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Participation in a School Incentive Programme in India

SHARON BARNHARDT*, DEAN KARLAN** &
STUTI KHEMANI***
*Harvard University, USA, **Yale University, USA, ***The World Bank, Washington DC, USA

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ABSTRACT *Education policy has recently focused on improving accountability and incentives of public providers for actual learning outcomes, often with school-based reward programmes for high performers. The Learning Guarantee Programme in Karnataka, India, is prominent among such efforts, providing cash transfers to government schools that achieve learning at specified high levels. This study examines whether schools that self-selected into the incentive programme are different than those that did not. The answer has important implications for how to evaluate the impact of such a programme. Although we find no significant differences in resources and characteristics, we do find significant and substantial differences in test scores prior to selection into the programme, with better performing schools more likely to opt-in. These findings also provide insight into how incentive-based programmes that focus on levels of (rather than changes in) achievement can exacerbate inequality in education. Failing schools, since they are more likely to opt-out of incentive programmes, are likely to require other targeted programmes in order to improve. In addition, our findings reinforce the value of randomised controlled trials to evaluate incentive programmes since evaluations that rely on matching schools based on resources (if, for instance, pre-programme test scores are unavailable) will be biased if resources poorly predict test scores.*

I. Introduction

Can incentive programmes that provide rewards for greater achievement levels lead to improvements by unleashing some hitherto hidden and untapped potential in schools? In particular, will those schools that are at the lower end of performance, that is, the most poorly performing ones, join such programmes and then improve? Performance differences across schools have usually been explained by either: (1) education production functions and differential resources (Hanushek, 1997 provides a review); (2) household and neighbourhood differences from which a school's student population is drawn (Alderman et al., 1997;

Correspondence Address: Dean Karlan, Yale University, PO Box 208209, New Haven, CT 06520-8209, USA. Email: Dean.Karlan@yale.edu

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Glewwe and Jacoby, 1994); or (3) institutional variations in how schools are managed and held accountable for learning outcomes. This third area has recently become the focus of policy discussions in developing countries (see the conclusions of World Bank, 2004) and in the United States (Education Commission of the States, 2004) that has led to experimentation with a variety of incentive programmes.

Incentive programmes have different mechanisms for deciding which schools will participate. Sometimes participation is mandatory, particularly when the programme is part of a country-wide government initiative (for example, the 'No Child Left Behind' policy of the United States). Alternatively, an incentive programme can be voluntary, with individual schools deciding whether to opt-in or not. This is more common for programmes conducted by private organisations or foundations, or by the government when funds are limited. In many developing countries, where countrywide initiatives are often difficult to fund, some combination of geographic or district targeting and self-selection usually determines enrolment into these programmes.

As a result, an issue of real concern is whether poorly performing schools have a motivation to participate in these incentive programmes. We focus here on incentive programmes with an absolute bar for achievement (for example, average scores must be above a certain threshold), rather than a relative requirement (for instance, schools in the top 25% receive an award) or changes requirement (schools that improve at least 15% on average test scores receive an award). If poorly performing schools are in fact less likely to opt-in to incentive programmes than schools that already perform better, then such programmes are likely to exacerbate quality differences across schools. The state of Karnataka in India hosts a unique incentive-based initiative in government primary schools known as the Learning Guarantee Programme (LGP). In 2003, at the time when this programme was being piloted in a few districts of Karnataka, we collected data on school characteristics and performance from a random sample of schools that self-selected to participate in the programme and those that did not. This situation provides a unique opportunity to study the participation decisions of schools willing to opt voluntarily into the programme.

The LGP is a joint effort between Azim Premji Foundation (APF), a local non-governmental organisation, and the Government of Karnataka (GoK). The programme was designed by a team of education experts from APF, the GoK and outside academics. It reflects many of the ideas of performance-based awards in improving incentives and accountability of service providers. The creators of the programme aspired to certify some schools as those that could guarantee learning, and reward them for their performance both through a cash 'prize' as well as a public acknowledgement ceremony. This package is expected to simultaneously change school incentives and parents' information base, motivating interaction between communities and schools and generating pressure for higher quality education. Participation in the programme is voluntary and the decision to join is made by school insiders – the teachers and elected parental bodies that monitor school performance, called School Development and Monitoring Committees (SDMC). The programme was piloted between November 2002 and December 2004 in eight of the most disadvantaged districts of the state of Karnataka, where learning achievements lag the rest of the state.

All 9272 public primary (and upper primary) schools in the programme districts were directly contacted by APF in the early months of 2003, and provided with materials to sign-up for the LGP. APF monitored this solicitation process closely to ensure that no school was unaware of the existence of the programme. In June 2003, APF confirmed with 896 schools that they were participants of the programme and would be evaluated between July and September 2003. That is, the first LGP evaluation of schools was designed to take place immediately after schools were confirmed as participants (Azim Premji Foundation, 2005).

Detailed data on school characteristics and functioning were collected from over 100 schools in one of the programme districts, Bellary, between September and October 2003. After the completion of the first-round LGP evaluation exercise, 77 were drawn randomly from the group of schools that requested the LGP prospectus and 51 drawn randomly from the group that did not. The LGP evaluation was extended to the non-participating schools in the sample to facilitate performance comparison with participants. This paper analyses the determinants of participation, presenting evidence on the differences between schools that never expressed interest in the LGP and those that did. Understanding the participation decision is critical to thinking about appropriate evaluation methodologies.

In brief, we find that participating and non-participating schools had remarkably similar characteristics and resources as measured by the survey in the first few months of the programme. Yet when students in sample schools were tested on state-prescribed competencies in language and mathematics, those in schools that expressed interest in the LGP programme outperformed those that did not by over 18 percentage points (x standard deviations). This difference in performance reflects self-selection of better performing schools into the programme, with the poor performers being more likely to opt-out. This follows intuitively from that fact that the reward is based on the level of – not the change in – performance. As such, schools achieving high standard levels prior to the start of the initiative are most likely to win the incentive, regardless of their actual effort made whilst in the programme. This selection effect could result in the entrenchment of pre-existing inequalities if better-off schools participate in the programme, garner financial rewards and invest them in the schools. This paper thus presents evidence that suggests that to reach and improve poorly performing schools, voluntary incentive programmes with level performance requirements are inappropriate.

Furthermore, the paper makes a methodological contribution to the programme evaluation literature. With the exception of test scores (which are not always available), there is a lack of other observable differences across participating and non-participating schools. This supports the need to use randomised controlled trials to evaluate such programmes, rather than rely on retrospective studies that use matching techniques. This is because these studies are at a minimum unlikely to adequately address the selection-bias arising from voluntary participation when test scores are unavailable.

Section II provides a review of the literature on incentive programmes in education. Section III describes some details of the design and implementation of the LGP. Section IV presents evidence on selection into the programme. Section V then discusses implications of self-selection for evaluation of programme impact, and section VI concludes.

II. Background Literature

Recent studies in developing countries have focused on rigorously evaluating the impact of different education initiatives, both the inputs-oriented initiatives (such as, adding teachers to the classroom, providing wall-charts, textbooks or in-school health initiatives such as de-worming) and those that are incentive-oriented (for example, providing rewards to families, teachers or schools for excellent performance). Traditional inputs such as textbooks and flipcharts, that showed significant impact in retrospective analysis, have been shown to have no measurable impact when prospective techniques of randomised experiments were used to evaluate impact (Glewwe et al., 2004). The underlying problem is that retrospective analysis is constrained in addressing the selection bias – schools or teachers that elect to use textbooks and flipcharts are more likely to be high performers, thereby upwardly biasing impact estimates. In contrast, relatively new and innovative inputs in remedial teaching and school-based health programmes have demonstrated success when evaluated using the randomised experimental techniques (Banerjee et al., 2004; Miguel and Kremer, 2004).

Policy attention has recently shifted to incentive-based initiatives ranging from decentralisation, to performance-based pay for teachers, to conditional awards to schools, to vouchers and school choice. The introduction of new initiatives such as increasing school autonomy and promoting community participation in school management has been suggested to improve child attendance and learning by making schools more responsive to their beneficiaries (Jimenez and Sawada, 1999; King and Ozler, 2000). However, a rigorous evaluation of the impact of such programmes is constrained by the ability to correct for selection bias in the programme. In recent and ongoing work, Banerjee et al. (2006) experimentally implemented different strategies of empowering village communities in the state of Uttar Pradesh in India to demand higher quality education services from their village schools. Their findings from the baseline survey prior to the interventions, and field experience in undertaking the interventions, suggest that there is a general apathy among citizens to improving education through local collective action. This work cautions against excessive optimism of community-based approaches to improving education. Instead, external facilitation of rewards programmes like the LGP to change teacher incentives continues to be an important policy instrument that is being explored.

A new study has highlighted large-scale teacher absenteeism in developing countries which, in turn, is associated with lower student attendance and test scores (Banerjee and Duflo, 2006). New and systematic data has recently been collected on absenteeism of teachers through independent surveys, and shows for India that the average absence rate is higher than 24 per cent (Chaudhury et al., 2005). Alongside this research effort, some experimental studies were undertaken to improve incentives for teachers to come to school more regularly. Duflo and Hanna (2006) find that a monitoring intervention in Rajasthan, India, not only increased teacher attendance but one year later test scores in programme schools were 0.17 standard deviations higher than in the comparison schools.

Lavy (2002) studied a programme of performance-based pay for teachers in a set of high schools in Israel, which were below the national mean matriculation rate of

45 per cent. Teachers in these high schools competed in a tournament where their students' performance, relative to each other, earned teachers bonus pay from the Ministry of Education. This incentive system, based on relative improvements in performance, led to significant improvements in mean test scores (Lavy, 2002). In contrast, a programme in Kenya that sought to improve teacher incentives by providing bonuses to the school to distribute among teachers, conditional upon the performance of the school as a whole in district exams, was associated with higher performance only in the short run. The teachers responded to these incentives by 'teaching to the test', conducting test preparation sessions and administering more tests, with no long-term gains in learning achievement (Glewwe et al., 2002). This contrasting evidence from Israel and Kenya suggests that the effectiveness of school-level incentives is not as clear as individual incentives.

On the one hand, rewarding the school with cash to be used for school purposes may not be a strong enough incentive for teachers to increase their individual attendance or effort, even in a small school where teachers can easily monitor each other. Nothing in the LGP design prohibits schools from sharing an award among teachers as a 'bonus,' but it is far from guaranteed that any teacher would benefit individually if the programme recognised her school. Teachers whose efforts increase stand to gain a reputation benefit of working in an LGP-recognised school, but their financial gain is uncertain and includes the likely possibility of no bonus at all. On the other hand, instituting incentive pay for individual teachers raises the possibility of reducing cooperation among teachers and of crowding out intrinsic motivation (Frey and Jegen, 2001). There are considerable policy lessons to be gained from experimenting with different types of incentive programmes to identify particular design features that are more (or less) likely to improve school and student performance. This paper contributes to such a purpose by examining a popular programme being instituted in several states in India.

III. Learning Guarantee Programme

The LGP is one of the flagship programmes of the Azim Premji Foundation (APF), a non-profit, non-governmental organisation created in 2001 in the southern Indian state of Karnataka with the objective of improving the quality of public education in the country. Its founder, Azim Premji, is a leading industrialist and philanthropist in India. One of the central concerns of the LGP was to devise a methodology to evaluate the extent to which students were developing practical competencies of problem solving and analysis, as opposed to learning concepts by rote of which their understanding is limited (Azim Premji Foundation, 2005).[1] The test to be administered to students for such an evaluation was developed by a pedagogical team composed of APF staff and outside experts. The evaluation tool was also conceived as an instrument for strengthening incentives for school quality by rewarding high performers, and setting them as an example for poor performers to demonstrate that it is possible to improve. For this purpose, the programme set specific criteria for determining whether a school could be designated a 'Learning Guarantee School', which is summarised in Table 1, and differential rewards for the level of learning achieved.

Table 1. Criteria to be a 'Learning Guarantee School'

Criteria	Learning Guarantee School: category A	Learning Guarantee School: category B	Learning Guarantee School: category C
Enrolment	100 per cent of children (ages 6–14) in the habitation area of the school		
Attendance	90 per cent of the enrolled to have attended at least 75 per cent of school days		
Learning	80 per cent of all enrolled in grades 2–5 score at least 90 per cent on competency-based test	70 per cent of all enrolled in grades 2–5 score at least 90 per cent on competency-based test	60% per cent all enrolled in grades 2–5 score at least 90 per cent on competency-based test
Award	Rs. 20,000 (approx. US$500)	Rs. 10,000 (approx. US$250)	Rs. 5000 (approx. US$125)

Source: Azim Premji Foundation, 2005a.

The LGP was launched in November–December 2002 with an orientation programme for all Block Education Officers (BEOs) in the eight programme districts in the state of Karnataka, the Block being the lowest jurisdictional level to which the management of public schools is directly assigned. The schools themselves were contacted in early 2003, with APF soliciting 'prospectuses' (written information from each school on its relevant statistics) to join the LGP from all 9272 government primary schools in the programme districts. The solicitation process was extensive and involved personal visits by APF workers to each school and SDMC, as well as obtaining signatures of the head teacher and an SDMC member upon receipt of the information package. APF placed considerable emphasis on monitoring this solicitation process to ensure all schools were aware of the existence of the programme.

Less than 1900 of the more than 9000 schools, about 20 per cent, sent back a completed prospectus and expressed interest in the programme. Since APF went through considerable effort to ensure that all schools were informed about the programme (and have the signatures of school authorities upon receipt of the materials to prove this), the likely reasons the majority of schools did not express interest in the programme are that they did not want to expend effort completing the detailed APF prospectus and they did not want to expose school records to the scrutiny of external evaluators.

In June 2003, APF confirmed with 896 schools that they were part of the programme and would be evaluated between July–September 2003. This first round of the LGP evaluation appears to have functioned largely as a pilot to refine the evaluation methodology and to understand how schools were performing at the start of the programme (Azim Premji Foundation, 2005). A team of external evaluators unaffiliated with the government assessed the schools. APF hired and trained 37 area coordinators and 584 evaluators to take on the task of testing students and checking records in all schools. They inspected school records to assess enrolment and attendance, and administered maths and language learning tests to assess student

competency. The tests were both oral and written and administered over a four-day period to students in classes II–V in each school.[2] In the first year, 40 schools were able to achieve an award; 12 in category A, 20 in category B, and the remaining 14 in category C, as per Table 1 (APF 2005b).

In the second programme year, APF evaluated 1,443 participating schools between July–September 2004. Based on school records and registers, the team of APF evaluators concluded that 94 per cent of the 1,443 programme schools fulfilled the enrollment criteria, and of these 94 per cent nearly 55 per cent also fulfilled the criteria of attendance, again, as measured by entries in school registers (Azim Premji Foundation, 2005). Every child in grades 2–5 in all the schools was tested for language and maths competencies.

Of the 1443 participating schools, only 41 were able to qualify as Learning Guarantee Schools under category A, 19 schools under category B, and 24 schools under category C. Hence, of the total population of public primary and upper primary schools in the programme districts in Karnataka, only 16 per cent of schools agreed to be evaluated and fewer than 6 per cent of the participating schools were able to qualify for a Learning Guarantee award. The participating schools that did not win any award were significantly lagging the winning schools in average test scores, which were 55 per cent in the former compared to 93 per cent in the latter. This distribution of actual performance by LGP participant schools suggests that the programme's criteria for winning were set high compared to the level at which schools performed prior to the programme.

APF reports that an award function for the second year of the programme was held in December 2004, in the Bellary district and was attended largely by teachers and community members from the 84 winning schools and not by the other participants that did not win the LGP award. Following the award function, APF organised a team of 42 volunteers to visit each of the 1443 participating schools during March 2005 to provide feedback on their performance to the head teachers. APF also facilitated meetings among government education functionaries in two of the programme districts in May 2005 to deliberate upon the methodology and results of the evaluation and come up with strategies to improve performance. From the description provided by APF, it appears that the thrust of programme implementation occurred between December 2004 and May 2005 with the provision of feedback to all participating schools on their performance, and facilitation of discussion amongst education functionaries on how performance could be improved.

By the end of the third year of implementation, APF reports that participation in the programme went up to 1887 schools (20% of the total), and 144 schools (8% of the participants) won the award. At this time, APF organised larger and multiple award functions that were held in each of the programme districts for their participating schools. In addition to awarding the LGP prizes to 144 winning schools, these award functions recognised the other participating schools by presenting them with a feedback report and a set of books as a memento of their participation.

APF (2005a) reports the LGP was extended in different forms in Karnataka and other major states of India. The evaluation methodology of the LGP is in the process of being adopted by the Government of Karnataka to replace its traditional testing and examination system in primary schools.

The programme experience described above provides suggestive support for the argument of this paper that observed differences in our sample between participating and non-participating schools is due to self-selection rather than programme impact. First, the programme was not fully implemented until early 2005, when specific feedback was provided to participating schools on their performance and discussion was facilitated on how performance could be improved. This feedback and discussion process had been conceived as critical in the APF's early writings on the design of the LGP to enable schools to improve performance (Azim Premji Foundation, 2002). Indeed, APF publications describe the initial implementation of the first round of the LGP as a 'learning journey', when programme details were still being ironed out (Azim Premji Foundation, 2005a). This suggests that the period during which our data were collected to analyse programme participation, September to October 2003, was too early in the programme's life cycle to expect incentive impact because the programme was not fully implemented as conceived.

Second, the programme's targets for learning were set so high that only a few schools, even among participants, were able to achieve them. Although this is *ex-post* knowledge for us, the outside observers and the APF team, it is not unreasonable to expect that many schools would already have this knowledge when they were reviewing the programme criteria and deciding whether to participate.[3] It is also not unreasonable to surmise that, at the beginning of the programme, schools would expect benefits from programme participation only if they 'won.' That is, even if the programme evolves to provide other forms of benefits to all participating but non-winning schools – such as technical assistance and information that might help schools to improve their performance, schools might not know this at the start of the programme. This characteristic of the programme – that it set very high standards for rewards that very few schools would be able to achieve – is more likely to have led to self-selection of higher-end performers at least in the first year of the programme, when programme benefits for non-winners were most uncertain.

IV. Data and Evidence on Programme Participation

During September and October 2003, we undertook a survey of over 100 schools in collaboration with APF. About half were randomly selected from the list of schools that never expressed any interest in the programme, and the other half were taken from the pool of schools that expressed interest in the programme and joined the programme in its first year.[4] All of these schools were located in Bellary – one of the eight programme districts. Detailed data on school resources and parental participation in the school were collected from structured interviews of teachers and local school committee members, as well as through direct observation of school functioning by the interviewing teams. The surveys captured information on items such as school inputs purchased the previous year, facilities available by the survey date, official enrolment and attendence statistics, teacher education, experience and their reported job satisfaction, and finally school committee membership and activities. Data on village or town census area characteristics, such as literacy, social composition and availability of public services, from the 2001 Census of India provide information on 'neighborhood' characteristics prior to the programme's launch.

Additionally, students in the third and fifth standards were tested between July and October 2003 for basic competencies in mathematics and their language of instruction using the LGP evaluation methodology. The test was administered 8–10 months *after* the programme was announced to schools, and one to four months after participation status of schools was confirmed. Ideally, to answer the question we pose here, these tests would have been administered *before* the programme announcement in order to estimate more precisely the participation decision. However, we do have test results *prior* to programme announcement for a subset of the sample: district authorities provided grades for the 'Seventh standard leaving exam' from March 2002 (nine months before the LGP was announced) for the 61 'upper' primary schools in the sample, which extend up to the seventh standard. These seventh standard test scores, since they were obtained prior to the announcement of the LGP incentives, are the best measure of any participation bias with respect to test scores. However, there are two drawbacks to relying just on these scores to understand differences between LGP participants and non-participants. First, we only have these data for 61 upper primary schools out of the 100 schools; but perhaps, more importantly, the testing methodology upon which the scores are based might not be as high quality as the LGP test in terms of discerning performance differences across schools.

We use these data to answer the main question of this paper: how do schools that express interest in participating in the LGP differ from schools that showed no interest at all, and what can we learn from this about potential programme impact? The evidence presented in this section has been analysed using two techniques. The first compares the mean values of school and village characteristics of schools that expressed no interest in the programme to those that ended up joining the programme (or had expressed preliminary interest). The second method estimates the probability of a school joining or at least expressing interest in the LGP using multivariate regression and probit models. We explore differences between interested and not-interested schools along four broad dimensions: 1) school performance, as measured by test scores and child attendance; 2) school inputs and measurable resources, such as teacher-student ratios, teacher education, textbooks, chairs and desks, cash resources and availability of facilities such as toilets, electricity and running water; 3) community participation, as measured by the activities of village-level governance bodies, and the extent to which school teachers have ties to the local community; and 4) neighbourhood characteristics available from the 2001 Census that are likely to be correlated with the population's demand for quality education.

Table 2 compares sample means of measures of school performance, school-specific resources and inputs, student and teacher characteristics, community participation, and neighbourhood characteristics between schools that expressed interest in participating in the programme and schools that did not.[5] The striking pattern emerging is that participating schools are significantly more likely to be better performing schools as measured by test scores and child attendance, and more likely to experience community participation, but no different in the availability of school-specific resources and inputs.

Among the 61 schools in our sample that are upper primary schools for which the seventh standard leaving exam scores are available *prior* to programme announcement, the average 'total marks'[6] is 25.7 points higher for interested/joined schools

Table 2. Comparison of mean school characteristics by school response to programme: 'Not interested' versus 'Interested or joined'

		Not interested			Interested/joined			Interested/joined–not interested
		N	Mean	Standard deviation	N	Mean	Standard deviation	Difference in means
School performance	Average 7th standard leaving exam language %	21	0.51	0.12	40	0.57	0.09	0.06**
	Average 7th standard leaving exam math %	21	0.47	0.14	40	0.51	0.11	0.04
	Average 7th standard leaving exam total %	21	0.49	0.11	40	0.53	0.08	0.04*
	Average LGP language test %	48	0.45	0.25	77	0.59	0.24	0.14***
	Average LGP math test %	48	0.35	0.23	77	0.57	0.24	0.23*
	Total average of LGP test %	48	0.40	0.23	77	0.58	0.23	0.18***
Student attendance	School records % students attend > 20 days July 2003	51	0.87	0.10	77	0.90	0.09	0.03
	School records % students attend 11–19 days July 2003	51	0.05	0.06	77	0.02	0.05	−0.03***
	School records % students attend 1–10 days July 2003	51	0.04	0.05	77	0.04	0.05	0.00
	School records % students attend 0 days July 2003	51	0.04	0.06	77	0.04	0.06	0.00
	Student attendance – surprise visit	51	0.69	0.16	77	0.77	0.16	0.08***
School inputs and resources	Desks received per student	51	0.02	0.01	77	0.03	0.03	0.01
	Chairs received per student	51	0.07	0.05	77	0.07	0.07	0.01
	Notebooks received per student	51	0.33	0.33	77	0.34	0.27	0.01
	Textbooks received per student	51	3.41	1.06	77	3.06	1.36	−0.35
	Cash received per student (Rs.)	51	67.34	112.39	77	138.71	305.18	71.37
	% schools that have electricity	51	0.33	0.48	78	0.35	0.48	0.01
	% schools that have running water	51	0.49	0.50	78	0.62	0.49	0.13
	Students per toilet	51	55.10	90.34	78	60.58	97.51	5.48
Teachers	% teachers with education beyond SSC	51	0.80	0.28	78	0.79	0.30	−0.01
	Student: teacher ratio	51	42.69	16.84	78	43.07	20.51	0.38
	% teachers originally from this location	51	0.11	0.21	78	0.17	0.28	0.06

(*continued*)

Table 2. (*Continued*)

		Not interested			Interested/joined			Interested/joined–not interested
		N	Mean	Standard deviation	N	Mean	Standard deviation	Difference in means
Student composition	% enrolled students belonging to Scheduled Castes	51	0.25	0.27	77	0.27	0.29	0.02
	% enrolled students belonging to Scheduled Tribes	51	0.23	0.04	77	0.20	0.03	−0.03
Community participation	SDMC contribution per student (Rs.)	51	15.64	42.70	77	26.88	65.14	11.24
	Last Gram Sabha discussed school (% Yes)	51	0.43	0.50	78	0.50	0.50	0.07
	SDMC discussed teacher attendance at staff meeting	51	0.39	0.49	78	0.64	0.48	0.25***
2001 Census data for neighbourhood characteristics	% literate females	50	0.44	0.16	78	0.44	0.14	−0.01
	% Scheduled Caste population	51	0.21	0.20	78	0.21	0.16	0.00
	% Scheduled Tribe population	51	0.25	0.24	78	0.21	0.18	−0.04
	% with post & telegraph facility (for villages)	43	0.67	0.47	67	0.87	0.34	0.19*
	Distance to nearest town (km) (for villages)	43	20.74	9.04	67	17.87	8.76	−2.88*
	Number of middle schools (for villages)	43	1.02	1.39	67	1.21	1.46	0.19

Notes: *Difference in means is significant at 90 per cent level of confidence; **significant at 95 per cent; ***significant at 99 per cent.

than for the not-interested schools. This difference in test scores corresponding to expressing interest in the programme is equivalent to 0.22 standard deviations and is significant at the 90 per cent level. The difference in the average first language scores taken alone is 6 points higher for the interested/joined schools, a significant difference at the 95 per cent level. Math scores are four points higher as well but this difference is not statistically significant. Figure 1 demonstrates this paper's primary finding that programme participants are likely to be better-performing schools as measured by test scores, with the poor performers choosing to opt-out. It shows the kernel density estimate of the distribution of test scores on the seventh standard leaving exam administered prior to programme announcement, broken down by whether or not the schools expressed interest in the LGP.

As mentioned earlier, the seventh standard leaving exam scores are obtained prior to programme announcement and are, therefore, reflecting self-selection of particular types of schools into the programme rather than programme impact on performance. However, this testing data is only available for 61 schools that are not representative of a typical primary school in the district (which does not go beyond grade five). Furthermore, the examination methodology underlying these scores is not likely to be as discerning of student learning achievement as the LGP test is. However, the LGP test score, measured one to four months after schools were confirmed as participants in the programme, shows even larger differences in performance between interested and not-interested schools. We find that the average student test score combining maths and language was 58 per cent for interested/joined schools but only 40 per cent for not-interested schools. The difference between these scores is statistically significant at the 1 per cent level.

We measure student absenteeism, another aspect of school performance likely to be correlated with learning, by examining attendance registers for July 2003 (one month after school participation in the programme was confirmed). We find less absenteeism – only 6 per cent of students in interested schools attend for less than 20

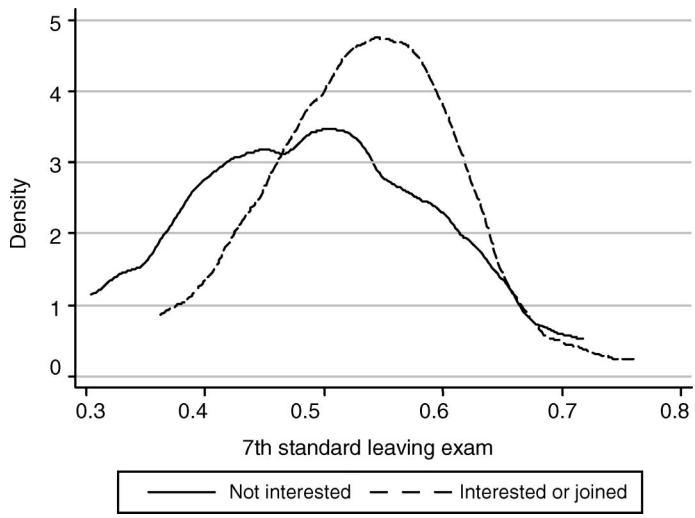

Figure 1. Kernel density, pre-LGP seventh standard exam marks.

days in the month, compared to 9 per cent in non-interested schools. We also measure attendance by conducting a single surprise visit on one randomly picked day. We find 77 per cent attendance at interested/joined schools and 69 per cent at not-interested schools.

Schools are statistically indistinguishable in inputs and resource availability as measured by: availability of running water, electricity and toilets; student supplies such as desks, chairs, notebooks/textbooks, cash per student; percentage of teachers per school holding an education above that of secondary school; and student-teacher ratio.

As mentioned earlier in section II, one of the problems with public education systems in developing countries that recently received a lot of research and policy attention is that of teacher incentives and absenteeism (The World Bank, 2004; Chaudhury et al., 2005). This study did not collect data directly on teacher absenteeism, but we did ask school head teachers to identify the percentage of teachers in their school that were indigenous to the village, under the assumption that if teachers are native to the village they are more likely to reside there and thus have lower costs of attendance. Teachers that belong to the village where the school is located might also have greater ties to the community and experience informal pressure to care for the school's performance. The converse, of course, could also be true, if they belong to powerful elite families in the village and are less accountable to poor villagers.

Quite interestingly, we find a significant difference between participating and non-interested schools in this dimension of teacher background. Among the group of schools that joined the programme, 20 per cent of teachers on average are native to the village, compared to 11 per cent in schools that expressed no interest, and this difference is significant at the 90 per cent level (Table 3). There is no evidence that this difference is due to schools response to the programme. That is, the school survey does not show that significant numbers of new local teachers were hired within the few months between participation in the programme and the fielding of the survey.[7]

The family background of children enrolled in the school might also matter for participation. In India, in particular, if a school has a higher proportion of children coming from historically-disadvantaged social groups designated Scheduled Castes and Scheduled Tribes, then it might feel less pressure to participate, or might be a laggard performer and decide not to participate.[8] We measured the proportion of children enrolled in a school that belong to Scheduled Castes and Tribes and find no difference between the schools along this dimension.

Community participation is measured by activities of a local school governance body – the School Development and Monitoring Committee (SDMC) – which consists of parents elected by the community to monitor school performance. Villages in India also have a general institution for community participation in all types of public services – the Gram Sabha, which is a village-wide gathering of all adult citizens to deliberate upon matters of local public services. We asked all survey respondents about various SDMC activities and about whether school affairs were discussed at the most recent Gram Sabha in the village. We find that a higher proportion of participating schools were likely to have an SDMC discussion about teacher attendance, a critical area that SDMC's are empowered to monitor (64% of interested/joined schools, and 39% of not interested schools reported that the SDMC discussed teacher attendance at a staff meeting). There are no differences

between the groups of schools in the extent to which the Gram Sabha discussed education.

This difference in SDMC activity between participating and not-interested schools could easily be in response to the programme. Indeed, school committees such as the SDMC that want to improve learning outcomes in response to the new incentives should probably strive to improve teacher attendance and performance. However, even if the evidence of greater SDMC monitoring of teachers in participating schools is a response to the programme, this difference in community participation still suggests that committees are more likely to be active in participating schools.

The neighbourhood characteristics likely to have an impact on school performance that we focus upon are those that have been emphasised in the literature on education in India – female literacy, proportion of disadvantaged social groups in the population (Scheduled Caste and Scheduled Tribe, in the Indian terminology), distance from the nearest town, and the number of middle schools in the census area.[9] The only difference is in the physical location of participating schools – rural schools that were interested in the programme are likely to be located in villages that are closer to towns (17.87 km for interested/joined schools and 20.74 km for not-interested schools). Rural participating schools are also more likely to be in villages that have post and telegraph facilities (87% for interested/joined schools and 67% for not-interested schools). This location difference might explain why participating schools are likely to have a higher proportion of teachers indigenous to the village.

Thus, from a simple comparison of means we find an interesting pattern – schools interested in participating in the programme are better performing schools, as measured by student test scores, student attendance and community participation in monitoring teachers but, do not differ systematically in easily observable school inputs. Since the LGP tests were administered and data on attendance and community participation were collected *after* the programme began and not before, this difference could have been driven by selection (only the best schools sign up), or alternatively by the actual impact of the programme (schools improved their performance in order to win the award). We will address this issue in more detail in the next section, but first we report whether these differences between participating and non-participating schools are robust in multivariate regression analysis.

Table 3 presents the multivariate regression analysis of programme participation using a linear probability model. All models include fixed effects at the *taluk* level (a jurisdictional level below the district – Bellary district, from which the study sample is drawn, has seven *taluks*), to account for differences in general public administration quality across schools. Column 1 of Table 3 presents the regression for interest and participation in the LGP, including the seventh standard leaving exam score, and neighbourhood characteristics as measured by the 2001 Census as predictors, that is, variables on which data was collected prior to the programme. We find that these test scores prior to the programme are significant in predicting a school's interest in the programme at the 90 per cent level of confidence, even after controlling for neighbourhood characteristics. School location is an insignificant predictor in this multivariate setting and for this smaller sample.

Column 2 of Table 3 presents the determinants of interest/participation in the LGP for all 123 schools in our sample focusing on school resources and teacher,

Table 3. Probability of 'Expressing interest or joining' using linear probability model

	(1)	(2)	(3)	(4)
7th Standard Leaving Exam (overall average %)	1.335*			
	[0.783]			
Literate female population (%)	−0.618	−0.359	−0.196	−0.215
	[0.764]	[0.536]	[0.438]	[0.439]
SC population (%)	−0.027	0.085	0.193	0.173
	[0.690]	[0.378]	[0.297]	[0.300]
ST population (%)	−0.350	0.070	0.378	0.382
	[0.574]	[0.334]	[0.280]	[0.283]
Post & telegraph facility available in village (Y/N)	−0.034	0.274**	0.121	0.159
	[0.353]	[0.131]	[0.117]	[0.122]
Distance to nearest town (Kms.)	0.005	−0.004	−0.007	−0.007
	[0.010]	[0.007]	[0.005]	[0.005]
Middle schools in census area (#)	0.019	−0.003	0.022	0.021
	[0.066]	[0.040]	[0.035]	[0.034]
Urban school (Y/N)	0.295	0.243	−0.016	0.045
	[0.427]	[0.246]	[0.194]	[0.210]
Cash received per student (Rs.)		0.000*		0.000
		[0.000]		[0.000]
Text received per student (#)		−0.091**		−0.046
		[0.038]		[0.030]
Teachers educated above SSC (%)		0.056		
		[0.159]		
Teachers originally from this location (%)		0.162		
		[0.182]		
Student: teacher ratio		0.002		
		[0.003]		
SC students enrolled (%)		−0.099		
		[0.183]		
ST students enrolled (%)		−0.212		
		[0.274]		
LGP Test Score (overall average %)			0.743***	0.733***
			[0.166]	[0.168]
Student attendance, surprise visit (%)			0.403	0.356
			[0.251]	[0.258]
Value of SDMC contributions per student (Rs.)			0.000	−0.000
			[0.000]	[0.001]
Gram Sabha discussed school in last meeting (Y/N)			0.037	0.040
			[0.079]	[0.081]
Teacher attendance discussed in last SDMC-staff meeting (Y/N)			0.291***	0.284***
			[0.082]	[0.084]
Constant	0.374	0.938**	0.124	0.242
	[0.716]	[0.461]	[0.313]	[0.326]
Observations	61	123	123	123
R-squared	0.155	0.195	0.406	0.417
Adjusted R-squared	−0.103	0.037	0.304	0.303
Root MSE	0.503	0.479	0.406	0.407

Notes: Taluk level fixed effects included in all specifications. Robust standard errors in parentheses. *Significant at 90 per cent level of confidence; **significant at 95 per cent; ***significant at 99 per cent.

student and neighbourhood characteristics. Teacher characteristics and student-teacher ratios are not significantly different across the two types of schools. Cash resources per student are slightly larger (significant at the 90% level of confidence), while textbooks per student are slightly lower in participating schools (at the 95% level of confidence). We also include enrolment of children from disadvantaged social groups (Scheduled Castes and Scheduled Tribes) but do not find this to be a significant predictor of participation. We find that schools located in villages that have post and telegraph facilities are more likely to participate in the programme.

Column 3 of Table 3 considers the LGP test score, student attendance and community participation as predictors of a school's interest in the programme, while controlling for neighbourhood characteristics. These performance variables continue to be significant in this multivariate setting, and taken together explain an additional 25 per cent of the variation in programme participation, after accounting for neighbourhood characteristics and *taluk* fixed effects. Column 4 of Table 3 adds school resources to the model, thus including almost all the variables whose means were presented in Table 2. The only significant predictors of programme participation are LGP test scores and community participation.

Table 4 presents the analysis using a probit specification, finding approximately the same results with a few minor exceptions. Post and telegraph facilities and cash received per student are not statistically significant predictors of participation in this specification (column 2, Table 4). Texts received per student are significant predictors in the probit specification only when included along with LGP test scores, and the coefficient continues to be negative (column 4, Table 4). Further, test scores and community participation are even larger predictors of a school's interest in the programme under this specification.

In sum, we find that the only robust and substantial differences between schools that expressed interest in or joined the programme and those that did not are in LGP test scores, student attendance and community participation, with no robust differences in measurable school inputs and teacher characteristics.

V. Implications for Evaluating Programme Impact

The significant relationship between interest in the LGP and higher test scores, student attendance and community participation can be interpreted alternatively as programme impact or self-selection of better performing schools into the programme. For three reasons outlined below, we argue that the difference in test scores is due to self-selection of better performing schools, not because of the impact of the programme.

First, although the LGP tests were administered after the enrolment of schools in the program, the schools only had a few months to make changes at their school prior to administering the tests. This short time period makes the difference highly unlikely to be from the programme's impact. If test scores in 'joined' schools were the same as test scores in 'did not join' schools before the announcement of the programme, then participants would have had to increase their scores by 55 per cent of the average (0.89 standard deviations) in the four to six months of teaching time available outside of school exams and holidays. Compared to the randomised

Table 4. Probability of 'Expressing interest or joining' using probit specification

	(1)	(2)	(3)	(4)
7th standard leaving exam (overall average %)	1.325*			
	[0.702]			
Literate female population (%)	−0.619	−0.371	−0.271	−0.281
	[0.632]	[0.532]	[0.513]	[0.502]
SC population (%)	−0.052	0.155	0.173	0.132
	[0.598]	[0.419]	[0.394]	[0.388]
ST population (%)	−0.295	0.131	0.640	0.637
	[0.499]	[0.353]	[0.404]	[0.395]
Post & telegraph facility available in village (Y/N)	−0.026	0.320	0.174	0.248
	[0.266]	[0.140]	[0.156]	[0.169]
Distance to nearest town (km)	0.003	−0.005	−0.010	−0.011
	[0.008]	[0.007]	[0.007]	[0.007]
Middle schools in census area (#)	0.024	−0.004	0.016	0.009
	[0.054]	[0.042]	[0.046]	[0.048]
Urban school (Y/N)	0.218	0.217	−0.062	0.033
	[0.204]	[0.177]	[0.252]	[0.240]
Cash received per student (Rs.)		0.000		0.000
		[0.000]		[0.000]
Text received per student (#)		−0.103**		−0.082*
		[0.044]		[0.042]
Teachers educated above SSC (%)		0.061		
		[0.174]		
Teachers originally from this location (%)		0.193		
		[0.202]		
Student: teacher ratio		0.002		
		[0.003]		
SC students enrolled (%)		−0.138		
		[0.204]		
ST students enrolled (%)		−0.242		
		[0.271]		
LGP Test Score (overall average %)			1.067***	1.087***
			[0.249]	[0.253]
Student attendance, surprise visit (%)			0.690**	0.588*
			[0.342]	[0.358]
Value of SDMC contributions per student (Rs.)			0.000	0.000
			[0.001]	[0.001]
Gram Sabha discussed school in last meeting (Y/N)			0.033	0.042
			[0.110]	[0.108]
Teacher attendance discussed in last SDMC-staff meeting (Y/N)			0.391***	0.397***
			[0.103]	[0.102]
Predicted probability	0.762	0.653	0.696	0.703
Observations	61	123	123	123
Pseudo R-squared	0.139	0.166	0.382	0.399
Pseudo log likelihood	−33.806	−68.239	−50.531	−49.140

Notes: dy/dx reported. Taluk-level fixed effects included in all specifications. Robust standard errors in parentheses. *Significant at 90 per cent level of confidence; **significant at 95 per cent; ***significant at 99 per cent.

control trials of a remedial education programme in Mumbai and Vadodara, which found at most a 0.25 standard deviation increase in test scores *when a teaching assistant was provided*, this seems unlikely. The highest gain from pre- to post-test in

the first year of this programme was a 15.8 percentage point or 46 per cent increase (from 34% to 49.8%) in verbal scores for fourth standard students in Vadodara (Banerjee et al., 2004). Thus, a programme impact interpretation for the LGP case would mean that 'joined' schools increased test scores by 22 percentage points or 55 per cent in less than six months, given no additional inputs of any kind but, rather, simply in response to the possibility of winning a prize. This seems unrealistic when compared to the magnitude of impact found in other interventions that provided more generous inputs to schools.

Second, the seventh standard exams, taken *before* the launch of the LGP incentives, provide the cleanest evidence that the schools differ on selection, showing that schools that expressed interest in the LGP incentives were higher achieving schools beforehand.

Finally, as a part of our survey, teachers in programme schools were asked what changes they expected due to the LGP. They consistently answered this open-ended question in broad and vague terms of improved attendance, learning levels, overall improvements, or better teaching. Of the 183 teachers asked what changes they anticipated in their school, none answered in a manner that indicated the schools had any concrete plans by which they were attempting to improve student attendance or performance in order to increase their chances of earning the LGP award.

We do find differences between programme and non-programme schools in student attendance and community participation specifically directed to the issue of teacher attendance. We are unable to distinguish whether these are part of the self-selection of the better schools into the programme, or due to programme impact. Yet, in either case the evidence here highlights the importance of non-tangible and difficult to observe processes at the community-level that shape the incentives of both providers and beneficiaries.

Given the significance of village location that occasionally appears in our analysis, an interpretation could be that better-located schools attract better teachers and serve communities that care more about education. The interesting point here is that the suspected advantages of well-performing schools are not obviously derived from easy-to-measure school-level inputs (such as textbooks, desks or chairs) but, instead, from the largely unobservable phenomena of teacher and student commitment.

Another interpretation of the significance of village location is that it captures the socioeconomic wellbeing of households. If villages located closer to towns or with post and telegraph facilities are more likely to have better-off households that can provide a better learning environment for their children, and are more demanding of quality services, then this might be driving the correlation with school performance and decision to participate in the incentive programme.

We explore this point further by analysing the correlates of variation in school performance as measured by LGP test scores. In column 1 of Table 5, we include school resources, teacher characteristics, percentage of enrolled children belonging to SC/ST groups, and neighbourhood characteristics as determinants of variation in LGP test scores. In column 2, we also include student attendance and community participation variables as predictors, although these are likely to be endogenously determined along with test scores. We find no significant or robust correlation between LGP test results in a school and its resources, teacher and neighbourhood

Table 5. OLS estimates of LGP test results

	(1)	(2)
Literate female population (%)	−0.214	−0.219
	[0.249]	[0.245]
SC population %	−0.091	0.038
	[0.169]	[0.176]
ST population %	−0.305*	−0.185
	[0.165]	[0.168]
Post and telegraph facility available in village (Y/N)	0.039	0.040
	[0.065]	[0.066]
Distance to nearest town (Km)	0.002	0.002
	[0.003]	[0.003]
Middle schools in census area (#)	0.002	0.016
	[0.022]	[0.020]
Urban school (Y/N)	0.137	0.160
	[0.098]	[0.105]
Cash received per student (Rs.)	0.000	−0.000
	[0.000]	[0.000]
Text received per student (#)	−0.015	−0.011
	[0.023]	[0.023]
Teachers educated above SSC (%)	0.109	0.022
	[0.081]	[0.085]
Teachers originally from this location (%)	0.168	0.137
	[0.103]	[0.098]
Student: teacher ratio	−0.002	−0.001
	[0.001]	[0.002]
SC students enrolled (%)	0.080	0.024
	[0.088]	[0.090]
ST students enrolled (%)	0.141	0.127
	[0.120]	[0.130]
Student attendance, surprise visit (%)		0.395**
		[0.166]
Value of SDMC contributions per student (Rs.)		0.001
		[0.001]
Gram Sabha discussed school in last meeting (Y/N)		0.032
		[0.046]
Teacher attendance discussed in last SDMC-staff meeting (Y/N)		0.004
		[0.044]
Constant	0.473**	0.168
	[0.219]	[0.297]
Observations	123	123
Adjusted R-squared	0.13	0.20
R-squared	0.28	0.36

Notes: Robust standard errors in brackets. Taluk level fixed effects included in all specifications. *Significant at 90 per cent level of confidence; **significant at 95 per cent; ***significant at 99 per cent.

characteristics. The only significant covariant of test scores is student attendance – schools with higher rates of attendance among enrolled students (as measured in a surprise visit by our surveyors) are also schools where the students score higher on the LGP test. However, we do not find significant correlation between test scores and

community participation, measured particularly as monitoring of teacher attendance. The difference in test scores between participating and non-participating schools is therefore unlikely to be due to differences in community participation across schools, which is the instrument that schools could have used immediately to respond to the programme's incentives.

Our findings suggest that the specific design of the rewards programme has important distributional implications. The LGP conditions the cash reward to a school on its absolute level of student enrolment, attendance and achievement, irrespective of prior performance. This may lead to better schools participating in the programme, with the poorer performers opting out and, hence, this could exacerbate inequality across schools.

There is also an important methodological implication brought out by this study. Adding to the finding of omitted variables bias in retrospective versus prospective data to measure the effectiveness of flip charts in primary schools in Kenya (Glewwe et al., 2004), a proper evaluation of the impact of this kind of levels-based incentive programme must also consider the selection bias of those who voluntarily join. Here we find that observable information cannot predict the decision to join, yet the interested/joined and not-interested schools differ significantly on test results. This suggests that non-programme characteristics that account for some schools being better than others cannot be easily measured using standard survey instruments and are, therefore, likely to be neither appropriately 'controlled for' nor 'matched upon' to evaluate programme impact. A matching exercise, for instance, would fail to control properly for omitted variable bias and a randomised control trial might be the only reliable methodology to measure programme impact.

VI. Conclusion

Programmes such as the LGP, which aim to improve outcomes by creating direct incentives to schools, are becoming popular around the world. We find schools that participate in a *level-target (not improvement-target)* incentive-based programme have better test scores and student attendance than non-participating schools but otherwise cannot be distinguished (that is, observable school inputs are the same but outcomes differ in important ways). The self-selection into such programmes is important: rewarding improvements rather than rewarding fixed levels may address some of this problem, but it also raises other problems. Schools that start out at different levels and need to exert different effort levels to improve will respond differently to the same incentive structure. Much care needs to be taken in the design of these programmes in order to avoid undesirable distributional outcomes, whereby school quality is made more unequal and the worst-performing schools are actually targeted *out*, not *in,* of the programme.

More generally, the finding that participating schools perform much better on outcomes such as test scores and student attendance but are similar in physical resource availability, is suggestive of the importance of unobservable resources that affect incentives for learning. Programmes such as the LGP that aim to improve incentives and accountability have promise but the self-selection of well-performing schools suggests that a challenge lies in reaching out to the weaker-performing

schools. Further work is required to design programmes that do not leave the weakest schools behind.

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Notes

1. See the LGP concept note posted on the APF website: http://www.azimpremjifoundation.org/downloads/LGPconcept.pdf
2. APF reports that an award function (for the first round) was held in the district of Gulbarga in February 2004 attended by teachers and community members of award-winning schools.
3. Except of course the schools that are uninformed of the level of learning of their own students.
4. Some of the schools on this list, 13 in number, turned out to have expressed interest in the programme but had not completed the paperwork to formally enroll in the programme. We present results including these 13 schools in the sample of participants. The pattern of results is robust to the exclusion of these 13 schools from the analysis.
5. Our sample started with 51 schools that were "Not Interested" and 78 that at least formally expressed interest in the program or even joined ("Interested/joined"). Of the Not Interested, we conducted our school survey for all 51, but were not able to administer the LGP exam in 3 schools, reducing the sample to 48. Of those 48 schools, 21 are upper primary schools and we obtained 7th standard leaving exam scores for them. In a few cases, all census data were not available for the 51 schools; also 8 schools are in urban areas, and measures of village resources are not applicable. One of the schools is located in a village that has a female population of zero according to the 2001 census, so percentage literate females could not be calculated. Of the Interested/joined, one school was unable to finish the survey (though we have its 7th standard test scores) and another school's LGP test was not completed by the time our database was compiled, reducing the sample of 76. Of these 76 schools, we have the 7th standard leaving exam scores for 39 of them; also 9 are urban schools thus they do not have village resource measures. We exclude schools that do not have a complete data set from the OLS and Probit regressions. Taking account of the missing data, we have 61 schools with 7th standard leaving exam scores and the full set of variables in model 1 of Table 3 and Table 4 and 123 schools that have the full data required for models 2–4 in Table 3 and Table 4.
6. Total Marks is comprised of six individual exam marks: three languages, mathematics, science and social studies.
7. We asked the school head teachers how long each teacher currently employed by the school had been at the school. Only 41 teachers in the whole sample of 377 teachers had been at their school less than five months, and only seven of these recent hires were native to the village. These seven were almost equally divided between LGP and non-LGP schools, with the former accounting for four of the seven new local hires.
8. Hoff and Pandey (2004) and Pandey (2005) provide new evidence on the importance of caste identity in India for school and child performance.

9. Most villages in India have at least one primary school owned by the government. However, coverage of middle schools is substantially lower, so that the existence of multiple middle schools in a village is more likely to capture the population's demand for schooling.

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