



BRIEF 7
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Do Disadvantaged Urban Schools Lose Their Best Teachers?

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A growing body of research confirms the long-held belief of parents, school administrators, and policy makers that teachers are the key component to a good education and that there is substantial variation in teacher quality. This research differs fundamentally from prior work on teachers by focusing directly on differences in student learning outcomes across classrooms rather than differences in teacher experience, salary, education, or other quantifiable characteristics. Moreover, it raises questions about studies that draw inferences about implications for teacher quality based entirely on observable characteristics. When looked at in terms of teacher effectiveness, many of the policies commonly discussed are suspect if not wrong.

Current views about teacher policy—and particularly issues of the distribution of teachers across schools—are largely based on evidence about teachers' choices, but not on evidence about their effectiveness as seen through achievement differences of students. One strand of literature emphasizes the importance of community type, wealth, and race on selection and mobility of teachers and presents a *prima facie* case that teacher quality is not distributed equitably. Boyd, Lankford, Loeb, and Wyckoff (2005) show that teacher labor markets tend to be highly localized, which complicates recruitment efforts in both urban centers and rural areas. There is also evidence that teacher exit probabilities are higher for those with better alternative earning opportunities or more education (Dolton and van der Klaauw 1995, 1999) and that teachers tend to prefer schools with higher achieving, higher income students, in

addition to higher salaries (Lankford, Loeb, and Wyckoff 2002; Hanushek, Kain, and Rivkin 2004; Scafidi, Sjoquist, and Stinebrickner 2007). These findings tend to confirm the impediments to teacher hiring and retention in higher poverty and geographically isolated schools and are reinforced by administrators in rural areas and large urban districts who often bemoan both the difficulty of attracting teachers and the loss of teachers to the suburbs, private schools, and other occupations.

Importantly, none of these studies provides direct information on classroom effectiveness. Understanding of the actual effectiveness of teachers by transition status constitutes a large void in the understanding of teacher labor market dynamics. Even if teachers with better alternative earnings opportunities are more likely to quit teaching and inner city and rural schools experience higher turnover than suburban schools, the implications for policy and the well-being of students depend crucially on the actual effectiveness of leavers. If, for example, performance is a primary determinant of a teacher's job satisfaction and the desire to stay in a school, leavers may be drawn disproportionately from the lower end of the teacher quality distribution despite a positive relationship between exiting and alternative earnings opportunities. Scafidi, Sjoquist, and Stinebrickner (2006) show that majority of teachers who exit public schools do not transition to high paying jobs outside of teaching but are rather more likely to exit the labor market entirely or switch to a lower paying private school, a finding consistent with the possibility that job satisfaction is an important determinant of teacher retention. In this case efforts to improve working conditions and increase the probability of success in the classroom

may help recruitment efforts more than increases in salary or even a relaxation of credential requirements.

We investigate teacher quality differences by transition status and school characteristics for teachers in a large urban district in Texas using estimates of teacher contributions to student learning as our measure quality. This discussion has both methodological and policy facets.

VARIATIONS IN TEACHER QUALITY

We begin by estimating the variation of teacher value-added using models of teacher fixed effects similar to those used by many others.¹ Our main objective in this initial portion is obtaining direct evidence on what the overall distribution of teacher quality looks like. Because differences among communities and schools complicate efforts to identify teacher quality differences, we examine alternative estimation approaches. Estimation of quality variation within schools must overcome fewer obstacles but cannot provide information on between-school differences in quality—leading us to provide evidence from both district-wide and within-school estimation. Further, consistent with recent discussions, we examine the sensitivity of the estimates to sorting of teachers and students in several dimensions.² Finally, we separate nonpersistent differences in achievement growth across classrooms from the persistent growth. This analysis allows for test measurement errors along with year-to-year fluctuations in teacher effectiveness (say from added experience or personal circumstances).

Nonpersistent fluctuations in teacher effectiveness can be handled in a variety of ways as long as they are not directly related to persistent teacher effectiveness. One straightforward way to deal with this is to use the correlation in estimated teacher effectiveness across two years to adjust the estimated variances in teacher effectiveness for persistent. Within our sample, the correlation of scores from one year to the next is approximately 0.4, although it varies some with the sample used for the estimation.

After correcting for errors and nonpersistent factors, we obtain estimates of the standard deviation of teacher quality in the range of 0.13–0.20. The interpretation of these estimates is straightforward: a standard deviation of teacher

quality of 0.2 implies that moving from an average teacher to a teacher at the 84th percentile of the quality distribution (i.e., one standard deviation of teacher quality) would yield growth in student achievement that was 0.2 s.d. higher in that year. This would move a student eight percentile points in the student achievement distribution—from the 50th percentile to the 58th percentile. Obviously a series of good teachers could accumulate to a very significant effect.³ The lower bound in our range of estimates would imply that the 84th percentile teacher would still move the average student in her class up five percentiles (i.e., from the 50th to the 55th percentile).

The range of estimates reflects some uncertainty in the precise estimation of teacher quality. The difficulty throughout this analysis is separating the impacts of the teacher from other characteristics of students and schools. This is difficult because of the choices of parents and teachers. The range in this study comes from comparing all teachers to the district average (s.d.=0.20) or just to other teachers in the same school (s.d.=0.13).

The prior estimates presume that there is no sorting of students in classrooms that would influence the estimates of teacher value-added. We consider this possibility directly. Our primary approach to analysis of sorting is to divide schools into a sample that clearly sorts students into classrooms in a selective way and the remaining schools. Given that division, it is then possible to consider the impact of the sorting of schools on estimates of how much variation there is in teacher quality. The schools that are defined as sorting students are ones where there are significant differences in average performance by classroom within a school and ones where there are not such difference (referred to frequently as the not sorted sample).

In the “not sorted” sample where equality of pretest achievement means across classrooms cannot be rejected within each school, the estimated standard deviation of teacher quality is now in the range of 0.11–0.20, or only slightly different from that for the full sample. The estimated standard deviation in the most restricted case (within-school and not sorted) is reduced by 15 percent from the prior full sample estimates. A similar comparison of variations for the sorted sample shows a range of 0.15–0.20. In other words, within the sorted sample where classroom mean achievement equality can be rejected in each school, the within-school estimator

shows a slightly higher standard deviation, but the change from the full sample and from the other, not sorted schools is not very large.

In a final extension of estimating student outcomes, we pursue a strategy in the spirit of Rothstein (2008). Instead of relating the actual teacher to her students, we relate the subsequent year's teacher to performance. Quite obviously, the future teacher cannot teach the student today, so the future teacher might reasonably be thought of as exogenous. But this is wrong. If there is sorting on the basis of achievement, students with a better teacher in grade g will tend to be put together in the same classroom in grade $g+1$, implying that the grade $g+1$ teacher will look like she has an influence on grade g performance. Similarly, students with a worse teacher will be placed together in the $g+1$ classroom.

When we use our division of schools into a sorted and a not sorted sample, we find that future teachers have nothing to do with current student performance in the not sorted sample. But, in the sorted sample, future teachers appear directly related to current performance, albeit with less apparent variation in quality than estimated for current teachers.

In sum, sorting can influence the estimates of variations in teacher quality, although in terms of the aggregate distribution the impact of sorting does not seem to be excessively large. In the most stringent estimation of the variations in teacher quality based on within-school variations in schools where students are not obviously sorted, the aggregate distribution is very similar both to that from estimates that are not prone to these concerns and to more common approaches that could suffer from sorting.⁴ Indeed, in terms of the aggregates, it is much more important to adjust for test measurement errors and other nonpersistent influences.

MOBILITY OF TEACHERS BY QUALITY

Following this analysis we turn to a study of quality variation by transition status and school characteristics. We estimate the mean quality of stayers, of teachers who move within the district, of those who move to a different district, and of teachers who exit teaching—again using a value-added model similar to that used in the study of the variance of teacher quality. As part of this analysis, we again examine the sensitivity of the

estimates to the process used to sort students into classrooms and to temporary shocks in teacher effectiveness.

Our estimates provide little or no evidence that more effective teachers have higher exit probabilities. On the contrary, those who exit teaching are significantly less effective on average than stayers regardless of whether they are compared to all stayers in the district or only those in the same school and year. Moreover, those who switch campuses within the same district are also significantly less effective, while teachers who switch districts do not appear to differ significantly from the stayers. Moreover, we find little difference in these patterns by experience level of the teacher.

Because most of the concern about selective attrition focuses on lower performing schools, an important question is whether these patterns differ by school characteristics. In order to address this question we divide the schools into two equal sized categories on the basis of initial achievement and proportion of students who are black and examine quality differences by transition and school characteristics.

Our estimates provide little support for the view that it is the lowest performing or highest black enrollment schools that experience larger losses of highly effective teachers. To the contrary, the average quality deficit is larger for teachers coming from lower achieving or higher proportion black schools, though the differences tend to be small.

Further investigation confirms the finding that teachers who exit the Texas public schools are less effective on average than their colleagues in the same grade regardless of school average achievement or proportion black. More interestingly, the average value-added of school leavers in the sorted sample (described previously) tend to be more negative, particularly in the low proportion black and high achievement samples. This suggests that a difficult classroom placement may both downward bias estimated quality and precipitate a school change, though these results are far from definitive.

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NOTES

¹ See Hanushek (1971, 1992); Armor et al. (1976); Murnane (1975); Murnane and Phillips (1981); Aaronson, Barrow, and Sander (2003); Rockoff (2004); Rivkin, Hanushek, and Kain (2005); Boyd et al. (2006); and Kane, Rockoff, and Staiger (forthcoming).

² The interpretation and use of estimated differences in individual teacher effectiveness, often under the heading using “value-added measures” for teacher evaluation and possibly compensation, has been the subject of considerable recent discussion (e.g., Sanders and Horn 1994, Wainer 2004, McCaffrey et al. 2004, Ballou, Sanders, and Wright 2004, Rothstein 2008, Rivkin 2008). While this discussion introduces additional issues, a portion is relevant for the estimation of the aggregate distribution of teacher effectiveness and is discussed below.

³ Note that the estimated achievement models imply that there is always some loss in achievement from one year to the next, so perhaps only 60–70 percent of this added learning stays with the student in the next year. Nonetheless, this amounts to a huge impact over time.

⁴ The comparison to the estimates in Rivkin, Hanushek, and Kain (2005) is most appropriate, because those estimates were designed to be immune to the classroom sorting considered here.

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