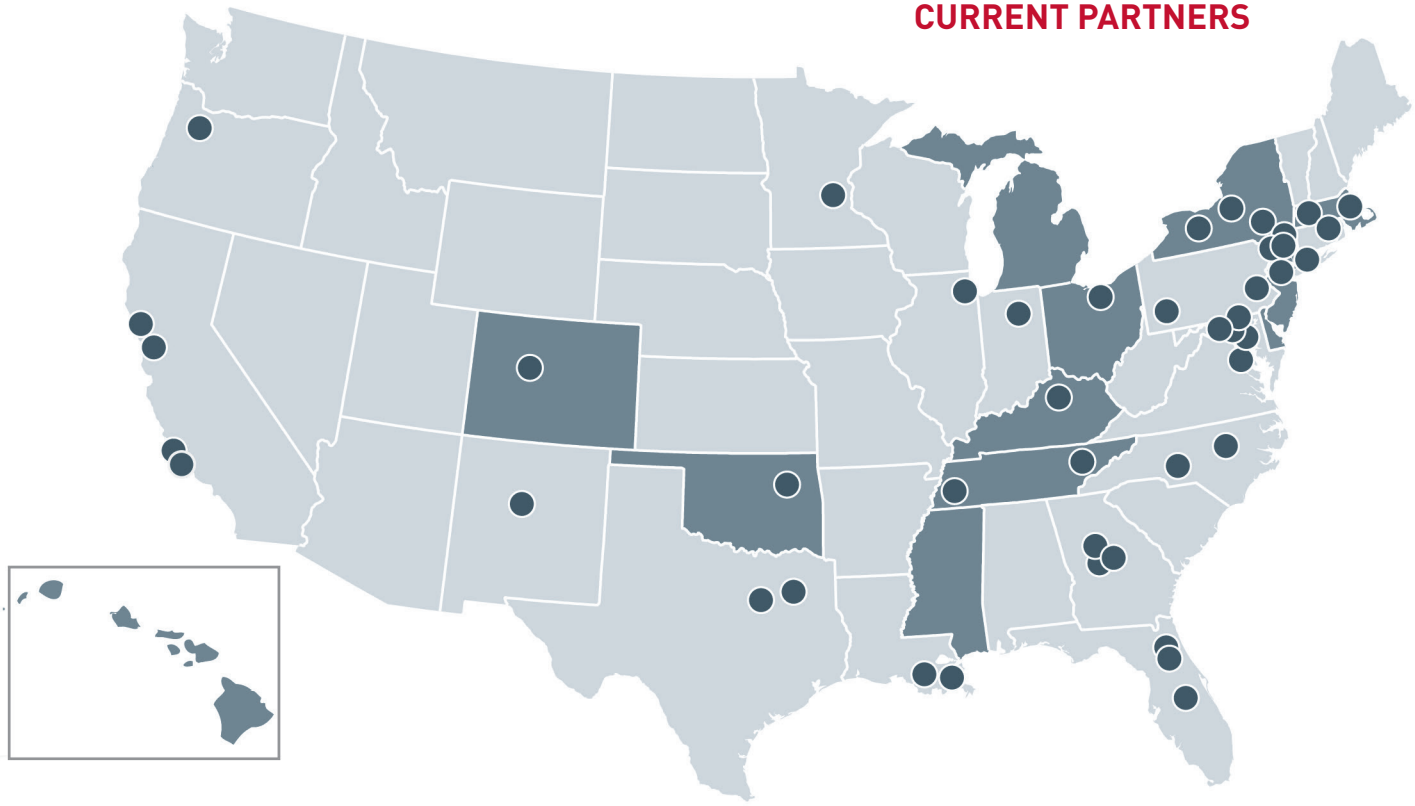
STRATEGIC DATA PROJECT

SDP HUMAN CAPITAL DIAGNOSTIC

Boston Public Schools, Massachusetts

August 2013

CURRENT PARTNERS



STRATEGIC DATA PROJECT (SDP)

Since 2008, SDP has partnered with 56 school districts, charter school networks, state agencies, and nonprofit organizations to bring high-quality research methods and data analysis to bear on strategic management and policy decisions. Our mission is to transform the use of data in education to improve student achievement.

Part of the Center for Education Policy Research at Harvard University, SDP was formed on two fundamental premises:

1. Policy and management decisions can directly influence schools' and teachers' ability to improve student achievement.
2. Valid and reliable data analysis significantly improves the quality of decision making.

SDP's theory of action is that if we are able to bring together the right people, assemble the right data, and perform the right analysis, we can help leaders make better decisions—ultimately improving student achievement significantly.

To make this happen, SDP pursues three strategies:

1. Building a network of top-notch data strategists who serve as fellows for two years with our partners (e.g., school district, charter management organization, nonprofit, or state education agency).
2. Conducting rigorous diagnostic analyses of teacher effectiveness and college-going success using agency data.
3. Disseminating our tools, methods, and lessons learned to the education sector broadly.

For more information, visit: www.gse.harvard.edu/sdp

The project is supported by the Bill & Melinda Gates Foundation.

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INTRODUCTION AND BACKGROUND

CONTENTS

Educators, researchers, and policymakers alike agree that teachers play a critical role in student learning. In fact, research has shown that a teacher's effectiveness has more impact on a student's academic achievement than any other factor controlled by school systems, including class size and the school a student attends (Rivkin, Hanushek, & Kain, 2005).

Only recently, however, have the data become available to measure teacher effectiveness in ways that can inform education policy and practice. To this end, the Strategic Data Project (SDP) has developed a human capital diagnostic to help school districts and agencies better understand the distribution of effective teaching, uncover issues, and respond strategically.

In 2011 and 2012, SDP researchers collaborated with Boston Public Schools (BPS) staff to use this framework to analyze teacher effectiveness and to provide a starting point for developing deeper questions about the mechanisms behind the results. Secondary goals of the diagnostic were to assess the depth, breadth, and quality of the district's administrative data and to demonstrate ways that BPS could capitalize on this information to improve policy and practice.

The research team, working with BPS staff and the SDP Fellows, used Massachusetts Comprehensive Assessment System (MCAS) test scores in mathematics and English/language arts (ELA) to assess the impact of teachers on achievement for students in Grades 4 through 8 in the 2006–07 to 2009–10 school years. Each student's performance was compared to that of his or her peers as well as with his or her own performance in the prior year. These "teacher effects" statistically isolate the average impact a teacher has on student achievement from factors that a teacher has little or no control over, such as student poverty, English-learner status, and prior academic achievement.[1]

Mirroring work with other partner agencies, SDP researchers developed a series of analyses that examined various aspects of teachers' performance across the typical stages of a teacher's career at BPS—recruitment, placement, development, evaluation, and retention. Based on the findings from these analyses, SDP and BPS together identified areas of particular policy and strategic interest for further exploration, such as analyses focused on the demographic characteristics of new teachers, and whether and how rates of new hires and teacher retention differ across BPS schools and are related to schools' average student achievement level.

This report presents findings from the SDP Human Capital Diagnostic for BPS, focusing on analyses related to teacher hiring and placement, effectiveness and compensation, and retention and turnover.

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KEY FINDINGS

Hiring and Placement

- Schools with the highest average MCAS math scores were least likely to hire new teachers. Among schools in the top quartile of average MCAS achievement, new teachers comprised 8% of these schools' teaching staffs in the 2006–07 through 2009–10 school years. By comparison, 11% of the teachers in bottom-quartile schools were new teachers.

- The racial composition of BPS teachers did not match the racial composition of the district's students. For example, 58% of teachers were White, but only 14% of students were White.

- The share of BPS teachers from minority racial/ethnic backgrounds varied across teachers with different years of experience in the district. For instance, Black teachers made up 37% of teachers with 10 or more years of district experience, compared with only 15% of teachers in their first five years of teaching.

Effectiveness and Compensation

- Math teacher effectiveness, as measured by the impact on student MCAS scores, grew most during the first three years of teaching and then plateaued after year four at about 0.14 standard deviations higher than the average value for novice teachers.

- There was no significant difference in effectiveness between teachers with and without masters' degrees after controlling for teachers' years of experience.

Retention and Turnover

- Among novice teachers who entered the district in the 2006–07 school year, 55% were still teaching in BPS three years later, and 43% were still teaching in the same school.

- Math teachers in the top quartile of teacher effectiveness were significantly more likely to continue teaching in the same school in the following year then their bottom-quartile peers. The annual retention rate for top quartile math teachers was 86% compared with 76% for their bottom-quartile peers.

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ANALYSES: Hiring and Placement

Hiring and Placement

A school system's teaching force is its most valuable asset and also its largest cost. Monitoring hiring patterns across schools in a district can help system administrators identify schools where teachers' relative inexperience may require a greater investment in teacher development or where large numbers of experienced teachers may be retiring in coming years. Examining teachers' background characteristics—such as their race and gender—and how the composition of the workforce has changed over time can inform policymakers' efforts to recruit and retain a workforce that mirrors the diversity of the student population it serves. Research suggests that the match between teachers' and students' race and gender can affect students' performance (see, for example, Dee, 2004, 2005, 2006). Further, examining how students are placed with new and recently hired teachers can shed light on potential inequities between and within schools. Teacher race has been of particular concern in Boston because of a 1975 court order mandating that 25% of the BPS teacher workforce be Black and an additional 10% be from other minority groups (Morgan v. Kerrigan, 1975).

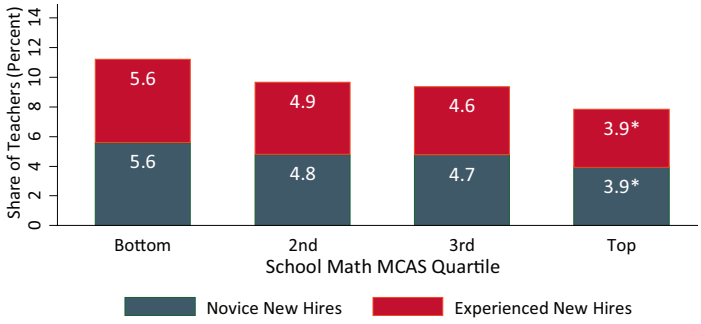
Guiding Questions

- How does hiring vary across BPS, and what kinds of schools hire what kinds of teachers?
- What are the characteristics of the BPS teacher workforce?
- How do the demographic characteristics of Boston's teachers and students compare?
- How academically prepared are students who are placed with inexperienced teachers relative to peers who are taught by more experienced teachers?

Identifying teacher hiring patterns provides district leaders with a useful baseline for assessing the current workforce. This information can be broken down by school performance level or school type to reveal important trends in staffing that are often obscured at the district level. For example, Figure 1 divides schools in the BPS system into four quartiles based on the average math MCAS scores for each school for all tested students in all school years from 2006–07 through 2009–10. The figure shows that schools in the bottom quartile of average student achievement were the most likely to hire new teachers during those school years. Approximately 11% of teachers in these schools were new hires, compared with 8% in top-quartile schools.

Comparing the proportions of novice and experienced new hires in Figure 1, exactly 50% of all new teachers in both top- and bottom-performing schools came into the district with prior experience.

Figure 1. Share of Teachers Who Are New Hires by School Average MCAS Score



*Significantly different from bottom quartile value, at the 95 percent confidence level.
Notes: Sample includes teachers with teacher job codes who are linked to students in traditional and exam schools, with 11851 teacher years and 4230 unique teachers in the 2006-07 to 2009-10 school years. New hires are provisional class 1. Novices are provisional class 1 and have salary step 1. School MCAS performance quartiles are calculated across all traditional and exam schools with students in grades 4-8 or grade 10, using all sample years. All data are from Boston Public Schools administrative records.

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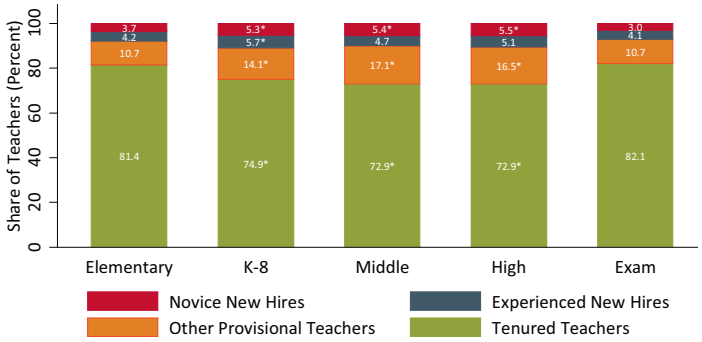
ANALYSES: Hiring and Placement

However, the experience level of new hires differed across types of schools. Comparing the proportion of experienced new hires to novice new hires across each school type, Figure 2 shows that exam schools were slightly more likely to hire experienced teachers. Approximately 58% of new hires between 2006–07 and 2009–10 at these schools had prior teaching experience. It is worth noting that exam schools also had a larger share of tenured teachers and lower shares of both novices and experienced new hires than other schools.

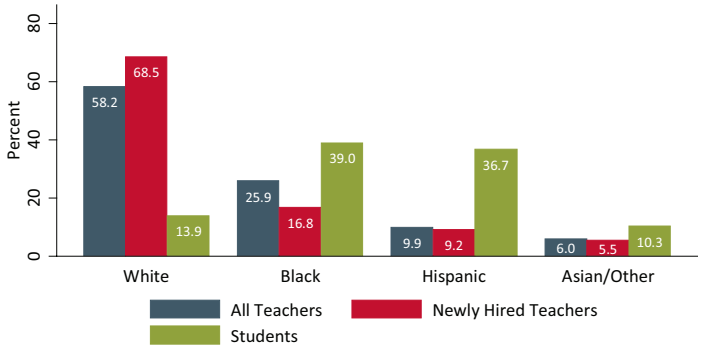
Figure 2. Share of Teachers Who Are New Hires by School Type



*Significantly different from elementary school value, at the 95 percent confidence level.
Notes: Sample includes teachers with teacher job codes who are linked to students in traditional and exam schools, with 11860 teacher years and 4231 unique teachers in the 2006-07 to 2009-10 school years. New hires are provisional class 1. Novices are provisional class 1 and have salary step 1. Other provisional teachers are not new hires and do not have tenure. All data are from Boston Public Schools administrative records

The racial distribution of new BPS teachers roughly mirrored the overall distribution of teachers. As Figure 3 shows, though, a somewhat larger share of new hires was White and a smaller share of new hires was Black, relative to the shares of teachers from different races across all BPS teachers. Of the new teachers hired in the 2006–07 through 2009–10 school years, 69% were White, 17% were Black, and 9% were Hispanic. For both new teachers and all teachers, the racial distribution of teachers did not match the racial distribution of students. Only 14% of students were White, while 39% were Black and 37% were Hispanic.

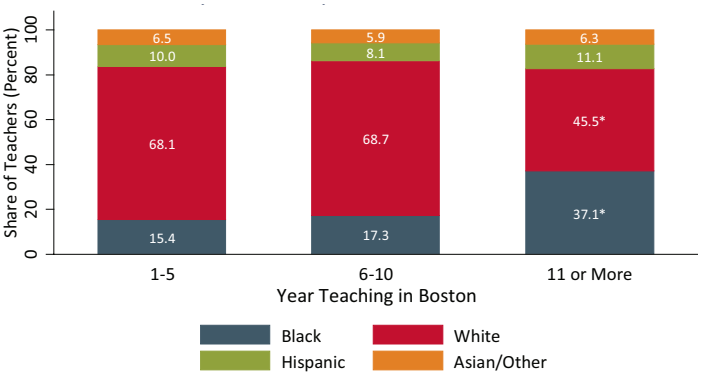
Figure 3. Shares of Teachers and Students by Race



Notes: Teacher sample includes teachers with job codes who are linked to students in traditional and exam schools in the 2006-07 to 2009-10 school years, with 11776 teacher years and 4147 unique teachers. Student sample includes 215051 student years and 79543 unique students in the same years and schools. Newly hired teachers are provisional class 1. All data are from Boston Public Schools administrative records.

The experience levels of Boston teachers also differed by race. Black teachers working within BPS in 2009–10 had nearly five more years of in-district experience on average than White teachers and nearly three more years of in-district experience than Hispanic or Asian teachers (not shown). As Figure 4 shows, the average shares of White teachers were similar for teachers in the first five years and second five years of teaching. Among teachers with more than 10 years of in-district experience, however, the share of White teachers was sharply lower, while the share of Black teachers more than doubled. The racial distribution of teachers with different levels of in-district experience could reflect differential rates of attrition, changes in hiring practices, changes in the composition of teacher applicants, or a combination of all three.

Figure 4. Teachers in 2009–10 by District Experience and Race



*Significantly different from value for years 1-5, at the 95% confidence level.
Notes: Sample includes 2904 teachers with teacher job codes who are linked to students in traditional and exam schools. All data are from Boston Public Schools administrative records.

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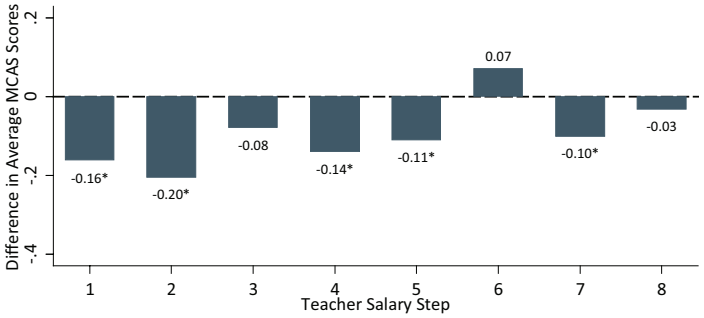
ANALYSES: Hiring and Placement

Across the country, novice and early-career teachers have been shown to be less effective than their more experienced peers (Clotfelter, Ladd, & Vigdor, 2006; Jacob, 2007). As described later in this brief, this finding also holds true in Boston. Placing inexperienced teachers with students who are already academically behind their peers is likely to exacerbate achievement gaps. Figures 5 and 6 test whether this practice is prevalent in BPS. The two figures show the difference between incoming math scores for students of teachers at the bottom of the salary step scale and incoming math scores for students of teachers at salary step nine and above. Teachers can transfer up to three years of credit for prior teaching experience to begin work in Boston at a level above salary step one. Thus salary step serves as a rough proxy for total experience for early-career BPS teachers.

Figure 5 shows district-wide results, while Figure 6 restricts the analysis to compare teachers only within the same school. As Figure 5 demonstrates, overall, students of teachers who were lower on the salary scale tended to have lower prior achievement. For example, in the district-wide comparison, students of teachers at salary step two began the year 0.2 standard deviations behind students of teachers at step nine or higher—roughly the equivalent of about six months of learning. As Figure 6 shows, the difference was half as large for students of second-year teachers when comparing teachers within the same schools, but it was still significant.

Figure 5. Students' Prior-Year Math Scores by Teacher Salary Steps Compared to Students of Teachers at Step Nine, Across Schools



*Significantly different from zero, at the 95 percent confidence level.
Notes: Sample includes 4th-8th grade math students and teachers with teacher job codes who are linked to those students in traditional and exam schools in the 2006-07 through 2009-10 school years, with 1893 teacher years, 49748 student years, 795 unique teachers, and 26088 unique students. All data are from Boston Public Schools administrative records.

Figure 6. Students' Prior-Year Math Scores by Teacher Salary Step Compared to Students of Teachers at Step Nine, Within Schools

*Significantly different from zero, at the 95 percent confidence level.
Notes: Sample includes 4th-8th grade math students and teachers with teacher job codes who are linked to those students in traditional and exam schools in the 2006-07 through 2009-10 school years, with 1893 teacher years, 49748 student years, 795 unique teachers, and 26088 unique students. All data are from Boston Public Schools administrative records.

Questions for Further Investigation

- What factors are responsible for the different levels of in-district experience we observe for teachers from different racial/ethnic backgrounds? Have, for instance, demographic trends in hiring changed over time, or do retention rates differ across teachers from different racial/ethnic backgrounds, or is there some other explanation altogether?
- How, if at all, do demographic matches between teachers and students affect student achievement?
- Are teachers' places of residence related to the racial distribution of teachers in Boston, and how, if at all, does a teacher's place of residence affect the likelihood of attrition?

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ANALYSES: Effectiveness and Compensation

Effectiveness and Compensation

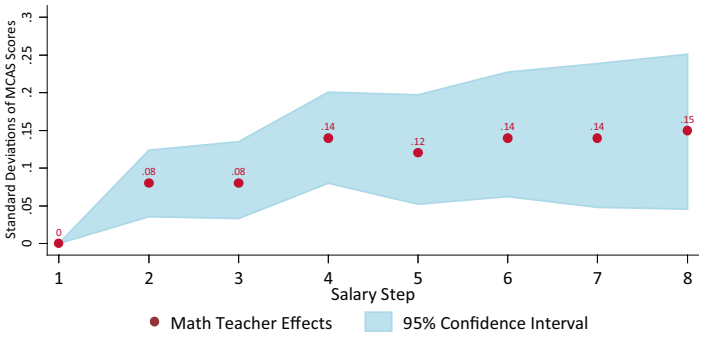
Analyzing how teacher effectiveness varies with experience can help district leaders understand how teachers develop professionally. Examining the intersection of experience, effectiveness, and compensation can also help uncover whether compensation systems are creating appropriate incentives. (See the box at the end of this section for a brief description of SDP's effectiveness measures.)

Guiding Questions

- How does the effectiveness of BPS teachers change as teachers gain experience?
- Are BPS teachers with advanced degrees more effective, on average, than their peers without such credentials?

In this analysis, improvement in effectiveness is defined as the differential impact that experienced teachers at each salary step had on student test scores relative to novices. Similar to findings in other school districts, the effectiveness of BPS math teachers improved most during the early years of their careers, with marginal returns to more years of experience. As Figure 7 indicates, the typical growth in MCAS test scores was 0.08 units for teachers at the second salary step relative to those at the first step, and a further 0.06 units for teachers at the fourth step relative to those at the third. Effectiveness relative to novice teachers leveled off at roughly 0.14 standard deviation units, with little or no additional gains.

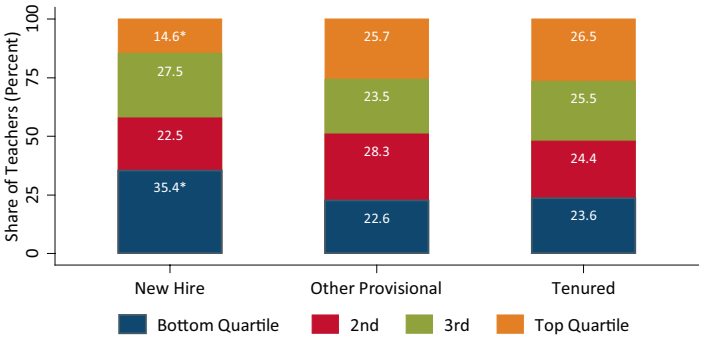
Figure 7. Growth in Math Teacher Effects by Salary Step



Notes: Sample includes teachers with teacher job codes and teacher effects estimates who are linked to 4th-8th grade students in traditional and exam schools in the 2006-07 to 2009-10 school years, with 1893 teacher years and 795 unique teachers. Teacher effects are average within-teacher gains compared to novice teachers. All data are from Boston Public Schools administrative records.

Since tenure within BPS is tied to in-district teaching experience, it is useful to look at teacher effectiveness by tenure status. Figure 8 groups BPS fourth- through eighth-grade math teachers into three experience categories: new hires (including both novices and new hires entering the district above salary step one), other provisional (with at least one year of prior in-district experience but no tenure), and tenured (with at least three years of in-district experience). If there were no differences in effectiveness, 25% of each group would fall within each quartile.

Figure 8. Share of Math Teachers in Each Effectiveness Quartile by Tenure Status



*Significantly different from 25 percent, at the 95 percent confidence level.
Notes: Sample includes teachers with teacher job codes and teacher effects estimates who are linked to 4th-8th grade students in traditional and exam schools in the 2006-07 through 2009-10 school years, with 1893 teacher years and 795 unique teachers. Teacher effectiveness quartiles are calculated using single-year teacher effects estimates. All data are from Boston Public Schools administrative records.

New hires were significantly more likely to be in the bottom effectiveness quartile (35%) than in the top quartile (15%). In addition, the share of new hires in the bottom effectiveness quartile was larger than the shares of provisional (23%) and tenured teachers (24%) in that quartile. The shares of provisional and tenured teachers in the bottom and top effectiveness quartiles differed little. These findings suggest that experience in the early years of a teacher's career in BPS yields improvements in student achievement, though highly experienced teachers were unlikely to be more or less effective than those with moderate amounts of experience.

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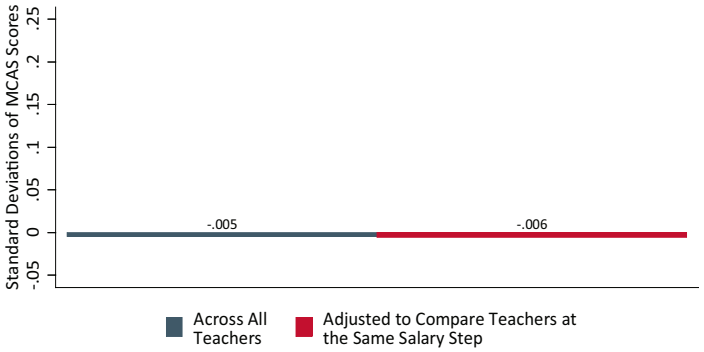
ANALYSES: Effectiveness and Compensation

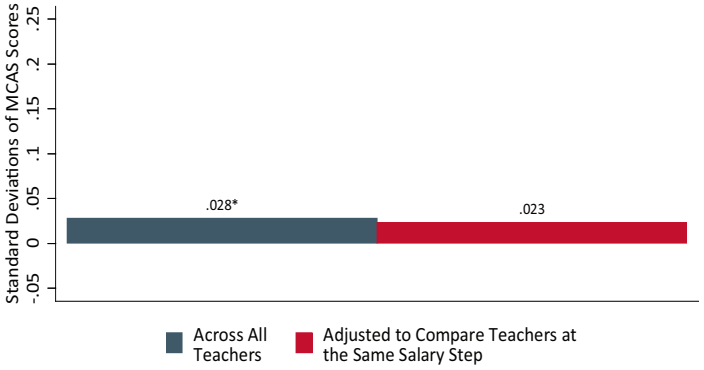
Another element of the BPS compensation system between 2006–07 and 2009–10 was that teachers holding or obtaining advanced degrees (master's or higher) in any field were paid higher salaries at every step. As Figure 9 shows, however, the average BPS math teacher with at least a master's degree was not significantly more effective than the average math teacher without an advanced degree—even among teachers within the same salary step. The differences between ELA teachers with and without advanced degrees were marginally significant, as shown in Figure 10, although that significance disappeared when comparing teachers within the same salary step. These results are similar to those that SDP has obtained in other school districts and are consistent with findings in the national literature (Staiger et al., 2006). Lastly, while Figures 9 and 10 present results for fourth- through eighth-grade teachers together, we also examined this same relationship separately for elementary and middle school teachers and found similar results.

Figure 9. Difference in Math Teacher Effects for Teachers with and without Advanced Degrees



*Values are significantly different from zero, at the 95 percent confidence level, if asterisk is present.
Notes: Sample includes teachers with teacher job codes and teacher effects estimates who are linked to 4th-8th grade students in traditional and exam schools in the 2006-07 to 2009-10 school years, with 1893 teacher years and 795 unique teachers. Teachers with advanced degrees have masters degrees or higher.
All data are from Boston Public Schools administrative records.

Figure 10. Difference in English/Language Arts Teacher Effects for Teachers with and without Advanced Degrees



*Values are significantly different from zero, at the 95 percent confidence level, if asterisk is present.
Notes: Sample includes teachers with teacher job codes and teacher effects estimates who are linked to 4th-8th grade students in traditional and exam schools in the 2006-07 to 2009-10 school years, with 1871 teacher years and 799 unique teachers. Teachers with advanced degrees have masters degrees or higher.
All data are from Boston Public Schools administrative records.

Questions for Further Investigation

- Are there specific advanced degrees that have a positive impact on teacher effectiveness—i.e., that are more predictive of raising student achievement?
- What forms of professional development are available for novice or experienced teachers that could improve their effectiveness?

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ANALYSES: Effectiveness and Compensation

Interpreting Teacher Effectiveness Results

Teacher effect estimates are valuable measures because they objectively capture the impact that individual teachers have on student achievement without holding teachers responsible for factors outside their control—most importantly, students' prior academic achievement. In addition, there are very few other widely used measures of teacher effectiveness that bear a relationship to improved student outcomes. Indeed, the most commonly rewarded indicators of teacher quality—years of experience and advanced degrees—account for little of the variation in student achievement (Staiger, Gordon, & Kane, 2006; Rivkin et al., 2005).

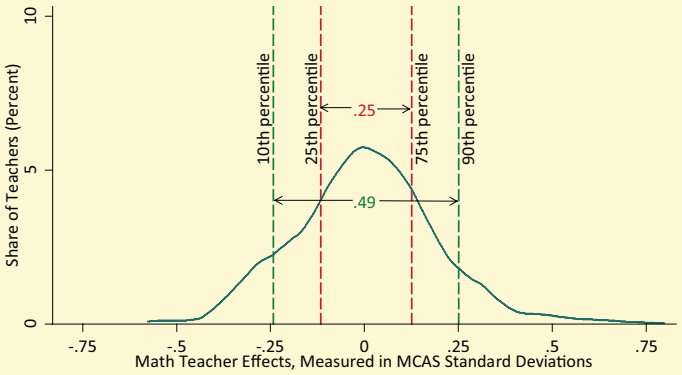
SDP measures teacher effect size by standard deviations in student test scores. Although there is no specific cutoff for a large or small effect, estimates above 0.2 are often considered large for educational interventions. One point of reference is the achievement gap in fourth-grade math between Black and White BPS students, which was 0.7 standard deviations in 2010.

Another way to assess teacher effectiveness is to convert the estimates into a months-of-learning measure. On nationally standardized tests, a teacher effect size of 0.20 equals roughly six additional months of learning above the average year's learning in math (Hill, Bloom, Black, & Lipsey, 2008). The average annual gains in math were calculated from six nationally normed standardized tests and averaged across grade transitions from third to eighth grade. Although the MCAS assessments are not nationally normed tests, it is still possible to use this conversion factor as a rough approximation in translating the size of teacher effects into a months-of-learning measure.

Student test scores were normalized to have an average of zero and a standard deviation of one. Estimates are based on the average change in these normalized test scores from one year to the next, controlling for other factors. As Figures A and B show, for both math and ELA teachers, more- and less-effective teachers were distributed approximately normally around zero.

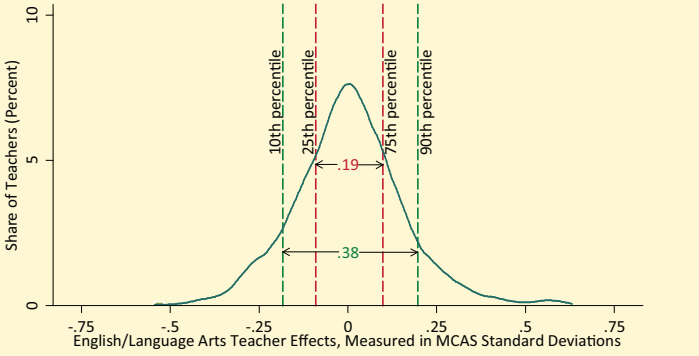
Teacher effects are not absolute measures but rather estimated relative to the average BPS teacher. As a result, even if BPS teachers as a group were among the most effective in the nation, half would still have negative effects because they were being compared to the average BPS teacher.

Figure A. Distribution of Math Teacher Effects



Note: Sample includes 795 4th-8th grade math teachers in school years 2006-07 through 2009-10. Percentages on the vertical axis approximately correspond to the area above 0.025 standard deviations on the horizontal axis. Teacher effects are estimated using student data from all sample years. All data are from Boston Public Schools administrative records.

Figure B. Distribution of English/Language Arts Teacher Effects



Note: Sample includes 799 4th-8th grade English/Language Arts teachers in school years 2006-07 through 2009-10. Percentages on the vertical axis approximately correspond to the area above 0.025 standard deviations on the horizontal axis. Teacher effects are estimated using student data from all sample years. All data are from Boston Public Schools administrative records.

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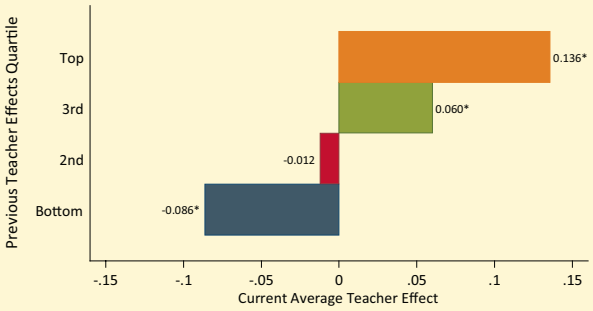
ANALYSES: Effectiveness and Compensation

Nationwide, teacher effects vary widely and can account for an important share of differences in students' academic progress. In BPS, teacher effects also varied widely. The difference between the effectiveness of math teachers at the 25th and 75th percentiles was one-quarter of a standard deviation—roughly equivalent to eight months of instruction. Furthermore, teacher effects were predictive of future teacher performance. As Figures C and D show, teachers in the top quartile had higher third-year effects on average than teachers in lower quartiles. Similarly, teachers in the bottom quartile continued to have low teacher effects in the third year.

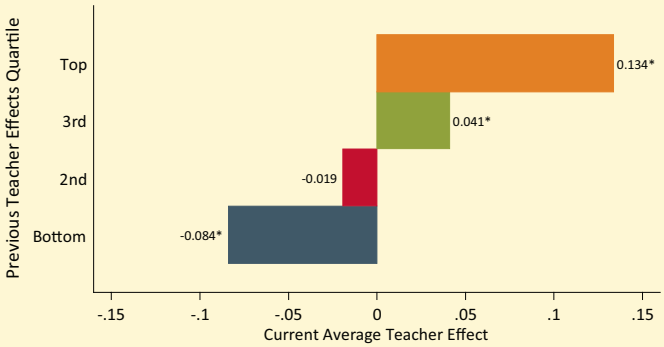
As with any performance measure, there are a number of caveats. First, SDP's teacher effects measure performance only as it relates to student achievement on the MCAS math and ELA tests, but effective teachers clearly do more than raise student test scores. Second, although the SDP measure accounts for supplemental instruction that students receive as part of their regular curriculum, it cannot account for extra help received outside of school. Finally, the SDP analyses highlight aggregate trends rather than evaluate individual teachers. Even so, care is required when interpreting group averages since teacher effects vary far more within than between groups. For example, while less effective on average than their more experienced peers, some BPS novice teachers outperformed more experienced teachers.

Figure C. Math Teacher Effects in Third Year by Rank during Previous Two Years



*Significantly different from zero, at the 95 percent confidence level.
Notes: Sample includes 328 math teachers with current and two-year prior teacher effects estimates and teacher job codes who are linked to students in grades 4-8 in traditional and exam schools in the 2006-07 to 2009-10 school years. All data are from Boston Public Schools administrative records.

Figure D. English/Language Arts Teacher Effects in Third Year by Rank during Previous Two Years



*Significantly different from zero, at the 95 percent confidence level.
Notes: Sample includes 321 English/Language Arts teachers with current and two-year prior teacher effects estimates and teacher job codes who are linked to students in grades 4-8 in traditional and exam schools in the 2006-07 to 2009-10 school years. All data are from Boston Public Schools administrative records.

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ANALYSES: Retention and Turnover

Retention and Turnover

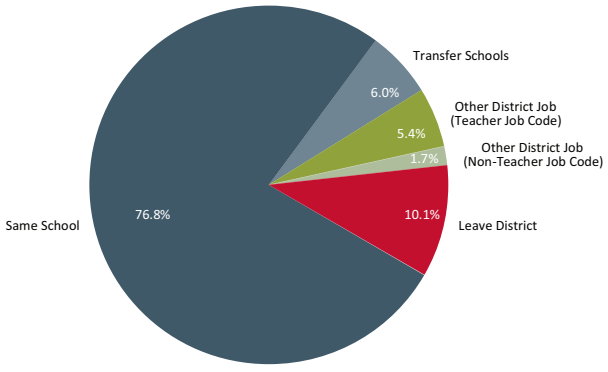
Workforce retention analyses can provide a useful perspective on the stability of the teaching staff and may indicate the need for additional professional support for certain subgroups of teachers. More fine-grained investigations of whether and how turnover differs according to teachers' effectiveness can help school systems determine whether patterns of turnover and mobility are likely to improve or compromise student performance and why.

Guiding Questions

- What are teacher turnover rates across the district, and where do teachers go when they leave BPS schools?
- How well is BPS retaining its most effective teachers?

According to the average one-year turnover rates for all BPS teachers shown in Figure 11, 77% of teachers who taught in a school in 2006–07 through 2008–09 also taught in the same school a year later. Of the 23% that did not continue teaching at the same school, more than half stayed within the district, either transferring to another school or moving to a different job.[2]

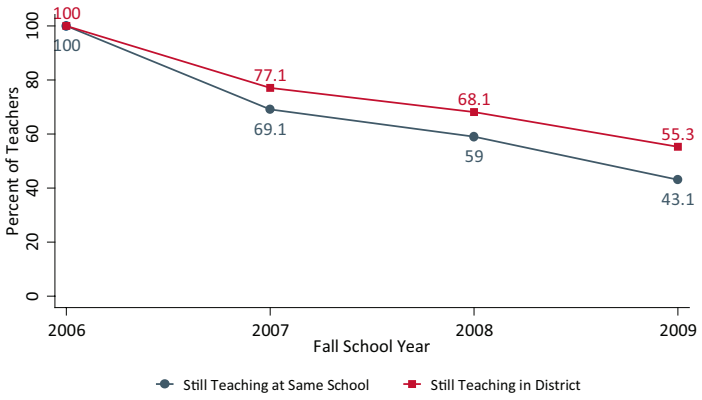
Figure 11. Average Teacher Turnover



Notes: Sample includes teachers with teacher job codes who are linked to students in traditional and exam schools in the 2006-07 to 2008-09 school years, with 8956 teacher years and 3947 unique teachers. Retention analyses are based on one-year retention rates. Teachers who moved to other district jobs are those who continued employment at BPS but were not linked to students in the following year. All data are from Boston Public Schools administrative records.

As discussed earlier, novice teachers are least effective on average during their first year in the district but show considerable gains in their second, third, and fourth years. As a result, it is useful to know how many first-year BPS teachers made it into their second year and beyond. Figure 12 shows the trajectory for a single cohort of novice teachers hired in the 2006-07 school year. These teachers began their careers at salary step one and presumably had no prior teaching experience. After one year, 77% of these novices were still teaching in the district, and 69% were still teaching at the same school. After three years, more than half were still teaching in the district; of those, more than three-quarters were at the same school.

Figure 12. Novice Teacher Trajectory



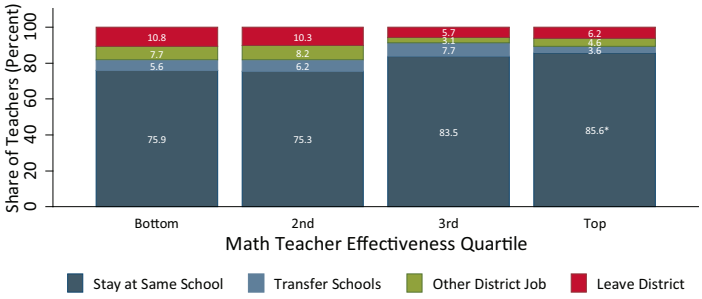
Notes: Sample includes 188 novice teachers in the 2006-07 school year with teacher job codes who are linked to students in traditional and exam schools. Novice teachers have salary step 1 and provisional class 1. All data are from Boston Public Schools administrative records.

SDP HUMAN CAPITAL DIAGNOSTIC

ANALYSES: Retention and Turnover

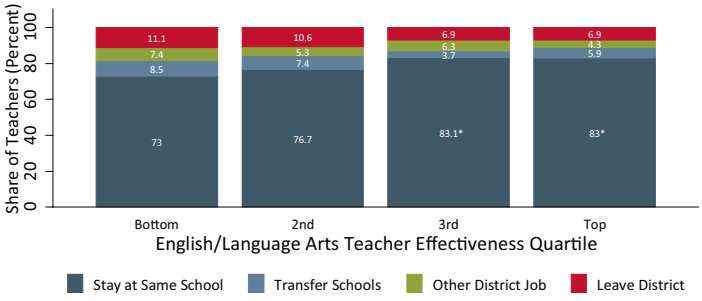
Retaining teachers, whether experienced or novice, can be good news, but it is important to take teacher effectiveness into account. The perpetual retention of teachers who are persistently ineffective may prevent school systems from hiring new teachers who might have more success with their students. Figures 13 and 14 show turnover rates for fourth- through eighth-grade math and ELA teachers between 2006–07 and 2008–09. Because newer teachers are simultaneously less effective and more prone to exit their schools and the teaching profession, these analyses focus on a subset of BPS teachers with three or more years of teaching experience. Among math teachers, 89% in the top effectiveness quartile continued teaching in Boston, either at the same or another district school. This compared with 82% of those in the bottom effectiveness quartile who continued teaching. Among the ELA teachers, the shares were the same: 89% and 82%, respectively.

Figure 13. Average Teacher Retention by Teacher Effectiveness for Experienced Math Teachers



*Significantly different from bottom quartile value, at the 95% significance level.
Notes: Sample includes math teachers with teacher effects estimates, teacher job codes, and at least three years of experience who are linked to students in Grades 4–8 in traditional and exam schools in the 2006–07 to 2008–09 school years, with 777 teacher years and 483 unique teachers. Teacher effects are averages of two-year pooled effects, unless only a single year of data is available. Retention analyses are based on one-year retention rates. Teachers who moved to other district jobs are those who continued employment at BPS, and may still have had a teacher job code, but were not linked to students. All data are from Boston Public Schools administrative records.

Figure 14. Average Teacher Retention by Teacher Effectiveness for Experienced English/ Language Arts Teachers



*Significantly different from bottom quartile value, at the 95% significance level.
Notes: Sample includes math teachers with teacher effects estimates, teacher job codes, and at least three years of experience who are linked to students in Grades 4–8 in traditional and exam schools in the 2006–07 to 2008–09 school years, with 755 teacher years and 474 unique teachers. Teacher effects are averages of two-year pooled effects, unless only a single year of data is available. Retention analyses are based on one-year retention rates. Teachers who moved to other district jobs are those who continued employment at BPS, and may still have had a teacher job code, but were not linked to students. All data are from Boston Public Schools administrative records.

Questions for Further Investigation

- Why do teachers leave the district, and are teachers who transfer more effective in their new schools?
- Are there any transfer patterns among more effective or less effective teachers that could shed light on mobility trends?

CONCLUSION

Conclusion

The goal of the SDP Human Capital Diagnostic was to demonstrate the insights that are available when administrative data from different source systems are combined and subjected to rigorous analysis. By combining student scheduling, demographic, and test score data with school and human resources information, we were able to investigate questions of interest to BPS policymakers concerning teacher and school performance and differences in the demographic characteristics of BPS's teacher and students.

The past decade has been a time of change and upheaval in education policy. Driven by the availability of new types of data and new methods of analysis, education research is helping to support a national conversation about how to close achievement gaps, increase equity, and improve outcomes for all students. It is the goal of SDP to use a district's own data to illuminate local workforce trends in a way that reflects this national conversation. Ultimately, the goal of the SDP Human Capital Diagnostic effort is to support policy and action that will improve outcomes for BPS students.

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RESOURCES AND ENDNOTES

Resources

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Endnotes

[1] Other student characteristics that the SDP model controls for include gender, race/ethnicity, participation in free or reduced price lunch, special education classification, gifted program participation, whether a student was retained, and whether the student was new to the school. In addition, the student-level variables are averaged by a student's classroom peers and a student's grade-level peers (cohort) in the same school. The peer and cohort averages are included as controls in the model.

[2] SDP defined a teacher as a BPS employee who, in a given school year, was on the active payroll, had a teacher job code, and could be matched to students in at least one classroom. Student–teacher links are, however, susceptible to data inconsistencies and incompleteness. In the retention analyses presented in this section, a subset of teachers is classified as having "other district jobs" in the subsequent year either because (1) they had a non-teacher job code (e.g., principals or administrators), or (2) they had a teacher job code but could not be matched to students in a classroom. For example, an employee with a teacher job code but no teacher–student links could be a non-teaching curriculum specialist but could also be a teacher who transferred to a school with missing or incomplete class roster data. As a result, the figures presented here may overstate the share of teachers who remained in the district but left classroom teaching.

Center for Education Policy Research

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