

**LONG-RUN TRENDS IN THE
QUALITY OF TEACHERS:
EVIDENCE AND IMPLICATIONS
FOR POLICY**

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Abstract

One of the key provisions of the No Child Left Behind Act requires states to ensure that every teacher be “highly qualified.” Though the meaning of “highly qualified” remains hotly contested, the legislation’s emphasis on teachers is well founded. Nearly all modern research on the subject finds teacher effectiveness to be among the most important school inputs into student achievement. Yet recent literature, including my own work (Corcoran, Evans, and Schwab 2004), finds evidence that the quality of teachers has steadily eroded over time. In particular, the likelihood that a high-aptitude female pursued a career in teaching dropped precipitously between 1960 and 2000. In this article, I summarize these and related findings, review some of the most common explanations for the trend in teacher quality, and discuss policies that have been advanced to attract talented graduates to the teaching profession.

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INTRODUCTION

With the 2002 passage of the No Child Left Behind Act (NCLB), the U.S. federal government sought to hold schools and state education agencies accountable for ensuring “that all children have a fair, equal, and significant opportunity to obtain a high-quality education.”¹ Central to this legislation is the requirement that all teachers of core academic subjects be “highly qualified.” Though there remains much debate over what constitutes a highly qualified teacher, the law’s emphasis on teachers is well founded. Nearly all recent research on the subject has demonstrated that teacher quality ranks among the most important inputs that schools can contribute to educational outcomes (Hanushek and Rivkin 2006).

At the same time, there is reason to believe that the quality of teachers has steadily eroded in recent decades. In the not-so-distant past, schools enjoyed a captive labor pool in academically talented women who had few career opportunities outside of teaching, nursing, and social work. Today, college-educated women are more likely to become doctors, lawyers, scientists, or managers than to enter one of the traditionally female-dominated professions (Goldin 2006). To be sure, the effect of new occupational opportunities for women on the supply of quality teachers has been partially offset by rapid growth in the broader supply of women with college degrees. Yet evidence suggests that an increased quantity of academically talented women in the labor market has not been sufficient to offset a decline in the quality of graduates who choose to teach.

In this article, I describe common indicators of teacher quality and review some of the existing evidence on the ability of schools to attract teachers with these attributes. Drawing on some of my own work (Corcoran, Evans, and Schwab 2004), I document how the quality of new teachers—as measured by their own relative math and verbal ability—has evolved over a four-decade period of expanding labor market opportunities for women. I briefly explore some of the most common explanations for these trends in teacher quality over time, and conclude by discussing and assessing policies that have been advanced to improve the quality of teachers.

MEASURING TEACHER QUALITY

Despite intense interest in recent years in raising the “quality” of teachers, there is little consensus over what teacher attributes contribute most to students’ academic and social success.² Complicating matters is the likelihood that the most

1. Elementary and Secondary Education Act, Title I, Section 1001. Available www.ed.gov/policy/elsec/leg/esea02/.
2. See Hanushek and Rivkin (2006) and Rice (2003) for recent reviews.

valuable skills or characteristics differ from one classroom setting to the next. Qualities that make for a productive suburban middle school math instructor, say, are unlikely to be the same qualities that make for an effective second-grade classroom teacher in the city. In addition, many of the traits that potentially are the most effectual in promoting educational outcomes—such as patience, dedication, creativity, and skilled communication—are practically unmeasurable.

That there exists a set of individual characteristics that one can collectively call teacher quality or effectiveness is not in dispute. This will come as no surprise to any of us who recall a particularly masterful or inspirational teacher in our own education. However, identifying specific qualifications, experiences, aptitudes, or other observable predictors of teacher effectiveness has largely remained elusive. One recent empirical approach that remains agnostic with respect to teacher attributes uses indirect estimates of “teacher effects” to calculate the fraction of overall variation in student achievement attributable to individual teachers (Nye, Konstantopoulos, and Hedges 2004; Rockoff 2004; Rivkin, Hanushek, and Kain 2005; Aaronson, Barrow, and Sander 2007). In one survey of this literature, Nye, Konstantopoulos, and Hedges (2004) find that as much as 21 percent of the variance in student achievement gains can be explained by variation in teacher effectiveness. Such statistics convincingly demonstrate the importance of individual teachers but do little to help researchers, policy makers, and practitioners identify observable metrics of teacher quality.

Where researchers have attempted to quantify the importance of specific teacher attributes, they have focused on those traditionally tied to compensation (educational attainment and training, years of experience, certification), direct or indirect measures of aptitude and intelligence (standardized or licensure test scores, college selectivity), or immutable characteristics (such as race and gender). Of these, few prove to have systematically positive effects on student learning. A notable exception is cognitive ability. Where such measures are available, the evidence suggests that—all else equal—teachers who score higher in a distribution of standardized test takers produce more favorable academic outcomes than teachers lower in the distribution (Ehrenberg and Brewer 1994, 1995; Ferguson 1991; Ferguson and Ladd 1996; Clotfelter, Ladd, and Vigdor 2007).

Of course, this literature has focused almost exclusively on student achievement gains on standardized tests. Teacher aptitudes that yield gains in math and reading are not necessarily the same skills that promote social development or many of the other educational outcomes expected of schools.³ Use of teacher

3. On indirect estimates of teacher effects on students' social development, see Booher-Jennings and DiPrete (2007).

test scores also fails to address unobservable skills cited above that surely matter for student performance. Still, academic aptitude remains one of the few observed teacher characteristics that consistently appears to be associated with academic outcomes, and it seems reasonable to expect teachers to possess a high level of those skills they cultivate in their own students. It is also reasonable to suspect that cognitive abilities—thinking, reasoning, problem solving, and creativity, for example—are traits highly valued by industries and firms vying with schools for the same set of talented college graduates. In the next section I examine the evidence on the ability of schools to attract high-aptitude graduates into the teaching profession, focusing in particular on how this capacity has evolved in the long run.

LONG-RUN EVIDENCE ON THE QUALITY OF TEACHERS

A number of cross-sectional studies covering the 1970s and 1980s suggest that practicing and prospective teachers came disproportionately from the lower half of the distribution of college graduates or standardized test takers.⁴ Weaver (1983) and Ballou and Podgursky (1997), for example, found that prospective education majors scored lower on average on the SAT than students not intending to study education. Similarly, Vance and Schlechty (1982), Manski (1985), Hanushek and Pace (1995), Vegas, Murnane, and Willett (2001), and others found in longitudinal surveys of college graduates an inverse relationship between academic ability as measured by the SAT or ACT and entry into the teaching profession.

As pointed out in Corcoran, Evans, and Schwab (2004), however, the juxtaposition of these cross-sectional studies is unlikely to provide a complete story of how teacher quality has evolved in the long run. In that article, we argued that the rapid growth in female college attendance and completion since 1970 considerably altered the composition of college graduates (particularly female college graduates) and admissions-test takers. As such, the typical female teacher in 1960 would likely fare much differently in the distribution of 1960 college graduates than the same teacher in the distribution of 1990 graduates, if only because the reference group changed so dramatically.

To provide some evidence of changes in the distribution of new female teachers over the 1964–2000 period, we examined longitudinal surveys of five cohorts of high school graduates—the Wisconsin Longitudinal Survey (WLS) for the class of 1957, Project Talent for the classes of 1960–64, the National Longitudinal Survey of the High School Class of 1972 (NLS-72), High School and Beyond (HSB) for the class of 1982, and the National Education

4. This section draws heavily on Corcoran, Evans, and Schwab (2004).

Longitudinal Survey (NELS) for the class of 1992.⁵ Each of these surveys administered a test of math and verbal abilities to participating high school seniors and followed these students in subsequent years as they entered the workforce. Given the relative stability of the high school versus college graduate population over this period, we placed each graduate into the (survey-wide) distribution of her high school class based on her test score. We then used these rankings to see how the propensity to choose teaching as a profession varied with aptitude over the five cohorts, and in turn how differential selection into teaching affected the distribution of skill among new teachers over time.

Table 1 summarizes some of our findings. Based on centile scores, the average new female teacher consistently ranked above the average high school graduate in her cohort but below the average college graduate (consistent with the cross-sectional research cited above). Perhaps surprisingly, the average centile rank of new female teachers was relatively unchanged over this period. In the late 1960s and early 1970s, the average teacher scored between the 67th and 70th centiles of math and verbal ability; by 2000 this had fallen to the 64th centile. Much more striking is the change in propensity to teach across decile groups—in the 1960s, 15–17 percent of women in the top decile could be predicted to become teachers; by the 1990s this fell to 6–8 percent. Similar patterns exist for women in the 8th and 9th deciles.⁶ Of course, declining enrollment through the 1970s and 1980s meant that fewer graduates across the board were entering teaching. However, when comparing propensities with those of the average graduate, the story changes little. In the 1960s, top decile graduates were more than twice as likely to enter teaching as the average graduate; by 2000, they were only slightly more likely to teach than the average high school graduate.

The consequences of these shifts in career choices among talented women are illustrated in figure 1, which shows the composition of young female teachers (approximately age 26) in each of our five cohorts. The fraction of teachers who were among the most talented in their high school class—the top decile—dropped precipitously between our 1964–74 cohorts and the 2000 NELS cohort. By contrast, the fraction scoring in the 2nd–7th deciles rose.

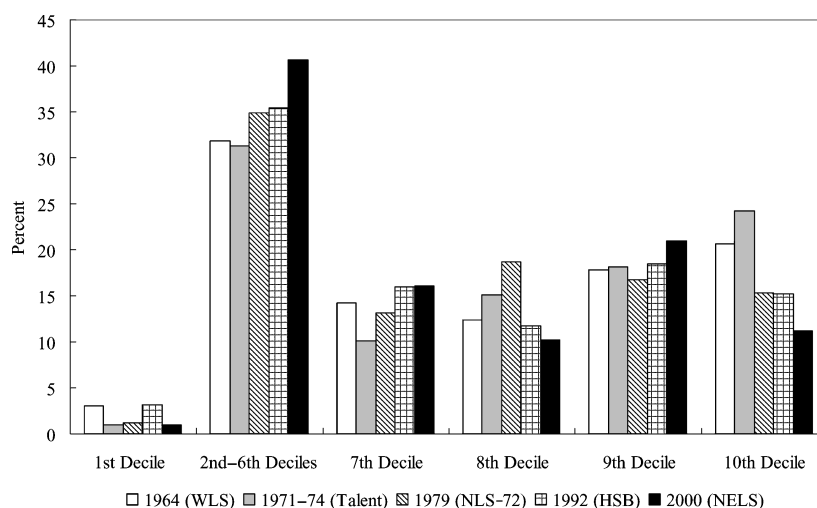
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5. We chose to focus on women in this analysis for two reasons. First, women make up the vast majority of teachers—a proportion that has remained relatively unchanged for years. (According to the March Current Population Survey, 70.8 percent of teachers aged 25–34 in 1964 were female; in 2000, 74.5 percent were women.) Second, given the historic propensity for college-educated women to pursue teaching careers, we hypothesized that changes in the labor market that created new opportunities for talented women would have a significant impact on the quality of teachers.
 6. With one exception—in the NELS sample we find a surge in the fraction of 9th-decile women who became teachers.

LONG-RUN TRENDS IN THE QUALITY OF TEACHERS

Table 1. Five Cohorts of Female High School Graduates, 1957–92

	WLS	Talent	NLS-72	HSB	NELS
High school graduation year	1957	1960–63	1972	1982	1992
Follow-up survey year	1964	1971–74	1979	1992	2000
Average age at follow-up	25.0	26.8	26.1	27.5	26.1
Mean centile rank:					
High school graduates	50.0	50.4	50.4	50.7	50.5
College graduates	73.4	74.9	72.4	76.2	67.4
Teachers	67.2	69.5	66.4	64.8	63.7
Predicted probability of entering teaching:					
10th decile	16.9	14.7	9.6	5.7	7.9
9th decile	13.5	11.1	10.9	5.4	14.5
8th decile	12.2	9.2	11.7	4.6	6.9
2nd decile	2.4	1.8	1.8	2.2	1.9
1st decile	2.2	1.9	0.1	1.7	0.7
Relative to the average high school graduate:					
10th decile	2.1	2.4	1.4	1.4	1.1
9th decile	1.7	1.8	1.6	1.3	2.1
8th decile	1.5	1.5	1.7	1.1	1.0
2nd decile	0.3	0.3	0.3	0.5	0.3
1st decile	0.3	0.3	0.1	0.4	0.1

Source: Corcoran, Evans, and Schwab (2004).



Source: Corcoran, Evans, and Schwab (2004).

Figure 1. Distribution of Teachers across Decile Groups, 1964–2000

A similar analysis of the National Longitudinal Surveys of Youth, Young Men, and Young Women by Bacolod (2007) and Murnane et al. (1991) corroborates these trends. They find that the greatest decline in teaching as an occupational choice between 1967 and 1989 occurred among those graduates who scored highest on the Armed Forces Qualifying Test or attended the most selective colleges. Bacolod shows that this trend is evident across all race and gender categories but finds it to be particularly pronounced among high-aptitude women and African Americans—those workers who clearly had the most to gain from reduced labor market discrimination and occupational opportunity.

Two encouraging trends emerged from our analysis. First, a relatively stable mean centile ranking among new teachers combined with a sharp drop in the fraction of top decile women who chose to teach suggest that declines at the top were counterbalanced by a drop in lower-than-average graduates who entered the profession. Thus it appears that state efforts to ensure a minimal level of teacher quality through certification have been fairly successful to this end.⁷ Second, we find that the likelihood that top-scoring men pursued careers in elementary and secondary education rose over this same period.⁸ Of course the latter result should be taken with caution—our sample sizes of male teachers were small, and in any case men continue to make up a relatively small share of all teachers. Next, I overview three of the most common hypotheses advanced to explain the observed trend in the quality of graduates choosing to teach.

THE DECLINING QUALITY OF TEACHERS—SOME HYPOTHESES

Several explanations have been offered for the decline in academically talented women choosing teaching as a profession. The first and most frequently cited points to earnings opportunities outside of teaching. Wage growth for college-educated women for decades outpaced that for men, both in the aggregate and within traditionally male-dominated professions (Murphy and Welch 2001; Bacolod 2007). By most measures, real earnings in K–12 education have not kept up with those of other skilled professions, a trend particularly evident during the 1970s enrollment slump and the recent 1990s technology boom (Hanushek and Rivkin 1997; Allegretto, Corcoran, and Mishel 2004). The result has been a surge in the fraction of female college graduates entering traditionally male professions (Black and Juhn 2000). Given the high economic returns possible in the most lucrative of these occupations, one might expect

7. Teacher testing for minimum competency will not necessarily raise *average* quality. On this, see Angrist and Guryan (2004).

8. See Corcoran, Evans, and Schwab (2004) for details.

that the most academically talented women would have the most to gain from choosing a nonteaching profession.

Bacolod (2007) tests this hypothesis for the 1970–90 period using data from the National Longitudinal Surveys of Young Men, Young Women, and Youth. Indeed, she finds that where earnings outside of teaching increased relative to that of teachers, both men and women were less likely to make teaching their occupational choice, with the highest aptitude graduates the most responsive to outside wage opportunities. She finds, for example, that a 10 percent increase in professional earnings reduced the highest scoring (top quartile) graduates' likelihood of teaching by 6.4 percent.⁹

A second and closely related hypothesis for the decline in relative quality pertains to the structure of pay within teaching. Hoxby and Leigh (2004) suggest that the compressed “uniform pay schedule” found in most public school districts discourages high-aptitude individuals from pursuing a teaching career. Instead, these workers migrate to professions that better reward them for their abilities. Arguing that unionization acts as a force for wage compression, these authors use variation across states in relative earnings and collective bargaining laws to estimate the importance of wage structure in the decline of teacher quality.¹⁰ They find that wage compression played a substantial role in this trend, noting that relative earnings outside of teaching improved equally for women of all aptitude levels but that high-aptitude graduates considering teaching were affected the most by unionization.

Finally, a third explanation for the long-run trend in teacher quality considers the declining relative importance of the profession's complementarities with motherhood. The work schedule, locale, and summer vacations available to teachers historically offered occupational compatibility with child rearing that other professions lacked. Flyer and Rosen (1997) have further illustrated another such advantage in that women who temporarily leave teaching do not suffer the same wage penalty on reentry as in other professions. These relative features have arguably declined in attractiveness as female college graduates have delayed marriage and childbearing and generally invested in career before family (Goldin 2006). Increased child care availability in both the private and public sectors has also likely diminished the relative advantage teaching once held over traditionally male-dominated professions. The third of these hypotheses has been considerably less studied relative to those tied to compensation. Further research is needed to assess its relative importance.

9. In her article, Bacolod measures cognitive abilities using IQ and the Armed Forces Qualifying tests, college selectivity, and spousal earnings (assuming positive assortative mating).

10. Rather than direct measures of aptitude, Hoxby and Leigh use mean SAT scores of the college attended.

POLICIES TARGETING TEACHER QUALITY

The push for school accountability made explicit in NCLB has had the beneficial effect on policy research of producing new and incredibly rich data sets on individual students and teachers over multiple schools, grades, and years. Sophisticated empirical research based on data from Florida, New York, North Carolina, Texas, and a growing list of other states has significantly advanced our understanding of teacher labor markets and the policies that affect them.

With respect to teacher quality, policy makers should pay close attention to research devoted not only to the recruitment of talented graduates into teaching (as addressed in earlier sections), but also the retention and equitable distribution of effective teachers across schools. The search for a more comprehensive measure of teacher quality that encompasses the full range of outcomes expected of our schools must also remain at the forefront of research and policy discussions. In this section, I conclude by describing a few of the policies that have targeted quality teacher recruitment and retention, and offering a brief assessment of their success.

Among proposed policy solutions to improve teacher quality, across-the-board salary increases have received the most attention. Evidence of the impact of universally higher salaries on teacher quality, however, remains mixed. Short-run and cross-sectional research on the relationship between teacher pay and teacher quality typically finds weak to no support for the idea that greater base pay attracts better teachers (Ballou and Podgursky 1997; Hanushek, Kain, and Rivkin 1999). On the other hand, research that takes a longer-run view on selection into teaching more often than not finds a more robust relationship between relative wage opportunities and teacher quality (Lakdawalla 2006; Bacolod 2007). One possible reconciliation of these seemingly contradictory results is that enacted wage increases have been too small—or labor markets too slow to respond—to detect much of an effect of pay on quality in the short run. Another, put forth by Ballou (1996), suggests that school administrators frequently fail to identify and hire the most academically talented candidates among applicants. To the extent that this holds true, pay increases have the potential to expand the pool of high-quality applicants but not the supply of effective teachers. In any case, the role of relative earnings is more likely to be evident over the long run as successive cohorts of college graduates respond to available wage opportunities.

Critics of across-the-board salary increases often point to their weak connection to teaching quality. Universal pay raises awarded to all teachers—rather than new entrants—diminish the ability to recruit quality graduates to the profession. It is further argued that talented graduates will generally be discouraged by the lack of return to performance and aptitude offered by the “uniform salary schedule” found in education (Hoxby and Leigh 2004).

Policies promoting alternative methods of teacher compensation—including group- and individual-based merit pay tied to student performance—have emerged in fits and starts across the United States, showing some limited promise in raising academic achievement (Odden and Kelley 2002; Dee and Keys 2004). There has been little to no evidence, however, on how such incentive pay schemes may ultimately affect the recruitment of high-quality graduates into the profession.¹¹ Targeted pay increases in specific settings such as hard-to-staff subjects or schools have shown considerably more promise (Clotfelter et al. 2006).

A final class of policy measures designed to raise the quality of new teachers relates to licensure. Well-intended policy makers have often viewed rigorous course and licensure requirements as foolproof (and easily legislated) paths to a more capable teaching force. Indeed, there is some research that supports certification's ability to identify effective teachers (Goldhaber and Anthony 2007). However, costly certification provisions may do as much to discourage high-achieving students from pursuing a teaching career as assuring a minimal level of quality (Angrist and Guryan 2004; Reback 2006). Today's college graduates—particularly the most talented among them—may be unwilling to invest in human capital specific to the teaching profession that has little to no value elsewhere should they someday switch professions (Wiswall 2007).

In this article, I have drawn on recent literature as well as my own work (Corcoran, Evans, and Schwab 2004) to provide an overview of trends in teacher quality over the past four decades, some of the hypotheses advanced to explain these trends, and policies designed to stem the decline in high-achieving graduates choosing teaching as a profession. Most of the literature I have considered has focused on a single dimension of quality—academic aptitude as measured by tests of math and verbal abilities. Such a measure is not the only, and may not even be the most important, measure of teacher effectiveness. Yet to the extent parents and policy makers value the academic skills represented in these measures, the evidence cited here may be discouraging.

Teaching is a profession that in many ways is still tailored to an era in which female employment was rarely more than secondary to the household, when women were less interested in an upwardly mobile career than a job that complemented their responsibilities at home. Attracting the most academically talented women into the teaching profession in the modern era will require a recognition that female graduates look at the labor market much differently

11. Milanowski (2007) finds in survey data a generally favorable view of individual pay-for-performance among undergraduates preparing to be teachers. I am not, however, aware of any research to date that indicates how students on the margin of entering the teaching profession respond to the prospect of performance pay.

today than they did in decades past. Only through a substantial reengineering of the level and structure of compensation, pathways into teaching, levels of professionalism and autonomy, and opportunities available to working teachers are we likely to see a significant reversal in past trends.

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