

## **Improving Science Achievement: The Role of Teacher Workforce Policies**

Don Boyd, University at Albany  
Hamp Lankford, University at Albany  
Susanna Loeb, Stanford University  
Jim Wyckoff, University at Albany

May 2005

### **Abstract**

Those concerned with educational policy face a stark reality: the students failing to achieve even minimal levels of educational achievement typically are taught by individuals whose qualifications are relatively weakest and often inadequate. These same students are most dependent upon their teachers and schools for academic learning, as nearly all of them come from disadvantaged home and community environments. This reality raises a set of questions: What is the extent to which teacher quality differs across student groups? What are the underlying causes and consequences for student learning? How can public policies best address the challenge of assuring that all students are taught by the high quality teachers needed for their educational success? We address these questions in this chapter.

Teaching in traditionally hard-to-staff and low-performing schools needs to be made far more attractive. Urban districts must institute policies that make it possible to attract and retain sufficient numbers of high quality teachers for their needs in general, including sufficient numbers of highly effective teachers willing to teach in the schools traditionally hardest to staff. Even though current research does not allow us to say with a high degree of confidence how dollars can *best* be spent to achieve this outcome, there are a number of strategies which we believe offer substantial promise in addressing the underlying causes of the problem, including salary increases targeted to hard-to-staff schools, hard-to-staff-subjects, increasing the nonpecuniary rewards of teaching, and a “grow your own” strategy of teacher recruitment.

### **Introduction**

Teacher workforce policies have become central to debates over how to improve student outcomes. The push for higher academic standards and expanded student testing translates into higher expectations both for teachers and the students they teach. This increased emphasis on student outcomes has intensified concerns regarding the overall quality of the teacher workforce and underscored the imperative that all students are taught by high-quality teachers. In addition the accelerating retirement of the “baby boom” cohort of teachers means many districts will need to hire many more new

teachers, a pattern which will continue for the remainder of this decade. Policies to reduce class sizes also have increased the demand for teachers. In some areas of the nation, particularly in the southwest and some of the mountain states, rapid enrollment increases will boost demand further.

The policy issues and questions relating to the teacher workforce being discussed across the nation are quite varied, perhaps reflecting differences in perspectives regarding what goals should be pursued but likely also reflecting the lack of knowledge about what policies are most effective in increasing student achievement. Some of these questions are quite controversial. Should the salary schedules used in most districts be replaced with compensation that links pay to either student performance or teachers' skills and knowledge? Can National Board Certification of teachers or national accreditation (e.g., NCATE) for schools of education help bring about changes that would improve the teacher workforce and student outcomes? Should requirements for teacher certification be tightened or eliminated? In large part, these examples and a variety of other, often less controversial, policies focus on issues relating to all teachers and the teacher workforce as a whole. But policies that affect all teachers will need to be coupled with policies that affect some teachers differently than others, to help ensure that highly qualified teachers teach in low-performing schools. In this brief we examine the sorting of teachers working in schools with the lowest performing students, the policies and labor market conditions that account for this sorting, and what policies might address this maldistribution.

Those concerned with educational policy face a stark reality: the students failing to achieve even minimal levels of educational achievement typically are taught by individuals whose qualifications are relatively weakest and often inadequate. These same students are most dependent upon their teachers and schools for academic learning, as nearly all of them come from disadvantaged home and community environments. The pattern that low achieving students very often are taught by teachers who themselves have weak academic backgrounds raises a set of questions and issues which are addressed in this policy brief. What is the extent to which teacher quality differs across student groups? What are the underlying causes? What are the consequences for student learning? How can public policies best address the challenge of assuring that all students are taught by the high quality teachers needed for their educational success?

## **The Sorting Of Low Achieving Students And Teachers**

In this brief we examine the sorting of teachers across schools in New York State. Some states, New York included, have an extraordinarily rich set of data on teachers and schools that allow us to answer questions that no national data set can answer. However, many of the patterns we have observed in New York occur elsewhere as well, particularly in urban school districts.<sup>1</sup> Portions of our analysis focus on how teachers are sorted across schools according to average student performance on 4<sup>th</sup>-grade science exams. For an

---

<sup>1</sup> See Haycock (2004).

earlier analysis that uses average student performance on 4<sup>th</sup>-grade mathematics exams, see Boyd, Lankford, and Loeb (2004).

The vast majority of low-performing students in New York are concentrated in a relatively small number of schools. For example, nearly 20 percent of all students taking the State's fourth grade science examination in 2004 scored at Level 1 or 2, indicating that they failed to achieve competency, with 4 percent of students failing to achieve minimum competency in any of the areas tested.<sup>2</sup> As shown in Figure 1, about half of the students scoring at Level 1 were concentrated in 10 percent of New York's elementary schools. Eighty percent of the Level 1 students were concentrated in 20 percent of the State's elementary schools. In large part, this concentration reflects the fact that student failure rates are exceptionally high in a relatively small number of schools,<sup>3</sup> as shown in Figure 2. The lowest 5 percent of schools had an average of 27.8 percent of their students scoring at Level 1 and enrolled 30 percent of all the students scoring at that level. The proportion of students in these schools passing the exam (scoring at Levels 3 or 4) averaged only 32 percent. Though less extreme, the proportion of students scoring at level 1 in schools between the 5<sup>th</sup> and 25<sup>th</sup> percentiles (Low 20%) is also high. On average, almost one in nine of the students in these schools scored at Level 1 and only 60 percent of the students passed the exam. These schools enrolled 53 percent of all those scoring at Level 1. In contrast, the majority of schools have few students in the lowest performance group, with 44 percent of schools having no students scoring at Level 1. Similar patterns hold for the 8<sup>th</sup> grade science exam and the other exams given by New York State.

The groupings of New York elementary schools shown in Figure 2 allow us to characterize how schools having high concentrations of low-performing students differ from other schools. The lowest two achieving groups (Lowest 5% and Low 20%) are defined above. Middle-low 25% includes those schools having percentages of students scoring at Level 1 that fall within the second quartile (i.e., between the 25<sup>th</sup> and 50<sup>th</sup> percentiles of schools). Middle-high 25% and High 25% include schools in the third and fourth quartiles, respectively.

Summary statistics for the schools in each group are shown in Table 1 with the first two rows showing average percentages of students in the schools scoring at Levels 1 and 2. As statistics in the second panel of the table show, the vast majority of students attending the schools having the highest failure rates are poor and either African-American or Hispanic. Higher percentages of them also have limited English proficiency. It is striking that schools falling in the Lowest 5% on average have almost 84 percent of their

---

<sup>2</sup> New York's student achievement data for 4<sup>th</sup> and 8<sup>th</sup> grade place each student's test results in one of four performance levels, where level 1 is the lowest performing group. The school data indicate the number of students in each level. Students scoring at Level 1 are described by the New York State Education Department as having, "serious academic deficiencies. They show no evidence of any proficiency in one or more of the elementary standards and incomplete proficiency in all standards." Students scoring at both level 1 and level 2 are considered to have failed the exam.

<sup>3</sup> These schools are also slightly larger than average.

students participating in the free-lunch program, and 68 percent of their students failing to pass the 4<sup>th</sup> grade science exam.<sup>4</sup>

Poor performance on science exams in New York is disproportionately an urban problem, as shown in Table 2. More than 95 percent of the states' lowest performing schools (Lowest 5%) are in New York City. Other large urban districts in New York also have poor student performance on these exams. For example, 38 percent of schools in New York's four next-largest cities are in the bottom 25 percent of New York state schools (the two leftmost columns in the table) while only 2.7 percent of suburban schools and 2.2 percent of rural schools are in the bottom 25 percent. Small-city districts fall between large-city and suburban schools in student performance on science exams. Even though a majority of urban schools have large percentages of their students scoring at Level 1, there are urban schools having far fewer lower achieving students. Thus, while almost all the schools having high percentages of students failing to achieve even minimal academic standards are in urban districts, not all urban schools have such high failure rates. This heterogeneity across schools in urban districts is pertinent as we consider strategies for improving educational outcomes for the lowest achieving students.

Measures summarizing the attributes of teachers in the groupings of schools are shown in Table 3. As the statistics make clear, students in the quartile of schools having the highest failure rates (Lowest 5% and Low 20%) are taught by teachers whose qualifications fall far short of those teaching in schools where students have higher test scores and where student are more likely to be white and have higher family incomes. For example, about one in three of the teachers in the Lowest 5% schools failed a general knowledge certification exam, compared to one in ten teachers in the High 25% schools. The percent of teachers not certified in any assignment was 20.5 percent in the Lowest 5% schools but only 1.2 percent in the High 25% schools. More detailed information regarding teachers' scores on the first taking of the Liberal Arts and Sciences Test (LAST)<sup>5</sup> is shown in Figure 3. The cumulative distribution (curve) for each of the school groupings shown indicates the percent of teachers employed (shown on the vertical axis) whose LAST exam score was less than or equal to the score on the LAST exam shown on the horizontal axis. For example, nearly 30 percent of the teachers in the Lowest 5% schools who took the last LAST exam scored below 220, the passing rate, compared to roughly 8 percent of the teachers in the top half of schools.

When considering data like that in Table 3 or Figure 3, there is a natural tendency to focus on differences in the qualifications of teachers across schools or categories of schools. Even though such comparisons are important in understanding both the corresponding differences in educational outcomes and issues regarding educational equity more generally, such a focus can divert attention from what we view as the most pressing problem: the students failing to achieve even minimum educational standards far too often are taught by individuals whose qualifications may be inadequate. For example, students in the five percent of schools having the highest failure rates (Lowest

---

<sup>4</sup> As shown by Stiefel, Schwartz and Chellman (2003), meaningful gaps in test scores exist across student groups within schools as well.

<sup>5</sup> The LAST is the general knowledge portion of the New York State Certification Exam.

5%) have a one-in-three chance of being assigned a teacher who failed a basic liberal arts certification exam, more than a one-in-four chance of being assigned a teacher whose undergraduate degree is from a “least competitive” college and a one-in-five chance of having a teacher not certified in any assignment.

Urban schools pose a particular challenge. In New York City nearly 40 percent of all 4<sup>th</sup> grade students did not pass the science exam (scoring at level 1 or 2). However, there are meaningful differences across urban schools in student educational attainment, as noted above and illustrated in the first panel of Table 4. Here New York City elementary schools are grouped by the percentage of students scoring at Level 1 on the 4<sup>th</sup> grade science exam. Distributions of teachers’ scores on the LAST certification exam for NYC teachers are shown in Figure 4, similar to the distributions shown in Figure 3 for elementary teachers statewide. Not surprisingly, the differences between the groups with respect to attributes of students and teachers are not as great as those statewide. However, the differences are important. For example, Table 4 shows that the proportion of teachers in the schools in the lowest two achievement groups (Lowest 5% and Low 20%) who failed a general knowledge certification exam is 56 percent higher than is the case for the High 25% schools. The patterns found across the three groupings of schools in the bottom half of student performance (Lowest 5%, Low 20% and Middle-Low 25%) are somewhat surprising. Note that there are large differences across these groups with respect to the percent of students scoring at Level 1 at the same time there is little difference with respect to student and teacher attributes. This suggests that factors other than those observed also contribute to the student achievement differences. Nonetheless, there are important differences in the attributes of students and teachers between the top half and bottom half of New York City schools (High 25% and Middle-High 25% versus Lowest 5%, Low 20% and Middle-Low 25%).

Similar patterns hold both for the fourth-grade math and English Language Arts exams as well as the comparable exams given to eight-graders. It is also pertinent to note that the sorting of teachers across schools in New York mirrors the pattern found across the country.<sup>6</sup>

Given the marked sorting of teachers across schools and the fact that students most needing highly skilled, academically able teachers are very frequently taught by individuals lacking those qualities, questions arise as to the extent to which these patterns contribute to the failure of many students to achieve even a minimal level of educational attainment.

A voluminous body of research has attempted to estimate the effects that various school, family, and community attributes have on student achievement. Identifying the set of school attributes and resources which translate into greater student learning has proven to be difficult. However, one thing is clear: the contributions teachers make to student learning are large and dominate the effects of other measured school inputs. Recent studies by Rivkin, Hanushek, and Kain (2001) and Sanders and Horn (1994) provide strong evidence that teachers play a crucial role in the educational process. In their policy

---

<sup>6</sup> Haycock (2004)

brief for a symposium on New York's teacher workforce, Hanushek and Rivkin (2001) note that (1) teachers have quite large effects on student achievement gains in mathematics and reading, (2) there is large variation in the contributions teachers make to student achievement, (3) the contributions teachers make to student learning dominate the effects of other measured school attributes, and (4) these teacher effects are comparable in magnitude to the effects of students' own family background. For example, "the gain from having a very good teacher (one standard deviation better) rather than an average teacher for three years in a row is roughly equal to the average mathematics test score differential between low-income students eligible for a subsidized lunch and higher-income students not so eligible."

The large differences in the educational attainment of students are in part the result of large differences in the home and community environments in which students live. However, the differences in educational attainment and the failure of many students to achieve even minimal educational standards is also the result of the teachers and other educational resources these students are provided. Rather than school resources working to offset factors beyond the control of educators and public officials, the allocation of resources frequently compounds the problem.

With a relatively small proportion of schools enrolling most of the low-achieving students and employing the least qualified teachers, it is clear that general efforts to improve the overall quality of the teacher workforce and student learning are unlikely to assure all students achieve high, or even minimal, educational standards. General workforce policies at best provide very blunt instruments for addressing the problem outlined above. Far more targeted action will be needed if significant progress is to be made with respect to assuring all traditionally low-performing students are taught by highly skilled teachers.

## **The Importance of Teacher Preferences**

The factors contributing to the problems outlined above can best be understood within the context of the range of factors, which together determine the overall quality of the teacher workforce and the sorting of teachers across schools. We find the following organizing framework useful. First, the supply of teachers is affected by a variety of factors that make teaching more or less attractive, both in general and in particular schools, districts, and subject areas. Here teacher preferences with respect to hiring requirements and job attributes are pertinent. Second, on the demand side, various factors affect hiring practices and the screening of prospective and practicing teachers. Factors pertinent here would include the preferences, objectives and abilities of school officials making personnel decisions. The choices made by teacher candidates, teachers and school officials are made within the context of the school system's institutional structure, which places constraints on those choices. These decisions interact to determine both who teaches and where. A third set of factors affecting the quality of the teacher work force relates to teacher education, professional development, and teacher effort.

Even though factors in all three categories are important, much comes down to a range of choices made by teachers and those considering teaching as a career. These choices crucially depend upon the individuals' preferences with respect to various job attributes. Three categories of such attributes appear to be especially important: wages, non-wage job attributes, and distance from home to available teaching jobs.

## **Wages**

A large literature suggests that teachers respond to wages and are more likely to choose to teach when starting teacher wages are high relative to wages in other occupations.<sup>7</sup> In fact, teachers appear at least as responsive to wages in their decisions to quit teaching, as are workers in other occupations.<sup>8</sup> Salaries affect not only whether an individual chooses to be a teacher, but also in which district he or she chooses to teach.

When assessing the extent to which salary differences influence the job and occupation choices made by teachers and those considering whether to teach, it is important to consider the differences in salaries between the alternatives individuals consider. For the decision whether to enter teaching, the pertinent comparisons are with respect to the salaries and fringe benefits the individual could earn in the various occupations being considered. For teachers choosing where to teach, differences in the salaries across the pertinent schools and districts are relevant. As discussed below, many teachers choose among districts within a relatively small geographic area, so that differences in salaries across metropolitan areas are less relevant for teachers' decisions than are differences in wages across the districts within those areas. Thus, for an individual considering whether to teach in a particular urban district, the relevant salary comparison would include teacher salaries in nearby districts as well as the salaries the individual could earn in alternative occupations, typically in the same area.

Figures 5a through 5e provide information regarding how teacher salaries in 2003 varied across districts within New York's largest metropolitan areas. The solid black lines in Figures 5a and 5b show the salary schedule for New York City. The dashed lines in the two figures show salary schedules for representative samples of districts on Long Island and in the northern suburbs.<sup>9</sup> (The solid grey line in Figure 3b is the schedule for Yonkers, a large city just north of New York City.) Figures 5c, 5d and 5e show salary schedules for New York's three largest upstate cities, Buffalo, Syracuse, and Rochester, and their suburbs.

The most striking feature in the figures is the large differences between teacher salaries in New York City and its suburbs. The gaps for novice teachers in most cases range from

---

<sup>7</sup> Baugh and Stone (1982); Brewer (1996); Dolton (1990); Dolton and van der Klaaw (1999); Dolton and Makepeace (1993); Hanushek and Pace (1995); Manski (1987); Mont and Rees (1996); Murnane, Singer and Willett (1989); Rickman and Parker (1990); Stinebrickner (1998, 1999, 2000); Theobald (1990); Theobald and Gritz (1996).

<sup>8</sup> Baugh and Stone, J.A. (1982).

<sup>9</sup> These districts were chosen by calculating each district's average salary across experience levels. Ordering districts by this summary measure, the districts at the deciles (i.e., 10<sup>th</sup> percentile, 20<sup>th</sup> percentile, ..., 90<sup>th</sup> percentile) were selected.

five to ten thousand dollars. These differences increase to between \$10,000 and \$24,000 for mid-career teachers. For teachers having more than 20 years of experience, the differences in most cases are in the 7 to 15 thousand dollar range. The gaps would have been larger for all levels of experience had salaries in NYC not increased substantially over the last few years. (The salary for a teacher having an MA and no prior experience increased by more than \$7,000 between 2000 and 2003. During this same period, the salary for teachers having an MA and 20 years of experience increased \$16,000.) Different patterns are seen for Syracuse, Rochester and Buffalo. Salaries in Buffalo and Rochester are at the high end of the range for starting teachers but at the low end of the range for teachers having 20 years of experience. Teacher salaries in Syracuse are near the low end of the range for its suburbs. However, in all three metropolitan areas the differences in salaries across districts are not great.<sup>10</sup>

The salaries reflected in the schedules shown in figures 5a-5e likely affect the decisions of those currently deciding whether to enter teaching, where to initially teach as well as whether to transfer or leave teaching. Even though such current flows in and out of schools and teaching affect the composition and distribution of New York's teacher workforce, the current workforce in large part reflects the cumulative effects of past events and the choices individuals have made over many years. A case in point is the long-lived consequences of large numbers of teachers having been hired at the time of the "baby-boom" bulge in student enrollments more than thirty years ago. Many of these teachers remained in teaching and only now are retiring, in turn contributing to the current surge in new hires. Such long-lived consequences follow from teachers teaching for many years on average so that in any year only a small fraction of the teacher workforce is replaced. Given this slow turnover, the current teacher workforce in a district, a region or the state as a whole is in part determined by the historical pattern of salaries.<sup>11</sup>

Figures 6a through 6d show how teacher salaries in New York City, Buffalo, Rochester, Syracuse and averages for their suburbs have changed over time. Salaries are shown for starting teachers and teachers having 20 years of district experience, both having a master's degree. To account for inflation, all salaries are expressed in 2003 dollars. The figures document some common trends as well as a number of striking differences across the metropolitan areas. The real salaries of urban and suburban teachers in all four regions declined substantially between 1970 and the early 1980s and then increased subsequently. With the exception of the New York City region, the real salaries of starting teachers were slightly lower in 2003 compared to 1970. Salaries for starting

---

<sup>10</sup> There is significant variation in teacher salaries across districts in New York as well as nationally. However, much of that variation is across, not within, metropolitan areas. This large between-metro wage variation contrasts with variation in the qualifications of teachers, which is largely within, rather than between, metropolitan areas. See Loeb (2001).

<sup>11</sup> Research indicates that salaries are more important to individuals' decisions whether to enter teaching and whether to remain in the early years, more so than for the decisions of more senior teachers as to whether to continue teaching. Thus, the salaries in place at the time individuals enter teaching and during the early years of their careers are likely to be more important than the salaries paid in later years. In addition to underscoring the importance of the historical pattern of salaries, such findings have implications for how salaries can be best structured.



teaching in the suburbs of New York City increased in real terms. Starting teacher salaries in New York City were lower for almost the entire period but are now slightly higher than in 1970, as a result of recent salary increases. A similar pattern holds for more experienced teachers in NYC, with the recent increase in real salaries being more marked. Both urban and suburban teachers in the Syracuse metropolitan area, as well as more experienced teachers in the suburbs of Rochester now earn slightly less in real terms than was the case in 1970.

In 1970, the salaries paid to teachers in each of the cities roughly equaled the average for the surrounding suburbs. In Syracuse and, to a lesser extent, Buffalo this parity has been maintained over the intervening years. The case of New York City and Rochester are quite different. Starting in the late 1980s, the salaries of senior teachers in Rochester were increased relative to the surrounding suburbs.<sup>12</sup> The starting salaries of novice teachers in Rochester also were higher during the 1980s, with this difference subsequently eliminated largely through reductions in real salaries in Rochester. Since the early 1980s, the real salaries paid to those teach in the suburbs of NYC have increased substantially, especially for more senior teachers. Salaries paid more senior teachers in Yonkers have increased dramatically over the last decade. The salaries paid NYC teachers also increased during the 1980s but changed little during the 1990s. These trends together have resulted in the salary gap for starting teachers in NYC being fairly constant over much of the last two decades. However, the gap in the salaries of more experienced teachers increased significantly, but has been substantially reduced since 2000.

When considering whether to become a teacher, individuals are likely to look not only at the salaries they can expect as a teacher, but also at the salaries available in other possible occupations. Nationwide, the wages of teachers have fallen relative to the wages of college graduates working full-time in other occupations, with the decline being relatively larger for women who now have a far greater range of labor market opportunities than was the case earlier. In 1950 female teachers between 20 and 29 years of age earned more than 54 percent of other young college educated workers. By 1990 young female teachers only earned more than 35 percent of their college-educated peers.<sup>13</sup> In general, the decline in the relative earnings of teachers reflects the increasing demand for and earnings of highly skilled workers.

In summary, teachers appear to respond to wages. They are likely to look not only at the salaries they can expect as a teacher, but also at the salaries available in other possible occupations. Teacher salaries are low relative to lawyers, doctors, scientists, engineers, managers and sales and financial service workers, and on par with that of social workers and ministers. Much of the variation in teacher wages across districts comes from

---

<sup>12</sup> It is relevant to note that the salary paid teachers having 20 years of experience in Rochester is not representative of the salaries paid more senior teachers – as is typically the case. For example, in 2002-03 a teacher in Rochester having 30 years of experience was paid \$13,475 more than a teacher having 20 years of experience. This difference increases to more than \$20,000 for a teacher having 35 years of experience. As a result, the salaries received by teachers close to retirement are higher in Rochester than in the surrounding suburbs.

<sup>13</sup> Hanushek and Rivkin (forthcoming). Also see Flyer and Rosen (1997) and Hanushek and Rivkin (1997).

differences in average wages across metropolitan not from differences within these areas. Yet, there are still some substantial differences in wages across districts within metropolitan areas. Thus, to increase the quality of teachers, especially in low-performing schools, it will be necessary to address the general differences in starting salaries between teaching and other occupations, as well as the differences in salaries between more and less attractive teaching positions.

### ***Non-Wage Job Characteristics***

Salaries are only one element of employment affecting decisions of whether and where to teach. Many non-wage job characteristics likely affect teacher preferences, including attributes of students, class size, school culture, facilities, leadership, and safety. Multiple studies provide evidence indicating that teachers prefer to teach in schools with higher achieving students. Similarly, studies have found that when teachers switch schools, they are more likely to move to schools having higher percentages of higher-achieving students and relatively fewer minority and poor students.<sup>14</sup>

The fact that teachers, especially teachers having stronger academic backgrounds, prefer to teach higher achieving students<sup>15</sup> contributes to a cycle in which other unattractive features of schools having large numbers of low-achieving students makes attracting more qualified teachers difficult. Schools having fewer highly qualified teachers result in lower test scores, which in turn make the schools less attractive places to work. While such feedback can contribute to a school's downward spiral, the reverse is also true. Success in improving the attractiveness of work environments directly can improve the teacher quality and, in turn, the academic performance of students, which will make these schools more attractive places to work.

The "flight" of white and higher-income households to the suburbs and other long-run demographic trends has resulted in significant changes in the student-body composition of urban schools so that urban districts in New York State increasingly enroll poor and minority students. Historical data regarding the poverty status of students is limited but data regarding the racial composition of urban schools illustrate the point. Between 1970 and 2000, the percent of public school students in New York City and Yonkers who were either African-American or Hispanic increased from 58 to 73. In Buffalo, Rochester and Syracuse as a group, this percentage increased from 35 to 70. In part, this has resulted from increasing enrollments of minority students. However, large declines in the enrollments of white students have been a major factor. (The net effect is that total enrollments in urban districts outside New York City have declined substantially.)

Both white and minority teachers tend to choose schools with lower minority populations, given the choice, at least in part because of the working conditions in the schools in which there are high proportions of minority students, which tend to be less attractive than those of other schools. Whether these working conditions play a larger role in teachers' preferences than the student racial characteristics with which they are

---

<sup>14</sup> Hanushek, Kain and Rivkin (1999 and 2004)

<sup>15</sup> Boyd, Lankford, Loeb and Wyckoff (2005b).

correlated is unknown. In either case, attracting teachers to teach in urban schools has been made more difficult as a result of the marked changes in student composition.

While student characteristics are likely to influence teachers' work lives, one reason that teachers choose schools with more high-achieving and wealthy students is that these schools have other characteristics, such as better facilities or more preparation time, that teachers prefer. Principals also strongly affect the working conditions in a school, as some principals are better able to create environments that teachers find favorable.

Working conditions may be as important as salaries in determining the current distribution of teachers across schools, or even more important.<sup>16</sup> Differences across schools in non-wage attributes of the job will be particularly important when there is little variation in wages, which, as we have shown above, is the case in many metropolitan areas. The lack of salary differences across schools within urban districts is also pertinent here as teachers typically earn the same salary regardless of their school assignment and therefore will choose among schools in a district based on other considerations.

## **Location**

Even though the importance of teacher preferences in explaining the sorting of teachers is generally recognized, one aspect is not well understood. Teachers have a strong preference to teach close to where they grew up. For example, over 60 percent of first-year public school teachers in New York take jobs within fifteen miles of where they grew up, with 85 percent taking jobs within forty miles. Even teachers who go far away to college tend to come home to teach: almost half of those who attended college over 100 miles from where they went to high school returned to within 15 miles of their high school district for their first teaching job. These patterns reflect more than just a preference for proximity, as teachers show a strong preference for teaching in areas having characteristics similar to their hometown.<sup>17</sup> Teachers growing up in an urban area are much more likely to teach in an urban area, and those growing up in a suburban area are more likely to teach in a suburb.

This preference for both proximity and similarity of place works to disadvantage urban districts as a result of these districts being net importers of teachers. Table 5 provides information for the first-time public school teachers hired in New York State between 1999 and 2002.<sup>18</sup> During this period, urban districts hired over 16,000 new teachers. However, of all the new teachers hired in the state, only 11,000 grew up in urban settings. In contrast, suburban districts hired fewer than 18,000 new teachers at the same time that almost 23,000 of all the new teachers had suburban homes. This pattern is in part due to the outflow of more highly educated, often white, families from urban districts noted above. With the number of teacher recruits who grew up in urban areas falling short of the number of positions being filled in urban districts, these districts must recruit teachers

---

<sup>16</sup> Hanushek, Kain, and Rivkin (1999).

<sup>17</sup> Boyd, Lankford, Loeb and Wyckoff (2005a).

<sup>18</sup> Boyd, Lankford, Loeb and Wyckoff (2005a).

from the suburbs or other regions. As shown in Table 5, in recent years only 60 percent of new hires grew up in urban districts. In contrast, almost 86 percent of new hires in suburban schools come from suburban areas.

Teacher candidates coming from suburban or rural hometowns strongly prefer to remain in those areas. Thus, urban districts must overcome these preferences with respect to distance and urbanism, in addition to addressing the problems typically identified with respect to recruiting teachers to difficult-to-staff urban schools, such as salary, working conditions, and the characteristics of the student population. In general, urban schools must have a combination of salaries, working conditions, and student body attributes that are more attractive than those of the surrounding suburban districts for the urban districts to attract equally qualified teachers living in the suburbs. To the extent that they do not, teachers with suburban hometowns who take jobs in urban areas are likely to be less qualified than those teaching in the suburbs.

Urban districts face a second disadvantage. Graduates of urban schools receiving less than an adequate education can result in cities facing a less qualified pool of potential teachers, even if they are not net importers. Preferences for proximity contribute to the perpetuation of inequities in the qualifications of teachers. The local nature of the teacher labor market increases the difficulty of breaking the cycle of inadequate education.

## **The Tightening of Teacher Labor Markets**

The general tightness of teacher labor markets (e.g., an increase in the demand for new teachers relative to the supply) together with the preferences of teachers have affected both the sorting of teachers and the absolute quality of those teaching in difficult-to-staff schools. As is clear from the consequences of the recent class-size reduction in California, a general shortage of teachers creates expanded opportunities for more qualified teachers to take first jobs, or transfer into positions, in schools that are relatively more attractive. This is true with respect to differences across districts as well as across schools within districts. The net result is that the problems associated with a general shortage of highly qualified teachers are greatly amplified for the districts and schools having relatively large numbers of low-income, minority, and low-achieving students. This reality is cause for concern when considered in combination with two ongoing trends. First, increasing numbers of teachers are retiring or are approaching retirement age. Second, enrollment growth and class-size reduction have increased the demand for new teachers.

The consequence of this general tightening of teacher labor markets in recent years can be illustrated using changes in New York City. As shown in Figure 7, the number of teachers transferring to suburban New York schools increased substantially from 1990 cohort to the 1999 cohort. This is shown by the consistently higher position of each cohort's transfer graph. For example, about 1.5 percent of all teachers who began teaching in 1990 in New York City had transferred to the suburbs within two years. That figure increases to about 2.3 percent for the 1993 cohort, 3 percent for the 1996 cohort

and 7 percent for the 1999 cohort. This suggests that labor market conditions increased the relative attractiveness of teaching in the suburbs. The 2002 cohort shows a modest reversal of this trend. Fewer teachers from the 2002 cohort transferred than was true for the 1999 cohort. Also note the flattening of the transfer graphs for the other cohorts during the last two years of each. This is especially apparent for the 1999 and 1996 cohorts. This suggests that New York City is a relatively more attractive alternative in 2003 and 2004 than was true between 2000 and 2002.

Even though current trends make it unlikely that significant further tightening of teacher labor markets will be seen, neither is it likely that markets will slacken to any great degree over the next five years. Thus, the outflow of teachers from urban districts is likely to continue,<sup>19</sup> implying that there is cause for concern. First, those teachers transferring out of high-poverty and high-minority schools, on average, have stronger qualifications than do those who remain. Second, the increased tightness in the teacher labor market that has resulted in increasing transfers to the suburbs also is likely to further disadvantage urban schools in their efforts to hire large numbers of new teachers. Third, this increased annual outflow of teachers is in part cumulative. Significant numbers of those transferring otherwise would have continued to teach in New York City for many years so that such an increase in the annual outflow adds up over time so that the total effect on the New York City teacher workforce is substantially larger than one might first think given the annual flow. Finally, urban districts are now hiring large numbers of new teachers to fill openings created by retirements, at the same time that the labor market for teachers is tighter than it has been for thirty years. Given the relatively slow turnover of the teacher work force, hiring large numbers of teachers having qualifications falling short of those desired can have long-lived consequences for generations of students. From a slightly different perspective, the attributes and distribution of the teacher work force outlined above in large part do not reflect most of the consequences of the recent increases in enrollments and teacher retirements. Thus, market forces could result in a further deterioration in the average quality of the teachers in traditionally difficult-to-staff schools.

## **Other Underlying Causes**

As noted above, demand-side factors such as hiring practices and personnel decisions as well as a range of institutional features also affect who teaches and where. Several factors falling into these categories are important in explaining why the lowest-performing schools most often are staffed with teachers having the least qualifications.

Teacher workforce policies have not been responsive to market conditions. With teachers paid the same regardless of where within a district they teach, districts have relinquished use of the potentially powerful tool of differential pay which could help

---

<sup>19</sup> Annual teacher retirements in New York may well have peaked within the last year or two. However, over the next four to five years the annual number of new hires will change little, partly because the falloff in retirements will be relatively modest and partly because the new hires replacing retiring teachers have relatively higher quit rates during the first few years of teaching, implying that many of those initially hired to replace retiring teachers will quit, there by necessitating additional hiring.

entice personnel to work where they are most needed. At the same time, the common seniority post-and-fill system further inhibits the discretion of school officials by having decisions with respect to teacher transfers depend solely upon the seniority and preferences of teachers, thus allowing the most experienced teachers to transfer out of the schools with the greatest needs. Frequently it is argued that the post-and-fill system is to blame for the intra-urban district sorting of teachers. While contributing to the problem, the fundamental problem is that the hard-to-staff schools are less attractive places to work, both in terms of working conditions and/or differential compensation to the extent that other working conditions can not be altered. There are reasons to consider the reform or elimination of the post-and-fill system. However, such changes cannot be expected to solve problems associated with the sorting of teachers within urban districts. To solve that problem will require making teaching in traditionally hard-to-staff schools relatively more attractive.

The common practice of urban districts not hiring many of their teachers until after other districts have filled most of their vacancies disadvantages urban districts relative to the districts and other employers with whom they must compete for teacher candidates. The result is that many of the stronger applicants will have taken other jobs when the late hiring decisions are made. The magnitude of the problem and its causes are discussed in an informative report published by the New Teachers Project (2003). The report paints a picture in which many strong applicants committed to teaching in urban schools end up taking positions elsewhere because urban districts fail to make job offers until mid-to-late summer. The report identifies several contributing factors. First, district rules and practice are such that those teachers resigning and retiring often provide late notification, thereby delaying the hiring of replacements. Second, seniority based post-and-fill transfer policies negotiated between unions and districts often result in a vacancy chain in which an initial vacancy is filled through a transfer, thereby creating a second vacancy, and so on. The net result is that weeks can pass before hiring authorities know what position will need to be filled with a new hire. Third, late budgets and inadequate forecasting of personnel needs add to the problem.

To varying degrees other factors are important as well. Inefficiencies in administrative systems delay and otherwise complicate hiring.<sup>20</sup> There is anecdotal evidence that application, screening and job assignment processes in urban districts often are not “job candidate friendly”. Finally, given the inherent difficulty of identifying which among a set of candidates will make the best teachers, it is questionable whether sufficient resources are devoted to allow hiring authorities to adequately screen candidates.

## **Promising Strategies for Addressing the Problem**

Teaching in traditionally hard-to-staff and low-performing schools needs to be made far more attractive. Urban districts should institute policies that make it possible to attract and retain sufficient numbers of high quality teachers for their needs in general, including sufficient numbers of highly effective teachers willing to teach in the schools traditionally

---

<sup>20</sup> Ballou (1996).

hardest to staff. Stating such a goal is far easier than formulating and implementing effective strategies for achieving the desired outcome. However, we believe that the strategies discussed below have the potential to help improve the educational outcomes of traditionally low-performing students.

To focus the discussion, suppose that public officials decided to spend \$1 billion additional dollars in an effort to increase the number of high quality teachers teaching in those schools having high concentrations of low-performing students. How could the money best be spent? It is certain that a large part of such an allocation would need to be used to make the traditionally hard-to-staff schools more attractive places to work, although there are other needs also discussed below. However, questions regarding how such dollars can *best* be spent cannot be answered with a high degree of confidence. Past research does not yield a clear picture of the relative effectiveness of alternative strategies.

Even though identifying the best among all possible strategies is not possible, there are a number of options which we believe offer substantial promise in addressing the underlying causes of the problem discussed above. These include increasing salaries in ways that are well targeted, and making a concerted effort to improve working conditions. It is almost certain that monetary rewards by themselves will not solve the problem. Success crucially depends upon reducing the burdens and increasing the nonpecuniary rewards associated with teaching in traditionally hard-to-staff schools. In this regard, the key role of enlightened and effective leadership working to change the school cultures is extremely important. Urban districts also need to emphasize “grow-your-own” strategies in their teacher recruitment efforts and must take actions that significantly increase the number of hires made during the late spring and early summer. It is also important that the screening of prospective and practicing teachers be far more rigorous. Given the slow turnover in the teacher workforce, improvements in professional development also are needed. These strategies are discussed in turn.

## **Salaries**

Salary differences can be used to compensate teachers for less favorable working conditions, thereby providing incentives for individuals to work in traditionally hard-to-staff schools. As noted above, there is evidence that higher salaries – especially starting salaries – increase individuals’ willingness to enter and remain in teaching as well as teach in particular districts. However, there is little evidence regarding the sizes of compensating differentials that would be needed to offset various unattractive aspects of districts and schools. In large part, the problem is that salaries typically vary little across districts in ways that would allow researchers to infer the effects of specific salary policies. There is little experience with districts implementing meaningful school-level salary differentials in an effort to entice high quality teachers to teach in traditionally hard-to-staff schools. As a result, we do not know how large such differentials would need to be. However, it is clear that the school-level bonuses for the hardest-to-staff schools will have to be substantial.

District and union officials working together to alter compensation schemes to include school-level salary premiums will need to address difficult issues regarding the sizes of such bonuses in general and how such bonuses will vary across schools. Any program that is implemented will have flaws. However, even a program that is far from optimal is likely to be superior to the status quo. Furthermore, the knowledge gained from putting differential-pay plans in place and seeing their consequences will allow plans to be improved over time.

Just as salary differentials are needed to entice individuals to teach in certain schools, salary bonuses can be an important tool to attract and retain those teaching in hard-to-staff fields. The sizes and fields in which bonuses are needed will depend upon local labor market conditions. Even though subject-area differentials have been discussed in policy circles for many years, little progress has been made in implementing such bonuses.

The introduction of large school-level salary bonuses will help entice larger numbers of high quality teachers to teach in schools having large numbers of currently low-achieving students. However, without increasing the overall attractiveness of the teaching profession, such a policy merely would lead to the existing teacher workforce being reallocated across schools. Even though the students most in need of high quality teachers would benefit, an urban district implementing such a plan still would have too few high quality teachers. Furthermore, the consequences for students from relatively more affluent and politically active families make such a “zero-sum” policy politically unachievable.<sup>21</sup> One component of increasing the attractiveness of teaching generally is to increase overall compensation to compete with alternative occupations. In addition, increasing the ease of entry into the profession and status of teachers would increase overall supply.

It is important that district officials target general salary increases to teachers in the early years of their careers, e.g., the first ten years, rather than increasing teacher salaries across the board: higher salaries for teachers in the early years of teaching are likely to be substantially more effective in helping to attract and retain high quality teachers than would increases going to more senior teachers. As noted above, research indicates that salaries are more important to individuals’ decisions whether to enter teaching and whether to remain in the early years more than for the decisions of senior teachers as to whether to continue teaching. Thus, for a given increment in total compensation, targeted salary increases would be more effective. Of course, if a district instituted both school-level bonuses and higher pay for less experienced teachers, more senior teachers could increase their salaries by teaching in schools having bonuses. In fact, the school-level bonuses need to be large enough so that more experienced and skilled teachers actually respond in this way.

Historically, in negotiating new contracts, district officials often have negotiated with union leaders regarding the total increase in teacher salaries but then deferred to union officials regarding how that increase would be structured. Far too often such practices

---

<sup>21</sup> See Hill and Rosa (2004) and Sclafani (2004) for examples.



have resulted in large portions of such increases in pay going to more senior teachers. The consequences of such practices can be seen in Figures 6a through 6c. In the suburbs of New York City, the cities of Yonkers and Rochester, and the Buffalo region, increases in the salaries of teachers have been structured so that more senior teachers have received meaningful, often quite large, increases in real salaries at the same time that the real salaries of starting teachers have either not increased or increased much less.<sup>22</sup> All New York City teachers have received meaningful salary increases over the last several years. However, the increases for senior teachers have been substantially larger. Between 2000 and 2003, there was an average salary increase of approximately \$7000 for teachers who had taught in NYC no more than five years. The average increase for teachers having taught 20 or more years was in excess of \$13,000. Note also that the increases for more senior NYC teachers were introduced more quickly than were the increases for less experienced teachers.

Significant salary increases in urban districts are needed in order to recruit and retain more qualified teachers. However, such salary increases need to target teachers in the early years of their careers, teachers in hard-to-staff fields and the more experienced, skilled teachers willing to teach in traditionally hard to staff schools. It is important that educators, public officials and the public understand that across-the-board salary increases will not solve the teacher workforce problems discussed above, for at least two reasons. First, such increases will not alter the relative attractiveness of different types of schools; the schools that are currently hard to staff will remain relatively less attractive so that across-the-board salary increases will do little to alter intra-district differences in the qualifications of teachers. Second, given the magnitude of the problems outlined above, substantial increases in resources are needed but may be constrained by budget limitations. In such an environment, it is imperative that any additional resources be used most effectively. Spending limited resources on increasing the salaries of more senior teachers regardless of where they teach will be relatively ineffective in improving the quality of the teacher workforce and, in turn, student outcomes. Given the magnitude of the problems faced by urban districts, it is important that public officials structure salaries so as to best achieve educational goals.

### **Working Conditions**

Working conditions are important determinants of the career and job choices of teachers.<sup>23</sup> Here working conditions are broadly defined to include a wide range of factors including a school's physical environment; class sizes and the availability of teaching materials and other resources; the degree of student discipline and safety in the school; the level of crime in the surrounding neighborhood; as well as the effort, abilities and other attributes characterizing students, parents and other school employees. In particular, the roles of school culture and leadership are extremely important.

Even though a number of these conditions of work are beyond the control of school officials, others are not. Policies can attract effective administrators, increase preparation

---

<sup>22</sup> See Lankford and Wyckoff (1996, 1997) for further discussion.

<sup>23</sup> See, for example, Hanushek, Kain, and Rivkin (2004, forthcoming).

time, decrease class size, or provide funds to renovate and maintain facilities – all aspects that add to teachers’ perceptions of good working conditions. Other controllable aspects include issues of safety and the need for school officials to deal effectively with disruptive students. Some issues vary from school to school, while still others are quite subjective. This underscores the importance of having effective school leaders who understand the tradeoffs in using resources in various ways to improve working conditions and have the discretion to use resources to address the pressing needs. The role of school leaders in helping to improve school culture is even more important. A teacher having the moral and professional support of school leaders and other staff, the social services and other resources needed to be effective and the satisfaction that comes from knowing that one’s efforts are making a difference together can motivate individuals to work willingly in settings that under different circumstances would be unacceptable.

### ***A Grow-Your-Own Recruitment Strategy***

As discussed above, teachers have strong preferences for teaching close to home and in schools similar to those they attended. Given such preferences for proximity and similarity and the fact that most students attend college close to home, an important part of the solution is likely to be partnerships between urban schools and higher education institutions in close proximity to the district. This then places a premium on teacher preparation and recruitment in urban areas, where the graduates are most likely to become teachers in difficult-to-staff urban schools. Policies could also create incentives for academically successful urban high school graduates to attend college and choose careers in teaching. Such strategies offer the promise of helping to alleviate the problem noted above that the number of individuals from urban areas going into teaching falls short of the number of teaching positions which need to be filled.

In New York City and elsewhere there has been tremendous growth in the number of individuals entering teaching through alternative pathways. The Teaching Fellows Program in New York City is an important example. The program provided approximately 300 of New York City’s new teachers in September 2000, but by September 2003 it had grown approximately 8-fold, providing over 2,400 new teachers and accounting for about 30 percent of the City’s new teachers.<sup>24</sup> The Teaching Fellows program is an important example of the type of partnership which could help to address the current workforce problems faced by urban districts. At this point it is unclear how effective those entering teaching through such alternative pathways are in improving student outcomes; however some successes are readily apparent. To qualify for alternative certification, Teaching Fellows must have passed both the Liberal Arts and Sciences (LAST) certification examination and the Content Specialty Test of subject matter knowledge in their areas of specialization. Historically, many of the new teachers working in New York City under temporary licenses had such licenses specifically because their failures to pass the LAST exam precluded them from receiving provisional certification. The contribution of the Teaching Fellows Program to New York City’s

---

<sup>24</sup> Based on data provided by the Teaching Fellows program and on information at [http://www.tntp.org/cli/hlt\\_nyc\\_teachingfellows.html](http://www.tntp.org/cli/hlt_nyc_teachingfellows.html).

success in almost all of its new hires having either alternative, provisional or permanent certification is important. Going beyond helping to attract teachers having stronger general and content knowledge, the ultimate question concerns the success of those entering teaching through alternative pathways in helping to improve student learning.

### ***Teacher Hiring Practices***

Though not easy, implementing reforms that result in urban districts being able to make job offers substantially earlier are likely to be easier and less costly than the other reforms we discuss. None the less, districts making timely offers, in the spring when possible, would lead to important teacher quality gains. The recent report by the New Teacher Project (2003) discusses a number of promising strategies districts have implemented, and offers four recommendations. The first focuses on efforts to have teachers provide timely notification of their pending resignation or retirement, in particular vacancy notification deadlines and the removal of disincentives for early notification. The second argues for changes in teacher transfer rules which work to delay new hires. The third stresses the need for more timely budgets and more accurate forecasting of budgets and enrollments. The fourth calls for improvements in the efficiency and effectiveness of HR departments. In considering solutions to the problem of late hiring, it is pertinent to note that there are potential indirect benefits associated with improving working conditions and instituting bonuses for teaching in traditionally hard-to-staff schools. Reducing differences in the relative attractiveness of various jobs and the dependence on seniority-based transfer rules would reduce the prevalence of vacancy chains associated with a job in an attractive job opening up and a set of teachers having varying levels of seniority then each moving up in a series of steps.

### ***Improving the Screening of Prospective and Practicing Teachers***

Whether considering the teacher workforce at the school, district, or state level, increasing the pool of individuals interested in teaching will not in itself lead to an improvement in teacher quality, as the outcome depends upon the screening of prospective and practicing teachers. Evidence suggests that the individuals attracted to teaching as a result of higher salaries and better working conditions tend to have qualifications similar to those of people already attracted to teaching. To improve the quality of the teacher workforce, school officials will need to use the extra discretion created by the increase in the pool of aspiring teachers to be more selective in their hiring and retention of teachers. In part, this will entail devoting the resources necessary to effectively screen job applicants. Similar resources are needed to carry out effective evaluation at the time of the tenure decision. Teachers who have not clearly demonstrated their teaching effectiveness should not be renewed. Districts also need to be more aggressive in dealing with tenured teachers who are ineffective. In addition to ongoing professional development, target “measure-up-or-leave” programs are needed. Continuing to employ an ineffective teacher for many years is both an unjustified financial burden and a failure to protect the rights of students.

## **Teacher Induction and Professional Development**

After having attracted individuals to teach in urban districts, it is important that novice teachers initially be placed in school environments that provide them the opportunity to develop the wide range of skills needed to be effective teachers. This strategy can result in these individuals becoming better teachers as well as directly affect teacher retention in at least two ways. First, effective induction programs will reduce the personal costs associated with novices learning how to teach. Second, helping individuals become more effective teachers will contribute to their personal satisfaction from seeing that they can make a difference in the lives of students. Both will affect the cost-benefit calculation of whether to stay in teaching. New York City has systematically implemented a very promising and highly structured teacher induction and mentoring program designed by the New Teacher Center at the University of California at Santa Cruz. It will be interesting to examine the effects of this program on teacher retention and student achievement.

Current practice in New York's urban districts places novice teachers in the full range of schools but these teachers, on average, have slightly higher percentages of poor, minority, LEP and low-performing students than is the case for the placements of more experienced teachers. The result is that urban districts have higher teacher quit rates than would be the case if novice teachers were initially placed in urban schools that were relatively less challenging.<sup>25</sup> Several policies discussed above can help. Improvements in working conditions and the introduction of school-level bonuses would help "bonus schools" attract more teachers having at least minimal levels of experience. In turn, districts would be able to place more novice teachers in schools having fewer students with exceptional needs as well as school cultures and the types of peer support that would help novice teachers develop fully. If the incentives teachers face regarding where to teach have been brought in line with the staffing needs of the district, one can imagine those developing teachers in subsequent years moving through a progression of more challenging jobs.

Going beyond induction, professional development is especially important in urban districts where teaching is especially challenging. Here the slow turnover of the teacher workforce is especially pertinent. Currently districts pay substantial premiums for teachers earning additional degrees and educational credits where teachers themselves are able to decide what to study and where. The result is that individuals have an incentive to accumulate degrees and course credits but not necessarily seek out the programs and courses that would most improve their effectiveness as teachers. (This is another example of a teacher workforce policy where school officials in many districts have chosen to have a relatively passive role.) Research findings indicate that advanced degrees per se do not translate into higher student achievement, although well targeted education can (e.g., having a degree in the subject area taught). Districts devote substantial resources to professional development directly and in the form of increases in salary associated with the level of educational attainment. Such expenditures can yield

---

<sup>25</sup> Boyd, Lankford, Loeb and Wyckoff (2005b).

large dividends. However, this will be the case only if professional development broadly defined is carefully targeted to address the goal of improving student learning.

## **Conclusions**

Policymakers, educators and citizens interested in improving the educational achievement of the lowest performing students confront a daunting problem. Large numbers of students in New York fail to achieve even minimal educational standards. With most of these students coming from disadvantaged home and community environments, they are dependent upon their teachers and schools for academic learning. Yet in New York, as well as across the country, these students face bleak prospects. The vast majority of these low-achieving students are highly concentrated into a relatively small number of schools where academic failure is the norm rather than the exception. Furthermore, the teachers in these schools very frequently have weak academic backgrounds and little prior teaching experience, much less prior success or even experience in working with students coming from such exceptionally disadvantaged home and community environments.

The challenges associated with making traditionally hard-to-staff schools more attractive places to work are complicated by a complex set of interdependencies. The prevalence of many poorly qualified teachers in schools having high student failure rates is an important factor contributing to those failures. Many teachers avoid such schools in part because of students' low performance, the ineffective leadership and, possibly, the attributes of the other teachers in those schools. School leaders respond in similar ways. At the same time, more advantaged students and their parents having the ability to avoid such failing schools do so, an important factor in explaining the concentration of disadvantaged and low-achieving students.

Given such interdependencies, solitary policies are unlikely to meaningfully alter outcomes for students. Meaningful progress will require aggressive action that is extensive in terms of the range of actions taken, concentrated on the schools having the greatest problems and sustained over the extended period of time needed for such reforms to bear fruit. The various actions taken individually can help improve student outcomes, however such a holistic and aggressive effort can yield improvements that go beyond the sum of the benefits from the individual components. Furthermore, by devoting the resources needed in the short-run to significantly change school environments and improve the educational attainment of students and assuring that those resources are used effectively to improve student outcomes, the long-run costs of maintaining such improvements well could be significantly lower.

There are many other promising strategies for improving educational outcomes which we have not discussed. Many proposals being debated around the country focus on global solutions related to improved accountability and the general incentives faced by public officials, educators, students and their parents. Many are quite controversial and would require major reforms. Instead, we have focused on a more modest set of proposals.

Salary bonuses for teaching in difficult-to-staff schools can be added to the traditional structure of teacher salary schedules. Such differential pay need not be delayed until more systemic reforms in teacher compensation are carried out. Even though implementing such a reform presents many challenges, doing so does not require completely changing the face of the labor market for teachers, which is undoubtedly desirable, but unlikely to occur. Similarly, the strategies of improving working conditions and aggressively pursuing a grow-your-own strategy in teacher recruitment and education also face fewer hurdles and shorter implementation time than more radical policies. Even if more major reforms are carried out in the future, the strategies discussed here would complement more systemic reforms and are good and worthy in their own right.

Questions regarding the cost of providing all students a sound basic education have been central to litigation in New York and elsewhere challenging the constitutionality of education financing arrangements. At the same time, there has been far too little recognition that the total dollars needed to provide a sound basic education crucially depends upon how effective current and additional resources are used. Teacher salaries and fringe benefits make up more than 60 percent of total expenditures by public school districts in New York State, underscoring the fact that the resources needed to improve student outcomes depend upon the efficacy of teacher workforce policies and the resources devoted to teachers. Whether changes in response to litigation will lead to substantial gains in the educational attainment of the lowest achieving students will depend upon whether public officials and educators actually make the needed changes in policies and practices regarding the teacher workforce and systematically target additional resources so as to best achieve the State's educational goals and responsibilities. Making these changes will not be easy. However, failing to do so will result in little, if any, improvement in the educational opportunities available to the disadvantaged students most dependent upon teachers and schools for their educational success.

## References

- Ballou, D. (1996) "Do public schools hire the best applicants?" *Quarterly Journal of Economics*, 111(1), 97-133.
- Baugh, W.H., & Stone, J.A. (1982). "Mobility and wage equilibration in the educator labor market", *Economics of Education Review*, 2(3), 253-274.
- Boyd D., Lankford, H., Loeb, S. and Wyckoff, J. (2005b) "Explaining the Short Careers of High-Achieving Teachers in Schools with Low-Performing Students" *American Economic Review*, May 2005.
- Boyd D., Lankford, H. and Loeb, S. (2004) "Improving Student Outcomes: The Role of Teacher Workforce Policies," in *Proceedings from the Symposium on the Teaching Workforce*, New York State Education Finance Research Consortium, [www.albany.edu/edfin](http://www.albany.edu/edfin).
- Boyd D., Lankford, H., Loeb, S. and Wyckoff, J. (2005a) "The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools," *Journal of Policy Analysis and Management*, 2005, 24(1), pp.1134-132.
- Boyd D., Lankford, H., Loeb, S. and Wyckoff, J. (2002) "Initial Matches, Transfers, and Quits: Career Decisions and the Disparities in Average Teacher Qualifications Across Schools," Working Paper.
- Boyd D., Lankford, H., and Wyckoff, J. (2002) "School District Expenditures and Fiscal Stress," Education Finance Research Consortium Condition Report.
- Brewer, D.J. (1996). Career paths and quit decisions: Evidence from teaching. *Journal of Labor Economics*, 14(2) (April), 313-339.
- Dolton, P.J. (1990). The economics of UK teacher supply: The graduate's decision. *The Economic Journal*, 100(400), 91-104.
- Dolton, P.J., & van der Klaaw, W. (1999). The turnover of teachers: A competing risks explanation. *Review of Economics and Statistics*, 81(3), 543-552.
- Dolton, P.J., & Makepeace, G.H. (1993). Female labour force participation and the choice of occupation. *European Economic Review*, 37, 1393-1411.
- Flyer and Rosen (1997) "The New Economics of Teachers and Education," *Journal of Labor Economics* 15(1) (January) 104-139.
- Hanushek, E.A., Kain, J.F., and Rivkin, S.G (forthcoming) . "Why public schools lose teachers," *Journal of Human Resources* (forthcoming).
- Hanushek, E.A., and S.G. Rivkin (2004a) "How to Improve the Supply of Teachers as well as Change Requirements," *Brookings Papers on Education Policy*.

- Hanushek, E.A., J.F. Kain, & S.G. Rivkin (2004b) The Revolving Door, *Education Next*, Winter, 77-82
- Hanushek, E.A., Kain, J.F., and S.G. Rivkin (1999). Do higher salaries buy better teachers? Working Paper.
- Hanushek, E.A., and S.G. Rivkin (1997) "Understanding the Twentieth-century growth in U.S. school spending," *Journal of Human Resources* 32(1) 35-68.
- Hanushek, E.A. and S.G. Rivkin (2001) "Teacher Quality and School Reform in New York," *Proceedings from the Symposium on the Teaching Workforce*, Education Finance Research Consortium.
- Hanushek, E.A., & Pace, R.R. (1995). Who chooses to teach (and why)? *Economics of Education Review*, 14(2), 101-117.
- Haycock (2004) "The Elephant in the Living Room: Why the Poorest Schools Get the Least Experienced Teachers," *Brookings Papers on Education Policy*.
- Hill, P. and M. Roza (2004) "How Within-District Spending Inequities Help Some Schools to Fail," *Brookings Papers on Education Policy*.
- Lankford, H. (2001), ed., *Proceedings from the Symposium on the Teaching Workforce*, [www.albany.edu/edfin](http://www.albany.edu/edfin).
- Lankford, H. and J. Wyckoff (1997) "The Changing Structure of Teacher Compensation, 1970-94," *Economics of Education Review* 16(4) 371-384.
- Lankford, H. and Wyckoff, J. (1996) "The Allocation of Resources in New York State School Districts: 1979-80 to 1993-94," in *Cost-Effectiveness in Education*, Robert Berne ed., New York State Regents, 45-62.
- Levin, J. and M. Quinn, Missed Opportunities: How We Keep High-Quality Teachers Out of Urban Classrooms, New Teachers Project (2003).
- Loeb (2001) "How Teachers' Choices Affect What a Dollar Can Buy: Wages and Quality in K-12 Schooling," *Proceedings from the Symposium on the Teaching Workforce*, Education Finance Research Consortium.
- Manski, C.F. (1987). Academic ability, earnings, and the decision to become a teacher: Evidence from the National Longitudinal Study of the High School Class of 1972. in D.A. Wise (ed.), *Public Sector Payrolls*, Chicago: University of Chicago Press, 291-312.
- Mont, D., & Rees, D.I. (1996). The influence of classroom characteristics on high school teacher turnover. *Economic Inquiry*, 34, 152-167.
- Murnane, R.J., Singer, J.D., & Willett, J.B. (1989). "The influences of salaries and 'opportunity costs' on teachers' career choices: Evidence from North Carolina", *Harvard Educational Review* 59(3), 325-346.



- Rickman, B.D., & Parker, C.D. (1990). Alternative wages and teacher mobility: A human capital approach. *Economics of Education Review*, 9(1), 73-79.
- Rivkin, Hanushek, and Kain (2001) "Teachers, Schools and Academic Achievement", Working Paper No. 6691, National Bureau of Economic Research (revised).
- Sanders and Horn (1994) "The Tennessee value-added assessment system (TVAAS): Mixed-Model methodology in educational assessment" *Journal of Personnel Evaluation in Education*, 8(3), 299-311.
- Sclafani, S. (2004) "Discussion of 'How Within-District Spending Inequities Help Some Schools to Fail'," *Brookings Papers on Education Policy*.
- Stiefel, L., A. Schwartz and C. Chellman, *Test Score Gaps in New York State Schools: What Do Fourth and Eighth Grade Test Scores Show*, Education Finance Research Consortium Condition Report (2003).
- Stinebrickner, T.R. (1998). An empirical investigation of teacher attrition. *Economics of Education Review*, 17(2), 127-136.
- Stinebrickner, T.R. (1999). Estimation of a duration model in the presence of missing data. *Review of Economics and Statistics*, 81(3), 529-542.
- Stinebrickner, T.R. (2000). An analysis of occupational change and departure from the labor force: Evidence of the reasons that teachers quit. Working paper;
- Theobald, N.D. (1990). An examination of the influences of personal, professional, and school district characteristics on public school teacher retention. *Economics of Education Review*, 9(3), 241-250.
- Theobald, N.D., & Gritz, R.M. (1996). The effects of school district spending priorities on the exit paths of beginning teachers leaving the district. *Economics of Education Review*, 15(1), 11-22.

## Tables and Figures

**Table 1**

Measure	Attributes of NYS Elementary Schools Schools Grouped by Fraction Of Students Scoring At Lowest Level On 4th Grade Science Exam in 2004					
	Average of Measure for Schools in Percentile Groupings					
	Lowest 5%	Low 20%	Middle- Low 25%	Middle- High 25%	High 25%	Statewide
Percent of students scoring at Level 1	27.8	10.5	2.8	0.2	-	4.2
Percent of students scoring at Level 2	40.1	30.1	15.0	10.8	2.1	15.0
Percent of students participating in the free-lunch program	83.8	73.3	41.8	26.6	13.5	39.3
Percent of students having limited English Proficiency	14.6	12.1	6.5	3.4	2.4	6.2
Percent of Students who are African-American or Hispanic	93.6	72.4	36.7	18.2	11.4	35.5

**Table 2**

Distribution of New York State Elementary Schools  
Schools Grouped By Fraction Of Students Scoring At Lowest Level On 4th Grade Science Exam in 2004  
And By Urbanicity of District

Schools in		Lowest 5%	Low 20%	Middle- Low 25%	Middle- High 25%	High 25%	All schools
New York City	row %	15.5	51.0	24.6	7.0	1.8	100.0
	column %	95.5	76.3	29.6	8.3	2.1	29.8
Four-largest City districts, after NYC	row %	1.5	36.8	36.8	18.0	6.8	100.0
	column %	1.8	10.7	8.6	4.2	1.6	5.8
Small-city districts	row %		11.5	39.5	29.5	19.5	100.0
	column %		6.6	18.1	13.4	8.8	11.4
Suburban districts	row %	0.1	2.6	20.4	32.0	44.8	100.0
	column %	0.9	5.7	35.4	54.8	76.3	43.0
Rural districts	row %	0.9	1.3	20.6	48.7	28.5	100.0
	column %	1.8	0.7	8.3	19.3	11.2	10.0
All schools	row %	4.9	19.9	24.8	25.1	25.3	100.0
	column %	100.0	100.0	100.0	100.0	100.0	100.0

**Table 3**

Attributes of Teachers in NYS Elementary Schools  
 Schools Grouped By Fraction Of Students Scoring At Lowest Level On 4th Grade Science Exam in 2004

Percent of teachers	Schools, Distributed By Average Student Performance					All schools
	Lowest 5%	Low 20%	Middle- Low 25%	Middle- High 25%	High 25%	
failed general knowledge or LAST exam	32.7	25.8	15.7	10.1	9.3	17.4
BA from a least competitive college	28.4	22.9	14.6	10.1	11.1	15.6
BA degree or less	29.4	22.6	13.7	10.7	8.2	15.1
not certified in any assignment	20.5	14.0	6.3	2.5	1.2	7.2
permanent certified in all assignments	47.2	56.6	70.9	76.4	79.4	68.9
ratio of inexperienced (0-1 years) teachers relative to mean school	1.90	1.36	0.90	0.76	0.67	1.00

**Table 4**

	Attributes of Students And Teachers in New York City Elementary Schools Schools Grouped By Fraction Of Students Scoring At Lowest Level On 4th Grade Science Exam in 2004					
	Schools, Distributed By Average Student Performance					
	Lowest 5%	Low 20%	Middle- Low 25%	Middle- High 25%	High 25%	All schools
<b>Percent of students</b>						
scoring at Level 1	36.1	20.6	11.4	5.9	1.6	10.6
scoring at Level 2	38.8	39.4	32.6	24.3	15.9	28.0
participating in the free-lunch program with limited English Proficiency	83.3	85.6	77.6	70.1	53.4	71.5
who are African-American or Hispanic	13.1	15.1	13.9	11.4	9.4	12.4
	94.7	93.5	78.9	65.2	49.5	71.9
<b>Percent of teachers</b>						
failed general knowledge or LAST exam	32.2	32.2	28.8	24.5	20.6	27.1
BA from a least competitive college	29.4	28.0	27.0	25.3	22.1	25.9
BA degree or less	29.9	28.3	25.2	21.9	18.6	23.9
not certified in any assignment	25.3	18.2	16.1	13.9	13.9	15.9
permanent certified in all assignments	45.4	49.5	53.8	57.2	59.6	54.5
ratio of inexperienced (0-1 years) teachers relative to mean school	1.28	1.17	0.99	0.92	0.87	1.00

Figure 1

Concentration of Students Scoring at Level 1 on Grade 4 Science Exam in 2004  
(Schools ordering based on number of Level 1 students)

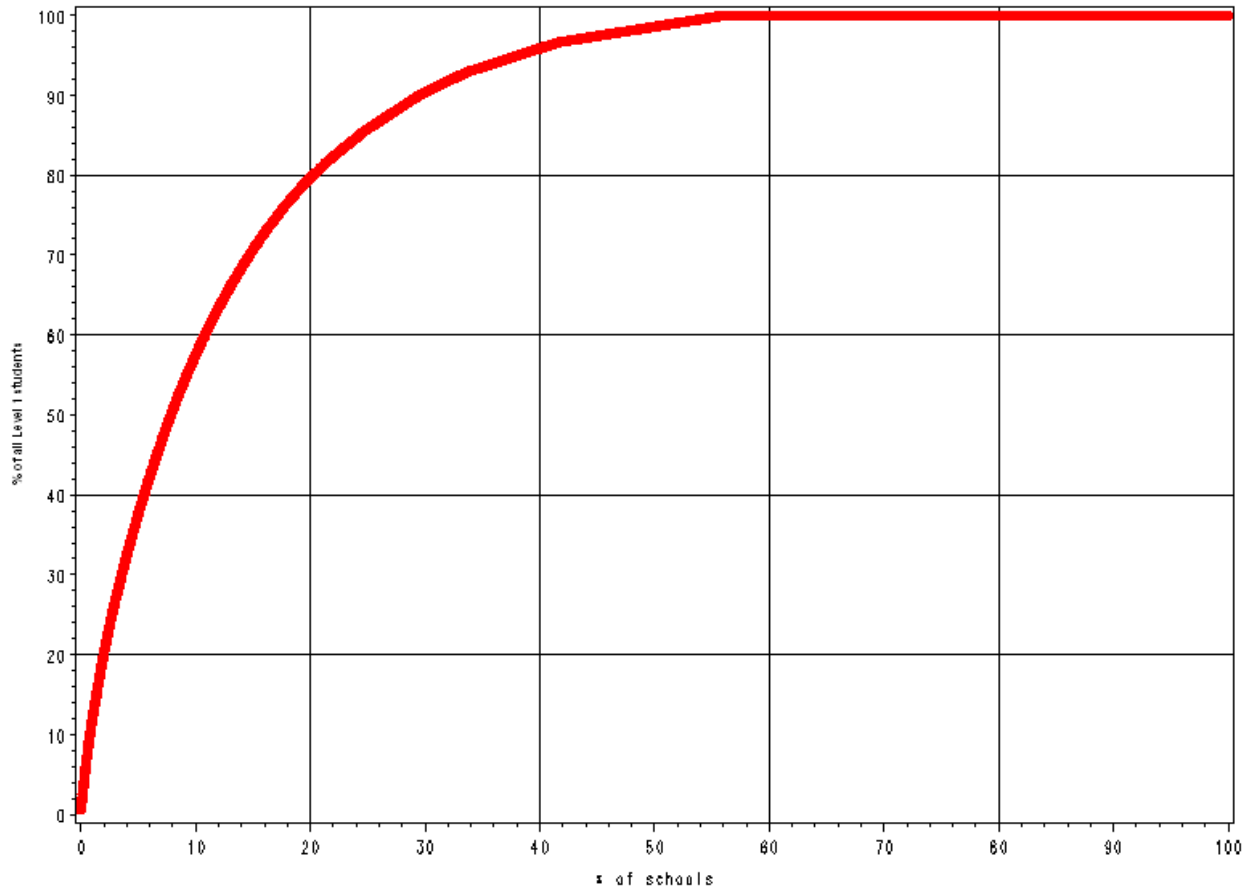


Figure 2

Percent of Students in Schools Scoring at Level 1 on Grade 4 Science Exam in 2004  
(Schools ordering based on percent of students in school failing)

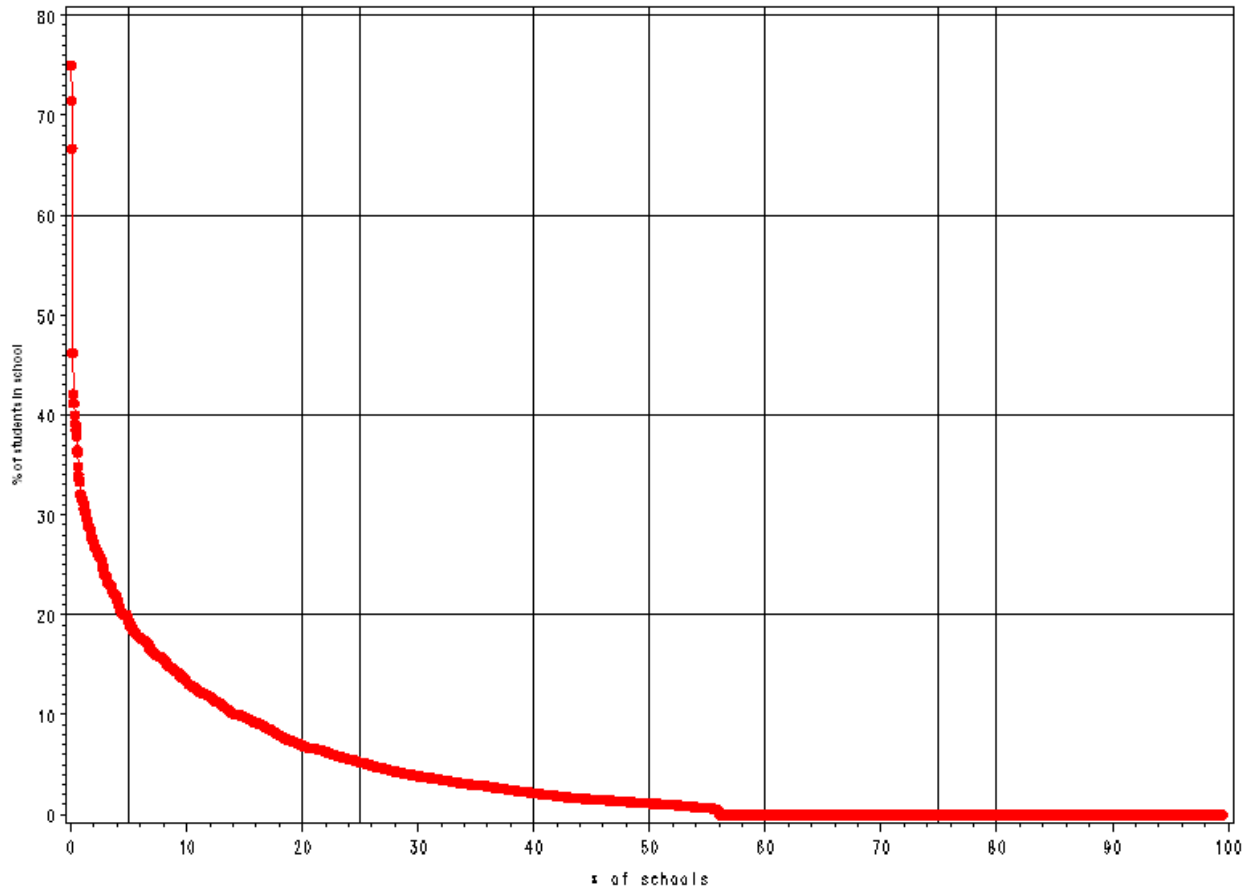


Figure 3

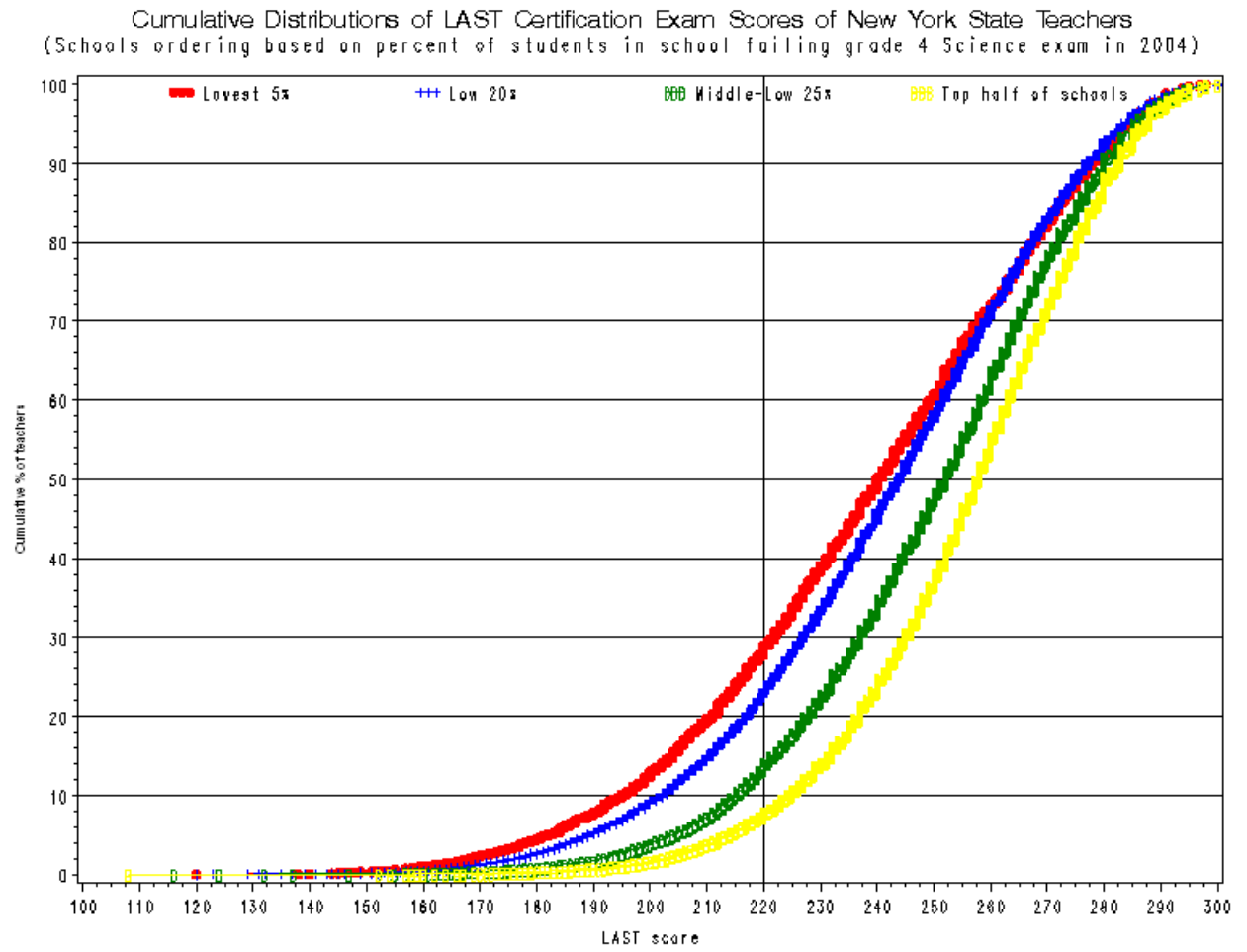
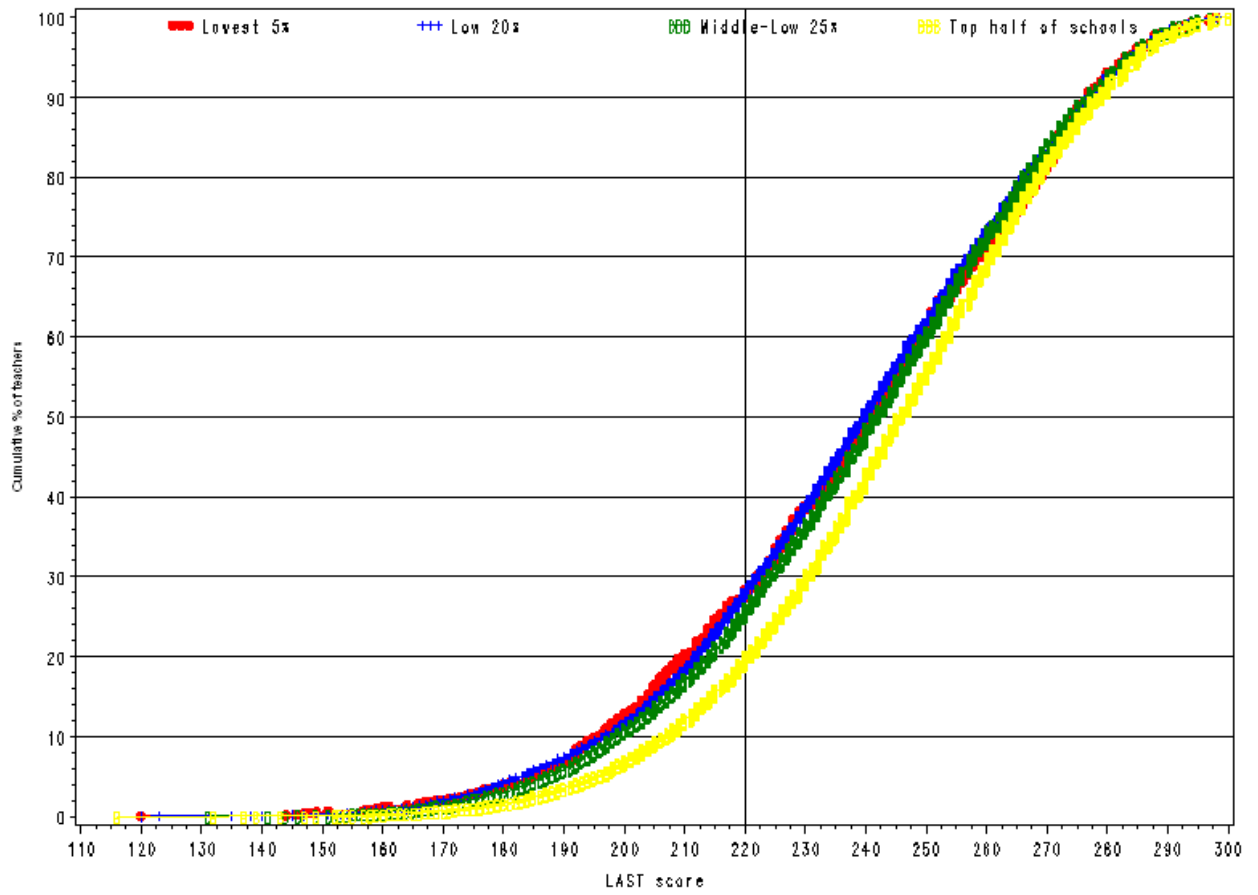




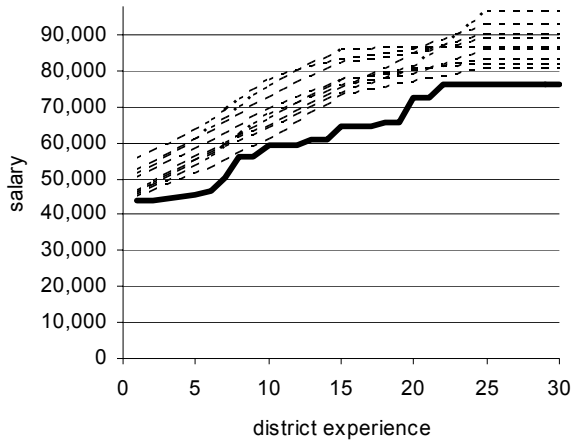
Figure 4

Cumulative Distributions of LAST Certification Exam Scores of New York City Teachers  
(Schools ordering based on percent of students in school failing grade 4 Science exam in 2004)



Figures 5a – 5e  
Teacher Salary Schedules for Urban Districts and Representative  
Samples of Districts in the Surrounding Suburbs (MA Degree, 2003)

**Figure 5a: New York City and Long Island**



**Figure 5b: New York City and Lower Hudson Valley**

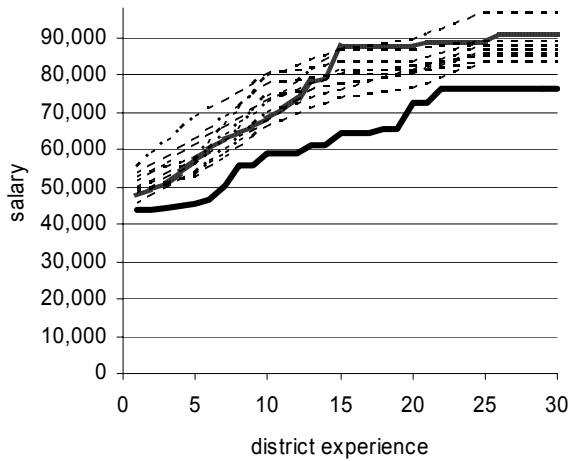


Figure 5c: Buffalo

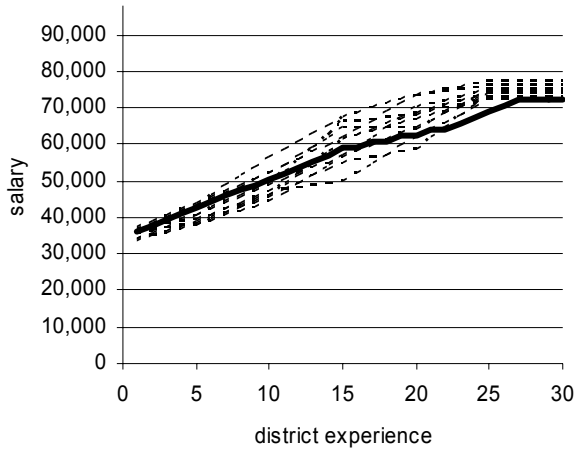


Figure 5d: Rochester

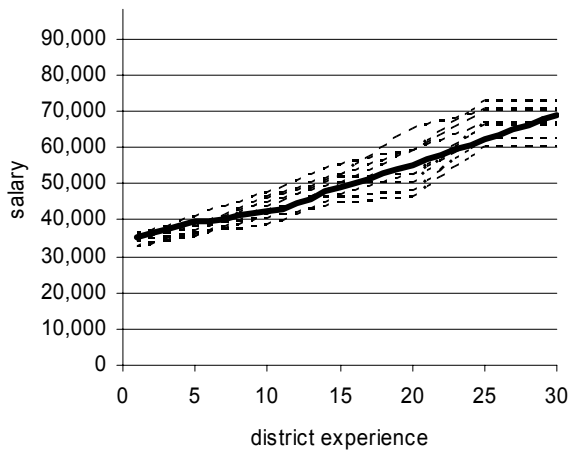
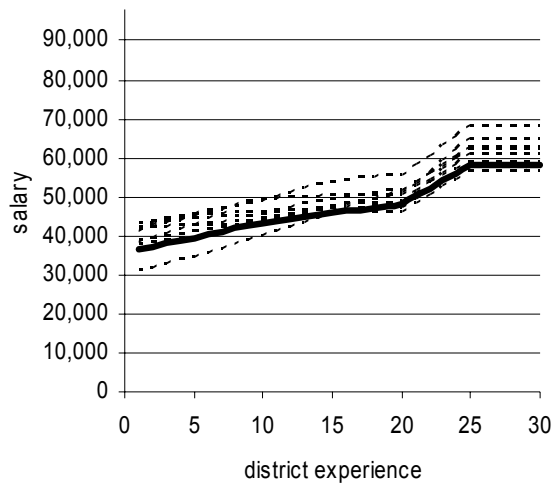


Figure 5e: Syracuse



Figures 6a – 6d  
Real Salaries of Teachers in Urban Districts and Surrounding Suburbs  
(1 and 20 years of experience, 2003 dollars)

Figure 6a: NYC, Yonkers and Surrounding Suburbs

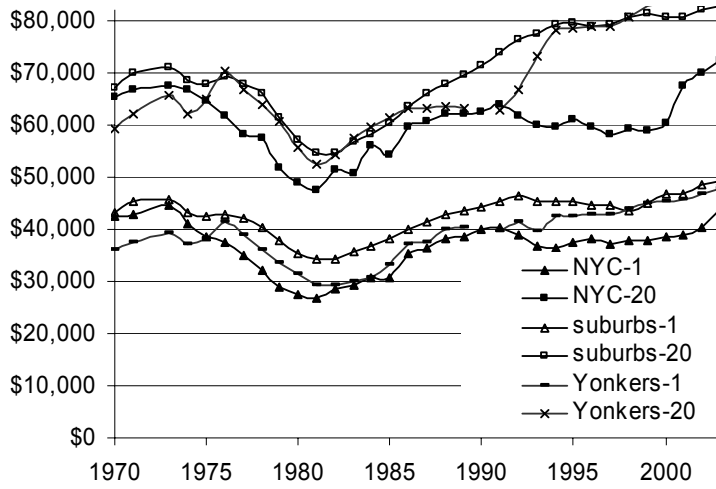


Figure 6b: Buffalo and Surrounding Suburbs

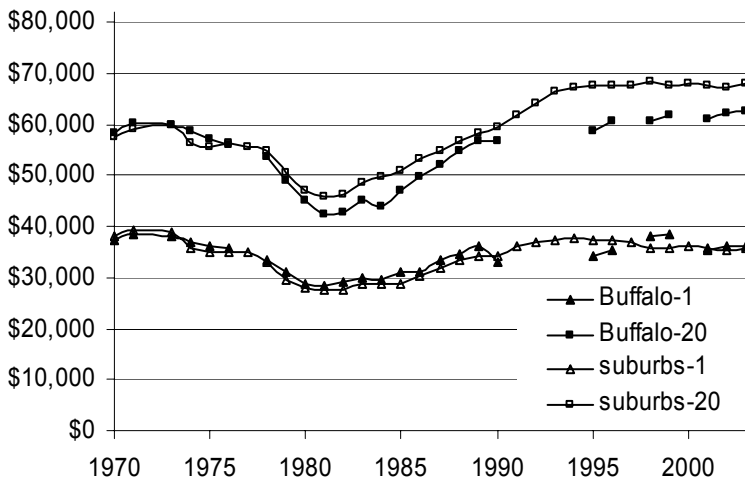


Figure 6c: Rochester and Surrounding Suburbs

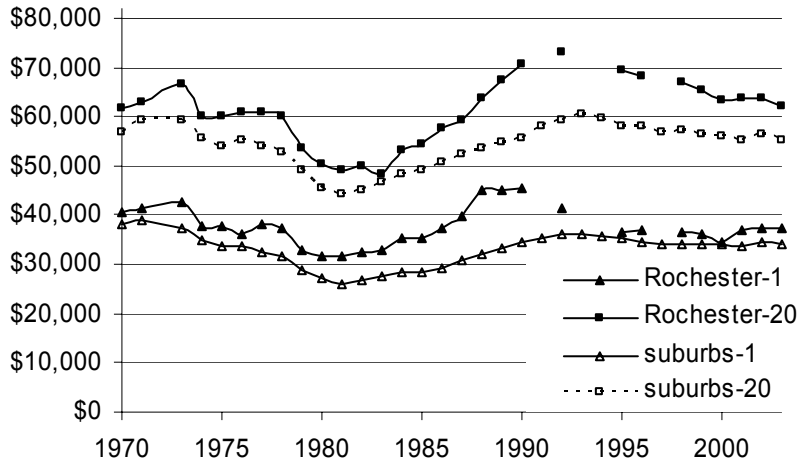


Figure 6d: Syracuse and Surrounding Suburbs

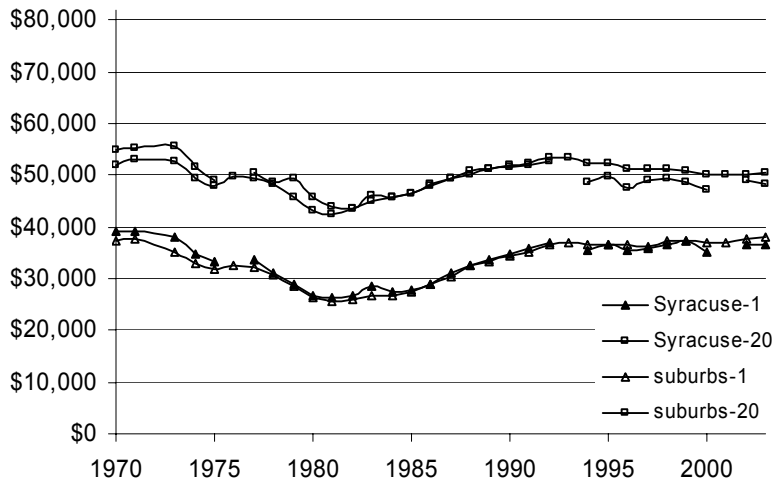


Figure 7: Cumulative Proportion of New York City Teachers Transferring to Other New York State Public School Districts by Year of Beginning Cohort

