PAKISTAN

Learning and Educational Achievements in Punjab Schools (LEAPS)







Insights to inform the education policy debate

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Learning and Educational Achievements in Punjab Schools (LEAPS):
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And

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CURRENCY AND EQUIVALENTS

Currency Unit = Pakistan Rupee
US$ = PKR 60.5

FISCAL YEAR

July 1 – June 30

ACRONYMS AND ABBREVIATIONS

AJK	Azad Jammu & Kashmir
EFA	Education for All
EMIS	Educational Management Information System
FANA	
FATA	Federally Administered Tribal Areas
FBS	Federal Bureau of Statistics
GPS	Global Positioning System
ILO	International Labor Organization
NAGE	National Assessment of Governing Board
NEC	National Educational Census
NCTM	National Council of Teachers of Mathematics
NWFP	North Western Frontier Province
PIHS	Pakistan Integrated Household Survey
PTC	Primary Teaching Certificate
STR	Student-Teacher Ratio
SW	
TIMMS	Trends in International Math & Science Study

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EXECUTIVE SUMMARY

1. *There have been dramatic changes in the educational landscape of Pakistan in the new millennium.* Enrollments are starting to look up with a 10 percentage point jump in net enrollments between 2001 and 2005. In addition, secular, co-educational and for-profit private schools have become a widespread presence in both urban and rural areas. Between 2000 and 2005, the number of private schools increased from 32,000 to 47,000 and by the end of 2005, one in every 3 enrolled children at the primary level was studying in a private school.

2. *These changes represent an opportunity and a challenge for educational policy in the country.* A large fraction of rural Pakistani households no longer lives in a village with one or two government schools—half the population of rural Punjab, for instance, lives in villages where parents routinely have 7-8 schools to choose from. This new educational landscape is best described as an *active educational marketplace* with multiple schools vying for students whose parents are actively making educational decisions. From evaluating policy reform to understanding how the private sector can help educate the poor, the rise of such schools represents a significant opportunity and challenge, not only in Pakistan but also in the wider South-Asian context.

3. *Furthermore, with enrollments looking up, debate will likely shift to what children are learning in school.* Enrollment does not imply learning. Low-income countries routinely place at the bottom of the charts in international comparisons. Measuring what children are learning in public and private schools and understanding how the educational marketplace can foster learning is a first step towards formulating policy in the new millennium.

4. *This report shares the findings of first round of the Learning and Educational Achievement in Punjab Schools (LEAPS) survey carried out in all the public and private schools offering primary-level education in 112 villages of the province.* This survey includes learning outcomes for 12,000 children in Class III in Urdu, English and Mathematics together with detailed information on the beliefs and behavior of schools, teachers and parents. This large and independent exercise provides critical information on every aspect of the educational

Figure 1: Testing Children as part of the LEAPS project

marketplace, including performance of all types of schools in select districts of the province. This report presents findings from the first round of the survey in 2003 along with trends for a few key outcomes between 2003 and 2007; a further report will incorporate all other information from the 4 rounds collected between 2003 and 2007.

5. *The findings shed light on the relative strengths and weaknesses of private and government schooling.* Driven by higher teacher salaries, government schools require twice the resources to educate a child compared to private schools. Furthermore, children studying in private schools report higher test-scores in all subjects—partly because their teachers exert greater effort. Private schooling alone, however, cannot be the solution. Access to private schools is not universal. Private schools choose to locate in richer villages and richer settlements within villages, limiting access for poor households. In contrast, a laudable feature of the government school system is that it ensures equal geographical access to schools for all. Since children who receive less attention and educational investments at home are also more likely to be enrolled in government schools (if they are enrolled at all), government school reform could ensure that no child is left behind.

6. *Based on these findings, the report proposes a modified role of the government for discussion.* This modified role envisions the government as complementary to, rather than in competition with, the private sector. It advances three spheres for government intervention. The first is as a *provider* of information on the quality of every school—public or private—in the country. This will enable households to make informed decisions and increase beneficial competition between schools. The second is as an *actor* who corrects the imbalances arising from unequal geographical access to private schools and ensures that all children acquire a set of basic competencies. Inevitably, this requires reform of government teacher hiring and compensation schemes. The third is as an *innovator* willing to experiment with and evaluate "out-of-the-box" reforms such as public-private partnerships where financial support is given to children regardless of the school chosen. Moving from such proposals to operational feasibility requires debate and discussion, both on the proposals presented here and to better understand the concrete steps that such a transition might require.

I. CHALLENGES FACING THE EDUCATION SYSTEM IN PAKISTAN

7. *Enrollment*. Educational outcomes in Pakistan have traditionally been poor. The adult literacy rate is 50 percent compared to a 58 percent average for the entire South Asian region. Similarly, the primary school net enrollment for 2004 at 61 percent was lower than comparator countries in the same region: Sri Lanka (97 percent), India (90 percent), and Nepal (78 percent).[2] Recent enrollment data, however, suggest grounds for optimism. In a space of four years (2001-2005), *net* national enrollment jumped 10 percentage points, from 51 to 61 percent. The highest increase occurred in Punjab province (12 percentage points), followed by Sindh and NWFP provinces (7 percentage points), and Balochistan province (4 percentage points). Enrollment rates in urban and rural areas increased and for both boys and girls— for example, girls in rural Punjab and NWFP registered enrollment growths of 14 and 10 percentage points respectively. Participation in schooling is finally looking up.

Table 1: What do Children Know in Mathematics

The Question	Percentage who answered correctly	Corresponding Class for Curriculum
4 + 6	89	K & I
36 + 61	86	K & I
8 – 3	65	K & I
5 x 4	59	II
238 - 129	32	II
Read and Write the time (Clock shows 3:40)	24	II
384 ÷ 6	19	III
4 x 32	50	III
Fractions: ½ + 3/2	19	III
Read a diagram of a scale to answer which part is heavier	12	III
Fractions: 7/5 – ¾	1	IV

8. *Learning outcomes.* As enrollment numbers improve, increasing attention is being paid to what children are learning; in the near future, it is likely that this will become the defining issue about education in the country. The Learning and Educational Achievement in Punjab Schools (LEAPS) survey results show that children perform significantly below curricular standards for common subjects and concepts at their grade-level. By the end of Class III, just over 50 percent of children have mastered the Mathematics curriculum for Class I (Table 1). They can add double-digit numbers and subtract single-digit numbers but they cannot subtract double-digit numbers or tell the time. Both multiplication and division skills have not solidified and advanced topics such as fractions are beyond all but the best students. In Urdu, they cannot form a sentence with the word "school" or the word "beautiful" and less than 20 percent are able to comprehend a simple paragraph. If by the end of Class III, a child could read a sentence in Urdu, recognize simple words in English, and perform standard arithmetic operations of 3-digit addition and subtraction, it would mark a huge improvement over the current scenario. For children who have either never attended school or have dropped out by Class III (40 percent of boys and 50 percent of girls), this is the maximum they will have learnt through the formal schooling system.

[2] World Development Indicators (2006)

Box 1: Learning across the South Asia region: Is Poor Learning in Pakistan an Exception?

Recent testing exercises in low-income countries show that learning levels are far below international standards, and that they have little or nothing to do with the curriculum designed for the Grade level. The results from the LEAPS study show that children tested for Mathematics in Pakistan fall in the middle of the spectrum of children tested in Mathematics in 29 Indian states according to the Annual State of Education Report released by Pratham in 2005. In a comparable division problem, for instance, the tested children ranked ahead of 19 states out of 29—below West Bengal, Kerala and Haryana but above Andhra Pradesh, Punjab and Gujarat.

II. THE CURRENT EDUCATIONAL LANDSCAPE

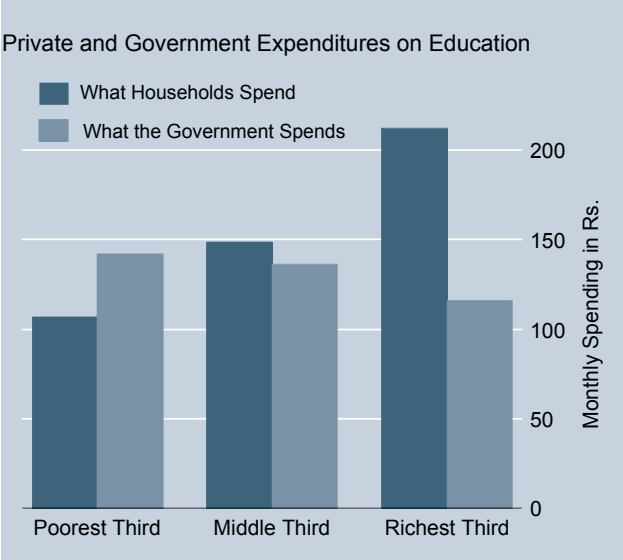
9. *The educational marketplace is expanding.* The emerging reality of Pakistan, both urban and rural, is that there is a well-defined *educational marketplace* at the primary level with actively engaged players on both sides of the market—the schools and the parents. The one-school village (two if gender segregated) has given way to a selection among public and private schools (religious schools are rarely used with the percentage of children enrolled in such schools stagnant at 1-3 percent of enrollment countrywide). The "education story" in Pakistan is the rise of an active and competitive educational marketplace where self-owned, for-profit private schools offering secular education provide parents another option for investing in their children's education.

10. *The number of private schools has increased dramatically since the 1990s.* Between 2000 and 2005 the number of private schools increased from 32,000 to 47,000. Since 1995, one-half of all new private schools have set up in rural areas and they are increasingly located in villages with worse socioeconomic indicators. Enrollment in private schools increased dramatically between 2001 and 2005 and by 2005, one out of every three enrolled child was studying in a private school. Although the government remains the largest provider of education, this report shows that government schools—despite being staffed with better-educated and better-paid teachers—are now competing for the same segment of students, even in rural areas.

11. *The average rural private school is affordable.* In a nationwide census of private schools in 2000, the fee in the median rural private school (50 percent of all private schools charge lower fees) was Rs.60 per month. According to household survey data from the Pakistan Integrated Household Survey (PIHS 2001), 18 percent of the poorest third sent their children to private schools in villages where they existed.

12. *Households have emerged as significant investors in their children's education.* Out-of-pocket spending by households on children's education is higher than what the government spends on providing education through public schools for the richest one-third of the rural LEAPS household sample, and is roughly equal for the middle third (Figure 2). Even among the poorest one-third of households, out-of-pocket expenditures, at Rs.100 per month, amounts to 75 percent of government educational spending on this group. Across the board, more than one-half of children's educational expenditures are now borne by parents. Even though government schooling is a free option, poor parents are spending substantially on their children's education, both by enrolling their children in private schools and spending on additional educational investments beyond school fees.

Figure 2: Even the poorest households bear a large share of the cost of educating their children



III. THE LEARNING AND EDUCATIONAL ATTAINMENT IN PUNJAB SCHOOLS (LEAPS) SURVEY

13. *The LEAPS surveys, initiated in 2003, were conducted in 112 villages in Punjab province.* Following an accepted geographical stratification of the province into North, Center and South, these villages were located in the 3 districts of Attock (North), Faisalabad (center), and Rahim Yar Khan (South). Villages were randomly chosen from a list of villages *with at least one private school* according to the 2000 census of private schools. The survey team worked with all schools offering primary level education as well as a sample of households in each village. The survey covered 812 government and private schools, 12,000 students (in 2003), 5,000 teachers and 2,000 households.

14. *The LEAPS study design responds to three critical needs.* First, it responds to the current informational void on what children are learning in Pakistani schools by testing children in English, Mathematics and Urdu. Second, it provides insights into the child's complete educational environment by collecting information on schools, teachers, and households. Finally, the report is forward looking in that it examines the structure of educational decisions and outcomes in villages with private schools. At the time of the LEAPS survey in 2003, close to 50 percent of the rural population of Punjab lived in villages with private schools. The

exponential growth in private schools in the new millennium from 32,000 in 2000 to 47,000 in 2005 implies that the future we envisaged in 2003 is now the present for most of rural Punjab.

15. *The sampling strategy provides a valuable opportunity to contextualize the relative strengths and weaknesses of government vis-à-vis private schools within the larger educational environment.* Given little *de jure* variations in the way government schools operate (and in the case of teachers, little *de facto* variation as well), private schools provide an alternate system of educational provision to which government provision can be compared. Including systematic information about rural private schools—where one-third of all enrolled children are currently studying—as well as data from households and all the schools in these villages brings the educational marketplace in its entirety into better focus.

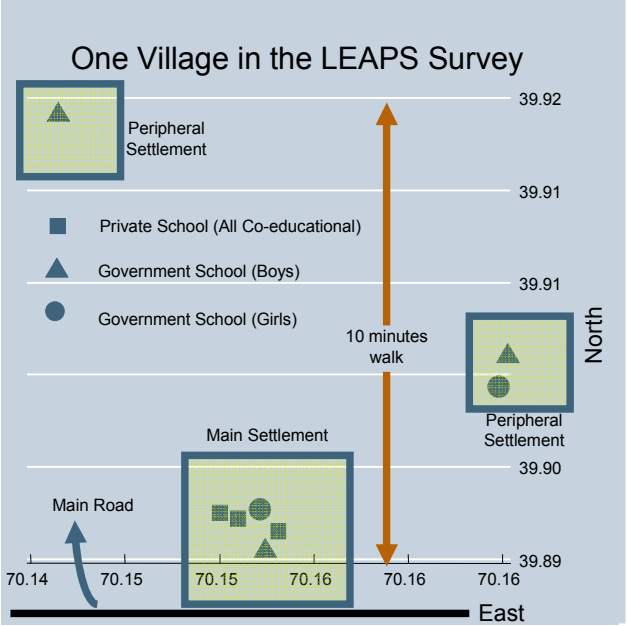
16. *Although the findings of this report are from data on 3 districts in rural Punjab, the analysis and policy ideas raised are relevant for a wider population.* Both Punjab and NWFP have seen dramatic increases in private schooling since the mid-nineties. In addition, the geographical expansion of private schools means that the educational landscape described here will become relevant for a greater fraction of Pakistani villages over the next 10 years. While rural Sindh and Balochistan are currently different and need to be treated as such, many Pakistani households already live in the kinds of villages studied here—and their numbers will only increase over time. Beyond Pakistan, India, Bangladesh and Nepal have all seen an increase in private schooling over the last decade. The issues discussed here are likely as relevant for this wider group.

17. *The LEAPS report advances evidence based discussion and policy.* It is important to stress that whether the debate is over private schools or reform in government schools, we do not, by choice, go beyond what the data can tell us. Our reading of the education discussion in Pakistan is that the views expressed and stands taken are seldom supported by a systematic look at the data, albeit in many cases because the data are just not available. In our view, this report will have served its purpose if these data from households and schools informs the debate on education in the country.

IV. THE EDUCATIONAL MARKETPLACE

18. *The typical village in the sample had 8 schools.* To provide a sense of what we mean by the "educational marketplace," Figure 3 plots the geographical locations of schools in a single village. In this village, 5 schools—three co-educational private, one government boys' and one government girls'—are within 50-100 meters of each other. Apart from this cluster, there are two government schools (one boys' and one girls' north of the village) and a third government school (boys') to the east. The cluster of schools is located in the main settlement while the two schools in the north and the third in the far-east each cater to smaller, separate settlements. This is a typical village configuration—the LEAPS survey located 812 schools catering to the primary level in the 112 sampled villages for an average of close to 8 schools in every village.

Figure 3: A typical village in the LEAPS survey has 5-8 government and private schools, many located in a main settlement and some in peripheral settlements—the latter mostly government schools

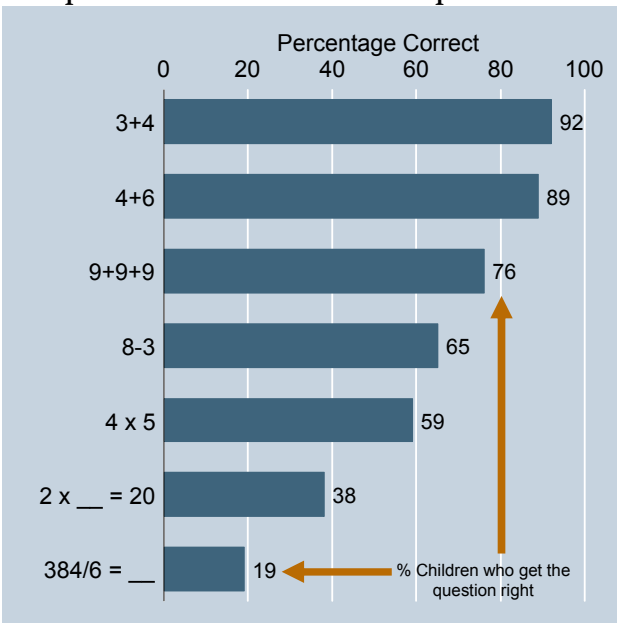


19. This village raises some immediate questions. How different are schools in the same village—in terms of their test-scores, infrastructure, teachers and costs? How do households choose what schools to send their children to and how much to spend on them? The LEAPS report provides information on these important questions; here, we summarize some of the salient findings of the report focusing on the public-private differences. We start with learning outcomes, then look at school infrastructure, the schooling market, teachers and the demand for schooling in terms of parental knowledge and action.

Facts about learning in a nutshell: Learning outcomes are poor. They have little to do with where you live, and everything to do with whether you go to a public or private school. The differences between public and private schools are so large that it will take government school students between 1.5 to 2.5 years of additional schooling to catch up to where private school students were in Class 3. It also costs less to educate a child in a private school. Putting learning and cost differences together, the quality-adjusted-cost in government schools is three times higher than in private schools.

20. *Children are learning very little in school.* It is worth reiterating that children are learning little relative to what is expected of them in the curriculum and relative to what they need to function in a fast globalizing world. Children who never attended school or leave after Class III will be functionally illiterate and innumerate. They will not be able to perform basic mathematical operations—while 90 percent will know how to add single-digit numbers, only 65 percent can subtract single-digit numbers and 19 percent can divide a 3-digit by a single-digit number (Figure 4). They will not be able to write simple sentences in Urdu—only 31 percent can use the word "school" in a sentence. They will not be able to recognize simple words in English.

Figure 4: Children at the end of Class III cannot perform basic mathematical operations



21. *Learning outcomes are very similar in poor/rich and less/more literate villages.* Although learning outcomes in rural Punjab are poor on the average, there is wide variation--some children scored 0 in the LEAPS tests and some children scored 100. Unlike enrollment, where richer and more literate villages are also more likely to have children in schools, village attributes have almost nothing to do with learning outcomes. Instead, most of the variation in learning is explained by differences across schools *in the same village*—and a large portion of this is due to differences across public and private schools.

Figure 5a: Children in government schools take 1.5 (Mathematics) to 2.5 (English) additional years of schooling to catch up with Class 3 children in private schools

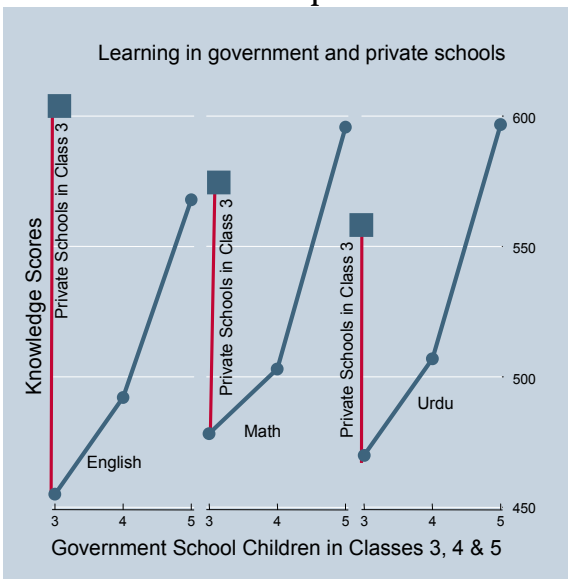
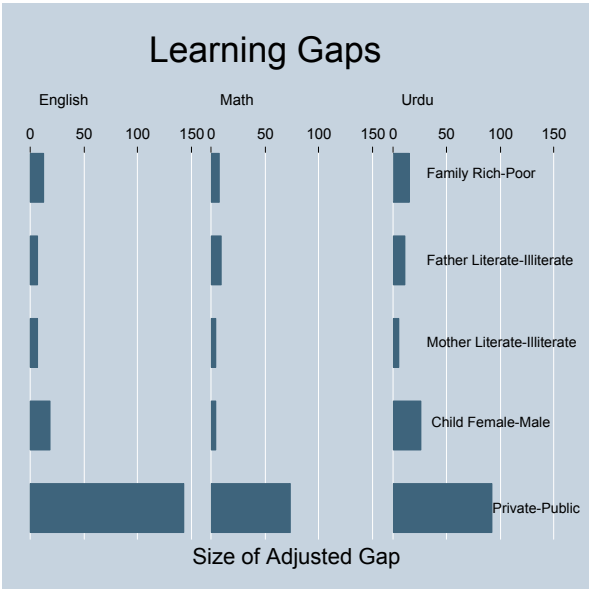


Table 5b: The gap between private and public schools is 8 to 18 times the gap between socioeconomic backgrounds



22. *The public-private schooling gap is large.* Children in private schools score significantly higher than those in government schools, even when they are from the same village. To understand how large these public-private differences are, Figure 5b shows the difference in knowledge scores between children in public and private schools. As a rough guide, a knowledge score difference of 150 points translates into an increase in the ranking of the child from 50th to 85th out of 100 children; a knowledge score difference of 300 increases rankings from 50th to 97th out of 100.[3] The knowledge scores of children in private schools are between 76 (Urdu) to 149 (English) units higher than those in government schools. Children in government schools will be among the *worst* performing 20 percent in private schools in English, and the worst performing 30 percent in Urdu.

23. *Children in public schools will take 1.5-2.5 years to catch up to private school children in Class 3.* To understand the size of the public-private gap in test-scores, Figure 5a also shows how long it takes for the *same* public school children who were tested in Class III and followed through to Class V to "catch-up" For all three subjects, children in public schools will report the same test scores as children in private schools after 1.5-2.5 additional years of learning. In English, government school children in Class V have still not caught up with

[3] Following international testing protocols, test-scores are transformed into "knowledge scores" and reported in standard deviations in a distribution with mean 500 and standard deviation 150. As described in Chapter 1 "knowledge scores" correctly account for the different difficulties of test questions in computing an overall score. The details of the test and the procedures used are presented in the Technical Appendix of the report.

private school children in Class III. Even in Urdu, an additional 1.5 years of schooling is required before government school children catch up with their counterparts in private schools.

24. *The public-private learning gap is much larger than that across children from different socioeconomic backgrounds*. Another way to benchmark the private-public gap in learning is to compare it to differences across widely emphasized parental dimensions, such as parental literacy and wealth. The gap between public and private schools in English is 12 times that between rich and poor children. The gap between public and private schools in Mathematics is 8 times that between children with literate and illiterate fathers. The gap between public and private schools in Urdu is 18 times the gap between children with literate and illiterate mothers (Figure 5b). [4]

25. *Educating a child in a public school costs twice as much as in a private school.* Are test scores in private schools higher because they use more resources, or, put another way, are children in government schools learning less because there is no money? The overall cost of educating a child in the median rural private school was Rs.1000 or $15 a year—one month's fee is roughly the equivalent of one day's wage for an unskilled laborer. As it turns out, educating a child in a public school costs society *twice as much—at Rs.2000 a year*—as a private school. Looking at the quality-adjusted cost of private schools, education in the public sector is three times more expensive than the private sector. For every Rs.1 that a private school spends on an extra percent correct on a test, the public system spends Rs.3.

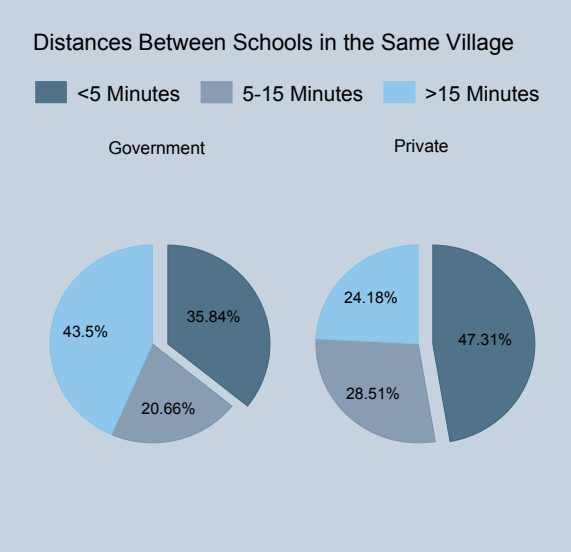
26. *In* addition *to higher test-scores, parental satisfaction with private schools is also higher.* When asked about teaching skills of government and private teachers, parents ranked 45 percent of government school teachers "above average" or "excellent" compared to 60 percent in private schools. When asked to rank all the schools in the village, parents were 26 percentage points *less* likely to rate a government school as "good" or "excellent" compared to their private counterparts. Whether we look at test scores, costs or parental satisfaction, private schools look a whole lot better.

[4] Because wealthier children are more likely to be in private schools, the socioeconomic gaps control for the school that the child is in as well as other relevant household and child attributes. Similarly, because private schools have richer children, the public-private gap controls for the household and child attributes of children. In Chapter 1 we also show that public-private differences are *not* due to differences in the student body—either observable or unobservable. In terms of observable differences the raw gap between public and private schools is reduced by *at most 20 percent*, with a rich set of school, child and household controls.

Facts about schools in a nutshell: Private schools are located in intensely competitive schooling clusters. The need to keep fees low implies that profits are low: The median private school's profits are equivalent to the salary of a male teacher. Moreover, private schools compete on other dimensions than learning. Consequently, facilities in private schools are better than in government schools.

27. *Private schools are located in intensely competitive schooling clusters.* The geographical clustering patterns evident in Figure 3 extend to the wider LEAPS data from 112 villages. The average private school in the LEAPS data is located such that close to *half* of all other schools in the village are within a 5-minute walk, and less than a third are more than a 15-minute walk away. With 8 schools in every village, the average private school has close to 4 schools surrounding it. Government schools tend to be less clustered, with just over a third of all schools in a village within a 5-minute walking distance of the average school.

Figure 6: Nearly half of all schools in a village are within a 5-minute walk of a private school.

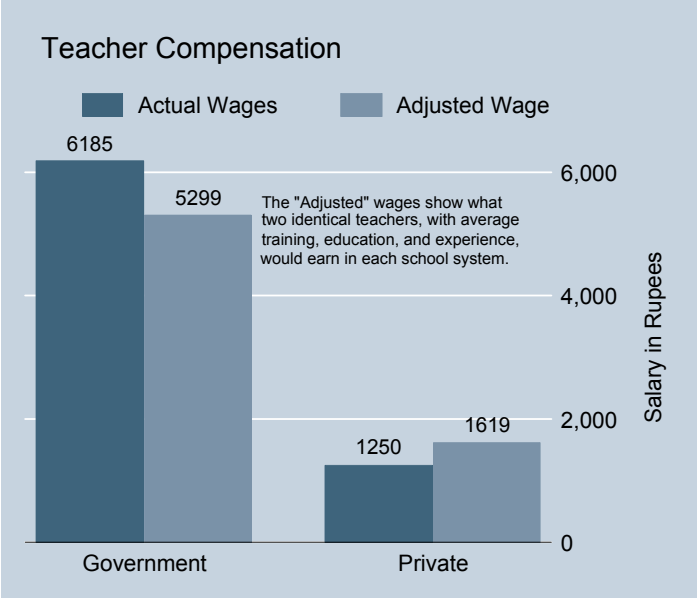


28. *One consequence is that private school profits are low.* A detailed cost and revenue accounting exercise with private schools showed that the median profit of a private school is Rs.14000 a year. This is equivalent to the salary of a male teacher in a private school. Another way of looking at it is the principal of the private sector could earn exactly this amount by teaching in another school—profits lower than this would imply that in monetary terms, the principal would be better off by shutting down the school.

29. *A second consequence is that private schools have lower student-teacher ratios and better infrastructure than government schools.* Prior to looking at private-public differences, it is worth noting that basic facilities in the LEAPS sample schools, including government schools, are not "dismal"—they have classrooms and blackboards, although seating arrangements and the availability of toilets is troubling. Slightly more than a one-quarter of schools have no toilet facilities and even in schools with such facilities, there are 74 children to every toilet. Comparing private to public schools, the typical private school has almost one-half the student-teacher ratio and significantly better facilities than the typical government school—cost savings in private schools are not because they are skimping on *other* aspects of a child's education.

Facts about teachers in a nutshell: Cost-savings in the private schools arise because government teachers' salaries are 5-6 times higher. There are weaknesses and strengths in both sectors. The relative strengths of the government sector are a better educated and trained workforce that is equitably distributed. The relative strengths of the private sector are the ability to cut costs by paying teachers according to local conditions and performance and eliciting higher levels of effort from their teachers.

Figure 7: Government teachers wages are 3 times as much private school teachers…after adjusting for differences in age, education, training and experience



30. *Teachers in the public sector are paid 5 times more than teachers in the private sector.* If private schools are producing better test scores *and* are cheaper *and* provide better infrastructure, where are the cost savings coming from? Given that 98 percent of a private school's costs stem from teachers' salaries, it is not surprising that most cost-savings arise from how much teachers are paid. As Figure 7 shows, only a small bit of this huge wage premium is due to differences in teacher characteristics (and this is *before* a 2007 pay increase for public school teachers). Starting from this wage difference, several characteristics of public and private teachers are worth highlighting.

31. *Teachers in the public sector look better in terms of their qualifications.* Teachers in government schools are more educated, more experienced and better trained than private school teachers. Moreover, they are equitably allocated across rich and poor villages and across schools with rich and poor students.

32. *Compensation for teachers in the government sector focuses on inputs and in the private sector on outcomes.* Teachers in government schools are hired based on education and training and compensation is mostly driven by age, experience, and training—it has little to do with effort or actual performance on the job. In the private sector, teachers are paid more when they exert greater effort and produce better outcomes. Not surprisingly effort, as evident from higher absenteeism rates, is lower in government schools. The test scores of children in

private schools suggest that less-educated teachers making greater effort can outperform more educated and better trained government teachers.

33. *Compensation for teachers in the government sector is unrelated to local labor market conditions.* Teacher salaries for government schools are the same in villages with a large number of unemployed graduates and villages where there are no other educated people for miles. While this is understandable, maybe to attract teachers to remote areas under the "education for all" mandate, it means that the flexibility to pay according to local labor market conditions vanishes. In contrast, compensation in the private sector reflects the alternative employment opportunities of the teacher in the wider labor market. As a consequence, women and those who reside locally are paid less.

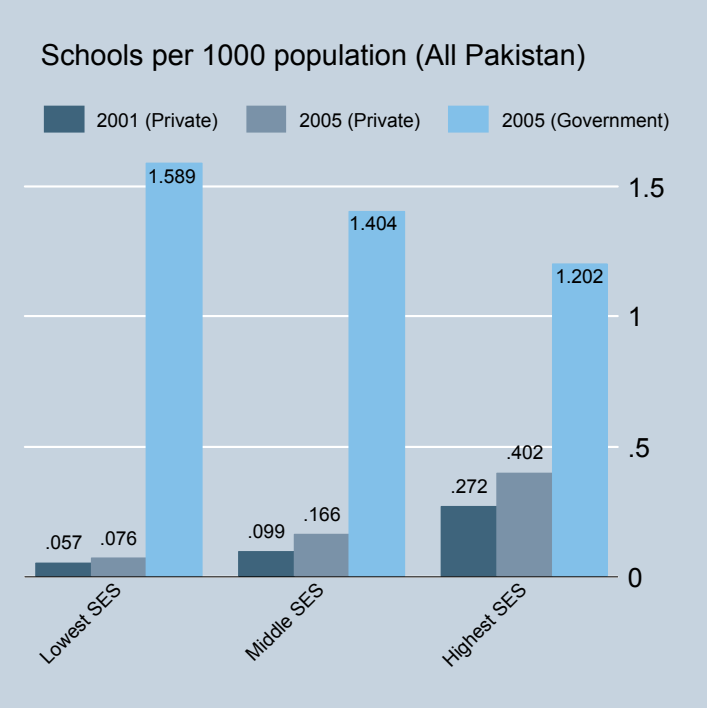
34. *The higher qualifications of government school teachers combined with their lower effort defines the tragedy of government schools.* As one reviewer of this report puts it: "*The question really is how we free up the resources represented by those government teachers who do not teach. The loss here is doubly tragic both because it is money down the drain and because the government actually hires those who have the training needed to be the best teachers. The only reason the private schools look so good is that the poorly performing public schools are so disastrous: if at some future date, children actually start demanding something more than the most rudimentary education, the semi-educated teachers in the private schools would actually find it hard to cope.*"

Facts about the constraints to private schooling in a nutshell: Private schools are overwhelmingly located in richer villages, while government schools ensure equitable geographical access for all income levels. Within villages, private schools are located in central and richer settlements. The main constraint on private schools is the availability of an educated (female) workforce. Private schools do not arise in a vacuum: government investment in girls' secondary schooling during the 1980s probably paved the way for private schools today.

Are private schools then a unilaterally better option? No—because private schools are not everywhere.

35. *Private schools tend to cluster in richer communities.* Access to private schools is highly uneven. Data from the National Education Census (NEC, 2005) show that private schools are primarily located in the provinces of Punjab, NWFP and urban Sindh; in rural Sindh and Balochistan their numbers are low and growth rates are slower. Even within provinces, private schools tend to cluster in richer communities. Public schools remain the only option among villages in the lowest one-third of the socioeconomic status (SES) of Pakistani villages—in fact, there are more public schools relative to the population in villages with poorer socioeconomic indicators (Figure 7). The public sector does a much better job at ensuring that poor people have geographical access to schools.

Figure 8: There are more public schools per 1000 population in villages with poorer socioeconomic status…private sector location patterns are the opposite

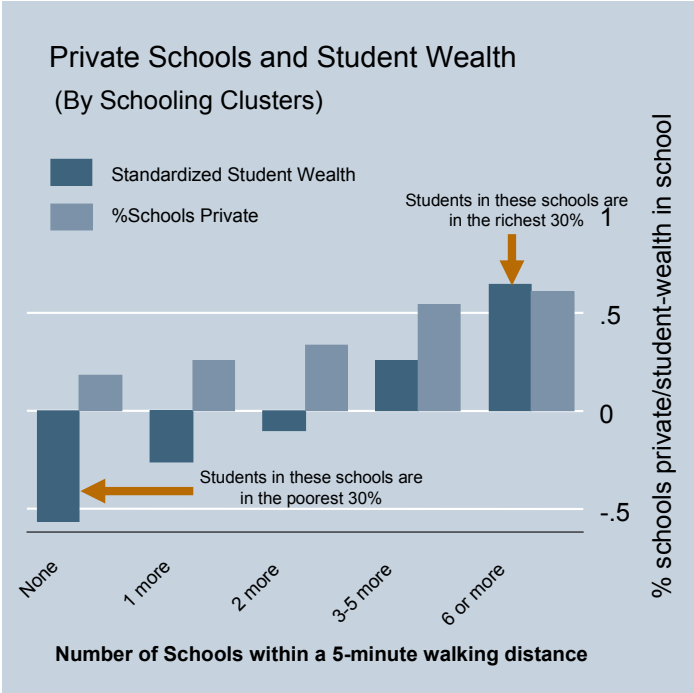


36. *Private schools are slowly spreading into previously underserved areas.* An open question is whether all areas will be served by private schools in the near future or whether the clustering of private schools in richer villages reflects longer-term patterns that are unlikely to change. The NEC data (2005) do show that private schools *are* slowly spreading into previously underserved areas, particularly villages with poorer socioeconomic

characteristics. Yet, the number of private schools in villages with the lowest SES increased only from 0.057 to .076 per 1000 population compared to an increase from .272 to .402 in villages with the highest SES.

37. *Even within villages, having a private school does not mean that everyone has geographical access.* The LEAPS data show that significant problems are still likely to arise with the location of private school locations *within* villages. Figure 3 showed this in the context of a single village, and highlighted that this clustering of private schools implies that they are operating in a highly competitive environment. The downside of this clustering is that peripheral populations within villages may not have access to private schools. Across all villages in the LEAPS survey, 82 percent of private schools are located close to a bank (82 percent) or a health center (92 percent)—an indicator of richer settlements closer to a main road. This contrasts with 60 percent (banks) and 71 percent (health centers) for the location of all government schools. Figure 9 puts together the greater clustering of private schools and their location in richer settlements in a startling fashion: when six or more schools are clustered together, 60 percent are private and 40 percent are public. It also shows that students in schools that are clustered are appreciably richer—children studying in schools that are "stand-alone" are among the poorest 30 percent; those studying in school clusters are among the richest 30 percent. Most villages have a well-defined "school cluster" in the richer settlement and the majority of private schools are located in this cluster.

Figure 9: Among schools in a cluster, the majority is private. Among schools that are stand-alone, the majority is government…and students in these schools are significantly poorer



38. *Increasing income does not guarantee that private schools will locate in peripheral village settlements.*. Furthermore, increasing village incomes will not lead to greater penetration of private schools into peripheral areas—in richer and more literate villages, schools tend to locate *closer* to banks and health centers than in their poorer and less literate counterparts. Neither does it guarantee that private schools will start catering to the secondary sector.

39. *These location patterns of private schools are, in part, a response to a shortage of teachers in rural areas.* Consequently, a government girls' secondary school in a village increases the probably of a private school by 300 percent—largely because yesterday's students in government schools are today's teachers in private schools. Private schools do not arise in a vacuum: Government investment in girls' secondary schooling during the 1980s has probably paved the way for the explosion of private schooling today. Understanding how the local labor market functions and, in particular, the availability and size of the secondary-educated female cohort, is critical for understanding the relative strengths and weaknesses of the two sectors. It also highlights a key insight into providing education through public-private partnerships.

Box 2: Enrollment, test scores, and infrastructure in 2007

A look at enrollment, test scores, and infrastructure in government and private schools since the Punjab Education Sector Reform Program (PESRP) began in 2003 suggests that the framework for the national debate on education policy is as relevant today as it was 4 years ago:

- **Enrollment in public schools increased by 17 percent between 2000 and 2005 compared to 62 percent in the private sector**. As a consequence, the share of the private sector in enrollment increased by 7.3 percentage points between 2000 and 2005. During the same period, private school enrollment shares increased less in NWFP and Sindh—5.3 and 3 percentage points respectively.
- **Learning outcomes have remained static**. The LEAPS tests show that between 2003 and 2006, children in Class III learning outcomes were stagnant for English and declined fractionally in Urdu and Mathematics. These outcomes did not improve either in government or private schools; consequently the gap between the two remains as large in 2006 as it was in 2003.
- **The private-public infrastructure gap widened between 2003 and 2006**. Infrastructure has improved in public schools with greater construction of semi-permanent classrooms and toilets, but little else. Infrastructure improvements in rural private schools were much greater during the same period.

In the past four years, more money was spent on educating children in government schools at the same time that its share in total enrollment declined, test scores stagnated, and the private-public infrastructure gap widened. Government inputs included:

- Cash grants for girls to attend government schools in 15 districts.
- Free textbooks were provided in government schools only, until a later amendment which included urban private schools, but excluded rural private schools.
- Infrastructure was upgraded in government schools.
- School Councils were re-activated.

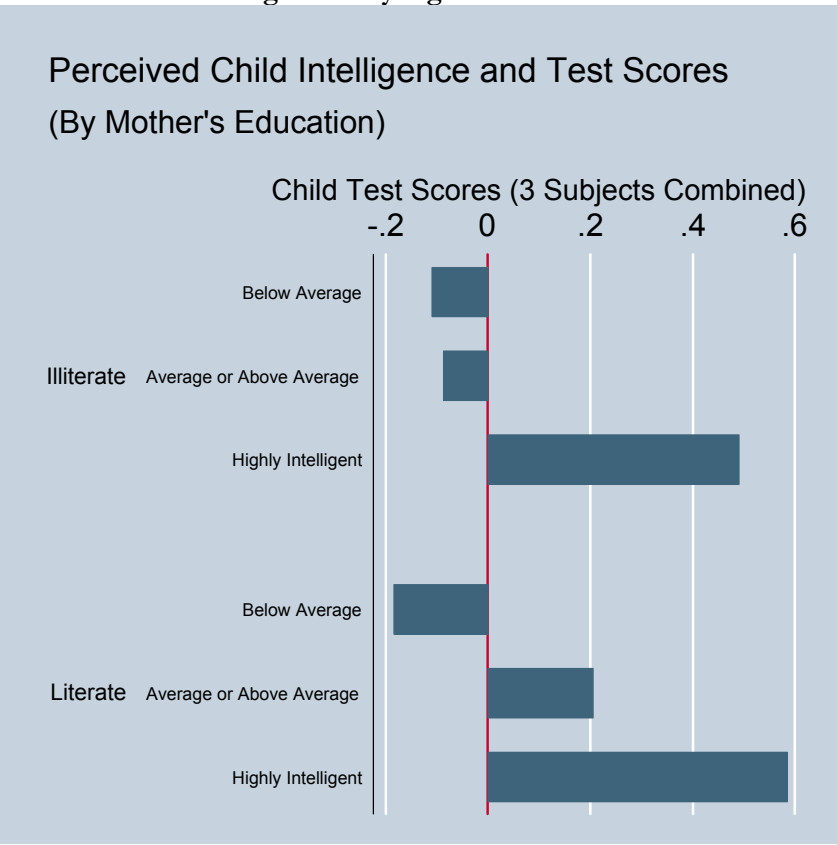
These facts are not meant to act as an "evaluation" of the PESRP, but rather to underscore the continued and increasing relevance of the private sector today.

Facts about the demand for education in a nutshell: Parents, both literate and illiterate know a lot about their children and the schools in their village. What school they choose depends on their preferences for quality, cost and distance. There are two groups of particularly vulnerable children—girls living "far" from school and children perceived as "less intelligent" by their parents. Female enrollment drops off sharply with distance to school. Parents invest less on children perceived to be "less intelligent".

Parents are making decisions in this complicated environment to find out about schools, choose among them and ultimately invest in their children's education. How are households, particularly those with illiterate parents, coping?

40. *Both illiterate and literate parents know a lot about schools, their teachers, and their own children.* Parents consistently ranked schools in their village with poor test scores worse than those with better test scores. The results are similar in a teacher-ranking exercise—for instance, parents were accurately reporting on teacher absenteeism. Finally, when asked about their children's intelligence, parental perceptions correlated strongly with their children's test scores—children perceived as intelligent by their parents had test scores 0.5 to 0.7 standard deviations higher than other students (Figure 10). Notably, the association between parental perceptions of intelligence and actual test scores was as strong for mothers as for fathers, and for illiterate and illiterate parents.

Figure 10: When parents say their children are "more intelligent" their test scores are significantly higher…



41. *Low enrollment has little to do with child-labor but a lot to do with distance, particularly for girls. One group of vulnerable children consists of those who live far from school.* For children in the primary school-going age group, the alternative to not going to school is not working at home or in factories, instead it is playing and sleeping. Primary age children who are not in school spend only 93 minutes a day working at home and working for a wage. On the other hand, every additional 500 meters increase in the distance to the closest school results in a large drop in enrollment, and more so for girls—girls living 500 meters from the school are *15 percentage points* less likely to attend than those living next door. The drop-off is much smaller for boys, and in fact, distance to school accounts for the bulk of the gender differential in enrollment in Pakistan. The magnitude of this decline is similar among rich and poor households, teenage and younger girls, and girls with literate or illiterate mothers. Solving the distance issue is thus the *key* to increasing enrollment, particularly for girls, and it has little to do with incomes.

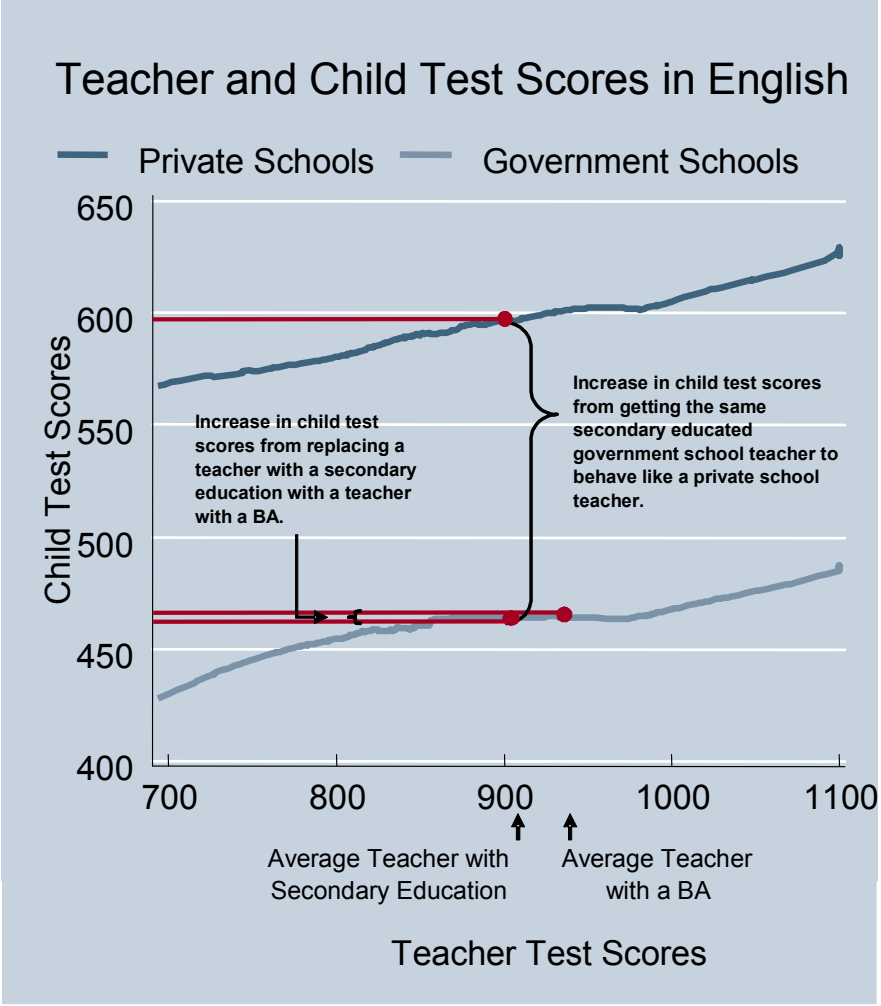
42. *The second group of vulnerable children consists of those perceived as less intelligent by their parents. Parents spend significantly on their enrolled children, but invest a less on this vulnerable group.* More than one-half of all educational expenditures for school-going children are out-of-pocket spending by households. Parents spend almost as much on girls as on boys. The distinction *within* households is the relative investments on children *perceived* to be more or less intelligent. By the time children enter primary school, those *perceived* as less intelligent have three strikes against them—they are less likely to be enrolled, when enrolled they are less likely to be in private schools, and even for a household with two children enrolled in similar schools, children perceived as more intelligent by parents will have more spent on them.

V. SHAPING THE EDUCATIONAL DEBATE IN PAKISTAN USING DATA

43. How can these data be used to answer policy questions? As examples, we take two issues that are both contentious and widely debated. The first is a proposal to increase the minimum qualifications of government teachers, the second is the question of how (and whether) to regulate private schools.

44. *Example 1: Increase minimum teacher qualification*. The assumption underpinning this proposed policy change is that teacher education drives student learning. Figure 11 shows what we observe in the Pakistani data based on the following thought experiment: Does hiring a teacher with a bachelor's degree over one with a secondary education (in the public sector) increase child test scores? The answer, evident in the small gap on the vertical axis as we move along the teacher education curve in the government sector, is "not really"—this gap is roughly 1-2 percentage points. In contrast, a dramatic difference of 19 percentage points emerges between teachers with secondary education in the public versus the private sector. The figure strongly suggests that the benefits of increased accountability and effort trumps the marginal increases from increased educational qualifications, which are small.

Figure 11: Children in private schools with secondary-educated teachers report higher English test scores than children in government schools with college educated teachers



45. *If effort trumps education and training, a policy to raise the minimum education standard for primary school teachers would cause problems in areas with limited teacher availability.* The median village in Punjab had 8 secondary-school educated women in 1998 so teachers with a bachelor's degree will have to be brought in from outside the village. Absenteeism *increases* when teachers are not local hires, so effort among more highly educated graduates may be lower. This does not bode well given the overall skill shortage in the Pakistani economy.

46. *Example 2: Regulate the private sector.* Different opinions about private schools and their recent growth abound. One camp advocates regulatory oversight of private schools. Another camp argues that even if private schools provide poor quality, or parents do not get what they pay for, regulation will not solve the problem. Can the data combined with standard economic analysis shed light on this issue?

47. *Economic theory suggests that the first rationale for regulation is to ensure that every school meets a minimum quality standard.* But, the bulk of the poorly performing schools are *government schools*. While top government schools are only slightly worse than top private schools, the performance of the worst government schools is much worse that that of the worst private schools. The same goes for infrastructure—of the 100 schools with the worst infrastructure, 98 are in the public sector. This is particularly a problem because parents invest more in children they think are more intelligent (e.g., they select private schools). Children perceived as "less intelligent," who are overwhelmingly enrolled in government schools, may not be receiving an education that meets a basic minimal standard.

48. *The second rationale for regulation is to address pricing inefficiencies arising from monopolistic behavior.* Typically, every country looks at such issues and advocates alternatives. Since private schools overwhelmingly locate in schooling clusters, they *cannot* behave as monopolies. The direct competition from other schools keeps their prices low. Indeed, the average profit of a rural private school in Punjab is approximately the salary of one male teacher.

49. *The third often used rationale for regulation is that consumers are unable to evaluate the quality of the product they receive, and that it is cheaper to regulate quality rather than provide information.* As discussed earlier, the average household is actually fairly good at distinguishing well performing from poorly performing schools**.** Unlike the private sector where prices signal quality so that schools with higher test scores charge higher fees, in the government sector, all schools are free and therefore parents may find it harder to evaluate their relative performance. Once again the standard rationales for regulation suggest that it is schools in the government rather than the private sector that deserve closer attention. Furthermore, if there is a set of parents who do not know much about schools, providing information itself is a feasible alternative. Not only does this enable parents to make better decisions, but it can also lead to greater competition across schools leading to better

outcomes. A pilot study shows that providing information about school test scores in the village *does* lead to improvements in learning and that these improvements are higher for initially poorly performing children. Fixing the underlying failures of information may be easier than imposing additional regulatory structure from above.

50. *Of the three rationales for regulation—ensuring a quality standard, ensuring competitive pricing and ensuring that prices reflect quality —schools in the government sector are more likely candidates for regulation than those in the private sector.* But government schools are already regulated. It appears the inherent ability of parents to choose schools is better than the safeguards in educational quality the bureaucracy can achieve. Given these data, the issue of regulation of a new activity may be premature.

VI. A MODIFIED ROLE FOR GOVERNMENT?

51. Article 37 (b) & (c) of the Constitution of Pakistan (1973) affirms that "the State shall remove illiteracy and provide free and compulsory secondary education within minimum possible period." The education landscape has changed since 1973, with a rapid rise in enrollments in Punjab and other provinces.

52. *Although there may be pockets in Punjab where school availability is still an issue, access to education is reasonable.* Every village in our sample has multiple public schools that are free, and average learning, although poor, is similar across villages, whether in lagging or high-performing regions. The "State shall remove illiteracy" and what such an affirmation means in the context of the results presented here is the real issue. The rapid rise of private schools and the higher scores in these schools is one means for citizens to fulfill their demands for such educational services.

53. *However, the view that the government should step back from education all together and leave it to the private sector and to households is too extreme*. This view assumes that parents will make schooling decisions for their children based on their *children's* best interests, rather than their own. A body of literature argues, and as parental discrimination in Pakistan towards children shows, this is generically not the case. As a reviewer of the report points out, and we agree, "*it is worth emphasizing that parental discrimination has to be one of the most powerful reasons for state intervention into education.*" Parental discrimination means that different children in the same family can reach adulthood with very different skills and knowledge—those perceived as less intelligent by their parents likely suffer a significant educational disadvantage in adulthood. The goal of literacy is for all children in the country, so some kind of government action is required to ensure that these children are not left behind.

54. *It is well within the powers of the government to improve educational quality in public schools, and enable a balance between private school location and parental knowledge and discrimination.* The picture regarding private schools is changing rapidly, and some basic institutions are needed to help parents make better decisions. We propose a discussion on a modified role of the government. This role envisages a government educational system that tries to rectify the problems arising from private school location decisions and tries to protect children who do not receive sufficient investments from parents. The modified proposal has three parts: providing information, complementing the private sector to protect vulnerable children and innovating and evaluating "out-of-the-box" reforms for public-private partnerships. Suppose that every year a sample of children is tested in every village. Our goal is to ask what government policies can ensure that the knowledge these children hold increases over time.

Providing Information

55. *Information for better decision making and accountability*: Data on learning outcomes need to be systematically collected, monitored, analyzed and made publicly available. These data serve two purposes. *First,* given that many villages now have 8 or more schools, parents with access to test scores of schools in their village may be able to make better schooling choices for their children. Moreover, test score comparisons across children, schools and even villages could lead to greater parental demands for performance among school principals and teachers. Initial results from a randomized experiment that provides such test scores in the LEAPS sample of villages suggest that this simple (and virtually free) step could have large effects for initially poorly performing children. *Second*, transparent and publicly available information on standardized tests and school performance will allow independent monitoring on progress as well as research on what is working. The uses of these data increase dramatically if they also provide information beyond test scores on the full learning environment (teachers, parents and schools) of the Pakistani child.

56. An open question is whether the *same* protocol can be used for these two very different purposes. International experience suggests not. Typically, school-wise results, which require testing on the universe of schools, are administered by the government. However, tests used for monitoring performance and learning gaps are administered by an independent or autonomous quasi-government institution, similar to the National Center for Educational Statistics in the United States. This ensures a separation of powers and guarantees the integrity of the findings. Furthermore, since monitoring tests are conducted for a *sample* (rather than all schools), they also allow for collecting more information on student and school attributes—critical for understanding the correlates of learning achievement.

57. The widespread test at the end of Class V administered in Punjab province in 2006 is an important first step and further work is required to ensure that citizens are able to monitor and hold the state accountable for its performance in guaranteeing the right to education. If these exam results are standardized and replicated every year in a reliable manner, with information given to parents on school results, part of the information gap will be filled.

58. Regular and timely access to data is a critical component for evidence based policy making. In recent years, Punjab has collected annual data on all its public schools, instituted a test of 1.2 million children, collected detailed information on all teachers in the province and the Federal Bureau of Statistics has collected information on all schools in the country. Making such information public and validating the analysis would be an important first step. Researchers, academics, multilateral institutions (who are often implicated in the withholding of data and information) and those interested in the Pakistani education system need to ensure that this information is made available to the broader public on a regular basis. Enrollment numbers are released on an annual basis; similar results need to be made available on learning so that this becomes part of the popular discourse on the state of Pakistani education.

Reforming Government Education: Increasing Access and Improving Quality

Increasing Access: The government has been remarkably successful in ensuring access to schools at the primary level in large parts of the country, including Punjab. Further expansion includes the setting up of secondary schools (especially for girls) and identifying pockets where school availability is still a concern. In addition, the government needs to experiment with policies that can decrease the "distance-penalty" for girls.

59. *Deployment strategies for teachers could try and reduce competition between the public and private sector in the limited market for teachers*. One of the most powerful tools that the government holds in its hands is the right to transfer teachers to villages and schools where they are needed most. Given the inherent differences in salaries between the private and public sector, it makes little sense, if we are concerned about the right to education of the poor in Pakistan, for the public sector to *compete* with the private sector when both choices are available.

60. *A complementary strategy might involve transferring teachers to those villages and settlements (or levels of schooling, such as secondary) where the private sector has no presence*. This would justify part of their high salaries because of the inherent difficulties of working in the places where they are posted. Although problems of accountability and incentives will remain, these teachers will be providing some education where previously there was none. The government system of compensation and the right to transfer teachers to other locales allows it to fulfill

certain key objectives: in particular, bringing education to geographical areas where the private sector presence is not as strong and expanding access to secondary education, where poor teacher qualifications may prove an impediment for private sector provision.

61. *Increasing secondary schooling options for girls could lead to higher attainment as well as long-term gains in the increased availability of teachers*. One way to improve learning is to keep children in school longer. More secondary schools (particularly for girls) would help widen educational opportunities and ensure a cohort of secondary educated women in every village. Such an expansion would also increase the future supply of teachers. Private schools are 3 times as likely to locate in villages with a Government girls' secondary school—largely because the students in these schools yesterday became the teachers in the private schools today. Building more secondary schools will be cheaper if teachers from existing government schools with low student-teacher ratios are used, instead of new hires.

62. *The government also needs to experiment with ways to reduce the "distance-penalty"* for girls. A girl who lives 500 meters further from a school is 15 percentage points less likely to be enrolled than one who lives next door to a school. It is very costly to provide a government school within 100 meters of every household; an alternative is urgently required. The LEAPS data so far do not yield a clear policy—what they do show is that money, age and parental literacy have little to do with the ability of girls to attend farther schools.

Improving quality: From the widening international consensus and the LEAPS data, it is clear that improving quality in the government sector is all about rethinking government teacher hiring and compensation. The debate around how to do this could center around (a) letting teachers teach, (b) increasing flexibility in hiring through probation periods and the relaxation of certification where necessary and (c) providing incentives for better performance.

63. *Let teachers teach*. If teachers are primarily in villages to teach, burdening them with additional duties and requirements does not help. Work-related absences (though self-reported and not verified) are quite common in the public sector, but not in the private sector. The reasons ranged from attending workshops and meetings, collecting salaries, being on examination duty in other schools and administering polio vaccinations. Should rewards go to teachers who complete electoral rolls on time, administer polio vaccinations and attend numerous meetings, or to those who teach? A recent proposal to separate teaching and management cadres is laudable—much will depend on whether additional duties can be restricted only to those in the latter group.

64. *Consider a probationary period to identify and retain good teachers.* To some extent, good teachers are born, not made. The only way to figure out who has the instinct to be a good teacher and who does not is to observe them for some period of time. Yet, the public sector is a "settled" sector with very little turnover—teacher turnover in a given year is 24 percent in government schools compared to 71 percent in the private sector. The private sector builds in the flexibility to get rid of teachers who are inherently bad and hire new ones but the government sector does not. One possibility is a probationary period of 2-3 years during which the teacher is kept on a temporary contract. At the end of this period, the teacher may be converted to a permanent contract through a clear process. The problem, though, is in the details: Who should decide whether the teacher should be retained or not and what should be the nature of the process?

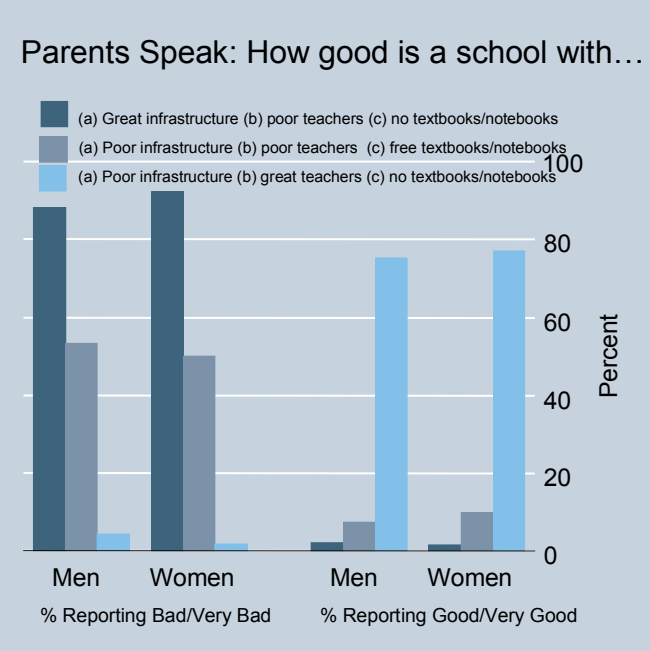
65. *Teachers should be rewarded for greater effort. These incentives will increase performance*. While few disagree with the overall premise (apart from the inherent political realities), this is a tough issues to resolve and requires extensive public discussion. Broadly speaking, there are two ways to go about doing this—one is to reward teachers on *inputs* such as attendance, the other on *outcomes* such as learning. In recent randomized evaluations, both have been shown to work; yet the former ran into problems when the same technique was tried with government nurses (rather than NGO teachers) and the latter faces severe technical issues (see chapter 3). One alternative is to reward teachers not on outcomes but on processes. The problem is that it is not clear how such a process would work, or who would decide.

Box 3: The Politics of Teacher Reform: Who Benefits? Who Loses?

Whenever teacher reform is discussed, the first reaction is that it is "politically difficult". Yet what does "politically difficult" mean—does the average voter *not* support teacher reform? In the last year of the LEAPS study, we asked parents a number of questions about what they wanted from the government and from their schools.

Parents graded hypothetical schools with different characteristics on a scale of 1 (very bad) to 5 (very good). The first school had "*a roof that never leaks, a new boundary wall and desks, but teachers who were frequently absent and not motivated and no free textbooks or school supplies*". The second had "*a roof that leaks, a broken boundary wall, teachers who were frequently absent and not motivated but gave free textbooks and school supplies*". The third had "*a roof that leaks, a broken boundary wall and desks, no free textbooks or school supplies but teachers who were always present and highly motivated*". The majority (Figure 12) thought that schools without dedicated teachers (but with very good infrastructure or free school supplies) were bad or very bad. Close to 80 percent thought those schools with poor infrastructure and no free school supplies but with dedicated teachers are good or very good.

Figure 12: Parents value schools with dedicated teachers very highly…



The findings were mirrored in a separate question where 62 percent of men and 68 percent of women reported "dedicated teachers" as their top priority in schools with "good facilities" coming a distant second with 13 percent (men) and 8 percent (women). Our third question asked what the top priority demand from the government was. Not surprisingly, 50 percent of men and women reported "jobs" as their top priority. However, 20 percent of men and 25 percent of the women reported their top priority was secondary schools in their village—ahead of roads, 24-hour electricity, 24-hour water, and greater security.

Since parents form the bulk of voters in any election, increasing teacher accountability and providing secondary schools is a politically feasible option. Neither will all teachers lose from such reforms. The problem with the current system is that all teachers are treated the same way—regardless of whether they are highly motivated and hard-working or not. Reforming teacher compensation will benefit teachers who are working around the clock in difficult circumstances to ensure that children learn. The losers are non-performing teachers. Pakistan needs to decide whether it can mortgage the future of millions of children a year to the demands of a fraction of teachers who are not performing.

If not teachers, what else?

66. *Apart from teachers, there is no single input that can be easily and consistently linked to test scores*. As an illustration, in one of our sample villages the three head-teachers of private schools agreed that motivated teachers were critical for better learning, but they differed on everything else. In fact, each of them was doing something different to improve learning in the school. The first had arranged Mathematics training for a teacher; the second constructed a boundary wall because he felt that road-traffic was distracting children and the third provided a chaperone to bring children to school across a small forest. Private schools are probably doing better not because of "a set of inputs" that are higher quality than the government, but because they have the ability and flexibility to fix the weakest link in the chain, and in different schools, this implies that they are doing different things.

67. *Government schools can learn from private schools*. One approach is the "planning approach" that tries to see what input should be augmented to improve outcomes; a second approach admits that different places and different children have different needs and a central planner can *never* seek to align inputs perfectly for every single child. It also recognizes that there *are* agents at the local level who can do this better—the flexible head-teachers in private schools for instance. The "flex-approach" suggests that instead of trying to fix every input optimally, the planner fixes the *system* so that those who know more and are able to respond better to individual needs prosper, while those who are inflexible and provide low-quality inputs are taken out of the system. A debate around whether such a "flex-approach" is better and feasible in the government system is necessary for shifting from inputs to outcomes in educational performance. Government should not try to fix the pipes, but instead fix the institutions that fix the pipe and ensure that the water is flowing. How the institutions actually fix the pipes is of lesser concern.

Innovating and Evaluating "out-of-the-box" reforms

68. *In countries where private schooling option is widespread, policy options in education have revolved around public-private partnerships*. Such partnerships largely involve government financing and private delivery of education. Examples include grant-in aid schools (UK, India) and charter schools in the US which largely involve block grants/funding to private schools. The other model is financing families directly through vouchers to each school-going child. This has been tried in Colombia, Chile, Sweden and the U.S. among other countries. How well these alternate forms of partnerships work is highly debated and depends on country circumstances

69. *Are vouchers the way forward for fixing institutions in Pakistan?* Along similar lines, one way to fix the institutions is to provide financing for education, but leave provision to the private sector. Under such schemes (or equivalent schemes such as tuition subsidies), each child is given money (a "voucher") that can

be used to attend the school of her choice—be it is private or public. As the popularity of such schemes increases, it is becoming clear that their success depends on (a) whether parents can figure out good and bad schools; (b) whether parents value the same things in schools that governments do and; (c) whether the supply of private schools will increase to meet the demand generated by such schemes or not.

70. *Parents are good at evaluating school quality*. When they say that a school is good, test scores are high and when they say that a school is poor, test scores are low. However, not all parents may be equally informed. Furthermore, parents may have very different views of what they value in a school compared to governments. The critical difference in the Pakistani case is the distance to school. Governments do not think that schools further away from children are "worse" but parents clearly do.

71. *Given that distance is such a critical determinant of school choice, the question is if children who live in villages or peripheral settlements without private schools will be able to access such schools, even with a voucher.* One answer is that more money will enable households to fund transport options for their children to get to school. There is little evidence in support. The LEAPS data show that the distance penalty for girls has nothing to do with how rich a household is. Not surprisingly therefore, a stipend given for girls to attend government schools did increase enrollment by 10 percentage points, but at the cost of *$400* for every additional child enrolled. A second answer is that new private schools will set up in areas where they previously did not exist. Data collected thus far does not answer this question. If teachers are a severe constraint, as previous work suggests, it may take a long time for schools to reach these underserved areas. Furthermore, if *existing* private schools are unable to hire more teachers to cater to the increased demand from vouchers, either their fees will increase, or their quality will drop, or both.

72. *Given the current educational environment, and the government's interest in setting up voucher schemes, there is clearly a strong case for an evaluation of what a voucher system does.* For us, there would be at least three components for such an evaluation. First, it would last at least 5 years, since it will be critical to see whether the private sector is able to respond to greater financing by increasing supply. Second, it would consider a *village* as the appropriate unit at which to look at test-score responses. Vouchers may lead to greater social stratification; if such stratification means that children learn less from each other, it may have a detrimental effect on learning. Third, it would look not only at the effect on the "average" child but also on children who are disadvantaged, either because of their location or their backgrounds. In either case, even if these vouchers bring about the desired improvements in supply they will take time. In the interim, there is little alternative but to directly tackle the problem of teachers in the government sector.

INTRODUCTION

The Educational Setting

The changing educational marketplace in Pakistan presents opportunities and challenges for education policy in the country. Enrollment in primary schools is increasing and secular, co-educational private schools are locating in both urban and rural areas. Many rural Pakistani families no longer live in a village with one or two government schools—in rural Punjab, for instance, parents can now routinely chose among seven to eight schools in their village. The expansion of education providers in the private sector has implications for educating the poor not only in Pakistan, but also in the wider South-Asian context.

The Learning and Educational Achievement in Punjab (LEAPS) report presents basic facts and a framework for an "evidence-based" debate around education performance and education policy in Pakistan. This report is based on a large and independent survey and testing exercise that provides information on every aspect of the educational marketplace in selected districts of rural Punjab. This report presents findings from the first survey in 2003; a forthcoming report will incorporate information from all four survey rounds between 2003 and 2007. The first four chapters—on learning, schools, teachers, and households—present an overview of the education sector. The final chapter presents questions for debate and discussion based on these facts and suggests a new "modified" role government can play in this new educational landscape. The data collected through the LEAPS survey are publicly available at www.leapsproject.org and further analyses of these data are welcome and encouraged. This introduction presents a portrait of this new educational marketplace, provides an overview of the report's focus and the types of villages included in the LEAPS sample.

Facts and features of the new educational marketplace

Educational attainment is poor, but improving. Educational performance, as measured by literacy and enrollment indicators reported in household survey data, is poor both in absolute terms and relative to the average income of the country. Adult literacy in Pakistan is 50 percent compared to 58 percent average for South Asia as a whole. The primary school net-enrollment rate was 66 percent in 2004 compared to 90 percent for India, 97 percent for Sri-Lanka and 78 percent for Nepal. Pakistan is struggling to meet the educational needs of its large population.

Enrollment is on the rise. Data from household and establishment surveys show that the number of children in school is increasing. Across the four main provinces of Punjab, Sindh, NWFP, and Balochistan, the number of children in school has risen from 21.36 million in 2001 to between 27.67 million (National Educational

Census, 2005) and 28.84 million (Pakistan Social and Living Standards Measurement Survey or PSLM, 2004-05). Net enrollment across the four provinces rose from 51 percent in 2001 (Pakistan Integrated Household Survey) to 61 percent in 2004-05 (PSLM).

Of the three players in the educational marketplace—government, religious, and private schools—attendance in government and religious schools has increased slowly or stagnated since 1991 while private school enrollment has risen rapidly. Parents who send their children to school have three options—government, religious, or private schools. Religious schools attract a small minority of school-going children, with enrollment ranging from 1-3 percent depending on the data source used. Enrollment in government schools has increased, but total share of enrollment in government schools declined between 1991 and 2001 (using comparable PIHS data) from 87.5 percent in 1991 to 74 percent in 2001. Between 2001 and 2005, the relative share of the public sector has either remained constant (according to the household survey data from PSLM 2004) or declined further to 66 percent (according to the National Education Census or NEC, 2005). The share of the private sector, which stood at 12.5 percent in 1991 and increased to 25.9 percent in 2001 has either stagnated since then (PSLM data), or increased further to 33 percent in 2005 (NEC, 2005). Whether the private sector maintained its share or increased it further between 2001 and 2005, it has made significant inroads into the education marketplace between 1991 and 2005, and is now teaching one out of every three children enrolled at the primary level.

Private schools are locating in rural areas and the children in these schools are increasingly drawn from poorer segments of society. Private schools were primarily an urban phenomenon before the early 1990s, but since 1995 they have increasingly located in rural areas. By 2000, 8,000 new private schools were being set up every year—half of them in rural areas. Not surprisingly, the growth in private school shares has been highest among the poor, a factor largely driven by the phenomenal growth rates among low and middle-income groups in rural areas (see Andrabi, Das and Khwaja, forthcoming).

The typical rural private school operates out of the head-teachers' house with 2-3 teachers and a shoe-string budget. These private schools are very different from the sprawling private institutions in urban centers such as Karachi or Lahore. Figure 1 is a picture of a typical rural private school. The small door in front leads to the courtyard and the biggest classroom. There are three more classrooms and a small office, each equipped with a blackboard and desks. The head-teacher is typically an older educated male, sometimes retired from a previous job and or has returned to live in the village. The school shown in this picture is actually one of the best-performing schools in the village, and it charges Rs.100 per month ($1.5).

Figure 1: A typical rural private school

The LEAPS sample

The LEAPS report is based on data collected from 112 villages in Punjab province. Following an accepted geographical stratification of the province into North, Center and South, these villages were located in the 3 districts of Attock (North), Faisalabad (center), and Rahim Yar Khan (South). Villages were randomly chosen from a list of villages with at least one private school according to the 2000 census of private schools. The survey team worked with all schools offering primary level education as well as a sample of households in each village. The survey covered 812 government and private schools, 12,000 students (in 2003), 5,000 teachers and 2,000 households.

Although the findings of this report are from data on 3 districts in rural Punjab, the analysis and policy ideas raised are relevant for a wider population. Both Punjab and NWFP have seen dramatic increases in private schooling since the mid-nineties. In addition, the geographical expansion of private schools means that the educational landscape described here will become relevant for a greater fraction of Pakistani villages over the next 10 years. While rural Sindh and Balochistan are currently different and need to be treated as such, many Pakistani households already live in the kinds of villages studied here—and their numbers will only increase over time. Beyond Pakistan, India, Bangladesh and Nepal have all seen an increase in private schooling over the last decade. The

issues discussed here are likely as relevant for this wider group and the LEAPS report brings together evidence on all aspects of the educational marketplace by using the following survey instruments.

1. *School surveys*. The school surveys collected information on infrastructure, prices, costs, and other facilities available in the neighborhood of the school

2. *Teacher surveys*. The LEAPS project administered three teacher surveys. A short *roster* of questions administered for all teachers in the school and for all teachers who had left the school in the previous two years yields information on about 5,000 teachers in the LEAPS project schools. A longer *questionnaire* administered to the teachers of the tested children includes detailed socioeconomic information about the teacher and yields data on roughly 800 teachers. A head-teacher questionnaire (where the head-teacher was different from the class teacher) included questions on management practices and bonus schemes, along with other modules.

3. *Child tests*. All children in grade 3 (approximately 12,000) were tested in the LEAPS project schools with specially designed tests in Urdu, Mathematics, and English administered by the LEAPS team to ensure impartial test circumstances. Further, for a sample of 10 randomly selected children in every class (roughly 6,000), a short questionnaire was administered to collect information on parental literacy, family structure, and household assets (in classes with less than 10 children, all children were chosen).

4. *Household surveys*. Finally, to cover the inputs that the child received from *home*, a full-fledged household questionnaire was fielded for 1,800 households in the sampled villages, with a special focus on households with grade 3 students. A similar stratified approach was used to sample households with school-age children who were not in school to ensure that we could compare the activities of enrolled and out-of-school children. The details of this sampling procedure are presented in Annex 1.

The aims of the LEAPS report

Opinions about private schools in Pakistan generally fall into two camps. One camp argues that private schooling is stratifying Pakistani society into those who can afford such schooling and those who cannot (see for instance, Rahman, 2005). Given that the provision of quality education is a constitutional responsibility of the government, there is little positive to say about the increasing penetration of such schools into rural areas. Further refinements of such a view advocate a strong regulatory policy and state oversight of such schools.

A second camp argues that private schools perform a valuable service by taking the "load off" government schools. Providing quality education for an increasing population entirely through government schools will be

difficult; to the extent that private schools share the burden, their penetration may improve the education that *all* children receive. Those who cannot afford private schools will still benefit, the argument goes, because classrooms are less crowded than they would be otherwise and more resources are available. This camp argues for a more pragmatic stance about the relevant alternatives given Pakistan's history.

The LEAPS report considers these viewpoints and more. The media, the multiple "Islamic education" experts in the West, and policymakers in Pakistan frequently express views and take passionate stands unsupported by data, albeit in many cases because the data are just not available. As a result, educational debate often fixates on the notion that Pakistan is a "failed state" and educational facilities, standards, and outcomes in the country are poor because of government apathy and an elitist mindset. Such pronouncements make it difficult for policy-makers and researchers to understand and effectively address a difficult yet critical topic affecting not just Pakistan but other South Asian countries as well. The educational lives of the poor and those who live in rural areas are best understood by examining the data. This report will have served its purpose if statements and views expressed in the country and by international experts become more consistent with the data from the households and schools in the villages.

THE FOCUS OF THE LEAPS REPORT

Efforts to enrich the debate on education policy focus on three areas: learning outcomes, the link between inputs and outcomes, and the role of private schools.

The centrality of learning outcomes

The main educational outcome that the LEAPS report focuses on is learning, as measured through test-scores of grade 3 children in English, Mathematics, and Urdu. This focus on "learning" offers several advantages over focusing on more conventional measures like enrollment rates.

Measures of enrollment are valued in large part because they are viewed to be good estimates of child learning – after all, children in school are almost certainly learning more than those not attending. But measures of enrollment fail to capture the tremendous variations in learning that we find between schools. It may be true that students in school may be learning more than those out of schools, but it is also true that students in some schools are literally years behind students at other schools in the same grade.

Examining student learning is also important because it provides some insight into *why* parents choose to enroll (or not enroll) their children in school. If parents decide to send their children to school based on whether they think school with result in a better life for their children, then parents may not want to send

their children to school because they feel that they will not learn much. And examination of student learning (and parental perceptions of schools) allows such an analysis.

The focus on learning rather than enrollment in this report is also a reflection of the quality of work already conducted on enrollment in Pakistan. From data collected through household surveys such as the PIHS or PSLM, the basic facts about spatial and household-level enrollment variation are well-documented, well understood and regularly updated (see for instance, Alderman and others 1995, Gazdar 2000, Shahid Kardar 1995, Lloyd and others 2005). Increasing enrollment remains *the* dominant paradigm for thinking about educational achievement in the country. Moreover, increasing Net and Gross Enrollment Rates (NER and GER) were seen (and to some degree are still seen) as the aim of public policy on education. But as *participation* improves, what children are actually learning is likely to become *the* defining issue in debates about education in the country.

In an early interview, an educational specialist on our team, Anila Asghar, asked a mother about the decision to send a child to school. The mother she interviewed had been through primary school but her husband was uneducated:

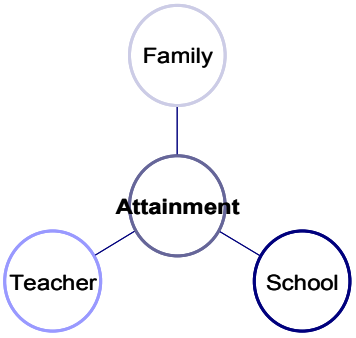
> *"We send our boys to the government school but actually we would like to send them to a private school. But we do not have money for tuition and other expenses. We want our children to learn because the poor are progressing because of education (gharib aagay jaa rahay hain taaleem ki wajah se)."*

This finding—that parents look at their children's performance and care deeply about what their children are learning—was echoed in interviews across all parts of Punjab. Despite this interest in the quality of children's educations on behalf of parents, however, no systematic data on school quality has ever been collected. It is our hope that the data from the exams administered in LEAPS villages will stimulate a renewed and nationwide push toward systematic thinking about learning among practitioners/researchers (on test instruments, protocols and scoring techniques; discrepancies and commonalities among different tests, and broadening the scope of testing), policymakers (on the implications of differences in learning between private and public schools, and the impact of teacher training on test scores), and the public at large (on whether private schools lead to educational apartheid, and at what point age gaps in learning arise).

Linking inputs with learning outcomes

Focusing on learning as a key outcome of the educational system also allows us to think about inputs into the educational system in a systematic manner. The educational production function approach views learning outcomes as a function of the child's complete educational environment. This holistic look at the child's learning includes both school and household information (Figure 2). Thus, teacher qualifications and effort, school infrastructure, facilities and curriculum, household expenditures and time spent by parents on children, all need to be examined together to understand the variation in learning that exists among children.

Figure 2: Education Inputs



The report examines each components of the educational production function—schools, teachers, and households—using specifically designed survey instruments. The emphasis on *outcomes* implies that schooling inputs have to be evaluated not only for their own merits, but also through their effect on outcomes. The first chapter introduces the status of learning outcomes in Punjab and subsequent chapters complete each portion of Figure 2 with a systematic look at schools, teachers, and households.

The role of private schools

The third focus of the report is the structure of educational decisions and outcomes in villages with private schools. This focus provides a framework for debate on education in settings that will be increasingly relevant in the near future, as close to 50 percent of the rural population of Punjab currently lives in a village with a private school (as of 2000).

The advantages of focusing on educational achievements and inputs of all children in villages with private schools

Advantage 1: It yields an important source of new data on private schools for which little is known, particularly when they are unregistered. How are children in private schools performing? What is the experience and salary profile of teachers in private schools? What is the infrastructure like in these schools? All of these are key questions with little accompanying data in the context of framing education policy in the country.

Advantage 2: It contextualizes the performance and inputs into the government schooling system within a broader framework. Given that there is little *de jure* variation in the way that government schools operate (and in the case of teachers, little *de facto* variation as well), the entirely different management and teacher compensation systems

of private schools provides a valuable point of comparison. On the question of teacher training, the comparison will show that nearly all government teachers are "trained" and nearly all private school teachers are "untrained". Without the private comparison, we have no way of knowing how important this training is; comparing government and private schools provides some indication of whether (at the primary level) this training bears fruit in terms of learning achievements.

Advantage 3: The dynamics of villages with private schools are entirely different from rural village with a single school. These issues range from the type of data necessary to monitor educational outcomes and draw conclusions about the effects of government programs to the type of planning required, say for, the location of government schools or the complexity of household decisions about school choice.

For example, in a village with a single school, if enrollment in the school decreases, it is reasonable to assume that enrollment in the village has also fallen. This is no longer true when there are private schools as well. In such a case, decreased enrollment in a government school could just as well reflect a movement of children to private schools without any overall change in enrollment levels. For this, we need data on private school enrollments, and this information is not collected as part of the standard Educational Management Information Systems (EMIS) data.

Consider next the issue of where to locate a school. In a village without a school, it probably makes sense to locate the school in the middle of the most densely populated settlement. But this is not necessarily the case in villages with a private school. If private schools are already located in densely populated settlements, it might make more sense to locate a government school further out to serve populations not currently served by the private school. Yet, as will be discussed in the chapter on schools, there is currently no data at the provincial level on the location or number of schools (public and private) in a village, which is an important factor for improving school access.

Finally, the decisions that households need to make are infinitely more complex when there is school choice. With a single school in a village, a household needs to decide whether to send the child to school or not. When there are multiple schools, households need to decide whether to enroll their child and figure out *which* school to send their child to. This requires a completely different set of information (location of schools, cost of each school, and quality of teaching at each school) and interacts in complex ways with the government's education policy.

CONTEXTUALIZING THE LEAPS REPORT

Inter-District Variation

The three different districts of the LEAPS sample vary in measures of wealth, education, and occupation. Rahim Yar Khan is the poorest of the three districts with much lower per-capita expenditures and household wealth than Faisalabad and Attock. Faisalabad reports the highest per capita expenditures and Attock the highest household wealth.

The lowest adult educational achievement is in Rahim Yar Khan for males and Attock for females. Faisalabad reports the highest levels of male and female education. Along a number of measures, male education in Attock is similar to that in Faisalabad with Rahim Yar Khan following; for female education, Faisalbad is a consistently strong performer with Attock coming last. This division may be the result of enrollment patterns from the past—if boys have had high enrollment rates in the past and continue to have high enrollment rates today then we would observe high enrollment for boys as well as a high proportion of adult men who can read or write (as is observed in Attock). Similarly the pattern in Faisalabad is suggestive of high enrollment by girls in the past that continues today.

One-half of all household heads in Rahim Yar Khan report no education and one-third are farmers with 20 percent self-employed and 11 percent salaried workers. Household heads in Faisalabad are somewhat more educated with a significantly lower proportion engaged in farming (19 percent) and greater number reporting salaried employment (16 percent). Households heads in Attock report higher educational levels than in Rahim Yar Khan, but lower than Faisalabad; 23 percent report farming as their main occupation followed by self-employment (16 percent) and salaried jobs (12 percent). In all three districts, farming remains the single largest occupation, but a transition toward self-employment and salaried jobs is evident in the central and Northern districts compared to in the South.

Enrollment patterns in the LEAPS villages

Enrollment patterns are well understood in the literature on education in Pakistan, and provide a natural starting point for comparisons with other samples. The enrollment patterns in the report are based on the LEAPS household census of over 150,000 children between the ages of 5-15 in the project villages.

The average enrollment rate in the surveyed villages is 76 percent for boys and 65 percent for girls between the ages of 5-15, which is somewhat higher than those reported by the PSLM for all of rural Punjab, primarily as a reflection of the LEAPS sampling strategy. These overall enrollment rates, however, mask tremendous variation both across and within villages.

Variation by wealth, literacy, and gender

Across the sample villages, male enrollment ranges between 26 percent to 97 percent and female enrollment ranges between 14 percent and 94 percent. The average wealth of households in a village—as measured by the monthly household expenditure—and the overall literacy rate of adults in the village is strongly correlated with both the overall enrollment rate and the enrollment gap between boys and girls. As Table 1 shows, enrollment in villages classified as poor and with low literacy is 28 percentage points lower for boys and 44 percentage points lower for girls than in villages classified as rich and with high literacy. These classifications are based on the top one-third and bottom one-third of wealth and literacy and thus do not even represent the full range of differences between villages. In the LEAPS villages, male enrollment ranges between 26 percent and 97 percent and female enrollment ranges between 14 percent and 94 percent – dramatic differences indeed.

Table 1: Percentage of Children Enrolled by Gender, Village Literacy Level, and Wealth

		Village Literacy		
Village Wealth	Gender	Low	Medium	High
Poor	Male	56	75	83
	Female	38	65	75
Middle	Male	82	77	88
	Female	62	66	80
Rich	Male	73	82	84
	Female	53	73	82

Note: Computed from LEAPS Census, 2003. Village wealth categories are quintiles based median monthly household expenditures. Village literacy categories are quintiles based on the percentage of literate adults (25 years or above) in the village. Percentages reported are the percent of children ages 5-15 currently enrolled in school in each village. Averages are across villages. The male enrollment rate is reported above the female enrollment rate in each category.

Villages that have high literacy and wealth also have smaller gender gaps in enrollment. This is particularly true for high levels of literacy. In villages classified as high literacy, the gap between boys and girls narrows to a few percentage points and is uncorrelated (or even slightly negatively correlated) with wealth. By comparison, villages classified as low literacy have a gender gap approaching 20 percent.

It is better for a village to be literate and poor than rich and illiterate. The importance of literacy as a protection against poverty's effects is pronounced. Even in poor villages, high levels of literacy are associated with male and female enrollment rates above 75 percent. Although both high village literacy and wealth are associated with high enrollment and a small gender gap, literacy is significantly more correlated than wealth. At least with respect to education, it is better for a village to be literate and poor than rich and illiterate. Education, it seems, truly builds on itself.

As is well known in the Pakistani context, correlations between village attributes and enrollment mirror those between household characteristics and enrollment. As with the results for villages, differences in household and child characteristics are strongly correlated with enrollment. One way to explore the relationship between enrollment and these

characteristics is with enrollment profile curves (Box 1). These curves show the relationship between age, demographic characteristics, and enrollment.

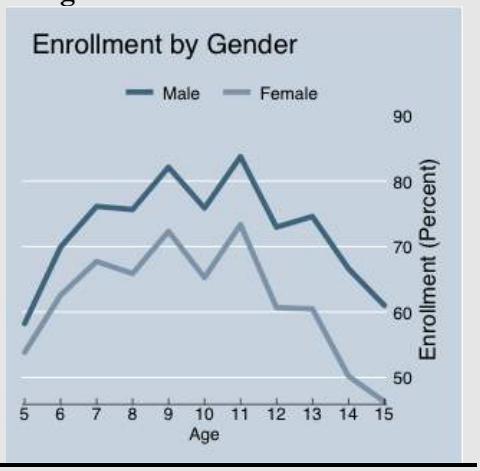
Box 1: Reading Cross-Sectional Enrollment Profiles

Cross-sectional enrollment profiles for children ages 5 to 15 show the percentage of children of each age who are currently enrolled in school. This number is computed from answers to the LEAPS household census question "is this child enrolled in school?" and other household and child attributes.

Enrollment profiles allow one to easily see the ages at which children tend to enroll in school, and subsequently drop out. They also illustrate how differences in child and household attributes affect the rates of enrollment at different ages.
For example, the graph above shows enrollment by age and gender. From this graph one can easily see that at all ages female enrollment is significantly below – in the order of 10% points – male enrollment. Enrollment peaks at age 11 with female enrollment at 73% and male enrollment at 84%. Enrollment drops below 50% for girls around age 14 and falls to around 60% for 15 year-old males.

For more information on enrollment profiles see the World Bank's Educational Attainment and Enrollment Around the World website at: http://www.worldbank.org/research/projects/edattain/edattain.htm.

Figure 3: Enrollment for Boys is higher than enrollment for Girls



Across all ages boys are more likely to be enrolled in school than girls. This divergence is slightly larger for older children than for younger children. For children ages 5 to 15 the enrollment rate for females is on average 10 percent below the male enrollment rate – 62 percent compared to 72 percent. Children ages 9, 10 and 11 are the most likely to be enrolled (Figure 3). The inverted "u" relationship between enrollment and age marks another key facet of Pakistan's primary schooling system—the wide range in ages for each grade. Because initial enrollment can be delayed, especially for girls, each grade has children of many ages. The makeup of grade 3, for example, has 10 percent of children ages 7 and below and 17 percent of children ages 12 and above.

The wealth and education of a household (defined by household head's literacy) and the presence of a public or private school in a settlement are strongly correlated with a child's chance of being enrolled. With respect to wealth, a child from a household with monthly expenditure below Rs.2500 is about 25 percent less likely to be enrolled in school than a child from a household that spends more than Rs.5000 monthly (Figure 4(a)). The correlation with literacy is even stronger (Figure 4(b)). In households where the head of household is literate 82 percent of children are enrolled compared to only 54 percent of children in households led by an illiterate adult. Even when controlling for age, gender, wealth, and income simultaneously, moving from a household spending less than Rs.2500 to a household spending more than Rs.5000 is associated with a 12-percentage point increase in enrollment rate; moving from an illiterate to literate household is associated with a 29-percentage point increase.

Figure 3: Enrollment for Boys is higher than enrollment for Girls

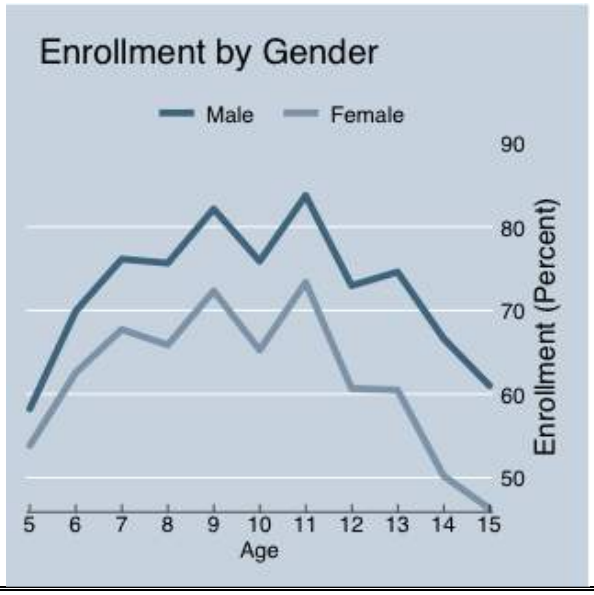
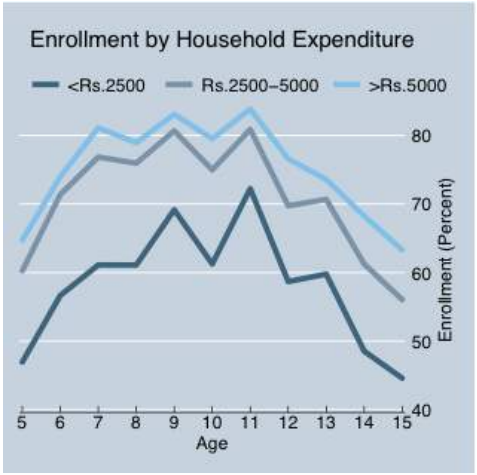
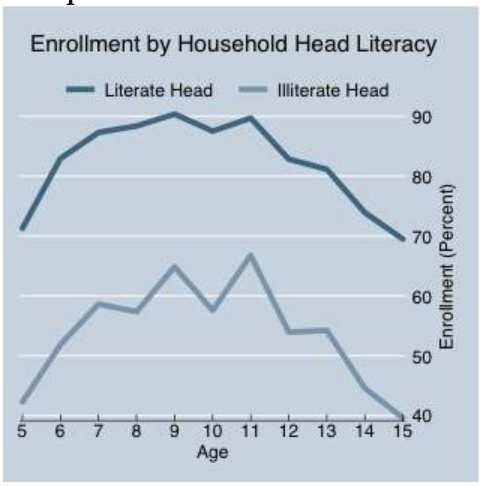


Figure 4: Household wealth and literacy are strong predictors of enrollment in the LEAPS sample





Regardless of a household's wealth or literacy, characteristics of the settlement in which a household is located (most villages are divided into multiple settlements or *mohallas/dhoks*) also affect the chance of a child attending school. Most significantly, the enrollment rate in settlements with both a public and private school is 27-percentage points higher than in settlements with no school—76 vs. 49 percent. Even after controlling for the age and gender of the child and the wealth and education of the household, the presence of both public and private schools is associated with an increase in enrollment of over 20-percentage points. As would be expected given that younger children find it more difficult to travel large distances to school, this difference is slightly larger for younger children than older children (Figure 5). Although the presence of a government school by itself is associated with higher enrollment compared to settlements without any schools, the association between enrollment and settlements with both government and private schools is much stronger.

Figure 5: The presence of a school in the settlement is strongly correlated with enrollment

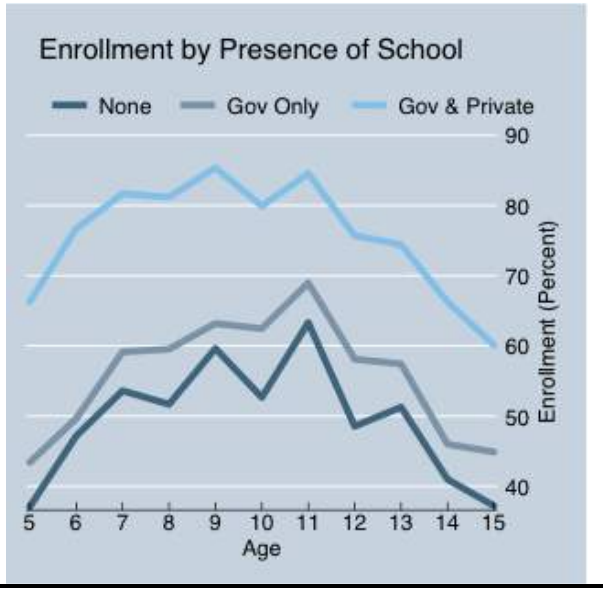
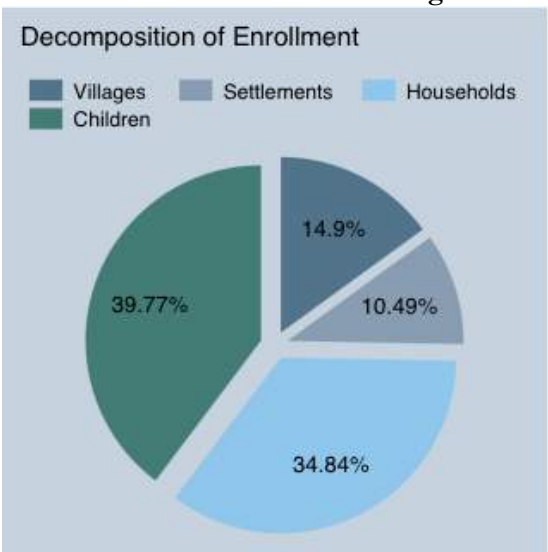


Figure 6: Decomposition of Enrollment Variation in the LEAPS villages



Another way to look at the role of village, settlement, household, and child attributes is to measure how well different factors predict whether a child will be enrolled. For example, if every child in village A is enrolled and every child in village B is not then all the variation in enrollment can be explained by differences across villages. By contrast, if 50 percent of children in both villages enroll in school then village differences explain nothing and the variation must stem from differences in settlements, households, or children. Figure 6 shows this decomposition of variation across villages, settlements, households, and children. It shows that 15 percent of the variation in enrollment is explained by differences across villages, 25 percent is due to differences across settlements (15 + 10) and approximately 60 percent is explained by differences between households. The remaining 40% comes from the fact that households do make the same enrollment decisions for all of their

children. Rather, a significant number of households send only some of their children to school. One possible explanation for this result—considered further in chapter 4 is that families pick "winners" and send only their "best" children to school. The differences in enrollment between children in the same households are important to understand if one hopes to increase overall enrollment rates.

Private school enrollment patterns

In the LEAPS project villages, 70 percent of enrolled children attend government schools, 29 percent attend private schools, and around 1 percent attends religious madrassas. Private school enrollment in this sample is thus somewhat higher than the 22 percent in rural areas reported by the PSLM; surprisingly, the difference is not as high as one might have imagined given that the LEAPS sample did not include villages without private schools. Mirroring the trends in overall enrollment, richer and more literate villages have a higher percentage of children enrolled in private schools (Table 2).

Table 2: Percentage of Children Enrolled in Private Schools by Gender, Village Literacy and Village Wealth

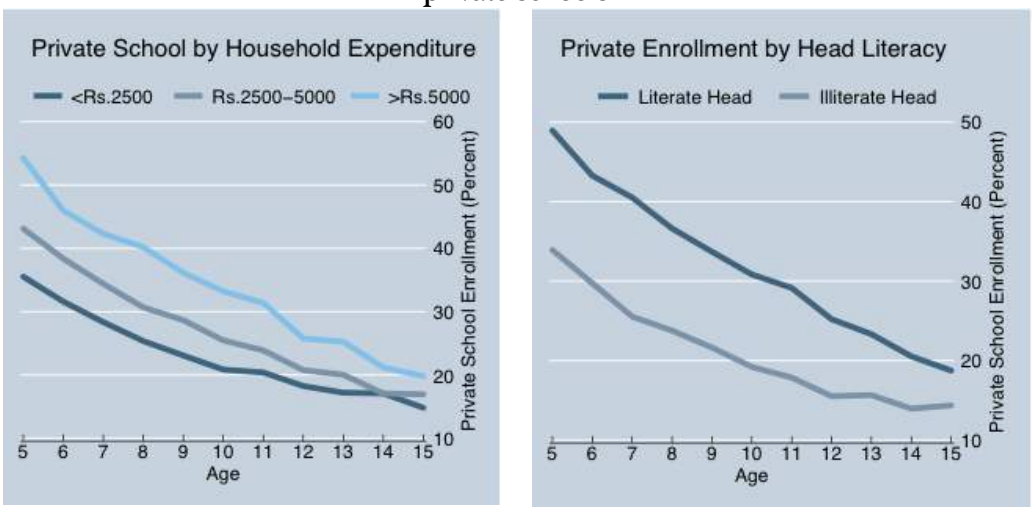
		Village Literacy		
Village Wealth	Gender	Low	Medium	High
Poor	Male	17	33	20
	Female	22	32	19
Middle	Male	30	26	29
	Female	33	27	28
Rich	Male	25	21	30
	Female	31	26	30

Note: Computed from LEAPS Census, 2003. Village wealth categories are quintiles based median monthly household expenditures. Village literacy categories are quintiles based on the percentage of literate adults (25 years or above) in the village. Percentages reported are the percent of children ages 5-15 currently enrolled in school in each village. Averages are across villages. The male enrollment rate is reported above the female enrollment rate in each category.

For example, in villages classified as poor and with low literacy private schools account for only 19 percent of enrollment compared to 30 percent of enrollment in rich and highly literate villages. Notably, private schools also serve a greater fraction of enrolled girls than enrolled boys in villages classified as low literacy.

Private schools educate a significant fraction of children from all socioeconomic groups. As Figure 7 shows, richer and more educated households are more likely to send their children to private school, and there is a clear drop-off in private school usage with age. But private schools do not only serve the elite. Even in households with monthly expenditure below Rs.2500, 24 percent of enrolled children attend private schools; in households with illiterate household heads, 22 percent attend private schools.

Figure 7: Younger children from richer and more educated families use private schools more…but even among the poorest, 24 percent of enrolled children are in private schools



The enrollment numbers, the choice of private schools and the characteristics of households in the LEAPS villages suggest two things about the wider applicability of the LEAPS sample. On *average* these villages are somewhat richer and larger than the representative village in rural Punjab—a difference that stems more from the restriction of the sample to villages with a private school rather than the choice of the three districts. At the same time, not all villages in the LEAPS sample are uniformly richer than the average Punjab village; the range of indicators in these villages covers most of the spectrum in Punjab other than the poorest 10 percent. As such the facts presented here are a reasonable starting point for debate about the general state of education in the province.

LIMITATIONS OF THE LEAP REPORT

Limitations of the sampling strategy

Private schools are overwhelmingly located in larger villages with greater access to infrastructure and more literate and richer populations. Private schools have not penetrated many parts of the country. The provinces of Punjab, and to some extent NWFP, are clearly becoming the heartland of private schooling. Rural Sindh and Balochistan, where only 4 and 1 percent children are enrolled in private schools, need to be treated separately. Even within Punjab and NWFP, private schools are overwhelmingly located in larger villages (both in population and land-area) with greater access to infrastructure (water and electricity) and more literate and richer populations (see Andrabi, Das and Khwaja 2006). Villages with private schools thus represent the upper-end of the spectrum in rural areas.

Extrapolating the facts in this report beyond these two major provinces merits some caution. On the one hand, certain facets of the educational system, such as the compensation of government teachers, are unlikely to be very different

in villages without private schools. On the other hand, the absolute levels of learning reported here may not represent the country at large. Government test scores in LEAPS village could be higher than average as a result of competition from private schools, or lower than average if private schools are locating in villages with failing government schools.

Table 3 highlights another characteristic of private school location patterns. Private schools are three times as likely to be located in villages with both a girls' primary *and* secondary school. This relationship arises because the teachers in private schools are almost exclusively women who were educated in government secondary schools (Andrabi, Das, Khwaja (2007), Pakistan Country Gender Assessment 2005). Private schools tend to arise in locales where such teachers are available. This relationship has clear implications for the role of the government in hiring teachers and deploying them to areas with chronic teacher shortages, a point that will be explored in greater detail in chapter 3.

Table 3: Percentage of Children Enrolled by Gender, Village Literacy Level, and Wealth

	Villages with Private Schools	Number of educated women per village	Number of educated women per 1000 population
Does not have girls primary or secondary school	12%	12.27	12.9
Received girls primary only in last 20 years	13%	12.41	16.2
Received girls primary and secondary in last 20 years	31%	27.71	18.8

Source: Population Census 1998, PEIP 2000, EMIS 2000

The relationships documented in this report are associations, and do not necessarily indicate causal relationships. The data may show that higher wages for teachers in the private sector are associated with better learning outcomes among their students, but this does not necessarily imply that increasing private sector teacher's wages will lead to better learning. It could be that certain types of schools attract better students and better teachers, or that better paid teachers in a particular school teach the students who score higher in tests. Similarly, differences between different types of schools could arise either because some schools are better at teaching children or because the children enrolled at these schools are better at learning. That said, we have made every attempt to ensure that the relationships presented in this report are robust to multivariate regression techniques and to relevant geographical and household fixed-effects. Proving causality a hard task in empirical economics and requires considerable work.

The report does not *talk about important issues such as grade repetition and school drop-outs*. Although the longitudinal data is used in places to compare the situation in 2006 to that in 2003, only the insights from the cross sectional information from 2003 are presented here. The longitudinal data and changes between 2003 and 2007 may be explored in a separate report.

Chapter 1: Are students learning?

1.1 *This chapter of the LEAPS report examines how much primary school students are learning in rural Punjab Province and how much factors like school facilities, parental education, and wealth matter.* The sampling for the LEAPS report was done in two stages. In the first stage, three districts were chosen from the province of Punjab. The choice of districts follows the accepted division of the province into the "better" performing North and Central parts (Attock and Faisalabad) and a "poorer" performing South (Rahim Yar Khan). Within these districts, 112 villages were chosen randomly from a list of all villages with a private school in 2003. The total sample yields over 800 public and private schools. The LEAPS survey tested all 12,000 children in Class 3 enrolled in these schools on three subjects—English, Mathematics and Urdu. We describe the outcomes from these tests in two sections.

1.2 *Levels of learning.* Section 1 gives a sense of what children are learning in schools. It focuses both on "average learning" and the *specific* knowledge that children acquire in school. Can children add 5+14 and make a sentence with the word "ball"? Basic test data on counting and addition in Mathematics and alphabets in English and Urdu provide information on where children are compared to one another and where they stand relative to the curriculum.

1.3 *Learning levels and attributes.* Section 2 presents associations between children's learning levels and their attributes. It identifies learning "gaps" across geographical locations, schools (public/private), households (parental wealth and education) and children (age and gender), and looks at associations between learning and school characteristics, such as infrastructure and the student-teacher ratio.

1.4 *Summary of the findings.* First, learning levels are poor. Most children fail to meet the curricular goals set by Pakistan's Ministry of Education. Second, most variation in learning is *across* schools in the same village. That is, there are good and bad schools in all villages rather than good schools in certain types of villages and bad in others. Third, private schools significantly outperform government schools, and this difference dwarves all other associations. The worst government schools, where children learn virtually nothing, drive most of this gap. Fourth, there is no *single* characteristic of private schools that accounts for the vast difference with government schools—improving quality in government schools will require more than improving infrastructure or reducing the student-teacher ratio. These facts inform the structure and questions raised through the remainder of this report.

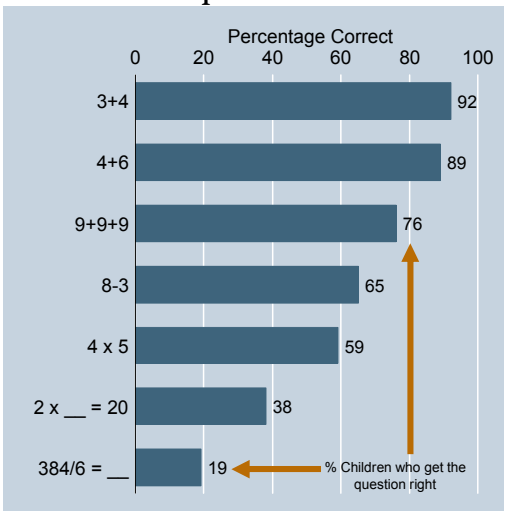
I. WHAT DO CHILDREN KNOW?

1.5 *Children are performing significantly below curricular standards.* The majority of children cannot answer simple questions in Mathematics, Urdu, and English. At the end of Class 3, many children have not mastered the Class 1 curriculum in Mathematics and a majority has not mastered the Class 2 curriculum. Only one-third can construct a sentence with the word "school" in Urdu.

1.6 *By the end of Class 3, just over 50 percent of the tested children have fully mastered the Mathematics curriculum for grade I.* They can add double-digit numbers and subtract single-digit numbers but not much more. They cannot subtract double-digit numbers, they cannot tell the time, and double-digit multiplication and simple long division are beyond reach for all except a small minority. In Urdu, they cannot form a sentence with the word "school" or the word "beautiful". Less than 20 percent can comprehend a simple paragraph. For children who never attend school beyond Class 3 (40 percent of boys and 50 percent of girls), this is all the formal learning they will receive for the remainder of their lives.

1.7 *The LEAPS test results in Mathematics suggest children are performing significantly below their current grade level.* Figure 1.1, presents a number of Mathematics questions from the test along with the percentage of children who answered the question correctly. 89 percent answer "4+6=" correctly. Subtraction is the next best skill but only 65 percent answer the question "8-3 =" correctly. More difficult subtraction problems such as "238-129=" are answered correctly by only 32 percent of children. Both multiplication and division skills have not yet solidified and more advanced topics such as fractions are beyond all but the best students. For example, only 59 percent can solve the basic multiplication problem "4 x 5=" and just 19 percent can solve the long division problem "384/6 =".

Figure 1.1: Children at the end of Class III cannot perform basic mathematical operations



Box 1.1: LEAPS Survey Tests

Several characteristics of the LEAPS test design and administration are unique and important in the Pakistani context.

- LEAPS is the largest survey of learning outcomes in both public and private schools in rural Punjab. Children were tested in every school in the 112 villages surveyed, yielding information on over 12,000 children in 800 public and private schools in the districts of Attock, Faisalabad, and Rahim Yar Khan.
- The tests were developed with the help of experts familiar with the curriculum as well as international testing protocols. The tests were extensively piloted and revised to ensure that it would capture information not only where children were with respect to the curriculum, but also where they were on the "ladder of learning." To accurately capture what children knew, all tests started simply but ended with questions beyond the Class III material. What do we mean by very simple? In English, investigator made three alphabets sounds aloud (with a pause in between each) and asked the children to write each one down. Mathematics tests started with counting. In Urdu, the tests started with the written alphabet. These simple test questions minimized interactions between the test-takers and the students, which have been shown to affect results in other testing exercises.
- The testing was administered by the LEAPS team with no inputs allowed from the teachers of the tested children. Children were selected by constructing school-by-school rosters for the tested class. More than 90 percent of all children in the rosters were eventually tested, suggesting that the Class III population was effectively covered through the testing procedure.
- The test scores were then analyzed using the latest tools and methods from the educational testing literature to ensure strict comparability across schools and children. Both multiple choice and free response questions were included.

Students answered approximately 30 percent of the questions correctly in each subject—indicating that the majority of exam questions were significantly above the ability of most students. That said, a few children received almost perfect scores even though questions toward the end of the test were significantly beyond the grade-level in which they were tested. Details on the test instrument are presented in the Technical Annex to this document.

Comparing LEAPS results with Curriculum Standards

1.8 *The gravity of the problem in Mathematics becomes obvious when comparing how students are expected to perform under the new curriculum standards developed by the Ministry of Education* (http://www.moe.gov.pk-->curriculum) *with how they performed in the LEAPS test.*

Curriculum standard 1: In grades I-II children should be able to "count, read and write numbers up to 999."

Figure 1.2: Counting and Subtraction Questions

LEAPS test results: Only 47 percent of all children in Class 3 can answer the simple counting question in Figure 1.2. Part of the reason why children are unable to answer this simple question but can do more complicated additions is because they are used to being asked [illegible] in; th[illegible] does not directly match what they have seen before, they are stumped.

Math Question: Counting
Instructions: Tick the number which matches the number of stars.
* * * * *
1
2
3
4
5

Math Question: Subtraction
Solve:

238
-129

Curriculum standard 2: In Class 1 and 2, children should be able to "add and subtract up to 3-digit numbers."

LEAPS test results: Only 32 percent of children in Class 3 can correctly perform the subtraction shown above in Figure 1.2. There is no new "format" issue here that requires children to think differently. This is exactly how subtraction questions are given to children in basic tests. Children can barely perform single digit subtractions; anything more complicated is too difficult.

Figure 1.3: 3-Digit Division

Math Question: Division

Solve:

6 ⟌ 384

Curriculum standard 3: In Class 3-5, children should be able to "multiply and divide up to 6-digit numbers by 2 and 3-digit numbers."

LEAPS test results: Only 19 percent of all tested Class 3 children can divide a 3-digit by a single digit number as in the problem shown in Figure 1.3.

1.9 *The LEAPS test results in English also suggest children are performing significantly below their current grade level.* As Table 1.1 demonstrates, the average [illegible]n write the alphabet, and a fair number of children cannot even complete this task proficiently. In terms of alphabet familiarity, 86 percent can write the letter "D" when they hear it spoken and 70 percent can fill in the blank letter E in a sequence question like "D, __, F". Far fewer children can successfully spell a word they hear—only 46 percent can spell the word "bat" when it is spoken and only 20 percent can correctly spell "girl". Children are somewhat more successful in recognizing common words when presented with a picture of the object. Presented with a picture of a book and three possible words, 70 percent check "book" correctly. When shown a picture of a bird, a more difficult word, 57 percent of children can correctly select "bird" from the list "cow", "bird" and "boy". More advanced language skills such as constructing a basic sentence given a particular word is beyond the vast majority of children. Only 11

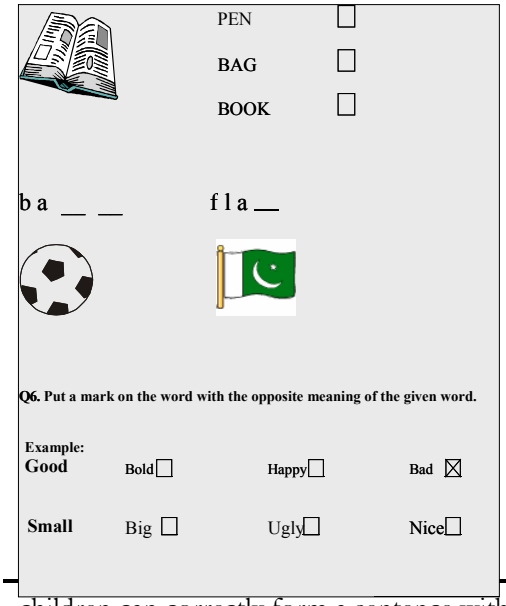
percent can form a coherent and grammatically correct sentence using the word "school" (e.g., "I go to school").

Table 1.1: What do Children Know in English

Subject	The Question	Percentage who answered correctly	Corresponding Class for Curriculum
English	Write the letter "D" (spoken out loud)	86	1-2
English	Fill in the right letter D _ F	70	1-2
English	Tick the correct answer to match the picture (picture of book)	70	1-2
English	Fill in the missing letters (picture of a ball) BA _ _	45	1-2
English	Fill in the missing letters (picture of a flag) F L A _	29	1-2

1.10 *The gravity of the problem in English becomes obvious when comparing how students are expected to perform under the new curriculum standards developed by the Ministry of Education* (http://www.moe.gov.pk-->curriculum) *with how they performed in the LEAPS test.* According to the curriculum, the first benchmark for children in Classes 1-2 is that they "use reading readiness strategies; recognize words and sentences as meaningful units of expression and paragraphs as graphical units of expression." They are also (Benchmark 3) supposed to "Locate information from a visual cue or a graphic organizer and express the information verbally." Finally, under "Writing Skills" (C2 in the curriculum) children in Classes 1-2 are supposed to "Write words and sentences using writing techniques".

Figure 1.4: Basic English Questions



1.11 Figure 1.4 on the left shows three test questions for English. In the first, the instruction asks the child to tick the matching word, for the second the child has to fill in the blanks and for the third, tick the opposite word. All questions start off with a completed example, as in the third question, where "bad" is ticked as the opposite of "good" to show what is expected. Seventy percent of all children answer the first question correctly, 45 percent can correctly complete "BALL", 29 percent complete "FLAG" (putting in the single "G") and only 36 percent correctly tick that the opposite of "SMALL" is "BIG". The percentage correct on the "opposites" question is much worse than it seems— if children *randomly* ticked a box, 33 percent would get it correct so that performance is only *3 percent* above what randomness would imply. Given these results, it is not at all surprising that only 11 percent of all children can correctly form a sentence with the word "school".

Box 1.2: Rote learning is widely prevalent in both government and private schools.

We encountered rote learning first hand during the test development phase of the LEAPS assessment tool in a small private school in a village about 100 miles from Lahore. The children in the school struggled with a simple reading comprehension exercise conducted informally by the LEAPS team. We were puzzled because the same children had done quite well in a much more advanced English reading comprehension passage used in the school in their last internal examination. The puzzle was solved when we found out that the passage on the internal test was taken verbatim from the textbook used in the class. Each child had practiced and mostly memorized all the main passages in the prescribed anthology.

Testing children using template questions not only leads to official exams overstating children's subject mastery, it also results in them forgetting the important skill of decoding instructions. When administering the English exam in a second school in Rawalpindi, we found that students were completely stumped when the format of the question was changed slightly. The question was on understanding the difference in usage of a masculine vs. a feminine gender noun—a standard third grade question in Urdu. In Pakistani exams, the question is typically asked by having students convert a masculine noun into a feminine one and vice versa. Our question asked students whether a given noun was masculine or feminine. Most of the students could not answer that question even though the content was well below grade level.

Other examples abound. An essay on "your last actual holiday trip" led to a majority of students in a school in central Punjab answering in very similar tone about the beauties of Murree. In Math, a free response question showed the picture of a parallelogram and a rectangle drawn on graph paper and asked "How are these shapes different and how are they similar?" It drew a complete blank, even among fourth graders at an "elite" English medium school. Upon prompting, the students confided that they had never been exposed to that type of question. We eventually dropped that question in our actual test because of low discriminatory power vis-à-vis student ability. In plain English, nobody came even close to giving a satisfactory answer.

Source: Tahir Andrabi.

1.12 *The LEAPS test results in Urdu show children are performing significantly below their current grade level.* While English is a foreign language for most Pakistani children, we should at least expect that by Class 3 children have a basic grasp of reading and writing in Urdu. Yet only 31 percent (see Table 1.2) can write a grammatically correct and coherent sentence using the word "school." Likewise less then 30 percent of children can answer the most basic questions after reading a short paragraph. More difficult reading comprehension questions are answered incorrectly by nearly all children. Converting singular words to plural is particular troublesome- just 12 percent of children can correctly pluralize "habit" (*adat*). Children also struggle to separate words into their constituent letters –54 percent fail to separate the letters in the word "country" (*watan)*. And they have similar difficulties with combining letters into words–29 percent fail to combine the letters of the word "work" (*kaam*) and 73 percent were unable combine the letters of "morning" (*subah*). When presented with a picture of a book, only 73 percent of children chose the matching written word out of three options. In Urdu most children are performing just at the standards meant for Class 1.

Table 1.2: What do Children Know in Urdu

Subject	The Question	Percentage who answered correctly	Corresponding Class for Curriculum
Urdu	Tick the correct answer to match the picture (picture of house)	52	1-2
Urdu	Tick the correct answer to match the picture (picture of book)	73	1-2
Urdu	Write a sentence with the word "beautiful"	33	1-2
Urdu	Write a sentence with the word "school"	31	1-2

1.13 *The view that rising enrollment signals all is well is incorrect.* Learning has not improved dramatically since the time of the first LEAPS test in 2003. Although this report is primarily based on the first LEAPS cohort (class 3 children tested in 2003), we also tested a second cohort of third graders from the same schools in 2006. Table 1.3 displays the knowledge scores (explained below) and the percent correct score for both cohorts. Using knowledge scores that are comparable across years, the first cohort of third graders receives on average 500 across all three subjects (by construction). Three years later in 2006, the second cohort of same-aged children scored similarly in English but somewhat lower in Math (463) and Urdu (479). Learning lagged even as enrollment grew. This not surprising if one believes that the marginal enrolled child is at a greater disadvantage than the typical child or if increasing enrollment stresses the educational system.

Table 1.3: Rising Enrollment, Lagging Learning				
Subject	First Cohort Class 3 in 2003		Second Cohort Class 3 in 2006	
	Knowledge score	Percent Score	Knowledge score	Percent Score
English	500	30	502	31
Urdu	500	29	463	27
Mathematics	500	38	479	34

II. WHY DO SOME CHILDREN OUTPERFORM OTHERS?

1.14 *Knowledge scores are better at distinguishing between high and low performing children.* While the average child scores between 30 and 35 percent across the three subjects, some children score 0 percent and others score 100 percent. To understand what characteristics are associated with greater learning this study uses *knowledge scores* rather than the percentage correct on the test. There are a number of reasons for doing so. First, the percentage of questions correct can be a potentially misleading measure of "knowledge" if questions vary in difficulty. That is, the difference between 60 and 70 percent may be much larger in terms of the child's knowledge than the difference between 30 and 40 percent if questions in the test are progressively harder. Second, these knowledge scores, which are centered at 500 with a standard-deviation of 150 have a clear interpretation in terms of rankings: the difference between someone scoring 500 and someone scoring 650 is the same as moving from a rank of 50th out of 100 to a rank of 84th out of 100; the difference between 500 and 800 is the same as moving from a rank of 50th to a rank of 97th.

1.15 *Using these knowledge scores, the report describes three main findings in the data.* The first finding relates to the breakdown of overall variation in the data; the second and third then take a closer look at differences across children from different backgrounds and in different schools.

Table 1.4: Knowledge Scores				
Exam Question	Question	Pakistan Knowledge Points		
		350	500	650
Complete the addition problem:	36+61	76	89	95
Complete the subtraction problem:	238-129	11	28	55
Complete the multiplication problem:	4*32	22	49	77
Complete a sentence with the word:	Beautiful	2	15	78
Complete a sentence with the word:	School	1	10	76

Box 1.3: Computing Knowledge Scores

Knowledge Scores are computed using a technique known as "Item Response Theory" which gives different weights to correct answers depending on the difficulty of the question. This is the same methodology used for international exams such as TIMMS and most national testing programs such the United States' SAT. The knowledge score can thus be interpreted as the student's knowledge or ability in a given subject area such as Mathematics, English, or Urdu. By construction the mean knowledge score is 500 and the scores range from 0 to 999, with a standard deviation of 150. Note though that a score of 500 does not mean that a student is meeting the curricular standards for Class III—it's simply the average score of children in this test. As a brief guide (see Table 1.4), a child at the mean of the knowledge-scale distribution (with a score of 500) can add two single-digit numbers in mathematics, complete alphabets in English and recognize simple words in Urdu. A child with a knowledge score of 300 (2 standard deviations below average) can barely count, may be able to recognize one or two English alphabets, and can write the Urdu alphabet. A child with a knowledge score of 800, can add, subtract, multiply, and divide large numbers and can understand, although not fully manipulate, fractions.

Enrollment and learning are two completely different processes

1.16 We have all heard about the high-performing and lagging regions in education; provincially, Punjab is performing well, Sindh and Balochistan poorly. Within Punjab, the North and Central are relatively better performing than the South. While correct for enrollment patterns, there is no evidence that learning levels follow similar patterns.

1.17 *The two main enrollment patterns show the dramatic gender-gap in enrollment and the positive effects of higher village literacy and wealth*. Table 1.5 (also in the introduction) shows enrollment patterns for children in rich/poor and high/low literacy villages. Here we add in test scores in Mathematics across the different village categories (Mathematics is chosen simply for readability; English and Urdu scores show very similar patterns). The two main enrollment patterns show the dramatic gender-gap in enrollment, with female enrollment always lower than male enrollment, and the positive effects of higher village literacy and wealth, whereby more children are enrolled in villages that are richer and/or more literate. These increases are fairly dramatic, and more so for girls compared to boys. For instance, moving from a low- to a high-literacy village increases enrollment by 27 percent for boys and 32 percent for girls when the village is poor, and by 11 (boys) and 29 percent (girls) when the village is rich. Although more literate villages are also wealthier, it is clear that even when villages are poor, literacy has a large effect on enrollment. Given the strength of the relationship, one would expect similar patterns to emerge for learning.

Table 1.5: While the percent enrolled increases with village wealth and literacy….

Village Wealth	Gender	% Enrolled by Village Literacy		
		Low	Medium	High
Poor	Male	56	75	83
	Female	38	65	75
Middle	Male	82	77	88
	Female	62	66	80
Rich	Male	73	82	84
	Female	53	73	82

Similar patterns do not emerge for levels of learning

Village Wealth	Gender	Mathematics Knowledge Scores by Village Literacy		
		Low	Medium	High
Poor	Male	512	526	565
	Female	463	495	503
Middle	Male	484	493	484
	Female	455	462	489
Rich	Male	497	515	525
	Female	507	522	522

1.18 *A similar pattern does not emerge for learning.* While the first row *does* suggest that moving from a low- to a high-literacy village increases Mathematics scores, a closer look reveals no systematic pattern. Villages with medium wealth appear to be doing worse for all literacy categories; among high-wealth villages, those with high literacy are doing worse than those with medium literacy. The best performing category are those in high-wealth villages with high literacy; the next best are those in low wealth villages with high literacy. Finally, there is no gender-gap in the knowledge scores—girls are performing as well as (or even better than) boys.

If you take away enrollment, a child is only as good as the school she attends

1.19 *Most villages have both good and bad schools.* Given that village wealth and literacy have little to do with children's performance in tests, one possible explanation is that these differences arise from good and bad schools in the *same* village rather than good schools in a rich/more literate village and bad schools in the others. To examine this hypothesis, we ranked villages by average mathematics scores and then selected the 5th best village and the 5th worst village for comparison (with a total of 112, this corresponds roughly to the 5th and 95th percentiles of the distribution). On average, schools in the 5th best village naturally do better than those in the 5th worst, but when schools are compared individually, it becomes clear that this village average masks a more complicated story

1.20 *That average mathematics scores in these two villages are different does not imply that all schools in the "bad" village are worse than all schools in the "good" village.* In fact, it is the opposite—of 10 schools in the "bad" village, 7 are better than the worst school in the "good" village. Of the 14 schools in these two villages, 10 "overlap": That

is, the majority of schools in the "bad" village perform similarly to the schools in the "good" village. Only the two worst schools in the "bad" village and two best schools in the "good" village do not have counterparts.

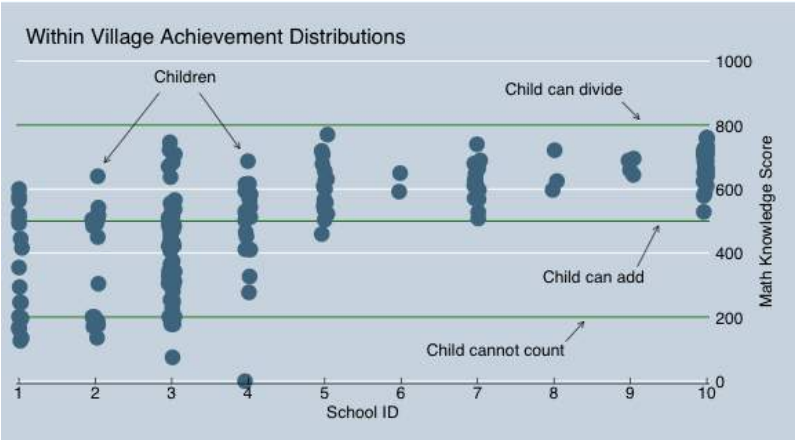
Box 1.4: Results from the Learning Decomposition

That fact that test scores are not associated with village wealth and literacy leads to the natural question "How much of the difference in test scores can all village attributes together explain?" A simple version of such a "variance decomposition" exercise sequentially regresses test scores on district, village, and school dummies; the residual variation is assumed to be driven by differences across children and unexplained variation in the data such as measurement error.

In our sample 50 percent of the total variation occurs across schools rather than across children in the same school. School effects explain the most variation for English (more than 60 percent of the total variation) and the least for Urdu (still 50 percent). Consistent with the finding that there are no "good" or "bad" villages, the portion of variation attributable to villages in Pakistan is small; for all subjects it accounts for less than 15 percent of the total variation.

Surprisingly child and household characteristics such as age, gender, parental literacy, and wealth add little explanatory power: With a full set of household and child covariates, and a school fixed effect, total explained variation never exceeds 68 percent. The percentage of variation explained by differences across schools is large compared to what has been found in other countries. The average variation across schools in 29 OECD countries, for instance, is 33 percent and only 6 countries (Austria, Germany, Hungary, Italy, Japan, Netherlands and Turkey) report between-school variation above 50 percent in Mathematics (OECD 2005).

Figure 1.5: Different schools in the same village are very different….and so are different children in the same classroom



1.21 *Given the large differences across schools in the same village, a natural follow-up question is to ask whether there are differences across children in the same school.* Do we see that most children perform at the same levels when they are studying together? One simple way to do this is to plot the scores, school by school in a given village, as in Figure 1.5. The figure plots each student's Mathematics score against a school identifier. This shows the full distribution, for every child, of schools in a typical village, grouped by the school they attend. The three horizontal lines indicate knowledge scores of 200, 500 and 800—children scoring 200 can barely count; those scoring 500 can add two-digit numbers and those scoring 800 can multiply and divide.

1.22 *More than one-half of the variation in learning is across schools*. There are 10 schools in this village and each one is identified by a unique number on bottom of the graph. As the visual inspection makes clear, some schools are fairly good and others are not doing well. This is simply a repetition of an earlier point—large variation across schools implies that in the same village, there are schools where every child can at least add, and schools where the vast majority of children cannot. Formally, following the terminology in Box 1.5, 50 percent of the variation in learning is across schools.

1.23 *Of the total variation in learning, 50 percent is within the same class*. Even within schools, children are at very different levels of learning. Schools 6 through 10 all have children who are performing at a roughly similar level and reasonably well, but in schools 1 through 5 children *in the same class and taught by the same teacher* are miles apart in what they know. In school 2, two groups of children are clustered over 200 knowledge points apart. School 1 baffles—even though it performs the worst on average, it displays the full spectrum of learning in the same class, ranging from children who cannot count to children who are close to performing division problems. While in schools 6 and 8 with 2 and 3 children in the class it is possible to see how teachers may actually accommodate children at different levels of understanding, school 3 has 61 children taught by the same teacher. It is unclear how this teacher can cater to the needs of children who can divide and children who cannot count at the same time. Again, following Box 1.5, of the total variation in learning, 50 percent is within the same class.

1.24 Two messages thus emerge. First, higher enrollments do not necessarily mean better learning—enrollment and learning are different processes. Second, the largest differences in learning are not across children from different types of households or children living in different types of villages, but children enrolled in different schools. Given that every village in our sample has at least one private school, it is then natural to ask what fraction of the variation in schools within the same village arises from the difference between government and private schools.

Private schools outperform than government schools. The difference is much larger than those across socioeconomic groups, such as children from rich and poor villages.

1.25 *Government schools underperform private schools on average in both the best and worst villages.* Figure 1.6 looks at schools in the 5th worst and the 5th best village—with one added fact. Here, we separate the private and government schools, using triangles to show private and circles to show the government schools. Government schools clearly under-perform private schools on average in both villages. However, the mean comparison does not imply that all government schools are worse than all private schools—in the "bad" village, three government schools are better than the worst private school, and the top performing school is a government school. At the same time, the worst schools are also run by the government so that the four worst schools in the "bad" village are all government-run, and the bottom-of-the-pile schools are truly dismal—with an average score below 100, children in this school can barely count after four years of education.

Figure 1.6: Different schools in the same village are very different

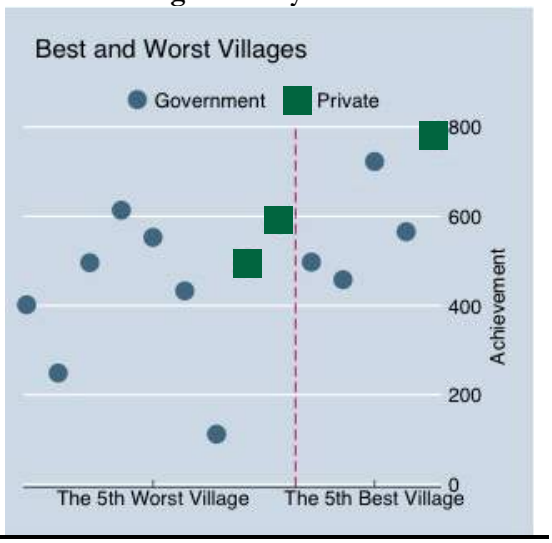
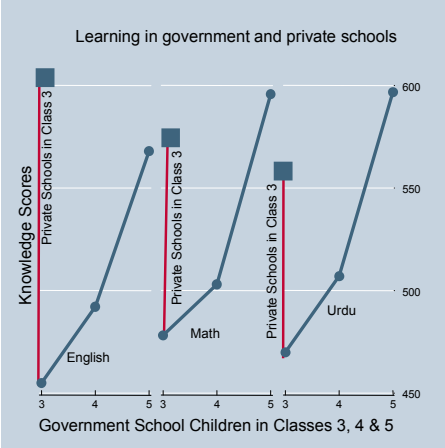


Figure 1.7: Private school students are years ahead



1.26 *The differences between government and private schools are systematic.* Children in private schools score significantly higher than those in government schools, even when they are from the same village. To understand how large these public-private differences are, Figure 1.7 shows the difference in knowledge scores between children in public and private schools.[5] As a rough guide, a knowledge score difference of 150 points translates into an increase in the ranking of the child from 50th to 85th out of 100 children; a knowledge score difference of 300 increases rankings from 50th to 97th out of 100. The knowledge scores of children in private schools are between 76 (Urdu) to 149 (English) units higher than those in government schools. Children in government

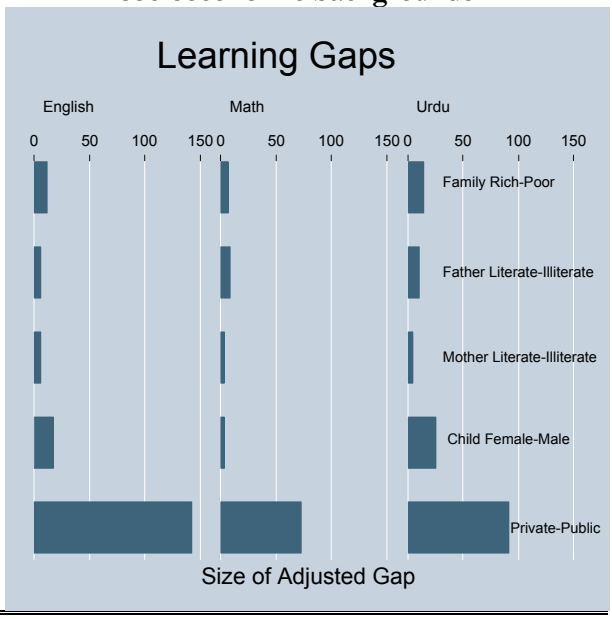
[5] The adjusted gap has a simple interpretation -- it shows the extent to which two children with the *same* observable characteristics and studying in the same school would score differently due to (say) differences in parental wealth. Similarly, in comparing public and private schools, we ask whether two schools—one public and one private—with similar students still show differences in learning. A natural question is whether the differences between public and private schools are driven by differences in school characteristics—we address this issue below.

schools will be among the worst performing 20 percent in private schools in English, and the worst performing 30 percent in Urdu.

1.27 *Children in public schools will take 1.5-2.5 years to catch up to private school children in grade 3.* To understand the size of the public-private gap in test-scores, Figure 1.8 also shows how long it takes for the same public school children who were tested in Class III and followed through to grade V to "catch-up" For all three subjects, children in public schools will report the same test scores as children in private schools after 1.5-2.5 additional years of learning. In English, government school children in grade V have still not caught up with private school children in Class III. Even in Urdu, an additional 1.5 years of schooling is required before government school children catch up with their counterparts in private schools.

1.28 *The public-private learning gap is much larger than that across children from different socioeconomic backgrounds.* Another way to benchmark the private-public gap in learning is to compare it to differences across widely emphasized parental dimensions, such as parental literacy and wealth. The gap between public and private schools in English is 12 times that between rich and poor children. The gap between public and private schools in Mathematics is 8 times that between children with literate and illiterate fathers. The gap between public and private schools in Urdu is 18 times the gap between children with literate and illiterate mothers (Figure 1.8).

Figure 1.8: The gap between private and public schools is 8 to 18 times the gap between socioeconomic backgrounds



1.29 *A priori, one might expect to find that there are also differences among government schools and among private schools.* Casual observation suggests that private schools range from elite institutions to temporary schools run by a local high school graduate seeking supplemental income. Likewise, government schools sometimes appear well-managed and staffed but just as often appear dilapidated and mismanaged. Indeed, the data confirm that the stark difference between government and private school performance is not because all government schools are performing poorly and all private schools well. To the contrary, the best government schools are competing head-to-head with even some of the top private schools. Of the top 10 percent of schools in Mathematics, 39 percent are government

schools. In fact, out of the 804 schools tested, the top scoring school in mathematics is a government school. Even on the English exam, 17 percent of the top 10 percent of schools are government schools.

1.30 *The gap between top and bottom ranked government school is truly massive compared to any other gaps found.* The real problem with poor government school performance is the much higher variation in test scores across government schools and the performance of the worst schools. In English the worst government school scored 84 and the best scored 845—a ten-fold difference in performance. By comparison, the worst private school scored 351 and the best scored 850—only a 2.5 fold difference. The difference between good and bad government schools is almost 10 times that between children from rich and poor families. The difference is almost 15 times that between children with literate and illiterate parents. This extreme range of performance in government schools is not the result of two outlying schools. The vast majority of poor performing schools are government schools. Government schools account for 91 percent of schools performing in the bottom 10 percent in Mathematics, 95 percent of the bottom 10 percent in Urdu and the entire bottom 10 percent in English. When government schools fail, they fail completely, and the difference between schools dwarfs the difference between children from different households.

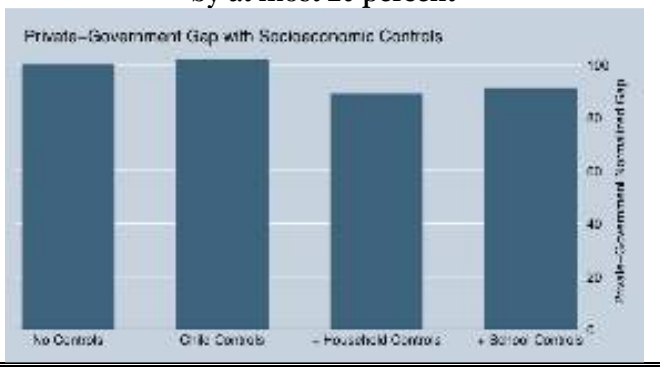
1.31 *The real problem in the government sector is a "long-tail" of dismal schools with no counterparts in the private system.* A clear picture emerges of learning achievement in the sample villages. All villages have good and bad schools. Although there are some differences across children from different backgrounds, these are small compared to that between government and private schools. An average private school has children with higher test scores than an average government school. Third, average performance masks the fact that the top-performing government schools are almost as good as the top-performing private schools; the real problem in the government sector is a "long-tail" of dismal schools that have no counterparts in the private system.

1.32 *An immediate reaction to these results is to point to the differences between private and public schools in their student-body and in their inputs.* One reaction may even be to say that in many ways this is a remarkable accomplishment for these government schools. Attaining top scores with open admittance and large class sizes is considerably more difficult than with a closed admissions process and small classes, regardless of the quality of instruction. Some might say government schools perform poorly because they have children from poor and illiterate backgrounds, insufficient resources, poor infrastructure and very high student-teacher ratios. But does this argument hold water?

1.33 **The nature of the student-body, the quality of school infrastructure and Student-Teacher Ratios (STRs) have little to do with learning outcomes**

1.34 *Even among schools with similar students, similar infrastructure and STR, private schools substantially outperform government schools*. Figure 1.9 starts with the raw gap "normalized" to 100 points, and limits the analysis to Mathematics. A multiple regression framework is used to see how much the gap reduces when including additional controls for child, family, and school characteristics. The first bar introduces child characteristics (gender, age, height-for-age, parental perception of intelligence and self-reported health-status), the second bar introduces family characteristics (education, wealth and home environment measured by the availability of books/media at home), and the third introduces school characteristics (infrastructure index and STR). While adding controls for child and household characteristic reduces the gap by 25 percent, the difference between public and private school test-scores remain large and observed school characteristics fail to explain any of the difference.

Figure 1.9: Controlling for school, household and child characteristics reduces the public-private gap by at most 20 percent

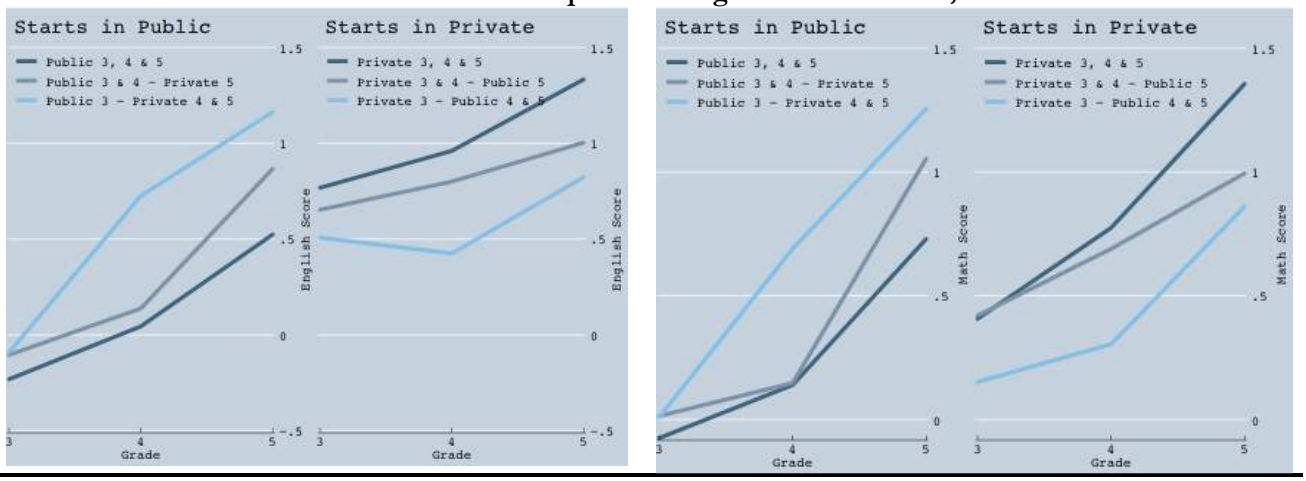


Box 1.5: Field Notes - How Teachers Adjust To High Student-Teacher Ratios

Why is it that greater STR's have no effect on test scores? One reason could be that teachers are imaginative in finding ways to teach even when the STR is high. For example, in a Government Girl's Elementary School in Attock's Mauza number 35 grade 3 has 94 students and a single teacher. It was a big problem to seat them all in one room when it came time for testing, so we used two rooms. When I asked the class teacher how she managed to teach in the class room with such a large number of girls, she said "*it is difficult to teach and manage them in a room. The way I manage them is that there is a monitor for each column and she is sitting at position 1 in each column, she helps a lot while listening to the lessons and keeping the students quiet*". After the testing I found that the school is performing well compared to the other government schools in this Mauza. It made me wonder how well this teacher could do if she had fewer children!
Source: Sarfraz Bhatti.

1.35 *Controlling for a wide group of child, household, and school characteristics makes relatively little difference to the magnitude of the public-private learning gap*. Educationalists and economists will also be concerned with other variables that we cannot control for in the multivariate regression framework; for instance, the ability or intrinsic motivation of the child. If parents send more motivated children to private schools, maybe the test-score difference is due to differences in motivation rather than the type of school. Using the three years of data collected in the LEAPS study, it's possible to show that it is unlikely that the differences are driven by this sort of "selection" on unobserved characteristics.

Figure 1.10: When the same child switches from a government to a private school, she learns more…when she switches from a private to a government school, she learns less



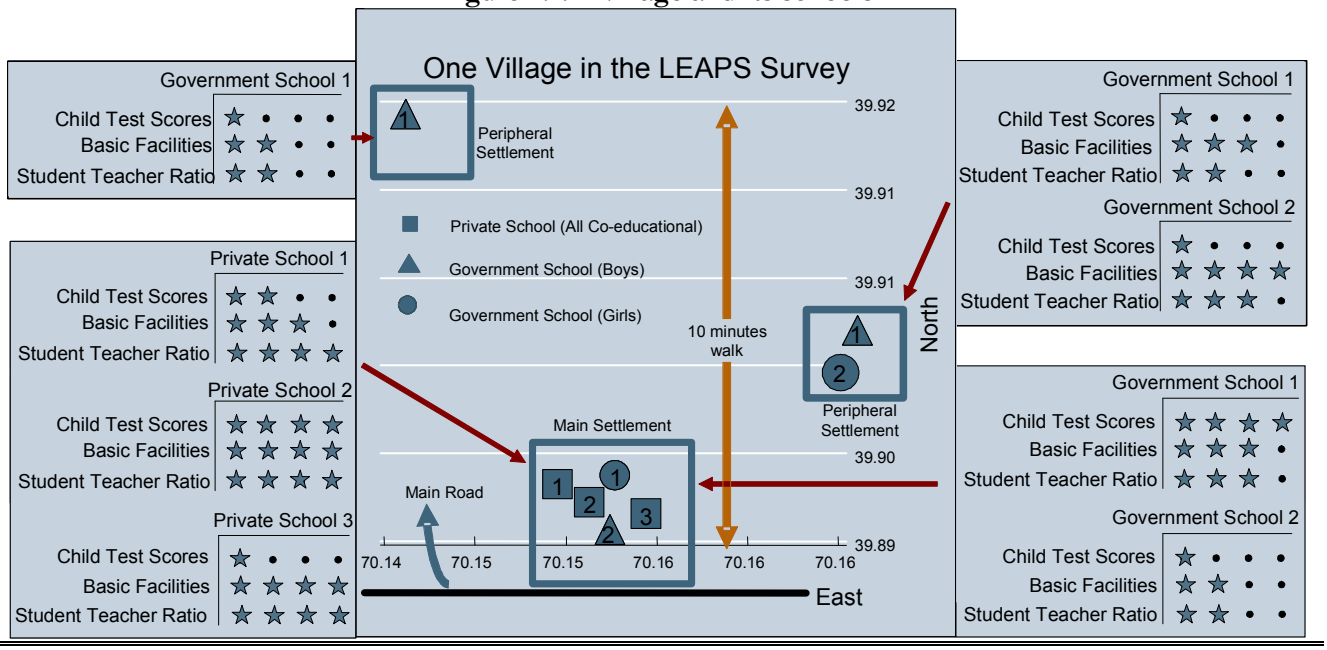
1.36 Figure 1.10 shows one of the formal tests in Andrabi, Das, Khwaja and Zajonc (2007), which plots the test-scores of children who stayed in the same school (type) and those who switched schools over the three years. Children who *switched* into a government school learned less in the year of the switch compared to their counterparts who remained in private schools. This pattern is identical for all three subjects. In contrast, children who *switched* to a private school learned more in the year of the switch compared to those who remained in a government school. Since these same children were followed over time, factors like motivation are unlikely to explain the strong positive correlation between learning switches from public to private schools. While ultimately the public-private gap can best be answered in an experimental framework, all the multi-year observational data suggests that the raw gap in the data is very close to the impact of private schools on learning.

Chapter 2: Are Schools Functional?

2.1. *This chapter highlights basic characteristics of public and private schools in the LEAPS project villages.* It looks at over 800 schools offering primary schooling in 112 LEAPS project villages. That's an average of almost *8* schools serving primary age children in any village. Before starting this work, our view of the schooling environment in a typical village was the same one shared by others in Pakistan—that a typical village is served by one school and that the decision for parents was simple---to send their children to school or not. Similarly, we also held the view that villages with private schools have 2 schools—one government (two if gender separated), one private—and the difference between the two lies in their quality and price. Reality is very different. One-third of all villages and 50 percent of the rural population in Punjab have, on average, 8 schools to choose from. This finding has led to a host of new questions.

2.2. Figure 2.1 depicts the schooling environment of a typical village. The main panel plots the geographical locations of schools in a single village in Attock district using Global Positioning System (GPS) coordinates (the relative coordinates are accurate, but to ensure anonymity, the actual numbers have been changed). The squares are private, circles are government girls' schools, and triangles are government boys' schools. For every school, the stars adjoining the schools show the relative performance in test scores, basic facilities, and student-teacher ratios. Four-star schools are in the top 25 percent, 1-star schools are in the bottom 25 percent.

Figure 2.1: A village and its schools



2.3. The figure shows a cluster of schools in the main settlement and the absence of private schools in peripheral settlements. Among the main cluster of 5 schools—three are private, one is a government boys' school, and one is a government girls' school—and they are all within 50-100m of each other. Apart from this cluster, there are two government schools (one boys' and one girls' East of the village) and a third government school (boys') in the North—these government schools are all in smaller, separate settlements.

2.4. Another pattern is the wide variance in performance, infrastructure, and student-teacher ratios within villages. On average, private schools report higher test scores than government schools, yet there are both well-performing government and poorly performing private schools. In contrast, student-teacher ratios and basic infrastructure is better in all private schools.

2.5. Is the educational marketplace—as depicted—largely representative of the villages in the LEAPS sample? If so, what does this imply for the fees that private schools charge and the types of facilities they offer? The findings in this chapter are directly tied in with ongoing policy debates and initiatives, which focus largely on access to schools, costs, and infrastructure to the exclusion of learning and educational quality.

2.6. This chapter explores three issues that have received considerable attention in recent debates on education policy.

- *Regulating private schools.* Typically, the case for regulation is built either on (a) a desire for standardization of quality; (b) a concern over monopoly abuses or (c) a concern that consumers do not have enough information to make optimal decisions on their own. Chapters 1 and 4 examine the merits of the first and last of these rationales, while concerns over monopoly behavior and pricing are addressed in this chapter.
- *Upgrading infrastructures and improving student-teacher ratios in government schools.* Stories abound of schools being used as cowsheds, schools without roofs, desks or even mats for children to sit on, and classes with 150 children. Indeed, the current education reform program in the province has been concerned about upgrading infrastructure and improving student-teacher ratios in government schools. This section will review the quality of school infrastructure and student-teacher ratios across government and private schools and across different types of villages.
- *The implications of access to both private and public schools.* There is a concern that the presence of multiple schools in the same village may lead to a stratified system of education. These concerns have been expressed not only about stratification by *wealth* across public and private schools, but also by *social* status; the idea that schools are essentially divided along *biraderi* or *zaat* lines. The section looks at the data on the student body in public and private schools, focusing on their parents' wealth, education and caste.

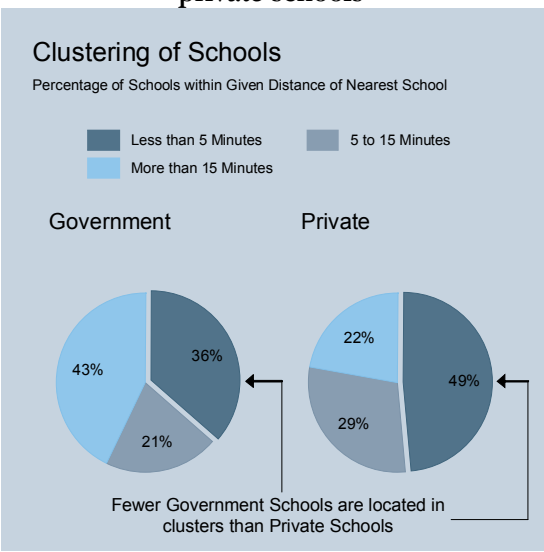
2.7. The analysis in the remainder of the chapter addresses the extent to which the patterns in this village in Attock are observed in the entire sample of data.

I. PRIVATE SCHOOL LOCATION PATTERNS

Private schools are overwhelmingly located in schooling "clusters" in the main settlements of villages. Government schools are located both in the main clusters and on the periphery of the village. Across both types of schools, clustering is more common in richer and more literate villages.

2.8. *Much of what we have to say about private school costs, their infrastructure, and the degree to which they promote segregation within villages is directly linked to the way in which schools are geographically distributed within villages.* Private schools tend to locate closer to banks and health centers (which are generally close to roads and to denser, richer settlements). Upward of 82 percent of all private schools are within a 30-minute walk to a bank and 92 percent are within a 30-minute walk from a health center. By contrast, 60 percent of government schools are within a 30-minute walk of a bank and 71 percent with a 30-minute walk of a health center. A "school overlap" measure computed from the school mapping exercise for the illustrative village in Attock shows that all schools in the main cluster have four other schools within a 5-minute walking distance. The two schools in the eastern peripheral settlement each have one such school and the single school in the northern periphery has none.

Figure 2.2: Most schools are located close to each other…this is particularly true for private schools



2.9. Figure 2.2 shows the different walking times for all schools in the LEAPS project villages and the difference between public and private schools. The pattern is similar to the illustrative village in Attock. Schools tend to cluster within the village—for the average school, 40 percent of all other schools in the village are located within a 5-minute walking distance and 66 percent are located within a 15-minute walking distance. Furthermore, such clustering is more common for private schools than public schools. The average private school has more than 75 percent of the village's schools located within a 15-minute walk while for the average government school this is only 56 percent.

2.10. *An immediate question is whether such clustering patterns will eventually disappear as villages become richer.* As it turns out, in richer and more literate villages, schools tend to be located *closer* to banks and health centers than in their poorer and less literature counterparts. Similar patterns arise using the school overlap measure. In richer villages, 52 percent of all the schools in the village are located within a 5-minute walk of the average school compared to 30 percent in poorer villages. The picture is similar across more- and less-literate villages—villages with relatively high levels of literacy have 47 percent of schools located within 5 minutes compared to 32 percent in villages with low levels of literacy.

2.11. *Most villages thus have a well-defined "school cluster" located in the richer settlement and the clear majority of private schools are located in this cluster.* The fact that private schools locate in close proximity to one another encourages competition and drives down school prices, but their tendency to locate in richer neighborhoods limits the access of the poor to private education. The next section looks at the data on school operating costs and revenues, before turning to infrastructure, access, and potential caste and wealth segregation.

II. REVENUES AND PROFITS

2.12. *School fees in private schools are low on average, priced competitively with small profits, and increase with school quality.* The median revenue of a private school is Rs.1141 a year or Rs.95 a month per child.[6] The median annual school fee is Rs.1089 per child, and this accounts for more than 95 percent of the revenue generated by private schools. Factoring in the costs incurred in running a private school, which are computed in the next section, the median private school makes a *total* annual profit of Rs.14580 or just over Rs.1200 a month. So a private school owner earns as much from running the school as he would from working as a teacher in another private school. Given that this is usually the career option available to the owner, this is the minimum compensation he would require to keep the school functional.

2.13. *In contrast to the "law of one price" in economics, there is considerable variation in private school fees and revenues.* While the median revenue per child is Rs.1141 a year, competitive pricing also implies that all private schools should charge the same amount—this is the "law of one price" in economics. In contrast, the data show large differences across private schools: The bottom 10 percent generate annual revenues as low as Rs.516 per child compared to schools in the top 10 percent, which generate four times as much at Rs.2086 per child (Table 2.1). The same pattern holds for profitability—while the median private school earns total profits of

[6] Government schools are not included in the analysis of school revenue. Unlike the owner/head-teacher of a private school, the government school-head teacher is not responsible for generating or collecting revenue. Government school revenue is essentially transfers from the education department and hence obtained ultimately through public taxation and grants.

Rs.14580 annually, the bottom 10 percent operate at a loss (Rs.71060) and the top 10 percent make a profit of Rs.148850. While capturing revenues and costs in a survey like this (as in most firm surveys) is difficult,[7] the substantial variation in private schools fees and revenues is revealing.

Table 2.1: Revenues and Profits of Private Schools in different types of villages (Rs., 2003)

		Revenue per Student				Total Profits			
		Mean	Median	10th %tile	90th %tile	Mean	Median	10th %tile	90th %tile
Overall	**Total**	1259.4	1140.6	516	2086.1	24713.1	14580	-71060	148850
Wealth	**Poor**	1185.8	1214.9	538.6	1853.1	28211.7	11869	-91800	168660
	Middle	1401.6	1250	548.9	2378.8	35982.0	16870	-45640	143050
	Rich	1175.8	857.4	509.7	2040.8	9810.0	10875	-91440	133515
Literacy	**Low**	1466.6	1239.9	511.9	2405.8	42681.7	20000	-83800	191610
	Medium	1177.9	1155.1	505.4	1881.1	22892.2	5146	-84505	181230
	High	1127.9	1034.5	546.0	1589.5	8307.4	14606	-58215	116300

2.14. *The variation in costs and revenues for private school does not stem from differences between villages.* While villages with higher literacy levels report *lower* school revenues and fees, the differences are not large. It seems that private schools in the middle-wealth villages have the highest revenues and school fees, but again the differences are not large. Similar differences hold for total profits. There are large differences in revenues and fees across private schools in the same village.

2.15. *The failure of the "law of one price" stems from the fact that private schools differ in the quality of education they offer and this is reflected in the fees they can charge.* Schools with better educational quality, more facilities, and convenient locations are also able to charge more. A multivariate analysis relating school fees to a variety of school and village characteristics shows that the most important factor in explaining school revenues per child is the quality of the school. Schools with average English scores one standard-deviation above average (with similar results for other subjects) are able to charge fees almost 20 percent higher. These results also hold for schools within the same village (thus removing all village-level effects).[8] The private sector responds to market conditions and higher quality schools are able to charge higher fees.

[7] Revenues could be over-estimated if schools are unable to raise fees regularly (and there is evidence that parents may not pay on time or fully) or underestimated if schools are able to raise funds through other means (school material fees etc.) that are not reported or if schools fail to report non-teaching staff expenditures.

[8] Schools with better infrastructure and in more central locations charge higher fees, but these differences arise due to differences across villages and disappear once we include village fixed-effects in the regression.

III. SOCIAL COSTS OF SCHOOLING

The cost to society of educating a child in government schools is at least double the cost of educating a child in a private school. These cost savings arise from lower wages for teachers in the private sector.

2.16. *The social cost of schooling must include the total cost of raising money and spending money.* Even if private schools are relatively cheap, education in the public sector still seems relatively "free". However, while the parent may not be directly paying fees in the public sector, society does have to pay this cost indirectly as their taxes go towards paying the costs of creating and running public schools. Moreover, to the extent that the tax burden does not fall more on the rich, the poor/middle-class and salaried may be paying a high cost for such provision. Therefore, if the overall costs for providing education are lower in private schools, a relevant question is whether taxpayers can get more out of their money taking their public dollars and paying for children to attend private schools—the idea behind voucher systems.

2.17. *There are large differences in the cost of educating a child in public and private schools.* The per-child annual expenditure in the median public school of Rs.2039 is twice that of the median private school of Rs.1012. Multivariate regression analysis shows that these differences remain just as large even with controls for parental wealth and education and village wealth and literacy. Moreover, the differences remain even when comparing government and private schools in the *same* village.[9] Furthermore, since the administrative cost of running government schools is not included in this analysis, this estimate is a *lower-bound* of the true cost difference between public and private schooling.

Table 2.2: Private schools are half as expensive as government schools

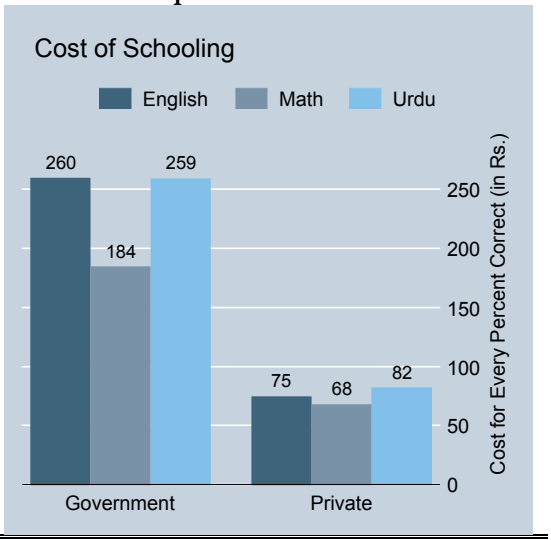
		Total Cost per Student		
		Median	10th Percentile	90th Percentile
School Type	Government School	2039.2	963.7	4006.1
	Private School	1012.1	435.8	2248.8
Village Income	Poor	1608.8	679.3	3898.2
	Middle	1558.834	593.5	3446.2
	Rich	1602.2	436.8	3316.9

2.18. *Private schools cost less not because they have fewer teachers per student, but because they pay teachers a lot less.* The median government school spends almost three times as much per student on teacher's salaries as the median private school. Since more than three-fourths of a school's expenditure is spent on teaching costs (almost 90

9 It is also likely that this is actually an underestimate of the true difference: Since government schools rarely report rental costs of buildings, it is likely that we are underestimating these costs at least relative to private schools that do not own their own premises. According to the Punjab Education Foundation (2006), the cost of educating a child in a government school is Rs.6000 a year, which is more than 3 times the amount reported here.

percent if salaries of non-teaching staff are included), the large differences in per-student teaching costs drive up the overall cost difference between public and private schools.[10] This difference is even more remarkable given that private schools have almost twice as many teachers per students as government schools. Private schools cost less not because they have fewer teachers per student, but because they pay teachers a lot less.

Figure 2.3: The cost per percentage correct is 3 times higher in public compared to private schools



2.19. *The societal "cost of learning" is much lower in private schools.* Putting together the results on learning and costs shows that the quality-adjusted cost in government schools is three times higher than in private schools. Figure 2.3 shows "the cost per percentage correct" on the test. This assumes children in Class III have been through three years of schooling in the same type of school, and then divide the costs accumulated over three years by the percentage obtained in the test for every child. The results are shown for the three subjects tested, and separately for public and private schools. For every subject tested, the cost per percentage in the government sector is at least three times higher than the private sector. The societal "cost of learning" is much lower in private schools.

IV. SCHOOL FACILITIES

With the exception of a few very poorly equipped government schools, most government and private schools have adequate classrooms and blackboards but both lack extra facilities such as libraries, adequate toilets and sports equipment. Private schools however, do offer better school facilities across all categories compared to government schools.

2.20. School infrastructure is valued for its expected input into the educational production function—it is believed that children cannot learn well unless they have functioning classrooms and blackboards and reasonable student-teacher ratios. It also is likely to provide direct intrinsic value. Boundary walls, fans, and toilets make classrooms more comfortable and safe for children and, it is assumed, more conducive to learning. The following discussion reviews the basic infrastructure and student-teacher ratios in public and private schools, "extra" facilities, and differences across public and private schools.

10 These costs may be over-stated to the extent that schools do not report rental costs of buildings they own (in the case of private schools) or do not have to pay rent on (in the case of government schools). However, even if we examine (private) schools that do pay rental, we still find that teaching costs are the largest share of expenditure.

School Size and Student Teacher Ratios

2.21. Table 2.3 reports the mean, the median, the 10th percentile and the 90th percentile for a number of indicators related to school size and student teacher ratios. The typical school in the LEAPS sample has 120 children, 5 teachers, and 7 classes. The median student-teacher ratio is 27, which is below the benchmark figure of 40 suggested by the government. Nevertheless, the student-teacher ratio is a problem in schools in the 90 percentile—the student-teacher ratio for the top 10th percentile of schools is only 15, compared to close to 50 for the 90th percentile. We return to this issue further below.

Table 2.3: Student Teacher Ratios are largely manageable...but there are some schools that are not

	Mean	Median	10th percentile	90th percentile
Students	163.64	119	46	320
Teachers	5.96	5	2	12
Classes	7.45	7	5	11
Students Per Teacher	30.36	27	14.5	49.75

Basic physical facilities

2.22. *The typical school is reasonably equipped in terms of classrooms and blackboards.* Close to 96 percent of the schools in the sample have classrooms and 86 percent of these rooms are permanent structures. These classrooms typically accommodate 33 children. Even without data on the physical dimensions of these rooms, this information alone shows that school facilities are better than generally believed. Similarly, 95 percent of all schools have a blackboard with 26.5 students to a blackboard. However, as with student-teacher ratios, the worst 10 percent of schools have an average of 78 children to a classroom and 60 students to a blackboard.

2.23. *The picture worsens, however, when considering the availability of toilets and seating arrangements.* Slightly more than a one-quarter of schools have no toilet facilities. And those that do seem inadequate, with almost 74 children per toilet. Only 60 percent of schools have desks available and almost one-third only use floors or mats. Parents frequently expressed a preference for schools with better seating facilities.

Additional Facilities in Public and Private Schools

2.24. *Apart from these basic facilities, schools offer little else in terms of infrastructure.* Only one-third of all schools offer *any* of the following extra facilities – a library, a computer facility, sports equipment, and transport facilities. Schools are roughly equally split in terms of which of these four facilities they offer. One may not expect computers to be common in villages, but the lack of sports equipment is surprising. The average village child probably lacks such equipment at home and so the only exposure to this type of equipment may

be at school. The lack of transport facilities suggests that distance will play an important role in school choice and we will examine this in later sections.

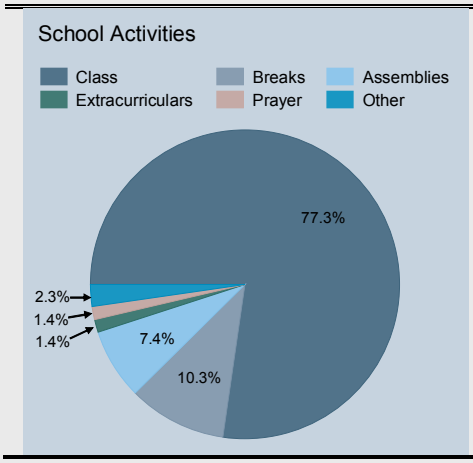
2.25. *Lack of electricity*. It is also worth pointing out that one-third of the schools we surveyed lacked electricity. This may sound minor but most of villages tend to be in fairly hot locations with temperatures rising over 40°C during the school term (schools are closed for summer recess during the hottest months). Since children are likely to learn better in a comfortable environment, this is a serious impediment. It is common on hotter days to see children sitting under the shade of trees rather than inside stifling classrooms.

2.26. A broader issue is whether schools offer an attractive environment for primary school aged children (typically between 6 and 12 years of age) both physically and mentally. To the extent that children can be excited about learning through the use of libraries, or just having a good time at school through organized sports, it seems that most schools in our sample offer no such benefits. This aspect of LEAPS schools is examined in Box 2.1 below.

Box 2.1: Are schools too boring?

Do schools with few facilities over and above the basic necessities affect what children do in school? For many children in high income countries, schools are a fun place to go to, especially at the primary level, not because of the time spent in classes, but because of the extra-curricular and sports activities during the school day. The LEAPS project constructed detailed time charts of a day at school to look at this issue.

Figure 2.4: School Activities



For the vast majority of students, the typical school day lasts 5½ hours. Figure 2.4 shows how the different activities. More than three-fourths of the day is spent in formal classes and the rest of the time is divided into break and assembly times.

Less than 5 percent of the day (30 minutes) involves non-academic activities such as supervised sports, music/art classes, and extra-curricular activities such as drama/debates. The vast majority of schools do not even offer such activities (65 or 8 percent). But most schools have a 30-minute assembly period. Low-cost enrichment programs could add another important element to learning and educational quality.

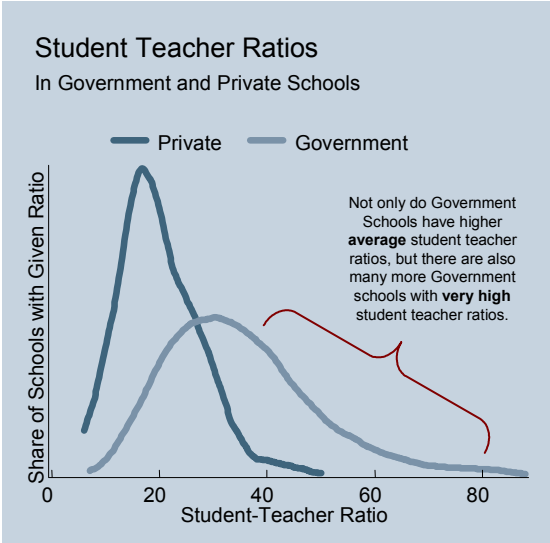
Differences in School Infrastructure

2.27. While most schools report adequate classrooms and blackboards, there is a small but significant fraction that lack even basic facilities. For example, 10 percent of schools have too few (or no) classrooms. Most of these are government schools. Private schools report better facilities overall, and the average infrastructure indicator for government schools is dragged down by schools where there is almost nothing.

Average and distributional differences

2.28. Figure 2.5 presents the *distribution* of student-teacher ratios across government and private schools using a smoothed histogram. The typical private school has almost one-half the student-teacher ratio of the typical government school. As with the results on learning outcomes, large differences exist *within* government schools. The difference between the top 10 percent and the bottom 10 percent in private schools is small (9 students per teacher compared to 33 students per teacher) relative to that in the government sector—17 students per teacher in the top 10 percent and *65* students per teacher in the bottom 10 percent. Out of a total of 823 schools, there are 76 schools (9 percent) with more than 50 students per teacher and almost all (75) of these are government schools.

Figure 2.5: Student Teacher Ratios



2.29. *The results for facilities across public and private schools are similar: private schools report better infrastructure on average while public school figures are skewed by a number of very poorly equipped government schools.* Table 2.4 presents simple mean comparisons of basic and additional facilities in public and private schools. The latter come out looking better with more classrooms, toilets, blackboards, boundary walls and access to electricity. Combining these different types of infrastructure into two "infrastructure indexes" (one for basic facilities and one for extra facilities) yields similar results.[11] There is a 1.2 standard-deviation difference in the basic facilities index between the average private and government school and a 1.4 standard-deviation difference for the extra facilities index. While the best government schools are comparable to the best private ones, there are a number of government schools that are truly dismal. The 10 percent of all schools that have few or no classrooms are almost all government schools. Similarly 80 percent of the 65 schools that have no or inadequate (more than 100 students/board) blackboard facilities are government schools. As with other infrastructure, it is also government schools that typically lack toilet facilities.

[11] In order to undertake comparison in facilities across type of school we construct an infrastructure index using principal component analysis (PCA). PCA allows us to combine a variety of related measures into a single index. The basic facilities index is constructed using four indicators: (i) classrooms per student, (ii) black-boards per student (iii) toilets per student, and (iv) sitting arrangements (like desks). The basic facilities index is the first principal component and by construction has a mean of 0 and standard deviation 1. Higher values of this index mean better facilities. For instance, a basic facilities index of -1 means that the school has 50 students to a classroom, 40 to a blackboard, 250 to a toilet and a 40 percent chance of having desks. In comparison an index value of 1 implies that the school has 20 students to a classroom, 18 to a blackboard, 65 to a toilet and a 90 percent chance of having desks.

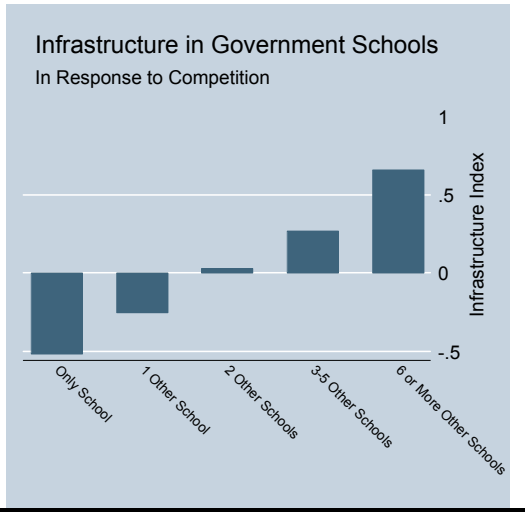
Table 2.4: Average School Facilities (in 2003)

	Government Schools	Private Schools
Number of Classrooms	3.58	4.64
Number of Semi-permanent classrooms	0.41	1.08
Number of Toilets	0.26	0.71
Number of Blackboards	5.04	6.65
Percentage of Schools with a Library	16%	23%
Percentage of Schools with Walls	67%	98%
Percentage of Schools with Fans	44%	91%
Percentage of Schools with Electricity	50%	96%

2.30. *As with the location patterns of public and private schools, village characteristics do not explain the quality of school infrastructure.* There is hardly any difference in student-teacher ratios or the availability of infrastructure across different types of villages. Multivariate regression analysis shows that whether the school is public or private is far more important in explaining these differences than village wealth, literacy, or even the parental education and wealth of students attending these schools.

2.31. *While political-economy stories driven by differences across villages are not consistent with the data, government schools in peripheral settlements generally lack extra facilities like libraries, computers, sport equipment, and transport.* Figure 2.6 divides all government schools in the LEAPS sample into those that have no other school (23 percent of all government schools), one other school (25 percent), two other schools (23 percent), 3-5 other schools (23 percent) and 6 or more schools (5 percent) within a 5-minute walking distance. The number of other schools within 5 minutes is a good indicator of whether the school is in a main cluster or on the outskirts. The vertical axis plots the infrastructure index of the school. What is clear from the figure is that government schools on the outskirts fare worse than those within schooling clusters with a difference of more than 1 standard-deviation in the extra infrastructure index. In a multivariate regression context, controlling for the village that the school is in using village-level fixed-effects, the

Figure 2.6: Government Extra Infrastructure is better in clusters



difference is hardly reduced and remains highly significant. Interestingly, the same variable is *not correlated* with infrastructure for private schools. This finding suggests that the community that the government school is located in may not be the issue, or that private schools are better able to maintain and look after their infrastructure compared to their government counterparts even when located in the same settlement.

2.32. *The fact that differences in basic facilities are driven more by school type rather than village wealth/literacy suggests that problems with inadequate facilities in government schools may not be intractable.* If private schools are able to retain teachers and provide basic facilities even in less desirable environments, government schools can do so as well. The problem appears to be the vast differences in government school infrastructure *within* the same village, with those schools located in central clusters faring better. In 2003, the government recognized that a significant fraction of public schools lacked basic facilities, and one of the focuses of the Punjab Education Sector Reform Program was to provide "missing facilities" in government schools.

Box: 2.2 "Someone from the village stole our water pump"

Whenever we see government schools without desks, without blackboards and without electric fans, our first instinct is to blame the government for not providing these resources. However, providing resources to schools may not be enough. They still need to be maintained and looked after, and our experience often shows that this does not happen.

One school that I encountered during my field work had the resources necessary to improve the learning environment, but was unable to use them. I was working in a village in Rahim Yar Khan and when I visited the government girl's elementary school, the head-teacher came out to meet us. She seemed quite experienced, with more than 15 years in the teaching profession.

The school building appeared to be newly constructed, with six class rooms and a separate office for the head-teacher. Despite the relatively high quality infrastructure, there were no electric fans and children were sitting in temperatures exceeding 45 degrees. When I asked the head-teacher if the school had electricity, she told me that they did have a connection. Were electric fans not given to the school despite the electric connection? The head-teacher replied:

"*The government did give us fans for the classrooms but the doors of the classrooms and office are not strong and are easily broken. If someone steals the fans, I cannot compensate the government for the loss. Already the water pump has been stolen twice. We (the school teachers and myself) had to buy them again from our own pockets. So we have removed the fans and keep them locked separately*".

"*Why don't you involve the community, so that they take care of the resources in the school? This may be a good idea since they are present in the village even at night.*" I asked.

She replied, "*Someone from the village stole the water-pump. They do not have any interest in the school and their attitude towards the school is very negative. We requested the education department for a full time gate-keeper; only if we are given a gate keeper, will our students be able to use the fans during the summer.*"

—Contributed by Irfan Ahmed

2.33. *The data show that infrastructure in government schools has improved between 2003 and 2005, but the improvements in private schools have been even greater.* Table 2.5 uses the 2005 round of the LEAPS surveys and combines it with data on school infrastructure from 2003. There have been dramatic improvements in government schools in terms of the number of semi-permanent classrooms, availability of toilets and availability of libraries. For many types of facilities though, the improvements in private sector schools have been even higher. For instance, the number of semi-permanent classrooms in government schools increased by 86 percent, compared to 127 percent in private schools. While the government sector has shown greater improvements for certain types of facilities (such as toilets), the gap between the government and private sector still remains large and significant.

Table 2.5: Changes in School Infrastructure

	Public 2003	Public 2005	Private 2003	Private 2005	Percent Increase in Government	Percent Increase in Private
No. Classrooms	3.58	3.47	4.64	4.07	-3%	-12%
No. Semi-permanent classrooms	0.41	0.77	1.08	2.46	86%	127%
No. Toilets	0.26	0.36	0.71	0.71	38%	0%
No. Blackboards	5.04	5.19	6.65	7.02	3%	6%
Has Library	0.16	0.26	0.23	0.49	65%	109%
Has Wall	0.67	0.63	0.98	0.92	-5%	-6%
Has Fans	0.44	0.48	0.91	0.94	8%	4%
Has Electricity	0.50	0.55	0.96	0.95	10%	0%

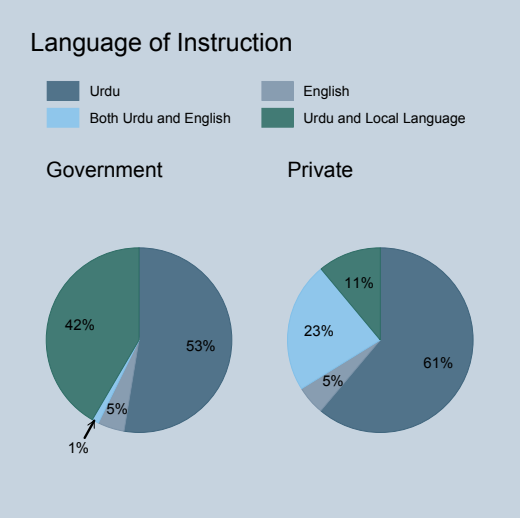
V. SCHOOLING MARKET: POTENTIAL CONCERNS

2.34. *There is a rising concern in Pakistan that the presence of private schools is leading to "educational apartheid".* According to this argument, English medium private schools offer a different level of education—but at a price. Consequently, they are used only by the very rich while the rest are forced to use (lower quality) government schools. The increasing tie-up between English skills and wages means that private schools will offer a way for the rich to become even richer. Compounding the problem of wealth stratification is that of social stratification—internecine and clan-based politics has fed its way into the educational systems and student bodies in schools are coming to represent these divides in the community. At a very basic level, these concerns about different mediums of instruction are true—private schools tend to use English far more as a medium of instruction and almost never teach in the local language (see the box). Yet, the data suggest a more nuanced picture than the commonly heard stories of *perfect* segmentation.

Box 2.3: Language of instruction - English versus Urdu?

More than half the schools in the LEAPS sample use only Urdu, which is not the local language in any of the villages in Punjab, as their medium of instruction. Around 30 percent either partly (in combination with Urdu) or primarily use a local language as well, whereas the remaining 15 percent partly use English. While we find little differences across schools of different types (government or private) or in different villages (rich/poor, level of education) in terms of the length of the class day or time spent on formal teaching, but there are large differences across schools in terms of language of instruction. Figure 2.7 shows that government schools are much more likely to use the local language (Punjabi, Saraiki, Hindko, Pastho) in addition to Urdu as their language of instruction. Private schools are relatively more likely to use English in addition to Urdu in the classroom, and also slightly more likely to exclusively use Urdu. In comparison there are little differences in language of instruction across villages with different literacy levels, although richer villages are slightly more likely to use English (with Urdu) in the classroom.

Figure 2.7: Language of Instruction



Differences across school types ~~(and use of language),~~ do not necessarily lead to educational apartheid to the extent that all types of parents choose what type of school they prefer. It is not the case that the poor or less educated are destined only for one approach to teaching.[12]

[12] For more on language of instruction in Pakistan, see Rahman (1997).

2.35. *The first nuance suggested by the data is that of geographical segregation of private schools.* Figure 2.8 shows greater clustering of private schools and their location in richer settlements. Schools are again divided (as in Figure 2.6) into different categories depending on the number of schools within a 5-minute walking distance—those with no other schools, those with one other school, two other schools, 3-5 other schools and 6 or more schools. It then plots two different variables. The lighter bar shows the percentage of all schools in the relevant category that are private. For instance, of all schools that do not have any other schools within a 5-minute walking distance, fewer than 20 percent are private and the rest are government. The percentage of private schools increases with the number of other schools in close proximity—among all schools with 6 or more schools nearby, 60 percent are private and 40 percent are public. The darker bar shows the average wealth of students attending schools by the same clustering categories. Students in schools located far from any other school are relatively poor, with average wealth levels 0.5 standard-deviations below the mean, and student wealth increases with the number of other schools in the vicinity.

Figure 2.8: Private School Clustering

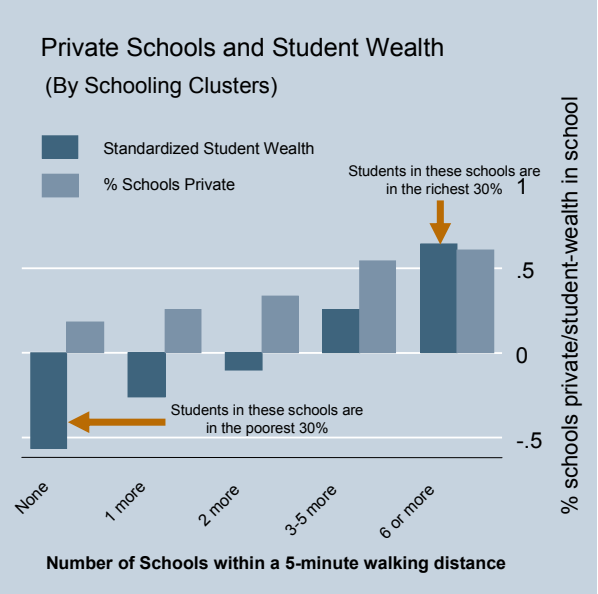
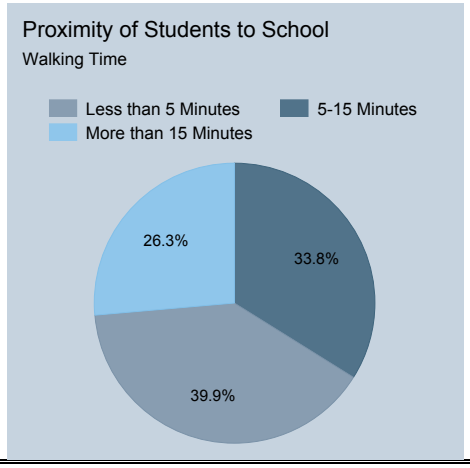


Figure 2.9: Most students come from within 5 minutes of the school

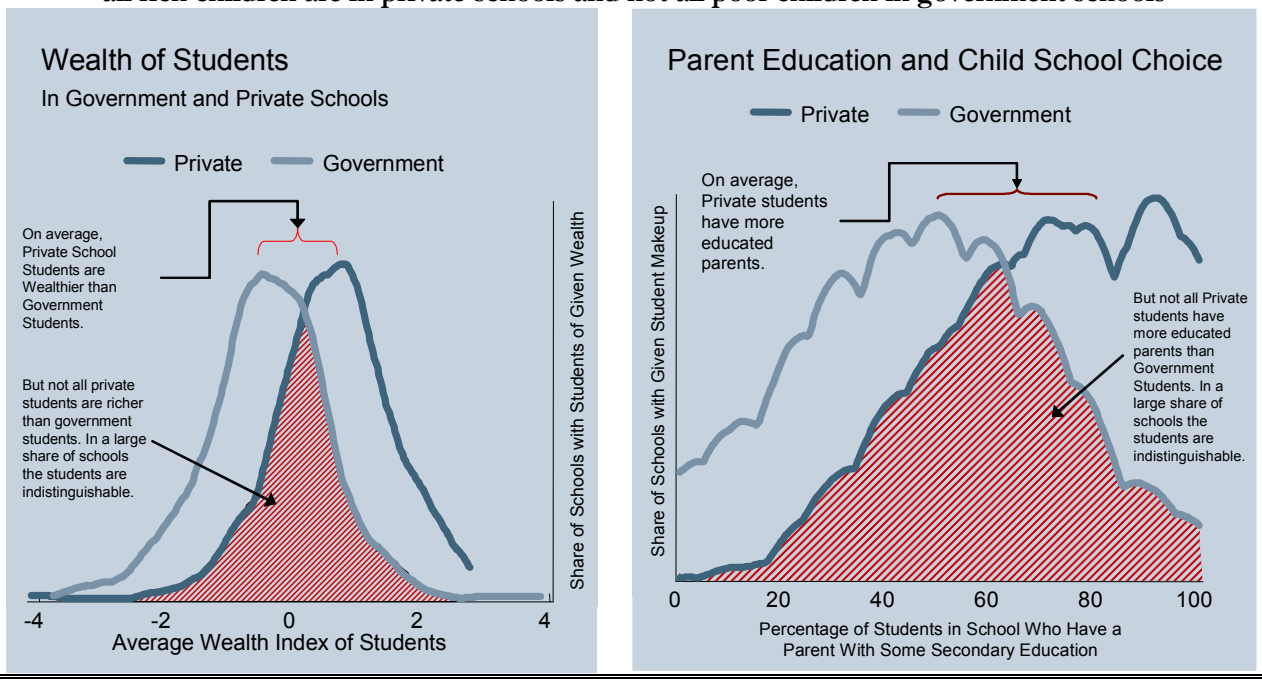


2.36. *Research on education in Pakistan as well as this fieldwork suggests the choice of school may be affected by the distance of the school to the household—a finding confirmed by data presented in the chapter on households.* Figure 2.9 shows what this implies for the student population in a school, in terms of their geographical locations. Here, the graph shows the percentage of children who come to the school from different distances, as reported by the school head-teacher. The overwhelming majority live less than a 15-minute walk from the school they attend, and close to 40 percent come from houses within 5 minutes of the school they attend. The patterns are similar for public and private schools with 38 and 42 percent of all students, respectively, living within a 5-minute distance of the school. Interestingly, in richer and more literate villages, the percentage of children who come from within 5 minutes *increases* by 3-7 percentage points, suggesting that children in poorer villages travel *farther* to school. To the extent that distance to school is an important factor in school choice, the fact

that private schools generally do not locate in peripheral settlements suggest that the poor are *geographically* segregated. Providing incentives for private schools to move to peripheral areas will enhance accessibility for the poor.

2.37. *The second nuance is that, despite this geographical segregation, poor and illiterate parents do also send their children to private schools—typically, such schools have children from all kinds of backgrounds.* Figure 2.10 shows the distribution of household wealth and education for students in public and private schools. The construction of these measures is described in the technical box below. The wealth index has a mean of 0 and standard-deviation 1, and the education index measures the percentage of children in the school who come from households where at least one parent reports higher than elementary education. Both indices show that the parents of children in private schools are wealthier and more educated—these children tend to come from families with wealth indices 1.2 standard deviations higher and 60 percent of private school students have at least one parent with more than primary education compared to 45 percent for those in public schools. Nevertheless, there is substantial *overlap* between the two distributions: Private schools are not composed only of students from wealthy and educated families, and government schools also have students from rich and educated backgrounds. For example, in 13 percent of private schools, more than 50 percent of the student body comes from households where the parents report no education.

Figure 2.10: Children in Private schools come from richer and more educated backgrounds…but not all rich children are in private schools and not all poor children in government schools



2.38. *The third nuance is the lack of segmentation along caste lines.* A school caste segregation index was constructed to estimate the probability that two students chosen from the *same* school will be from a different

caste. An index value of 1.0 for this intra-school fractionalization index indicates that the student body in the school is mixed, since the probability of two students being from different castes is 100 percent. Conversely, a value of 0.0 indicates perfect segregation (the probability of two students in the school being from different castes is 0 percent). The first two rows of Table 2.6 below show that if we look across schools, the probability that randomly selected children from a *given* school will be from different castes is around 0.52-0.53. This suggests that there isn't that much caste segregation *within* schools--if there are two castes in the school, students are equally likely to belong to one of them. However, we may still see segregation across schools if these two castes are not present in the other schools. In order to check for segregation *across* schools we construct a similar index but now look at the probability that two students randomly picked from *different* schools will be from a different caste – an *inter*-school fragmentation index. In this case an index value of 1 means complete segregation. The last three rows of the table show that this measure is 0.78. This suggests that while there clearly isn't full segregation across schools, there is some degree of segregation across schools as this index is higher than then intra-school fragmentation index. Also worth noting is that the social stratification observed in private schools is much the same as in government schools.

Table 2.6: School Segregation

Intra-School Fractionalization	Mean Caste Segmentation Index
Within Individual Government Schools	0.52
Within Individual Private Schools	0.53
Inter-School Fractionalization	**Mean Caste Segmentation Index**
Between Different Government Schools in the Same Village	0.78
Between Different Private Schools in the Same Village	0.75
Between Government Schools and Private Schools in the Same Village	0.73

2.39. *Public and private schools are thus not perfectly segmented by either parental wealth/literacy, or by caste (zaat).* The observed segmentation is driven by a combination of price factors—the poor are less likely to be able to afford the fees of private schools—and distance factors, because private schools are located further from the poor. It is encouraging that apart from these two effects, we do not find private schools systematically discriminating against children from any particular background. Chapter 5 discusses how the price segregation may be addressed through government policy. The segregation arising from location patterns may be harder to address—but it is worth pointing out that the best way of addressing such segregation is by encouraging more private schools to open, rather than trying to close or regulate those already in existence.

Box 2.4: Socioeconomic indices 

Wealth Index

This index is constructed from data collected in a short survey administered in every school to a randomly selected group of 10 students in Class III (or all, if less than 10). Using ownership of different assets as reported by the students, we construct a single wealth index through principal component analysis. The index (with a mean of 0 and standard deviation of 1) is the first principal component and has a higher value for wealthier students.

Education Index

This index is constructed using the fraction of children in a school with at least one parent who has some non-zero level of schooling (similar results obtain if we look at higher levels of parental education).

Zaat Fragmentation Index

This index is a measure of the heterogeneity of castes within and between schools. A value of 1 means that all students are from different castes, while a value of 0 means that everyone is from the same caste. A further explanation of the index is presented in paragraph 2.38.

VI. DISCUSSION

2.40. *This chapter highlights basic characteristics of public and private schools in the LEAPS project villages and how these characteristics differ between schools in central clusters and schools located on settlement peripheries.* It also examines claims that private schools lead to social stratification, and finds little evidence of strong segregation along socio-economic or caste lines. Private schools are almost always clustered in the main settlement while government schools are present in the settlements as well at the village periphery. Three implications follow from these location patterns. First, private school fees and profits are fairly low. The schools that report higher revenues and profits also have a higher quality of learning. The cost to educate a child in the government sector is twice that in the private sector. Factoring in differences in learning implies that the cost-per-percent in public schools is three times that in private schools. Second, basic infrastructure in public and private schools appears to be in place. Private schools do a somewhat better job of providing basic infrastructure than government schools, which have some of the worst infrastructure. Third, there is evidence of segregation arising from pricing and location patterns, but no evidence of discrimination against illiterate or poor parents, or children from different castes. The discussion below suggests how these characteristics can be used to inform a debate on what should be done about schools in the province.

Infrastructure— basic, add-ons, and extras

2.41. LEAPS project villages by and large report functional classrooms, reasonable access to blackboards and manageable student-teacher ratios. The problem appears when we look at additional facilities, such as

electricity, fans and toilets and even more so when we look at libraries and basic sports equipment. Three important questions present a framework for the wider debate.

2.42. *First, what should the infrastructure "package" for a school look like?* Following the division in the chapter, one could think of the "basics" (classrooms and blackboards) and "extras" such as fans, toilets, libraries and transportation. There appears to be a widespread consensus that both the basic and some extra facilities (like bathrooms) should be available in every school. Yet "extras" make schools a fun place for children, and educators often suggest that simple additions that make learning "fun" also make children want to come to school more regularly. What this really hinges on is whether we think of the decision to attend a school as a parental choice, or partly, a choice of the child. The chapter on households shows that parents make very conscious choices about which child to "push" through school, and which child to exert less effort on. The fact that schools are boring means that those children whose parents do not push them to attend school will likely not attend. In our survey, the reasons parents gave for children not attending school were sometimes related to the child's perceptions of school, rather than the opinions of the parents. Reasons for children remaining out of school included reasons such as the child was "afraid of teacher" or "does not want to go to school".

2.43. *Evidence shows that simple things that make schools more attractive lead to large gains in attendance, even without a substantial change in the benefit-cost ratio for parents.* For instance, an experimental school meal program in Rajasthan carried out by the NGO Seva Mandir, dramatically increased enrollment although the cost of the feeding program was much smaller than the wage losses incurred by parents when their children stopped working to attend school. In a detailed evaluation, Ravallion and Wodon (2000) find similar effects in Bangladesh—school meal programs led to large gains in attendance, but no decline in child labor. Recent studies by the International Labor Organization (ILO) find that a large group of children are "idle", in the sense that they are neither in school, nor engaged in child-labor and the chapter on households shows similar patterns for Pakistan. A recent evaluation of a program run by the organization Child Resources International in Islamabad shows that "child-centered" teaching approaches help to improve attendance and test-scores (Naseer and Patnam (2007)). Among primary-age children, the hours saved by not going to school for out-of-school children are not spent working—they are spent playing. The fact that most out-of-school children are "idle" suggests that increasing enrollment may not be that hard since it does not need to address the trade-off between schooling and wages. Making schools "child-attractors" by putting in extra facilities, such as small libraries could improve enrollments substantially.

2.44. *Second, what is process by which decisions are made to renovate or put in place new infrastructure in public schools?* Under the Punjab Education Reform Program considerable funds were spent to provide and repair "missing

facilities". The situation has improved for many schools since 2003, but improvements in private school infrastructure were even *greater* during the same period, without any financial assistance from the government. Not surprisingly, in recent interviews head-teachers expressed concern that there is no clear mechanism for petitioning the education authorities to fulfill an infrastructure need. When such petitions are made, there is often no response. Given that the condition of infrastructure varies dramatically across schools, there is a clear need for a process to meet needs in a timely and targeted fashion, rather than by blanket provision. In addition, the current stock of infrastructure requires maintenance. Communities are often implicated in the improper use of school infrastructure. Maintenance is a critical issue that requires imaginative solutions.

Village level school locations: who decides?

2.45. *Who should decide where to locate a school?* The decision of where to place a government school becomes far more complicated once private schools enter the picture and we recognize that there are multiple settlements with differing population characteristics in the same village and there is a strong relationship between distance and enrollment. The problem of access to schooling is illustrated in village after village by the large variation *within* the same village— some schools have 2 teachers and 200 children and others have 8 teachers and 90 students. This huge variation reflects large cost differences in educating children in the government sector, which can be as low as Rs.400 per child per year to as high as Rs.8000 per child per year.

Box 2.5: Locating a school? Who decides?

In one of the sample villages, there are two government girls' primary schools. One school was built in 1973 and the other was built in 1987. The government girls' primary school is a little bit further from the main settlement, but still less than a 15-minute walk. There are three teachers and 35 students.

When we visited this school and talked to the teacher about the small number of students, she told us that this school was the first school in the village but the Nazim approved a new government girls' primary school in the main village settlement instead of upgrading this old school. Parents now prefer to send their children to the newer school, especially when they are living in the main settlement.

The teacher told me that their school was in the fields and there is no boundary wall; sometimes they find dangerous animals in the school and two days ago, when she opened a cupboard there was a snake in it. The government is spending almost Rs.17500 every month on teachers' salaries, which means it costs Rs.6000 per child per year.

I don't understand why the government did not check before opening the new school if there is already a school near the "settlement" or in the "settlement", and if there was, whether they should close or upgrade it when they built the new school.

—Contributed by Kashif

2.46. *Balancing the needs of a peripheral village settlement with a poor population and a main village settlement with a large number of private schools is difficult.* Government schools in peripheral settlements significantly improve equity in access to schooling—the children attending these schools are usually from poorer families and are at risk of bypassing education entirely without access to these schools. In main settlements, government schools compete directly with private schools and there are several such schools with few students. Access here is not an issue. The real question is what would happen to enrollments if these schools were shut down? The type of data that is collected by the province cannot be used to inform such a decision since school codes used in the Educational Management Information System (EMIS) do not allow easy mapping of schools to villages. As incredible as this may sound, there is currently no easy way to identify the number of schools in every *village*, which of course precludes going below this level to the settlement. The single exception is the recently completed school census, which details all schools in the country, both public and private, and identifies them by the village they are in. Ensuring access to these data would support a greater understanding .

2.47. *An important first step would be to pull together data on the locations of schools and make them public so that researchers and planners can come up with potential solutions with full access to the relevant information.* Having such data would make it easier to set up a process for setting up or closing down a school and deciding how teachers could be relocated within schools in the same village. A central allocation of teachers to specific schools in a village may be less efficient than allowing Village Education Committees to make these decisions taking into account their specific environment. Again, within the Pakistani context and the existing structure of power relations this may or may not work.

Should private school fees be regulated?

2.48. Regulating private school fees is a topic of regular discussion among policymakers. In some areas such as Islamabad, measures have been taken to ensure that private schools are charging "appropriate" fees. The argument for regulating prices can stem from one of two economic rationales: (a) either the firm (private school) being regulated is a monopoly with excessive profits or (b) that lack of information on the part of consumers leads to prices that do not reflect quality.

2.49. *The results highlighted here from the schooling environment in Punjab villages suggest that justification for either of these rationales is weak.* Private schools are overwhelmingly located in school clusters and therefore behave in a highly competitive manner. In fact, the only potential monopolies in these environments are government schools located outside the main settlement where children have no other choice. Consequently, private school fees are relatively low and profits roughly correspond to the monthly wage of a private school teacher.

This is precisely the opportunity cost of the private school's head-teacher. Finally the considerable variation in private school fees suggests that fees respond to quality. A school with average test scores (across all three tests) charges Rs.1000 per year; a school with test scores 2 standard-deviations above the mean charges Rs.l800 per year. Some private schools are more expensive because they are better.

2.50. *In such an educational market attempts to "control" or regulate prices will result in compensating action by private schools.* For instance, capping the prices that private schools can charge implies that those providing quality levels above that justified by the price will either lower their quality or shut down. Undoubtedly, there may be some private schools where profits are not excessively high, or prices are above those justified by the quality of learning, but cracking down on a few such schools could well impose a heavy regulatory burden on the rest. Instead, given that there may still be a concern that parents are not adequately informed about school quality, an alternate approach would be to foster competition between schools through standardized testing and the provision of report cards. The LEAPS project initiated such a scheme and the initial results of the randomized intervention appear quite positive: Providing information on the relative performance of schools to parents induced greater competition between schools and raised their investments, leading to improvements in learning outcomes for the average child, and even more so for those who started off at lower levels of learning.

Social costs and private schools

2.51. Consider the following arguments:

> *"Governments should get out of the provision of education and focus only on its financing. Figure 2.14 is the reason—if the cost-per-percent in public schools is three times as high as in private schools, it is much cheaper to let the money follow the child by providing vouchers and letting children decide where to go."*

And,

> *"Private schools can never provide education to the poor, because they are interested only in making profits. Look at Figure 2.7. It is clear that private schools locate only in the richer settlements of the village, and where government schools are already present. If government schools are shut down, how will poor children in peripheral settlements get access to schooling, which is their constitutional right?"*

2.52. This chapter shows that both statements are correct. Costs of learning are far lower in private schools and their fees are set in a competitive fashion since they are located in schooling clusters. The downside of these location patterns is that private schools are seldom found in peripheral settlements where households are poorer. Despite criticisms, the government is delivering education in an equitable manner. Not only are basic infrastructure and student-teacher ratios similar in rich and poor villages, but government schools are often the only access to education for children outside the main settlements. Data from the

National Education Census (2005) confirm that these patterns hold for the entire country—there are more government schools per capita in poorer compared to richer villages.

2.53. *The correct policy (or "public-private partnership") would seriously consider the spatial distribution of the population in a village and the access to schooling.* For instance, vouchers may leave a lot of children out of school if they are insufficient to cover the cost of educating children in peripheral areas. Alternatively, where private schools are already operational, vouchers may make a lot of sense given the dramatic differences in cost-per-percent across public and private schools.

2.54. *What is also clear is that the main reason for these large cost differences between public and private schools is the compensation of teachers.* The wage-bill in private schools is less than one- quarter of that in government schools; controlling costs thus has everything to do with limiting the wage bill and restructuring teacher compensation. The next chapter turns to this difficult topic.

Chapter 3: Do Teachers Teach?

3.1 *Improving teacher quality and performance has been central to most educational reform efforts in the world.* A decade of research on learning outcomes confirms that teachers are the most important school-based input: a school with leaking roofs, no textbooks, and uninvolved parents can still produce good learning outcomes for students if the teacher is motivated and committed.

3.2 *A close look at teacher characteristics and compensation reveals dramatic differences between government and private schools*: A teacher in a public school is absent one-fifth of the time and has students that perform very poorly but still earns 5 times more than a teacher in a private school who is present nearly every day and has students that perform very well. One implication may be that the educational system would *benefit* if this government teacher were to stay at home, pocket 85 percent of his salary and use the other 15 percent to pay a teacher in the private sector to take his/her place. This chapter shows that such compensation schemes may still have benefits if used appropriately. The chapter analyzes why and how government and private compensation schemes are so different and suggest ways to build on the strengths of both to improve the overall quality of education.

3.3 *Comparing how the private and public sectors rewards teachers offers insight into what factors matter in the "production" of education.* In a healthy education marketplace private sector wages reflect productivity (more effective teachers are paid higher salaries) and outside opportunities (good teachers have multiple job opportunities). The report examines teacher demographic and educational characteristics in both sectors, incentives in the form of compensation policy and the system of monitoring, as well as the effect of these incentives on teacher effort as measured by absenteeism and student outcomes as measured by test scores.

3.4 The focus of the LEAPS survey on villages with both private and public schools is of particular value, since we are able to compare teacher demographic profiles, characteristics and compensation differences within the same village and can appropriately correct for geographical effects in the analysis.

3.5 *The data suggest that private and public schools exist in different and separate systems*. On most dimensions of interest—teacher profiles, competence, effort and rewards—a series of the public-private distinctions dominate the landscape:

- *Teacher selection and hiring practices differ*. The government sector hires teachers based on education and training qualifications. Contrary to views that richer villages or schools with richer children receive the best teachers, the data show government teachers are *equitably* distributed across villages and schools. The private sector hires primarily locally born and resident young women, most of whom do not have a post-secondary degree or formal teacher training.

- *Teachers in private schools are paid a fraction of the salary of public school teachers earn*. After controlling for observed differences, government teachers are paid between 3 and 4 *times* as much as their private counterparts. But the story is not just restricted to level differences in salary; the reward and penalty structure of teacher pay is radically different in the two sectors as well.

- *Government salaries are largely determined by experience, education and training*. Private sector compensation schemes are more complex—not only do they reward teachers for effort and performance, they also respond to the *outside opportunities* available to the teacher. Those who are likely to be paid higher in jobs outside the teaching sector get higher salaries

- *Once hired, accountability for teachers in government schools is limited*. Job retention is used to leverage teacher performance once they are hired, but teacher turnover is very low and most of it happens as a result of routine transfers, not firings for absenteeism. Turnover in the private sector is high and frequent—close to 25 percent of teachers are replaced every year. This frequent turnover may hurt the private sector, but it also allows constant replenishment of the teaching workforce and pruning of non-performing teachers.

3.6 *The government system rewards inputs and the private sector rewards performance*. The private sector responds to local conditions, the government sector does not. Combining these two systems presents an opportunity for public-private partnerships to enhance educational outcomes. There may be better solutions even under the current compensation scheme followed in government schools. A series of facts and findings based on special purpose data collected through the LEAPS project is used to frame the subsequent discussion.

Box 3.1: What we know about teachers

Studies on teacher performance in the United States and countries around the world systematically show that teachers matter.[13] For most other schooling inputs (infrastructure, student-teacher ratios, direct funding to schools, provision of textbooks and others), careful empirical work finds little consistent evidence of a link with student achievement. In contrast, there are some teachers whose children learn systematically more; others whose children learn systematically less. However, while it has been easier to show that "teachers matter", it has been very difficult to pinpoint *what it is* about teachers that matter—typically, experience matters only in the first year of teaching and qualifications and training have very little effect. These findings have led researchers to hypothesize that intrinsic motivation and aptitude for teaching are the most important determinants of teacher effectiveness.

The findings from the United States and other rich countries may or may not hold for countries like Pakistan. The problem is that because educational systems in the richer countries already ensure that only highly educated and trained teachers join the workforce and already have well-designed monitoring mechanisms to ensure that teachers show up for work, the differences between different teachers are small.

The differences among teachers qualifications and work ethic in Pakistan and South-Asia is generally large—there may be teachers with only secondary education and others with a masters degree; there are some teachers who don't show up for work and some who are present every day.

The literature on teachers in South Asia is small. Kingdon and Teal (2005) compare teacher incentives and student outcomes in 30 private and government schools (172 teachers) in one Indian study. Murgai and Pritchett (2006) cite secondary data and use household survey data to look at teacher wages in both sectors, arriving at conclusions very similar to those presented here. In Pakistan, the work on teachers has typically been conducted in education departments. Recent "experiments" from India on the importance of teacher incentives and monitoring is discussed later in the report. However, while this strand of research has led to many interesting studies on teacher development and professionalism, there is no evidence to link teaching inputs and student outcomes in Pakistan.[14]

Part of the problem is data. Publicly available data sets exist on public schools such as provincial Educational Management Information Systems (EMIS) and one-off data sets on private education by the Federal Bureau of Statistics (FBS). But most research on education comes from household data sets (Pakistan Integrated Household Surveys conducted by the FBS) which have little usable information on teachers. Labor force surveys have not been exploited in any depth.

However, the lack of data has not hampered the introduction of "reforms" and changes in the teaching sector that have yet to be evaluated for their impact on student outcomes. Examples include creating a cadre of English language teachers, the introduction of contract teachers, and large-scale, province-wide teacher training programs conducted by the University of Education. Numerous smaller programs conducted by various NGOs and donor initiatives that have not been formally analyzed. Understanding how government teachers function, what reforms are necessary, and where to go from here requires a detailed study of the existing system of teaching linked to student outcomes.

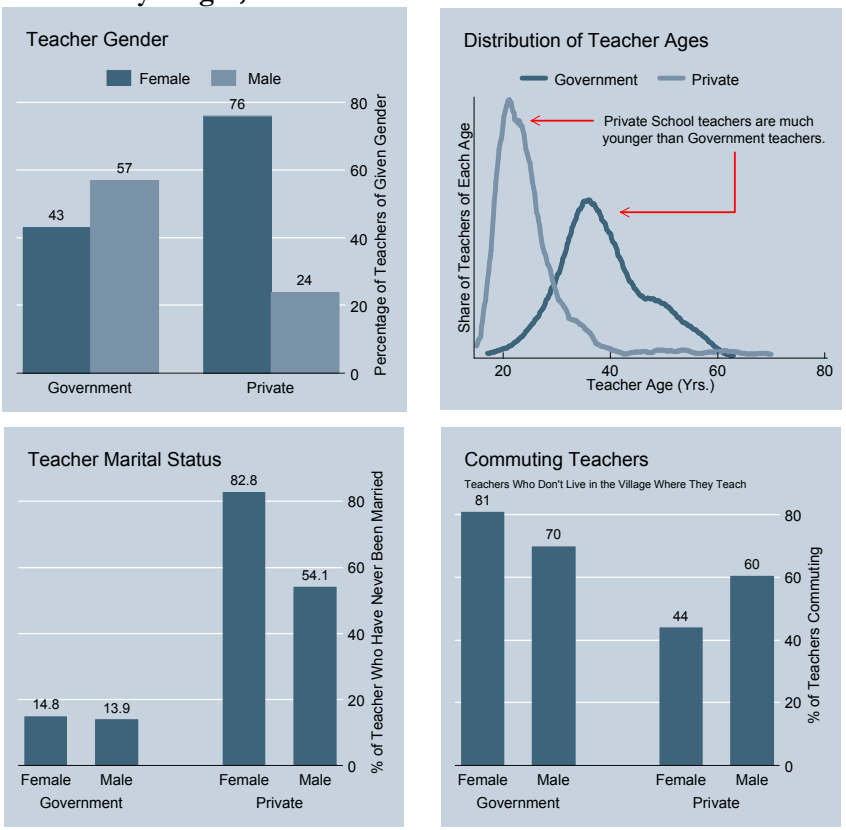
[13] See Hoxby (1996), Glewwe, Ilias and Kremer (2003),Vegas (2005) and references therein.
[14] For an example of Aga Khan University's work, see
http://www.aku.edu/ied/raps/policydialogue/dialoguekeyedu/discussionreports/report1/index.shtml

I. FACTS AND FINDINGS

The geographic and demographic profiles of public and private teachers show that they are drawn from two completely different groups. On paper, the government sector is *much better positioned* to deliver quality education than the private sector, and in a highly equitable manner. Does it actually do so? And if not, what are we to learn from the relative performance differences in learning outcomes between the public and private sectors?

The overall demographic profile of teachers differs dramatically across the government and private sectors. Teachers in private schools are more likely to be female, younger, unmarried, and from the local area.

Figure 3.1: Private school teachers are predominantly female, younger, unmarried and from the local area…



3.7 *Teachers in private schools are predominantly female, younger, unmarried, and from the local area.* Figure 3.1 summarizes the dramatic differences in the demographic profiles of teachers in the government and private sector. The top left corner shows that the gender distribution of teachers—76 percent of private school teachers are female compared to only 43 percent in the government sector. And the teachers in private schools are a lot younger. The figure on the top right corner shows that the age distribution among private school teachers is highly concentrated around 21, while the age distribution of government school teachers is more dispersed with an average close to 40.

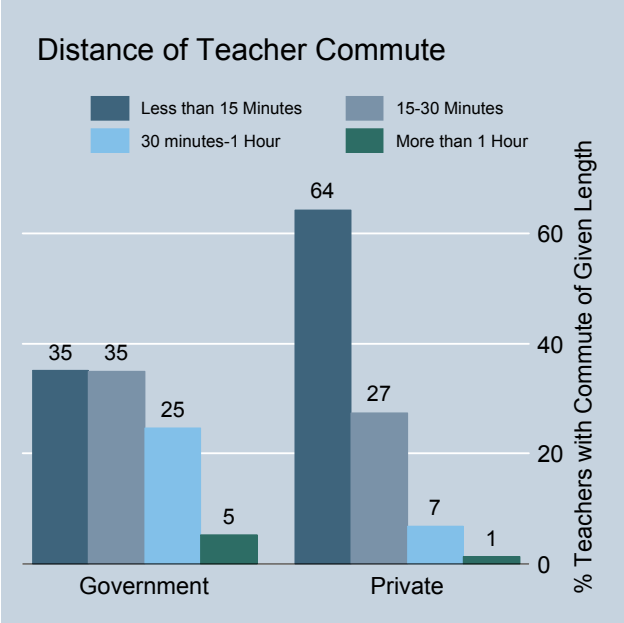
3.8 As a consequence of the younger age profile, most teachers in private schools, especially women, are unmarried (bottom left). Furthermore, in the private sector there is a large difference in the percentage of

unmarried female versus male teachers (83 percent vs. 54 percent), but in the government sector there is none (both are just below 15 percent).

Box 3.2: What data are required for this first look at the teaching sector?

The LEAPS project developed questionnaires to collect detailed information on teachers in the sample schools. The survey results provide a unique, detailed look at teacher profiles, competence, effort and reward structures in Punjab. The teacher roster questionnaire collected basic information on salary, education, training, experience and basic demographic information on every single teacher in the sample schools. This gives us data on 4,878 teachers, of which 4,825 are in government and private schools and 2,826 are female. [15] This teacher roster captures the maximum breadth and diversity of the teacher information across government and private schools, as well as rich and poor villages.

Figure 3.2: Private school teachers live in the local area



3.9 The detailed teacher questionnaire was administered to the class teacher of the grade tested in the LEAPS project (typically one teacher per school) and provides more extensive information than the roster—for example these teachers were administered tests as well The teacher data is linked with student test scores on specially designed tests for Class III children and to the socioeconomic profiles of the children in the classrooms.

3.10 *Government and private school teachers differ in where they come from and how far they travel to work.* According to data on the teacher's village of birth and their current residence, a greater fraction of both females and males in private schools (56 and 40 percent, respectively) were born in the village where they currently work than in government schools (19 and 30 percent for females and males, respectively) (Figure 3.1, bottom right). Private school teachers who may not have been born in the village appear to frequently become part of the local community. Figure 3.2 looks how far teachers live from the school they teach in—65 percent of private school teachers live within 15 minutes of the school while only 36 percent of the government school teachers do so.

[15] 51 (< 2%) are in NGO schools. They are excluded from the discussion.

3.11 *Both measures of "local hiring" (village of birth and current residence), increase dramatically with village literacy*. The percentage of local teachers by place of birth increases from 28 percent for the least literate villages to 48 percent for the most literate. The difference is even larger if we look only at private schools: 39 percent of teachers are of local origin in the least literate villages while 66 percent are of local origin in the most literate village. The same pattern also emerges when we look at the distance traveled to school by teachers. The percentage of teachers who live within 15 minutes of the school increases from 38 to 60 percent moving from the least to the most literate villages.

3.12 *In summary the use of local teachers in private schools increases dramatically as the supply in the village—measured through village literacy—increases*. The average teacher in a private school is a young, unmarried female teacher who is very likely born in the village where she is teaching and lives close to school. Teachers in government schools are older, married males who were neither born locally nor live locally. Furthermore, for private schools, the use of locally resident teachers increases dramatically as the supply in the village—measured through village literacy—increases; there is some evidence of an increase in government schools as well, but the difference is smaller.

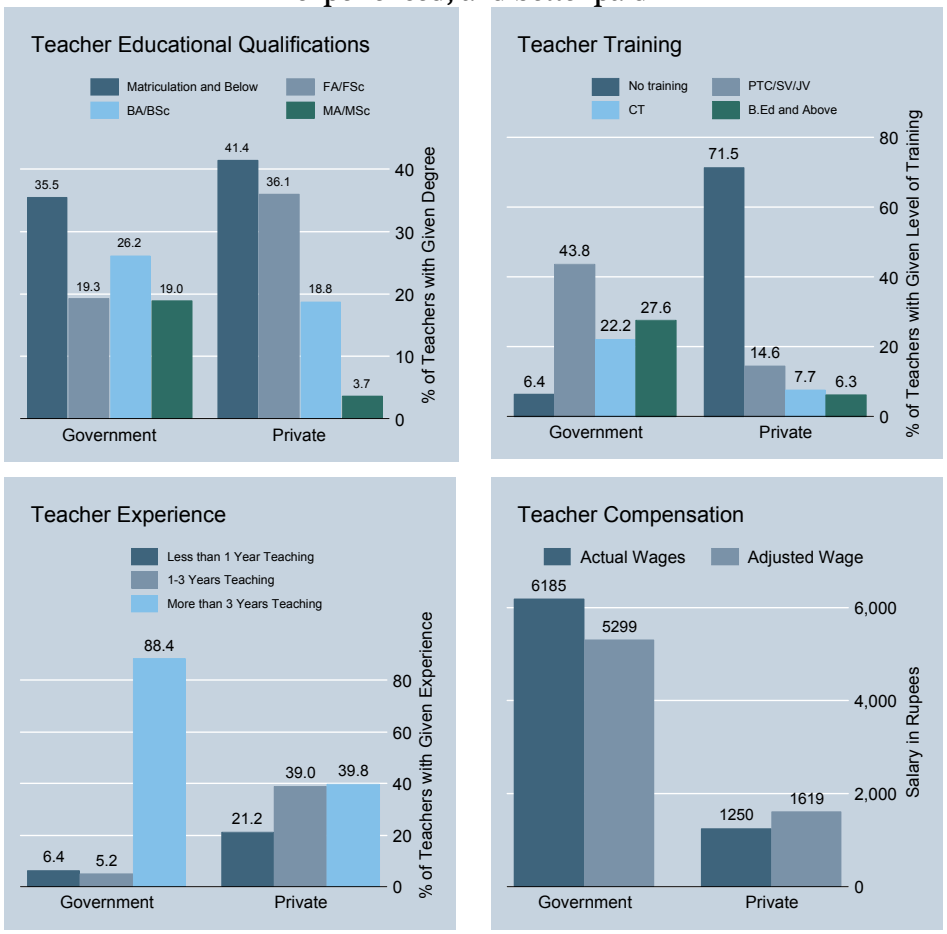
On the basis of observed characteristics, government school teachers look much better qualified. They are more educated, better trained, and have more experience. They are also paid a lot more than their counterparts in the private sector.

3.13 *Government teachers are more educated.* The government sector follows a strict and consistent hiring policy for teachers. A large fraction of government teachers is highly educated—19 percent have a master's degree (MA) and another 26 percent hold a bachelor's degree (BA). In contrast, only 4 percent of private school teachers hold a master's degree, and 19 percent report a bachelor's degree (Figure 3.3, top left). The male-female differential in educational attainment in the government sector is also less pronounced than that in the private sector: 38 percent of female teachers hold at least a BA compared to 51 percent for male teachers; the equivalent numbers for the private sector are 17 and 39 percent.

3.14 *The differences in education within the government sector stem largely from different age cohorts.* Over time, the educational qualifications required for joining the government teaching cadre has increased, so that younger and newly hired teachers are more educated—in the latest wave of teachers hired on a contractual basis, more than 93 percent reported a bachelor's or higher degree. The lowest educated teachers in the government sector are usually the oldest—matriculates for instance, report a median age of 40 compared to 35 years for those with a bachelor's degree.

3.15 *The private school age-education profile is quite different with age and educational outcomes positively correlated.* The median age of a matriculate is 22 years and for more advanced degrees, age increases from 23 years for completed secondary schooling (FA) to 25 years for a bachelor's and 29 for a master's degree.

Figure 3.3: Government teachers are more educated, better trained, more experienced, and better paid



Government teachers are better trained. Teacher training is a government requirement; only 6 percent of government teachers report "no training". The bulk (43 percent) holds a Primary Teaching Certificate (PTC) while the remaining 50 percent are divided between CT (that typically goes with FA) and the higher-level Bachelor of Education degree. More than one-fifth of all government teachers in our sample report a Bachelor of Education or higher degree. Educational attainment among private school teachers varies widely; more than 70 percent report no training at all and only 14 percent report a Bachelor of Education or higher degree (Figure 3.3, top left).

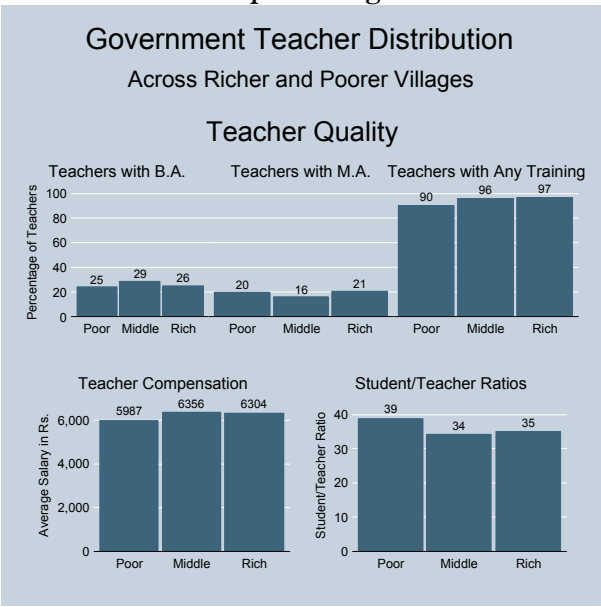
3.16 *Government teachers are more experienced.* Not surprisingly given the older age profile of government teachers, 88 percent report three or more years of total teaching experience, with no difference in experience profiles between men and women.[16] The situation in private schools is quite the opposite: 21 percent were in their first-year of teaching ever and only 40 percent report three or more years of experience in the teaching

[16] Our question on experience was categorical with three categories--<1 year of experience, 1-3 years of experience and >3 years of experience.

sector. Furthermore, women are generally less experienced than men—42 percent of the teachers who are female report 1-3 years of experience compared to 21 percent of men.

3.17 *Government teachers are better paid.* Finally, government school teachers are much better paid. The bottom right corner of Figure 3.3 plots average wages of government and private school teachers. To control for the objection of comparing apples and oranges—government teachers are paid more simply because they are more educated and better trained—salaries in the public and private sector were regressed on teacher characteristics to control for potential differences in education, qualification, and age. The figure shows both the unadjusted wages, which is just the average in the two sectors, and the "adjusted" wages, which are wages in the two sectors controlling for observed characteristics. It is immediately clear that private teachers earn a lot less than their government counterparts. The unadjusted wages in the private sector of Rs.1250 a month are almost 5 times less than the government sector wage of Rs.6185. Although some of this difference can be attributed to differences in teacher profiles, controlling for these differences (but retaining the assumption that compensation *schemes* are the same in both sectors) makes little difference—teachers with identical profiles are paid 3-4 times as much in the government compared to the private sector. In particular, a 25 year-old female with a bachelor's degree, 1-3 years of experience, and a 2-year teacher training course residing locally (thus controlling for age, gender, education, experience, training and residence) would earn Rs.5299 in the public sector, but only Rs.1619 in the private sector. [17]

Figure 3.4: Teacher education, training, wages and student-teacher ratios are very similar in rich and poor villages

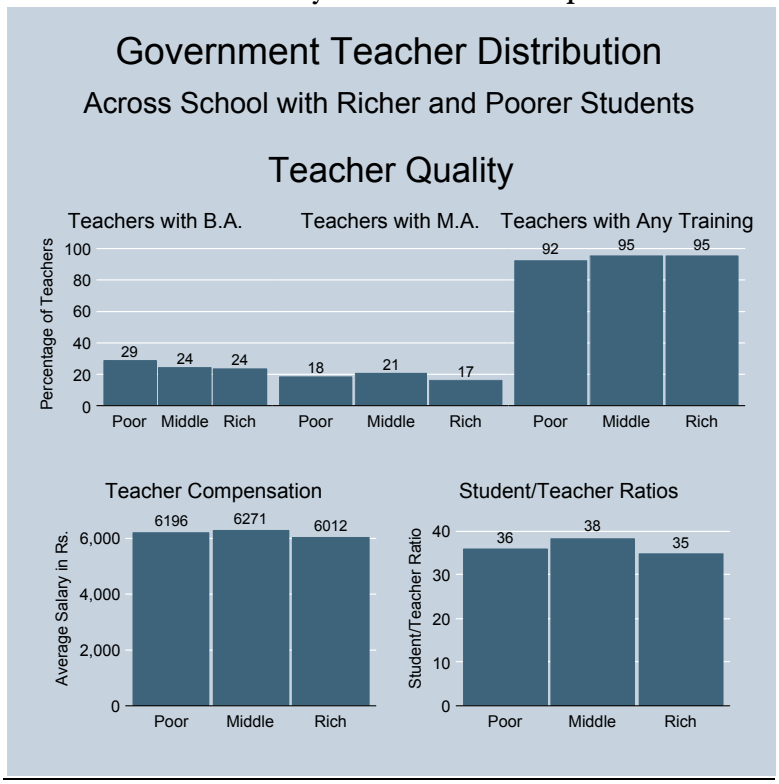


Government teachers are evenly distributed across poor and rich villages and poor and rich schools

3.18 *There is no systematic difference in the placement of government teachers in villages of different socioeconomic levels.* A political economy story, oft-repeated in the Pakistan case, suggests that less-educated teachers are placed systematically in poorer villages that have less influence in provincial education departments. Even within villages, it could be that schools with richer children have more "bargaining" power and hence get the best teachers.

[17] The adjusted wages assumes that returns to characteristics are identical in the public and private sector. We return to this technical issue below.

Figure 3.5: Teacher education, training, wages and student-teacher ratios are very similar in rich and poor schools



3.19 Figure 3.4 shows there is little evidence that better teachers are allocated to richer villages or schools, at least on the basis of observed qualifications. Figure 3.4 uses the LEAPS population census of all villages in the sample to classify villages as rich, middle, or poor in terms of household wealth—the same classification used to look at enrollment in the introduction and the chapter on learning. The top panel of the figure looks at teacher education and training in these three types of villages; it shows the proportion of teachers in the public sector who hold a bachelor's degree, a master's degree, and who report some training. The bottom panel looks at teacher wages and student-teacher ratios—the latter because it could be that the government allocates fewer teachers to poorer villages. Figure 3.5 replicates the top and bottom panels of Figure 3.4, using school instead of village wealth—the school wealth measures are derived from the asset index of 10 randomly selected students in Class III of every school.

3.20 Both figures show that, at least in the Pakistani context, village and school wealth are not correlated with teacher education levels, teacher training, teachers' wages or student-teacher ratios. Neither are they correlated with teachers' wages or student-teacher ratios. Disaggregating teachers by gender or looking at variation in education within each sector does not change these results. Although these data are only for the sample of villages with a private school and therefore do not say much about smaller villages, there is currently little evidence that more educated or better-trained government school teachers are sent to wealthier villages or schools.

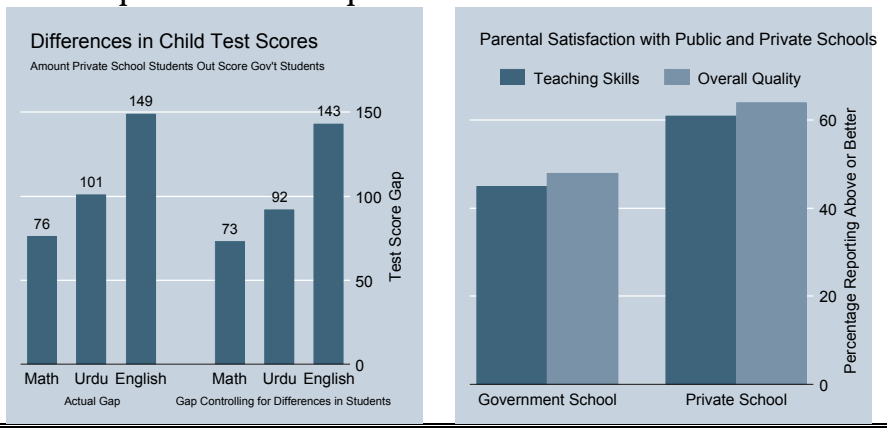
3.21 On paper, the government sector looks much better positioned to deliver quality education than the private sector, and in a highly equitable manner. Government schools are staffed by well-educated and trained teachers, with lots of experience; the government also ensures an equitable distribution of teachers across

villages and schools. In contrast, the private sector looks quite bad—teachers are inexperienced, less-educated, and almost without exception, have little teacher training. They are also paid less, and turnover is frequent. Schools must constantly recruit new teachers. The inputs approach to education would argue that the government sector is doing everything right and the private sector is, in comparison, is doing less well and has severe staffing issues.

3.22 *But private schools are significantly outperforming government schools.* Inputs are important in that they are the instruments through which preferred outcomes are achieved, but ultimately it is the outcomes that matter, and here the *private sector* is doing much better. Figure 3.6 reproduces the learning gaps across public and private schools from the learning chapter, and also includes measures of parental satisfaction with teachers in government and private schools.[18]

3.23 As the figure shows, private schools are significantly outperforming government schools and that very little of this difference is attributable to differences in household wealth, parental education, the child's age or the child's gender. Furthermore, parents rate government schools far below private schools—on average, only 45 percent thought that the teaching skills of government school teachers was above average or excellent. Parental satisfaction with private schools is significantly higher at 60 percent. When asked about the overall quality of the teacher, the results were similar.

Figure 3.6: Learning outcomes are far better in private schools, and parents think that private school teachers are better



3.24 *In terms of the education production function, one needs to account for teacher "effort" in addition to teacher 'type" and compensation.* If test scores are worse in government schools and parents are less satisfied, what accounts for this? When asked for more detailed views parents do not fault government teachers for low education or poor qualifications; rather they say that their children's government teachers are not "motivated", do not "care about the children" or are "almost never there". It may be that teacher effort matters as much, if not

[18] To look at parental satisfaction with different types of schools, in the accompanying household survey parents were asked to report their levels of satisfaction with different types of schools in their village. In particular, we asked parents to tell us what they thought of the teaching skills of their children's teacher as well as the overall quality of the school. The figure shows the fraction reporting that teaching skills and overall quality were "above average" or "excellent".

more, than teacher competence in the production of learning. In addition, we also need to think about teacher compensation: Given that effort is an important component of teacher quality, do we find differences in how public and private schools reward effort monetarily? Towards such an analysis, the last part of this section provides a detailed decomposition of government and private teacher salaries, and in particular the relative contribution of different teacher attributes in the compensation package.

Government teachers exert less effort than their private counterparts. The differences get larger as teachers become more experienced and for women who live farther from the school.

3.25 To measure effort, we recorded the number of days absent in the last one month for each teacher as reported by the head-teacher.[19] In addition, for 800 detailed teacher interviews, teachers were asked to rate themselves on absenteeism. This was further broken down into absenteeism arising from emergencies, personal reasons, or official business. These results almost surely underestimate the extent of "true" absenteeism in the system, and it is very likely that they underplay the difference between the government and private sectors. Furthermore, government head-teachers may have had reasons to believe that high absenteeism recorded in the survey could result in some kind of official backlash (although all survey results are stripped of identifiers and teachers were informed that all responses were anonymous); private head-teachers do not face this incentive to underreport.

3.26 *Absenteeism is considerably higher in government schools than in private schools.* In government schools the absentee rate is 3.2 days per month vs. 1.8 days per month for private schools (this translates to 15 and 8 percent rates of absenteeism, respectively). It's possible the high degree of teacher accountability in the private sector accounts for this difference.

3.27 *Absence rates for more versus less experienced teachers.* There is no difference in absenteeism between public and private teachers (1.9 days a month) with less than one year of experience. As shown in Figure 3.7, however, the story is different for more experienced teachers. Government school teachers with more than three years of experience are absent 3.4 days a month while teacher absenteeism in private schools remains unchanged for those who are more experienced.

[19] Effort is hard to measure in large-scale surveys without detailed classroom observation of teacher's going about their daily routine. "A plausible indicator of effort is teacher absenteeism (see for instance, recent work by Chaudhury and Dilip (2006) for an analysis of absenteeism in India and Ghuman and Lloyd 2007, for absenteeism in 12 villages in NWFP and Punjab)." It's likely that teachers who are absent from class are less effective. Previous studies report teacher absenteeism using an audit approach; that is, by arriving unannounced at the school and taking a roll-call of all present teachers. Since we needed to interview teachers and they needed to be present at time of testing we could not rely on random checks, and used head-teachers' reports of teacher absenteeism as the primary measure. Das, Dercon, Habyarimana, and Krishnan (2005) discuss the different measures and their relative merits.

Box 3.3: Doesn't the government already have a monitoring system in place?

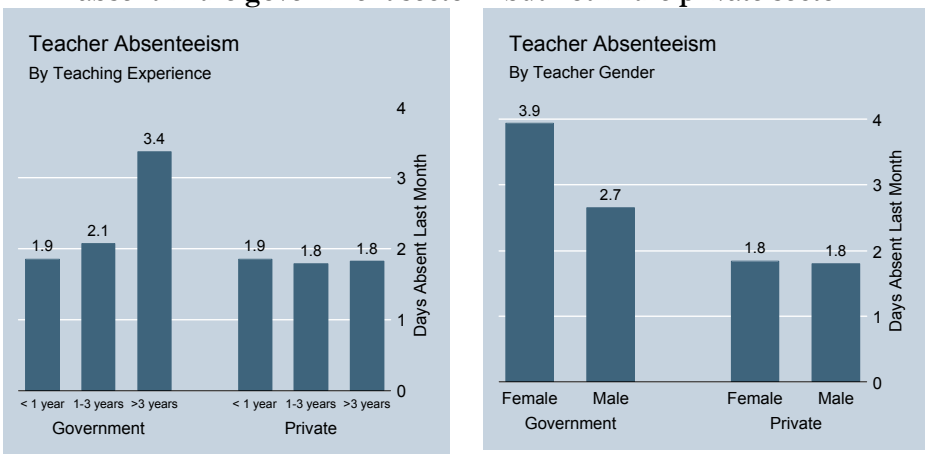
The government does have an elaborate system of monitoring and management in place at the district level, with District Education Officers aided by deputies and assistants. The schools report that they are visited regularly by the district education staff; in fact, 66 percent of all schools were visited by a school inspector in the last three months and if anything poorer villages were visited more often by the school inspectors than richer villages. There is some weak evidence that schools that are visited more have lower absenteeism but that is not robust to the definition of the time period, and runs into complicated issues of whether the visits *lead* to lower absenteeism, or whether inspectors just choose to visit schools where absenteeism is lower to begin with.

Absenteeism and Auditing Regularity

	Percentage of Schools	Mean Number of Monthly Absences
0-1 Month Ago	43.20	2.49
2-3 Months Ago	23.12	2.94
4-6 Months Ago	11.56	2.68
7-12 Months Ago	9.53	3.70
> 1 Year Ago	11.97	2.22
Never	0.61	1.67

3.28 *Absenteeism differentials between females and males.* As Figure 3.7 shows, females are absent 3.9 days a month in the government sector compared to 2.7 days for males. Again, there is no difference in absenteeism between men and women in private schools (1.82 days a month on average). In the Pakistani environment where females cannot move about freely and transportation woes are frequent, the literature has often cited transport problems and other responsibilities in the household as contributing to the increased absenteeism of female teachers. If this is the case teachers who live further from work should have higher absenteeism rates and these problems should affect the government sector more, since only one-third of female teachers in government schools live within 15 minutes of the school, compared to 66 percent of those in the private sector. In fact, female teachers in government schools

Figure 3.7: Female teachers and more experience teachers are more absent in the government sector—but not in the private sector



who live more than half-an-hour away from home are absent 43 percent more (3.67 days vs. 2.56 days) than female teachers in government schools who live less than 15 minutes away.[20] All these results also hold in a multiple regression framework after controlling for teacher education, training, gender, experience, village origin, school type, and village fixed effects.

3.29 *Absenteeism rates may be much higher in the government sector because of additional responsibilities.* Part of this higher absenteeism clearly has to do with accountability issues in the government sector, but part of it may also be due to the non-teaching duties that government school teachers are often asked to undertake. Only 3 percent of private school teachers were absent for work-related reasons in the last month, compared to 26 percent in the government sector. While accountability is a serious issue in the government sector, officially sanctioned absenteeism from class is equally serious from the students' point of view.

Box 3.4: Additional Responsibilities for Government Teachers

One big problem is the extra responsibilities that government teachers face over and above their regular teaching duties. I came across the following example in our field-work. When I went to a Government Primary School in one of our sample mauza (village) there was only one teacher present. When I spoke with him, he told me that there are only two teachers in the school and the other one had been called by the Deputy District Educational Officer (DEO). The teacher complained that there is lot of extra work given to them by the government. Sometimes it is a meeting in the EDO's office, sometimes the Deputy DEO calls them, sometime they are on election duty, others on examinations duty and sometimes even on surveys conducted by the government.

> *"Now tell me, how can I teach the whole school? I wrote to the government saying that there we need more teachers but there was no reply. I tried to talk to the LC and AEO, but they said that I had given the written application and I should now wait because government work cannot be done quickly. Now you tell me—already the two teachers are not enough and with all these extra responsibilities we cannot give proper attention to the children. You have to ask the Government that to give us one more teacher and if they can't give us a teacher then they should not give us extra responsibilities. Only then we can give proper attention to the school or the children."*

Source: Kashif

[20] The distance to school variable is from the teacher questionnaire so has a smaller sample size.

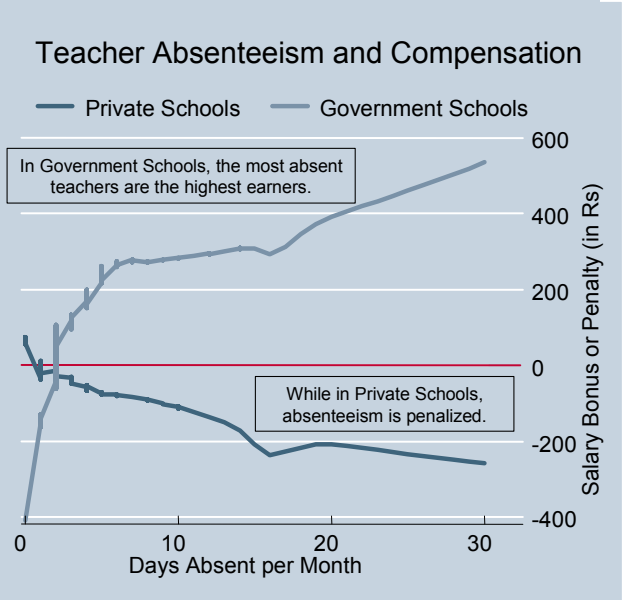
II. GOVERNMENT AND PRIVATE SECTOR COMPENSATION: INPUTS OR OUTCOMES?

3.30 *Four pieces of data have been brought together for the first time in the LEAPS survey to examine teacher performance and its relationship to compensation in public and private schools.* Student test-scores, teacher absenteeism, teacher test-scores and teacher's salaries in the public and private sector can be *linked*: to show, for instance, whether there is a correlation between student test scores and teacher salaries or absenteeism and teacher salaries and if so, whether this correlation differs between the public and private sectors. We highlight each of these four correlations next and then discuss the overall compensation schemes in the two sectors.

Salaries for government sector teachers do not vary with effort or outcomes. In the private sector, they do.

3.31 Figure 3.8 shows the deviation from average salary for teachers based on absenteeism in public and private schools. As absenteeism increases in the private sector, salary goes down—teachers with low absenteeism earn more (close to Rs.100 above the average salary) while those with high absenteeism earn less. This relationship is reversed in the government sector, where those with low absenteeism report salaries Rs.400 *below* the mean in their sector, and those with the highest absences receive salaries Rs.600 *above the mean.*

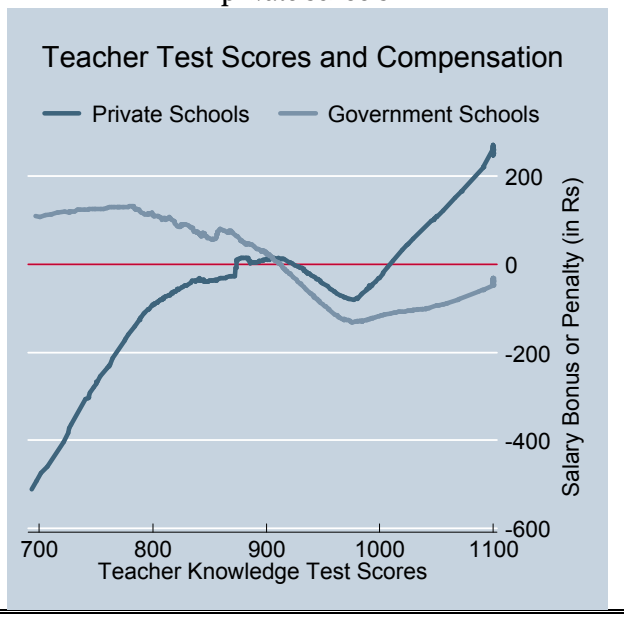
Figure 3.8: More absent teachers are paid less in the private, but not in the government sector



3.32 *Older teachers are absent more and they are also paid the most.* These results hold in a multivariate regression controlling for the age, gender, education, training and residence of the teacher, as well as the geographical location of the village (village fixed effects). In private schools, a teacher who is absent 5 days a month is paid 5 percent less, in government schools a teacher is paid 3 percent more! One potential explanation for these results may be that the teachers with higher absenteeism in the government sector may hold more "senior posts" such as a head or acting head. Higher posts carry higher salary terms, and these may also be the teachers who tend to be more absent, whether because of official duties or other reasons.

3.33 The LEAPS project tested Class III teachers on the curriculum they are supposed to teach in Mathematics, English, and Urdu. Figure 3.9 shows the relationship between teacher test scores and salaries. As in the previous figure, the vertical axis represents deviations from the average salary in the sector; the horizontal axis in this case represents the percentage of questions the teacher answered correctly on the test. As before, better scores on the test for private school teachers were associated with higher salaries—a teacher who scored 60 percent on the test receives Rs.600 less than the private sector mean, while a teacher scoring 95 percent receives Rs.200 *more* than the mean. In the government sector, teachers who scored 60 percent received Rs.200 more than the mean. The only saving grace is that teachers who scored highly were not penalized as much as in the absenteeism figure, reporting salaries only Rs.100 below the mean. Taken together, these data imply that the least competent teacher in the government sector earns the same salary as the most competent teacher in the private sector.

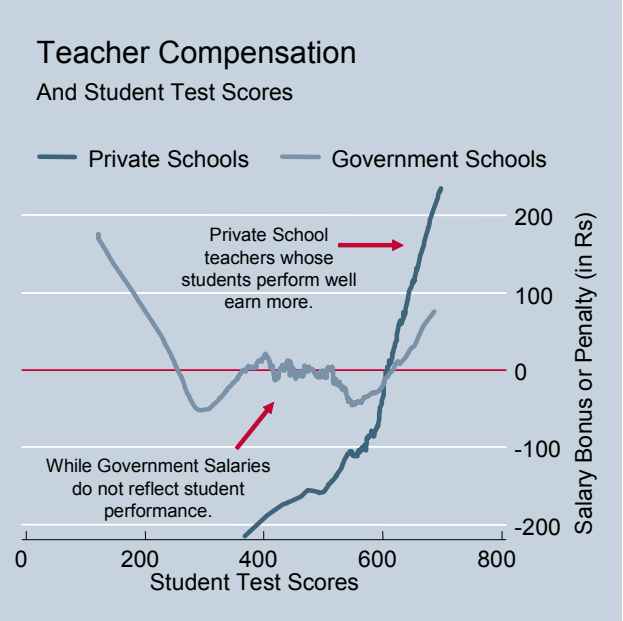
Figure 3.9: Higher scoring teachers earn more in private schools



3.34 Again, the results hold in a multivariate regression context, albeit with a few differences in functional form. Across the test-score range, a private school teacher in the top 20 percent reports a salary that is 28 percent higher than one in the bottom 20 percent. However, private schools are particularly responsive to poor and exceptional teacher test scores, with little difference in compensation for average teachers. Moving from the third to the fourth quintile of test scores does not increase salary, but moving from the first to the second quintile of test scores increases salaries by 8 percent and from the fourth to the fifth quintile by 9 percent. In the government sector, the relationship between test scores and compensation is generally weak and somewhat supportive of the representation in Figure 3.9 above.

3.35 Figure 3.10 presents a third association, in this case between student and teacher test scores. As before, the vertical axis is deviation from average salary in the sector. The horizontal axis is the average test score of the students taught by the teacher. In the private sector, teachers of students with higher test scores are paid more. In the government sector, there is no relationship between student scores and teacher compensation; at worst, those at the bottom of the distribution are paid somewhat more.

Figure 3.10: Teachers whose children perform better earn higher salaries in the private, but not in the government sector



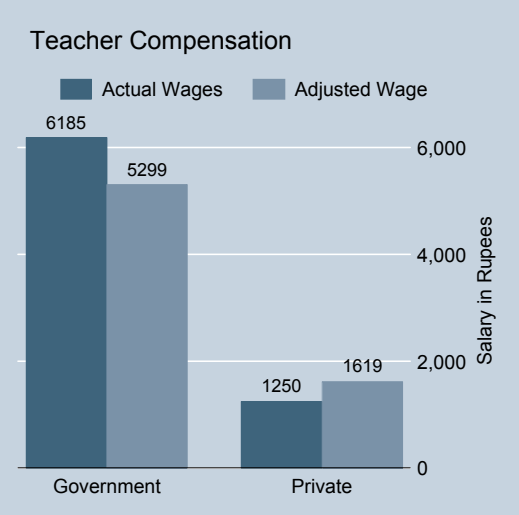
3.36 These three figures highlight what is already fairly well known about government compensation schemes—that they reward experience and education in teachers (see for instance, Vegas (2005) for a discussion of Latin America or Kingdon, Geeta and Teal (2004), and Murgai and Pritchett (2006) for India). It also adds new information about compensation in the private sector. For teachers in private schools, effort (as measured through lower absenteeism), competence (as measured through their own test-scores), and student achievement (as measured through children's test-scores) are all rewarded with higher salaries. Thus, although the government system of education provides teachers who are more experienced, more educated and better trained, it seems the lack of accountability and mechanisms for rewarding better performers may lead to lower effort. Compensation schemes in the private sector seem to reward competence and effort; in the government sector, better performers can actually end up receiving *lower* salaries. This hints at the next and final step, which looks at the overall compensation schemes in the two sectors and a discussion on how to structure a debate about teacher recruitment, deployment, and compensation.

The government system rewards teachers differently from the private sector.

3.37 *On average, government teachers are paid five times as much as their private sector counterparts.* This finding echoing findings from many other countries. To re-emphasize the point, we reproduce the unadjusted and adjusted salaries of government and private school teachers, where the adjusted salaries control for education, experience, gender, qualifications, and training. The adjusted salary gap is somewhat smaller, but still represents a three-fold advantage for the government sector.

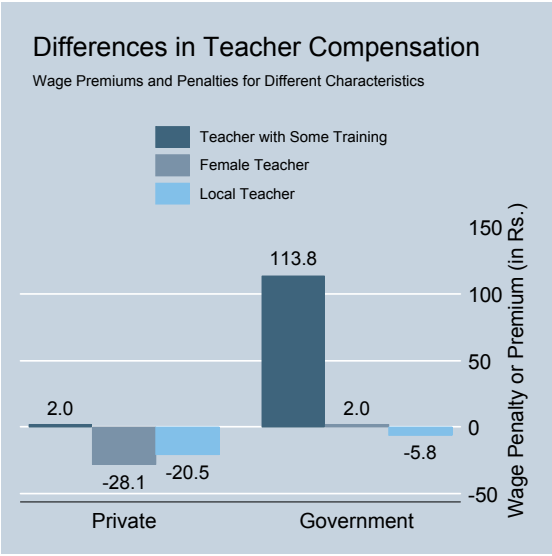
3.38 One problem is the adjusted wage calculation in the two sectors assumes that the government and private sectors reward the same teacher characteristics in the same way. That is, a teacher with training receives the same additional wage in the government sector as she does in the private sector. In fact, as the relationship between effort and wages suggests, the compensation function in the two sectors looks quite different. To examine how the different sectors reward different characteristics, we regress (log) wages on teacher characteristics separately for public and private schools. Several noteworthy contrasts are summarized in Figure 3.12.

Figure 3.11: Government teachers earn a lot more…



3.39 *Salaries in the government sector are largely determined by experience, training and education.* In the private sector, education matters, but the premium to experience and teacher training is much smaller. For example, in government schools a 50 year-old teacher earns 70 percent more than a 25 year-old; in the private sector, the premium decreases dramatically to only 20 percent. The rewards to teacher training are equally dramatic. In the government sector, the minimum level of teacher training (PTC) increases salaries by 88 percent, while in the private sector, such a teacher would earn only 7 percent more than one without any training. In contrast, education matters equally in both sectors, and perhaps even somewhat more in private schools.

Figure 3.12: Public/Private Wage Premiums and Penalties

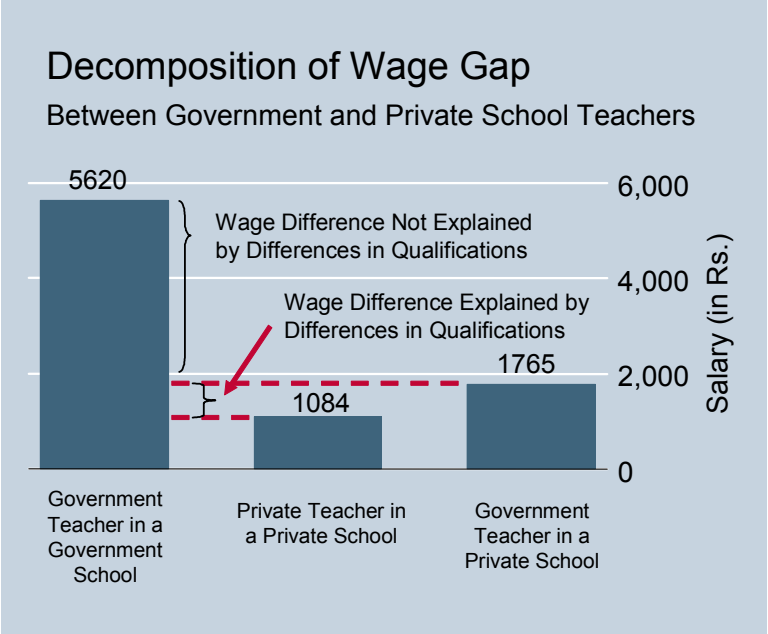


3.40 *Private schools pay their teachers according to how much they could earn elsewhere while the government sector makes no adjustment for alternative employment opportunities.* As a result, private schools pay women and local teachers considerably less. Females in government schools actually earn a little more than men (3 percent) while in private schools they earn 36 percent less. In general, employment opportunities for women are limited and because it is difficult for them to travel outside the village they live in, they have fewer outside opportunities and they are paid less in the private sector. Local teachers are actually paid less under both systems, but the difference is much larger in private schools—the penalty

is 5 percent in government compared to 24 percent in private schools. Again, residence in the village means that travel costs are lower and the teacher (most of whom are women) enjoys the safety and convenience of working where she lives. She is willing to accept a lower salary than a teacher who has to commute from a neighboring village.

3.41 Given these differences in how the two sectors reward teachers, the pay differential between the teachers in the government and private sectors becomes clearer. Figure 3.13 illustrates the compensation outcome of moving a teacher with certain characteristics from the public sector and to the private sector by using the estimated coefficients from Column 1 in Table 5. The figure plots the average pay of a teacher in the public sector (the first bar), a teacher in the private sector (the second bar) and a teacher in the private sector if he/she had the same characteristics as teachers in the public sector. The difference between the first and the third bar is the difference in salaries arising from differential returns in the two sectors; the difference between the second and the third bar is the difference due to characteristics.

Figure 3.13: Very little of the wage difference between government and private schools is because of differences in characteristics



3.42 *A teacher's salary would decrease dramatically if she were to move from the public sector to the private sector.* The average salary for the public sector teacher falls from Rs.5620 to Rs.1765 for three reasons: the private sector does not value teacher training (which the public sector does), it does not compensate experience to the same level as the public sector, and it pays female teachers a lot less. Only the remaining difference between the salary that average public school teacher would receive and the average salary in the private sector, Rs.1084 vs. Rs.1765, comes from the fact the average public school teacher is better trained and educated than the average private school teacher.

3.43 *These facts suggest that the government sector cares more about observed teacher inputs, such as education and training, whereas the private sector cares more about teacher effort and student outcomes.* Private sector teachers are paid according to local job market conditions—those with better options are paid more. The labor market for government

teachers responds to different signals, particularly the need to reward everyone equally depending on education, qualifications and training, but little else. The flexibility to adjust wages depending on local conditions or teacher effort in the private sector is absent from government sector compensation schemes. We are not saying *all* government teachers are "bad" and *all* private school teachers are "good". As the chapter on learning pointed out, the top government and private schools perform at the same level. The problem is the bottom 20 percent of government schools where little to no learning goes on at all. Part of the problem is that government compensation schemes do not distinguish between good and bad teachers. In fact, compensation when linked to experience only results in more absenteeism, less-educated teachers (recall that older teachers are also less educated), and poorer learning outcomes for students.

III. DISCUSSION

3.44 The government sector works well in some regards, very poorly in others. It hires educated and well-trained teachers and pays them well. It also allocates them fairly across both rich and poor villages and schools with rich and poor students. On the other hand, it has no mechanism for penalizing non-performing teachers and rewarding exceptional ones. The current mechanistic compensation scheme results in the highest compensation being directed towards the worst teachers, in terms of education, training, or effort. Teachers are also burdened with duties outside the purview of their main responsibilities.

3.45 The private sector compensates teachers for outcomes, and high turnover permits retention based on merit, but private sector schools locate only in areas where teachers are available at a low wage. It is exceedingly difficult for private schools to arise in areas without educated women or in the rural areas with secondary schools, where further education is required. Teachers receive wages according to their available local opportunities—they are paid less in villages where there is higher literacy (and therefore greater supply), and females with these characteristics earn the least.

3.46 Overall some private sector characteristics may be "desirable" in government compensation schemes; others, such as gender discrimination in wages clearly violate government rules and may be "undesirable." Suggestions for how can Pakistani can best take advantage of these two very different sectors and compensation schemes requires either rethinking the stage of education and the geographical locations the government sector should focus on or a large, systematic reform of the government compensation system.

Rethinking teacher recruitment, deployment, and rewards

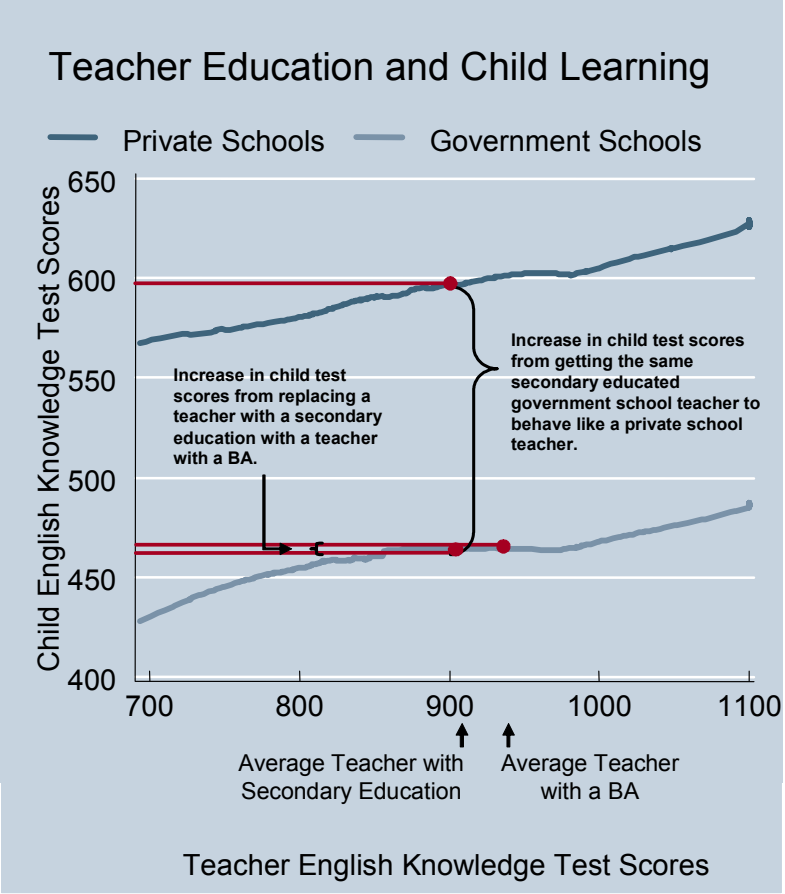
3.47 The debate around teachers in government schools seems to hinge on two related issues: the attributes of teachers and the institutional framework that contribute to better student outcomes, and the availability of teachers or schools catering to different levels of education in each village (primary, middle, and secondary). Teacher and institutional attributes can be broadly separated into three categories: *hard to observe teacher characteristics* such as motivation, which can emerge only over time, *easy to observe* characteristics such as educational qualifications, experience and training and, the institutional framework embodied in *incentives* such as the teacher salaries and bonuses. Research in the United States has tried to separate the influence of the first two types of characteristics (motivation and qualification); given that most of this research is for public school teachers, it has made less progress on the impact of incentives. This research finds that characteristics like motivation and a love of teaching are *far* more important in explaining the variation in student learning compared to educational qualifications, experience, and training. Experience for instance, matters only in the first year. In short, in systems with the same set of incentives, teachers appear to be *born*, not made.

3.48 When there are many potential teachers to hire from, it makes sense to try and recruit and retain the best applicants and eventually fire those who do not perform. However, in geographical areas or levels of schooling where potential applicants are few, this is no longer true. Firing a teacher makes sense only if you can replace him/her with another teacher who is better. In areas of limited supply, a teacher who is absent three days a week may still be a good hire compared to the alternative of being teacher-less. The key point is that these different factors *interact*—providing incentives for teachers mean that those with higher motivation (and thus better outcomes) are more likely to apply, thus increasing the quality of the teacher pool. In fact, in the United States studies have argued that the quality of the teacher pool has suffered because of teacher unionization, which pays a fixed wage regardless of the motivation of the teacher (see Hoxby, 1996). Some options and their potential interactions in terms of student outcomes are discussed next.

An example: The popular wisdom that "increasing the educational qualifications and training of new entrants is a must" could lead to *worse* educational outcomes

3.49 This proposed policy option assumes *easy to observe* teacher characteristics drive student learning. Do they? Figure 3.14 plots the English test scores (results are very similar for Mathematics and Urdu) of children against the English test score of their teacher. The red line shows the relevant relationship for public schools and the blue line for private schools. Finally, the two red dots show the test scores of teachers with a secondary education versus those with a bachelor's degree—the teachers with secondary education scored 80 percent on the test compared to 90 percent for the latter.

Figure 3.14: At the primary level, its teacher effort that matters, not teacher education



3.50 The small gap on the vertical axis suggests that hiring a teacher with a bachelor's degree instead of secondary education in the public sector results in a gain of roughly 1-2 percentage points on student test-scores. Contrast this with the dramatic difference of 19 percentage points between teachers with secondary education in the public versus the private sector. The figure suggests that increases from additional education are small and that effort, not education accounts for the difference, at least at the primary level.

3.51 Given the evidence given above, such a policy could cause particular problems in areas with limited availability. To the extent that the average village does not have individuals educated beyond the secondary level (the median village in Punjab had 8 secondary-school educated women in 1998), teachers holding a bachelor's degree will have to be brought in from outside the village. As we have seen, absenteeism *increases* when teachers are not local hires, so overall effort is likely to decrease. Moreover there is an overall skill-

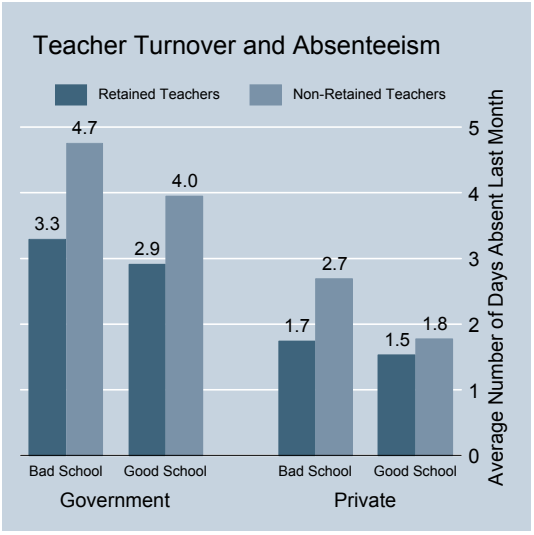
shortage in teaching the Pakistani economy. Higher government wages may attract a teacher with a bachelor's degree, but not necessarily a better teacher.

3.52 Increasing teacher training will probably not hurt in the same way as increasing the educational requirements for new teachers, but good training is expensive. In fact, it is too expensive an investment for rural private schools. The Ali Institute, for instance, runs a teacher training course of three weeks that costs Rs.3000 per teacher. It's possible this amount could be better spent elsewhere.

An alternate option is to create an enabling environment for better learning. Three potential features of such a system would involve (a) decreasing the additional duties for teachers; (b) implementing a probationary assessment period before teachers are regularized (perhaps combined with incentive payments for teachers), and; (c) allocating teachers to those geographical areas and schooling levels where the private sector is not a presence, perhaps in combination with devolving teacher hiring and compensation to the district level.

3.53 *Let teachers teach.* The government needs to decide what it wants its teachers to do. Burdening them with additional duties and time consuming tasks detract from the job of teaching. In a typical village setting the teacher may be the only representative of the state and may be called upon to take a census for electoral rolls. Indeed, work-related absences for government teachers (though self-reported and unverified) are quite common: 26 percent of teachers in the public sector reported some work-related absence in the last month compared to barely 3 percent in the private sector. The reasons ranged from attending workshops and meetings, collecting salaries, being on examination duty in other schools, and administering polio vaccinations. Teachers absent due to emergencies was closer in both sectors—32 percent in the government and 26 percent in the private sector. The incentives on teaching are being confused with providing related government services.

Figure 3.15: Teacher Turnover and Absenteeism



3.54 *Consider a probationary period to identify and retain good teachers.* The only way to figure out who has talent as a teacher who does not is to observe them for some period of time. A reasonable amount of turnover should be expected. Yet, the public sector is a "settled" sector with very little turnover. More than 70 percent of government teachers in the LEAPS sample report have more than three

years experience at the school they are teaching compared to 29 percent in private schools. In 71 percent of private schools, a teacher left in the previous year compared to 24 percent in the government. Overall, in the private sector, 530 teachers left in the year preceding the survey and 690 new teachers were hired out of a total of 2,167 present in the survey year. In the government sector, 171 left, and 356 new ones were hired out of a total of 2,652 teachers. Figure 3.15 suggests that turnover, both in the public and private sector, may be good in that it gets rid of teachers who exert less effort. As the figure shows, whether we look at initially high or low performing schools, teachers who were not retained the following year were those who were more absent than the others.

3.55 A middle ground therefore might be a probationary period of two to three years during which the teacher is kept on a temporary contract. At the end of this period, the teacher may be converted to a permanent contract through a clearing process. The process for retention could evolve. Indeed, the Punjab government freeze on regular hiring of teachers in 2002 led to an increase in teachers hired on temporary contracts—although this was a response to a fiscal issue tied in to pension payments rather than as a means of improving accountability. These contract teachers may work, but only if (a) the government does not renew contracts for poorly performing teachers and (b) ultimate political pressures do not lead to their "regularization" (there are already agitations towards this step).

3.56 The data on contract teacher performance from the LEAPS study shows that contract teachers are absent less often, are more competent, and are paid less. This analysis is a bit misleading because contract teachers are also a considerably younger than the average teacher in public schools. A correct comparison would control for age, but this cannot be done in a simple regression context because there is no variation—all contract teachers are young, all public school teachers are older. In the future a more sophisticated analysis using regression discontinuity designs will be used.

3.57 *What about rewarding teachers for greater effort?* While few disagree with the overall premise of rewarding teachers for effort, the question of how best to do so is a subject of much debate. It is difficult to institutionalize a mechanism for rewarding effort – after all, how is effort measured? Current literature suggests it will be necessary to develop policies that combine different means of measuring effort, from "inputs" like attendance to "outcomes" like child test scores, and possibly even the "process" by which teachers teach. In recent small-scale randomized evaluations, rewarding teachers based on inputs or outcomes have both been shown to work; see Duflo and Hanna's experiment of using cameras and compensation linked to days present for an example of the first and Muralidharan and Sundararaman (2006) on compensating teachers based on improvements in test scores for the second. Rewarding teachers strictly on

objective *outcomes* is difficult. The objection is somewhat technical. Test scores display strong mean reversion—which means, that in any given year, the worst performers at the beginning will show the strongest gains and the best performers the weakest. Thus, teachers who start with a poor class will get rewarded irrespective of what they do; those who start with a strong class will not get rewarded irrespective of what they do. The set of teachers who can change their compensation depending on their effort may be very small so that the scheme turns out to be very costly. Once teachers understand this process, gaming the system combined with outright cheating in tests will become pervasive (the experiment above was tried only for one year). Because of similar problems, every state in the United States has at some time tried and discarded this strategy. An alternative, advanced by Murgai and Pritchett (2006) is to reward teachers not on verifiable outcomes, but on verifiable processes. Under this scheme, the hiring and retention of teachers would be decentralized to the village level. Yet, this also comes with its own problems. Decentralization may or may not work in the Pakistani context. It would depend on issues of "elite capture" and how democratic and participative the ultimate process turns out to be. In the state of Uttar Pradesh in India, for instance, a recent survey revealed that even *members* of the "Village Education Committee" are not aware of their membership! The attractiveness of this proposal lies in it promise of giving power to the ultimate receivers of a service, but there is little evidence on whether such a scheme could or would work.

3.58 *Allocate government teachers where they are needed the most.* One of the most powerful tools for equity that the government holds in its hands is the right to transfer teachers to villages and schools where they are needed most. The inherent differences in salaries between the private and public sector is explored in the chapter on schooling. It will show that educating a child in a government school requires *twice* the resources needed to educate that same child in a private school when one is available. It makes little sense, if we are concerned about the right to education of the poor in Pakistan, for the public sector to *compete* with the private sector when both choices are available. Matters are made worse because the government sector competes not only for enrollment, but also for teachers in a limited labor market. Private school teachers desire jobs as public school teachers. When asked, one such teacher said: "*And would you not take a job where you are paid 4 times as much and do not have to work?*" Yet, in many villages there are no private schools. In areas or sectors where the supply of educated potential teachers is low, it will be difficult for private schools to hire and retain good teachers. The data show that private schools are likely to function better as literacy increases and that locally hired and resident teachers have lower absenteeism. As village literacy increases, the percentage of local teachers increases—in private schools, 39 percent are local in the least literate villages while 66 are local in the most literate (for government schools it increases from 28 to 48 percent). Similarly, the percentage of teachers who live within 15 minutes of the school goes up from 38 percent to 60 percent

when we go from the least literate to the most literate category. Private schools will *only* function in sectors and geographical areas where supply of teachers is sufficient.

3.59 Given these supply issues one possibility may be to develop 2 different "cadres" of teachers: a provincial cadre that can be transferred across districts and a district cadre that can be transferred across villages. These cadres would provide education where the private sector is reluctant to go. They would also justify part of their high salaries because of the inherent difficulties of working in the places where they are posted. Although problems of accountability and incentives will remain, at least these teachers will be providing some education where none was previously available.

3.60 While some devolution for education has shifted from provinces to districts, teacher compensation and posting is still a provincial responsibility. As we have seen above, this does not permit different districts to take advantage of local conditions—where there are many educated individuals, wages should be lower. Allowing districts to come up with their own hiring, retention, and compensation policies would take the devolution process further and help strengthen local accountability mechanisms. At the same time, *recourse* to a centralized cadre (at a fixed cost per teacher) would ensure that they have access to trained personnel if needs cannot be met locally.

3.61 Of roughly 12 million employees in the government workforce, 3 million are teachers and they have strong unions, as do teachers around the world. Moreover, as a hangover from the British era, where teachers were the only educated individuals for miles on end, village teachers may be asked to man election booths, draw up voter lists, and work as part and parcel of the political system. A democratic debate on this issue must go beyond efforts to *compete* with the private sector, and focus instead on providing somewhat lower quality education in areas where the private sector is absent, and gradually withdraw provision (but not financing) as the private sector takes over. Widespread systemic reform is needed before the current cadre of teachers retires since it will take close to 25 years to refresh at least 50 percent of the teaching workforce. The question is whether Pakistan can afford to mortgage the future of 2 million children every year for the next 25 years to the desires of 3 million teachers.

Chapter 4: Parents and their Children

4.1 *Is it true that parents, who may have low educational attainment themselves, must be cajoled and "incentivized" into sending their children to school?* The media and governmental policy suggest that the reality for children, even when enrolled, is that their ability to participate and learn is severely hampered by multiple demands on their time, either through housework or paid child-labor. The girl-child is less likely to be enrolled in school in the first place, and when she is her learning suffers because of the added burden of work at home and low parental attention, both in terms of money spent and time given. Popular wisdom is that the emergence of rural private schools may have made matters worse still. Illiterate parents, unable to gauge the quality of private schools, it is conjectured, are easily fooled by unscrupulous private school operators into paying unnecessarily high fees. These perceptions have clear implications for educational policy. The government must work hard to get children into school, compensate for the inability of parents to fund or spend time with their children, legislate against child-labor and regulate the private sector. Leaving illiterate parents to fend for themselves is not the best educational investment in the next generation of citizens. What do the data say about parental participation in the education process?

4.2 *Participation is only part of the story*. Researchers in Pakistan and elsewhere *have* actively explored the link between households and schools. However, the focus has been on factors that lead to higher enrollment. In the Pakistani context, given the importance of the distance to school and its interplay with gender, there is a considerable literature on the impact of distance from school on attendance; more so for girls than for boys. [21] As the chapter on learning shows, once children get to school ensuring learning outcomes is an entirely separate issue. Upping enrollment is undoubtedly an important first-step, but it is now time to think about how to bolster their learning and expand our understanding about the role of households in supporting the learning process.

4.3 *The role of the household in promoting better educational outcomes is equally important*. This chapter presents detailed information on the choices that parents make regarding their children's schools, the time and money they spend on their children, the daily activities that a child engages in, and reiterates the critical constraints that distance to school has for enrollment, especially among girls. While some findings from the survey data accord well with some of the commonly held beliefs mentioned above, other findings suggest a closer

[21] Alderman, Behrman, Khan, Ross and Sabot (1995), Holmes, Jessica. (2003), Lloyd, Mete and Sathar (2005), Sawada and Lokshin (2001).

evaluation of the Pakistani rural household and its role in educating their children is in order. As a teacher said to one of us recently "*The child is in school 6 hours a day and at home 18. If parents do not pay attention, what can the child learn?*" This chapter looks at how parents both enhance and hamper their children's educational outcomes. The results show that households are very different in what they want for their children, and that different children within the same household are treated very differently. The chapter concludes with a discussion of how these findings can enhance the educational policy debate.

I. FACTS AND FINDINGS

4.4 *A typical parent probably goes through the following thought process when considering the educating their children.* They look for an appropriate school; gather information about different schools in their village in terms of distance, fees, quality and other attributes important for them; decide which school to send their child to, if they decide to enroll their child at all; and then determine how much time and money to spend on their child's education and how much time a child will devote to school work, household chores, and other activities. These decisions are not taken one after the other in the fashion presented here, but are intrinsically inter-related and play out over time. For instance, a household may decide against enrolling a child under any circumstances, in which case they may not look at the different schools in their village. Similarly, the household may decide which school to send their child to depending on their assessment of the inputs in time and money they are likely to spend on their child. This model is not meant to serve as an "explanation" of the data presented here, but rather to provide a context for the specific facts and findings that follow.

Parents Perceptions of Quality: Children, Teachers and Schools

4.5 *Contrary to popular belief, parents know a lot about how their children are performing, how good their teachers are, and how good the schools in their villages are.* The LEAPS household survey asked the following questions of fathers and mothers, separately:

1. Rate each of your children on a scale of 1 (very poor) to 5 (excellent) for intelligence and effort (how hard-working are they?).
2. Rate each of your children's *teachers* on performance and attendance (regularity) using a similar scale.
3. Rate each of the *schools* in the village. For every school in the village parents were asked whether they had heard of the school, and if yes, how good they thought the school was.

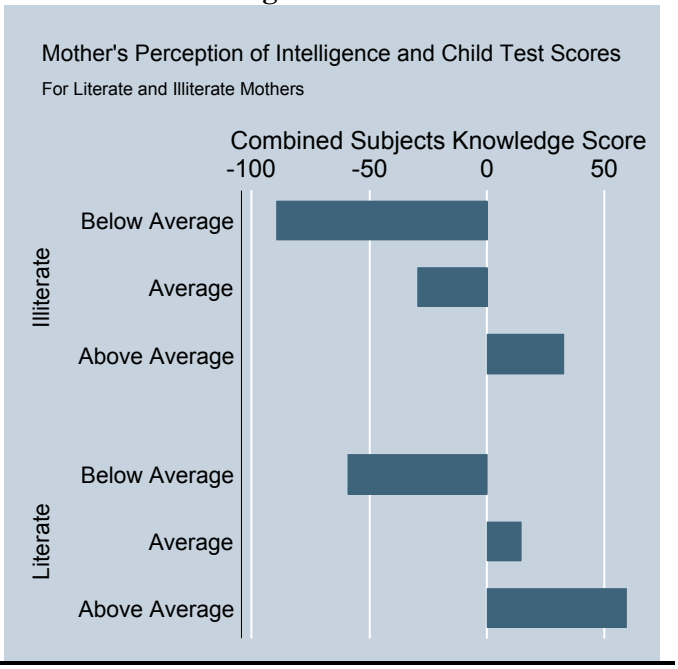
4.6 *The LEAPS survey design allows us to match these parental perceptions to objective outcomes.* Because the LEAPS survey tested a large number of children for whom household surveys were also completed, we can match the responses of the households to the test scores of more than 800 children in Class 3. We are also able to

match parental assessments of the child's teachers and schools to the test scores of children taught by the teacher and to the test scores of the Class 3 children in every school.

4.7 *Households are well-informed about the performance of their children, their children's teachers, and their children's schools.* The following four figures demonstrating the extent of household information, all follow the same pattern. The horizontal axis plots what the household said. The vertical axis plots the test scores in the independently administered test, whose results had not been disclosed to households at the time of the survey. Depending on the figure, these are the test-scores of their child, other children taught by the child's teacher, or children in the school that the parents ranked.

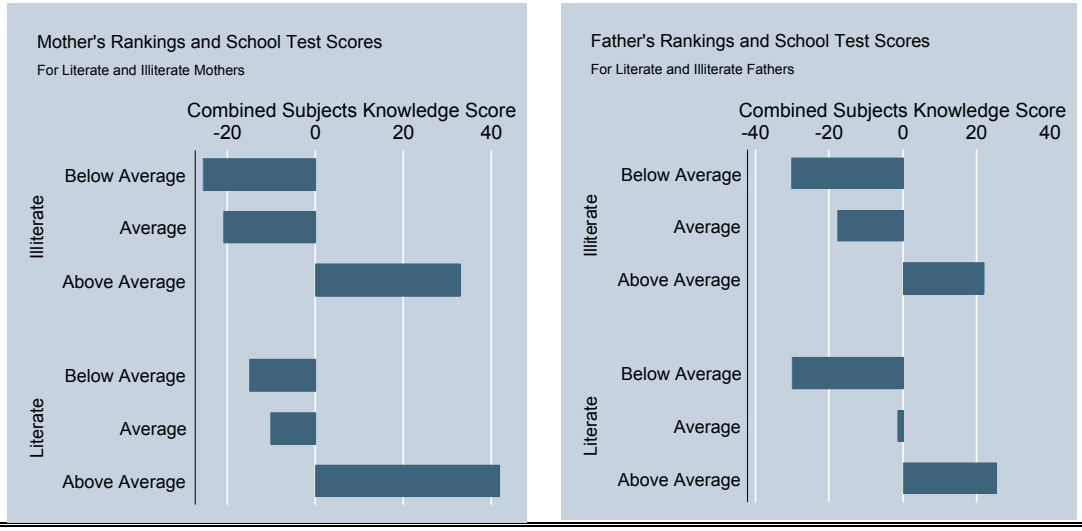
4.8 *Result 1: Children perceived as more intelligent by their parents score higher on tests.* Figure 4.1 plots household reports of child intelligence against the child's actual test score for illiterate and literate mothers (the results for fathers are similar). When households say that a child is very intelligent, he/she reports test scores that are much higher than when the household says that a child is not intelligent. The differences are large and significant—a child who is perceived as less intelligent reports test scores close to 0.7 standard deviations lower than a child perceived to be intelligent. *The results do not depend on whether the parents are literate.* Illiterate mothers are as good as literate mothers in figuring out which of their children is intelligent and hard-working and which is not. Finally, factors other than learning are not associated with parental assessments of child intelligence: For every additional standard deviation increase in the child's average test score there is a 13 percentage point increase in the probability that the mother perceives her child as highly intelligent, and a 10 percentage point increase in the probability that she perceives her child as "performing highly". It is particularly interesting to note that neither age nor gender are statistically significant, suggesting that mothers do not discriminate among older or younger children or among boys and girls.

Figure 4.1: Children Perceived as Intelligent Score Higher on Tests



4.9 *Result 2: When parents say a school is good, it usually is.* Figure 4.2 shows a similar pattern in way households' perceive school performance. Here, we plot for both fathers and mothers the actual English score of tested children in the school against what parents told us they thought the quality of the school was ("poor", "average" or "above average"). The results are also separated by mothers and fathers who can read and those who cannot. (The choice to show results for English test scores is based on the expectation that parents will be less able to assess the quality of teaching in English, which may or may not be true.) When households feel that a school is above average, the English test scores of children in that school are much higher than that of schools that households feel are poor. Again, illiterate parents are as good at judging school performance as literate ones. And women are good as men in figuring out which schools perform well.

Figure 4.2: Parental Perceptions of School Quality are Accurate



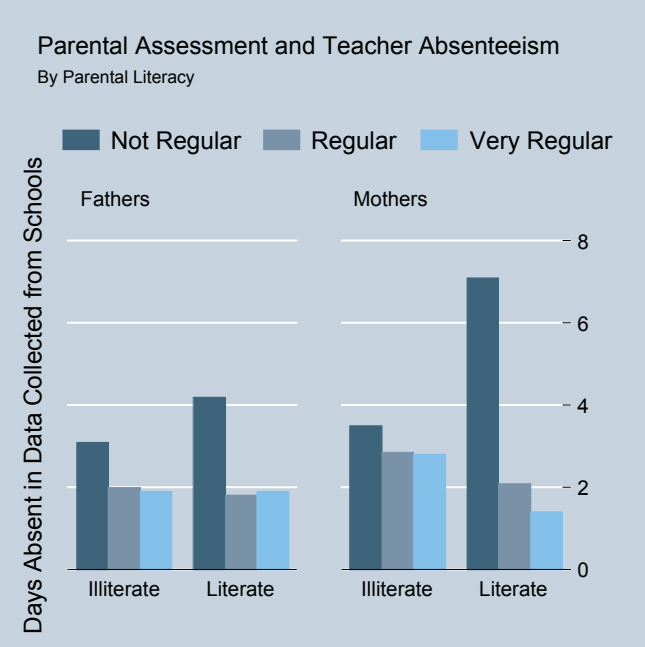
Box 4.1: Are household assessments of schools based on observable characteristics rather than test scores?

Part of the result above could be driven by parents judging schools on attributes *other* than test scores but still correlated with the performance of children in the school. For instance, if parents ranked all private schools as good and all public schools as bad, similar correlations would arise. As it turns out, the relationship between household ranking and test scores of children in the school remain significant *after controlling for all observable characteristics of the school.*

Parents are indeed more likely to rate a school highly if it is private (26 to 31 percentage points). In addition, observed characteristics of schools increase the probability that parents rate the school highly; in particularly, the number of teachers increases the probability by 1 percentage point and better infrastructure by 1.2 percentage points. However, test scores continue to matter most: a one-standard deviation in the combined subject test scores increases the probability that a school is ranked highly by more than 2.6 percentage points, twice as high as any other observable characteristic other than whether the school is public or private. These results tell us not only that households place value on test scores and rate schools where children are performing better higher, but *also* that literacy and the gender of the parent do not matter for the ability to judge schools and that households are not "taken in" by observable characteristics of schools. Schools may have better infrastructure and more teachers, but at the end, it's the quality of instruction that influences household perceptions.

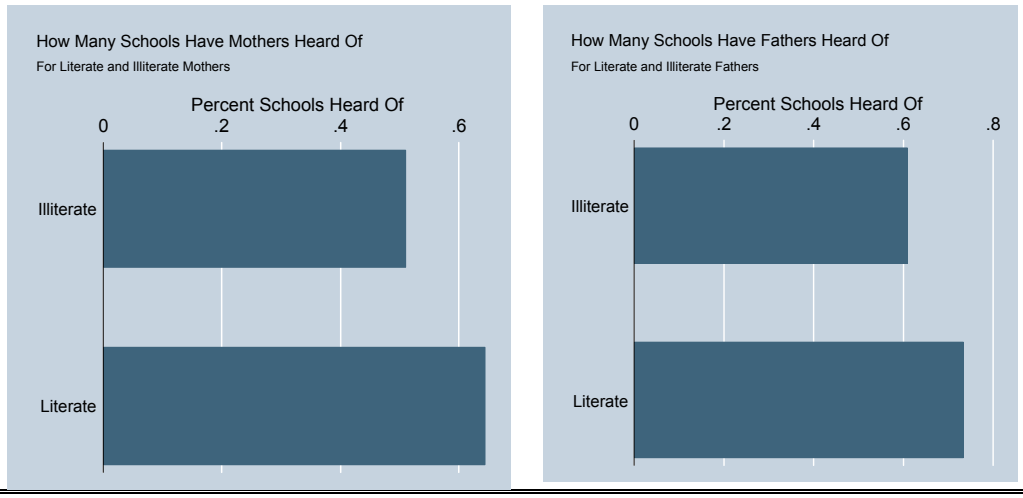
4.10 *Result 3: Mothers know best.* Figure 4.3 relates households' perceptions of teacher attendance (regularity) measured at the school as part of the teacher questionnaires and roster exercise (see Chapter 3). Again maternal assessment of the teachers' regularity tracks the actual state of affairs well. Literate mothers do a slightly better job (especially in figuring out which teachers are not regular) than literate fathers. Combining this with results 1 and 2, mothers are more aware of school conditions despite, as we will see next, having visited far fewer schools than fathers.

Figure 4.3: Mother Knows Best



4.11 *Result 4: In a typical village some schools are unknown to parents.* Figure 4.4 is the *only* set of results that resonate, at first glance, with the common wisdom that households are relatively ignorant, and illiterate and less wealthy households know less. Mothers have *heard of* only 60 percent of the schools in their village, and fathers 70 percent, and illiterate mothers and fathers have heard of even fewer schools. Several salient points emerge through a multivariate regression analysis: both mothers and fathers are far more likely to report having heard of a school that is public rather than private. The public "advantage" translates into a 22 percentage point increase for fathers, 17 percentage points for mothers, resulting in a 20.6 percentage point increase for household responses that combine both the parents' information. At the level of the school, the size of the school as measured by the number of male and female teachers correlates strongly with the probability of being recognized (for male, female, and household regressions), while every additional year that a school has been in the village increases the probability of recognition by 0.2 to 0.3 percentage points (males and females, respectively). At the level of the household, being rich, having educated parents and being close to a school increase the probability that any school is recognized by parents. For every kilometer that the school is further from the house, the probability of hearing about it decreases by 7 percentage points for fathers and 9 for mothers, presumably reflecting the limited mobility of women within the village.

Figure 4.4: Even in a village, people have not heard of a large number of schools



4.12 These results suggest that ignorance about schools, to the extent that it hampers the ability of households to choose appropriately for their children, is limited *on the average* to household's knowledge of the existence of certain schools. Even here, it is easy to imagine scenarios where this ignorance has no impact on actual outcomes. For instance, if the schools that the household has not heard of are those which would never be chosen (perhaps they are too far), lack of knowledge does not imply that households are making uninformed decisions. The average household is thus reasonably accurate in their perceptions of how well their child is doing, how well their child's teacher is doing, and how well different schools in the village are doing. The common wisdom that mothers and illiterate parents know less is limited, at most, to their awareness of certain schools.

The decision to enroll a child

4.13 *The household survey showed that between the ages of 5 to 15, just over one-third of the children in the sample (35 percent) were not enrolled in any school.* The data are consistent with the patterns observed in the Pakistan Integrated Household Survey (PIHS). In particular, girls are less likely to be enrolled than boys, and there is a familiar pattern of delayed enrollment, whereby enrollment first increases with age, peaks between the ages of 9 and 10, and subsequently declines. There is a hint of a greater decline among girls compared to boys between the ages of 10 and 15, but the additional decline for females is neither large nor statistically significant. Close to 30 percent of the enrolled children are in private schools (27.3 percent), a number not very different from that in the PSLM for rural areas of the province. Finally, as expected, enrollment is higher among wealthier households and household with more educated parents. These facts are well known and the LEAPS data are similar to those obtained from larger surveys.

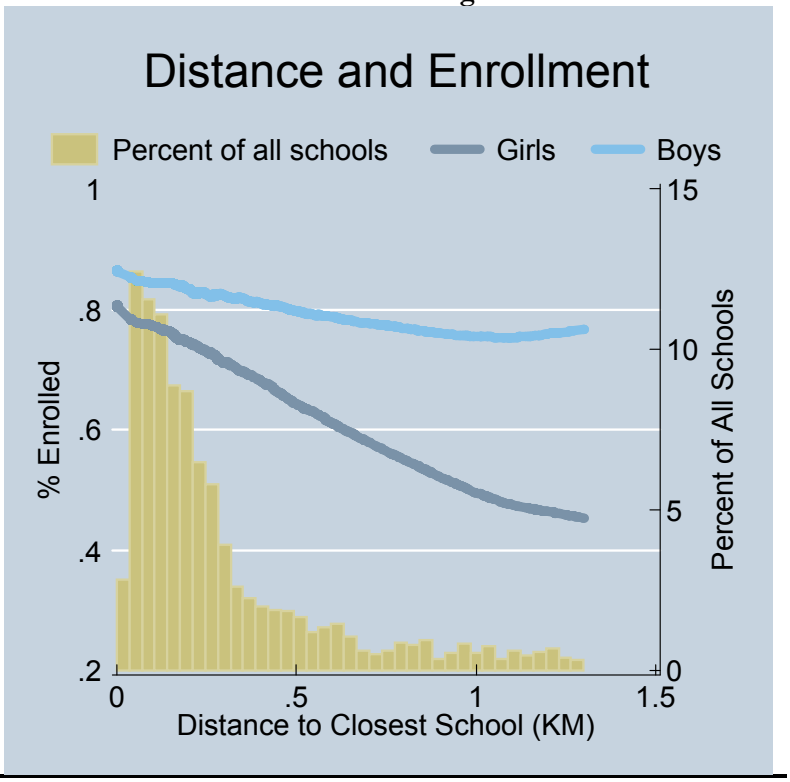
4.14 *The LEAPS survey improves on PIHS enrollment data in three ways*. First, the LEAPS survey measured distances from households to schools using global positioning systems (GPS). For every child in the surveyed household, there is data on the distance not only to the school he/she attends, but to *every possible school in the village*. This is an improvement over the PIHS where the questionnaire assumes a single school in the village and provides a single number for distance between home and school for every household—a strategy that can yield erroneous results when there are 10-12 schools in every village. Second, the survey recorded the specific name of the school so that the association between distance and enrollment can be linked to information about the school the child attends. Third, as described in the previous section, the survey included questions for parents on their perceptions of the child's intelligence, work ethic, and school performance. These additional bits of information lead to some surprising results. Relating enrollment to parental perceptions of intelligence yields important insights into how parents allocate educational investments among children in the same household. And new findings (relative to what is well known from analysis of standard household survey data) emerge when these new distance measures and information on parental perceptions of the child's intelligence are used to better understand enrollment and school choice decisions.[22]

4.15 *Distance plays a major role in the decision to enroll a child, and more so for girls*. Figure 4.5 presents the relationship between enrollment and the distance to the closest eligible school that the child can attend, differentiated by gender. The left axis presents a histogram of the distance measure for the children in the sample. The right axis shows the enrollment for boys and girls as a function of the distance measure.[23] The distance measure was computed by using GPS coordinates to measure the distance between every household-school pair (close to 50,000 such pairs in the data); by using information on whether a school is co-educational (all private school) or single-sex (all government schools are either for only boys or only girls) to assess whether a child is *eligible* to attend the school (for instance, girls are not eligible to attend a boys' school, even if it is much closer than the alternative); and by combining the eligibility and distance data to compute the distance to the closest eligible school.

[22] Parental perceptions of the child's intelligence could be self-reinforcing, in that, they invest in the child they *think* is more intelligent, and the child then performs better, making the parental beliefs self-fulfilling. Nevertheless, these perceptions do present an added dimension to understanding intra-household allocations across children. For instance, parents who invest more in children they *think* are more intelligent still suggests that parents are not following a policy of compensating for weaker children in their educational investment decisions.

[23] The associations are computed in a non-parametric fashion using locally weighted linear regressions. Since these non-parametric measures tend to be highly sensitive to areas with few observations, the fitted curves are "trimmed" at the 95th percentile of the distance measure. That is, the associations are plotted using the full sample data, but omit observations in the top 5 percent from the graph.

Figure 4.5: Most schools are within 500 meters of the household…yet enrollment falls dramatically with distance and more so for girls



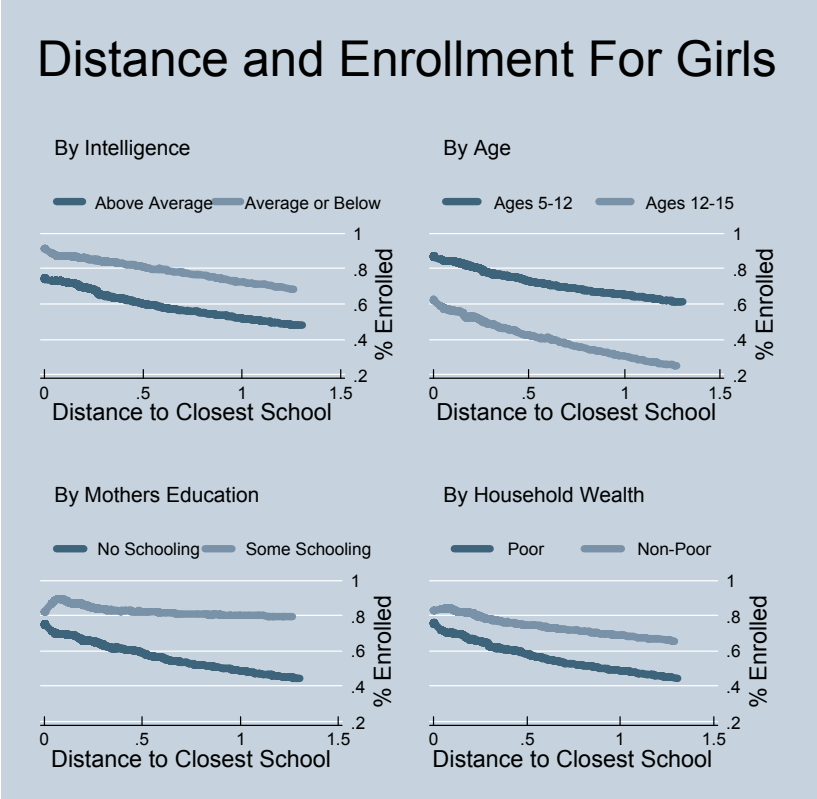
4.16 *Across the three districts, 50 percent of children are within 200 meters of the closest eligible school and the average distance of a child from his/her closest eligible school is 350 meters.* The histogram in Figure 4.5 shows the distribution of distance from school for children in the LEAPS survey. The vast majority of children are within 500 meters of the closest eligible school. In several villages we walked this distance with boys and girls between the ages of 8 and 12, and in no case did it take us more than 10 minutes. Children live closest to schools in Faisalabad (median 150 meters and mean 220 meters) and furthest in Rahim Yar Khan. Even in Rahim Yar Khan though, 50 percent of all children live within 400 meters from the closest school (the average distance is 550 meters). At first glance, low enrollments arising because children live far from school does not appear be an issue.

4.17 *Even with the relatively small distances to school, the distance-enrollment relationship is strong, especially for girls: the "distance penalty" accounts for 60 percent of the gender-gap in enrollments.* The relationship between enrollment and distance is strongly negative and more or less linear. Across boys and girls, enrollment declines by 8-10 percentage points for every 500 meters that a school is further from the house, and the relationship is as strong moving from 0 to 100 meters as from 800 to 900 meters. As expected, the relationship is (much) stronger for girls than for boys; in fact, the drop in enrollment as the distance to the closest eligible school increases is 3-4 times as much as that for boys—4 percentage points for every 500 meters for boys and 11-16 percentage points for girls. In a multivariate regression context that controls for age, household expenditures (a measure of income), education and the intelligence of the child, the "distance penalty" for boys is further reduced to 1.5-3 percentage points; for girls, the effect of distance is still large at 9-11 percentage-points for every 500 meters. While household and child characteristics, such as household expenditures and the child's age, all have independent effects on enrollment they do not alter the size of the basic gender gap of 15-16

percentage points in enrollment in the LEAPS data. In sharp contrast, allowing for the distance-enrollment relationship to differ across boys and girls reduces the pure effect of gender on enrollment to 5 percentage points—a dramatic decline of 60 percent.

4.18 *One way to assess what policies might increase female enrollment is to ask whether there are any household or child characteristics that reduce the "distance-penalty"*. For instance, if girls from richer households are able to attend schools farther away this is an indication that with more money, parents will be able to pay for transportation costs. We examine the effects of two household characteristics (the maximum education of an adult female in the household and the wealth of the household) and two child characteristics (age and intelligence) on the distance penalty. The analysis examines a policy question: in the absence of new school construction, how many households can be induced to send their children, particularly girls, to schools that are farther away?

Figure 4.6: Only educated adult females reduce the "distance-penalty" for girls



4.19 *The enrollment-distance relationship for different types of children and different types of households is used to address the policy question.* Figure 4.6 presents the results for girls. As in Figure 4.5, the relationship between enrollment and distance to the closest school for girls is plotted, but now for different sub-groups. The top-left graph looks at the relationship for girls perceived to be "above average" in intelligence and "average or below average intelligence"; the top-right graph looks at girls aged 5-12 and those aged 13-15 (post-menarche); the bottom left by whether the mother has any schooling or not and the bottom right by household wealth (poor or non-poor is defined such that 50 percent of all households fall into each of the two categories). Each graph conveys the *level* effect of the categorization (the extent to which, say, intelligent girls are more likely to be enrolled than those who are less intelligent) and the *gradient* effect of the categorization (the extent to which, say, intelligent girls are more likely to be sent to schools farther away).

4.20 *For girls, only the presence of educated adult females in the household reduces the distance penalty.* Girls living in households with educated females or in richer households are all more likely to be in school, as are those who are more intelligent and those in the younger age groups. These differences are large and significant, accounting for an increase in enrollment of between 15-20 percentage points (the dramatic effects of intelligence on enrollment will be discussed further on). However, apart from the presence of an educated female in the household, *none* of the other characteristics reduce the distance-penalty for girls. A priori, one might have thought richer households could and would obtain appropriate transport (or chaperone services) or that post-pubescent girls will be less likely to travel farther, but there is *scant evidence that distance plays a larger role for girls from poorer families or for teenage girls compared to others.* Girls in households where there is an adult female with *some* education (30 percent of all households) are enrolled even when the school is farther away, and the result is fairly large and significant in a regression context.

4.21 *In the case of boys, both educated adult females and parental perception of the child's intelligence reduce the "distance penalty".* Figure 4.7 shows the same set of relationships for boys. As before, child intelligence, younger ages, adult female education and greater wealth are all significantly associated with higher enrollment, albeit with two notable differences. First, consistent with Figure 4.1, the overall gradients are less steep—distance matters less for boys. Second, adult female education plays less of a role in reducing the distance effect, but parents are more willing to send boys they perceive to be more intelligent to schools farther away. As before, household wealth and the age of the child has little effect on the enrollment-distance gradient.

Figure 4.7: Nothing reduces the "distance-penalty" for boys

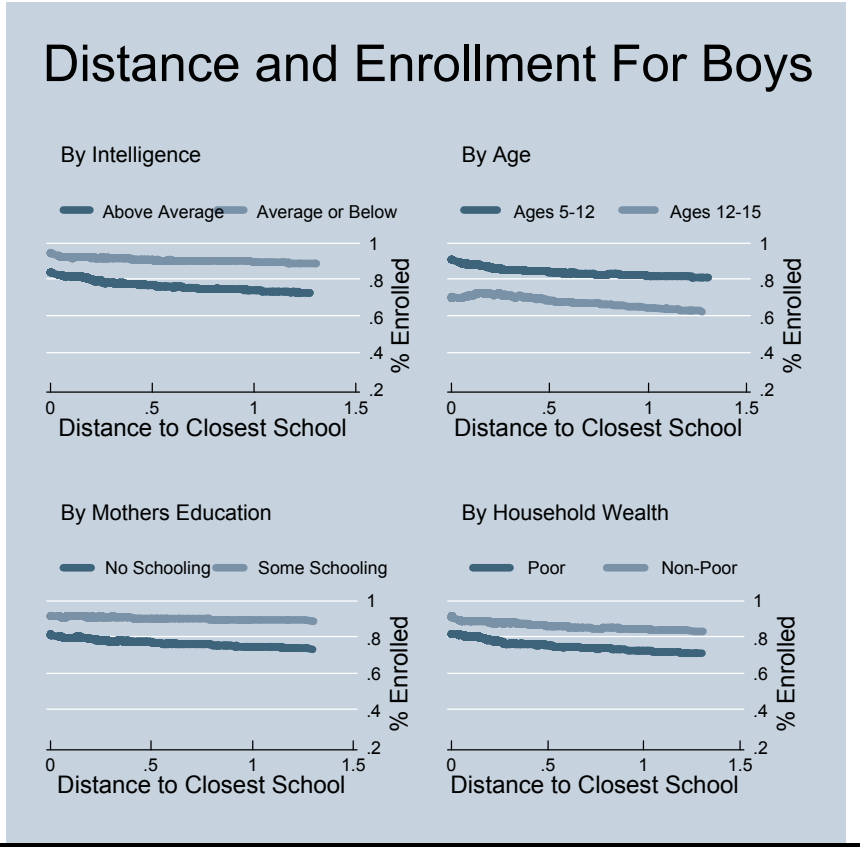


Table 4.1: Household and Child Characteristics, Enrollment, and the Distance Gradient				
	Boys		Girls	
	Likelihood of Enrollment	Effect of Distance on Enrollment	Likelihood of Enrollment	Effect of Distance on Enrollment
Child Intelligence	Increases	Reduces the distance penalty	Increases	No Change
Child in teenage years	Decreases	No Change	Decreases	No Change
Household Wealth	Increases	No Change	Increases	No Change
Educated Adult Female in Household	Increases	No Change	Increases	Reduces the distance penalty

4.22 *Children more likely to be enrolled if they come from richer households, are more intelligent (according to their parents), and are pre-teens.* The enrollment analysis is summarized in Table 4.1. In essence, children from richer households, more intelligent children, and those in the pre-teen years are all more likely to be enrolled, whether they are boys or girls. However, in the case of girls, child attributes do not play a role in decreasing the detrimental effects of distance; the only statistically significant result is that the distance-penalty is lower for girls in households with an educated female. For boys, child intelligence plays an important role in attenuating the distance penalty.

The school choice decision

4.23 *The question of school choice at the household level is linked to understanding how policy changes might affect enrollment in different types of schools.* The next section looks at the public-private school choice and, in particular, the effects of distance, household income and expenditure on the choice of a private school. It then examines the evidence on how parents are choosing schools. Two main findings emerge. First, poorer students attend public schools partly because they are closer. Second, different households care about different things in choosing schools. For instance, despite the dramatic effects of distance on enrollment, 50 percent of enrolled boys and girls *do not go to the closest eligible school.* School choice depends on whether households are quality conscious, distance conscious, or price conscious.

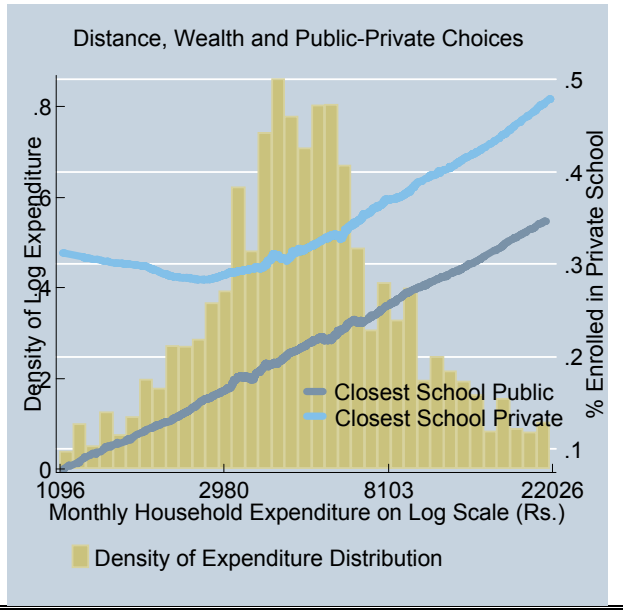
Table 4.2: Children closer to private schools are from richer and more educated households

Household Characteristics	Closest Eligible School is:	
	Private	**Public**
% all Children	53.14	46.86
Mother's Education (Years)	1.407	0.828
Father's Education (Years)	3.706	2.93
Per Capita Expenditure	778.933	659.394
PCA Wealth	-0.199	-0.404
Median distance to closest eligible school	0.176	0.277

4.24 Chapter 2 on the schooling environment showed that private schools tend to locate in richer settlements and public schools are also found in peripheral areas of the village, where households are poorer. Table 4.2 confirms this typology using household data—children who are closest to a private school tend to come from richer and more educated households, and travel shorter distances to school.

4.25 Figure 4.8 shows how location patterns relate to the wealth segmentation observed in the data, whereby children in private schools were 1.2 standard-deviations richer on average than those in public schools. It plots the percentage of children enrolled in private schools against (log) monthly household expenditure for two groups of children—those whose closest eligible school is public, and those whose closest eligible school is private. The histogram gives some sense of the distribution of (log) household expenditures.

Figure 4.8: Distance to a private school has as much to do with their use as the wealth of the household



4.26 *Public-private enrollment decisions show a clear pattern.* First, there is a dramatic increase of 10 percentage points (30 percent) in the probability of using a private school *regardless of wealth* when the private school is closer than a public school. A child in a household with monthly expenditures of Rs.3000 whose closest school is private is as likely to enroll in a private school as a child in a household with monthly expenditures of Rs.15000 whose closest school is public. Second, the likelihood of enrolling in a private school as household income increases is unaffected by whether the closest school is public or private. This implies that even if every child in the village had equal access to a private school, there would still be a considerable difference in the household incomes of children in public and private schools. Predictions from a regression model suggest that if private schools were the closest option for *all* children, enrollment in these schools would increase from 31 to 34 percent for the rich and 24 to 29 percent for the poor. Part of the 7 percentage point gap between the rich and the poor is because of the specific location choices of private schools, but even if private schools were to locate in all settlements, the gap would remain at 5 percentage points.

4.27 *The distance and enrollment analysis shows that the distance to school matters when parents choose whether to enroll a child or whether to send a child to a public or private school.* One might think that parents always enroll their children

in the closest school given the strong relationship between distance and enrollment (a 500-meter increase in this distance leads to a 20 percentage point decline for girls). Yet the results so far say little about the school that the parent *actually* chooses—while children are less likely to attend school if it is further away, this does not necessarily imply that all *enrolled* children go to the closest eligible school.

4.28 *Other selection factors*. In fact, only 36 percent of all enrolled boys and 38 percent of all enrolled girls attend the closest eligible school. Of the remainder, 52 percent choose to bypass a nearby private school to go to a public school that is further away; 15 percent bypass a nearby government school to go to a more distant private school, 25 percent choose a most distant government school than the one that is closest to their house and 12 percent bypass one private school to go to another. Neither is bypassing a purely male-child phenomenon. While boys *are* more likely to bypass the closest school, 60 percent of all enrolled girls also travel beyond the closest eligible school to one that is further away. The additional distances they travel are not large in themselves, ranging from 150 meters (private for private) to 500 meters (public for public), but these do attain greater significance in light of the enrollment-distance relationship discussed above.[24] These results may be reconciled in a number of ways.

4.29 *Data on school bypassing suggests three types of households*. A potential reconciliation is that the child whose enrollment status is affected by the construction of a nearby school is very different from the one who bypasses a school that is next door to go to one that is further away. In fact, the only child whose enrollment changes after school construction nearby *is* the child who is sent to the closest school. The data on bypassing suggests three types of households in the sampled villages (see Annexure 1, Table A4.1):

- Distance conscious households are characterized by a combination of fewer enrolled children and enrollment in the closest school for those who attend.
- Quality conscious households bypass a nearby public school to go to a private school further away. These households tend to be rich with more educated parents, and the schools they finally select report learning levels close to one standard-deviation higher than the school closest to their house.
- Price conscious households bypass a nearby private school to go to a public school further away. As one may expect, these households tend to be poorer, less educated, and children are enrolled in schools where the learning levels are much lower than the school close to their house.

[24] If all households and children were identical this finding is puzzling. Consider a household with a school 500 meters away from home. The results suggest is that if the government constructs another school 200 meters from the household, enrollment would increase, but *some of the newly enrolled children would go to the school that is 500 meters away*. A natural question is: why were these children, whose choice is not affected by the construction of the closer school, not in school in the first place?

4.30 *The presence of these different types of households in a typical village (which cannot be identified a priori) makes it very hard to say much about school choice without further assumptions*. For instance, does bypassing mean that households are searching for quality? Not necessarily. *If* the household is bypassing a public school to go to a private school further away, it is searching for quality. But, if it bypasses a nearby private school to go to a public school that is further away, it is probably searching for a lower cost. What happens in the aggregate data depends on the proportions of each type of household.

4.31 *Interactions between households or between children within the same household could also explain part of the data on school choice*. As an example, a nearby school may allow children from a cluster of households to leave together; some of whom may then attend the closest school, while others may travel a little further, or even accompany their companions to the school further away before returning. Such effects are likely larger if there are particular obstacles that have to be crossed—a main road for example, or an empty field, or a stream.

4.32 These new data add several elements to the debate on distance and enrollment in Pakistan. To summarize the new findings:

- Distance and enrollment are strongly and negatively related, and more so for girls. There is little that mitigates the distance penalty.
- The poor use public schools more partly because private schools are located closer to richer households, but even if location patterns were equitable, (not surprisingly) there would still be a gap in the use of private schools by the rich and the poor.
- Moving beyond distance-enrollment relationships to the choice of specific schools reveals diverse household preferences with regard to quality, cost, and distance. Different households want different things for different children. Figuring out who these different households are or even their proportions in the data is new territory with the potential to offer insights with important policy implications.

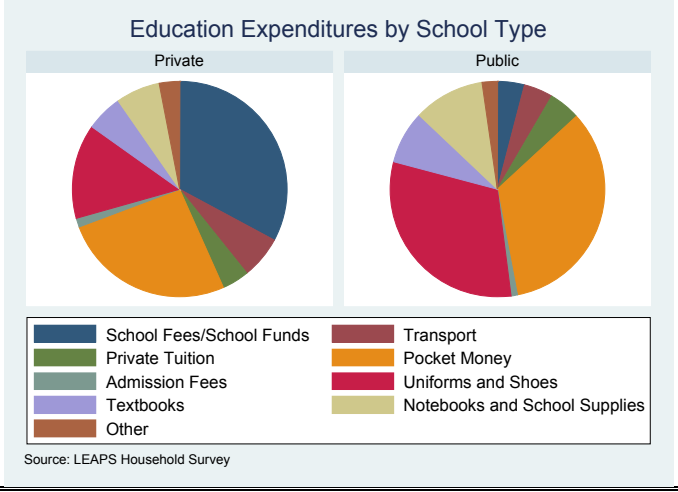
Households Educational Investments in their children: Money

4.33 *The final discussion centers on the "popular wisdom" about Pakistani rural households; in particular parental investments of time and money on their children's education.* It is commonly believed that households do not have the money to spend on their children's education; it is also believed that children are burdened by multiple demands on their time, and that learning outcomes suffer as a result. It is also commonly believed that these problems are far worse for girls compared to boys. How much of this is true?

4.34 *Households spend substantial sums of money on school-going children.* Households with children enrolled in public schools spend Rs.155 every month and households with children enrolled in private schools spend Rs.231 every month. The median monthly expenditures at the household level are about Rs.4700, which implies that a household with four children enrolled in a private school would be spending close to 20 percent of its budget on schooling expenditures. It also implies, together with the results from the schooling chapter on expenditures by schools that close to 50 percent of the total spending on education in public schools is incurred by households as out-of-pocket expenditures.

4.35 *How the money is spent depends on whether the child is enrolled in a public or a private school.* Figure 4.9 shows the breakdown of schooling expenditures across public and private schools. As expected, school and admission fees are the dominant expenditure category in private schools. The next most costly outlay is in public schools, for "uniforms and shoes" and "pocket money". In fact, pocket money is the single biggest expenditure category for students in public school—so large, that in absolute amounts, it is only Rs.10 less than school-fees paid by private school-going children.

Figure 4.9: Household Spending on children in public and private schools

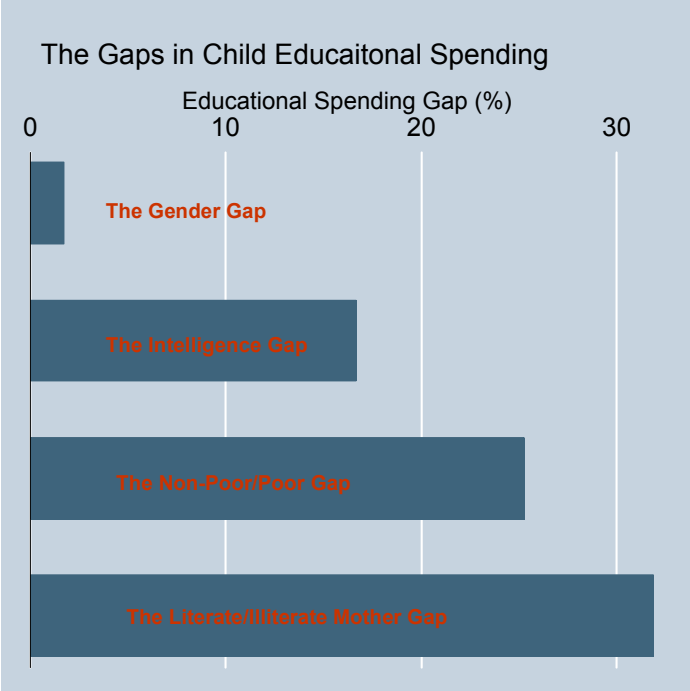


Source: LEAPS Household Survey

4.36 *If the cost of uniforms and pocket money is excluded from school expenditures, the average amount spent on education drops dramatically.* If expenditures on pocket money and uniforms would have been incurred regardless of enrollment, it is wrongly counted as spending associated with school enrollment. It could well be that pocket money, which parents say is used to purchase drinks or snacks, would have been spent as food expenses in any case, and represents a pure substitution from spending on the child at home or at school. Similarly, if spending on uniforms means that less is spent on other clothing for the child, this is a clothing expenditure rather than expenditure associated with schooling. Excluding both of these categories drops the expenditure on schooling dramatically to Rs.50 a month; with free textbooks, this becomes only Rs.30 a month for public and Rs.100 a month for private school-going children. With four children in private schools, this comes to less than 10 percent of the household's monthly expenditures; with four children in public schools, it is less than 2 percent.

4.37 *Average spending on children masks considerable variation across households and children.* Richer households and households with educated parents spend significantly more and elder children incur greater educational expenditures. This is not unexpected since educational spending is almost certainly a normal good. What is surprising is the strong effect of child intelligence on educational spending. Figure 4.10 shows educational expenditures for children disaggregated by parental perception of intelligence (very poor, poor, average, above average and highly above average) and by enrollment in public/private schools. Children perceived as more intelligent are four times more likely to be enrolled in private schools. The differences are much smaller for those enrolled in public schools, but still represent a two-fold increase over the same range. In contrast to this "intelligence" effect, gender discrimination in educational spending is small, accounting for at most a 5 percent difference in spending (Figure 4.11). Putting the two together, households, on average spend a *lot more* on girls perceived to be intelligent than on boys who are not (Rs.224 versus Rs.180 per month). To the extent that parental perceptions of intelligence can be viewed as "objective", this implies that even at the young ages of 5-15, parents start supporting children who are doing better with more investments, and cutting back on the children they feel are not performing.

Figure 4.10: Parents spend more on children they think are more intelligent



Households Educational Investments in their children: Child Time Allocation

Girls do more work at home, but they also spend more time studying, while boys play. Children not attending school do more housework (girls) and paid-labor (boys) and in the teenage years (especially for girls) these are close to full-time jobs. For the primary-age group though, out-of-school children spend most of their time playing (and sleeping).

4.38 *Both boys and girls in schools spend less than one hour per day on housework or paid work.* The average child in the sample spends 10 hours a day sleeping, 5 hours attending school, 3 hours playing, 1 hour each on housework and homework from school. The remaining time is spent on prayer and religious activities (1 hour), working for wages (15 minutes), preparing for school (45 minutes) and entertainment such as listening to the radio or watching television. This is very close to what children around the world do; certainly the time spent either on housework or on paid work does not seem excessive.

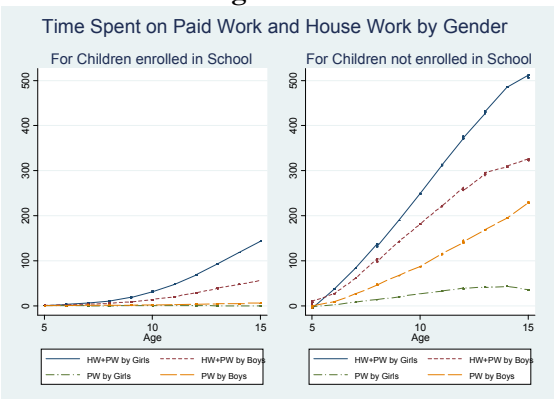
Table 4.3: A Day in the Life: How Children Spend their Day—a minute by minute account

	Non-Enrolled	Public	Private
Sleep/Rest	661.9	597.0	603.3
Playing	267.1	159.1	144.7
Housework	194.5	27.9	20.0
Paid Work	57.0	2.8	1.5
School	0	358.5	355.0
Tuition	0	16.3	25.6
School work outside School	0	74.5	79.4
Media Entertainment	31.1	35.2	45.1
Religious Education/ Prayer	63.5	76.4	77.8
Preparation for School	0	58.8	57.4
Other	127.6	23.7	21.8

4.39 *Primary school-age children, on average, do not spend their time in paid work even when they are out of school.* An immediate question is the difference in time allocation between children who are going to school and those who are not. The average school-going child spends 350 minutes, or roughly 6 hours in school and 1 hour, on school work. The 6 hours for the child who is not enrolled is spent sleeping and playing (2½ hours), working for pay (1 hour), and housework (3 hours) (Table 4.3). Children, on average, are not working all the time whether they attend school or not. Despite the 6 hours that they spend in school every day, the enrolled child still gets 2 ½ hours a day to play, spends a ½ an hour on housework and less than 2 minutes on paid work. Children of primary school age (less than 12 years old) who do not attend school play more than 4 hours a day, substantially more than those in school and spend *93* minutes on average on paid work and housework. The notion that school-age children are being exploited for "child labor" is not consistent with the data.

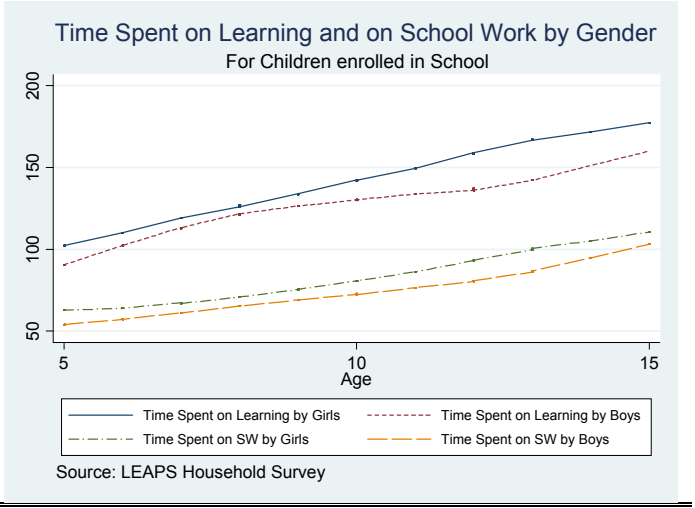
4.40 *For older children, particularly girls, child labor may be an issue.* Figures 4.12 plots the minutes spent every day on paid work and the minutes spent on the combination of paid and housework for girls and boys, separately. The graph on the left is for children who are in school; that on the right for those who do not attend school. The abbreviations HW stands for "housework" and PW for "paid work". For children in school, paid work for both girls and boys is minimal and probably reflects one-off activities during particular seasons. It never exceeds 10 minutes a day, even for older children

Figure 4.11:



(15 years old). When housework is added to paid work, girls come out looking much worse off than boys, and the difference between the two increases with age. At 10 years old, girls and boys are similar in their time allocation patterns, but by the time they are 15, girls spend twice as much time as boys on these two categories, but the total time spent never exceeds 2 hours. For children not attending school, the gradient of time spent on these two categories becomes steeper with age for both boys and girls, with boys spending more time on paid and girls more time on housework. By the time she reaches her early teen years, the girl-child who does not attend school spends close to 300 minutes a day on housework and by the time she is 15, housework has become a full-time job (8.5 hours a day). For these girls, the trade-off between child work and school is clear.

Figure 4.12: Girls do more housework…and more school work



4.41 *Although enrolled girls spend more time on house and paid work than boys more housework for girls does not mean that they are spending less time on school-related activities.* Figure 4.13 graphs the time girls and boys of different ages spend on schoolwork at home (SW) and learning activities, in general, which includes not only homework, but also time spent in tuition and media activities. The graph shows that girls spend more time on learning activities. In fact, most of the additional time spent doing housework for girls comes at the expense of playtime. In essence, boys and girls are both in school for roughly the same time; but when they come home, boys are allowed to play more while girls are asked to do more housework. The differences are not large; even with this additional housework, the average girl-child spends 2 hours a day playing.

III. DISCUSSION

4.42 *The LEAPS household survey and subsequent analysis adds an important new dimension to the educational debate.* As this study makes clear, the question facing parents in many villages is no longer "should I enroll my child in the single school in the village" but "*which* school should I send my children to?" The complexity of this decision must be taken into account by policymakers if future educational policies are to be as effective as possible. Some parents care about quality, some about cost, and some about distance, and if policies fail to take this into account they will likely aid one type of households but not others.

4.43 *Three key dynamics emerge that are useful for the policy debate in this more complex environment.* First, distance is important for enrollment, especially for girls. Second, parents are fairly well-informed and make substantial investments in their children's education. Third, through their choices of whether to enroll a child, through the choice of school (private or public) and finally through the amount they chose to spend, households pick "winners" and try to carry them through. In the following section, we examine the implications these three dynamics have for two key policy issues currently under debate; a third important policy issue—the regulation of schools—is discussed in the epilogue.

Potential Policy 1: Improving education for the girl-child

4.44 *The gender gap in educational attainment is large, but as the findings in this chapter show, the gender gap is almost entirely restricted to enrollment.* The gap in education expenditures is small (not more than 5 percent) and households spend a lot more on intelligent girls than on less intelligent boys. It is true that girls enrolled in school work more at home than boys, but the average working hours are still less than an hour per day and girls *also* do more schoolwork at home compared to boys.

4.45 *The commonly held view that distance to school affects girls more than boys is supported by the data and accounts for 60 percent of the gender gap in enrollment.* And that is precisely the problem. The relationship is so strong and so negative, that it really does not make much sense viewed in physical terms. Enrollment drops by 20 percentage points for girls for every 500 meters increase in distance from home to school. When we walked with out-of-school children from households in our sample, it took us 10 minutes to walk these 500 meters. With 12 schools in every village and with 50 percent of our households within 500 meters of a school, the policy option of building more schools makes no sense. No government can ensure the availability of a school within 100 meters of every household; such a policy is neither feasible nor cost-effective. Furthermore, household wealth, the child's age and the child's intelligent all have an independent effect on enrollment, but *none* of them mitigate the distance "penalty", except for the presence of an educated female, which is outside the purview of any short-term policies. It appears then that this distance effect has little to with monetary needs of the family or whether the child has reached her teenage years. A workable policy is not yet evident.

4.46 *The Punjab government's stipend program, whereby households are given Rs.200 per month for every enrolled girl between Class 5 and 8 signals the government's commitment to education, yet the costs may far outweigh the benefits.* An evaluation (Chaudhury and Parjuli 2006) shows the program increased enrollment by 10 percent. Out of 110 girls now in school, 100 would have gone to school with or without the stipend and 10 additional girls changed status from non-enrollment to enrollment because of the stipend. The price of targeting these 10 girls is the stipend paid to all 100. The cost *per additional girl-child enrolled* is the total cost of the stipend divided

by 10—a staggering $400 per marginal child. The stipend cannot distinguish between children who would be going to school anyway, or children who change their decision as a result of the stipend, or children who would not go to school with or without the stipend. The cost to target the second group is unsustainably large.

4.47 *Differences across households are evident in the significant fraction of children who bypass the closest school to go to a school that is further away.* Although males are slightly more likely to bypass, 60 percent of all enrolled girls are bypassing as well. The key to improving female enrollment is to understand better the relationship between enrollment and distance. Why is it that some households and children are able to send their kids to schools further away, while others take their children out as the distance to school increases? Would this change if chaperones or elder siblings or neighborhood children walk to school together? This requires further research.

Potential Policy 2: Improving schooling outcomes through more school inputs

4.48 *The goals of policies to increase school inputs need to be debated through a household "lens".* The government recently instituted a policy of providing free textbooks. This may bring in children for whom the costs of textbooks were prohibitive and who were therefore not enrolled. It may also have improved learning among the children who were already enrolled but did not have access to textbooks. The debate here centers around two issues. First, among the out-of-school children, was the cost of textbooks really prohibitive? The data are unclear, and much depends on whether we think of pocket money and spending on uniforms as substitutes for household expenditures on all children. Second, giving out textbooks for free means that households who were earlier buying textbooks for their children will stop buying them so that the total number of textbooks a child has access to remains unaffected by the policy. What is the specific aim of this policy? If all children were enrolled, free textbooks for instance, are a pure *income* subsidy since parents save the equivalent amount by not buying textbooks on their own. While this might be a desirable effect of such a program, we should not expect improvements in learning as a consequence. We are asking, in essence, that a household "lens" be applied in thinking of potential educational policy.

4.49 *A household lens suggests a role for educational policies that support children who receive fewer inputs at home.* Right now some children are heavily supported by households and others are left by the wayside. Children perceived as intelligent by their parents are more likely to be enrolled, more likely to be in private schools, and have three times as much money spent on them. In high-income countries, higher investments in more "productive" children typically kick in around the college-going years. But for children in primary school, $12,500 per child is spent on learning-disabled children in the United States compared to $6,500 spent on

"regular" children, with an implied spending ratio of close to 2:1. In Pakistan, by the time children are in Class 3, parents have already picked "winners" perceived to be more intelligent and are spending three times as much on these children. Public money for education should include these "vulnerable" children. In India, for instance, there is some evidence that programs designed to help poorly performing children (Banerjee and Cole, Duflo, and Linden 2005) yield positive effects. Maybe it is time to think of similar programs for Pakistan.

4.50 *It may also be time for a wider discussion about the overall goals of the educational system.* South Asian systems were traditionally formulated for stringent selection of talented students: the average or poorly performing child was relegated to trades or lifestyles that did not require formal schooling. The system was designed to bring out the best possible children through tests and screening at every possible occasion. The data show that households are mirroring this system—certain public sector jobs, for instance, are made available only to children who have passed Class 10; not surprisingly, returns to education in Pakistan are *convex* at low levels of education. If a family is aiming for such a job for one of its children, it will be spent considerable resources to ensure that the required qualification is obtained; if the child can get to Class 9, but no further, the returns are significantly lower. These kinds of "non-linear" returns or "sheepskin" effects, as they are known in the literature, may explain non-compensatory behavior among households at a young age. To the extent that the desire for the average child to perform well seems to be more widely held, it is time now to think about policies that screen poorly performing children and take measures to help them specifically, without spending large amounts on the average child.

4.51 *Whatever these eventual policies may be, each deserves to be rigorously evaluated.* During the course of our surveys, a female teacher offered the following wisdom: "*The difference*", she said, "*between Pakistan and Japan is that in Japan they think for 50 years and then make policies, in Pakistan we make the policy first and do the thinking later, if at all.*" The existing evidence offers policy makers clear choices in some areas—teacher's performance, for instance, would certainly improve if they were held accountable for their actions. However, differences across households and children make predictions about policy effects harder—the ultimate effects of these policies will depend on the proportion of households with different types of preferences and returns to education. This proportion will certainly differ across regions (what works for Punjab may not work for Sindh) and plausibly across villages. In other areas more needs to be understood about the nature of differences across households and children that affect household educational choices. Experimenting with and evaluating policies that are in the implementation process is critical. These evaluations will at least validate how useful they were in the region they were implemented. They will be even more informative if applied using the

household "lens" so the extent to which these policies interact with the decisions that households make can be better understood.

4.52 *An advertising executive once remarked that he "knows that half the money spent on advertising is wasted, the problem is that he does not know which half."* This is particularly true in this case. Policies now need to identify the *marginal* rather than the *average* child so that they do not spend a lot of money on *average* children to benefit those who are "marginal". In these situations, it is often best to enable households to make better decisions without forcing a particular set of actions on them; how the government can act as a better enabler requires discussion and debate.

Chapter 5: Thoughts for Discussion and Debate

5.1 *The state provides equitable access to education at the village level in Punjab.* Article 37 (b) & (c) of the Constitution of Pakistan (1973) affirms that "the State shall remove illiteracy and provide free and compulsory secondary education within the minimum possible period." During the 1990s enrollment rose rapidly in Punjab and other provinces. Based on the sample in the LEAPS study, which covers at least 50 percent of the population of Punjab at the time of the study, the State is indeed providing access to education. Every village in the sample has multiple free public schools, and average learning is similar across villages, independent of village-level wealth or learning. Data from the National Education Census (2005) confirm that there are more government schools per student in poorer villages in all of rural Pakistan, thus extending the findings from the LEAPS sample villages..

5.2 *Literacy goals often unmet.* What Pakistan needs to debate is whether any attempt is being made to address the affirmation that the "State shall remove illiteracy". It also needs to debate the implications of the rapid rise of well-performing private schools for achieving this goal. This chapter examines five issues related to the quality of education and future education policy that are frequently debated in Pakistan. The goal of this chapter is to argue that evidence can yield important insights for policy and provide a framework for further debate.

Issue 1: The Learning Agenda: What does it imply?

5.3 *Increasing learning requires bringing more children into school.* One easily identified group of children at risk of being left out of the educational system are those who live "far" from school and are therefore less likely to be enrolled. This study agrees with a number of other studies in Pakistan that the distance to school has a big impact on enrollment, particularly for girls. The problem is that this effect is too big for a potential supply-side response of constructing more schools to bring all out-of-school children into schools. It would be expensive to construct, maintain, and staff schools within 100 meters of every household.

5.4 *The government needs to actively pilot interventions to see how these distant effects can be overcome.* The problem with the results thus far is that there are no clear household or child characteristics that mitigate the harmful effects of distance. An idea that has been advanced is the use of "chaperones" who bring children to school—anecdotally, it has been suggested that when children can walk to school together or with a responsible adult, they are more likely to enroll. It is exceedingly difficult to assess this type of phenomenon

with these data. This is partly because there are too few households to construct indicators of what "neighbors" are doing and partly because such interaction effects (for instance, using the number of siblings as an appropriate indicator) are hard to interpret. It is difficult to dissociate household effects from the independent effects of having someone to go to school with. If "chaperones" are indeed the solution, this should not be very hard to address. Given the difficulties in assessing the impact observationally, this sort of intervention requires rigorous evaluation using randomized strategies.

5.5 *Children who do not attend school work for pay less than two hours a day.* The data are also notable in showing that the alternative to school is *not* work. Primary age children who are not in school spend 93 minutes a day (an hour-and-a-half) working at home and working for a wage. Getting these children into school does not require "compensating" parents for a loss of income; but it may require schools that are more interesting for children and schools where learning is of a higher quality. The appropriate infrastructure and pedagogic "package" to get children who are disinterested and not pushed by their parents into school requires the combined knowledge of educators, head-teachers and parents themselves.

5.6 *While improving enrollment is critical toward ensuring that children learn, it is insufficient.* Children are unable to read simple sentences in Urdu and add and subtract by the time they are in Class 3. That greater enrollment does not imply more learning demonstrates the importance of a holistic approach toward the educational rights of the Pakistani citizen. More children may be attending school in rich and highly literate villages (Chapter 1), but the average child's test scores in Class 3 remain largely unchanged.

5.7 *Once children are in school, efforts to measure performance must follow.* Unfortunately, there is no magic recipe for improving learning. Despite many years of research in high income countries, there is little consensus (apart from the role of teachers discussed below) on how learning can be improved. There is considerable agreement, however, that collecting information on learning is the critical first step for the broader "learning agenda". Before we even think of how learning may be engendered, a system for tracking learning in different schools over time based on tests conducted by a reliable and impartial authority will important to ensure that citizens know how well their children are performing in school.

5.8 *Information on enrollment and learning outcomes need to become part of the popular discourse on the state of Pakistani education.* The widespread use of a test at the end of Class 5 in Punjab province in 2006 is an important first step. Further work is required to ensure that citizens are able to monitor and hold the state accountable for its performance in guaranteeing the right to education. Ensuring exam results are

standardized and replicated every year in a reliable manner is only part of the challenge; access to comparable data for all schools is also critical. In recent years, Punjab has collected annual data on all its public schools, the Federal Bureau of Statistics has enumerated and collected information on *all* schools in the country, and Punjab has tested children in Class 5. Yet, these data are not publicly available and their accuracy has yet to be subjected to independent analysis. Researchers, academics, multilateral institutions (who are often *implicated* in the withholding of data and information) and those interested in the Pakistani education system need to ensure the general public has ready access to this information. While enrollment numbers are currently released on an annual basis, similar summary statistics on academic achievement need to be made available as well to ensure school quality becomes part of the popular discourse on the state of Pakistani education. In the United States, school performance in learning is posted on the internet. This may be a worthy goal to aspire to.

5.9 *The comparison of public and private schools made here strongly suggest that better learning is not out of reach of the Pakistani system.* Even within the same villages, private schools are doing much better in all subjects than public schools. Furthermore, the differences between schools are far greater than the differences across households or villages, and are equally strong after accounting for parental wealth and education. Based on the results of this study, where public and private schools in the same community are compared, the best place to focus attention is on the condition of schools and not the attitude of parents toward their children's schooling.

Issue 2: Should the Government Regulate schools?

5.10 *Ensuring standards of quality*. Popular policy pronouncements and the discourse surrounding private schools often revolve around regulation of quality and (at varying points in time) prices. But what is such regulation meant to do? One purpose of regulation is to ensure that providers deliver a minimum standard of performance. Using performance and test scores as a yardstick, it is government, not private schools that need better oversight. The bulk of the poorest-performing schools are government schools, where there is little accountability or mechanism for complaints—these schools are not meeting any minimum quality standard. In contrast, parents unhappy with a private school can simply withdraw their child, and this exit option shows up clearly in the data—children in the worst private schools have far higher test-scores than those in the worst public schools (Chapter 1).

5.11 *Ensuring competitive pricing.* A second purpose of regulation is to ensure that private schools do not charge "excessive" fees. Such pricing inefficiencies arise from monopolistic behavior. Firms that act as monopolies maximize profits by charging prices above what is socially optimal; some consumers who would

like to buy the product from the monopolist cannot because this implies decreasing the price for the *entire* market. Typically, every country has an authority that looks at monopolistic or restrictive trade practices and advocates alternatives. The chapter on schools showed that private schools are not behaving as monopolies. These schools are most often located in "schooling clusters" with other private and government schools. Direct competition from other schools keeps their prices low—indeed, the average profit at a rural private school in Punjab is approximately equal to the salary of a male private school teacher. This is precisely the opportunity cost of the private school entrepreneur. Government schools tend to be located both in schooling clusters and in stand-alone locations outside the main settlement. Given the strong relationship between distance and enrollment, these schools may be the *only* option for a large set of children. From chapter 2, levels of infrastructure in these schools are lower, suggesting that they do not command the same resources that government schools in denser and richer settlements do. If there is any evidence that some schools may be "monopolies" it is these government schools rather than the majority of private schools.

5.12 *Ensuring that prices reflect quality*. The third common rationale for regulation is that consumers are unable to evaluate the quality of the product they receive. In the case of private schools, parents cannot tell the quality of education imparted in school and are thus able to "fleece" parents by charging high fees for low quality. It is worth recognizing that this rationale for regulation does not imply that poor quality private schools should not exist. In fact, poor quality need *not* be a problem as long as it is completely embedded in the price of the service and as long as the preferences of the child are fully reflected in the decisions of the parent. A Mehran is cheaper than a BMW, yet few would argue that there is a need to regulate Mehran's out of the market. Similarly, in the schooling case, if worse performing and cheaper private schools are regulated out of existence, there will be a large number of households who will stop sending their children to school (because the alternative government school is too far away or even lower quality) or be forced to opt for an even lower quality government school. The rationale for regulation arises from the discrepancy between price and quality, rather than lower quality itself.

5.13 *Moreover, this is a rationale for providing more information, not necessarily regulation*. It becomes a rationale for regulation only if the cost of providing information about quality is prohibitively high, leaving regulation as an only alternative. The results suggest that the market is already working well in some ways. The average parent's ranking (whether the parent is literate or not) of schools coincides with the ranking from independently administered tests, suggesting parents are already aware of the quality of schools in their villages. Quality is also reflected in prices – higher fees are clearly associated with higher quality. That said, providing more information could help increase awareness about the number of schools in the village and their relative quality and lead to better outcomes through increased competition. If every village had posters

and a page of test scores for different schools and their addresses in the village (perhaps with comparisons to other villages or their own district), parents might make better school choices. Indeed, a randomized evaluation of precisely such an experiment is underway. Preliminary results suggest that the experiment led to better learning outcomes among the initially poor performers. If confirmed, such an experiment could then be reevaluated within the context of the Punjab government's large-scale testing exercise in Class 5.

5.14 *These three rationales for regulation—ensuring a "standard" of quality, ensuring competitive pricing and ensuring that "prices reflect quality" suggest that public sector schools are better candidates for regulation on all three counts than private sector schools.* But government schools are already regulated! It seems parent's ability to choose schools is operating better than government regulation to deliver basic minimum educational goals. Pakistan needs to rethink the costs and benefits of regulating private schools, given these findings from the data.

5.15 *Regulation has to first focus on the worst-performing government schools.* As reported, the gap between the best and worst government schools is 10 times the gap between children from rich and poor families and 15 times the gap between children with literate and illiterate parents. The utter failure of the lowest performing government schools suggests an obvious target for any future education reform program. Although efforts to improve mediocre and slightly above average schools may yield positive results, these schools are not the driving force behind low child test scores. It is the worst government schools that drive down average test scores—dropping the 50 worst government schools is equivalent to raising the other 436 government schools' scores by 25 knowledge points each. The debate about regulation has to *first* focus on very poorly performing government schools. Once theses schools are on track, attention can then be focused on the extension of regulation to other types of schools.

Issues 3: Shifting the focus from inputs to outcomes

5.16 *Reframing the education policy debate involves shifting the focus from inputs to outcomes.* Most popular writing on Pakistani education starts with the poor state of school infrastructure, high pupil-teacher ratios, and low budgetary support. The implication is that more money will solve all these problems. This would be an easy solution and one that all funding agencies would be happy to support. Unfortunately, as a number of studies worldwide show these inputs cannot explain large differences in learning between schools. As confirmed in chapter 1, private schools outperform public schools regardless of their infrastructure or pupil-teacher ratio. In fact, the correlation between infrastructure and test scores or student-teacher ratios and test scores is fairly small to begin with.

5.17 *The amount of resources required to educate a child in the private sector is one-half the amount required by the public sector.* Take the case of Urdu. Private school students grasp 38 percent of the content in the test; government school students grasp 25 percent. By the end of Class 3, assuming that children have been in school for three years, the spending on a government school student is Rs.6000, on a private school student Rs.3000. Therefore, it costs Rs.79 per Urdu-percent to educate a child in the private sector and Rs.240 or 3 times as much in the government sector. These numbers do not change much if we account for differences in household characteristics. *Prima facie*, the argument that improving outcomes requires far greater resources does not appear to be accurate. Although there are more subtle arguments based on the tendency for private schools to open in richer, more educated villages that support a case for greater spending (more on this below), the subject is clearly a matter for public debate. The automatic reaction to poor educational results is to throw more money at it before looking at whether something else is going on.

5.18 *The source of the public-private school learning gap is the ability of private school administrators to adapt to the specific circumstances of their school.* The key question of course, is what this something else might be. In a number of discussions the first question is always "So what do private schools do differently that government schools do not?" The question and what is implied is that there must be some difference in *an input or set of inputs* that can be provided by the government to bring them to the same level of learning as private schools.

5.19 *Despite extensive efforts to isolate observable factors that could explain the private-public gap, the data collected by the LEAPS survey cannot conclusively explain why private schools out perform public schools.* Using the set of children in the household survey who could be matched to test scores in the school-based assessment (about 900 in all) a "kitchen-sink" regression was used to explain learning as a function of child characteristics (age, gender, health status, household spending on education, intelligence, work ethic,), family characteristics (availability of books and other media at home, parental education and income, time spent with the child on studies), school characteristics (infrastructure, location, student-teacher ratio) and teacher characteristics (absenteeism, age, education, gender, test scores, training). While some of these were independently correlated with test scores, the private-public gap could only be reduced by 30 percent *at most*. This in sharp contrast to richer countries, where the gap is sharply reduced the moment a basic set of household characteristics is included in the regression.

5.20 Follow-up fieldwork was done to interview three head-teachers in private schools to get at this elusive input. All agreed that it was important to bring motivated teachers onboard and ensure that they were fulfilling their teaching duties, but they differed on everything else. In the first interview, the head-teacher felt that one of his teachers was weak in mathematics, so he had arranged for her, together with other teachers

from neighboring villages, to go for further training in Hafizabad, 60 kilometers away from the village. The second head-teacher felt that the lack of a boundary wall was distracting students (the school was next to a road), so he spent funds on building such a wall and his impression was that children could now focus more as a result of this construction. In the third school, children from one settlement were frequently absent since they had to cross a small forest to reach the school. The head-teacher decided to send a teacher every morning to this settlement to chaperone the children to the school, and attendance increased dramatically. Much like the intrepid teacher dealing with 94 children in chapter 1, private schools are probably doing better not because of "a set of inputs" that are of higher quality than those provided by the government, but because they have the ability and administrative flexibility to fix the weakest link in the chain.

5.21 *Shifting from inputs to outcomes requires flexibility.* One approach is the "planning approach" that tries one by one, to check the impact of each input on outcomes; this has also been the approach of most educational research in low-income countries. A second approach admits that different places and different children have different needs and a central planner is inherently unable to align inputs perfectly for every single child. However, it also recognizes agents at the local level *can* do this better—the flexible head-teachers in private schools for instance. The "flex-approach" suggests that instead of trying to fix every input optimally, the planner fixes the *system* so that those who know more and are able to respond better to individual needs prosper, while those who are inflexible and provide low-quality inputs are selected out of the system. The private system does this automatically. As we saw in the chapter on households—private schools that cannot provide the learning levels parents expect ultimately shut down or charge lower fees. A debate around whether a more "flexible approach" is better or even feasible in the government system also needs to tackle the question of educational performance.

Issue 4: Fixing institutions: Public-Private Partnerships?

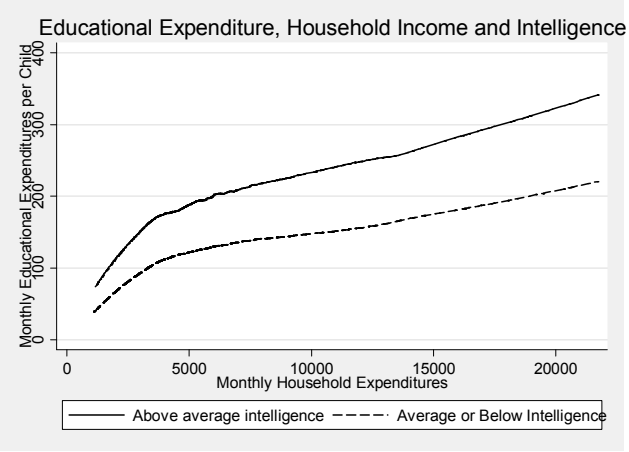
5.22 *In countries where private schooling option is widespread, policy options in education have revolved around public-private partnerships.* Such partnerships largely involve government financing and private delivery of education—thus combining the flexibility of the private system with funds from the government. Examples include grant-in aid schools (UK, India) and charter schools in the US which largely involve block grants/funding to private schools. The other model is financing families directly through vouchers to each school-going child. Voucher systems de-link the financing of education from its provision by ensuring that "money follows the child". That is, parents are given a fixed sum every month by the government and they use this to pay the fees of any school they elect to send their child to; if they choose a free public school, the money is sent back to the government. This has been tried in Colombia, Chile, Sweden and the U.S., among other countries. How well these various arrangements have worked is highly debated and depends on country circumstances.

5.23 *Although the large cost-per-percentage difference between public and private schools suggests a strong justification for vouchers, there are a few troubling issues to consider.* Private schools are overwhelmingly located in the main settlements, which are richer. For these main settlements, there is indeed a strong case for a voucher system. But, under a voucher system, will private schools locate in peripheral settlements, and at what price? The performance and prices of private schools are closely tied to their ability to find good teachers. If such teachers are hard to find, private schools will just increase their fees to cater to the larger demand under a voucher system; if they are not allowed "top-up" fees over and above the voucher price, it's likely they will decrease quality. In fact, there has been no increase in performance as a result of the voucher systems used in Chile over the past 20 years. As one observer noted, private schools tend to become like public schools, and in direct proportion to the public subsidy they receive.

5.24 *Such issues of performance and price may not be problems in the larger and denser settlements where the private schooling clusters already exist.* But this leaves the poorer and disadvantaged children in peripheral settlements underserved. The current government system, counter to what is commonly believed, provides education equitably across villages, and in most cases (with the exception of infrastructure), within them as well (Chapters 2 and 3).

That the government sector provides equitable educational opportunities is critical, because it is the only part of the educational system that does so. Private schools, by virtue of their prices and their location choices do not—poor households cannot pay even the relatively small fees, and live farther from such schools. As Figure 5.1 shows, households do not treat children in an equitable manner either. The figure shows what parents spend per month on children's education, separated across the children they perceive as intelligent versus those they perceive are not. Children who are not perceived as intelligent have three strikes against them—they are 20 percentage points less likely to be enrolled in school; they are more likely to be enrolled in public schools and; even when enrolled, households invest less time and money on them. The problem does not seem to be one of prioritizing expenditures in a low resource setting—the gap in spending by child intelligence actually *increases* with income. As it turns out, most of the money spent on the education of children thought to be of "average or below" intelligence comes from the public sector. Even with a voucher system, it will take a while

Figure 5.1: Parents spend more on intelligent children…and the difference increases with income



before supply of private schooling picks up—meanwhile, if Pakistan is to take seriously the idea of "Education for All", there is really no option but to improve the performance of government schools.

5.25 *Whichever way the debate goes, a careful evaluation of what a voucher system actually will do is vital.* A proper evaluation program would have at least 3 components. First, it would last at least 5 years, since it will be critical to see whether the private sector is able to respond to greater financing by increasing supply. Second, it would consider the *village* as the appropriate unit for assessing test-score responses. Vouchers may lead to greater social stratification; if such stratification means that children learn less from each other, it may have a detrimental effect on learning. Third, it would look not only at the effect on the "average" child but also the effect on disadvantaged children (whether because of their location or their backgrounds).

Issue 5: Fixing institutions: Can Government Schools Improve?

5.26 *Even with greater private sector involvement, fixing government schools is still important, goal.* The biggest issue in the government sector seems to be what to do about teachers—the rest is tinkering at the margins. The chapter on teachers offers a fairly comprehensive framework for debate, and is briefly summarized here.

5.27 *Two things about teachers matter most—their intrinsic motivation and love of teaching and the incentives that they face*. What matters *less* is their formal educational qualifications, so long as they are above secondary (for primary school children) and they have some training. Although a number of studies in low-income countries argue that schools should design systems that provide teachers with better incentives, this might be very hard to implement and not sustainable in the long-run. It is particularly difficult in an environment where government teachers fulfill non-teaching responsibilities such as manning election booths, drawing up voter lists, working as part and parcel of a political system (chapter 3), and performing administrative duties such as administering polio vaccinations. Even if teachers were to be relieved of non-teaching responsibilities and better monitoring of teacher attendance could encourage less absenteeism, more subtle incentive schemes, such as pay based on test scores of the children in their classes, are probably out-of-reach at the moment. The goal of getting the right teachers into the public sector and ensuring that top performers are retained while those who do not perform are gradually let-go remains a daunting problem.

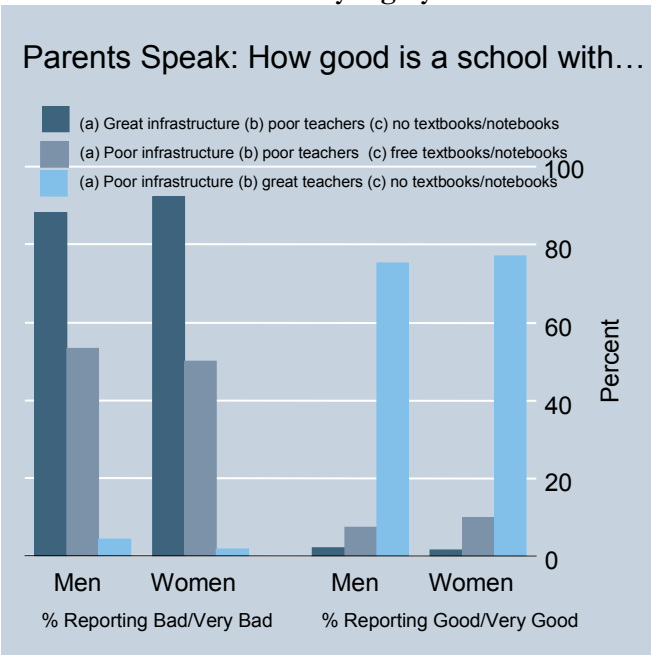
5.28 *At the moment good government teachers receive the same compensation as those that do no work and there is no process for shedding teachers who shirk.* As Pakistan grows and other job options become available, the mechanical wage function in the public sector may force the best teachers (who would arguably receive higher salaries elsewhere) to leave, and the worst (who would arguably receive lower salaries outside) to stay—similar

patterns have emerged in the teaching workforce in the United States over the last two decades, and are already evident in urban Lahore and Karachi.

5.29 *The government can afford to move teachers around.* In rethinking how government teachers—who currently earn 5 times as much as their private sector counterparts—should be compensated, two broad issues arise. First, given that this higher salary "buys" the government the right to transfer teachers, perhaps the government should think about deploying teachers to geographical areas and to educational sectors (the secondary sector for instance) where the private sector presence is low. Second, devolving teacher compensation to the district, along with the creation of a district cadre of teachers in combination with the provincial cadre, could allow salary scales based on the structure of the local market to develop. This would also support the ongoing devolution process.

5.30 *The politics of teacher reform requires the separation of teachers' demands from voters' demands.* Whenever teacher reform is discussed, the first reaction is that it is "politically difficult". Yet what does "politically difficult" mean—does the average voter *not* support teacher reform? In the last year of the LEAPS study, we asked parents a number of questions about what they wanted from the government and from their schools. Parents graded hypothetical schools with different characteristics on a scale of 1 (very bad) to 5 (very good). The first school had "*a roof that never leaks, a new boundary wall and desks, but teachers who were frequently absent and not motivated and no free textbooks or school supplies*". The second had "*a roof that leaks, a broken boundary wall, teachers who were frequently absent and not motivated but gave free textbooks and school supplies*". The third had "*a roof that leaks, a broken boundary wall and desks, no free textbooks or school supplies but teachers who were always present and highly motivated*".

Figure 5.2: Parents value schools with dedicated teachers very highly…



5.31 *The majority of parents (Figure 5.2) thought that schools without dedicated teachers (but with very good infrastructure or free school supplies) were bad or very bad.* Close to 80 percent thought those schools with poor infrastructure and no free school supplies but with dedicated teachers are good or very good. The findings were mirrored in a separate question where 62 percent of men and 68 percent of women reported "dedicated teachers" as their top priority in schools with "good facilities" coming a distant second with 13 percent (men) and 8 percent (women). Our third question asked what the top priority demand from the government was. Not surprisingly, 50 percent of men and women reported "jobs" as their top priority. However, 20 percent of men and 25 percent of the women reported their top priority was secondary schools in their village—ahead of roads, 24-hour electricity, 24-hour water, and greater security.

Since parents form the bulk of voters in any election, increasing teacher accountability and providing secondary schools is a politically feasible option. And it is not as though all teachers would lose from such reforms. The problem with the current system is that all teachers are treated the same way—regardless of whether they are highly motivated and hard-working or not. Reforming teacher compensation will benefit teachers who are working around the clock in difficult circumstances to ensure that children learn. The losers are non-performing teachers. Pakistan needs to decide whether it can mortgage the future of millions of children a year to the demands of a fraction of teachers who are not performing.

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ANNEXES

Annex 1: Sampling Procedure of the LEAPS project

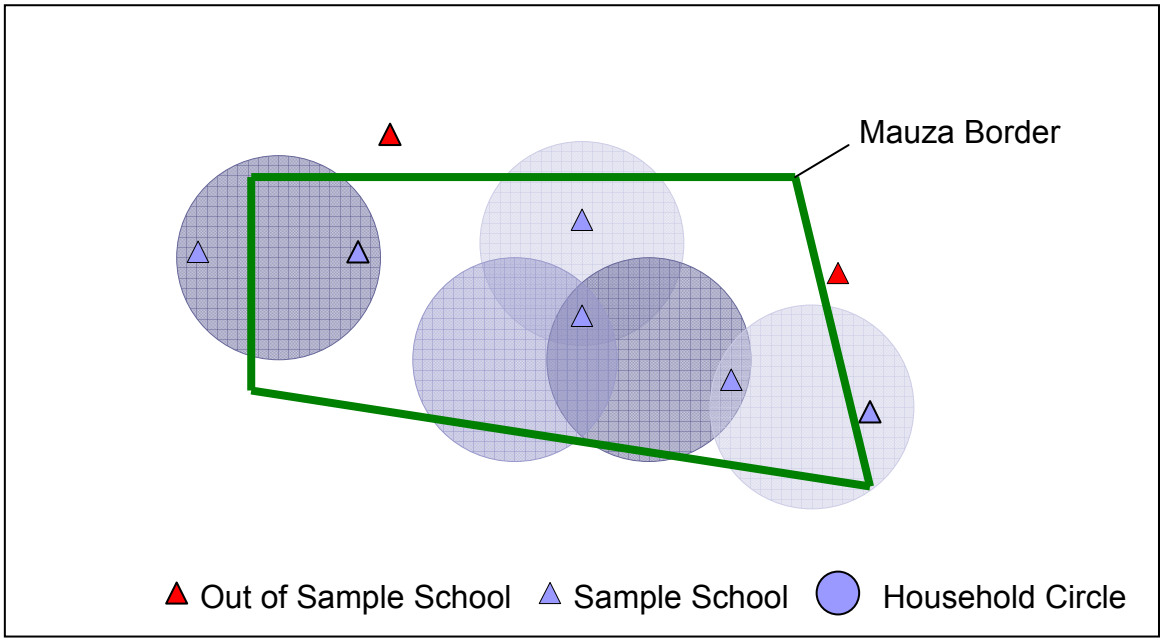
1. This annexure describes the sampling procedure for the LEAPS project. Samples were drawn for villages, schools, and households and each are described in turn.

Construction of the village and school sample

2. The village and school sample was constructed in two steps.

- Step 1: A preliminary sample of 125 villages, with 41-42 villages in each of the 3 districts, was randomly drawn from a list frame of villages with at least one private school (as reported in the private school census information FBS, 2000).

Figure A1.1: Sampling of Schools in LEAPS villages



- Step 2: The team conducted a survey of all primary schools (public and private) in the village and within a 30-minute walk of the village boundary. A "choice set" in each village is defined as schools in the village and within a "feasible" walking distance of the village. In Attock and

Faislabad this distance was determined to be within a 15-minute walk of the village whereas in Rahim Yar Khan, which is less densely populated, this distance was determined to be within 30 minutes of the village.[25] The figure above shows how this exercise was conducted over a 6-month period. The two schools in red are not in the sample, since (a) they are outside the village boundary and (b) they are not within 15-minute walking distance of any household in the village. All the schools in blue are in the "choice set"; in particular, two schools outside the village would still be chosen because they are within 15 minutes of *some* household in the village. All villages without a private school or with greater than 24 public and private schools in their choice set were excluded, providing the final sample of 112 villages.

3. Table A1.1 uses 1998 census data to compare the survey sample to rural Punjab, the three districts, and villages in the three districts with a private school. There are several observations. First, village population, literacy, and access to infrastructure and schools in the three districts are very similar to that of rural Punjab as a whole (Columns 1 and 2). Second, in accordance with previous observations on the location patterns of private schools, villages in these three districts with a private school tend to be larger, more literate, and with more access to infrastructure (Columns 1 and 3). Finally, the LEAPS project villages look very much like other rural villages in these three districts with a private school, although they are smaller, both in population and in geographical land area—the last follows from our systematic elimination of villages with more than 25 schools.

[25] Enrollment data based on a census of all households in the preliminary sample support this finding. While in Attock and Faislabad 91 percent and 94 percent of grade 3 enrollment is in schools in the village or within 15 minutes, in Rahim Yar Khan the percentage enrollment for the same distance is significantly less at 85 percent. By including schools within a 30-minute walk of the village for Rahim Yar Khan comparable enrollment coverage of 91 percent is obtained.

Table A1.1: Sample Summary Statistics

Table A1.1: Village Characteristics					
	Statistics	**(1) Rural Punjab**	**(2) ATK, FSD, RYK**	**(3) ATK FSD, RYK with Private School**	**(4) 120 Sample Villages**
Village Population	***Mean***	**2062**	**2665**	**4771**	**4125**
	se(mean)	16	49	129	228
	N	24531	2491	611	110
Percent Adult Literacy	***Mean***	**37**	**34**	**45**	**42**
	se(mean)	0	0	0	1
	N	24531	2491	611	110
Household Size	***Mean***	**6.88**	**7.15**	**7.19**	**7.15**
	se(mean)	0.01	0.02	0.04	0.10
	N	24501	2486	611	110
Village Area (Acres)	***Mean***	**1639**	**1581**	**1864**	**1891**
	se(mean)	19	19	30	93
	N	24703	2115	481	74
Fraction Houses with Potable Water	***Mean***	**0.019**	**0.021**	**0.025**	**0.021**
	se(mean)	0.000	0.001	0.001	0.003
	N	16879	1905	579	103
Fraction Houses with Electricity	***Mean***	**0.097**	**0.086**	**0.110**	**0.103**
	se(mean)	0.000	0.001	0.001	0.004
	N	21091	2141	607	109
Fraction Pacca (Cement) Houses	***Mean***	**0.521**	**0.503**	**0.642**	**0.647**
	se(mean)	0.002	0.006	0.010	0.022
	N	23260	2409	611	110
Number of Private Schools in Village	***Mean***	**0.39**	**0.43**	**1.96**	**1.68**
	se(mean)	0.01	0.02	0.07	0.11
	N	25836	2770	612	110
Number of Government Schools in Village	***mean***	**2.33**	**2.71**	**3.43**	**2.95**
	se(mean)	0.01	0.05	0.12	0.20
	N	19501	2111	604	109

Table A1.2 presents a more recent comparison of enrollments in the three districts of the study and the rest of Punjab, based on PSLM data. The table shows the net enrollment rates for children aged 6-10 and the percentage in private schools for the three districts of the study. These data confirm that the stratification into North, Central, and South reflects existing education data—Net enrollments are far higher in the north and the center (Attock and Faisalabad) than in Rahim Yar Khan (South). It also confirms that the center of Punjab, with 42 percent of children enrolled in private schools (26 percent in rural Faisalabad) is the heartland of private schooling, followed by Attock and Faisalabad. As before, the choice of the three *districts* is fairly representative of the province as a whole.

Table A1.2: Enrollment by District

District	Indicator	Urban			Rural			Total		
		M	F	Total	M	F	Total	M	F	Total
Attock	% in Private Schools	38	42	40	13	12	12	17	17	17
	NER, 6-10	85	83	84	79	82	80	80	82	81
Faisalabad	% in Private Schools	62	60	61	27	26	26	41	42	42
	NER, 6	81	79	80	71	61	66	75	68	72
Rahim Yar Khan	% in Private Schools	42	45	43	17	13	15	22	21	22
	NER, 6	76	68	72	49	39	44	54	44	49
Rest of Punjab	% in Private Schools	55	52	53	23	22	23	31	32	31
	NER, 6	77	76	76	67	58	63	69	63	66
Total	% in Private Schools	55	52	54	22	22	22	32	32	32
	NER, 6	77	76	77	66	58	62	69	63	66

Construction of the household sample

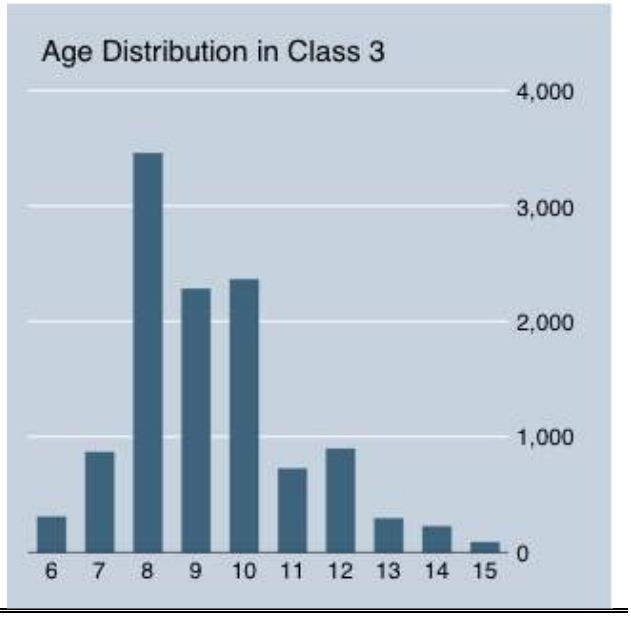
4. In each sample village a total of 16 households were surveyed. Households were picked randomly from two strata with 12 households in the first and 4 in the second strata. The list frame for sampling households was obtained from a census of all households in the village with at least one child between the ages of 5 and 15. The two populations sampled were:

- Strata 1: Households with at least one child eligible for and enrolled in grade 3
- Strata 2: Households with at least one child eligible for but not enrolled

5. The focus on grade 3 was in order to maximize the potential match between children that were tested in the schools (grade 3 only) and the children included in the household survey.

6. In practice, it was not possible to obtain these two strata since "eligibility for grade 3" is not a readily defined concept in the environment. While age cut-offs could be drawn, as figure A3 shows, there was a large degree of variation in reported age for children enrolled in grade 3, with a significant majority between the ages of 8 and 10. Moreover, households that enrolled their children earlier or later in grade 3 were different: Younger children in grade 3 are from wealthier and more educated households. Nevertheless, comparisons between households with an out-of-school child between the ages of 5-15 with households reporting an out-of-school child between the ages of 8-10 showed no differences in household expenditure, land, or the head of household's education.

Figure A1.1: Age Distribution of Children in Class 3



7. Given the concerns with following a wider age group, it was finally decided to adopt the 8-10 cut-off and reweight based on the proportions in the census population. The household sample cannot be used, for example, to compute (say) average poverty in these villages—it is (at most) representative of households with a child eligible for grade 3.

ANNEX 2 : CHILDREN WHO CHANGE SCHOOLS

Table A2.1: The Stayers and the Bypassers

		Goes to Closest Eligible		Bypasses				
	Not Enrolled	**Public School**	**Private School**	**Public for public**	**Private for Public**	**Public for Private**	**Private for Private**	**Total**
Number of Observations	1,369	827	414	668	1,443	386	421	5,528
% of all children	24.76	14.96	7.49	12.08	26.1	6.98	7.62	100
Household Characteristics								
Mother's Education (Years)	0.415	0.936	2.319	0.967	1.469	2.107	2.702	1.141
Father's Education (Years)	1.99	3.271	4.744	3.455	3.961	5.23	5.87	3.36
Per Capita Expenditure	613.322	691.69	819.031	670.347	807.996	974.086	903.212	722.836
Household Wealth	-0.915	-0.113	0.165	-0.301	-0.021	0.758	0.605	-0.296
Child Characteristics								
Age	10.183	9.513	9.199	9.938	9.958	9.37	9.436	9.873
Male	0.393	0.564	0.46	0.664	0.57	0.66	0.53	0.51
Above Average Intelligence	0.131	0.216	0.389	0.329	0.315	0.345	0.391	0.249
Below Average Intelligence	0.221	0.126	0.09	0.059	0.098	0.062	0.042	0.135
Birth Order	3.229	3.506	3.098	3.353	3.261	3.044	3.222	3.266
Total Educational Expenditures	0.461	130.603	234.628	212.649	170.592	341.344	436.19	138.991
School Characteristics								
Difference in English Test Scores				0.12	-1.031	1.068	0.024	-0.287
Difference in Urdu Test scores				0.083	-0.624	0.838	-0.01	-0.163
Additional Distance Traveled (Median)				0.503	0.213	0.191	0.148	0.095

Technical Annexes

Test Construction, Characteristics and Analysis[26]

A1.1 To construct the LEAPS test, a feasibility study was conducted in June/July, 2002 to build the knowledge and capacities to conduct the more extensive LEAPS test. This appendix provides background information for the test instrument, the rationale behind the test design, a description of the test content, a formal validation of each individual test and notes on issues that arose during the test's administration and preliminary data analysis. It is organized as follows. Section A2 summarizes assessments of primary education undertaken in Pakistan over the past two decades, till 2003. The summary is based on published studies and publicly available documents; as such, it may miss small-scale studies that are hard to access or recent tests whose details have not been publicly released. Section A3 provides an overview of the assessment instrument, discussing both the test design and content. It then covers the procedural and implementation issues faced during the administration of the pilot test instrument and a diverse range of concerns related to the interpretation of the results. This section includes a summary of the actions that were taken in the final LEAPS test to address these issues and concerns. Section A4 presents an assessment of the testing instrument using Item-Response Theory to examine the validity of each question (henceforth item) as well as the precision of each test and the set of item parameters.

I. PREVIOUS STUDIES

A1.2 Since 1984, at least 19 assessments of primary education in Pakistan have been conducted. These efforts gained momentum after the World Declaration on Education for All (EFA) in 1990 and again with the joint UNESCO-UNICEF global initiative for Monitoring Learning Achievement in 1996. The studies have been both national and provincial in scope and focused on various competencies/content areas. UNESCO (2001) provides an excellent summary of previous assessment work in Pakistan and the summaries below draw from this document.

[26] This document is based on the test feasibility report prepared by the authors of this report together with Duriya Farooqi, who was at Harvard University at the time of the report preparation.

Early Studies – 1980s

A1.3 The first two major assessments of primary education in Pakistan were the World Bank's Primary Education Project in 1984 and the BRIDGES project of the Harvard Institute of International Development in 1988-89.

A1.4 The Primary Education Project study compared Science and Mathematics achievement of 3,300 students of grades 4 and 5 in a representative sample of project and non-project schools in Punjab, Sindh and the North-Western Frontier Province (NWFP). Shah (1984) summarizes the results. In all three provinces, girls scored higher in sciences while boys scored higher in mathematics. However, achievement for all groups was low and based on these results the author suggests that schools should primarily focus on ensuring that students acquire basic competencies rather than increasing peripheral luxuries in the curriculum. Interestingly, the correlation between professional teacher qualifications and test outcomes was fairly weak, with a significant positive correlation only in one province.

A1.5 The BRIDGES project collected student achievement data from a random sample of about 11,000 students in grades 4 and 5 and 1,000 teachers from 500 schools using the same instrument as the Primary Education Project study described above. The test showed a decline in both Science and Mathematics scores between 1984 and 1989. The study also collected information on student and teacher background characteristics and classroom practices, in an effort to relate these teacher characteristics to student outcomes.

Later Studies – 1990s

A1.6 Testing activity in Pakistan increased significantly during the 1990s as a result of the Education For All (EFA) declaration and the associated UNESCO-UNICEF initiative. These studies focused on a broad variety of topics. The results are briefly overviewed below.

A1.7 Mirza and Hameed (1994) explored the effectiveness of various school types. These types were: 1) mosque school, 2) two teacher primary school, 3) five teacher primary school, 4) primary section with middle school and 5) primary section with high school. Three test instruments were administered. The first two covered Mathematics, Science, Social Studies and Dinyat (the study of the practical laws and ideology of Islam). The third attempted to assess students' behavior as measured by classroom participation, motivation, cooperation and socialization, discipline, cleanliness, carefulness and regularity and punctuality. The sample consisted of 15,991 students in grades 3 and 5 from 472 schools selected from the four provinces of Balochistan, M.W.F.P., Punjab and Sindh. Mosque schools had the lowest gross achievement and gross

behavior scores. Primary sections of middle schools performed best on the achievement score and primary sections of high schools ranked first for behavior. Five teacher primary schools were the most cost-effective in terms of cognitive achievement. However overall, the correlation between achievement scores and per-student cost was extremely weak.

A1.8 Pervez (1995) attempted to determine the degree to which students possess basic competencies. The testing instrument was a semi-structured questionnaire covering life skills, reading competence, writing competence, counting and arithmetic, mental arithmetic and Holy Qur'an. The sample consisted of a representative sample (multi-stage, systematic-random sampling design) of 1,241 rural and 1,341 urban 11-12 year olds. One of the unique characteristics of Pervez's study was the use of a household rather than school based sampling frame. Thus, children from the appropriate age group were sampled from households irrespective of whether they were currently enrolled in school or not—as a result, the test outcomes are a snapshot of learning achievement for the entire age-specific population, rather than a selected school-going group. Perhaps as a result of this unique sampling frame, only 20.7% of children were competent at levels considered basic. Competency was lowest for letter writing whereas numerical skills, arithmetic, rote-reading and writing from dictation were deemed acceptable. As a result, Pervez (1995) concludes that Pakistani schools should shift away from teaching only rote-memorization-based skills.[27]

A1.9 The national survey conducted by the Multi-Donor Support Unit for the Social Action Program in 1995 aimed at determining the critical variables impacting academic achievement at the primary school level. Basic information was collected on 527 schools throughout the country. Academic achievement in mathematics, general knowledge and comprehension was tested for 914 teachers and 11,563 students in grade 5 (although data from the Sindh province was later discarded). The test instruments were based on textbook materials for grades 3 and 4. The survey found student performance to be satisfactory. There were three interesting correlations reported from this study:

1. Teacher qualifications improved student scores (teacher performance varied across provinces from a high of 91% in Punjab to a low of 77% in the Northern Areas (FANA). This effect was particularly pronounced in rural areas where trained teachers accounted for a 12 percent increase in student scores.
2. Students taught in mixes settings or by female teachers generally outperformed their peers.
3. Private school consistently scored better than government schools.

[27] Since the document does not provide detailed breakdowns by the schooling status of the child, we are unclear for the basis of this statement.

A1.10 The NGO Action Aid Pakistan conducted an assessment of Mathematics, Urdu and General knowledge on 965 students in 50 schools sampled from six districts in the four major provinces and AJK. In addition, the study included focal group sessions as well and interviews with community leaders. Private schools performed significantly better than NGO and government schools in all categories. The difference between NGO and government schools was negligible. These results matched the opinions expressed in focal groups and interviews.

A1.11 Khan et al (1999) assessed learning achievement in Science, Mathematics, and Language (Urdu) for grade 4 students. The test instruments were based directly on the curriculum. In total, the sample consisted of 145 schools and 2794 students from 28 districts (he sample was not random). The results mirrored earlier studies. Girls performed better in Science and Urdu whereas boys were better in Mathematics. Urban students scored higher on all three sections than rural students and children in Sindh ranked first, followed by Punjab and NWFP and, significantly lower, FATA, FANA, AJK and Balochistan.

A1.12 Arif et al (1999) explored the factors expounded by head teachers, teachers, learning coordinators, parents and students for low educational outcomes. Additionally an achievement test in Social Studies, Mathematics and Urdu was given to 200 students. Generally head teachers criticized the standard of teaching, absenteeism of teachers, and lack of support provided to students at home. Teachers predominantly blamed low performance of the lack of adequate facilities and physical resources. Learning coordinators also focuses on the lack of physical resources in addition to teacher absenteeism and, poor school administration and non-cooperation between teachers and the community.

A1.13 Studies by Haque et al (2000), the Bureau of Curriculum Development and Extension Servicess, N.W.F.P, (1999) and the Bureau of Curriculum and Extension Centre, Balochistan, (2000) have similarly explored the factors responsible for poor performances. Questionnaires in these studies were submitted to head teachers, teacher and learning coordinators along with achievement tests for students. Complaints were similar to those found by Arif et al (1999).

A1.14 Punjab Literacy Watch (1999) tested students from 31 schools (16 boys public schools, 14 girls public schools and one co-educational private school), 822 boys and 549 girls, to determine competency in Mathematics and Urdu. For the choice of schools, District Educational Officers from two districts in each of Northern, Central and Southern Punjab were asked to select equal numbers of good, average and weak schools. The test instruments were designed based on the complete common curriculum. Students did well

on simple and mechanical mathematical problems and tasks like joining letters into words, making sentences and comprehension. In contrast, students performed poorly on geometry, fractions, decimals, and problems involving thinking or application of knowledge as well as grammar, letter writing and arrangements in alphabetical order.

A1.15 This array of tests and outcomes is summarized in the table in Annexure 1. A surprising fact that emerges from the summary below is that although a large number of assessments have been undertaken in Pakistan, there has been little (if at all, any) coordination between the different testing bodies, and as a result, there is no systematic reporting of information. For instance, UNESCO (2000) in their document on Assessing Learning Achievement specifies that a `good survey' should include at the very minimal, careful documentation of the sampling methodology (with standard errors), as well as instrument construction and validation. As our summary below shows, only in a very few cases are we able to learn these essential test-characteristics from available documentation.[28] As a result, there is almost no comparability of these different tests- while they each provide an individual snapshot that can be used to understand variation *within* the testing sample, they cannot be used to further our understanding of changes in achievement over time (for instance, we have no idea whether students score higher in one Urdu test compared to another because of learning or because of differences in the test instrument).

II. THE LEAPS TEST INSTRUMENT

A1.16 Our description of the test instruments as well as the testing environment is organized as follows: We start with an overview of the aims of the test instruments as well as the general principles used in the overall selection of test items. We then outline the basic structure of the three tests, with specific emphasis on the content domain and a discussion of our instrument in the context of testing frameworks that have been developed by other organizations.

What should we test?

A1.17 Schools serve multiple purposes and teach a diverse range of subjects, skills as well as morals and attitudes (see Box A.1). As such, measuring their output is difficult and controversial. The test instrument developed here attempts to roughly quantify a small set of a school's output. Accordingly, the test only includes sections on English, Urdu, and Mathematics. Although far from measuring the total "output" of a

[28] We are currently in the process of trying to contact each individual author to update this review, but in a number of cases, instruments have been discarded and published documents remain the only source of information.

school, or even the educational development of students, such an instrument is still useful for numerous purposes.

Box A.1: Multiple School Effectiveness

Schools serve a multiplicity of functions involving individual, institutional, community, national and international levels. As a consequence, assessing quality or effectiveness is both difficult and controversial. For example, one school may develop students with a strong sense of civic responsibility whereas another might excel at producing talented scientists. Since any assessment instrument implicitly supports a conceptualization of effectiveness, determining which roles to measure is an important consideration during the test construction stage. Cheng (1997) classifies the potential school functions into five types: *technical/economic functions, human/social functions, political functions, cultural functions,* and *educational functions.* In turn, these functions create five corresponding measures of school effectiveness.

Technical/Economic School Effectiveness: The degree to which schools contribute to the technical or economic developments. This ranges from the individual level—skills and job training—all the way to the international level—the high quality forces needed for efficient economic cooperation and competitions.

Human/Social School Effectiveness: The extent to which schools contribute to human and social development throughout society. Schools provide such things by promoting psychological development for individuals, nurturing human relationships within the institution, supporting the social needs of the community, facilitating social integration in society and fostering international social cooperation and friendship.

Political School Effectiveness: The ability of schools to contribute to political developments at different levels of society. This includes promoting civic responsibility and attitudes within the citizenship, providing a venue for political discourse, serving the political needs of the community, encouraging democracy throughout society, and securing peace and stability at the international level.

Cultural School Effectiveness: The degree to which schools contribute to cultural transmission and development of society. At the individual level, this consists of the socialization with values, norms and beliefs. At higher levels, schools serve as an epicenter for cultural transmission, reproduction and understanding.

Educational School Effectiveness: The extent to which schools contribute to the development and maintenance of education. This type of effectiveness refers to the role of schools in teaching students how to learn to learn rather than simply the educational attainment of pupils. Similarly, at higher levels the ability refers to the self-reinforcing power of schools—schools beget more support and resources for educational systems. For example, schools increase the supply of teachers.

Rational for Testing Urdu, English and Mathematics

A1.18 The inclusion of Urdu and Mathematics—the staple subjects of previous assessments—was made for primarily three reasons. First, literacy and Mathematics are two important competencies supplied by primary schools. Second, literacy and Mathematics are generally more standardized than other subjects and hence

lend themselves to greater cross-school comparability.[29] Third, most subjects besides Urdu and Mathematics are based almost exclusively on rote-memorization at the primary school level. Hence, the chosen subjects have the additional benefit of testing reasoning and logical analysis as well as critical and complex thinking.

A1.19 The inclusion of English separates this assessment from most previous studies. The primary ground for its inclusion is that it can be considered a core competency, which is now part of the official curriculum of the country. There are also more subtle reasons. For instance, there may be a specific connection between English achievement and private school fees. This suggestion is motivated by the prevalence of schools advertising English language instruction. English instruction may also serve as an important signaling mechanism indicating quality for both employers and parents. For these reasons, the assessment of English achievement is particularly interesting.

Development and Selection of Test Items - Overall

A1.20 The principles and frameworks prevalent in the learning assessment literature have been useful as guiding principles for designing the test but they have not been treated as rigid structures that the test must conform to. Many of the frameworks are formulated in the context of developed countries and thus are not entirely well suited for settings in which the national distribution of achievement is dramatically dispersed (even across the same grade). In the design of the pre-test, we chose not to administer a criterion-referenced test since an explicit goal in the future for such tests would be to relate test outcomes to educational inputs (such as teacher quality) that we believe are important. As such, it was important that the test should measure learning with high precision levels *at all levels of knowledge*- while a criterion-referenced test would distinguish sharply between students who meet (do not meet) the specified criteria, it may not yield any information of those below (or above) the critical level.

A1.21 The use of a norm-referenced test creates special needs in the case of Pakistan: although the test will be administered to Pakistani children who have all completed the third grade, there is wide variation in learning across schools and provinces, and it is expected that many of the children tested may not be familiar even with the content of the first grade curriculum. This places special demands on test construction even if a norm-referenced test is used.

[29] For example, due to the nature of the subject matter, the progression of social studies and life sciences can easily diverge significantly from curricular guidelines. Indeed, even the curricular guidelines for social studies indicate a substantial degree of flexibility, stating "much of the learning of pupils in the early years should be based on direct experience and practical activities, achieved as far as possible through the exploration of their immediate environment."

A1.22 Specifically, to use a norm-referenced test properly, we need to first know what the lower and upper bounds of learning in the grades to be tested are; this is particularly important in the case of value-added assessment, where the test has to try and cover children at all levels of knowledge in the population. Because of the huge differences in learning across schools, it is important to ascertain carefully the questions that can be used in a norm-referenced test. Prior to the design and administration of the final LEAPS test, an extensive pilot was used to identify lower and upper limits of learning in the population and provide an analysis of the validity and reliability of the instrument used. The data from this phase was then used to refine the final test used in the LEAPS project.

A1.23 The choice and structure of content for English, Urdu, and Math was based on an attempt to optimize on the following:

- Breadth of content: The test should cover the general range of content taught to children by the time they reach fifth grade.
- Range of difficulty: The range of difficulty should be varied across skills (questions) as well as within each skill (question) to better capture variation in achievement.
- Distribution of ability type: The test should call upon the different cognitive abilities relevant for understanding the content in question (for example, in Mathematics: conceptual, procedural and problem solving).
- Variation in type of questions: Depending on the content being tested, there should be some variation in type of questions, including multiple-choice questions, short answers and long answers. Each type connotes a different level of prerequisite skill as well.

A1.24 In addition to these general principles, other rules followed for wording and compiling each question included the following criteria:

- Easy to understand: Formats that are familiar to children should be used and understanding the question should not require an ability greater than that which is being tested by the question.
- Easy to administer: Questions that required additional materials can be discriminatory. Such questions should only be considered if they are feasible to administer properly.
- Unbiased instrument with respect to socio-economic status: References to items that children from particular socio-economic backgrounds will have no exposure to can create bias. Such references should be avoided.

A1.25 The initial version of the test followed the curricular standards for Grade 3 and 4 closely. However, it was quickly noted that the performance of children was considerably below what the curriculum stated it should be, thus further validating the choice of a norm-referenced test rather than a criterion-referenced test based on the curriculum. For the first week of pilot testing (6 schools) parts of the test were reconstructed after each test to minimize the problems discussed above and improve the precision of ability/learning estimates across the range of students. Although all the content of the final version was checked for consistency with the Pakistan's curricular standards and some material was added based on emphasis in the curriculum, the instrument is designed to test basic competencies rather than comprehensive knowledge of specific curricular items. The content for the portions of the test specific to Grade 3 and 4 (the medium and difficult sections) follows frameworks prevalent in the learning assessment literature (see Annexure 1).

Development and Selection of Test Items

Urdu and English

A1.26 Literacy frameworks used by other assessments (see Annexure 1) categorize the different purposes of reading and writing that should be assessed. However, these frameworks assume that the pupil will have the basic ability to do *some* reading and writing. We have not made this assumption while constructing the instrument. Hence both the English and Urdu sections begin with the alphabet and progress through the basic elements of writing: word construction, grammar, vocabulary, sentence construction, and conclude with a reading comprehension and essay exercise.

A1.27 The instruments included in the Urdu and English sections were adapted from a variety of sources[30]. The two sections cover a comparable range of content and difficulty: Both sections begin with alphabet recognition and end with an essay question and the tests maintain consistency in content, structure and intellectual demands. Table I below summarizes the content areas of the Urdu and English sections.

[30] Many questions in the Urdu section were adapted from instruments included in Kizilbash (1997). Other than tests and exams administered by teachers in schools, we were unable to find suitable instruments for the English component and in addition to designing questions ourselves, web-based resources for educationists were used to fill this gap. Based on Dr. Catherine Snow's (Harvard School of Education) suggestion a cloze passage (every fifth word or so blanked out) was included in the English section (source: www.tut-world.org) and Urdu section.

Table A.1: Content Areas for Urdu and English

Content Areas	Urdu		English	
	Type	*Qs**	*Type*	*Qs**
Alphabets	Written: Complete chronological order of alphabets	1	Verbal: Write alphabets read aloud Written: Complete chronological order of alphabets	1 3
Word Recognition	Written: Match words with pictures	**2**	Verbal: Write words read aloud Written: Match words with pictures	2 **4**
Word Construction	Break words into alphabets Join alphabets to form a word	3 4	Write words read aloud Complete word for each picture Create words from given alphabets	2 5 9
Grammar	Match words with antonyms Write plural for singular words Fill blanks for gender agreement Cloze passage	**6** 7 8 **9**	Math words with Antonyms Fill blank words in sentences Close passage	**6** **7** **8**
Vocabulary	Fill blank word in sentence	**5**	Fill blank word in sentence Create words from given alphabets	**7** 9
Sentence Construction	Use words in sentences	10	Use word in sentences	10
Comprehension		11		11
Essay		12		12

Note: *Multiple-choice questions are indicated in bold. Some questions are listed for more than one content area.

A1.28 Note however, that the starting items of the English section are easier than the Urdu since competency in English may be lower: For instance, the first question in English requires recognizing 3 alphabets read aloud and writing them. No knowledge of alphabetical order or the ability to recognize other alphabets is required. In Urdu on the other hand, the first question involves filling the right Urdu alphabet in the blank and students need to know both how to write the missing alphabet as well as recognize other alphabets and know the alphabetical order. Apart from this difference in difficulty of the early items, the standard test format between the two languages allows the student to familiarize herself with the test in Urdu, before proceeding to the section on English. Finally, while difficulty increases with each section of the test, there is also a range of difficulty within each test section. Thus for example, the section on vocabulary includes both easy and difficult words to aid in discriminating between different students.

Mathematics

A1.29 For the Mathematics test, we have adapted frameworks used by other assessments that outline the content domains to be assessed. The five major domains that are identified under these outlines are[31]:

- Number sense, properties, and operations (40%);
- Measurement (20%);
- Geometry and spatial sense (15%);
- Data analysis, statistics, and probability (15%); and
- Algebra and functions (15%).

A1.30 While we have followed a similar pattern, greater emphasis is placed in our math test on the first major domain- Number sense, properties and operations. During the initial fielding of the test instrument in 6 schools, it was noted that performance in math was lower than expected, and the test was not providing adequate information for children at the lower end of the knowledge distribution. Thus, additional items were added covering the first domain to obtain finer partitions of knowledge for this subset of test-takers. The content and cognitive demand of the final test is summarized below:

Table A.2: Content and Cognitive Domain for Mathematics with Question Examples

Content Domains (example Qs from test)	**Cognitive Domains** (example Qs from test)
a) Number Operations (1-5) b) Measurement (15) c) Geometry (22) d) Algebra (11 and 20) e) Data Analysis (21)	1. Conceptual Understanding (4 and 11) 2. Procedural Knowledge (5, 10, 13) 3. Problem Solving (9, 12, 14)

A1.31 The more advanced content domains such as algebra have only been conceptually tested, whereas more rudimentary elements such as addition, subtraction, multiplication and division have been tested both procedurally and through problem solving. As with the English and Urdu tests, the range of difficulty varies within math skills tested (e.g. Addition: single digit, two digit, three digit with carry, decimal with carry) as well as across math skills tested (counting to percentages and fractions). In addition to better capturing variation in achievement, the test design could also be useful in identifying particular `stumbling blocks' for students with regard to particular skills (for example, difficulty with `division') or particular levels of difficulty (for example, difficulty with 2 digit division/multiplication). The order of questions and progression of content is based on

[31] See Appendix 1 for a detailed description

the order in which particular math skills are taught to students in Pakistani schools (as indicated by the state curriculum in 2002) and is summarized in the table below:

Table A.3: Content Area and Range for Mathematics Items

Content Area	Range of skills tested	Q*
Counting	Count objects, compare numbers, complete chronological order of numbers, addition of objects, translate numbers in words, tell time, retrieve count from word prob.	**1**,**2**,3,4,6,7,8,9
Addition	1 digit no carry- 3 digit with carry, word problem	5, 9, 10, 12
Subtraction	1 digit - 3 digit with carry, word problem	5, 9, 10, **14**
Multiplication	1 digit by 1 digit - 3 digit by 2 digit with carry, word prob.	5, 13, **14**, 18,19
Division	1 digit by 1 digit- 3 digit by 2 digit, word prob., LCM, HCF	5, 9, 13
Decimals	Addition, subtraction	10
Fractions	Read chart, conversion to mixed fractions, addition of fractions, subtraction of fractions	**15**, 16, 17
Data Analysis	Read Bar chart, read chart in fractions, read chart in percentages	**15**, **21**
Deductive	Complete Sequence, weight comparison	11, **20**

Note: *Multiple-choice questions are indicated in bold. Some questions are listed for more than one content area.

A1.32 The careful design of the test instruments based on the pre-assessment in the first six schools combined with a large number of interviews with teachers and children has allowed us to estimate with fairly high precision, the knowledge of children at all levels of learning. However, several problems were noted in the design and implementation of the tests in the pilot which were later corrected. Some of these are specific to the educational environment in Pakistan and we outline these briefly below for future testing exercises; these problems need to be further discussed in the context of the national assessment exercise and we hope that the documentation here ensures that future tests better accommodate these issues in the design and administration of the instrument.

Procedural/Implementation Issues and Other Concerns

A1.33 The first set of problems that we outline arises from the multiplicity of native languages currently used in Pakistan. Specifically, we address the issue of the language that should be used to provide instructions in different tests and the implication that restricting our tests to Urdu and English has for the potential uses of such assessments. Lastly, we briefly note some problems that arose in the formatting of test questions.

The Interpretation of Literacy Scores

A1.34 The exclusive use of Urdu in our test instrument places limits on the interpretation of literacy scores. Functional literacy, in terms of the ability of individuals to participate in society, may diverge significantly from Urdu literacy if Urdu is used primarily as a `second-language' in the region considered. This limits the use of the literacy score in certain types of analysis. For example, using Urdu literacy as a proxy for human capital may underestimate human capital in areas where Urdu is not the primary language. This would suggest the expansion of the test-instrument to include testing in the vernacular, particularly, Saraiki, Pashto and Punjabi for Punjab province.

A1.35 On the other hand, this does not significantly affect the value of Urdu literacy scores for other potential questions. Since Urdu literacy is a core competency in Pakistan's curricular standards, Urdu literacy scores provide valuable information on educational attainment in different schools. Thus, the decision to test in the vernacular as opposed to (or in addition to) testing in Urdu must be based on the aim of the test instrument—if the main aim of the test instrument is to assess *functional literacy*, vernacular testing would be essential, but if the primary focus is on *learning in schools* (or value-added learning), restriction to testing in Urdu would yield significant insights.

Literacy Bias in Mathematics

A1.36 Pakistan's linguistic fractionalization also has implications for the language used in providing instructions for the test instrument. For our pilot, we chose Urdu and English primarily due to high uniform exposure from early childhood and to ensure compatibility with the Pakistan Education Ministry in their Strategic Framework for National Education Assessment 2001.

A1.37 Despite the fact that our tests were administered in areas where Urdu is *not* a second language, the use of two languages for instructions raised important issues in the Math assessment as a result of the interaction between language skills and math skills in the design of the instrument. This interaction was noted in two different areas of the test: the medium of instruction, and the design of questions that required conceptual translations between language and math.

Medium of Instruction

A1.38 In the schools for the pilot test, which included top private schools in urban areas, all language statements (including instructions) in the mathematics section were either in Urdu or English depending on the language of instruction. The need for separate languages arises due to the presence of different language

"mediums" for school instruction (note though, that this is an issue only if the sample includes urban schools; for the rural sample of the LEAPS project, all instructions were in Urdu). Specifically, in `English-medium' schools exposure to mathematical terminology may be only in English, and the use of only Urdu terminology would lead to problems in comparisons across schools: For instance, children in English (Urdu) medium schools may be familiar with the English (Urdu) *but not* the Urdu (English) concept of the "lowest common multiple" of two numbers.

A1.39 Although an effort was made to limit unneeded verbiage in the mathematics section of the test, significant portions still required a basic level of literacy. The choice to include written instructions with mathematical terminology and some word problems is intentional, and is intended to test the ability of the student to mathematically interpret common (verbal) situations.

A1.40 However, this prerequisite of basic literacy, although reasonable, may bias the use of test scores as a measure of students' skills and competencies in mathematics, if language skills are poor[32]. Future tests need to carefully consider the implications of using verbal statements in mathematics exams, especially in the context of students who may not have attained any degree of literacy by the time the test is administered. This problem is further compounded in regions where the vernacular language is different from Urdu—in these cases, test designers need to assess the degree to which the use of vernacular instructions would help in ensuring that the test instrument is valid as a measure of learning in mathematics.

Vocabulary Sets

A1.41 A second, perhaps subtler problem was the requirement of *different levels of vocabulary* in the translation of language to mathematical statements, depending on the medium of instruction. One item that led to such a problem was the translation of numbers in words to numbers in numerals. The choice of one particular number, "65" raises a direct issue, since in English, to write numbers in words till "100" requires memorization of each number till the "20" as well as the specific numbers "30", "40" etc. In Urdu however, this requirement requires the memorization of *all numbers till "100"*: and it is common to find students with the same mathematical skills who differ along this particular dimension. Particular care needs to be taken that when instructions and items are translated, the *size of the required vocabulary set* is the same in all languages used for test administration.

[32] For example, Howie and Plomp (2001) find a relationship between the number of first language speakers in a class and pupils' achievement in mathematics in their analysis of South African school level TIMSS data. Similarly, The SAP National Survey (1995) found similar literacy effects when testing teacher skills. Both male and female teachers from urban and rural areas scored worse on narrative questions as compared to numerical questions.

A1.42 Thus, the testing of Math in Pakistan raises special problems through the interaction of the subject matter with language skills. Our recommendations for future tests in this regard are to assess with some care (potentially through the development of a more extensive item-bank) the use of the medium of the test instrument, with particular emphasis on the second issue raised above—the *levels* of language skills required by the math instrument should ideally be independent of the particular language used.

Question and Answer Format

A1.43 During the initial testing rounds, there was some concern regarding the format of test questions. Teachers felt that questions might be unfair, since students were not used to the particular question-answer format used. As a result, efforts were made to format questions in collaboration with the teachers, in a simple and straightforward manner. To assess the importance of formatting in test scores, a simple experiment was carried out, where students in a large school were randomly divided into two groups. For the first group, the test was administered with no guidance and following standard guidelines. For the second group, an additional instructor was detailed to provide assistance for `problematic questions'. The comparison of scores of the first and second groups shows no significant difference, leading us to conclude that the format of the test was not related to test scores of students[33]. However, we feel that the formatting of test questions requires greater attention in future assessments. Prior to the design of such an assessment, it would be important to assemble a database of tests currently used in different schools to check for differences in the use of common test formats. The final format of the test instrument could then account for these differences, potentially through the choice of a subset of formats that are common to all schools.

Assessment of the Instruments using Item Response Theory

A1.44 This section assesses the content of the test, and statistically examines the validity of the test for examining various issues regarding learning achievement in Pakistan. For this section of the document, we rely on methods derived from Item-Response Theory to examine the validity of each question (henceforth item) as well as the precision of the test taken in its entirety. As explained previously, this test was specifically

[33] One particular formatting problem arises with the popular `matching' questions used in tests in Pakistan. This item requires students to `match' two words from different columns, for instance:

Q. Match the opposites	
Good	Smart
Stupid	Bad

This sort of question has two problems: First, our preliminary results indicated that students were confused by this style of question, manifested by dramatically lower performance compared to levels seen for the same question formatted in alternative ways. Second, the answers for each match depends on the availability of remaining unmatched words. Since each match is not independent of the others, the informational content provided by every new match is reduced. This dependence between two test answers would then invalidate standard test response assessments.

designed to provide information on the ability/knowledge of children from all points of the distribution—how precise is our test then, in distinguishing between different ability/knowledge[34] levels? For a brief introduction to Item Response theory (to the extent needed to understand this section), refer to Annexure 2.

How well do the tests estimate student ability/knowledge

A1.45 Figures A.1, A.2 and A.3 show the characteristics of the tests and the distribution of student scores. Each figure is formatted in the same manner: a histogram is drawn for the distribution of test-scores in the relevant subject and, the histogram is overlaid with the 95% confidence intervals for the estimate of the score. Overall, the standard errors of the knowledge estimates are low. Comparable tests for other countries (Sweden, Togo and Zambia have been compared) are characterized by much higher at the lower and upper ends of the ability distribution (almost double that of our tests).

Figure A.1: Knowledge Scores and Standard Errors for English

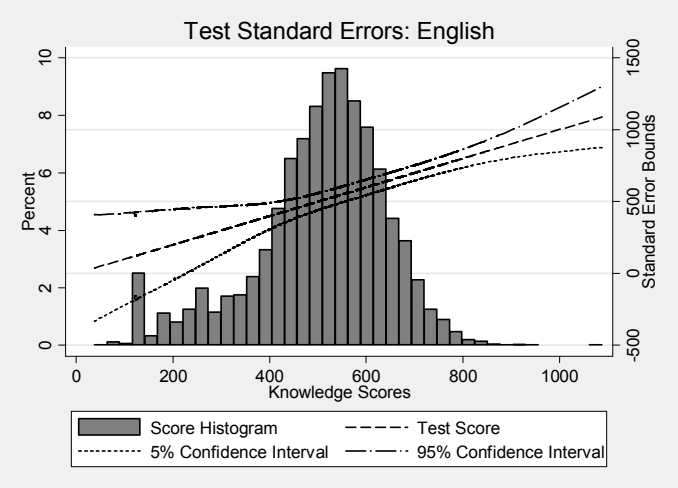


Figure A.2: Knowledge Scores and Standard Errors for Mathematics

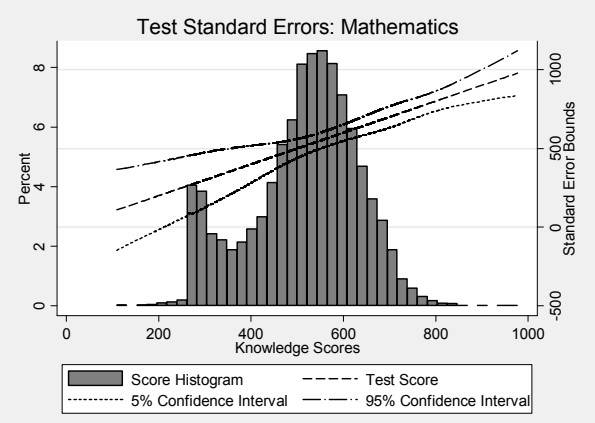
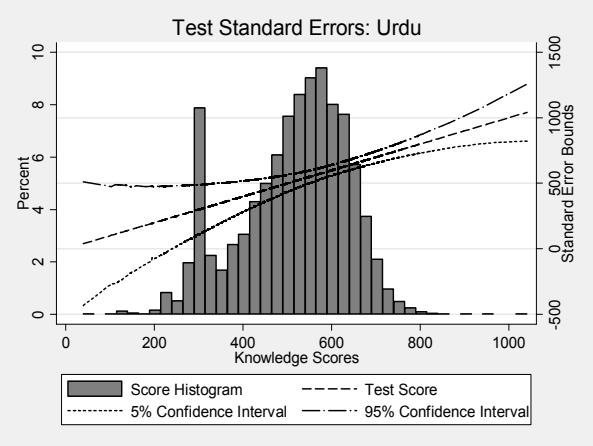


Figure A.3: Knowledge Scores and Standard Errors for Urdu



[34] Through this document, we use the words ability and knowledge interchangeably, although the terms have very different meanings in economics and Item Response. While in the former, ability is a measure of the student's learning, in economics ability is an intrinsic attribute of the individual that remains fixed over time. We attempt to satisfy both strands by using `ability/knowledge' but our functional definition of either is a measure of the student's level of learning.

A1.46 Nevertheless, the graphs show that our estimates around the middle of the distribution are far better than at the ends of the distribution—this is a standard issue with all tests, since items designed for providing information at the extremes of the distribution also add to information for the mean, but not necessarily the other way around. The problem is compounded in our case because the distribution of knowledge scores appears to be a mixture consisting of a "hump" of students who perform extremely poorly combined with a standard normal distribution. This hump is the group of students who know so little that even the LEAPS test, which starts with the basics, does not yield much information about their knowledge—we know they are doing badly, but not how badly they are doing. Clearly, it is possible to rectify this for Urdu by starting the test with asking children to write alphabets, rather than fill in the order. Similarly for Mathematics, the test could start with asking children to write down numbers next to a collection of objects. For English, we don't see any alternative at all, since the test started with the easiest possible question that can be used without involving supervisors more integrally—something that usually causes biases and greater error due to supervisor-specific effects.

III. CONCLUSION

A1.47 This document provides a detailed description of the testing environment in Pakistan as well as documentation and analysis of a pre-pilot test carried out in private and public schools in Pakistan. The analysis of this test shows that while there are some areas for improvement, on the whole the test has performed extremely well in its ability to distinguish between students of different caliber. Nevertheless, valuable lessons were learnt, relating to the issues of testing in a linguistically fractionalized region and these should be carefully noted, especially with regards to the upcoming national assessment program.

Annexure 1: Test Summary Tables

Year of Test	Subjects Tested	Sample Size (schools)	Sampling	Test Outcomes Mean % (standard error)	Test Available?	Test Validation Documents Avalable?	Source
1984	Science Mathematics	3,300	Representative. Grades 4 and 5.		No.	No.	Shah (1984)
1988-9	Science Mathematics	11,000 (500)	Grades 4 and 5.		No.	No.	BRIDGES project at Harvard Institute for International Development (1989)
1994	Mathematics Science Social Studies	15,991 (472)	Grades 3 and 5.		No.	No.	Mirza and Hameed (1994)
1995	Dinyat Life Skills Knowledge Rote Reading Reading with Comprehension Writing from Dictation Writing Letter Numeracy and Arithmetic Mental Arithmetic Reading of Holy Qur'an	2582	Multi-stage, systematic-random sample design. All children ages 11-12.	26.1 63.7 26.8 61.7 18.1 69.6 67.7 44.2	No.	No.	Pervez (1995)
1995	Mathematics General Knowledge Comprehension	11,563 (527)	Grade 5.	45.6 74.4 69.1	No.	No.	MSU (1995)
1999	Mathematics Urdu General Knowledge	965 (50)	Grade 4.	60 71 75	No.	No.	Action Aid Pakistan (1999)
1999	Science Mathematics Urdu	2794 (145)	Grade 4. Sample not proportionate to universe.	72 58 72	No.	No.	Khan et al (1999)
1999	Mathematics Science Social Studies Urdu	200 (20)	Grade 3 and 5.		No.	No.	Arif et al (1999)
1999	Mathematics Science Social Studies Urdu	160 (20)	Sample 10 male, 10 female schools (80 students each). Grades 3-5.		No.	No.	Research Team of Bureau of Curriculum Development and Extension

Year of Test	Subjects Tested	Sample Size (schools)	Sampling	Test Outcomes Mean % (standard error)	Test Available?	Test Validation Documents Avalable?	Source
							Services, NWFP (1999)
1999	Mathematics Urdu	1371 (31)	DEOs selected equal numbers of good, average and weak schools.		No.	No.	Punjab Literacy Watch (1999)
2000	Sindhi Mathematics Science Social Studies Islamiyat	300 (20)	Randomized sample 10 male, 10 female schools (150 students each). Grades 3-5.		No.	No.	Haque et al (2000)
2000	Mathematics Science Social Studies Urdu	801 (20)	10 male, 10 female schools. Grades 3-5.		No.	No.	Research Team of Bureau of Curriculum and Extension Centre, Balochistan (2000)

Source: UNESCO (2001)

Other Assessments Table

Author(s) / Research Organization	Title	Date	Sponsoring Organization
Institute of Education and Research University of Punjab	(Not known)	1996	Primary Education Project From EDI (1999)
North West Educational Assessment Programme	(Not known)	1996	PEDP (NWFP) From EDI (1999)
Bureau of Curriculum and Extension Wing, JAMSHORO, Sindh	(Not known)	1997	SPEDP From EDI (1999)
Primary Education Directorate, QUETTA, Balochistan	(Not known)	1998	BPEDP From EDI (1999)
Bureau of Curriculum and Extension Wing, JAMSHORO, Sindh	(Not known)	1998	SPEDP From EDI (1999)
Test Development Centre, Education Department, LAHORE	(Not known)	1999	Punjab Middle Schooling Project From EDI (1999)
Directorate of Education, Gilgit	Baseline Achievement of Class 4 Students in Northern Areas, Pakistan	2000	NAEP

Source: UNESCO (2001)

Annexure 2

FRAMEWORKS FOR LITERACY

National Assessment of Educational Progress:

According to the *NAEP Reading Framework*, developed by the National Assessment Governing Board (NAGB), NAEP assesses three purposes for reading. In addition to reading for different purposes, NAEP reading comprehension questions are developed to engage the different approaches that readers take in the process of trying to understand what is being read.

Three different purposes for reading were assessed:

- **Reading for literary experience:** Readers explore human emotions and events by reading novels, short stories, poems, plays, and essays.
- **Reading to gain information:** Readers gain information by reading such materials as magazines, newspapers, textbooks, encyclopedias, and books.
- **Reading to perform a task:** Readers apply what they learn from reading such materials as bus or train schedules, directions for repairs, games, classroom procedures, tax forms, maps, etc.

Students were assessed on four different stances or ways of responding to what is read:

- **Forming an initial understanding:** what is the overall meaning and purpose of what is read?
- **Developing an interpretation:** what meaning do the relationships among the different parts of the text have?
- **Personal reflection and response:** how does what is read relate to or compare with the reader's knowledge and experience?
- **Critical stance:** how does what is read communicate information or express ideas?

According to the *NAEP Writing Framework*, developed by the National Assessment Governing Board (NAGB), the NAEP writing assessment should have the following objectives:

- Students should write for a variety of purposes: narrative, informative, and persuasive.
    - *Narrative writing* involves the production of stories or personal essays. It encourages writers to use their creativity and powers of observation to develop stories that can capture a reader's imagination.
    - *Informative writing* communicates information to the reader to share knowledge or to convey messages, instructions, and ideas. The informative topics in the 1998 writing assessment required students to write on specified subjects in a variety of formats, such as reports, reviews, and letters.
    - *Persuasive writing* seeks to influence the reader to take some action or bring about change. It may contain factual information, such as reasons, examples, or comparisons; however, its main purpose is not to inform, but to persuade. The persuasive topics in the 1998 writing assessment asked students to write letters to friends, newspaper editors, or prospective employers, to refute arguments, or to take sides in a debate.
- Students should write on a variety of tasks and for many different audiences.
- Students should write from a variety of stimulus materials.
- Students should generate, draft, revise, and edit ideas and forms of expression in their writing.

Progress in International Reading Literacy Study:

The *PIRLS Reading Literacy Framework* for 2001 was developed through an international collaboration involving the PIRLS Reading Developing Group and National Research Coordinators from over 40 countries. The framework focuses on two aspects of reading literacy: purposes for reading and processes of comprehension.

The PRILS framework outlines two purposes for reading:

- Acquire and Use Information (50%); and
- Literary Experience (50%).

It also includes four processes of comprehension:

- Focus on and Retrieve Explicitly States Information (20%);
- Make Straightforward Inferences (30%);
- Interpret and Integrate Ideas and Information (30%); and
- Examine and Evaluate Content, Language and Textual Elements (20%).

FRAMEWORKS FOR MATHEMATICS

National Assessment of Educational Progress:
The NAEP mathematics assessment uses a framework influenced by the National Council of Teachers of Mathematics (NCTM) Curriculum and Evaluation Standards for School Mathematics. The *NAEP Mathematics Framework* describes five broad strands of mathematics content with varying target assessment times (in parentheses), as follows:

- Number sense, properties, and operations (40%);
- Measurement (20%);
- Geometry and spatial sense (15%);
- Data analysis, statistics, and probability (15%); and
- Algebra and functions (15%).

It includes three types of mathematical abilities as follows:

- Conceptual understanding;
- Procedural knowledge; and
- Problem solving.

And it includes mathematical power as follows:

- Reasoning;
- Connections; and
- Communication.

Trends in International Mathematics and Science Study:
The TIMSS mathematics assessment uses a similar framework. It contains two dimensions—content and cognitive domains. The development of this framework included widespread participation and review by educators around the world. The close relationship with the NAEP domains illustrates the considerable consensus on appropriate elements.
The *TIMMS Mathematics Framework* for 2003 outlines five mathematical content domains:

- Number (40%);
- Algebra (15%);
- Measurement (20%);
- Geometry (15%); and
- Data (10%).

It also include four mathematical cognitive domains:

- Knowing Facts and Procedures (20%);
- Using Concepts (20%);
- Solving Routine Problems (20%); and
- Reasoning (20%).

Annexure 3: Example Questions from Different Tests

Note that a single *question* can be multiple items, since each part of the question is treated as a separate item.

Question Number: 1 (Items 1-3): Easiest Questions in English	
Task Content: Verbally recognize and write alphabet Format: Short answer – Question to be read aloud	
Question: Listen to your teacher carefully, and then write the letter. _____ _____ _____	
Answer Key	a) B b) G c) Q
Scoring Guide	Record 1 if the English alphabet read aloud is written correctly Record 0 otherwise (including partially correct and blank answers)

Question Number: 2 (Items 4-6)	
Task Content: Match words with pictures Format: Multiple choice	
2- ہر تصویر کے سامنے تین الفاظ دیے گئے ہیں۔ تصویر کے مطابق صحیح لفظ پر (✓) لگائیں۔  Question Instructions Translation: There are three words given in front of each picture. Mark the word matching the picture.	
Answer Key: Scoring Guide:	1=Only the correct word ticked for the picture 0=Incorrect word ticked for the picture or multiple words ticked for the picture

Question Number: 10 (Items 47-51): Difficult Questions in English

Task Content: Using given word in sentence construction

Format: Short answer

Question:

Use the following words in sentences:

school _____

_____

doctor _____

_____

beautiful _____

_____

deep _____

_____

play _____

_____

Answer Key

Scoring Guide

For each part Record 1 if any sentence written using the word has been constructed Record 0 if

Examples from the Urdu Test

Question Number: 8 (Items 34-40): Difficult Questions in Urdu
Task Content: Recognize Masculine/Feminine gender in nouns
Format: Short answer

8۔ مندرجہ ذیل مذکر الفاظ کے سامنے مذکر اور مونث الفاظ کے سامنے مونث لکھیں۔

لڑکا _____
قمیض _____
خالہ _____
نواب _____
ممانی _____
بارش _____
پانی _____

Question Instructions Translation:
Write "masculine" in front of the masculine word and "feminine" in front of the feminine word

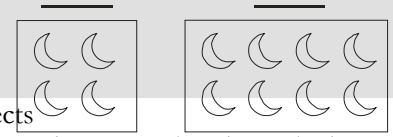
Answer Key:
Scoring Guide: 1= Correct masculine/feminine filled in the blank
0=all other responses

Comments:
This question was drafted differently from the way students are used to seeing this problem in their exams. In their exams, they are used to converting masculine nouns to feminine and vice versa. We wanted to give some abstract nouns that did not have an opposite gender counterpart. This question turns out to be **much** harder than all other questions in the test.

Example Questions from the Math Test

Question Number: 1 (Item 1) : An easy question in Mathematics
Task Content: Recognize more versus less

Format: Multiple choice (question read aloud)
Question:
Circle the box that has more objects



Answer Key: Box with 8 objects
Scoring Guide: Record 1 if ONLY the correct box is marked
Record 0 otherwise

Question Number: 5 (Items 8-12): The first two questions are easy, the rest are difficult
Task Content: One digit addition, subtraction and multiplication
Format: Short Answer
Question:
Solve

$$\begin{array}{r} 4 \\ +\,6 \\ \hline \end{array} \qquad \begin{array}{r} 8 \\ -\,3 \\ \hline \end{array} \qquad \begin{array}{r} 9 \\ 9 \\ +\,9 \\ \hline \end{array}$$

$$\begin{array}{r} 4 \\ \times\,5 \\ \hline \end{array} \qquad \begin{array}{r} 2 \\ \times\,\square \\ \hline 20 \end{array}$$

Answer Key:
A. 10
B. 5
C. 27
D. 20
E. 10
Scoring Guide:
For each part:
Record 1 if the correct answer is filled in
Record 0 otherwise

Question Number: 2 (Items 2-3): A medium difficulty question in Mathematics
Task Content: Count objects and identify corresponding number Format: Multiple Choice (question read aloud)
Question: Circle the number that matches the number of objects. A 1, 2, 3, 4,    B 1, 2, 3, 4, 
Answer Key: A. 2 B. 5 Scoring Guide: For each part Record 1 if ONLY the correct number is ticked, circled or underlined Record 0 otherwise

Annexure 4: Item Response Theory

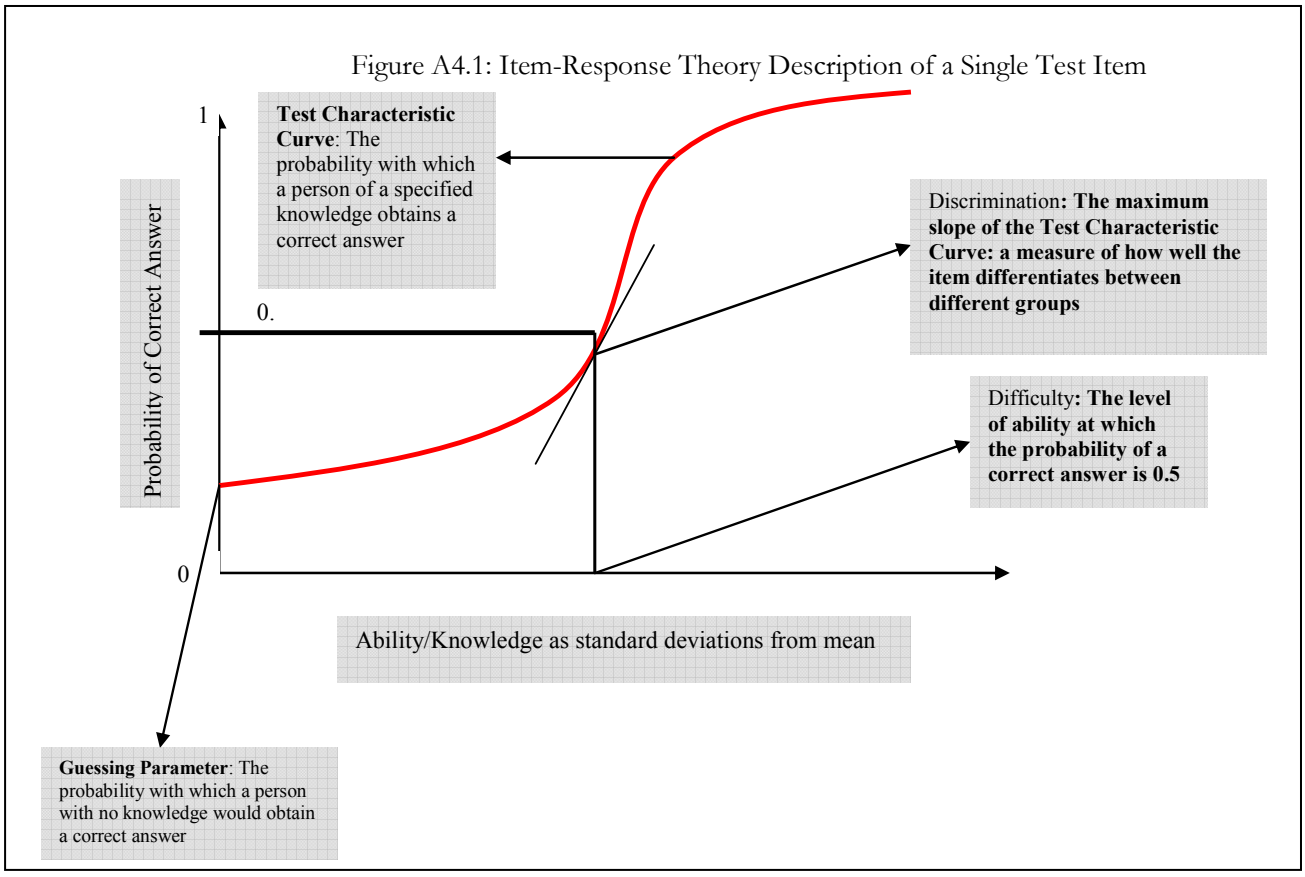
I. ITEM CHARACTERISTICS

Item response theory seeks to model test-responses to answer four types of questions:

1. How likely is a person with a given level of knowledge to answer a particular item correctly?
2. What are the estimates of ability/knowledge of the individual test-takers?
3. With what precision does a single item allow us to estimate this ability/knowledge?
4. With what precision does the *entire test* allow us to do the same?

While the statistical tools for analyzing tests using item-response theory are fairly complex, the basic concepts are readily understood in the following diagram:

Figure A4.1: Item-Response Theory Description of a Single Test Item



In using Item-Response Theory methods to model responses to items, the logistic family of distributions is used to structure the probability of a correct response as a function of the knowledge of the student. Each item is associated with an *Item-Characteristic Curve* (in red above) that shows how this probability changes with

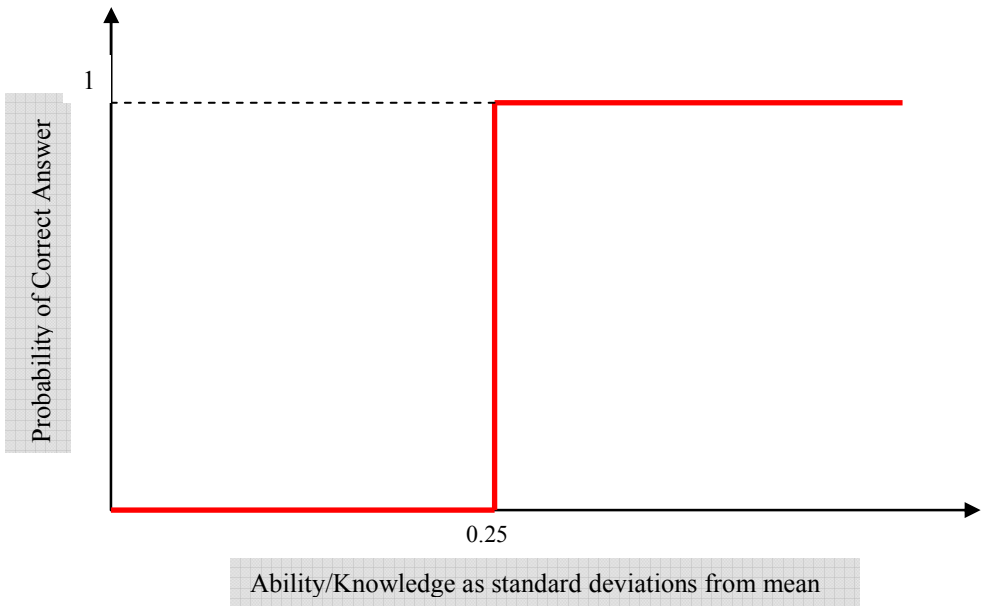
the knowledge of the student. Further, for each question, there are three related parameters that fully define this Item Characteristic Curve:

1. **Difficulty**: As suggested by the term, the more `difficult' a question, the lower the probability that a student of a given ability will obtain a correct answer. In terms of the diagram above, increasing the difficulty of the item will shift the item-characteristic curve to the right- a student at the same level of knowledge will have a lower probability of obtaining a correct answer (technically, the difficulty of the question is the ability/knowledge required to obtain a correct answer with a 50% probability).

2. **Discrimination**: While the difficulty of an item tells us something about the probability with which a person will answer the question correctly, it does not tell us much about the ability of the item to distinguish (or `discriminate') between individuals of differing ability/knowledge. This ability to discriminate is described by the **discrimination** of the item, which measures the slope of the characteristic curve at the point of inflection (equivalent to the maximum slope) - the greater the slope at this point, the greater the ability of the item to discriminate between students above or below *the point at which the slope is measured*. The discrimination parameter lends itself easily to an intuitive formulation: suppose that both students of ability 1 and students of ability 2 had an equal probability of answering an item correctly- in this case, the item would be unable to discriminate between these two types of students, and, drawn between these two ability types, the slope of the characteristic curve would be 0. However, if it were the case that *all* students of ability 1 had a 0 probability of answering the question correctly, and all students of ability 2 had a probability 1 of answering the question correctly, then the item would *discriminate perfectly* between these two groups, as in the diagram below.

3. **Guessing Parameter**: The final parameter associated with an item is a `guessing parameter' that is an estimate of the probability with which a student with no knowledge of the item can obtain a correct response. One way to think about this parameter is in the case of multiple choice questions- if there are four options, random-guessing would imply that the probability of a correct answer is at least 0.25. Note however, that the guessing parameter in this case may actually be *higher* than 0.25, if there is reason to favor one sort of answer for the question- the notion of the `educated guess'.

Figure A4.2: Item with perfect discrimination at 0.25.



At the end of this appendix, we will provide the estimates of these parameters for each item in the tests- the primary aim of doing so is to aid in the development of an item-bank, and move towards a systematic standard-setting for tests in Pakistan that would generate comparability across time and countries.

Once the three parameters discussed above are estimated for each item, the values of these parameters are then used to estimate the ability/knowledge of each student who takes the test[35]. These estimates are essentially the *item response scaled* estimates of student performance, and take into account not only the total number of questions that a student has answered correctly but also the *types of questions* that the student answers- two individuals with otherwise identical test responses will score differently if one answers a more difficult question correct than the other. This is the *knowledge score* used in Chapter 1, with a mean of 500 and standard-deviation 150.

[35] What is potentially confusing here is the circularity of using student responses to calculate item parameters and using the same parameters to calculate student ability. This problem is avoided by assuming a fairly innocuous assumption regarding either the distribution of student parameters in the first stage (that of normality of the distribution), or using the empirical distribution of raw scores. This distributional assumption is used to `integrate-out' student-abilities in the conditional likelihood maximization.

II. TEST CHARACTERISTICS

While the three parameters above provide a description of every item in the test, we are also interested in *overall* test characteristics- particularly the ability of the test to be able to accurately assess the knowledge of students that we estimated at all points in the distribution. Two additional concepts are used to present this information. The first is the *item-information*, which shows for each item the *amount of information* the item reveals about the knowledge of students at various points in the distribution. Intuitively, a the perfectly discriminating item in Figure A5.1 would yield a lot of information regarding students of knowledge 0.25, but no information about those either below or above this level of knowledge. The information for each item can then be aggregated to provide *test-information*, which as the term suggests is a measure of how informative the test, taken in its entirety, is for estimating the distribution of knowledge. The *standard error* of the test- which is the error in estimating knowledge- is then a function of the inverse of the test information. Ultimately, the plot of standard error vs. knowledge/ability will tell us the accuracy with which our test is able to distinguish between different students in the knowledge distribution, as in Figures 1, 2 and 3 in the main text above.

III. GOODNESS OF FIT

We may also be concerned about the assumptions of Item-Response Theory for the modeling of our test-responses. Each of the items in the pilot was put through a battery of standard goodness-of-fit tests; briefly, these compare the predicted answers for children in different parts of the knowledge distribution with the actual answers in the test. Items where there is a large difference between the predicted answers from the structural modeling and the actual answers were re-examined and the final LEAPS test items are selected accordingly. The test statistic used to assess goodness-of-fit was the chi2 goodness-of-fit statistics that compare the observed proportion of correct responses to predicted responses obtained from the logistic model. Finally, the unidimensionality assumption was tested for every test using the eigenvalues following from factor analysis. For all 3 tests, the first eigenvalue was at least 8 times as high as the second, with very little difference between the second and consequent eigenvalues. This suggests that the tests assessed a single dimension, which we call knowledge.

Table A5.1. Item Characteristics of All Items in LEAPS test

Subject	Item Number	Discrimination	Standard Error of Discrimination Estimate	Difficulty	Standard Error (Difficulty)	Guessing Parameter	Standard Errors (Guessing)
ENGLISH	1	0.78465	0.0242	-2.94356	0.09194	0.01902	0.01827
ENGLISH	2	1.01656	0.02814	-2.22578	0.05834	0.00793	0.00764
ENGLISH	3	1.03297	0.02944	-1.55684	0.04555	0.00508	0.00489
ENGLISH	4	1.1849	0.03839	0.2202	0.02431	0.01178	0.00731
ENGLISH	5	2.44615	0.08562	1.02168	0.01527	0.01743	0.00364
ENGLISH	6	2.18622	0.03028	0.31637	0.0077	0.02048	0.00338
ENGLISH	7	2.28913	0.03125	1.07531	0.00655	0.00279	0.00105
ENGLISH	8	1.95487	0.0302	-0.58533	0.01644	0.09535	0.00716
ENGLISH	9	2.04673	0.024	-0.20457	0.00808	0.00188	0.00154
ENGLISH	10	1.83451	0.02111	0.09919	0.00698	0.00055	0.00053
ENGLISH	11	1.97506	0.02338	0.63778	0.00585	0.00076	0.0006
ENGLISH	12	2.95612	0.04398	-0.0898	0.0096	0.12234	0.00541
ENGLISH	13	2.73417	0.04396	-0.38572	0.01344	0.19515	0.00736
ENGLISH	14	2.49802	0.0716	0.13667	0.01531	0.06532	0.00718
ENGLISH	15	2.01735	0.07644	0.21391	0.0253	0.20314	0.01142
ENGLISH	16	2.55253	0.03342	0.35012	0.0063	0.02286	0.0026
ENGLISH	17	3.56596	0.10329	0.27021	0.01001	0.03523	0.00471
ENGLISH	18	2.64652	0.03535	-0.21606	0.00992	0.07987	0.00503
ENGLISH	19	2.42036	0.0337	0.85513	0.00586	0.01226	0.00173
ENGLISH	20	2.3628	0.03578	1.28707	0.00801	0.00545	0.00105
ENGLISH	21	3.29073	0.09482	1.16857	0.01345	0.00078	0.0006
ENGLISH	22	2.80555	0.04943	1.74729	0.01162	0.00078	0.00037
ENGLISH	23	3.09896	0.08096	0.80115	0.01032	0.00512	0.00175

Subject	Item Number	Discrimination	Standard Error of Discrimination Estimate	Difficulty	Standard Error (Difficulty)	Guessing Parameter	Standard Errors (Guessing)
ENGLISH	24	1.38722	0.06794	1.12909	0.02872	0.06303	0.00816
ENGLISH	25	1.82085	0.07843	0.79781	0.02056	0.09488	0.00834
ENGLISH	26	2.07919	0.13359	1.41058	0.0313	0.13272	0.00685
ENGLISH	27	0.89791	0.03744	1.7342	0.03046	0.1248	0.00787
ENGLISH	28	1.30099	0.06906	1.28789	0.03418	0.0657	0.00828
ENGLISH	29	2.73985	0.05819	1.00925	0.00762	0.13459	0.0036
ENGLISH	30	3.11145	0.07135	1.15553	0.00746	0.14291	0.00318
ENGLISH	31	1.79763	0.14276	1.60372	0.04612	0.16607	0.00788
ENGLISH	32	1.37996	0.0745	1.30964	0.03367	0.06353	0.0081
ENGLISH	33	1.81619	0.08141	2.01137	0.05312	0.00193	0.00109
ENGLISH	34	1.3715	0.06865	2.07753	0.06515	0.00391	0.00225
ENGLISH	35	1.63033	0.08074	2.36093	0.07652	0.00073	0.00068
ENGLISH	36	1.35085	0.06586	2.14746	0.07014	0.00204	0.00135
ENGLISH	37	1.67085	0.09191	2.41072	0.08476	0.00102	0.00085
ENGLISH	38	1.3578	0.07722	2.16377	0.07424	0.00879	0.0027
ENGLISH	39	1.49866	0.08458	2.56355	0.10001	0.0008	0.00073
ENGLISH	40	2.78457	0.03751	1.31538	0.00687	0.00048	0.0003
ENGLISH	41	3.3128	0.04969	1.49526	0.00728	0.00047	0.0002
ENGLISH	42	3.98209	0.16845	1.64156	0.02148	0.00039	0.00031
ENGLISH	43	3.86907	0.11584	2.22199	0.0208	0.00036	0.00014
ENGLISH	44	3.32827	0.06953	1.91927	0.01374	0.0007	0.00023
ENGLISH	45	2.82208	0.06344	1.07348	0.00777	0.14727	0.00353
ENGLISH	46	2.01364	0.05775	1.45825	0.01313	0.13837	0.00385
ENGLISH	47	1.74454	0.1024	1.59618	0.03881	0.05781	0.00563

Subject	Item Number	Discrimination	Standard Error of Discrimination Estimate	Difficulty	Standard Error (Difficulty)	Guessing Parameter	Standard Errors (Guessing)
ENGLISH	48	2.13839	0.05204	1.40805	0.01099	0.08311	0.00316
ENGLISH	49	0.73241	0.08785	3.07603	0.21544	0.05011	0.01066
ENGLISH	50	0.79615	0.05635	3.46117	0.1341	0.0515	0.00517
ENGLISH	51	0.91312	0.10883	2.78426	0.18373	0.07607	0.00951
ENGLISH	52	1.79259	0.13123	2.49325	0.06568	0.13568	0.00385
ENGLISH	53	1.33264	0.08266	2.51679	0.06413	0.10142	0.00473
ENGLISH	54	1.31211	0.02221	-1.75909	0.03004	0.00344	0.00331
ENGLISH	55	1.15058	0.01929	-2.23263	0.03745	0.00381	0.00367
ENGLISH	56	1.23421	0.02056	-1.34249	0.02546	0.00296	0.00284
ENGLISH	57	2.77921	0.04335	1.14679	0.00657	0.00269	0.00109
ENGLISH	58	2.64309	0.07729	2.08824	0.02124	0.0068	0.00093
ENGLISH	59	2.08092	0.05216	0.44153	0.0166	0.25716	0.00782
ENGLISH	60	2.20655	0.04763	0.71502	0.01052	0.11341	0.00545
ENGLISH	61	1.76666	0.08027	2.8111	0.06421	0.00477	0.00103
ENGLISH	62	2.95744	0.05508	1.44412	0.00859	0.00548	0.00105
ENGLISH	63	3.80363	0.08226	1.59432	0.00886	0.00643	0.00084
ENGLISH	64	0.93876	0.04857	2.28309	0.0504	0.08203	0.00685
ENGLISH	65	1.81441	0.09319	1.97788	0.03099	0.18088	0.00473
ENGLISH	66	2.84361	0.08629	1.4169	0.0109	0.1705	0.00378
ENGLISH	67	1.72006	0.03856	0.99718	0.01161	0.07235	0.00486
ENGLISH	68	3.28987	0.11681	1.40864	0.01104	0.26273	0.00394
ENGLISH	69	1.19493	0.05442	2.07839	0.0368	0.08933	0.00567
ENGLISH	70	1.35827	0.02867	1.77607	0.02069	0.0015	0.00107
ENGLISH	71	0.97631	0.02799	2.60773	0.05287	0.00056	0.00053

Subject	Item Number	Discrimination	Standard Error of Discrimination Estimate	Difficulty	Standard Error (Difficulty)	Guessing Parameter	Standard Errors (Guessing)
ENGLISH	72	3.1366	0.1397	2.68832	0.04947	0.00019	0.00012
ENGLISH	73	2.21485	0.08071	1.70811	0.01731	0.1485	0.00388
ENGLISH	74	1.61226	0.0344	1.8727	0.02056	0.00135	0.00091
ENGLISH	75	1.43914	0.04303	2.38562	0.03874	0.00215	0.00127
ENGLISH	76	1.1179	0.02695	2.11242	0.03218	0.00109	0.00095
ENGLISH	77	1.53471	0.03889	2.24496	0.03205	0.00106	0.00063
ENGLISH	78	1.54403	0.0431	2.48187	0.04072	0.00096	0.00058
MATH	1	1.42515	0.02808	0.09966	0.0224	0.25289	0.00783
MATH	2	1.19113	0.02482	0.43699	0.02049	0.13887	0.00711
MATH	3	1.24143	0.05143	0.36555	0.0326	0.0823	0.01246
MATH	4	1.91901	0.07632	-0.03201	0.03112	0.22109	0.01406
MATH	5	1.90589	0.0691	-0.0201	0.02727	0.15145	0.01278
MATH	6	1.70105	0.06114	0.03733	0.02835	0.13801	0.01239
MATH	7	1.70103	0.05672	0.00232	0.02574	0.09536	0.01124
MATH	8	1.04263	0.03236	-2.25381	0.06321	0.00539	0.00642
MATH	9	1.01397	0.01469	-2.60746	0.03422	0.00193	0.0023
MATH	10	0.86984	0.03331	-0.71333	0.06233	0.02035	0.01726
MATH	11	1.14338	0.01543	-1.21202	0.01828	0.00099	0.00118
MATH	12	1.72105	0.02383	-0.06065	0.01099	0.03761	0.00408
MATH	13	1.57452	0.02147	0.62235	0.00863	0.01567	0.00246
MATH	14	2.52653	0.06785	0.53962	0.01129	0.0122	0.00328
MATH	15	2.26011	0.02691	0.97444	0.00617	0.00094	0.00049
MATH	16	2.76778	0.04094	0.11893	0.008	0.06943	0.00391
MATH	17	3.02693	0.08842	0.16721	0.01192	0.03732	0.0058
MATH	18	1.61985	0.02424	1.04086	0.00898	0.01491	0.00213
MATH	19	2.3417	0.0329	0.48776	0.0072	0.04108	0.0029
MATH	20	1.97643	0.02583	0.60991	0.00746	0.02406	0.00238
MATH	21	2.55883	0.06824	0.64076	0.01138	0.00978	0.00291
MATH	22	2.34508	0.03287	0.23124	0.00844	0.06059	0.00377
MATH	23	1.43691	0.02987	2.0696	0.02108	0.006	0.00123
MATH	24	1.08716	0.01662	-1.92198	0.03221	0.00691	0.00766
MATH	25	1.44163	0.01708	-0.00624	0.00878	0.00111	0.0012
MATH	26	1.41641	0.01991	0.90788	0.00924	0.00361	0.00174
MATH	27	1.29891	0.02007	-0.67345	0.02095	0.03609	0.00696
MATH	28	1.36788	0.01744	0.81471	0.0087	0.00084	0.00086
MATH	29	1.89958	0.07155	1.07142	0.01962	0.02289	0.00434
MATH	30	1.77589	0.02415	0.2107	0.00891	0.02052	0.00316
MATH	31	1.81638	0.02497	1.57293	0.01125	0.0004	0.00034
MATH	32	2.17563	0.02816	1.16462	0.00747	0.00155	0.00077
MATH	33	2.34891	0.04659	2.22537	0.01779	0.00048	0.00026

Subject	Item Number	Discrimination	Standard Error of Discrimination Estimate	Difficulty	Standard Error (Difficulty)	Guessing Parameter	Standard Errors (Guessing)
MATH	34	1.31864	0.037	2.13237	0.02564	0.02607	0.00256
MATH	35	1.84941	0.09273	1.89224	0.0506	0.00366	0.00176
MATH	36	1.26991	0.06825	3.65272	0.11012	0.00748	0.00116
MATH	37	0.48565	0.01804	4.80166	0.15506	0.00076	0.0009
MATH	38	2.20743	0.09484	3.03462	0.05577	0.00236	0.00044
MATH	39	2.3467	0.06326	2.50987	0.02711	0.00132	0.00037
MATH	40	1.96729	0.03682	2.19913	0.02003	0.00033	0.00025
MATH	41	4.25327	0.39364	2.16371	0.06731	0.00115	0.00043
MATH	42	1.01899	0.03178	2.26842	0.03319	0.0329	0.00343
MATH	43	1.14854	0.03159	2.0072	0.0254	0.02159	0.00295
MATH	44	2.16982	0.05019	2.34116	0.02307	0.00053	0.00029
MATH	45	1.17019	0.04443	2.99799	0.06093	0.00777	0.00169
MATH	46	1.36128	0.13894	3.50545	0.15838	0.10419	0.00324
MATH	47	1.09843	0.03313	2.01294	0.02696	0.0306	0.00371
MATH	48	2.03642	0.04543	2.22786	0.02124	0.00107	0.00048
MATH	49	1.40279	0.02857	0.71708	0.01496	0.06774	0.00548
MATH	50	1.47297	0.05118	2.66689	0.04199	0.01091	0.00157
MATH	51	0.96635	0.016	-2.15189	0.03551	0.00157	0.00187
MATH	52	1.32306	0.02612	-0.17515	0.02293	0.08687	0.00832
MATH	53	2.48566	0.03802	1.47366	0.00886	0.00029	0.00022
MATH	54	2.35439	0.03224	0.81975	0.00666	0.00388	0.00111
MATH	55	1.94855	0.03067	1.23284	0.00893	0.00716	0.00133
URDU	1	0.70533	0.01188	-0.48468	0.02681	0.00348	0.00585
URDU	2	0.75171	0.01119	-2.01605	0.03363	0.00234	0.00405
URDU	3	1.47457	0.02401	-0.95575	0.02353	0.00918	0.0076
URDU	4	1.49811	0.02496	-0.89767	0.02356	0.01631	0.00786
URDU	5	0.8794	0.01251	-0.16791	0.01356	0.00024	0.00042
URDU	6	1.91426	0.02721	0.23573	0.00985	0.04888	0.00407
URDU	7	1.77163	0.02718	-0.08357	0.01357	0.07547	0.00557
URDU	8	1.35248	0.04045	1.08765	0.02387	0.00052	0.00089
URDU	9	1.70765	0.02226	1.33149	0.0092	0.00019	0.0003
URDU	10	1.89337	0.03539	-0.32069	0.01935	0.23334	0.00795
URDU	11	1.76957	0.06203	0.93024	0.01804	0.02001	0.0046
URDU	12	2.02298	0.02794	0.69002	0.00727	0.02414	0.00258
URDU	13	2.63928	0.0385	1.53297	0.00826	0.00141	0.00049
URDU	14	2.69272	0.10044	1.5647	0.02595	0.00081	0.0007
URDU	15	2.8015	0.09065	1.1134	0.0144	0.00463	0.00198
URDU	16	1.89853	0.02584	0.48733	0.00786	0.02258	0.00281
URDU	17	1.77537	0.02482	-0.07624	0.01193	0.04459	0.00449
URDU	18	1.90119	0.05459	0.40861	0.01476	0.01421	0.00493
URDU	19	1.52044	0.02704	0.52841	0.01259	0.07448	0.00509
URDU	20	1.50545	0.02569	0.63492	0.01122	0.04197	0.00441
URDU	21	1.33112	0.05156	0.4747	0.02475	0.03699	0.00917
URDU	22	0.88529	0.01532	1.61349	0.02013	0.00053	0.0009
URDU	23	1.3688	0.03721	1.58964	0.01646	0.07514	0.00428
URDU	24	1.01095	0.0211	1.3659	0.01562	0.0049	0.00328

Subject	Item Number	Discrimination	Standard Error of Discrimination Estimate	Difficulty	Standard Error (Difficulty)	Guessing Parameter	Standard Errors (Guessing)
URDU	25	1.91648	0.1333	2.45201	0.10099	0.00159	0.00087
URDU	26	1.42993	0.02771	1.85932	0.01777	0.00486	0.00125
URDU	27	2.38871	0.0885	1.4495	0.02386	0.00303	0.00133
URDU	28	1.60492	0.02772	1.47678	0.01164	0.00909	0.00161
URDU	29	2.30716	0.05688	2.4279	0.02662	0.00037	0.00032
URDU	30	2.10989	0.06721	2.9621	0.04972	0.00012	0.00014
URDU	31	3.07161	0.07874	0.59767	0.00956	0.00877	0.00244
URDU	32	2.92059	0.03673	1.26442	0.00584	0.00096	0.00036
URDU	33	3.25471	0.08443	0.8492	0.00964	0.0025	0.00122
URDU	34	3.23898	0.03884	1.02563	0.00472	0.00133	0.00049
URDU	35	3.35357	0.08618	0.66587	0.00903	0.00904	0.00208
URDU	36	1.83694	0.02572	0.89579	0.00745	0.01904	0.00205
URDU	37	2.42224	0.03339	0.84645	0.00614	0.02271	0.00201
URDU	38	2.96127	0.08249	0.61594	0.01057	0.02452	0.0037
URDU	39	2.59485	0.07898	0.71376	0.01218	0.03611	0.00432
URDU	40	2.96539	0.08103	0.60028	0.01036	0.0212	0.00346
URDU	41	1.82036	0.0783	1.59509	0.03447	0.00704	0.00225
URDU	42	1.16611	0.05119	1.64384	0.04536	0.00255	0.0029
URDU	43	2.4634	0.03191	0.9362	0.00581	0.01224	0.00143
URDU	44	2.91288	0.08849	0.92785	0.01161	0.0114	0.00241
URDU	45	2.74257	0.03939	1.48508	0.00764	0.00178	0.0005
URDU	46	2.87229	0.11277	1.35101	0.01934	0.01147	0.00197
URDU	47	2.45471	0.1222	1.77092	0.03844	0.00604	0.0014
URDU	48	2.82462	0.12885	1.7139	0.03245	0.00306	0.00099
URDU	49	2.58916	0.045	1.47105	0.0085	0.00643	0.00113
URDU	50	1.82212	0.03079	1.49618	0.01118	0.00273	0.00103
URDU	51	1.67813	0.02982	1.2544	0.01026	0.01079	0.00207
URDU	52	2.44388	0.04405	1.28756	0.00797	0.02154	0.00198
URDU	53	0.81583	0.01358	-1.45917	0.03078	0.00173	0.003
URDU	54	1.81262	0.03682	2.16209	0.0215	0.00014	0.00021
URDU	55	2.32155	0.03627	1.20627	0.00756	0.00563	0.0014
URDU	56	2.3213	0.03484	1.2791	0.00784	0.00175	0.00091
URDU	57	2.69515	0.04892	1.85505	0.0123	0.00028	0.00024
URDU	58	2.3077	0.03815	0.25757	0.01005	0.05872	0.0046
URDU	59	0.54593	0.01325	1.45287	0.02992	0.00055	0.00095
URDU	60	1.82683	0.05686	2.65564	0.03935	0.00163	0.0007
URDU	61	2.54493	0.07574	2.43263	0.02767	0.00158	0.00047
URDU	62	2.86968	0.03989	1.14975	0.00603	0.00235	0.00071
URDU	63	2.8052	0.04269	1.45739	0.00753	0.00068	0.00032
URDU	64	2.99179	0.05011	1.68636	0.00908	0.00012	0.00012
URDU	65	2.00863	0.04277	1.74795	0.01378	0.00937	0.00159
URDU	66	2.21346	0.04273	1.3198	0.00903	0.03045	0.00249
URDU	67	1.87871	0.03311	1.37096	0.01002	0.00973	0.00179
URDU	68	2.57945	0.0467	1.70948	0.01059	0.00249	0.0007