Strategic Staffing? How Performance Pressures Affect the Distribution of Teachers within Schools and Resulting Student Achievement

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Abstract
School performance pressures apply disproportionately to tested grades and subjects. Using longitudinal administrative data and teacher survey data from a large urban school district, we examine schools' responses to those pressures in assigning teachers to high-stakes and low-stakes classrooms. We find that teachers who produce greater student achievement gains in math and reading are more likely to be placed in a tested grade-subject combination in the following year and that the relationship between prior performance and assignment is stronger in schools where principals have more influence over assignments. This strategic response has the consequence of disadvantaging achievement in early grades, however, concentrating less effective teachers in K–2 classrooms, which in turn produces lower achievement for those students, as measured by low-stakes assessments, that may persist into tested grades as well.

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Evidence abounds that schools respond strategically to the pressures of high-stakes accountability systems in both productive and unproductive ways. Researchers have documented a long list of unintended responses to these pressures, including gaming the composition of the population by suspending low achievers during the testing window or reclassifying them as learning-disabled (e.g., Figlio, 2006; Jacob, 2005), focusing school resources away from lower achievers towards those near proficiency cutoffs (Booher-Jennings, 2005), or cheating by altering students' responses to test items (Jacob & Levitt, 2003). More productively, accountability pressures push schools to increase instructional time, focus teacher attention on core subjects, provide supplemental educational services for struggling students, and expand time for teacher collaboration (see Dee, Jacob, & Schwartz, 2013; Hannaway & Hamilton, 2008;

Jacob & Lefgren, 2004; Rouse, Hannaway, Goldhaber, & Figlio, 2007). Some recent evidence suggests that strategic behavior seeking to improve student test performance may also extend to how schools make decisions about their teacher workforce. For example, in interviews principals report engaging in strategic hiring, assignment, development, and dismissal practices with the goal of improving their schools' average test performance (Cohen-Vogel 2011). Research documenting these behaviors systematically or linking them explicitly to accountability pressures, however, is scarce.

In this article, we focus specifically on one area of strategic staffing Cohen-Vogel (2011) identified: assignments of teachers to students and classes. While a long literature has examined the sorting of teachers across schools—and repeatedly documented the matching of better qualified teachers towards higher achieving students (e.g., Lankford, Loeb, & Wyckoff, 2002; Clotfelter, Ladd, & Vigdor, 2006)—a small literature has begun to consider teacher assignment decisions within schools as well. For example, despite research demonstrating that beginning teachers are less effective (Nye et al., 2004; Rockoff, 2004), schools systematically assign less experienced teachers to lower performing students, though evidence also suggests that this tendency is less pronounced in high-growth schools (Loeb, Kalogrides, & Béteille, 2010; Kalogrides, Loeb, & Béteille, 2013). Decisions about how schools deploy existing teacher resources likely impact student achievement levels and gaps among students, given that matching a student to an effective teacher is a primary means whereby a school can affect his or her outcomes (e.g., Aaronson, Barrow, & Sander, 2007). Assignment decisions are also amenable to direct influence from school leaders, unlike some other areas of personnel management, such as teacher hiring, which may rest more heavily on factors (e.g., the quality of the applicant pool) that are beyond school leader control. Thus, by understanding and adjusting patterns of teacher assignment across classrooms, we may be able to improve outcomes for students and reduce gaps in access to high-quality teachers.

Because accountability systems measure school performance using student achievement test scores from some grades and subjects but not others, accountability pressures are felt disproportionately in some classrooms. Under No Child Left Behind (NCLB), in most states—including in Florida, the context for the present study—elementary schools are evaluated on the basis of math and reading achievement performance in grades 3, 4, and 5. In Cohen-Vogel's (2011) interviews, principals reported reassigning teachers from these "high-stakes" classrooms if their students showed inadequate test score performance to "low-stakes" assignments in grades K–2. Such a strategic move may improve student performance in the tested grade (and thus *measured* school performance) in the short term, particularly if a more effective teacher is available to fill the reassigned teacher's position. Longer term effects on school performance are less clear. They could be positive if, for example, the move results in a better match of a teacher's skills to his or her students or the content, or they could be negative if that match is poor, or if the move is to an assignment that is low-stakes but that has important effects on later learning, as might be the case for an ineffective third-grade teacher moved to an untested position in first grade (Claessens, Duncan, & Engel, 2009; Fuller & Ladd, 2013). Evidence on the importance of early-grades learning for later life outcomes suggests that a system that pushes schools to concentrate ineffective teachers in the earliest grades could have serious unintended consequences (Chetty et al., 2011; Schweinhart et. al., 2005).

Using detailed administrative and survey data from Miami-Dade County Public Schools (M-DCPS), we first ask whether the test performance of a teacher's students is associated with the likelihood that a teacher remains in or is moved out of a tested grade or subject in a subsequent year. This analysis echoes that of Chingos and West (2011), who showed that Florida teachers with lower value-added scores were less likely to be reassigned to tested classrooms. Second, we ask whether the relationship between the test performance of a teacher's students and the likelihood that they move to an untested area varies systematically across schools. In particular, we test differences by school level, the school's performance in the state accountability system, and school-level value-added. We also draw on data from a survey that we conducted with M-DCPS teachers to characterize class assignment policies in each school and test whether the relationship between teacher performance and where they are subsequently assigned varies by the factors that are considered in the assignment process (e.g., teacher seniority) and the participants that have higher perceived influence over assignments (e.g., the principal, parents). Finally, we assess whether a strategic school response to accountability pressure that moves low-performing teachers from high- to low-stakes classrooms is likely to have negative effects on student learning in grades in which the accountability pressures are weaker. We focus specifically on elementary schools, where moves of less effective teachers out of tested grades are likely to result in reassignment to untested early grades. Using student scores on the Stanford Achievement Test, Version 10 (SAT-10), a low-stakes exam administered in M-DCPS in early grades, we estimate learning gains among first and second graders taught by teachers reassigned from tested elementary grades.

The next section reviews what we know about strategic responses to accountability pressures, including the small body of research on strategic personnel assignments. We then detail our data and methods before turning to a presentation of the results. We conclude with a discussion of the implications of the study for school and district policy and for future research.

Strategic Responses to Accountability Pressures

Test-based accountability systems, such as those imposed by the No Child Left Behind Act (NCLB), create incentives for schools to improve student outcomes and sanctions for schools that fail to do so. Prior research has documented the effects of accountability policy on the behaviors of teachers and school leaders. The types of strategies identified by these studies can be grouped into two categories: behaviors that increase average test scores without improving productivity and those that identify changes in the ways that schools deliver education that generate meaningful improvements to student learning.

There are several examples in the literature that describe educators' attempts to "game the system" as a means of increasing average student test scores. Jacob and Levitt (2003), for example, estimate that a minimum of 4–5 percent of elementary school teachers in Chicago Public Schools cheat on state tests by systematically altering students' responses to test items. The frequency of cheating increased when the incentives to do so increased (via grade retention policies tied to minimum test score cut-offs and threats to reconstitute low-performing schools). Figlio (2006) shows that schools differentially punish low-achieving students for misbehavior, particularly during testing periods, as a way of removing them from the testing pool. He compares incidents involving more than one student that was suspended. He finds that schools always tend to assign harsher punishments to low-performing students than to high-performing students but that this gap grows during the testing period of the school year. Moreover, these patterns are only evident in tested grades. There is also evidence that some schools respond to accountability pressure by differentially reclassifying low-achieving students as learning disabled so as to exclude their scores from the formula that determines schools' accountability ratings. Figlio and Getzler (2006), for example, use student fixed-effects models and find increases in reclassification rates for low-income and previously low-performing students to disabled after the introduction of Florida's testing regime. Such behaviors were concentrated among low-income schools on the margin of failing to meet the accountability standards.

Such practices may increase schools' average test scores—all important for high-stakes accountability systems—but have little meaningful impact on actual student learning. Other studies, however, suggest that schools also respond to accountability pressures in educationally meaningful ways. Rouse et al. (2007), for example, find that student achievement increases in response to accountability pressure and that changes to school policy explain at least some of these increases. In their study, increased accountability pressure was associated with increased focus on low-performing students, increasing the amount of the school day spent on instruction, increasing the resources available to teachers and decreasing the amount of control held by the principal. Dee, Jacob, and Schwartz (2013) similarly find that NCLB increased the allocation of instructional time to math and language arts, which may partially account for achievement gains associated with the law (Dee & Jacob, 2011). Cohen-Vogel's (2011) study shows that school leaders engage in a variety of personnel policies in hopes of increasing student achievement, which she terms "staffing to the test." In interviews, principals reported hiring, developing, and dismissing teachers in an effort to improve their schools' average test performance. For example, principals described selecting teacher candidates in part by looking at their past student outcomes data in hopes of ensuring that they are hiring more effective teachers.

Strategic Assignment of Personnel

Cohen-Vogel (2011) finds that principals report using student test scores when making decisions to reassign teachers within their schools. This strategic approach to human resource decisions is especially evident in lower performing schools, where some principals report moving effective teachers to tested grades (Cohen-Vogel, 2011). In keeping with the principals' reports, Chingos and West (2011) find that effective teachers are more likely to remain in grades and subjects where high stakes testing takes place and that this relationship is strongest in schools receiving lower ratings from the state's accountability system. Similarly, Fuller and Ladd (2013), in an examination of the distribution of elementary teacher credentials across grades in North Carolina, show that NCLB pushed schools to move more qualified early grades teachers to higher grades and less qualified upper elementary teachers to early grades.

The strategic allocation of staff described by these prior studies aligns with the large body of literature demonstrating that there is wide variability in teacher effectiveness and that teachers are one of the most important resources available to schools to improve student learning outcomes (Aaronson, Barrow, & Sander, 2007; Kane, Rockoff, & Staiger, 2008; Nye, Konstantopoulos, & Hedges, 2004; Rivkin, Hanushek, & Kain, 2005; Rockoff, 2004; Sanders & Rivers, 1996). Test-based accountability systems focus on student achievement in certain grades and subjects while placing less emphasis on others. School leaders, therefore, have clear incentives to keep their more effective teachers in tested grades and subjects while reassigning less effective teachers to positions that will not influence the school's accountability rating.

It is not clear, however, what effects on students or schools this type of strategic reallocation of low-performing teachers to low-stakes classrooms has over the long term, particularly if those low-stakes classrooms are in earlier grades that feed into later high-stakes classrooms. One on hand, the skills necessary to be successful in earlier grades may not be the same as those required to teach older children effectively, and reassignment may positively impact a teacher's performance if it leads to a better match with that teacher's skills. In this case, student achievement will be positively affected. On the other hand, if an ineffective teacher in later grades is also ineffective in earlier grades, such reassignment may have negative longer-run consequences for both students and the school, particularly if student-learning trajectories are affected by the foundations laid in earlier grades. Certainly learning is a cumulative process, and student learning in early grades are strong predictors of achievement in later schooling (e.g., Claessens, Duncan, & Engel, 2009; Perry, Guidubaldi, & Kehle, 1979; Watts et al., 2014). As one principal in a high-growth school interviewed by Cohen-Vogel (2011) put it, "you can't say you want your higher achieving teachers in grades three, four, five. If you have high achieving teachers in K, one, and two, then you are going to be okay with three, four. . . . You need strong teachers everywhere" (494).[1] Relocating an ineffective teacher to a grade prior to the onset of high-stakes testing may allow for the placement of a more effective teacher in the tested grade, but gains from that replacement may be undercut in subsequent years if there are deleterious effects on student learning in the earlier grade associated with the ineffective teacher that cannot be fully remediated. Moreover, student learning in early grades may affect post-schooling outcomes as college attendance and earnings, even if gains made in early grades do not show up in differences in achievement scores in later grades (Chetty et al., 2011).

Data

Our analysis of strategic assignment uses data from administrative files on all staff, students and schools in the Miami-Dade County Public School (M-DCPS) district from the 2003-04 through the 2011-12 school years. We also use data from a web-based survey of 8,000

[1] To this same point, another pointed out: "if you don't teach your children to read in first and second grade, you cannot make that up in third, fourth and fifth grade. . . . So, I have always hired my strongest teachers and put them in that first and second configuration" (Cohen-Vogel, 2011, 494).

M-DCPS teachers we conducted in 2011.[2] M-DCPS is the largest public school district in Florida and the fourth largest in the United States, trailing only the school districts in New York City, Los Angeles, and Chicago. In 2010, M-DCPS enrolled 347,000 students, more than 225,000 of whom were Hispanic. Nearly 90 percent of students in the district are either black or Hispanic, and 60 percent qualify for free or reduced priced lunches.

Administrative data come from three different files provided by the district: test score and basic demographic information for all students in the district, course-level data that link students to each of their teachers in each year, and a staff-level file with information on all district employees. The student-level files include student race, gender, free/reduced price lunch eligibility, number of times the student was absent that year, and the number of days the student missed school due to suspensions that year. The test score data include FCAT math and reading scores. The FCAT is given in math and reading to students in grades 3–10. We also obtained spring SAT-10 scores for students in grades kindergarten, 1, and 2. The second grade SAT-10 scores are available from 2004 to 2012, the first grade scores from 2009 to 2012, and the kindergarten scores from 2011 to 2012. The staff database includes demographic measures, prior experience in the district, current position, and highest degree earned for all district staff from the 2003-04 through the 2011-12 school years.

In our 2011 survey, we asked teachers several sets of questions about how students are assigned to teachers at their school. The first set asked teachers which actors were involved in the assignment of students to their classroom that year (i.e., 2010-11). We provided the teachers with a list of possible actors, including themselves, other teachers in their grade, the principal, and parents, and the respondents indicated involvement with a binary response of *yes* or *no*. Next, we presented teachers with the same set of actors and asked how much influence each one

[2] The response rate for this survey was 38%.

had over the assignment of students to their classroom that year. We recorded responses were on a scale of 0 (*not involved/no influence*) to 4 (*a lot of influence*). Lastly, we presented teachers with a list of factors, such as student academic needs, teacher seniority, teacher effectiveness, and parent preferences, and asked them to rate the importance of each factor in determining assignments at their school on a similar five-point scale.

We combine the survey data with the administrative data to create a teacher-level file with teachers' survey responses, demographic information from administrative data, and characteristics of the students in teachers' courses generated by matching teachers to student course-level data. We determine whether teachers teach tested grades and subjects by matching students to each of their teachers via course-level data. We code a teacher as teaching in a tested grade or subject if more than 50 percent of his or her students in a given year are in grades 3–10 and are enrolled in math or English/reading courses with that teacher. Note that in our data elementary school students also have course-level data but their teacher is generally the same across most subjects. Florida schools are required to test students in grades 3-10. In K–5 elementary schools, therefore, kindergarten, first, and second grades are untested grades while third, fourth and fifth grades are tested grades. For middle and high schools, we consider math and English/reading in grades 6 through 10 to be tested grades/subjects and consider teachers to be teaching in tested grades if at least half of their students meet those criteria are in these classes.

Table 1 provides the mean and standard deviations of the main variables used in our analyses. The first three columns show descriptive statistics for teachers in the administrative data and the final three columns show descriptive statistics for teachers that responded to our survey. Table 1 shows that the characteristics of our survey sample looks remarkably similar to the characteristics of the district as a whole. Survey respondents are similar to the district population of teachers in terms of race/ethnicity, gender, highest degree earned, total years of experience, and whether they teach in a tested grade or subject. Teachers average about 8 years of experience at their current school; they are predominately female (80 percent); 40 percent are Hispanic; 26 percent are black; and 46 percent have a master's degree or higher. The average teachers' class is 28 percent black, 9 percent white and includes 57–67 percent of students receiving free/reduced priced lunches.

Table 1 also shows basic descriptive statistics for the class assignment items included in our survey. Sixteen percent of survey respondents report that they themselves participate in the class assignment process at their school. Teachers report more involvement from principals, assistant principals and counselors with 51, 64, and 38 percent, respectively, reporting involvement from these three types of personnel. Seven percent of teachers also report that students and parents play some role in determining class assignments. Teachers also report that various factors related to student test performance and student academic needs play some role in the assignment process. For example, the academic needs of individual students and individual students' test performance are given ratings of above 3—which indicates that teachers view them as being somewhat to very influential in the assignment process (these items are rated on a 5 point scale that ranges from not influential at all to most important). All of the items have means of above 2 indicating that they have at least a little influence over how class assignment are made. We will use these items to examine whether assignments in tested areas happen differently in schools with different teacher-reported class assignment practices.

Methods

Our analysis comprises multiple components. First, we examine whether principals engage in strategic staffing when making teacher assignments to high-stakes classrooms. We do so by estimating the relationship between teacher effectiveness and assignments to tested grades and subjects. We test whether teachers in tested areas are more likely to be moved into a non-tested area following a year that their students perform poorly on state tests. For teachers who teach in a tested area in year *t* we predict whether they remain in a tested area in year *t+1* as a function of a measure of their performance and control variables:

$$\Pr(tested\ classroom\ at\ t+1)_{it} = \beta_0 + PERFORMANCE_{it}\beta_1 + T_{it}\beta_2 + \delta_{st} + \varepsilon_{ist} \quad (1)$$

Equation (1), which we estimate as a linear probability model, models the probability of remaining in a high-stakes classroom as a function of teacher performance, teacher-level characteristics (gender, race, highest degree, years in current school), and a school-by-year fixed effect that isolates the association between assignment and performance to be within school and year combinations.[3] We use three measures of teacher performance: (a) the average math test scores of students in a teacher's class(es) in year *t* ; (b) the proportion of students in a teacher's class(es) scoring proficient or higher; and (c) teacher's value-added to math achievement in year *t*.[4] The first measure captures whether principals consider the average test scores of teachers' students when determining class assignments; the second more closely captures the measure used for accountability purposes; and the third measure captures whether principals consider the adjusted student test score gains of teachers' students. The third measure is likely to capture something that more closely reflects teacher quality than the first and second, but it is harder for

[3] Results are similar using logistic regression.
[4] Teacher value-added is computed by predicting student math test scores in the current year as a function of math and reading scores in the prior year, student, school and class-level control variables, grade and year indicators and a teacher by year fixed effect. The teacher-by-year fixed effect, which we shrink to account for measurement error using the empirical Bayes method, is our measure of value-added.

principals to observe. Both average test performance and test score gains are considered in Florida's accountability formula, so all three metrics could influence strategic assignment decisions. In these models we also include a school-by-year fixed effect so that we make comparisons among teachers who teach at the same school.

In the second stage of our analysis, we assess whether the association between student test performance and the probability that a teacher remains in a tested area varies across schools with different characteristics. In most cases, this analysis simply includes appropriate interaction terms in the estimation of Equation 1, though in the case of one characteristic, school level, we re-estimate Equation 1 separately for elementary, middle, and high schools, given differences in the accountability context at each school level. For example, in middle schools, all grades are tested, so the only way a middle school teacher can be switched out of a tested area is if they change subjects or switch schools. In high schools, higher grades with more advanced course content are generally preferred by teachers (Neild & Farley-Ripple, 2008), so principals may feel pressured to assign their best or more experienced teachers to those (untested) grades.

We then test interactions with school accountability grades.[5] The direction of this interaction is not clear, a priori. Schools facing more accountability pressure may feel more compelled to engage in strategic staffing as a means of improving their school's performance. At the same time, however, one reason for lower school performance could be a failure to engage in strategic staffing, which would induce a negative correlation. In a related third analysis, we include an interaction with school value-added. School value-added, estimated from student

[5] School grades are determined by a formula used by the district that weighs the percentage of students meeting high standards across various subjects tested, the percentage of students making learning gains, whether adequate progress is made among the lowest 25 percent of students, and the percentage of eligible students who are tested. For more information, see: http://schoolgrades.fldoe.org/pdf/0708/2008SchoolGradesTAP.pdf

FCAT scores using a model comparable to the one used to estimate teacher value-added only replacing the teacher fixed effect with a school fixed effect, captures the average adjusted achievement gains associated with a school over time. Again, the direction for this interaction is unclear a priori. On one hand, high-growth schools may be high-growth in part because they have engaged in strategic behavior that has increased student test score gains over time, suggesting that school value-added will be a positive moderator between teacher performance and the probability of future assignment to a tested classroom. On the other, low-growth schools may feel greater pressure to engage in strategic assignment, in which case the direction will be negative.

We next include interactions of the teachers' student achievement level and value-added with teacher reports of class assignment policies at their school. We hypothesize that the relationship might be weaker in schools that place more emphasis on teacher preferences when determining assignments and stronger in schools that place more emphasis on students' academic needs and teacher effectiveness. In using the class assignment items, we aggregate teacher survey responses to the school level and examine the average rating (on a scale of 1–5) of the importance of the following factors when determining assignments: students' academic needs, teacher preferences, teacher experience in a certain grade or subject, teacher seniority, teachers' overall effectiveness, and teachers' effectiveness in a certain grade or subject. We also include interactions with school-average ratings of the amount of influence of the following personnel over assignments (on a scale of 0-4): the teacher themselves, other teachers in their grade, teachers in the grade below, other teachers, principals, assistant principals, counselors, parents, and students. Although we collected these measures in 2011, when collapsing them to the school-level and combining them with administrative data from other years, we treat them as a time-invariant feature of schools. Note that not all survey respondents were asked each of these assignment factor items, which is one of the rationales for aggregating responses to the school-level. We presented each teacher with 12 randomly drawn possible contributors to class assignments (from a list of 23) and asked them to rate the importance of each. The random assignment of questions reduced the burden on each individual teacher. We still have approximately 3,000 responses from teachers for each of these items (though the individual teachers that responded to each item differ).

Next, we test whether student learning gains in early grades are affected when students are taught by a (presumably less effective) teacher reassigned from a high-stakes grade. For this analysis, we estimate student gain-score equations, separately for math and reading, using student scores on the SAT-10 in those subjects in grades 1 and 2. These models take the form:

$$A_{it} = \beta_0 + A_{it-1}\beta_1 + High\_to\_Low\_Reassigned_{it}\beta_2 + Low\_to\_Low\_Reassigned_{it}\beta_3 + First\_Year\_Teacher_{it}\beta_4 + X_{it}\beta_5 + C_{ct}\beta_6 + \delta_{sgt} + \varepsilon_{icgt} \quad (2)$$

In this model, student *i*'s achievement at time *t* is a function of his or her prior-year score (i.e., in grades K or 1), a vector of student characteristics *X* (student race, gender, free lunch eligibility, and limited English proficiency status), and the aggregate of those variables to the classroom level (*C*), plus a school-by-grade-by-year fixed effect. The variable of interest in Equation 2, *High_to_Low_Reassigned*, is set equal to 1 if the student's teacher at time *t* was reassigned from grade 3, 4, or 5 (i.e., a high-stakes classroom) to grades 1 or 2 at the end of the prior year. Since all teachers that are new to a grade might exhibit lower student performance, we also include *Low_to_Low_Reassigned*, which is set equal to 1 if the student's teacher at time *t* was teaching a different K–2 grade in the prior year, and *First_Year_Teacher*, which is set to 1 if the teacher is in their first year in teaching. If teachers reassigned from high- to low-stakes classrooms are associated with lower average learning gains, the coefficient β_2 will be negative, and potentially larger in magnitude (i.e., more negative) than β_3 and β_4.

Finally, we test whether students taught by a reassigned teacher in grade 2 have lower achievement in grade 3. If reassigned teachers are of lower quality, then students with reassigned teachers may learn less in second grade which may contribute to lower achievement in third grade. For this analysis, we predict student achievement on the FCAT in third grade, separately for math and reading. The following equation describes the model:

$$A_{i3} = \beta_0 + SAT10_{i2}\beta_1 + High\_to\_Low\_Reassigned_{i2}\beta_2 + Low\_to\_Low\_Reassigned_{i2}\beta_3 + First\_Year\_Teacher_{i2}\beta_4 + X_{it}\beta_5 + C_{ct}\beta_6 + \delta_{sgt} + \varepsilon_{icgt} \quad (3)$$

In this model, student *i*'s achievement at grade 3 is a function of his or her SAT-10 test score in grade 2, a vector of student characteristics *X* (student race, gender, free lunch eligibility, and limited English proficiency status), and the aggregate of those variables to the classroom level (*C*), plus a school-by-grade-by-year fixed effect. The variable of interest in Equation 2, *High_to_Low_Reassigned*, is set equal to 1 if the student's teacher at in grade 2 was reassigned from grade 3, 4, or 5 (i.e., a high-stakes classroom) at the end of the year before the student was in their class. Again, since all teachers that are new to a grade might exhibit lower student performance, we also include *Low_to_Low Reassigned*, which is set equal to 1 if the student's teacher in second grade was teaching grade K or 1 in the year before the student was in their class. Finally, *First_Year*_Teacher is set to 1 if the student's second grade teacher was in their first year when the student was in their class. If having a reassigned teacher in second grade has negative effects on third grade achievement, the coefficient β_2 will be negative and potentially larger in magnitude than β_3 and β_4.

Results

Teacher Effectiveness and Assignment to Tested Students

We first examine the relationship between the test performance of a teacher's students and whether he or she remains in a tested area in a subsequent year. Following a given year, there are 5 distinct destinations to which teachers in tested areas can move: (1) they can stay in a tested grade/subject and remain at the same school (70%); (2) they can move to an untested grade/subject and remain in the same school (13%); (3) they can stay in a tested grade/subject but move to a different school (5%); (4) they can move to an untested grade/subject and move to a different school (2%); or (5) they can leave the sample (10%). We create four different outcomes using this information: (1) for teachers in a tested grade/subject in year *t*, we predict whether they stay in a tested grade/subject in *t+1*, irrespective of their school assignment; (2) for teachers in a tested grade/subject in year *t*, we predict whether they stay in a tested grade/subject in *t+1* and remain in the same school; (3) for teachers in a tested grade/subject in year *t*, we restrict the model to teachers that remain in the same school in *t+1* and predict whether they remain in a tested area in *t+1*; and (4) for teachers in a tested grade/subject in year *t*, we restrict the model to teachers that switch schools in *t+1* and predict whether they remain in a tested area in *t+1*. Comparing the estimates for the third and fourth outcomes shows whether teacher performance is just as important in determining assignments to tested/non-tested areas for teachers that do and do not switch schools.

Table 2 describes the results of these models. The first row in each section shows the effects across all school levels. We see a strong positive relationship between class average achievement and teacher value-added and the probability that a teacher remains in a tested area. For example, the first column shows that a one standard deviation increase in students' math test scores predicts an 8 percent increase in the probability that a teacher remains in a tested area in the following year (comparing all switchers to all non-switchers). The results are similar across all four outcomes described above and when using teachers' value-added and the proportion of their students scoring proficient instead of class average achievement. These results suggest that principals may consider both average test scores of a teacher's students and the teacher's value-added, which measures students' achievement gains adjusted for their background characteristics, when moving teachers across grades within schools. Interestingly, the positive relationship between the test score measures and remaining in a tested grade holds up even among teachers who switch schools. This result lines up with those from prior (qualitative) studies that find that many principals use information on the test performance of teachers' students when making hiring decisions and when assigning transferring teachers (Cannata et al., 2014; Cohen-Vogel, 2011).

Interactions with School Characteristics

The secondary panels of Table 2 re-estimate Equation 1 separately by school level. In general, the coefficients are similar across school levels, though somewhat smaller in magnitude in high schools than in elementary or middle schools. This pattern indicates that high-performing teachers, regardless of how performance is measured, tend to be reassigned to tested classrooms in elementary, middle, and high schools. While we don't know why the results are less strong for high school, it is possible that in high schools teacher effectiveness data is less central in assignments decisions or that effective teachers' preferences for teaching 11^{th} and 12^{th} grade students are stronger than the desire on principals' part to keep experienced and/or effective teachers in tested grades (9^{th} and 10^{th} grade). In addition, high school students take some end-of-course exams, which, while not important for NCLB-driven accountability, may factor into teacher assignment decisions.

In Table 3 we examine whether the relationship between student performance and staying in a tested area varies by school accountability grades. We use two different measures of accountability grades. First, we code the grades on a five point scale (ranging from 0 to 4) and treat the measure as continuous. Second, we include dummy variables capturing “A” and “F” schools and treat B/C/D schools as the reference group. While we hypothesized that these measures might interact with assignment practices, we do not find clear evidence that they do.

We also look at the interaction between student performance, staying in a tested grade, and school value-added, a measure of student learning adjusted for students’ background characteristics. Here we do find that the relationship between the test scores of a teachers’ students and reassignment to a tested classroom is generally stronger in schools with higher value-added in high-stakes subjects. The finding also holds when test performance of teachers’ students’ is measured using mean achievement and proportion proficient but not when using teacher value-added. Principals may have a more difficult time observing value-added than the other measures of teachers’ performance. Overall, while lower performing schools may have more incentive to engage in strategic staffing, they do not appear to be reassigning teachers to untested grades more than are higher performing schools.

As shown in Table 4, we also find that the strength of the relationship between student performance and remaining in a tested area varies across schools using different class assignment policies. We are particularly interested in whether we see different patterns in schools in which teachers report more strategic assignment practices. When teachers report that more emphasis is put on teacher effectiveness, then, perhaps not surprisingly, the relationship between class average achievement and staying in a tested grade is stronger. None of the other assignment policy measures moderate the relationship between test performance and reassignments. We also find that the relationship between achievement and staying in a tested area is stronger when principals and other teachers have more involvement over assignments and weaker when parents and students have more involvement.

Reassignments of Teachers that Switch

Our next set of analyses builds on the models in Table 2 and shows the relationship between value-added and grade and subject assignments in the subsequent year. First, for elementary school teachers we restrict the analysis to teachers in a tested area in year *t* that stay in the same school in year *t+1*. We create a variable that is equal to the grade they taught next year, for those that move. This variable can take the values of kindergarten, 1st grade, 2nd grade, or "other" non-tested grade. We also identify teachers that teach grades 3–5 in one year and switch to another 3–5 grade in the subsequent year. Then we do simple *t*-tests to compare the value-added of teachers that move to each of these grades with those who remain in the same 3–5 grade. Table 5 shows the results. For both reading and math value-added we find that elementary teachers that switch to prekindergarten, kindergarten, first grade, or second grade have lower value-added to those that stay in the same 3–5 grade. Teachers that switch among grades 3–5 also have lower value-added than those that remain in the same grade but teachers that switch within the 3–5 set are higher performing than teachers that switch from grades 3–5 to grades K–2. The majority of elementary school teachers that move out of tested grades, switch to teach second grade in the following year (63 percent).[6]

[6] Very few teachers move to pre-kindergarten or to non-elementary school grades so those cells are omitted from the table.

For high school teachers we restrict the analysis to teachers in a tested area in year *t* that stay in the same school in year *t+1*. We create a variable that takes on 4 values: (1) changes grade but stays in same subject; (2) changes grade and switches subject; (3) stays in the same grade, but changes to a different modal subject; or (4) continues to teach a tested subject but switches from primarily teacher 9th graders to primarily teaching 10th graders or vice versa. The vast majority of high school teachers that leave a tested grade/subject switch from teaching 9th or 10th grade students to teaching 11th and 12th grade students (and remain in the same subject). High school teachers that remain in tested areas also have significantly higher value-added than those that switch to 11th and 12th grade classrooms in the following year.

Given the stark patterns in elementary schools, we further investigate the within-school sorting of teachers between and among high- and low- stakes K-5 classrooms by teacher performance measures. We first use SAT-10 data to classify the average math achievement of early grades teachers and estimate value-added for those teachers using the same approach as for the high-stakes standardized tests. We then pool standardized values for early grades and 3–5 teachers and run models predicting where teachers work at time *t*+1 as a function of their performance at time *t*, classifying teachers as working (a) in the same grade, (b) in a different grade but still within the early or upper primary set (e.g., a teacher who moves from second grade to first grade), or (c) in a different grade and not in the same early or upper primary set (e.g., a teacher who moves from second grade to third grade). We then run three different models, results of which are presented in Table 6. The focal variables in each model are average math achievement (or math value-added), an indicator for whether the teacher teaches in an early-grades (K–2) classroom, and the interaction between the two.

The results are generally consistent for math achievement and value added across the models. The first column predicts the probability of teaching in the same grade next year compared to not teaching in the same grade. Although the interaction term in the average math achievement models is not statistically significant, the value-added model suggests that high-performing K–2 teachers are *less* likely than high-performing 3–5 teachers to remain in the same grade next year. The second column makes the binary comparison between teachers who teach a different grade next year but still within the lower primary or upper primary set to teachers who either remain in the same grade or switch to the opposite grade set. Here, the average math achievement and math value-added model tell the same story, which is that high-performing K–2 teachers are less likely to move to other low-stakes grades. The final column compares teachers who switch to the *other* primary grade set (i.e., switch from K–2 to 3–5 or vice versa) to those teachers who remain in the same set, either in the same grade or in a different grade. Again, the results for average math achievement and math value-added are consistent, demonstrating that teachers in high-performing K–2 classrooms are more likely to be moved to the high-stakes, upper primary grades.

A graphical illustration of the value-added results is provided in Figure 1. For both K–2 and 3–5 teachers, the probability of staying in the same grade increases and the probability of moving to another grade in the same high- or low-stakes context decreases as teacher value-added increases. But among grade switchers, the pattern differs. High value-added teachers in grades 3–5 are *less* likely to switch to grades K–2. In contrast, high-value-added K–2 teachers are *more* likely to switch to tested classrooms. Alongside our earlier results, these findings are consistent with a general tendency of schools to reallocate effective teachers from across classrooms into the high-stakes grades, concentrating relatively less effective teachers in classrooms with the schools' youngest students.

Unintended Consequences of Strategic Staffing

Our final analysis considers the potential impact of shifting low-performing teachers to untested grades, given the opportunity that we have to follow elementary teachers reassigned to first and second grade classrooms. Table 7 shows the result of estimating Equation 2 for SAT-10 math and reading, pooling first and second grade students. Student math achievement is given as a function of whether their teacher switched grades. The coefficients show that, in both subjects, being taught by a teacher recently reassigned from a high-stakes grade is associated with learning gains that are .06 to .07 s.d. lower than those attained by students in classrooms with teachers that were not reassigned. For comparison, this effect is stronger than for students taught by a teacher that switched grades within the K–2 set, who have learning gains that are about .05 s.d. lower than those attained by students in classrooms with teachers that were not reassigned. In math, students taught by first year teachers have the lowest achievement gains, while in reading students taught by teachers that switched grades do the worst.

Lastly, we consider whether the apparently negative effect of being taught by a reassigned teacher in second grade is associated with lower FCAT achievement as of the end of the following year, third grade, which is the first grade "counted" for accountability purposes. The results are shown in Table 8. In the two leftmost columns, estimated from five years of data, we find evidence of a negative effect of similar size in both math and reading. Being taught by a reassigned teacher in second grade is associated with third grade scores that are between 0.02 and 0.03 s.d. lower than for other students (both coefficients significant at the 0.01 level). The magnitude of these relationships is similar to the effect of having had a first year second grade teacher. The rightmost columns add a control for SAT-10 score at the end of first grade to better isolate this effect. The tradeoff, however, is that we only have enough years of SAT-10 data to estimate the model that includes this lagged score for three cohorts of students. Despite this loss of sample size, the coefficients remain significant and similar in magnitude with the inclusion of controls for first grade achievement. These results suggest that reassignment of low-performing teachers to early grades may have longer term consequences for student learning trajectories.

Discussion and Conclusions

Our analysis of strategic staffing in tested and non-tested classrooms in a large urban school district finds that teacher effectiveness, as measured by student test score performance, in one year is a strong predictor of whether a teacher continues to teach tested students in a subsequent year. These patterns are particularly apparent in schools where more emphasis is placed on teacher effectiveness in determining class assignments and where principals have more influence. Although the association is strongest among school stayers, past performance is predictive of subsequent assignment to a high-stakes classroom even among teachers that switch schools. Taken together, our results suggest that principals attempt to balance their desire to satisfy stakeholders (teachers, parents, students) with their desire to improve student achievement when making assignment decisions. In higher stakes environments, principals may respond more strategically to accountability pressure and make different decisions about how to allocate teachers to students.

Gains from the strategic assignment of high-performing teachers to high-stakes grades have limits, however. Reassignment of low-performing elementary teachers to early grades results in reduced student achievement gains in those classrooms in both math and reading as measured by a low-stakes assessment. This result is concerning from the perspectives of both schools and families if achievement in early grades provides a foundation for later learning. In responding to the acute pressures of the accountability system, schools may be disadvantaging students taught by these less effective reassigned teachers over the longer term, opening up the possibility that, by providing incentives to increase student learning by increasing teacher effectiveness in later grades, current test-based accountability systems may also be perversely incenting reduced investment in students' earliest schooling years when returns on that investment are greatest (Heckman, 2006; Hill et al., 2008).

Consistent with the idea that a student's achievement is influenced not only by his or her current teacher but by past teachers as well, we find some evidence that this lower performance translates into lower achievement at the end of third grade. Being taught by a teacher moved from the upper elementary grades in second grade is roughly equivalent to being taught by a first-year teacher in terms of impacts on scores at the end of third grade. These results should give pause to school leaders aiming to boost school performance in the eyes of the accountability regime by focusing only on teacher effectiveness in high-stakes classrooms.

Follow-up research with additional years of K–2 achievement data linked to a longer panel of student achievement scores in tested grades may allow for a fuller investigation of the effects of reassignment of low-performing teachers to lower grades on student performance later in school. Studies of the persistence of teacher effects suggest that effects of this kind of systematic reassignment on later outcomes may be substantial (Konstantopoulos & Chung, 2011). In short, teachers at the earliest stages of a child's schooling career may have a disproportionately large impact on the child's learning trajectory, but policymakers have designed an accountability system that pushes schools to sort its best teachers away from those grades, with potentially large long-term consequences. Unfortunately, most accountability systems' focus on testing beginning in third grade further means that the kind of information on early-grades performance necessary to investigate this phenomenon is missing from most large-scale administrative data bases. Our results underscore the importance of education researchers bringing new data to these issues.

This study, however, faces concerns about generalizability. M-DCPS is a very large urban district whose school settings may be very unrepresentative of those in the typical school district. Although the accountability pressures faced by M-DCPS are similar to those faced by other Florida school districts, Florida's accountability system is among the nation's most stringent, and the pressures it applies on schools—particularly low-performing schools—may elicit particularly strong responses from schools (Rouse et al., 2007). Assessment of assignment practices both in general and in the context of school accountability set in other districts or states would be useful in developing our understanding of how schools approach human capital decision-making.

Future research might also consider whether the reassignment of low-performing teachers to low-stakes classrooms might have implications for student outcomes beyond those associated with moving teachers to early grades. Evidence in Table 5 suggests that high schools move many relatively low-performing teachers to non-tested classrooms in grades 11 and 12, for example, which may affect students' preparation for postsecondary opportunities. Reassignment of ineffective teachers to other kinds of untested classrooms (e.g., arts, non-core subjects) may similarly have consequences for student learning beyond math and reading.

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FIGURE 1: Association between teacher value-added in math and probability of staying or switching grades

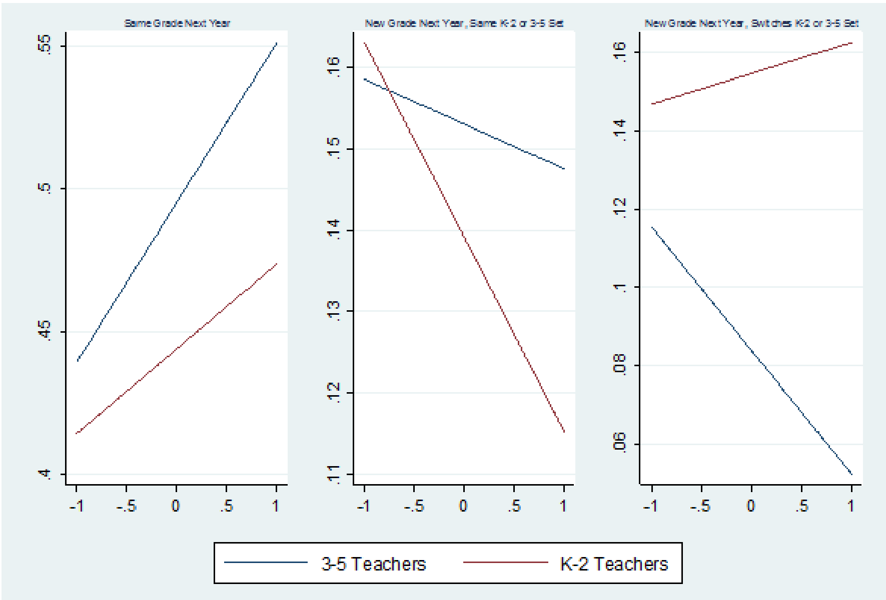

TABLE 1: Descriptive Statistics

	Administrative Data			Survey Data		
	Mean	SD	N	Mean	SD	N
Teacher Characteristics						
Female	0.76		140135	0.80		7473
White	0.29		139780	0.33		
Black	0.27		139780	0.26		7423
Hispanic	0.43		139780	0.40		7423
Other Race	0.02		139780	0.02		7423
MA or Higher	0.36		140139	0.46		7474
Experience in Current School	9.94	9.21	140139	8.23	7.38	7655
Teaches Tested Grade	0.40		140139	0.36		7730
Switches from Tested to Non-Tested Grade Between Current and Prior Year[1]	0.17		43795	0.16		3259
Class Characteristics						
Average Prior Year Math Achievement	-0.09	0.71	106025	-0.16	0.75	4997
Proportion Receiving Free Lunches	0.66	0.24	140089	0.67	0.23	6873
Proportion Black	0.28	0.33	140090	0.29	0.33	6875
Proportion White	0.09	0.12	140090	0.08	0.12	6791
Elementary School	0.53	0.50	140139	0.40	0.49	7639
Involvement in Class Assignments (Yes/No)						
Me				0.16	0.36	6568
Other Teachers in My grade				0.12	0.32	6568
Teachers in the Grade Below				0.16	0.36	6568
Other Teachers in My grade				0.11	0.32	6568
Principal				0.51	0.50	6568
Assistant Principals				0.64	0.48	6568
Counselors				0.38	0.48	6568
Parents				0.07	0.26	6568
Students				0.07	0.25	6568
Factors Involved in Class Assignments (1-5 Scale)						
Individual students' end-of-year state test performance				3.28	1.17	3011
Mixing disruptive and well-behaved students in a class				2.79	1.27	3024
Mixing students at different achievement levels in a class				2.89	1.25	3032
The academic needs of individual students				3.64	1.08	3057
Individual students' prior test scores				3.43	1.09	3001
Individual teachers' preferences or requests				2.59	1.14	3025
The test scores of a teacher's former students				3.05	1.17	3006

[1]Restricted to teachers in a tested grade in year t-1.

TABLE 2: Linear Probability Models Predicting Staying in a Tested Grade between Years

Comparison:	All Non-Switchers to All Switchers		Non-Switchers (Same School) to All Switchers		Non-Switchers (Same School) to Switchers (Same School)		Non-Switchers (Different School) to Switchers (Different School)	
Math Test Scores of Teachers' Current Students								
Average Effects	(1)		(2)		(3)		(4)	
Average Math Achievement of Teachers'	0.079	***	0.077	***	0.079	***	0.065	***
Current Students This Year	(0.003)		(0.003)		(0.003)		(0.017)	
N	54705		54705		46082		3966	
Effects by School Level	(5)		(6)		(7)		(8)	
Average Math Achievement of Teachers'	0.089	***	0.088	***	0.084	***	0.073	**
Current Students This Year (Elementary School)	(0.004)		(0.004)		(0.003)		(0.022)	
Average Math Achievement of Teachers'	0.073	***	0.072	***	0.078	***	0.045	
Current Students This Year (Middle School)	(0.007)		(0.008)		(0.006)		(0.035)	
Average Math Achievement of Teachers'	0.056	***	0.049	***	0.064	***	0.064	+
Current Students This Year (High School)	(0.008)		(0.008)		(0.008)		(0.037)	
Teacher Value-Added in Math								
Average Effects	(9)		(10)		(11)		(12)	
Teacher Value-Added in Math This Year	0.054	***	0.058	***	0.047	***	0.014	
	(0.003)		(0.003)		(0.003)		(0.020)	
N	24014		24014		20432		1590	
Effects by School Level	(13)		(14)		(15)		(16)	
Teacher Value-Added in Math This Year	0.058	***	0.060	***	0.047	***	0.049	+
(Elementary School)	(0.003)		(0.004)		(0.003)		(0.028)	
Teacher Value-Added in Math This Year	0.060	***	0.062	***	0.060	***	0.029	
(Middle School)	(0.006)		(0.007)		(0.005)		(0.036)	
Teacher Value-Added in Math This Year	0.031	***	0.042	***	0.038	***	-0.102	+
(High School)	(0.009)		(0.010)		(0.010)		(0.053)	

TABLE 2 (cont'd)

Proportion of Teachers' Current Student Scoring Proficient or Better								
Average Effects	(17)		(18)		(19)		(20)	
Proportion of Students Proficient or Better*	0.198	***	0.196	***	0.187	***	0.169	***
	(0.008)		(0.008)		(0.007)		(0.042)	
N	54688		54688		46067		3966	
Effects by School Level	(21)		(22)		(23)		(24)	
Proportion of Students Proficient or Better	0.229	***	0.227	***	0.212	***	0.211	***
(Elementary School)	(0.009)		(0.010)		(0.008)		(0.054)	
Proportion of Students Proficient or Better	0.157	***	0.172	***	0.155	***	0.034	
(Middle School)	(0.018)		(0.020)		(0.016)		(0.090)	
Proportion of Students Proficient or Better	0.133	***	0.110	***	0.143	***	0.170	+
(High School)	(0.022)		(0.022)		(0.022)		(0.099)	
School by Year Fixed Effects	X		X		X		X	
Includes Controls	X		X		X		X	

Notes: ***p<.001; **p<.01; *p<.05. The models are restricted to teachers who teach students tested in math or reading in a given year. The outcome is whether they remain in a tested grade/subject in the following year. Column 1 compares teachers that stay in a tested grade/subject in t+1 to all those that switch out of a tested area; Column 2 compares teachers that stay in a tested grade/subject and stay in the same school to all those that switch out of a tested area; Column 3 compares teachers that stay in a tested grade/subject and stay in the same school to those that switch out of a tested area and remain in the same school; Column 4 compares those that stay in a tested grade/subject and change schools to those that switch out of a tested area and switch schools. This final outcome shows whether student performance is related to staying in a tested area among teachers that change schools.

TABLE 3: Linear Probability Models Predicting Staying in a Tested Grade between Years, By School Performance

Comparison:	All Non-Switchers to All Switchers		Non-Switchers (Same School) to All Switchers		Non-Switchers (Same School) to Switchers (Same School)		Non-Switchers (Different School) to Switchers (Different School)	
Math Test Scores of Teachers' Current Students								
Continuous School Accounability Grade	(1)		(2)		(3)		(4)	
Average Math Achievement of Teachers' Current Students This Year	0.086	***	0.065	***	0.108	***	0.010	
	(0.010)		(0.010)		(0.009)		(0.040)	
Average Math Achievement of Teachers' Current Students This Year*School Accnt Grade	-0.002		0.004		-0.009	***	0.025	+
	(0.003)		(0.003)		(0.003)		(0.015)	
N	44168		44168		37173		3218	
Categorical School Accounability Grade (B/C/D Omitted)	(5)		(6)		(7)		(8)	
Average Math Achievement of Teachers' Current Students This Year	0.081	***	0.076	***	0.082	***	0.056	**
	(0.004)		(0.004)		(0.004)		(0.020)	
Average Math Achievement of Teachers' Current Students This Year* **A** School Accnt Grade	-0.003		0.004		-0.010	+	0.069	+
	(0.006)		(0.007)		(0.006)		(0.040)	
Average Math Achievement of Teachers' Current Students This Year* **F** School Accnt Grade	-0.014		-0.025		0.055	*	-0.104	
	(0.021)		(0.022)		(0.021)		(0.067)	
N	54705		54705		46082		3966	
School Value-Added in Math	(9)		(10)		(11)		(12)	
Average Math Achievement of Teachers' Current Students This Year	0.076	***	0.075	***	0.078	***	0.061	**
	(0.004)		(0.004)		(0.003)		(0.021)	
Average Math Achievement of Teachers' Current Students This Year* School Value-Added	0.014	***	0.015	***	0.015	***	-0.001	
	(0.004)		(0.004)		(0.003)		(0.022)	

TABLE 3 (cont'd)

Teacher Value-Added in Math								
Continuous School Accounability Grade	(13)		(14)		(15)		(16)	
Teacher Value-Added in Math This Year	0.049	***	0.048	***	0.058	***	-0.073	
	(0.010)		(0.010)		(0.009)		(0.047)	
Teacher Value-Added in Math This Year* School Accnt Grade	0.002		0.003		-0.003		0.039	*
	(0.003)		(0.003)		(0.003)		(0.017)	
N	19438		19438		16505		1298	
Categorical School Accounability Grade (B/C/D Omitted)	(17)		(18)		(19)		(20)	
Teacher Value-Added in Math This Year	0.057	***	0.058	***	0.050	***	0.023	
	(0.004)		(0.004)		(0.003)		(0.024)	
Teacher Value-Added in Math This Year* **A** School Accnt Grade	-0.004		0.000		-0.007		0.030	
	(0.006)		(0.006)		(0.005)		(0.049)	
Teacher Value-Added in Math This Year* **F** School Accnt Grade	-0.023		-0.029		0.048	*	-0.196	**
	(0.022)		(0.024)		(0.023)		(0.074)	
N	24014		24014		20432		1590	
School Value-Added in Math	(21)		(22)		(23)		(24)	
Teacher Value-Added in Math This Year	0.056	***	0.057	***	0.050	***	0.026	
	(0.003)		(0.003)		(0.003)		(0.024)	
Teacher Value-Added in Math This Year* School Value-Added	0.004		0.004		0.001		0.031	
	(0.003)		(0.003)		(0.003)		(0.027)	

TABLE 3 (cont'd)

Proportion of Teachers' Current Student Scoring Proficient or Better								
Continuous School Accounability Grade	(25)		(26)		(27)		(28)	
Proportion of Students Proficient or Better*	0.171	***	0.137	***	0.201	***	-0.049	
	(0.025)		(0.027)		(0.024)		(0.107)	
Proportion of Students Proficient or Better*	0.008		0.018	*	-0.005		0.087	*
School Accnt Grade	(0.008)		(0.008)		(0.007)		(0.038)	
N	44152		44152		37159		3218	
Categorical School Accounability Grade (B/C/D Omitted)	(29)		(30)		(31)		(32)	
Proportion of Students Proficient or Better*	0.192	***	0.185	***	0.188	***	0.120	*
	(0.010)		(0.011)		(0.009)		(0.050)	
Proportion of Students Proficient or Better*	0.017		0.030	+	-0.005		0.228	*
A School Accnt Grade	(0.016)		(0.017)		(0.015)		(0.097)	
Proportion of Students Proficient or Better*	-0.022		-0.056		0.136	*	-0.195	
F School Accnt Grade	(0.065)		(0.068)		(0.065)		(0.198)	
N	54688		54688		46067		3966	
School Value-Added in Math	(33)		(34)		(35)		(36)	
Proportion of Students Proficient or Better*	0.196	***	0.195	***	0.191	***	0.164	**
	(0.009)		(0.009)		(0.008)		(0.050)	
Proportion of Students Proficient or Better*	0.039	***	0.037	***	0.038	***	0.016	
School Value-Added	(0.009)		(0.010)		(0.009)		(0.053)	
School by Year Fixed Effects	X		X		X		X	
Includes Controls	X		X		X		X	

Notes: ***p<.001; **p<.01; *p<.05. The models are restricted to teachers who teach students tested in math or reading in a given year. The outcome is whether they remain in a tested grade/subject in the following year. Column 1 compares teachers that stay in a tested grade/subject in t+1 to all those that switch out of a tested area; Column 2 compares teachers that stay in a tested grade/subject and stay in the same school to all those that switch out of a tested area; Column 3 compares teachers that stay in a tested grade/subject and stay in the same school to those that switch out of a tested area and remain in the same school; Column 4 compares those that stay in a tested grade/subject and change schools to those that switch out of a tested area and switch schools. This final outcome shows whether student performance is related to staying in a tested area among teachers that change schools.

TABLE 4: Linear Probability Models Predicting Staying in a Tested Grade between Years, By School Assignment Processes

	Class Average Math Achievement		Class Average Math Achievement* Assignment Factor		Teacher Value-Added		Teacher Value-Added* Assignment Factor		Proportion Proficient		Proportion Proficient* Assignment Factor	
Importance of Factors in the Assignment Process												
Student Academic Needs	0.070	**	0.002		0.072	**	-0.005		0.086		0.031	+
	(0.025)		(0.007)		(0.024)		(0.007)		(0.064)		(0.017)	
Teacher Preferences	0.100	***	-0.008		0.076	***	-0.008		0.233	***	-0.013	
	(0.018)		(0.007)		(0.016)		(0.006)		(0.045)		(0.017)	
Teacher Experience in a Certain Grade	0.083	***	-0.001		0.065	**	-0.003		0.189	**	0.003	
	(0.024)		(0.007)		(0.023)		(0.007)		(0.062)		(0.018)	
Teacher Seniority	0.094	***	-0.006		0.055	***	-0.000		0.218	***	-0.009	
	(0.016)		(0.007)		(0.015)		(0.006)		(0.041)		(0.017)	
Teachers' Overall Effectiveness	0.056	*	0.007		0.065	**	-0.003		0.107	+	0.026	
	(0.023)		(0.007)		(0.022)		(0.006)		(0.058)		(0.017)	
Teachers' Effectiveness in a Certain Area	0.037		0.012	+	0.039	+	0.004		0.091		0.030	+
	(0.023)		(0.006)		(0.022)		(0.006)		(0.059)		(0.017)	
Influence of Various Personnel Over Assignments												
Me	0.081	***	-0.004		0.057	***	-0.007		0.193	***	0.015	
	(0.005)		(0.011)		(0.005)		(0.010)		(0.013)		(0.029)	
Other Teachers in My Grade	0.072	***	0.028	**	0.055	***	-0.001		0.171	***	0.097	***
	(0.004)		(0.011)		(0.004)		(0.010)		(0.011)		(0.027)	
Teachers in the Grade Below	0.072	***	0.017	*	0.056	***	-0.002		0.175	***	0.055	**
	(0.004)		(0.008)		(0.004)		(0.007)		(0.011)		(0.019)	
Other Teachers	0.081	***	-0.006		0.055	***	-0.001		0.201	***	-0.013	
	(0.004)		(0.012)		(0.004)		(0.011)		(0.011)		(0.031)	
Principals	0.061	***	0.010	**	0.040	***	0.008	*	0.144	***	0.030	***
	(0.007)		(0.004)		(0.007)		(0.003)		(0.018)		(0.009)	
Assistant Principals	0.076	***	0.002		0.053	***	0.001		0.188	***	0.005	

	(0.009)		(0.004)		(0.008)		(0.004)		(0.023)		(0.011)	
Counselors	0.087	***	-0.009	*	0.059	***	-0.006	+	0.225	***	-0.032	***
	(0.004)		(0.004)		(0.004)		(0.004)		(0.011)		(0.009)	
Parents	0.088	***	-0.055	**	0.058	***	-0.022		0.221	***	-0.143	**
	(0.004)		(0.018)		(0.004)		(0.017)		(0.011)		(0.047)	
Students	0.088	***	-0.083	***	0.060	***	-0.054	**	0.225	***	-0.261	***
	(0.004)		(0.019)		(0.003)		(0.019)		(0.009)		(0.048)	
School by Year Fixed Effects	X		X		X		X		X		X	
Includes Demographic Controls	X		X		X		X		X		X	

Notes: ***p<.001; **p<.01; *p<.05. Each row reflects estimates from a separate model. Teacher responses to 2011 survey items on class assignments are aggregated to the school level and then treated as a time-invariant school characteristic. The outcome compares teachers who stay to those who switch in tested areas, ignoring school changers. Sample sizes for class average math achievement regressions range from 54,429 to 54,651; for teacher value-added models, sample sizes range from 23,908 to 23,993; and for proportion proficient models, sample sizes range from 54,413 to 54,634.

TABLE 5: Mean Value-Added Among Teachers in Tested Grades in Year *t*, by Status in Year *t*+1

	Math VA		Reading VA		% of those who move overall	% of those who move out of tested grade
Elementary School						
Moves to K from Grades 3–5	-0.448	***	-0.464	***	5%	13%
Moves to 1st from Grades 3–5	-0.481	***	-0.309	***	8%	22%
Moves to 2nd from Grades 3–5	-0.396	***	-0.363	***	23%	63%
Stays in 3–5, but Changes Grades	-0.116	***	-0.115	***	64%	
Stays in 3–5, Same Grade	0.041		0.008			
High School						
Same Subject, Grade 11-12	-0.070	*	-0.114	**	51%	94%
Different Subject, Grade 11-12	-0.033		-0.121		2%	4%
Different Subject, Grade 9-10	-0.584	*	-0.186		1%	2%
Stays in Math/ELA, Grades 9-10 but Changes Grade	0.025		-0.125	**	46%	
Stays in Math/ELA, Grades 9-10, Same Grade	0.026		0.117			

*Significance tests compare the VA in a given category to the VA of teachers that remain in a tested area. The analysis is restricted to teachers that teach in tested areas in year t and that stay in the same school in year t+1.

TABLE 6: Achievement Gains among First and Second Grade Students

Assignment Next Year:	Same Grade Next Year		Different Grade Next Year but in the same K–2 or 3–5 Set		Different Grade Next Year and in Different K–2 or 3–5 Set	
Average Math Achievement of Teachers'	0.095	***	-0.021	***	-0.038	***
Current Students This Year	(0.004)		(0.003)		(0.003)	
K–2 Teachers (3–5 Teachers = reference)	-0.024	***	-0.060	***	0.088	***
	(0.004)		(0.003)		(0.003)	
Math Achievement*K–2 Teacher	0.001		-0.026	***	0.025	***
	(0.006)		(0.004)		(0.004)	
N (School by Year Observations)	2189		2189		2189	
N (Total Observations)	72760		72760		72760	
Teacher Value-Added in Math This Year	0.053	***	-0.007	**	-0.028	***
	(0.003)		(0.003)		(0.002)	
K–2 Teachers (3–5 Teachers = reference)	-0.053	***	-0.016	*	0.074	***
	(0.009)		(0.006)		(0.006)	
Value-Added*K–2 Teacher	-0.024	*	-0.029	**	0.054	***
	(0.012)		(0.009)		(0.008)	
N (School by Year Observations)	1907		1907		1907	
N (Total Observations)	21541		21541		21541	
School by Year Fixed Effects	X		X		X	
Includes Controls	X		X		X	

The model includes teachers that teach grades K–2 and 3–5.

TABLE 7: Achievement Gains among First and Second Grade Students

	Math		p-value	Reading		p-value
Student's Teacher…						
Switched from Grades 3–5 in Prior Year	-0.072	***	reference	-0.062	***	reference
	(0.008)			(0.008)		
Taught Different K–2 Grade Last Year	-0.050	***	0.03	-0.051	***	0.26
	(0.008)			(0.008)		
Is A First Year Teacher	-0.097	***	0.12	-0.045	**	0.27
	(0.015)			(0.015)		
N (School by Year by Grade Cells)	2177			2172		
N (Students)	86920			85766		

Models include a control for prior year test score, controls for student race, gender, free lunch eligibility, and limited English proficiency as well as the aggregate of these student-level measures at the class-level. They also include school by year by grade fixed effects.

TABLE 8: Achievement among Third Grade Students, By Status of Second Grade Teacher

	Math	p	Reading	p	Math	p	Reading	p	Math	p	Reading	p
Student's Second Grade Teacher….												
Switched from Grades 3–5 in Year Prior to Teaching Student	-0.023***	ref	-0.033***	ref	-0.028*	ref	-0.030**	ref	-0.032**	ref	-0.031**	ref
	(0.007)		(0.006)		(0.012)		(0.011)		(0.011)		(0.010)	
Taught Different K–2 Grade in Year Prior to Teaching Student in	-0.014*	0.35	-0.019**	0.09	0.012	0.01	0.007	0.01	-0.015	0.24	-0.006	0.07
Year	(0.007)		(0.007)		(0.013)		(0.012)		(0.012)		(0.011)	
Was First Year Teacher	-0.036***	0.17	-0.034***	0.92	-0.044*	0.47	-0.035+	0.83	-0.025	0.72	-0.020	0.57
	(0.008)		(0.008)		(0.020)		(0.019)		(0.018)		(0.017)	
N (School by Year by Grade Cells)	1930		1936		750		753		750		753	
N (Students)	142000		136000		39732		37653		39732		37653	
Restricted to Sample with 1st Grade SAT10	No		No		Yes		Yes		Yes		Yes	
Control for 1st Grade SAT10 Score	No		No		No		No		Yes		Yes	

Models include controls for student race, gender, free lunch eligibility, and limited English proficiency as well as the aggregate of these student-level measures at the class-level. They also include school by year fixed effects. *p*-values result from tests of equality of coefficients, with the first row indicating the reference group.