

**Private School Support Program:
A Characterization of the Private Segment of Kenya's Educational Sector**

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1. Introduction

This document presents the main findings of surveys administered to school heads, teachers and students in 142 schools across four cities in Kenya. The main objectives of the survey are twofold. First, the document provides a rich characterization of the private sector. Second, it validates the experimental intervention of a program that provides technical assistance and increases access to credit for private schools.

The survey provides a description of a segment of the private educational sector in Kenya that is itself a source of interesting and useful information. Data on the private basic education sector in Kenya—as in many countries in the region—are largely unavailable or unreliable, particularly recent data corresponding to the rapid growth in the sector. The surveys provide detailed information about the characteristics and challenges of the private schools that are serving middle- and low-income populations.

The surveys were undertaken in conjunction with the establishment of IFC's Kenya Private School Support Program (KPSSP). This initiative sought to provide local currency financing and advisory services (AS) to private K-12 institutions in Kenya. On December 7, 2006, IFC signed a risk-sharing agreement with K-Rep Bank (K-Rep) of up to 120 million Kenyan shillings (\$1.7 million equivalent) on loans extended to eligible private schools in Kenya. Under this agreement, IFC shares 50 percent of the risk on the pool of loans made to schools after an initial 5 percent first loss taken by K-Rep. The program's target areas are Nyeri (Central), El Doret and Nukuru (Rift), Mombassa (Coast), and Nairobi (Nairobi).

Schools will use these loans to finance construction projects, purchase educational materials, including computers, and cover other capital expenditures. To support schools' ability to apply for and utilize bank loans, a comprehensive advisory services program is being carried out. The program is designed to improve schools' financial, management, and educational capacities; strengthen K-Rep's ability to evaluate and monitor loans to schools; and foster the development of an independent provider of educational services to private schools.

This paper seeks to outline the main characteristics of the baseline data collected as part of the impact evaluation. Between September and November 2007, an independent consulting company administered surveys at the school, teacher, and student levels. From

a population of approximately 2000 schools¹, 190 were randomly selected to comprise the treatment and control groups. Of these 190, 142 schools agreed to take part in the survey. In each school, the school owner or head was surveyed, as well as a random sample of teachers and students. The school-level data is thus based on a sample of 142 schools, the teacher-level data on a sample of 798 teachers, and the student-level data on a sample of 8,863 students.

2. School characteristics

This section presents the characteristics of the schools, including infrastructure, administrative capacity, finances, and student body, based on the questionnaires completed by school heads.

The infrastructure section will present an overview of the physical characteristics of schools. Although the literature on school inputs and their impact on educational achievement is controversial (Hanushek 2003 and 2006), the characterization of schools can be done by assessing aspects of their infrastructure. Moreover, aspects such as year of creation can be a strong indicator of the viability of the school. Older schools tend to have a more solid reputation, and because of a steadier influx of students, they are more stable as businesses.

The section on the student body presents a picture of the size of the school and key educational outcomes, such as dropout and repetition rates. These variables are important for two reasons. First, the size of the school is the key characteristic affecting the flow of resources, as most private schools depend on tuition and fees for the vast majority of, if not all revenue. Second, school size, and repetition and dropout rates are indicative of school quality (Murname and Nelson 2007). In that section we include a first approximation to teacher quality, mainly teacher absenteeism and evaluation. Recent literature has demonstrated the importance of teacher absenteeism in learning outcomes (Chaudhury et al 2008). In the section discussing the results of the student survey, we contrast the responses from teachers and children, showing that they differ sharply. Incentives to teachers has been an area of intensive research in the past ten years (for example, Duflo, Dupas, and Kremer, 2008; Kremer and Chen 2001; Duflo, Hanna, and Ryan 2007) Here we incorporate in the instruments the evaluation of teachers as a critical variable in the incentive process.

The section on administration describes the schools' administrative personnel, administrative system, computer capacity and governance structure. These variables are relevant from the point of view of the schools' viability as businesses.

¹ A comprehensive list of all registered private schools in Kenya with accurate contact information did not exist. The team pieced together a list from several different sources. Each school on that list was called and, if reached, information updated. The resulting list included all schools that could be contacted. The randomization was then carried out on that list.

Finally, in the section on finances, we present information on key indicators, such as fees charged by schools, and costs and revenues over time. Fees are both a clear determinant of access to school (for instance, see Kremer and Holla, 2008) and determine the sustainability of private schools.

A. Infrastructure

Of the total sample of 142 schools, about 68% were primary, 28% secondary, and 4% both primary and secondary. These figures roughly reflect the proportion of private primary and secondary schools in Kenya. The vast majority of schools in the sample were founded in the past ten years, with the average age being 8.6 years, again mirroring the rapid growth in the number of private schools recently observed. There is a positive relationship between number of students and year of creation. This follows from the way in which schools are typically established, with just a few classes begun at a time, and is in line with the argument that the older the school, the more robust its enrollment.

Most schools are single or joint proprietorships (60%) or limited liability companies (20%), structures that reflect the way in which many private schools at this level emerged. Often a single teacher or school head started a school by taking a few students into his/her own home, and then gradually building enrollment, acquiring a building, and so on.

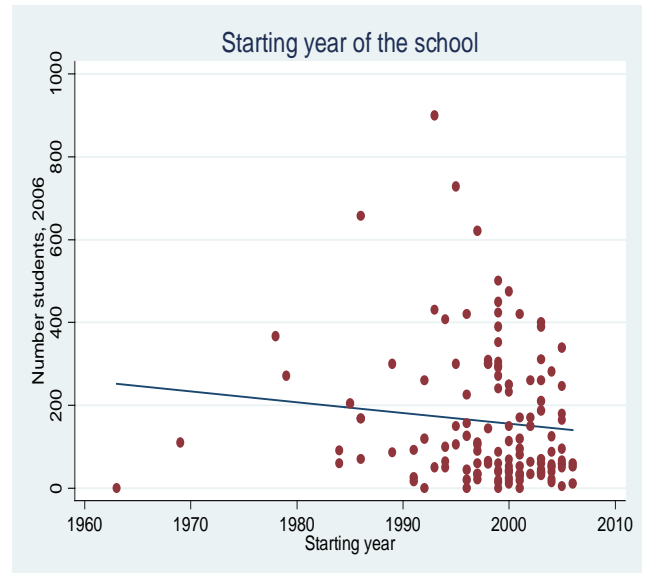
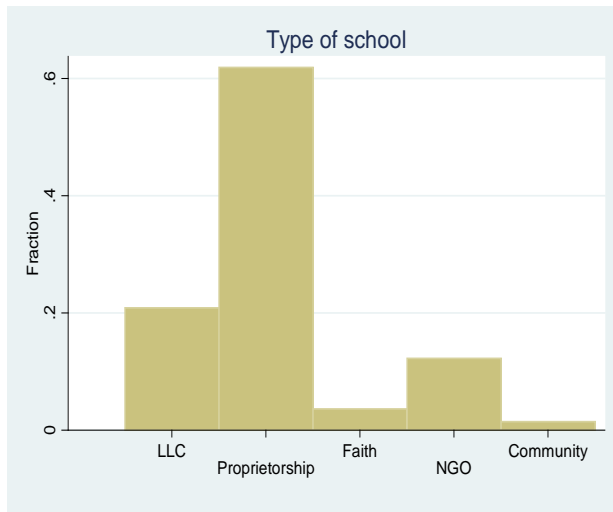
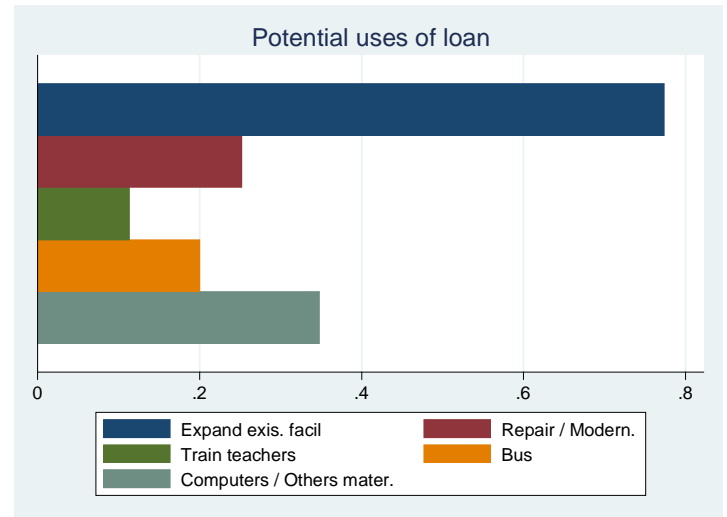
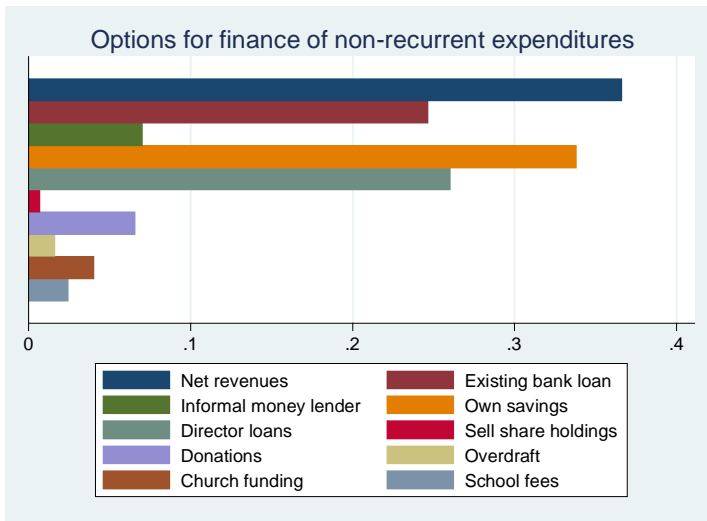


Table 1 presents the main characteristics of the schools’ infrastructure. Most schools reported having a library, though containing limited resources, some access to computers (for both teachers and students), and a number of desks and classrooms proportional to enrollment (e.g., one desk per student). At the same time, 82% of respondents indicated that they would access a bank loan at prevailing interest rates if they could, to be used predominantly for physical expansion and, secondarily, purchasing computers and other

educational materials. Own savings and net revenues were the predominant options for financing non-recurrent expenditures.

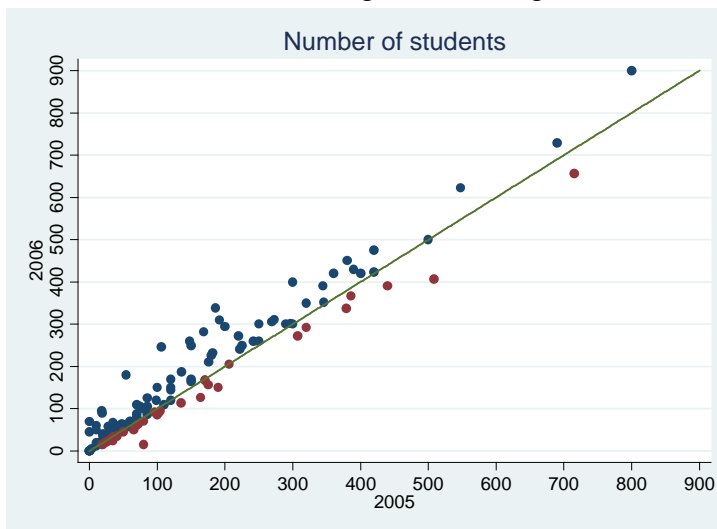
School Characteristics			
	<i>Mean</i>	<i>Std. Dev</i>	<i>Obs.</i>
<i>Infrastructure (numbers)</i>			
School age (years)	8.6	(6.96)	140
Classrooms	10.6	(5.66)	142
Toilets	12.9	(12.11)	142
Desks	170.1	(173.25)	141
Computers (for students)	5.6	(10.15)	141
Computers (for teachers)	1.5	(2.40)	142
Library books	167.3	(280.7)	123
<i>Teachers and students (numbers)</i>			
Admin. personnel ²	18.27	(13.50)	142
Teachers	15.96	(13.77)	142
Student enrollment, 2005	145.6	(157.95)	132
Student enrollment, 2006	161.6	(163.80)	135
Repeaters, 2005	2.2	(8.63)	135
Repeaters, 2006	5.1	(29.56)	132
Dropouts, 2005	8.7	(12.38)	132
Dropouts, 2006	9.6	(12.11)	133
<i>Administration: does school have:</i>			
Computers for accounts	0.37	(0.48)	142
Computers for payroll	0.44	(0.50)	142
Computers for fee payments	0.39	(0.49)	142
Computers for stud. Records	0.39	(0.49)	142
Computers for exam scores	0.37	(0.49)	142
Board of directors	0.58	(0.49)	142
Strategic plan	0.85	(0.36)	142
Staff manual	0.72	(0.45)	142
PTA	0.47	(0.50)	142
<i>Finances ('000 KSH)</i>			
Revenues 2005	3902.8	(5470.94)	91
Revenues 2006	4122.9	(5667.36)	95
Cost 2005	4188.9	(6819.05)	85
Cost 2006	4771.7	(7164.58)	87
Fees, primary	18.8	(78.49)	94
Transport, primary	6.0	(32.86)	94
Lunch, primary	7.0	(42.89)	93
Extra coaching, primary	6.6	(32.87)	93
Boarding, primary	10.1	(82.45)	94
Fees, secondary	18.4	(31.46)	40
Transport, secondary	0.5	(1.13)	40
Lunch, secondary	4.0	(15.78)	40
Extra coaching, secondary	1.9	(3.52)	40
Boarding, secondary	2.8	(4.28)	40

² Includes teachers with administrative responsibilities.



B. Student body

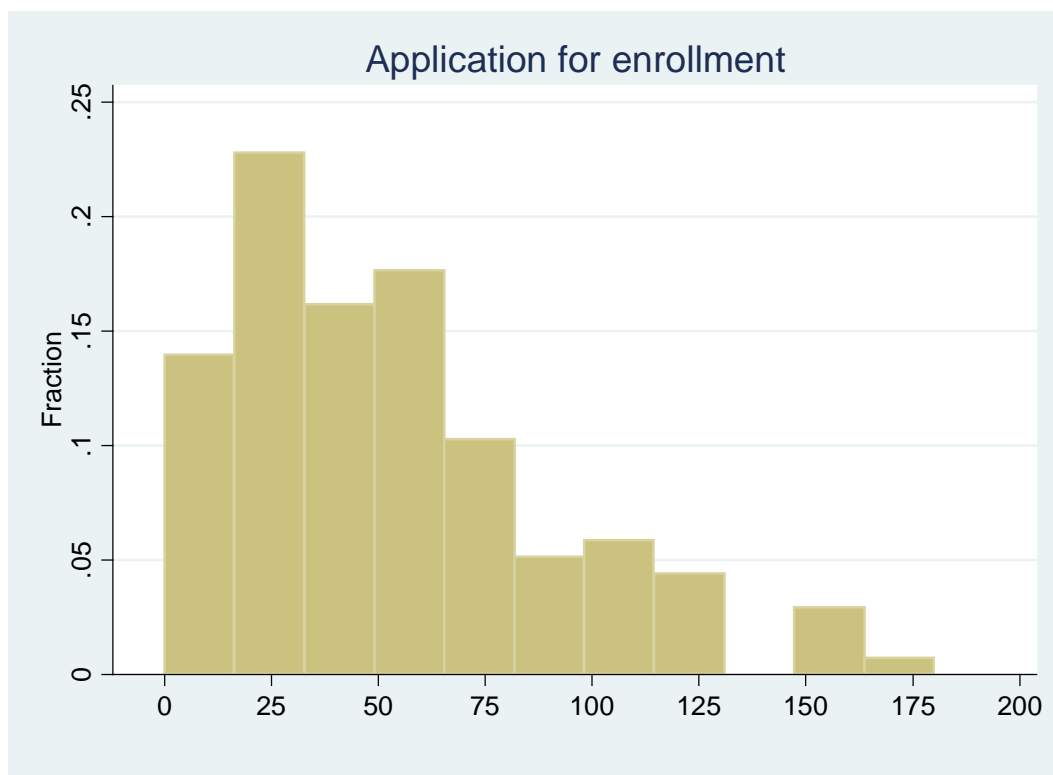
The average number of students in the sample was 145.6 in 2005 and 161.6 in 2006. The graph below confirms that the majority of schools had a larger student population in 2006 (blue) than in 2005 (red), again reflecting the trend of an expanding private sector.



Most school heads reported very low dropout and repetition rates—both below 5% for 2005 and 2006, with many schools reporting no repeaters or dropouts. These figures almost certainly understate the true figures (though it is unclear why so many schools would do so), however, the more interesting finding – apart from higher rates in 2006 than in 2005 – is the reason for students leaving. According to the head masters and coordinators, the main reason for leaving school is the inability to pay fees (34.1), and only secondarily relocation (19%). In contrast, the student survey revealed that nearly 40% of the students claimed to have repeated a grade, the most common reasons being

transferring to a new school and academic performance. Inability to pay fees was cited as a reason in only 10% of the cases. It is unclear why the perception differs between the two groups. Later in the article we highlight several potential explanations for the differences in these data.

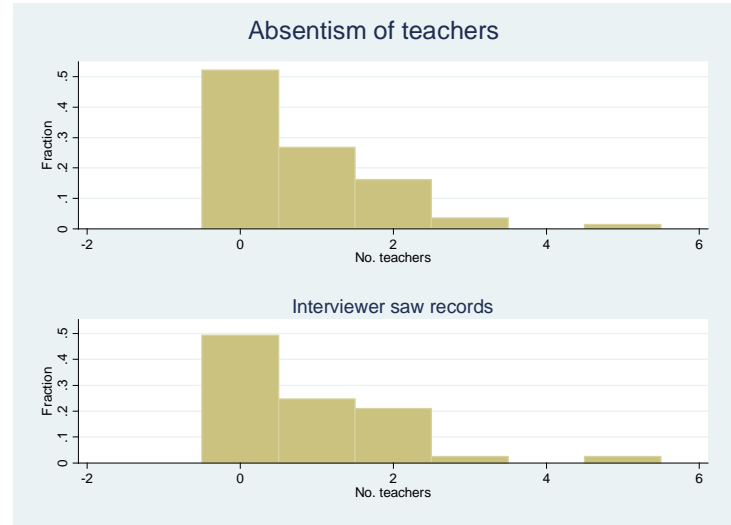
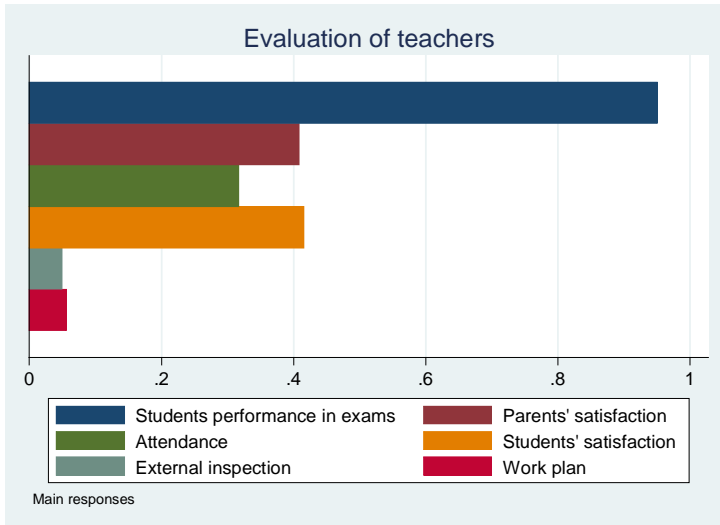
Demand for new places at the schools appears strong, with 60% of schools receiving between 25 and 75 student applications, exceeding average class size. These data fit with the trend in upward enrollment. The student-teacher ratio, as measured by average student enrollment divided by average number of teachers is low, at around 10, which differs from the class size reported by teachers (around 25). There may be several reasons for this result, the most likely being double-counting, as the school head may have counted teachers who teach more than one subject multiple times.



Teacher qualifications appear strong, with the vast majority having at least a teachers' college certificate (the minimum credential required in Kenya); only 10% of teachers had only a secondary school degree. Schools use student performance on exams as the main evaluation tool of teachers, with nearly half using student and parent satisfaction as a means of evaluating teachers as well. The literature on school accountability (Rubio-Codina 2008; Barrera-Osorio et al 2009) shows that involvement of parents in the schools is critical to increased learning outcomes.

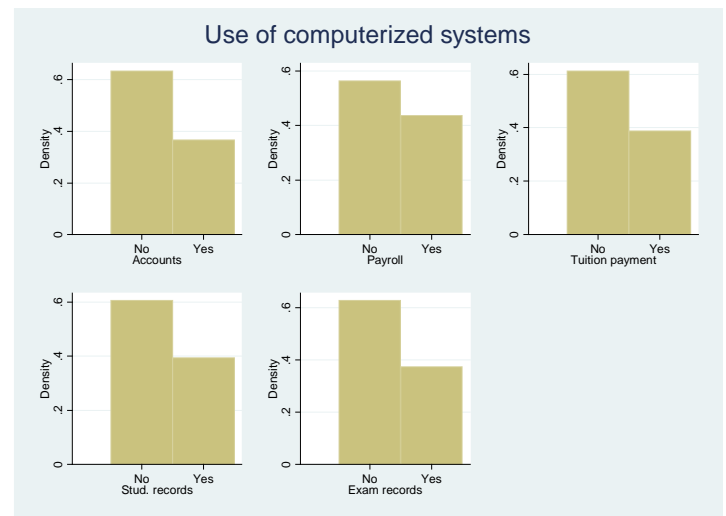
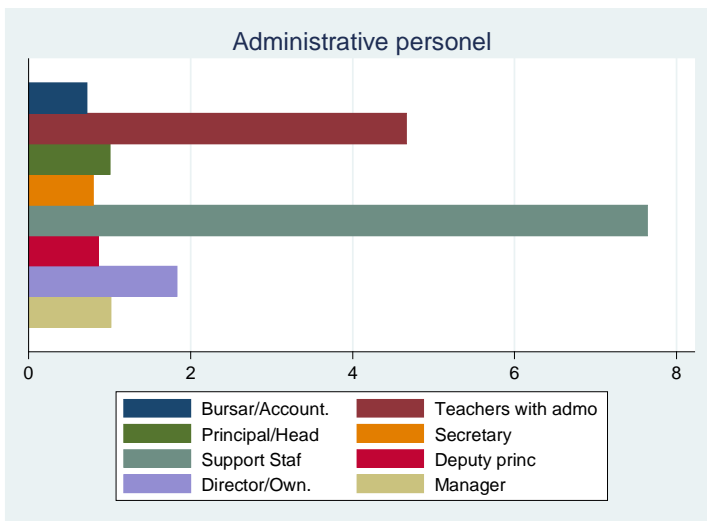
About 55% of the schools reported all the teachers arriving to school the previous week of the survey; 22% of schools reported 1 teacher absent and 18% reported 2 teachers absent. However, the distribution increased slightly if the interviewer was able to see the

schools' records. These figures differ from both those reported by teachers themselves (18% absent for at least one day) and students (30% absent for at least one day). This pattern is more pronounced for late arrivals.



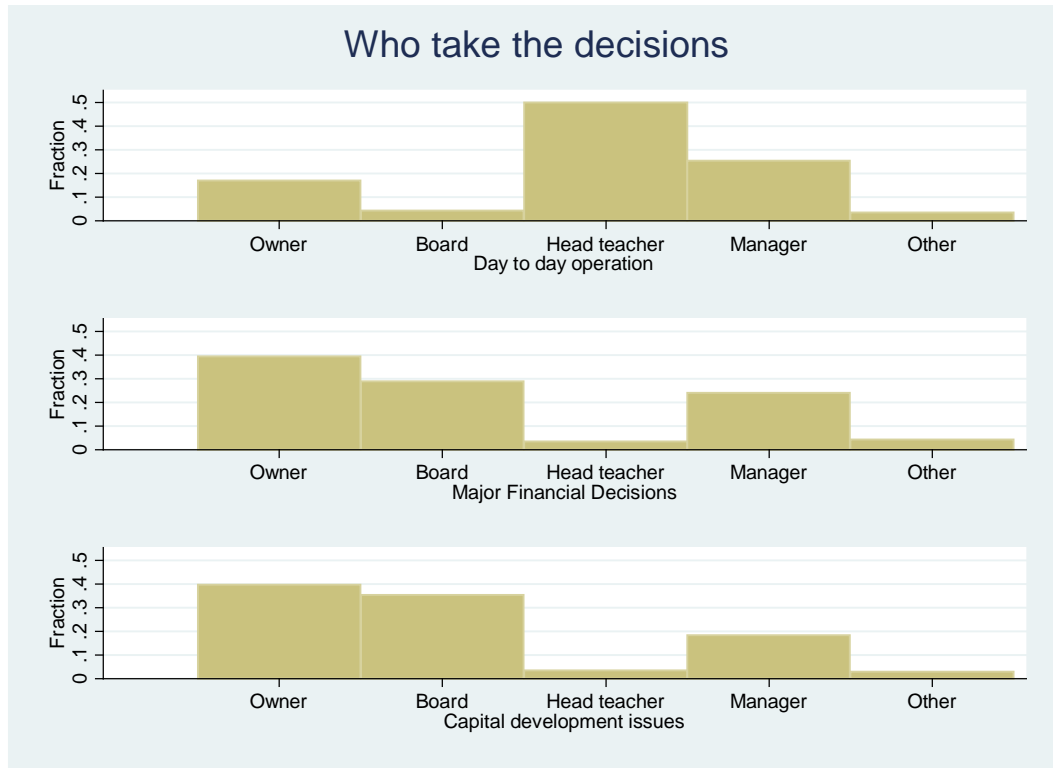
C. Administrative capacity

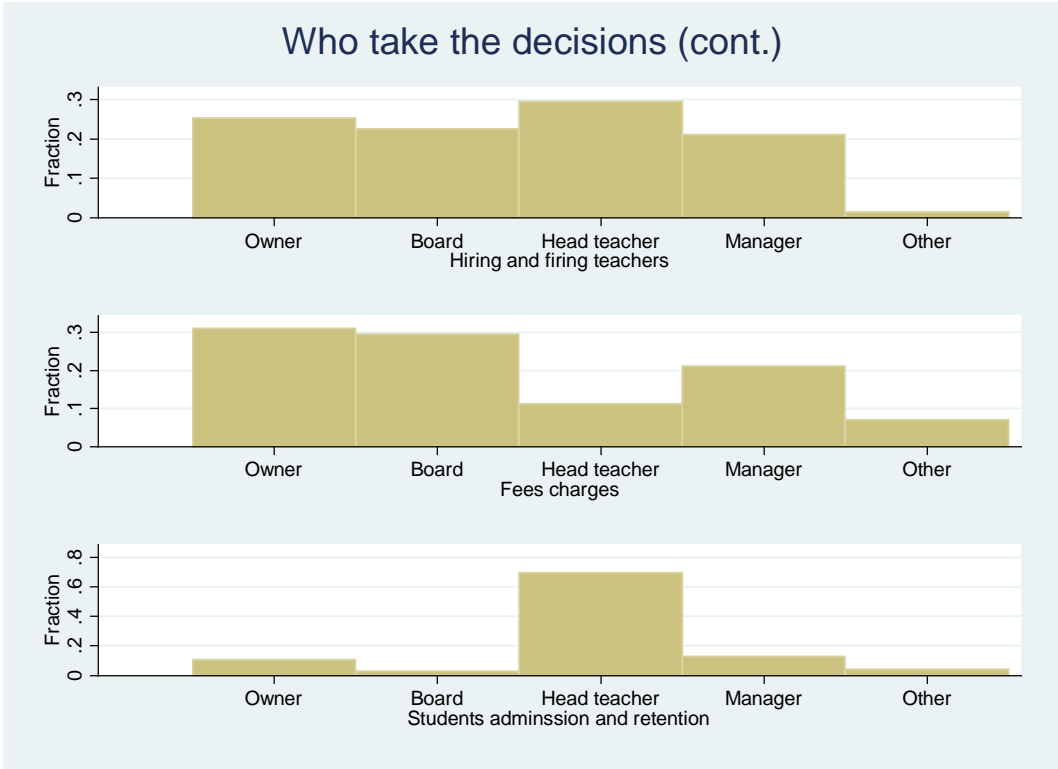
On average, schools reported employing 18 administrative staff (including teachers with administrative responsibility). This number seems high on its face, given that the average school size is 140-160 students. The number does not indicate, however, whether staff are full time or part time and whether some have multiple duties (e.g., teaching). The majority of schools, however, do not utilize computerized systems for accounting, payroll, tuition, and student and exam records, which may explain a small part of this high number.



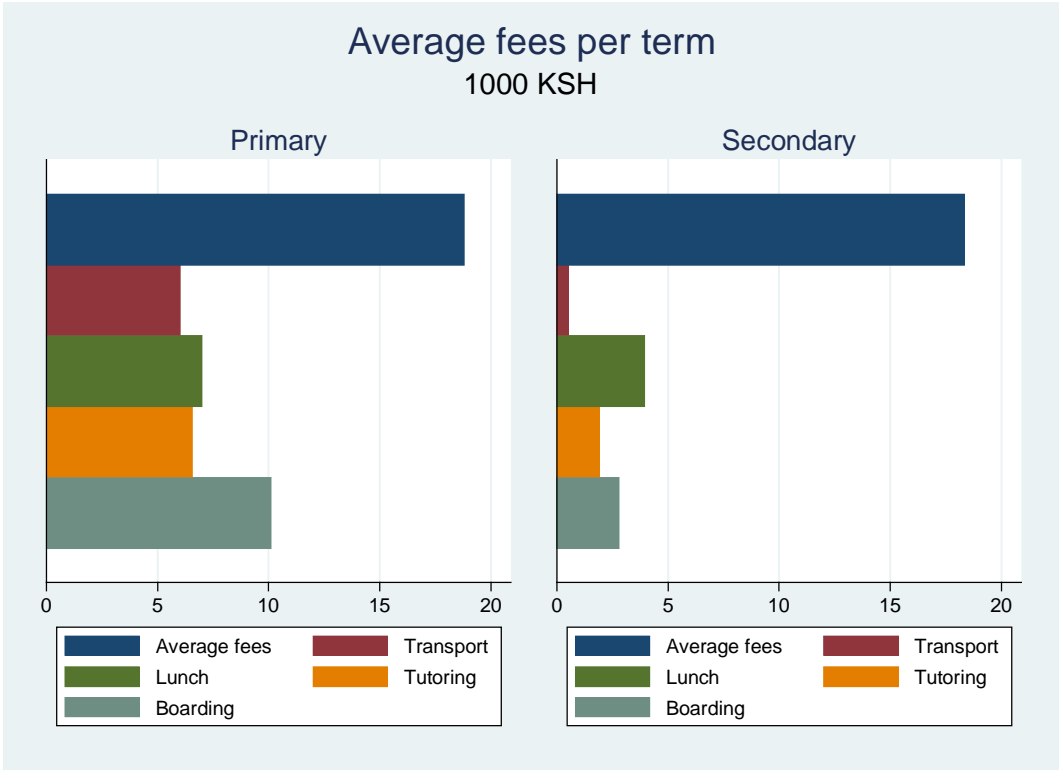
In the majority of schools, directors are in charge of maintaining financial records. More than one-third of schools did not have audited financial statements.

Critical decision-making is distributed across different people. The head master makes most decisions on the day-to-day operation of the schools, as well as student admission and retention. The owner and Board make most financial decisions, including on issues of capital development. The decision to hire and fire teachers is spread among owner, board, head teacher and school manager.



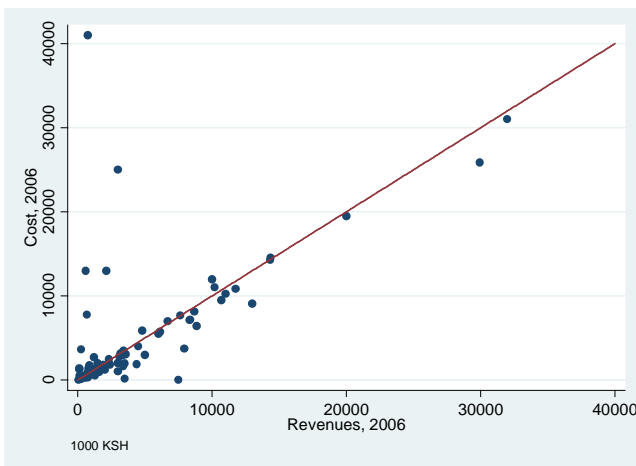
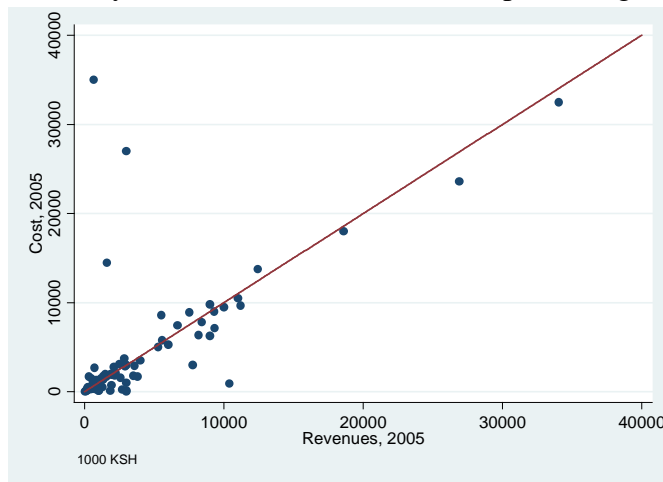


D. Finances

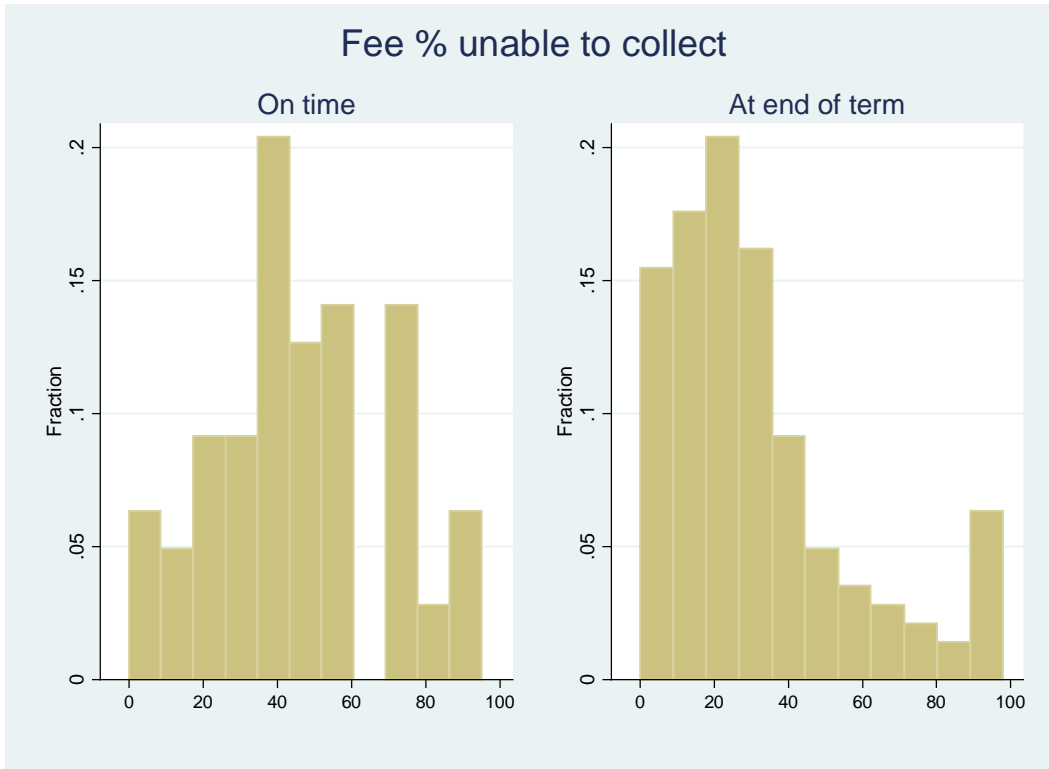


Schools' average fees per term were around 18,800 KSH (\$284) and 18,200 KSH (US\$275) per term for primary and secondary, respectively. Fees of this level place the surveyed schools in the middle of the distribution of private schools in Kenya, in which fees run from just a few dollars per term for unregistered schools (operating primarily in the poorest neighborhoods) to around \$5000 for elite international schools. It is an unusual result that average fees are higher for primary than for secondary school. However, this structure likely reflects the fact that private primary schools are much more prevalent in Kenya, as it is seen as more desirable to send children to public secondary schools.

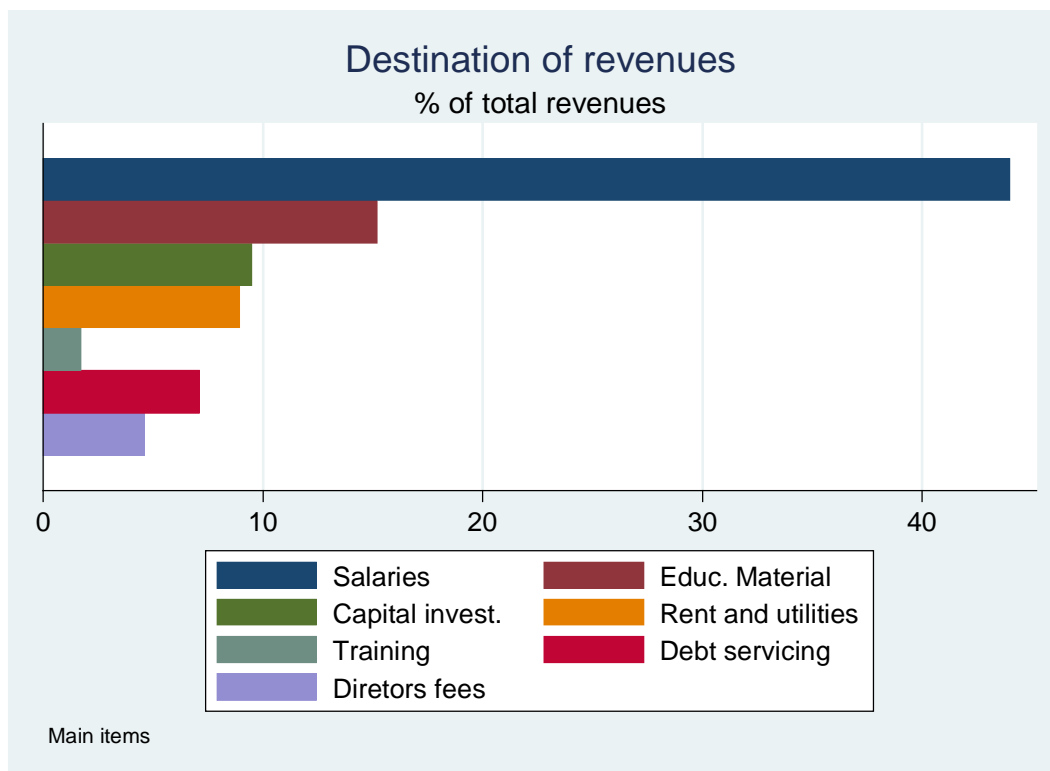
Most schools also report higher revenues than costs in both years. However, the majority of schools are clustered around the 45-degree line, indicating that most cannot finance large capital costs through cash generation alone. This finding also brings into question the ability of schools to finance debt at prevailing interest rates.



Part of this thin margin may be due to the evident difficulty schools have in collecting fees, with all reporting an inability to collect some fees. More than 50% of schools, for instance were not able to collect an average of around 15% of fees by the end of the term.



Most revenues (nearly 50%) are used to pay salaries, although, this percentage appears low for primary and secondary schools. The survey also revealed that nearly 10% of revenues are used for capital costs. If these costs are included in the measure of costs above—that is, if the graph of revenues vs. costs represents total costs, not just recurrent costs, then the picture would change in terms of ability to borrow. Moreover, schools' reducing the percentage of fees they were unable to collect would also increase their capacity to borrow.

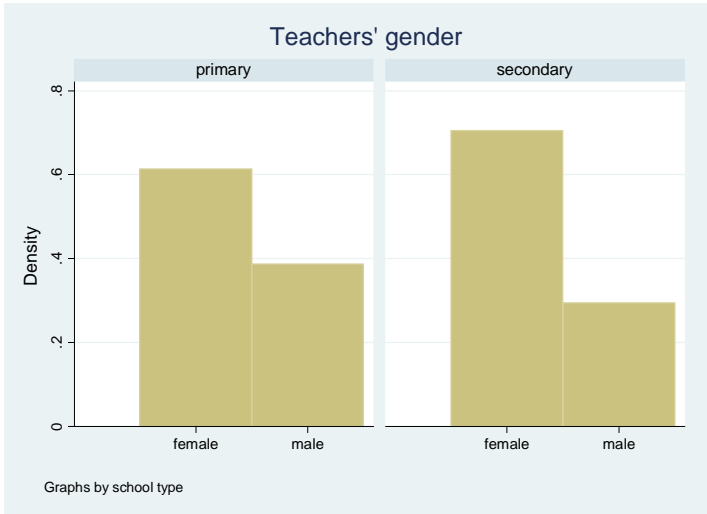


3. Teacher characteristics

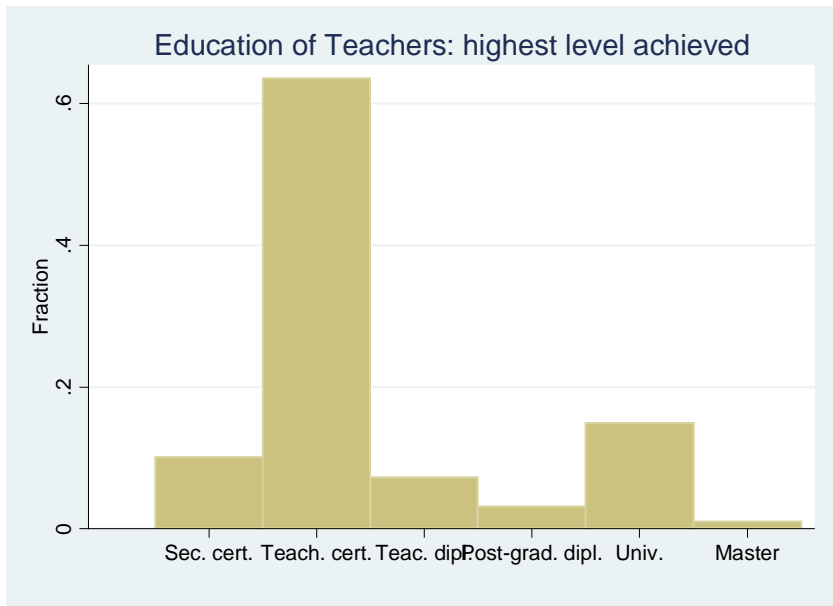
Teachers are a critical input in the production of educational outcomes. The baseline included a survey specifically directed toward teachers. In addition to gathering information about teacher demographics, the survey collected information about teachers' perceptions of their schools. The survey requested information on the allocation of time in class as an important measure of teacher performance (Abadzi 2006). Finally, the survey collected information on teacher training, as one element of the IFC AS program is curriculum management.

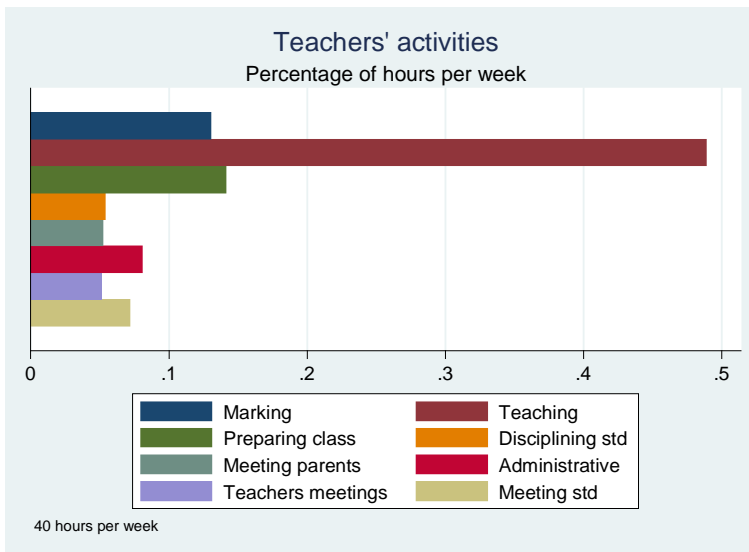
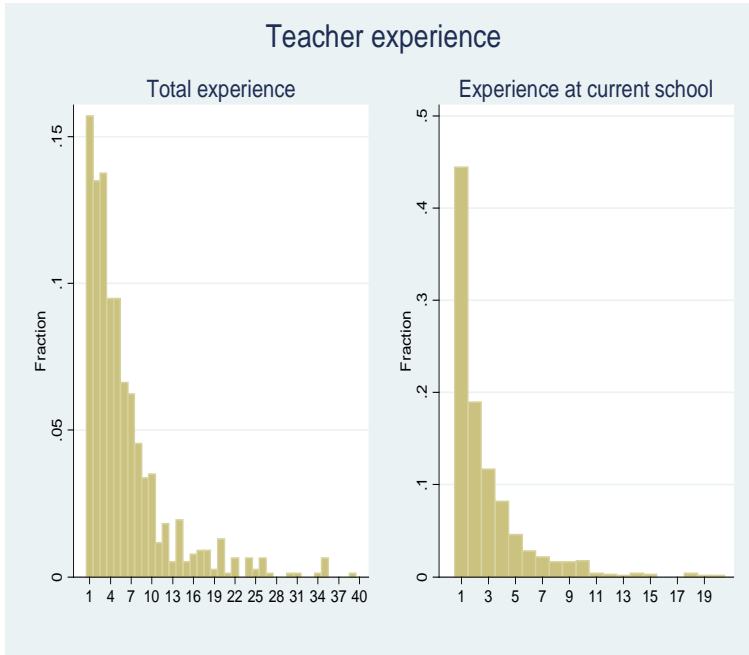
A. Teacher demographics

Our sample consisted of 798 teachers, an average of 7 teachers surveyed per school. More than 60% of teachers were women in both primary and secondary schools.

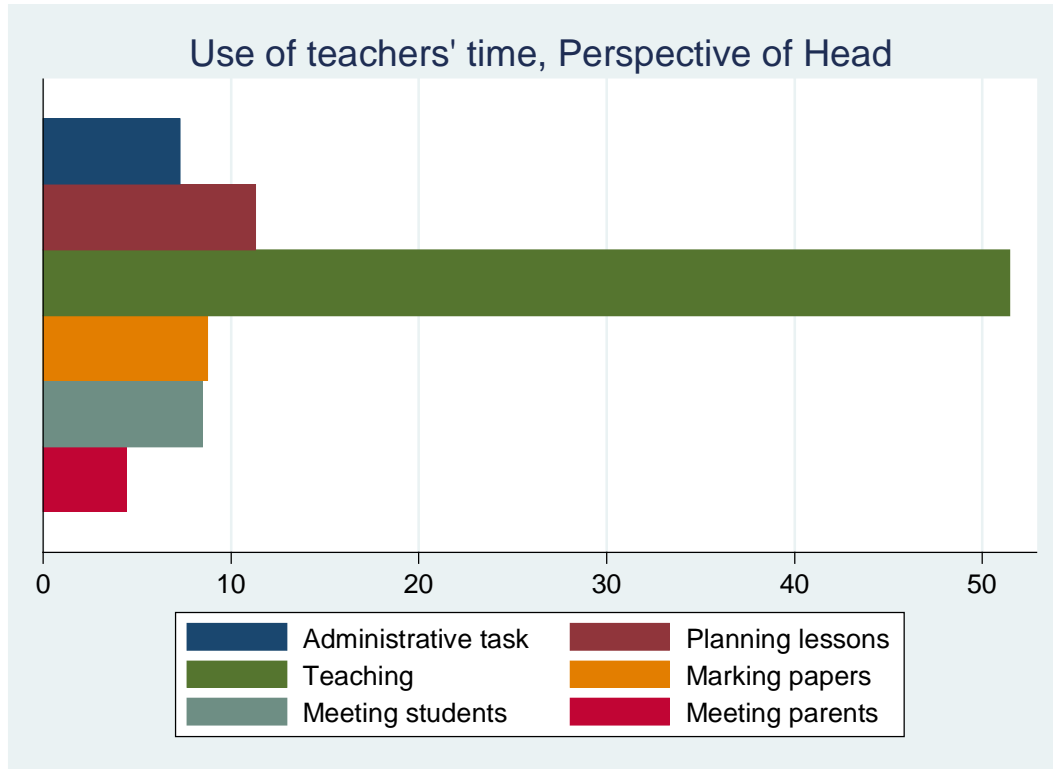


Self-reported teachers' education is similar to that reported by the school head, with the vast majority having at least the minimum qualification, holding a teacher's certificate. Average years of experience, however, is quite low, with the majority of teachers having less than five years overall teaching experience and more than half having been at their present school for less than three years (with 45% having been at the school for only one year). The implication is that teacher turnover is high, either because teachers are moving among schools or in and out of the teaching profession. It may also be the case that young teachers start out in the private sector and, when able to, move to the public sector, where job security and benefits are greater.





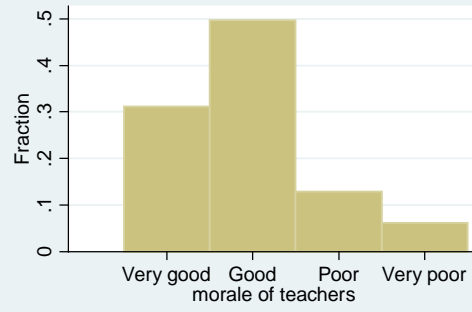
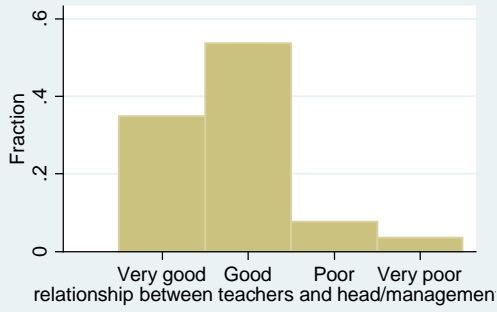
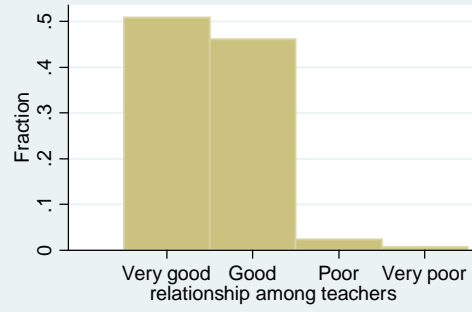
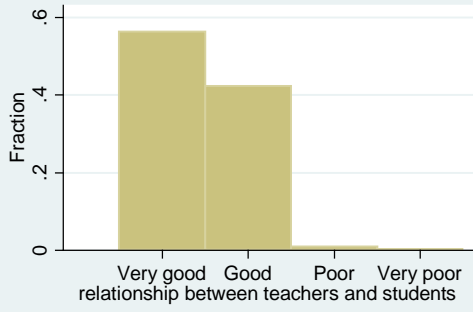
According to data collected from both teachers and school heads, teachers spend the majority of their time teaching, and less than 15% of their time in any other task. Preparing class lessons and marking papers together constitute between 25% and 30% additional time.



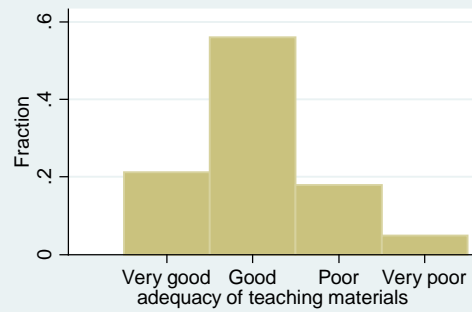
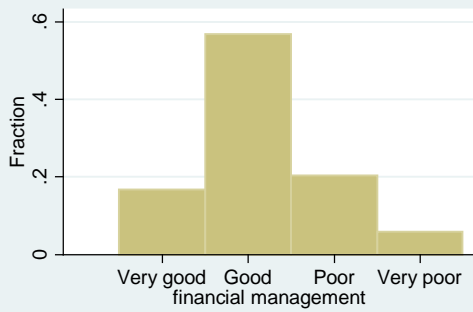
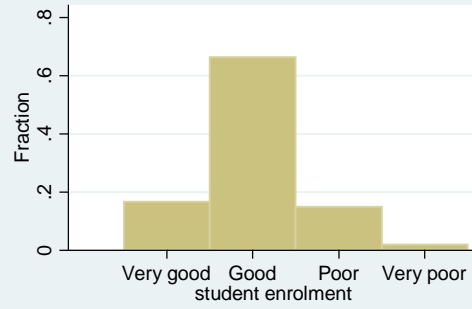
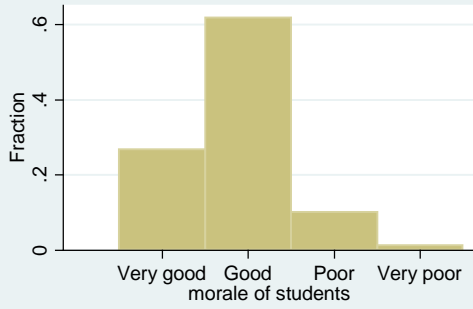
B. Teachers' perceptions of schools

Teachers' overall perceptions of their schools were good, with less than 15% reporting poor morale, and less than 10% reporting poor relationships with students and management, and among themselves.

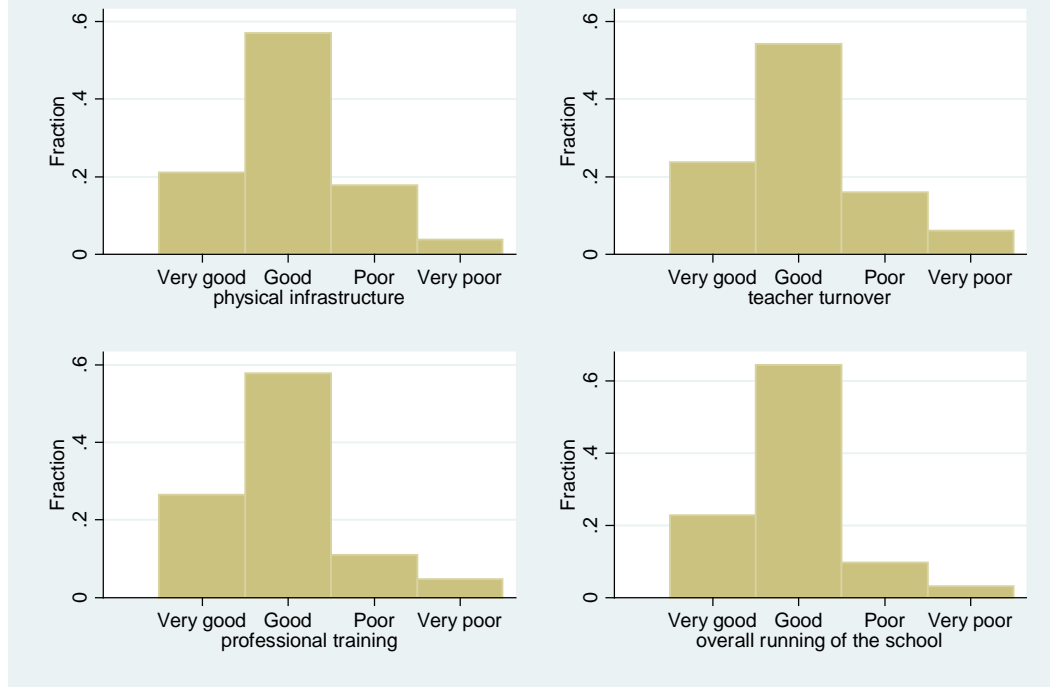
Perceptions about schools, teachers



Perceptions about schools, teachers (cont.)



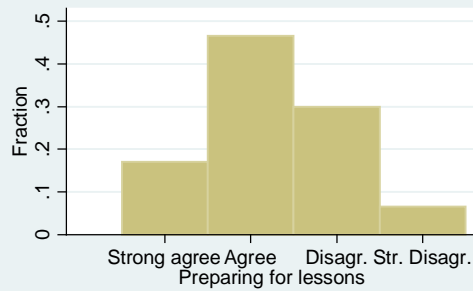
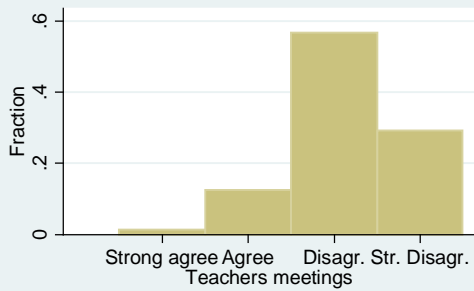
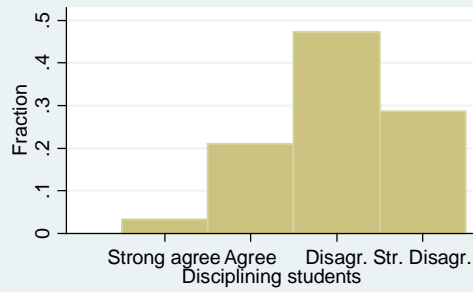
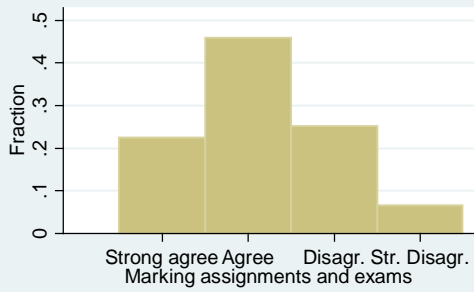
Perceptions about schools, teachers (cont.2)



Surprisingly, teachers' perceptions of schools were also positive for aspects of schools that are typically criticized, including, physical infrastructure and adequacy of teaching materials. Most teachers also felt that they received good professional training, even though more than 50% reported that they received no teacher training as part of their job (see graph below). One explanation for this last finding requires is that teachers were reluctant to express dissatisfaction with these aspects of their school, even in an anonymous survey. Another is that teachers misunderstood the question, perhaps taking it to mean the level of training of the staff and management, rather than the training provided by the school. (The question is worded as follows: "How would you rate your school on the following aspects:" What follows is a list of characteristics, one of which is "Professional training.") Training in curriculum development and teaching techniques, specific subject knowledge, and school management were the most sought-after types of training.

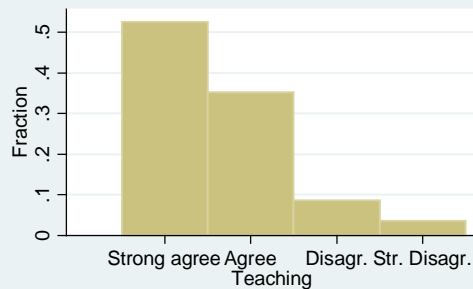
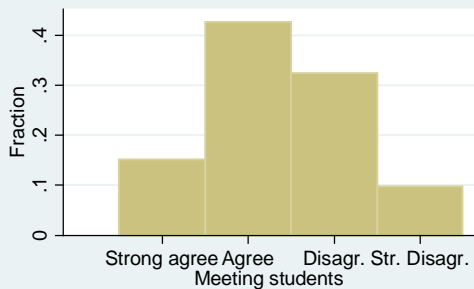
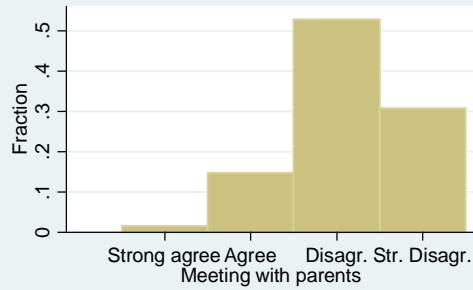
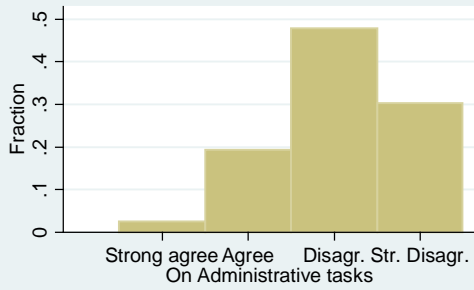
Perceptions about the school, teachers

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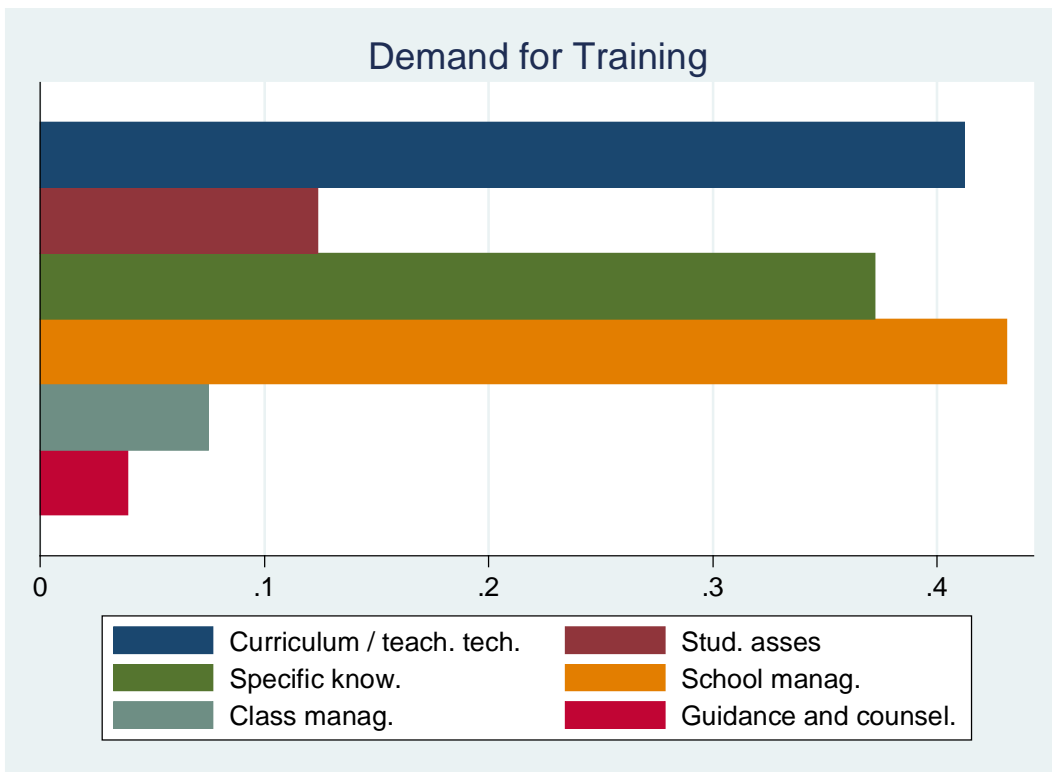
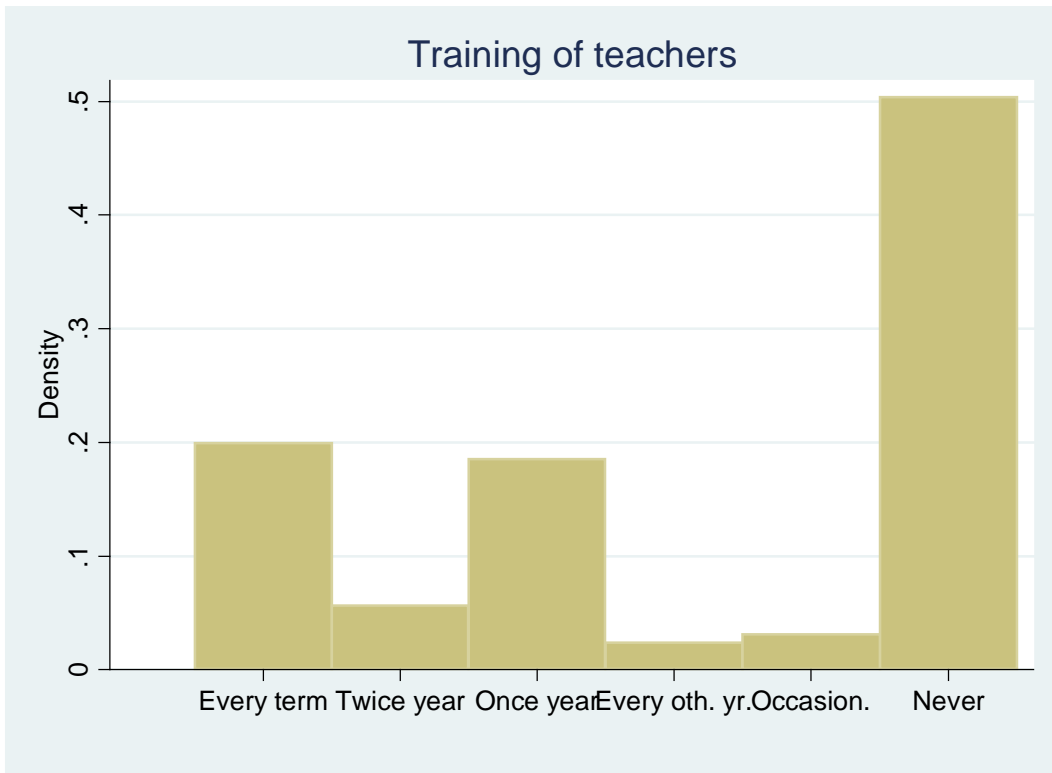
Perceptions about the school, teachers (cont.)

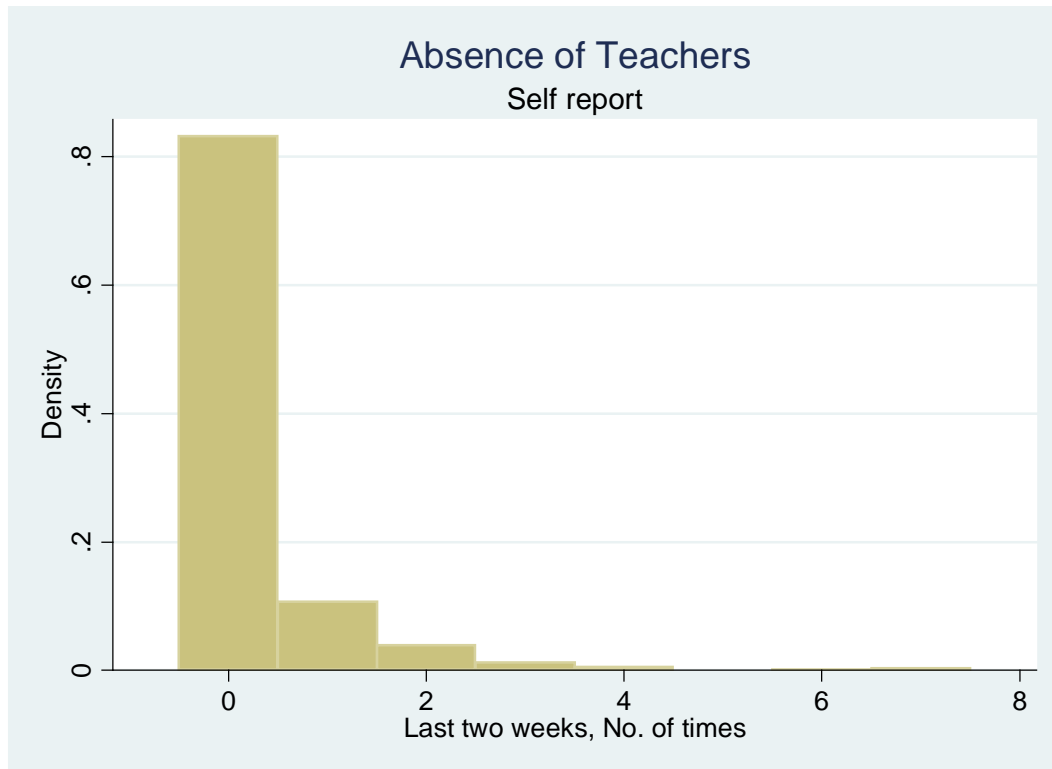
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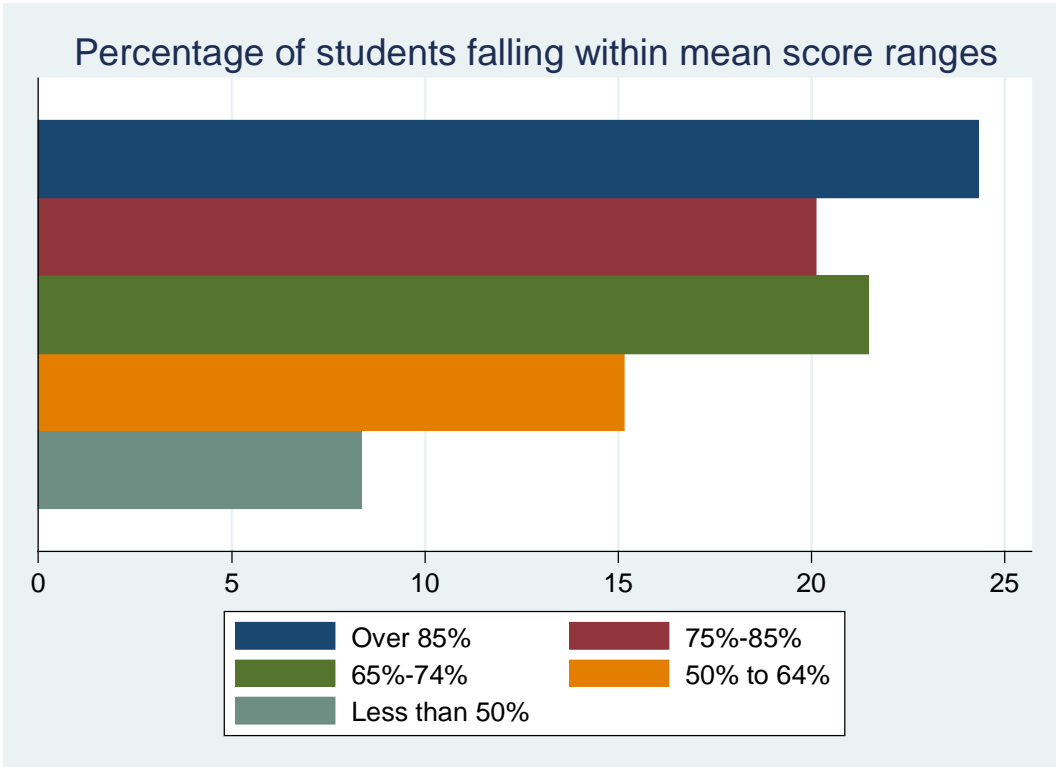
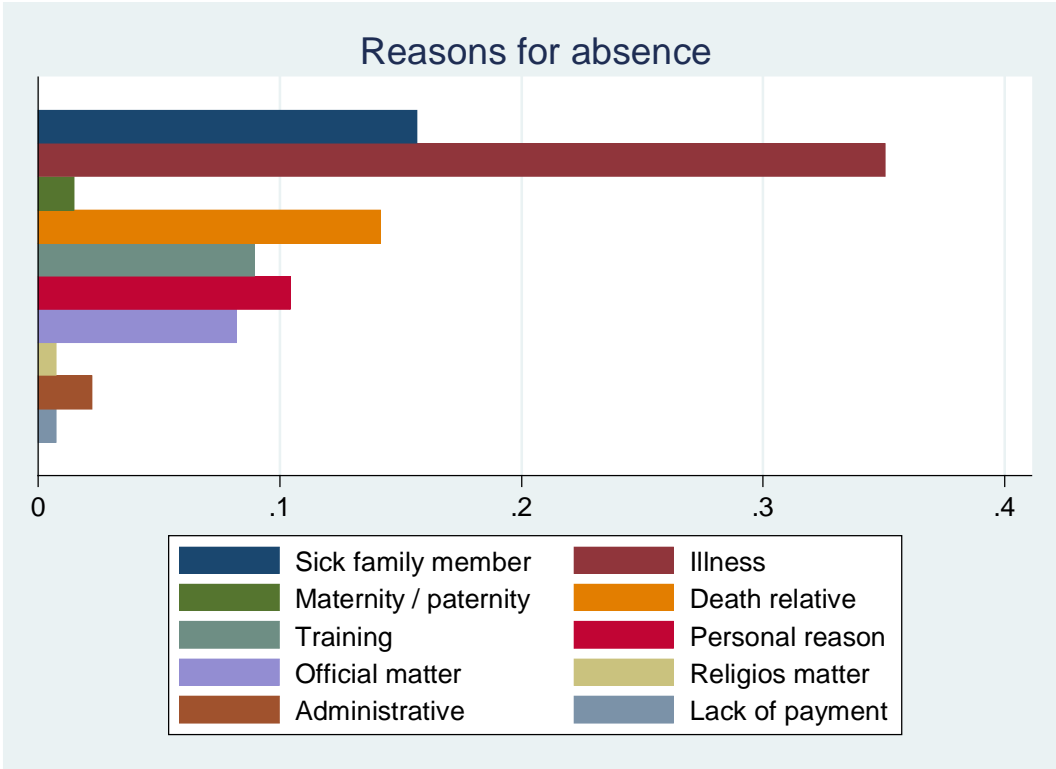
Finally, there was some evidence of teachers complaining about their allocation of time or workflow, with the majority claiming that they have to spend too much time meeting

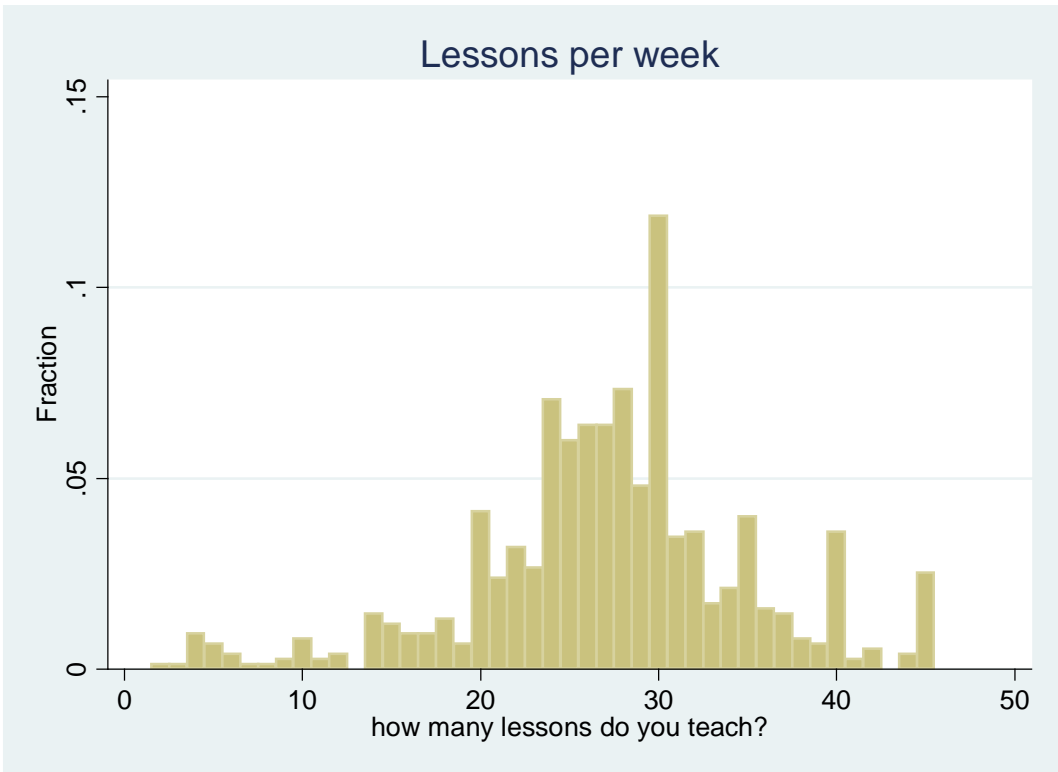
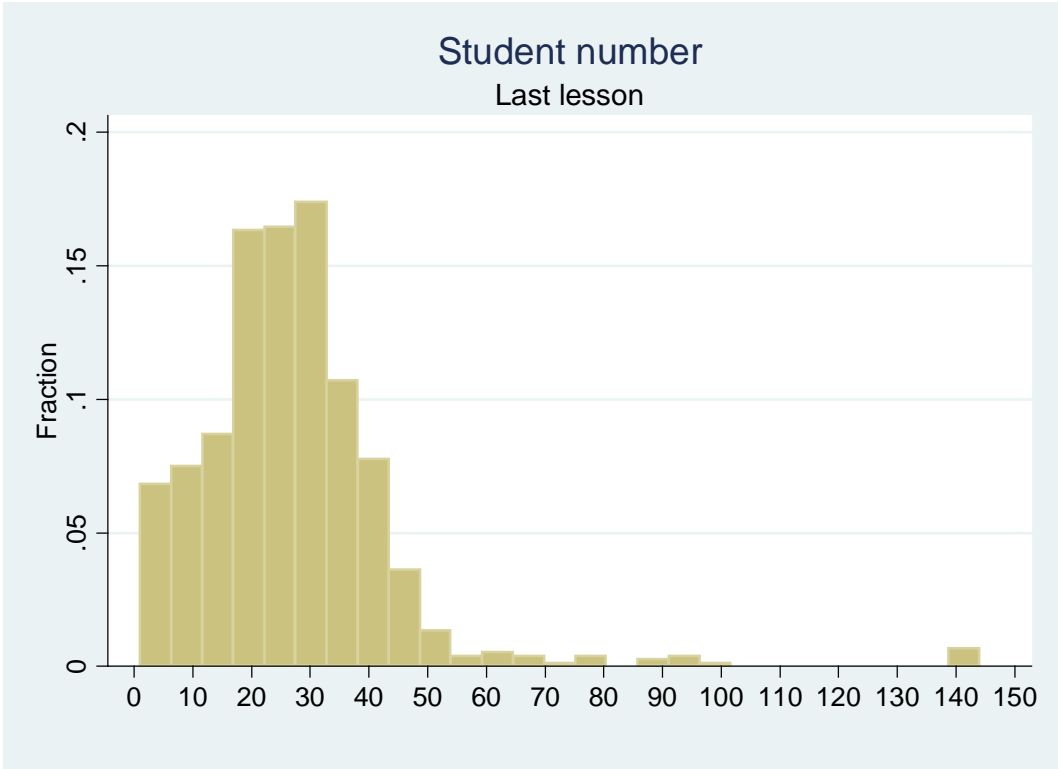
students, teaching, marking papers and preparing for lessons. Most (80%), however, did not feel overburdened by administrative tasks.





Approximately 82% of teachers reported that they had not missed a day in the past two weeks, which is at variance with the percentage reported by both school heads (about 50%) and students (about 70%). The most common reason for absence was personal illness.





Finally, teachers reported an average of 27 students per class, and teaching an average of 27 lessons per week. On one hand the student to teacher ratio seems low; for instance, Duflo et al (2008) reports an average class of size 83 students per teacher in Kenya's NGO schools. On the other, the high number of lessons taught per week is consistent with teachers' perception that they spend too much time teaching and meeting with students.

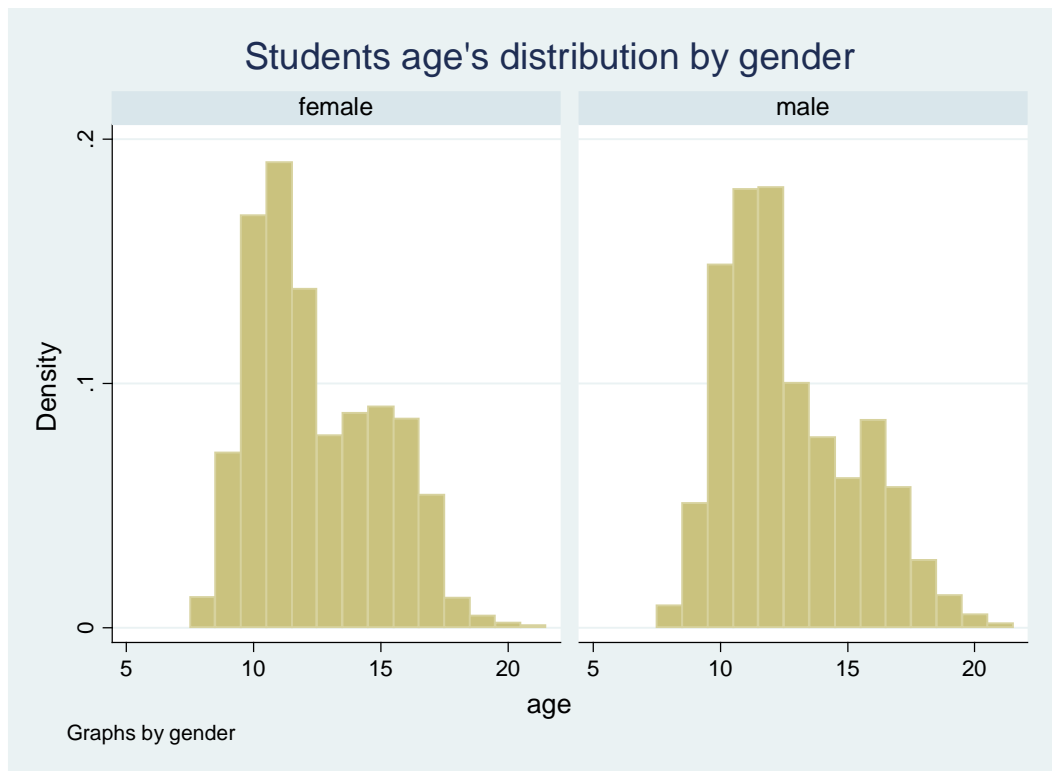
Teachers" characteristics			
	<i>Mean</i>	<i>Std. Dev</i>	<i>Obs.</i>
<i>Teachers characteristics</i>			
Age	30.56	(7.45)	785
Gender (female)	0.64	(0.48)	794
Secondary certificate	0.13	(0.33)	794
Teacher's college certificate	0.56	(0.50)	794
Teacher's college diploma	0.08	(0.28)	794
Post graduate diploma	0.04	(0.19)	794
University degree	0.18	(0.39)	794
Masters graduate	0.01	(0.11)	794
Years of experience	6.06	(5.97)	770
Number of lessons (week)	27.34	(7.68)	749
Marking	0.13	(0.09)	775
Teaching	0.49	(0.19)	781
Preparing class	0.14	(0.09)	773
Discipline	0.05	(0.07)	548
Meeting with parents	0.05	(0.07)	430
Administrative task	0.08	(0.09)	426
In teachers meetings	0.05	(0.06)	587
Meeting with students	0.07	(0.09)	647
<i>Classrooms</i>			
Homework, every lesson	0.30	(0.46)	798
Homework, every day	0.68	(0.47)	798
Number of students, last lesson	26.93	(16.92)	747
Absenteeism	0.17	(0.37)	798
80% students reached req. level of performance	0.27	(0.44)	798
50-80% students reached req. level of performance	0.60	(0.49)	798
<50% students reached req. level of performance	0.11	(0.30)	798

4. Student characteristics

The student questionnaire presents demographic characteristics, educational outcomes and perceptions of schools. The instrument also describes the main individual and household characteristics, which predict educational outcomes (Todd and Wolpin, 2003). The instrument includes questions about assets, family structure, parents' labor status, and parents' educational attainment.

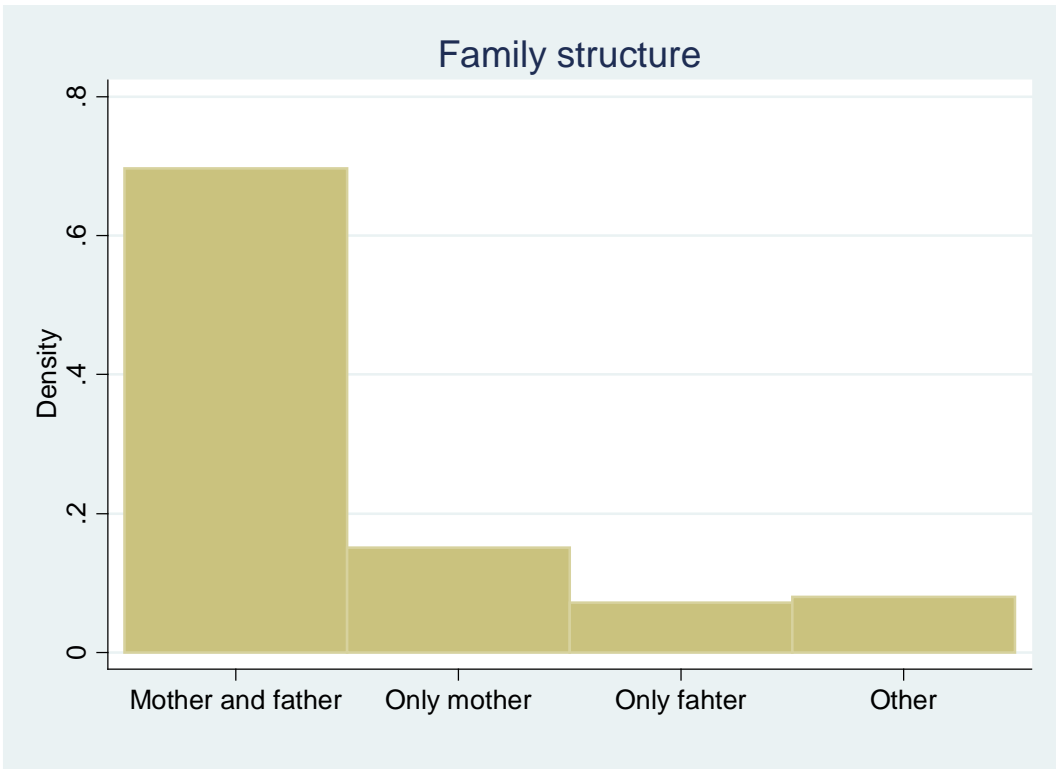
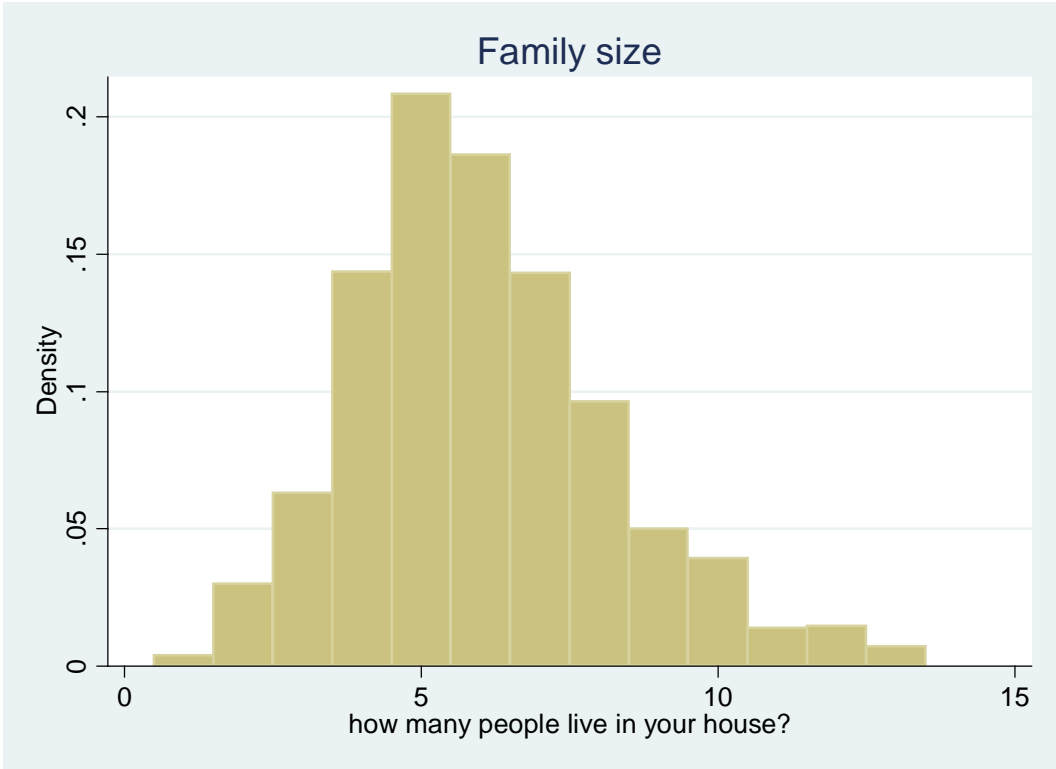
Students' educational outcomes are one of the main variables of study, since presumably the program has as its final objective the improvement of educational performance as well as the sustainability of the schools themselves.³ The instrument collected information about grade repetition, dropout rates, hours of study, student absenteeism, and test scores, among others. Also, the baseline provides information about the attitude of the students toward the school, which may potentially capture changes in the environment of the institution.

A. General characteristics of student and household



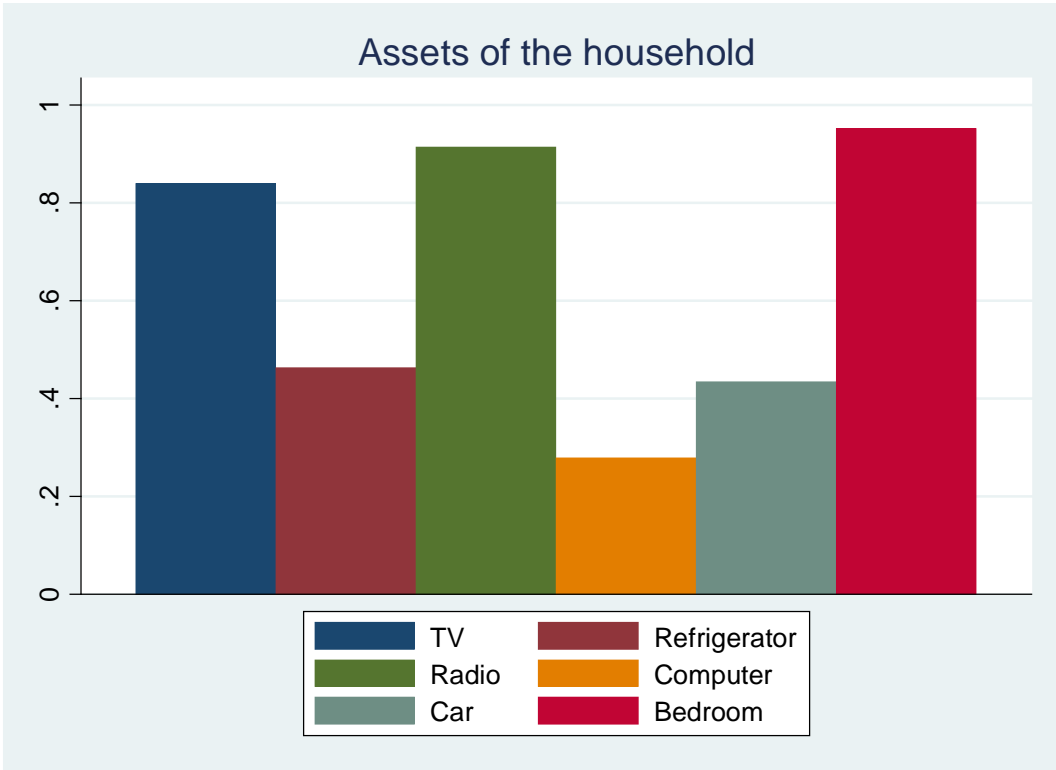
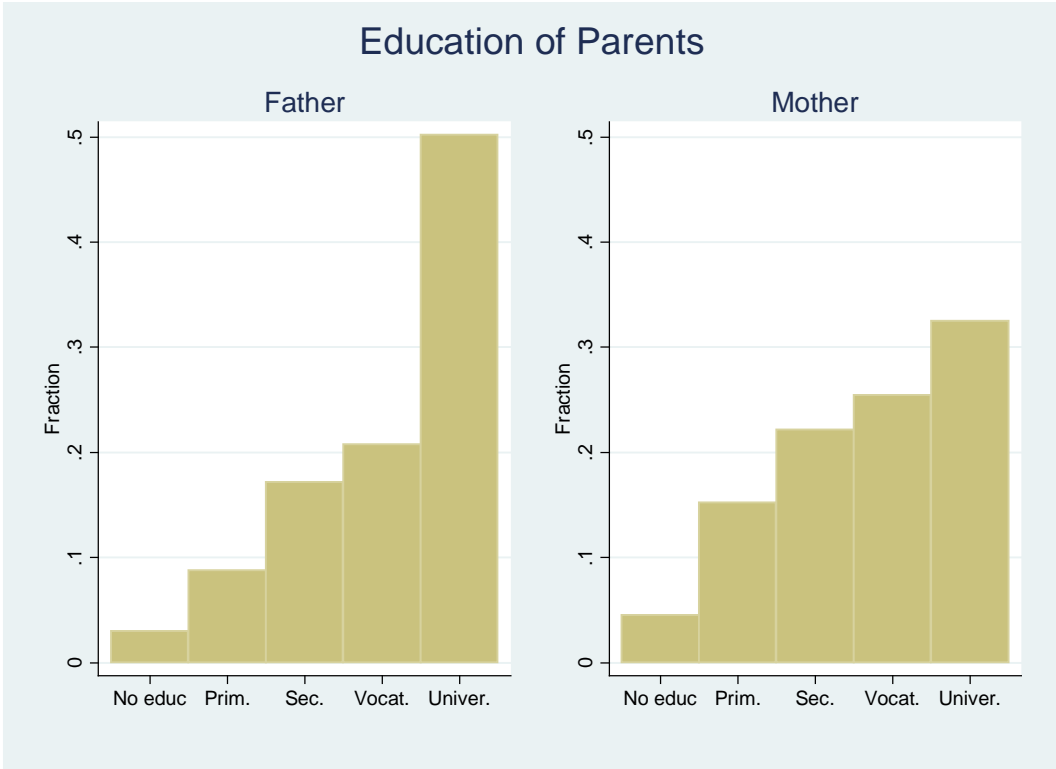
Our sample included 8,863 students, whose average age was 12.6 years and who were evenly divided by gender. Students came from households with an average of 6 members, and nearly 70% lived with both their mother and father.

³ Clearly, it is critical to understand the changes in inputs that may lead to these changes, and for that reason we collected all the detail information about teachers and school characteristics.



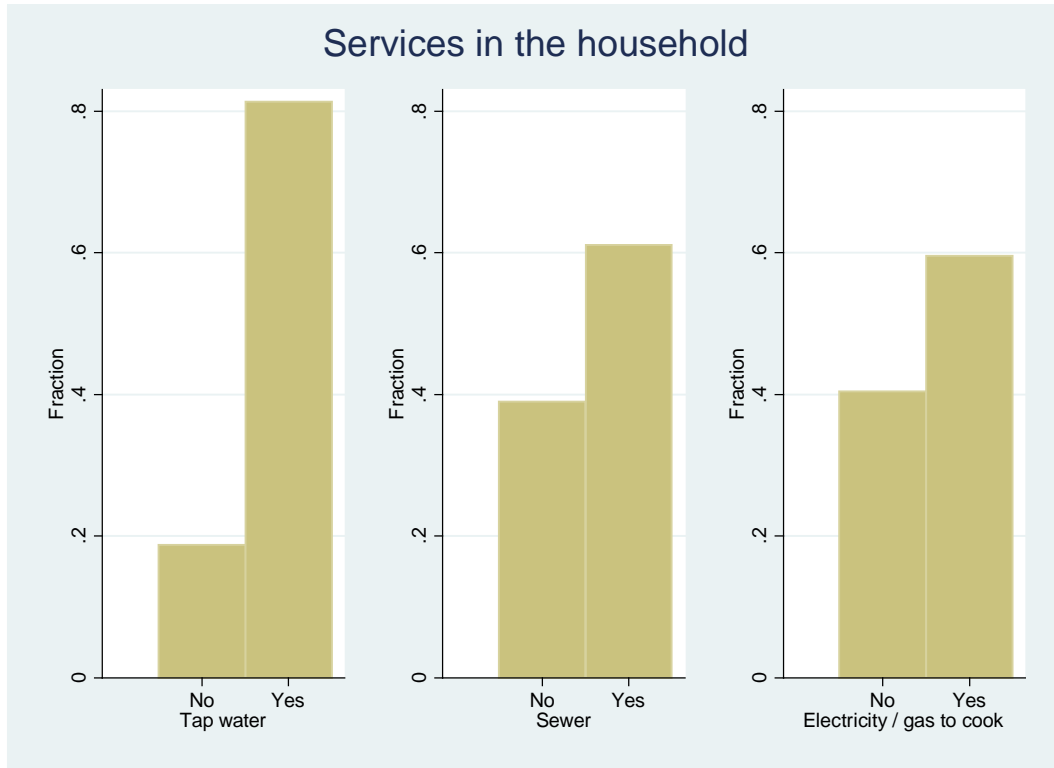


According to students, nearly 90% of fathers and 60% of mothers were employed outside of the home. Also according to students, parents are very highly educated, with half of all fathers having attained a university education and nearly one-third of all mothers. These figures are far in excess of tertiary enrollment rates for Kenya (recent figures cite gross tertiary enrollment at less than 5%).



About 65% of households had at least three assets (which we would expect with a better-educated population). More than 40% of households own cars and more than 80% own radios and televisions. The correlation between assets and education is quite high

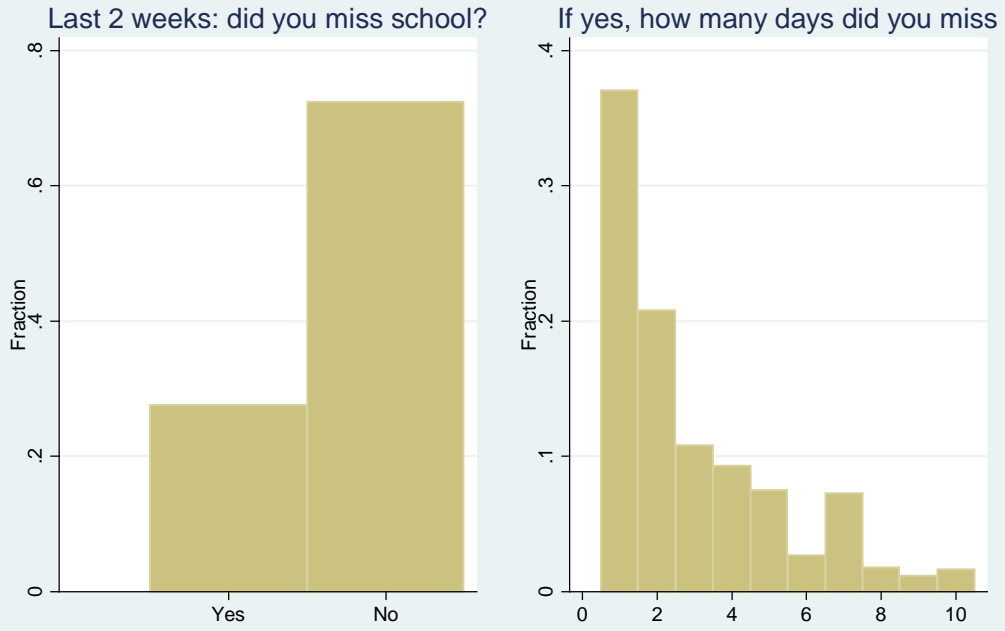
(coefficient of 0.044) and highly statistically significant (t-value of 41.18). In addition, more than 80% of households surveyed responded that they have tap water, and 60% sewer services and electricity or gas for cooking.



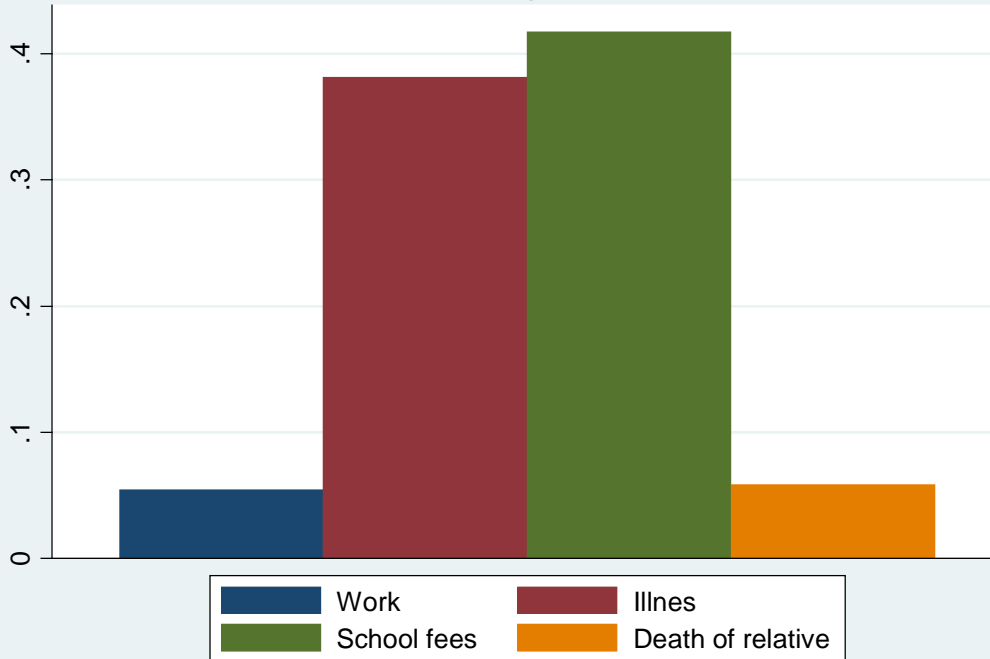
Finally, less than 3% of students reported working in addition to attending school (the figure is higher for students over the age of 14).

B. School

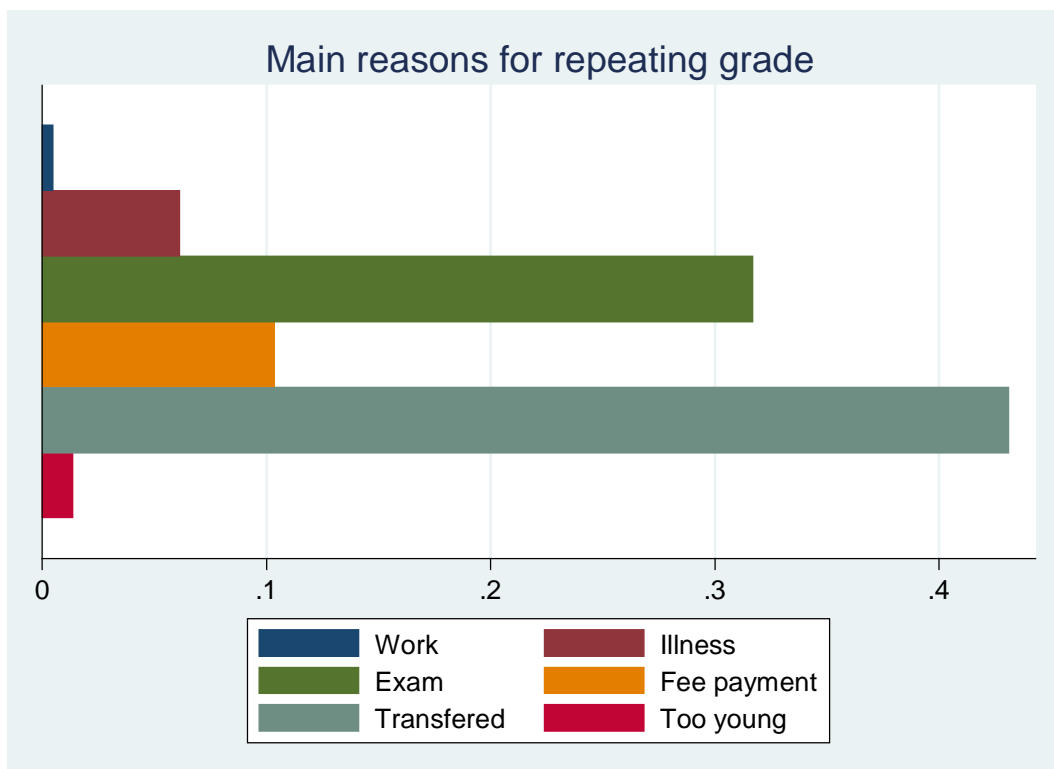
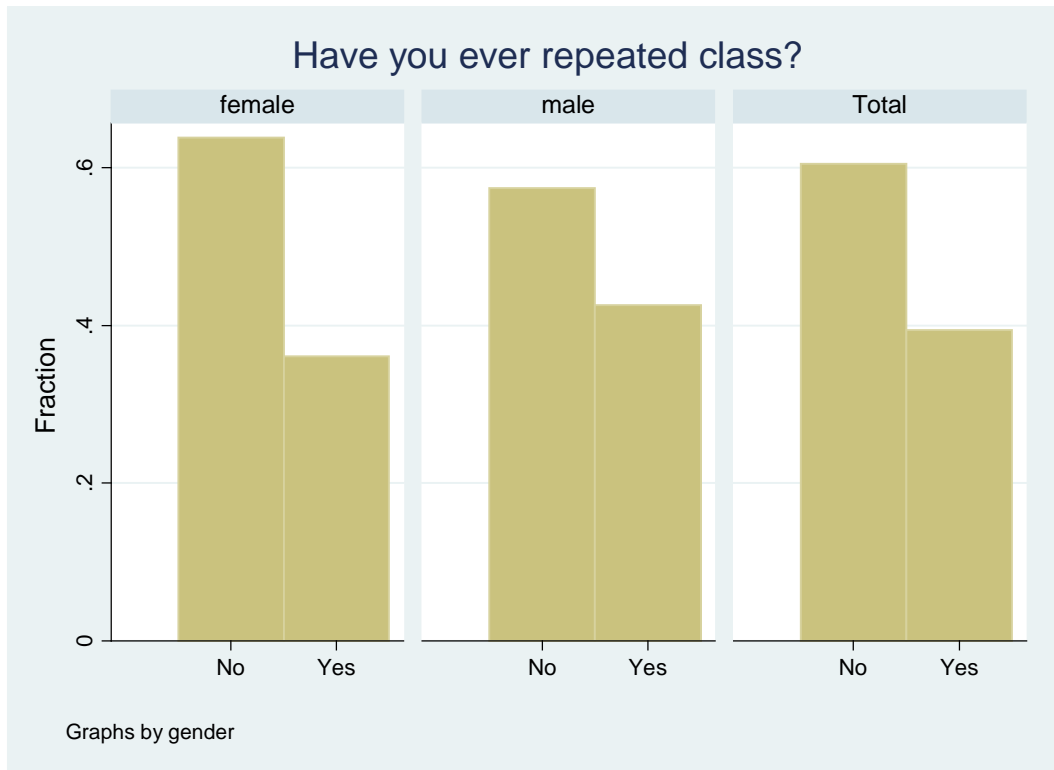
Students' attendance, self report



Reason for not attending school, last two weeks

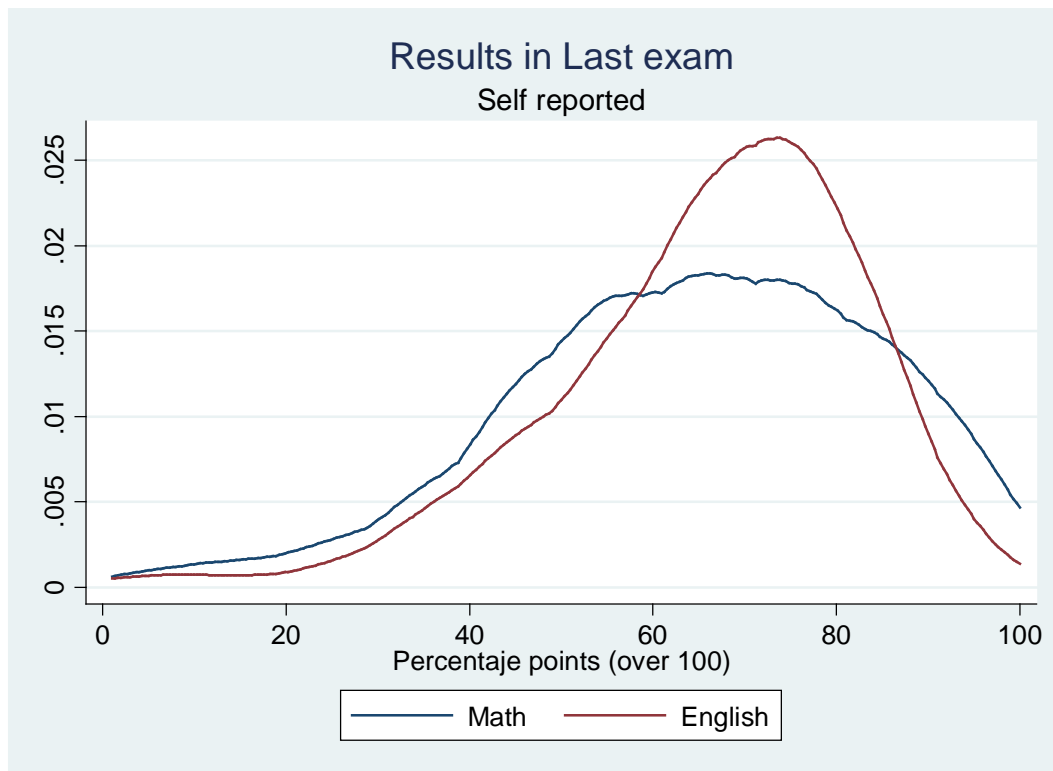


Approximately 25% of students reported missing at least one day of school in the past two weeks, the most common reason being the inability to pay school fees, and, only secondarily, illness.



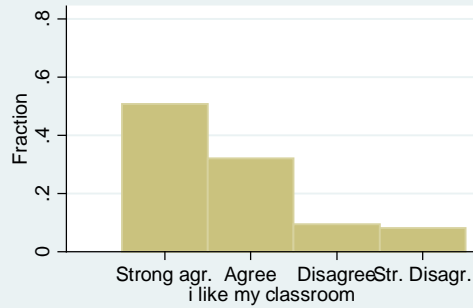
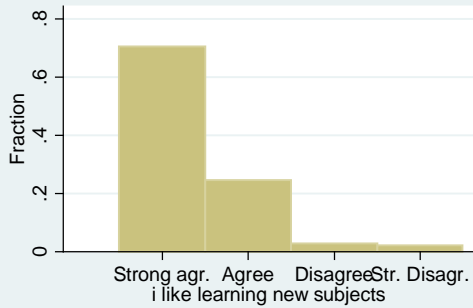
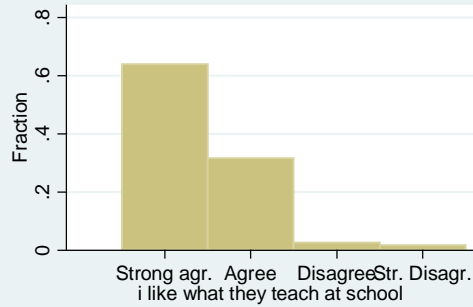
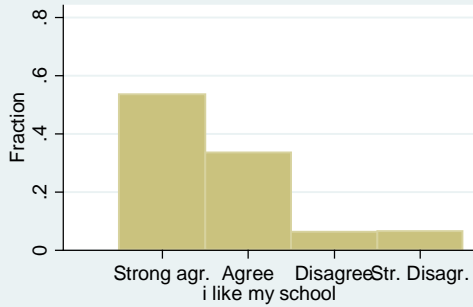
Nearly 40% of students claimed to have repeated at least one grade, despite that the reported repetition rate of school heads was less than 5 percent. Part of this difference is likely due to the fact that the main reason for repeating a grade is transfer to a new school, which would not be recorded as a repetition by the current school. Still, this is not the whole answer, as more than 30% cited academic reasons for repeating a grade. Interestingly, only 10% cited an inability to pay fees, even though this was the primary reason for absence.

Students also reported scoring roughly the same on English and math exams, with average scores of 64% and 66% respectively. However, the dispersion of scores was greater for math than for English.

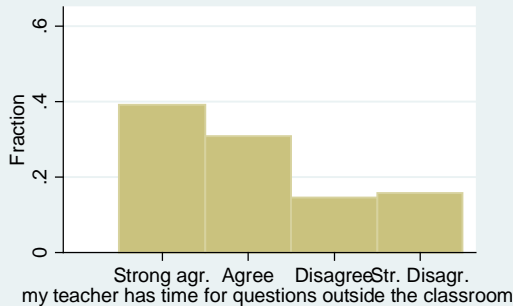
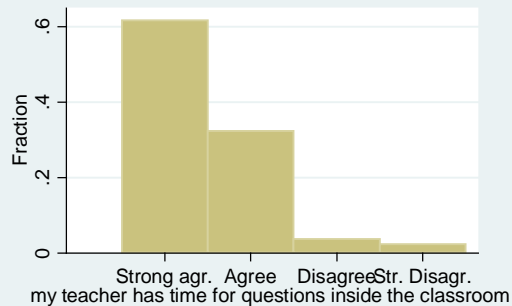
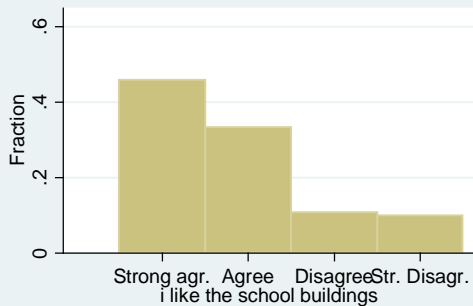


C. Perceptions of the school

Perceptions about the school

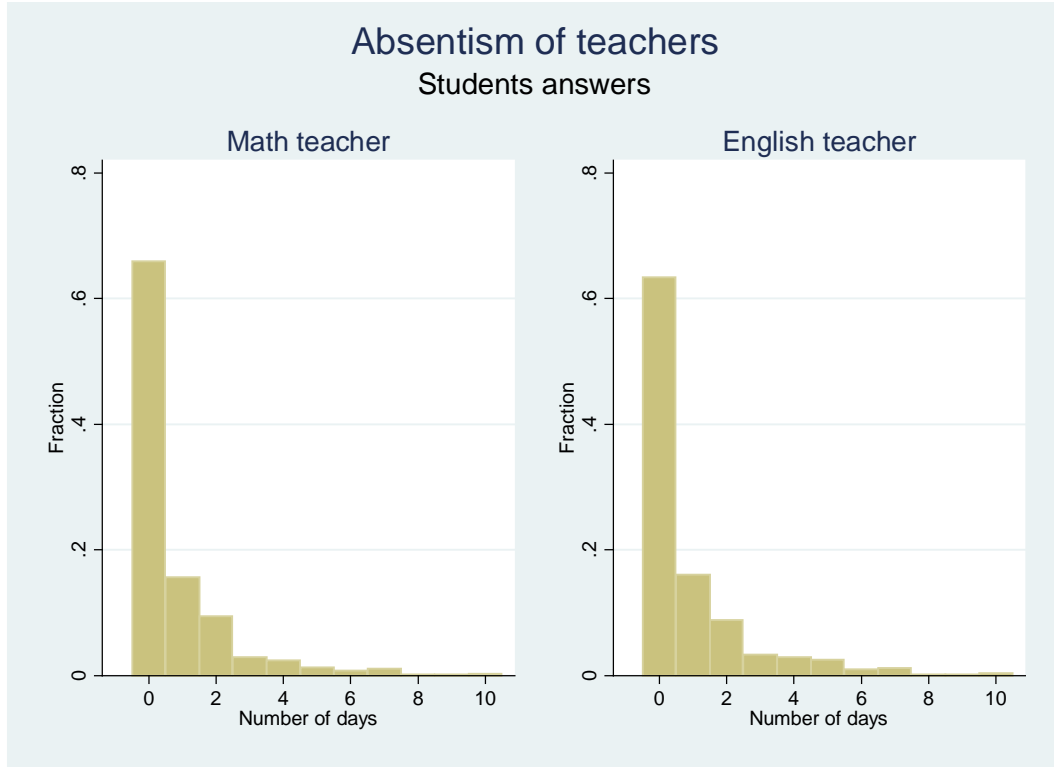


Cont, Perceptions about the school



The majority of students had favorable perceptions of their school, with more than 70% responding positively to most questions, including those about the physical facilities, learning, subjects taught, and their teachers. It is, however, instructive to look at the

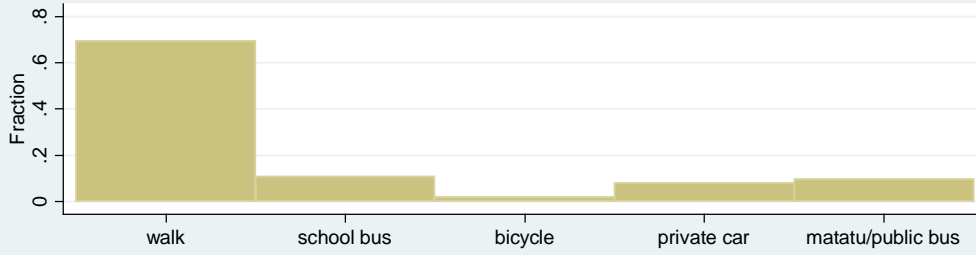
percentage of negative responses, in particular more than 30% claiming that their teacher does not have time for them outside the classroom, and about 20% expressing dissatisfaction with the school buildings.



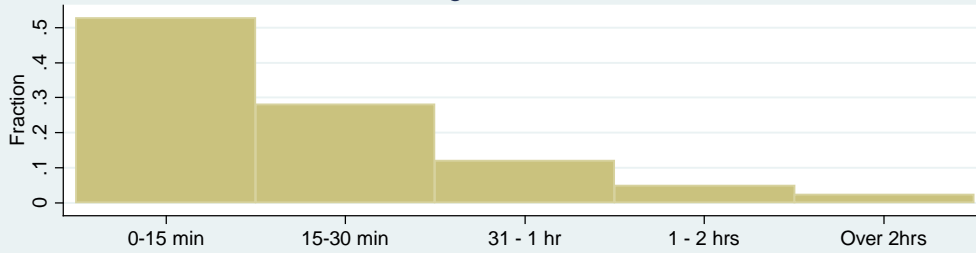
Approximately 30% of students reported that their math teacher had missed at least one day of school in the past week, and nearly 40% of students reported that their English teacher had missed at least one day. These figures are higher than those reported by teachers and on par with those reported by school heads.

Transportation to school

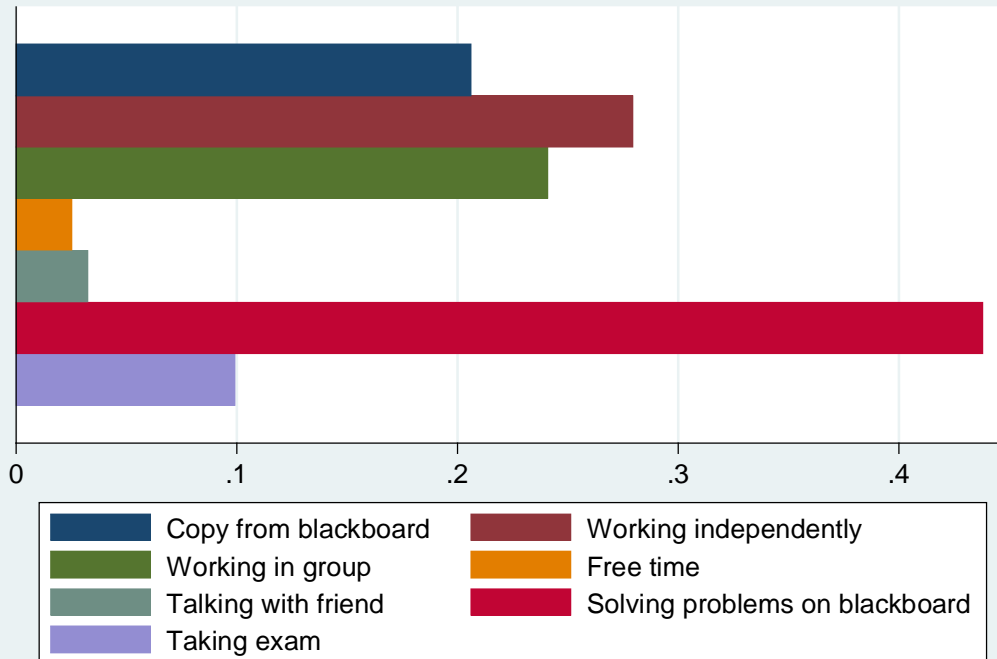
Means of transportation

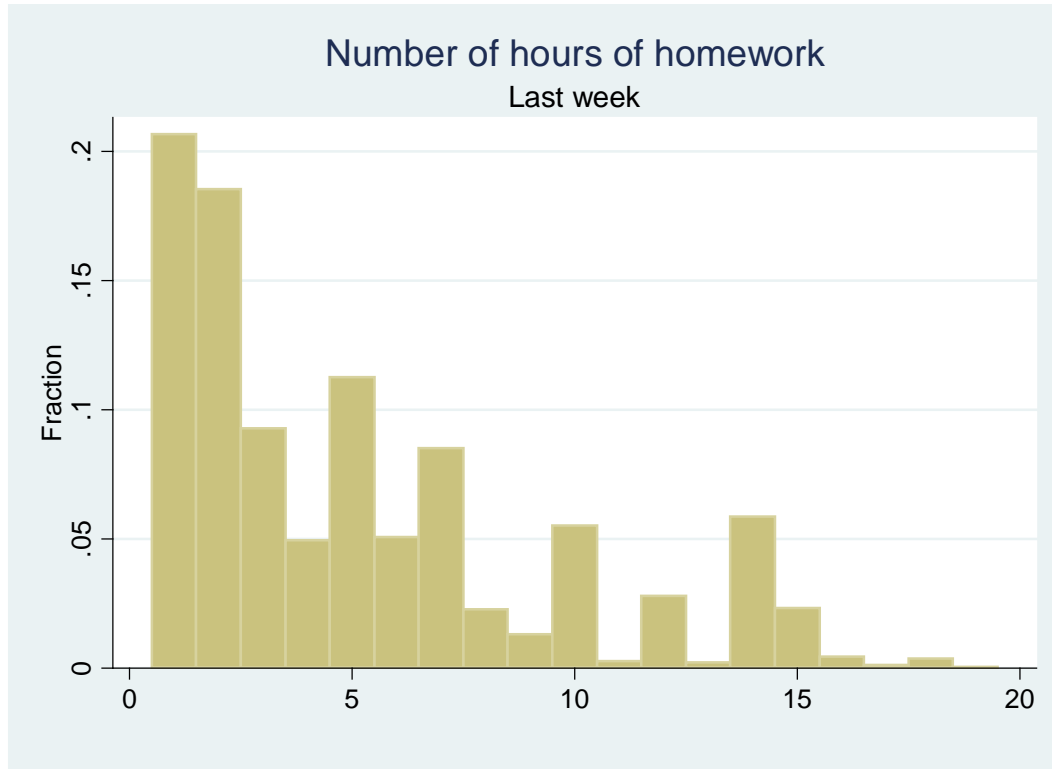


Average Time to School



Activities, last Math class





Students reported completing nearly 6 hours of homework per week and spending the majority of time in math class solving problems on the blackboard, working in groups and working independently.

Student characteristics

	Mean	Std. Dev	Obs.
<i>Student characteristics</i>			
Gender (female)	0.51	(0.50)	8863
Age	12.60	(2.57)	8207
Work for pay	0.03	(0.17)	8863
If yes, hours per week	12.30	(15.72)	182
Number in household	6.03	(2.19)	8104
Mother employment			
Self-employed	0.37	(0.48)	8067
Employee	0.37	(0.48)	8067
At home	0.27	(0.44)	8067
Father employment			
Self-employed	0.34	(0.47)	7272
Employee	0.61	(0.49)	7272
At home	0.05	(0.22)	7272
Mother education			
None	0.05	(0.21)	5816
Primary	0.15	(0.36)	5816

Secondary	0.22	(0.42)	5816
Vocational	0.25	(0.44)	5816
University	0.33	(0.47)	5816
Father education			
None	0.03	(0.17)	5650
Primary	0.09	(0.28)	5650
Secondary	0.17	(0.38)	5650
Vocational	0.21	(0.41)	5650
University	0.50	(0.50)	5650
<hr/>			
<i>Household characteristics</i>			
Household has:			
Television	0.84	(0.37)	8863
Refrigerator	0.46	(0.50)	8863
Radio/stereo	0.91	(0.28)	8863
Computer	0.28	(0.45)	8863
Car	0.43	(0.50)	8863
Bedrooms	0.95	(0.22)	8863
Asset index ⁴	0.65	(0.25)	8863
Tap water	0.81	(0.39)	8863
Sewer	0.61	(0.49)	8863
Cooking fuel	0.60	(0.49)	8863
If missed school, number of days in past two weeks	2.94	(2.27)	1949
Hours homework per week	5.87	(5.63)	6983
Ever repeated class	0.39	(0.49)	8863
Mark in math	64.54	(19.87)	8010
Mark in English	66.11	(16.42)	7993

⁴ Asset index is equal to total number of assets in the household divided by 6.

5. Further comments on the data

The data collected in the baseline survey provides a valuable snapshot of a segment of the private school sector in Kenya, particularly that that serves the low- and middle-income population. The data, however, raise a number of questions that are pertinent to our understanding of the sector and critical for judging the impact of the KPSSP. The first issue concerns the evident contradictions in the information provided by the surveyed parties, particularly concerning repetition and dropout rates, and the associated reasons, and teacher absenteeism. These are important variables affecting school quality and sustainability; the differing values reported by school heads, teachers and students highlight not only the need to look more closely at school performance in these respects, but also the need to establish a reliable tracking mechanism to gather accurate data, if only for the schools' own self-knowledge.

A second issue concerns findings in the data that call for deeper inquiry to determine whether certain school or teacher characteristics are most effective for the schools. For example, are limited liability companies or joint proprietorships appropriate structures for most of these schools? Are the decision-making systems—which vary widely across schools—efficient? Why is teacher tenure at most of the schools so low, and why are schools relying on a fairly inexperienced teaching pool? What are the implications of these characteristics for education quality and for the sustainability of the schools?

A third issue that must be examined is the credibility of some of the data. For example, the high percentage of fully qualified teachers seems at odds with reports on the quality of teachers overall in Kenya. Likewise, the reported educational attainment of parents is far in excess of even middle-income families in the country. Finally, overwhelming teacher and student contentment with the schools should be examined.

Another objective of the data was to validate the randomization of the impact evaluation exercise.⁵ Given the current situation of the program, the team decided to perform a case study analysis for the follow up. In short a series of case studies are now being undertaken which will focus on several of the issues highlighted here. In addition to correcting or verifying some of the information gathered for this report, these case studies will present a dynamic view of how these variables shape the schools and how the KPSSP influences this process.

⁵ Nonetheless, the exercise of validations was carried out. Overall, the sample presented a balanced group among non-invited and invited institutions. The technical details are presented in Appendix 1.

References

- Abadzi, H. 2006. *Efficient Learning for the Poor*. The World Bank, Washington, DC.
- Barrera-Osorio, F., T. Fash, H. A. Patrinos. 2009. *Decentralized Decision-Making in Schools*, Direction in Development Human Development, The World Bank, Washington, DC.
- Chaudhury, N., J. Hammer, M. Kremer, Karthik Muralidharan, and F. Halsey (2008) "Missing in Action: Teacher and Health Worker Absence in Developing Countries," forthcoming, *Journal of Economic Perspectives*.
- Hanushek, E.A. (2003). "The failure of input-based schooling policies". *Economic Journal* 113 (485, February), F64–F98.
- Hanushek, E. A. (2006) "School Resources" pp 865-908, in the *Handbook on the Economics of Education* (ed. By E.A. Hanushek and F. Welch). Amsterdam: Elsevier, 2006. Volume 2.
- Murnane R. J. and R. R. Nelson, 2007. "Improving the Performance of the Education Sector: The Valuable, Challenging, and Limited Role of Random Assignment Evaluations," *Economics of Innovation and New Technology*, Taylor and Francis Journals, vol. 16(5), pages 307-322
- Pandey, P., S. Goyal, Sangeeta and V. Sundararaman. 2008. "Community participation in public Schools : the impact of information campaigns in three indian states" Policy Research Working Paper WPS 4776, The World Bank, Washington, DC
- Duflo, Esther, Pascaline Dupas, and Michael Kremer (2007), "Peer Effects, Pupil-teacher Ratios, and Teacher Incentives," mimeo, Harvard University
- Kremer, Michael and Daniel Chen (2001), "Interim Report on a Teacher Incentive Program in Kenya," mimeo, Harvard University.
- Duflo, Esther, Rema Hanna, and Stephan Ryan (2007), "Monitoring Works: Getting Teachers to Come to School," NBER Working Paper No. 11880.
- Kremer, M. and A. Holla. 2008. "Pricing and Access: Lessons from Randomized Evaluations in Education and Health", mimeo, Harvard university.
- Todd, P.E. and K. I. Wolpin. 2003. "On The Specification and Estimation of The Production Function for Cognitive Achievement" *Economic Journal*, Vol. 113, Issue 485, pp. F3-F33
- Duflo, E., R. Glennerster and M. Kremer. 2006. "Using Randomization in Development Economics Research: A Tool Kit" NBER Working Paper No. T0333

Appendix 1. Validation of the randomization

The nature of the risk-sharing agreement between IFC and K-Rep did not allow for randomization of loan recipients. However, we were able to use participation in an introductory workshop as the identification mechanism. The general idea is that the invitation to the short workshop is randomized, based on a master list of private schools in Kenya. In short, the strategy to assign causation follows an encouragement design: as long as the loan take up rate of the schools invited to the workshop group is higher than that of schools that were not invited, the randomized invitation can be used as an instrument to estimate the effect of the program (e.g., the loan *and* the TA provided by IFC).

This validation is performed by assessing whether the encouraged and not-encouraged groups have the same observable characteristics (for the general description of this type of validation, see Duflo, Glennerster and Kremer 2006). The strategy to establish similarities between the two groups is given by the following equation to estimate:

$$X_i = \beta_0 + \beta_1 * T_i + \varepsilon_i \quad (1)$$

where X_i is an observable characteristic of the specific unit of observation i —school, teacher or student—, T_i is an indicator variable equal to one if the school was invited to the short workshop and zero otherwise. If the randomization is valid, $\hat{\beta}_1 = 0$, e.g., there will be no systematic differences between encouraged schools and “control” schools.

It is entirely possible, and highly likely, that K-Rep will lend to schools that do not participate in the TA program. That is, the TA is in no way obligatory for a school wishing to obtain a loan. As long as a school meets the basic lending criteria, K-Rep can extend a loan, and that loan will be included under the risk-sharing agreement.

The master list of private schools comes from three sources: the membership list of the Kenya Private Schools Association, the list of registered and non-formal schools obtained from the Ministry of Education, and the list of non-formal schools obtained from the Kenya Independent School Association (receipt of this list is still pending). The total number of schools on the master list is around 2,000.

The project team based in Kenya attempted to contact each school on the master list directly by phone and through newspaper ads. Schools with which no contact could be made were dropped from the list. Based on that list, the evaluation team performed a randomization, in which 97 schools were invited to the seminar and 94 were not. The distribution of schools across regions followed the distribution of the master list (Table 1). The distribution reflected the number of workshops in each area. However, the survey company was unable to find all the target schools, especially in Nairobi. The actual sample of the survey included 142 schools, 48 fewer than the intended target due to inability to find the school. Also, a small number of schools were public schools, and therefore not eligible to enter the program. Table 1 shows that on average the percentage

loss of target schools in the sample is 67% for the control group and 69% for the treatment group.

Table 1. Randomization and data sample

	Randomization sample		Data sample			
	Control	Treatment	Control	%	Treatment	%
Mombasa	18	19	15	0.83	17	0.89
Nairobi	40	40	22	0.55	29	0.73
Nakuru	18	19	11	0.61	11	0.58
Nyeri	18	19	15	0.83	10	0.53
Total	94	97	63	0.67	67	0.69

In this section we assess whether equation 1 holds in the baseline sample. The section is divided by unit of analysis—schools, teachers and students.

A. School balance.

Table 2 presents the result of the estimation of equation 1 for school-level characteristics. The first column shows the means and standard deviations of several characteristics of the non-invited schools; the second column shows the results for the invited schools. The last column presents differences in means, and standard errors that allows t-tests of differences between non-invited and invited schools.

For example, in 2005, the average enrollment for the group of schools that were not invited to the short workshop is 144.53, whereas the figure for the invited institutions is 155.2. The mean difference, estimated by a regression of equation 1, is 10.67, a difference that is not statistically significant.

In general, table 2 shows that the non-invited and the invited schools present, on average, similar characteristics. It is important to keep in mind that the number of observations is, in the best case scenario, 142 schools, implying that the precision of the estimator is low (e.g., standard errors may be large). Nonetheless, we find that on average only one characteristic—the number of support staff—differed between non-invited and invited schools.

Table 2

Balance of sample: Schools characteristics

	Non-invited	Invited	Difference
<i>Students and teachers</i>			
Students 2005	144.53 (154.19)	155.2 (170.79)	10.67 (31.57)
Students 2006	153.68 (153.32)	174.2 (179.10)	20.52 (32.02)
Repeaters 2005	2.89 (12.57)	2.34 (5.36)	-0.55 (1.83)
Repeaters 2006	3.25 (14.41)	8.7 (43.19)	5.44 (6.35)
Dropout 2005	10.14 (12.40)	8.02 (8.89)	-2.12 (2.07)
Dropout 2006	11.49 (14.77)	9.43 (11.09)	-2.06 (2.49)
Number of support staff	9.55 (12.58)	5.75 (6.92)	-3.80** (1.89)
Number of teachers	17.62 (16.16)	14.84 (12.38)	-2.77 (2.67)
<i>Infrastructure</i>			
Age of schools	8.49 (8.60)	8.66 (5.96)	0.17 (1.39)
Classrooms	11.13 (6.64)	10.12 (4.90)	-1.01 (1.08)
Toilets	14.53 (15.05)	10.95 (8.41)	-3.59 (2.27)
Desk	177.53 (170.00)	159.46 (190.66)	-18.08 (33.36)
Computers	5.82 (10.06)	4.93 (10.94)	-0.89 (1.94)
Library books	162.43 (310.20)	127.31 (195.94)	-35.13 (52.12)
<i>Systems and governance</i>			
Syst. Accounts	0.35 (0.48)	0.35 (0.48)	0 (0.09)
Syst. Payroll	0.45 (0.50)	0.44 (0.50)	-0.01 (0.09)
Syst. Payment	0.42 (0.50)	0.33 (0.48)	-0.08 (0.09)
Syst. Student Records	0.35 (0.48)	0.4 (0.49)	0.05 (0.09)
Board of directors	0.58 (0.50)	0.54 (0.50)	-0.04 (0.09)
<i>Finances</i>			
Revenues 2005	3908.08 (5481.48)	3497.74 (5722.53)	-410.34 (1302.38)
Revenues 2006	4237.69 (5995.67)	3571.16 (5553.27)	-666.53 (1299.68)
Cost 2005	5006.39	3301.9	-1704.49

	(8534.72)	(5687.53)	(1701.41)
Cost 2006	5999.45	3512.8	-2486.66
	(9111.88)	(5411.68)	(1737.80)
Average fees, primary	24.71	9.22	-15.49
	(106.72)	(15.74)	(17.28)
Percentage unable to collect	48.57	46.25	-2.32
	(20.64)	(24.47)	(4.18)
Demand for loan	0.8	0.84	0.04
	(0.40)	(0.37)	(0.07)

***, **, and * denote significance at 1, 5 and 10 percent levels, respectively

Parenthesis: for means, standard deviation; for difference, standard errors

B. Teacher balance

The analogous exercise for teachers is presented in Table 3. The sample size is approximately 798 teachers, allowing us to have more precision in the estimators.

Table 3 shows statistically significant differences between invited and non-invited schools in four characteristics. The non-invited schools tend to have more educated teachers (invited schools have 6% more teachers with only a secondary education, and 2% fewer teachers with master degrees). Also, teachers in invited schools tend to spend more time teaching (4%) and have lower absenteeism. On average, these differences are very small if they are compared to the standard deviation. For the remaining 10 variables, we were not able to find statistically significant differences between the two groups of schools.

Table 3.

Balance of sample: Teachers			
	Control	Treatment	Difference
<i>Characteristics of teachers</i>			
Age of teacher	30.47 (7.63)	30.11 (7.10)	-0.36 (0.56)
Gender	0.62 (0.49)	0.65 (0.48)	0.04 (0.04)
Secondary education	0.1 (0.30)	0.16 (0.37)	0.06** (0.03)
College certificate	0.55 (0.50)	0.58 (0.49)	0.03 (0.04)
College diploma	0.1 (0.30)	0.07 (0.26)	-0.03 (0.02)
Post graduate diploma	0.04 (0.20)	0.03 (0.16)	-0.02 (0.01)
University degree	0.19 (0.39)	0.16 (0.37)	-0.02 (0.03)
Masters graduate	0.02 (0.14)	0 (0.00)	-0.02*** (0.01)
Experience	6.24 (6.43)	5.61 (5.53)	-0.63 (0.46)
<i>Teaching</i>			
Number of Lessons	26.89 (6.99)	27.51 (8.18)	0.62 (0.59)
% of time in teaching	0.47 (0.19)	0.5 (0.18)	0.04*** (0.01)
% of time in admo.	0.08 (0.10)	0.08 (0.08)	0 (0.01)
Students last class	25.63 (13.22)	27.57 (20.15)	1.94 (1.34)
Absenteeism	0.19 (0.40)	0.15 (0.35)	-0.05* (0.03)

***, **, and * denote significance at 1, 5 and 10 percent levels, respectively

Parenthesis: for means, standard deviation; for difference, standard errors

C. Student balance

Finally, Table 4 presents the same data for 13 variables included in the student questionnaire. In this case, the sample size is 8,863 observations, and the gains in precision are high. We observe some differences between the two groups of schools. First, students in the invited schools have, on average, parents with less education; lower family income (as captured by the asset index and cooking); higher repetition rates; and higher grades.

Table 4.

Balance of sample: Students

	Control	Treatment	Difference
<i>Demographics</i>			
Age	12.85 (2.56)	12.53 (2.62)	-0.33*** (0.06)
Work for payment	0.02 (0.16)	0.04 (0.19)	0.01*** (0.00)
Family size	6.04 (2.20)	6.07 (2.21)	0.03 (0.05)
Father no educ	0.03 (0.17)	0.03 (0.18)	0 (0.00)
Father primary educ	0.08 (0.27)	0.11 (0.31)	0.02*** (0.01)
Father second. educ	0.17 (0.37)	0.19 (0.39)	0.02* (0.01)
Father vocational educ	0.21 (0.41)	0.2 (0.40)	0 (0.01)
Father university educ	0.51 (0.50)	0.47 (0.50)	-0.04*** (0.01)
Mother no educ	0.05 (0.22)	0.05 (0.21)	-0.01 (0.01)
Mother primary educ	0.14 (0.35)	0.18 (0.39)	0.04*** (0.01)
Mother second. educ	0.21 (0.41)	0.24 (0.43)	0.03** (0.01)
Mother vocational educ	0.26 (0.44)	0.24 (0.43)	-0.02* (0.01)
Mother university educ	0.34 (0.47)	0.29 (0.46)	-0.04*** (0.01)
<i>Household infrastructure</i>			
Asset index of the hh	0.66 (0.25)	0.63 (0.25)	-0.04*** (0.01)
Tap water	0.59 (0.49)	0.59 (0.49)	0 (0.01)
Sewer	0.51 (0.50)	0.5 (0.50)	-0.01 (0.01)
Cook (elect or gas)	0.2 (0.40)	0.18 (0.38)	-0.03*** (0.01)
<i>Schooling</i>			
Days absent last two weeks	0.73 (1.74)	0.7 (1.63)	-0.03 (0.04)
Ever repeat class	0.39 (0.49)	0.41 (0.49)	0.02* (0.01)
Math grade	62.68 (19.52)	66.04 (19.86)	3.36*** (0.46)
Language grade	65.4 (16.10)	66.49 (16.61)	1.09*** (0.38)

***, **, and * denote significance at 1, 5 and 10 percent levels, respectively
 Parenthesis: for means, standard deviation; for difference, standard errors

Again, though, as was the case with the teacher questionnaire, the differences in averages are small in comparison with the standard deviations.

In short, we do find some differences in terms of students between invited and non-invited schools. However, the differences are, first, relatively small, and, second, possibly the product of increases in accuracy in the estimation due to a larger sample.

Overall, the sample seems to present a balanced group among non-invited and invited institutions. This result is important as it validates the lottery, and supports the use of an encouragement design for the evaluation.