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Paying for Performance to Improve K-12 Student Achievement

by
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About the Author

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Introduction and Executive Summary

This report examines the potential for using performance incentives to improve the K-12 classroom education experience. It uses principles derived from economic theory to identify what type of incentives might work and what form those incentives should take. The limited literature on performance incentive applications in K-12 education is then examined to see if the evidence is consistent with the economic prescriptions.

This review reaches the following conclusions:

- Teacher-based performance incentives make the most sense conceptually, and appear to perform the best empirically. This confirms the theoretical notion that the classroom, as a production unit, faces weak, and sometimes perverse, incentives to perform optimally.

- School- and school-management based incentives appear to be ineffective, or less cost effective than teacher-based incentive schemes. The exception appears to be in the case where introducing profit-motivated management is an option.

- Student-based incentives appear to stimulate better test performance selectively. Because young people heavily discount the future, however, compensation needs to be immediate, making it more difficult to stimulate long-term performance. It also is unclear whether teachers will respond to greater student effort with increases or decreases in their own effort.

- Parent-based incentives likely are effective in stimulating reduced truancy and more parental involvement, at least in low-income households. Since parental oversight and effort improves school performance generally, stimulating that oversight with financial incentives likely will improve student performance and, perhaps, provide some stimulus to teacher effort.

In almost all of the studies reviewed, institutional and labor policy barriers limit the ability to implement and demonstrate the potential of incentive-based systems. Proponents of the status quo resist with great vigor attempts to make schools and staff accountable or to amplify market-competitive forces. Incentive programs will function more effectively if communities confront this issue, and reduce such barriers.

Background

Most K-12 policy is formulated by education professionals working with school boards, legislative bodies, and labor representatives. The role of economics in education policy making historically has been limited to fiscal policy dimensions. Although the education sector is arguably the largest single industrial sector in the US economy, educators and their advocates bristle at the notion that market-based notions, and performance incentives in particular, deserve a role in K-12 education strategies.[1,2]

Viewed from an economist's perspective, this attitude has little justification. Educational institutions face all of the same challenges of other business enterprises–producing a quality product in an efficient manner, managing labor and other inputs, and managing client relationships to mutual advantage. It is unclear what special feature of K-12 education can justify an operating model that has been rejected by other sectors of the economy.

Specifically, K-12 education, as an industry, operates in relative isolation from some of the market disciplinary forces that economists credit with ensuring efficient behavior elsewhere in the economy:

- Competition for customers is dulled by the organization of K-12 education as a public monopoly in most circumstances.

[1] See, for example, the summary of opposition to marketbased reforms in Terry Moe, “Reform Blockers,” Education Next, (Stanford: Hoover Institution), Spring 2003 (vol. 3, no. 2).

[2] The National Education Association (NEA) stands in strong opposition to pay for performance. See: “NEA marshals forces against teacher pay proposals.” http://blogs.edweek.org/edweek/NCLB-ActII/2007/09/nea_and_political_realities.html. Cite collected August 11, 2008.

- There are limited risks of failure in the conventional business sense, both for the organizations and their management and labor.

- Labor arrangements constrain operational flexibility through asymmetric contractual arrangements.[3]

- There is also the challenge of managing an enterprise whose unit of output is multi-factorial and difficult to define and measure unambiguously.

Some would see the absence of these essential elements of the efficient economic paradigm as so crucial as to hopelessly doom efforts to improve performance with methods that only work within the limits of existing, K12 institutional labor and competitive arrangements. Others, on the other hand, observing variations in the performance of individual teachers and schools see evidence of the potential for performance incentive strategies.

First Principles

Economic philosophers were quick to realize that the superior productivity and efficiency of private market-based economies was due to the mobilizing of self-interest through incentives. In 1775, Scottish economist Adam Smith's *The Wealth of Nations* first articulated how market incentives motivated self-interested individuals to act in a manner that maximized societal well-being.

Smith's observations and insights have been elaborated mainly in two fields of modern microeconomics–the fields of industrial organization and organizational economics. The former articulates how the institutional structure of markets affects economic performance, while the latter focuses on the inner workings of the individual institutions. In both fields, extensive empirical investigations have demonstrated the importance of economic incentives in guiding organizations toward productivity and efficiency.

[3]The equivalent of the board of directors, the local School Board, and Parent Teacher Associations (PTAs) often are weak relative to teacher organizations. Charlene Haar asserts “PTA parents also feel intimidated by the overwhelming pro-union bias in PTA.” Haar (1995)

The author has drawn on his own training and experience in these fields to make the observations presented here. Organizational and industry structural defects in K12 education have elicited similar observations from other prominent economists. See, for example, Ouchi (2003).

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We take as given the typical operational context of the K-12 public school setting, and focus only on intra-organizational incentive schemes. Specifically, it is understood that there is little effective interschool competition (via school choice mechanisms, for example), and no omniscient regulatory/accountability superstructure that successfully emulates these market accountability features.

It is assumed, however, that there is at least a modicum of policy and labor work rule flexibility. The latter are necessary, of course, for any intra-school reform to be championed, and for incentives to be introduced and allowed to have effect.

Loci for introducing incentives

By focusing on intra-organizational rather than industrial structure remedies, the loci of intervention and types of incentives are narrowed. Specifically, in the parlance of economics, there are four classes of economic agents who might be influenced by incentive schemes: schools (and their management), teachers, students, and parents. Industrial organization theory and consideration of private market analogues of such agents offers some insights regarding the potential for each of these agents to be influenced by performance-based incentives.

School management

In theory, providing incentives to the school management is a natural locus for performance incentives because they have the greatest potential to influence organization-wide behavior. Indeed, in other industrial settings, the notion of an operating officer being evaluated and compensated on a performance basis is at the heart of notions of efficient, organizational control. Managers are monitored by shareholders and corporate boards of dispassionate third parties, and provided with a wide variety of performance incentives.

There are, however, a number of material differences between the private market and public school contexts that affect the viability of providing incentives to school management. These differences mostly are not natural, but rather have been imposed by powerful special interests to avoid accountability.

First, third party oversight is much more difficult in the public school context. Public education accounting and operational data systems are primitive compared to those used, and required by securities regulators, in the private sector.

Second, public school management is better able to operate inefficiently with impunity due to generally weaker corporate control. Although it must be admitted that the idealized model of corporate control is hardly universally operational in the private sector, it is subject to further backstopping by risks of corporate takeover or enterprise failure. There are no such analogous disciplinary forces in the K-12 setting.

Third, public school managers (such as principals and supervisors) typically enjoy less latitude in controlling downstream behavior than do their private sector counterparts. They have less ability to influence the composition of spending, to hire and fire, or to monitor school performance. Tenure, mechanical promotional mechanisms and labor-contractual constraints leave school management with relatively few channels of control.

Coupled with the fact that the time horizon over which performance improvements can be measured is longer in the education sector, it is no surprise that there is a high turnover rate of public school management. Though they lack control, principals and supervisors are typically at-will employees, and thus subject to termination. The combination of lack of control and employment vulnerability is a counterproductive incentive scheme–discouraging risk-taking and outside-the-box innovation.

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This likely makes public school management a less useful locus of incentive systems. Absent a broader scope of control, the only practical advantage of using principals as a locus of incentives is that, unlike the reform of teacher compensation, reform of principal compensation is relatively easy.[4]

Thus, linking manager compensation to performance, coupled with the necessary expansion of authority to influence downstream agents (such as teachers), may offer some potential.

Teaching Staff

Teachers are a logical locus for performance-based incentives because they have the most immediate control over the learning process and the quality of the classroom environment. Moreover, from an industrial organization theory standpoint, the classroom environment is a virtual textbook example of a dysfunctional production environment:

- Compared to industrial production environments, the worker/teacher goes largely unmonitored in real time by either management, fellow teachers, or the parent-consumers.

- The link between individual teacher effort and long-term student achievement is a blend of the efforts of multiple teachers that is difficult to decompose. This allows poor teaching by any one faculty member to enjoy a certain amount of deniability. This creates a compositional fallacy–the individual teacher has little incentive to maximize teaching effort, and thus so does the institution as a whole.

- This compositional fallacy is aggravated by a moral hazard problem that did not exist in the one room schoolhouse, where the same teacher bore the burden in upper grades of inadequate training in the lower grades. In the modern public school, a problem learner moves on to be another teacher's problem and that

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[4] Goldhaber recently has advocated for this locus of incentives. See Goldhaber (2007).

latter teacher has no recourse to discipline the former teacher. This, too, reduces the reward to special effort by any one teacher.

- Parents, even if active monitors of the classroom, have little authority to get their student reassigned to better classroom environments. The oft-heard refrain in public schools is "if I did that for you I would have to do the same for any dissatisfied parent." In effect, the teacher has little overall incentive to respond to classroom malpractice.

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The central role of the teacher in learning, coupled with the inherently dysfunctional production environment, suggests strongly that teachers are a key locus for incentive reform. Of course, precursor conditions must exist for teacher effort to have effect; namely, they must not be unduly foreclosed from making changes in their effort or methods.

Students

Students also are a potential locus of performance incentives. The logic of applying incentives at the student level is two-fold. First, the student is a "co-producer" of the education product along with the school. The student has opportunities to make the teacher's job easier, since an ill-prepared or disruptive student can dissipate a teacher's effort. Second, an attentive, well-prepared student–like a well-informed consumer in other settings–introduces competitive motivational forces that may stimulate better teacher performance. On the other hand, the more outside preparation a student brings to the classroom, the less need some teachers may feel to maximize their own efforts.

Thus, incentives that compensate students for better classroom demeanor, attendance, and/or performance may be an adjunct to incentive mechanisms directed at the teacher or school management. It is certainly the case that in private markets for non-education products, rewards to encourage customer participation are common. This is especially true in those cases where, as in the case of education, the customer is a co-producer of the product. The fitness and weight-loss industries, for example, are akin to the education sector in that sense, and use a variety of mechanisms, such as service enhancements, reward

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mechanisms, and offers of special attention to bind the client to actively participate.

Parents

Parents serve a dual role in the K-12 education marketplace. On the one hand, they are co-beneficiaries of their children's educational attainment. Even in modern societies, a successful child produces economic benefits and reduces cost burdens for parents. Thus, parents have interests that are aligned with, if not identical to, the direct beneficiaries of a good education.

In economics parlance, the parent's incentives are aligned with those of the student. In the context of primary education, in fact, the parent agent is a better-informed client of the school system than is the student herself. Not all parents perform the agency function equally well or share the normal strong mutuality of interest. Parental tolerance of truancy, failure to provide guidance or monitoring of student performance, etc., are all breaches of the agency relationship. As with Hollywood talent agents and their clients, however, a parent can be provided with incentives to perform better as an agent for their child's education.

Inserting incentives at the parental level likely will be more successful in cases where the parent – because of their own background or language barriers – is inherently less inclined to perform this role well or appreciate the downstream benefits of education generally, let alone actively monitor classroom experiences.

These observations about the prospects of incentive reform at various levels necessarily offer a fairly skeletal characterization of the marketplace characteristics of education and the role of its key agents. Nevertheless, the notion that amplification of incentives at the classroom level likely would be successful is evidenced by the comparative performance of K-12 versus the higher education sectors.

Why should it be that the quality of education often increases once a student graduates high school and goes on to higher learning? There are a number of reasons, all consistent with the notions offered above.

- The client/student is more mature and able to discern quality differences among teaching personnel. The student also has a more proximate stake in the rewards to a high quality education. This speaks to the potential of a motivated student influencing the classroom experience.

- Students generally have the ability to select among teachers, sometimes within the same subject and level. To the extent this selection is based on teaching quality, this further disciplines the instruction process, since small classrooms may not be funded. Idle teachers and empty classrooms serve as a signal to management about comparative teacher performance.

- At a more macro level, students can select amongst majors and the timing of enrollment in a program. This resolves, to some degree, the fallacy of composition and moral hazard problems alluded to earlier. Fellow instructors in the same field have an incentive to monitor the performance of their colleagues, since their poor performance has an impact on major enrollments and, ultimately, their own career prospects.

All of these observations are consistent with the notion that teaching can be motivated by incentives. It must be noted, of course, that there also is competition among higher education institutions to attract and retain students, which also introduces competition for the best faculty. Thus, unlike the conventional, quasi-monopoly market position enjoyed by schools and school districts in K-12 education, institutions of higher learning enjoy a much greater amount of explicit monitoring and implicit competitive discipline.

What Types of Incentives Are Most Effective?

Once one identifies a locus for inserting a performance incentive, the next question that must be answered concerns the precise form the incentive should take. In private markets, incentives take numerous forms. Labor compensation, for example, takes the form of wages, salaries, commissions, bonuses, stock options, prizes, gifts in kind, office and other workplace amenities, prize lotteries, sabbaticals, employee of the month awards, etc. – all of which are structured to encourage superior performance. Clients are offered incentives through frequent-customer-discounts, rebates, below market loan rates, complimentary food and drink, and so on. The multiplicity of incentive mechanisms is not random. Companies have researched extensively how employees and customers respond to incentives of similar value but different features.

It is not possible to enumerate all of the circumstances under which one type of incentive outperforms another. However, there are some general dimensions of compensation schemes that can help craft effective performance incentives for public schools.

The risk-taking posture of agents

An incentive needs to be crafted to resonate with the risk-perspective of the recipient. Risk-taking individuals, for example, place greater value on a high-payout but low probability method over a low payout with high probability, even if the latter has a lower expected value than the former. Risk-averse individuals, in contrast, prefer a low payment with certainty to a high payment with low probability even if the expected value of the latter is greater.

Although we are unaware of risk-aversion studies specific to educator behavior, the popular lore is that public employees in general are self-selectively risk-averse. Hence, everything else being equal, it may be the case that performance incentives can be relatively small if they are relatively certain. But this also implies that if the odds of any given teacher receiving performance pay are low, performance pay may have little effect.

If, on the other hand, the locus of the incentive were the student or parent, receptivity to low probability but high-payout incentives might be more cost-effective. Participation in raffles, lotteries, and other such activities is high in the general population, even in lower-income strata. Hence, if the payouts were linked to education-compatible, productive behavior of the student or parent, a lottery-type payout scheme might have more potent and broader incentive effects than a program of equal cost with a lower, but more certain payout structure.

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Immediacy of compensation

A second, general dimension of compensation schemes is the timing or immediacy of the payment. An incentive that is received relatively immediately with regard to the achievement or performance event offers greater stimulus effect than a promise of future payment, even if the present value of both payments is the same.

The preference for immediate gratification is greater among low-income households and those who are pessimistic about future prospects. Neither of these characteristics applies to the typical educator, but may apply to students and parents in some settings.

Objectivity of the performance indicator(s)

Economic theory offers some insights regarding the nature of the performance measure and the process by which incentives are awarded.

- Payments received in return for performance must be linked to a measure of performance that is objective and perceived as non-capricious. The less clear it is what constitutes good performance, the lower is the incentive effect.

- Conversely, however, for risk-averse individuals, capricious processes that generate negative incentive effects (punishment) may offer greater motivation to avoid that event. Thus, if educators can generally be thought of as risk-averse, structuring the performance scheme as a negative event may be superior to a positive incentive in terms of total motivation of the educator workforce.

- Rewarding on the basis of an absolute achievement threshold is less effective than rewards based on relative performance. The reason is that the relative target is a moving one, and a teacher has to be continuously diligent to avoid being passed by other colleagues.

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What performance measure(s) should be used?

Comprehensively measuring student performance or, derivatively, teacher performance, is a challenge. There is no single accepted measure of how well the education process was conducted. This should not discourage use of performance incentives as long as indicators that reasonably correlate with academic achievement are used. The measures have to be tailored to the agent's span of influence, and respect the lags between effort of educators and performance. Some general rules of thumb are as follows:

- Teacher performance needs to be measured at the classroom level. Standardized testing for each grade level is appropriate, but should employ what are referred to as dynamically-designed test instruments that make it difficult to teach-to-the-test. Rotation of test instruments and test contents will encourage more comprehensive effort on the part of the teacher. Performance measurement for incentives directed at school management are more difficult to construct, since good schools should perform well in multiple dimensions–test scores, college or job admission rates, student retention rates, the incidence of disciplinary events, etc. Multi-factorial performance measures can be consolidated through weighting schemes, using weights derived from parents and policy makers using multidimensional evaluation techniques.[5] As alluded to earlier, it takes time for an entire school to show differences in performance, thus making it difficult to reward school management in a timely and meaningful way.

- Before-and-after performance comparisons are superior to absolute score or indicator levels, since the educational endowment of students coming to the classroom will vary from classroom to classroom.

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[5] One such system in the Analytic Hierarchy Process (AHP). See: http://en.wikipedia.org/wiki/Analytic_Hierarchy_Process

- Performance incentives directed at students and parents should be based on intermediate, rather than final, performance indicators. Neither parents nor students have sufficient information to understand the basis of final performance indicators such as grades or standardized test scores. Intermediate indicators are such things as attendance, lack of disciplinary actions, homework completion, etc.

- Basing incentives in a strongly progressive way on how much improvement has occurred will provide stronger incentives in all settings to a fixed increment or a reward based on achieving a minimum performance threshold. As a practical matter, most pay-for-performance schemes contemplate only positive incentive formulae. However, the overall effect is stronger if compensation includes negative incentives (e.g., decrements from average pay for severe underperformance).

A Brief Review of the Evidence

Before making recommendations regarding specific types of initiatives that might be considered, it is worthwhile to review the evidence from US and other experience. Again, we narrow our scope of focus to those incentives that might work within the dominant public education industrial organization context. We will not be reviewing school choice, privatization, or other "macro" organizational remedies. We limit ourselves to initiatives that offer incentives to one of the agents identified earlier.

Measurement issues in research on performance incentives

Experiments or initiatives taken locally form a useful laboratory for testing alternative initiatives. As we begin an initial review of the available evidence, it is worth noting a few difficulties that arise in implementing and deriving robust findings from trials of different types of incentive mechanisms.

First, instances of true experimentation are rare. A true experiment involves random assignment of a policy or initiative to some members of a given population. As a result, most of the evidence comes from what are termed natural experiments. That is, schools that happen to have instituted a particular policy are compared with those that happen not to have done so. Unfortunately, natural experiments form a much weaker foundation for scientific investigation of policy alternatives. Natural experiments are haunted by the possibility that differences in results are simply the consequence of self-selective processes. In natural experimental settings it also is difficult to control for other material differences that may contribute to differences in performance.

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A second problem is measurement of outcomes. Since we have discussed performance measurement already, we will not dwell on the issue here. Proponents of the status quo will, rightly or wrongly, always find an argument for resisting the scientific findings of both random and natural experiments. The implications of this are two-fold. First, much less experimentation goes on knowing that virtually any experimental design or result is going to be attacked by those invested in the status quo. Second, it may argue for relying on scientific first principles (such as those presented earlier in this paper), rather than experimentation, to craft policy.

Deriving those first principles from a discipline such as economics has the advantage of bringing the credibility of results from non-K-12 settings to buttress available education experiments. Of course, to proceed on this basis alone requires an understanding and appreciation of the underlying foundations.

Empirical findings

Despite the evaluation challenges highlighted above, a review of the literature is worthwhile to see if experience with performance compensation schemes comports at all with the first principles suggested by industrial organization theory. A review of the literature finds that all of the agent loci identified earlier have been subject to some form of incentive manipulation. The literature, though not massive, is too large to summarize comprehensively here. Instead, we focus on the general findings, relying where relevant on recent and/or meta-study findings. In general, the empirical experience confirms the conceptual notions offered earlier.

School- and school-management based incentives

- Peterson and Chingo (2007) found that schools managed by for-profit entities far outperformed non-profit management in an experiment involving Philadelphia's lowest-performing schools. This suggests that, when management has sufficient scope of control, financial incentives can stimulate student performance, but that scope of control by itself is insufficient to stimulate performance.[6]

- The Kentucky Instructional Results Information System (KIRIS) was introduced in 1990 to reward schools that showed performance improvements over time. Every two years schools that exceeded their improvement goals received funds to distribute as salary bonuses. A RAND study of KIRIS financial incentives found that they had little effect on existing standards-based performance (Stecher 1998). Theory would argue that the incentives were too diffuse to motivate individual teachers.

- In a Netherlands experiment, giving schools extra financing to assist struggling students and to acquire more modern equipment failed to stimulate performance. (Leuven, Lindahl, Oosterbeek and Webbink, 2003). This confirms that programs with diffuse (at best) incentives are likely to be ineffective in conventional school settings.

- A 2007 study by Billger found that principal compensation and accountability were not reliably linked to improved school outcomes. Billger used a national, restricted-use Schools and Staffing Survey (SASS) administered by the National Center for Education Statistics (Billger 2007)

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[6] This suggests that replacing public management with private non-profit management (as proposed by Washington, DC's new school chancellor) in and of itself is unlikely to provide adequate management incentive. http://www.washingtonpost.com/wp-dyn/content/article/2008/05/15/AR2008051502354.html?nav=rss_metro/dc (Retrieved 8/05/2008).

Teacher-based incentives

- The Dallas Value Added system introduced in 1992 sought to include a variety of norm-referenced and criterion-based tests to measure school performance. Monetary awards were provided to teachers and administrators (ranging around $1,000 per year). Studies by Ladd (1999) support the notion that teachers responded to incentives and accountability.

- A 2008 meta-study of teacher-based merit pay systems concluded that student achievement mostly improved when teachers received financial incentives (Podgursky and Springer, 2008). This study refuted many of the claims to the contrary made previously by Lawler (1990) in his meta-study of incentive-based systems in the 1970s and 1980s.

- A 2008 study by Muralidharan and Sundararaman reports the results of a true, random experimental design implementation of pay-for-performance incentives. Despite the small size of the incentives (about 3 percent of compensation) positive, statistically significant performance improvements were measured. The developing-world setting (India) was, in some regards, an advantage since the institutional constraints that make experimentation and implementation difficult were much lower.

- Israel conducted dual, non-random experiments involving both school- and teacher-incentives. The program offered incentives to schools in the form of performance awards, part of which were distributed to teachers and school staff as merit pay, and the rest used for the well being of the school. There were positive responses to both forms (merit and general) of compensation, but merit pay was more cost-effective. (Lavy 2001)

- A study by Figlio and Kenny (2007) found that pay incentives for teachers had more positive effects on student test scores than other school improvement methods such as smaller class sizes or stricter requirements for attendance.

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Student-based incentives:

- In 2004, Coshocton, Ohio schools experimented with student incentives for performance on standardized tests by offering cash payments linked to their performance. Students in third, fourth, fifth, and sixth grades who passed district and state-mandated standardized exams were eligible for as much as $100. Eligibility was determined through random assignment. Math performance was significantly improved among those eligible for incentives, with little or no effect in other subject matter. (Bettinger 2007)

- Several studies find that younger students discount the future at far greater rates than adults. For students with such high discount rates, incentives in the form of immediate rewards for performance may tip the scales in favor of more effort. See, for example, Bettinger and Slonim (2006).

Parent-based incentives:

- In the mid-1990's Mexico started a program called Progresa that, using a random assignment method, paid poor parents to keep their children in school and to take them for regular health check-ups. Offering monthly cash payments if the children remain in school and perform well instead of going to work helps compensate these families for the loss in their children's earnings. Studies show Progresa has succeeded keeping children in school longer. See for example, Parker and Turiel (2005).

- A study by Houtenville and Conway (2008) did not study incentives for parental involvement, per se, but did measure the effect of involvement on student achievement. Using a national longitudinal education database, they determined that the value of parental involvement (in terms of resources spared) averaged approximately $1,000. Even if parent-based incentive schemes were not used directly, teacher-based performance incentives might encourage teachers to take steps to amplify parental involvement.[7]

[7] In my experience, teachers do not have a strong incentive to urge and tolerate more parental involvement. Although wont to blame poor school performance on family and societal factors, school systems do not tend to assist parents in being better co-consumers of K12 education.

Conclusion and Recommendations

The recent evidence on economic incentives and educational attainment are consistent with the first principles elucidated earlier. This suggests the following conclusions regarding the various loci for introducing incentives:

- **Paying school management for performance.** Theoretically this should be an effective mechanism for improving performance, and even the stimulus for developing downstream, classroom incentive mechanisms. As a practical matter, however, the scope of control of school management is constrained by rigid tenure, compensation, resource allocation and other work rule stipulations. It should be considered, however, in settings where these constraints can be relaxed. It could be good policy in communities where boards are independent of labor influence and teachers are eager for greater freedom to test their abilities. The primary opportunities for these strategies are in private schools or quasi-privatized settings such as charter schools.[8]

- **Paying teachers for performance.** Performance payments in excess of teacher base pay focuses incentives on the classroom environment–that part of the education process that displays the highest concentration of conceptual, organizational defects. For maximum effect, payments should be based on a formula that is relatively free of management bias. It should also be based on the performance of the teacher relative to his or her peers–not on the satisfaction of some minimum achievement threshold. Performance should be measured at year-end based on percentage improvements in student performance on dynamically-designed test instruments.

  Performance increments should be material, and rise progressively (i.e., more than linearly) with peer-outperformance. Ideally, the performance formula would permit not just bonuses for outperformance, but also decrements of base pay for severe

[8] A recent interview with Michelle Rhee, the new Chancellor [Supervisor] of Washington, D.C., public school system is revealing regarding the difficulty of motivating school management and labor to accept aggressive reform. See:
<http://www.pbs.org/newshour/bb/education/july-dec07/dcschools_10-01.html>.
Site URL collected August 1, 2008.

underperformance. This would protect the strategy from attempts to raise base compensation to marginalize the bonus incentive, and would lower the cost of the performance pay mechanism. Alternatively, non-monetary mechanisms to enhance relative performance could be used, such as endowing parents with a limited number of opportunities to select the teacher of their choice.[9]

- **Paying students for performance.** Since students are "co-producers" of the classroom education process, it follows that encouraging students to be more focused on education outcomes (more attentive and studious, and less disruptive) should enhance education outcomes. Although there may be some spillover stimulus on teacher performance, student cash incentives do not target directly the primary organizational defect of K12 education. In addition, since youth heavily discount future events, the conceptual potential of such incentives is limited or the plans may be very costly to implement.

- **Paying parents for performance.** Payments to parents have their greatest potential in communities where household incomes are low and parental oversight of the education process is weak. Although it targets (in effect) only intermediate factors in the education process (e.g. truancy), the resulting reduced truancy and greater parental incentives for involvement have positive effects on education outcomes through effects on the student co-producer. Effects on institutional performance are likely to be weak, or even counterproductive, in settings where teachers have weak incentives to maintain a performance focus. The first experiment of this type in the US is underway in New York City and may provide further insight into such programs' effectiveness.[10]

[9]The author suggested such a strategy while serving on Oregon's Quality Education Commission. The notion involved giving parents a limited number of opportunities to pull their children out of particularly dysfunctional classrooms.; akin to what happens naturally in the higher education sector, if certain teachers' classrooms emptied as a result, a strong signal would be sent to both the teacher and school management.

[10]Opportunity NYC is an experimental Conditional Cash Transfer program (CCT) akin to similar programs in Mexico. It is being launched in New York City by Mayor Michael Bloomberg. (http://en.wikipedia.org/wiki/Opportunity_NYC).

In almost all of the studies reviewed, institutional and labor policy barriers limited the ability to implement and prove the potential of incentive-based systems. Incentive programs thus likely will function more effectively if policy makers have scope to address some of these dimensions. Doing so also might open up opportunities for non-financial incentives and negative incentives, which currently are extremely difficult to overlay on the heavily regulated, K-12 workplace environment.

Primary Recommendation

Given the findings above, and acknowledging the difficulty of undertaking any of the incentive plans outlined, it is this author's primary recommendation that the main focus of any pay for performance system be the classroom teacher. Because the classroom environment displays the highest concentration of conceptual, organizational defects, it is the classroom where the most progress can be seen with a properly implemented pay for performance system. Those wishing to make the most impact on student achievement would be wise to start with the classroom teacher.

Bibliography

Paul E. Peterson and Matthew M. Chingos. “Impact of For-Profit and Non-Profit Management on Student Achievement: The Philadelphia Experiment,” KSG Working Paper No. RWP07-055.

Eric P. Bettinger. “The Effect of Financial Incentives on Elementary School Test Scores,” NBER Working Paper, September 17, 2007.

Bettinger, E., and R. Slonim, 2006. “Patience Among Children,” Forthcoming, Journal of Public Economics.

Sherrilyn M. Billger, 2007. "Principals as Agents? Investigating Accountability in the Compensation and Performance of School Principals," IZA Discussion Papers 2662, Institute for the Study of Labor (IZA).

Figlio, David N. & Kenny, Lawrence W., 2007. "Individual teacher incentives and student performance," Journal of Public Economics.

Dan Goldhaber, “Principal Compensation: More Research Needed on a Promising Reform,” Center for American Progress, December 2007.

Eric A. Hanushek and Dale W. Jorgenson, “Improving America's Schools: The Role of Incentives.” Journal of Policy Analysis and Management, Vol. 17, No. 1 (Winter, 1998), 127-129.

Charlene K. Haar, “Cutting Class: The PTA Plays Hookey from Educational Reform,” Policy Review, No. 73, 1995.

Andrew J. Houtenville and Karen Smith Conway, 2008. “Parental Effort, School Resources, and Student Achievement.” J. Human Resources, XLIII(2): 437-453.

Ladd, H F. 1999. "The Dallas School Accountability and Incentive Program: An Evaluation of Its Impacts on Student Outcomes." Economics of Education Review 18: 116.

Victor Lavy, “Evaluating the Effect of Teachers' Group Performance Incentives on Pupil Achievement,” Journal of Political Economy, 2002, vol. 110, no. 6.

Lawler, E. E. 1990. “Strategic Pay: Aligning Organizational Strategies and Pay Systems.” San Francisco: Jossey-Bass.

Edwin Leuven, Mikael Lindahl, Hessel Oosterbeek, and Dinand Webbink, “The effect of extra funding for disadvantaged students on achievement,” Working Paper, February 2003.

Karthik Muralidharan and Venkatesh Sundararaman, “Teacher Incentives in Developing Countries: Experimental Evidence from India,” National Center on Performance Incentives, Vanderbilt University, 2008.

William Ouichi, “Making Schools Work: A Revolutionary Plan to Get Your Children the Education They Need.” Simon & Schuster, September 2, 2003.

Susan W. Parker and Graciela M. Teruelm. “Randomization and Social Program Evaluation: The Case of Progresa.” The ANNALS of the American Academy of Political and Social Science, Vol. 599, No. 1, 199-219 (2005).

Michael J. Podgursky, Matthew G. Springer. “Teacher performance pay: A review.” Journal of Policy Analysis and Management 26:4, 909-950 (2008).

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