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Is Teacher Pay “Adequate?”

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Abstract

In school finance lawsuits plaintiffs often claim that pay levels are not sufficient to recruit teachers who can deliver constitutionally-mandated levels of educational services. In this paper I consider several ways in which one might bring economic theory and data to bear on that question. I conclude that at present, and at least for the near term, education research cannot prescribe an “adequate” level of school spending on teachers, whether in the form of pay, benefits, or professional training, that can reliably predict a target level of student performance. If courts are predisposed to intervene in this matter, a more reasonable standard for “adequacy” is whether available revenues, when spent in an efficient manner, are sufficient to staff classrooms with appropriately-certified teachers in a flexible licensing regime that satisfies both state and federal teacher quality standards.

PRELIMINARY DRAFT. COMMENTS WELCOME.

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Introduction

Teacher pay plays a major role in school finance lawsuits. Plaintiffs typically claim that pay levels are not sufficient to recruit teachers who can deliver constitutionally-mandated levels of educational services. For example, in the recent New York state case (*Campaign for Fiscal Equity v. New York State*), the plaintiffs successfully argued that because teacher pay schedules in New York City were well below those in the wealthier suburban counties such as Westchester or Nassau it was not possible to recruit or retain adequate numbers of qualified teachers. In Massachusetts (*Hancock v. Discoll*) the plaintiffs in the focus districts complained that they lacked resources to pay competitive salaries or provide adequate professional development.

These school finance cases, and the more general policy debate about teacher quality, have raised concern about the “adequacy” of teacher pay. Are the resources provided to public schools adequate to recruit and retain a teaching workforce that can deliver educational services that pass constitutional muster? In this paper I consider several approaches to the question of teacher pay adequacy. Each approach can in principle lend itself to measurement and statistical testing. All three have appeared in the claims of plaintiffs in school finance cases, and in the more general policy debate about teacher quality.

The first considers the compensation of teachers vis-à-vis other professions. If we found that teacher pay was substantially below that of workers in other professions with roughly similar levels of educational training, that would at least provide prima facie evidence of underpayment or inadequacy of teacher pay. In fact, plaintiff’s experts in adequacy cases routinely cite data on the pay of teachers relative to other professions. A second approach, which I term “regulatory compliance,” focuses on school staffing. Given the per-pupil resources provided to districts, are schools able to fill vacancies with teachers qualified under state licensing or federal NCLB

requirements? For example, the high proportions of teachers with emergency or other substandard certification figured prominently in California (*Williams v. State*), in the NYS case noted above, and was taken as evidence that the pay of teachers was too low.¹

A final approach, which I would term “social underinvestment,” views teachers qualifications as a continuum and asks whether public schools are buying enough teacher quality. In this view, teachers are “underpaid” if the social benefits from raising teacher pay exceed the costs, i.e., an additional dollar spent on teacher pay yields a discounted stream of student benefits greater than one dollar. Thus, even if the current pay and benefits of teachers are adequate to staff classrooms with qualified teachers, pay may still be too low from a social investment point of view. This view is often implicit in the arguments of those who focus on the relative pay of teachers versus non-teachers – higher relative pay will yield higher relative quality, and the quality response will be sufficiently elastic to make the investment worthwhile in cost-benefit terms. In the sections below we will consider each of the views in turn. We begin with the issue that, deceptively, seems most easily measured – relative teacher pay.

I. Relative Teacher Pay

How does the pay of teachers compare to non-teachers with similar levels of education? Data from the U.S. Department of Labor show that in September 2004 the average annual full-time earnings of public elementary school teachers in the Chicago metropolitan area was \$47,856. For computer systems analysts it was \$72,206, or 51 percent more. Clearly, many factors differ between the two professions. The training required is very different. So, too, are working conditions. Systems analysts may have irregular hours and be on call when there are problems. There may be considerable pressure when the system is down. Of course there are continual changes in technology that require constant human capital investments to keep up with the field.²

Finally, as the “dot com meltdown” illustrates, the risk of job loss is likely much greater than for public elementary school teachers.

Ultimately, what matters from an economic point of view is the degree of substitution between the two professions. Does a rise in elementary school teacher pay relative to system analysts lead some teachers who might have quit teaching to become computer system analysts, or a computer science major to switch to teaching in response to a relative pay change? If this substitution elasticity is close to zero then from an economic point of view the earnings of computer analysts are irrelevant to a discussion of teacher pay. This example may seem contrived. The pay of computer analysts is probably not relevant to the career decisions of most current or would-be elementary school teachers. However, it is probably much more relevant for high school computer or math teachers. This example suggests that discussions of the adequacy of teacher pay should take teaching field into account.³

Studies of teacher mobility also find that teacher labor markets tend to be localized. Most teachers take jobs near where they grew up or went to college.⁴ Thus, to extend our example, it isn't national earnings of computer analysts that matter, it's the earnings of computer analysts in the local labor market. (particularly for the eighty percent of teachers who are women, most of whom are married).

Another problem in comparing teacher to non-teacher earnings are differences in annual work hours. The standard approach in labor economics is to assess the relative pay of two jobs by comparing relative remuneration for an identical period of work, e.g., hourly, weekly, or monthly. For professions the usual metric is annual pay, which implicitly assumes that annual hours of work for the professions compared (e.g. doctors and lawyers) are similar. The problem with comparing doctors or lawyers to k-12 teachers is that there is a very large difference in

annual hours of work on site. Teacher contracts typically run 9-10 months in duration, as opposed to other professions, where 12 month contracts are the rule.⁵

Teacher contracts are tied to the school year. Data from the 1999-00 Schools and Staffing Surveys finds that the median number of days for a school year is 181. Most teacher collective bargaining agreements add several additional work days for grading, parent teacher meetings, etc. A representative survey 524 school districts by the Education Research Service finds an average contract year of 186 days for teachers (Education Week, April 13, 2005, p. 14). Over summer months, teachers are not employees of the public school system.

Thus, there are two ways to make an apples-to-apples comparison of teachers to non-teachers. One approach is to annualize teacher pay. If we assume a 38 week contract for teachers, we can simply multiply annual teacher pay by 1.37 ($52/38$) and compare it to non-teachers. Alternatively, we can compare weekly pay while under contract for teachers and non-teachers.

How does overall teacher pay compare to non-teacher pay in the local labor markets? Many employers, including the federal government, have need for reliable data that permits comparison of pay and benefits for similar jobs in the public versus private sector or across different metropolitan areas. This led to the development of the National Compensation Survey (NCS) by the Bureau of Labor Statistics (BLS), the data-gathering arm of the U.S. Department of Labor. The NCS is an establishment survey of employee salaries, wages, and benefits. It is designed to produce reliable earnings and benefit estimates at local levels, within broad regions, and nationwide (<http://www.bls.gov/ncs/ocs/comfaq.htm>). One attractive feature of the NCS is that it provides data on earnings by occupation in dozens of metropolitan areas (MSA's). This is important because teacher labor markets tend to be local, not regional or national.

These NCS data are available for dozens of MSA's. However, in our examination we limit our analysis to the fifteen largest MSA's. These MSA's accounted for roughly one-third of the U.S. population in 2003, thus we may assume that they represent roughly one third of the public school teachers as well. For this comparison, our selection was guided by occupations for which college degrees (but generally not post-graduate degrees) are common or required, and for which data are available for many of the MSA's. We do not claim that these occupations represent the relevant non-teaching earnings for teachers in all fields. However, they probably are relevant for some. More likely they pick up the general wage structure in the area labor market.

Data for Registered Nurses are presented in Figure 1. RN's are a convenient comparison group. First, their mean earnings are reported in almost all labor markets in the NCS. Second, like teaching, it is a female-dominated profession. That said, I am aware of no study finding a high elasticity of substitution between the two occupations. We report two histograms per MSA. The first gives the percent gap in annual earnings and the second the gap in weekly earnings. A bar below the line indicates that teacher pay is below non-teacher pay, and vice-versa.⁶ For RN's annual pay is below teachers in 10 of 13 MSA's. However, for weekly pay the results are completely reversed: teacher pay is as high as or higher than RN's in 12 of 13 MSA's. In fact, in two of the MSA's the weekly pay premium for teachers exceeds 40 percent. (see Figure 1)

Figure 2 reports similar ratios for six other occupations as well as RN's. Rather than report all MSA's as in Figure 2, we simply report a population-weighted average over all the MSA's for which data are available. The number of MSA's are indicated on top of the histograms. We have chosen for comparison a variety of occupations for which BA's are

required or commonplace. As in Figure 2, the first bar indicates the percentage teacher-non-teacher gap in annual earnings and the second in weekly earnings. We have ranked the occupations from most to least favorable vis-à-vis teaching. Starting at the left, teachers have a huge premium in comparison to Clinical Lab Technicians and Social Workers. They have virtual parity in annual earnings but a 20 percent premium in weekly earnings with respect to librarians. Their annual pay is roughly 10 percent below computer programmers, but on a weekly basis is twenty percent above. Pay is less favorable overall for Architects and Engineers and Managers and Administrators, however, for the former weekly pay is very similar. In sum, NCS data suggest that on a weekly basis, teacher pay is quite competitive with many other professions.

(see Figure 2)

Allegretto, Corcoran, and Mishel (2004) argue that the NCS data presented above overstate teacher weekly and hourly pay relative to non-teachers. They make the following argument. (I am rounding weeks for simplicity.) Non-teachers work under 52 week contracts. In computing weekly pay, the BLS simply divides annual earnings by 52 weeks. For teachers, the BLS divides by 38 weeks. However, if non-teachers have, say, 4 weeks of paid vacation, then Allegretto, et. al claim that this comparison is a biased measure of pay for weeks worked. In my simple example above, non-teachers' weekly earnings are under-estimated by eight percent (i.e., 4 / 48 weeks). If teachers actually worked every day during their 38 week contracts then this critique would be valid. In fact, even under 38 week contracts, teachers have a good deal of paid leave.⁷ Table 1 below reports the percent of total compensation represented by paid leave for public school teachers, managers and professionals in private industry, and all private sector workers in June 2004. Paid leave, including vacations, amounted to 7.9 percent of total

compensation costs for managers and professionals in the private sector as compared to 5.1 percent for public school teachers. Thus, in the example above, if we want to compute a measure of pay per week actually worked (versus weeks under contract), in our example we could multiply $52 \times (1-.079)$ for managers and professionals and $38 \times (1-.051)$ for public school teachers. This calculation suggests that a “weeks worked” comparison would result in roughly a 4 percent upward adjustment in relative weekly pay for non-teachers. While not trivial, this adjustment is much smaller than is suggested by Allegretto, Corcoran, and Mishel (2004) and in no way changes our conclusions based on visual inspection of Figure 2.

(see Table 1)

Most economists would probably agree with the proposition that employer-reported data on employee pay and benefits are much more reliable than household survey data. However, the household survey data do have the virtue that they permit the researcher to control for individual worker demographics in making pay comparisons. For that reason, I also examined household survey data from the March CPS. In the March CPS household respondents (not necessarily the workers themselves) answer a series of questions about employment and earnings during the previous year. Using the March 2003 CPS I compared the full time earnings of public school teachers with those of other full time employees. Table 2 reports the regression-adjusted gaps in the log of annual earning between teachers and non-teachers.

(see Table 2)

The March CPS results reinforce our findings with the NCS. If teachers and non-teachers had identical weekly earnings but 38 and 52 week contracts, respectively, then in an annual earnings regression teachers the gap in the natural log of earnings would be $-.314 (= \ln(38/52))$, indicating a 27 percent pay gap $(38/52 - 1)$. The estimates in the first column have no

covariates, and I progressively add covariates plus regional and state dummies. I believe the estimates in column three, which absorb a state effect along with controls for rural and urban residence, provide the most accurate estimate of the annual earnings gap. The log gap in earnings for women is quite small, on the order of .04. For males it on the order of -.3. Thus, the March earnings regressions suggest that on a weekly basis, on average female teachers earn more than non-teachers.⁸

This finding is consistent with the those of a careful study of 2000 Census Public Use data. Taylor (2005) analyzed a very large national sample of workers from the 5 percent Individual Public Use Microdata Sample from the 2000 Census of Population. Taylor finds that college-educated non-teachers are much less likely to live in rural areas than are teachers. Since earnings for all occupations tend to be lower in rural areas, failing to take account of the spatial distribution of teachers will tend to greatly understate their earnings vis-à-vis other college educated workers. She estimates a complicated multivariate statistical model with 469 occupation and 800 labor market variables, along with the usual education, demographic, and self-reported weekly and annual work time. Taylor finds that teachers earned eight percent less than college-educated non-teachers. When she restricts her comparison to a set of occupations more comparable to teachers the gap drops to just six percent. Since she is replicating the work of Allegreto, Corcoran, and Mishel (2004) she combines both public and private school teachers in her estimates. If we assume that private school teachers on average earn 70 percent of public school pay, then her estimates suggest that the (self-reported) hours adjusted gap in earnings between teachers and college-educated non-teachers is only 4-6 percent. Thus, these estimates suggest that when one takes account of the shorter annual hours, public school teachers and non-teachers have approximate parity in earnings.

The Shadow Price of Summers Off

While weekly earnings of teachers under contract may compare favorably with those in some other professions, it may be the case that individuals who choose non-teaching occupations prefer more weeks of paid work than teaching provides. For such individuals, annual rather than weekly earnings are the more relevant measure of remuneration. In fact, the vast majority of public school teachers do not work in the summer and there has been no tendency for that to change of the last decade or so. In 1987-88 Schools and Staffing Surveys (SASS), 32.5 percent of teachers reported working for pay during the summer. In 1999-00 SASS (the most recent available) the percentage was virtually identical (34.5 percent). Unfortunately, these SASS data provide no information on the number of days worked by teachers during the summer, only whether they worked and total summer earnings. Of the 34.5 percent who worked, all we know is that their average earnings were roughly \$3500. However, we do not know if they earned this in two days or twenty days.

Clearly teaching will tend to attract individuals who value short and predictable hours of work on site and long summer vacations, i.e., women with children, or who plan to have children. Data from the 1990 Census of Population show that the average number of own children for college-educated women aged 40 and younger employed in teaching was considerably higher than for other occupations (2.1 versus 1.7). The share of women in teaching is high and rising. From 1960 through the mid 1980's, women accounted for roughly 68-69 percent of public school teachers. However, between the mid-80's to 2001, the most recent national data available, the female share has increased to 79 percent (U.S. Department of Labor, Table 69). Clearly, the modest gaps in annual pay estimated in the previously section for females would be easily offset by savings in daycare over the summer and during the work year.

This type of benefit will on average be of less value to males, many of whom would desire more hours of work. Not surprisingly, far more males than females move into administrative k-12 positions. This suggests if the goal is to increase the number of male teachers, teacher pay may need to increase.⁹

Earnings of Exiting Teachers

If public school teachers are “underpaid” then we would expect to observe earnings for teachers who quit teaching and move to non-teaching jobs to jump sharply. Podgursky, Monroe, and Watson (2004) analyzed new teachers who terminated initial teaching spells between 1990-91 and 1999-2000 and who did not subsequently return to public school teaching. They then matched these records against the Missouri master Unemployment Insurance earnings files for the four quarters of the calendar year following their last year of teaching and compared these post-teaching earnings to the earnings they would have made had they stayed in their school district (using district salary schedule data). The results are presented in Table 3 below. For males, non-teaching earnings are slightly lower than teaching earnings and only about 45 percent of male teachers earned more than their teaching earnings. In part this may be due to greater prevalence of part time employment in non-teaching earnings. (UI data did not permit them to distinguish between hours and earnings.) For women, however, non-teaching earnings are well below teaching earnings. These findings mirror those in Stinebrickner, Scafini, and Sjordquist (2002) who conducted a similar study using Georgia UI earnings data, and Wyoming (Wolkoff and Podgursky, 2002).¹⁰

(see Table 3)

Fringe Benefits

Anecdotal data suggest that the fringe benefits of public school teachers compare favorably to those in the private sector. However, systematic data on this point has only recently become available. One valuable feature of the NCS is that it also provides data on the costs of employee benefits and detailed data on the character of fringe benefits for public and private employees. Unfortunately, due to concerns about inadequate sample size the BLS until recently did not disaggregate fringe benefit costs for public school teachers.¹¹ Public school teachers were grouped with college professors as well as pre-school teachers. However, more recent reports have begun to present some limited data broken out for public school teachers. Table 4 presents data from the most recent BLS report. Here we report selected fringe benefits as a percent of total compensation. Insurance (primarily health insurance) and retirement contributions are a substantially larger percent of total compensation for teachers as compared to professional employees in private sector employment. However, most teachers are not covered by the federal social security system, so legally required contributions are somewhat smaller for teachers. Overall, these three components of benefits total 20.2 percent of payroll for teachers, and 17.0 percent for private sector managers and professionals. Thus, fringe benefits are at least comparable to those of professionals in the private sector.

(see Table 4)

Why Spending Per Student Rises Faster Than Teacher Pay.

Any discussion of teacher pay needs to be combined with a discussion of staffing. If revenues available for payroll rise by 5 percent, school districts have a tradeoff. They can hold staffing ratios constant and raise pay by five percent, freeze pay and lower staffing ratios by five percent, or some combination of the two that totals five percent. Over the last two decades,

public schools have absorbed professional and non-professional staff at rates well in excess of student enrollment growth. Figure 3 shows that since 1980 public school enrollment has grown by 17 percent while teacher employment has grown by 37 percent. By fall 2002, the overall student-teacher ratio had fallen from 18.7 in 1980 to 16.1. These statistics only count teachers. If we include teacher aids, librarians, counselors, and other instructional staff the student teacher ratio falls to 12. . If we count all adults on the payroll (e.g., secretaries, custodians) the ratio drops to 8.1. Again, it would be possible to raise the pay of teachers if other staff were trimmed. In fact, the non-teaching staff have grown slightly faster than the teaching staff since 1980. Simply put, any school district could raise teacher pay with current revenues by increasing the student-teacher ratio or by lowering the ratio of non-teaching to teaching staff.

(see Figure 3)

It is sometimes argued that this staffing growth is driven by special education spending. Figure 4 presents Missouri data suggesting that this is not the case. Missouri's student teacher ratio in 2002-2003 (13.9) was below the national average, and, like the overall national rate, has declined substantially over the last two decades. Using administrative state data, we can establish how much of this decline is due to employment of special education teachers. The lower line presents the actual student-teacher ratio and the upper line presents the student teacher ratio holding the special ed share of teachers constant at the 1990 rate (12.9 percent).¹² The additional growth of special education teachers lowered the student teacher ratio by .4 students and accounted for 19.6 percent of the decline. Thus just over 80 percent of the decline was due to other factors. Similarly, while some of the growth in non-teacher staffing (e.g., teacher aids) might be associated with special education, most cannot (e.g., counselors, media specialists, administrators).

(see Figure 4)

In sum, when adjusted for annual hours of work, the pay of teachers is not obviously out of line with that of other college educated workers. Indeed, when expressed on a weekly basis, teacher pay compare favorably to many other professions in metropolitan labor markets. Teacher benefits compare quite favorably as well. By allowing professional and non-professional employment to far outstrip enrollment growth, school districts have passed up opportunities to make teacher pay even more competitive.

II. Regulatory Compliance

A second approach to the question of adequacy is to determine whether schools have resources sufficient to put qualified teachers in the classroom. Clearly this criterion is related to the previous one. Presumably districts with higher relative pay will have lower turnover and thus fewer vacancies. They will also have larger applicant pools and thus more qualified applicants per vacancy. However, there is no reason to believe that the level of pay necessary to staff classrooms with qualified teachers will produce earnings “parity,” however defined, with other professions. It may be that the level of pay adequate to staff elementary school classrooms, for example, is just sixty percent that of accountants. Moreover these benchmarks are likely to vary by teaching field and from one geographic labor market to another.

An issue that arises here is the definition of “qualified.” Since public school teacher labor markets are highly regulated, satisfying the quality standards of state and federal regulations would seem to be a logical starting point. Teachers in all states must hold state licenses to teach in public school classrooms and in nearly all states this requires completion of a state-approved teacher training program with supervised student teaching. In addition 37 states require teachers pass a pre-professional test prior to entering a teacher training program, 38

require a field specific licensing exam, and 16 require candidates to pass a performance evaluation one or two years after they have been on the job. Many states require ongoing professional training or evaluation for license renewal (27).¹³

The federal NCLB act mandating “highly qualified” teachers in every classroom adds further hoops for both new and incumbent teachers in core academic subjects. All new teachers must hold at least a baccalaureate degree or higher, be fully licensed, and have demonstrated subject matter competence in the areas they teach. Similarly, all incumbent teachers must meet a similar standard, although states are permitted to come up with their own methods (subject to federal approval) to demonstrate compliance. The latter are called HOUSSE standards (High Objective Uniform State Standard of Evaluation).

How well, then, are school districts able to meet these regulatory standards? I am aware of no nation-wide data. In part this is due to that fact that licensing and HOUSSE standards vary from state-to-state. The most commonly used national data file, the Schools and Staffing Surveys, includes a teacher survey wherein roughly 42,000 public school teachers are asked about their educational backgrounds and teaching credentials. Tabulations from the most recent available survey (1999-00) finds that 90 percent of public school teachers report that they hold regular state certification in their primary teaching area. Administrative data from states or school district report cards tend to reinforce this finding. I am aware of no systematic compilation of these data, however, a simple perusal of state and district report cards finds similar figures.

California certainly represents one of the most highly stressed public systems in the nation. The school age population is growing rapidly. The state has major fiscal difficulties. Less well known is the fact that in 1996 voters in a state-wide ballot passed a class size reduction

initiative that greatly exacerbated teacher shortages and led to an exodus of teachers from many urban classrooms as suburban jobs opened up (Jenson and Rivkin, 2002). In spite of these travails, in school year 2003-04, 89.4 percent of California public school teachers hold full (“clear”) teaching credentials in their teaching area. Another 5.3 percent are in supervised intern or pre-intern programs. Only 5.2 percent are teaching with substandard credentials (emergency or waiver).

Data reported for Illinois provide a more detailed portrait in that state (Table 5). Ninety eight percent of teachers state-wide hold regular certification, a figure that varies little between high and low poverty districts. The last column provides a more interesting statistic. This is the percent of core academic teachers who are “highly qualified” by NCLB standards – 98.2 percent statewide, and 93.4 percent in high poverty districts.

(see Table 5)

While the overall compliance rates are very high, detailed examination of district data show that virtually no school district is in full compliance with licensing laws. Figure 5 presents data for Missouri public K-12 school districts (I have excluded k-8 districts). On the vertical axis we measure the percent of courses taught by teachers with inappropriate licenses during the 2002-2003 school year. Arguably this type of statistic, which is not available in most states, is a better measure of student exposure to teachers with substandard certification. On the horizontal axis we measure spending per student in average daily attendance. Of 447 K-12 school districts only two had no courses taught by an inappropriately licensed teacher (the average was 9.5 percent). Moreover, the prevalence of inappropriate licensed practice seems to have little to do with per pupil district spending. In fact, the correlation between the rate of unlicensed teaching and spending per student is positive and statistically significant (.27).

(see Figure 5)

Figure 6 presents similar data for New York State.¹⁴ In this case, NYS publishes data on the percent of teachers who teach at least 20 percent of their classes with no or an inappropriate teaching license. Again, virtually no district is in total compliance, and higher spending districts are as likely to be out of compliance as low spending districts. A case in point is Scarsdale, which boasted a 2002-03 median teacher salary of \$95,326, but nonetheless had 4.8 percent of its teachers out of compliance as defined above.

(see Figure 6)

Why are nearly all school districts to some degree out of compliance with these certification laws and why is non-compliance unrelated to spending? I would argue that that given the Byzantine complexity of state teacher licensing laws, bureaucratic delay, and the natural dynamics of the teacher labor market, full compliance is nearly impossible (or random). In fact, teacher labor markets likely have a “natural rate of non-compliance” that is above zero for many of the same reasons that the macroeconomy has a “natural rate of unemployment” that is above zero.

Consider Missouri. Like all other states with which I am familiar, the state of Missouri issues a single license to practice medicine, law, dentistry, accounting, nursing, and veterinary medicine. However, in the area of K-12 education the Missouri Department of Elementary and Secondary education currently issues 260 certificates and endorsements (171 vocational, 89 non-vocational). However, that is only part of the story. There are levels of certification (permanent, provisional) for all of these and a host of “grandmothered” codes. As a consequence, there are 781 valid certification codes in the master teacher certification file. There is nothing unique about Missouri.

Now combine this complex licensing regime with the dynamics of the teacher labor market and the result is less than complete compliance even under the best of conditions.. At the district level, roughly 10-12 percent of teaching positions turn over each year. Many of these exits are temporary (“stopouts”) for child-rearing or other family matters. Roughly one third of district level turnover is inter-district mobility of teachers. As a consequence roughly 80 percent of teaching vacancies at the district level are filled by experienced teachers (U.S. Department of Education, 2000). However, given this labor market flux, school administrators find themselves scrambling under short deadlines to fill classrooms with qualified teachers. It is inevitable that some classrooms will be filled with teachers whose certificate papers are not in order. Perhaps their license has expired and new approval is pending. Perhaps the elementary teacher in Missouri taught in Florida with a valid license but falls short of some requirements for a regular Missouri certificate. A science position may be held by a new liberal arts college graduate who lacks only one or two education school courses for certification. A chemistry teacher in rural high school may need to cover biology and math courses as well. Or maybe the state regulators have simply misplaced a teacher’s certification paperwork. For these and a myriad of other reasons, these complex licensing systems that states have constructed virtually guarantee a steady-state rate of compliance less than one hundred percent. For this reason, I believe it is unrealistic for courts to hold school districts to a standard that requires perfect compliance for “adequacy,” yet this seems to be the position of many advocates. “A qualified teacher in every classroom” is taken to mean a fully certified teacher in every class, every hour of the day.

In short, given current levels of spending, the vast majority of public school districts have staffed public school classroom with teachers who meet state licensing standards (Wenders, 2004). Education researchers and commentators may argue about the rigor or efficacy of some of

these standards, and the jury is clearly out as to their long-run effect. However, it is clear that many states and the federal government are groping toward regulatory mechanisms for raising the quality of the teaching workforce. While this process is under way, courts should defer to education regulators in defining “qualified” rather than accepting definitions from education advocacy groups – an argument that we will expand upon below.

The Structure of Teacher Pay

A fundamental problem in assessing the adequacy of teacher pay is the fact that it is not market-based. Working conditions, training, and, in particular, non-teaching opportunities differ greatly by teaching field and between schools. The training and alternative employment opportunities for a typical second grade teacher are very different from those of the typical high school chemistry teacher, yet both are paid off the same salary schedule in nearly all school districts in the U.S. For example, in 2004 there were 25 applicants for every elementary school vacancy in Missouri but just five for each chemistry opening. The salary schedules set teacher pay based on years of experience and accumulated graduate credits or degrees. Table 6 shows the current salary schedule for teachers in Chicago public schools. There are 13 seniority step rows and five graduate credit columns (“lanes”). A teacher with an MA “tops out” after 13 years at a salary of \$65,636 annually. This does not mean no further salary increases are forthcoming. However, at that point, a teacher will only receive increases reflecting the general increase in pay associated with a cell from one year to the next. There is nothing special about this salary schedule. I chose it merely for illustration. The level of pay, number of steps and columns will vary from district to district, however, the general structure of setting base pay according to seniority and graduate credits is the same in nearly every U.S. school district, large or small.¹⁵

If pay is not market-based, what level of inefficiency in teacher salary schedules is tolerable in assessing whether teacher pay is adequate? If, as is commonplace, a single salary schedule for a school district yields a large surplus of qualified applicants for elementary education, social studies, and physical education, but no qualified applicants in physics or speech pathology, is teacher pay in this district “adequate?” Recent studies of teacher effects by Rivkin, Hanushek, and Kain (2005) find no effects on teacher performance beyond the first year of teaching experience, yet school districts routinely use additional revenues to “backload” pay increases by adding additional steps on a salary schedules or longevity bonuses at 25 or 30 years (Ballou and Podgursky; 2002; Lankford and Wyckoff, 1997). By suppressing performance or field-based pay differentials these schedules may be driving high ability teachers out of the profession. Hoxby and Leigh (2004) conclude that wage compression associated with collective bargaining and salary schedules helped push high ability women out of teaching. Single salary schedules impose identical salaries across dozens or even hundreds of schools in a district that often differ greatly in their attractiveness as places to work. Experienced teachers often use their seniority to transfer from high poverty to low poverty schools, resulting in intra-district inequities in school spending (Roza and Hill, 2004).

The inefficient structure of teacher pay is yet another reason that the rate of certification is rarely one hundred percent in any district. A typical district will have a large number of certified applicants per vacancy in fields such as elementary or physical education, however they may have far fewer in fields such as special education, science, or math. Rather than differentiate pay to reflect market conditions, nearly all school districts persist in maintaining rigid salary schedules. These virtually guarantee shortages or recruitment difficulties in some

fields at some time, even if the overall level of resources for pay and benefits are more than adequate.

Should Courts Push the Bar Higher?

Some might argue that “highly qualified” teacher standards are not very high. No doubt there is some merit in this charge. However, if we move away from federal and state regulatory standards for teachers to other teacher quality measures, what standards do we use? For example, in the CFE case plaintiff’s experts presented evidence purporting to show that teachers in New York City were inferior to teachers in the rest of the state. Indicators of inferiority included multiple failures on licensing exams and lower selectivity of colleges attended by NYC teachers. In other cases, plaintiffs have claimed that teachers lacked adequate professional development. Or that teachers in plaintiff districts have fewer MA degrees. A common feature of all such claims is an appeal to the courts to set the adequacy bar higher than the standards of the state regulators.

Such claims assume that the teacher characteristics in question – MA degrees, professional development, college selectivity – have a demonstrable and strong relationship to student achievement. In fact, the evidence linking any type of teacher training, licensing, or testing to student achievement is mixed at best. Even estimated effects of general academic skills of teachers such as SAT scores, while usually statistically significant, are generally modest in effect. MA degrees are particularly suspect. A recent survey by Hanushek (2003) finds that of 170 reported estimates, 86 percent were statistically insignificant. Of the statistically significant studies, nine percent were positive and five percent negative. Nonetheless, interdistrict gaps in the share of teachers with MA or higher degrees are routinely presented as evidence of resource inadequacy.

Does this mean teachers do not matter? On the contrary, while the effect of measured teacher characteristics is small, one consistent finding is that there seems to be considerable variation in teacher effectiveness between classrooms. Thus, if one compares the effect on student learning of the top and bottom 20 percent of teachers ranked by performance, the effect is often quite substantial. However, these teacher effects are largely unrelated to traditional measures of teacher quality such as licensing exam test scores, certification credentials, experience, or graduate degrees, a result highlighted in a survey by Goldhaber (2002). Hanushek and Rivkin (2003), summarizing their own and other research come to the same conclusion.

A recent study of Chicago public teachers by Aaronson, Barrow, and Sander (2003) illustrates this point well. Like other such studies, this work is based on a large longitudinal file of linked student achievement scores. What makes this study unique is that the authors also have very extensive administrative data on teacher characteristics that are unavailable in other studies, including education, experience, types of teaching licenses, and selectivity of the teacher's undergraduate college. They find that over ninety percent of teacher effects are not explained by any measured teacher characteristics.

In sum, the growing "teacher effects" literature suggests that teacher quality, as measured by student achievement gains, is highly idiosyncratic. This does not mean that teacher quality is random or unknowable. It simply means that traditional measures of teacher quality – experience, MA's, education coursework – explain virtually none of the variation in teacher effectiveness. However much courts may wish to raise student achievement through higher teacher quality, research to date does not provide observable "buttons" to push. Indeed, if anything, the trend is in opposite direction, pointing to ever fewer buttons.

III. Underinvestment in Teacher Quality.

The analysis in section II treats teacher pay as “adequate” if schools are able to staff their classrooms with qualified teachers, where qualified is understood to mean teachers who meet state licensing and NCLB requirements. As the previous discussion indicates, this is a fairly simplistic approach to defining teacher quality. Many economists would treat quality as a continuous variable. In this view, higher relative pay for teachers would improve the quality of the applicant pool thereby allowing schools to recruit and retain better teachers who, in turn, would improve student achievement. In this view, even if state regulators do not know what observable buttons to push, presumably local administrators do, and will take advantage of the larger applicant pools do pick out the better applicants.

Surveys of the early education production function literature find little evidence of a strong positive effect of teacher pay on student achievement. Of 118 estimates reported in the literature, 73 percent were statistically insignificant, 20 percent were positive and significant, and 7 percent were negative and significant (Hanushek and Rivkin, 2004). In a subset of studies they (appropriately) term “high quality” (student-level data, value-added econometric model, single state), there are 17 estimates in the literature. Of these 82 percent were statistically insignificant and 18 percent were positive and significant. Two recent, sophisticated studies of teacher effects cast further doubt on a positive wage effect. Jacobs and Lefgren (2005) find no relationship between teacher pay and teacher performance in a large urban school district, and Hanushek, Rivkin, and O’Brien (2005) report no relationship between teacher productivity and changes in teacher pay for teachers who left a Texas school district. Earlier studies using Census data or aggregated district data have found positive effects on student test scores (Ferguson, 1991) or student graduate rates (Loeb and Page, 2000). However, at best one could only call research

support for a positive teacher pay effect mixed. I see it trending negative. Moreover, even in studies finding a positive effect, I have seen no evidence presented that across-the-board pay increases are cost-efficient or pass a benefit-cost test.

In the absence of direct support in the education production function literature, it is interesting to assess some indirect evidence from the market for private school teachers. Suppose that the benefits of higher teacher pay did, in fact, outweigh the costs, and public schools were setting teacher pay inefficiently low. If that were the case, one would expect to see private schools, which operate in a very competitive market, paying higher teacher pay. After all, private school parents should be willing to pay higher tuition to support higher teacher pay if it is worth it in terms of their own children's achievement. Many of these same parents will soon be paying college tuition rates far in excess of those in K-12, reflecting in part the higher faculty salaries at private colleges and universities.

Of course, in areas other than K-12 education personnel managers routinely use private pay and benefits as a benchmark in setting government pay. Indeed, one important function of compensation data collected by the Bureau of Labor Statistics is to provide private-sector as well as state and local benchmark data for Federal wage-setting. In higher education, administrators (and faculty) are keenly aware the level and structure of compensation in private institutions.

Since 12 percent of teachers are employed in private schools, one might expect private sector compensation data to play a larger role in policy discussions concerning the adequacy of public school teacher pay. The two sectors compete for teachers and mobility between the two is extensive. Data from the 1999-2000 School and Staffing Survey show that 36 percent of full-time private and 13 percent of full-time public school teachers report some teaching experience in the other sector.

In fact, comparisons of pay and benefits between the two sectors play little role in discussions of public school teacher pay. In part this may reflect the role that teacher unions play in shaping the policy discussion – neither the AFT nor the NEA mention private schools in their reports on teacher pay. There are, however, legitimate objections to public-private comparisons. First, many private schools have a religious orientation and are staffed by teachers of the same religious denomination. To the extent that such schools are advancing a religious mission, they and their teachers are not comparable to public K-12 schools. Second, private schools are generally more selective in admissions than public schools and, on average, have students with higher socioeconomic status. To the extent this results in better-behaved and more academically-motivated students in private-school classrooms, it makes for a more attractive teaching environment.

Table 7 presents regression estimates comparing public and private teacher salaries in a manner that attempts to address these concerns. First, I present earnings data only for private school teachers in non-religious private schools. In addition, I exclude private schools that have a special emphasis (e.g., special education, Montessori, Waldorf) and only focus on schools that most closely resemble traditional public schools in mission. The gap in log pay between teachers in private schools and public schools is .136, implying that private school teachers earn only 87 percent on average what public school teachers earn. Even with the above adjustments, a critic might argue that private school teaching is not comparable to public school teaching since the socioeconomic status of the former students is higher. In order to make the public schools more comparable to private, I exclude over 90 percent of the public school teacher sample and only retain public school teachers in low-poverty (less than five percent free and reduced lunch eligible), suburban schools. If we restrict our attention to very low poverty

suburban schools private school teachers earn just 79-81 percent of what public school teachers earn. Not only are private school salaries lower, but the benefits are lower as well (Podgursky, 2003). The fact that we observe selective private schools paying lower teacher salaries suggests that whatever positive effects higher teacher pay may have on teacher quality, they do not produce commensurate benefits in terms of student achievement, or at least benefits of sufficient magnitude that parents are willing pay for them.

(see Table 7)

IV. Conclusion

Plaintiffs in school finance “adequacy” lawsuits often claim that teacher pay levels are not sufficient to recruit or retain teachers of sufficient quality to deliver constitutionally-mandated levels of educational services. These claims, and the more general policy debate about teacher quality, have raised concern about the “adequacy” of teacher pay. In this paper I considered three notions of “adequacy” concerning teacher remuneration. The first considers the relative pay of teachers. If teacher pay were substantially below that of workers in other professions with roughly similar educational training, that would at least provide prima facie evidence of underpayment or inadequacy of teacher pay. In fact, when adjusted for annual weeks of work, teacher pay and benefits compare favorably with those of other college-educated workers. A second approach focuses on school staffing. Given the per-pupil resources provided to schools, are they able to fill vacancies with qualified teachers? In fact, the vast majority of public school classrooms are staffed by teachers who meet state licensing and federal NCLB requirements. The fact that compliance is not one hundred percent is largely due to the bureaucratic complexity of state licensing regimes combined with the dynamics of teacher labor

markets and seems to have little relationship district resources. A final approach treats teacher qualifications as a continuum and asks whether public schools are under-investing in teacher quality relative to other inputs. In this view, teachers are “underpaid” if the social benefits from raising teacher pay exceed the costs. At present, scientifically-valid education research simply cannot define an “adequate” level of school spending on teachers, whether in the form of pay, benefits, or professional training, that can with even minimal levels of statistical reliability predict a target level of student performance. Research simply cannot tell us how much money to spend on teachers to produce a given outcome for students.

If courts are predisposed to intervene on this matter, the most reasonable standard for “adequacy” would be whether resources available to a district are adequate to meet current regulatory standards. In this regard, I would make two provisos. First, the standard should require that districts spend money efficiently. A district that insists it must raise the pay of all teachers in the district because it cannot recruit a certified speech pathologist is not spending money wisely. Second, state licensing standards must have some flexibility. As noted above, the large number of certifications and endorsements guarantees that virtually no district can assure that every class will be taught by a teacher with the right certificate and endorsement. Indeed, most of the “out of field” teaching in public schools would disappear overnight if states issued a single license in K-12 teaching as they do in medicine, law, accounting, and other professions. Short of that, aggressive development of “alternative route” licensing programs that target existing vacancies hold considerable promise. Teachers in some small rural schools cannot be licensed in every field in which their teaching skills are required. Here, too, licensing standards must have some flex.

Finally, let me conclude by saying that I have focused on the general level of teacher pay. I find little convincing evidence of general underpayment of teachers, although with 14,000 school districts in the U.S. there are no doubt some where that case can be made. However, a more compelling argument is that some teachers are underpaid. The problem with teacher pay in traditional public schools is not its overall level, but its rigid structure. Relative pay increases may be in order for some particularly valuable teachers (and relative pay declines for others). In large urban school districts rigid salary schedules cover hundreds of schools and thousands of teachers. These schedules reward teacher characteristics with little demonstrated relationship to performance and suppress differentials for teacher characteristics that may really matter (e.g, high levels of performance, willingness to teach in low performing schools, scarce field skills). A much more productive discussion concerning teacher pay would focus on its inefficient structure and the benefits of a more market and performance-based system.

References

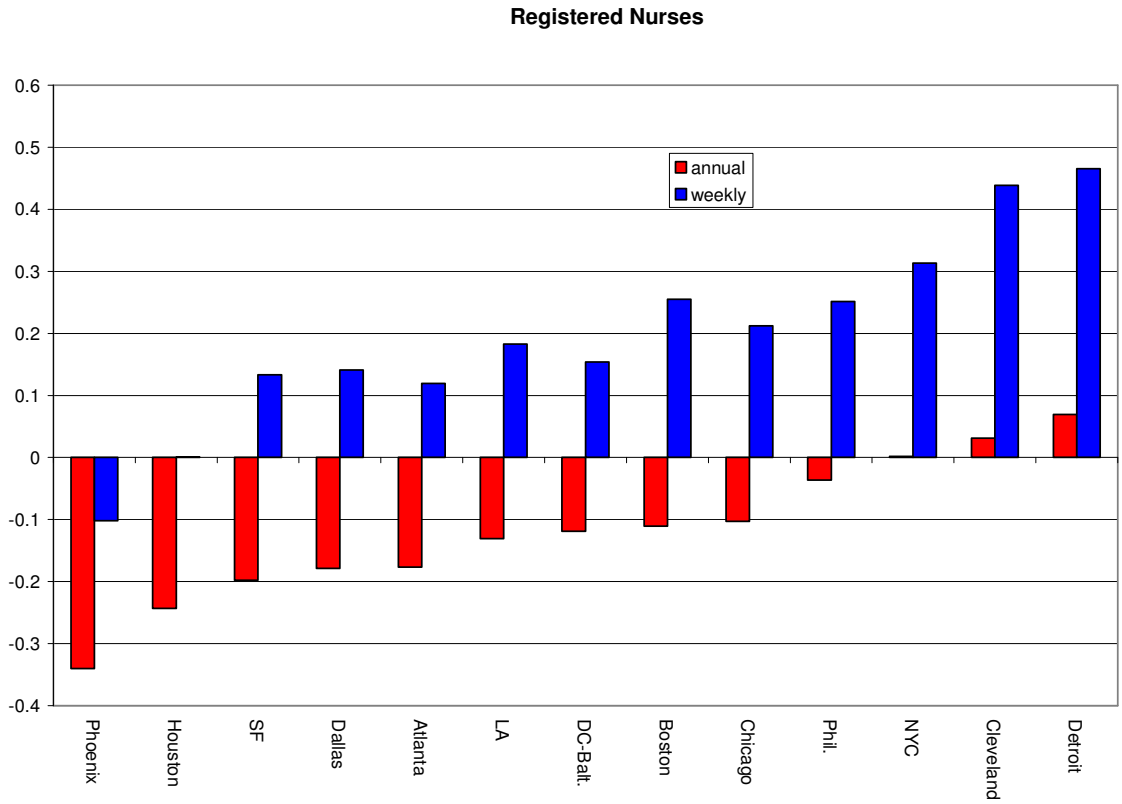
- Aaronson, Daniel, Lisa Barrow, and William Sander. 2003. "Teachers and Student Achievement in the Chicago Public High Schools" Working Paper. Research Department. Federal Reserve Bank of Chicago.
- Allegretto, Sylvia, Sean Corcoran, and Lawrence Mishel. 2004. How Does Teacher Pay Compare? Washington, DC: Economic Policy Institute.
- Bacolod, Marigee. 2003. "The Role of Female Labor Markets in the Decline of Teacher Quality." University of California – Irvine.
- Ballou, Dale and Michael Podgursky. 1997. Teacher Pay and Teacher Quality. Kalamazoo, MI: W.E. Upjohn Institute for Employment Research.
- Ballou, Dale and Michael Podgursky. 1998. "Teacher Recruitment and Retention in Public and Private Schools." Journal of Policy Analysis and Management. Vol. 17 No. 3 (Summer), pp. 393-418.
- Boyd, Donald, Hamilton Lankford, Susanna Loeb, James Wyckoff. 2003. "The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools." State University of New York at Albany (December).
- Education Week. 2005. "Salaries and Wages in Public Schools." (April 13), pp. 14.
- Ferguson, Ronald F. 1991. "Paying for Public Education: New Evidence on How and Why Money Matters." Harvard Journal of Legislation. Vol. 28, pp. 465-498.
- Goldhaber, Dan. 2002. "The Mystery of Good Teaching." Education Next Vol. 2 (Spring). pp. 50-55.
- Hanushek, Eric.A. 2003. "The Failure of Input-Based Schooling Policies." Economic Journal. Vol. 113 No. 485, pp. F64-F98.
- Hanushek, Eric A. 1986. "The Economics of Schooling: Production and Efficiency in Public Schools." Journal of Economic Literature. Vol. 24. No. 3 (Summer), pp. 557-77.
- Hanushek, Eric. A. 2003. "The Failure of Input-Based Resource Policies." The Economic Journal. Vol. 113 No. 485 (February). pp. F64-F98.
- Hanushek, Erik A. and Steven G. Rivkin. 2004. "How to Improve the Supply of High Quality Teachers" Brookings Papers in Education Policy: 2004. Washington, DC: Brookings Institution. Forthcoming.

- Hanshek, Eric, John F. Kain, Daniel M. O'brien, and Steven G. Rivkin. 2005. "The Market for Teacher Quality." NBER Working Paper No. 11154 (February).
- Hoxby, Caroline and Andrew Leigh. 2004. "Pulled Away or Pushed Out? Explaining the Decline in Teacher Aptitude in the United States." American Economic Review, Vol. 94 No. 2 (May), pp. 236-240.
- Jacob, Brian A. and Lars Lefgren. 2002. "The Impact of Teacher Training on Student Achievement: Quasi-Experimental Evidence from School Reform Efforts in Chicago." NBER Working Paper 8916. Cambridge, MA: National Bureau of Economic Research.
- Jenson, Christopher and Steven Rivkin. 2002. "Class Size Reduction, Teacher Quality, and Academic Achievement in California Public Elementary Schools." San Francisco: Public Policy Institute of California.
- Lackdawalla, Darius. N. 2001. "The Declining Quality of Teachers." NBER Working Paper 8263. Cambridge, MA: National Bureau for Economic Research.
- Loeb, Susanna and Marianne E. Page. 2000. "Examining the Link Between Teacher Wages and Student Outcomes: The Importance of Alternative Labor Market Opportunities and Non-Pecuniary Variation." Review of Economics and Statistics. Vol. 82 No. 3, pp. 393-408.
- National Associate on State Directors of Teacher Education and Certificatoin. 2003. The NASDTEC Manual on the Preparation and Certification of Educational Personnel..
- Podgursky, Michael. 2003. "Fringe Benefits" Education Next. Vol. 3 No. 3, pp. 73-76.
- Podgursky, Michael. 2004. "Teams versus Bureaucracies: Personnel Policy, Wage-Setting, and Teacher Quality in Traditional Public, Charter, and Private Schools."
- http://www.missouri.edu/%7Eecon4mp/papers_presentations/wp/PP_in_chart_schools_5.pdf
- Podgursky, Michael and Dale Ballou. 2001. Personnel Policy in Charter Schools. Washington DC: The Fordham Foundation. (August).
- Podgursky, Michael, Ryan. Monroe, Donald Watson. 2004. "Academic Quality of Public School Teachers: An Analysis of Entry and Exit Behavior." Economics of Education Review 23, pp. 507-518.
- Rivkin, Steven G., Eric A. Hanushek, and John F. Kain. 2005. "Teachers, schools, and academic achievement." Econometrica. Vol. 73 No. 2 (March).

- Roza, Marguerite and Paul T. Hill. 2004. "How Within-District Spending Inequalities Help Some Schools to Fail." Brookings Papers on Education Policy 2004. Washington DC: The Brookings Institution.
- Stinebrickner, Todd R., Scafidi, B., Sjodquist, D., 2002. "Do Teachers Really Leave for Higher Paying Jobs in Alternative Occupations?". Department of Economics, University of Western Ontario
- Taylor, Lori L. 2005. "Comparing Teacher Salaries." Unpublished manuscript. Bush School of Public Policy, Texas A&M University.
- U.S. Department of Education. National Center for Education Statistics. 2000. "Teacher Supply in the U.S.: Sources of Newly Hired Teachers in Public and Private Schools: 1987-88 to 1993-94." Washington, D.C.: NCES 2000-309.
- U.S. Department of Education. National Center for Education Statistics. 2004. Teacher Attrition and Mobility: Results from the Teacher Follow-Up Survey, 2000-01. Washington D.C.: NCES 2004-301 (August).
- U.S. Department of Labor. Bureau of Labor Statistics. 2005. Occupational Outlook Handbook.
- <http://www.bls.gov/oco/ocos042.htm>
- U.S. Department of Labor. Bureau of Labor Statistics. 2000. "Employee Benefits in State and Local Government, 1998." Bulletin 2531.
- U.S. Department of Labor. Bureau of Labor Statistics. 2004. Occupational Wages in the U.S. July 2003 Supplemental Tables. (August) <http://www.bls.gov/ncs/ocs/sp/ncbl0636.pdf>
- Wenders, John. 2004. "Full of Sound and Fury and Signifying Nothing: Metaphysical and Other Irrelevant Debates about Teachers' Comparable Pay." Policy Briefing. Education Excellence Idaho. (September) www.edexidaho.org
- Wolkoff, Michael and Michael Podgursky. 2002. "Wyoming School District Employee Compensation." Davis, CA: Management Analysis and Planning. (January 31)

Figure 1

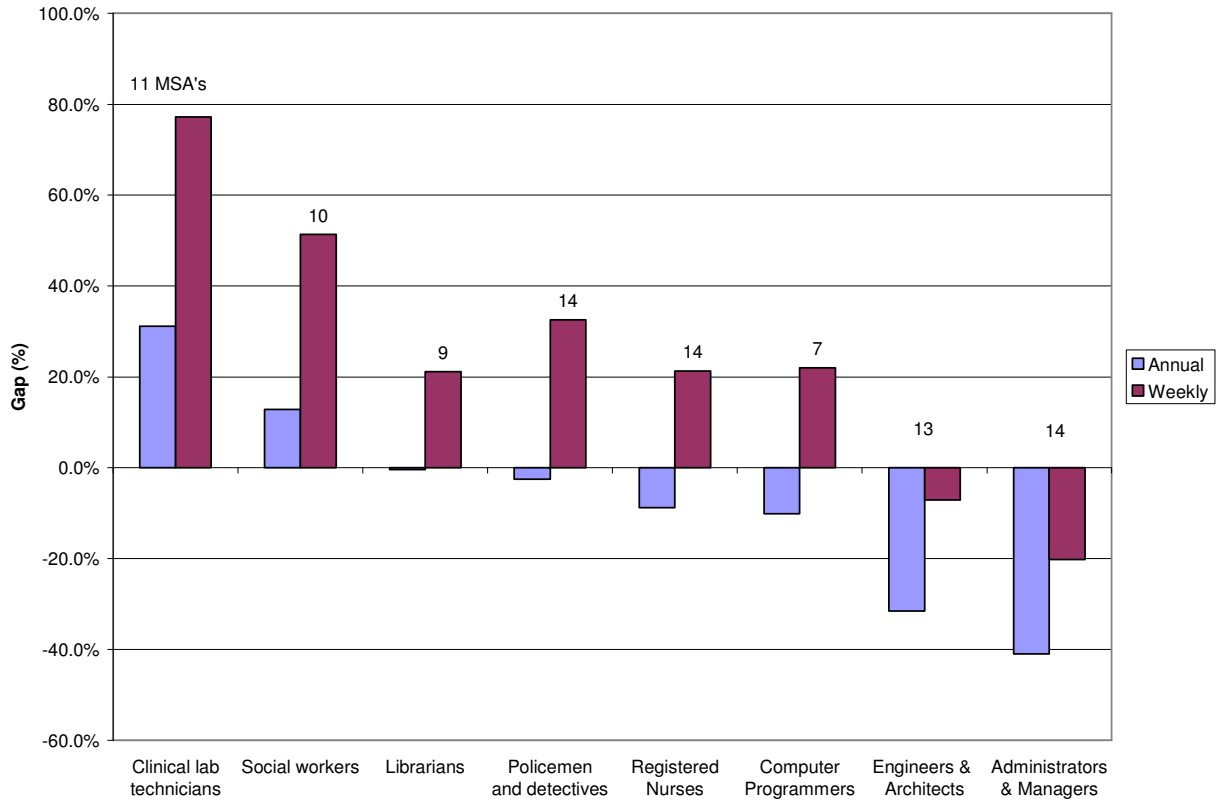
Teacher Pay Relative to Registered Nurses:
Annual and Weekly Earnings Gap for Largest U.S. Metropolitan Areas
(zero = parity)



Source: Bureau of Labor Statistics, National Compensation Survey. Public elementary school teachers versus RN's in the indicated MSA's.

Figure 2

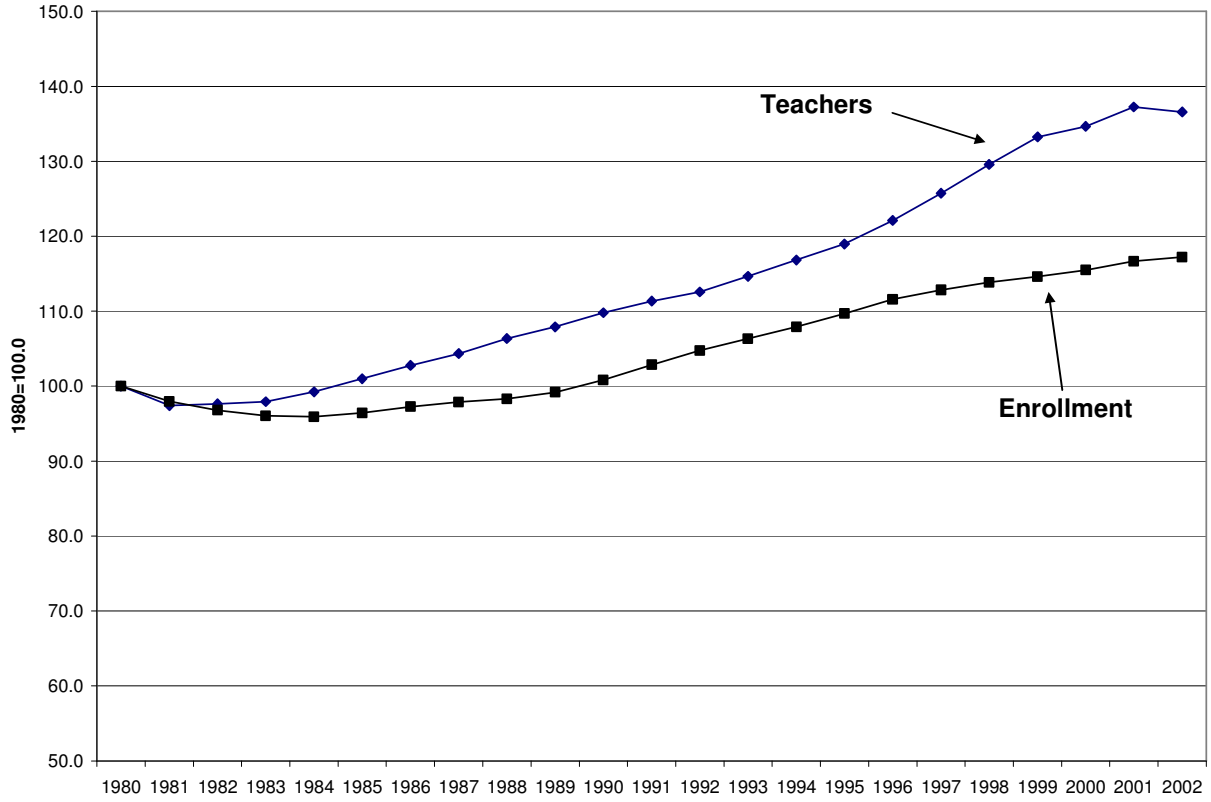
Weighted Average Percent Pay Gap in Largest U.S. Metropolitan Statistical Areas:
 Teacher Pay Versus Selected Occupations
 (15 Largest MSA's)



Source: Bureau of Labor Statistics, National Compensation Survey. Data not available for all MSA's. Number of MSA's indicated above each bar.

Figure 3

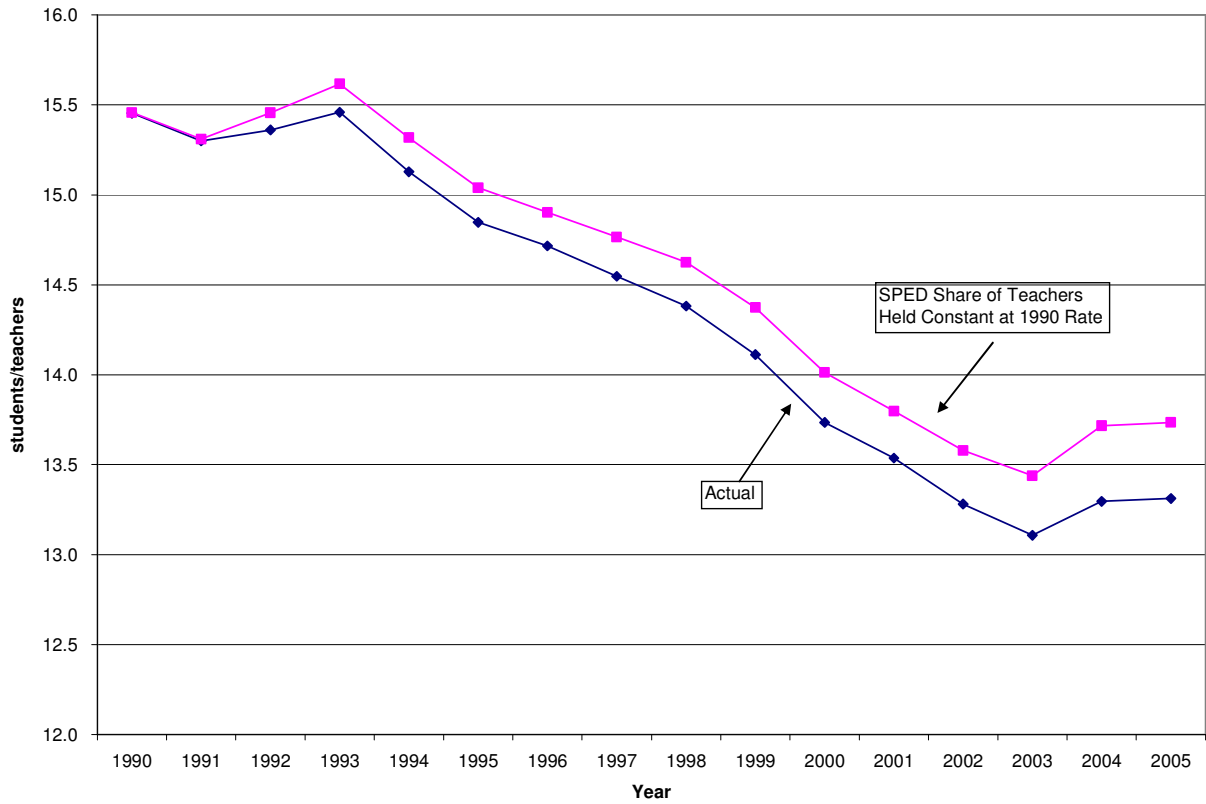
Public School Enrollment and Teacher Employment: Fall 1980 - Fall 2002
(1980 = 100.0)



Source: National Center for Education Statistics. Digest of Education Statistics 2003.

Figure 4

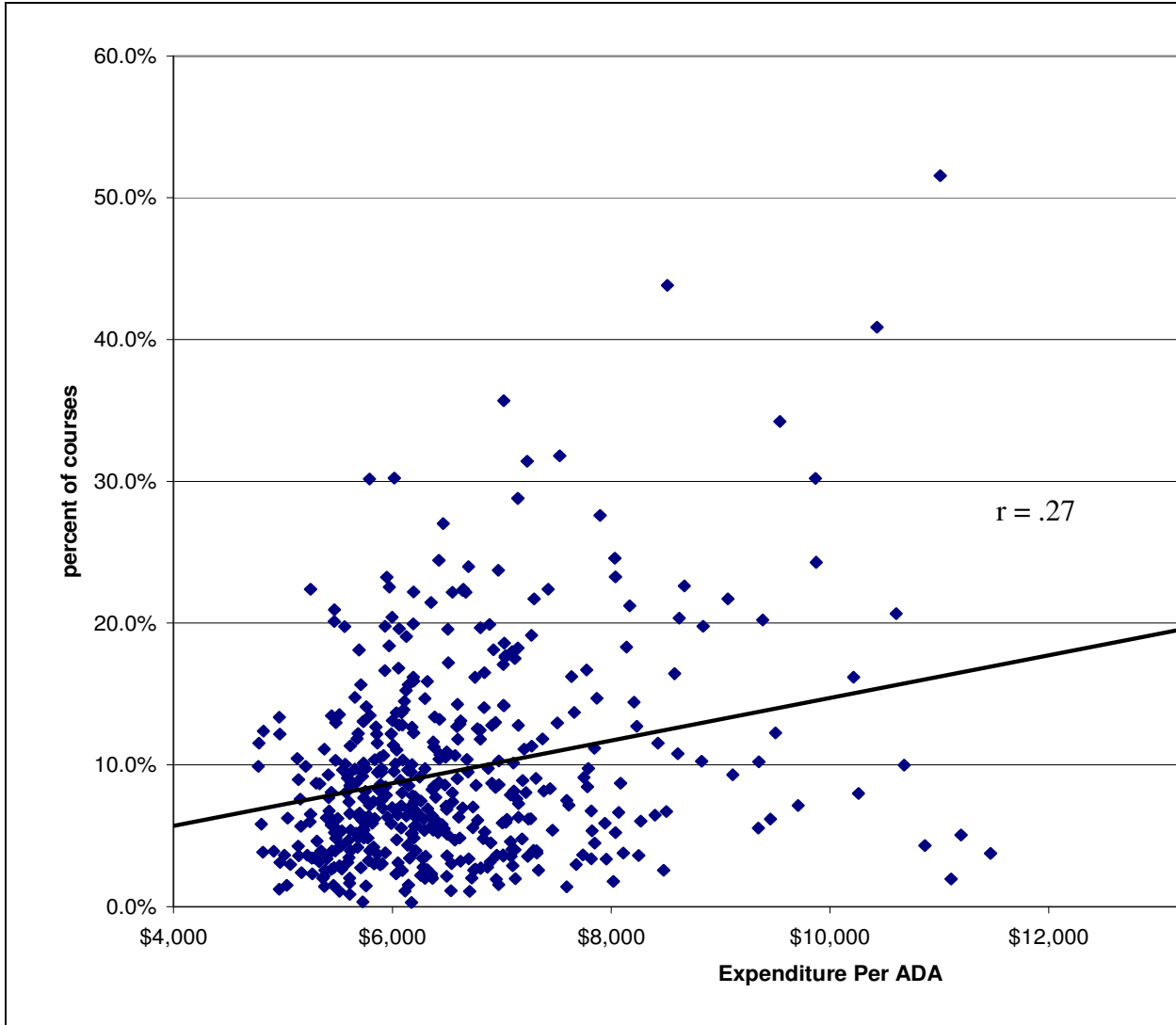
Student-Teacher Ratio in Missouri Public Schools:
Simple and SPED-Adjusted
(SPED-Adjusted = Constant 1990 SPED Share of Teachers)



Source: Missouri Department of Elementary and Secondary Education.

Figure 5

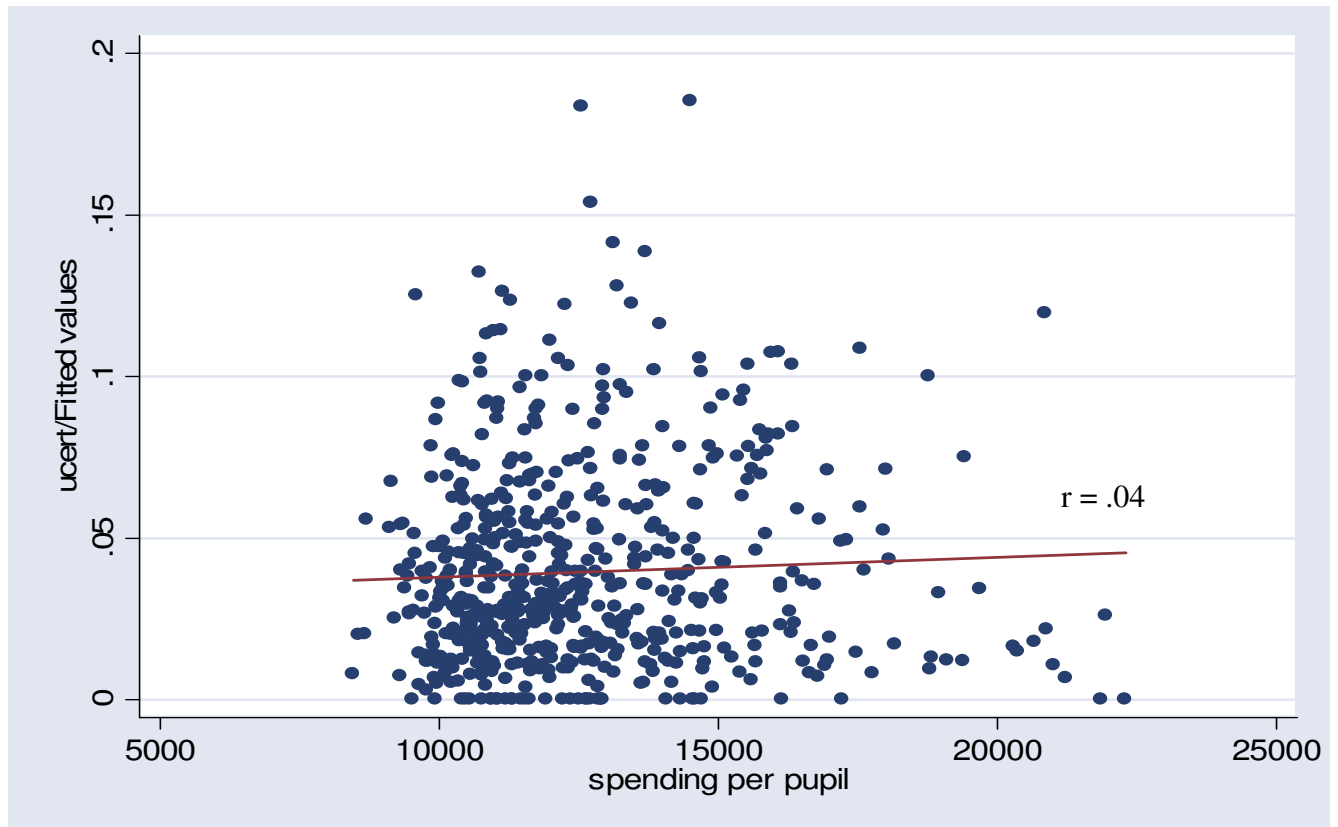
Percent of Courses Taught by Teachers With Inappropriate or No Licenses by Expenditure Per Pupil in Average Daily Attendance:
Missouri K-12 Public School Districts, 2001-2002



Source: Missouri Department of Elementary and Secondary Education.

Figure 6

Percent of Teachers Not Certified and Instructional Spending per Pupil:
New York State



Source: New York State Department of Education. All school districts with at least 500 students. New York City did not provide data in this report. Percent uncertified teachers for 2002-03, spending per pupil 2001-02.

<http://www.emsc.nysed.gov/irts/655report/2004/home.html>

Table 1

Paid Leave for Public School Teachers and Private Sector Workers as a Percent of Total Compensation: June 2004

	Paid Leave as a Percent of Total Compensation
Public School Teachers	5.1 %
Management, Professional and Related, Private Industry	7.9 %
All Private Industry	6.0 %

Source: Bureau of Labor Statistics. Employer Costs for Employee Compensation – June 2004. (Sept. 15, 2005) Tables 4 and 5. www.bls.gov/ncs/ect/home.htm

Table 2

Difference in Log of Annual Earnings:
 Teachers Versus Other College Graduates,
 March, 2003 Current Population Survey^a
 (t-values in parenthesis)

	Total Earnings			
Females	OLS	OLS	OLS	M-REG
	-.048*	-.039*	-.026	-.053**
	(2.31)	(1.97)	(1.33)	(3.31)
Covariates ^b	N	Y	Y	Y
Regions (4)	N	Y	N	Y
States (50+DC)	N	N	Y	N
N	8134	8134	8134	8134
Males				
	-.343**	-.304**	-.281**	-.305**
	(10.14)	(9.63)	(14.88)	(10.04)
Covariates ^b	N	Y	Y	Y
Regions (4)	N	Y	N	Y
States (50+DC)	N	N	Y	N
N	10437	10437	10437	10437

a. Sample: college graduates, 18-64, who worked full-time at least 36 weeks in 2002 with non-imputed earnings on longest job. Dependent variable equals total annual earnings.

b. Covariates include Quartic in Age, education dummies (MA, Ph.D/Ed.D), race/ethnicity, married, metro residence

Table 3

Teaching and Non-teaching Earnings of Teachers Who Quit Teaching Between 1992-2000 Who Were Reemployed in a UI-Covered Missouri Job

ACT Score	Total Number of Teachers	Estimated Teaching Earnings ^a	UI Earnings after Leaving Teaching ^b	Ratio Non-Teaching to Teaching Earnings	Percent of Exiting Teachers Found in UI file	Percent of Exiting Teachers with UI Earnings Greater than Simulated Teaching Earnings
Males						
19 and below	222	\$25,716	\$25,550	.99	64%	43%
20-21	299	\$25,287	\$26,759	.99	70%	37%
22-24	316	\$25,001	\$24,702	.99	64%	45%
25-26	164	\$24,742	\$24,087	.97	67%	44%
27 and above	209	\$25,138	\$23,471	.93	63%	44%
All	1,210	\$25,192	\$25,109	1.00	66%	43%
Females						
19 and below	845	\$24,811	\$19,512	.78	57%	27%
20-21	1,055	\$24,466	\$17,703	.72	58%	22%
22-24	1,071	\$24,923	\$18,505	.74	55%	27%
25-26	460	\$24,498	\$18,145	.74	57%	28%
27 and above	532	\$25,241	\$15,750	.62	53%	17%
All	3,963	\$24,773	\$18,109	.73	56%	25%

Source: Podgursky, Monroe, Watson (2004, Table 6)

a. Earnings of the teacher based on former salary and estimated returns to experience from the salary schedule of the district in which they were employed.

b. Sum of earnings in four quarters of the calendar year following year of exit starting in the fourth quarter for teachers with positive earnings in at least one quarter, e.g., for teachers who quit teaching in the 1999-2000 school year this would be the total of earnings in 2000:4 through 2001:3.

Table 4

Selected Fringe Benefit Costs:
Public School Teachers Versus Private Sector Professionals

	Insurance	Retirement and Savings	Legally Required (Social Security, Worker's comp., UI)	Total
Public School Teachers	9.1%	5.9%	5.2%	20.2%
Management, Professional, and Related (Private)	6.0%	3.8%	7.2%	17.0%

Source: U.S. Department of Labor, Bureau of Labor Statistics. "Employer Costs for Employee Benefits – June 2004." (Sept. 15, 2004), Tables 4 and 5. www.bls.gov/ncs/ect/home.htm

Table 5

Teachers Certification Rates:

Illinois Public Schools, 2003-04

	% of Teachers with Regular Certification	% of Classes Taught by Highly Qualified Teacher
All Districts	98.3	98.2
High Poverty	95.4	93.4
Low Poverty	99.5	99.7

Source: Illinois Board of Education. 2004 State Report Card
http://www.isbe.net/research/pdfs/2004_StateReport_E.pdf

Table 6

Chicago Public Schools
2005-2006 Teacher Salary Schedule

12006schA

CHICAGO PUBLIC SCHOOLS
SALARY SCHEDULE FOR REGULARLY APPOINTED TEACHERS
ELEMENTARY AND SECONDARY EDUCATION
EFFECTIVE JULY 1, 2005

1A-3. BASIC SCHEDULE OF SCHOOL MONTH SALARIES AND ANNUAL SALARIES BASED UPON A 6.25 HOUR DAY DURING THE REGULAR SCHOOL TERM OF 193 DAYS FOR REGULARLY APPOINTED MEMBERS OF THE TEACHING STAFF HOLDING REGULAR CERTIFICATES: ELEMENTARY, HIGH SCHOOL, TRADE AND VOCATIONAL.

ST EP	LANE I BACHELORS DEGREE				LANE II MASTERS DEGREE				LANE III MASTERS PLUS 15 SEMESTER HOURS OF APPROVED GRADUATE CREDIT			
	MONTHLY	ANNUAL	PENSION PICKUP	TOTAL COMP	MONTHLY	ANNUAL	PENSION PICKUP	TOTAL COMP	MONTHLY	ANNUAL	PENSION PICKUP	TOTAL COMP
1	3827.68	39851	2720	41571	4092.80	41542	2908	44450	4225.38	42888	3002	45890
2	4026.56	40870	2861	43730	4291.64	43560	3049	46609	4424.22	44906	3143	48049
3	4241.92	43055	3014	46069	4507.00	45746	3202	48948	4639.50	47091	3296	50387
4	4440.78	45074	3155	48229	4705.92	47765	3344	51109	4838.38	49110	3438	52547
5	4639.52	47091	3296	50388	4904.68	49783	3485	53267	5037.32	51129	3579	54708
6	4838.48	49111	3438	52548	5103.62	51802	3626	55428	5236.10	53146	3720	56867
7	5004.10	50792	3555	54347	5269.20	53482	3744	57226	5401.80	54828	3838	58666
8	5203.02	52811	3697	56507	5468.12	55501	3885	59387	5600.66	56847	3979	60826
9	5401.82	54828	3838	58666	5666.90	57519	4026	61545	5799.54	58865	4121	62986
10	5600.66	56847	3979	60826	5865.74	59537	4169	63705	5998.30	60883	4262	65145
11	5816.06	59033	4132	63165	6081.16	61724	4321	66044	6213.76	63070	4415	67485
12	6014.88	61051	4274	65325	6280.04	63742	4462	68204	6412.58	65088	4556	69644
13	6193.54	62864	4401	67265	6466.56	65636	4594	70230	6603.04	67021	4691	71712
ST EP	LANE IV MASTERS PLUS 30 SEMESTER HOURS OF APPROVED GRADUATE CREDIT				LANE V MASTERS PLUS 45 SEMESTER HOURS OF APPROVED GRADUATE CREDIT				LANE VI DOCTORATE DEGREE (PH.D. OR ED.D.)			
	MONTHLY	ANNUAL	PENSION PICKUP	TOTAL COMP	MONTHLY	ANNUAL	PENSION PICKUP	TOTAL COMP	MONTHLY	ANNUAL	PENSION PICKUP	TOTAL COMP
1	4357.94	44233	3096	47329	4490.46	45578	3190	48769	4623.10	46924	3285	50209
2	4556.74	46251	3238	49488	4689.30	47596	3332	50928	4821.94	48943	3426	52369
3	4772.16	48437	3391	51828	4904.68	49783	3485	53267	5037.30	51129	3579	54708
4	4971.02	50456	3532	53888	5103.62	51802	3626	55428	5236.06	53146	3720	56866
5	5169.84	52474	3673	56147	5302.40	53819	3767	57587	5434.96	55165	3862	59026
6	5368.64	54492	3814	58306	5501.22	55837	3909	59746	5633.84	57183	4003	61186
7	5534.40	56174	3932	60106	5666.90	57519	4026	61545	5799.48	58865	4121	62986
8	5733.22	58192	4073	62266	5865.76	59537	4169	63705	5998.32	60883	4262	65145
9	5932.10	60111	4215	64426	6064.62	61556	4309	65865	6197.16	62901	4403	67304
10	6130.90	62229	4356	66585	6263.46	63574	4450	68024	6396.00	64919	4544	69464
11	6346.28	64415	4509	68924	6478.90	65761	4603	70364	6611.40	67106	4697	71803
12	6545.12	66433	4650	71083	6677.68	67778	4744	72523	6810.28	69124	4839	73963
13	6739.56	68407	4788	73195	6876.00	69791	4885	74677	7012.56	71177	4982	76160

THE COLUMN ENTITLED "ANNUAL" REFLECTS THE ANNUAL SALARY ROUNDED TO THE NEAREST DOLLAR AND INCLUDES THE PAYMENT OF TEN DAYS OF VACATION SO THAT IT IS BASED UPON 203 DAYS OF PAY FOR 193 DAYS OF EMPLOYMENT.

THE COLUMN ENTITLED "PENSION PICKUP" (ARTICLE 36-3.1) WHICH HAS BEEN ROUNDED TO THE NEAREST DOLLAR IS THE AMOUNT OF PENSION PAID BY THE BOARD OF EDUCATION CALCULATED AT SEVEN PERCENT OF SALARY.

THE COLUMN ENTITLED "TOTAL COMP" REFLECTS THE TOTAL COMPENSATION PAID (ANNUAL SALARY PLUS PENSION PICKUP) AND IS ROUNDED TO THE NEAREST DOLLAR.

Source: http://www.cps-humanresources.org/Employee/Forms/SalAdm/TSCHA-01_05.pdf

Table 7

Pay Gap Between Full-Time Teachers in Private Non-Sectarian Schools and Public School Teachers
(t-values in parenthesis)

	All Public School Teachers	Public School Teachers in Low Poverty Suburban Schools	Public School Teachers in Low Poverty Suburban Schools	Public School Teachers in Low Poverty Suburban Schools
Private-Public Pay Gap in Logs	-.136 (11.90)	-.315 (22.61)	-.210 (12.88)	-.236 (14.82)
Private Teacher Pay as % of Public (regression adjusted)	87.2 %	73.0 %	81.1 %	79.0 %
Other Covariates ^a	No	Yes	Yes	Yes
State Effects	No	No	Yes	No
MSA Effects	No	No	No	Yes
N	39,024	2,958	2958	2958

a. Central City, suburb, gender, race, education, total teaching experience, school/district teaching experience. State effects model absorbs state. MSA model absorbs the first three digits of the of the school zip code.

Source: 1999-00 Schools and Staffing Surveys

Endnotes

¹ To avoid verbal clutter throughout this paper, unless otherwise indicated, “teachers” refers to public school teachers only. It is well known that private school teachers, particularly those in religious schools, have pay and benefits far below those in public schools. Obviously, combining the two groups will lower average teacher pay. However, the relevant policy debate is about public school teachers. Note that some commentators on teacher pay combine public and private school teachers in their statistical analyses (e.g., Allegretto, Corcoran, and Mishel, 2004).

² “Computer systems analysts, database administrators, and computer scientists must be able to think logically and have good communication skills. Because they often deal with a number of tasks simultaneously, the ability to concentrate and pay close attention to detail is important. Although these computer specialists sometimes work independently, they frequently work in teams on large projects. They must be able to communicate effectively with computer personnel, such as programmers and managers, as well as with users or other staff who may have no technical computer background. ... Technological advances come so rapidly in the computer field that continuous study is necessary to keep one’s skills up to date.” (Bureau of Labor Statistics, 2005).

³ See Wenders (2004) for a concise discussion of teacher pay comparability.

⁴ Boyd, Lankford, Loeb, and Wyckoff (2003) for example, find that 85 percent of New York teachers take their first teaching job within 40 miles of their home town. Similar high rates occur outside of NYC as well. Data for Missouri show that large shares of the teaching workforce come from the nearest teacher training programs, which, in turn, are generally housed in four year colleges that tend to attract students from the same or contiguous counties. See “Teacher Preparation Institution Profiles” <http://dese.mo.gov/divteachqual/tached/teacherpreprof/index.html>

⁵ Scheduled hours of work on site are also much shorter for teachers as well. For example, NCS data for elementary school teachers in the New York metropolitan area average 34.7 hours per week. The similar figure for physicians and lawyers is 45.4 and 37.4 hours per week, respectively (<http://www.bls.gov/ncs/ocs/sp/ncbl0668.pdf>)

⁶ For public school teachers the NCS reports pay for elementary and secondary teachers separately in many MSA’s. In Figures 1 and 2 we report values for elementary teachers. Since elementary and secondary teachers are paid off the same salary schedules in public school districts their average salaries are very similar in the NCS surveys.

⁷ Teacher collective bargaining agreements typically provide 10-15 days of sick or personal leave days during the 185-190 day contract. These days can be taken not only for illness by the teacher but also for family members (often broadly defined). For example a recent Columbus, Ohio teacher contract provided 15 sick days annually and allows teachers to use them for illness not only for themselves but for “immediate family” defined as: “... father, mother, brother, sister, son, daughter, wife, husband, grandmother, grandfather, grandson, granddaughter, father-in-law, mother-in-law, legal guardian, or foster or step-parents of said teacher; and all dependents as defined by IRS living in the home or any person living in the home to whom a teacher becomes the primary caregiver.” <http://www.ceaohio.org/contract/20032004contract.htm>

⁸ The estimates in Table 2 would also include summer earnings for teachers. Thus teachers may be working more than 38 weeks.

⁹ Or licensing entry barriers will need to be changed. Many states have enacted alternative certification or alternative route programs to recruit career changers or post-baccalaureate candidates to enter teaching in a way that minimizes pre-service training. The population of teachers who enter through such programs tend to include relatively more men as well as minorities. Podgursky (2003).

¹⁰ Data from the NCES 2000-01 Teacher Follow-up Survey are consistent with these findings. They find that only 19 percent of teachers who were in classrooms in 1999-00 and who quit teaching the subsequent year reported

“better salary or benefits” as very important or extremely important in their decision to leave teaching (U.S. Department of Education, 2004, Table 7).

¹¹ Because of sample size restrictions, the BLS still does not disaggregate data on employee benefits for public k-12 school teachers (e.g., U.S. Department of Labor, 2000). Tabulations for “teachers” in this report include college professors as well as pre-school teachers.

¹² A special education teacher is defined as any teacher who teaches at least one special education class during the day. None of these results change if other definitions are used.

¹³ Education Week (2005, pp. 92-93), NASDTEC (2003).

¹⁴ New York has 703 regular school districts. Figure 6 presents data for school districts with at least 200 students.

¹⁵ Charter and private schools are much less likely than traditional public schools to use these types salary schedules. See Podgursky and Ballou (2002) and Podgursky (2005).