Peer Effects, Pupil-Teacher Ratios, and Teacher Incentives in Kenya

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Sector(s): Education, Political Economy and Governance

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Sample: 210 primary schools

Target group: Children Parents Primary schools Students Teachers

Outcome of interest: Student learning

Intervention type: Community monitoring

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Partner organization(s): Government of Kenya Ministry of Education, Science and Technology, ICS Africa, World Bank

The introduction of free primary education has raised primary school enrollment in many developing countries, but the resulting overcrowding of schools and influx of students with little preparation poses new challenges to policymakers. Researchers evaluated three interventions that addressed the large class sizes and heterogeneity in student preparation in the Kenyan school system. They found that hiring additional local contract teachers helped reduce classroom overcrowding and improved student learning outcomes. The biggest gains came when local school committees were empowered to oversee the recruitment process and to effectively monitor teachers, and when classes were structured to target instruction to students' initial achievement level.

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The introduction of free primary education has raised primary school enrollment in many developing countries. However, the resulting overcrowding of schools, as well as the influx of new students with little or no preparation, poses new challenges to policymakers. For example, increased enrollment has often not been matched by increased numbers of government-salaried teachers. One method of lowering the pupil-teacher ratio, versions of which have been used by many governments, is to hire low-paid local contract teachers to supplement government-salaried teachers. However, there are concerns that these teachers may be less experienced and therefore less effective. Empowering the local community to monitor teachers' performance may help to overcome this problem, and may also increase civil-service teacher effort and subsequently student learning.

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Historically, Kenyan schools have had two types of teachers - those hired through the Ministry of Education and those hired locally and informally by Parent Teacher Associations (PTAs). For civil-service teachers, promotion, transfers, and disciplinary measures are decided through the Ministry of Education, rather than by more locally accountable bodies. These teachers are

represented by a strong union, have civil-service protection, and receive wages and benefits considerably above market levels. PTA teachers, while typically paid much less than their civil-service counterparts, have much stronger incentives, partly because they do not have union protection, but also because a good track record as a contract teacher can help them obtain a civil-service job.

Incentives for civil service teachers, while weak, are largely based on their students' scores on the primary school exit exam. Teachers may, therefore, have an incentive to focus on students they believe will perform better on the exam, while ignoring the weaker students who may be too far behind to catch up.

In 2003, Kenya eliminated school fees for primary school. This led to an almost 30 percent increase in enrollment and greater heterogeneity in student preparation. Many of the new pupils were first-generation students and had not attended preschools. Since parents were no longer required to pay fees, local school committees were generally unable to raise the funds necessary to hire PTA teachers to match the influx of students and bring the new students up to speed.



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In collaboration with International Child Support (ICS), researchers evaluated three nested interventions that addressed the large class sizes and heterogeneity in student preparation in the Kenyan school system: (1) the addition of locally hired contract teachers to reduce the pupil-teacher ratio; (2) the empowerment of parents within PTA committees through School-Based Management (SBM) training; and (3) the sorting of students by initial level of preparedness to reduce heterogeneity within the classroom.

Out of 210 primary schools, 140 were randomly assigned to receive the Extra Teacher Program (ETP). The ETP program provided funding to hire a local contract teacher to address classroom overcrowding. The remaining seventy schools served as a comparison group. In each school, ICS held a meeting with parents and teachers to explain the program rules regarding the hiring of an additional teacher. School committees were responsible for hiring the contract teachers and were free to replace or keep the original contract teacher based on performance. The contract teachers were paid approximately one-quarter of the salary of regular civil service teachers, but had the same educational qualifications.

In 2005, the first year of the program, the ETP contract teacher was assigned to grade 1. Two sections were created for grade 1, one taught by regular civil service teachers (with multiple teachers rotating in an out of the class, teaching different subjects) and one taught exclusively by the contract teacher. As a result, the average class size in grade 1 was only 44 in ETP schools, compared to 82 in comparison schools. In the second year of the program, the ETP teacher moved to grade 2, such that the cohort of first graders that benefitted from the ETP program continued to benefit once in grade 2.

While in half of the ETP schools (the "non-tracking ETP schools"), students were divided into sections at random, in the other half (the "tracking ETP schools"), students were divided into sections based on students' level of preparedness (as measured by exam scores during the first term). For all schools, which section was taught by the ETP contract teacher was then decided by random draw.

Finally, half of the schools assigned to ETP, including both tracking and non-tracking schools, were randomly selected to receive School-Based Management (SBM) training. The training was designed to empower parents (within the PTA committee) to ensure a fair and objective recruiting process for the ETP teacher, as well as to monitor teachers' performance. Two parents of grade 1 students were asked to perform attendance checks on teachers on a regular basis.

Standardized tests covering math and literacy questions were administered to each school just before the program ended and again one year later. Five unannounced visits were also made to each school to measure teacher effort and to observe the classroom environment.

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Learning: Providing school committees with funds to hire an extra teacher on a short-term contract had a positive effect on learning. Test scores of students in ETP schools were on average 0.22 standard deviations higher than those of students in comparison schools. However, not all students benefitted equally. The program impact varied a lot with the details of how it was implemented. In particular:

- The impact was significant for students assigned to the ETP contract teacher (0.29 standard deviation gain) while that on students assigned to the civil-service teachers was not.
- The impact was larger when the ETP program was accompanied with SBM training (0.24 standard deviation) than when it was implemented alone (0.20 standard deviation).
- There was relatively rapid fade-out of these learning gains in the year after the program ended, except for the gains in tracking schools and the gains in SBM schools.

Teacher effort: A crude measure of teacher effort is how often the teacher is found in class and teaching during a random spot check. This rate is 58 percent among civil-service teachers in non-ETP schools, suggesting relatively low levels of efforts. Despite their low pay, contract teachers were found 11.7 percentage points (20 percent) more likely to be teaching during a random visit. As a result, their students learned more. In contrast, civil-service teachers in ETP schools responded to the introduction of the ETP program by decreasing their own effort: the probability that they would be found in class teaching during a random visit decreased 15.7 percentage points (27 percent). As a result, their students did not significantly gain in learning over students in comparison schools, despite being in much smaller classes. One of the reasons why the SBM program led to increased learning

gains is that it mitigated the negative effort response by civil-service teachers.

Selection of contract teachers: Because a contract teacher position is a stepping stone for permanent civil-service positions, it is highly valuable (despite the low pay). As a result, existing civil-service teachers may want to hire their own relatives as contract teachers. In ETP schools without SBM training, 31 percent of contract teachers hired were relatives of existing teachers in the school. Those relatives tended to perform less well than other contract teachers. The second reason why the SBM program led to increased learning gains is that SBM increased the transparency of the contract-teacher recruiting process. Specifically, it reduced the number of contract teachers who were hired because they were related to an existing teacher by about half.

Homogeneous classrooms: Compared to students in non-tracking ETP schools, students in tracking ETP schools were in more homogeneous classes. This homogeneity benefitted them, irrespective of whether they had started at the top, middle, or bottom of the distribution.

Homogeneity is beneficial in part because it allows teachers to better tailor their materials to the level of their students, but also because it increases teachers' attendance in the classroom. For those who started at the middle of the distribution, being assigned to the bottom track (instead of the top track) had no detrimental effect on their learning, because the decrease in peer quality was compensated by a positive effect of being at the top of the class.

Overall, the results suggest that while hiring supplementary contract teachers can be part of the solution to Kenya's teacher shortage, to get the most out of these teachers, implementation details matter. The biggest gains come when local school committees are empowered to oversee the recruitment process and to effectively monitor teachers, and when classes are structured so as to target instruction to students' initial achievement level.

Duflo, Esther, Pascaline Dupas and Michael Kremer. 2015. "School Governance, Teacher Incentives, and Pupil-Teacher Experiemental Evidence from Kenyan Primary Schools." Journal of Public Economics 123:92-110. Duflo, Esther, Pascaline Dupas, and Michael Kremer. 2011. "Peer Effects, Teacher Incentives, and the Impact of Tracking: Evidence from a Randomized Evaluation in Kenya." American Economic Review 101(5): 1739-74.