A Slower Climb

It is well known that teachers earn less than doctors and lawyers. However, few realize that most doctors and lawyers make up much of the gap between their initial and peak earnings by their early 40s, while teachers' earnings rise slowly and peak when they reach their mid-50s and are near retirement.

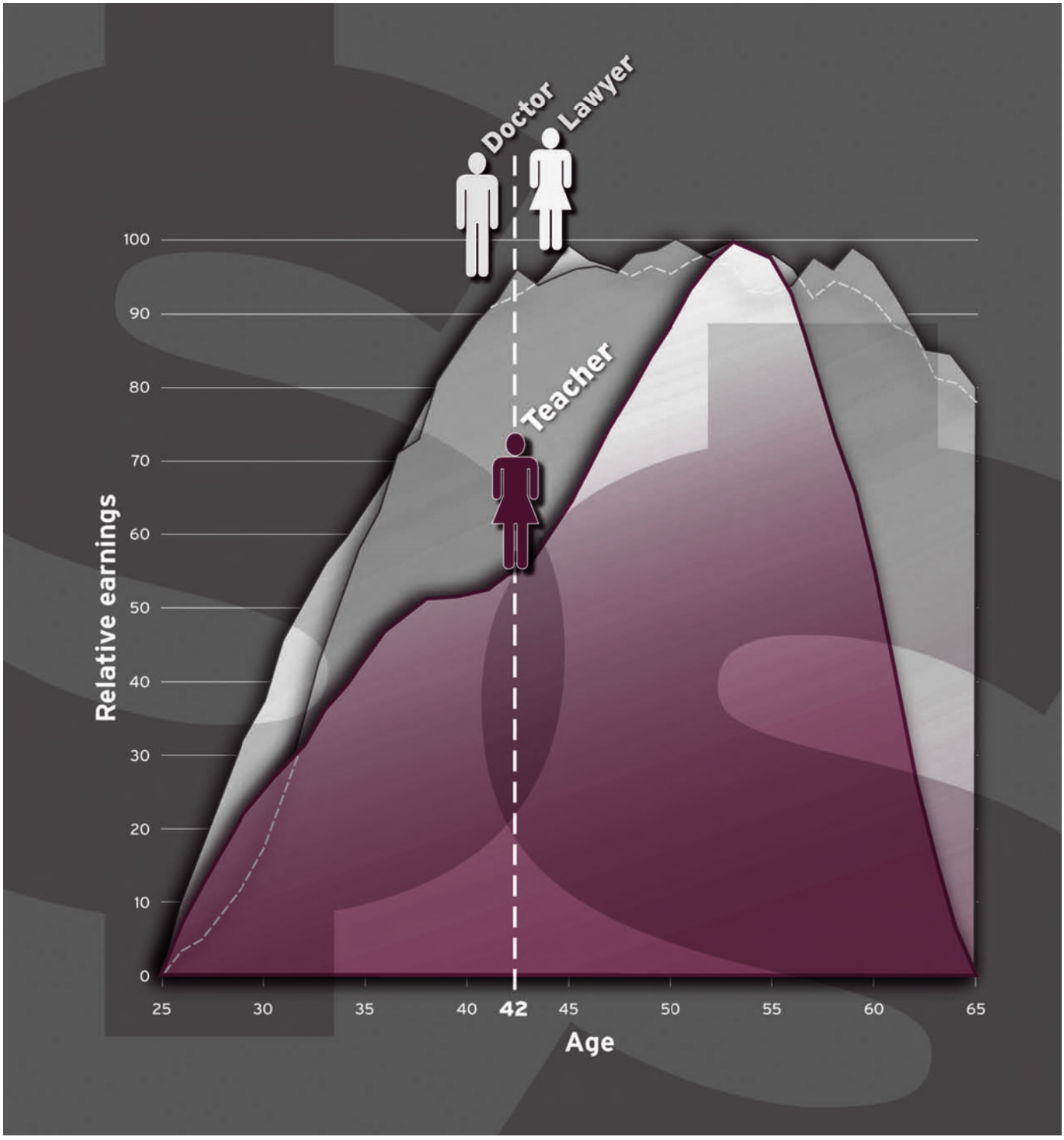

ILLUSTRATION / BRUCE SANDERS DESIGN

Note: The figure plots five-year moving averages of annual earnings,measured relative to the difference between earnings at age 25 and peak earnings for each profession.

SOURCE: U.S. Census Bureau, American Community Survey, 2006

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How about more pay for new teachers, less for older ones?

BY JACOB VIGDOR

On what basis should we distribute rewards to salespeople? It seems like a silly question, doesn't it? First, "we," meaning the public at large, don't usually get to decide such matters. Second, there are obvious systems of rewards for salespeople already in place, foremost among them the system of commissions, which pays salespersons for the value they directly contribute to a firm's operation.

Replace the word "salespeople" with "teachers," however, and we move from the realm of silly questions to the arena of intense policy debate. Teachers are in most cases public employees. So we do, in theory at least, get to decide how they are paid. The commission model for teachers, variants of which have been proposed for many years, would involve compensating them for the value they provide to their school's operation, that is, the degree to which they educate their students. Unfortunately, the amount of education a student receives in a given year is much harder to quantify than the total sales recorded by a clerk in a store. Measuring student growth has been made somewhat easier by recent advances in the tracking of student performance on standardized tests over time. But the notion of paying teachers on the basis of their ability to improve test scores, often termed "merit pay," while earnestly debated by education policy researchers, is strongly opposed by teachers unions and is a political nonstarter in many parts of the country.

Lost in the debate over merit pay are some interesting, and to some extent disturbing, facts about the way we currently distribute compensation to teachers. Most districts reward teachers for their years of experience, advanced degrees, and in some cases special credentials such

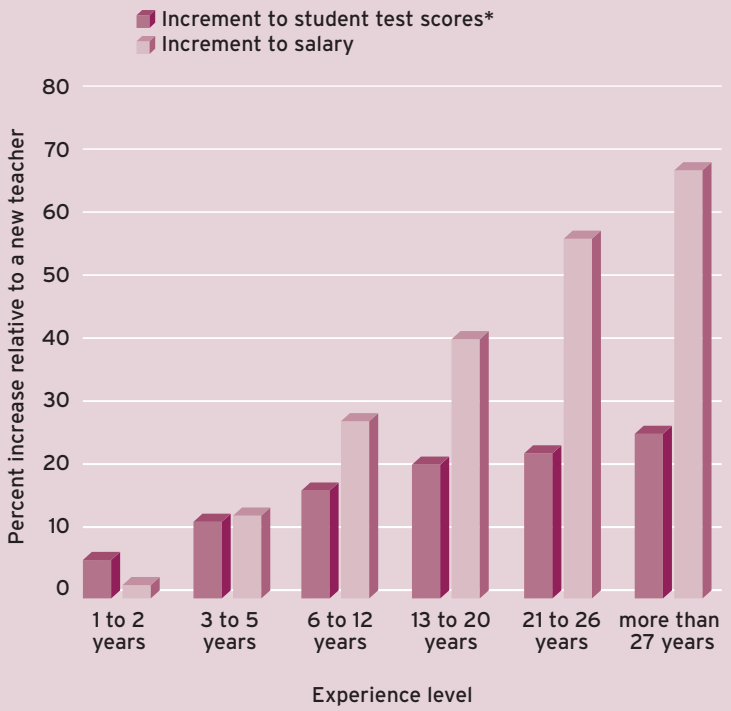
Shifting teachers' lifetime compensation toward the beginning of their careers would make the profession more attractive to highly qualified college students.

as a certificate from the National Board for Professional Teaching Standards (NBPTS). If every year of experience and every credential were strongly associated with a teacher's ability to educate students, we could feel content that our system rewarded the ability to educate de facto. But the available evidence suggests that the connection between credentials and teaching effectiveness is very weak at best, and the connection between additional years of experience and teaching effectiveness, while substantial in the first few years in the classroom, attenuates over time. Though exact results vary from one study to the next, there is little doubt that credentials and additional years of experience (beyond the first few years) matter far less to teacher effectiveness than they do to teacher compensation as it is currently designed.

What if, rather than proposing a direct pay-for-performance system, we took the intermediate step of stopping the practice of paying rewards for credentials that have no established association with the ability to educate students? A simple case study, based on the teacher workforce in North Carolina, suggests that this policy change would return several dividends. Money currently spent on rewarding teachers for valueless credentials could be used to increase starting salaries, a policy goal espoused by nearly all interested parties, from education reformers to teachers unions. Shifting teachers' lifetime compensation toward the beginning of their careers would make the profession more attractive to highly qualified college students. Finally, the age-earnings profile for teachers would more closely resemble the profile for other professions. Doctors and lawyers reap the full rewards of competence in their profession within 10 years of entrance. Teachers must wait three times that long, even though evidence suggests that they become fully competent in their profession just as quickly.

Seniority Rules (Figure 1)

In North Carolina, as in most states, teacher salaries increase with years spent teaching, while improvements in teachers' effectiveness as measured by student test-score gains rise initially and then level off.



*In standard deviation units

SOURCES: Salary figures are from North Carolina's statewide schedule, 2007–08, North Carolina Department of Public Instruction http://www.ncpublicschools.org/docs/fbs/finance/salary/schedules/2007-08schedules.pdf; test-score analysis is from North Carolina statewide high school end-of-course tests, see C. T. Clotfelter, H. F. Ladd, and J. L. Vigdor, "Teacher Credentials and Student Achievement in High School: A Cross-Subject Analysis with Student Fixed Effects," National Bureau of Economic Research Working Paper #13617 (2007)

Pay for Effectiveness

Before we take the next step and introduce the "evidence-based" salary schedule, let's review the basic details of teacher compensation in North Carolina. School finance is relatively centralized in North Carolina, to the extent that there is a

statewide teacher salary schedule. Local districts are permitted to supplement the schedule, and almost all of them do. But the state's salary schedule largely determines the rewards paid to teachers across the state. Moreover, the statewide schedule is typical of teacher compensation in most other public school systems nationwide.

On the North Carolina salary schedule, teachers receive rewards for experience, for attaining advanced degrees, and for becoming certified by the NBPTS. A master's degree entitles a teacher to a permanent 10 percent increase in salary. Teachers with doctoral degrees earn a permanent 15 percent differential relative to those with bachelor's degrees. Teachers with NBPTS certification receive a permanent 12 percent boost in salary. Finally, teachers accrue increments to their salary as they gain experience. At the top rung of the experience ladder, teachers with 27 or more years in the classroom earn 68 percent more than starting teachers with equivalent credentials.

Contrast this information with what we know about the relationship between credentials and classroom effectiveness, as measured by student test-score gains. Numerous studies, including several based on North Carolina data, show no significant relationship between advanced degrees and effectiveness, with the possible exception of high school teachers who receive advanced training in their field of specialty. An evidence-based salary schedule, accordingly, would pay no automatic premium for these degrees.

To a large extent, the jury is still out on the importance of NBPTS certification. Studies have shown that teachers nominated for this certification have a legacy of superior classroom performance, but there is less evidence that the process of certification actually improves their performance. Nonetheless, whether NBPTS certification improves teacher quality or merely identifies high-quality teachers, there is some evidence to support a premium for it. How large a premium? We'll return to that question after discussing the returns to experience.

Teachers with more experience are automatically paid more in North Carolina, and in virtually every other public school system in the country. Research has shown that experienced teachers are more effective in the classroom. So the real-world salary schedule looks a lot like the "evidence-based" schedule, right? Not exactly. Consider the evidence in Figure 1. This chart shows two forms of returns to experience. The lighter bars track the returns paid out in the 2007–08 salary schedule, relative to the salary for starting teachers. The darker bars track the returns to experience in terms of teachers' ability to improve test scores, based on a recent analysis of North Carolina secondary schools. The returns to experience are measured by tracking the performance of each individual teacher according to time in the profession.

These two forms of returns to experience look very different. Relative to a teacher just beginning in the profession, teachers with one or two years of experience raise test scores by an extra 5 percent of a standard deviation. They are paid, on average, 2 percent more than starting teachers. If the standard were to pay teachers an extra 1 percent of salary when they raise test scores by 2.5 percent of a standard deviation, then highly experienced teachers who post a 25 percent test-score advantage over rookies should be paid a 10 percent premium. Instead, their premium approaches 70 percent. Visually, the darker bars rise quickly at first, moving from left to right, but largely level off once a teacher has six years of experience. The salary schedule marches right along, providing continuously increasing rewards to teachers as they progress from 6 to 27 years of experience, even though their classroom effectiveness has barely improved.

The existing salary schedule rewards teachers too little for the substantial improvements they post in the first few years on the job, and too much for the later years of their career, when they show only incremental advances. An evidence-based salary schedule would alter this arrangement, focusing the rewards on the early rungs of the experience ladder.

So now we have some basic principles on which to build a better model: Reward characteristics associated with greater effectiveness; do not reward those that have no evidence linking them to effectiveness.

An evidence-based salary schedule would directly reward teachers when they demonstrate evidence of greater effectiveness. Teachers would enroll in advanced degree programs if those programs were known to improve effectiveness.

Looking at Other Professions

Rewarding younger members of a profession for their rapid early gains in expertise is quite common outside of teaching. Consider the age-earnings profile of physicians. The opening figure shows earnings information taken from the American Community Survey of 2006. Young doctors in their late 20s and early 30s are paid relatively low salaries: 30-year-old physicians earn about one-third what their 45-year-old colleagues are being paid. But the ascent of the pay scale is rapid. Within 10 years, the 30-year-old physician can expect to reach the peak of the earnings distribution—a plateau, really, since doctors earn their high maximum salaries for a decade or more.

The picture is quite similar for lawyers. The average earnings of 25-year-old lawyers, fresh from law school, are a fraction of what 45-year-old attorneys are paid, possibly because many of the 25-year-olds are still trying to land a job. The ascent of the pay scale is once again rapid. By the age of 35, the typical young lawyer has attained a level of compensation that can be expected for the next quarter century, with a few years of extra-high earnings in the late 40s.

Contrast these market-driven age-earnings profiles with that of teachers, whose salaries are determined not so much by market forces but by collectively bargained agreements. Whereas the young lawyer can expect to reach peak earnings by age 35, and the young physician by age 40, the opening figure shows that the young teacher must wait until age 55 to attain that professional stature. What is more, the "plateau" in the young doctor or lawyer's future is more of a true peak for teachers. Beyond the age of 55, average teacher earnings fall off rapidly, as many take early retirement once their pensions have vested.

It is true, of course, that the educational profile of the typical young doctor or lawyer is different from that of the typical beginning teacher. Teachers can usually begin work with no more than a bachelor's degree, while doctors and lawyers must complete several more years of very costly specialized training. But the market is telling us something here: across professions, young practitioners spend a few years learning on the job; after this learning period, a 35-year-old practitioner is just as proficient as a 55-year-old. All our evidence suggests the same is true in teaching, yet the teaching profession has not established a pay schedule that reflects this basic fact.

Rational Teacher Pay

Looking at the opening figure, it is not difficult to understand why rates of exit from the teaching profession are high relative to rates in other fields. The 25-year-old teacher is not that much worse off financially than college friends who went into other professions. In addition, the teacher likely has less of a debt burden to bear. By the age of 35, however, the teacher's compensation has declined precipitously relative to that of peers. Most economists would tell you that the teacher should have anticipated such an eventuality. But not every college student plotting out the future behaves as rationally as an economic model would presume.

So now we have some basic principles on which to build a better model: Reward characteristics associated with greater effectiveness; do not reward those that have no evidence linking them to effectiveness. To launch the system, all we need to do is pin down the increment of compensation for a given increase in effectiveness. There are several ways to do this, but let's consider just one. Suppose that we reward a characteristic associated with an improvement in test scores of 1 percent of a standard deviation with a 1 percent increase in salary. This would make the height of the lighter bars in Figure 1 match the height of the darker bars. This rule also gives us a perspective to think about what the right increment would be for NBPTS certification. While new evidence could be helpful in determining the exact amount, it's fairly clear that North Carolina's 12 percent increase is larger than what evidence would support. For the purposes of this exercise, let's set the premium at 5 percent. Here's what would happen.

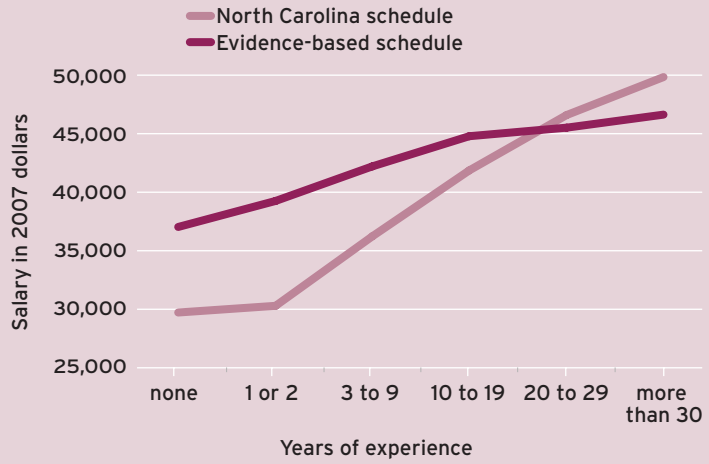
First, we would find ourselves with a fair amount of surplus cash. Although the rewards for the first few years of experience would increase, there would be dramatic decreases in the

rewards for more time in the classroom. Eliminating the automatic salary increments for advanced degrees and reducing the premium for NBPTS certification would save still more.

What should be done with this extra money? One straightforward response, consistent with the goals of a wide range of advocates, would be to plow it straight back into teacher salaries, raising the base salary underlying these rewards. Increasing starting salaries in teaching has been advocated by, among others, the National Education Association, the New Commission on the Skills of the American Workforce, New York City schools chancellor Joel Klein, and the authors of a heavily publicized 2007 report by McKinsey & Company on the characteristics of the world's most effective school systems. Using data from the actual characteristics of North Carolina public school teachers, we can simulate just how much of a boost could be applied to starting salaries using the savings associated with the evidence-based salary schedule. As shown in Figure 3, this schedule features a starting salary of $37,000, about 25 percent higher than the current low rung on the salary schedule, which is less than $30,000. As expected, the returns to experience would be concentrated in the first years on the job. After just three years in the classroom, teachers would earn salaries above $40,000. Under the current salary schedule, it takes teachers with bachelor's degrees 13 years to reach that level.

Raising Teacher Pay (Figure 2)

Paying teachers on an evidence-based salary schedule would boost starting salaries and enable teachers to reach their peak earnings at a younger age than they do in the current system.



Note: North Carolina salary schedule is for a teacher with a bachelor's degree and no national board certification.

SOURCES: North Carolina salary data are from North Carolina Department of Public Instruction, http://www.ncpublicschools.org/docs/fbs/finance/salary/schedules/2007-08schedules.pdf; evidence-based salary schedule is from author's calculations, based on tabulations of teacher degree and experience level, see C. T. Clotfelter, H. F. Ladd, and J. L. Vigdor, "Teacher Credentials and Student Achievement in High School: A Cross-Subject Analysis with Student Fixed Effects," National Bureau of Economic Research Working Paper #13617 (2007)

Common-sense reforms to teacher pension systems, such as those discussed in *Education Next* by Robert Costrell and Michael Podgursky (see "Peaks, Cliffs, and Valleys," *features*, Winter 2008), would have a similar effect of making the returns to teaching more front-loaded. Under current pension systems, a teacher switching to a different career after five years leaves with virtually nothing in retirement savings. If school systems used modern 401(k)-style defined-contribution plans, early departing teachers could take their retirement savings with them, as many private-sector employees currently do. Old-fashioned pension plans discourage young college graduates not yet committed to a profession from giving teaching a chance.

The proposed salary schedule shown in Figure 2 is constructed to be expenditure-neutral. If we simply switched from one schedule to the other, the budgeted amount for teacher salaries would not change. A conversion to the evidence-based salary schedule could thus be seen as a means of boosting starting teacher salaries without increasing expenditures on education. Granted, the boost to starting salaries is not as great as some advocates would like—the New Commission on the Skills of the American Workforce has called for starting salaries of $45,000—but remember that this new schedule is based on the arbitrary decision to reward credentials that improve test scores by 1 percent of a standard deviation with a 1 percent boost in salary. A further flattening of the salary schedule would permit a further increase in starting salaries, with no net growth in public expenditure.

Transition Costs

The evidence-based salary schedule is not a win-win proposition; a switch from current schedules would create clear winners and losers. Beginning teachers fare better under the new system. On the current salary schedule, a starting teacher who expects to hold nothing more than a bachelor's degree throughout her career will receive earnings over 30 years worth $620,000 in present value terms, discounting at a 5 percent rate. On the evidence-based salary schedule, this present value increases 11 percent, to $686,000. Even a teacher entering the profession with a master's degree is better off under the evidence-based salary schedule, even though it pays no reward for the advanced degree. This is because the benefit of front-loading the returns to experience outweighs the lost 10 percent salary increment over the long term.

Older teachers would be harmed in a direct switch from the current system to an evidence-based salary schedule. It

Academic institutions that grant advanced degrees to teachers would also suffer under this plan. Without the promise to teachers of a guaranteed salary increment, enrollment in master's-level programs would undoubtedly decrease. Such a shock to the system of advanced teacher education could, however, lead to improvements in program quality.

is too late for these teachers to reap early returns to competence, and depriving them of the present system's rich rewards for advanced degrees and experience beyond the first few years would cut directly into their expected future earnings. Teachers with bachelor's degrees and more than 20 years in the classroom would experience an immediate pay cut. Bachelor's degree–holding teachers with at least 17 years on the job would see a decline in the present value of future earnings, if we assume a 30-year teaching career.

Academic institutions that grant advanced degrees to teachers would also suffer under this plan. Without the promise to teachers of a guaranteed salary increment, enrollment in master's-level programs would undoubtedly decrease. Such a shock to the system of advanced teacher education could, however, lead to improvements in program quality. If postgraduate education makes teachers more effective, they should be rewarded for it. An evidence-based salary schedule would directly reward teachers when they demonstrate evidence of greater effectiveness. Teachers would thus enroll in advanced degree programs of their own accord if those programs were known to improve effectiveness. Alternatively, individual teacher education programs could be accredited on the basis of their demonstrated ability to improve teacher effectiveness. Graduates of accredited programs could then receive guaranteed increments. An ideal evidence-based salary schedule would be flexible in light of new evidence.

Political Reality Check

Given the losses to experienced teachers, and the likely opposition of those in the business of educating teachers, is the evidence-based salary schedule a pie-in-the-sky ideal with no chance of becoming reality? Not necessarily. Entry-level teachers will find it in their best interest to choose the new system, if given a choice. The relative benefits become even more obvious if they intend to stay in the profession only a few years.

Phasing in the system, applying the evidence-based schedule to new teachers while retaining the traditional schedule for those who wish to remain on it, would shift the burden from highly experienced teachers. Of course, this burden would not disappear. It would shift to taxpayers, who would have to finance higher levels of teacher salaries until the completion of the phase-in period, perhaps 20 years or longer. The costs of paying new teachers on the evidence-based schedule while keeping existing teachers on the traditional schedule would peak after 10 years, at which point savings associated with the flattened rewards for experience would begin to outweigh the costs of higher salaries to younger teachers. In North Carolina, the long-run transition costs would amount to about $1.6 billion, half of which would be incurred in the first dozen years after the transition. That's equivalent to a one-time charge of $180 per state resident, or roughly $12 per resident per year if financed over a 30-year period. Relative to the more than $1,000 per capita the state government spends on education each year, this is a modest sum.

There are many other solutions to the three-way negotiation problem among new teachers, experienced teachers, and taxpayers. For example, experienced teachers could be guaranteed their current salaries, plus cost-of-living adjustments, rather than the original raises on the traditional schedule or the salary declines imposed by an evidence-based schedule. The 25 percent increment to starting salaries could also be reduced, or phased in gradually.

Should a family of four be willing to pay an extra $50 per year to finance a move to an evidence-based salary system? Since taxpayers would in the end reap benefits from the move by introducing a system that attracted more qualified teachers with no additional cost after the transition period, most observers would say yes. Taxpayers nationwide pay billions of dollars each year in salary premiums to reward teachers for credentials of highly questionable value. Fifty dollars a year is a small price to pay to reallocate this money in a manner that encourages highly qualified teachers to enter the profession and stay there.

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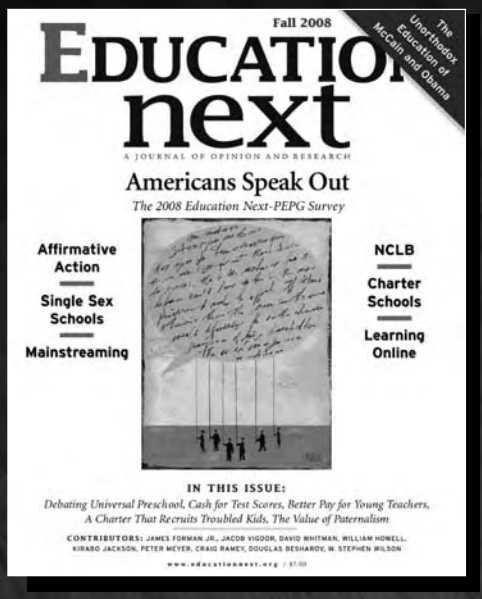

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