

# Teacher and Parental Perceptions of Performance Pay in Education: Evidence from Tanzania

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## Abstract

This paper presents evidence on teacher opinions regarding performance pay from a large experimental evaluation that included three interventions: a school grants program, a teacher performance pay program, and a combination of both programs. The experimental evaluation was conducted in a nationally representative sample of 350 public primary schools in Tanzania. We report four sets of results. First, approximately 96 percent of teachers support the idea of teacher performance pay, while 61 percent favor at least some performance linked element in a future salary increase. Further, 80 percent of head teachers support performance pay. Second, we find that exposure to a performance pay program has a limited positive impact on teacher support. Third, contrary to arguments from performance pay critics that such programs adversely affect the work environment in schools, we find that teachers in all the experimental arms report higher satisfaction with the work environment and job support. Fourth, we find that a majority of parents (55 percent) prefer performance pay over school grants, but exposure to the experimental programs does not change this preference.

## **Teacher and Parental Perceptions of Performance Pay in Education: Evidence from Tanzania**

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## 1. Introduction

Teachers play a central role in education systems and are an important constituent of the labor market. In Sub-Saharan Africa, about 7.6 million individuals work as primary or secondary school teachers, accounting for an estimated 8.7 percent of wage workers. Teachers represent almost 10 percent of wage workers in Tanzania, our country of study.<sup>2</sup> The importance of teachers is further reflected in their compensation, which represents the single largest expenditure item in the education budget. Among a sample of 109 low- to high-income countries, the average share of the education budget devoted to teacher compensation is 74 percent (World Bank, 2018a).

Most teacher compensation systems are based on salary scales that tie remuneration to observable characteristics, such as experience and formal qualifications. However, these observable characteristics are weakly correlated with student learning outcomes (Rivkin et al., 2005). Because teacher effort and motivation are important inputs in the education production function, the typical teacher compensation policies currently employed may not be well structured for addressing the low levels of learning in developing countries (De Ree et al., 2017). Consequently, there is growing interest among policymakers and researchers in strengthening the links between teacher remuneration and student learning outcomes through teacher performance-pay programs.<sup>3</sup>

Teacher performance pay programs of varying designs have been tested in multiple settings. Overall, the evidence suggests that certain performance pay programs can improve learning outcomes especially in settings where other accountability mechanisms are weak (Bruns and Luque, 2015 and Ganimian and Murnane, 2014). However, the introduction of a performance pay policy can generate opposition from a variety of stakeholders including teachers and parents. Teachers' opposition may be particularly pronounced because such reforms directly affect their interests, and they tend to be well organized and represented by unions (Bruns et al., 2019).

Because opposition by key stakeholders can block or reverse of any (education) reform, it is important to understand their attitudes and opinions, both before and after the reforms are instituted. Pre-reform attitudes and opinions by teachers and parents are critical as these stakeholders can amplify their voices

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<sup>2</sup> Authors' calculations using World Bank/ILO data and the IPUMS version of the 2012 Tanzanian Census (Minnesota Population Center 2019).

<sup>3</sup> Globally, 13 of 34 countries that provided information about their teacher policies under the World Bank's Systems Approach for Better Education Results (SABER) initiative provided monetary bonuses to high performing teachers (World Bank, 2018b)

and apply political pressure, by voting or union lobbying, to support or oppose any proposed reform. For example, in response to a policy proposal on teacher incentive pay, the NEA, a large teachers' union in the US wrote "NEA opposes federal requirements for a pay system that mandates teacher pay based in whole or in part on student performance or student test scores" (NEA, 2015). This example of union opposition is mirrored in the teacher opinion data, where only about a third to two-fifths of teachers in the UK and US were supportive of teacher performance pay based on test-scores (Leigh, 2012). In addition, post-reform opinions can provide a signal about the potential (political) sustainability of such reforms. Specifically, if exposure to the performance pay reform increases stakeholder support, then the program is likely to be sustained overtime. However, the program may be abolished if it proves unpopular with stakeholders.

In this paper, we examine teachers' and parents' attitudes toward performance pay in Tanzania and estimate the effects of exposure to such a program on these attitudes. The data come from a large, nationally representative randomized controlled trial in Tanzania that studied the effectiveness of three programs on student learning in the early grades of public primary schools. The first program introduced teacher performance pay in 70 schools. The second program provided 70 schools with unconditional school grants deposited directly to their bank accounts. Finally, the third program provided 70 schools with a combination of performance pay and grants.<sup>4</sup> We measure and report a variety of teacher, head-teacher, and parental attitudes and opinions about their preference (or support) for performance pay programs. The data from the control group allows us to measure the pre-reform perceptions of performance pay among stakeholders. By comparing the different levels of support for performance pay relative to the control group across our treatment arms, we estimate the impact of treatment exposure on stakeholder's perceptions and support for teacher performance pay. To gain insights into potential mechanisms, we make use of comprehensive survey data collected from teachers, head-teachers, and parents.

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<sup>4</sup> Mbiti et al. (2019) presents the results of this intervention in terms of improvements in student learning.

We find that teachers in Tanzania were generally highly supportive of performance pay, both before and after exposure to treatment.<sup>5,6</sup> Over 95% of teachers in the control group had favorable views on teacher performance pay linked to student test scores. This is consistent with the levels of support among Indian teachers from the State of Andhra Pradesh (Muradlihan and Sundararaman, 2011). Teachers in the grants only and incentive only treatment arms had similar views to their control group counterparts, while teachers in the combination arm were almost three percentage points more likely to hold a favorable view of teacher performance pay. We defined the most effective teachers as those ranked in top 20<sup>th</sup> percentile of the teacher value added distribution within each experimental arm. Using this measure, we find evidence that the most effective teachers responded to each treatment differently than their less effective peers. In the control group, the most effective teachers were more supportive of the performance pay, suggesting that pre-reform, the best teachers believe this type of reform would benefit them. However, in both experimental arms that feature the teacher incentives (the incentives only and the combination arm), the best teachers were less supportive than their less effective peers. This provides some evidence on the potential for performance pay to alter the characteristics of the teacher recruitment pool. Our results on the pre-reform opinions of more effective teachers suggest that the performance pay programs may attract better teachers. However, once these better teachers are exposed to the specific program used in this paper, they develop less favorable opinions than their less effective counterparts. This suggests the design used in this project may be insufficient to help retain and motivate the best teachers.

Head teachers were also broadly supportive of performance pay. Almost three-quarters of head teachers from the control group were supportive of performance pay. Head teachers who had been exposed to performance pay through either the incentives arm or the combination arm were about 13 percentage points more supportive of incentive pay. Head teachers were thus somewhat more skeptical beforehand, but exposure to the program resulted in a relatively large increase in their approval of the program.

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<sup>5</sup> Results in this paragraph are based on answers to the question: “What is your overall opinion about the idea of providing high-performing teachers with bonus payments on the basis of objective measures of student performance improvement?”, with answers coded on a Likert scale from 1 (very unfavorable) to 5 (very favorable). A teacher is counted as supportive if he/she answered 4 (favorable) or 5 (very favorable).

<sup>6</sup> We find similar patterns when we examine support for adjusting the existing national compensation structure so that part of the annual salary increases would be based on performance (see Section 6 for the exact phrasing).

Teachers in the treatment groups generally trusted that the implementation team would deliver on the promises. Trust was slightly higher among the combination group relative to the incentive group. In addition, over 95 percent of teachers could correctly calculate bonus amounts in a hypothetical scenario, suggesting that teachers had a clear understanding of how the incentive program worked. Teachers who were exposed to incentive pay were more concerned about their job security, perhaps due to introduction of objective and external measures of performance. In addition, teachers in the grants arm and the combination arm were more likely to report improvements in the work environment, compared to their counterparts in the incentives only arm.

Although our data on parental opinion is more limited, we also examine how parental support for teacher incentive programs changes in response to the treatments. Parents are key stakeholders in education systems and have some ability to exert pressure by lobbying schools and voting. Accordingly, understanding their reactions to incentive pay programs can provide further insights into the sustainability of such programs. We solicited the opinions of parents whose children were enrolled in our intervention (and control) schools, and asked them whether they preferred a teacher performance pay program or a school grants program, in a hypothetical scenario where the government has budget to fund only one of these two programs. We find that parents were moderately supportive of performance pay before and after treatment exposure, with just under 55 percent of parents in the control group preferring performance pay over school grants. This is generally consistent with the levels of public opinion held in the US (Leigh, 2012). Exposure to the incentives arm or combination arm resulted in small increases (between 1.5 and 4 percentage points) in parental support, and these increases relative to the opinions of parents who were exposed to the grants treatment are statistically significant.

Parents from the incentives and combination arms were also slightly more engaged with schools. Their meeting attendance increased between three to five percent, whereas the attendance of parents in the grants treatment decreased by eight percent (relative to the control group). Although the individual treatment effects on meeting attendance were not statistically significant, the estimates for the incentives and combination arms were significantly different from the grants arm. This suggests that the incentives program was more effective at encouraging parental participation and engagement than the grants

program.<sup>7</sup> As parental involvement in schools is thought to be an important driver of educational outcomes (Avvisati, Gurgand and Guyon, 2014), our results highlight an additional channel through which incentive programs could be sustainable. Despite our efforts to deliver information about the programs to all households in our sample, only about half of households were aware of the ongoing programs that were being implemented in their schools. This highlights the importance of parental awareness campaigns in shaping their opinions.

Our paper makes several contributions to the literature. We build on a very limited set of studies that use stakeholder opinion data to carefully examine the political sustainability of teacher incentive programs. To our knowledge the only other paper to examine this issue was Muralidharan and Sundararaman (2011), and they focus exclusively on teacher opinion—whereas our study expands the set of stakeholders to include head-teachers and parents. Further, we also examine the extent to which our treatments affect the work environment for teachers. As critics of teacher incentive programs argue that such programs can have negative impacts on the collaborative work environment, our results provide an important test of this hypothesis. In addition, by comparing the changes in support for performance pay in response to exposure to the grants, incentives, and combination treatments, we can examine how stakeholder opinions are shaped by exposure to policies that alleviate resource constraints versus those that alleviate teacher effort constraints and those that address both constraints at the same time.

## 2. Context

Tanzanian primary schools serve students from first grade through seventh grade (or standard one through seven). Students take two national examinations, one at fourth grade and another at seventh grade. The seventh-grade exam is the Primary School Leaving Examination (PSLE) and determines if children can progress to secondary school, while the fourth-grade exam is “low-stakes” and is generally used for administrative and monitoring purposes. In 2001, Tanzania abolished fees in public primary schools which resulted in significant increases in both enrollment and class sizes (Valente, 2015). The revenues previously collected through fees were replaced by government grants to schools, though low budget allocations for these grants, inflation and the fact that district offices could re-assign the grants to other priority expenditures resulted in low and unequal per-capita receipts at school level. World Bank Service Delivery Indicators show that in 2011 only 3% of schools had sufficient infrastructure (clean water,

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<sup>7</sup> Mbiti et al. (2019) find that parents of students in the grants program schools lower their private financial school contributions. The lower parental meeting attendance in grants schools is consistent with this change in “financial engagement”.

improved sanitation, and electricity accessible at school); furthermore, on average, 5 children (in grades 1, 2, and 3) shared each math textbook, while 2.5 children shared each reading book (World Bank, 2012). Class sizes in primary schools averaged 74 students, with almost 50 students per teacher (World Bank, 2012).

In addition to large class sizes and limited resources, there is also limited accountability in Tanzanian public primary schools. Teacher absence rates are high. Almost one in four teachers is absent from school on a given day (World Bank, 2012). Teacher effort also seems low even among those that are present in school: over 50% of teachers who were present in school were absent from the classroom (World Bank, 2012) and children received about 2 hours of instruction per day on average. These low levels of effort were mirrored by low self-reported motivation: 47% of teachers said that if they could start over, they would not choose teaching as a career (2013 survey data, Twaweza).

Despite the success in increasing access to schooling, there is growing evidence that learning levels are low. The annual nationwide learning assessments carried out by Twaweza's Uwezo program consistently show that less than one third of grade 3 students can read a simple story at a grade 2 level in Kiswahili (the national language and language of instruction) or successfully demonstrate grade 2 numerical skills, while only one out of five can do both. Performance in English is especially weak, with less than 12% of grade 3 students able to read at the grade 2 level in English (Uwezo, 2013; Jones, Schipper, Ruto, & Rajani, 2014).

### **3. Experimental and incentive program design**

This paper uses data from a large nationally representative randomized controlled trial in Tanzania that aimed to study the relative effectiveness of three interventions: (1) sending capitation grants directly to school bank accounts, (2) introducing teacher performance pay in public primary schools, and (3) a combination treatment. The programs were implemented by Twaweza, a leading Tanzanian non-profit organization with a strong track record of working to improve education in East Africa, including conducting independent assessments of student learning in Kenya, Uganda, and Tanzania (Uwezo, 2017). The name of the program was KiuFunza (shorthand for Kiu ya Kujifunza or "Thirst for learning" in Kiswahili).

The three KiuFunza interventions were randomly assigned in a nationally representative sample of 350 schools in 10 randomly selected districts in Tanzania. Treatment was randomly assigned at the school level



with stratification at the district level. In each district, seven schools were randomly assigned to one of the three treatment arms; 14 schools were assigned to the control group. The study sample thus consists of 210 intervention schools and 140 school control schools. Intervention schools were informed that the program would last for two years (2013 and 2014). The treatment arms were:

- 1) A capitation grant program that provided schools with block grants (the “grant” treatment). Schools in this program received 10,000 Tanzanian shillings (TZS) (approx. US\$5) per student directly in the school bank account. The funds could be spent according to existing policy rules on capitation grant spending, that is: on student learning materials such as textbooks, instructional materials for teachers such as chalk and blackboards, printing exam papers, and minor repairs to school infrastructure. The funds could not be used for major construction projects such as building a new classroom or paying teachers.
- 2) A pay for performance program that provided subject teachers in grades I-III and head teachers with bonus payments based on the number of students who passed basic literacy and numeracy tests (the “incentives” treatment). This intervention is described in more detail below.
- 3) A combination program where schools were provided with both the grants and the incentives programs.

Teachers will only respond to an incentive if certain conditions are fulfilled. First, teachers need to understand the offer. Next, they need to trust that the offer will be fulfilled, for instance that the organization offering the program can be trusted to follow up on the promise and fairly and transparently calculate the performance bonus. Finally, teachers need to be able to improve the skills of their students for the incentivized subjects (Kiswahili, English and Math).

The KiuFunza incentive offer was designed with the express purpose to be easy for teachers to understand. Efforts were also made to select implementation teams, training methods, and intervention scripts that would generate trust. The program was limited to teachers in grades 1, 2, and 3 and focused on numeracy (Mathematics) and literacy in English and Kiswahili. For each of these subjects, an eligible teacher earned a TZS 5,000 bonus (approx. US\$3) for each of their students who passed all sections of the KiuFunza test, a grade-appropriate assessment based on the national curriculum and administered by Twaweza teams. If a teacher taught all three subjects in a given grade, they could earn TZS 15,000 from each student that passed all three tests. The test scores were the only determinant of teacher

performance and pay. To ensure interest and support from the head teacher, the program included a head teacher bonus of TZS 1,000 (approx. US\$ 0.6) for each subject test a student passed. Head teachers thus earned an amount equal to one-fifth of the bonus paid to each teacher.

This proficiency threshold bonus design was selected for KiuFunza because it is easy to understand and implement, but such designs can be criticized. For example, the bonus threshold could be set too high or too low, resulting in weak effort incentives (Neal, 2010). A drawback for a policy maker is that the size of the required bonus budget is not known ex-ante. The average teacher performance payment in 2014 was TZS 204,164 (USD 122), about 3.2 percent of the annual teacher salary (pre-tax, salary and allowances included, pension excluded).

The Tanzanian school year runs from January-December, and interventions and surveys were implemented over the 2013 and 2014 school years. This means that two full performance pay cycles were implemented. The first cycle started when the program was introduced to school communities in March of 2013; this was followed by a midline visit in July-August 2013 and “high stakes” endline student tests in November. The high stakes tests were used to calculate teacher bonuses for 2013, which were paid out in the first week of April 2014. Soon after, a school visit was done to provide an overview of 2013 earnings and performance at the school level, with a clear explanation of the number of students (not) passing and the resulting payment. During this visit, the bonus rules were re-introduced, and any clarifying questions were answered.

#### **4. Data and empirical specification**

Our survey data cover all teachers (about 1500) who taught in focal grades (grades 1, 2, 3) and focal subjects (Math, English and Kiswahili). The teacher opinion data come from the first year’s midline survey conducted in July 2013 (prior to any testing or bonus payments) and from the endline survey in October 2014, after the first round of bonus payments and immediately prior to the second round of high stakes testing and bonus payments. The available data allow for a comparison of teachers exposed to the performance pay program (those in the “incentives” and “combo” treatment arms) versus teachers not exposed to the program (those in the control arm and those in the “grants only” treatment).

In addition to the teacher opinion data, we collected data on a range of teacher characteristics, including demographics, teaching qualifications, and salary information. We conducted 350 head teacher/school level interviews per survey round, which included information on head teacher characteristics, school facilities, input availability, and expenditures. We further interviewed parents of 3500 randomly selected students, which provides parental views of the KiuFunza program. However, the parents answered fewer opinion questions than the teachers.

Our empirical strategy is primarily based on the experimental design of the program. The main goal is to assess whether exposure to the Twaweza performance pay program increases stated support for performance pay programs in general. We explore this question using the following OLS regression specification:

$$Y_i = \beta_0 + \beta_1 grants + \beta_2 incentives + \beta_3 combo + \gamma_t + \gamma_d + e_i \quad (1)$$

where  $Y$  is a measure of teacher support for performance pay.<sup>8</sup> On the right-hand side, *incentives*, *grants* and *combo* are binary measures of treatment assignment,  $\gamma_t$  is a time fixed effect, and  $\gamma_d$  is a district fixed effect. As the assignment to treatment was randomized,  $\beta_1$ ,  $\beta_2$  and  $\beta_3$  will capture the causal effect of being assigned to an intervention on teacher support for performance pay.

We estimate equation (1) using data from both the 2013 midline and the 2014 endline. The coefficients of central interest are  $\beta_2$  and  $\beta_3$  which show the impact of exposure to one of the teacher incentive arms (incentives only or the combination treatment) on teacher support, relative to the control group. We are also interested whether the combination treatment effect differs from the incentive only effect (i.e. testing  $B3 > B2$ ); and whether grants and incentives display complementarity in their effect on teacher support (i.e. testing  $B3 > B1 + B2$ ).

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<sup>8</sup>  $Y$  is a binary variable coded 1 if the teacher answer indicates a (strongly) favorable attitude towards the performance pay program described in the question; and 0 otherwise. See section 6 for the question phrasing.

## 5. Results

### A. Descriptive Summary

The key outcomes of interest for this study are teacher and parent opinions concerning teacher performance pay. These opinions were addressed in two survey questions to teachers only and a third question to both teachers and parents. The first question simply asked teachers to state their opinion about performance pay, using the question: “What is your overall opinion about the idea of providing high-performing teachers with bonus payments on the basis of objective measures of student performance improvement?”, with answers coded on a Likert scale from 1 (very unfavorable) to 5 (very favorable).<sup>9</sup> Descriptive results are presented in Appendix Table A1. Overall, 96 percent of teachers in our sample support the idea of performance-linked pay. Further, a solid majority (80 percent) of all head teachers support the idea of performance pay.<sup>10</sup>

The second question introduced a hypothetical 15 percent increase in total budget available for teacher salaries, and asked teachers: “Suppose the government was going to change the amount and structure of pay increases to teachers in the next 2 years. Suppose that the total budget for increases in teacher salaries is 15%. How would you want this money to be allocated?” The question provided four answer options:

- (1) a flat 15 percent increase for all teachers (no performance pay);
- (2) a flat 10 percent increase for all teachers plus 0-10 percent additional increase based on performance;
- (3) a flat 5 percent increase for all teachers plus 0-20 percent additional increase based on performance; or
- (4) no flat increase but a 0-30 percent increase based on performance (all performance pay).

This question forced teachers to make a trade-off between (hypothetical) fixed and performance linked compensation, rather than only expressing agreement with a proposition that carries no downside. We find that approximately 60 percent of all teachers support a future salary increase to incorporate some

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<sup>9</sup> Enumerators used visual aids that allowed respondents to point to their preferred position or opinion. This approach facilitated coding the answers as one of these categories.

<sup>10</sup> For each teacher, opinions are drawn from responses in Year 2 when available. When the teacher was not surveyed in Year 2, their response from Year 1 is used. Head teacher responses are from Year 2 only.

element of performance linked pay (at least 5 out of 15 percent). In addition, (only asked in 2014) almost three-quarters of head-teachers in our survey were supportive of diverting part of the salary increment budget towards a performance pay system.<sup>11</sup>

The third question asked teachers to express their preference over two proposed national policies: a capitation grant program or a teacher incentive program. Given these two options, 70 percent of teachers preferred the incentive program, around one-fifth preferred the capitation grant program, and the remainder were indifferent. The same question was also asked to parents and just over half of parents preferred incentives to capitation grant. This contrasts with the patterns of support found in developed countries where parents (or voters) are typically more supportive of teacher incentive pay, while teachers are much less supportive of such programs (Leigh, 2012).

## **B. Program Impact on Teacher Opinions**

We present regression estimates of a linear probability model using the teacher and head-teacher opinion data in Table 2. For the general support question, the outcome is coded one if the response is “somewhat favorable” or “very favorable”, and zero otherwise. For the trade-off question, the outcome is coded one if the respondent’s choice includes any performance-linked component (5, 10 or 15 percent).

Exposure to the grant or incentive treatment had no discernable effect on teacher opinions. However, exposure to the combination treatment increased support for teacher performance pay by almost 3 percentage points (Column 1). As teachers’ support for performance pay was generally very high, this represents a small increase in support relative to the control group. Head-teacher opinions were more responsive to the treatments (Column 2). Exposure to the grant treatment increased head teacher support for incentives by about 8 percentage points (not significant), while exposure to the incentives and combination treatment increased head teacher support by about 13 percentage points or roughly 17 percent relative to the control group mean.

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<sup>11</sup> The questions used in our opinion survey were asked to a random sample of teachers in India too as part of an experimental study on performance pay (Muralidharan and Sundararaman, 2011). It is interesting to note the differences in answers. Teachers in India were less supportive than Tanzanian teachers on the “overall support” question (85.5 percent had a somewhat/very favorable opinion) but were more supportive on question 2, where 75 percent wanted some element of performance pay in future salary increases. One interpretation is that Tanzanian teachers are more risk-averse; are less optimistic about their performance; or less optimistic than their Indian colleagues that such a conditional pay increase could indeed be introduced.

When we examine teacher and head teacher support for allocating part of a future salary increment to performance pay, we find that teacher opinions are generally less responsive to our treatments than in the first two columns. The treatments increase support between just under a percentage point to roughly 2.5 percentage points, although none of these increases are statistically significant (Column 3). Head-teachers' opinions were more responsive than those of teachers. Head-teachers in all our treatments were more supportive of setting aside monetary resources from the salary increment to implement a teacher performance pay program, with the largest increase found among combination head-teachers. Finally, teacher and head teacher opinions on an incentive program relative to a grant program are not significantly affected by our treatments (Column 5 and 6). However, the signs of the coefficients are in line with our expectations as exposure to the grants program reduces support for teacher incentives, while exposure to incentives increases support.

We find some evidence of an association between teacher effectiveness and support for performance pay in Table 3. Due to data limitations, we are only able to accurately link students to teachers in the second year of the program. We compute the average growth rate on the endline test scores for each teacher by computing the difference between the baseline and endline test score for their students. Because the growth rates for teachers are likely affected by the treatment effects, we classify effective teachers using a binary variable which is equal to one if a teacher is ranked in the top quintile of their treatment group. In column 1, we find that effective teachers in the control group were over four percentage points more likely to support performance pay compared to their less effective counterparts in the same experimental group. We do not find any statistically significant relationship between teacher effectiveness and support for performance pay in the grants only group. Among the set of teachers who were exposed to teacher incentives, either in the incentives only or combination group, we find that the support for performance pay declined by 5 to 7 percentage points among the most effective teachers compared to their less effective peers.<sup>12</sup> We do not find any differential patterns by teacher effectiveness when we consider opinions that include a hypothetical trade off, or a choice between incentive and grant programs in Columns 2 and 3.

Trust is a key component in an incentive program as such policies require teachers to exert extra effort against a promise of a future reward. At the same time, the reward structure must be clear for teachers to understand how

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<sup>12</sup> These broad patterns are robust to different definitions of teacher effectiveness such as top 10 percentile or the top 25 percentile.

their efforts will be rewarded (Leigh, 2012). Table 4 shows that teachers trusted that the programs would deliver the promised rewards. Since the capitation grant funds were delivered first, trust in the capitation grant arm and the combination arm was higher than the incentives only arm (Column 1). We find a similar gap in trust between the incentives and combination arms in Column 2, where teachers in the combination arm were 10 percentage points more likely to trust that the bonuses would be paid. This gap closes in the second year of the program after the first-year bonuses are paid (Column 3). The program was also well understood by teachers (Column 4 and 5).

We examine the changes in the (self-reported) work environment as a result of our treatments. As opponents of teacher performance pay systems argue that such programs would reduce cooperation among teachers, we test for this possibility in Table 5. Using teacher self-reported data on the work environment, we find no evidence of a reduction in collaboration due to incentive programs. Our summary index suggests that conditions generally improved by almost 0.3 SD as a result of the treatments, and the individual estimates were not significantly different from each other (Column 1). Teachers across all three treatments reported higher rates of satisfaction with the resources they received (Column 2), where teachers in the grants treatment reported the largest increases in satisfaction. This effect was significantly larger than the estimated effect among incentives teachers. Exposure to the incentives treatment increases satisfaction with the levels of teaching assistance received by 13 percentage points (a 40 percent increase), however there were limited and statistically insignificant effects for teachers in the grants and combination arms (Column 3). If teacher incentives were to increase discord among teachers then this would likely result in reductions in assistance received from peers and the head-teacher. Columns 4 and 5 show that there were no negative repercussions of teacher incentives (or the combination arm) on cooperation and assistance from other teachers. Rather, our estimates suggest the opposite as the coefficients are all positive but insignificant. Finally, we examine teachers' opinions on their overall work conditions. While resource policies such as the grants and the combination arms increase perceptions of better work conditions by a factor of two, there is no shift in satisfaction from the incentives only program (Column 6). As the estimated coefficients for the grants and the combination were both significantly larger than the incentives coefficient, this suggests that teacher perceptions are very responsive to programs that alleviate resource constraints.

As the incentive program was only implemented in the first three grades, there may be concerns about the work environment that are not adequately captured in our satisfaction measures discussed above. We directly asked eligible teachers in the incentives and combination arms about potential issues such as jealousy from their non-eligible co-workers (results not shown). About 40 percent of teachers report that the non-program teachers were jealous (as they were not eligible to earn a bonus). However, only 16 percent of teachers report the work

environment became more uncomfortable as a result of the exclusion of their peers. Further, only 8 percent of teachers in the program report feeling pressured to share their bonus, and only 5 percent report attempts of sabotage. Overall, the regression results combined with these self-reports suggest that there is limited evidence that incentive programs can lead to a deterioration of the work environment.

### C. Parental Opinions

We examine the impact of exposure to the treatments on parental opinions in Table 6. Overall parents are less supportive of teacher performance pay compared to teachers and head teachers. On average 55% of parents prefer a teacher incentive program over a capitation grant program. Exposure to each of the treatments does not significantly change parental opinions on teacher performance pay. However, as expected, the signs of the coefficients show that parents exposed to the capitation grant program were less supportive of performance pay, while those in the incentives and combination treatments were more supportive. Although the individual point estimates are not statistically significant, the difference between the coefficients on the incentives and the combination are both significantly larger than the coefficient on the grants treatment.

To better understand the mechanisms underlying parental responses to the treatments, we examine changes in parental engagement, investment, and perceptions of the school in Table 6 (columns 2-4). Parents in the control group attended about one meeting at the school in the past 12 months (not including program meetings). However, the additional hypothesis tests show that parents in the incentives and combination arms attended about 10 to 15 percent more meetings than their counterparts in the grants arm (Column 2). Although we do not find any impacts of our treatments on parental contributions to schools (Column 3), we do find that parental spending was differentially affected by our treatment (Column 4). Parents exposed to the grant treatment reduced their spending by about USD 2 (a 10 percent reduction relative to the control group), while there were limited changes among the incentives and combination group. Although none of these individual coefficients was statistically significant, the reduction in spending in the grants group was statistically different from change in spending in the incentives group. A similar qualitative pattern is found between the combination arm and the grants arm.

Although the intervention team made concerted efforts to disseminate the information about the interventions to parents, the levels of understanding among parents were moderate. Table 7 shows that around 50 percent of parents in the incentives and the combination arm were aware of the program. Of those who were aware, just under two-thirds knew the specific details. We found similar patterns among the capitation grant group. Overall, this suggests that the program materials were quite effective at conveying the details of the program if they were



received by parents. It further highlights the importance of a comprehensive communication strategy in building sustained support for such programs.

We examine changes in parental perceptions of the school in Table 8. Parents were asked to report whether they felt that various characteristics at the school had improved over the school year. Given the large set of discrete characteristics reported, we group these variables into a resources index (Column 1) and a teaching index (column 5) to ameliorate multiple hypothesis testing concerns. Parents in grant and combination schools had 0.25 to 0.3SD better perceptions about the improvements in school resources, while there was a negligible increase among parents in the incentives group. Our hypothesis tests also show that the estimated coefficients for the grants and the combination were both greater than the estimate for the incentives group. The results in columns 2 through 4 suggest that much of the effect in the resource index is driven by parental perceptions of textbooks and writing materials. The effect of the treatments on parental perceptions on teaching are shown in Column 5. The individual coefficients on our treatments are not statistically significant. However, the coefficient on the combination arm is significantly different from the coefficient on the incentives arm. Moreover, the grants and incentives coefficient estimates are both negative, whereas the combination coefficient estimate is positive. This could reflect complementarities between resources and incentives that ultimately result in improved (perceptions of) teaching by teachers. The patterns in the index are driven by opinions on teaching ability (Column 8), classroom interactions (Column 9), and homework (column 10).

## 6. Conclusion

This paper presents evidence on teacher opinions regarding performance pay, based on interviews with early grade teachers in a nationally representative sample of 350 public primary schools in Tanzania. The study took place while an experimental teacher performance pay program was implemented in 140 randomly selected schools in this sample. The opinions were collected in 2013 and 2014.

We report five sets of results. Our first set of findings provides evidence of high support among early grade teachers in Tanzania for teacher performance pay programs that link earnings to objective measures of student learning. This is true using three different measures of support for performance pay. Second, exposure to performance pay has a limited impact on support for this type of program. Third, we document the heterogeneous responses to interventions by our binary measure of teacher effectiveness. Relative to less effective teachers, we find that effective teachers in the control group were more supportive of performance pay, while effective teachers in both incentive treatments were less

supportive. Fourth, we find that teachers in all the experimental arms, both incentives and school grants, report higher satisfaction with work environment and job support. Fifth, we find that parental support for performance pay (their preference relative to school grants) is 55 percent, but exposure to the experimental programs does not change their reported support.

Our results have some relevance for the political dynamics of future performance pay programs. First, performance pay programs might be self-reinforcing (if exposure increases support) or self-diminishing (if exposure reduces support). We do not find any evidence for the self-diminishing hypothesis and find some suggestive evidence that exposure to performance pay programs may improve support relative to grant programs. However, if anything, we find that support increases because of exposure to a program that combined both incentives and school grants. This result is in line with the large student learning impacts in this treatment arm, described in Mbiti et al (2019).

A second policy question is whether high performing teachers have higher support for performance linked pay. This is relevant because of the sorting effect of performance pay: beyond improving effectiveness of current teachers, performance pay could potentially improve student learning in the long run by attracting better teachers into the profession (Lazear, 2003). To the extent that teacher opinions are predictive of labor supply decisions such as entry into the profession, we find mixed evidence on this hypothesis. Pre-reform, there is more support for performance pay among better teachers, however post-reform exposure to the incentive program used in this study reduce their support. This suggests that performance pay may be helpful in the recruitment of better teachers, but either a different incentive design or additional program would be needed to motivate and retain the best teachers.

Overall, we find that early grade teachers in Tanzanian public primary schools are very supportive of programs that offer pay linked to performance. The offer made by the experimental KiuFunza program was for a performance bonus in addition to the base salary and did not carry any risk for the teacher. In addition, the program was implemented by an organization that was reputable and trustworthy. This may explain some but not all of the overwhelmingly positive support of teacher performance pay. In sum, our results suggest that there is scope to scale up such programs in Tanzania, especially as they have been shown to be cost-effective at raising student learning outcomes (Mbiti et al., 2017).

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**Table 1. Balance**

Teachers (Grade 1-3)	Means (standard errors)				p-values (each equal to control)		
	<i>Combo</i>	<i>Grants</i>	<i>Incentives</i>	<i>Control</i>	<i>Combo</i>	<i>Grants</i>	<i>Incentives</i>
<b>Male</b>	0.323 (0.027)	0.292 (0.027)	0.277 (0.026)	0.311 (0.020)	0.715	0.588	0.314
<b>Age (in 2013)</b>	40.278 (0.688)	40.845 (0.714)	39.900 (0.698)	40.095 (0.537)	0.836	0.405	0.827
<b>Years of total teaching experience (in 2013)</b>	16.313 (0.736)	16.972 (0.758)	15.976 (0.732)	16.157 (0.563)	0.868	0.391	0.846
<b>Years of teaching experience at current school (in 2013)</b>	7.735 (0.435)	9.165 (0.485)	8.003 (0.457)	8.568 (0.356)	0.151	0.322	0.338
<b>Travel time from house to school (minutes)</b>	22.388 (1.663)	18.972 (1.557)	22.661 (1.565)	21.879 (1.223)	0.805	0.151	0.699
<b>Teaching certificate is highest level of education</b>	0.540 (0.028)	0.477 (0.028)	0.526 (0.029)	0.443 (0.021)	0.006	0.331	0.019
<b>Ordinary level secondary school is highest level of education</b>	0.358 (0.027)	0.410 (0.028)	0.369 (0.028)	0.435 (0.021)	0.026	0.476	0.061
<b>Lives in staff housing</b>	0.237 (0.025)	0.342 (0.028)	0.304 (0.027)	0.307 (0.020)	0.034	0.312	0.945
<b>Gross monthly salary in USD</b>	324.447 (7.942)	331.475 (7.928)	321.851 (7.850)	312.306 (5.823)	0.216	0.051	0.330
<b>Salary always paid on time</b>	0.431 (0.028)	0.474 (0.028)	0.497 (0.029)	0.449 (0.021)	0.623	0.465	0.173
<b>Offers extra (private) tutoring to students</b>	0.300 (0.026)	0.313 (0.026)	0.225 (0.024)	0.271 (0.019)	0.346	0.183	0.145

<b>Ever attended in-service trainings</b>	0.626 (0.027)	0.623 (0.028)	0.624 (0.028)	0.644 (0.020)	0.599	0.529	0.561
<b>Used internet/library/resource centre etc. in last year to improve teaching</b>	0.265 (0.025)	0.206 (0.023)	0.288 (0.026)	0.272 (0.019)	0.821	0.031	0.629
<b>Days absent from teaching this term</b>	3.080 (0.226)	2.923 (0.188)	3.003 (0.222)	3.072 (0.157)	0.976	0.555	0.798
<b>Would choose teaching if could start career over</b>	0.463 (0.028)	0.523 (0.028)	0.480 (0.029)	0.492 (0.021)	0.411	0.389	0.740
<b>Teach outdoors regularly</b>	0.141	0.132	0.160	0.138	0.912	0.817	0.373

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**Table 2: Teacher & Head Teacher Opinions by Treatment and Year**

	Favorable or very favorable towards PP		Would like to have some component of total pay be based on performance		Prefers PP over capitation grants	
	Teacher [1]	Head Teacher [2]	Teacher [3]	Head Teacher [4]	Teacher [5]	Head Teacher [6]
<b>Capitation Grants: A</b>	0.00365 (0.0140)	0.0858 (0.0683)	0.00896 (0.0413)	0.0758 (0.0708)	-0.0101 (0.0417)	-0.00266 (0.0826)
<b>Incentives: B</b>	0.00927 (0.0175)	0.131** (0.0665)	0.00856 (0.0403)	0.0277 (0.0736)	0.0580 (0.0392)	0.131 (0.0847)
<b>Both: C</b>	0.0275** (0.0140)	0.139** (0.0611)	0.0241 (0.0419)	0.170** (0.0673)	0.0242 (0.0375)	-0.0464 (0.0835)
<b>Year 1</b>	0.0339*** (0.00850)		-0.164*** (0.0279)			
<b>Control Group Mean</b>	0.950	0.737	0.603	0.667	0.708	0.475
<b>Test A = B</b>	0.757	0.525	0.993	0.540	0.146	0.159
<b>Test B = C</b>	0.318	0.906	0.738	0.0585	0.428	0.0624
<b>Test A = C</b>	0.127	0.431	0.749	0.197	0.447	0.641
<b>Test C = A + B</b>	0.536	0.916	0.418	0.520	0.690	0.166
<b>Observations</b>	2,477	258	2,477	258	1,922	258
<b>R-squared</b>	0.031	0.050	0.035	0.120	0.024	0.055

**Notes**

1. All regressions are clustered at the school level. P values of hypothesis tests of equality of treatments reported.
2. All regressions control for district fixed effects. Significance levels are as follows: \* 10%, \*\* 5% , \*\*\* 1%.
3. The dependent variable is a binary indicator of teacher/head teacher favorability towards performance pay and willingness to accept a performance-based component in total compensation (these are based on the last column in Table 1). Prefers PP over capitation grants is set to one if the respondent preferred performance pay and zero if the respondent preferred capitation grants or had no preference.
4. For each teacher, opinions are drawn from responses in Year 2 when available. When the teacher was not surveyed in Year 2, their response from Year 1 is used. A Year 1 indicator variable is included. Head teacher responses are from Year 2 only. Prefers PP over capitation grants was asked only in Year 2, which is why it has less observations. Columns 1 and 3 report teacher opinions; columns 2 and 4 report head teacher opinions. Control group means are pooled across Year 1 and Year 2 for teacher opinions.



**Table 3: Heterogeneity in Teacher Opinion by Teacher VA**

	Favorable or very favorable towards PP	Would like to have some component of total pay be based on performance	Prefers PP over capitation grants
	[1]	[2]	[3]
<b>Top 20 percentile of teacher value-added</b>	0.0433** (0.019)	0.0350 (0.046)	-0.0120 (0.052)
<b>Top 20 percentile*Capitation Grants: A</b>	-0.0439 (0.0343)	0.0315 (0.0851)	-0.0206 (0.0863)
<b>Top 20 percentile*Incentives: B</b>	-0.0735* (0.0429)	-0.1251 (0.0818)	-0.0061 (0.0788)
<b>Top 20 percentile*Both: C</b>	-0.049** (0.0274)	-0.0506 (0.0701)	0.0701 (0.068)
<b>Capitation Grants</b>	0.0194 (0.0235)	-0.0452 (0.0551)	-0.0208 (0.0453)
<b>Incentives</b>	0.0392* (0.0208)	0.0272 (0.0511)	0.0405 (0.0444)
<b>Both</b>	0.0577*** (0.0209)	0.0083 (0.0534)	-0.013 (0.0427)
<b>Control Group Mean</b>	0.9390	0.6446	0.7160
<b>Test A = B</b>	0.532	0.113	0.872
<b>Test B = C</b>	0.565	0.388	0.300
<b>Test A = C</b>	0.883	0.357	0.260
<b>Test C = A + B</b>	0.215	0.722	0.393
<b>Observations</b>	2389	2389	2389
<b>R-squared</b>	0.032	0.028	0.030

**Notes:**

1. All regressions are clustered at the school level. P values of hypothesis tests of equality of treatments reported.
2. All regressions control for district fixed effects. Significance levels are as follows: \* 10%, \*\* 5%, \*\*\* 1%.

3. The dependent variable is a binary indicator of teacher/head teacher favorability towards performance pay and willingness to accept a performance-based component in total compensation (these are based on the last column in Table 1). Prefers PP over capitation grants is set to one if the respondent preferred performance pay and zero if the respondent preferred capitation grants or had no preference. Data is from year 2 only.

**Table 4: Teacher Understanding and Trust of Program**

Mean responses to the following questions:

	Trust Twaweza to deliver on promised programs <b>[1]</b>	Trusted Twaweza would pay bonuses in 2013 (reported in 2014) <b>[2]</b>	Trust Twaweza will pay bonuses in 2015 (reported in 2014) <b>[3]</b>	Correctly calculated example teacher bonus <b>[4]</b>	Correctly calculated example head teacher bonus <b>[5]</b>
<b>Control</b>	0.695 (n=770)				
<b>Capitation Grant</b>	0.944 (n=428)				
<b>Incentives</b>	0.859 (n=426)	0.780 (n=410)	0.890 (n=473)	0.971 (n=476)	0.966 (n=471)
<b>Both</b>	0.943 (n=422)	0.888 (n=412)	0.936 (n=468)	0.950 (n=478)	0.962 (n=468)
<b>Total</b>	<u>0.832</u> (n=2,046)	<u>0.835</u> (n=822)	<u>0.913</u> (n=941)	<u>0.960</u> (n=954)	<u>0.964</u> (n=939)

**Notes:**

1. All responses from midline or endline Year 2. Some teachers were asked the teacher and head teacher bonus calculations at midline and endline Year 2, in which case the most recent response was used.
2. Columns 1-3 show combinations of “Agree” and “Strongly agree” responses.
3. The “Trust Twaweza to deliver on promised programs” question was asked to all teachers, so Column 1 reports means for all treatment arms. Other questions were only asked to teachers in the incentive and combination schools.

**Table 5: Teacher Support by Treatment**

	Job Support Index (Standardized) <sup>1</sup>	Teaching input and resources	Teaching assistance	Help from head teacher	Help from other teachers	In comparison with previous years, working conditions have become better
	[1]	[2]	[3]	[4]	[5]	[6]
<b>Capitation Grants: A</b>	0.315*** (0.0938)	0.210*** (0.0395)	0.0866 (0.0588)	0.0396 (0.0347)	0.0266 (0.0365)	0.215*** (0.0413)
<b>Incentives: B</b>	0.266*** (0.102)	0.0977** (0.0442)	0.137** (0.0610)	0.0589* (0.0330)	0.0445 (0.0331)	0.0158 (0.0359)
<b>Both: C</b>	0.272*** (0.0970)	0.172*** (0.0447)	0.0154 (0.0535)	0.0490 (0.0340)	0.0398 (0.0352)	0.208*** (0.0413)
<b>Control Group Mean</b>	-0.173	0.596	0.322	0.794	0.770	0.199
<b>Test A = B</b>	0.659	0.0166	0.483	0.599	0.647	3.30e-05
<b>Test B = C</b>	0.961	0.150	0.0714	0.784	0.901	6.07e-05
<b>Test A = C</b>	0.685	0.420	0.273	0.804	0.749	0.892
<b>Test C = A + B</b>	0.0356	0.0374	0.0201	0.325	0.553	0.717
<b>Observations</b>	1,919	1,932	1,932	1,929	1,932	2,477
<b>R-squared</b>	0.054	0.075	0.050	0.021	0.016	0.066

**Notes:**

1. All regressions are clustered at the school level. Significance levels are as follows: \* 10%, \*\* 5%, \*\*\* 1%.
2. All regressions control for district fixed effects.
3. All outcome variables from the Year 2 endline
4. "Good" and "Very good" responses were recoded as one and "Average," "Poor," "Very poor," and "Did not receive" were recoded as zero
- <sup>1</sup> Index generated by principal component analysis. Index includes rankings noted in columns 2-6. Index is standardized to mean of zero and standard deviation of one.
5. For columns 2-5, The responses are answers to the question "How would you rate the following support you have received this year to allow you teach your classes to the best of your ability?"

**Table 6: Parent Opinions & Involvement by Treatment**

	Prefers Incentives to Capitation Grants	Number of official and unofficial meetings attended	Gave anything (including in-kind) to school	Household spending on focus child's education (USD)
	[1]	[2]	[3]	[4]
<b>Capitation Grants: A</b>	-0.0366 (0.0265)	-0.0840 (0.0576)	-0.0246 (0.0281)	-2.016 (1.258)
<b>Incentives: B</b>	0.0401 (0.0259)	0.0324 (0.0598)	-0.00452 (0.0279)	0.158 (1.285)
<b>Both: C</b>	0.0155 (0.0272)	0.0598 (0.0613)	0.0242 (0.0284)	0.0227 (1.402)
<b>Control Group Mean</b>	0.542	1.162	0.538	17.84
<b>Test A = B</b>	0.00888	0.0838	0.536	0.0928
<b>Test B = C</b>	0.410	0.696	0.380	0.925
<b>Test A = C</b>	0.0862	0.0365	0.138	0.149
<b>Test C = A + B</b>	0.765	0.221	0.217	0.325
<b>Observations</b>	5,068	6,828	6,834	5,054
<b>R-squared</b>	0.024	0.051	0.086	0.206

**Notes:**

1. All regressions are clustered at the school level. Significance levels are as follows: \* 10%, \*\* 5% , \*\*\* 1%
2. All regressions control for district fixed effects.
3. The dependent variable is a binary indicator of parent preference for performance-based bonus payments (versus preference for a school funding / capitation grant program). No preference is set to zero.
4. The outcome variables in columns 1 and 4 are from endline Year 2. Outcome variables in columns 2-3 are from endline Year 2, filled in with older responses when newer data is unavailable.

**Table 7: Parent Knowledge and Perception of Incentives and Capitation Grant Programs**

	Knows incentives program <b>[1]</b>	Knows bonus payment amount <b>[2]</b>	Knows capitation grants program <b>[3]</b>	Feels well informed of capitation grant spending <b>[4]</b>
<b>Capitation Grant</b>	0.198 (n=358)		0.550 (n=358)	0.564 (n=94)
<b>Incentives</b>	0.540 (n=417)	0.632 (n=247)	0.283 (n=417)	
<b>Both</b>	0.499 (n=473)	0.646 (n=260)	0.552 (n=473)	0.602 (n=118)
<b>Total</b>	<u>0.426</u> <u>(n=1,248)</u>	<u>0.639</u> <u>(n=507)</u>	<u>0.462</u> <u>(n=1,248)</u>	<u>0.585</u> <u>(n=212)</u>

**Notes:**

1. Responses from endline Year 1, baseline Year 2, and endline Year 2. For each parent interviewed, latest response used.
2. Columns 1 and 3 based on questions asking if the Twaweza/Kiufunza program provides uniforms, capitation grants, teacher training, food, bonus payments, health programs, and new classrooms, with possible responses “Yes”, “No”, and “Don’t know.”
3. Column 2 asks how much the bonus amount is per pupil, with responses open ended. Only responses of exactly TZS 5,000 are considered correct.
4. Column 4 shows combinations of “Agree” and “Strongly agree” responses.

**Table 6. Parent Perceptions by Treatment**

Compared with previous years, has during this school year \_\_\_\_\_ increased/improved?

	Resources Index# (Columns 2-4)	Quantity of textbooks	Quantity of writing materials	Quality of classrooms	Teaching Index# (Columns 6-10)	Quantity of disciplinary action	Amount of tutoring	Teachers' teaching ability	Individual attention from teachers	Amount of homework assigned
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]
<b>Capitation Grants: A</b>	0.249*** (0.0629)	0.0839*** (0.0228)	0.102*** (0.0247)	0.0195 (0.0256)	-0.0236 (0.0779)	0.0142 (0.0156)	0.0272 (0.0173)	-0.0137 (0.0344)	-0.00327 (0.0323)	-0.00674 (0.0232)
<b>Incentives: B</b>	0.0295 (0.0515)	0.0228 (0.0214)	0.0102 (0.0187)	-0.0149 (0.0241)	-0.113 (0.0716)	0.00644 (0.0148)	0.0313* (0.0190)	-0.0619* (0.0330)	-0.0319 (0.0305)	-0.0437** (0.0200)
<b>Both: C</b>	0.311*** (0.0597)	0.0922*** (0.0225)	0.126*** (0.0224)	0.0470* (0.0254)	0.0894 (0.0819)	0.0353** (0.0175)	0.0619*** (0.0216)	0.0453 (0.0332)	0.0199 (0.0311)	0.00444 (0.0252)
<b>Control Group Mean</b>	-0.117	0.201	0.136	0.264	0.00954	0.143	0.247	0.378	0.262	0.149
<b>Test A = B</b>	0.00125	0.0231	0.000446	0.229	0.293	0.640	0.846	0.207	0.429	0.113
<b>Test B = C</b>	1.55e-05	0.00940	1.48e-06	0.0303	0.0227	0.117	0.214	0.00414	0.142	0.0543
<b>Test A = C</b>	0.400	0.764	0.403	0.355	0.230	0.270	0.140	0.127	0.529	0.688
<b>Test C = A + B</b>	0.716	0.680	0.688	0.269	0.0560	0.544	0.912	0.0179	0.251	0.108
<b>Observations</b>	6,106	6,106	6,106	6,106	3,694	6,106	6,106	3,694	3,694	3,694
<b>R-squared</b>	0.094	0.053	0.120	0.034	0.072	0.021	0.031	0.049	0.046	0.041

**Notes:**

1. All regressions are clustered at the school level. Significance levels are as follows: \* 10%, \*\* 5%, \*\*\* 1%
  2. All regressions control for district fixed effects.
  3. The dependent variable is a binary indicator of parental perception of each item. Responses are coded as increasing/improving set to one and reducing/worsening/don't know set to zero.
  4. Outcomes from columns 8-10 are from endline Year 2. Outcome variables in columns 2-4 and 6-7 are from endline Year 2, filled in with older responses (specifically, baseline Year 2 and endline Year 1) when newer data is unavailable.
- # Indexes generated by principal component analysis. The Resource Index includes columns 2-4 and the Teaching Index includes columns 6-10. Indexes are standardized to mean of zero and standard deviation of one.

## APPENDIX

**Table A1: Opinions on Performance Pay**

Distribution of answers to the question: “What is your overall opinion about the idea of providing high-performing teachers with bonus payments on the basis of objective measures of student performance improvement?” (percentage of responses)

### Panel A: Teachers

	Very Unfavorable	Somewhat Unfavorable	Neutral	Somewhat Favorable	Very Favorable	Total of Somewhat and Very Favorable
Control (n = 975)	0.7	0.8	3.5	18.9	76.1	<b>95.0</b>
Capitation Grant (n = 506)	0.8	0.6	3.0	22.9	72.7	<b>95.6</b>
Incentives (n = 491)	0.8	0.6	2.6	16.9	79.0	<b>95.9</b>
Both (n = 505)	0.0	0.0	2.2	15.2	82.6	<b>97.8</b>
<u>Total</u> (n = 2,477)	<u>0.6</u>	<u>0.6</u>	<u>2.9</u>	<u>18.6</u>	<u>77.3</u>	<u><b>95.9</b></u>

### Panel B: Head Teachers

	Very Unfavorable	Somewhat Unfavorable	Neutral	Somewhat Favorable	Very Favorable	Total of Somewhat and Very Favorable
Control (n = 99)	14.1	4.0	8.1	17.2	56.6	<b>73.7</b>
Capitation Grant (n = 55)	12.7	1.8	3.6	12.7	69.1	<b>81.8</b>
Incentives	11.8	0.00	2.0	23.5	62.8	<b>86.3</b>



(n = 51)

Both

(n = 53)	13.2	0.00	0.00	13.2	73.6	<b>86.8</b>
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Total

<u>(n = 258)</u>	<u>13.2</u>	<u>1.9</u>	<u>4.3</u>	<u>16.7</u>	<u>64.0</u>	<u><b>80.6</b></u>
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**Notes:**

1. For each teacher, opinions are drawn from responses in Year 2 when available. When the teacher was not surveyed in Year 2, their response from Year 1 is used. Head teacher responses are from Year 2 only.
2. Of 350 schools, 258 head teachers were available to be surveyed. Schools where others completed the head teacher survey (deputy head teacher, academic master, etc.) were excluded.

## Table A2: Opinions on Different Performance Pay Options

Distribution of answers to the question: “Suppose the government was going to change the amount and structure of pay increases to teachers in the next 2 years. Suppose that the total budget for increases in teacher salaries is 15%. How would you want this money to be allocated?”

### Panel A: Teachers

	Flat increase of 15% for all teachers, no performance based component	Flat increase of 10% for all teachers, rest based on performance	Flat increase of 5% for all teachers, rest based on performance	Flat increase of 0% for all teachers, rest based on performance	<b>Percentage of teachers who would like some component of salary increase to be based on performance</b>
Control (n = 975)	39.7	42.6	12.1	5.6	<b>60.3</b>
Capitation Grant (n = 506)	39.3	40.5	15.2	4.9	<b>60.6</b>
Incentives (n = 491)	38.7	38.1	11.8	11.4	<b>61.3</b>
Both (n = 505)	37.8	41.4	14.9	5.9	<b>62.2</b>
<u>Total</u> (n = 2,477)	<u>39.0</u>	<u>41.0</u>	<u>13.2</u>	<u>6.7</u>	<b><u>60.9</u></b>

### Panel B: Head Teachers

	Flat increase of 15% for all teachers, no performance based component	Flat increase of 10% for all teachers, rest based on performance	Flat increase of 5% for all teachers, rest based on performance	Flat increase of 0% for all teachers, rest based on performance	<b>Percentage of teachers who would like some component of salary increase to be based on performance</b>

Control					
(n = 99)	33.3	44.4	12.1	10.1	<b>66.7</b>
Capitation Grant					
(n = 55)	23.6	56.4	14.6	5.5	<b>76.4</b>
Incentives					
(n = 51)	27.5	54.9	11.8	5.9	<b>72.5</b>
Both					
(n = 53)	13.2	50.9	18.9	17.0	<b>86.8</b>
<u>Total</u>					
<u>(n = 258)</u>	<u>26.0</u>	<u>50.4</u>	<u>14.0</u>	<u>9.7</u>	<u><b>74.0</b></u>

**Notes:**

1. For each teacher, opinions are drawn from responses in Year 2 when available. When the teacher was not surveyed in Year 2, their response from Year 1 is used. Head teacher responses are from Year 2 only.
2. Of 350 schools, 258 head teachers were available to be surveyed. Schools where others completed the head teacher survey (deputy head teacher, academic master, etc.) were excluded.