

Teacher Workforce Developments: Recent Changes in Academic Competiveness and Job Satisfaction of New Teachers

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ABSTRACT

The capacity of the nation's public schools to recruit and retain highly skilled teachers is a perennial concern of policy makers and school leaders. Over the past two decades, major policy strategies including the federal No Child Left Behind Act and alternative pathways to teaching, as well as changes in the broader labor market, have altered the context in which academically skilled college graduates choose whether to enter teaching, and, if so, where to teach. Using data from 1993 to 2008, we find that schools nationwide are recruiting a greater share of highly skilled college graduates into teaching, and that increases in teachers' academic skills are especially large in urban school districts that serve predominantly non-white students. On the other hand, the increase in the share of academically skilled teachers coincides with the lower likelihood of non-white teachers being hired. Once hired, non-white teachers report substantially lower job satisfaction than other teachers. The issue of how to recruit and support highly skilled and diverse teacher workforce remains pressing.

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Abstract

The capacity of the nation's public schools to recruit and retain highly skilled teachers is a perennial concern of policy makers and school leaders. Over the past two decades, major policy strategies including the federal No Child Left Behind Act and alternative pathways to teaching, as well as changes in the broader labor market, have altered the context in which academically skilled college graduates choose whether to enter teaching, and, if so, where to teach. Using data from 1993 to 2008, we find that schools nationwide are recruiting a greater share of highly skilled college graduates into teaching, and that increases in teachers' academic skills are especially large in urban school districts that serve predominantly non-white students. On the other hand, the increase in the share of academically skilled teachers coincides with the lower likelihood of non-white teachers being hired. Once hired, non-white teachers report substantially lower job satisfaction than other teachers. The issue of how to recruit and support highly skilled and diverse teacher workforce remains pressing.

Keywords: Teacher workforce, Teacher academic skills, Job satisfactions of teachers

JEL code: J21; J24; J28

Introduction

The capacity of the nation's public schools to attract highly skilled college graduates into teaching is a perennial concern of both policy-makers and school leaders. While the evidence suggests that teachers' academic qualifications are only modestly aligned with measures of their instructional effectiveness (Goldhaber 2008; Murnane and Steele 2007), the academic ability of individuals entering teaching is an indicator of the attractiveness of the profession and of schools' capacity to recruit talented individuals along other dimensions. Comparative analyses of highly successful school systems in other countries such as Finland, Korea, and Japan frequently contrast those nations' success at recruiting "top talent" into teaching with the comparatively low status of the teaching profession in the U.S (Auguste, Kihn, and Miller 2010; Darling-Hammond 2010; OECD 2012; Tucker 2011). In 2009, the U.S. Secretary of Education Arne Duncan called for America's colleges of education to increase the selectivity of students and improve their programs to better prepare new teachers. More recently, the U.S. Department of Education, in partnership with the nation's two largest teacher unions, Teach for America, and several other organizations, launched the TEACH campaign aimed at recruiting America's best to teach (The New York Times 2013). These recent policy initiatives have further elevated the national discussion of recruiting "top talent" into the teaching profession.

Over the last two decades, significant federal legislation including the No Child Left Behind (NCLB) Act of 2001 contain features intended to promote the recruitment of more "high quality" teachers such as higher minimum standards for teachers' certification (Loeb and Miller 2006). Available evidence shows a trend from 1993 to 2007 that teachers after NCLB are working longer hours, perceive greater control in their own classrooms, and feel greater support among peers, administrators, and parents (Grissom, Nicholson-Crotty, and Harrington 2014).

This change may influence new graduates' view of teaching profession and their job satisfaction once they enter into this profession.

Spurred by both the NCLB legislation and by teacher shortages in many schools and subject areas, alternate pathways into teaching have also expanded rapidly over the past two decades. In 1995, 6,932 teachers prepared through alternative certification programs. That number had jumped to 59,000, or about one-third of newly hired teachers in 2007 (Grossman and Loeb 2008, p.4). Many alternate pathways, including such prominent programs as Teach for America and Troops to Teachers, focus on filling teaching assignments in hard-to-staff schools in particular. The increase in the diversity of pathways into the teaching profession might be an important source of the increase in academic talent for this profession (Johnson, Birkeland, and Peske 2005).

Alongside political efforts and evolving pathways into teaching, substantial fluctuations in the nation's economic conditions and accompanying impacts on labor markets and on public financing of education may have influenced the attractiveness of the teaching profession to new college graduates. The tech-boom of the early 2000's and the aftermath of the financial collapse in 2008 represent sharp contrasts in this respect. Particularly, the latter corresponded to substantial reductions in state education spending in many states (Leachman and Mai 2013), which may have affected the hiring and job experiences of new, un-tenured teachers.

Previous research about the academic qualifications of incoming teachers indicates that higher-scoring college graduates had become increasingly less likely to enter teaching since the 1950's, but that this trend may have reversed in recent years. As of the 1990's, higher-scoring college graduates were significantly less likely to enter teaching, capping a decline over several previous decades as changes in the labor market opened up more alternative career opportunities

for women (Bacolod, 2007; Corcoran, Evans, and Schwab, 2004). However, more recent evidence indicates that the academic quality of new teachers may have rebounded since then, with increases in the aggregate SAT ability scores, GPA, and college competitiveness of prospective and new teachers (Goldhaber and Walch 2013; Lankford, Loeb, McEachin et al. 2014).

While the recent uptick in incoming teachers' academic competitiveness nationwide has been highlighted as an encouraging development (Goldhaber and Walch 2013), extant research has not examined the other characteristics of teachers that are contributing to this trend such as race/ethnicity, nor where higher-ability teachers are recruited to teach. In addition, it remains unclear whether improvements in schools' ability to recruit more skilled teachers correspond to more positive job experiences for new teachers after they are hired so that they would more likely stay.

Along with concerns about the quality of new teacher recruits in the aggregate, a substantial body of research has documented disparities in the qualifications and academic ability levels of individuals hired to teach in "hard-to-staff" schools that serve more poor and minority students, particularly in urban contexts (Clotfelter, Ladd, and Vigdor 2007; Lankford, Loeb, and Wyckoff 2002; Peske and Haycock 2006). Teachers in these schools historically have been less likely to have a Bachelor's degree, more likely to be provisionally or emergency certified, and typically score lower on ability tests and licensure exams. Moreover, despite research indicating that being taught by a teacher of the same race improves students' academic outcomes (Dee 2005; Villegas and Lucas 2004), there is a persistent and large gap between the percentage of minority students and the percentage of minority teachers in the U.S. system in recent decades. For example, there were about 32 percent of minority students enrolled in 1993-04 and 41

percent in 2007-08, while the percentage of minority teachers was 13 percent of the whole teaching workforce in 1993-94 and 17 percent in 2007-08 (Ingersoll and May 2011). Another challenge of building a diverse teaching workforce is that minority teachers tend to be less satisfied with their jobs and are less likely to remain in teaching. In light of these challenges, improving the capacity of schools to recruit and retain a more skilled and diverse workforce may be critical to addressing the persistent academic achievement gaps of minority students.

In this study, we build on prior research by examining the improvement in new teachers' academic qualifications in greater detail, and by considering the work experiences of new teachers after they are hired. Using the Baccalaureate and Beyond (B&B) studies in 1993, 2000, and 2008, we describe the subgroups of teachers that have seen the most change in academic background, as well as the characteristics of schools where skilled teachers are increasingly being hired. The answers to these questions offer insight into what may be driving recent changes, and which schools may be benefitting from them. We supplement data on the ability scores of new teacher hires with survey data on new teachers' job satisfaction over time, both overall and related to specific aspects of the job. These additional data provide information regarding the relative attractiveness of teaching in comparison to other professions, over time.

We specifically ask the following five research questions:

1. How has the academic ability of recent college graduates entering teaching changed across the graduating classes of 1993, 2000, and 2008?
2. How have trends in these new teachers' academic ability varied as a function of teachers' characteristics, including their demographics and what grades and subjects they teach?

3. How has the distribution of academically skilled new teachers to different types of schools changed over this period, particularly for “hard-to-staff” schools that serve disproportionately poor and minority students?
4. How has new teachers’ reported job satisfaction changed over time, both overall and with regard to job pay and job security in particular?
5. How has teachers’ reported job satisfaction varied over time for different types of teachers and across different school contexts?

Data Description

Our analysis utilizes data from three Baccalaureate and Beyond (B&B) studies conducted by the National Center for Education Statistics (NCES). Each study includes a nationally representative survey of graduates from postsecondary institutions, and in each case we utilize survey data from graduates collected in the year immediately after they earned their bachelor degrees (i.e. 1994, 2001, and 2009). These survey data are linked to extensive information about graduates’ educational experience and test scores, demographic backgrounds, and post-graduation work experiences.

In the case of teachers, the B&B studies include data about the schools at which they reported working, drawn from the U.S. Department of Education’s Common Core of Data (CCD). When linking teachers to schools, we identify either the first school they taught at following graduation or, alternatively, the most recent school that the teacher reported teaching at. We summarize our key measures below.

Teacher Characteristics and Job Experiences

The B&B studies include a range of information about recent graduates and about incoming teachers. We specifically utilize data on graduates’ gender, race and academic ability.

When comparing teachers to other graduates, we include only teachers who are employed full time in grades K-12, excluding substitute teachers and teacher aides.

We derive the measure of graduates' academic ability from individuals' SAT and ACT test performance. Within our nationally representative sample, we estimate individuals' relative percentile ranking on SAT and ACT scores separately, both for their combined scores and for verbal and math separately. Our ability measures are thus individuals' test score percentile relative to that of their peer graduates from postsecondary institutions. We use ACT percentile ranks as a substitute ability measure for those individuals who did not take the SAT or for whom SAT data are unavailable.

In order to examine teachers' on-the-job experiences, we consider three survey questions about degree recipients' job satisfaction that were identical in the 2000 and 2008 cohort surveys.¹ These questions, which were given to all employed degree recipients, ask whether graduates were satisfied with their jobs overall, with their job pay, and with their job security in the year after graduation. As a benchmark, we compare responses from teachers to those from other professionals within each cohort.

School and Role Characteristics

In order to evaluate the distribution of teachers by ability level and reported job satisfaction, we include in our analysis several characteristics of teachers' roles and the schools where they teach. Our role characteristics include a measure of the highest grade level taught by the teacher as well as the subject matter taught by the teacher. We use teachers' grade level assignment to distinguish secondary (grades 7-12) and elementary (grades K-6) school teachers,

¹ The job satisfaction survey questions of our interest were either unavailable or were framed in substantially different ways in the 1993 cohort B&B survey. Thus, we exclude this year's data from the analysis.

and we use subject area assignments to distinguish secondary teachers who teach science, math, and technology (i.e. “STEM” subjects) from secondary teachers in other subject areas.

Our available data on school characteristics includes whether each teacher’s school is a public or private school, the school’s locale (urban, rural, or other), and information about the demographic composition of the students race/ethnicity and eligibility for lunch subsidies as a proxy for family income. Available lunch eligibility data from the 2000 cohort includes the percent of students eligible for free lunch. This differs slightly from the 1993 and 2008 cohorts, where we have data on the combined percent of students eligible for free or reduced price lunch status. To standardize our measures of student poverty across cohorts, we calculate a relative proportion of low-income students by ranking schools within each cohort according to the poverty indicator available for that cohort. Finally, we create indicator measures for schools that serve predominantly non-white students (>66%), and for schools in the top third of the distribution of the proportion of students eligible for subsidized lunch.

Analytic Strategies

To address our research questions, we first provide descriptive summaries of the ability scores and job satisfaction rates of teachers and other graduates. In each case, we include information regarding the confidence intervals around our point estimates from the nationally representative samples. We also examine patterns in the distribution of teacher ability scores as a function of teacher and school characteristics.

We also use multivariate regression analyses to predict (1) the ability score percentiles of new teachers across different teacher and school characteristics; and (2) the job satisfaction rates of new teachers across a range of teacher and school characteristics. When predicting job satisfaction, we utilize logit models to estimate the likelihood that teachers are satisfied with

their job across different teacher and school characteristics, and report the results in the form of odds ratios. Our analyses utilize the Balanced Repeated Replication (BRR) weights appropriate to each of the individual B&B samples in question.

Some individual and school characteristics data are missing for individual survey respondents, related to the B&B study design and implementation. Missing data occurs, for instance, when a surveyed teacher did not provide sufficient information to identify the school where they taught, or when CCD datasets were missing some information about a school that was successfully identified. To address cases of missing data, we include in our multivariate analyses dummy indicators corresponding to missing observations for each of our independent variables of interest. We include additional information about the B&B variables that we use in our Appendix section. Table A-1 details the extent of missing data for each of the variables in our analyses, and Table A-2 examines whether observations with and without any missing school-level data appear significantly different in terms of observable characteristics of teachers. By and large, they do not. Nevertheless, since these data are not missing at random, it is possible that our results may be biased in some instances due to missing data.

Findings

How Has the Academic Ability of Recent College Graduates Entering Teaching Changed across the Graduating Classes of 1993, 2000, and 2008?

In line with recent research about the improving academic qualifications of incoming teachers (Goldhaber and Walch 2013), Figure 1 shows a drop in teachers' academic ability from the 1993 to 2000 cohort, though statistically insignificant, but a statistically significant increase

in teachers' academic test scores from the 2000 to 2008 cohort.² College graduates entering the teaching profession from the 2000 cohort ranked around the 42nd percentile in SAT and ACT scores relative to their peers, while teachers from the 2008 cohort ranked in the 48th percentile. Moreover, as shown in Figure 2, this increase is somewhat larger around the tail ends of the distribution, with fewer very low-scoring college graduates and more very high-scoring graduates entering teaching in 2008 relative to the 2000 cohort. The uptick in incoming teachers' test scores represents an interruption of the downward trend in schools' capacity to attract top performers in prior decades that has been documented in several studies (Bacolod, 2007; Corcoran, Evans, and Schwab, 2002).

[FIGURE 1 HERE]

[FIGURE 2 HERE]

Furthermore, the improvement in test scores between the 2000 and 2008 cohorts is primarily driven by schools' ability to recruit teachers with higher math ability. Figure 3 illustrates that math scores reached their lowest point in 2000 before rebounding strongly in 2008. Incoming teachers' verbal test scores increased only modestly across the three cohorts.³ As follows, we further examine the rising SAT scores in relation to the gender and majors of graduates entering the teaching profession.

[FIGURE 3 HERE]

How Have Trends in These New Teachers' Academic Ability Varied by Teachers'

Demographics?

² Approximately the same percentage of college graduates are either entering teaching or preparing to teach in each of the three cohorts (1993, 2000, and 2008). Comparable test score increases are apparent among both full time teachers and those who are still just preparing to teach in the 2008 cohort.

³ This increase in teachers' math ability scores does not, however, correspond to a commensurate increase in the propensity for graduates from STEM majors to begin careers in teaching (Goldhaber and Walch 2013).

Trends in the academic ability of incoming teachers vary by gender. While roughly a quarter of incoming teachers are men in each cohort, the test scores trends of men and women differ over time. Among women, ability scores were flat between 1993 and 2000 and then increased between 2000 and 2008. The test scores of men who enter teaching, on the other hand, have fluctuated sharply, reaching their nadir in the 2000 cohort.

[FIGURE 4 HERE]

The fluctuation in test scores among men parallels the decline in math scores in the 2000 cohort, and may be a function in part of the prevailing economic conditions that college graduates faced in the year following graduation. Low unemployment around the time of the 2000-2001 tech boom (i.e., 4.4 percent, compared to 6.6 percent for the 1993 cohort and 7.7 percent for the 2008 cohort) corresponds to lower math scores for all teachers, particularly lower scores for men going into teaching.⁴ Scores rebounded strongly in 2008-09 at the peak of the “Great Recession.” This pattern suggests that male graduates and graduates with greater math ability may be more sensitive to alternative job opportunities when choosing whether or not to enter teaching.

Over the same time frame, we observe changes in not only the test scores but also the proportion of black and Hispanic college graduates who enter teaching. As shown in Figure 5, incoming black and Hispanic teachers’ test scores were lowest in the 2000 cohort. However, the proportion of black and Hispanic graduates entering teaching, at 21.2 percent, was higher than the proportion of black and Hispanic college graduates overall, at 17.0 percent. In contrast, in the 2008 cohort the ability test scores of incoming black and Hispanic teachers increased, but minority representation among incoming teachers, at 15.7 percent, was less than their share of

⁴ The subject and gender trends appear to be independent. Math scores declined in 2000 among both men and women, and both math and verbal scores declined among male teachers in the 2000 cohort.

the college graduate population at 18.5 percent.⁵ These results provide evidence that the increase in academic selectivity of new teachers coincides with the reduction in the diversity of the teaching force of the 2008 cohort.

[FIGURE 5 HERE]

How Have Trends in These New Teachers' Academic Ability Varied by What They Teach and Where They Teach?

While incoming teachers' academic ability in the aggregate is one measure of the health of the profession, *what* skilled graduates end up teaching and *where* they teach are also of significant interest to policymakers and school leaders. Elementary and secondary school hires might differ in terms of their responsiveness to policy and economic changes as a function of the skills required to fill those different roles, particularly new hires in STEM subject areas. Moreover, the NCLB legislation has an explicit focus on the recruitment of highly skilled teachers in schools serving more non-white and poor students. We, therefore, analyze the distribution of teacher ability scores across schools as a function of teachers' grade level, subject area, and school sector. Table 1 provides these results.

We find that teachers in secondary grades (7-12) and particularly STEM teachers who teach in secondary grades have consistently higher ability scores than elementary teachers. This disparity is consistent across cohorts. For instance, in the 2008 cohort secondary teachers' SAT percentiles were roughly six percentage points higher than elementary teachers when controlling for other factors. Secondary school teachers who teach STEM subjects tend to score even higher than other secondary school teachers (around 10 percentage points higher than other secondary school teachers in 2008). This differential is not surprising, given that graduates who have

⁵ The over and under-representation of black and Hispanic teachers in the 2000 and 2008 time points, respectively, are statistically significant at p-values of less than 0.1.

majored in STEM subjects typically have higher SAT scores than their non-STEM peers (Goldhaber and Walch 2013).

[TABLE 1 HERE]

To further understand the differences between elementary and secondary schools, we contrast the relative ability level of teachers entering public schools with that of teachers entering private schools. The average SAT percentile rank of teachers hired by private *elementary* schools was around four percentage points higher than their public school peers in 1993, but by 2008 their scores were roughly five percentage points lower. Thus, while new teachers at private *secondary* schools retain a sizeable ability advantage over those entering public secondary schools, the overall public-private school ability gap had shrunk from a more than seven percentage point gap in 1993 to virtually none as of 2008. As shown in Figure 6, this change is driven primarily by a substantial reduction in the academic ability of new teachers entering private elementary schools over time.

[FIGURE 6 HERE]

We, next, examine the distribution of higher ability teachers as a function of the students and locales that they serve. As shown in Table 2, schools that serve predominantly minority students recruited teachers with ability percentile ranks approximately 5 and 10 points lower, in 1993 and 2000, respectively, when controlling for other factors, including the percent of low-income students served.⁶ However, as of the 2008 cohort, high-minority schools on average recruited teachers with roughly the same ability levels as other schools on average.

⁶ Associations between high-minority schools and incoming teacher test scores are very similar in a specification that does not include controls for school percent poverty indicators. While school percent minority and percent low-income characteristics are fairly highly correlated (0.56), the bulk of the associations we observe between teacher ability levels and students served stem from the percent of minority students in the teachers' schools, rather than the percent of poor students served. As a consequence, we focus our analyses on high-minority schools in particular.

[TABLE 2 HERE]

The recent improvement in the ability level of new teachers entering high-minority schools is driven almost entirely by a shift in the competitiveness of teacher hiring in high-minority *urban* school settings. While high-minority non-urban schools continue to hire teachers of lower academic ability, high-minority urban schools in the most recent cohort hired teachers whose academic ability scores were above average for incoming teachers. Urban high-minority schools have gone from recruiting teachers who ranked roughly 8 percentage points lower than non-urban high-minority schools in 1993 to recruiting teachers who ranked 21 percentage points higher than non-urban high-minority schools in 2008, when controlling for other factors.

The improvement in teacher ability scores in urban high-minority schools corresponds to a striking bi-modal distribution. As shown in Figure 7, these schools went from recruiting predominantly very low-ability teachers in 1993 and 2000 to recruiting from a mix of both very low and very high ability teachers in 2008. This distinctive shift to a bi-modal distribution of teacher ability scores suggests that the increase in test scores in urban high-minority schools represents a targeted outreach to very high-ability college graduates in particular.⁷

[FIGURE 7 HERE]

While ability score improvements are apparent among teachers of all racial groups in the 2008 cohort, the distribution of these improvements differs between black and Hispanic teachers and other teachers. Figures A-1 and A-2 in the appendix section illustrate teacher ability distributions in high-minority urban schools separately within the non-black and non-Hispanic teacher sample and the black or Hispanic teacher sample, respectively. Incoming non-black and

⁷ Urban high-minority schools have also hired an increasing share of college graduates over time. They recruited 9.5% of graduates from the 1993 cohort, 12.2% from 2000, and 15.5% from the 2008 cohort. This trend could relate to demographic and mobility changes among students and families over time, as well as to changes in these schools' propensity to hire more teachers with college degrees after NCLB.

non-Hispanic teachers in these schools include a dramatically larger proportion of very high ability individuals. Black and Hispanic teachers' scores have also improved substantially, but primarily through a marked reduction in the share of very low ability teachers hired.

How Has New Teachers' Reported Job Satisfaction Changed Over Time?

Improvements in new teachers' academic ability scores over time provide evidence that schools are increasingly successful at recruiting academically talented college graduates. However, recruiting more skilled individuals into teaching may be of limited utility if teachers at these schools are unsatisfied with their job. In this section, we examine the overall job satisfaction, job pay satisfaction, and job security satisfaction of college graduates who enter teaching, in comparison to graduates who are employed in other fields. Figure 8 illustrates the results.

[FIGURE 8 HERE]

Recent college graduates' overall job satisfaction declined between the 2000 and 2008 graduating cohorts for both teachers and non-teachers. However, as of the 2008 cohort, teachers remained more satisfied (84.7 percent) with their jobs overall than non-teachers (71.0 percent), and this advantage in job satisfaction represents a slight increase between the two periods.

Teachers' satisfaction with job pay also increased slightly between these two periods, while non-teachers saw a significant decline. Thus, while teachers were less likely to be satisfied with their pay than non-teachers in 2000, they were more likely to be satisfied with their pay in 2008. This reversal may stem from the relative inelasticity of teacher pay scales. Public school teacher pay may be slower to change in response to economic conditions, while non-teacher pay may have seen a greater reduction as a result of the onset of the recession in 2008.

In contrast with the trend of teachers' satisfaction with pay, teachers' satisfaction with their job security decreased more than that of non-teachers over the same period. In 2000, incoming teachers were significantly more likely to report being satisfied with their job security (90.1 percent versus 83.3 percent, respectively), while in 2008 both teachers and non-teachers reported roughly the same levels of job security. The steeper decline in teacher job security may reflect the degree of uncertainty in public school budgets as a result of growing deficits around the peak of the recession.⁸

How has Teachers' Reported Job Satisfaction Varied over Time for Different Types of Teachers and across Different School Contexts?

Finally, in keeping with our exploration of teacher ability scores, we examine whether teachers of different ability levels, demographic groups, roles, or school contexts were differentially likely to report job satisfaction in each period. As shown in Table 3, we find that black and Hispanic teachers were roughly 60 percent less likely to report job satisfaction overall in 2001, and 40 percent less likely in 2008, when controlling for other factors.⁹ We do not, however, observe that teachers' academic skills predict either higher or lower job satisfaction in any period.

[TABLE 3 HERE]

In line with our previous finding of reduced teacher ability levels in private elementary schools, we see a marked decrease in the likelihood that private elementary teachers will be satisfied with their job overall and with job pay between the two periods. While these teachers

⁸ California, for example, experienced a particularly steep decline in new teachers' job satisfaction in 2008-09, with job security satisfaction rates going from 91% in 2000-01 to 38% in 2008-09, as shown in appendix Figure A-3. This sharp decrease in reported job security among new teachers in California corresponds to the substantial shortfall in public school funds that educators and policymakers anticipated during the 2008-09 school year in particular (The Associated Press 2009).

⁹ These results are consistent with Ingersoll and May (2011), who also provide evidence that minority teachers are more often hired into more challenging work environments.

were similarly likely to be satisfied in the 2000 cohort, incoming private elementary teachers in the 2008 cohort were approximately 80 percent less likely to be satisfied with their job pay and 60 percent less likely to be satisfied with their job overall compared to their peer teachers in public elementary schools.

In a similar vein, we see a substantial difference in teacher satisfaction in high-minority schools in urban versus non-urban settings as of the 2008 cohort. Urban high-minority school teachers appear to be trending higher in both their job and pay satisfaction. In contrast, teachers in non-urban high-minority settings report lower job satisfaction than teachers in schools that serve fewer minority students. Teachers in urban high-minority schools report overall job satisfaction rates roughly twice that of either teachers in high-minority non-urban schools or of teachers in urban schools that serve fewer minority students. These results suggest that the changes we observe in urban high-minority schools' capacity to recruit more talented teachers correspond to other material changes in the job that have simultaneously buttressed teachers' satisfaction with their work.

[TABLE 4 HERE]

Discussion and Conclusion

The ability of K-12 schools to recruit and retain a highly skilled teacher workforce is a barometer of the health of the teaching profession in the United States. In this study, we utilize multiple waves of cross-sectional data over a fifteen year period to examine the career decisions and job experiences of recent college graduates entering teaching. We highlight emerging trends in who chooses to teach, where they teach, and how satisfied they are once they enter the profession. We expand upon previous research about new college graduates entering teaching by considering measures of both teacher academic quality and job satisfaction, and by identifying

substantial heterogeneity in trends across teacher demographics, types of school organizations, and teaching assignments.

Among the 1993, 2000, and 2008 cohorts, we find that incoming teachers' test scores were highest for the graduating class of 2008, who entered teaching in the midst of the "Great Recession," while scores were lowest for the graduating class of 2000, who entered teaching in the midst of the tech-boom of the early 2000's. This general uptick is in line with previous research (Goldhaber and Walch 2013; Lankford, Loeb, and McEachin et al. 2014). While the general trend toward higher ability levels is promising, the pattern of results that we observe also indicates that the academic ability of incoming teachers may vary substantially as a function of economic fluctuations and the availability of other employment. Consistent with prior research, the skill levels of men and of individuals with higher ability scores may fluctuate more dramatically as a function of their greater access to alternative career opportunities (Guarino, Santibanez, and Daley 2006).

While the academic ability level of incoming teachers shifted substantially over the period of our study, teachers retained a relative advantage over non-teachers in terms of their job satisfaction rates. Teachers tended to be more satisfied with their jobs overall than graduates going into other careers, and this advantage persisted across both the 2000 and 2008 cohorts. Moreover, while other recent graduates saw a decline in their job pay satisfaction between those two periods, teachers' pay satisfaction was unchanged or even improved somewhat. It is possible that relative inelasticity of teacher pay scales may be an appealing attribute during challenging economic times. On the other hand, new teachers experienced a greater decline in their reported job security between the 2000 and 2008 cohorts than non-teachers, perhaps due to the decline in public financing of education during the recession period. Particularly given the

studied sample includes new (un-tenured) teachers, they often feel less secure in their jobs than veteran teachers, because under the Collective Bargaining Agreement and when layoffs do happen due to the financial downturn, the “last hired, first fired” provisions make seniority the determining factor for which teachers are laid off (Goldhaber and Theobald 2013).

Aggregate trends in new teachers’ academic skills and job satisfaction rates mask substantial variation in where highly skilled new teachers are choosing to teach and where they report being more satisfied with their jobs. In particular, we observe a large increase in the number of teachers with very high academic ability entering urban schools that serve predominantly minority student and have historically been among the hardest to staff (Lankford, Loeb, and Wyckoff 2002). The increasing competitiveness of teacher hiring in high-minority urban schools may be the result of intentional efforts by districts and educational organizations in the post-NCLB period. One example is the growth of alternative pathways such as Teach for America that recruited an increasing number of high-ability teachers into hard-to-staff districts during this period.¹⁰ Another example is The New Teacher Project that became active in partnership with large urban school districts to improve their hiring and recruiting process by filling vacancies earlier and working with district human resources staff to shape district policies.

The above results highlight that teacher academic quality is not uniform. While urban high-minority schools’ incoming teachers are increasingly more academically skilled, we observe persistent and substantial disparities in new teachers’ academic ability and job satisfaction persist in non-urban high-minority schools. In addition, even as the ability scores of

¹⁰ Teach for America (TFA) recruits primarily teachers of very high academic ability and places many of their teachers in high-poverty urban school settings. Their efforts may have played a meaningful – but likely not the only – role in the increasing numbers of very high-ability teachers entering high-minority urban schools. For instance, 3,600 new TFA teachers entered a mix of urban and non-urban schools in 2008, compared to our estimate of around 18,000 total new teachers recruited by high-minority urban schools nationwide from the 2008 cohort of college graduates.

new teachers have improved the diversity of the incoming teaching workforce and in particular the hiring of black and Hispanic college graduates into teaching has dropped off as of 2008. Moreover, once hired, minority teachers report substantially lower job satisfaction rates than other teachers, which had been consistent over time. Policies or strategies may be needed particularly to staff non-urban high-minority schools with highly skilled graduates. Moreover, preparing and supporting highly skilled and diverse teacher workforce as a whole remain as a pressing issue.

Our study is descriptive in nature. We do not explicitly evaluate what may be driving changes in teachers' ability levels or job satisfaction, and, thus, can only speculate as to the underlying causes of the trends that we observe in incoming teachers' academic quality. In addition, the specific cohorts that we examine correspond to widely varying economic and labor market circumstances. While this allows for an informative analysis, we lack sufficient data to assess whether the trends toward increased ability levels and relative job satisfaction among incoming teachers are likely to continue over time and across changing economic circumstances. Nevertheless, the patterns that we observe at both the aggregate level and within high-minority urban schools suggest that efforts by policy makers and practitioners over the past two decades to bolster the recruitment of highly skilled college graduates into teaching may in fact be bearing fruit.

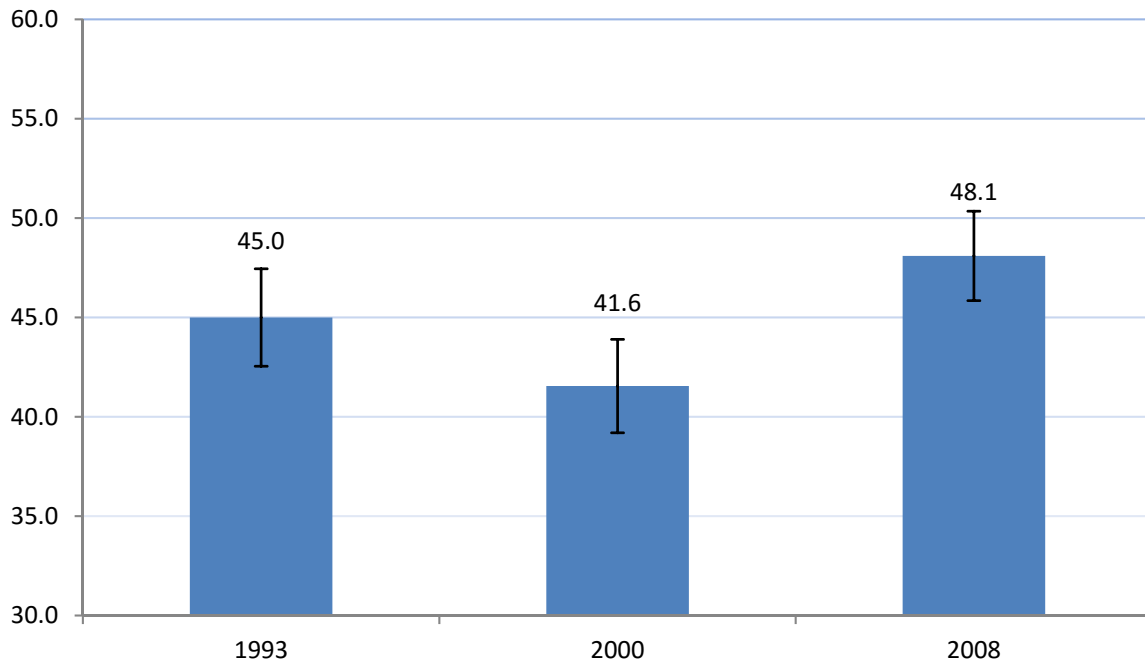
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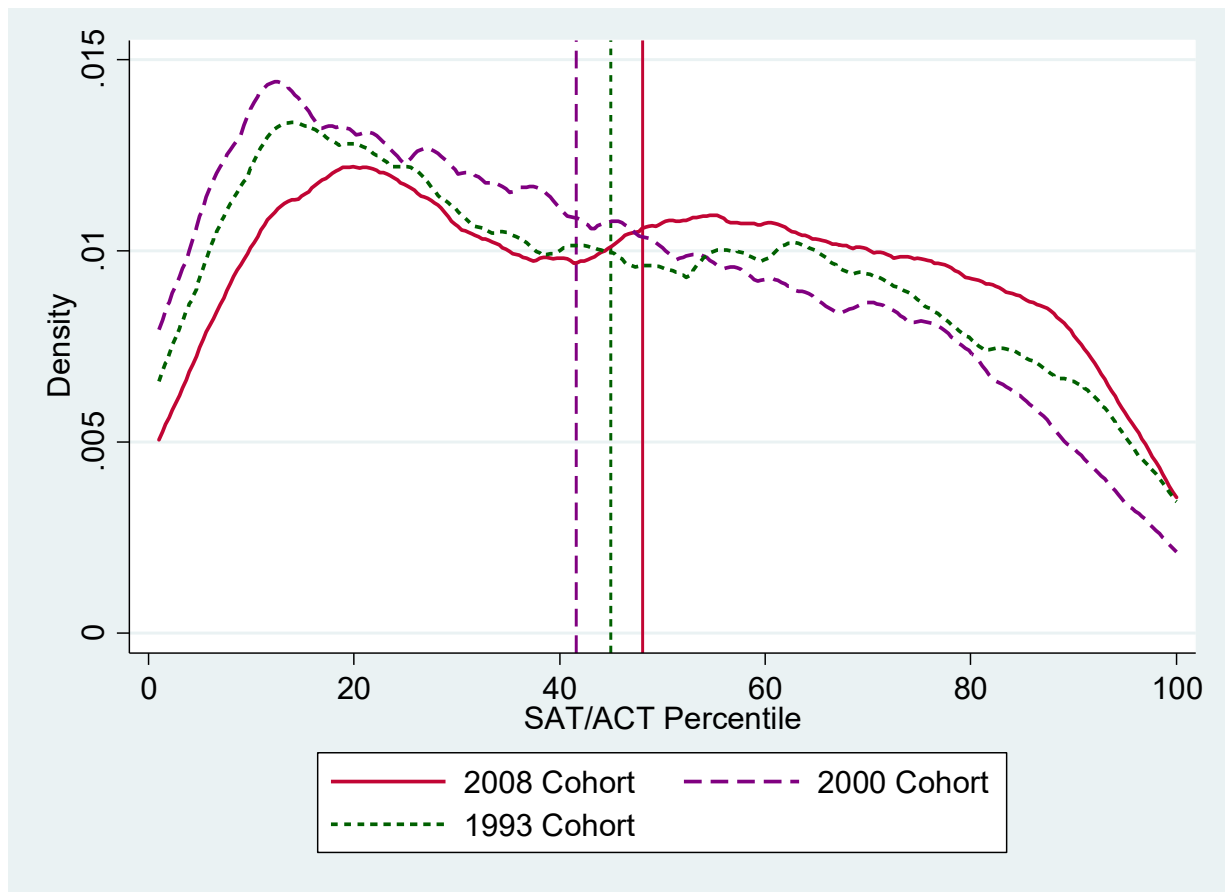
Figures and Tables

Figure 1. SAT/ACT Percentile Ranks of Recent College Graduates Entering Teaching



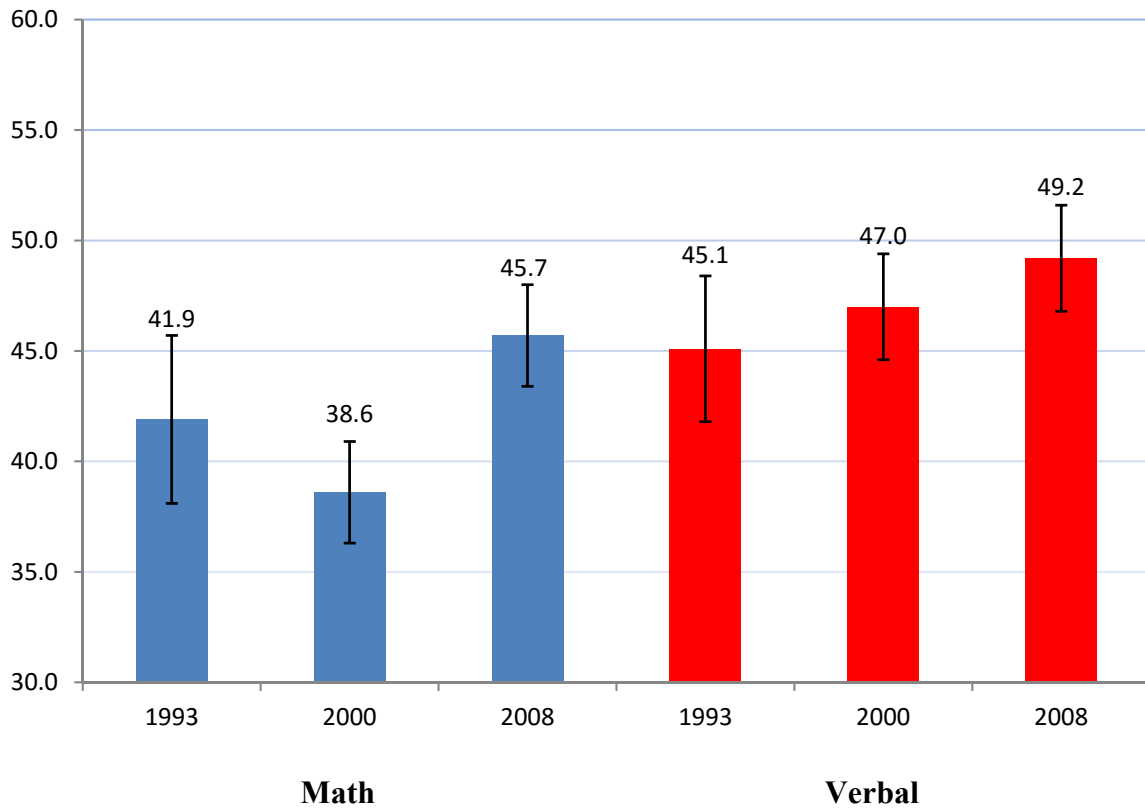
Note: 95% confidence intervals shown. Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. Data points in all cells represent >10 observations.

Figure 2. Distribution and Mean of SAT/ACT Percentiles for Recent College Graduates Entering Teaching



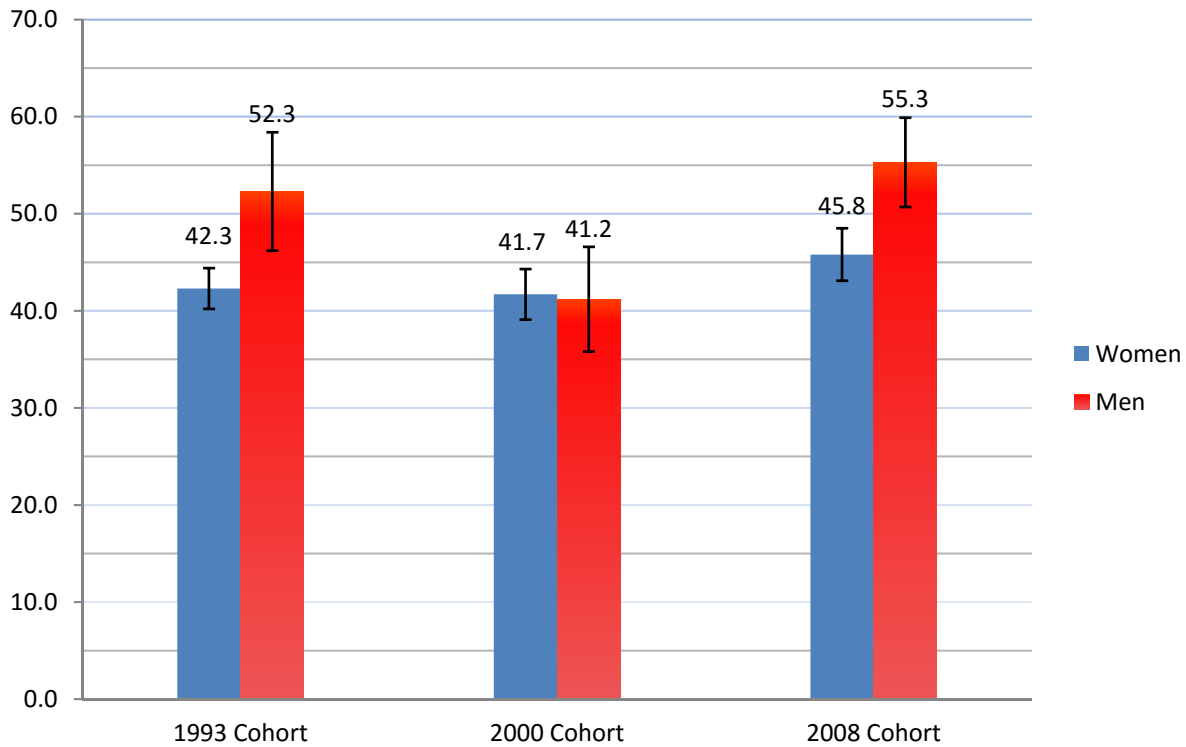
Note: Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. Data points used to estimate means all include >10 observations.

Figure 3. SAT/ACT Percentile Ranks of Recent College Graduates Entering Teaching, by Subject



Note: 95% confidence intervals shown. Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. Sample of 1993 cohort graduates with available by-subject data is a subset of the sample for overall scores reported in Figure 1, due to missing data on by-subject ACT in 1993. Data points in all cells represent >10 observations.

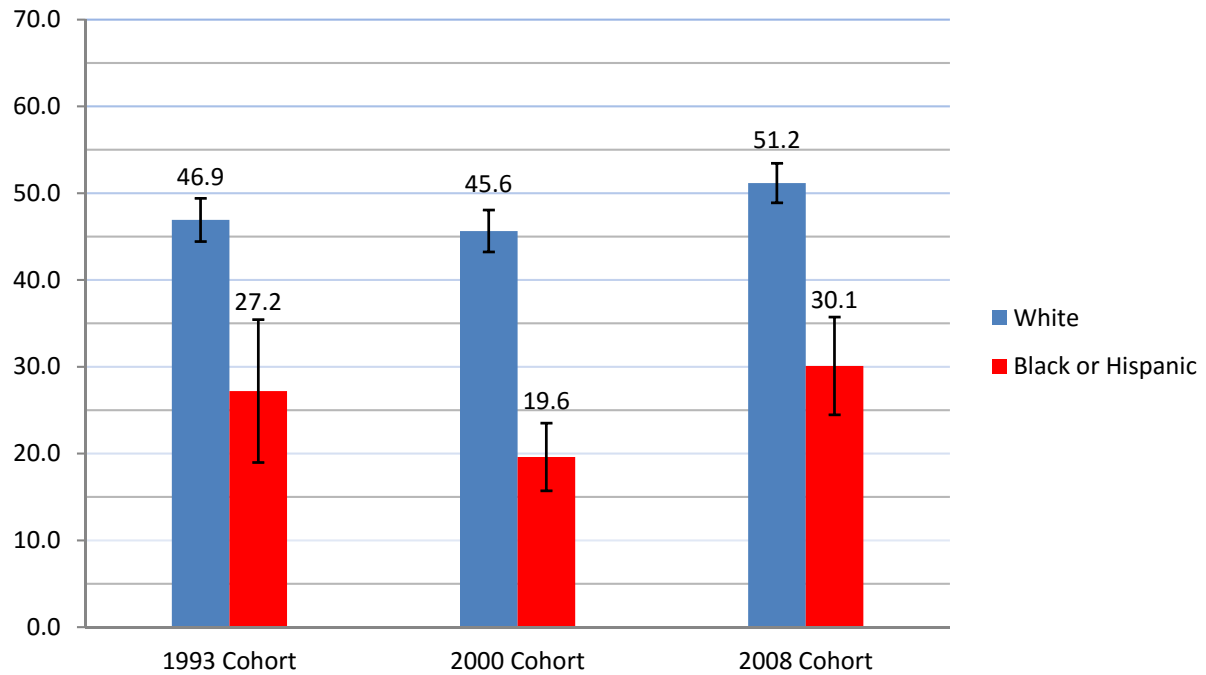
Figure 4. SAT Percentile Ranks of Recent College Graduates Entering Teaching, by Gender



National Unemployment Rate	6.6%	4.2%	7.7%
% Male (Teachers)	27.1%	26.6%	24.2%

Note: 95% confidence intervals shown. Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. Unemployment Rates are national seasonally adjusted rates as reported by the US Bureau of Labor Statistics for January 1st of the year following college graduation (i.e. 1994, 2001, and 2009). Data points in all cells represent >10 observations.

Figure 5. SAT Percentile Ranks of Recent College Graduates Entering Teaching, by Race



% White (Teachers)	85.7%	76.3%	78.6%
% Black or Hispanic (Teachers)	11.8%	21.2%	15.7%
% Black or Hispanic (All Professions)	11.3%	17.0%	18.5%

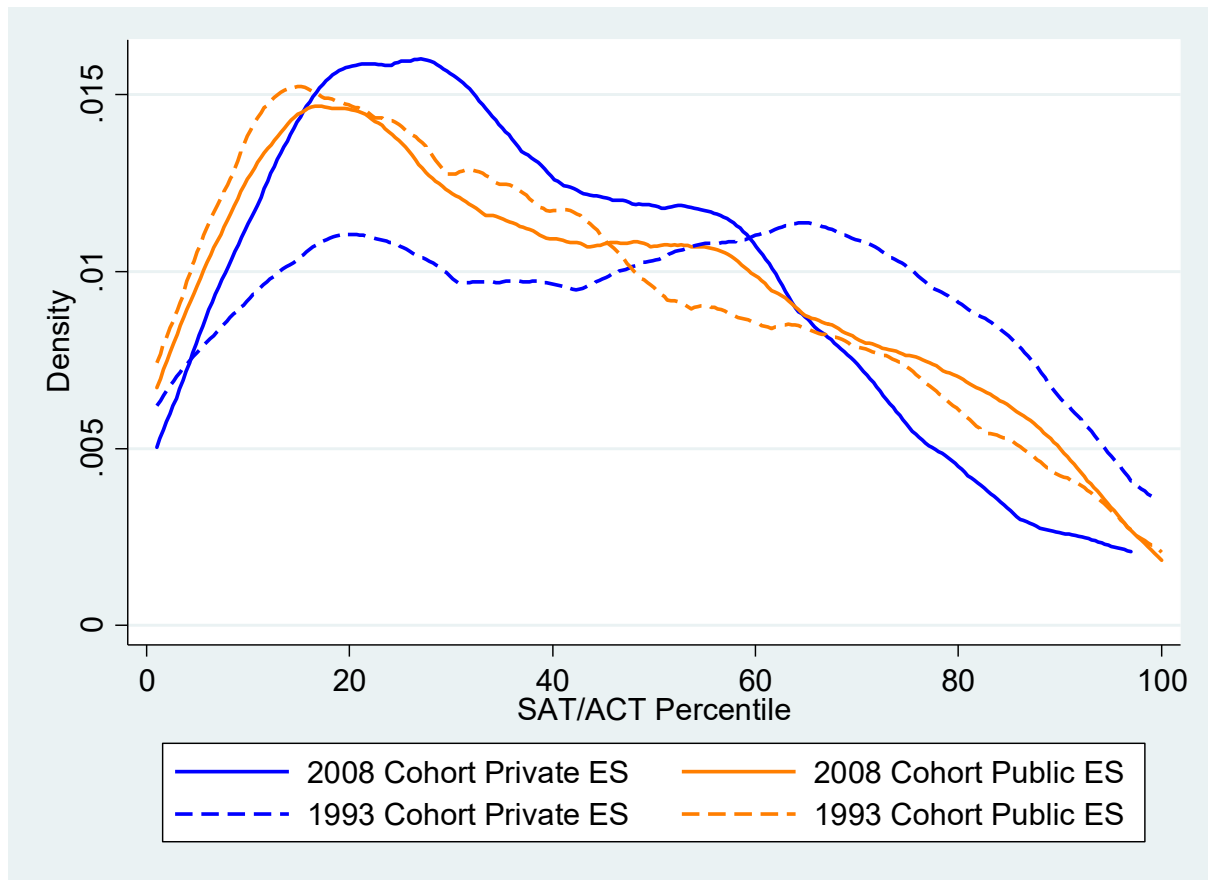
Note: 95% confidence intervals shown. Test score percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. Data points in all cells represent >10 observations.

Table 1. Predicting New Teachers’ SAT Percentiles as a Function of Their School Type, Grade, and Subject area

	1993 Cohort				2000 Cohort				2008 Cohort			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Secondary Grades	7.324*	(3.227)	6.300*	(3.120)	9.043**	(2.826)	7.191*	(2.939)	6.378*	(2.704)	5.049 [†]	(2.927)
STEM Subjects in Secondary	6.421	(4.234)	6.434	(4.209)	7.049 [†]	(3.587)	7.123*	(3.509)	9.758**	(3.399)	9.512**	(3.422)
Private Schools	7.200*	(2.814)	4.222	(3.720)	7.447 [†]	(4.134)	-1.876	(5.221)	0.217	(2.920)	-4.585	(3.594)
Private Secondary Schools			8.571	(7.690)			20.342**	(6.415)			8.638	(5.742)
N of teachers	970		970		1170		1170		1260		1260	

Note: *** for $p < 0.001$, * for $p < 0.01$, * for $p < 0.05$, [†] for $p < 0.1$. Analysis excludes teachers who did not take either the SAT or ACT or for whom test score data were unavailable. SAT/ACT Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. STEM = Science and math teachers in secondary grades 7-12. Sample sizes rounded to the nearest 10.

Figure 6. SAT Percentile Ranks of New Teachers at Public and Private Elementary Schools, by Cohort



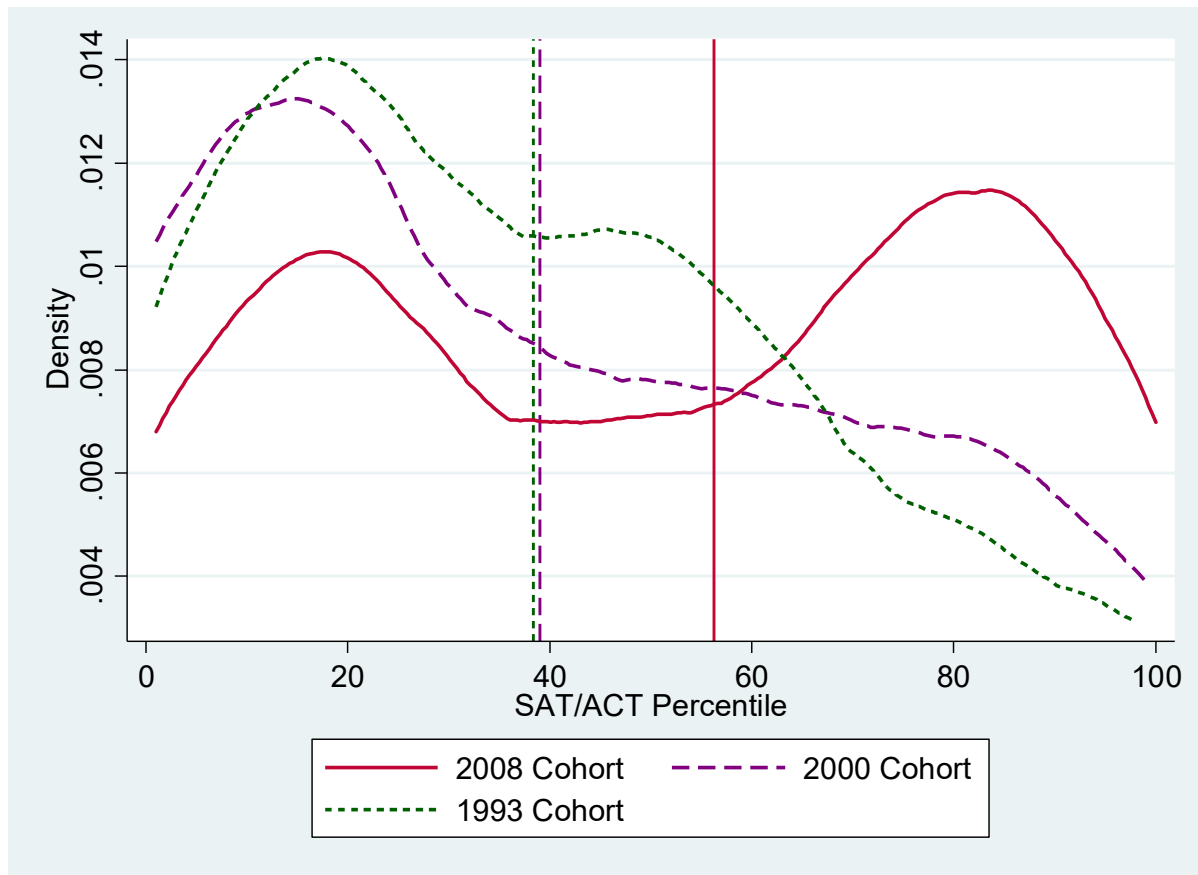
Note: Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. ES = Elementary Schools.

Table 2. Predicting New Teachers’ SAT Percentiles as a Function of Their School’s Locale and Students Served

	1993 Cohort				2000 Cohort				2008 Cohort			
	Model 1		Model 2		Model 1		Model 2		Model 1		Model 2	
	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error	Coeff.	Std. Error
Urban Schools	2.106	(2.676)	4.656 [†]	(2.747)	1.556	(3.284)	-2.720	(3.220)	1.359	(2.983)	-7.016*	(3.188)
Rural Schools	-3.985	(3.110)	-3.818	(3.097)	-2.383	(2.632)	-2.483	(2.627)	-3.194	(2.720)	-4.202	(2.643)
High-poverty Schools	-2.114	(2.820)	-2.033	(2.874)	-2.816	(3.690)	-2.232	(3.513)	-2.384	(3.912)	-3.348	(3.783)
High-minority Schools	-4.549	(3.241)	-1.454	(4.081)	-9.757***	(2.611)	-17.166***	(4.253)	2.678	(3.475)	-5.936 [†]	(3.453)
High-minority Urban Schools			-8.264	(6.603)			14.858*	(7.035)			21.126***	(5.591)
N of teachers	970		970		1170		1170		1260		1260	

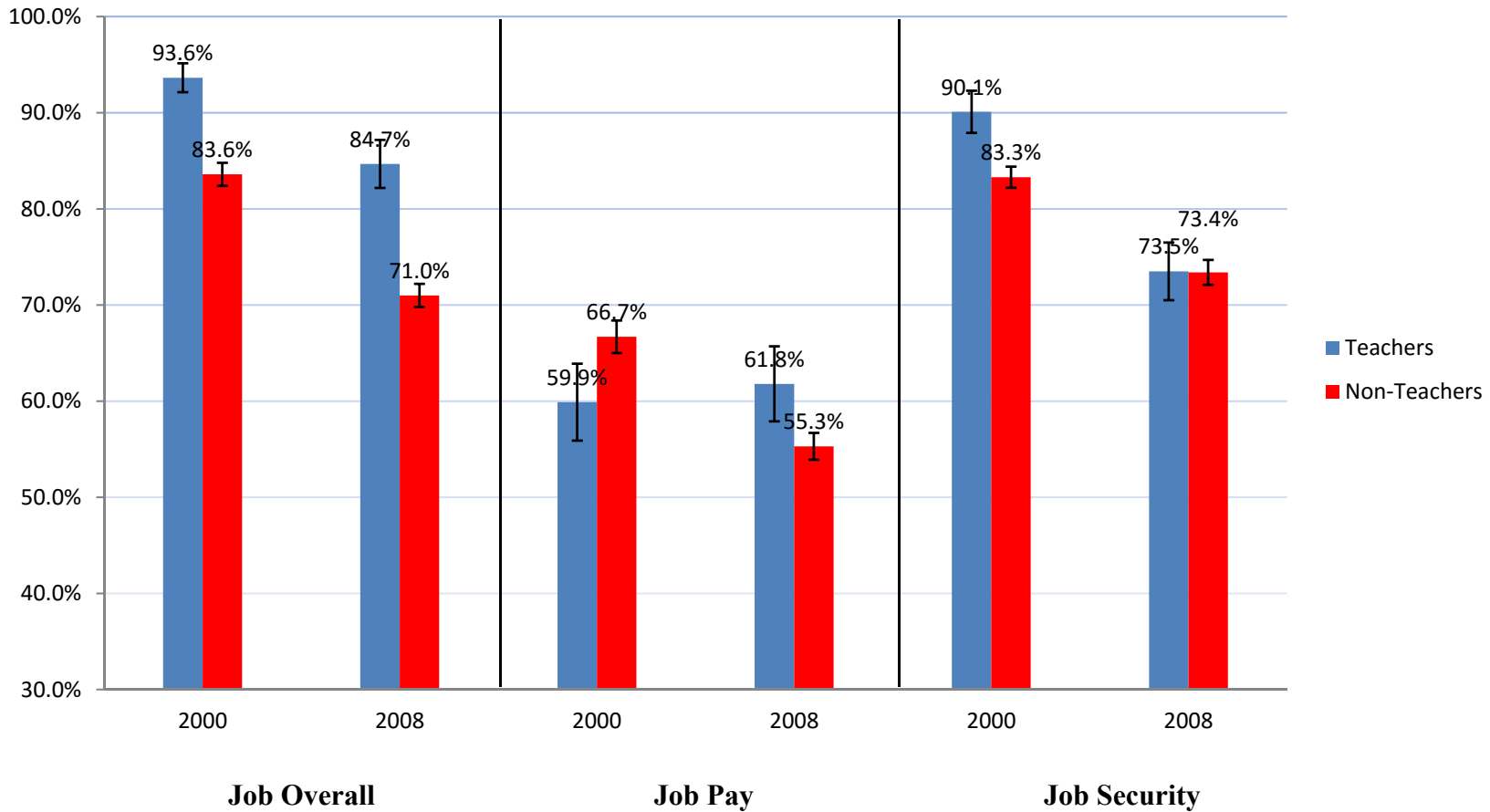
Note: *** for p<0.001, * for p<0.01, * for p<0.05, [†] for p<0.1. Analysis excludes teachers who did not take either the SAT or ACT or for whom test score data were unavailable. SAT/ACT Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. High-minority schools defined as schools with >66% non-white students. High-poverty schools defined as schools in the top tercile in each period in terms of the proportion of students eligible for subsidized lunches. Sample sizes rounded to the nearest 10.

Figure 7. SAT Percentile Ranks of New Teachers at High-minority Urban Schools, by Cohort



Note: Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. High-minority schools defined as schools serving >66% non-white students. Data points used to estimate means all include >10 observations.

Figure 8. Percent of Recent Graduates Reporting Satisfaction with their Job Overall, Job Pay, and Job Security, by Cohort and Job Type



Note: 95% confidence intervals shown. Data points in all cells represent >10 observations.

Table 3. Predicting the Likelihood of a Teacher Being Satisfied with Their Job Overall, Their Job Pay, or Their Job Security, as a Function of School Type, Teacher Role and Teacher Characteristics

	2000 Cohort			2008 Cohort		
	Job Overall Odds Ratio	Job Pay Odds Ratio	Job Security Odds Ratio	Job Overall Odds Ratio	Job Pay Odds Ratio	Job Security Odds Ratio
Secondary teachers	1.105	0.944	1.461	0.772	1.045	0.650 [†]
STEM Secondary	0.906	0.891	0.779	1.116	0.856	1.638
Private Schools	1.036	1.128	0.869	0.378*	0.189***	1.521
Private Secondary	1.228	0.744	1.207	1.204	6.033***	0.597
Teacher SAT / ACT Percentile	0.990	1.004	0.994	0.999	0.999	0.998
Male Teacher	0.642	1.361 [†]	1.198	1.363	1.496 [†]	1.362
Black or Hispanic Teacher	0.386**	0.780	0.794	0.587*	0.979	0.620
N of teachers		1400			1410	

Note: *** for $p < 0.001$, * for $p < 0.01$, * for $p < 0.05$, [†] for $p < 0.1$. Satisfaction coded as 1=satisfied, 0=dissatisfied. Sample sizes rounded to the nearest 10.

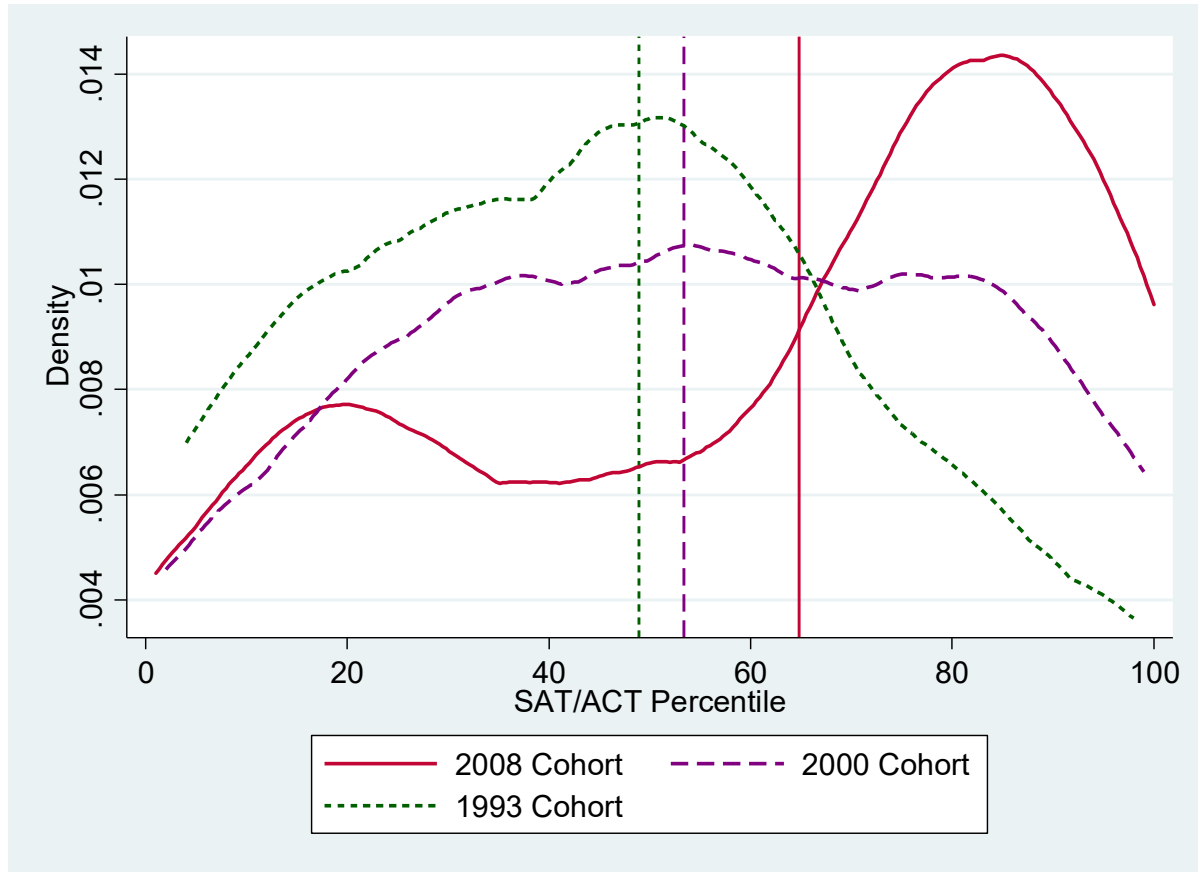
Table 4. Predicting the Likelihood of a Teacher Being Satisfied with Their Job Overall, Their Job Pay, or Their Job Security, as a Function of School Context

	2000 Cohort			2008 Cohort		
	Job Overall Odds Ratio	Job Pay Odds Ratio	Job Security Odds Ratio	Job Overall Odds Ratio	Job Pay Odds Ratio	Job Security Odds Ratio
Urban Schools	0.819	0.808	0.752	0.552 [†]	0.606*	1.111
Rural Schools	0.622	0.895	0.627	0.707	1.003	1.462
High-minority Schools	1.013	0.876	0.732	0.509*	0.755	1.119
High-minority Urban Schools	1.205	1.165	2.272	4.246**	2.291*	1.311
Teacher Characteristic Controls	Yes	Yes	Yes	Yes	Yes	Yes
N of teachers		1400			1410	

Note: *** for $p < 0.001$, * for $p < 0.01$, * for $p < 0.05$, [†] for $p < 0.1$. Satisfaction coded as 1=satisfied, 0=dissatisfied. High-minority schools defined as schools with >66% minority students. Teacher characteristic controls include indicators for race, and gender. Sample sizes rounded to the nearest 10.

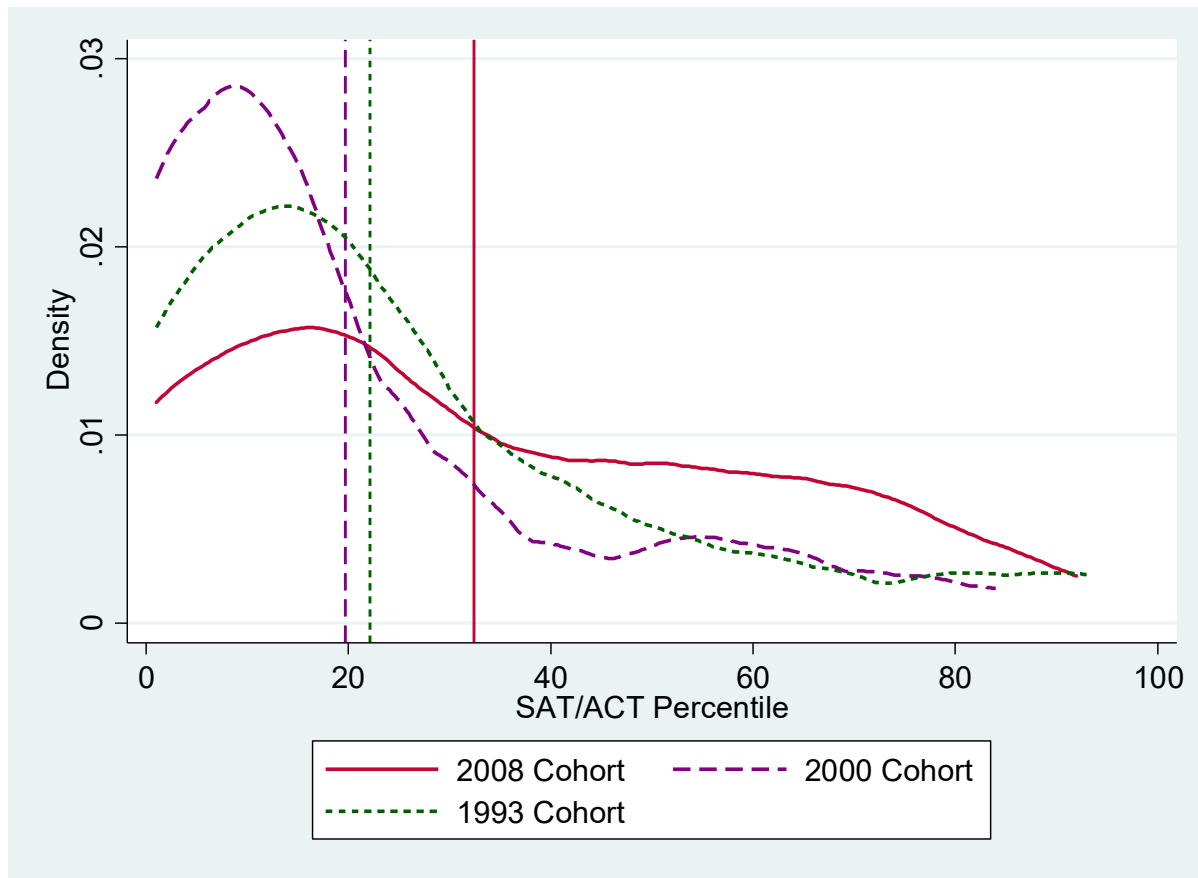
Appendix A – Additional Figures and Tables

Figure A-1. SAT Percentile Ranks of New Non-Black and Non-Hispanic Teachers at High-minority Urban Schools, by Cohort



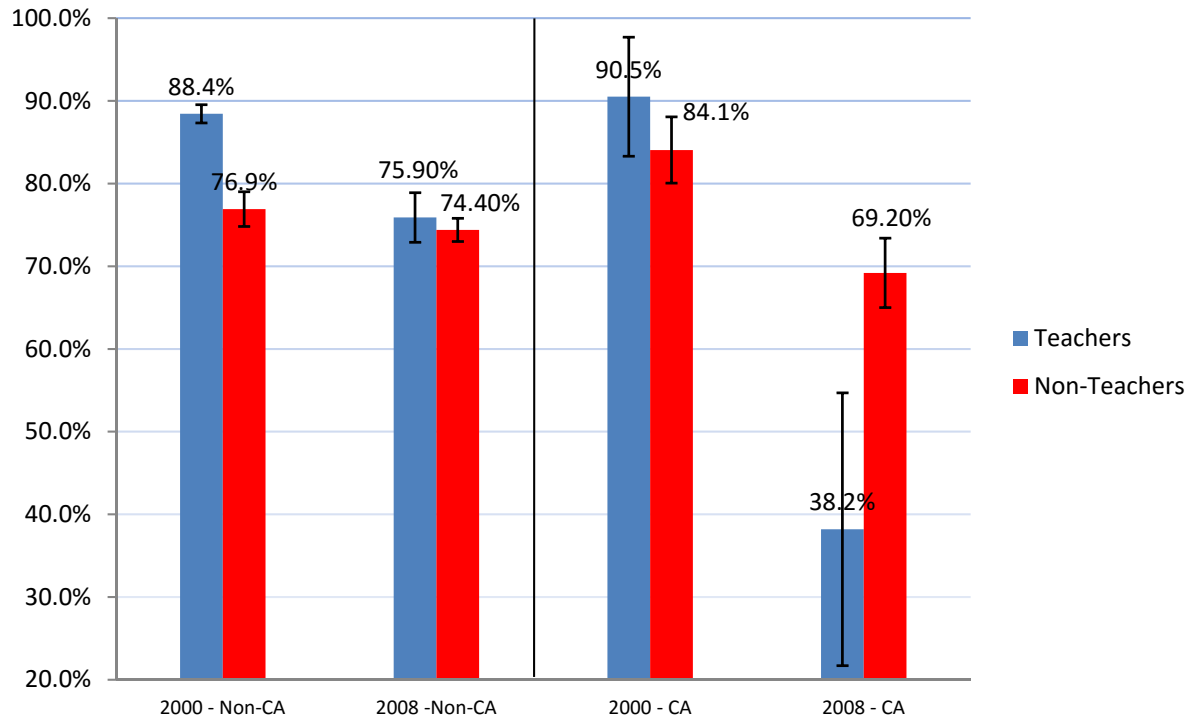
Note: Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. High-minority schools defined as schools serving >66% non-white students. Data points used to estimate means all include >10 observations.

Figure A-2. SAT Percentile Ranks of New Black or Hispanic Teachers at High-minority Urban Schools, by Cohort



Note: Percentile ranks are relative to all college graduates in each cohort. ACT scores used in cases where SAT test score data was unavailable. High-minority schools defined as schools serving >66% non-white students. Data points used to estimate means all include >10 observations.

Figure A-3. Satisfaction with Job Security, California Compared to other States



Note: 95% confidence intervals shown. Data points in all cells represent >10 observations.

Table A-1. Proportion of Missing Observations for Each Independent Variable Used in Our analyses, by Cohort

	1993 Cohort	2000 Cohort	2008 Cohort
Teacher SAT / ACT Ability Score	0.310	0.239	0.175
School Sector (Public or Private)	0.124	0.200	0.076
School Poverty (% Eligible for Lunch Subsidies)	0.201	0.503	0.214
School % Minority Students	0.099	0.196	0.081
School Locale (e.g. Urban, rural, other)	0.222	0.198	0.077
School Level (Elementary or Secondary)	0.258	0.039	0.076

Note: Independent variables that had no missing data are not shown. Missing SAT scores include individuals who did not take the SAT or ACT and individuals for whom testing data are unavailable.

Table A-2. Descriptive Statistics for Observations with and without Any Missing School Characteristic Data, by Cohort

	1993 Cohort			2000 Cohort			2008 Cohort		
	Missing Data	Non-Missing	T-test p-value	Missing Data	Non-Missing	T-test p-value	Missing Data	Non-Missing	T-test p-value
Teacher Proportion Male	0.288	0.256	0.253	0.292	0.238	0.130	0.241	0.242	0.978
Teacher Proportion White	0.855	0.859	0.906	0.736	0.793	0.071	0.739	0.799	0.159
Teacher Proportion Black or Hispanic	0.112	0.123	0.733	0.232	0.190	0.183	0.182	0.150	0.377
Teacher SAT / ACT Percentile	47.8	42.8	0.022	43.3	39.7	0.148	47.5	48.3	0.774

Note: For simplicity, observations are categorized as missing data if they were lacking data about school sector, school locale, school level, school proportion minority students, or school proportion of students eligible for lunch subsidies. T-tests examine the statistical significance of differences in means between individuals with and without missing data from any of these school characteristics in each cohort.