

# Introducing the Issue

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*Susanna Loeb, Cecilia Rouse, and Anthony Shorris*

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A high-quality education is critical to the future well-being of a child—and thus also to the nation as a whole. By one estimate, a high school dropout in the United States will earn nearly a quarter of a million dollars less over his lifetime than a high school graduate who completes no further education. He will also contribute \$60,000 less in tax revenues. Aggregated over a cohort of eighteen-year-olds who never complete high school, these losses add up to \$200 billion.<sup>1</sup> Moreover, gaps in the educational achievement of children by race and social class are large and persistent. For example, among eighth graders in 1988, 95 percent from the most advantaged families had received a high school diploma within six years, compared with only 66 percent from the least advantaged families.<sup>2</sup> According to the National Assessment of Educational Progress, 9 percent of black and 13 percent of Hispanic eighth graders perform at or above the proficient level in mathematics, compared with 39 percent of whites.

Concern about the overall quality of U.S. education, and in particular about the troublesome gaps in achievement, has led many poli-

cymakers and parents to demand reform of the educational system. But for reform—whether increased education revenues, smaller class sizes, or greater accountability—to make a difference, it must penetrate the classroom and affect the quality of teaching. Indeed teachers are so important that, according to one estimate, a child in poverty who has a good teacher for five years in a row would have learning gains large enough, on average, to close completely the achievement gap with higher-income students.<sup>3</sup> Improving the quality of teachers is thus crucial to efforts to raise student achievement and narrow achievement gaps. But schools with high concentrations of black students, Hispanic students, and students in poverty have serious problems in recruiting and retaining effective teachers. According to one study, three times as many black students as white students in New York State had teachers who failed their general knowledge certification exam on their first attempt (21 versus 7 percent).<sup>4</sup>

But although almost everyone recognizes the importance of effective teachers, it is much less clear how to improve the teaching workforce. One difficulty is the sheer size of that workforce. Teachers make up about 10 per-

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cent of all college-educated workers. With more than 40 percent of schools' operating expenditures going to instructional salaries, even small changes in compensation or in the number of students per teacher can have huge revenue implications. Total spending on teacher salaries in U.S. public schools is more

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than \$160 billion a year.<sup>5</sup> Thus, a 5 percent salary increase—\$2,338 for an average teacher—would cost taxpayers more than \$8 billion a year.<sup>6</sup>

A second difficulty for schools and districts is how to identify effective teachers. On one level, most people know a good teacher when they see one. As Lee Shulman, president of The Carnegie Foundation for the Advancement of Teaching, notes (see box 1), good teachers engage the class and motivate student participation. They inspire students to challenge themselves and help them develop values, commitments, and identities. But how districts are to pick out such people before they enter a classroom, or educational institutions are to guide them to reach this ideal, is much less clear. Equally problematic is precisely which qualities of the ideal teacher should form the basis of policy reform.

Nevertheless, researchers have established that carefully designed public policies can strengthen teacher quality. The articles in this volume explore key tools available to policymakers to do just that—from changes in the way teachers are certified, to investments in professional development, to wage policies, to financial and other incentives, to policies that affect unions and collective bargaining. The volume also examines the special challenges facing rural and urban districts and synthesizes relevant experiences from other developed and developing nations.

### What Have We Learned?

Before reviewing the main findings of the articles in this volume, we must stress how hard it is to know whether a particular policy makes a difference. Although most observers would agree that good teachers do more than simply raise the test scores of their students, measuring other outcomes is problematic. In addition, when student learning improves, it is difficult to be certain whether the gain is in fact attributable to a particular policy intervention, such as a new professional development program. Perhaps the gain would have happened even in the absence of the intervention.

The challenge is to determine what social scientists call the counterfactual—what learning gains students would have made had their teacher not, for example, received professional development. To construct the counterfactual, researchers might look at similar students, similar classrooms, and similar teachers who have not participated in the reform, or they might look at the same student during two different periods. By making such comparisons, researchers hope to tease out the causal effect of the policy on students. But because researchers can rarely be completely confident of the accuracy of the coun-

terfactual—are the students, classrooms, and teachers they are comparing similar in all respects or just in the few characteristics observed?—the research base on many policies is surprisingly thin, a fact that is reflected in the articles in this volume.

## A Framework

The first step in recognizing potential weaknesses in the nation's system of public education, and in seeing how to address those weaknesses, is to understand the institutional framework within which teachers and their employers work. In the leadoff article in this volume, Richard Murnane and Jennifer Steele provide just such a framework. They describe how wages and working conditions both in teaching and in competing occupations influence the number and skills of people drawn to teaching. Growing job opportunities for women during the 1970s and 1980s, for example, dramatically affected the supply of teachers, pulling away many women with the strongest academic backgrounds. Because wages and working conditions vary from school to school, the supply of teachers varies as well. Similarly, because alternative job opportunities are greater for some teachers than for others, the supply of teachers also varies by teacher characteristics. For example, greater opportunities for people with strong science backgrounds decrease the supply of science teachers relative to teachers in fields such as history and English.

The demand for teachers—the number of teachers that schools and school districts need to hire—also varies over time and across locations, driven by factors such as the number of students, the desire for particular class sizes, and retirement trends among teachers. Declining student-teacher ratios over the second half of the twentieth century, for example—from roughly 27:1 in 1955 to

16:1 by 2001—increased the demand for teachers by 41 percent.

When considering a job, a prospective teacher looks at both wages and working conditions. Salary schedules almost always reflect years of teaching experience and educational attainment, though there is some leeway to provide added pay for added responsibilities (such as coaching) or, in rare instances, for performance as a teacher. Within districts, salary schedules are usually the same for all schools and for all teachers, regardless of field. This salary structure creates difficulties for schools with less desirable working conditions and for fields in which opportunities outside teaching are better or the work in the classroom is more difficult. The wide disparity among schools in the characteristics of their teachers is one manifestation of this structure. To address these problems, policymakers have proposed a variety of reforms, including across-the-board pay increases for teachers, more flexible pay structures, and reduced requirements for certification. Murnane and Steele address these approaches briefly and lay the framework for the remaining papers, which address these and other policies in more detail.

## The Benefits—and Costs—of Certification

Every state has its own procedures for certifying teachers, and every public school is expected to hire teachers certified by the state. All states require a bachelor's degree, and all but two require applicants to pass at least one certification exam that covers general knowledge and subject-area knowledge, as well as pedagogy. Some states require high school teachers to have a major in the subject area that they teach, and most require teachers to complete coursework in education. Further, most teacher candidates must spend time as a

## **Box 1. Good Teaching**

**By Lee S. Shulman**

“What does good teaching look like?” It’s a question I get often, more frequently from my colleagues in the academy than from my neighbors down the street. My colleagues are almost always referring to teachers in general, much less often to the teachers in their children’s schools. They are almost never talking about themselves.

For an economist doing research, good teaching can be simplified into an estimate of the regressed gain scores of pupils who have studied with a teacher during some specified time period. That estimate of impact is often further corrected by estimating the cost of the teaching during that period. But I have yet to read of an economist who defined good teaching that way for her own kids or for a university professor of economics.

Nevertheless, the attributes of good teaching can indeed be specified, and I’d wager they are not all that different for a third-grade math teacher, a high school history teacher, and a college economics teacher. A good teacher operates on at least four dimensions concurrently—intellectual, practical, emotional, and moral. For research purposes we typically simplify teaching and concentrate on only a particular feature of a single dimension, but we delude ourselves if we fail to realize how profoundly our simplifications have distorted the phenomenon we are studying. Thus the Nobel laureate Carl Weiman has studied college physics teaching and documented how students can make positive (albeit modest) gains in understanding the elements of physics while taking on a negative attitude toward science and misconstruing utterly the nature of scientific inquiry. A researcher studying gains in knowledge of physics concepts and facts—which is the norm—would deem the course a great success.

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student teacher before becoming fully eligible to teach in a public school system.<sup>7</sup>

Donald Boyd, Daniel Goldhaber, Hamilton Lankford, and James Wyckoff raise a salient policy issue regarding these certification processes. In theory, certification can improve the quality of teachers in the classroom by establishing a floor on quality. To the extent that certification can distinguish bad teachers from better teachers, it can keep the worst teachers from entering the classroom. However, certification can fail to meet its goal in two ways. First, it can fail to distinguish good teachers from bad. Second, it may drive away potentially good teachers. If the certification process itself is so onerous that it keeps good teachers from pursuing a teach-

ing career, then it may in fact lower the overall quality of teachers, even if it does screen out the worst teachers. Assessing the value of certification systems therefore requires evaluating both their ability to screen out the worst candidates and the extent to which they discourage potentially good candidates.

There is surprisingly little research that sheds light on how any element of certification affects classroom teaching. This does not mean that certification has no effect, just that there is no convincing evidence one way or the other. What little research there is suggests that teachers who score higher on exams tend to add more to the achievement gains of their students than do their lower-scoring peers, though these effects are not large. The au-

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So what does good teaching look like? In the classroom of a good teacher, students are visible, engaged, attentive, and participating. They aren't looking off into space, surfing the net, or dozing. They are engaged in public performances of their understanding and misunderstanding. In good teaching, students are not silent partners. As the educator Deborah Meier observed, "teaching is mostly listening, learning is mostly telling." In good teaching, students are responsible for their learning; they are accountable for their understanding. Accountability is not determined by midterms and finals alone, but by the continuity of their participation, engagement, and interaction with the teacher and one another. Good teaching is passionate, and it induces an emotional response in students. Students may even feel a tad anxious because something they care about is at stake. That doesn't mean that good teaching is intimidating; mental paralysis can be induced by teachers who are gratuitous pedagogical terrorists. Good teaching starts with inducing habits of mind, but doesn't stop there. Good teaching engages practical thinking and problem-solving skills that can be applied in a variety of settings. And good teaching affects students' values, commitments, and identities. A good teacher of writing does not stop at teaching students to write a five-paragraph essay. He teaches students to think of themselves as readers and writers, who are competent, comfortable, and committed to their literacies.

Yes, good teaching is not a simple independent variable. It is rich, nuanced, complicated, internally and longitudinally inconsistent and produces different impacts on different students and in different contexts. Like all good scientists, we simplify any phenomenon in order to study and understand it. Teaching is no different. The danger arises when we forget how much of value we chose to ignore in order to explain a phenomenon like teaching and we treat our scientific conclusions as if we never compromised at all.

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thors were not able to identify any high-quality studies of how coursework or field experiences influence teacher effectiveness. The best evidence for the effect of field experience, and particularly student teaching, comes from the tendency of teachers to improve over their first few years. Students of first-year teachers, on average, learn less than students of more experienced teachers—a finding that suggests that classroom experience helps make teachers more effective.

Many states have introduced new routes to teaching that lessen coursework requirements. These new routes vary in their characteristics and content. Several studies of the most highly selective of these alternative routes, Teach for America, find that TFA

teachers appear to perform at least as well in math as do the other teachers in their school, though (depending on the analysis) not quite as well in reading. But TFA is not representative of all alternative routes because it is highly selective, national, and aimed only toward recent college graduates. Given the enormous investment in teacher preparation and certification and the potentially negative consequences of certification for teacher supply, the lack of evidence is disturbing.

### **Professional Development: Unrealized Promise**

Although some policies focus on improving new teachers, the fact that 82 percent of teachers have at least four years of teaching experience highlights the importance of poli-

cies aimed at veteran teachers as well.<sup>8</sup> On-the-job training—professional development—is important for several reasons. First, the alternative routes into teaching, with their reduced coursework and field experience requirements, mean that new teachers often arrive with less preparation than before. Second, it is not easy for schools and districts to know how effective teachers will be before they begin teaching. Third, many schools find

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it almost impossible to fire poorly performing teachers because of tenure and due process rights at the state level, together with teacher contract provisions at the district level. In all these cases, professional development can, in theory, help teachers develop the knowledge and skills that they lack. Finally, as states and districts aim to implement new standards and new curriculums, teachers may need help incorporating the new material into their practices.

Heather Hill describes some common professional development activities and reviews the research on their effectiveness. The average professional development program is of little benefit; however, a few programs have demonstrably improved teaching and student learning. Hill identifies three important characteristics of these high-quality programs.

First, they involve a substantial time commitment, such as a two- to four-week summer program. One-day programs, in most cases, are not worthwhile. Second, the program content is targeted—for example, on specific content knowledge, subject-matter-specific instruction, or student learning. Broad programs do not appear to be effective. Third, professional development is linked to the instructional goals and curriculum materials of the district or school. Teachers can make better use of the material provided by their schools and districts if their professional development is tied closely to it—a practice that is surprisingly uncommon today.

### **Wages, Working Conditions, and Teacher Labor Markets**

Teaching is influenced not only by programs and policies that affect the current workforce, but also by those that influence who goes into teaching, who stays in teaching, and in which schools teachers choose to work. Both wages and working conditions affect the appeal of a teaching job. In their article in this volume, Eric Hanushek and Steven Rivkin address salaries and working conditions broadly. They find that the wages of teachers relative to those of other college graduates have fallen over time. In addition, salaries vary substantially from one region to another, with the highest wages found in the Northeast and the lowest in rural areas. There is little difference, on average, however, between wages in urban and suburban districts. In some metropolitan areas urban districts pay more, whereas in others, suburban districts pay more. But working conditions do differ substantially between urban and suburban districts, with urban teachers reporting less support from administrators and parents, poorer materials, and greater student problems. These difficult working conditions appear to drive much of the

turnover of teachers and the transfer of teachers across schools.

Although the authors note that both wages and working conditions affect teachers' choices and result in a sorting of teachers across schools, they find less evidence on whether this sorting of teachers is actually detrimental to students. For example, teachers with higher test scores may be more likely to leave the lowest-performing schools, but these teachers might not be the most effective teachers. Although research in this area is sparse, existing studies indicate that the teachers who leave are not better at producing student learning gains than those who stay.

Teacher preferences, as affected by salaries and working conditions, are central to understanding the distribution of teachers across schools. But they are not the only factors. The preferences of hiring authorities, the effectiveness of district personnel decisions, and the institutional constraints within which they operate are also important, driving both who gets hired out of the pool of available teachers and the setting of wages and working conditions that then determine the pool of interested teachers. Teachers unions operate in all fifty states, and all fifty states have tenure laws. Thirty-five states and the District of Columbia have laws guaranteeing collective bargaining rights for teachers. These state policies and resulting teacher contracts often limit the ability of districts to hire, transfer, and fire teachers as they would like. They also set the current salary schedules, which, as Hanushek and Rivkin note, often do not reward teachers for student learning.

### **The Challenge of Building Incentives into Pay Structures**

Teachers may have many incentives to work hard. The satisfaction of seeing their students

learn, appreciation from students' parents, and recognition from their colleagues and principal may all motivate teachers. But only a few school districts, both in the United States and abroad, base teacher salaries on performance in the classroom. One such district is Denver, where in November of 2005 voters approved a \$25 million tax increase to fund "merit pay" rewarding elementary and secondary school teachers for a variety of accomplishments, including their own demonstrated knowledge and skills and their students' academic growth. Victor Lavy synthesizes the research on pay for performance.

He notes that performance-based pay can take innumerable forms. It can reward individual teachers, groups of teachers, or schools; it can be based on student test performance or principal or peer evaluation; it can be large or small; it can include sticks as well as carrots. Each of these elements can substantially shape the incentives created for teacher performance. Clearly the benefit of performance-based pay is that it increases teachers' incentives to improve their students' learning. But as Lavy points out, it may also create perverse incentives—discouraging teachers from helping their peers or encouraging them to cheat or to restructure their class time in ways that improve students' test performance but not their long-term learning. The empirical research on the programs implemented to date has not found consistently positive effects from these reforms.

Lavy examines several practical challenges in implementing performance-based pay and concludes that the most daunting is to devise a way to measure performance. Such a measure must reflect the student outcomes of interest, minimize error, and discourage cheating and other unintended consequences. Implementing a system of performance-

based pay that works is not a one-time task. Even with the best preparation, initial implementation is likely to be problematic. But if commitment to reform is ongoing, it may be possible to make progress gradually in addressing each of the challenges. As evidence, Lavy cites two carefully designed incentive programs in Israel that generated significant student gains.

### **How Unions Affect Teacher Labor Markets and Teaching**

Some challenges in implementing any new policy, such as performance-based pay, are technical; others are political. Unions have played and continue to play a considerable role in schools, affecting not only teacher labor markets but also standards, curriculum, and other aspects of schooling. They have not always supported reforms favored by school administrators. In his article, Randall Eberts synthesizes the research on teacher unions and collective bargaining, focusing on how both affect compensation, student outcomes, and education policy.

Teachers unions, like unions in other occupations, increase worker pay and benefits. Teachers who are union members and teachers in highly unionized states receive higher salaries. Moreover, the higher the share of unionized teachers, the larger the gap in wages between new and experienced teachers. On average, collective bargaining increases education spending by roughly 15 percent. How unions affect student outcomes is much less clear. Although some studies find that unions improve student learning, others suggest that union efforts to increase salaries force a trade-off with other productive inputs and thus decrease achievement and increase dropout rates. An alternative explanation, says Eberts, is that unions force a standardization inside classrooms and schools

that increases the achievement of students who perform close to the average but decreases outcomes for lower- and higher-achieving students.

Unions are central to contemporary education policy. If districts and states are to enact successful reform, they must work collaboratively with them. Eberts notes that the traditional stance of unions against policies that enhance local discretion may be susceptible to change in light of other policy reforms, such as accountability, that shift the focus from schools' resources (class sizes and teacher salaries, for example) to student outcomes and expect local actors to respond to their inherent incentives.

### **The Unique Challenges of Urban and Rural Settings**

Urban and rural schools each face particular challenges in attracting, retaining, and making the most of their teacher workforce. Brian Jacob identifies the challenges and potential policy solutions for urban schools; David Monk, those for rural schools.

Most of the lowest-performing schools and students in the United States are in urban districts, where poverty is highly concentrated and large shares of students have limited English proficiency and perform poorly on achievement tests. These districts often face unusually high costs. Higher wages in other occupations make it more costly for schools and districts to hire workers; space is often expensive; and high crime rates increase facilities requirements and tend to make upkeep more expensive. Urban districts are often far larger than other districts. Although increased size may offer some advantages in terms of reduced rates from suppliers, it also presents problems. As Jacob points out, to manage their many schools,

large urban districts often institute unwieldy bureaucratic systems that slow the pace of operations. They also tend to face powerful teachers unions that hamper their actions even further. Urban districts thus face challenges both in attracting teachers to their schools and in optimizing their hiring, transfer, and retention policies so that they are able to bring the best available teachers into their classrooms and retain them.

In examining the recruitment and retention of teachers in rural areas, David Monk begins by noting the unique characteristics of rural communities—small size, sparse settlement, distance from population concentrations, and an economic reliance on agricultural industries that are increasingly using seasonal and immigrant workers to minimize labor costs. Many, though not all, rural areas, are seriously impoverished. Classes in rural schools tend to be small, and teachers often report good working conditions and relatively few discipline problems. But compensation tends to be low, perhaps because of a lower fiscal capacity in rural areas. Moreover, rural areas often have a smaller pool of college-educated workers from which to recruit teachers. Teacher turnover is often high, and the share of highly trained teachers is low. Relatively large shares of students with special needs and of highly mobile children of low-income migrant farm workers can also complicate recruiting and retaining teachers. Thus, while much of the policy focus has been on urban schools, the small size, remote location, and often poor and mobile student populations of rural schools create other obstacles to improving the teacher workforce.

### Lessons from Other Countries

Helen Ladd puts U.S. educational policies and practices into international perspective by focusing on educational policies and practices

in industrialized countries. She documents that students in countries with high teacher salaries do not, in general, perform better on international tests than do students in countries with lower teacher salaries, but notes that many factors, such as cost, could obscure an underlying relationship between teacher

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wages and student outcomes. She also points out that in countries with low teacher salaries, teachers tend to have weaker qualifications. In high-salary countries like Germany, Japan, and Korea, for example, only 4 percent of teachers are underqualified, as against more than 10 percent in the United States, where teacher salaries are relatively low.

Throughout the developed world, policies that make salaries uniform across academic subject areas and across geographic regions hamper schools' efforts to recruit qualified teachers in math and science and in large cities. Among the strategies used to combat resulting teacher shortages are paying teachers different salaries according to their subject area and offering financial incentives, including bonuses and loans, for teachers in

specific subjects or geographic areas. Other developed countries are also creating alternative routes into teaching to attract qualified teachers. To retain effective teachers and reduce attrition, they are providing more support staff for teachers, recognizing and celebrating effective teachers, improving school leadership, and reducing teacher burnout through part-time work, sabbaticals, and extended leaves. The lesson, says Ladd, is that effective policy must simultaneously address a variety of issues, such as teacher preparation and certification, working conditions, the challenges facing new teachers, and the distribution of teachers across geographic areas.

Finally, Emiliana Vegas reports on how the world's developing countries fill their classrooms with qualified teachers. Although schools in the world's poorest countries may seem unusual models to inform U.S. educational policy, in fact, those schools often resemble difficult-to-staff urban U.S. schools. Severe budget constraints and a lack of teacher training capacity have pushed developing nations to try a wide variety of reforms, including part-time or assistant teachers, pay incentives, and school-based management. Hiring teachers with less than full credentials has had mixed results at best. A more promising approach has been to increase pay to improve teacher quality, although the specific policy of providing incentive pay has had mixed results. Finally, school-based management reforms that devolve decisionmaking authority to the schools have improved both teacher performance and student learning. In Central America, for example, such reforms have lowered rates of teacher absenteeism, increased teacher work hours, increased homework assignments, and improved parent-teacher relationships. These changes are especially promising in schools where educational quality is low.

## Implications

Although almost everyone agrees that school reforms are unlikely to improve student performance if they do not directly affect what happens in the classroom, to date there is strikingly little evidence to indicate exactly which policies are most likely to enhance teaching, and thus student learning. But research does point toward some approaches as more effective than others, and recent changes in local and federal policy will make it possible to learn more about teacher policy more quickly than has yet been possible.

First, research has made clear the shortcomings in teacher pay structures. Although some districts offer higher compensation for particular fields of specialization, especially special education, math, and science, that practice is not the norm. In most districts, all teachers in all schools are generally subject to the same salary schedule, leaving some fields and regions with teacher shortages, others with surpluses. A good short-term solution to these staffing problems may be to target large pay incentives for highly effective teachers in hard-to-staff subject areas or less desirable schools. But in the long run, it may be more productive—though expensive—to address working conditions directly by reducing class sizes, increasing release time for planning, providing instructional supports such as coaches, and ameliorating adverse conditions such as crime and dilapidated buildings.<sup>9</sup> Incorporating elements of pay for performance into salary structures is another reform with much theoretical appeal. Although experience with such policies has generated mixed results on student outcomes, much could be learned from carefully designed and implemented pilot programs.

Teacher preparation and certification is a second policy area that warrants further consid-

eration and potential reform. The paucity of evidence on the effects of different elements of states' certification requirements is no reason to eliminate those requirements. Not knowing what effect they have is not the same as knowing that they have no, or even a negative, effect. In the absence of solid evidence, policy must be based on common sense and professional consensus. One thing that researchers have definitively established is that entry requirements strongly affect the pool of people interested in teaching. Policies that have loosened entry requirements have not only dramatically increased the number of people interested in teaching but also raised their average academic performance. It is thus crucial to evaluate entry requirements closely, especially in communities that have had trouble attracting qualified teachers.

Reform in ongoing teacher education is a third area worth pursuing. Although professional development can, in theory, benefit schools and districts, so far the nation has little to show for its substantial investment in this area. As Heather Hill points out, hours spent in general and unspecified professional development do not improve instruction. Instead, the work must be linked to the curriculum, have substantive content, and be sustained over time. Coaching and release time for directed collaboration among teachers are both promising forms of professional development.

Research has also uncovered some structural impediments to improving the teacher workforce. In particular, given how hard it is to identify good teachers, the constraints that keep schools from removing poorly performing teachers likely hurt students. Easing these restrictions may have large payoffs when an ample supply of potential replacements is available, especially if schools and districts can also offer teachers incentives to improve

student learning. In addition, cumbersome bureaucracies keep many large urban districts from adjusting to changing needs or even making predictable hires in a timely manner. As an example, streamlining the process so that these districts could hire teachers earlier in the year could help increase supply.

Finally, the papers in this volume demonstrate that strengthening the teacher workforce is not a one-time policy initiative. The effort must be ongoing—for schools, districts, states, and even the federal government. The introduction of assessment-based accountability systems over the past two decades has yielded a rich harvest of data that can help practitioners and policymakers assess the effectiveness of policy initiatives, especially those that are implemented with an eye toward careful evaluation. Education policy in individual districts, and in the nation as a whole, would be well served if reform initiatives were designed from the outset with credible evaluation elements, especially when it comes to collecting data about how the reform affects students facing various challenges. Without careful evaluation, the nation will continue to commit enormous public resources to one of society's most important investments without any real analytic support.

Researchers have begun to learn more about potentially effective interventions in teacher labor markets, many of which are described in the articles that follow. But much work remains. That research has not yet unlocked the "secret" of something as complicated as effective classroom teaching should be neither surprising nor discouraging. Our aim, in this volume, is to contribute to the continuing search for practical policy steps to improve teaching—the single most important element in student achievement—especially for children facing the greatest barriers.

## Notes

1. Cecilia Elena Rouse, "Inadequate Education: Consequences for the Labor Market," mimeo (Princeton University, September 2005).
2. Lisa Barrow and Cecilia Elena Rouse, "U.S. Elementary and Secondary Schools: Equalizing Opportunity or Replicating the Status Quo?" *The Future of Children* 16 (2006): 99–117.
3. Eric A. Hanushek, Steven G. Rivkin, and John J. Kain, "Teachers, Schools and Academic Achievement," *Econometrica* 73, no. 2 (2005): 417–58. Here, a "good teacher" is defined as one with an average value added that is one standard deviation greater than the average. This does not include knowledge depreciation.
4. Hamilton Lankford, Susanna Loeb, and James Wyckoff, "Teacher Sorting and the Plight of Urban Schools: A Descriptive Analysis," *Education Evaluation and Policy Analysis* 24, no. 1 (2002): 37–62.
5. This estimate comes from multiplying the average teacher salary from 2003–04 (\$46,752 at [www.nea.org/edstats/images/05rankings.pdf](http://www.nea.org/edstats/images/05rankings.pdf)) by the number of teachers given above.
6. Thomas D. Snyder, Alexandra G. Tan, and Charlene M. Hoffman, *Digest of Education Statistics 2005* (U.S. Department of Education, National Center for Education Statistics, July 2006), table 28, downloaded from [http://nces.ed.gov/programs/digest/d05/tables/dt05\\_028.asp?referer=list](http://nces.ed.gov/programs/digest/d05/tables/dt05_028.asp?referer=list) (October 26, 2006).
7. Susanna Loeb and Luke Miller, "State Teacher Policies: What Are They, What Are Their Effects, and What Are Their Implications for School Finance," Getting Down to Facts Report, unpublished (Stanford University, December 2006).
8. G. A. Strizek and others, *Characteristics of Schools, Districts, Teachers, Principals, and School Libraries in the United States: 2003–04 Schools and Staffing Survey* (U.S. Department of Education, National Center for Education Statistics, 2006), <http://nces.ed.gov/pubs2006/2006313.pdf>.
9. Bringing in effective administrators is likely to be even more helpful, but unfortunately this is a substantially more difficult undertaking, since administrator labor markets are no less complicated than teacher labor markets.