

Abstract Title Page

Title: Teacher labor markets, segregation and salary-based policies to combat inequity across schools

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Abstract Body

Background/context:

The market for teachers differs from the typical market. In a typical market, an employer who hired more productive workers would benefit from being able to sell additional output. Competitive pressure would lead the employer to offer a better compensation package to more productive workers. Public schools, by contrast, generally expect no additional revenue from hiring more productive workers. Moreover, they are usually bound by contracts that stipulate specific salary levels for teachers with a given set of credentials. Lacking the incentive or the ability to reward higher productivity, schools become differentiated primarily by the working conditions they offer, which do vary. The most effective teachers hence cannot expect pecuniary rewards; to the extent they have any market reward at all it takes the form of superior working conditions – which generally implies a job teaching higher achieving, more affluent, or majority-race students. Although not all teachers reveal these kinds of preferences, studies dating back to Becker’s 1952 study of the careers of Chicago public school teachers confirm that most do.

The sorting of more highly qualified teachers toward schools serving advantaged students reflects some combination of three mechanisms: disparities in initial placement, differences in the likelihood of exit from the profession, and differences in the propensity to move from one school to another. Our study builds on a substantial empirical literature that can be summarized by two major conclusions.

1. *Teachers, like most other people, respond to financial incentives in deciding where to work.* Teachers are attracted to positions with higher salaries; when alternatives salaries are higher, teachers are more inclined to leave their current post or to leave teaching altogether. Thus higher teacher salaries tend to reduce attrition rates, and attrition is sensitive to wage differences between teacher and non-teacher salaries.* Teachers with the best prospects outside of teaching are generally most likely to leave teaching. Thus higher exit rates are found for teachers with high scores on achievement tests and for math and science teachers.†

* See Murnane and Olsen (1989, 1990) and Hanushek, Kain and Rivkin (2004) (only for women having fewer than six years’ experience), Podgursky, Monroe and Watson (2004), Reed, Rueben and Barbour (2006), and Krieg (2006). For the effect of non-teacher salaries, see Baugh and Stone (1982), Rickman and Parker (1990), Dolton and von der Klaauw (1995). Imazeki (2005) incorporate teacher salaries in both the current and alternative districts as well as non-teacher salaries. The former study finds significant effects in most specifications for non-teacher salaries. The latter includes both current and expected teacher salaries in a teacher’s own district and neighboring ones as well as non-teaching salaries, generally finding significant wage effects for current and expected teacher salaries relative teacher salaries for women, but no effects for anyone associated with non-teaching salaries.

† See Murnane and Olsen (1989), Lankford, Loeb and Wyckoff (2002), and Podgursky, Monroe, and Watson (2004). Imazeki (2005) observes higher transfer rates among women teaching math and special education. In contrast, Krieg (2006) finds that high scoring female elementary teachers were less likely to quit.

2. *Teachers care about certain non-wage aspects of their jobs.* Social science research going back at least 50 years suggests that teachers, by and large, prefer students who are high-achieving, affluent, and white.[‡] In studies of teacher attrition, these preferences reveal themselves directly through the estimated effect of certain school characteristics, but they also show up in comparisons of the origin and destination schools between which teachers transfer. Racial composition is the school characteristic most consistently. This aversion to nonwhite students is observed largely among white teachers.[§] There is also evidence that teachers prefer to teach high-achieving students^{**}

Purpose / objective / research question / focus of study:

One important reason for concern about racial or socioeconomic segregation of public schools is that it generates an uneven distribution of teacher quality, as measured in this paper by teacher qualifications, across schools. In particular, the existing evidence clearly shows that schools with large proportions of nonwhite or low income students typically have teachers with far weaker qualifications than those in schools serving white or more affluent students. (Clotfelter, Ladd, Vigdor & Wheeler, 2007; also see summary of studies in Goldhaber, 2008). As noted above, this well- documented pattern largely reflects the operation of teacher labor markets in which the distribution of teachers across schools is affected not only by state or district policies but by also the preferences of teachers. Of particular interest for this study are the revealed preferences of teachers who are likely to be effective teachers. We use as a measure of likely effectiveness various measure of teacher qualifications. Although some observers and analysts play down teacher qualifications, our own prior research provides evidence that certain qualifications are in fact predictive of student achievement (Clotfelter, Ladd and Vigdor, 2006, 2007a, 2007b, forthcoming).

[‡] Hollingshead (1949, p. 171) reported, “Because the academic teachers believe that college preparatory students have more ability, are more interested, and do better work than those in the general course, they prefer to teach the former group.” See also Becker (1952).

[§] In comparisons of origin and destination schools, Greenberg and McCall (1974, Table 3, p. 493) and Hanushek, Kain and Rivkin (2004) show that teachers moved from less to more able student bodies, as measured by average standardized test scores. Evidence of this preference also appears in two multivariate studies of attrition – Mont and Rees (1996) and, for female teachers only, Krieg (2006). Clotfelter, Ladd, Vigdor, and Diaz (2004) find that the rate of exit from low-performing schools increased with the advent of North Carolina’s assessment program, one that exposed teachers in low-rated schools to fewer rewards and the prospect of punitive policies. Using data for New York City, Boyd, Grossman, Lankford, Loeb and Wyckoff (2008) find that teachers in low-performing schools were more likely to leave than those in other schools.

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In light of these preferences, the purpose of this paper is to examine the potential for salary-based policies to generate a more equitable distribution of teachers characterized by strong qualifications across schools.

Setting:

The analysis is based on rich longitudinal administrative data on teachers and schools in the state of North Carolina. North Carolina provides an excellent state for a study of this type. It is a large state with a population of over 9 million, it has a variety of regions that differ in their racial and socioeconomic characteristics, it had a short-lived state-wide policy that provided salary bonuses to teachers of certain subjects in low-performing middle and high schools, and two of its larger districts have introduced new salary supplements for some schools intended to make it easier to attract and retain high quality teachers to those schools.

Population / Participants / Subjects:

By using administrative data, we are able to include all teachers in our analysis. In fact, however, we restrict much of the analysis to teachers who began teaching spells during the period under study, that is, between 1994/95 and 2003/04. We separately analyze two sets of teachers, those who had never taught before the new spell began (novice teachers) and those who had previously taught before the spell began (veteran teachers). For each of these teachers, we have information on their teacher licensure test scores, their years of experience, their advanced degrees, and whether they are board certified. We also have basic demographic information on their gender, race and age. We are able to follow all teachers as they move from school to school within a district, to a school in a different district, or out of the population of North Carolina public school teachers.

In addition to the data on teachers, we have information on the racial and socio-economic characteristics of the students in each school, the age of the school building, student enrollment and its rate of growth. At the district level, we have information on whether the district is in the rural, coastal or mountain region; whether there is a research university or college in the county, and whether the county is a beach county.

Intervention / Program / Practice:

The policy intervention of interest for this study is differential salaries. For much of the analysis we rely on the variation across districts in teacher salaries. Although North Carolina has a statewide salary schedule, salaries differ across the state because the local districts (of which there are 115) are able to supplement teacher salaries out of local tax revenues. In addition, we are able to examine two explicit policy interventions. One is a short-lived state-wide bonus policy that paid bonuses to teachers certified in math, science or special education who were teaching in low-performing middle and high schools. The other, implemented in two of the states' school district was an "Equity plus" program that, among other things, paid higher salaries to teachers in low performing schools.

Research Design:

This study uses secondary data analysis to examine the effects of salary differentials, combined with elements of a quasi natural experiment to examine the effects of the two specific types of policy interventions. We estimate two types of models. First we estimate a series of probit models designed to predict the probability that a school fills a vacancy with a teacher with certain strong qualifications, where strong indicates that the qualification has been shown to be predictive of higher student achievement in other studies. Among the other variables of interest in these models are the schools' racial and economic mix of students. These models generate coefficients that allow us to determine the percentage difference in salary needed to offset the negative effect on the probability of filling a slot with a teacher with strong qualification of the school's racial or economic mix. In doing so we need to pay attention to the possibility of bias in our estimates that arises from our use of secondary data.

Second, we estimate two hazard models, one for the novice teachers and one for veteran teachers who start new teaching spells during the period. The goal is to predict the probability that a teacher in a given school will leave the school in time period $t+1$, given she is in the school in period t . We include three forms of exit from the school: switching to another school in the same district, changing districts, or leaving the profession. In addition to a large number of control variables, these hazard models include main effects for each of three teacher qualifications, the racial and economic mix of the school's students, and the teacher's salary, as well as interactions between teacher qualification and the two variables of most interest, the teacher's salary and the demographic mix of the school's students. This specification permits us to examine not only how teacher response to salaries and to the school's demographic mix, but also to determine whether teachers with strong qualifications are differentially responsive. To determine the effects of the two specific salary interventions, we are able to embed a differences in differences specification in our overall model, which represents a quasi experimental approach.

Data Collection and Analysis:

Most of the data come from the North Carolina Education Research Data Center which obtains the data from the North Carolina Department of Public Instruction. By the time we as researcher s gain access to the data, the data center has removed all original identifiers to preserve confidentiality. As is the case with all administrative data, this data set required substantial cleaning to make it usable for our purposes and we needed to supplement it with information from other sources.

Given the importance of teacher salaries to this study, we have paid particular attention to the salaries available to teachers in other jobs. To that end, we have constructed alternative salaries for each teacher for each year for teaching and non teaching positions in nearby districts, defined as those within 30 miles of her current district. The inclusion of these alternative salaries means that we are measuring a teacher's own salary relative to the alternative salaries available to her.

For details of the data analysis strategy, see the previous section.

Findings / Results:

Our analysis first confirms the findings in the extent literature that teachers are reluctant to remain in schools with high proportions of nonwhite students, even after we control for the proportion of students eligible for free lunch. Second, we find that in making their decisions to leave a school, teachers are quite responsive to salary differentials. Taken together, these results suggest that salary differentials are potentially useful as a tool for retaining teachers in the schools serving disadvantaged students. Importantly, however, we find that teachers with the stronger qualifications are both more responsive to the racial characteristics of the students and less responsive to salary differentials than are their counterparts with weaker qualifications. As a result the salary differentials required to retain the teachers with strong qualifications are far larger than those for weaker teachers.

With respect to the specific policy interventions, we find some support for the conclusion that the Equity Plus program reduced teacher departure rates but only in one of the two districts, Charlotte-Mecklenburg, and not in the other. With respect to the statewide bonus program, our analysis supports some of our earlier research by showing that the bonuses reduce somewhat the departure rates of experienced teachers from low performing middle and high schools (Clotfelter, Gleenie, Ladd, and Vigdor 2008a and b.).

Conclusions:

Teachers are indeed responsive to salary differences but the salary differences would need to be quite large to have much impact on the willingness of the teachers with strong qualifications to teach in schools with large proportions of minority or low-income children. The bottom line is that from a societal point of view, it may well be less costly, at least from a financial perspective, to promote a more equitable distribution of high quality teachers across schools by balancing the mix of students across schools than by using salary differentials.

Appendices

Not included in page count.

Appendix A. References

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