

Teacher Opinions on Performance Pay: Evidence from India

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Abstract: The practical viability of performance-based pay programs for teachers depends critically on the extent of support the idea will receive from teachers. We present evidence on teacher opinions with regard to performance-based pay from teacher interviews conducted in the context of an experimental evaluation of a program that provided performance-based bonuses to teachers in the Indian state of Andhra Pradesh. We report four main findings in this paper: (1) over 80% of teachers had a favorable opinion about the idea of linking a component of pay to measures of performance, (2) exposure to an actual incentive program increased teacher support for the idea, (3) teacher support declines with age, experience, training, and base pay, and (4) the extent of teachers' stated ex-ante support for performance-linked pay (over a series of mean-preserving spreads of pay) is positively correlated with their ex-post performance as measured by estimates of teacher value addition. This suggests that teachers are aware of their own effectiveness and that implementing a performance-linked pay program could not only have broad-based support among teachers but also attract more effective teachers into the teaching profession.

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1. Introduction

Education policy makers around the world have been showing growing interest in directly measuring and rewarding schools and teachers based on student learning outcomes.¹ The idea of paying teachers based on direct measures of performance has attracted particular attention since teacher salaries are the largest component of education budgets and an increasing body of research shows that teacher characteristics rewarded under the status quo in most school systems (such as experience and master's degrees in education) are poor predictors of better student outcomes (Rivkin, Hanushek, and Kain 2005; Rockoff 2004; Gordon, Kane, and Staiger 2006). International evidence suggests that introducing performance-linked pay (PLP) programs for teachers leads to significant improvements in student learning outcomes (Lavy 2002 and 2008 in Israel; Muralidharan and Sundararaman 2009 in India) and cross-sectional evidence in the US suggests that schools with individual teacher compensation systems that reward performance are more likely to have high performing students (Figlio and Kenny 2007).

While empirical evidence suggests that PLP for teachers may improve student learning² and education administrators are increasingly interested in implementing such programs, a critical factor in the success of scaled up PLP programs is the extent of support they receive from teachers. Several studies in the US have examined teacher attitudes towards PLP and have reported mixed findings depending on the specific questions asked and the type of differential pay considered (see Ballou and Podgursky, 1993; Jacob and Springer, 2007; and Goldhaber et al, 2010 for some illustrative studies in the US). In general, teachers tend to be most supportive of higher pay for teachers accepting additional responsibilities or accepting positions in schools that are difficult to staff, and least supportive of proposals to link pay to student test scores (Farkas et al 2003).

This paper adds to the literature on teacher opinions with regard to performance-linked pay by looking at evidence from the Indian state of Andhra Pradesh. In addition to being the first paper to study the levels and correlates of teacher support for performance pay in the Indian

¹Prominent policy initiatives in this regard include the "Race to the Top" initiative in the US, as well as similar initiatives in Australia (<http://alp.org.au/agenda/school-reform/performance-pay/>), the UK (Atkinson et al. 2009), Chile (Contreras and Rau 2009).

² However, a recent experimental study in Tennessee found no impact of a performance-linked teacher bonus program on student test scores (Springer et al. 2010), suggesting that context and program details may produce different outcomes in various programs and locations.

context (and to our knowledge, the first in any developing country), we also make two original contributions to the global literature on teacher opinions on performance pay. First, our evidence is based on teacher interviews conducted in both treatment and control schools in the context of an *experimental implementation* of a performance pay program.³ We therefore present evidence not only on the levels of teacher support in general, but can also provide an experimental answer to the question of how exposure to an actual performance pay program influences teacher opinions. Second, we can also link teachers' *ex-ante* opinions on performance pay to their actual *ex-post* performance (as measured by estimates of teacher value addition), which has not been possible in the literature to date.

We report four main findings in this paper. First, over 80% of teachers had a favorable opinion about the idea of linking a component of pay to measures of performance with over 45% of teachers having a *very favorable* opinion. Second, exposure to an actual incentive program increased teacher support for PLP with teachers in schools that were randomly assigned to the incentive program reporting significantly higher levels of support. Third, teacher support for PLP declines significantly with age, experience, training, and base pay. Fourth and finally, the extent of teachers' stated *ex-ante* support for PLP (over a series of mean-preserving spreads of pay) is positively correlated with their *ex-post* performance as measured by estimates of teacher value addition. This correlation continues to be positive and significant even after controlling for several observable teacher characteristics, suggesting that teachers are aware of their own effectiveness (based on traits *unobservable* to the econometrician or policy maker) and that their support for PLP is positively correlated with these unobservables.

The last finding is important because Lazear (2000) shows that around half the gains from performance-pay in the company he studied were due to more productive workers being attracted to join the company under a performance-pay system. Similarly, Hoxby and Leigh (2005) argue that compression of teacher wages in the US is an important reason for the decline in teacher quality, with higher-ability teachers exiting the teacher labor market. Our results suggest that teachers are aware of their own effectiveness and that implementing a performance-linked pay

³ The program was implemented by the Azim Premji Foundation (a leading non-profit organization working to improve primary education in India) on behalf of the Government of Andhra Pradesh, with technical support from the World Bank. See Muralidharan and Sundararaman (2009) for details.

program could not only have broad-based support among teachers, but also attract more effective teachers into the teaching profession over time.

Qualitative evidence based on detailed interviews of teachers conducted by field enumerators suggests a few possible reasons for the popularity of the program. First, several teachers reported being de-motivated by the status quo where there is no differentiation of teacher career prospects on the basis of performance, which in turn leads to an erosion of motivation over time (over 75% of teachers in incentive schools report that their motivation levels increased as a result of the performance-based incentive program). Second, teachers also report trusting the integrity of the program as run by the Azim Premji Foundation and over 90% of teachers reported a favorable opinion of the Foundation's program. Finally, teachers report being satisfied that the content of the assessment tools provided an appropriate measure of student learning, with over 85% saying that the tests used were either good or very good.

In parallel work (Muralidharan and Sundararaman 2009), we find that both group-level and individual-level performance pay programs led to significant improvement in student test scores. The results presented in this paper suggest that scaling up such a program may not only improve learning outcomes in Andhra Pradesh (and India), but also be popular among teachers. Section 2 of the paper discusses some theoretical considerations that may affect how incentive pay schemes may be perceived by teachers. Section 3 describes the context, the experiment, and the data. Section 4 presents the main results, and section 5 concludes.

2. Theoretical Considerations

There are several reasons for why teachers may not be in favor of a system that paid bonuses to teachers on the basis of gains in student test scores. First, evidence from psychological studies suggests that monetary incentives can sometimes crowd out intrinsic motivation and lead to inferior outcomes on the task that is being monitored and rewarded (Deci and Ryan, 1985; Fehr and Falk, 2002). Teaching may be especially susceptible to this concern since many teachers are thought to enter the profession due to strong intrinsic motivation. Second, teachers may feel that test scores are only one component of a good education and that being evaluated solely on test scores would limit their functioning as teachers and induce activities such as "teaching to the test" that may be detrimental to longer-term learning outcomes. Third, even if test scores

represented learning accurately, the teacher is only one input into the determination of learning, with crucial inputs being required from the household and from the student as well. Thus, being held accountable for an outcome that is not fully within a teacher's "locus of control" may also be de-motivating to teachers (a related concern may be measurement error in test scores, which may lead to bonuses being determined mostly by luck). Fourth, depending on the specific structure of the bonus program, the incentive for teachers to cooperate among themselves may be affected, which in turn may reduce collegiality in the workplace. Finally, teachers may not trust administrators and head teachers to implement the program fairly and may resist changes to the status quo.⁴

On the other hand, a system that does not differentiate among high and low-performing teachers may also be de-motivating to teachers and reduce effort if higher effort and effectiveness is not rewarded in any way. The context in India and Andhra Pradesh suggested that this may have been a valid concern. Kremer et al (2005) show that in Indian government schools, teachers reporting high levels of job satisfaction are *more likely* to be absent. In subsequent focus group discussions with teachers, it was suggested that this was because teachers who were able to get by with low effort were quite satisfied, while hard-working teachers were dissatisfied because there was no difference in professional outcomes between them and those who shirked. Thus, it is also possible that the lack of external reinforcement for performance can erode intrinsic motivation and teacher satisfaction (Mullainathan, 2006). In such a context, the provision of external incentives based on objective measures of performance that are transparently and fairly applied could *increase* intrinsic motivation, and teacher satisfaction, which may lead to teachers favoring such a system.

In summary, the psychological literature on incentives suggests that extrinsic incentives that are perceived by workers as a means of exercising control over them and interfering with norms of professional behavior are more likely to crowd out intrinsic motivation, while those that are seen as reinforcing norms of professional behavior can enhance intrinsic motivation (Fehr and Falk, 2002). Thus, the way an incentive program is framed can influence its effectiveness.

⁴ These points are made in various forms in the several papers that study teacher attitudes towards performance pay in the US including Goldhaber et al, 2010; and Jacob and Springer, 2007

The teacher incentive program implemented in Andhra Pradesh was designed with a view to recognizing and rewarding excellence in teaching and had no negative implications for poor performance beyond the non-receipt of a bonus. Thus, all communications to teachers described the program as one that aimed to provide recognition to outstanding teachers as opposed to framing the program in terms of “school and teacher accountability”. The Azim Premji Foundation is also a well-regarded entity in India with a reputation among teachers for aiming to improve the quality of education in India. It is therefore likely that the teachers trusted the integrity of the program. Finally, testing and coaching for high stakes tests is such an integral component of the Indian education system,⁵ that assessment and evaluation on the basis of improvements in student test scores probably seemed like a fair and transparent way to assess teacher impact. Thus, a combination of contextual and program design factors probably helped to mitigate the concerns that teachers might have otherwise had about such a program.

3. Context, Experimental Design and Data

3.1 Context

While India has made substantial progress in improving access to primary schooling and primary school enrolment rates, the average levels of learning remain very low. The most recent *Annual Status of Education Report* found that nearly 60% of children aged 6 to 14 in an all-India sample of over 300,000 rural households could not read at the second grade level, though over 95% of them were enrolled in school (Pratham, 2010). Public spending on education has been rising as part of the “Education for All” campaign, but there are substantial inefficiencies in public delivery of education services. A study using a nationally-representative dataset of primary schools in India found that 25% of teachers were absent on any given day, and that less than half of them were engaged in any teaching activity (Kremer et al. 2005).

Andhra Pradesh (AP) is the 5th most populous state in India, with a population of over 80 million, 73% of whom live in rural areas. AP is close to the all-India average on measures of human development such as gross enrollment in primary school, literacy, and infant mortality, as well as on measures of service delivery such as teacher absence. There are a total of over 60,000

⁵ The centrality of testing to the Indian education experience is attested to by the proliferation of coaching classes for high-stakes entrance tests to selective colleges and universities. The best known coaching classes are in turn so selective that there is a large industry of coaching classes for the entrance exam for the coaching classes for the entrance exam for highly selective institutes such as the Indian Institute of Technology (IIT).

such schools in AP and over 70% of children in rural AP attend government-run schools (Pratham, 2010). All regular government-school teachers are employed by the state, and their salary is mostly determined by experience and rank, with minor adjustments based on assignment location, but no component based on any measure of performance. The average salary of regular teachers is over Rs. 10,000/month and total compensation including benefits is even higher (per capita income in AP is around Rs. 2,500/month; 1 US Dollar \approx 45 Indian Rupees). Teacher unions are strong and disciplinary action for non-performance is rare.⁶

3.2 Experimental Design and Data

The data used in this paper come from an experimental evaluation of the impact of providing performance-linked bonuses to teachers in Andhra Pradesh (AP). We studied two types of teacher performance pay (group bonuses based on school performance, and individual bonuses based on teacher performance), with the average bonus calibrated to be around 3% of a typical teacher's annual salary (or 35% of a month's pay). The incentive program was designed to minimize the likelihood of undesired consequences (see Muralidharan and Sundararaman, 2009 for details on the incentive design) and the study was conducted by randomly allocating the incentive programs across a representative sample of 300 government-run schools in rural AP with 100 schools each in the group and individual incentive treatment groups and 100 schools serving as the control group.

The school year in AP runs from mid-June to mid-April, and the experiment was carried out in the school years 2005 – 06, and 2006 – 07. Baseline tests were conducted in June-July 2005 and end of year tests were conducted in March-April 2006 and 2007. Measures of teacher value addition are constructed using this panel data on test scores using a standard teacher fixed effect specification. The data on teacher opinions used in this paper comes from interviews conducted with teachers in July-August 2006 and 2007 respectively. These interviews were conducted after the teachers had exposure to the program, but before they knew their own results (and bonus amounts to be received) because the bonuses based on performance in each school year were paid out a few months into the next school year (usually in September). Teachers in all three treatment groups (control, group incentive, and individual incentive schools) were interviewed

⁶ See Kingdon and Muzammil (2001) for an illustrative case study of the power of teacher unions in India. Kremer et al (2005) find that 25% of teachers are absent across India, but only 1 head teacher in their sample of 3000 government schools had ever fired a teacher for repeated absence.

and the interviews included questions on teaching practice, activities during the school year, and opinions on teacher performance pay. The control schools were not exposed to the details of the performance pay treatments, but were probably aware that the Foundation was conducting pilot programs involving performance-linked bonuses in other schools.⁷ We report the main results regarding teacher opinions on performance-linked pay both separately by treatment as well as pooled across treatments.

4. Results

4.1 Teacher Opinions on Performance Pay

We focus on two main variables of interest. The first is teacher response 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?” We find that over 80% of the teachers in control schools who were interviewed report having a somewhat or very favorable opinion about such an idea (Table 1 – Panel A). Teachers who were exposed to the incentive program report even higher support for the idea of performance-linked pay (PLP), with teachers in the individual incentive program showing the highest extent of support (over 88%). Averaged across all teachers, over 85% of teachers were supportive of PLP.

Since teacher bonuses were paid over and above the base salary, the high level of support indicated might partly reflect the fact that there was nothing to lose for any teacher from the program. Our second variable of interest is therefore the extent of self-reported teacher preference over a schedule of mean-preserving spreads of pay. Since pay revisions for public employees in India typically follow the recommendations of decennial Pay Commissions appointed by the Government of India, the specific question asked was: “The 6th Pay Commission has just been set up and is going to consider the amount and structure of pay increases 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 choices ranged from an across the

⁷ There was no formal communication to any school about programs being offered to other schools, but field reports suggest that teachers generally knew about the programs offered in other schools through informal channels. We cannot rule out the possibility that there may have been some spillovers from the incentive program in other schools to teachers’ opinions in control schools, but we think that this is unlikely since direct interaction between teachers in control and incentive schools was very limited (due to the geographical dispersion of the schools).

board increase of 15% for all teachers to allocating all of the extra money for performance-linked bonuses.⁸

We find that over 70% of teachers in control schools report a preference for at least some component of total pay being linked to performance (Table 1 – Panel B). Again, the level of support is higher in the schools that were part of the incentive experiment, with over 78% of teachers in individual incentive schools expressing such a preference. Across all teachers, over 75% expressed a preference for some PLP. If teachers are risk-averse and have rational expectations about the distribution of their abilities, we would expect less than 50% to support expected-wage-neutral performance pay since there was no risk premium offered in the set of options. The 75% positive response could reflect several factors including over-optimism about their own abilities, a belief that it will be politically more feasible to secure funds for salary increases if these are linked to performance, or a sense that such a system could bring more professional respect to teachers, would be fair to high-performing teachers, and could enhance teacher motivation across the board.

The rest of the analyses in this paper use the answers to these two questions as the main dependent variable of interest (the exact questions and distributions of answers are shown in Table 1). Table 2 presents ordered probit and OLS estimates of teacher responses to these questions as a function of the treatment status of their school and the project year (Panels A and B show the two different questions, which correspond exactly to those in Panels A and B in Table 1). The ordered probit specifications make the best use of the information contained in the teacher surveys because the answers to the questions in Table 1 are only ordinal and not cardinal. However, since these coefficients are difficult to interpret, we also present OLS specifications that use a binary dependent variable indicating favorability towards PLP (using the same classification tabulated in the last column of Table 1). The OLS coefficients can be directly interpreted as the change in probability of being favorable towards PLP.

We see that teachers in both the group and the individual incentive treatment groups are more likely to be in favor of performance pay than those in the control schools (the omitted category) with teachers in individual incentive schools significantly more in favor than those in group

⁸ The questions were asked of teachers in 2006 and 2007, while the 6th Pay Commission was set up in 2006 and made its recommendations in 2008. This timing made the phrasing of the question salient in a way that could be understood by all teachers.

incentive schools (Table 2, Panel A – Column 1). Since these treatments are randomly assigned, the results suggest that exposure to the programs increased teacher preference for performance-linked bonuses. We control for several teacher demographic characteristics (the ones shown in Table 3) and find that this result is unchanged, but the number of observations falls by a quarter due to lack of demographic data on all teachers and as a result the coefficient on the group incentive schools is no longer significant, though the point estimate is essentially the same as without the controls (Column 2). Columns 3 and 4 break down the results by treatment as well as by year and we see that in general there was no significant difference between the two years for any of the treatment groups. Columns 5-8 present the results from the OLS specification and we see the same pattern of results, with teachers in both types of incentive schools showing significantly higher levels of support for PLP, and the highest support being in individual incentive schools (though not significantly different relative to group incentive schools in the OLS specification).

Panel B (opinions on mean-preserving spreads of pay) show the same patterns as Panel A, but the difference between group and individual incentives is not significant in any of the specifications though the point estimates continue to indicate greater support in individual incentive schools. Breaking down the results by year and treatment suggests that support in individual incentive schools increased at the end of the second year (in the ordered probit specification with demographic controls), while it decreased in group incentive schools (OLS specifications based on binary indicator of support). Since we have only two years worth of data, it is difficult to generalize from these results as to how the long-run attitude towards PLP programs may evolve among teachers. However, it is worth noting that the overall level of support does not seem to change much over the two years of the program.

4.2 Demographic Correlates of Teacher Opinions

While the overall level of teacher support for performance-linked bonuses is high, there may be variation in support by teacher demographic characteristics. Table 3 presents bivariate correlations between several teacher characteristics and their attitudes towards performance-linked pay in general (columns 1 and 2) and the extent of mean preserving spreads of PLP that they would prefer to see (columns 3 and 4). As in Table 2, we report both ordered probit (columns 1 and 3) and OLS specifications (columns 2 and 4) with incrementally-coded and

binary responses respectively (the results from these 2 specifications almost never differ in terms of which covariates are significant). The main results here are teachers with higher levels of training, greater experience, higher base pay, and teachers who are older are significantly less likely to support the idea of PLP.

One group of teachers who strongly support PLP are contract teachers (also known as para-teachers). Contract teachers are usually locally-hired on fixed-term renewable contracts, are typically not professionally trained, and are paid much lower salaries than those of regular teachers – often less than one fifth as much. Since these teachers do not obtain any of the benefits of civil-service job security or pay, and appear to be as effective as regular teachers (see Muralidharan and Sundararaman (2010) for further details) it is not surprising that they were supportive of the idea of performance-linked pay.

Finally, we also run these regressions with a linear interaction between each characteristic and a dummy for ‘incentive school’ status to test for differential response by covariates across treatment and control schools, and find that in most cases, we cannot reject the null of similar response by covariates across treatments. Notable exceptions include teachers who have completed college education or formal teacher training, who appear to be even less likely to support PLP when they were in incentive schools.

Since several teacher characteristics (such as age, experience, and base pay) are correlated with each other, we also run a multiple regression on the correlates of teacher opinions (using ordered probits and OLS) and present these results in columns 5 to 8 of Table 3. The two main predictors of teacher preferences are teacher training and age, both of which are significantly negatively correlated with teacher preferences for PLP. We also see that the coefficient on teacher salary is no longer significant in the multiple regression suggesting that opposition to PLP may be more a function of age than that of high base pay under the status quo (though the two are highly correlated).

4.3. Performance-related Correlates of Teacher Opinions

A unique feature of this paper is that our data allows us to match teacher opinions on PLP with not only demographic characteristics, but with actual measures of performance since we can calculate the “value added” to test scores by each teacher in our sample. We also conduct the interviews on teacher opinions *after* the school year, but *before* teachers know their own

performance and bonus figures. Table 4 shows the correlation (based on ordered probits) between teachers *ex ante* stated opinions regarding PLP after the first year of the program and their actual *ex post* performance in improving student test scores (average of each teacher's 'value added' estimate across the two years). We present results on both dependent variables (Panels A and B), but focus our discussion on the extent of mean-preserving spreads of pay desired by teachers (Panel B), since this is the more direct measure of the *extent* of change from the status quo desired by teachers (the results are not very different though).

We see that there is a significant positive correlation between the extent of performance-linked mean-preserving spread of pay that teachers would support and a measure of their own effectiveness. The result holds in both the pooled sample across all schools (Column 1) as well as in the samples that are disaggregated by treatment status (Columns 2 and 3). We also test for whether this correlation can be explained by teacher demographics that are correlated with both their opinions on performance pay and their actual performance by including as controls all the demographic variables shown in Table 3. We find that the results are robust to the inclusion of all these controls and that the magnitudes of the effects are only slightly lower (Columns 4-6). If we assume that teacher responses would be consistent with their self interest, then this result suggests that there are aspects of teacher effectiveness that are unobservable to the econometrician (and to policy makers), but which teachers themselves are aware of.

Since unobservable quality traits of teachers are not compensated under the status quo, our finding a positive correlation between teachers' *ex ante* preference for PLP and their *actual performance* (which would be a measure of quality) suggests that a system of teacher compensation that included a performance-linked component may be able to attract higher-quality teachers into the teaching profession. Of course, if teacher learning about their own aptitude for teaching mostly takes place only after entering teaching, then the impact of PLP is more likely to be on the retention margin, and this may have less of an overall effect in India given that the rents accruing to government school teachers are quite large and that few government school teachers ever leave their jobs (see Muralidharan and Sundararaman, 2010).

Finally, we also measure the correlation between changes in teacher opinion between year 1 and year 2 and measures of the actual bonus received and find that this correlation is positive and significant. This suggests that while teachers are aware of some of their unobserved quality, the scores and bonuses also provide them with additional information about their effectiveness,

which probably affects their level of support for PLP programs. Thus, it is likely that teacher opinions over time will be influenced by their actual performance and that support may fall among teachers who receive no or low bonuses.

5. Conclusion

This paper presents the first evidence on teacher opinions regarding performance-linked pay from a developing country and is also unique in being able to study these opinions in the context of a multi-year experimental evaluation of the impact of PLP on student learning outcomes. We report four main results in this paper: (1) over 80% of teachers had a favorable opinion about the idea of linking a component of pay to measures of performance, (2) exposure to an actual incentive program increased teacher support for the idea, (3) teacher support declines with age, experience, training, and base pay, and (4) the extent of teachers' stated ex-ante support for performance-linked pay (over a series of mean-preserving spreads of pay) is positively correlated with their ex-post performance as measured by estimates of teacher value addition.

It is worth reflecting on why our findings (especially the high levels of teacher support for performance bonuses linked to improvements in student test scores) may be different from the typically low levels of support for PLP based on student test scores found in other studies – especially in the US. We can think of three possible reasons for the divergence.

First, most papers that study teacher opinions on performance-linked pay are based on responses to questions about the general concept as opposed to specific well-defined schemes. It is possible that the absence of specifics may lead a risk-averse teacher to be wary of changes and oppose the suggestion. Our data is based on teacher responses in the context of an actual program, which they could see was transparently designed and fairly implemented by an independent NGO. Thus, though the questions asked were about teachers' opinion on PLP in general, the answers probably considered the specific program as a prototype.⁹

Second, since PFP programs in other parts of the world (and especially the US) are often associated with school accountability measures, the framing of these programs can often connote an adversarial relationship between teachers and administrators, which may also explain lower levels of support in such contexts. The communication to schools about the performance based

⁹ Of course, this would not explain the high levels of support in the control schools as well, but may explain why exposure to the program *increased* the support for the ideal of PLP.

bonus program was careful to frame the bonus program as designed to recognize and reward excellent teaching as opposed to holding teachers accountable for student performance. The questions that were asked to the teachers (including those in the control schools) also used a similar framing.

Finally, testing (and dedicated coaching of students for high-stakes testing) is such an integral component of the Indian education system, that being evaluated on the basis of improving student performance on tests perhaps does not seem unfair to teachers. This is in contrast with education systems like those in the US with a limited history of high-stakes testing. As discussed earlier, evaluation systems that conform to teachers' own sense of professional standards are more likely to be acceptable to teachers and the relative centrality of testing in different education systems may be an important factor in explaining differential teacher attitudes towards performance pay systems that are linked to student test scores.

The results in this paper suggest some straightforward policy implications. Linking a component of teacher pay to objective measures of performance is not only likely to improve student learning outcomes (Muralidharan and Sundararaman 2009), but is also likely to be popular among teachers. The results and discussion presented in this paper suggest that some of the key design features of a performance-pay system that may be broadly accepted by teachers include: framing the program less in terms of "school accountability" and more in terms of "teacher recognition", fair and transparent administration, and being seen as rewarding aspects of teacher behavior that are consistent with teachers' own notions of good professional conduct.

Table 1 (Panel A): Summary of Teacher 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?"

	Very Unfavorable	Somewhat Unfavorable	Neutral	Somewhat Favorable	Very Favorable	Total of Somewhat and Very Favorable
Control (n = 459)	3.1%	4.4%	11.5%	35.9%	45.1%	81.0%
Group Incentive Schools (n = 513)	2.1%	4.1%	7.6%	37.0%	49.1%	86.2%
Individual Incentive Schools (n = 543)	1.5%	5.0%	4.8%	32.4%	56.4%	88.8%
All teachers (n = 1515)	2.2%	4.5%	7.8%	35.0%	50.5%	85.6%

Table 1 (Panel B): Summary of Teacher Opinions on Mean Preserving Spreads of Pay

Distribution of answers to the question: "The 6th Pay Commission has just been set up and is going to consider the amount and structure of pay increases 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?"

	a. Flat increase of 15% for all teachers, no performance based component	b. Flat increase of 10% for all teachers, rest based on performance (range of salary increase from 10% to 20% based on performance)	c. Flat increase of 5% for all teachers, rest based on performance (range of salary increase from 5% to 25% based on performance)	d. Flat increase of 0% for all teachers, rest based on performance (range of salary increase from 0% to 30% based on performance)	Fraction of teachers who would like some component of salary increase to be based on performance
Control (n = 466)	29.7%	47.7%	10.3%	12.3%	70.3%
Group Incentive Schools (n = 512)	23.8%	47.4%	15.6%	13.2%	76.2%
Individual Incentive Schools (n = 543)	21.7%	49.5%	13.5%	15.2%	78.3%
All teachers (n = 1512)	24.9%	48.3%	13.2%	13.6%	75.1%

Table 2: Teacher Opinions by Treatment and Year

Panel A: Favorability towards Performance Pay (PP)								
	Ordered Probit: Favorability Towards PP				OLS : Favorable or very favorable towards PP			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Control Schools					0.81 (0.019)***		0.813 (0.026)***	
Group Incentive (GI) : A	0.124 (0.073)*	0.128 (0.084)	0.099 (0.104)	0.136 (0.108)	0.051 (0.024)**	0.05 (0.027)*	0.057 (0.034)*	0.062 (0.034)*
Individual Incentive (II) : B	0.273 (0.074)***	0.323 (0.088)***	0.202 (0.106)*	0.225 (0.110)**	0.077 (0.023)***	0.094 (0.026)***	0.068 (0.032)**	0.076 (0.032)**
Control * Year 2			-0.165 (0.103)	-0.129 (0.123)			-0.005 (0.035)	-0.013 (0.042)
GI * Year 2			-0.113 (0.094)	-0.15 (0.120)			-0.017 (0.030)	-0.043 (0.039)
II * Year 2			-0.027 (0.099)	0.121 (0.118)			0.013 (0.027)	0.033 (0.029)
Teacher Demographic Controls	No	Yes	No	Yes	No	Yes	No	Yes
Test: A = B	0.044	0.019			0.207	0.051		
Observations	1515	1137	1515	1137	1515	1137	1515	1137
R-squared					0.008	0.029	0.008	0.032

Panel B: Extent of mean-preserving spread of pay desired								
	Ordered Probit : Extent of mean-preserving spread of pay desired				OLS : Would like to have some component of total pay be based on performance			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Control Schools					0.703 (0.022)***		0.717 (0.030)***	
Group Incentive (GI) : A	0.159 (0.076)**	0.134 (0.086)	0.23 (0.093)**	0.256 (0.098)***	0.059 (0.030)**	0.071 (0.033)**	0.092 (0.039)**	0.107 (0.040)** *
Individual Incentive (II) : B	0.209 (0.075)***	0.261 (0.087)***	0.195 (0.093)**	0.217 (0.099)**	0.08 (0.029)***	0.103 (0.032)***	0.074 (0.039)*	0.081 (0.040)**
Control * Year 2			0.085 (0.096)	0.16 (0.125)			-0.028 (0.041)	-0.027 (0.052)
GI * Year 2			-0.055 (0.087)	-0.143 (0.108)			-0.093 (0.034)***	-0.123 (0.044)** *
II * Year 2			0.114 (0.084)	0.283 (0.104)***			-0.018 (0.033)	0.025 (0.038)
Teacher Demographic Controls	No	Yes	No	Yes	No	Yes	No	Yes
Test: A = B	0.49	0.122			0.447	0.312		
Observations	1512	1138	1512	1138	1512	1138	1512	1138
R-squared					0.006	0.023	0.01	0.03

Notes

- All regressions are clustered at the teacher level. Significance levels are as follows: * 10%, ** 5%, *** 1%
- Columns [1] to [4] report ordered probits based on the full range of responses shown in Table 1
- For columns [5] to [8] of panels A and B, the dependent variable is a binary indicator of 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).
- Teacher demographic controls included in the even columns are the same set reported in Table 3

Table 3: Correlates of Teacher Opinions on Performance Pay

Teacher Characteristic	Panel A: Bivariate Regressions of Teacher Opinion on Each Covariate				Panel B: Multiple Regression of Teacher Opinion on All Covariates			
	Favorability towards PP		Extent of mean-preserving spread of pay desired		Favorability towards PP		Extent of mean-preserving spread of pay desired	
	Ordered Probit	OLS	Ordered Probit	OLS	Ordered Probit	OLS	Ordered Probit	OLS
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Male	0.013 (0.069)	-0.017 (0.020)	0.003 (0.069)	-0.011 (0.026)	0.094 (0.073)	-0.008 (0.022)	0.085 (0.073)	0.015 (0.028)
College degree	-0.051 (0.098)	-0.011 (0.029)	-0.022 (0.096)	-0.025 (0.036)	0.2 (0.146)	0.047 (0.038)	-0.022 (0.129)	-0.04 (0.047)
Bachelor's in Education or higher level teacher training	-0.241 (0.079)***	-0.051 (0.021)**	-0.045 (0.074)	-0.011 (0.028)	-0.352 (0.109)***	-0.065 (0.024)***	-0.023 (0.098)	0.018 (0.034)
From same village	0.135 (0.115)	0.009 (0.032)	0.099 (0.109)	0.046 (0.041)	-0.006 (0.123)	-0.017 (0.039)	-0.039 (0.119)	0.008 (0.048)
Teacher Experience	-0.016 (0.004)***	-0.002 (0.001)*	-0.015 (0.005)***	-0.004 (0.002)***	-0.004 (0.009)	0 (0.003)	-0.003 (0.011)	0.002 (0.004)
Log Salary	-0.265 (0.075)***	-0.032 (0.018)*	-0.223 (0.067)***	-0.069 (0.023)***	0.1 (0.152)	0.055 (0.063)	0.034 (0.179)	-0.003 (0.072)
Log Age	-0.822 (0.156)***	-0.142 (0.042)***	-0.596 (0.153)***	-0.212 (0.055)***	-0.867 (0.288)***	-0.196 (0.079)**	-0.512 (0.303)*	-0.253 (0.104)**
Somewhat or very active in teacher unions	-0.056 (0.077)	-0.022 (0.022)	0.116 (0.075)	0.026 (0.030)	-0.1 (0.081)	-0.032 (0.023)	0.066 (0.078)	0.003 (0.031)
Contract Teachers	0.699 (0.262)***	0.113 (0.029)***	0.508 (0.194)***	0.152 (0.052)***	0.401 (0.391)	0.146 (0.118)	0.355 (0.372)	0.049 (0.142)
Observations					1137	1137	1138	1138

Notes

- Columns 1-4 present results from individual bivariate regressions of teacher opinion/preference for performance pay on several teacher characteristics, while Columns 5-8 present results from a multiple regression with each of the covariates included. Significance levels are as follows: * 10%, ** 5%, *** 1%
- All ordered probit specifications use the full range of responses recorded in Table 1, while all OLS specifications use binary dependent variables coded as in the last column of Table 1
- The number of observations for each bivariate regression (in columns 1-4) is not too different from the number of observations reported in columns 5-8 since all questions come from the same set of teacher interviews and item-level non-response is very low.

Table 4: Correlations of Teacher Preferences with measures of Value Addition

Panel A: Favorability towards Performance Pay (Year 1 only)						
	All Schools [1]	Control [2]	All Incentive Schools [3]	All Schools [4]	Control [5]	All Incentive Schools [6]
Teacher Value Added (Averaged across 2 years)	0.353 (0.104)***	0.191 (0.178)	0.391 (0.127)***	0.284 (0.112)**	0.048 (0.207)	0.341 (0.143)**
Teacher Demographic Controls	No	No	No	Yes	Yes	Yes
Observations	731	224	507	681	208	473
Panel B: Extent of mean-preserving spread of pay desired (Year 1 only)						
	All Schools [1]	Control [2]	All Incentive Schools [3]	All Schools [4]	Control [5]	All Incentive Schools [6]
Teacher Value Added (Averaged across 2 years)	0.39 (0.098)***	0.422 (0.198)**	0.344 (0.116)***	0.372 (0.104)***	0.319 (0.204)	0.338 (0.126)***
Teacher Demographic Controls	No	No	No	Yes	Yes	Yes
Observations	731	224	507	681	208	473

Notes

1. All regressions are ordered probits. The dependent variable is the teacher opinion from year 1 and the main right-hand side variable is the teacher value added averaged across both years of the project. Significance levels are as follows: * 10%, ** 5%, *** 1%
2. The dependent variable in Panel A is the one tabulated in Panel A of Table 1, while the dependent variable in Panel B is the one tabulated in Panel B of Table 1.
3. Teacher demographic controls used in columns 4, 5 and 6 are the full set shown in Table 3.

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