Down and Out: Economists Assess the Teacher Pay Disadvantage

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As public employees, elementary and secondary school teachers have the enormous responsibility of educating our youth, and much hinges on their success. Teacher quality is the most important input schools contribute to the academic success of their students.1 The ability of school officials to recruit and retain highly effective classroom teachers is a struggle in many school districts throughout the United States. For decades now, a small and declining fraction of the most cognitively skilled graduates choose to become teachers,2 while rigorous national standards and school-based accountability for student performance have pushed the demand for talented teachers to an all-time high.

Prolific career opportunities have made it increasingly difficult to attract the best and the brightest into the profession. Professional women, historically afforded limited choices outside of teaching, have increasingly diverse career prospects. Attractive pay and compensation structures are part of the appeal of these ever-expanding opportunities. For this reason, it is important to ask whether teacher pay has kept up with that of other professions available to college graduates today. This article presents empirical evidence from several sources that documents relative teacher pay in a present and historical context.

Major Findings

A broad array of analysts from across the political spectrum have found trends comparable to those found here — that teachers face an earnings disadvantage, and that this disadvantage has grown over the long run.1

The major findings of this report are as follows:

• An analysis of recent trends in weekly earnings shows that public school teachers in 2006 earned 15 percent less in weekly earnings than comparable workers. This represents a 10.7 percentage-point decline over the past decade.
Using U.S. Decennial Census data, the long-run relative pay gap between female public school teachers and comparably educated women — for whom the labor market dramatically changed over this period — grew by nearly 28 percentage points, from a relative wage advantage of 14.7 percent in 1960, to a pay disadvantage of 13.2 percent in 2000. The pay gap for male teachers was -20.5 percent in 1960 and grew over 10 percentage points to -31.2 percent by 2000.

An analysis of the weekly earnings of occupations comparable to K-12 teachers confirms the teacher disadvantage in earnings and the substantial erosion of relative teacher pay over the last 10 years. Teachers’ weekly wages were nearly on par with those in comparable occupations in 1996, but are now 14.3 percent, or $154, below that of comparable occupations.

After studying trends in relative compensation through the 1990s by age, nearly all of the increase in the weekly earnings gap between teachers and comparably educated and experienced workers occurred among mid- and senior-level teachers. Early-career teachers (aged 25-34) experienced roughly the same wage disadvantage today as in 1990 (about 12 percent).

Improvements in the non-wage benefits of K-12 teachers partially offset wage differences, such that the weekly compensation disadvantage that faced teachers in 2006 was about 12 percent, about 3 percentage points less than the 15 percent weekly wage disadvantage.

While our study is national in scope, we do present state-by-state pay gaps for public school teachers in the appendix of our book, The Teaching Penalty (see section above). In sum, states vary widely in the extent to which public school teachers are paid less than other college graduates. The bottom line, however, is that there is no state where teacher pay is equal or better. In 15 states, public school teacher weekly wages lag by more than 25 percent. And there are only five states where teacher weekly wages are less than 10 percent behind. In California, teachers make just 83.9 percent of that of other college graduates — 86.7 percent for those with a bachelor’s degree and 80.4 percent for teachers holding a master’s degree.

This section sets the stage for an analysis of recent trends in teacher pay by placing this study in the broader context of changes in the last 40 years in the labor market for teachers. A long-run perspective helps to understand the links between relative compensation and the quality of the teaching force, and to recognize the structural challenges facing schools that seek to attract highly skilled graduates into the profession. First, we review the evidence on long-run trends in relative teacher compensation, and then we turn to the decennial census to provide some estimates of change in relative teacher wages between 1960 and 2000.

Perhaps like no other profession, the labor market for teachers was profoundly affected by improvements in work opportunities for women during the mid-20th century. Schools had long enjoyed a captive labor pool in academically skilled women who had few career options outside of teaching, nursing,
and social work. As labor market opportunities for women improved, however, college-educated women were much more likely to pursue careers in medicine, law, science, and management than to enter a traditionally female-dominated profession.\(^5\)

Part of the appeal of these new opportunities was their earnings potential. Wage growth in general for college-educated women outpaced that for men for decades, in professions for both sexes and those within traditionally male-dominated jobs.\(^6\) Given the high economic returns possible in the most lucrative of these occupations, one might expect that the most academically talented women would have the most to gain from choosing a non-teaching profession.

Indeed, there has been a sharp reduction in the fraction of the highest-achieving female graduates entering the teaching profession since 1960,\(^7\) and research explicitly links trends over the 1970-90 period to relative earnings opportunities.\(^8\) Using the National Longitudinal Surveys of Young Men, Young Women, and Youth, research finds that, where relative earnings outside of teaching increased, both men and women were less likely to make teaching their occupational choice, with the highest-aptitude graduates being the most responsive to outside wage opportunities. For example, a 10 percent increase in professional earnings reduced the highest scoring (top 25 percent) graduates’ likelihood of teaching by 6.4 percent.

Evidence on how teachers’ earnings have fared relative to that of other college graduates is plentiful.\(^9\) Studies show that female teachers at one time earned significantly more than other female college graduates, but this pay premium has sharply eroded over time.

*Figure A*, right, provides “regression adjusted” estimates of the long-run changes in relative teacher earnings using data from the U.S. Census Bureau or the decennial census\(^10\) from 1960 to 2000. Throughout the paper, the terms “relative” and “regression adjusted” estimates refer to results using an econometric model. The model represents a typical earnings specification that controls for other characteristics, such as gender, race/ethnicity, age, marital status, geographic, and educational attainment. Therefore, each calculation displayed in *Figure A* is an estimate of the percentage difference in annual earnings between the average public elementary or secondary school teacher and a worker with similar education and work experience. In other words, what regression analysis does is take an average individual that is the same regarding all observable characteristics except occupation — in order to compare the average teacher to the average non-teaching professional.

*Figure A* illustrates dramatic erosion in relative teacher earnings since 1960. In 1960, female teachers had a relative pay advantage of 14.7 percent which continually declined over four decades and was a -13.2 percent pay disadvantage by 2000. Altogether, the annual pay differential between female teachers and non-teachers has shifted almost 28 percentage points over a 40-year period. Male teachers — who always experienced a negative earnings differential during this timeframe — also had a growing pay gap between 1960 and 2000, but to a lesser extent than women (10.8 percentage points). Combining male and female teachers, the overall pay gap grew nearly 20 percentage points over these 40 years.

With this steep erosion of relative pay, it is not surprising that several analysts\(^11\) have presumed that there is a likely link between relative wage declines and “a drop-off in average teacher quality.”
Recent Trends in the Relative Earnings of Teachers

It is important to historically situate the long-run trend in teacher pay in order to grasp how the vastly changing economic environment has affected labor market outcomes. Over the last several decades, and more so recently, there have been enormous shifts in the liberalization of gender norms, ever-increasing globalization, and transformed occupational structures. Addressing recent trends in teacher pay will put into perspective the current debates regarding educational policy and issues concerning teacher quality.

This section focuses on the period from 1996 through 2006. The analysis relies on weekly wage reports from the Current Population Survey-Outgoing Rotation Groups as the primary source of data; it is adjusted for differences in worker education levels, experience, region, and other relevant differences.

The CPS data, used extensively by economists to study wages and employment, is particularly useful because of its large sample size and information on weekly wages. This analysis presents separate estimates by gender and by highest level of education, examining workers whose highest degree is a B.A. and those with an M.A. or higher.12

First, there are several issues to address. This analysis of the relative wage of teachers relies on comparisons of weekly earnings, rather than annual or hourly earnings, an approach taken by some authors.13 We did this to avoid measurement irregularities regarding differences in annual weeks worked (i.e., teachers’ traditional “summers off”) and the number of hours worked per week that arise in many studies of teacher pay.

It is often noted that the annual earnings of teachers cannot be directly compared to that of non-teachers because teachers typically work only a nine-month year. But differences arise over exactly how much time teachers devote to their work outside the traditional school year. Teachers spend some of the summer months in class preparation, professional development, and other activities expected of a professional teacher. Teachers who wish to earn additional income during those three months often can do so, but they are unlikely to work at the same rate of pay as during the academic year.

Similarly, attempts to compare the hourly pay of teachers and other professionals have resulted in considerable controversy. As economist Michael Podgursky has noted, “comparing the hourly pay of teachers and non-teachers just sets off an unproductive debate about the number of hours teachers work at home versus other professionals.”14 It is noteworthy, however, that in addition to our comparisons of weekly earnings, we compared the relative hourly pay of teachers using CPS data and found no discernible difference in our results.

Such decisions regarding the pay interval (weekly, annual, or hourly) become irrelevant when the focus is on changes in relative pay over time. Results can be expected to be similar as long as the relative work time (between teachers and comparable professionals) remains constant. For example, if the ratio of weekly hours worked by teachers relative to the hours worked by comparable workers remains constant over time, then estimates of changes in either relative weekly or hourly wages will be the same. Similarly, estimated changes in relative annual earnings will parallel those for weekly earnings as long as the annual weeks and hours worked by teachers have not changed relative to those of comparable workers.
The Pay Gap

The level differences in basic weekly wages for public school teachers and non-teacher college graduates are striking — as is apparent in Figure B, left. Simply comparing average weekly wages shows that, in 2006, teachers earned, on average, $935 compared to $1,240 for other college graduates. Compared to the overall workforce, many of whom do not have college degrees, teachers fared a bit better, as would be expected.

These data also allow an examination of how teachers’ “real” or inflation-adjusted wages have fared relative to other college graduates over the last 10 years. The basic story is simple. Weekly wages of public school teachers have almost kept up with, but have not risen faster than, inflation since 1996. This is true for teachers at all education levels and of either gender. By contrast, non-teacher college graduates saw a remarkable 12.9 percent gain in their inflation-adjusted wages between 1996 and 2001. After 2001, wage growth was unfavorable for teachers and non-teachers alike, though teachers (particularly women) lost ground relative to other college graduates in this period as well.

Figure C, right, focuses on educational attainment and examines the ratio of teacher weekly wages to other non-teacher graduates, by gender. Women with a bachelor's or master's degree were close to pay parity with other female college graduates in 1996, but the ratio has declined considerably since. In 1996, male teachers with either degree were paid substantially less than other male college graduates with the same degree, and these pay disparities grew much worse over the decade.

Regression-Adjusted Estimates of Relative Teacher Wages

The next stage in our analysis is to estimate regression-adjusted relative teacher wages. Teachers are more likely to hold a master's degree than other college graduates, therefore, we include separate identifiers for those with a bachelor's degree alone, those with a master's degree, and those with education beyond a master's degree (i.e., doctorate or professional degree).

The regression-adjusted estimates of relative teacher wages from the CPS are presented in Figure D, below, with

Figure C Teacher/non-teacher weekly wage ratios, by education and gender 1996-2006

Figure D Relative wage premium of public school teachers, by gender, 1996-2006

Source: Authors’ analysis of CPS data.
estimates presented separately for all teachers and for teachers by gender. In 2006, female teachers had a pay differential of -10.5 percent, while male teachers were -25.5 percent behind similar college-educated workers.

The regression approach shows a 10.8 percentage-point erosion of the teacher relative-wage since 1996; similar erosion occurred whether one looks at all teachers together or strictly at male or female teachers. This estimate is somewhat smaller than that using unadjusted wage ratios, where relative wages fell about 12.4 percentage points.

The estimates with annual wage data (Figure A) confirm the findings based on weekly wage data — that there has been a substantial erosion of teacher wages relative to that of comparable workers over the last 10 years or so. The magnitudes of the erosion of relative teacher pay using weekly and annual wage data differ, but they tell the same basic story. A comparison of trends in annual earnings in the March CPS with an analysis of trends in the decennial census (1980 to 2000) confirms this pattern.17 Taken together, these findings show a large erosion in relative teacher pay over the last 10 years and since 1960.

Recruitment and Retention: An Age Analysis

This section examines relative teacher wages by age using three age categories: “young” (25-34), “middle” (35-44), and “senior” (45-54). The erosion in relative teacher pay, documented above, may ultimately affect teacher quality through its effects on recruitment and retention. An analysis that explicitly examines pay trends by age provides valuable insight. The results, by gender, are presented in Figures E, below, and Figure F, above.

The pay gap for young teachers overall and by gender was relatively constant over the last decade. In fact, the relative wage disadvantage among younger female teachers diminished slightly over this period — falling from a -9.4 percent gap to -8.0 percent. For young male teachers, the gap increased slightly from -19.8 percent to -21.9 percent. The figures illustrate that the erosion of relative teacher earnings has fallen most heavily on experienced teachers, aged 45 to 54. For instance, senior female teachers had wages just above those of comparable workers in 1996, but by 2006 earned 10.3 percent less than comparable workers, an erosion of 18.0 percentage points. The erosion from 1996 to 2006 among middle female
teachers (35-44) was less, but still considerable at 10.3 percentage points.

For men, erosion rates over time were similar, although they started and ended this timeframe with greater pay disparities compared to women for any age cohort. Similar to female teachers, senior-level male teachers experienced the largest pay gap increase from 1996 to 2006 — an increase of 17.4 percentage points. This may help explain why women still dominate the profession and the gender make-up of teachers has changed little over time.

These results suggest that trends in relative teacher earnings over the last 10 years may not have had a substantial impact on the recruitment of new teachers, though recruitment must still overcome the -8.0 percent and substantial -21.9 percent wage gap facing young female and male teachers, respectively. However, the doubling of the wage gap that teachers experience as they age, from their younger years (25-34) to mid-career (35-44), suggests that retention may have become more difficult. The erosion of pay for mid-career and more-senior teachers might also affect teacher recruitment to the extent that potential teachers consider their lifetime earning capacity in the profession.

An issue that frequently arises when discussing relative teacher compensation is whether teachers receive better benefits that offset their lower wages. The answer is “a bit,” with an overall (wages plus benefits) compensation disadvantage perhaps 2 percentage-points less than the wage disadvantage. Our study finds that teachers do have somewhat better benefits but not as much as critics claim. Furthermore, the scale of benefits is far too small — only 20 percent of total compensation — to offset the overall 15 percent wage disadvantage indicated in Figure D.

The Earnings of Teachers Relative to ‘Comparable’ Occupations

Teacher salaries are frequently compared directly with those of specific professions thought to be “comparable” to teaching. For example, the American Federation of Teachers, in its annual survey of salaries, compares teacher salaries to those of accountants, buyers, attorneys, computer systems analysts, engineers, and university professors. Unfortunately, these professions are chosen based on limited data availability or are chosen arbitrarily without reference to any selection criteria.

One innovation of our earlier study was to systematically and empirically identify professions that represent “proper” comparison occupations to teaching. This was done using occupational “skill level” data from the Bureau of Labor Statistics’ National Compensation Survey to identify professions similar to teaching in terms of specific skills used on the job. In other word, the NCS provides a ranking of occupations, and from these rankings we identified 16 professions that were “comparable” to teaching, based both on their raw skill requirements and on the market valuation of these skills. We then compared their weekly wage levels and trends to those of teachers.

We used six occupations as the “comparable” group in the analysis below. Given the dominance of this group in the earlier computations, it should not be surprising that the relative teacher wage in 2002 (the year of analysis in our prior study and a year for which all data are available) is the same under the “new” group.

Figure G, below, presents the trend in teacher wages relative to this comparable group of occupations from 1996 to 2006. What is striking is that the increasingly downward trend is very similar to all the results set out above. In 2006, teachers earned 85.7 percent as much (or 14.3 percent less, or $154 less) in weekly wages as those in the group of comparable

![Figure G: Teacher wages relative to comparable occupations, 1996-2006](image)

Source: Authors’ analysis of NCS and CPS data.
occupations. The erosion of relative teacher wages using comparable occupations from 1996 to 2006 parallels the erosion found using regression estimates.

This exercise represents another convincing piece of evidence that teacher pay is behind that of other professionals and that the gap has widened over the past decade. Even though one may argue over the precise magnitude of the gap, it is the trend that represents the ever-increasing pay disadvantage of teachers that is most important.

Conclusion and Policy Implications

Based on this study, it is clear that public school teachers earn less than similarly educated and experienced professionals, and that this disadvantage has grown substantially over the last decade. The earnings gains that seemed to benefit all college-educated (and other) workers during the late 1990s appear to have bypassed teachers. Moreover, in recent years the average college graduate has experienced stagnation in real wages, and teachers have fared even worse.

The longer view is that female teachers enjoyed an earnings advantage in 1960 relative to other women college graduates. But, as women's opportunities have expanded, their earnings from teaching have fallen substantially behind those of similarly educated women. The pay of male teachers, which has always been behind that of other male professionals, only worsened over the last four decades.

While it is true that teachers, on average, enjoy benefits that are better than other professionals, the difference is much less than conventional wisdom suggests. In fact, benefits are a small share of overall compensation (about 20 percent) so that accounting for differences in benefits does not alter the outcome much — it shaves off only 2 percentage points from the overall pay gap.

The real curiosity is that the extensive policy discussions of teacher pay seem to ignore the persistent and growing teacher pay disadvantage. Any effort to alter the quality of the teacher workforce by changing recruitment and retention must address this issue. It is essential if we expect to change the profile of the teaching profession, which is what is required to achieve a substantial impact on education outcomes. Efforts to provide one-time bonuses to a small minority of teachers (especially small bonuses) leaves the compensation of the most effective teachers below that of the labor market and can hardly be expected to improve retention and recruitment conditions for the “best” teachers, let alone the typical teacher.

References


1 Hanushek and Rivkin 2006; Rice 2003.

2 Corcoran, Evans, Schwab 2004.

3 For dissenting views, see two widely cited analysts, Jay Green and Michael Podgursky. In Allegretto, Corcoran, and Mishel 2008, 2004, it is clearly explained why the data they examine are inappropriate for measuring relative teacher pay.

4 Decennial data is information collected at 10-year intervals.

5 Black and Juhn 2000; Goldin 2006.

6 Murphy and Welch 2001; Bacolod 2007.

7 Corcoran, Evans and Schwab 2004.

8 Bacolod 2007.


10 Public-Use Microdata Samples, or PUMS.

11 Such as Hanushek and Rivkin 2007, Temin 2002, and others.

12 This analysis focuses only on public school teachers.

13 See e.g., Hanushek and Rivkin 1997; Greene and Winters 2007.


15 This accounts for any changes in the composition of the workforce and controls for observables that may account for differences in pay. Our earnings specification uses the natural logarithm of weekly wages as the dependent variable, with controls for education, age, gender, marital status, region, race, and ethnicity. The coefficient on a teacher indicator variable provides an estimate of the relative teacher wage that controls for these other worker characteristics. This analysis also focuses only on public school teachers. In practice this means having a dummy variable for public school teachers in the model along with a dummy variable for private school teachers.

16 Larsen 2006.

17 We do not show the evidence from the March CPS here but it is detailed in Allegretto, Corcoran, and Mishel 2008.

18 Employer Costs for Employee Compensation data from the Bureau of Labor Statistics was used for this analysis and is explored in detail in Chapter 4 of Allegretto, Corcoran, and Mishel 2008.

19 Allegretto, Corcoran, and Mishel 2004.

20 Unfortunately, it has not been possible to link current occupational wage data to historical wage data because of changes in occupational coding. Fortunately, there is comparability for the six largest occupations (accountants, reporters, registered nurses, computer programmers, clergy, and personnel officers) that comprised 83 percent of the aggregate employment of the initially selected 16 occupations.
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