Teacher Deselection

Eric A. Hanushek

May 2008

Teacher Deselection

Eric A. Hanushek

The national educational challenge was most forcefully articulated by the nation's governors in 1989. As they met in Charlottesville, they felt the needs of the nation to improve the performance of students – needs articulate a decade and a half previously in *A Nation at Risk* (National Commission on Excellence in Education (1983)). And, they declared that the United States should be first in the world in mathematics and science by the turn of the century (National Education Goals Panel (1991)). The problem was that we had no experience to draw upon that would indicate how this could be done. In the intervening two decades we have come to recognize the improving teacher effectiveness is perhaps the only viable way to accomplish the governors' goals, but even there the policies and mechanisms are far from obvious.

This discussion provides a quantitative statement of one approach to achieving the governors' (and the nation's) goals – teacher deselection. Specifically, how much progress in student achievement could be accomplished by instituting a program of removing, or deselecting, the least effective teachers? A variety of policies for hiring and retraining teachers have been proposed, but they are not been very successful in the aggregate as student performance has not improved. At the same time, it is widely recognized that some teachers do a very poor job, and few people believe that the worst teachers can be transformed into good teachers. What would happen if we simply adopted policies of systematically removing the worst teachers?

Motivation

At the time of *A Nation at Risk*, the U.S. was not performing very well on international tests but its school attainment far exceeded that in other countries. For example, while 88 percent of young U.S. students had finished high school, only 72 percent of young students in OECD countries had done so.[1] Further, central features of the U.S. economic system – such openness to trade, secure property rights and a well-developed legal system, highly adaptable labor and product markets – insulated the economy from any flaws in the development of its labor force.

The world has changed dramatically since then. Other countries, intent on emulating the successes of the U.S. economy, have dramatically increased the school attainment of their populations. Figure 1 shows the expected school attainment in 2003. The U.S. falls noticeably below the average for OECD countries.[2] On other fronts, competitors have also been moving rapidly to improve their economic conditions to match those of the U.S. As a result, other nations are currently much more competitive than at the time of *A Nation at Risk* – when the nation was told in unequivocal terms that the education system was not preparing our students to be competitive in the world.

The 1989 governors' meeting called for moving U.S. students up to the top of international rankings. But they did not attempt to describe what that would mean for the United States economy. We are now able to do that.

Start with considering how far behind are students of the U.S compared with the students of the best countries. Figure 2 shows the ranking of countries based on average

---

[1] These numbers reflect comparisons for the population born from 1961-1970; see Organisation for Economic Co-operation and Development (2007), table A1.2a.
[2] Organisation for Economic Co-operation and Development (2003), table C1.1.

mathematics score on the PISA tests in 2003.[3] U.S. students perform significantly below the OECD average. The top country on this assessment, Hong Kong, is two-thirds of a standard deviation ahead of the average U.S. student.

An improvement of one-half standard deviation would move U.S. students close to the top – roughly where Canadian students fall and slightly behind such countries as Japan or the Netherlands.

What would a half-standard deviation improvement mean for the U.S. economy? Recent analysis of how economic growth is affected by having a better educated population shows that the implications would be dramatic (Hanushek, Jamison, Jamison, and Woessmann (2008)). Figure 3, reproduced from that paper, describes how approximately meeting the governors' pledge through improving student performance by one-half standard deviation (making U.S. students perform like Canadians) would have affected current and future GDP.

The governors' pledge of achieving dramatic improvements by 2000 is equivalent to the curve for a 10-year reform plan in Figure 3.[4] This shows that by 2014 we could have expected GDP to be more than 4 ½ percent higher than will be obtained without student improvement. (U.S. student performance according to the National Assessment of Educational Progress (NAEP) is essentially similar today to what it was at the time of the governors' summit meeting). This addition to GDP is equivalent to the proportionate

---

[3] PISA (Programme for International Student Assessment) is testing conducted by the Organization for Economic Cooperation and Development (OECD) of international students for all OECD countries and a selection of other countries that voluntarily participated. PISA tests a random sample of 15-year-olds in each country. These tests, now on a three year cycle, assess math, science, and reading skills.   Alternative assessments at different age groups are provided by TIMSS (Trends in International Mathematics and Science Study). The TIMSS shows some different comparative results with U.S. fourth graders doing relatively well, U.S. middle school students in the middle, and U.S. twelfth graders in the bottom rankings.
[4] For a description of how these calculations are accomplished, see Hanushek and Wößmann (forthcoming).

expenditure for our 2008 national spending levels on K-12 education.   Our, seen differently, GDP in 2008 was over $14 trillion, making the two percent higher GDP in 2008 equivalent to about $300 billion.

If the reforms had been begun at the time of the governors' meeting but had stretched out for a longer period before they obtained their results, the improvements in GDP would take commensurately longer but, as also shown in Figure 3, would still have powerful implications for the U.S. economy. For example, a reform plan that took 30 years to bring students up to the Canadian level would cover K-12 expenditures with the added economic outcome by 2024.

The final motivating element for this paper is that little was accomplished by the policies that followed the governors' meeting or the previous call to action from *A Nation at Risk* (National Commission on Excellence in Education (1983)). A variety of approaches have been pursued (Peterson (2003)). These have involved expanding resources in many directions, including increasing real per pupil spending by more than 50 percent since 1983. Yet performance has remained unchanged since 1970 when we started obtaining evidence from NAEP (Appendix Figure A1).

The aggregate picture is consistent with a variety of other studies indicating that resources alone have not yielded any systematic returns in terms of student performance (Hanushek (2003)).   The character of reform efforts – at least until quite recently – can largely be described as "same operations with greater intensity." Thus, pupil-teacher ratios and class size have fallen dramatically, teacher experience has increased, and teacher graduate degrees have grown steadily – but these have not translated into higher student achievement. On top of these resources, a wide variety of programs have been

introduced with limited aggregate success. The experience of the past several decades vividly illustrates the importance of true reform, i.e., reform that actually improves student achievement.

The recent movement to an "standards and accountability-based reform" may change this picture, but the evidence is yet to be clear. In any event, the discussion below is consistent with accountability and with No Child Left Behind in the sense that it describes a set of teacher policies that could lead to the results sought under the accountability systems.

The implication of the discussion is that improvements in student outcomes – if they occur – would be expected to have powerful effects. At the same time, doing more of the policies we have been pursuing is unlikely to lead to the performance improvements we seek.

The Power of Effective Teachers

A first question – given the previous section – is whether or not achieving such gains could be feasible with realistic reform strategies. Recent research suggests that it is feasible but that it will take re-direction of efforts.

One explanation for past failure is simply that we have not directed sufficient attention to teacher quality and teacher effectiveness. By many accounts, the quality of teachers is the key element to improving student performance. But the research evidence suggests that many of the policies that have been pursued have not been very productive.

Specifically, while the policies may have led to changes in measured aspects of teachers, they have not improved the quality of teachers when identified by student performance.[5]

Rivkin, Hanushek, and Kain (2005) develop estimates of differences in teacher quality on an output basis. Specifically, the concern is identifying good and bad teachers on the basis of their performance in obtaining gains in student achievement. An important element of that work is distinguishing the effects of teachers from the selection of schools by teachers and students and the matching of teachers and students in the classroom. In particular, highly motivated parents search out schools that they think are good, and they attempt to place their children in classrooms where they think the teacher is particularly able (Hanushek, Kain, and Rivkin (2004a)). Teachers follow a similar selection process (Hanushek, Kain, and Rivkin (2004b, 2004c)). Thus, from an analytical viewpoint, it is difficult to sort out the quality of the teacher from the quality of the students that she has in her classroom. The analysis of teacher performance in Rivkin, Hanushek, and Kain (2005) goes to great lengths to avoid contamination from any such selection and matching of kids and teachers.[6] In the end, it estimates that the differences in annual achievement growth between an average and a good teacher in math are at least 0.11 standard deviations of student achievement.[7]

---

[5] For a review of existing literature, see Hanushek and Rivkin (2004, 2006). These papers describes various attempts to estimate the impact of teacher quality on student achievement.

[6] To do this, it concentrates entirely on differences among teachers within a given school in order to avoid the potential impact of parental choices of schools. Moreover, it employs a strategy that compares grade level performance across different cohorts of students, so that the matching of students to specific teachers in a grade can be circumvented. As such, it is very much a lower bound estimate on differences in teacher quality.

[7] For this calculation, a teacher at the mean of the quality distribution is compared to a teacher 1.0 s.d. higher in the quality distribution (84th percentile), labeled a "good teacher." The estimate of 0.11 comes from the mathematics estimates. The comparable estimates for reading are 0.15 (revised estimates). These results relate specifically to grades 4-7. It is plausible that the distribution of teacher quality at high school is even more dispersed than shown here.

Before going on, it is useful to put this lower bound estimate of the variation in quality into perspective. By these quality estimates, if a student had a good teacher as opposed to an average teacher for 4-5 years in a row, the increased learning would be sufficient to close entirely the average gap between a typical low income student and one who is not on free or reduced lunch.

Reasonable estimates (which are used throughout the following calculations) are actually higher than this lower bound, specifically, 0.20 to 0.30 s.d.. These larger estimates reflect likely differences in teacher quality among schools; the fact that the similarly conservative estimates for reading as opposed to math are 0.15 s.d. instead of 0.11 s.d.; and a series of other factors that bias the previously discussed estimate downwards (Rivkin, Hanushek, and Kain (2005)).

The implications of these differences are dramatic. Let us consider the impact of low quality, or ineffective, teachers on student achievement. If the average learning growth each academic year is one grade level equivalent, the bottom 5 percent of teachers get gains that are at best two-thirds of a grade level equivalent. Some are much worse that this. The bottom 1 percent of teachers get no more that one-half of a grade level equivalent in annual gains. (These calculations assume that one standard deviation of teacher quality – moving from the center of the distribution to the 84th percentile – is 0.20 s.d. of student achievement; using a calculation of 0.30 makes these conclusions even more grim).

An external validation of these estimates comes from Hanushek (1992). The calculations of the low end of the distribution developed here are similar to the effects calculated in Hanushek (1992), but suggest that the most conservative estimates may be

too optimistic. That analysis of the range in performance in Gary, Indiana schools suggests that the bottom five percent are no better than one-half grade level equivalent years in growth per academic year. These direct estimates of teacher differences are actually close to the higher estimates of teacher quality (0.30 standard deviations of student achievement).

Clearly, students in class with ineffective teachers are damaged. They can probably recover from a single year of having a bottom five percent teacher, but a few years might lead to lasting problems – ones that dog the student for a lifetime.

Let's look at the aggregate impact of the bottom teachers. Figure 4 plots out the impact on overall student learning of "deselecting" (i.e., moving out of the classroom) varying proportions of ineffective teachers. As an example, consider what would happen to average student performance if we could eliminate the bottom five percent of teachers from the distribution. The previous estimates of the impact of teachers on student achievement indicate that students would on average gain 0.28-0.42 s.d. of performance.

These estimates of the importance of teacher quality permit some calculations of what would be required to yield the reforms discussed earlier. To begin with, consider what magnitude of teacher deselection might yield an improvement in student performance to the Canadian level (0.5 standard deviations of student achievement). Figure 4 shows that eliminating the worst 6-10 percent of teachers in terms of effectiveness would bring student achievement up by one-half standard deviation.

The estimates given here need to be put into the policy context. Consider a school with 30 typical teachers. These estimates suggest that eliminating the bottom two or three could boost student achievement up to the Canadian level.

This kind of policy is very consistent with the McKinsey evaluation of the policies found in high performing school systems around the world (Barber and Mourshed (2007)). Their evaluation suggests that the best school systems do not allow ineffective teachers to remain in the classroom for long.[8] These conclusions are also consistent with more local evidence such as that for New York City in Kane, Rockoff, and Staiger (2006)and the related policy prescriptions in Gordon, Kane, and Staiger (2006).

Policies of making active decisions on retention and tenure are of course quite alien to the current school system. A number of states currently have laws and regulations that lead to tenure decisions as early as two years, with the mode being just three years (National Association of State Boards of Education (1997), National Council on Teacher Quality (2007)). On top of that, the teacher evaluation process as typically seen is very cursory (Toch and Rothman (2008)). Nonetheless, these are inconsistent with provding a quality education to all students, because some students must necessarily be relegated to these ineffective, and damaging, teachers.

The idea is that policies be put in place to identify the most ineffective teachers and to move them out of the classroom. Developing such policies, negotiating them with teachers, and implementing them in the schools clearly take time. Thus, the reform paths in Figure 3 sketch alternative time patterns for implementation that are likely to be relevant. Moreover, the prior calculations of impacts on student performance assume that

---

[8] The method of ensuring good teachers, according to this study, does depend on the country. Some of the highest performing countries do thia largely at entry by selecting from the very top of the pool of college graduates. Others have particularly effective professional development programs. For the U.S., moving to selection of teachers from the top of the new graduate distribution appears quite infeasible. See Hanushek and Rivkin (2004).

all students have the higher quality teachers for their entire K-12 school career. Thus, even if implemented immediately, it would take more than 10 years for any cohort to go through all schooling at the higher level. On the other hand, as noted earlier, had these policies been put in place as called for by the Governors in 1989 we would today be reaping the unmistakable gains from the improved working of our national economy. Had we actually started with effective reform in 1983 as called for in *A Nation at Risk* the gains to GDP would be sufficient to cover all of our expenditure on K-12 schooling.

It should also be noted that obtaining the gains from this policy presumes that the bottom 5-10 percent of the current distribution of teachers is eliminated *permanently*. In order to eliminate them permanently, it is necessary either to have a continuing deselection process or to upgrade the over level of teacher effectiveness in the future. In particular, if hiring follows the same pattern as currently, the new hires would have the same 5-10 percent of ineffective teachers, who would have to be deselected on an on-going basis.

In the long run, it would probably be superior, however, to develop systems that upgrade the overall effectiveness of teachers. The difficulty is that past approaches have not proved very successful, at least as judged from student outcomes. A variety of approaches have received widespread attention – induction programs, mentoring, professional development, and the like – and have been the focus of much policy interest. The interest in them has come substantially from the fact that they take the current set of teachers and transform them into a more effective group. There has been little reason to believe that, at least as currently operated, these are effective. If they would work, it

would be a way of ensuring that the pool of teachers is improved (and that continual deselection would not be needed). The key is "if they would work."

The full impact of setting up a deselection process are difficult to project in the abstract. First, one might expect a policy that selected and rewarded teachers on ability would alter who entered teaching. While more risk adverse people may shy away from teaching, a different group that wishes to be judged and evaluated by their contributions (see Hoxby and Leigh (2004)). Moreover, there could efficiency gains, say through improved professional development. Today, when performance is not effectively evaluated, teachers and principals give little attention to the usefulness or quality of any professional development programs – and the result appears to be little average gains from the existing professional development. But, if classroom effectiveness mattered, teachers might be more engaged in selecting and participating in good professional development. Nonetheless, these ramifications are speculative, since we have little experience with how the market might operate with the introduction of true performance evaluation.

Cost Considerations

Policy initiatives related to teacher deselection clearly alter the nature of the teaching contract. Today, few teachers are involuntarily separated from teaching, particularly after the probationary period. (In fact some of the nation's worst performing states – California or the District of Columbia – require decisions on tenure at the end of just a two-year probationary period, making it very difficult to evaluate teachers even if they had the will to do so). As a result, the possibility of deselecting ineffective teachers

increases the risk of employment as a teacher. As a result, attempting to change the quality of the overall distribution may require increased compensation to attract new and more effective teachers who are also willing to take the added employment risk..

Analyzing reform policies directly in terms of their costs is not feasible, because we know very little about the supply function for teacher quality. While there has been some work on the cost of hiring teachers with different characteristics (such as experience or advanced degrees), these characteristics do not readily translate into teacher quality (Hanushek and Rivkin (2004)).

There are alternative ways to consider the costs related to any policies aimed at improving the teaching force. Perhaps the simplest is to use the prior calculations of the benefits to provide an estimate of the upper bound on the feasible expenditure for new policies (based on the simple idea that costs must be less than benefits in order for the policy to be efficient).

Much of the current discussion of teacher quality is centered on statements about the overall level of salaries. It seems clear that teacher salaries have slipped relative to alternative earnings of college workers, particularly for women (Hanushek and Rivkin (1996; Hanushek and Rivkin (2004, 2006)).[9] For a variety of reasons, however, this does not give much policy guidance for the current discussions. In simplest terms, we do not know how teacher quality responds to different levels of salaries (Hanushek and Rivkin (2004)). Moreover, policies that simply raised salaries across-the-board (even if advanced as a way to increase the attractiveness of the profession) would almost certainly

---

[9] There is a current debate about how salaries of teachers compare to those in different professions; see Podgursky (2003) and Allegretto, Corcoran, and Mishel (2004).

slow any reform adjustments, because they would lower teacher turnover and make it more difficult to improve quality through new hiring.

Nonetheless, the aggregate growth numbers suggest that the annual growth dividend from an effective reform plan would cover most conceivable program costs over a relatively short period of time. Figure 2 describes an increase in GDP from improved student performance with varying implementation periods. Consider what real reform does. The "Canadian" improvement plan previously described that reached its goal in 20 years would already yield GDP that was 1.6 percent higher at the end of the 2-year implementation period. In other words, a 20-year reform plan begun in 2010 would yield this higher 1.6 percent level of GDP in 2030. In terms of the U.S. economy in 2005, 1.6 percent amounted to **$200 billion**. But, in 2005, total spending on instructional salaries and benefits was just $233 billion (U.S. Department of Education (2008), Table 169). In other words the increased GDP through improved student achievement would almost immediately cover current teacher salaries and benefits fully – suggesting considerable room to pay for better teachers and to compensate for the higher risk of entering teaching.

The conclusion of the cost considerations is simple. The benefits from quality improvements are very large. Thus, they can support incentive programs that are quite large and expansive *if the programs work*. U.S. schools have in fact expanded in a variety of ways over the past four decades – real expenditures per pupil in 2000 are more than three times those in 1960. It is just that these past programs have not led to significant improvements in student performance. Put another way, the benefits do not justify all types of expenditure. They do justify many conceivable programs if they can be shown to be effective.

Conclusions

Many discussions of teacher policies concentrate almost entirely on taking the currently available teachers and upgrading their effectiveness. This involves special induction programs, mentoring, on-going professional development and the like. Yet, past approaches have not proved to be generally effective. Good programs have been difficult to implement on a broad scale, as seen through the results in student achievement.

This analysis points to the very large cost of allowing the most ineffective teachers to remain in the classroom. The bottom end of the teacher force is damaging students. Allowing ineffective teachers to remain in the classroom is literally dragging down the nation.

If the bottom end of the teacher distribution cannot be improved through various remediation efforts, the alternative is more active deselection policies that trim off the bottom end of the distribution. What stands out from an analysis of the impact of teachers on achievement is that relatively modest changes in the bottom end of the distribution have enormous implications for the nation.
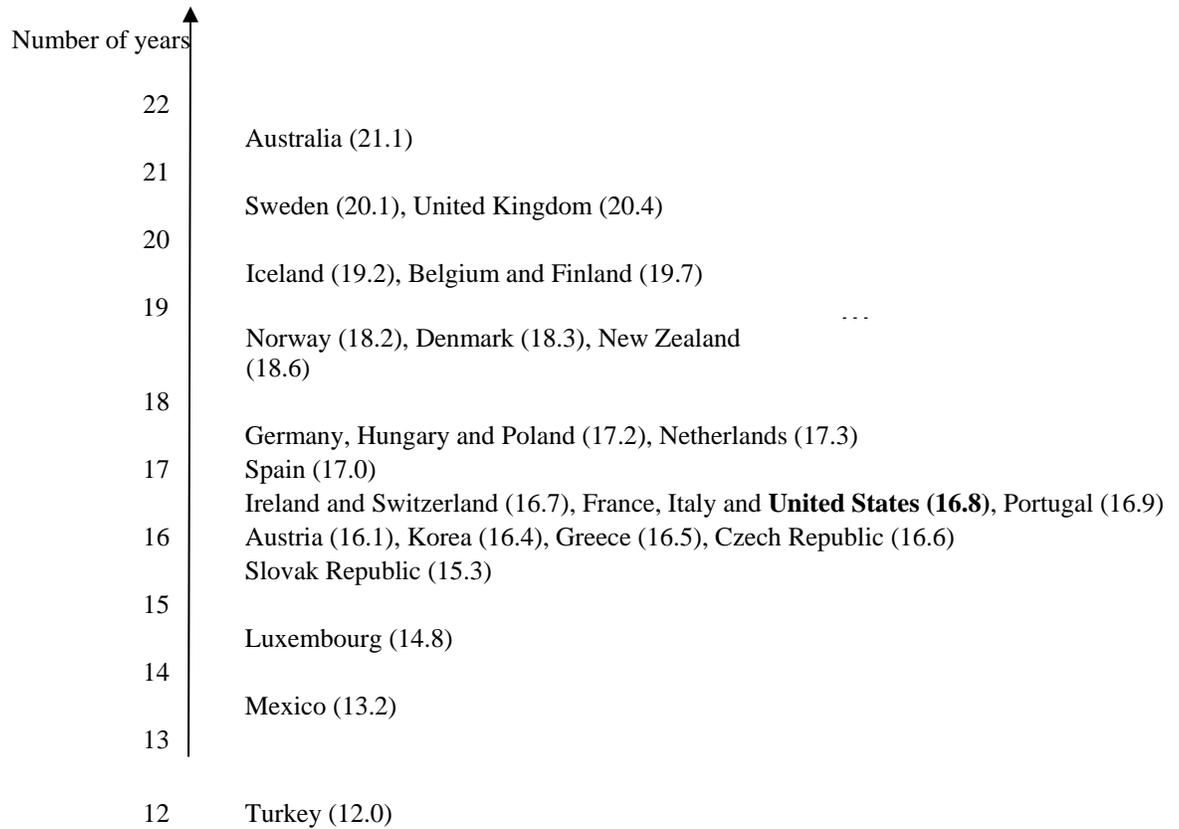
It is unclear why we permit a small group of teachers to do such large damage. The vast majority of teachers are effective. They are able to compete with teachers virtually anyplace else in the world. Yet these effective teachers are lumped in with a small group of completely ineffective teachers – who are permitted to continue year after year in doing damage.

Nor does it seem to be a problem with identifying these teachers. Some evidence shows that principals are able to identify these bottom performers.[10] It is almost certainly true that there is even broader recognition of the bottom teachers – by principals, other teachers, and parents. Instead, it seems simply to be a lack of will to act on readily available information.

---

[10] See, for example, Murnane (1975), Armor et al. (1976), or Jacob and Lefgren (2006).

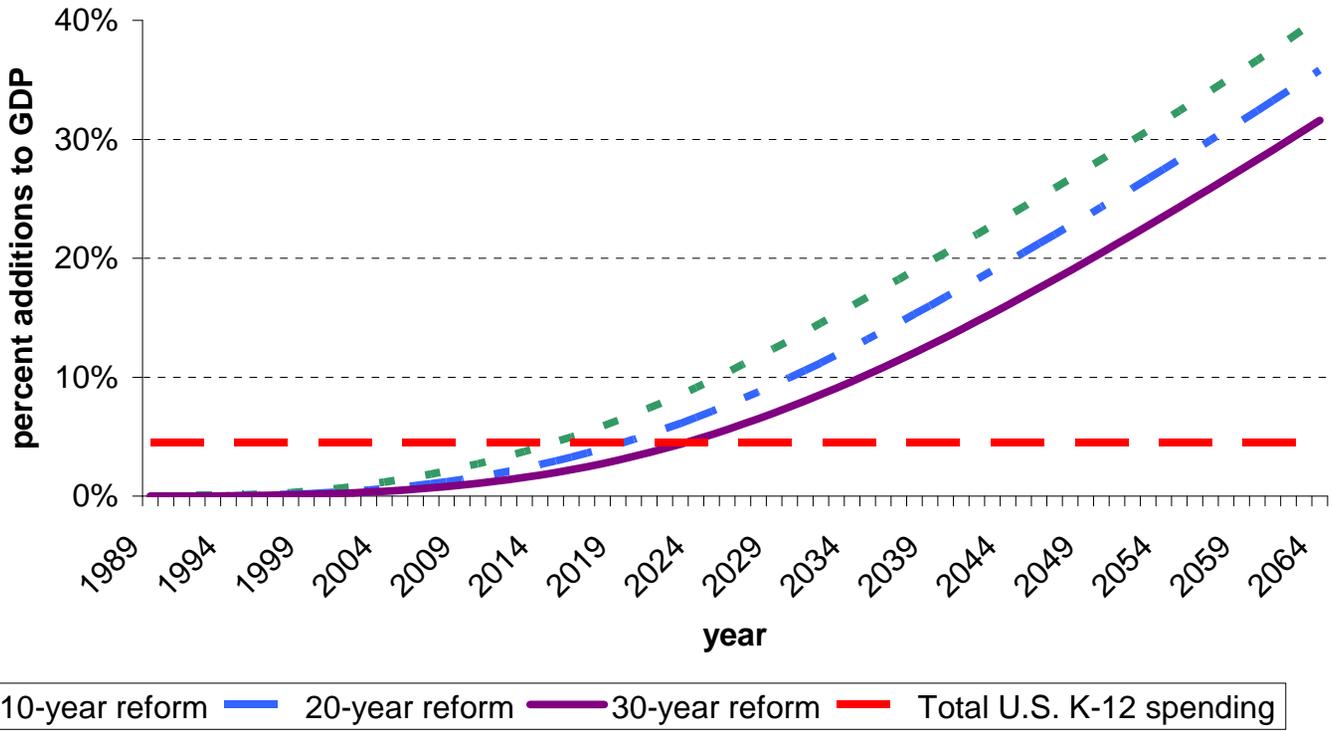Figure 1. Expected Schooling Levels Under Conditions in 2003

Number of years

22
          Australia (21.1)
21
          Sweden (20.1), United Kingdom (20.4)
20
          Iceland (19.2), Belgium and Finland (19.7)
19   . . .
          Norway (18.2), Denmark (18.3), New Zealand
          (18.6)
18
          Germany, Hungary and Poland (17.2), Netherlands (17.3)
17   Spain (17.0)
          Ireland and Switzerland (16.7), France, Italy and **United States (16.8)**, Portugal (16.9)
16   Austria (16.1), Korea (16.4), Greece (16.5), Czech Republic (16.6)
          Slovak Republic (15.3)
15
          Luxembourg (14.8)
14
          Mexico (13.2)
13

12   Turkey (12.0)

Source: Organisation for Economic Co-operation and Development (2003), chart C1.1.

Figure 2. Mathematics Performance on PISA, 2003

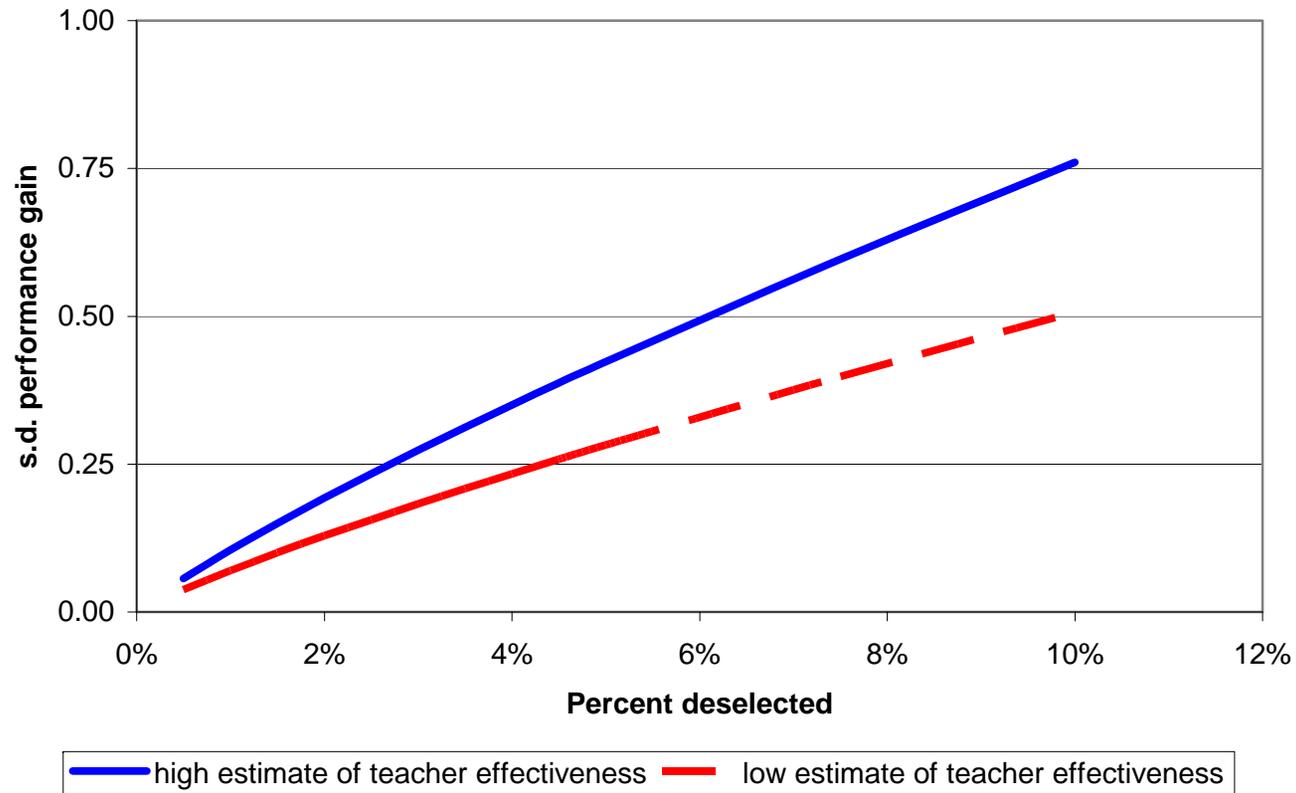standard deviations from OECD average
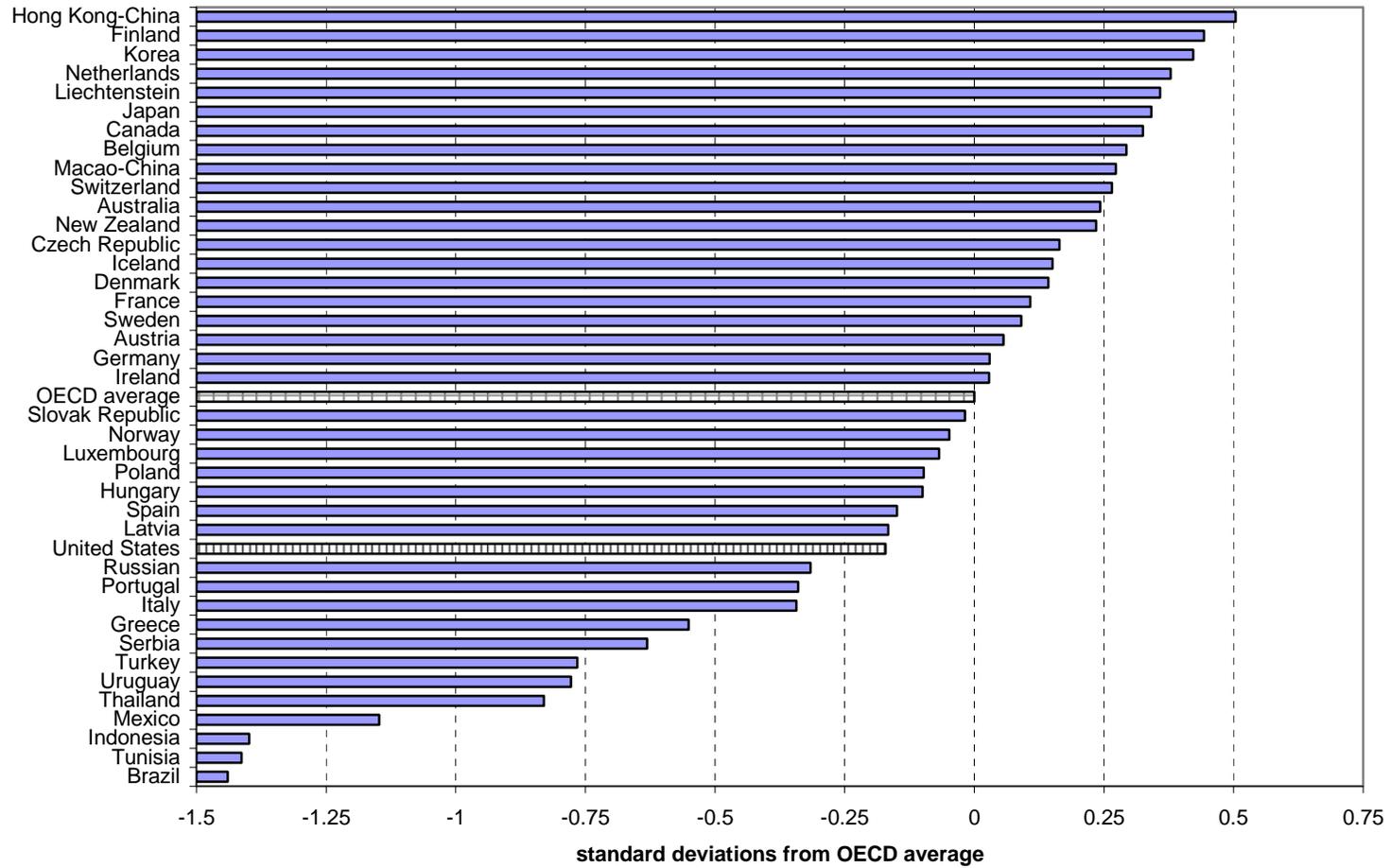
Figure 3. Improved GDP from Achieving the Governor's Goals -- First in the World by 2000

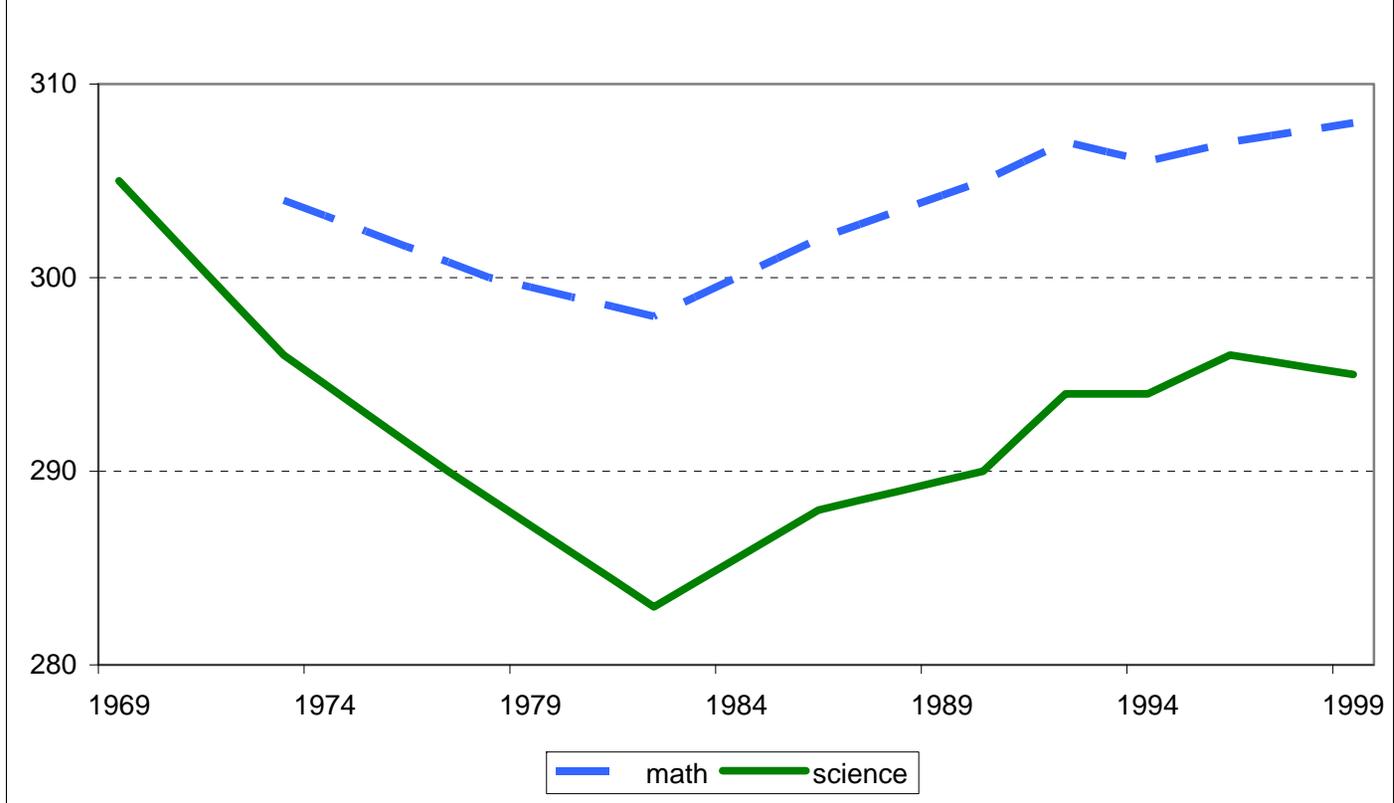Legend: 10-year reform, 20-year reform, 30-year reform, Total U.S. K-12 spending

Source: Hanushek, Jamison, Jamison, and Woessmann (2008)

Figure 4. Alternative Estimates of Teacher Deselection and Student Achievement

Figure A1. National Assessment of Educational Progress (NAEP), age 17

References

Allegretto, Sylvia A., Sean P. Corcoran, and Lawrence Mishel. 2004. *How does teacher pay compare? Methodological challenges and answers*. Washington: Economic Policy Institute.

Armor, David J., Patricia Conry-Oseguera, Millicent Cox, Niceima King, Lorraine McDonnell, Anthony Pascal, Edward Pauly, and Gail Zellman. 1976. *Analysis of the school preferred reading program in selected Los Angeles minority schools*. Santa Monica, CA: Rand Corp.

Barber, Michael, and Mona Mourshed. 2007. *How the world's best-performing school systems come out on top*. McKinsey and Company,

Gordon, Robert, Thomas J. Kane, and Douglas O. Staiger. 2006. "Identifying effective teachers using performance on the job." Washington, Brookings Institution (April).

Hanushek, Eric A. 1992. "The trade-off between child quantity and quality." *Journal of Political Economy* 100,no.1 (February):84-117.

———. 2003. "The importance of school quality." In *Our Schools and Our Future: Are We Still at Risk?*, edited by Paul E. Peterson. Stanford, CA: Hoover Institution Press:141-173.

Hanushek, Eric A., Dean T. Jamison, Eliot A. Jamison, and Ludger Woessmann. 2008. "Education and economic growth: It's not just going to school but learning that matters." *Education Next* 8,no.2 (Spring):62-70.

Hanushek, Eric A., John F. Kain, and Steve G. Rivkin. 2004a. "Disruption versus Tiebout improvement: The costs and benefits of switching schools." *Journal of Public Economics* Vol 88/9-10:1721-1746.

———. 2004b. "The revolving door." *Education Next* 4,no.1 (Winter):77-82.

———. 2004c. "Why public schools lose teachers." *Journal of Human Resources* 39,no.2:326-354.

Hanushek, Eric A., and Steven Rivkin. 1996. "Understanding the Twentieth-Century Growth in U.S. School Spending." *The Journal of Human Resources* Volume XXXII,no.Number 1.

Hanushek, Eric A., and Steven G. Rivkin. 2004. "How to improve the supply of high quality teachers." In *Brookings Papers on Education Policy 2004*, edited by Diane Ravitch. Washington, DC: Brookings Institution Press:7-25.

———. 2006. "Teacher quality." In *Handbook of the Economics of Education*, edited by Eric A. Hanushek and Finis Welch. Amsterdam: North Holland:1051-1078.

Hanushek, Eric A., and Ludger Wößmann. forthcoming. "The role of cognitive skills in economic development." *Journal of Economic Literature*.

Hoxby, Caroline Minter, and Andrew Leigh. 2004. "Pulled away or pushed out? Explaining the decline of teacher aptitude in the United States." *American Economic Review* 94,no.2 (May):236-240.

Jacob, Brian A., and Lars Lefgren. 2006. "When principals rate teachers." *Education Next* 6,no.2 (Spring):59-69.

Kane, Thomas J., Jonah E. Rockoff, and Douglas O. Staiger. 2006. "What Does Certification Tell Us About Teacher Effectiveness? Evidence from New York City." Working Paper No. 12155, National Bureau of Economic Research (April).

Murnane, Richard J. 1975. *Impact of school resources on the learning of inner city children*. Cambridge, MA: Ballinger.

National Association of State Boards of Education. 1997. "Teacher tenure." *Policy Updates* 5,no.3 (February):1.

National Commission on Excellence in Education. 1983. *A nation at risk: the imperative for educational reform*. Washington, D.C.: U.S. Government Printing Office.

National Council on Teacher Quality. 2007. *State teacher policy yearbook, 2007*. Washington: National Council on Teacher Quality

National Education Goals Panel. 1991. *Building a Nation of Learners, 1991.* Washington, D.C.: National Education Goals Panel

Organisation for Economic Co-operation and Development. 2003. *Education at a Glance: OECD Indicators 2003.* Paris, France: Organisation for Economic Co-operation and Development.

———. 2007. *Education at a Glance: OECD Indicators 2007.* Paris, France: Organisation for Economic Co-operation and Development.

Peterson, Paul E., ed. 2003. *Our schools and our future: Are we still at risk?* Stanford, CA: Hoover Press.

Podgursky, Michael J. 2003. "Fringe benefits." *Education Next* 3,no.3 (Summer):71-76.

Rivkin, Steven G., Eric A. Hanushek, and John F. Kain. 2005. "Teachers, schools, and academic achievement." *Econometrica* 73,no.2 (March):417-458.

Toch, Thomas, and Robert Rothman. 2008. "Rush to Judgment: Teacher Evaluation in Public Education." Washington, Education Sector (January).

U.S. Department of Education. 2008. *Digest of Education Statistics, 2007.* Washington, DC: National Center for Education Statistics.