. Therefore, gender does not have the same effects across locations. Stark differences are seen between currently enrolled and dropout children in terms of the proportion who were married at end line: while almost all children who continued schooling remained unmarried, about a third and a fifth of all dropouts in Hardoi and Sambalpur respectively were reported to be married. Recall also from Chapter 3 of this report that over 90 percent children who were married had dropped out at end line.

As seen in Chapter 4, proficiency levels among children who had dropped out was extremely poor compared to those who remained enrolled at end line. In both the language and arithmetic written tests, in both locations, children who dropped out comprise a higher proportion of those in the lowest score quartiles in each test.[33] For example, in Hardoi, nearly half of all dropouts scored between 0 and 9 percent in the language written test, whereas, in Sambalpur, over 40 percent of dropout children scored between 0 and 18.2 percent. Similarly, in the arithmetic written test, dropouts accounted for over 40 percent of the lowest score quartile category in both locations.

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[33]The score quartiles for the baseline language and arithmetic tests were calculated separately for each location. The baseline language quartiles in Hardoi are Q1 (0-9.1%), Q2 (9.2-22.7%), Q3 (22.8-45.5%) and Q4 (45.6 and above) and Q1 (0-18.2 %), Q2 (18.3-31.8 %), Q3 (31.9- 50%) and Q4 (50 and above) for Sambalpur. In arithmetic, the baseline quartiles are Q1 (0- 10.5%), Q2 (10.6- 26.3%), Q3 (26.4- 47.4%) and Q4 (47.5 and above) for Hardoi and Q1 (0-34.2%), Q2 (34.3-55.3%), Q3 (55.4-73.7%) and Q4 (73.8% and above) for Sambalpur.

Individual characteristics and baseline learning:	At end line, % children in:			
	Hardoi		Sambalpur	
	Enrolled	Dropped out	Enrolled	Dropped out
Age				
Average age	14.0	14.3	13.7	14.2
Gender				
Girls	42.8	58.9	51.9	45.9
Boys	57.2	41.1	48.1	54.1
Total	100	100	100	100
Marital status				
Married	0.6	30.3	0.2	19.2
Unmarried	99.4	69.7	99.8	80.8
Total	100	100	100	100
Baseline language score quartiles				
Q1 (First quartile)	26.0	49.7	28.2	43.6
Q2 (Second Quartile)	24.0	29.2	25.1	28.2
Q3 (Third Quartile)	24.6	14.2	27.7	12.8
Q4 (Fourth quartile)	25.4	6.9	19.1	15.4
Total	100	100	100	100
Baseline arithmetic score quartiles				
Q1 (First quartile)	18.6	48.8	25.8	43.2
Q2 (Second Quartile)	23.5	26.7	27.6	31.8
Q3 (Third Quartile)	28.0	16.0	23.5	20.5
Q4 (Fourth quartile)	29.9	8.5	23.1	4.6
Total	100	100	100	100

Table 5.2: Proportion of children in end line enrollment categories by their individual characteristics and baseline learning

Table 5.3 presents similar data by children's household characteristics - caste and household asset index[34] and parental education of dropout and enrolled children. In both locations of the study, over 50 percent children who dropped out were from Scheduled Caste families. In both locations, a higher proportion of dropouts were from 'low' asset index households compared to enrolled children. Moreover, children who dropped out were more likely to be first generation learners as compared to peers who continued to be enrolled at end line.

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[34]The household asset index was created from information collected during the end line household survey, which included information on durable assets owned by the household. The index includes 7 consumer durables: mobile phone, pressure cooker, fan, radio, clock, sewing machine and TV. The ownership of each item was awarded a point of 1, generating an index ranging from 0 to 7. This distribution was divided into three categories – low, medium and high with each corresponding to index values of 0-1, 2-3, and 4-7 respectively.

Table 5.3: Proportion of children in end line enrollment categories by household characteristics

Household characteristics:	At end line, % children in:			
	Hardoi		Sambalpur	
	Enrolled	Dropped out	Enrolled	Dropped out
Social category				
Unreserved Category (general)	23.4	11.8	6.6	2.7
Scheduled Tribe			11.0	10.3
Scheduled Caste	34.3	52.0	33.8	54.8
Other Backward Caste (OBC)	42.3	36.3	48.7	32.2
Total	100	100	100	100
Household affluence (Asset Index)				
Low	36.1	60.9	51.8	81.5
Average	20.4	18.1	21.2	8.9
High	43.5	21.0	26.9	9.6
Total	100	100	100	100
Mother's education				
None	65.4	86.1	42.7	75.4
Some or full primary school	13.9	8.1	33.8	20.9
Some or full middle school or above	20.6	5.8	23.4	3.7
Total	100	100	100	100
Father's education				
None	25.0	47.3	22.5	48.8
Some or full primary school	11.8	17.2	37.5	37.8
Some or full middle school	21.4	19.2	17.8	11.0
Secondary school or above	41.7	16.3	22.2	2.4
Total	100	100	100	100

Table 5.4 describes selected baseline school characteristics for children who remained enrolled and who had dropped out at end line. A higher proportion of dropout children in both locations were in government schools at baseline and this difference is much starker for the cohort in Hardoi. There are also important associations between the number of grades offered by schools and the proportion of students who dropped out - a higher proportion of children who dropped out in both locations came from schools that did not offer secondary grades. Further, in Hardoi, a higher proportion of drop out children came from schools with poor levels of average school attendance observed in the two days of the baseline survey. In Sambalpur where schools had much better levels of observed attendance during the baseline survey, a similar trend is not observed.

Baseline school characteristics:	At end line, % children in:			
	Hardoi		Sambalpur	
	Enrolled	Dropped out	Enrolled	Dropped out
School management type				
Government	58.7	86.7	77.8	86.3
Private	41.3	13.3	8.4	4.8
Other			13.7	8.9
Total	100	100	100	100
Composite schools				
Schoolswith secondary grades	33.9	10.7	71.4	37.0
School without secondary grades	66.1	89.3	28.6	63.0
Total	100	100	100	100
Average school attendance (% enrolled students present during two days of survey)				
Q1 (7% - 20%)	28.4	34.4	0	0
Q2 (21%-32%)	28.0	31.8	1.1	0.7
Q3 (32%-54%)	31.2	26.3	10.0	20.7
Q4 (Above 54%)	12.4	7.5	88.9	78.6
Total	100	100	100	100

Table 5.4: Proportion of children in end line enrollment categories by baseline school characteristics

We run a logistic regression to understand the independent effects of each of the abovementioned explanatory variables on children's end line enrollment status, i.e. whether the child remained enrolled or dropped out of school at end line. We run this analysis only for the cohort of children from the surveyed blocks in Hardoi as overall fewer children dropped out in Sambalpur.

The dependent variable, the child's end line enrollment status takes the value of 1 if the child dropped out and 0 if the child stayed enrolled at end line. The explanatory variables are grouped into four categories – baseline learning levels of the child (the language and arithmetic written test scores); children's individual characteristics (gender, age and marital status at end line); household characteristics (household affluence as measured by the asset index, caste and parental education); and school characteristics at baseline (management type and whether the school attended at baseline offered secondary grades).

Additionally, rather than combining scores of the language and arithmetic tests into a single composite score, we run two separate regressions controlling for children's language learning scores in one and arithmetic scores in the other. This allows us to examine the correlates of enrollment status for each of the two subjects separately. Given the common perception that math is more difficult than language, it is possible that the correlates of enrollment status differ for the two subjects. For each of the two regressions, two models are presented. Model 1 takes into consideration all children in Hardoi, whereas model 2 restricts the analysis to children who scored below 50 percent marks in the baseline language and arithmetic test. This is because the majority of the drop out children scored below 50 percent in these tests. The rationale behind restricting the analysis is that it is not clear if there is a straightforward causal relationship between enrollment status and learning levels. That is, while low learning levels can

influence the decision to drop out of school, it is equally possible that the likelihood of dropping out in the near future may cause a child to pay less attention to her studies thereby affecting learning levels. Given the restriction in children's baseline learning outcomes, Model 2 does not thus control for scores.

Table 5.5 presents the odds ratio of children who dropped out of school in the end line by the abovementioned explanatory variables separately for the language and arithmetic baseline scores, for all children in Hardoi. These data indicate the likelihood of children dropping out compared to staying enrolled in school for each characteristic included in this analysis.

As per model 1 that includes all currently enrolled and drop out children in Hardoi who took the baseline tests in both subjects, there is a positive association between learning outcomes and enrollment status. In other words, the likelihood of the child dropping out of school at end line decreases with an increase in the baseline test scores.

Gender also emerges as a significant factor influencing the child's enrollment status at the end line: other factors remaining constant, boys were less likely to drop out compared to girls. The results confirm, as expected, that marriage increases the likelihood of children dropping out of school by end line. Although the estimation sample for this analysis includes a higher proportion of children between 15-18 years, the results confirm the hypotheses that older children are more likely to drop out than younger children, or in other words, as children's age increases so does the likelihood of them dropping out.[35] The ASER survey which is nationally representative data also indicates that dropout rates increase for older children, particularly among children 15 years and above.

The association of caste on children's enrollment status is difficult to interpret. While caste does not seem have any association on the end line enrollment status of the child in the model with the language test results, it does have an association in the model with arithmetic test scores. In the latter, Scheduled Caste children were more likely to dropout than those from 'general' category households. Expectedly, belonging to an economically affluent family reduces the chances of children dropping out of school. Clear effects of parental education on children's end line enrollment status are seen. In both models as well as for both subjects, having mothers with some primary education or above reduces the chance of the child discontinuing school at end line. Fathers with education up to primary level did not have any significant positive effects on the enrollment status of children. Only children whose fathers had some upper primary education were less likely to dropout than children whose fathers had never been to school.

With respect to school characteristics, children from private schools were less likely to discontinue schooling compared to those in government schools. Similarly, children who studied Std VIII in schools that also offered education in the secondary grades had a lower chance of dropping out than those not going to such composite schools. Interestingly, in model 2, based on the restricted group of children scoring between 0-50 percent marks in the language and arithmetic written tests, the same set of factors emerge significantly predictive of children's end line enrollment status.

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[35] Age is used as a continuous variable in the regression model.

	Baseline language score as a control variable		Baseline arithmetic score as a control variable	
Table 5.5: Odds ratio of children who dropped out at end line by explanatory variables				
VARIABLES	**Model 1**	**Model 2**	**Model 1**	**Model 2**
	All children	**Restricted***	**All children**	**Restricted***
Language baseline scores	0.985*** (0.00382)			
Arithmetic baseline scores			0.980*** (0.00329)	
Gender Reference: Girls	0.514*** (0.0726)	0.495*** (0.0732)	0.558*** (0.0706)	0.491*** (0.0650)
Age Reference	1.193** (0.0965)	1.176* (0.101)	1.192** (0.0864)	1.220*** (0.0937)
Marital Status Reference: Married	0.0172*** (0.00627)	0.0107*** (0.00477)	0.0127*** (0.00477)	0.00899*** (0.00403)
Caste Reference: General				
Schedule Caste	1.124 (0.256)	1.236 (0.302)	1.649** (0.353)	1.797** (0.420)
Other Backward Caste	0.957 (0.215)	1.060 (0.256)	1.379 (0.294)	1.416 (0.330)
Asset Index and Household Affluence Reference: Low				
Medium	0.477*** (0.0876)	0.513*** (0.0983)	0.509*** (0.0818)	0.562*** (0.0945)
High	0.398*** (0.0696)	0.418*** (0.0768)	0.460*** (0.0697)	0.486*** (0.0783)
Mother's education Reference: No education				
Some or full primary	0.544** (0.135)	0.578** (0.152)	0.576** (0.125)	0.650* (0.145)
Some or full upper primary	0.476*** (0.130)	0.474** (0.140)	0.497*** (0.119)	0.402*** (0.110)
Father's education Reference: No education				
Some or full primary	1.216 (0.241)	1.248 (0.254)	1.044 (0.191)	0.969 (0.184)
Some or full upper primary	0.653** (0.130)	0.601** (0.126)	0.712** (0.122)	0.616*** (0.112)
Secondary or above	0.511*** (0.0988)	0.497*** (0.100)	0.550*** (0.0910)	0.458*** (0.0810)
Reference: Government Private	0.558** (0.135)	0.517** (0.135)	0.685* (0.143)	0.566** (0.131)
Composite School (With integrated secondary grades) Reference: Schools without integrated secondary grades	0.532* (0.142)	0.496** (0.145)	0.390*** (0.0943)	0.353*** (0.0958)
Observations	1,848	1,496	2,347	1,800

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

*Only those children who scored below 50% in baseline language and arithmetic written test.

5.2. Factors influencing learning outcomes

This section examines the factors influencing student learning outcomes in language and arithmetic written tests at end line. Given that children's learning outcomes are significant predictors of their enrollment status at end line, i.e. children with lower scores in language and arithmetic were more likely to drop out than those who scored better, this analysis is undertaken for the subset of students who continued to be enrolled at end line.

The following explanatory variables are examined for their influence on children's learning outcomes: children's individual characteristics (gender and age); household socio-economic characteristics (caste and affluence); home learning environment (mother's education, father's education, availability of reading material in the household); supplementary help (whether the child took tuition at end line) and school related factors (baseline and end line school management type and end line grade of the child).

Table 5.6 presents the estimation sample in Hardoi and Sambalpur for whom this multivariate analysis is undertaken. It is evident that children in the estimation sample in both locations have different characteristics with respect to caste, household affluence and school-type composition. For instance, majority of children in Hardoi were enrolled in private schools at end line, whereas, in Sambalpur higher proportion of children were in government schools. In Sambalpur, about a fourth of the estimation sample was Scheduled Tribe; on contrary, Scheduled Tribe is near to non-existent in the Hardoi.[36]

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[36]Children from Scheduled Tribe households in Hardoi and children moving from private schools at baseline to government school at end line in Sambalpur have not been included in the regression analysis due to insufficient observations. Moreover, since almost all children in the estimation sample for Sambalpur transitioned to Std 9 at end line, we do not control for the end line grade in the regressions for Sambalpur.

Particulars	Language (Hindi) Hardoi	Language (Odia) Sambalpur	Arithmetic Hardoi	Arithmetic Sambalpur
Table 5.6: Distribution of explanatory variables for the estimation sample in a multi-variable framework				
Number of children in estimation	1,207	922	1,480	963
Individual characteristics				
Percent boys	51.8	44.5	52.5	42.1
Average age of children at end line assessment	13.9	13.6	13.9	13.6
Socio-Economic characteristics				
Percent "general" category children	24.9	7.2	24.0	7.2
Percent Scheduled Caste (SC) children	32.2	9.2	34.1	8.9
Percent Scheduled Tribe (ST) children		29.4		28.6
Percent Other Backward Caste (OBC) children	42.9	54.2	41.9	55.4
Percent children in "low" household affluence category	31.9	46.5	33.7	46.5
Percent children in "medium" household affluence category	20.5	22.6	20.1	22.0
Percent children in "high" household affluence category	47.6	30.9	46.2	31.5
Home learning environment				
Percent children with mothers who never enrolled in school	60.7	37.9	62.4	38.2
Percent children with mothers with some or full primary education (Std I-V)	16.2	34.0	15.5	34.1
Percent children with mothers with some or full upper primary education (Std VI-VIII) or above	23.1	28.2	22.2	27.7
Percent children with fathers who never enrolled in school	23.3	20.2	24.1	20.2
Percent children with fathers with some or full primary education (Std I-V)	11.1	34.3	10.9	35.9
Percent children with fathers with some or full upper primary education (Std VI-VIII)	22.0	18.7	21.6	18.2
Percent children with fathers with education up to Std IX or above	43.7	26.9	43.5	25.8
Percent children in households with at least 1 reading material	20.8	19.9	19.3	19.4
Supplementary help				
Percent children taking paid tuition at end line	3.3	8.0	9.9	19.6
School management type				
Percent children in government schools at baseline and end line	14.8	67.0	14.4	66.2
Percent children in government schools at baseline and private schools at end line	42.8	23.2	45.4	24.1
Percent children in private schools at baseline and end line	6.6		5.8	
Percent children in private schools at baseline and government schools at end line	35.8	9.8	34.4	9.8
End line grade				
Percent children in Std VIII or below at end line	11.0		12.4	
Percent children in Std IX or above at end line	89.0		87.6	

The effects of various explanatory variables on children's language and arithmetic written tests are first examined in a bivariate framework. Table 5.7 presents children's mean percentage scores in both subjects by gender and caste for both locations, while Table 5.8 presents learning outcomes by children's household affluence (as measured by the asset index) and school management type at baseline.[37]

In Hardoi, statistically significant differences are seen in mean scores by gender in both language and arithmetic written tests. Boys consistently outperform girls with significant differences in scores between the two genders at both assessment rounds; however, the gender differences in language scores, though significant, are small. In Sambalpur, on the other hand, while girls are at par with boys in language, they have poorer outcomes in arithmetic. Results for Hardoi also indicate major differences by children's caste - children from marginalized caste groups (Scheduled Caste or SCs and Other Backward Castes or OBCs) exhibit poorer learning outcomes in both subjects compared to children in the 'General' category. In Sambalpur, while the language and arithmetic learning levels of OBCs are at par with 'General' category students, children from Scheduled Tribe backgrounds have the lowest learning as compared to other caste groups.

Household affluence as measured by the asset index also explains variations in children's learning levels in both locations. Children from 'high' and 'medium' asset households have significantly better language and arithmetic scores as compared to children from the 'low' asset category. In Hardoi, on average, children from 'high' asset households scored about 12 percentage points more than children from 'low' asset households, in both subjects. In Sambalpur, the gap between children from 'high' asset and 'low' asset households are about 12 percentage points in language and about 20 percentage points in arithmetic.

Data on school provisioning presented in Chapter 2 indicates that government provisioning of schools reduces drastically after the elementary stage, with more private schools offering education in secondary grades. While there were 296 government primary schools, only 33 government schools were found to offer secondary grades across both locations. We thus look at the types of school children attended at both baseline and end line to capture the differences in school type between the two rounds - for example, whether the child attended a government school at both baseline and end line or moved from a government to private school between baseline and end line.

In Hardoi, children enrolled in private schools at baseline outperformed peers who were enrolled in government schools. Further, there is no difference in the scores of children who studied in government schools at both baseline and end line or those who moved from a government to private school at end line. In Sambalpur on the other hand, children enrolled in government schools at baseline score higher than those enrolled in private schools, particularly in arithmetic.

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[37]Similar analyses for the other variables included in the multi variate framework are included in the appendix. See Appendix Table 10 (Mother's and Father's education), Appendix Table 11 (Out of school support – availability of reading material at home and paid tuition at end line), Appendix Table 12 (children's age).

Table 5.7: Mean percentage scores in language and arithmetic written assessment for both test rounds, by gender and caste

Particulars	Gender		Caste			
	Girls	Boys	General	SC	ST	OBC
Hardoi language						
Baseline	29.5	33.8***	39.5	27.11***	size too small	30.6***
End line	37	39.8**	47.1	33.9***	size too small	36.8***
Hardoi Arithmetic						
Baseline	31.9	42.9***	44.3	33.5***	size too small	36.4***
End line	33.8	47.6***	48.6	36.7***	size too small	40.3***
Sambalpur language						
Baseline	35.6	34.3	35.7	32.6	31.1**	37.4
End line	37.9	36.5	35.7	36.5	32.8	40.0*
Sambalpur Arithmetic						
Baseline	52.8	57.6***	54.2	52.1	49.1	58.2
End line	52.6	57.4***	54.7	50.9	48.4**	58.3

*** p<0.01, ** p<0.05, * p<0.1; Two tailed test; Mean score (Girls)!=Mean score (Boys), Mean score(General)!= Mean score ((SC or OBC)

Table 5.8: Mean percentage score for language and arithmetic test for both test rounds, by household affluence and school-type

Particulars	Household affluence			School management type in baseline and end line			
	Low	Medium	High	Government school at both baseline and end line	Government school at baseline – Private school at end line	Private school at baseline – Government school at end line	Private school at both baseline and end line
Hardoi language							
Baseline	24.3	29.2***	37.7***	24.6	25.0	44.8***	40.2***
End line	30.5	35.4***	45.1***	31.2	31.8	49.0***	47.5***
Hardoi Arithmetic							
Baseline	30.9	35.1***	42.9***	30.0	32.0	49.0***	45.4***
End line	35.3	38.0**	46.6***	33.6	35.1	50.7***	50.5***
Sambalpur language							
Baseline	31.0	36.1***	40.2***	35.6	36.1	insufficient	28.4***
End line	32.5	37.2***	44.5***	37.7	36.6	sample size	36.6
Sambalpur Arithmetic							
Baseline	48.1	55.7***	64.3***	56.3	53.5	insufficient	48.2***
End line	46.8	54.3***	66.3***	56.4	51.6***	sample size	49.7***

 *** p<0.01, ** p<0.05, * p<0.1; One tailed test; Mean score (Low)<Mean score (Medium), Mean score (Low)< Mean score (High); Two tailed test Mean score(Govt.-Govt.)!= Mean score (Other school transition categories)

In an uncontrolled framework, children with uneducated mothers and fathers consistently have a significantly poorer performance in both language and arithmetic tests across both locations, relative to children whose parents had some formal education. It is interesting to note that even some primary education among parents makes a significant difference in the learning levels of children (Appendix Table 10). Out-of-school learning support, which includes the availability of home reading material[38] and paid private tuitions, positively impacts language and arithmetic learning levels in both study sites. Children with some reading material at home outperformed those who did not possess any reading materials – these results are significant across both subjects and locations. Similarly, children who took paid private tuitions at end line scored significantly higher in both the subjects than those who did not take tuitions (Appendix Table 11). Surprisingly, in Hardoi, children in the younger age group (10-12 years) score better in language and arithmetic than those in the grade appropriate to their age (13-15 years). On the other hand, there is no difference in the performance of older children (15-16 years) and those at the grade-appropriate age (Appendix Table 12). [39]

While the effects of the abovementioned factors are significant in an 'uncontrolled' framework, it remains to be seen if they remain significant in a controlled framework.

Regressions were run for each of the two outcome variables in this analysis i.e. end line language (Hindi or Odia) and arithmetic written test scores for each location separately. The explanatory variables are grouped in five categories: i) individual characteristics (gender and age); ii) household socioeconomic characteristics (caste and affluence); iii) home learning environment (mother's education, father's education and availability of reading material in the household); iv) supplementary help (whether the child took tuition at end line) and v) school related factors (baseline and end line school management type and end line grade of the child). Additionally, the regressions also control for children's baseline scores in language and arithmetic tests. Thus, in all, a set of 4 regression models are run, one each for language and arithmetic test scores for Hardoi and Sambalpur respectively. The separate regressions for each location enable to capture the differences in the effects for children in the two locations separately which is important as the estimation sample have different characteristics with respect to caste, household affluence and school-type composition.

Table 5.9 summarizes the results of these regressions. Overall, the results corroborate our hypothesis that children's current learning levels are influenced by their previous learning outcomes. The coefficients for baseline scores in both subjects and locations are positive and significant, implying that children who had higher baseline scores were likelier to have higher end line scores as well. This result can also be inferred to imply that once learning deficits set in, it is more difficult for children to improve their learning outcomes.

With regards to gender, while there are no gender differences in language, boys continue to outperform girls in arithmetic in both locations. Children's age does not have a significant association with their learning levels either in language or in arithmetic in both locations.

Some of the effects of household affluence (as measured by the household asset index) that were seen in the bivariate analysis disappear in the multivariate framework. In the latter, there is no longer a difference

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[38]The household survey included questions on whether households had any of the following items: religious texts, newspapers, magazines and books other than textbooks. Households were assigned a score of 1 for the possession of each individual item on the list and thus the composite score on the availability of household reading materials ranged from 0 to 4. Overall, only 14 percent households had at least 1 reading material at home – this proportion is slightly higher in Sambalpur (16 percent) compared to Hardoi (13 percent).

[39]This bivariate analysis is only presented for Hardoi as the age distribution of children in this location has greater variation compared to Sambalpur. Thus, in the case of Sambalpur, age is taken as a continuous variable while in Hardoi, there are age-group ranges. The effects of age on children's learning levels are further explored in the multivariate framework and presented in Table 5.9.

in the learning levels of children from 'low' and 'medium' affluent households although children from 'high' affluence households continue to have a learning advantage over those from 'low' affluence households in both locations and for both subjects.

The multivariate analysis also indicates differences by caste in children's learning levels. In Hardoi, children from Other Backward Caste households have significantly lower language scores than general category students, whereas in arithmetic, Scheduled Caste children scored about two percentage points lower than children from 'General' category households. However, it is not always the case that children from 'general' category households score higher than children from other caste backgrounds. In Sambalpur, Other Backward Caste and Scheduled Caste children have significantly higher language scores compared to students from 'general' category households; however, we do not see any caste differences in arithmetic scores among children.

In a multivariate framework, only higher levels of parental education (Std IX or above for fathers and upper primary or above for mothers) have a positive and significant impact on children's arithmetic learning. In Hardoi, the education levels of fathers seem to play an important role in influencing language learning, while in Sambalpur, mother's education level are pivotal for language learning.

In Hardoi, only 3.3 percent children took paid tuition in language and about 10 percent children took paid tuition in arithmetic at end line; the corresponding percentage for children in Sambalpur was slightly higher at 8.8 percent for language and 19.6 percent for arithmetic. In Sambalpur, children who took paid tuition had higher language and arithmetic scores compared to those who did not; in Hardoi, on the other hand, while paid tuitions helped children with significant learning improvements in arithmetic scores, this was not the case with language scores.

In Hardoi, children who remained in private schools at both rounds have significantly better outcomes in both language and arithmetic tests compared to those who remained in government schools at both rounds. Learning differences between children in other school-type transition categories compared to those in only government schools disappear in multivariate framework. In Sambalpur, children enrolled in government schools in both rounds of the study score significantly higher in arithmetic than children with a different school type at baseline and end line. However, there are no differences in the language outcomes for children in different school type categories. In Hardoi but not in Sambalpur, children's end line grades also explain some of the differences in their learning levels. Compared to children who were in Std VIII or below, children who moved to Std IX or higher score significantly better in the language assessment at end line.

Table 5.9: Multiple linear regressions with end line language and arithmetic scores as outcome variables

Variables	Outcome variable: End line language Scores (Hardoi)	Outcome variable: End line language Scores (Sambalpur)	Outcome variable: End line arithmetic Scores (Hardoi)	Outcome variable: End line arithmetic Scores (Sambalpur)
Baseline language scores	0.773*** (0.0202)	0.547*** (0.0267)	0.743*** (0.0177)	0.588*** (0.0254)
Gender Reference: Girls	-0.218 (0.855)	-0.329 (0.958)	4.848*** (0.780)	2.390** (1.159)
Age category Reference: In grades appropriate for age (13-15 years)		0.200 ^ (0.583)		-0.743 ^ (0.703)
Younger children (10-12 years)	2.915 (1.957)		0.0795 (1.782)	
Older children (16-18 years)	-0.686 (2.222)		-1.874 (2.000)	
Economic affluence Reference: Lowest				
Medium	1.141 (1.197)	0.488 (1.243)	-0.532 (1.029)	1.459 (1.493)
High	2.650** (1.067)	3.663*** (1.220)	0.269 (0.919)	5.145*** (1.457)
Caste Reference: General				
Schedule Caste	-1.029 (1.265)	6.123** (2.392)	-1.846* (1.096)	1.578 (2.878)
Schedule Tribe		2.852 (2.043)		1.339 (2.430)
Other Backward Caste	-1.910* (1.153)	4.156** (1.890)	-1.012 (1.014)	2.523 (2.260)
Mother's education Reference: No schooling				
Some or full primary	0.797 (1.227)	1.498 (1.211)	0.0937 (1.072)	2.011 (1.450)
Some or full upper primary (Std VI-VIII) or above	0.0700 (1.204)	4.343*** (1.484)	1.885* (1.031)	3.181* (1.791)
Father's education Reference: No schooling				
Some or full primary	-0.930 (1.539)	-0.464 (1.386)	-0.464 (1.331)	-2.460 (1.655)
Some or full upper primary (Std VI-VIII)	3.951*** (1.291)	0.0869 (1.668)	1.075 (1.105)	-1.574 (2.006)
Std IX & above	2.636** (1.216)	2.770 (1.704)	2.861*** (1.029)	3.335 (2.043)
Availability of reading material in the household Reference: No reading material available in the household	-0.398 (1.145)	2.597** (1.251)	0.0447 (1.009)	2.769* (1.496)
Takes tuition Reference: Does not take tuition	-0.913 (2.363)	2.812 (1.802)	2.622** (1.278)	6.125*** (1.574)
School Transition category Reference: Government school at both baseline and end line				
Government school at baseline - Private school at end line	0.810 (1.274)	-1.480 (1.164)	-0.186 (1.109)	-3.125** (1.384)
Private school at baseline - Government school at end line	0.185 (2.017)		1.329 (1.827)	
Private school at both baseline and end line	2.784** (1.351)	2.994* (1.649)	3.585*** (1.178)	-1.688 (1.966)
Transitioned to appropriate or higher grade Reference: Remained in same grade or moved to a lower grade	4.627*** (1.399)		0.789 (1.172)	
Observations	1,207	922	1,480	963
R-squared	0.655	0.427	0.676	0.538

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

^ Age is a continuous variable in the regression for Sambalpur due to fewer observations in older (16-18 years) and younger (10-12 years) age categories.

5.3. Summary and concluding thoughts

The analysis in this chapter attempted to answer two key questions regarding the factors influencing children's school continuation status and learning outcomes at end line. The first question was analysed for all children in Hardoi who were tracked at end line and for whom we had baseline test results, while the second analysis was undertaken for children in both locations who continued to be enrolled in school at end line.

In the first analysis that explores factors associated with children's school continuation rates, evidence suggests that children's prior learning outcomes are a good predictor of their school continuation status at the end of elementary school. Children with better learning levels in both language and arithmetic in Std VIII were less likely to have dropped out one year later. This result underline the need to focus on the most vulnerable students with low learning levels who are also likely to come from poorer households and have parents who are not educated. Gender also emerges as a significant factor, corroborating existing evidence that girls are likelier to drop out of school post the elementary stage than boys. Children from government schools and schools that did not offer composite schooling in secondary grades had a higher likelihood of dropping out at end line. Future research examining the impact of composite schooling on reducing drop-out rates would be valuable for planning of secondary school provisioning.

The multivariate regression analysis on children's learning outcomes confirm that these are influenced by children's individual, socioeconomic and school characteristics. Specifically, the significance of baseline scores across all four regression models highlight the importance of prior learning levels[40] on children's current learning levels and hold a valuable lesson as far as policy and programme frameworks are concerned, suggesting that enabling children's learning earlier rather than later can go a long way in ensuring better outcomes in the future.

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[40]There is a sizable increase in the R-squared value after adding baseline scores to the model presented above, implying that these scores, in particular, explain variations in children's current learning levels well. See Appendix Table 10for models without baseline scores as an explanatory variable.

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Appendices

Appendix Table 1: Proportion of schools surveyed, and children enrolled in Std VIII at baseline, by school type and location

Location	Total N of schools surveyed	Proportion schools surveyed by management type			Total N of students enrolled in Std VIII	Proportion children enrolled in Std VIII by management type		
		Government	Private/other	Total		Government	Private/other	Total
Hardoi	206	69.4	30.6	100	9,187	67.0	33.0	100
Sambalpur	76	84.2	15.8	100	2,077	77.2	22.8	100
Total	282	73.4	26.6	100	11,264	68.9	31.1	100

Appendix Table 2: Gender distribution of students enrolled in Std VIII at baseline, by location

Location	Total N of students enrolled in Std VIII	School type at baseline	% children enrolled in Std VIII by gender:			
			Boys	Girls	NA	Total
Hardoi	9,187	Government	47.3	52.5	0.2	100
		Private/other	61.9	37.9	0.2	100
		Total	52.1	47.7	0.2	100
Sambalpur	2,077	Government	49.1	50.6	0.3	100
		Private/other	50.5	49.5	0.0	100
		Total	49.5	50.4	0.2	100
Total	11,264	Government	47.7	52.1	0.2	100
		Private/other	60.4	39.5	0.1	100
		Total	51.6	48.2	0.2	100

Appendix Table 3: Schools by total enrollment quartile categories, by location

Quartiles based on total school enrollment	All school			Hardoi			Sambalpur		
	N	Range of total enrollment in school	Avg. total enrollment in school	N	Range of total enrollment in school	Avg. total enrollment in school	N	Range of total enrollment in school	Avg. total enrollment in school
1st Quartile	119	0 - 121	82	80	0 - 121	84	39	38 - 118	79
2nd Quartile	61	122 - 172	142	48	122 - 172	142	13	124 - 167	143
3rd Quartile	47	175 - 311	222	28	175 - 311	227	19	176 - 273	215
4th Quartile	31	315 - 2967	897	27	315 - 2967	967	4	356 - 499	423
All schools	258	0 - 2967	220	183	0 - 2967	251	75	38 - 499	143

Appendix Table 4: Proportion of all enrolled students present in school at baseline

Location	Proportion enrolled students present in school (on Day 1 of baseline survey):			
	Less than 50%	Between 50% - 74%	More than 75%	Total
Hardoi	85.2	10.4	4.4	100
Sambalpur	8.0	49.3	42.7	100
Total	62.6	21.8	15.6	100

		Appendix Table 5: Proportion of enrolled Std VIII students present in school at baseline					
Location	N	Daily attendance: % Std VIII students present on:		Cumulative attendance: % Std VIII students present on:			
		Day 1	Day 2	Both days	Only 1 day	Neither day	Total
Hardoi	9,187	28.7	36.5	24.4	16.0	59.6	100
Sambalpur	2,077	70.3	74.5	63.5	16.7	19.9	100
Total	11,264	36.3	43.5	31.6	16.1	52.3	**100**

	Appendix Table 6: Framework of the written assessment in language, baseline and end line		
Item	Task	Nature of question	Nature of response
1	Comprehension text 1 (Narrative based text)	Direct retrieve	MCQ
2		Indirect retrieve	MCQ
3		Locating	Written
4		Integrate	MCQ
5		Interpret	MCQ
6		Evaluate	Written
7		Interpret	MCQ
8		Reflect and evaluate	Written
9	Comprehension text 2 (Informative text)	Direct retrieve	MCQ
10		Interpret	MCQ
11		Direct retrieve	MCQ
12		Synthesize	MCQ
13	Vocabulary (antonyms)	Vocabulary	Written
14	Grammar	Grammar	MCQ

	Appendix Table 7: Framework of the written assessment in arithmetic, baseline and end line	
S. no	Concepts Tested	Question Detail
1	Number recognition and number knowledge	Number or written word form
		Identify highest number from given series
		Number line
2	Numeric operations	Addition: 3-digit by 3-digit
		Subtraction: 3 digit by 3-digit
		Subtraction: 4-digit by 3-digit
		Multiplication: 2-digit by 1-digit
		Multiplication: 3-digit by 2-digit
		Division: 2-digit by 1-digit
		Division: 3-digit by 2-digit
3	Word problems	Subtraction
		Division
		Unitary method
		Percentage
4	Fractions and decimals	Converting a shaded-shape into fraction and decimal form
5	Geometry	Shape recognition
		Bigger angle recognition
		Geometry: Triangle classification based on angles
		Geometry: Triangle classification based on length of sides
6	Measurement and conversion	Kilogram to gram
		Meter to centimetre
		Minutes to seconds
7	Mensuration	Area
		Perimeter
8	Data interpretation	Based on data table

Appendix Table 8: Framework of the written assessment in English, baseline and end line

Language	Task	Nature of question	Nature of response
English	Vocabulary	Picture identification 1	Written
		Picture identification 2	
		Picture identification 3	
		Picture identification 4	
	Comprehension text	Direct retrieve	
		Indirect retrieve	

Appendix Table 9: Mean percentage scores in written assessments for children in Hardoi by end line enrollment status, for each test round

Test Round	End line enrollment status:	Average percentage scores in the written assessments in:	
		Language	Arithmetic
Baseline	Enrolled in Std IX or higher	33.0	47.4
	Enrolled in Std VIII or lower	18.7	24.3
	Dropped out	16.5	21.5
End line	Enrolled in Std IX or higher	37.9	47.9
	Enrolled in Std VIII or lower	23.2	28.5
	Dropped out	19.9	20.4

Appendix Table 10: Mean percentage score for language and arithmetic test for both test rounds, by mother's and father's education

Particulars	Mother's education			Father's education			
	None	Some or full primary (Std I-V)	Some or full middle (Std VI-VIII) or above	None	Some or full primary (Std I-V)	Some or full middle (Std VI-VIII) or above	Std IX or above
Hardoi language							
End line	26.7	35.4***	42.4***	22.3	26.8**	32.9***	37.4***
Baseline	33.4	42.7***	48.7***	28.1	31.3*	41.5***	44.3***
Hardoi arithmetic							
End line	33.4	39.4***	47***	28.7	32**	38.6***	42.7***
Baseline	37	42.7***	51.5***	32.4	34.6	41.9***	47.1***
Sambalpur language							
End line	30.5	34.6***	41.5***	28.9	34.3***	32.2**	42.4***
Baseline	31.8	36.5***	45.6***	31.4	34.9**	35.5**	45.9***
Sambalpur arithmetic							
End line	46.5	54.2***	67.1***	45.0	51.1***	52.9***	69.1***
Baseline	45.8	53.9***	67.6***	46.0	48.9*	53.1***	70.1***

*** $p<0.01$, ** $p<0.05$, * $p<0.1$; One tailed test; Mean score (None)<Mean score (Some or full primary school), Mean score (None)< Mean score (Some or full middle school), Mean score(None)<Mean score (Std IX or above)

Appendix Table 11: Mean percentage score for language and arithmetic test for both test rounds, by availability of reading material and tuition status

Particulars	Availability of reading material		Tuition Status at End line	
	No reading material	Some reading material	Does not take tuition	Takes tuition
Hardoi language				
End line	29.9	38.6***	31.4	39.9**
Baseline	36.6	45.5***	38.2	45**
Hardoi arithmetic				
End line	35.7	44.1***	35.7	51.6***
Baseline	39.4	48.1***	39.3	57***
Sambalpur language				
End line	33.9	39.3***	34.5	41.1***
Baseline	35.6	43.9***	36.6	45.5***
Sambalpur arithmetic				
End line	52.9	62.7***	51.1	70***
Baseline	52.1	64.7***	50.4	71.8***

p<0.01, ** p<0.05, * p<0.1; Two tailed test; Mean score (No reading material)!=Mean score (Some reading material), One tailed test; Mean score (Does not take tuition)< Mean score (Takes tuition)

Appendix Table 12: Mean percentage score for language and arithmetic test for both test rounds, by age

Particulars	Age		
	In grades, appropriate to age (13-15 years)	Younger children (10-12 years)	Older children (16-18 years)
Hardoi language			
End line	31.3	43.6***	25.2*
Baseline	37.9	51.9***	33.1
Hardoi arithmetic			
End line	32.2	43.7***	26.5
Baseline	36.2	52.3***	33.9

p<0.01, ** p<0.05, * p<0.1; Two tailed test; Mean score (Grade appropriate age (13-15 yrs))!=Mean score (Below grade appropriate age(10-12 yrs)), Mean score (Grade appropriate age (13-15 yrs))!=Mean score (Above grade appropriate age(16-18 yrs),

Appendix Table 13: Multiple linear regression without end line language and arithmetic scores as outcome variables

Variables	Outcome variable: End line language Scores (Hardoi)	Outcome variable: End line language Scores (Sambalpur)	Outcome variable: End line arithmetic Scores (Hardoi)	Outcome variable: End line arithmetic Scores (Sambalpur)
Gender Reference: Girls	4.084*** (1.266)	-0.667 (1.158)	13.67*** (1.115)	5.766*** (1.439)
Age category Reference: In grades appropriate for age (13-15 years)		-0.231 (0.705)		-0.809 (0.879)
Younger children (10-12 years)	6.855** (2.920)		3.568 (2.641)	
Older children (16-18 years)	-5.828** (3.314)		-4.866 (2.966)	
Economic affluence Reference: Lowest				
Medium	4.556** (1.784)	2.372 (1.499)	2.627* (1.523)	4.366** (1.861)
High	7.642*** (1.582)	6.497*** (1.465)	4.813*** (1.354)	9.359*** (1.809)
Caste Reference: General				
Schedule Caste	-3.306* (1.888)	6.860** (2.891)	-3.628** (1.625)	5.150 (3.595)
Schedule Tribe		3.568 (2.469)		4.220 (3.037)
Other Backward Caste	-3.947** (1.721	5.680** (2.283)	-2.609* (1.504)	6.122** (2.820)
Mother's education Reference: No schooling				
Some or full primary	3.843** (1.830)	2.675* (1.463)	1.387 (1.590)	4.400** (1.809)
Some or full upper primary (Std VI-VIII) or above	5.682*** (1.786)	7.054*** (1.787)	6.366*** (1.522)	8.650*** (2.221)
Father's education Reference: No schooling				
Some or full primary	0.842 (2.298)	1.173 (1.672)	0.537 (1.975)	-0.906 (2.069)
Some or full upper primary (Std VI-VIII)	8.390*** (1.922)	-0.623 (2.017)	5.611*** (1.632)	-1.458 (2.509)
Std IX & above	7.887*** (1.806)	6.424*** (2.049)	8.460*** (1.515)	10.24*** (2.528)
Availability of reading material in the household Reference: No reading material available in the household	0.0591 (1.711)	3.306** (1.511)	0.374 (1.498)	4.077** (1.870)
Takes tuition Reference: Does not take tuition	2.376 (3.529)	4.613** (2.176	7.292*** (1.890)	12.74*** (1.936)
School Transition category Reference: Government school at both baseline and end line				
Government school at baseline - Private school at end line	1.363 (1.903)	-1.146 (1.408)	1.740 (1.645)	-4.776*** (1.730)
Private school at baseline - Government school at end line	11.19*** (2.983)		10.66*** (2.691)	
Private school at both baseline and end line	10.83*** (1.994)	-0.435 (1.983)	10.47*** (1.732)	-6.055** (2.448)
Transitioned to appropriate or higher grade Reference: Remained in same grade or moved to a lower grade	11.58*** (2.073)		9.809*** (1.709)	
Observations	1,207	922	1,480	963
R-squared	0.23	0.161	0.286	0.276

Standard errors in parenthesis; p<0.01, ** p<0.05, * p<0.1