



Barbara Mitchell Centre for Improvement in Education



Teacher Incentive Pay that Works: A Global Survey of Programs that Improve Student Achievement

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Summary

The one-room schoolhouse may be a relic of a bygone era, but teacher compensation in Canada remains stuck in a time warp. Currently, teacher compensation is determined by a rigid salary schedule based on tenure and advanced degrees—factors that have little if any positive impact on student achievement. Outside of the teaching profession, surveys suggest that close to three-fourths of Canadian employees already receive performance-based and variable pay. In fact, compensation based on results is the rule rather than the exception at more than eight out of 10 companies worldwide because this approach is one of the most effective strategies for attracting and retaining top talent.

For now, Canadian students still regularly rank among the top 10 performers on international assessments, but evidence is mounting that student performance has been declining over the past decade. Performance also varies greatly depending upon where students live and their socioeconomic status. Other countries facing even greater challenges than Canada realize that education practices of the past cannot meet the needs of a competitive 21st century world. Consequently, the number of countries implementing incentive pay for teachers is proliferating after decades of increasing education funding overall with no commensurate improvement in student achievement.

It is now well established that effective teachers can add up to one and a half years' worth of additional student learning in a single school year. They can also overcome adverse out-of-school socioeconomic factors that can hinder students' academic achievement, such as poverty, native language, parental education levels, parental marital status, and race. Yet highly effective teachers are the most likely to leave the teaching profession in large part because of rigid salary schedules that do not reward their superior performance. In time, the overall quality of the teaching workforce suffers, which negatively affects student achievement.

The 10 case studies included in this *Global Survey* were selected because they reward teachers based primarily or solely on student achievement. This criterion means that numerous compensation schemes broadly considered incentive, performance, or merit pay programs are excluded because they reward teachers based largely (if not exclusively) on inputs such as seniority, length of time teaching, professional development, or credentials, and not the

output of interest here, namely, student achievement. Further, the selected case studies have been evaluated using scientifically credible methods. This second inclusion criterion means several better known incentive pay programs operating in other top performing countries, such as Denmark, Finland, and Sweden, are not included in this report; however, subsequent updates will include additional global examples of teacher incentive pay programs once evaluations of their impact on student performance become available.

Seven additional case studies are included alongside several of the 10 effective incentive pay programs highlighted in this *Global Survey* as examples of approaches and policies to avoid. These programs attempted to accomplish goals similar to the effective incentive pay programs, but they failed for a variety of key reasons that policymakers should keep in mind. This *Global Survey* highlights the cultural contexts influencing the various incentive pay program designs, as well as evidence that incentive pay programs are cost-effective and financially sustainable. It also offers key lessons for policymakers based on the successes—and failures—of these programs. These lessons include:

- ◆ Define expectations for teachers with teachers;
- ◆ Support teachers in meeting stated expectations;
- ◆ Reward teachers as promised;
- ◆ Build programs to last with smarter spending; and
- ◆ Promote a culture of continuous improvement.

Introduction

An honest day's pay for an honest day's work is a deceptively simple sentiment when applied to the teaching profession. The idea of offering incentive pay to teachers for raising student achievement is increasingly popular (Harvey-Beavis, 2003) but involves many challenges; beginning with the fact that teacher compensation worldwide is still largely determined by rigid salary schedules that do not factor in student achievement. According to Jay P. Greene, Chair and Head of the Department of Education Reform at the University of Arkansas, most programs claiming to offer teacher incentive pay are “phony” because “the game is often rigged so that virtually all employees are deemed meritorious and get at least some of the bonus” (2012). Gary Mason, *Globe and Mail* national affairs columnist, echoed this sentiment in a recent column documenting the furor at the mere suggestion by an Alberta task force that provincial systems of performance-based teacher evaluations be adopted and bad teachers be “weeded out” (2014, May 9). Mason rightly questions the fundamental fairness of treating talented teachers the same as mediocre teachers. He also notes that at most only a handful of teachers would be shown the door under a performance-based system, a position backed up by research evidence (Fuller et al., 2007; Imazeki, 2012). Most important, Mason underscores the fact that failing to make commonsense performance distinctions among teachers ultimately hurts students the most.

Canadian student performance is on the decline

Canada consistently ranks among the top-performing countries worldwide in terms of overall student performance. Canadian 15-year-olds, for example, have routinely placed among the top 10 globally in reading, math, and science on the Programme for International Student Assessment (PISA) throughout the 2000s (HRSDC, 2014a and b). Yet experts with the Council of Ministers of Education, Canada, noted that the 2012 PISA results confirmed a “significant decline” in student performance on PISA and other assessments (Brochu et al., 2013: 48). Student achievement levels also vary widely across the provinces (HRSDC, 2014a and b). Furthermore, chronic achievement gaps persist

between non-Aboriginal and Aboriginal students, who represent the youngest and fastest-growing population nationwide (Bains, 2014; Campion-Smith, 2013, May 8; Dion et al., 2010; Schmold, 2011; Statistics Canada, 2013a and b). Policymakers should strive to ensure that all Canadian students reach and remain in the top 1% globally. Strategies that worked 10 or even five years ago may not be optimal now or just a few years from now. Certainly, a rigid salary schedule may have sufficed for a bygone era, but just as one-room schoolhouses are a thing of the past, so too are compensation systems that do not recognize or reward teachers for improving student achievement.

Teachers are value-added, not widgets

Rigid compensation systems encourage what is now commonly referred to as the “widget effect” characterized by indifference to variations in teacher effectiveness (Weisberg et al., 2009), in spite of the documented impact those variations have on student learning and national economies (for summaries see Clifton, 2013; Podgursky and Springer, 2010) and recommendations by leading education economists that teacher salaries be data-driven based on value teachers add to student performance (Barlevy and Neal, 2012; Hoxby, 2014, March 10; Neal, 2011). Under the prevailing compensation system that does not recognize or reward effectiveness, teachers’ value-added with regard to raising student achievement plateaus after their initial few years of teaching. Under an incentive pay structure it would be possible to achieve a teaching force in which all but the very newest teachers would have a valued-added impact similar to that of teachers in the top 10% today, according to Stanford University economist Caroline Hoxby. Such a structure would help make the teaching profession attractive to talented individuals who could enter virtually any high-skilled field they wanted and would also encourage talented teachers to keep improving, thereby improving the teaching workforce over the long term (Hoxby and Leigh, 2005; Lazear, 2000 and 2003; Muralidharan, 2012; Muralidharan and Sundararaman, 2011b). Such a system would be financially sustainable and competitive with private-sector alternatives because limited resources would be distributed more strategically based on teachers’ effectiveness at improving student achievement, rather than spreading resources thin through across-the-board annual pay increases (Hoxby, 2014, March 10).

Recent efforts by provincial policymakers are under way to improve teacher quality, including the Ontario Ministry of Education’s New Teacher Induction Program (NTIP), the Teacher Performance Appraisal (2014a and b), and the landmark report released in 2012 by the Ontario Ministry of Finance’s Commission on the Reform of Ontario’s Public Services (Drummond, 2012). Yet such efforts do not include outcome-based incentive pay for teachers—a leading recommendation by management and personnel experts for attracting

and retaining talented individuals in other fields (Podgursky and Springer, 2007). Investing in ongoing training will yield limited returns absent a compensation system that rewards true teaching excellence defined in terms of improved student achievement.

Incentive pay predominates in other professions

In some of the world's fastest growing economies, including China, India, Singapore, and Hong Kong, between 60 and 75% of employees' pay is based on performance (Kelly Services, 2013a). At hundreds of the largest American companies the proportion of CEOs' salaries based on performance grew from 37% in 2009 to 51% in 2012 (*Wall Street Journal*/Hay Group, 2011 and 2013). From 1991 through 2010 awarding performance-based pay raises for private sector American employees increased 300% (Anderson and Leslie, 2013). Moreover, 81% of nearly 13,000 companies in 120 countries offer variable, performance pay awards that must be re-earned annually to attract, retain, and reward top employees (Aon Hewitt, 2013). In Canada, close to three-fourths of private sector employees currently receive performance-based or variable pay, and 43% of those who do not receive this kind of compensation report they would be more productive if their pay were linked to performance goals (Kelly Services, 2013b). Yet there is a common misconception that incentive pay is simply unworkable in the teaching profession, in spite of its prevalence in the private school sector (Ballou, 2001; Ballou and Podgursky, 1997). The "nature of teaching" objection claims that what teachers do cannot be fully measured, so why even try (Goldhaber et al., 2005). The frequent "teaching to the test" objection warns that teaching will be narrowed to mere test preparation if student results are used as a performance measure (Dixit, 2002; Hannaway, 1992; Holmstrom and Milgrom, 1991).

These objections, however, assume that teachers do not contribute to student learning, and that assessments are little more than busy-work rather than essential diagnostics to help teachers gauge and improve their students' mastery of core knowledge and skills. Many experts, including "new personnel economics" scholars, concur and point to the long-term negative effects on the overall quality of the teaching workforce if strong incentives to improve student performance are absent (Altonji and Pierret, 1996; Glewwe et al., 2003; Hanushek, 2008; Hanushek et al., 1998; Hoxby and Leigh, 2005; Lazear, 2000 and 2003; Murnane and Olsen, 1990; Podgursky, et al., 2004). At a time when government debt is mounting, budget deficits are deepening, and the average Canadian family is spending far more on taxes than food, housing, and clothing combined, public pressure is intensifying to ensure improved performance among public sector employees—in spite of continued resistance from unions (Clement, 2013; Kathryn May, 2014, April 5; Palacios and

Clemens, 2013; Palacios and Lammam, 2014; PIPSC, 2013). Incentive pay can help direct limited public resources more strategically toward improving teacher effectiveness based on raising student achievement over the long term.

Teacher incentive pay programs proliferating

The number of programs offering teacher pay incentives has grown dramatically over the past few decades (Gao, 2012; Harvey-Beavis, 2003; OECD, 2009; Sclafani and Tucker, 2006). Yet the vast majority of those programs do not reward teachers solely or primarily for improved student achievement (OECD, 2009). Instead, most incentive programs reward teachers for factors that experts agree have little—if any—demonstrable positive effects on improved student achievement, such as seniority, credentials, and participation in generalized professional development. Some experts attribute such program dilution to the influence of special-interest groups, most notably teachers unions (Buck and Greene, 2011). However, there is a growing body of evidence that incentive pay for teachers based on their contributions to improved student achievement works (Woessmann, 2011).

Part 1 of the *Global Survey* begins with 10 case studies of teacher incentive pay programs from around the world selected because they reward teachers primarily or solely based on student achievement. This criterion means that numerous compensation schemes broadly considered incentive, performance, or merit pay programs are excluded because they reward teachers based largely (if not exclusively) on inputs such as seniority, length of time teaching, professional development, or credentials, and not the output of interest here, namely, student achievement. Further, the selected case studies have been evaluated using scientifically credible methods. This second inclusion criterion means several better known incentive pay programs operating in other top performing countries, such as Denmark, Finland, and Sweden, are not included in this report; however, subsequent updates will include additional global examples of teacher incentive pay programs once evaluations of their impact on student performance become available.

Two successful group incentive pay programs are examined first, a nationwide program in Chile and another program in the Dallas, Texas Independent School District. These successful programs keep teachers motivated by carefully defining the size, composition, and incentive structures of the award groups. Yet, if student achievement is not the primary reward factor or if award groups are too large, incentive pay programs can be ineffective and costly, as failed programs in Bolivia, New York City, and Texas' Round Rock Independent School District demonstrate.

Next, two successful individual teacher incentive pay programs are reviewed, one voluntary program for public schools in Arkansas' Little Rock

School District and England's nationwide mandatory performance-related pay scale reform. These programs make student achievement the primary factor, regardless of whether single or multiple measures are used. Both of these programs demonstrate how collaboration can flourish within an achievement-driven, individual incentive program. In contrast, national individual performance-based teacher pay scale programs in Mexico and Portugal have been largely ineffective because the former does not make improved student achievement a key criterion; while the latter was implemented without clearly defined achievement expectations.

The third section explores programs that combine group and individual teacher incentives. The five successful programs examined include small-scale experimental programs in India and Israel designed to test the comparative impacts of each incentive structure. The programs in India and Israel achieved significantly better student achievement results at a fraction of the cost of class-size reductions and general education funding increases; however, the individual incentive programs in both countries had stronger and more enduring impacts on improving student achievement than the group incentive programs. In contrast, two voluntary experimental programs in Kenya and Nashville, Tennessee, failed to achieve lasting positive effects on student achievement because neither motivated teachers to change how they taught.

Two additional successful full-scale programs blend group and individual incentives based on clearly defined multiple measures linked to student achievement. In the Houston, Texas, Independent School District ASPIRE program teachers responded best to smaller, teacher-team group awards. The Teacher Advancement Program (TAP) adopted in schools across the United States combines individual and school-wide incentive awards along with rigorous, outcome-driven professional development. Both of these blended incentive pay programs were found to be far more cost-effective at raising student achievement than increasing funding or decreasing class sizes.

Part 1 concludes with one of the newest and most comprehensive teacher incentive pay programs, IMPACT, which operates in the District of Columbia Public Schools (DCPS) system in the United States capital. It is a full-scale, permanent program that awards both individual and group incentives to teachers based on clearly defined multiple measures of student achievement. All DCPS teachers, regardless of whether their students take standardized assessments, are eligible for generous annual bonuses and permanent base-pay increases year after year as long as they meet stated student achievement and related performance goals. IMPACT also uses differentiated strategies for effective and struggling teachers so that all teachers get ongoing customized professional development. However, IMPACT differs from every other teacher incentive pay program in this survey in a critical way: ineffective teachers are fired within a specified timeframe for

not improving their and their students' performance. Evaluations show that IMPACT has improved the overall quality of the DCPS teaching workforce and student achievement along with it—across student sub-groups, subjects, and grade levels.

Part 2 of the *Global Survey* details several key lessons drawn from successful—and not so successful—examples about designing, implementing, and sustaining teacher incentive pay programs intended to improve student performance. Since Canada is already a global top performer, policymakers have the distinct advantage of crafting sound teacher incentive pay programs that work best for their regions' unique circumstances by design and not out of desperation as so many programs were. Regardless of the preferred incentive pay program design, successful programs share several common features. Student achievement expectations for teachers are determined in collaboration with teachers. Professional development is integrated, rigorous, and customized. Teachers are rewarded as promised, and programs are funded in a sustainable way. Finally, successful incentive pay programs promote a culture of continuous improvement for all teachers based on rewards for success and consequences for failure.

1 Teacher Incentive Pay Case Studies from Around the Globe

Group, individual, and blended teacher incentive pay programs each strive to improve student achievement by motivating teachers to strengthen their collaborative and individual efforts. This section of the *Global Survey* begins with successful group incentive programs that reward teachers for improved school-level student performance. Programs in Chile and the Dallas, Texas, Independent School District (ISD) benefit from reform-oriented cultures that strive for continuous improvement, have extensive assessment and data-collection systems in place, and have strong buy-in from teachers. There are also design features and program elements in place to ensure student achievement gains are real, not the result of gaming the system through such practices as grade inflation or excluding struggling students. Chile's program, for example, is based on national standardized test results, which are difficult to manipulate locally. Further, only similar schools compete with each other for group bonuses, which levels the playing field and introduces powerful incentives to include students from all socioeconomic backgrounds. The teacher incentive pay program in the Dallas ISD also based rewards on a statewide standardized test as well as a nationally norm-referenced test that would be nearly impossible to manipulate locally (Neal, 2011). The program also uses a sophisticated value-added measurement to ensure students from all backgrounds are included and the competition for school-wide bonuses is fair, adjusted so a variety of student and school factors are taken into account.

It is also commonly assumed that teachers unions categorically oppose incentive pay for teachers. While such opposition may be common, it is neither universally true, nor does opposition from union leadership necessarily mean rank-and-file teachers are opposed to the idea. For example, Chile's school-wide teacher incentive pay program has enjoyed longstanding support from the national teachers' union. One factor contributing to this support includes early negotiations between government officials and union leaders before the reform was enacted. Another factor is that teacher incentive pay was one of several comprehensive reforms. Compared to vouchering all Chilean schools and swift decentralization of authority over education,

increasing teacher pay through school-wide performance incentives was the least controversial reform to union leadership. The situation in the Dallas ISD was quite different. There is a marked absence of strong union influence, and school officials and teachers have a tradition of working collaboratively on reforms to improve student performance. Standardized assessments and data-driven teacher evaluations have also long been a part of the education culture.

Contrasting unsuccessful group incentive programs demonstrate that no one group or constituency should dominate reform deliberations. Incentive pay programs in both Bolivia and New York City were largely shaped according to the preferences of powerful teachers unions. In Bolivia only a relative handful of schools participate in standardized testing, so the collective incentive is based on what amounts to self evaluations about student performance completed by school staff and board members. In addition to a lack of objective evidence about student achievement, there is little motivation for teachers to devote any extra effort to improving student achievement since they can earn far more by simply staying longer at their schools based on the current salary schedule. The situation was far different in New York City, where an extensive testing and accountability system had long been in place that provided objective student and school performance data. However, accommodating union resistance to the idea of performance differences among individual teachers meant that policymakers did not account for the effects of school size on their motivation in the New York City program design. Consequently, only smaller schools where teachers were more directly responsible for larger enrolment shares realized student achievement gains. Larger schools posted achievement declines. In contrast, group incentive programs such as the one in the Round Rock, Texas, Independent School District (ISD) near the state capital of Austin show that not involving teachers can result in misunderstanding and distrust that undermines program effectiveness.

Group Incentive Pay Programs

Chile—Sistema Nacional de Evaluación del Desempeño de los Establecimientos Educativos (SNED)

Chile embarked on significant market-oriented education reforms starting in the 1980s that resulted in decentralizing public school management to municipalities and establishing a nationwide voucher program, which significantly increased the number of private schools (Santiago et al., 2013). While union opposition to many of Chile's education reforms was strong, ongoing negotiations with teachers unions have built strong support among current and prospective teachers for incentive pay programs (Mizala and Schneider, 2014). Currently, Chile has one of the lowest proportions of students in publicly

owned schools among OECD countries, with nearly an equal proportion in municipal or public schools (48%) and private subsidized schools (46%). Another 6% of students attend non-subsidized, fees-based private schools (Pont et al., 2013). By 2006, Chilean 15-year-olds outperformed their peers in every Latin American country in reading and all but Uruguay in math on PISA (Elacqua et al., 2008). On the latest PISA assessment conducted in 2012, Chilean students outperformed all their Latin American peers in reading, math, and science.

As part of Chile's larger national education reform effort, the Ministry of Education implemented a regional teaching excellence award called the National System of School Performance Assessment (*Sistema Nacional de Evaluación del Desempeño de los Establecimientos Educativos*, SNED) in 1996 (Rau and Contreras, 2011). Publicly subsidized schools, both municipal public and private, are eligible to compete for bonuses that have been awarded biennially since 1997. SNED teaching excellence awards are determined by several criteria, including schools' student grade repetition and dropout rates, equity policies, new initiatives, integration of teachers and parents, and improving working conditions; however, student performance is the primary criterion. Fully 65% of the award decision is based on results from Chile's national standardized exam, the Education Quality Measurement System (*Sistema de Medición de la Calidad de la Educación*, SIMCE). Students' point-in-time performance level counts for 37% and their performance over time counts for 28% (Santiago et al., 2013). This exam annually assesses student performance in varying grades and core subjects (Mizala and Romaguera, 2004; Mizala and Schneider, 2014).

Within a given region, schools with similar student and school-level characteristics are divided into homogeneous groups and compete with each other in a rank-order tournament according to their average performance. As of 2011, there were 125 school groups nationwide (Santiago et al., 2013). Schools educating up to 25% of a region's students with the highest average student SIMCE performance win SNED awards, and they must distribute 90% of the funds directly to teachers in proportion to their hourly employment. School principals determine how to allocate the remaining 10% (Manzi et al., 2008). The incentive bonus originally averaged around 50% of teachers' average monthly salaries and was increased to 70% in 2004. Depending on teachers' years of experience, that increase effectively raised teachers' average monthly salaries to between US\$1,267 and US\$1,951 (in 2009 dollars), the equivalent of a 5 to 11% annual salary increase (Manzi et al., 2008; Mizala and Romaguera, 2005; Mizala and Schneider, 2014; Springer and Balch, 2009; Vegas and Umansky, 2005).

As of the 2010–11 school year, SNED performance subsidies were being used by 2,656 schools and benefitted 58,597 teachers, who received an average annual performance subsidy equivalent to US\$1,590. The SNED subsidies

were almost evenly divided between municipal public and private subsidized schools, 53% and 46% (the remaining 1% went to schools with delegated administration). Chile's SNED school incentive program is extensive, affecting around 90% of schools. Yet after 11 years, almost half of eligible schools have never won a SNED award (Rau and Contreras, 2011); while slightly more than half of 2010–11 SNED award schools (57%) had previously won an award at least once since the inaugural 1996–97 school year (Santiago et al., 2013). This suggests some schools react more favourably to rewards than others in terms of raising student achievement. In fact, Chile has demonstrated some of the greatest improvement in overall educational attainment and reading performance among OECD countries in recent years (OECD, 2013a). As the SNED incentive program has matured, improvements in student achievement are also more evident.

Initially, the SNED incentive appeared to result in only modest average test scores improvements in schools most likely to receive an award (Mizala and Romaguera, 2005). As of 2000, however, the introduction of SNED was shown to increase SIMCE scores between 5 and 18 points (Contreras et al., 2003). Subsequent research revealed that the program has produced verifiable improvements in students' standardized language and math scores, up to 0.23 of a standard deviation in language and up to 0.25 of a standard deviation in math (Rau and Contreras, 2011). Improved student achievement has also been documented by several other analyses (Manzi et al., 2008; and OECD, 2009).

United States, Texas—Dallas Independent School District, School Incentive Program

In the 1991–92 school year the Dallas Independent School District (ISD) instituted the School Incentive Program. The program was the result of a special commission appointed by the Dallas School Board in 1990 to ensure long-term improvement in student achievement. The local business community was deeply involved in this effort and initially funded half of the US\$2.5 million program cost. Researchers Charles T. Clotfelter and Helen Ladd considered this program “one of the most complete and sophisticated accountability and incentive programs of any big-city district in the country” (1996: 29). Easing the adoption of the School Incentive Program was a strong orientation in Texas toward accountability and testing, skilled statisticians within the district, and the absence of strong teachers unions opposed to the program (Clotfelter and Ladd, 1996). Under the incentive program schools were eligible for bonuses based on a value-added model (VAM) of the estimated improvements they made to student performance based on scores from the Texas Assessment of Academic Skills (TAAS) and the nationally norm-referenced Iowa Test of Basic Skills. School-wide factors relating to various grade levels also supplemented student test scores, including student attendance and promotion rates, dropout rates, accelerated courses, and average scores on college

readiness assessments (the PSAT and the ACT). The VAM used by Dallas ISD scrupulously attempted to control for both student and school characteristics to determine relative school improvement (Clotfelter and Ladd, 1996).

All teachers and principals at schools scoring in the top 20% won bonuses worth US\$1,000, about 10 to 22% of teachers' average monthly salaries, and other non-teaching staff won US\$500 bonuses. Winning schools also received an additional US\$2,000 for their activity funds. The number of winning schools varied each year depending on available funding and the number of teachers and staff at winning schools. For the 1994–95 school year, a second tier of winning schools that scored in the top 30% was established for schools that exceeded expected performance levels. Teaching staff at those schools won awards of US\$450, and non-teaching staff won US\$225. From 1992 through 1995 the School Incentive Program resulted in consistently higher passing rates in reading and math for white and Hispanic students relative to students statewide in other large Texas cities without incentive pay programs, but not for African-American students. Dropout rates were also lower in the Dallas ISD compared to districts in other cities from 1991 through 1994 (Ladd, 1999; OECD, 2009; Neal, 2011).

Since the 1990s the Dallas Independent School District has enacted several subsequent teacher incentive pay programs. The most recent program takes effect in the current 2014–15 school year and is an individual teacher performance pay plan that bases 85% of teachers' compensation on classroom performance and student test scores (Haag, 2014, June 18).

In contrast to the documented improvement in student achievement resulting from group incentive pay programs in Chile and the Dallas ISD, group incentive programs in Bolivia and New York City showed virtually no positive impact on student achievement. That outcome flies in the face of conventional wisdom since both programs enjoyed strong backing from teachers unions. A closer look at the design features of those programs, however, substantiates Greene's conclusion that achieving teachers union backing often dilutes program effectiveness. As the programs in Bolivia and New York City demonstrate, when student achievement is not the primary success measure, and when incentives are spread across large groups, teachers have less motivation to work harder at raising student achievement. The Round Rock ISD team incentive program is another example of a program that had every reason to succeed but did not.

Unlike most schools in Bolivia and New York City, Round Rock, Texas, ISD public schools are high-performing and located in an affluent suburb of Austin. Additionally, teachers in Round Rock schools work as part of interdisciplinary teams and are therefore well accustomed to working collaboratively. This unsuccessful program offers several more salient lessons about designing successful teacher incentive pay programs. First, as an experimental pilot program, teachers knew it would only last for a couple of years,

minimizing their motivation to make long-term changes to their teaching methods. The program was also not well communicated to teachers, resulting in the widespread belief that their chances of winning were too low to warrant working harder.

Bolivia—*Incentivo Colectivo a Escuelas (ICE)*

Bolivia's teacher compensation system is based primarily on seniority and dates back to the 1950s (*Escalafón Docente*). During the 1990s two reforms were enacted to help improve teacher quality and student performance. The Educational Reform Law of 1994 requires teachers to pass an exam before they can progress from a lower to higher seniority rank (Urquiola and Vegas, 2005). Four years later in 1998 National Law No. 25,027 instituted a system of voluntary merit wages (*salario al mérito*) that rewarded teachers for their performance on content exams. High failure rates in the first year of the program sparked widespread hunger strikes and outcry from the teachers union. The following year passing rates were significantly higher at 25%, but the program was eliminated and no more merit wages were awarded after 2000 (Mizala and Romaguera, 2004).

Replacing the short-lived merit wage program are four teacher incentive plans that still operate today. The first three programs incentivize teacher behaviours, including bonuses for additional in-service training (*Incentivo a la Actualización Docente, IAD*), bilingual instruction (*Incentivo a la Modalidad Bilingüe, IMB*), and for teaching in rural areas (*Incentivo a la Permanencia Rural, IMR*). None of those incentive programs has been deemed effective largely because at 2% or less of a teacher's average salary, the bonus amounts are too small to justify the additional effort to earn them (Vegas and Umansky, 2005).

The fourth incentive program is a collective school incentive (*Incentivo Colectivo a Escuelas, ICE*) intended to reward schools for student performance. The program went into effect in 2001 and encourages teamwork among principals, teachers, and administrative staff in public primary schools to improve student services. Though performance measures are part of Bolivia's collective incentive program, they are dwarfed by numerous education input and process components, such as teacher training, teacher retention rates, class sizes, student/teacher ratios, consistency in school management, the prevalence of teacher-initiated programs, and parental involvement. Performance measures are limited to student course passing rates and rates of student retention and dropping out of school (Mizala and Romaguera, 2004).

While Bolivia's collective incentive program ostensibly includes student performance, it has several limitations. Standardized achievement tests have been administered to primary school students since 1997; however, they are not administered in all schools. The ICE collective incentive is instead determined by an evaluation questionnaire completed by principals, teachers, and school boards representing parents. Although school evaluations go through a national sample verification process, they are little more than

self-evaluations. Another limitation is that although Bolivian schools are classified into 10 homogeneous groups for comparison purposes based on various school factors such as the number of teachers, location, and grade levels, student socioeconomic characteristics affecting school performance are not considered (Mizala and Romaguera, 2004).

In the first year of the collective school incentive nearly 12% of the 9,300 participating schools won awards totalling US\$1 million. Approximately 5% of eligible teachers received awards worth US\$281, representing an annual wage increase of 5% to 19%, depending on the type of teacher (Mizala and Romaguera 2004). This amount is only slightly higher than the incentive teachers could earn under the discontinued merit wage program, US\$260 in 2002 (Urquiola and Vegas, 2005).

Bolivia's collective school incentive has not prompted higher student achievement. While student performance is a component of the incentive pay program, Bolivia's overall teacher compensation system remains rigid with little room for pay differentiation. Nearly half of a teacher's base salary (47%) is not tied to any characteristic whatsoever. Compared to the collective school bonus, which at most amounts to 19% of a teacher's salary, seniority and training combined represent a much larger return for teachers at 37%. In fact, seniority, training, and where teachers work explain a full 90% of the variation in teaching salaries (Vegas and Umansky, 2005).

United States, New York—New York City, School Wide Performance Bonus Program

The New York City School Wide Performance Bonus Program (SPBP) was a four-year program implemented during the 2007–08 school year. Unlike most teacher incentive pay programs, the SPBP had strong political backing from New York City Mayor Michael Bloomberg, then-New York City Schools Chancellor Joel Klein, and then-United Federation of Teachers (UFT) President Randi Weingarten, as well as support from the local school district (CECR, 2010; Goodman and Turner, 2011; Springer and Winters, 2009). To participate, schools first had to gain the support of 55% of their teachers.

The SPBP was intended as a two-year pilot initiative to provide incentive awards to teachers in New York City's socioeconomically disadvantaged public schools. Because virtually all of the city's 1,600 schools would qualify, participants were randomly selected by a lottery. Originally, officials hoped to grow the program from 200 schools in the first year to 400 in the second year, but because of budgetary constraints the program did not grow as planned, and the number of schools voting to participate remained fewer than 200. Private donors financed the first year, and the city was able to leverage public funding in subsequent years, although not as much as supporters hoped (CECR, 2010; Goodman and Turner, 2011; Springer and Winters, 2009).

To earn awards schools competed against performance targets, rather than other schools, set by New York City's accountability system, the Progress

Report Card system. Under this system schools are given A through F letter grades based on three factors: student progress in English language arts and mathematics (55%); student performance on the state's English and math test (30%); and a combination of factors such as student attendance and perceptions by students, parents, and teachers of schools' learning environments. Union-member teachers in schools meeting 100% of their performance targets earned \$3,000; and those in schools meeting 75% of their targets earned US\$1,500. Those amounts were worth between 25% and 65% of average teachers' monthly salaries (OECD, 2009). During the SPBP's first year, 93% of participating schools met at least 75% of their performance targets, and US\$14.25 million was awarded to them. School-wide bonuses averaged just over US\$160,000 per school and ranged from US\$51,000 to US\$351,000 per school (Springer and Winters, 2009). In the program's second year, 91% of the 139 participating schools earned a combined US\$27.1 million in bonuses, averaging US\$195,100 per school (Goodman and Turner, 2011).

First and second year evaluations revealed the program had a negligible effect overall on student performance, with few discernible differences between participating and non-participating schools. Significantly, however, two distinct evaluations found that the school-wide bonus program did produce higher English and math achievement in small schools, about 3 scale score points higher each year in English and 1 scale score point higher each year in math. In contrast, student performance in larger schools decreased by a nearly equal amount in both subjects in both years. Researchers speculate that in smaller schools teachers are better able to work together toward a common goal, enhancing a sense of individual responsibility and improving teachers' motivation (Goodman and Turner, 2011; Springer and Winters, 2009).

Compared to the successful programs in Chile and the Dallas ISD, the group incentive programs in Bolivia and New York City also underscore another important lesson. A culture of continuous improvement prevails in both Chile and Dallas. Teachers in both locations are accustomed to participating in—rather than dominating—significant education policy reform debates. In contrast, teachers unions in Bolivia and New York City are extremely powerful and exercise significant influence over elected officials and public policy issues. On the other hand, the failure to communicate group incentive program features and goals to teachers in the already high-performing Round Rock ISD contributed significantly to its ineffectiveness.

United States, Texas—Round Rock Independent School District, Team Incentive Experiment

The National Center on Performance Incentives (NCPI) at Vanderbilt University in Nashville, Tennessee, has conducted numerous teacher incentive pay experiments throughout the United States since 2006 funded by grants from the US Department of Education. NCPI partnered with the

Round Rock Independent School District (ISD) in August 2008 to conduct two one-year randomized experiments on the effect of group-level performance pay for middle school teachers of core subjects: math, reading, science, and social studies. The experiments also examined participating teachers' attitudes and behaviours. Round Rock ISD is a high-performing district located in an affluent suburb near the Texas capital of Austin where interdisciplinary teams teach most sixth, seventh, and eighth grade students core subjects. Seventy-eight middle school teacher teams were divided into bonus-eligible and non-eligible groups in the first year, and 81 teacher teams were assigned to those groups in the second year. In all, 159 teachers from nine Round Rock ISD schools participated in the experiment, which awarded more than US\$300,000 in bonuses each year (Springer et al., 2012b and c).

Teachers in the bonus-eligible teams each received an award if their teams' value-added score on the Texas Assessment of Knowledge and Skills (TAKS) ranked among the top third, provided their individual scores were not statistically below grade-level average. Awards were worth up to US\$5,500 in the first year and US\$6,000 in the second year, approximately 108% of teachers' average monthly salaries (OECD, 2009; Springer et al., 2012c). Fourteen of the 39 teams eligible for bonuses in 2008–09 received bonus awards. Of the 67 individual teachers winning awards, 63 received the maximum award, and four received prorated awards worth as low as US\$3,800 based on their lighter teaching workload. The following year, 12 of the 40 bonus-eligible teams won bonuses. Forty-six teachers won the full award, and six teachers won prorated awards as low as US\$4,200. Only once throughout the two-year experiment was did a member on a winning team not receive a bonus because the teacher's individual value-added score was too low (Springer et al., 2012c).

The team incentive experiment had no effect on student achievement after two years for any subject or grade level assessed. Reviewers speculate that there could be several possible explanations for this result, including the experiment's short duration, teachers' misunderstanding of the experiment, and the teachers' belief that the chances of winning a bonus were so low that they were not motivated to change their teaching practices (Springer et al., 2012c). Evaluators also made another salient observation about the Round Rock ISD team incentive experiment that underscores a fundamental challenge with most existing teacher incentive pay programs: "The financial awards were an add-on to standard pay, performance was measured separately from the districts' standard evaluations of teachers . . . and there was no professional development specifically connected to these programs" (Springer et al., 2012c: 387). Reactions from teachers participating in the unsuccessful Round Rock ISD incentive pay program offer additional insight into those findings. The majority of participating teachers did not believe that the program negatively affected their schools or their attitudes toward each other. However, they criticized the program for not providing them with useful

information about their teaching effectiveness, an important insight from teachers in schools that are already performing well that suggests teachers are aware of their own effectiveness and want opportunities for continuing improvement (Springer et al., 2012c). As discussed later in this survey, teachers participating in the successful Little Rock, Arkansas, and Andhra Pradesh, India, incentive pay programs also indicated a desire to improve their teaching effectiveness and be compensated for those improvements.

Group incentive teacher pay programs can have significant, positive impacts on student achievement as programs in Chile and the Dallas ISD demonstrate. Successful programs make student achievement the primary factor for rewarding teachers and work with teachers to craft clear, fair, and ongoing student achievement gains. A leading benefit of group teacher incentive rewards is that they promote collaboration among teachers; however, there can be diminishing returns to group-based incentives once those groups become too large. Teachers need to believe that their efforts will be recognized and rewarded through a fair incentive pay process, and this principle is the cornerstone of individual teacher incentive pay programs described in the next section.

Individual Incentive Pay Programs

Individual incentive pay for teachers is another widespread program model. It recognizes that teacher motivation can be diminished if the incentive structure rewards differing levels of teachers' effort the same; however, the design of individual teacher incentive pay programs can take various forms, from simple annual bonuses tied to student test score gains to comprehensive pay scale reforms that require evidence of student achievement before teachers can earn higher base salaries. Individual teacher incentive programs in the Little Rock, Arkansas, School District (SD) and throughout England resulted in higher student achievement. While these programs were vehemently opposed by teachers unions, classroom teachers supported them.

The first successful program examined in this section is the Little Rock SD's Achievement Challenge Pilot Project. This program is especially noteworthy because it awarded incentive bonuses to individual teachers based solely on annual student test score growth. The Little Rock SD therefore targeted limited resources to teachers with assessed students and kept the program design simple. Set bonus amounts were scaled to students' annual test score percentage increases then multiplied by the number of students each teacher taught, so those who taught larger or a greater number of classes could earn substantial incentive bonuses. The program resulted in higher student achievement, particularly among those with teachers who had previously been the weakest at producing student achievement gains.

The second effective individual incentive pay program examined is England's Performance Threshold System Performance-Related Pay (PRP) program that ties the progress of individual teachers along the pay scale to evidence of ongoing, improved student achievement. As noted previously, evaluators of the Round Rock Independent School District's group incentive program cautioned that incentive pay programs grafted onto rigid pay scales that do not take student achievement into account may not motivate teachers (Springer et al., 2012c). England's pay scale reform mitigates that challenge by requiring all teachers to provide objective evidence of student achievement gains using standardized test results, classroom grades and test scores, or results from other pre-approved student learning goals before they can progress along the salary scale. In sharp contrast, two other national, individual performance-based teacher pay scale programs, Mexico's *Carrera Magisterial* (CM) and Portugal's Performance Pay Program (part of pay scale reform), have been largely ineffective because they did not make improved student achievement a key criterion for pay increases.

United States, Arkansas—Little Rock School District, Achievement Challenge Pilot Project

The Little Rock SD partnered with private foundations for a three-year incentive pay experiment from 2004–05 through 2006–07 called the Achievement Challenge Pilot Project (ACPP). Its purpose was to motivate teachers and staff to raise student performance in three Little Rock SD elementary schools that were socioeconomically disadvantaged and underperforming academically. Along with India's Andhra Pradesh experiments described below, the ACPP stands out among the performance programs in this report because teacher incentive bonuses were determined solely on the achievement growth of their students from one year to the next on the nationally norm-referenced Iowa Test of Basic Skills. The amount of the award was proportional to student achievement growth increases and multiplied by the number of students teachers taught. Thus teachers could earn US\$50 for performance growth up to 4% increasing to US\$400 for growth over 15%, multiplied by the number of students they taught (Neal, 2011; Winters et al., 2008). Average teacher bonuses ranged from US\$350 up to US\$7,600 (in 2007 dollars), which represented approximately 8% to 174% of teachers' average monthly salaries (OECD, 2009; Winters et al., 2008). In spite of challenging student and school characteristics, student performance improved significantly in all three subjects assessed.

Program analysis results showed that student scores in math increased 0.16 of a standard deviation in math, 0.15 of a standard deviation in reading, and 0.22 of a standard deviation in language (Neal, 2011; Winters et al., 2008). Particularly striking was the fact that the incentive program had the greatest impact on teachers who had previously been the weakest at producing student achievement gains (Winters et al., 2008). Yet for all the tremendous promise of

this pilot project, and the fact that a majority of teachers had to vote in favour of participating before their schools could join the program, the local teachers union lobbied against continuing the Achieve Challenge incentive pay project. In response, the local school board cancelled the program (Winters et al., 2008).

England—Performance Threshold System

Performance-Related Pay (PRP)

The Education Reform Act of 1988 transformed the English education system into a quasi-market where parents have a degree of choice over which schools their children attend, funding follows students, and schools have autonomy over management decisions. Curriculum and teacher pay scales, however, are determined by the central government. Interest in performance-related pay (PRP) for teachers to improve student achievement had generated strong interest since the 1980s, but it was not formally instituted until the 1999–00 school year, based on an official government Green Paper released in 1998 titled “Teachers: Meeting the Challenge of Change.” The PRP reform augmented the existing pay structure, which is based on a nine-point uniform salary scale ranging from £14,658 to £23,193 as of 2000. By the time PRP was implemented, approximately 75% of English teachers had reached point nine, based largely on years of experience, credentials, and duration at a particular school.

Through the PRP reform, beginning in 2000 teachers at the highest level on what is referred to as the main pay scale could apply to pass the Performance Threshold and advance to the Upper Pay Scale (UPS). This threshold encompasses four input-based standards relating to teaching management and skills and one standard relating to students’ academic progress. Teachers were required to provide evidence that their students have progressed relative to their own prior achievement, as well as to the achievement of similar students nationwide according to school-based or national assessments. Teachers were allowed to use evidence from the entire course of their careers to qualify for the UPS. In the first year, approximately 88% of eligible teachers applied for the Performance Threshold, and 97% succeeded at earning the bonus and acceptance into the UPS. Successful teachers received a US\$2,000 bonus (in 2000 dollars), approximately 9% of average teachers’ annual salaries, which became part of their permanent annual salary and retirement package. Teachers’ salaries then progressed along the new UPS based in part on student achievement (Atkinson et al., 2004 and 2009; OECD, 2009; Springer and Balch, 2009).

The Performance Threshold was for all intents and purposes a vehicle for a pay raise, not incentive pay; however, the UPS operated as an actual incentive pay system because teachers were required to demonstrate sustained and significant student achievement growth by their students each year. Before any UPS pay increases were authorized, headmasters had to conduct

a performance review (Atkinson et al., 2004). An early analysis comparing the two school years prior to PRP and the two years after its implementation was conducted using high school student scores on the Key Stage 4 (KS4) General Certificate of Secondary Education (GCSE) exam, a high-stakes college entrance exam taken by students at age 16 that assesses English, math, and science, compared to student scores on the previous Key Stage 3 (KS3) exam taken by high school students ages 14 to 16 in the same subjects. It found that overall student test scores increased by about one-half of a GCSE grade level per student, a significant 0.73 of a standard deviation (Atkinson et al., 2004).

The UPS originally had five pay levels, or spines, reduced to three in 2004. Even though 97% of teachers passed the Performance Threshold, their students' achievement continued to increase. A subsequent analysis that matched individual students and teachers found that even after controlling for various student, teacher, and school characteristics, the PRP system increased teacher effort and resulted in higher student achievement. Specifically, PRP added an average 90% of a GCSE grade and 40% of a value-added grade per student with a PRP-eligible teacher. These results are equivalent to roughly three-quarters the effort of novice teachers advancing up the learning curve (Atkinson et al., 2009).

There was growing concern, however, that PRP would have diminishing returns on student performance over time unless the pool of eligible teachers was expanded (Robb, 2013). Based on recommendations in 2012 from the School Teachers' Review Body (STRB), as of September 2014 all teachers' pay will be based on performance instead of length of service, which simplifies the progression between the main and upper pay scales, and gives schools more freedom to set teachers' starting salaries (DFE, 2014). Under England's revised PRP plan regardless of where teachers fall on the main pay scale, they can annually apply to the UPS (DFE, 2013b and c; Thorpe et al., 2013). Local school leaders and governing boards are responsible for the specific features of their PRP plans; however the Department for Education explains that PRP is intended to "act as an incentive for continuous improvement. Schools will already have some experience of making decisions about pay that are linked to assessments of performance—what is new is that all decisions about pay progression for teachers will need to be linked to performance in the future" (2013a: 5).

The Department recommends school leaders assess teachers' performance based on their students' performance on school or nationwide tests as well as defined objectives, including their impact on student achievement progress, improvements in classroom management and pedagogy, along with their contributions to the overall effectiveness of their schools and colleagues (DFE, 2013a). A recent analysis projected that tying teachers' base pay to performance would mean top teachers could earn £70,000 annually in as little as five to eight years, compared to the 12 years it used to take for teachers to earn £52,000 under the previous system (Robb, 2013).

In spite of those findings, leaders of some of the United Kingdom's largest teachers unions, including the National Association of Schoolmasters Union of Women Teachers (NASUWT) and the National Union of Teachers (NUT), threatened to strike over the PRP reform (Collett, 2013; Coughlan, 2014; Robb, 2013). Public support for a teachers union strike is low at just 29%, but support for teacher performance pay remains high at over 60% (Populus, 2013; Thorpe et al., 2013). Moreover, 89% of classroom teachers report they favour being paid based on their performance (Collett, 2013; Coughlan, 2014; Robb, 2013). Specifically, an overwhelming majority of teachers surveyed said they consider the most important factor for determining a teacher's salary is quality measured by annual appraisals (43%) and student exam results (29%), not seniority, qualifications, or income parity with other teachers (Populus, 2013). A separate survey revealed that 46% of teachers support evaluations based on their students' achievement and progress (Cunningham and Lewis, 2012).

Pay scale programs in Mexico and Portugal, however, have not been effective. As with Bolivia's group incentive program, Mexico's pay scale reform required compromising certain program design elements to garner the necessary teacher union backing. Progress along Mexico's pay scale, for example, depends far more on factors other than student achievement. So structured, few teachers who focus on improving student achievement ever realize pay increases, and those who do have little incentive to continue improving after they have earned their salary increases. The situation was far different in Portugal. Faced with soaring education costs and stagnating student performance, Portuguese government officials implemented a new pay scale structure that replaced seniority-based salary progression with progression based largely on student achievement. An overly hasty implementation, including the failure to clarify performance and pay expectations for teachers, resulted in national strikes by union members as well as rampant grade inflation. The experiences of Mexico and Portugal in advancing performance-based pay scale reform are opposite sides of the same coin and underscore the critical importance of partnerships, not political power plays, when attempting to advance lasting reforms to improve student achievement.

Mexico—*Carrera Magisterial* (CM)

Mexico's teacher career ladder program (*Carrera Magisterial*, CM), enacted in 1993, is one of the world's earliest programs to offer incentive pay for student performance (McEwan and Santibáñez, 2005). It was one of several reforms that emerged as part of the 1992 initiative to modernize primary and secondary education in Mexico, which at the time had a national illiteracy rate of 11.7%. That rate varied significantly depending on the state, from 4.3% in Nuevo León up to 28.5% in Chiapas (Gómez-Zaldívar, 2014). Mexico's CM was negotiated by state, federal, and teachers' union leaders. While

government leaders wanted compensation tied strictly to student performance on standardized tests, union leaders insisted that teachers be rewarded equally without including student performance. The resulting career ladder pay scale is a compromise that included student test scores, but those are given little weight (Mizala and Romaguera, 2004).

Through the program, teachers with union membership and permanent salary contracts are eligible for incentive awards if they volunteer to participate in professional development; year-long evaluations conducted by their principals, peers, and union representatives; take subject-specific and general content tests; and have their students take national tests. Participating teachers are classified according to five distinct levels, A (low) through E (high), based on a 100-point award scale; however, student performance counts for a maximum of just 20 points. Educational inputs and processes, including seniority, professional development, and degrees earned, account for the remaining 80 points (McEwan and Santibáñez, 2005; Mizala and Romaguera, 2004). The award amounts are worth a substantial percentage of teachers' annual salaries, increasing from 20% for teachers scoring at the initial Level A up to more than 200% for teachers reaching Level E (McEwan and Santibáñez, 2005; OECD, 2009; Vegas and Petrow, 2008).

Since 1993 more than 600,000 teachers have received awards, which become a permanent part of teachers' compensation throughout their careers (Vegas and Petrow, 2008). Yet experts note several limitations with Mexico's career ladder program. Teacher examinations are not demanding, and the same tests are used each year (McEwan and Santibáñez, 2005; Santibáñez et al., 2007). Given the points awarded for degrees and seniority in the career ladder program, there is a greater incentive for teachers to focus on factors that have little to do with improving student performance. Thus only a small number of teachers ever focus on student achievement, and once they advance they have little incentive to continuing focusing on it (Santibáñez et al., 2005; Santibáñez et al., 2007). Research has shown, however, that students with teachers most likely to receive the incentive award had test scores around 0.15–0.20 points—less than 0.1 of a standard deviation—higher than students with teachers too far above or below the awards threshold (McEwan and Santibáñez, 2005). Analyses designed to control for the possible effects of teacher self-selection also found that achievement among secondary school students improved 0.03 to 0.15 of a standard deviation but only for students with teachers facing strong incentives, about 4% of teachers (Santibáñez et al., 2007).

Those results stand in sharp contrast to those from Chile's school-wide teacher incentive pay program, which affects teachers in 90% of schools nationwide and has produced improvements in student achievement roughly twice as large (Rau and Contreras, 2011). Student achievement decreases were also documented among Mexican teachers who had received bonuses or been

promoted (Santibáñez et al., 2007). Thus pay incentives can promote higher student performance among a very limited pool of teachers, but several elements of Mexico's system weaken motivation among the majority of teachers who have earned or have little possibility of earning awards (Hopkins et al., 2007; Santibáñez et al., 2007). Changes are currently underway to strengthen the program (OECD, 2013b).

Portugal—Pay Scale Reform

Portugal stands out among the case studies included in the *Global Survey* because along with England, its incentive program was not grafted onto an existing, rigid pay scale system. Rather, in 2007 Portugal divided its single pay scale for teachers into two distinct scales. As part of this reform, near automatic, tenure-related progression along the pay scale was replaced with performance-based progression based on a variety of factors. The most controversial was student performance on school and national assessments. Other components include parental satisfaction, teachers' attendance at school and training seminars, performance of extra teaching and administrative duties, and participation in research projects. Promotion from the lowest to the highest pay scales under this system amounted to roughly 25% of teachers' monthly gross salary. Moreover, teachers who performed especially well and met pre-determined targets would be eligible for a one-time bonus, worth roughly one month's salary. Prompting this reform was the desire of a new government to address relatively high education and teacher compensation expenditures in stark contrast to ongoing poor student performance on international assessments (Martins, 2009). The change promoted two national strikes by teachers and their unions, and even as the implementation deadline approached, various performance and incentive details were still unclear.

An early analysis of the program's effect used the autonomous regions of the Azores and Madeira, as well as private schools, which participate in national testing but set their own teacher compensation policies, as controls and found that the focus on individual teacher performance negatively impacted student performance. Specifically, student performance declined up to 0.40 of a standard deviation on national exams. The decline was less pronounced with school-level results, indicating that teachers were responding to pay incentives by inflating students' grades. In spite of these negative results, analysis author Pedro S. Martins notes that the findings confirm that "teachers respond to incentives in a predictable way," and that ongoing research should focus on "which specific performance-related pay setups generate the best results for students" (2009: 16). While still in effect, Portugal's pay scale reform is undergoing significant redevelopment, including enactment of rigorous teacher evaluation and career development practices (Santiago et al., 2009).

Thus individual teacher incentive programs, whether based on straightforward test score gains or as part of large-scale salary schedule reforms, can

have demonstrable positive impacts on student achievement. Successful programs in both Little Rock, Arkansas, and England make teachers reform partners, developing clear expectations in consultation with them, and ensure a majority of teachers are eligible for incentive pay. Pay scale reform programs in Mexico and Portugal, however seemingly expansive in scope, affected, and therefore motivated, few teachers to expend additional effort at improving student achievement. Consequently, student achievement in Mexico did not improve as much as it could have, and it actually declined in some cases in both Mexico and Portugal.

The next section examines which teacher incentive pay program type is better: group or individual. Thus far evidence shows both types of programs have succeeded at the national and school levels, increasing student achievement the equivalent of roughly one-half to a full school year of additional learning. Several design features and implementation approaches critical to successful programs have also been identified. The following section also addresses another key consideration: program cost and sustainability. In particular, several program reviewers analyze the cost of teacher incentive pay programs compared to several popular education reforms, including class-size reduction and general education funding increases. The results indicate that both group and individual teacher incentive pay programs are far more cost effective than non-incentivized, resource-based programs.

Group or Individual Incentive Pay Programs Compared

The five successful teacher incentive pay programs examined in this section include experimental programs in India and Israel specifically designed to test the comparative impacts of group and individual pay incentives for teachers on student achievement. Another program adopted in schools throughout the United States, the Teacher Advancement Program (TAP), blends group and individual incentives for teachers to maximize the benefits of cooperation among teachers while minimizing the negative effects of indiscriminate rewards to all teachers regardless of individual effort. The fourth incentive pay program in the Houston, Texas, Independent School District, is also a blended program awarding individual and three types of group-based incentive bonuses. Two other programs that failed to achieve positive effects on student achievement are also considered, experimental programs in Kenya and Tennessee's Nashville Metropolitan Public Schools. The final program considered in this section is in Washington, DC, which not only blends group and individual teacher incentives, it also combines other rewards and consequences for teachers as part of a comprehensive reform package that comes closest to what Greene would consider a "real" incentive pay program for teachers.

India—Andhra Pradesh, Randomized Evaluation Study

India has embarked upon several initiatives to improve primary school enrolment and improve the quality of education, including increasing public education spending. Even though 95% of children ages 6–14 are now enrolled in school, literacy rates remain low with around 60% of students reading at a second grade level. Teachers in India are employed by the government and typically teach all subjects for a given grade, and they often teach multiple grades. Salaries are largely based on experience, with only slight adjustments based on where they teach. Teachers unions are powerful, no part of teachers' salary is based on performance, and non-performance is rarely disciplined, which is a particular problem given high teacher absenteeism rates. Yet teachers' monthly salaries and benefits during the experiment period were approximately five times greater than the per capita of the general population, Rs 10,000 compared to Rs 2,000, roughly US\$222 compared to US\$45 (in 2006 dollars) (Muralidharan and Sundararaman, 2011b).

Andhra Pradesh is the fifth largest state in India with more than 80 million people, 70% of whom live in rural areas, and it mirrors national child welfare averages such as infant mortality, primary school enrolment, and literacy (Muralidharan and Sundararaman, 2011b). There is an ongoing randomized evaluation of two types of teacher performance pay programs in rural, government-run primary schools in this state. Over a five-year study period, group bonuses were annually awarded to teachers based on school-wide average student performance in 100 schools. Teachers in another 100 schools received individual bonuses for their students' performance. In all, 25,000 students and 1,000 teachers participated. Teachers in both programs received bonuses worth Rs 500, approximately US\$12 (in 2006 dollars), for every percentage point of improvement in math and language test scores above a minimum improvement level of 5%. Teachers in the individual program received bonuses based on the results of their students, while those in the group program received bonuses based on school-wide student performance. No bonuses were awarded for negative results (Muralidharan, 2012). Controls were also put in place to discourage cheating and excluding weaker students from end-of-year assessments (Muralidharan and Sundararaman, 2011b). Overall, teachers could earn bonuses worth up to US\$450 (2006 dollars), as high as 50% of teachers' average monthly salaries (Muralidharan and Sundararaman, 2008; OECD, 2009; Springer and Balch, 2009).

These experiments are part of a larger research project conducted by the Azim Premji Foundation to assess various policies aimed at improving primary education in Andhra Pradesh. In addition to the two incentive pay experiments the foundation also sponsored two separate resource-based experiments that awarded schools extra funding to hire more teachers resulting in smaller classes and block grants for school supplies (Muralidharan

and Sundararaman, 2011b). Thus the Andhra Pradesh experiments shed valuable light on the comparative effectiveness of the group and individual incentive pay plans, as well as incentive pay and resource-based programs overall under scientifically controlled conditions.

Turning first to the anticipated effectiveness of individual and group performance pay experiments, much of the theoretical literature is speculative, since opportunities for designing empirical experiments such as the one in Andhra Pradesh are rare. The concern with group or school-level incentives is the propensity for free riding, meaning in this context that if less effective teachers are rewarded the same as more effective teachers for raising student achievement, the latter group loses motivation to work harder. The potential de-motivating impact of the free-rider effect is a leading reason why some experts believe that performance pay plans are more effective if they are based on individual incentives (Holmstrom, 1982). Other experts note that group incentives may have the benefit of greater cooperation among teachers and get better results (Hamilton et al., 2003; Itoh, 1991). Still others note that in smaller school or teacher group settings there could be greater social pressure against free riding and positive encouragement for everyone to do their best (Kandel and Lazear, 1992; Kandori, 1992).

Andhra Pradesh evaluators, however, found that the individual incentive schools always outperformed the group incentive schools, even after controlling for variations in school size. This finding resembles results in small schools participating in New York City's group incentive program and also in the Houston, Texas, Independent School District (ISD), described later. By the end of the Andhra Pradesh program's second year, students in the individual teacher incentive schools performed 0.28 of a standard deviation higher than students in control schools; while students in the group incentive schools performed 0.15 of a standard deviation higher than students in control schools (Muralidharan and Sundararaman, 2011b). Thus students in schools with teacher incentive programs gained the equivalent of approximately one-half to more than one full school year's worth of achievement compared to their peers in schools without teacher incentive pay programs. The individual teacher incentive program, however, resulted in student achievement gains nearly twice as great as the group incentive program. Ongoing analyses also concluded that the individual teacher incentive pay program had consistent, positive effects on student performance across all durations. Compared to students in control schools, those who had attended participating individual incentive schools for all five years scored 0.54 of a standard deviation higher in math and 0.35 of a standard deviation higher in language. While the group incentive experiment also yielded higher student achievement, the effect sizes were smaller than the individual incentive program, and the group incentive effects were not significant at the end of primary school for the five-year cohort of students (Muralidharan, 2012).

In spite of concerns over potential negative effects from teachers competing with each other (especially within the same school) for individual awards, it is important to note that in this experiment teachers compete against external performance benchmarks relative to their students' past performance, which means teachers are not working toward an unattainable goal based on the performance of other teachers' students or an arbitrary, mandated benchmark. Another important design feature is that bonuses are awarded to every teacher who exceeds his or her relative student achievement benchmark, which increases teachers' sense of fairness and motivation because bonuses are attainable. In a distinct analysis the Andhra Pradesh evaluators surveyed participating teachers' views of incentive pay based on performance. Fully 80% of participating teachers had a positive view about linking part of their pay to performance before the program started, and their support for incentive pay based on performance increased once they experienced how such a plan could work (Muralidharan and Sundararaman, 2011a). This finding led evaluators Karthik Muralidharan from the National Bureau of Economic Research and Venkatesh Sundararaman of the World Bank to conclude 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 over time" (2011a: 395).

In terms of improved student achievement, the results from Andhra Pradesh's individual teacher incentive program are a stark contrast to those from Mexico's individual pay scale incentive program. The Andhra Pradesh individual incentive yielded student achievement improvements up to nine times greater than those from Mexico's program. Unlike Mexico's program, in which student achievement counts for a small fraction of individual incentive pay for teachers, Andhra Pradesh's program linked rewards exclusively to student achievement gains but in a way that participating teachers believed was fair. This is a significant lesson for policymakers. Both Mexico and India have powerful teachers unions, and it is almost taken for granted that teachers will oppose linking their compensation to improving their students' achievement. As teachers in Andhra Pradesh demonstrate, even teachers in heavily unionized environments are eager to participate in incentive-based compensation programs given the choice, as long as those programs do not set teachers or students up to fail. Furthermore, when achievement bonuses and incentives are not artificially constrained, as they are in Mexico, teachers have strong motivation to devote additional effort to improving student achievement above the relative benchmark year after year.

The Andhra Pradesh evaluators also reached another significant conclusion. In both the individual and group incentive schools students also scored higher in subjects that were not part of the incentive pay program. After two years, students in incentive schools scored 0.11 and 0.18 of a standard

deviation higher than students in control schools in science and social studies, respectively (Muralidharan and Sundararaman, 2011b). After five years, students in incentive schools scored 0.52 and 0.30 of a standard deviation higher in science and social studies, respectively (Muralidharan, 2012). This finding suggests that teachers do not treat incentives as “cash for test scores” or simply “teach to the test.” Rather, incentive pay programs can promote an overall improvement in teacher effectiveness, student achievement, and a culture of continuous improvement.

It is also noteworthy that contrary to the prevailing wisdom about basing incentive rewards on multiple measures, including those less (or not) directly related to improved student achievement, rewards in India’s Andhra Pradesh experiment used only the average gain in test scores as the basis for rewarding teachers, similar to the Little Rock SD incentive pay program. Built into Andhra Pradesh’s incentive program was a set achievement target of 5% annual improvement for all teachers and schools, but that target was relative to students’ past performance. With this structure the incentive programs did not set up teachers or schools to fail, but neither did they sell teachers and schools short. On the contrary, by incentivizing teachers with set awards for every additional test score point gain above the stated minimum without limit, teachers had a significant amount of control over the size of their bonuses. While multiple measures can certainly increase a sense of fairness and motivation among teachers by making awards seem attainable, they can also make incentive pay structures exceedingly complicated. Such complexity can have the opposite effect of de-motivating teachers to focus on student achievement if it is not the primary factor for awarding incentive bonuses.

Even with incentive programs that do base rewards primarily or exclusively on student achievement, attempts to improve fairness by accounting for differences in the types of students, subjects, and schools through various adjustments such as value-added can result in minimized transparency. While the Dallas ISD group incentive program resulted in improved student achievement, one criticism was that it was overly complicated (Ladd, 1999). The lack of clarity from an overly complicated value-added group incentive structure was a leading factor contributing to the ineffectiveness of the Round Rock ISD group incentive program as well. Yet, regardless of how simple or complicated the incentive structures may be, they must always reflect the unique motivations of the teaching workforces where they are implemented. Andhra Pradesh evaluators underscore this point by noting that they found a strong correlation for participating teachers’ prior reported support for the incentive pay programs and their actual performance (Muralidharan, 2012).

Another significant finding by the Andhra Pradesh evaluators concerns the comparative cost effectiveness of incentive pay programs and resource-based programs. Even though both programs spent the same amount per school, test score gains were slightly more than three times higher overall

in incentive schools, 0.28 of a standard deviation compared to 0.09 of a standard deviation in resource-based schools. To put this cost effectiveness into perspective, evaluators Muralidharan and Sundararaman explain that the performance pay programs were almost “10 times more cost effective than reducing class size by hiring another civil service teacher” (2011b: 72–73). If the student achievement gains from the incentive pay programs are sustained, depending on wage growth and other factors, Muralidharan and Sundararaman estimate that labour market returns from higher student achievement to India would range from 16 to 185 times the initial cost (2011b). This is a significant finding because several incentive pay programs considered in this survey were implemented by policymakers as a last resort after spending years (even decades) increasing education funding with no corresponding improvements in student achievement. As noted previously, leading education economists concur that allocating teacher compensation resources more strategically based on performance instead of spreading them thin across the board makes incentive pay programs sustainable. Incentive pay programs operating in Israel also substantiate this finding.

Israel—Ministry of Education School Performance Program

In recent decades education in Israel has changed significantly, partially in response to growing numbers of immigrants who are largely disadvantaged in terms of income and language status. Such demographics present challenges for schools struggling to keep performance levels high. Throughout the 1990s and into the early 2000s there was strong public demand that schools adopt a more academic, back-to-basics emphasis. A variety of reforms were initiated during this period that serve as the foundation for present-day efforts. Yet secondary student achievement in core subjects, regardless of their socioeconomic status, remained low based on results from international assessments. Against this backdrop, several experimental programs were authorized starting in the mid-1990s with the goal of improving student and school performance, including the two incentive pay programs discussed here (OECD, 2010).

In 1995 the Ministry of Education implemented the School Performance Program and reserved the equivalent of US\$1.4 million for group incentives for schools ranking in the top third based on their relative performance improvement. There were 62 schools in all, 37 secular, 18 religious, and seven Arab schools (Lavy, 2002; Podgursky and Springer, 2010). Performance was measured based on the number of credit units per student, students taking Israel’s matriculation (*Bagrut*) exam and earning certification, and dropout rates. Seventy-five percent of the group incentive was distributed among teachers proportional to their gross annual salary (US\$30,000 mean at the time), and the remainder went toward improving teacher facilities such as lounges. In 1996, teacher bonuses went as high as US\$1,000, approximately 30% of average teachers’ monthly salaries. To promote the program and help increase

participation, teachers were awarded bonuses for the 1994–95 school year prior to the official implementation year of 1995–96. In the first two official years of the program, 1995–96 and 1996–97, a total of eight religious schools earned bonuses each year, while 13 and 17 secular schools received bonuses in the respective years.

Echoing results from India’s Andhra Pradesh incentive pay programs, the cost of Israel’s school incentive program was less than half that of a non-incentivized, resource-based intervention enacted by the Ministry of Education during this period, which involved funding increases for additional teaching time, class-size reductions, and on-the-job staff training (Lavy, 2002). As for results, the incentive program was far more cost-effective in terms of each marginal dollar spent. This finding echoes another similar finding with the Andhra Pradesh incentive pay experiments in India. Hebrew University’s Victor Lavy concluded that the school performance incentives “led to an increase in the proportion of students, especially among those from a disadvantaged background, who qualified for a matriculation certificate” (2002: 1315). Of particular interest is the documented change in teacher behaviour in response to the incentive pay experiment. The increases in student performance were largely the result in changes to teaching methods, additional tutoring after schools, and heightened responsiveness by teachers to students’ needs. Yet student learning gains dissipated once teachers earned their bonuses, and the possibility of additional bonuses ended (Lavy, 2004; Vegas and Umansky, 2005). Such results underscore the importance of ensuring ongoing eligibility for earning incentive bonuses so schools and teachers stay motivated.

Israel—Teacher Incentive Experiment

The Teacher Incentive Experiment was implemented in late 2000 in 49 Israeli high schools. Under this semester-long voluntary experiment individual teachers with students in grades 10 through 12 could earn incentive bonuses based on the matriculation credits their students earned on the national exit exam in English, Hebrew, Arabic, and mathematics administered in June 2001. Schools were allowed to accommodate teachers who taught courses in other core matriculation subjects. Teachers with multiple courses in core matriculation subjects could apply for as many courses as they taught. Eligible teachers also had to work at schools with poor matriculation exam passing rates. Teachers then competed with teachers in the same subjects at the same schools in a rank-order tournament that controlled for students’ socioeconomic backgrounds, grade levels, grade sizes, and various school characteristics. Teachers were ranked based on how their students’ actual performance compared to their predicted performance (Lavy, 2009).

The incentive program resulted in notably higher matriculation test-taking rates, pass rates, and mean test scores. Based on student results,

teachers were classified according to four ranks, weighted for student passing rates, and earned awards ranging from US\$1,750 to US\$7,500. Given that the mean gross income for eligible teachers at the time was US\$30,000, the incentive bonuses were significant—especially for teachers teaching multiple matriculation courses and therefore eligible for multiple awards—and averaged up to 40% of teachers’ monthly salaries (Lavy, 2009; OECD, 2009). A total of 629 eligible teachers participated in the Teacher Incentive Experiment, and 302 teachers received incentive bonuses. As with the School Performance Program, there was a marked positive difference in teacher behaviour in response to the prospect of an incentive award, including extra after-school tutoring and greater attention to struggling students; and no negative, gaming behaviours such as inflating grades or narrowing teaching to mere test preparation, were documented (Lavy, 2009). As a result, students taught by incentive program teachers increased the overall number of math matriculation exam credits they earned by 18% and the number of English matriculation exam credits by 17% (Podgursky and Springer, 2010).

A number of programs combine individual and group teacher incentive pay rewards. As noted previously, these programs attempt to leverage the benefits of individual teacher motivation and group collaboration. The potential challenge of such a blended approach, however, is that such programs can become so complicated that expectations for teachers are unclear, and teachers in turn become less motivated to participate. That has not been the case in the two following programs. The first was created by the Houston, Texas, Independent School District, which offers an individual incentive and three types of group incentives through one program called ASPIRE, which stands for Accelerating Student Progress, Increasing Results and Expectations. The second program is a nationwide, privately-run voluntary program for schools that combines individual and group incentives in one program, the Teacher Advancement Program (TAP).

United States, Texas—Houston Independent School District, Accelerating Student Progress, Increasing Results and Expectations (ASPIRE)

The Houston Independent School District (ISD) is the largest district in Texas with more than 200,000 students and nearly 300 schools. It is also among the 10 largest school districts in the United States. Houston ISD has had a performance award plan that includes teacher bonuses since 2001–02. That plan was changed in 2005–06 to include both school-wide and individual teacher bonuses. In 2006–07 further changes were implemented, notably shifting to value-added measures of student achievement growth, that laid the foundation for the district’s current Accelerating Student Progress, Increasing Results and Expectations (ASPIRE) program (Shifrer, López, and Heard, 2013).

Unlike the district's previous incentive pay plan, ASPIRE distributes three types of group-based incentives to teachers. School-wide bonuses are distributed for teachers and non-teaching staff whose schools rank in the top 50% of student achievement growth. Teachers receive bonuses worth US\$1,000 and non-teaching staff receive bonuses worth US\$500. The second award is a group teacher award that varies by grade level and subject. Early education teachers (pre-kindergarten through second grade) in core subjects of reading, language arts, math, science, and social studies can earn bonuses up to US\$2,500 for school-wide performance growth in reading and math that ranks in the top 25%. Elementary and middle school core subject teachers can earn bonuses up to US\$5,000 for student growth in their own classrooms. High school teachers of core subjects can also receive bonuses worth up to US\$5,000 for department-wide student growth in the subjects they teach. The third ASPIRE bonus worth up to US\$500 is awarded to teachers at schools that rate performing or better on the state accountability system and that rank in the top 50% of statewide improvement in reading or math. Houston ISD also rewards student attendance through the ASPIRE program. Teachers whose students have perfect attendance earn an extra 10% bonus or an extra 5% for students who miss two days or less (Terry, 2008).

Several features distinguish Houston ISD's ASPIRE program from other incentive pay programs. First, the local school board adopted ASPIRE with strong support from the business community but without the support of the local teachers union (Terry, 2008). Second, the incentive awards are based on much smaller groups of teachers, classrooms, and departments. This factor increases the likelihood that teachers feel they can contribute to winning an award, which maximizes motivation and minimizes the free-rider effect. Third, value-added measures are difficult to understand because of their complexity; however, Houston ISD teachers report that they have a clear understanding of what they need to do to earn a bonus and have changed their teaching approaches accordingly.

Another distinguishing feature of ASPIRE is that Houston ISD continually strives to improve the program (Imberman and Lovenheim, 2013). One improvement is increasing the size of incentive awards. While ASPIRE went into effect during the 2007–08 school year, 2006–07 awards were adjusted and dispersed according to the updated ASPIRE awards plan. Thus, in 2006–07 and 2007–08, high school teachers were eligible for awards of just over US\$8,000, including departmental and school-wide awards. That amount increased significantly in 2008–09, with high school departmental awards growing to US\$7,700, up from US\$5,000. Combined with possible school-wide awards, high school teachers could earn a maximum award of around US\$11,000, equivalent to 20% of a beginning teacher's total compensation (Imberman and Lovenheim, 2013). The average awards distributed for the following year remained high, up

to US\$7,300 for core pre-kindergarten through second grade teachers; slightly more than US\$11,000 for department and non-departmental third through eighth grade teachers; and up to US\$10,700 for core high school teachers. Overall, 94% of eligible core teachers received an ASPIRE award, and 12% also received an attendance bonus (Shifrer, López, and Heard, 2013).

Houston ISD officials credited the program for higher scores on the Texas Assessment of Knowledge and Skills (TAKS), which replaced the TAAS in 2003, and a record 156 Houston ISD schools earned top-ranked designations of Exemplary and Recognized under the state's accountability ratings in 2007–08, nearly double the number of schools earning those highest designations during the previous year (Terry, 2008). An official program evaluation in 2013 found that ASPIRE helped improve mean student TAKS gains across schools but especially in high-needs schools (Shifrer, López, and Heard, 2013). Because the ASPIRE program offers incentives based on groups of varying sizes, it is possible to examine which incentive designs maximize teachers' motivation to improve student achievement. Similar to findings from India's Andhra Pradesh experiments and the New York City school-wide incentive program, teachers respond differently to group rewards depending on the strength of the incentives.

Scott A. Imberman and Michael F. Lovenheim of the National Bureau of Economic Research conducted a special analysis of the impact of subject and grade-level, classroom-level, and department-level group incentives on Houston ISD high school teachers. They found that teachers' motivation increases proportionally when they are responsible for improving the achievement of a greater number of students. Specifically, Imberman and Lovenheim found that for every 10 percentage point increase in the share of students teachers taught after the ASPIRE program was implemented, math, English, and social studies scores increased by 0.024, 0.014, and 0.020 of a standard deviation, respectively. Imberman and Lovenheim conclude that the smaller incentive group sizes under the ASPIRE program increased teachers' motivation, minimized the free-rider effect, and resulted in "a large, positive effect on student performance in all subjects, with test scores increasing by between 3 and 10% of a standard deviation depending on the subject" (2013: 34). These results have tremendous implications for designing teacher incentive pay programs that are effective in terms of improving student achievement. Imberman and Lovenheim note that in contrast to concerns about whether teachers do, in fact, respond to financial incentives, particularly teachers in developed countries,

Our study establishes that teachers do respond to incentives when they are strong enough ... when structured correctly, group-based teacher incentive pay systems can have large positive effects on student academic achievement. Overall, the results from this analysis indicate that

design features matter a lot in determining how effective an incentive system is in increasing productivity ... In particular, the results indicate that when implementing group incentive pay it is better to provide awards on the basis of small groups and that there is substantial potential for schools with group awards to improve productivity by reducing group size. (2013: 5, 33–34)

To put the cost-effectiveness of the ASPIRE program into perspective, Imberman and Lovenheim calculate that the student test score gains achieved through the ASPIRE program, which costs no more than US\$1,950 per teacher, correspond with additional per-teacher earnings of between US\$4,200 and US\$17,200, depending on the number of students taught by each teacher. The ASPIRE student achievement gains also correspond with up to one-half of the effect of reducing class sizes by seven students (Imberman and Lovenheim, 2013). These estimates resemble similar findings from teacher incentive pay programs in India and Israel.

United States—Teacher Advancement Program (TAP)

The Teacher Advancement Program (TAP) rewards teachers based on both individual and school-wide student performance. TAP is one of the longest-running privately-initiated programs. The program was developed in 1999 by the Milken Family Foundation in California to attract and retain high quality teachers and improve student achievement. It has since grown to 347 schools, and 80 districts nationwide are participating in TAP, reaching 20,000 teachers and 200,000 students as of the 2011–12 school year. The majority of participating schools are located in Louisiana, Texas, and South Carolina (Buck and Greene, 2011; NIET, 2012).

TAP has four program components: multiple career paths, ongoing applied professional development, instruction focussed on academic accountability, and performance-based bonuses. Individual teachers earn performance bonuses based on three weighted elements. The first is teachers' individual skills, knowledge, and responsibilities (SKR) score, which is an average of multiple classroom observation scores conducted throughout the school year. Teachers' individual SKR scores count for 50% toward their bonus. Individual teachers' classroom achievement growth (30%) and school-wide achievement growth (20%) count for the remaining 50% toward a teacher's bonus (Buck and Greene, 2011; and NIET, no date).

Schools establish bonus pools, and effective career teachers can earn performance bonuses worth up to US\$5,000, with typical bonuses averaging US\$2,250 to US\$2,500, which is approximately 4% of teachers' average annual salary (NIET, 2014b). Career teachers performing in the top 10% at their school, based on improving their students' performance by more than one year's growth, earn average bonuses of US\$3,750, approximately

7% of teachers' average annual salary (NIET, 2014b). However, teachers can earn even higher bonuses because TAP differentiates among career, mentor, and master teachers. Mentor and master teachers are selected through a competitive, performance-based process, work longer hours, and have additional leadership responsibilities such as providing professional development to career teachers and working with schools' TAP Leadership Teams, which establish annual student learning goals. Mentor and master teachers receive higher overall compensation based on their additional responsibilities and performance standards, averaging around US\$10,000, including salary augmentation and performance bonuses (NIET, 2014b). Thus, depending on teachers' designations, they can earn incentive bonuses worth approximately 45% up to more than 200% of their average monthly salaries (OECD, 2009).

Virtually all TAP schools are considered high-need, enrolling large majorities of socioeconomically disadvantaged students. A recent evaluation found that in 84% of those schools, students gained at least one year of achievement growth, a result that is consistent with previous years' results. Research has also found that more established TAP schools perform better than newly-established TAP schools (NIET, 2012). Other analyses of TAP schools' performance found that math and reading achievement are higher in TAP schools compared to non-TAP schools (NIET, 2014b). At a cost of approximately US\$250 to US\$400 per student to implement, TAP is also highly cost effective with an impact on math achievement that is more than twice as large as class-size reduction initiatives (NIET, 2014a and b).

Each of the teacher incentive pay programs described in this section, whether individual, group, or blended, substantiate the research findings of education economists, namely, that offering teachers incentive pay based on clearly defined student achievement measures is cost-effective. In other words, paying teachers more for performance instead of more simply is a sustainable and cost-effective way for education policymakers, regardless of the wealth of their particular countries or communities, to improve student achievement as well as teacher quality. However, program design matters a great deal. Both the school-wide teacher incentive experiment in Kenya and the individual teacher incentive experiment in Nashville, Tennessee, underscore this point.

Kenya—International Child Support Incentive Program (ICSIP)

In early 1998 a Dutch non-governmental organization, International Child Support Incentive Program (*Christelijk Steunfonds*, ICSIP), offered 50 schools in the Busia and Teso districts of Western Kenya the opportunity to participate in a performance incentive program that rewarded teachers and headmasters with gifts for improved student test scores and lowered drop-out rates. ICSIP offered prizes to teachers of students in grades 4 through 8 based on the average school-wide performance on annual district exams (Glewwe et al., 2008). The 50 participating schools were randomly selected

from a group of 100 of the regions' lowest performing schools and offered the chance to participate in the ICSIP. The 12 top-scoring schools and the 12 most improved schools would receive awards, meaning 24 of the 50 participating schools would win. Every school accepted and was initially advised that award funding would be available for one year only, the 1998 school year, which in Kenya runs from January to November. Based on favourable reports, ICS continued the program in the 1999 school year.

For both the top-scoring and most-improved school categories, first through fourth place prizes were distributed to all teachers. The value of those prizes ranged from US\$26 to US\$51, representing approximately 21 to 43% of a teacher's average monthly salary at the time. To encourage them to promote cooperation among teachers, headmasters at winning schools were awarded briefcases, and their schools received wall clocks, time-keeping clocks, and bells (Glewwe et al., 2008). Schools could win in only one category, and as promised 24 of the 50 participating schools received prizes. Official evaluators noted that most teachers believed they had a fair chance of winning a prize and were supportive of the program (Glewwe et al., 2008).

During the two-year incentive program period teachers encouraged students to take the district tests and conducted more test-preparation sessions outside normal school hours. Student test scores improved on the incentivized district tests but not on non-incentivized tests administered by ICS and Kenya's national primary school leaving exam (the KCPE). The incentive program did not improve student dropout or teacher attendance rates, and there were no discernible changes in teaching methods that would affect longer-term learning. In fact, once the program ended, there was no significant difference between incentive schools and non-incentive schools (Glewwe et al., 2008).

United States, Tennessee—Nashville Metropolitan Public Schools, Project on Incentives in Teaching

The Project on Incentives in Teaching (POINT) was a three-year experiment initiated in 2006–07 by the National Center on Performance Incentives (NCPI) with the Metropolitan Nashville Public Schools (MNPS) system. Its express purpose was to test the effects of incentive pay for teachers whose students demonstrated large achievement gains on standardized tests. Teachers with middle school students in grades 5 through 8 volunteered to participate and were divided into two groups, one eligible for bonuses and the other not eligible. Eligible teachers had to instruct at least 10 students in math, but they could hold full- or part-time positions and teach other subjects as well.

Teachers whose students performed at levels historically attained by the top 5% of middle school teachers in a given year on the Tennessee Comprehensive Assessment Program (TCAP) could receive annual bonuses worth up to US\$15,000 based on the mathematics and other subject-area

gains. Teachers meeting the 80th and 90th performance percentiles received bonuses worth US\$5,000 and US\$10,000, respectively. So structured, teachers were competing against a fixed benchmark rather than against other teachers. Additionally, at least half of participating teachers could earn minimum bonuses if their students answered just two or three more questions correctly on the TCAP, which consisted of about 55 questions. Achieving this benchmark seemed reasonable, especially given the upward test score trend for MNPS middle school students on the TCAP since its implementation in 2004 (Springer et al., 2012a).

An impressive 70% of eligible teachers initially volunteered for the POINT experiment. Over the three-year project period POINT had high levels of support from the school district, teachers union, and various community groups. In all, nearly US\$1.3 million in POINT bonuses were awarded confidentially to teachers over the three-year period as promised. However, the number of participants dwindled from 296 in the first year to 148 in the final year for a variety of reasons, including transferring to other districts, switching to grade levels not assessed, or not instructing enough students in math (Springer et al., 2012a).

Evaluations revealed that the student performance of participating teachers did not significantly differ from that of non-participating teachers. The sole exception was fifth grade students during the second and third years of the program. Students of bonus-eligible teachers posted math gains up to two-thirds of a year's academic growth; however, those gains were not evident the following year with sixth grade scores. Teacher surveys revealed that less than 25% of participants changed their teaching methods in response to POINT, and 80% said the program really did not affect their job performance because they were doing their best already (Springer et al., 2010, 2012a).

It is important to keep in mind that just a few years before the POINT experiment, sweeping federal accountability regulations were enacted affecting all American public schools, which put significant pressure on teachers to raise student achievement by specified levels or face penalties. At MNPS student achievement had already begun improving in response to threats of a state takeover of the schools (Springer et al., 2012a). Evaluators speculate that the negative incentives to improve may have been more powerful than positive monetary incentives. POINT participants noted that they did not know what more they could do to raise student achievement. A majority of participants also did not endorse the criteria used to award bonuses to teachers, although most participants supported the idea of teacher incentive pay in theory. These two findings indicate the importance of providing integrated professional development and working with teachers to design optimal incentive pay programs (Springer et al., 2012a).

The incentive pay programs considered in this section are intended to guide decisions about which incentive structure is best: individual, group,

or blended. What the case studies in this section reveal is that even within a given incentive structure, there is a tremendous degree of flexibility to customize programs to the strengths and needs of particular school communities. In spite of concerns that individual incentives could undermine collegiality and collaboration, experimental programs in both India and Israel proved otherwise. Student achievement also improved much more in incentive programs compared to resource-based programs at a fraction of the cost. Yet in both cases individual teacher incentive programs produced higher and longer-lasting student achievement than the group incentives.

On the other hand, and contrary to concerns that group incentive pay programs could be less effective because of the free-rider effect, the Houston ISD group incentive program reveals that properly-sized groups keep teachers motivated and engaged. TAP also achieves an effective balance between teacher motivation and ongoing collaboration by blending individual and group incentives tied to improved student achievement. Bolstering TAP's effectiveness is rigorous professional development and mentoring, specifically tied to student achievement gains. Research also confirms that the more comprehensive blended incentive programs in Houston ISD and TAP are more cost-effective than resource-based programs such as class-size reduction.

The IMPACT teacher incentive program operating in Washington, DC public schools is the final blended individual and group program considered in this *Global Survey*. Like several effective teacher incentive pay programs examined previously, IMPACT has clear expectations, generous bonuses for improved student achievement that notably become part of teachers' permanent base pay, and differentiated strategies for helping ineffective and effective teachers improve. Unlike any other program, however, IMPACT also has clear consequences for failure since teachers deemed ineffective and who do not improve over time after completing customized professional development programs are fired.

United States, Washington, DC—District of Columbia Public Schools, IMPACT

IMPACT is the evaluation used in the District of Columbia Public Schools (DCPS) system implemented under then-Chancellor Michelle Rhee in the 2009–10 school year. In spite of being born out of both long-standing desperation for improvement and opposition from powerful interest groups, this program offering incentive pay to teachers is widely considered in policy circles to be a gold standard incentive pay program (Headden, 2011; Hess, 2013; Turque, 2009, Oct. 1). First, IMPACT uses differentiated strategies for retaining both low- and high-performing teachers, and gives those strategies teeth with high-stakes incentives, including generous annual and permanent base-pay bonuses for effective teachers, as well as dismissal for ineffective teachers. Second, the IMPACT program was sought to improve an ossified DCPS

system whose chronic, costly failure had become a national disgrace (Coulson, 2009a, June 26; and 2009b, March 6; Murray and Stacey, 2009; Turque and Glod, 2009, March 5). In spite of its challenging beginnings, IMPACT is widely hailed as a success and DCPS officials along with local teachers' union leaders appear to have embraced a continuous improvement management model by making successive enhancements to the program. The results show IMPACT has been successful at retaining and attracting high-quality teachers, thereby improving DCPS' overall teaching workforce—no small feat given that three-fourths of DCPS schools enroll large majorities of low-income and minority students from highly disadvantaged socioeconomic areas. Early results also indicate significant DCPS student achievement growth.

Third, IMPACT incentives are tied to multiple performance measures, each with numerous sub-facets that are clearly defined. Annual student achievement growth is the largest single factor; however, several other factors are based on actions that teachers can control directly, including managing their classrooms, demonstrating school commitment, and behaving professionally. Next, struggling teachers get intensive coaching to ensure they have the support they need to meet IMPACT expectations. Finally, IMPACT differs from most other teacher incentive pay programs in another important way according to the authors of the most extensive performance analysis to date, according to Thomas Dee of Stanford University's Graduate School of Education and James Wyckoff of the University of Virginia's Curry School of Education:

IMPACT is not a small-scale, temporary pilot but rather a highly visible *at-scale* initiative whose capacity to endure was tested during a contentious mayoral election that coincided with the program's first year ... the incentives created by IMPACT may have stronger credibility for teachers (and better external validity as a policy) because they are part of an at-scale, real-world program that has been sustained over several years rather than a small-scale and temporary experimental pilot. (2013: 3, 8)

Prior to IMPACT's enactment, efforts were underway to differentiate teachers' salaries. Throughout 2008 then-Chancellor Rhee tried to negotiate a two-tiered teacher compensation system with local Washington Teachers Union (WTU) leaders that would have given teachers the option to remain on the traditional pay scale or opt into an incentive-based system offering bonuses worth up to US\$20,000 annually. When salary negotiations broke down later that year, Rhee took the unprecedented step of simply moving forward with designing and implementing IMPACT (Sawchuk, 2008, Oct. 2). Rhee's bold action was authorized under the DC Public Education Reform Amendment Act (PERAA) of 2007, introduced by then-Mayor Adrian Fenty and subsequently approved by the DC City Council and finally Congress (AP,

2013, Oct. 17; NRC, 2011). Opposition from the local teachers union, though vocal, was weakened by a corruption scandal resulting in the imprisonment of WTU's former president and two assistants (Jaffe, 2007, Sept. 1).

Against this backdrop IMPACT took effect in the 2009–10 school year. The program uses multiple evaluation measures and awards both individual and school-wide financial bonuses to teachers. Through the program teachers can earn generous annual bonuses as well as permanent base-pay increases. Struggling teachers receive ongoing tailored coaching from mentors, and, unlike any other program in this survey, ineffective teachers can be fired. DCPS teachers receive a summative IMPACT score ranging from 100 to 400 points based on the weighted average of four component scores, starting with annual student achievement growth. Teachers of students in grades 4 through 8 who are assessed in reading and math on the DC Comprehensive Assessment System (CAS), 17% of all DCPS teachers, earn an Individual Value Added (IVA) score that estimates the contribution individual teachers make to their students' annual CAS achievement growth. The IVA score is adjusted to reflect student and school characteristics that could affect achievement performance, such as poverty. Originally the IVA student achievement growth score counted for 50% of teachers' overall IMPACT score; however, since the 2012–13 school year it counts for 35%. The remaining 15% of CAS teachers' student achievement score is determined by another assessment and learning goals set by teachers and principals (DCPS, 2012a; Dee and Wyckoff, 2013; Di Carlo, 2012, Aug. 22).

Because the vast majority of DCPS teachers (83%) do not have students who take CAS tests, they do not receive an IVA score. Instead, non-CAS teachers earn a Teacher-Assessed Student-Achievement (TAS) score. At the beginning of each school year, these teachers devise learning goals based on relevant non-CAS assessments. These goals count for 10% of non-CAS teachers' overall IMPACT score and are used to measure their students' learning and content mastery at the end of the school year (Dee and Wyckoff, 2013).

The second component of DCPS teachers' overall IMPACT score is based on five structured classroom observations conducted throughout the school year. Only one of those observations conducted by school principals is announced ahead of time, while the rest are unannounced observations by independent third-party evaluators who are veteran teachers specifically hired by DCPS for this task. Governing these classroom observations is DCPS' Teaching and Learning Framework (TLF), which defines effective instruction criteria, including leading organized, objective-driven lessons, verifying students' comprehension of material, providing clear content explanations, and optimizing instructional time. Classroom observations are rigorously scored according to the TLF and count for 35% of CAS teachers' overall IMPACT scores, and 75% towards non-CAS teachers' scores (Dee and Wyckoff, 2013). Thus regardless of whether they instruct students who take formal DCPS

assessments, teachers' contribution to the annual achievement growth of their students and effective teaching practices count for a combined 85% toward their overall IMPACT score.

The remaining two IMPACT score components are weighted equally for both kinds of DCPS teachers. The DCPS Commitment to the School Community (CSC) rubric counts for 10% of the teachers' IMPACT score and is used by school administrators to measure their efforts to support school initiatives, promote high expectations, and foster partnerships with students' families and school colleagues. Rounding out the final component of individual teachers' IMPACT score is the school value-added (SVA) score, which counts for 5% and estimates the contribution teachers' schools make to students' annual performance growth. Based on summative IMPACT scores, teachers currently fall into five performance categories:

- ◆ Highly Effective: 350–400
- ◆ Effective: 300–349
- ◆ Developing: 250–299
- ◆ Minimally Effective: 200–249
- ◆ Ineffective: 100–199.

The Developing category was added in the 2012–13 school year because the Effective category proved to be too broad, with 68% of teachers scoring in this range. DCPS officials explained that “teachers scoring at the low end of the old Effective category (250) produced eight fewer months of student learning in math and six fewer months of student learning in reading than did teachers at the top end of the category (350)” (DCPS, 2012a; Di Carlo, 2012, Aug. 22).

IMPACT scores are high stakes for teachers, carrying substantial financial rewards for effectiveness and clear consequences for ineffectiveness. As of the 2012–13 school year, all DCPS teacher salaries now follow the Leadership Initiative for Teachers (LIFT) career ladder schedule, consisting of five stages tied to teachers' IMPACT performance:

- ◆ Teacher—Does not meet Established Teacher criteria
- ◆ Established Teacher—Two years rated Effective/one year of Highly Effective
- ◆ Advanced Teacher—Three years scoring 300 or better (Effective/Highly Effective)
- ◆ Distinguished Teacher—Two more years of Highly Effective ratings
- ◆ Expert Teacher—Two more years of Highly Effective ratings (DCPS, 2012b).

Thus the DCPS salary schedule is primarily based on quality time, not quantity time. That is, teachers can dramatically increase their annual pay based on sustained and improved teaching, not simply time served. Since Effective and Highly Effective teachers remain eligible for annual bonuses and base-pay

increases year after year, the compounding effects translate into substantial overall salary increases in just a fraction of the time it takes to earn comparable increases under a rigid step-and-ladder salary schedule.

Once teachers have been evaluated under IMPACT, incentive funds are distributed through *IMPACTplus*. Annual bonuses that are awarded to Effective and Highly Effective teachers vary depending on where teachers fall on the LIFT salary schedule, and whether teachers work at high-poverty schools. For Highly Effective teachers, annual bonuses start at US\$10,000 if they teach in high-poverty schools. Otherwise their bonuses start at US\$2,000. Additional funds are added if teachers' students take the CAS, and their schools are among the lowest performing. In all, annual bonuses can reach US\$3,000 for Highly Effective teachers in regular schools and up to US\$10,000 for teachers in high-poverty schools (DCPS, 2013b). During IMPACT's first two years 16% of teachers were rated Highly Effective and eligible for bonuses (Sawchuk, 2011, July 15).

To encourage continued improvement even among top performing teachers, permanent base-pay increases are also offered under *IMPACTplus* after two years of effective teaching and one year of highly effective teaching. From then on, teachers can continue earning permanent base-pay increases each additional year they are deemed Effective or Highly Effective. Since the 2012–13 school year, Effective teachers have been eligible for base-pay increases worth up to US\$9,000 (DCPS, 2012b and 2013c). This compounding effect translates into substantial annual pay jumps. Under the previous salary schedule, it took teachers 21 years to move from the starting salary of US\$42,369 to the maximum salary of US\$87,584. Through *IMPACTplus* Highly Effective teachers can earn US\$79,975 in the first year they achieve this rating and reach the maximum salary of US\$131,540 in just nine years. The average annual base-pay increase is around US\$6,000 but can reach as high as US\$27,000, depending on where teachers fall on the salary schedule based on their years of experience and whether they teach in one of DCPS's 40 highest-poverty schools (75% of DCPS teachers work in such schools). Highly Effective teachers who do not teach in those schools can earn base-pay salary increases ranging from US\$10,000 to US\$20,000 (DCPS, 2012a, 2013a–c; Dee and Wyckoff, 2013). In their three-year program analysis Dee and Wyckoff examined the performance changes of teachers most likely to qualify for permanent base-pay awards, those ranked Highly Effective for two consecutive years. Over the three-year study period, these teachers improved their IMPACT scores by 10.9 evaluation points on average, roughly equivalent to moving from the 78th to the 85th percentile of the DCPS performance distribution (Dee and Wyckoff, 2013).

On the other side of the high-stakes coin, under IMPACT Ineffective teachers are immediately dismissed, while Minimally Effective teachers are dismissed the following year if they do not earn an Effective rating (Dee and

Wyckoff, 2013). Developing teachers must participate in intensive coaching and professional development and are dismissed if they do not achieve an Effective rating after three years (DCPS, 2012a). In their analysis of the performance changes of DCPS teachers just above and below the Ineffective and Minimally Effective cutoffs Dee and Wyckoff found that Minimally Effective teachers at risk of being fired improved their IMPACT scores by 12.6 evaluation points on average, an improvement equivalent to moving from the 10th to the 15th percentile of DCPS' overall teacher performance distribution. Put another way, Minimally Effective DCPS teachers achieved performance improvements equivalent to half of the performance gains of DCPS novice teachers over three years. The performance improvements of Minimally Effective teachers facing the threat of dismissal also posted higher IMPACT score gains than Effective teachers not at risk of dismissal. This finding appears to substantiate DCPS's decision to revise IMPACT's ranking scale in the program's fourth year to help ensure that more teachers previously rated Effective would continue to improve.

During IMPACT's first three years an average of 3.8% of DCPS' 4,000 teachers were dismissed each year for earning ratings of Ineffective and Minimally Effective. All told, 490 DCPS teachers have been fired for ineffective performance since IMPACT was implemented in 2009 (AP, 2013, Oct. 17; Dee and Wyckoff, 2013; Sawchuk, 2010, Aug. 11). Far higher proportions of DCPS teachers chose to leave, and Dee and Wyckoff concluded that these voluntary attrition patterns contributed to an overall improvement in the quality of DCPS' teaching workforce. In response to the threat of potential dismissal, about 20% of teachers who scored just above the Effective threshold left voluntarily; 31% of Minimally Effective teachers left voluntarily. The teachers hired to replace those who left earned IMPACT scores that averaged more than 25 evaluation points higher than the teachers they replaced (Dee and Wyckoff, 2013; Sawchuk, 2010, Aug. 11). As Dee explained to the Associated Press (AP), "DC is fielding incentives that are just very different from what we've seen before . . . Part of that is, it's not just cash for test scores. It's instead incentivizing things that teachers can control more directly" (AP, 2013, Oct. 17).

Comparing annual proficiency results of DCPS students from 2007 through 2013, the DCPS Office of the State Superintendent of Education (OSSE) reports that composite DCPS student proficiency rates on the CAS have improved 17.2 percentile points, from 31.2% in 2007 to 48.4% in 2013. Over this same period, DCPS reading proficiency has improved 13.4 percentile points, from 34% to 47.4%; while math proficiency improved 21.6 percentile points, from 27.9% to 49.5%. Impressive DCPS student proficiency gains were also realized from 2008 through 2013 on the CAS science assessment. Over this period student proficiency rates improved 11.7 percentile points, from 29% to 40.7%. Likewise, on the CAS composition

assessments administered from 2010 through 2013, DCPS student proficiency rates improved 16.6 percentile points, from 33.5% to 50.1% (Durso, 2013). In summary, Interim State Superintendent Emily Durso reports that the 2013 CAS assessment results show not only achievement growth in all grades and across all student sub-groups, they also represent:

- ◆ the highest overall results in DC history;
- ◆ the greatest overall growth in six years;
- ◆ the greatest growth in reading since 2008, 4.1%; and
- ◆ the greatest growth in math since 2009, 3.9% (2013: 17).

A decade ago, no one would have predicted that IMPACT could ever come into existence—much less improve student achievement—given the chronic poor performance of public schools in the United States capital, the District’s high poverty rates, and the fierce opposition from politically powerful local and national teachers unions. In other words, DCPS was able to implement one of the most comprehensive teacher incentive pay programs worldwide against all odds.

2 Key Lessons for Policymakers

Since Canada is already a global top performer, policymakers have the distinct advantage of crafting sound teacher incentive pay programs that work best for their regions' unique circumstances by design, not out of desperation as so many programs were. This section offers several key lessons drawn from successful—and not so successful—examples about designing, implementing, and sustaining teacher incentive pay programs intended to improve student achievement.

Many specific design features, such as offering individual, group, or blended types of incentives, will vary depending on the prevailing culture and specific needs of schools and their local communities. For example, if it is believed that a lack of cohesion among teachers and school staff is a leading contributor to low student achievement, a group incentive may be the best option—keeping in mind that group incentive sizes should be large enough to encourage collaboration but small enough to discourage free riding (as shown by experiences in New York City and the Houston ISD). If low student achievement is thought to be the result of de-motivated teachers, individual incentives could be more powerful motivators as long as achievement targets are clearly defined, account for challenging student and school factors, and are sufficiently rigorous yet attainable. If improving student achievement requires both a more supportive school community as well as more motivated teachers, incentives can be awarded on both an individual and group basis.

Each of the teacher incentive pay programs contained in this edition of the *Global Survey* offer an array of design options that could be tailored to meet the unique needs of students, teachers, and schools within and across the provinces and territories. The five key lessons that follow are therefore meant as guidelines regardless of the preferred teacher incentive pay program design.

Key Lesson 1 Define what we expect teachers to do

As obvious as this recommendation may seem, policymakers should not assume that there is a consensus about the fact that what teachers do actually contributes to student achievement—or that their contributions vary based on individual effort and talent. There is growing recognition, however, that

teachers are not interchangeable widgets. Successful teacher incentive pay programs define student achievement goals clearly, regardless of whether single or multiple measures are used. Teacher incentive pay programs can certainly succeed based on a single measure of student achievement such as annual test score gains, as the Little Rock ISD and India's group and individual incentive programs demonstrate. What matters most is that achievement goals are challenging but attainable. They should be based on students' past performance and all teachers who raise their students' achievement as specified should be rewarded, taking into account the number of students they teach.

By far, multiple measures of student achievement appear to be the most popular incentive pay program design and are used by eight of the successful teacher incentive pay programs in this survey (Chile, Dallas ISD, England, Houston ISD, Israel's school and teacher programs, TAP, and Washington, DC). Yet five of the six unsuccessful incentive pay programs also rely on multiple student achievement measures (Bolivia, Kenya, Mexico, Portugal, and Round Rock ISD). The most critical features of successful teacher incentive pay programs using multiple measures are making student achievement count most and clearly defined expectations. Incentive programs that are ineffective at raising student achievement prioritize input- and processed-based factors such as student or teacher attendance, perceptions about learning environments, degrees, class size, generalized professional development, and seniority (Bolivia and Mexico).

Regardless of whether incentive programs base rewards primarily or exclusively on student achievement, attempts to improve fairness by accounting for differences in the types of students, subjects, and schools through various adjustments such as value-added can result in minimized transparency (Dallas ISD, Round Rock ISD, and Metropolitan Nashville PS). No matter how simple or complicated the incentive structures may be, they must always reflect the unique motivations of the teaching workforce where they are implemented.

Key Lesson 2 Don't confuse incentive pay programs with "cash for test scores"

A leading concern expressed about incentive pay programs that reward teachers for improved student achievement is the possibility of narrowing teaching to mere test preparation. As the 10 successful case studies in this survey demonstrate, effective incentive pay programs motivate teachers of varying experience levels and abilities, based on their students' past academic achievement, to improve the way they provide instruction.

India's Andhra Pradesh experiments, for example, show that basing teacher incentive awards on straightforward test-score gains resulted in

significant improvement in both incentivized and non-incentivized subjects. In contrast, similar improvements were not documented in more common-place reforms such as class-size reduction or increased education funding. Likewise, there were documented changes to teacher behaviour in Israel's school and individual teacher incentive pay programs, including improved teaching methods, additional tutoring after school, and greater responsiveness to the needs of struggling students. Importantly, no grade inflation, practice testing, or other gaming behaviours were documented in official evaluations. The Little Rock SD incentive pay program similarly showed that incentivizing test score achievement growth not only improved scores, it also helped motivate struggling teachers to improve their students' achievement the most, indicating that teachers do in fact make positive changes with regard to the way they teach in response to incentive pay.

Teacher attitudes about student achievement-based incentive pay are also instructive. A majority of teachers in the Little Rock SD incentive pay experiment supported their schools' continued participation even though rewards were limited to teachers whose students took standardized tests, and they were awarded based solely on annual test score gains. Similarly 80% of teachers participating in India's incentive pay programs supported the idea of linking financial rewards to improved student achievement before the experiments started. After participating in those programs, teachers' support intensified, particularly among those who had earned incentive bonuses. Such responses suggest that contrary to concerns about acknowledging performance differences, teachers themselves certainly do recognize them and want to be compensated accordingly. Reactions from teachers participating in the unsuccessful Round Rock ISD incentive pay program offer additional insight.

Most participants did not believe the program negatively affected teachers' attitudes toward each other, even though the program offered generous per capita bonuses to teams of teachers strictly on the basis of their value-added contributions to students' test score gains. Unlike teachers participating in either the Little Rock SD or India Andhra Pradesh programs, those participating in the Round Rock ISD program worked at schools in an affluent suburb that were regularly deemed highly performing in terms of student achievement. However tempting it may be to assume only teachers in cash-strapped and academically struggling schools would be open to opportunities to help them improve their students' performance, Round Rock teachers faulted the incentive pay program for not providing them with useful information about strengthening their teaching effectiveness.

These findings indicate that teachers do not narrow their teaching in response to pay incentives based on improved student achievement. On the contrary, teachers acknowledge their own effectiveness, and regardless of whether teachers come from high- or low-performing schools, they want to improve their teaching. This desire makes sense given that the motivation

of the vast majority of those who enter the teaching profession is to help their students learn and succeed academically. Teachers' experiences with incentive pay programs underscore the need for integrated incentive pay program design and implementation if improved student achievement is the goal. Critical to this process is defining the desired student achievement goals, and putting in place professional development specifically tailored to assist all teachers help students reach those goals. To succeed, the prevailing "drive-by" professional development model must be scuttled.

With effective incentive pay programs, such as TAP and IMPACT in Washington, DC, professional development for teachers is intentionally as rigorous as the student achievement improvements expected of them. While both incentive pay programs operate in schools that have struggled academically, what distinguishes the professional development these programs offer to—and in some instances require of—teachers is that it is differentiated depending on teachers' effectiveness at improving student achievement. These programs therefore offer professional development models that could readily be adapted to support successful incentive pay programs regardless of current student achievement or teachers' effectiveness levels in schools.

Thus successful teacher incentive pay programs define student achievement goals, customize rigorous professional development to equip teachers to meet those goals, and then reward them as promised for their success at helping their students improve academically.

Key Lesson 3 Reward what we value

If improved student achievement is the expectation, teachers meeting those goals should be rewarded. Successful teacher incentive pay programs distribute awards amounting to significant percentages of teachers' average monthly salaries. Importantly, those percentages can vary substantially within individual programs, indicating that teachers of all experience levels are eligible and that they have a large degree of control over the size of the incentive bonus they earn. Another important consideration is consistency, which is at least as important as the amount of the incentive award. Under the ineffective Round Rock ISD incentive program, for example, bonuses amounted to approximately 108% of teachers' average monthly salaries—an amount that far exceeded most of the successful teacher incentive programs in this survey. Yet each year on average only around one-third of eligible Round Rock teacher teams received awards.

Successful programs ensure teachers have a fair chance of earning and receiving an incentive award. Available statistics indicate that the successful incentive pay programs in this survey distributed incentive rewards to 90% or more of eligible teachers and schools in a given award period. Such

programs also keep teachers motivated by making them eligible for ongoing annual bonuses (Chile, Dallas ISD, Little Rock SD, India, and Israel's individual teacher programs). Even better, many successful incentive pay programs ensure teachers can earn annual bonuses as well as higher base pay year after year. TAP's incentive pay model awards not only generous annual bonuses for improved student achievement, but teachers can also continue earning those bonuses and make higher base salaries by becoming career, master, or mentor teachers through a competitive performance and selection process. Incentive pay programs in England and Washington, DC, achieve a similar goal in a different way by making ongoing improvements in student achievement the primary condition for progressing along their respective teacher salary scales. In both of these programs not only can teachers earn significantly higher base salaries overall compared to traditional seniority-based pay scales, teachers can also reach higher salaries in just a fraction of the time.

Mexico's incentive program was supposed to work as these successful programs do; however, once teachers earn annual bonuses and the necessary points for a higher salary, there is little incentive to focus on raising student achievement since other factors count far more toward bonuses and higher base pay. On the whole, and in spite of Mexican policymakers' stated goal of improved student achievement, the compromise career ladder incentive pay program they approved simply rewards the status quo. This unsuccessful program underscores the importance of prioritizing student achievement as part of teachers' ongoing, permanent compensation plan through incentive pay programs that are designed to endure.

Key Lesson 4 Build programs to last

Canada is in the enviable position of having strong student achievement overall relative to other countries. However, this state of affairs is a double-edged sword. Policymakers should resist the temptation of complacency, especially given the wide variances in student performance across the provinces and territories, as well as chronic achievement gaps between Aboriginal and non-Aboriginal students. However, Canadian policymakers have several advantages other countries with successful teacher incentive pay programs do not enjoy, including the fact that education policy is determined locally. Local decision-making lends itself to the flexibility, innovation, and customization incentive pay programs need to improve student achievement now and years from now.

Building on this foundation of local control, provincial policymakers and school officials should begin designing and implementing teacher incentive pay programs. Such programs should not be implemented as short-term experiments or fragile pilot programs. So designed, even programs with demonstrated success are vulnerable to powerful political pressure to shut down

(Little Rock SD). Policymakers and education officials must demonstrate commitment to implementing at-scale programs (TAP, Washington, DC), however targeted they may be initially, to reassure teachers that their additional efforts will be rewarded on an ongoing basis. Otherwise, if teachers believe that the incentive award is unattainable (Metropolitan Nashville PS and Round Rock ISD) or that the incentive will go away, they will have no reason to put in additional effort (Israel school incentive program, Kenya, and Mexico).

Reliable, ongoing funding is therefore critical to successful incentive pay programs for teachers. For all the political support it received, the New York City program struggled in this regard. A leading reason was its incentive pay program was structured as an add-on expense requiring distinct appropriations from an already over-tapped city budget. Evaluators of India's Andhra Pradesh teacher incentive pay programs offer a basic conceptual model in which annual funding currently appropriated for across-the-board teacher salary increases could instead be used to fund sustainable incentive pay programs. Under such a funding plan, all teachers would continue to receive base pay salaries; however, only teachers who improved student achievement would earn higher salaries. Targeting funds that are already appropriated each year to effective teachers in the form of annual incentive base-pay salary increases instead of across-the-board pay increases makes performance pay programs sustainable and introduces powerful incentives for all teachers to improve student achievement.

For example, excluding fringe benefits and pension funds, teacher salaries nationwide increased an average of almost 3% to CA\$75,678 in the 2010–11 school year up from CA\$73,698 in the previous school year (in 2010–11 dollars) (Statistics Canada, 2013c). Based on the Andhra Pradesh evaluators' recommendation, what now amounts to a nearly CA\$2,000 across-the-board pay increase per teacher would instead be redirected as an incentive payment that would become part of an effective teacher's permanent base pay (Muralidharan and Sundararaman, 2011b). To augment available funding, policymakers should engage the business and philanthropic communities upfront as partners who could provide ongoing matching funding, rather than rely on them as last resorts as happened with the New York City incentive pay program.

Of course, actual salaries and annual increases vary significantly across the provinces and territories depending on the governing teacher contracts. Several provinces are, or soon will be, in contract renegotiations, and many of them must also contend with budget deficits and spending cuts (Palacios and Clemens, 2013; Sawchuk, 2014, May 4). Many taxpayers also question why they should be expected to fund multi-year guaranteed salary increases for teachers that can be significantly higher than the ones they can expect to earn. Targeting salary increases toward teachers who raise student achievement would be both cost-effective and fair for taxpayers and teachers alike,

and policymakers should require that at least a portion of any proposed salary increase be strictly incentive based. Because the needs of students vary from school to school, each school should be authorized to design its own incentive pay program provided improved student achievement is the primary factor for approving incentive pay awards.

Making teacher salaries more competitive and performance-based could also go a long way toward helping ease the alarming over-supply of teachers reported across the country (Tibbetts, 2008, January 31), while promoting improvement in the quality of the teaching workforce overall. Teachers are aware of their effectiveness at raising student achievement. Most of them want the opportunity to improve and earn more (Round Rock ISD), and the rest leave and find work elsewhere, making room for those who do (Washington, DC). Such self-selection is a far preferable approach than manipulating supply through arbitrary caps on teachers' college enrolments, for example, as Ontario education officials have done (CBC News, 2013, June 5; Steffenhagen, 2013, June 6). If improving student achievement is the goal, then policymakers should promote teacher quality, not teacher quotas.

Several leading education economists conclude that allocating teacher compensation resources more strategically based on performance instead of spreading them thin across the board makes incentive pay programs sustainable and far more cost effective than resource-based programs. India's Andhra Pradesh incentive pay programs were 10 times more cost effective than class-size reduction programs. Additionally, the estimated labour market returns based on the student achievement gains those incentive pay programs generated are at least 16 times the initial cost. Houston ISD's incentive teacher pay program cost less than US\$2,000 per teacher but produced student achievement gains that would likely require increasing teachers' average salaries between US\$4,200 and US\$17,200. Similarly, the cost of Israel's school incentive program was less than half that of interventions involving funding increases for additional teaching time, staff training, and class-size reductions. Those results are even more compelling because Israeli students from the most disadvantaged backgrounds showed some of the strongest improvements. TAP also indicates just how cost effective a fully-scaled, widely-implemented teacher incentive pay program can be—even one that includes integrated professional development. The program costs approximately US\$250 to US\$400 per student to implement and yields math achievement gains that are more than twice as large as class-size reduction initiatives.

Of particular concern is designing effective teacher incentive pay programs that prioritize student achievement in ways that do not require costly new external tests. Every incentive pay program in this survey has had to design a reward structure that accounts for teachers with students in subjects and/or grades that are not covered by external, standardized tests. Some programs limit eligibility to teachers whose students take such assessments

(Round Rock ISD and Little Rock SD), or award group bonuses to teachers based on school-wide average test results in core subjects (Chile, Dallas ISD, Metropolitan Nashville PS). Still other programs work with teachers of students who are not externally assessed to develop rigorous customized classroom-level student achievement goals (England, TAP, and Washington, DC). Regardless of the availability of external tests, successful incentive pay programs devise rigorous objective measurements of actual student achievement rather than subjective self-evaluations based on inputs and processes (Bolivia).

Targeting available funds and leveraging additional funds from the private sector for teachers who raise student achievement models the sustainability approach of successful incentive pay programs used in England, TAP, and Washington, DC. Each of these programs also offers integrated professional development to ensure effective and struggling teachers get the customized support they need to meet their programs' stated student achievement goals. Yet there is only so much time and so much money that can be directed to teachers who do not become effective at raising student achievement.

Key Lesson 5 Embrace a culture of continuous improvement

Student achievement does not improve overnight once incentive pay programs are enacted (Chile). As with any meaningful reform, modifications and improvements will be necessary (Washington, DC). That said, incentive pay programs that succeed at raising student achievement hold firm to making it the primary basis for awarding annual bonuses and/or base pay increases. Such steadfastness, however, does not mean one-size-fits-all programs. Ideally, programs would reflect local culture and practice. Within any given school, there will be teachers at varying levels of effectiveness relative to objective student achievement measures. Evaluation systems should be differentiated and clearly define the achievement benchmarks for each effectiveness category. Incentives for teachers deemed most effective should be ongoing and designed to encourage higher student achievement levels year after year; however, these teachers should not be immune from the same consequences and interventions less effective teachers face should their performance slip. Teachers who approach but do not meet the highest levels of achievement should be given multiple opportunities for observation and feedback within a given academic year by trusted school staff or independent experts, and professional development should be specially tailored to those teachers' specific needs.

However, opportunities for improving must have time limits given the critical impact teacher quality has on student achievement. Expected improvements should be clearly defined, and stated consequences must be acted upon if improvement targets are not reached. The reality is that not

everyone is cut out to be a teacher. Some people do a better job of improving student achievement than others through hard work, ability, or a combination of both. Washington, DC's IMPACT is the sole teacher incentive program in this survey that fires ineffective teachers. Firing ineffective teachers means more effective teachers can take their place, and over time the overall quality of the teaching workforce improves. Stanford University education economist Eric Hanusheck created a firestorm in 2011 for making this very argument.

He estimated that within one K–12 schooling cycle American student achievement could improve from levels that are about on par with students in developing countries to levels achieved by students in top-performing Finland and Canada by simply replacing the bottom 5 to 10% of teachers with just average performing ones (Hanushek, 2011). He acknowledged that it certainly would not take replacing 5–10% of the American teaching workforce each year for more than a decade to reach top student achievement levels. Rather, the teaching workforce would quickly stabilize at a higher overall level of quality, and replacements would be limited to a far smaller percentage of teachers who were below average. The experience with Washington, DC's IMPACT program seems to substantiate Hanushek's projections given that far more teachers left voluntarily than were fired in response to tying their salary increases to their effectiveness at raising student achievement. Taking the place of teachers who left or were let go were newer, more effective teachers who contributed to the marked improvement in the overall quality of the workforce in DC public schools, which in turn has resulted in dramatic student achievement gains across all subjects for all student subgroups.

The strong performance of Canadian students overall suggests few teachers would be dismissed because of a teacher incentive pay program designed to raise student achievement—particularly one with rigorous, customized professional development. However, attaining comparable gains in teacher effectiveness would help foster even stronger achievement among already highly-performing students as well as help narrow achievement gaps that persist across and throughout the provinces and territories.

Conclusion

A variety of reasons motivate individuals to enter the teaching profession besides salary. Altruism and the desire to help students reach their full potential is one. Another reason is the desire to positively influence the curricula and missions of the schools where they teach. In more practical terms, the teaching profession is also an attractive career for those seeking a work/life balance that best suits their families' needs (Mizala and Ñopo, 2012; Murray, 2007). Yet none of those goals are in conflict with earning a salary that compensates teachers for improving the academic achievement of their students. On the contrary, such a compensation scheme rewards teachers for doing what they already love, and properly structured, ensures they will continue to reap the rewards of their dedicated and exceptional work.

In Canada, all teacher salary schedules are based on years of experience and postsecondary education—inputs that have little if any positive effect on student learning (Clifton, 2013; Podgursky and Springer, 2010). Teachers in Canada also reach the peaks of their salary scale more than twice as quickly as their peers in other countries, 11 years compared to an OECD average of 24 years (Statistics Canada, 2014). Moreover, current evaluation systems in Canada are not connected to student achievement or growth. Instead, teacher evaluations typically consist of a single, pre-arranged classroom visit by a school administrator every five years. Performance ratings are binary, which creates an all-or-nothing system so that few teachers are ever deemed unsatisfactory. Finally, meaningful consequences for poor performance are lacking, as are rewards for excellence (Maharaj, 2014).

Yet it is now well documented that effective teachers are the leading in-school factor contributing to students' academic achievement, with teachers performing in the top 15 to 25% of teachers adding up to one and a half academic years' worth of additional learning. Effective teachers are also able to overcome adverse out-of-school socioeconomic factors that hinder students' academic achievement, such as poverty, native language, parental education levels, parents' marital status, and race (Clifton, 2013; Leigh, 2012; Maharaj, 2014). Ample evidence also exists that rigid salary schedules have serious negative consequences, including contributing to teacher shortages

in areas of critical need and making the profession generally unattractive to talented, potential teachers (Hoxby and Leigh, 2005; Odden, 2000; Podgursky and Springer, 2010).

In a recent study for the Canadian Council of Chief Executives, author Sachin Maharaj, a Toronto District teacher and school board curriculum advisor, concludes that noble intentions concerning simplicity, fairness, and equity notwithstanding Canada's salary schedule "has outlived its usefulness. The idea that all teachers should be treated the same undoubtedly helped to resolve inequities in the early 1900s, but in today's schools it has created perverse incentives. . . . it offers no financial incentive for teachers to improve their performance in the classroom—to become more effective teachers" (2014: 14). Maharaj elaborates by explaining:

Pay is based solely on academic/professional qualifications and seniority, neither of which are a strong indicator of how well teachers actually teach. Beyond the first few years of teaching, when effectiveness does appear to increase, there is no obvious reason why teachers should receive automatic yearly pay increases—and why a lazy and ineffective teacher should be paid the same as a hardworking, dedicated and effective teacher. Excellence goes unrewarded, mediocrity goes unaddressed. We should want much better than this for a profession as important as teaching. (2014: 14)

Programs offering incentive pay for teachers are proliferating in countries worldwide as part of broader efforts to improve student achievement. In recent years scientific evaluations of those programs have focused more exclusively on their contributions to improved student performance. The 10 successful case studies contained in the survey show that incentive pay programs for teachers can and do improve student achievement.

Incentive pay based on performance is the rule rather than the exception in other professions that seek to attract and retain talented individuals. Importantly for Canadian policymakers, clinging to rigid salary schedules that do not reward top performing teachers will likely erode the overall quality of the teaching workforce, and make the teaching profession less attractive to bright college graduates of the future. Given the critical contribution of teacher quality, that circumstance would have a devastating impact on student achievement and the country.

The case studies in this *Global Survey* offer a variety of teacher incentive pay program design features and models that vary in size, scope, and cultural context. They also offer key lessons for policymakers based on the successes—and failures—of these programs designed to improve student achievement. These lessons include:

- ◆ Define expectations for teachers with teachers;
- ◆ Support teachers in meeting stated expectations;
- ◆ Reward teachers as promised;
- ◆ Build programs to last with smarter spending; and
- ◆ Promote a culture of continuous improvement.

Overall, the evidence suggests that incentive pay programs are cost-effective, financially sustainable, and when properly designed and implemented, they succeed at improving student achievement even among the most disadvantaged student populations. Surveys of teachers participating in several successful incentive pay programs, both group- and individual-based, indicate a majority of them support the idea of linking their pay to student achievement, report no negative impacts to the working climates at their schools, and that teacher support for incentive pay increases after they have participated in their respective programs, and further intensifies if they have earned an award. Importantly, teachers respond to incentives by changing the way they teach to improve student achievement. They are aware of their own effectiveness, and even highly effective teachers want opportunities to improve, for themselves and their students.

Since Canada is currently among the top global educational performers, policymakers have the distinct advantage of crafting sound teacher incentive pay programs that work best for their specific jurisdiction's unique circumstances by design and not motivated by desperation or in response to a dramatic crisis of low student achievement as so many programs were. Yet the current decline in Canadian students' performance, particularly in math and sciences, wide variations in student performance across the provinces and territories, chronic achievement gaps between Aboriginal and non-Aboriginal students, and the escalation of educational expenditures in virtually all provinces provide justification enough that now is the time to consider proven and cost-effective policy measures such as incentive pay for teachers to enhance student achievement outcomes.

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The Fraser Institute provides a useful public service. We report objective information about the economic and social effects of current public policies, and we offer evidence-based research and education about policy options that can improve the quality of life.

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Founded in 1974, we are an independent Canadian research and educational organization with locations throughout North America and international partners in over 85 countries. Our work is financed by tax-deductible contributions from thousands of individuals, organizations, and foundations. In order to protect its independence, the Institute does not accept grants from government or contracts for research.

Nous envisageons un monde libre et prospère, où chaque personne bénéficie d'un plus grand choix, de marchés concurrentiels et de responsabilités individuelles. Notre mission consiste à mesurer, à étudier et à communiquer l'effet des marchés concurrentiels et des interventions gouvernementales sur le bien-être des individus.

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