

Performance-Related Pay for Teachers: An Updated Review

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There is a revived interest in performance related pay for teachers in the United States and around the world. Building on the previous seminal work, this paper presented an updated and comprehensive review of PRP by addressing such key issues in program development and implementation as the characteristics of districts that offered the programs and the characteristics of teachers that received the awards, the impacts of PRP on teaching practice, student achievement, and teacher retention. It also discussed the use of Student Learning Objectives to measure and improve teachers' instructional practice and student learning in non-tested subject areas and grade levels.

I. INTRODUCTION

There is a revived interest in performance related pay (PRP) programs for teachers in the United States and around the world and this trend mirrors a broader demand and public pressure for higher teacher effectiveness and greater student learning (Podgursky & Springer, 2007; Robinson, 1984; Woessmann, 2011). Under the *American Recovery and Reinvestment Act* of 2009, the federal government issued the \$4.35 billion *Race to the Top* fund and one goal of the program is to reform educator compensation systems by providing additional pay to highly effective teachers. Previously, the U.S. Congress had appropriated \$99 million for the *Teacher Incentive Fund* in 2006 to develop and implement sustainable performance-based compensation systems for principals and teachers in high-need schools; the appropriation soared to \$400 million for the 2010 fiscal year and followed by \$399 million in 2011 and \$299 million in 2012 (U.S. Department of Education, n.d.).

The oldest recorded PRP program (or merit pay as traditionally labeled) for teachers

in the United States was established in 1908 in Newton, Massachusetts (Robinson, 1984). This form of teacher incentive pay reflected the American value and belief that people ought to be rewarded in proportion to their talent, skill, and effort (Brittan, 1995), a notion from the Protestant Reformation of the sixteenth and seventeenth centuries (Evans, 1970). Little was known about those early plans except that most of them did not last long (Murnane & Cohen, 1986). During the 2007-08 academic year, 10.2% of school districts across the nation offered PRP programs and 4.7% of all full-time public school teachers received some form of PRP awards for their excellence in teaching (Liang & Akiba, 2011).

Building on the previous seminal reviews (e.g., Loeb, Miller, & Strunk, 2009; Podgursky & Springer, 2007), this paper provided an updated review of PRP programs for teachers. It contributed to the field and advanced our knowledge base in several important ways. First of all, it covered a broad range of key issues surrounding PRP and focused on rigorous and latest empirical studies in the United States and abroad. In addition, this

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review explored in depth the impacts of PRP on improving teachers' instructional practice, the key to achieving authentic and long-lasting student learning. Furthermore, this study provided policymakers with up-to-date information on the characteristics of districts offering PRP programs and the characteristics of teachers receiving PRP awards. Finally, this paper reviewed some empirical studies on using Student Learning Objectives (SLOs) to evaluate teachers and improve teachers' instruction, a promising and significant but rarely addressed area for teachers in non-tested subject areas and grade levels in teacher evaluation and PRP studies.

This review focused on recent studies that provided insight into current issues surrounding using PRP to improve teachers' instructional practice and enhance authentic student learning both in the United States and around the world. Special attention was given to empirical studies that offer quantitative and/or qualitative evidence to support the conclusions rather than simply presenting opinions or theories. Furthermore, this study examined primarily academic work published in peer-reviewed journals and organizations with well established peer-review processes. Relevant books, book chapters, and conference proceedings that offered empirical evidence and analysis were also reviewed.

A majority of the studies examined in this review were identified and collected by electronic database searches such as EBSCO, ERIC, JSTOR, and Google Scholar. Publications indexes of education research institutions such as the National Center for Education Statistics, the National Bureau of Economic Research, and the National Center on Performance Incentives were also checked. In addition, a number of scholars provided

suggestions of relevant works and some very recent studies such as the National Research Council (Hout & Elliott, 2011) and the evaluation of the Round Rock pilot project (Springer et al., 2012) were referenced.

This review was organized into the following sections. The first two sections reviewed the definitions and theoretical frameworks of PRP. The third section reviewed empirical studies on the characteristics of districts that offered PRP programs and the characteristics of teachers that received PRP awards. Sections 4-6 discussed empirical studies on the impacts of PRP on teachers' instructional practice, student achievement, and teacher retention, respectively. The seventh section focused on Student Learning Objectives. The final section concluded this paper with recommendations for future studies.

II. DEFINITIONS OF PRP

There lacks a common understanding of PRP and researchers have used dozens of similar terms to refer to a wide range of plans and programs (Rowland & Potemski, 2009). A quick review of various sources identified dozens of definitions of PRP as presented in the Appendix and they varied substantially on such key program design characteristics as scopes, targets and performance measures. While it may be convenient to label a variety of programs as PRP, it to a greater extent might hinder a constructive dialogue in teacher compensation reforms (Calhoun & Protheroe, 1983; Rowland & Potemski, 2009).

Following the previous studies (e.g., Podgursky & Springer, 2007; Springer, 2009), this study defined PRP as a compensation system that rewards teachers with extra

financial rewards beyond the annual salary raise on the salary schedule for outstanding performance in the performance evaluation. It provides teachers with extra financial resources which may include cash bonuses, salary raise or extra steps/channels on the salary schedule based on predetermined outcomes such as student proficiency or growth rather than inputs such as skills or knowledge. A PRP program may reward teachers for individual performance, a group of teachers by grade or by subject for group-level performance, or all the teachers in a school for school-level performance. It is worthwhile to note that based on this definition, this review leaves out studies on incentive pay programs which are not contingent on performance such as those on teacher recruitment and retention in hard-to-staff subjects and schools in California (Steele, Murnane, & Willett, 2010), Massachusetts (Fowler, 2003), and North Carolina (Clotfelter, Glennie, Ladd, & Vigdor, 2008).

III. THEORETICAL FRAMEWORKS

Tying what teachers earn to what students learn gains support from both economics (e.g., the principal agent theory) and psychology (e.g., the expectancy theory) under the common assumption that linking pay to performance increases performance (Heneman & Werner, 2005). These two bodies of literatures together delineate a picture of the complexity in PRP design and implementation (Hout & Elliott, 2011).

From an economic perspective such as the principal agent theory, there exists a principal-agent relationship in the public education system when a school district (i.e., the principal) employs a teacher (i.e., the agent) to teach and pays for his/her teaching

efforts. The objective of the district is to maximize the district's own payoff. However, there exists various forms of information asymmetry between the district and the teacher because teachers have more information on their own teaching efforts and effectiveness in improving student achievement than the district does. The key task for the district, therefore, is to design an incentive pay scheme that will induce the teachers to align their performance with the district's goals and produce the desired outputs at the least cost to the district (Dixit, 2002; Levacic, 2009).

From a psychological perspective such as the *Expectancy Theory* of Vroom (1964), three key conditions jointly determine an individual teacher's motivation: (a) The teacher must perceive the existence of a relationship between efforts and performance (i.e., expectancy); (b) The teacher must perceive that such performance will lead to certain outcomes (i.e., instrumentality); and (c) The outcomes must be desirable or attractive to the teacher (i.e., valence). If any of the three conditions is not met, the motivational effect will be zero and the teacher will not be motivated to perform or to improve. Therefore, when expectancy, instrumentality, and valence are appropriately aligned, linking teacher compensation with teacher performance would elicit both the short-term motivational effects on teachers for higher levels of efforts and performance, and the long-term sorting effects of attracting and retaining those who can produce the rewarded outcomes in the profession (Lazear, 2003).

The principal agent theory and the expectancy theory provide us with important lenses to examine such key issues as the characteristics of districts offering PRP programs and the characteristics of teachers receiving PRP awards, and the impacts of

PRP on improving teaching practice and enhancing student learning. These empirical studies are reviewed below.

IV. DISTRICT AND TEACHER CHARACTERISTICS

In a seminal article, Murnane and Cohen (1986) argued that PRP does not fit teaching because teacher performance is hard to monitor and as teachers work to a great extent as teams, PRP will harm teacher cooperation. In addition, education has multidimensional goals and it is almost impossible to isolate individual contribution to some important goals such as the realization of student potentials. On the contrary, Ballou (2001) compared the use of PRP in public and private schools with nationally representative datasets. He found that these programs was used in a large number of private schools and the awards were not trivial. In public school districts where teachers did not have union representation in collective bargaining, the use of PRP was nearly as great as that among the nonsectarian private schools. Therefore, he argued that the reasons for the failure of PRP programs in many districts were not inherent in the teaching contexts, but were rather due to the specific circumstances in the public education system, notably the opposition of teacher unions.

Understanding the characteristics of districts that are more likely to implement a PRP program constitutes important implementation data for policymakers to consider the future directions of PRP programs. In addition, an examination of the characteristics of PRP recipients will reveal whether the PRP programs are benefiting highly qualified teachers and teachers in high

demand. According to the principal-agent theory, a district will only choose to offer a PRP program when the benefits of the program exceed the administrative and political costs (e.g., union resistance) so as to maximize the district's welfare. In addition, teachers with demonstrated excellence in improving student achievement (e.g., National Board-certified teachers) and in high demand (mathematics, science, and special education teachers) should be more likely to receive a larger amount of PRP.

Goldhaber and colleagues (2008) used the 1999-2000 Schools and Staffing Survey (SASS) data set and explored how the nature of teaching and the political costs of union resistance affect school districts' PRP decisions. They found that union influence was a major deterrent to PRP programs, a finding consistent with Ballou (2001). In addition, they found that large suburban school districts were more likely to implement PRP programs. The enrollment of minority and low-income students, however, were not significant factors. Using the same data set, Belfield and Heywood (2008) examined the characteristics of teachers who received PRP awards. They found that the probability of receiving PRP was negatively associated with union member status, and female teachers were significantly more likely than male teachers to receive PRP.

In a series of studies in Texas, Springer et al. (2009) examined the Governor's Educator Excellence Grant (GEEG) program and found that the probability of receiving a larger amount of GEEG award is related to a teacher's experience in the school, gender, and subject-area assignment: Male mathematics teachers who have longer experience in the school are more likely to

receive a large amount of GEEG bonus. The key determinant of teacher salary scales (i.e., educational credentials and teaching experience), however, have no effect on the probability of receiving a GEEG bonus award in any year of the program. In another study on the Texas Educator Excellence Grant (TEEG) program, Springer et al. (2009) found that male teachers with longer experience in the school are more likely to receive a larger amount of performance award. However, the finding on teachers' teaching experience and highest degree are mixed. For example, they found the probability of receiving a TEEG bonus is positively associated with teaching experience, but negatively related to advanced degree. In a study on the District Awards for Teacher Excellence (DATE), Springer et al. (2010) found that newly arrived teachers in a school, experienced teachers, and teachers in non-tested subjects and grades had much lower probability of receiving a larger amount of award than the other teachers.

In a more recent study, Liang and Akiba (2011) used the latest three administrations of the SASS datasets and found that across the nation, large and ethnically diverse districts in urban areas with less union influence were more likely to offer PRP. Among the PRP recipients, teachers with a higher degree and more experience and who work in districts with less union influence and a higher percentage of ethnically diverse students tended to receive more PRP. However, highly qualified teachers with demonstrated excellence (e.g., National Board-certified teachers) in high demand (e.g., mathematics, science, and special education) were no more likely to receive a larger amount of PRP.

Although the picture on the characteristics of districts offering PRP and the

characteristics of teachers receiving PRP is not crystal clear, the evidence available does highlight the significance of engaging teachers and their unions in PRP design and implementation: "Compensation reform must be done with *teachers, not to them*" (Slotnik, 2009). In addition, the findings in Liang and Akiba (2011) that highly qualified teachers in high demand are not benefiting from PRP programs is a concern.

V. PRP AND TEACHING PRACTICE

According to the expectancy theory (Vroom, 1964), when the awards are substantial, teachers will respond to financial incentives and PRP programs can effectively motivate teachers to achieve the rewarded outcomes. Theoretically and ideally, teachers will improve their teaching practice such as engaging more constructivist instruction, aligning the curriculum with state standards, working longer hours, and participating in more ongoing professional development. However, the award may also bear little effect when its determination from teacher evaluation is not appropriately aligned with improved instruction and student learning.

In Texas, Springer et al. (2009) found that the GEEG bonus did not affect most teachers' instructional practice. In the TEEG program, Springer and colleagues (2009) did not find consistent changes in teachers' teaching practice such as aligning classroom instruction with curricular standards. In DATE, Springer et al. (2010) found no significant differences between teachers in DATE schools and non-DATE schools on their teaching practice such as using assessment results for diagnosing students or planning curriculum to meet external standards.

Using teacher survey responses from three randomized experiments including the individual-based Project on Incentives in Teaching (POINT) program in Nashville, TN (Springer et al., 2010), the team-based Pilot Project on Team Incentives (PPTI) project in Round Rock, Texas (Springer et al., 2012), and the school-based School-wide Performance Bonus Program (SPBP) Program in New York (Fryer, 2011; Goodman & Turner, 2010; Marsh et al., 2011), Yuan et al. (2012) examined the impact of such programs on teachers' instruction and found that none of the programs changed teachers' instruction such as focusing on state standards and student engagement in hands-on activities and group learning. The majority of incentive eligible teachers in all three programs reported that their programs had no effect on teaching, with 85% in POINT, 78% in PPTI, and 90% in SPBP, respectively. Similar results were reported in the Denver ProComp program (Wiley, Spindler, & Subert, 2010) and the Achievement Challenge Pilot Project (ACPP) in Little Rock, Arkansas (Barnett, Ritter, Winters, & Greene, 2007).

Findings from international studies are generally consistent with those in the United States. Although Lavy (2009) found that treatment group teachers in Israel reported greater use of individualized instruction, more tracking in the classroom by ability, and longer instructional time than control group teachers, the study in Kenya (Glewwe, Llias, & Kremer, 2010) showed no evidence of changes in teacher attendance, homework assignment, or pedagogy. The study in India (Muralidharan & Sundararaman, 2011) also found no differences in teachers' practices between treatment and control group teachers.

The lack of a statistically significant

association between PRP and improved teaching practice may be due to the design characteristic that teachers in those programs were primarily evaluated and rewarded by some measure of student outcomes, and notably test scores instead of improved classroom instruction. According to the Expectancy Theory, teachers may have only been motivated to enhance student achievement, but not to improve their instruction. Therefore, when teaching practice data are adequately used in teacher performance evaluation for determining PRP, teachers may be better motivated to improve their instructional practice.

Liang and Akiba (2012) used state-wide longitudinal survey data collected in 2009 and 2010 from middle school mathematics teacher in Missouri and examined the characteristics of teacher evaluation used to determine PRP, and the association between PRP and improvement in teachers' practice of constructivist instruction. They found that the PRP teachers were mainly evaluated by principals who conducted classroom observations and face-to-face meetings to assess their teaching practice and professional development activities. After controlling for the background characteristics, they found a modest yet positive association between PRP and improvement in teachers' practice of constructivist instruction from 2009 to 2010.

The study in Missouri (Liang & Akiba, 2012) provides some preliminary but important evidence suggesting the significance of incorporating teaching practice data into teachers' performance evaluation and the determination of PRP awards. By focusing on teachers' instructional practice, PRP can be used as an effective tool in improving teachers' classroom teaching which

in turn leads to enhanced authentic learning.

VI. PRP AND STUDENT ACHIEVEMENT

A key argument for PRP programs is that by linking teacher compensation with student achievement or other educational goals, teachers would get motivated and work harder to achieve the rewarded outcomes (Lazear, 2003). Studies suggested that teachers respond to incentives (Duflo, Hanna, & Ryan, 2012) and PRP may serve as a salient means for districts and schools to communicate the desired behaviors to teachers such as improved daily teacher attendance (Jacobson, 1989) and higher student retention rates (Eberts, Hollenbeck, & Stone, 2002). Due to the national interest in compensating teachers for higher test scores, the following focused on the impact of PRP on student achievement. In general, the findings in the United States are mixed and inconclusive.

Some studies reported positive effects of PRP in improving student learning. Using national data, Figlio and Kenny (2007) found that test scores are higher in schools that offer individual PRP. The study in Little Rock, Arkansas (Winters, Ritter, Greene, & Marsh, 2009) found a statistically significant math gain for every year a student spent in an ACPP school. Some other studies found no consistent effects of PRP programs on student achievement. The studies on the SPBP program New York City public schools (Fryer, 2011; Goodman & Turner, 2010; Marsh et al., 2011) consistently found that the program did not improve student achievement in any grade level. In Texas, Springer et al. (2009) found that depending on model specifications, GEEG had a weakly positive, negative, or negligible effect on student achievement gains.

Similarly, Springer et al. (2009) and Springer et al. (2010) found no strong and consistent evidence of TEEG or DATE on student achievement gains. The study by Jackson (2010) on the impact of the Advanced Placement Incentive Program in Texas showed some but not consistent associations between program adoption and increased number of students who took the SAT or ACT, AP course enrollment, and graduation rate.

In Chicago, Springer and colleagues (2008) compared student test score growth on the Northwest Evaluation Association tests in mathematics in the Chicago Teacher Advancement Program (TAP) schools with that in non-TAP schools over a 4-year period. After controlling for selection bias, they found a positive TAP treatment effect on student test score gains in the elementary grades, but negative effects for grades 6 through 10. In another TAP study, Glazerman and Seifullah (2012) found that the program did not consistently raise student achievement as measured by test score gains in the Illinois Standards Achievement Test. Their study showed evidence of both positive and negative impacts in selected subjects, years, and cohorts of schools, but overall there was no significant impact of the program on math, reading, or science achievement.

In Nashville, TN, Springer et al. (2010) examined the three-year POINT program in which middle school mathematics teachers could earn bonuses up to \$15,000 on the basis of a value-added measure of academic growth of their students on the Tennessee state mathematics test. They found that students of teachers randomly assigned to the treatment group did not outperform their peers whose teachers were in the control group when pooling across all years and grades. The

statistically significant effect was limited to mathematics, science, and social studies for the fifth graders, and it did not persist after students moved to the 6th grade.

Fryer et al. (2012) took a unique perspective of loss aversion in behavioral economics and conducted an experiment in nine schools in Chicago Heights, IL, to examine the power of loss aversion to motivate individual behavior. In the program, teachers were randomly selected to participate and those in the incentive groups received rewards based on their students' end of the year performance on the ThinkLink Predictive Assessment. One group of teachers received financial incentives at the end of the year (i.e., the "Gain" group), and another set of teachers were given a lump sum payment at the beginning of the school year and informed that they would have to return some or all of it if their students did not meet performance targets (i.e., the "Loss" group). Fryer and colleagues found that students whose teachers were in the "Loss" group showed larger and statistically significant gains in math test scores. In contrast, the effects were smaller and mostly insignificant for teachers in the "Gain" group.

Although literature in the United States depicted a blurred picture of PRP and student achievement, empirical studies in other countries, however, tended to suggest a positive impact of individual teacher PRP programs on student achievement including England (Atkinson et al., 2009), Israel (Lavy, 2009), and India (Duflo et al., 2012; Kingdon & Teal, 2007; Muralidharan & Sundararaman, 2009), and school/group PRP programs in Kenya (Glewwe et al., 2010), Israel (Lavy, 2002), and India (Muralidharan & Sundararaman, 2011). Using country-level

data from the Organisation for Economic Co-operation and Development and student achievement data in the 2003 Programme for International Student Assessment (PISA), Woessmann (2011) found that the use of PRP was significantly associated with math, science, and reading achievement across countries, and scores in countries with PRP were about one quarter standard deviations higher than those without PRP.

VII. PRP AND TEACHER RETENTION

In addition to the motivational effect, another important argument for PRP programs is that by linking teacher compensation with educational output such as increased student achievement, in the longer run, those teachers who can produce the desired goals, presumably highly effective teachers, will be sorted into the profession and those who cannot will be sorted out (Lazear, 2003). Several empirical studies addressed this issue.

In the GEEG program in Texas, Springer et al. (2009) found that compared with non-participant schools, GEEG schools had significantly lower teacher attrition in the first year of program implementation and the effect was particularly strong for experienced teachers and teachers certified in math or science. In addition, schools relying exclusively on student achievement levels to measure student success had significantly lower attrition rates than did schools relying on student performance growth. Furthermore, a larger amount of a GEEG award is positively associated with higher probability of teacher retention increased. In the TEEG program, Springer et al. (2009) found strong evidence that design features of performance plans influenced teacher retention. The

probability of retention increased as the size of the performance award grew. In addition, schools relying exclusively on student achievement levels to measure student success had significantly higher retention rates than did schools relying on student performance growth. Similarly findings were reported in the DATE program (Springer et al., 2010). Glazerman and Seifullah (2012) found some evidence suggesting that the Chicago TAP program increase schools' retention of teachers, but the impacts were not consistent across years, cohorts, and subgroups of teachers. In a study on the SPBP program, Fryer (2011) found no evidence that teacher incentives changed teacher behavior.

The few studies available provided promising but limited evidence on the impact of PRP on teacher recruitment and retention. More importantly, little is known on the effect of PRP on the recruitment and retention of highly effective teachers. This may be due to the fact that most of these PRP programs lasted for only a few years and cannot bear a long-term effect on influencing teachers' career decisions.

Another plausible explanation is that teachers may not view PRP favorably. Opinion surveys and polls on teacher attitudes toward PRP have consistently shown that the majority of the teachers opposed using student scores on standardized tests in determining teacher salary (Elam, 1989; Farkas, Johnson, Duffett, Moye, & Vine, 2003; Howell, West, & Peterson, 2007; Langdon & Vesper, 2000). A recent survey of over 3,000 full-time classroom teachers in Washington State showed that about 83% of the teachers opposed giving extra compensation to teachers whose students make greater gains on standardized tests than similar students

taught by other teachers (Goldhaber, DeArmond, & DeBurgomaster, 2011). Using SASS data set, Belfield and Heywood (2008) found that although PRP does boost earnings, job satisfaction is lower for the teachers who receive such pay awards.

Therefore, although the effectiveness of PRP programs on improving student achievement and recruiting and retaining highly effective teachers is a major concern for educational policymakers, the studies available in the United States do not provide consistent and conclusive evidence. More research is needed to adequately address these key policy issues. Compared with this growing body of empirical studies on teachers in tested subjects and grades, relatively little research has been done on the evaluation of teachers in non-tested subject areas and grade levels, and Student Learning Objects (SLOs) is emerging as a promising tool for both measuring and improving teachers' instructional practice.

VIII. PRP AND STUDENT LEARNING OBJECTIVES

In current practice, most school districts offering PRP programs reward teachers based on some measures of student performance in standardized tests (Johnson & Papay, 2009). However, this design characteristic often leaves out a significant portion of teachers in non-tested subject areas and grade levels. To address this problem, researchers and practitioners are probing for other alternative approaches to effectively evaluate teacher performance, and Student Learning Objectives (SLOs) is emerging as one of the most promising approaches.

SLOs are academic goals carefully crafted

by teachers and approved by principals for what a teacher's students will achieve over a given time period. A typical SLO contains the following components: student population, learning content, interval of instructional time, instructional strategies, student baseline achievement, student growth targets, assessment(s), and rationale. In developing SLOs, teachers analyze baseline achievement data, identify student needs, compose a designated number of objectives for student growth targets by using a multi-component protocol, provide rationales for the decisions, and plan the most effective instructional strategies (Slotnik & Smith, 2013).

In a seminal study on Denver's ProComp program, Slotnik and Smith (2004) found that students, whose teachers crafted the highest quality SLOs, showed more than a year's worth of gain on the Colorado Student Assessment Program and the Iowa Test of Basic Skills at all three school levels during each year of the four-year study. Although most pilot teachers did not attribute changes in their core classroom instructional practice to the program as they did not receive mandate to make such changes, teachers did indicate that they had greater access to student achievement data and that they used the data more effectively, particularly baseline data, to establish growth targets, to focus earlier on students who needed assistance and to monitor progress. In addition, they found that well-crafted SLOs helped teachers to improve student learning by promoting greater depth and rigor in planning instruction, creating conditions for professional learning and development, and enhancing attention and use of task-relevant knowledge and strategies.

In another study on ProComp, Proctor et al. (2011) found that although ProComp teachers

were more likely to meet their SGOs, at the school level, meeting SGOs did not appear to be related to student growth. Higher achieving schools tended to have more rigorous SLOs and SLOs did on average reward more effective teachers. However, the implementation of SLOs was impacted by a lack of standardization of the SLO process and criteria for rigorous SLOs. Teachers had mixed attitudes about whether SLOs changed instructional practice.

Although SLOs provide a promising and significant approach for the evaluation of teachers in non-tested subjects and grades, the knowledge base on the design, implementation, and evaluation of SLOs is still not strong and more research is needed on such key issues as its standardization, rigor, and impacts on teaching and learning. When well crafted, rigorous SLOs can be used both as an effective measure on teacher performance and student achievement, and a valid tool for improving teachers' instructional practice.

IX. DISCUSSION

Building on the previous seminal work (Loeb et al., 2009; Podgursky & Springer, 2007), this study presented an updated review of PRP for teachers in the United States and around the world. It provided policymakers with important, and up-to-date data on the implementation of PRP in the field and facilitated a constructive discussion on teacher compensation reforms by covering a variety of key issues surrounding PRP such as improving teachers' instructional practice, promoting student achievement, enhancing the retention of highly effective teachers, and using Student Learning Objectives to

effectively measure teacher performance in non-tested subjects and grades.

Theoretically, when carefully designed and implemented, PRP programs may serve as an effective policy tool for motivating teacher for higher levels of efforts and performance and in the long run attracting and retaining the highly effective teachers in the profession (Lazear, 2003; Vroom, 1964). However, the field lacks a consistent and generally accepted understanding of PRP. While it is convenient to label a variety of programs as PRP, the many different terms in use may hinder a constructive dialogue among researchers and practitioners in teacher compensation reforms. More importantly, the literature still paints a blurred picture and the evidence available is still not robust enough for successful program design and implementation.

As is the case for the implementation of any educational initiatives, teacher unions play a key role in affecting districts' offering of PRP programs (Ballou, 2001; Goldhaber et al., 2008; Liang & Akiba, 2011). It is, therefore, essential for school districts to get teachers proactively involved throughout the process of program design, implementation, and evaluation. Without teachers' participation and buy-in, it is highly unlikely for a PRP program to bear productive results in improving teachers' instruction and enhancing student achievement.

Although the findings on the characteristics of districts offering PRP (Goldhaber et al., 2008; Liang & Akiba, 2011) and the characteristic of teachers receiving PRP (e.g., Liang & Akiba, 2011) are not conclusive. The evidence does suggest that high need districts (e.g., small and poor districts in rural areas) are not more likely to offer PRP and teachers with demonstrated excellence in high demand

are not more likely to receive a larger amount of PRP. Due to the higher attrition rates of qualified teachers in hard-to-staff schools and districts, these findings deserve attention.

Teachers respond strongly to financial incentives (e.g., Duflo et al., 2012). However, when teachers are primarily or solely evaluated and rewarded on student scores or gains in state standardized tests, PRP is unlikely bear significant effect in improving teachers' instructional practice (e.g., Glewwe et al., 2010; Muralidharan & Sundararaman, 2011; Yuan et al., 2012), and on the contrary, the high stakes tests may entice teachers to engage in unethical behaviors such as outright cheating (e.g., Jacob & Levitt, 2003). Because the ultimate purpose of PRP is to motivate teachers to improve their teaching and enhance authentic student learning, it is critically important to examine the impact of PRP on teachers' instructional practice. Some evidence (Liang & Akiba, 2012) suggests that the data used in teacher performance evaluation matter. When teachers are evaluated on teaching practice instead of student test scores, they are more likely to improve their instruction. This highlights the importance of focusing on teaching practice data in teacher evaluation for determining PRP, as suggested by Yuan et al. (2012).

Although the direct evaluation literature on PRP in the United States is still mixed and inconclusive (e.g., Figlio & Kenny, 2007; Roland G. Fryer et al., 2012; Goodman & Turner, 2010; Jackson, 2010; Marsh et al., 2011; Matthew G Springer et al., 2012; Winters et al., 2009), the evidence available supports more extensive field experiments with careful follow-up evaluations. One rather consistent finding of these studies is that the design of PRP plans matters. For example,

Springer et al. (2010) found that students in the DATE districts that adopted a select school approach showed higher gains on reading and mathematics in state tests than did students in DATE districts that implemented a district-wide incentive pay plan. In Chicago Heights, IL, instead of distributing PRP awards at the end of the school year, the program gave some teachers a lump sum payment at the beginning of the school year with the notice that teachers would need to return some or all of the payment if their students did not meet performance targets. Fryer et al. (2012) found that students whose teachers were this treatment group showed larger and statistically significant gains in math test scores. The study in New York (Goodman & Turner, 2010) and India (Muralidharan & Sundararaman, 2011) highlighted the potential free-riding problem in group-based PRP and the relative advantage of individual-based PRP over schoolwide PRP programs. In addition, these findings highlights the importance of systemic reforms and inner capacity building to sustain the program for long-term effects. In some programs, the positive effect on student achievement tended to be short-term and often disappeared soon after the program ended (Glewwe et al., 2010) or the students leave the grade (Matthew G. Springer, Ballou et al., 2010).

Comparatively, international studies (e.g., Atkinson et al., 2009; Duflo et al., 2012; Glewwe et al., 2010; Lavy, 2002, 2009; Muralidharan & Sundararaman, 2011; Woessmann, 2011) provide stronger and more consistent evidence that PRP can exert positive impacts on student achievement. However, it is worthwhile to note that caution is warranted when borrowing findings from

studies in other countries with different national contexts and political priorities, cultural roles and identities of teachers.

The recruitment and retention of highly effective teachers are also top priorities for many districts and schools. Theoretically, PRP can serve as an effective policy tool in sorting those highly qualified teachers with demonstrated excellence into the district and the profession. The evidence, however, is not strong (e.g., Glazerman & Seifullah, 2012; Springer et al., 2010), and more research is needed when more longitudinal data on teacher recruitment, retention, and mobility become available.

The national interest and dialogue focusing on linking teacher compensation with student tests scores in state standardized tests often leave out a majority of teachers in non-tested subject areas and grade levels. A growing body of research seeks other alternatives of teacher evaluation and Student Learning Objectives (SLOs) is emerging as a promising tool (Proctor et al., 2011; Slotnik & Smith, 2004). When developed and implemented through a thoughtful, evidence-based process with a selective use of teaching and assessment practices, well crafted SLOs can bear positive effects on teacher practice and student learning (Slotnik & Smith, 2013).

Finally, some empirical studies provided pretty consistent evidence that when PRP programs reward students, instead of classroom teachers, for higher proficiency level or growth rates, student outcomes are more encouraging and significant. For example, Bettinger (2010) studied a 3-year experiment in Coshocton, Ohio in which elementary school students in grades 3-6 were paid \$15 for each score at or above the 75th percentile and \$20 for each score at or above

the 85th percentile on the state accountability tests in five core subject areas. The analyses showed that math scores improved 0.13-0.19 standard deviations higher for students who were eligible for the program relative to the control group. The effects on reading, social studies, and science test scores, however, were small. Studies in Israel (Angrist & Lavy, 2009), and Kenya (Kremer, Miguel, & Thornton, 2009) reported similar findings. These studies provide important perspectives for future PRP design and implementation.

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APPENDIX: DEFINITIONS OF PRP

‘Merit pay’ may include the following elements – super maximums, moving persons more than one step on the salary schedule, additional compensation for outstanding performance, extra pay for extra work or responsibility, and/or special grants (Liechti, 1972, p. 10).

In its simplest form, merit pay means paying a teacher according to the quality of his teaching. Merit pay programs range from vague statements authorizing local school boards to exceed regular pay schedules under certain conditions to plans in which all certificated employees are paid according to an evaluation rating (Glasman, 1974, p. 90).

Merit pay in the broadest sense is a generic term for any device that adjusts salaries or provides compensation to reward higher levels of performance. It comes in many different forms, including merit-based salary schedules, bonuses, incentive pay, and differential staffing or ‘master teacher’ plans (Ellis, 1984).

The term ‘merit pay’ might be used to denote variously a bonus plan that supplements the standard pay scale and rewards teachers for special services, a multitrack pay scale that provides rapid salary advancement for outstanding teachers, or a bonus pay plan for specific accomplishments such as improving test scores, participating in extracurricular activities, or conducting in-service training (Johnson, 1986, p. 61).

[merit pay is] a compensation scheme that bases a teacher’s compensation on performance, as measured either by gains in student test scores or by supervisor’s evaluations of the teacher’s actions in the classroom. (Murnane & Cohen, 1986, p. 2).

[Merit pay] are one-time bonus payments for individual teachers whose performance is judged to be meritorious. These are usually awarded on an annual basis (Stern, 1986, p. 304).

A ‘merit pay’ plan is a system in which a teacher's performance is a significant factor in determining his or her compensation (Schools and Staffing Survey, 1987-1988, p. 9).

[Merit pay] is awarded as a bonus to those who have performed particularly well over the past year, with the possibility of other bonuses in subsequent years. With it is no increased responsibility or extra assignment (Brandt, 1990, pp. 16-17).

Merit pay gives individual teachers more money to do the same work better (Firestone, 1991, p. 269).

Merit pay plans, defined here as a formal process in which a significant portion of a teacher’s compensation is based on an explicit and substantive assessment of teacher performance (Hatry, Greiner, & Ashford, 1994, p. 3).

[Merit pay is] an additional sum paid to an employee, as a school teacher, whose work is superior and whose services are valued (Random House Webster's Unabridged Dictionary, 1998, p. 1203).

[Merit pay plans includes] career ladders, extended contracts, pay for extra duties, and pay for special knowledge of skills (McCullum, 2001, p. 22).

Merit pay plans ostensibly award teachers bonuses for excellent performance, usually determined by a supervisor although sometimes by peer review (Odden & Kelley, 2002, p. 35).

Merit pay typically involves providing individual teachers with base pay increases by allotting a fixed fund of money based on administrators' subjective judgments of teacher performance during the prior year (Milanowski, 2003).

[Merit pay] is defined broadly here as any system of teachers' compensation that explicitly rewards better performance (Dee & Keys, 2004, p. 473).

At a very specific level, merit pay can be defined as individual pay increases based on the rated performance of individual employees in a previous time period (Heneman & Werner, 2005, p. 6).

Merit-based pay rewards individual teachers, groups of teachers, or schools on any number of factors, including student performance, classroom observations, and teacher portfolios. Merit-based pay is a reward system that hinges on student outcomes attributed to a particular teacher or group of teachers rather than on 'inputs' such as skills or knowledge (Podgursky & Springer, 2007, p. 912).

Quality merit pay plans are alternative compensation systems that reward teachers for improvements in student achievement and for high marks on supervisor evaluations. Sometimes, merit pay plans are called 'pay-for-performance' or 'incentive-based' compensation plans (Carr & Holley, 2008, p. 2).

Merit pay, also known as pay-for-performance, is defined as a raise in pay based on a set of criteria set by the employer. This usually involves the employer conducting a review meeting with the employee to discuss the employee's work performance during a certain time period (U. S. Department of Labor, 2008).

'merit pay' refers to teacher compensation that is based either on principal evaluations (old-style merit pay) or student standardized test scores (new-style merit pay) (Rowland & Potemski, 2009, p. 18).