Center for American Progress

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Comparable, Schmomparable

Evidence of Inequity in the Allocation of Funds for Teacher Salary Within California's Public School Districts

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Executive summary

Inequity haunts U.S. public school finance. Some federal programs are demonstrably unfair in allocating funds to states, and there prevails in many states a negative relationship between the rate of student poverty in school districts and the amount of per student revenues made available by the state funding formula. There is also reason to believe that the distribution of funds to schools within districts systematically disfavors schools serving the highest concentrations of low-income students. The reason is that funds follow teacher experience. Teacher salary, the largest category of school expenditure, is tightly linked to seniority, which also confers transfer privileges. Teachers tend to exercise these privileges to flee high-poverty schools for ones serving more affluent communities.

The empirical literature documenting the extent of within-district inequity is astonishingly thin. The data necessary to assess such inequity—actual expenditures at the school level—have been almost completely absent from the picture historically. School districts generally allocate funds to schools using abstract, nonfinancial terms such as the ratio of students to teachers, and districts, not schools, pay teachers' salaries. School budgets and expenditure reporting fail to reflect actual teachers' salaries, which one expects to be lower, on average, in high-poverty schools where teacher turnover holds down the average level of experience. Thus, school districts' ordinary business practices can conceal salary gaps: differences between the average salary of teachers in high-poverty schools and the average salary of teachers in low-poverty schools.

Intrepid researchers and advocates have made progress in pegging hidden salary gaps over the past few years. Laboriously constructed estimates of schools' average teacher salary reveal pervasive salary gaps among large school districts in several states. Yet within-district inequity is of potential concern in most school districts in every state. Fortunately, the American Recovery and Reinvestment Act of 2009, also known as the stimulus bill, included a reporting requirement that should enable researchers and advocates to expose hidden salary gaps far and wide.

This paper exploits a unique dataset containing information on a representative sample of 1,692 California public schools. Most of the data were drawn from centralized files maintained by the California Department of Education and the National Center for Education Statistics, but school-level average teacher salaries were plucked, one by one, from online school accountability report cards. Foreshadowing the reporting requirement of the stimulus bill, California Senate Bill 687 required schools to post actual expenditure data, including average teacher salary, on these electronic documents.

Analyses of this data shed light on the extent of within-district inequity in California. A 10 percent increase in the rate of student poverty in a California public school is associated with a $411 drop in average teacher salary, on average, controlling for several characteristics of districts and schools known to affect funding streams. This abstract finding translates to concrete disparities in funds available to support instruction. The aggregated salary gap between two otherwise identical schools with the average number of teachers, one with a student poverty rate of 50 percentage points higher than the other, amounts to approximately $76,000. Further analyses demonstrate that results are robust to a number of sensitivity tests, and they provide evidence consistent with the notion that policies by which funds follow experience are responsible for inequity. The magnitude and pervasiveness of predicted salary gaps corroborates existing evidence from large California districts while pointing to a statewide problem.

This paper demonstrates methods suitable for assessing salary gaps in a fair, simple, and general way. Its findings, while building knowledge and highlighting California's leadership in promoting transparency in school expenditures, represent the tip of the iceberg of an underexamined facet of fiscal equity. The stimulus bill reporting requirement will enable researchers and advocates to uncover hidden salary gaps in other states.

Uncovering these hidden gaps should be a high priority for two reasons. First, school districts wishing to allocate resources in ways that promote student achievement generally and help close achievement gaps between low-income students and their more affluent peers need a better grip on how they allocate resources in the first place. Second, Congress needs a better understanding of inequity currently condoned by a loophole in the comparability requirement, one of three fiscal requirements placed on districts receiving funds under Title I, Part A of the Elementary and Secondary Education Act.

Background

Characterizing equity in U.S. public school finance was once a simple matter. Schools in poor areas were poorly funded, and schools in wealthy areas were well funded. Virtually, all revenues derived from local taxes levied on real estate. The situation today is vastly more complex in two ways. First, the overall proportion of all school revenues from local sources, still 80 percent in 1930,[1] now hovers from year to year around 44 percent. This proportion was 43.9 percent in the 2006-07 school year, with state and federal revenues accounting for 47.6 and 8.5 percent of the total, respectively.[2] Second, urbanization and administrative consolidation in the late 19th and early 20th century made the school district, not the school, the focal point of revenue policies and the agent responsible for distributing resources to schools.

Whether schools are equitably funded depends not only on the distribution of local, state, and federal funds, but also on resource allocation practices within school districts. Federal funds flow almost exclusively according to the need-based formulas of large programs, most importantly Title I, Part A of the Elementary and Secondary Education Act, commonly called Title I, which channels funds to school districts to enhance the educational experience of children living in areas of concentrated poverty. There are legitimate concerns about equity in the allocation of these funds,[3] but the great majority of school finance reform efforts have aimed to improve equity in the distribution of nonfederal funds between districts within states.

Between-district equity

State funding formulas tend to exert an equalizing effect on per pupil revenues between districts, on average, and not by accident. These formulas were sculpted by two generations of litigation and legislation seeking equitable or adequate funding for property-poor school districts.[4] In some states, notably

New Jersey, state revenues accruing to school districts overcome disparities in local wealth to create a strong positive relationship between combined state and local revenues available to a school district and the percentage of its students living in poverty.[5]

In other states the relationship between school districts' nonfederal revenues and their poverty rates is negative. The legal status of these states' funding formulas remains in flux accordingly. The Connecticut Supreme Court, for example, recently paved the way for a challenge to Connecticut's school finance system by reversing a 2007 lower court decision dismissing the constitutional basis for a suit brought by a consortium of low-income districts, cities, and parents.[6] The Connecticut legislature could potentially preempt a suit and satisfy advocates for low-income students by improving between-district equity. But such a move, while representing progress, would not address inequity in school funding within districts.

Within-district equity

Scandalous inequity in the distribution of resources within school districts has plagued U.S. education for more than a hundred years. The persistence of these questions is not for lack of efforts to address the underlying problems. Equitable resource distribution was a central interest, for example, of numerous court-monitored desegregation plans—for decades.[7] Similarly, districts receiving federal funds under Title I are required to provide "comparable" services, on average, in both their schools serving concentrations of low-income students and their other schools.[8]

The problem is that schools districts have managed to appear equitable in the eyes of court monitors or Department of Education auditors without necessarily being so. The main reason is that compliance regimes do not focus on actual expenditures. They focus instead on abstract quantities such as the ratio of books to students or the ratio of students to staff.[9] Such quantities can be reasonably similar across schools even while actual per pupil expenditures vary enormously.

This state of affairs is convenient for school district officials, who typically allocate financial resources, to a large extent, in nonfinancial terms. Schools receive "slots" for teachers, administrators, and support personnel based primarily on the number and characteristics of students enrolled in them, not that this is a straight-

forward exercise. Class size limits and other policies can complicate matters considerably, but at the same time, officials are free to ignore the ramifications this approach can have on funding equity.

Funds follow experience

Teacher experience is the driving force behind the distribution of actual financial resources within school districts for three reasons. First, teacher salary constitutes the largest category of school expenditures.[10] Second, teacher salary increases in real terms with additional years of experience, on average. An applicable rule of thumb is that teachers who stay in the same school district for 30 years can expect their salaries to double, after accounting for inflation. Third, traditional transfer policies privilege seniority. A teacher's ability to transfer as desired between two district schools increases with experience.

These rules have clear implications for financial equity. Teachers, not unlike other kinds of workers, prefer to work at sites where their jobs are perceptibly easier, holding all else equal. This preference does not favor schools serving concentrations of low-income children.[11] Research shows that teachers often move away from high-poverty schools, either by securing a transfer within district, or changing districts.[12] At any given time, teachers in low-poverty schools exhibit higher levels of experience, on average, than teachers in high-poverty schools. This finding is true across and within districts.[13]

One might expect there to be mountains of evidence showing that teachers in low-poverty schools earn higher salaries than teachers in high-poverty schools, but it turns out that the relevant data have been hard to come by. Average teacher salaries at the school level do not appear in the Common Core of Data, the repository for annual collections of information about public schools made by the National Center for Education Statistics. Nor have state educational agencies historically had such information, much less made it available.

The reason for the dearth of school-level information on actual teacher salary at the school level is that reporting obligations align with the standard business practice of allocating teaching "slots" instead of funds. School districts pay teachers' salaries, and the district average is reported as though it pertained to individual schools, thus concealing differences in actual school-level average salary driven by teacher experience.[14]

Hidden salary gaps

Advocates have begun to get a handle on the magnitude and pervasiveness of inequity in actual expenditures on teachers' salaries by painstakingly matching school-level information on teacher experience to district-level salary scales. The Education Trust, a nonprofit research and advocacy firm, assessed the hidden salary gap within the 50 largest school districts in Texas and the 14 largest in Ohio by estimating the average teacher salary in schools serving the highest and lowest concentrations of low-income students. The Education Trust—West assessed the hidden salary gap within the 50 largest school districts in California.[15]

These studies yielded two common findings. First, the overwhelming majority of districts examined had substantially lower average teacher salaries in their high-poverty schools than in their low-poverty schools. Second, these hidden differences in average salary commonly topped $1,000, and some even topped $6,000. Further analyses showed that these funding gaps often persist after being converted to a per pupil basis to account for variation in student-teacher ratio. The studies provide strong evidence that large districts in California, Ohio, and Texas spend less, on average, to pay teachers in schools serving concentrations of low-income children than they do to pay teachers in schools serving more affluent students.

Funds follow experience in small- and medium-size school districts for the same reasons they do so in large districts, so it is reasonable to imagine that hidden salary gaps blight many small- and medium-size districts, too. And since 95 percent of districts receive Title I funds, federal policymakers would benefit from information speaking to the extent and magnitude of hidden salary gaps across more districts than just the largest ones in three states. The reason is that hidden salary gaps represent evidence that a known loophole in the Title I fiscal requirements undermines the compensatory purpose of Title I funds.[16]

The methodology pioneered by Education Trust and Education Trust—West does not lend itself well to characterizing hidden salary gaps across nearly all districts in a state. It relies purely on within-district comparisons that work best for districts with sizable numbers of schools, but there are analytic frameworks capable of working simultaneously with data from schools across all of a state's districts, large, medium, and small. The lack of appropriate data has been the obstacle to bringing such frameworks to bear on questions about hidden salary gaps, until quite recently that is.

New era of responsibility

The American Recovery and Reinvestment Act of 2009 contained a reporting requirement that blows this traditional obstacle out of the water. Under the act, each state educational agency must furnish the Department of Education with school-by-school expenditure data for the 2008-09 school year by March 31, 2010.[17] Department of Education guidance specifies that expenditures be reported in several categories. One of these categories is teacher salary.[18]

Advocates for greater equity in school spending will soon have access to potentially enlightening data from each state. Analysis of this data should be a high priority because the impending reauthorization of the Elementary and Secondary Education Act provides a window of opportunity for closing the comparability loophole. The novelty of these data and the myriad questions to which they may speak, however, present a real danger of stirring up a cacophony of competing messages based on all manner of analyses.

Advocates and researchers can take two precautions to ensure that federal policymakers receive a clear signal about within-district equity. The first precaution is to adopt a laser-like focus on variation in average teacher salary in the near term. The majority of expenditures go to teacher salary,[19] and hidden salary gaps speak directly to a specific flaw in the law, a loophole in the comparability provision of Title I that explicitly ignores the fact that funds follow experience. The second precaution is to rely on methods suitable for characterizing hidden salary gaps in a fair, simple, and general way.

This paper offers a guide for observing these precautions. It leverages a unique dataset containing information about a large, representative sample of California schools. This paper pilots an analytic approach and characterizes the hidden teacher salary gap in California. It adds to the still small knowledge base around within-district equity while anticipating a surge of work in this area. A technical appendix offers researchers a detailed treatment of methodological issues.

Why study California?

There are many reasons to investigate the hidden teacher salary gap in California. Foremost among them is an unusual—perhaps unique among states—public reporting requirement. Preceding the 2009 American Recovery and Reinvestment Act's similar requirement by four years, California Senate Bill 687 required schools to include specific expenditure data on their school accountability report cards.[20] The bill explicitly called for the reporting of average teacher salaries at the school level.

The bill's particular focus on expenditures made sense in the wake of the *Williams v. State of California* case, a class action lawsuit brought on behalf of students and parents from more than 46 schools based on California's constitutional responsibility to ensure students receive basic educational opportunities. This suit was settled by way of sweeping legislation promoting equity and transparency in public education, and S.B. 687 essentially corrected an oversight in this legislation.[21]

Studying California has two general advantages from a researcher's standpoint. First, extant knowledge of hidden salary gaps among California's largest districts allows one to compare findings to bolster credibility of new ones. This opportunity is especially welcome because no prior work has systematically explored expenditure data drawn from school accountability report cards. Second, California's size ensures that even a representative sample of California's many schools and districts is large enough to support appropriate statistical tests.

The nature of California's school funding system offers an additional advantage to studying variation in average teacher salary. Hidden salary gaps may be more pronounced in California than in other states. A combination of property tax reform and state Supreme Court decisions in the 1970s radically altered school finance in California. In sum, school funding was leveled down. With some notable exceptions, school districts generally enjoy quite similar per pupil revenues from state and local sources. Resources available to pay teachers' salaries vary less between districts than would be the case in many states. This means that characteristics of

schools may play a greater role relative to characteristics of districts in explaining teachers' sorting behavior, their tendency to seek and obtain the most desirable positions available to them, either in their current district or in another one. Moreover, teachers' salaries account for a higher percentage of school expenditures in California as compared to other states because school districts chose to increase class sizes rather than lower salaries in response to downward trends in revenue.[22] This observation augments the policy relevance of hidden teacher salary gaps in California.

Data analysis

Data sources and sampling procedures

The data used in this study were drawn from three sources. First, reported average teacher salaries were extracted, school by school, from online versions of 2007-2008 School Accountability Report Cards.[23] Second, supplemental information about schools and districts for the same year was drawn from the California Department of Education.[24] Third, additional information on schools and districts in 2006-2007, the most recent year available, were drawn from U.S. Department of Education's Common Core of Data.[25]

The two latter sources of data include information for 9,198 schools clustered in 1,036 districts. Average teacher salary figures, however, were only sought for a representative sample of these schools. The initial sample includes all schools from 84 districts receiving basic aid under California's school finance system. These districts' local property tax revenues suffice to meet or exceed the state's base per pupil funding requirement, which varies according to a complex formula. Basic aid districts receive only categorical grants from the state,[26] and they serve some of the nation's wealthiest communities.

The initial sample includes 20 percent of the schools from the remaining districts, known in the school finance context as revenue-limit districts, but these districts were divided into two groups for sampling purposes. The sample includes all schools from a randomly chosen 20 percent of 1,025 districts with fewer than 62 schools. It includes a randomly chosen 20 percent of the schools in the 11 districts with at least 62 schools—Los Angeles Unified, San Diego Unified, and others.

Measures

A final analytic sample was selected using criteria related to the measures essential to an assessment of hidden teacher salary gaps. Approximately 5 percent of schools in the original sample were omitted from analyses because they had missing or

implausible values for average teacher salary. Two types of implausible values reared their heads. First, in some districts, all schools reported the same average teacher salary. This pattern represents a systematic violation of the intent of the reporting obligation, and such districts can scarcely be expected to help shed light on hidden salary gaps. Second, some schools reported inordinately low or high average teacher salary such as $5,484 or $114,408, respectively. These types of values may represent data entry errors, computational errors, or some local misinterpretation of the reporting requirement. Spot checks of collective bargaining contracts yielded a smallest plausible value of $35,621 and a largest of $86,090.

Additional measures used in this research include status and demographic indicators. Schools with missing or implausible values for some of these indicators were omitted from the final analytic sample, which includes 1,692 schools clustered in 220 districts. By and large, revenue-limit districts in the final analytic sample were not statistically distinguishable from the population of revenue-limit districts based on observable status or demographic characteristics, a necessary condition for drawing conclusions about the population of schools based on statistical relationships found among schools in the analytic sample.

Analytic approach

Analytic methods should be chosen to suit the goal of the research: to characterize the hidden teacher salary gap in California in a fair, simple, and general way. Packaging this goal into a specific question sets the ball in motion:

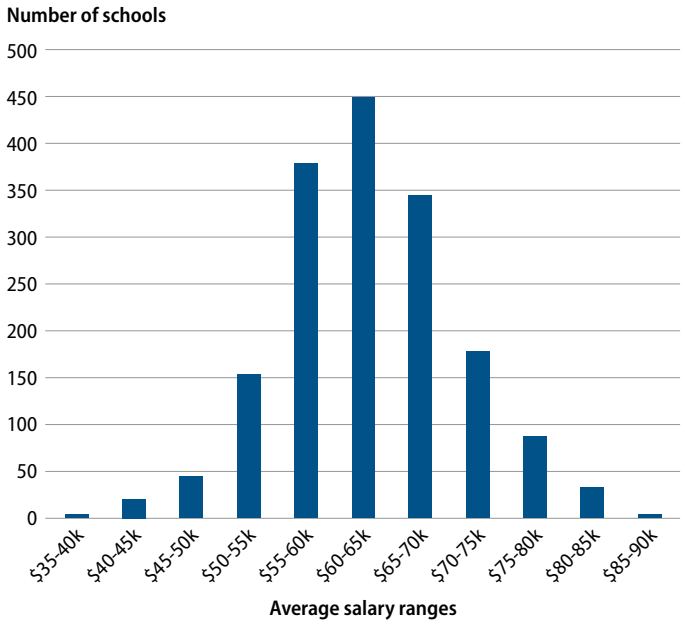
> *What is the typical difference between the average salary of teachers in one school versus another school, identical in many respects but serving students 10 percentage points more likely to be from a low-income family?*

Multiple regression techniques are well suited to addressing this question using the data at hand. The techniques allow one to employ statistical controls in service of fairness. Selected results can be presented straightforwardly, and statistical tests support generalizing findings to the population of California schools. Additional analyses can explore the robustness of findings, surface the need for special precaution around interpretation, and highlight analytic concerns for future work.

Figure 1 helps to illustrate the ideas guiding this focused exploration of variation in average teacher salary. The height of each bar indicates how many of the 1,692 schools in the analytic sample had average teacher salaries falling in the corre-

FIGURE 1

Frequency plot of average teacher salaries in 2007-08 for a representative sample of 1,692 California schools



sponding range. It is certainly reasonable to suspect that the district a school happens to represent helps explain which bin its average salary falls into. Basic aid districts have greater financial resources than revenue-limit districts, and California's school finance system treats unified, elementary, and high school districts a bit differently, partly because they face different costs in areas such as transportation and extracurricular activities. The Comparable Wage Index developed by the National Center for Education Statistics provides a way of comparing districts facing similar expenditure pressures.

Analyses should also respect the fact that teachers cannot sort themselves among schools in just any old way. A third-grade teacher may seek a transfer among elementary schools within a district, or she may obtain a position at an elementary school in another district. She is generally not able, however, to move to a high school, and it is a simple matter to respect analytically such grade-level constraints on teacher sorting.

Findings

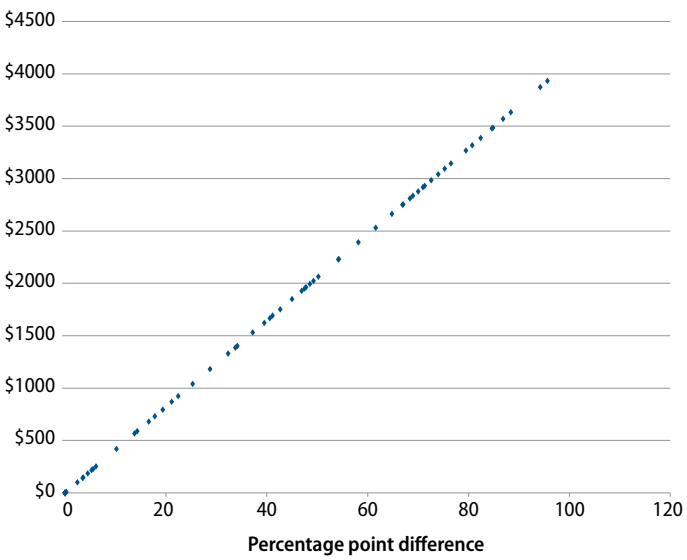
The findings are not surprising: the higher the proportion of low-income students served by a school, the lower the average salary of the schools' teachers. Controlling for select characteristics of schools and districts, each 10 percentage point increase in the proportion of low-income students served by a school corresponds to a $411 drop in the average salary of the school's teachers. Thus, for example, a 50 percentage point difference in the student poverty rate between two hypothetical schools corresponds to $2,055 difference in average salary. Multiplying this salary gap by 37, the average number of teachers in each of California's schools, yields a figure of $76,035, a sum roughly equivalent to the average salary and benefits of an additional teacher.

These results stand up to five sensitivity analyses. First, one might suspect that Los Angeles, home to 8 percent of California's public schools, may inordinately affect analyses, but it does not. Second, one might be concerned about generalizing the finding to the whole state from a sample in which basic aid districts are over-represented. Analyses omitting basic aid districts feature similar estimates of the relationship between student poverty rates and average teacher salary, in both magnitude and statistical significance. Third, the finding withstands the inclusion of additional statistical controls representing the ratio of students to teachers in a school. Thus, the hidden salary gap is not explained by districts' preferences or habits around the allocation of teaching slots based on numbers of students in a school. Fourth, analyses omitting the three special education schools and 82 alternative education schools suggest that these schools do not drive the findings in any appreciable way. Finally, analyses excluding districts with fewer than six schools in the analytic sample yielded similar results.

It is important to point out that the relationship between student poverty and average teacher salary vanishes when a measure of teacher experience is added to regression models. This phenomenon bolsters the case that the hidden salary gap is a product of funds following experience. One effect of seniority-based pay and teacher sorting is a distribution of resources that systematically disfavors high-poverty schools.

FIGURE 2

Predicted maximum salary gaps corresponding to differences in student poverty rates among elementary schools within 68 unified, revenue-limit school districts



In its naked form, this paper's key finding is easy to dismiss. A 10 percentage point change in a school's student poverty rate is hard to picture, and $411 represents the cost of a minor car repair. Yet within the same district, the student poverty rate can vary dramatically between schools, the basis for two ways of situating the finding.

Worst-case scenario

There are more than 600 districts in California in which the difference between the highest and lowest poverty rates of schools exceeds 10 percentage points. In a quarter of districts, the maximum difference exceeds 47 percentage points. Figure 2 portrays the maximum predicted salary gaps by focusing on elementary schools within unified, revenue-limit districts. The maximum observed difference in poverty rates among elementary schools within the 68 such districts in the analytic sample ranges from 0 to 96 percentage points. For districts with large ranges in this sense, the maximum predicted salary gap represents serious money—$2,000, $3,000, or nearly $4,000.

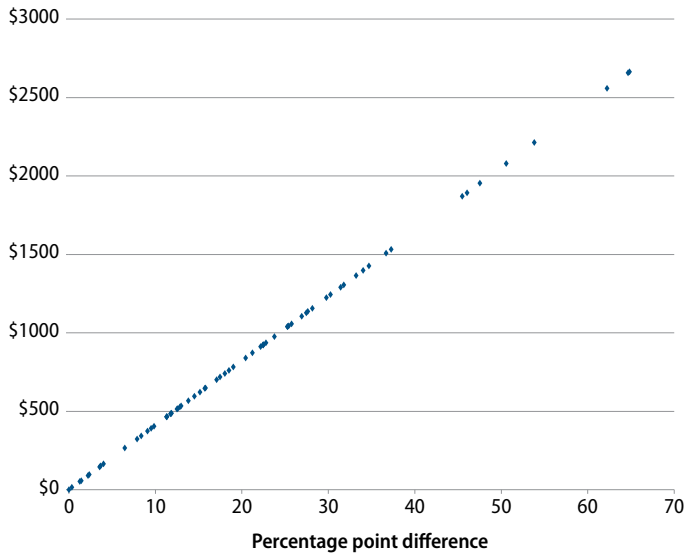
Classical gap analysis

Maximum predicted salary gaps raise serious questions about equity, but they do not illustrate the pervasiveness of salary gaps within districts. A hypothetical district with nine elementary schools with a very low student poverty rate and just one with a high student poverty rate would have a pronounced maximum salary gap but not a pervasive one. This is one reason why previous descriptive studies of salary gaps in large districts have focused on average salary gaps between schools with student poverty rates in the first and fourth quartiles on the local distribution of that measure.[27]

Figure 3 portrays the predicted salary gap between hypothetical schools at the 25th and 75th percentiles on the distribution of the measure of student poverty, again focusing on sample elementary schools within unified, revenue-limit districts. The difference between the 75th and 25th percentiles on student poverty rates among elementary schools within the 68 such districts in the analytic sample ranges from 0 to 65 percentage points. The predicted salary gap exceeds $1,000 for more than a third of these districts.

FIGURE 3

Predicted salary gaps between hypothetical schools at the 75th and 25th percentiles on student poverty based on observed rates among elementary schools within 68 unified, revenue-limit school districts



Discussion and conclusion

Prior research has documented hidden salary gaps within large districts, but this paper provides evidence speaking to a statewide phenomenon. A California school's student poverty rate is a good predictor of the average salary of the school's teachers. A 10 percentage point increase in student poverty rate is associated with a $411 drop in average teacher salary, on average, controlling for several characteristics of districts and schools.

Situating this fair, simple, and general result among districts in the analytic sample makes the equity implications of teacher salary gaps more palpable. Substantial variation in student poverty rates across schools within districts points to hidden teacher salary gaps that are both substantial and common. In this sense, the results of this research are highly consistent with those of the prior descriptive work by Education Trust and Education Trust—West. A substantial and pervasive hidden salary gap is not surprising, and it should be understood as a consequence of policies in which funds follow experience. These policies can undermine the intent of compensatory funding streams without the proper precautions. Federal policymakers should be especially concerned about this, since Title I, the largest school program operated by the Department of Education, allocates compensatory funds to high-poverty schools.

Close the comparability loophole

Widespread, hidden salary gaps suggest that the current Title I comparability requirement condones inequity. The reason is that the provision explicitly excludes from comparability determinations salary differentials based on teacher experience. Removing this exclusion from the law would go a long way toward ensuring that high-poverty schools receive a fair share of resources.[28]

Promote transparency around expenditures

This paper has modeled an analytic approach to summarizing one state's hidden teacher salary gap. In other states, however, systematic relationships between student poverty and average teacher salary at the school level remain hidden behind a veil of secrecy created by default business practices. Opacity in the distribution of financial resources to schools is indefensible in a new era of responsibility. Furthermore, school districts wishing to allocate resources in ways that improve student achievement generally and narrow achievement gaps would do well to understand first how and where they actually spend their funds.[29]

California can take distinct pride as a leader in promoting transparency around the distribution of actual resources to schools. This paper has exploited this transparency to shed light on the extent of inequity created by policies in which funds follow experience, and currently condoned by the very federal law meant to enhance the educational experience afforded children in areas of concentrated poverty. There is reason to believe that expenditure patterns disfavoring high-poverty schools obtain in most states and the District of Columbia, and advocates for low-income students should avail themselves of soon-to-be-released data stemming from the American Recovery and Reinvestment Act to see whether this is indeed the case.

Appendix

Table A1 gives a breakdown of the analytic sample by numbers of districts and schools of different types, as defined by grade levels served. Status indicators of district and school type have some bearing in efforts to predict the average teacher salary at the school-level because they affect the amount of resources available to pay teachers. California's school finance system treats basic aid and revenue-limit districts quite differently. Basic aid districts receive only categorical grants. Categorical and noncategorical funds are allocated differently, too, depending on whether a district is an elementary, high school, or unified district. Teachers can generally only sort themselves among schools serving the same grade levels. Note: Schools operated by county offices of educations are excluded entirely from this research.

Table A2 offers descriptive statistics on select indicators for 1,692 schools in the analytic sample (192 schools from basic aid districts and 1,500 schools from revenue-limit districts) and the population of 9,006 revenue-limit schools. Revenue-limit schools in the analytic sample are statistically indistinguishable from the population of revenue-limit schools on most indicators. A high proportion of schools from basic aid districts are included in the analytic sample. The exceptions are the few schools with missing or implausible values for average teacher salary. This information, in conjunction with randomization in the sampling process, provides a reasonable basis for generalizing findings created by fitting hypothesized regression models to data to the population of California schools.

TABLE A1

Numbers of districts and schools in the analytic sample, by types defined by grade-levels served

District type	Basic aid	Revenue limit	Totals
Elementary district	36	83	119
High school district	5	12	17
Unified district	15	69	84
Totals	**56**	**164**	**220**

School type	Basic aid	Revenue limit	Totals
Elementary school	136	1009	1145
Middle school	22	242	264
High school	34	249	283
Totals	**192**	**1500**	**1692**

The regression techniques used here begin with the hypothesized model represented by Equation 1, $Avesal_{ij} = \alpha + \beta D_j + \gamma S_{ij} + \mu_j + \varepsilon_{ij}$ where $Avesal_{ij}$ represents the average teacher salary in school i in district j, D_j represents a vector

TABLE A2

Means and standard deviations on select indicators for 1,692 in the analytic sample (192 schools from basic aid districts and 1,500 schools from revenue-limit districts) and the population of 9,006 schools from revenue-limit districts

Variable	Schools in analytic sample				Population of schools in revenue-limit districts	
	Basic aid districts		Revenue limit districts			
	mean	sd	mean	sd	mean	sd
Average teacher salary	67,894.67	9,731.24	62,452.16	7,316.22	n/a	n/a
Proportion of students eligible for free or reduced-price lunch	0.21	0.20	0.56	0.28	0.52	0.30
Average years teaching experience	15.18	4.69	13.03	3.59	12.99	4.31
Comparable Wage Index	1.34	0.24	1.32	0.14	1.31	0.16
Proportion of students identified as African American	0.02	0.02	0.08	0.11	0.08	0.12
Proportion of students identified as Hispanic	0.18	0.19	0.50	0.29	0.46	0.30
Proportion of students identified as Native American	0.01	0.04	0.01	0.02	0.01	0.06
Proportion of students identified as Asian or Pacific Islander	0.10	0.12	0.09	0.13	0.10	0.14
Proportion of students identified as white	0.64	0.19	0.29	0.26	0.32	0.27
Student enrollment	422.56	337.58	750.44	623.99	685.41	619.25
Full-time equivalent teachers	26.68	20.72	38.59	29.37	35.14	29.09

of district characteristics, S_{ij} represents a vector of school characteristics, and μ_j and ε_{ij} represent random error terms for at the district and school levels, respectively.

Table A3 presents results of fitting regression models to data. Column (1) corresponds to a so-called null model featuring only the error terms. These results merit some attention because the literature on school-level average teacher salary is so immature that the fractions of variation to be expected within and between districts are not well established. In California, it appears that only 30 percent of the variation in average teacher salary lies within districts. Explanations for this sort of variation speak to questions of within-district equity in the distribution of financial resources.

Column (2) corresponds to a baseline control model including indicators with some bearing on funds available for teacher compensation. The indicators explain 26 percent of the between-district variation in average teacher salary, and the signs of the estimated coefficients accord with expectations. In particular, basic aid districts, districts with higher values on the Comparable Wage Index, and high school districts to have higher average teacher salary because of the nature of California's school finance system.

TABLE A3

Parameter estimates, approximate p-values, and select goodness-of-fit statistics for a collection of regression models in which the unit of analysis is a school and the outcome is average teacher salary

Variable	(1)	(2)	(3)	(4)
Basic aid district		4,278**	3,040*	2084
Comparable Wage Index		12,069***	11,117***	15,863***
High school district		2449	2273	1146
Elementary district		-4,173***	-4,230***	-3,937***
Middle school		-311	-35	483
Elementary school		1,704***	2,031***	1,201*
Student poverty rate			-4,105***	-938
Teacher years of experience				928***
Constant	61,445***	45,957***	49,105***	29,367***
Schools	1,692	1,692	1,692	1,692
Districts	220	220	220	220
Between-district variance	58,012,047	42,967,684	42,167,867	42,563,228
Within-district variance	24,837,046	24,125,691	23,500,573	15,452,879
Intraclass correlation	0.70	0.64	0.64	0.73
R^2 between districts	0	0.23	0.25	0.29
R^2 within districts	0	0.03	0.06	0.38
R^2 overall	0	0.08	0.09	0.21

* p<0.05; ** p<0.01; *** p<0.001

Results of sensitivity tests involving alternate model specifications and subsets of the analytic sample are available from the author.

Columns (3) and (4) correspond to the same model specification as in (2), but with the addition of substantive predictors of interest. In column (3), the estimated coefficient associated with the student poverty rate in a school, the fraction of students eligible for free or reduced-price lunch, is -4,105. The estimated p-value is less than 0.001, evidence allowing one to reject the hypothesis that the corresponding parameter is zero. The estimate suggests that, holding other things in the model equal, a school with a 100 percent poverty rate has an average teacher salary $4,105 below that in a school serving no low-income students. Equivalently, a 10 percentage point increase in poverty rate is associated with a $410.50 drop in average teacher salary. This is the main finding of the paper.

In column (4), the effect of an indicator of the average number of years of experience of teachers in a school wipes out the effect of student poverty. This is not surprising given the prevalence of policies by which funds follow experience. The inclusion of the experience predictor explains 34 percent of the within district variation in average salary left unexplained in column (3).

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A note about the title

The main title of this paper, "Comparable, Schmomparable," was inspired by a paper by Jeffrey B. Liebman and Richard J. Zeckhauser of Harvard University.[30] Their paper has appeared in various iterations with the title "Schmeduling," which refers to behavior of consumers presented with extraordinarily complex pricing information. The paper has nothing to do with school finance. The title, however, nicely invokes the Yiddish convention of replacing an initial consonant with "schm" to create a term of derision.[31]

Endnotes

1 The fractions of school funds from local, state, and federal sources vary across states. For a concise explanation, see chapter 3, note 59 in Eric A. Hunushek and Alfred A. Lindseth, *Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools*. (Princeton, NJ: Princeton University Press, 2009).

2 U.S. Department of Education, National Center for Education Statistics, "Percentage distribution of revenues for public elementary and secondary education in the United States, by source: 2006–07" (2009), available at http://nces.ed.gov/EDFIN/graph_topic.asp?INDEX=4.

3 Raegen Miller, "Secret Recipes Revealed: Demystifying the Title I, Part A Funding Formulas" (Washington: Center for American Progress, 2009), available at http://www.americanprogress.org/issues/2009/08/title_one.html.

4 For a concise treatment of the two strains of school finance litigation, see Hunushek and Lindseth, *Schoolhouses, Courthouses, and Statehouses: Solving the Funding-Achievement Puzzle in America's Public Schools*.

5 Gordon MacInnes, *In Plain Sight: Simple, Difficult Lessons from New Jersey's Expensive Effort to Close the Achievement Gap* (New York: The Century Foundation Press, 2009).

6 Arielle Levin Becker, "State High Court Ruling Cites Need for Quantifying Education Quality," *The Hartford Courant*, March 23, 2010, available at http://articles.courant.com/2010-03-23/news/hc-school-funding-lawsuit-0323.artmar23_1_higher-education-adequate-education-public-education.

7 More than 200 districts remain under the supervision of the Department of Justice with regards to compliance with court-ordered desegregation plans. For an interesting current example, see Stephanie McCrummen, "Ruling on racial isolation in Miss. Schools reflects troubling broader trend," *The Washington Post*, April 20, 2010, available at http://www.washingtonpost.com/wp-dyn/content/article/2010/04/19/AR2010041905118.html.

8 *Elementary and Secondary Education Act,* Section 1120A(c) (1) (A). 20 U.S.C. 6321. (Government Printing Office, 2004).

9 Department of Education, "Non-Regulatory Guidance: Title I Fiscal Issues" (2008), available at http://ed.gov/programs/titleiparta/fiscalguid.pdf.

10 To date, educational expenditures are not widely reported at the school level. Education Resource Strategies, a consultancy, provided the author with estimates for the percentage of school-level expenditures due to teacher salary in a handful of client districts. Estimates vary significantly across districts and analytical approaches. The most nuanced estimates range from 42 percent to 55 percent. This evidence seems reasonable considering that, according to district-level data collected by the National Center for Education Statistics, 40 percent of expenditures are directed to salaries of instructional personnel (60 percent of expenditures are dedicated to instruction, and 67 percent of that spending goes towards salaries). See National Center for Education Statistics, "Finance Graphs," available at http://nces.ed.gov/EDFIN/graph_index.asp.

11 Center for Teaching Quality, "North Carolina Teacher Working Conditions Survey Interim Report" (2006), available at http://www.teachingquality.org/pdfs/2006nctwcinterim.pdf (last accessed October 28, 2008).

12 Benjamin Scafidi, David L. Sjoquist, and Todd R. Stinebrickner, "Do Teachers Really Leave for Higher Paying Jobs in Alternative Occupations?" *Advances in Economic Analysis & Policy* 6 (1) (2006), available at http://www.caldercenter.org/PDF/1001057_High_Poverty.pdf.

13 Charles Clotfelter and others, "High-Poverty Schools and the Distribution of Teachers and Principals." Working Paper 1 (Washington: The Urban Institute, Center for the Analysis of Longitudinal Data in Education, 2007).

14 Marguerite Roza, Larry Miller, and Paul Hiill, "Strengthening Title I to Help High-Poverty Schools: How Title I Funds Fit Into District Allocation Patterns" (Seattle: Center on Reinventing Public Education, 2005); Marguerite Roza, "What if We Closed the Title I Comparability Loophole?" In Phillys McClure and others, "Ensuring Equal Opportunity in Public Education" (Washington: Center for American Progress, 2008); Karen Hawley Miles and Marguerite Roza, "Understanding Student-Weighted Allocation as a Means to Greater School Resource Equity," *Peabody Journal of Education* 81 (3) (2006): 36-62.

15 The Education Trust, "Their Fair Share: How Teacher Salary Gaps Shortchange Poor Children in Texas" (2006), available at http://www.edtrust.org/sites/edtrust.org/files/publications/files/Texas%20(Poor).pdf; The Education Trust—West, "California's Hidden Teacher Spending Gap: How State and District Budgeting Practices Shortchange Poor and Minority Students and Their Schools" (2005), available at http://www.hiddengap.org/resources/report031105; The Education Trust, "No Accounting for Fairness: Equitable Education Funding" (2008), available at http://www.edtrust.org/sites/edtrust.org/files/publications/files/NoAcctgforFairnessOH.pdf.

16 Saba Bireda and Raegen Miller, "Walking the Talk: Closing the Comparability Requirement Loophole in Title I of the Elementary and Secondary Education Act" (Washington: Center for American Progress, 2010).

17 U.S. Department of Education, "American Recovery and Reinvestment Act of 2009: Title I, Part A Funds for Grants to Local Education Agencies" (2009), available at http://ed.gov/policy/gen/leg/recovery/factsheet/title-i.html.

18 The novelty of this reporting requirement may represent a real obstacle to successful reporting in some states. For an example of guidance offered by a state educational agency to school districts, see State of Washington, Office of Superintendent of Public Instruction, "School Apportionment and Financial Services" (2010), available at http://www.k12.wa.us/safs/bldg_lvl/sbr.asp.

19 See note 10.

20 For a detailed examination of the genesis, passage, and enforcement of Senate Bill 687, see John Affeldt and Guillermo Mayer, "Lifting the Fog of Averages: Enacting and Implementing California's Requirement to Report Actual Per Pupil Expenditures School-by-School" (Washington: Center for American Progress, 2010), available at http://www.americanprogress.org/issues/2010/05/liftingthefog.html. The bill requires schools to report actual per pupil expenditures (from restricted sources, unrestricted sources, and all sources) and average teacher salary as part of the school accountability report card. Compliance with these reporting requirements, a priority of advocates if not necessarily school districts and the California Department of Education, rose quickly such that 84 percent of schools were compliant for the 2007-08 school year. Public Advocates, a law firm,

has documented the saga of compliance with S.B. 687, available at http://www.publicadvocates.org/docs/SARC08/2008_SARC_Report_Rev1_FINAL.pdf.

21 Public Advocates, Inc., one of the co-lead counsels on the *Williams v. State of California* case, maintains a website documenting the timeline and key events around the case, available at http://www.publicadvocates.org/ourwork/education/index.html#williams.

22 Public Policy Institute of California, "Has School Finance Reform Been Good for California?" Research brief number 30 (2000), available at http://www.ppic.org/content/pubs/rb/RB_200JSRB.pdf.

23 School Accountability Report Cards, or SARCs, are meant to include four expenditure measures: average teacher salary, total per pupil expenditures, per pupil expenditures from restricted sources, and per pupil expenditures from nonrestricted sources. All four values were collected, where available. Exploratory analysis suggests that the per pupil expenditures measures are less credible than the average teacher salary measure. A plausible explanation is that there are more ways to interpret expenditures than ways to interpret teacher salary. District averages created from the school-level expenditure figures did not correlate strongly with district average expenditure figures available elsewhere. In contrast, similarly constructed district teacher salary figures correlated strongly with measures constructed from district expenditure data available elsewhere.

24 The California Department of Education provides access to various datasets by way of a handy website, available at http://dq.cde.ca.gov/dataquest/. It also maintains a central portal facilitating access to SARC, available at http://www.cde.ca.gov/ta/ac/sa/ap/sarclink1.asp.

25 See U.S. Department of Education, Institute for Education Sciences, National Center for Education Statistics, "Common Core of Data," available at http://nces.ed.gov/ccd/.

26 EdSource, a nonprofit research firm, offers many useful documents describing California's school finance system, including the following: EdSource, "About revenue limits and basic aid" (2004), available at http://rcsd.schoolwires.net/187710123165237197/lib/187710123165237197/About_revenue_limits_and_basic_aid.pdf.

27 The Education Trust methodology ranks schools by poverty and then divides them into four groups serving equal numbers of students. It does not always arrange for comparisons by grade band.

28 See Bireda and Miller, "Walking the Talk: Closing the Comparability Requirement Loophole in Title I of the Elementary and Secondary Education Act."

29 Karen Hawley Miles and Stephen Frank, *The Strategic School: Making the Most of People, Time, and Money* (Thousand Oaks, CA: Corwin Press, 2008).

30 See, for example, a 2004 version of Jeffrey B. Lieberman and Richard J. Zeckhauser, "Schmeduling" (Cambridge, MA: Harvard University and the National Bureau of Economic Research, 2004), available at http://www.econ.yale.edu/~shiller/behmacro/2004-11/schmeduling-zeckhauser.pdf.

31 See, for example, Merriam-Webster's Online dictionary, available at http://www.merriam-webster.com/dictionary/schm.

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