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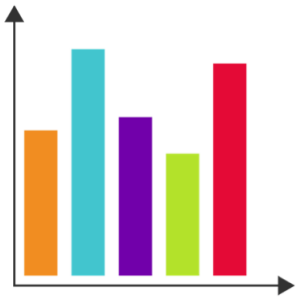
RESEARCH BRIEF

Quick Analyses of Measures from the School Finance Indicators Database
www.schoolfinancedata.org

July 2019

SCHOOL FINANCE AND TEACHER PAY COMPETITIVENESS

Bruce D. Baker, Matthew Di Carlo, and Mark Weber



ABSTRACT

In this research brief, we present state-by-state estimates of the gaps in wages between teachers and comparable non-teacher professionals, with particular focus on the relationship between these "teaching penalties" and state school finance systems. The penalties vary widely by state, ranging from 5-10 percent in in Pennsylvania and Montana to 30-35 percent in Arizona, Oklahoma, and Colorado. The gaps are larger for veteran versus young teachers, by an average of roughly four percentage points, suggesting that the teaching penalty grows modestly with experience. We also find that teaching penalties tend to be less severe in states that spend more on education, and in those that devote a larger share of their economic capacity to K-12 education. We close with policy recommendations, including the suggestion that any federal efforts to mitigate teaching penalties should incentivize improvement in states' finance systems.

INTRODUCTION

The issue of teacher pay has become a popular topic in our national political discourse over the past few years. Low salaries have been cited as a primary cause of several statewide teacher strikes and demonstrations, and the issue has even featured in the current presidential campaign.

Underlying virtually all of the debates about teacher pay, past and present, is the widely held belief that teachers are underpaid. This belief is not always, or even often, backed up by evidence. One big reason for this is the fact that evaluating this claim empirically is not straightforward. Assessing the adequacy of teacher pay, just like that of education funding in general, requires a benchmark against which pay can be compared.

In research studies of teachers or other workers, one common choice for this benchmark is the compensation of similar workers in different jobs (e.g., Allegretto and Mishel, 2019). This comparison not only provides a concrete reference group, but it also carries implications for recruitment and retention. That is, if teachers earn substantially less than similar workers in their geographical area, people will be less likely to choose the teaching profession and stay in it, thus reducing the "quality" of the teacher workforce.

Compensation, of course, is not the only factor, or even the primary factor, in decisions to enter and stay in teaching. But the most recent available evidence, on the whole, indicates that paying teachers more, whether via increasing salary or through different types of bonuses, can improve teacher retention and, in some cases, student outcomes (e.g., Feng and Sass, 2017; Jackson et al., 2016; Springer et al., 2016; Fulbeck, 2014; Hendricks, 2014; Clotfelter et al., 2008; Ondrich et al., 2008).

This does not imply that policies to improve teacher pay are uncontroversial. There is heated debate, for example, about how to distribute raises (e.g., across-the-board increases, performance-based bonuses, retention bonuses for teachers in hard-to-staff schools and subjects, etc.); most of the papers cited above evaluate bonuses rather than broad increases. Moreover, state and local budgets remain tight in many places, and financing pay increases will likely meet with political opposition.

That said, compensation is potentially an important lever for improving recruitment and retention, and so measuring the competitiveness of teacher pay is a critical first step for motivating and targeting policies to improve it. In this research brief, we present state-by-state estimates of teacher/non-teacher wage competitiveness—that is, the difference in wages between teachers and similar non-teachers within each state. Moreover, we examine the relationship between these teacher wage gaps and states' school finance systems, specifically whether states that spend more, or devote a larger share of their economies to education, exhibit larger gaps.

We would take care to point out that our estimates include private school teachers. Private school teachers tend to earn less than their public school counterparts, which would exacerbate the size of teacher/non-teacher wage gaps relative to estimates that include only public school teachers. The differences, however, will be modest, insofar as private school teachers are a small minority in every state. Moreover, public school teacher salaries tend to influence those of private school teachers in the area—that is, states with higher-paid public school teachers will also tend to have higher-paid private school teachers. As a result, the inclusion of private school teachers is unlikely to have much effect on states' teaching penalties relative to those found in other states.

A note on benefits

Our estimates do not include benefits, most notably health and retirement benefits. Although wages are likely more influential in teachers' employment decisions, benefits do matter as well, and so it is important to consider whether teaching penalties might be offset by more generous benefits.

We cannot estimate the cost of teachers' benefits state by state, but we can approximate the degree to which benefits offset wage differences nationally (Allegretto et al., 2008). Using data from the Bureau of Labor Statistics Employer Costs for Employee Compensation (ECEC) survey, we find that public school teachers do indeed receive more generous benefits than non-teacher professionals. The ECEC estimates indicate that benefits offset teaching wage penalties by 7.2 percentage points when teachers are compared with professionals in general, and 9.3 percentage points when compared with private sector professionals. In the vast majority of states, these estimates are far smaller than the gaps we report below (see Biggs and Richwine [2016] for a discussion of how the ECEC may misrepresent the cost of benefits in some cases).

In other words, in all but a handful of states, benefits do not come close to "explaining away" teaching penalties. It is, however, true that any increases in teachers' salaries would likely have ramifications for benefits costs, most notably pension costs. This is a very important consideration in any efforts to close teacher pay gaps.

METHODS AND DATA

The School Finance Indicators Database (schoolfinancedata.org) is a public collection of data on school funding and resource allocation, compiled and published by researchers at the Albert Shanker Institute and Rutgers Graduate School of Education. The primary product of this project is the State Indicators Database, which includes sophisticated indicators pertaining not only to "traditional" finance variables such as revenue and spending, but also to how states and districts spend those resources. One of the resource allocation indicators included in the state database is teacher/non-teacher wage competitiveness.

The competitiveness indicator simply compares teachers' wages with those of non-teachers in the same state who are similar in terms of age, education, and hours and weeks worked. The database includes these comparisons at four different ages (25, 35, 45 and 55), with age serving as an imperfect but adequate proxy for experience. The models use data from the U.S. Census Bureau's American Community Survey.

Throughout this brief, we present teacher/non-teacher wage competitiveness as the percentage difference in predicted wages between teachers and non-teachers (Penalty=1 – (TeacherWage/Non-teacherWage)). We call these differences "teaching penalties."

To assess the relationship between teacher wage competitiveness and states' school finance systems, we use two additional variables from the State Indicators Database.

1. **Adjusted state and local spending:** Total state and local K-12 education expenditures for districts at the 20 percent poverty level (poverty data from the U.S. Census), also controlling for district size, population density, and labor market costs. This is a measure of state spending that is more comparable across states, as it is adjusted for factors that affect the value of the education dollar.
2. **Fiscal effort:** Total current state and local K-12 education expenditures as a proportion of state capacity (measured as gross state product). This is a measure of how much each state invests in K-12 education as a percentage of its total economic capacity—i.e., how much "effort" states put into funding their public schools.

The association between these two indicators and teaching wage penalties represents the relationship between key state finance policy outcomes and teacher compensation. For more information on the models used to produce our estimates of teacher wage competitiveness and adjusted spending, see our State Indicators Database User's Guide and Codebook.

RESULTS

In Figure 1, we present teacher/non-teacher wage gaps for 2016, by state, for teachers at ages 25 and 55 (henceforth "young" and "veteran" teachers). Estimates for ages 35 and 45 are presented in the appendix table (for 2016 only). Readers can also use our online data visualization tools to graph teaching penalties, by state and year, at all four ages.

The estimated penalties for young teachers range from a high of about 36 percent in Arizona to a low of 6 percent in Montana. That is, young teachers in Arizona earn wages that are approximately two-thirds of the wages received by comparable non-teacher professionals in that state, whereas in Montana, young teachers earn wages only modestly lower than those of their comparable non-teacher counterparts.

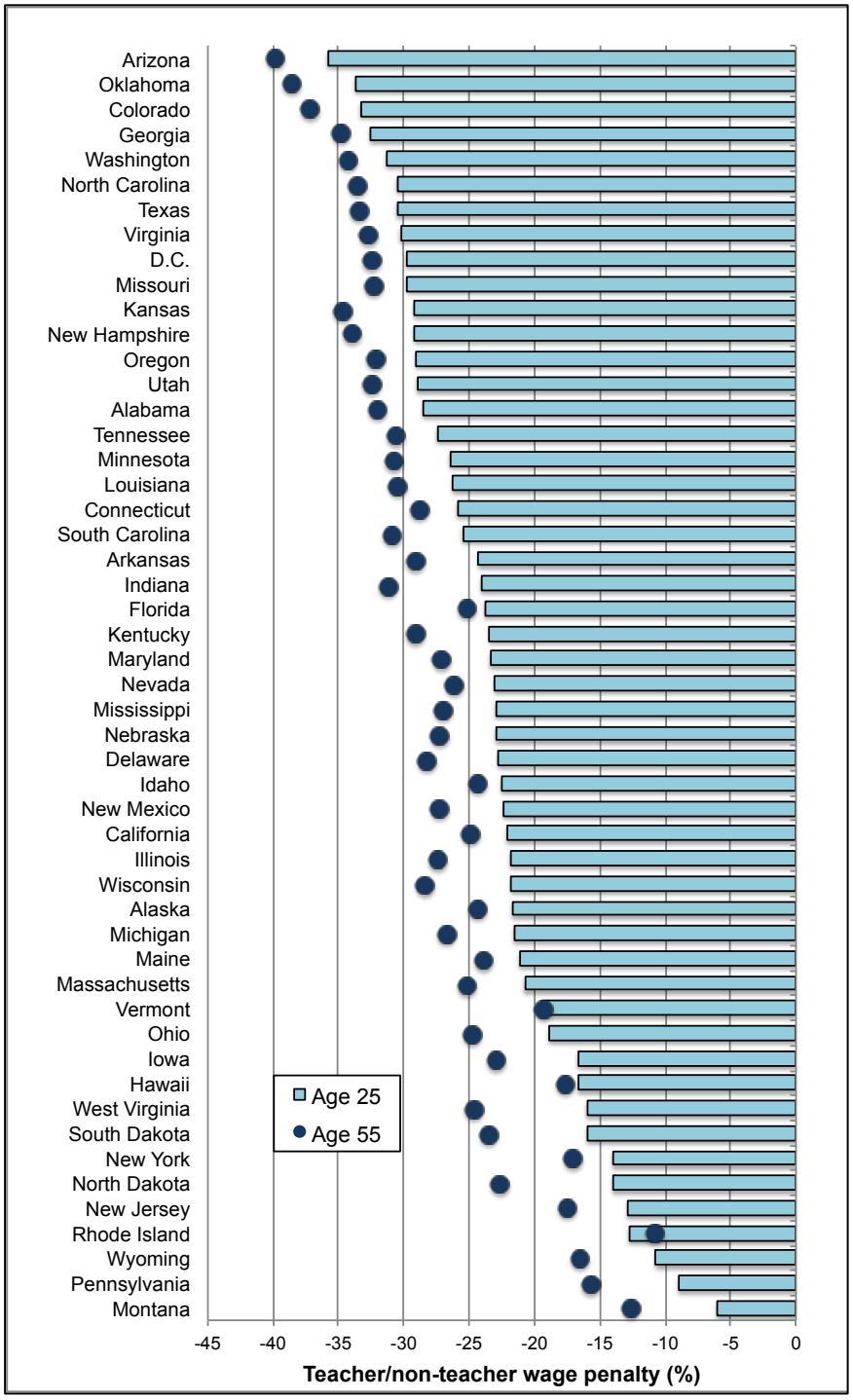


Figure 1

Teacher wage penalties, by state

Percentage difference between predicted teacher and non-teacher wages, by state and worker age, 2016

Notes:
Model controls for education, weeks worked, hours worked, and age. Includes private school teachers.

Variables used:
sal_parity25; sal_parity55

Longer bars, and dots further to the left, indicate larger teaching penalties. More space between the bars and the dots indicates a larger penalty for veteran versus young teachers.

The situation in Montana is the exception, however. In 20 states, wages for young teachers' wages are at least 25 percent less than those of young non-teachers. Conversely, there are only two states (Pennsylvania and Montana) in which young teachers' wages are within 90 percent of young non-teachers' wages. In other words, in every single state, young teachers' wages are lower than those of their non-teacher counterparts, and in most cases they are substantially lower.

Strikingly, the three states with the largest teaching penalties (Arizona, Oklahoma, and Colorado) all saw major teacher strikes during the 2017-18 school year.

The penalties are similar, and indeed worse, for veteran teachers. The wage penalty is larger for veteran teachers than for young teachers in all but two states (Vermont and Rhode Island). The penalty ranges from roughly 40 percent in Arizona to approximately 10 percent in Rhode Island. This suggests that, in the vast majority of states, the teaching wage penalty increases the longer teachers remain in the profession.

Overall, the magnitude of the teaching penalty varies quite widely by state, but it is at least meaningfully large in all states, and the gap is larger for veteran versus young teachers in all but a handful of states.

Note that our state-by-state estimates of the teacher/non-teacher wage gap are strongly correlated with but, on average, a few percentage points lower than, those reported in a similar analysis by the Economic Policy Institute (Allegretto and Mishel, 2019). This is due to using our different datasets/years, different models, different occupational codes, and other methodological differences, including the fact that our sample includes private school teachers.

Teaching penalties and state school finance systems

The gap between teacher and non-teacher pay can vary between states for many reasons, including non-education reasons (e.g., differences in the composition of non-teacher workforces, collective bargaining laws). But the most obvious potential factor is school funding. That is, in states where K-12 education funds are low, we might see larger gaps between teachers, whose compensation represents a very large proportion of state and local education spending, and similar non-teachers. We cannot estimate a direct causal effect of spending on teaching wage penalties, in part because the relationship is bi-directional—i.e., higher spending may cause smaller gaps, but smaller gaps may result in higher spending. Our purpose, rather, is to get a descriptive sense of the relationship between state finance systems and teaching penalties, with a focus on identifying how the gaps in some states may be due to their limited economic capacity, whereas other states are making a conscious policy decision to underfund their schools and teachers.

The scatter plot in Figure 2 presents the bivariate association between state and local education spending and teaching wage penalties in 2016. Each red dot in the plot is a state, and the sloping line in the middle represents the average relationship between these two measures. Note that we present the penalties at age 25 and adjusted spending at the 20 percent district poverty level (the plot is not appreciably different using penalties at other ages and spending at other poverty levels).

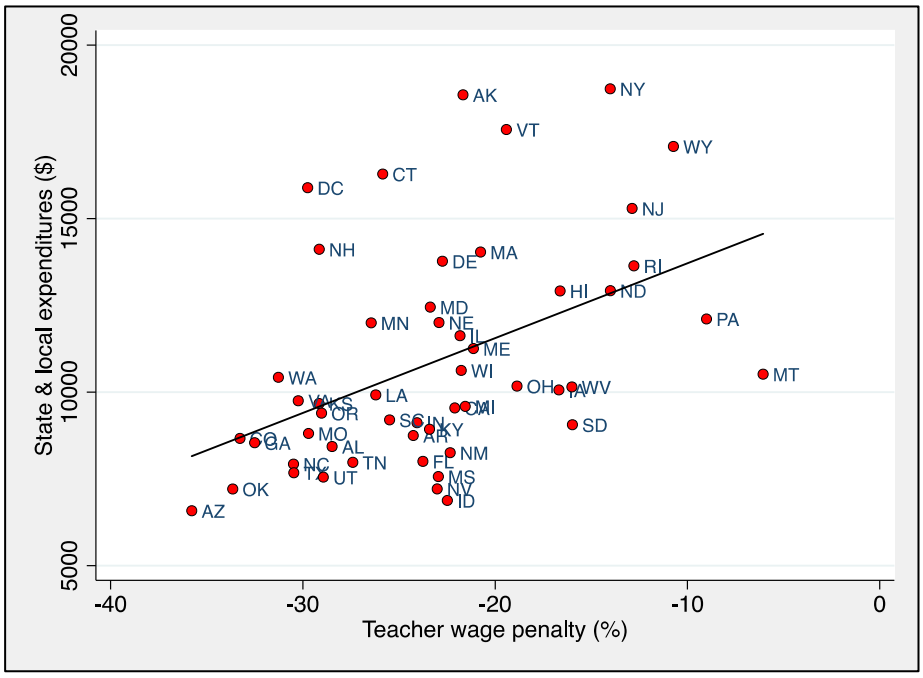


Figure 2

Teacher wage penalties by adjusted spending

Scatter plot of state and local expenditures (20 percent poverty) by percentage difference between predicted teacher and non-teacher wages at age 25, 2016

Notes:
r=0.46. Spending adjusted for labor market costs, district size, and population density.

The upward-sloping line indicates a positive relationship between spending and competitiveness—i.e., states that spend more on education tend to have smaller teaching penalties. For example, higher-spending states, such as New Jersey, New York, and Wyoming, exhibit penalties in the 10-15 percent range, whereas teachers in low-spending states like Arizona and Oklahoma earn wages that are around 35 percent less than comparable non-teacher professionals in their state.

The association is far from perfect, as indicated by the somewhat "messy" dispersion of dots along the sloping line in the middle of the plot. There are states, such as Connecticut and New Hampshire, that spend a lot vis-à-vis other states but still have relatively large penalties, while the opposite is true of states like Montana and Pennsylvania, where spending is not particularly high but penalties not particularly large. Overall, however, there is a moderately strong relationship between spending and teaching wage penalties.

This relationship is not surprising. Yet it bears mentioning that spending levels are not entirely within states' control. Some states have larger economies, and thus can draw revenue from a larger "pie" than can other states. This matters because, to the degree lower spending is responsible for larger teaching penalties, states with more capacity are making more of a conscious choice to underfund their schools, whereas lower-capacity states are more constrained in the revenue they can raise.

We account for this reality in our State Indicators Database with a measure called "fiscal effort," which assesses education spending as a percentage of states' capacity—in other words, as a percentage of how much they *might* spend. Figure 3 presents the relationship between teaching penalties and one version of our fiscal effort indicator, which is calculated by dividing total direct education expenditures by gross state product.

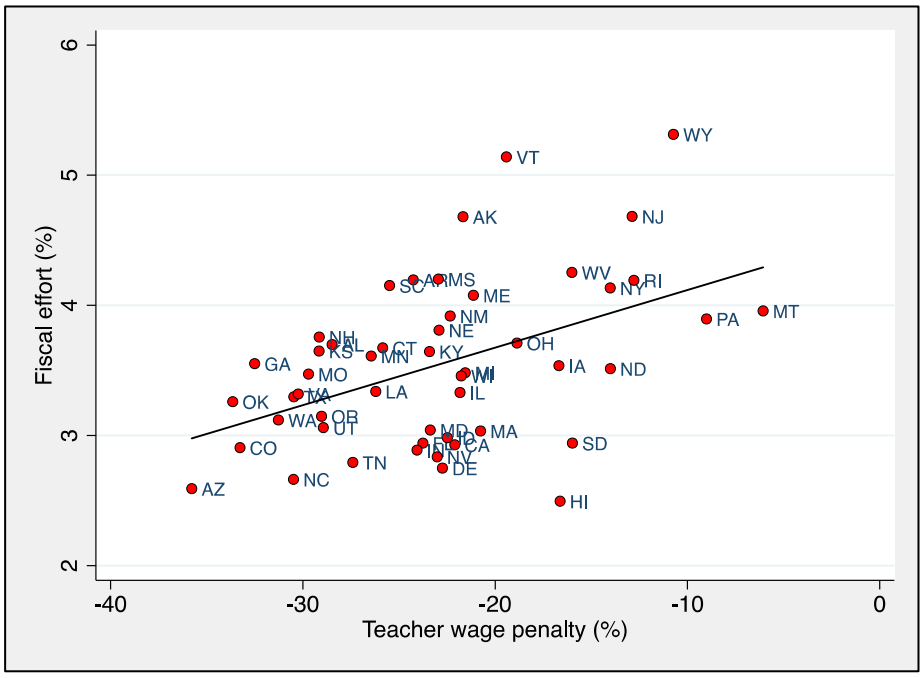


Figure 3
Teacher wage penalties by fiscal effort
Scatter plot of fiscal effort (GSP-based) by percentage difference between predicted teacher and non-teacher wages, 2016

Notes:
r=0.47

Variables used:
sal_parity25, effort

Once again, we find a moderately strong relationship; states that put forth greater effort also exhibit smaller teaching penalties. As would be expected, many high-effort states, such as New Jersey, New York, and Wyoming, are the higher-spending, lower-penalty states in Figure 2. But there are also lower-spending states from Figure 2, including Montana and West Virginia, in which effort is relatively high and penalties low. This illustrates how states with smaller economies can compensate

for this by devoting more of their "economic pie" to education, which might attenuate teaching wage penalties.

Conversely, most of the states with large penalties, including (but not limited to) Arizona, Colorado, and North Carolina, also put forth below-average effort. These are states that choose to devote a relatively low proportion of their economies to education, and may exhibit larger teaching penalties partially as a result. Of particular concern, on the other hand, are states, such as Mississippi, that put forth strong effort but still have somewhat large penalties. These are the states at which federal assistance to improve teacher pay might be most usefully directed.

To reiterate, there are many factors, including non-education factors, that influence the competitiveness of teacher pay. As Figures 2 and 3 suggest, though, state finance policy likely plays a big role. It is not at all surprising that states that spend more and put forth more effort tend to have smaller gaps in pay between teachers and non-teachers. But it does indicate, put simply, that efforts to improve the competitiveness of teacher pay can succeed if states are willing to fund schools properly.

CONCLUSION

Most teachers are not in the profession for the money, but like all workers, they consider monetary rewards when choosing to enter and stay in their jobs. These considerations include evaluating their earning prospects in different professions, which means that the competitiveness of teacher pay with that of similar non-teachers may have important implications for teacher recruitment and retention, and thus for the quality of public education in the U.S.

Our estimates do not account for differences in health and retirement benefits between teachers and comparable non-teachers, but the available evidence suggests that any differences are overwhelmed by the size of the teaching penalty in the vast majority of states. In addition, our sample does include private school teachers, but they are a small minority in all states and thus do not have a large effect on our estimates.

To be clear, it is not our purpose to argue that an across-the-board salary increase is necessarily the best way to proceed when it comes to improving teacher compensation, or that salary increases, however structured, will automatically result in drastic improvements in teacher recruitment and retention.

What our results do, however, indicate is that the teaching wage penalty—that is, the difference in wages between teachers and comparable non-teachers—is in virtually all states large in magnitude and that it tends to grow as teachers get older. We also find that teaching penalties are less severe in states that spend more on K-12 education, as well as in states that put forth more "effort"—i.e., devote a larger share of their total economic capacity to K-12 education.

Based on our results, we offer three general policy recommendations:

1. **The size and scope of policies to augment teacher salaries might vary by state.** We find teacher/non-teacher wage gaps in every state, but they are clearly larger in some states than in others. This means, very simply, that any initiatives to close the gap in pay between teachers and non-teachers will require greater resources in states with larger wage gaps.
2. **Teacher wage penalties can be improved via policy.** It is no accident that states in which education spending and fiscal effort are high tend to be those states with smaller teaching wage penalties, and vice versa. State finance policy makes a difference when it comes to teacher pay competitiveness, and policy changes can make a meaningful dent in the teacher wage penalty.

3. **Federal efforts to improve teacher pay should account for states' existing finance systems.** Most states with the largest teaching penalties are also those in which fiscal effort toward schools is relatively low. That is, teachers' salaries are low—and teaching penalties high—due in part to deliberate policy choices by states. Federal funds for teacher pay, and federal funding for education in general, should be structured such that it targets assistance where it is most needed (high-effort, low-revenue states) and, perhaps, provides incentives for states to boost their fiscal effort. Teacher/non-teacher wage gaps are primarily due to state finance systems, and narrowing these gaps will require state-level reform.

Teaching penalties likely hinder districts' efforts to recruit and retain talent. There are different ways to address this problem, and these solutions can and should vary between states (hopefully with an emphasis on improving state finance systems). Any effective effort will require significant investment of fiscal and political resources, particularly in states with large existing gaps. Attracting and retaining talented workers is neither cheap nor easy, but tolerating teaching penalties of the magnitudes presented above is not a viable option.

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Appendix Table 1 Teaching wage penalties (%), by age and state, 2016

	Teacher age			
State	**Age 25**	**Age 35**	**Age 45**	**Age 55**
Alabama	-28.5	-29.9	-31.5	-31.9
Alaska	-21.7	-21.4	-22.7	-24.3
Arizona	-35.8	-38.1	-39.7	-39.8
Arkansas	-24.3	-24.8	-28.0	-29.0
California	-22.1	-22.9	-24.0	-24.9
Colorado	-33.3	-34.8	-36.3	-37.1
Connecticut	-25.8	-26.5	-27.3	-28.8
Delaware	-22.7	-25.6	-26.9	-28.2
District of Columbia	-29.7	-30.7	-32.1	-32.4
Florida	-23.8	-23.0	-23.8	-25.1
Georgia	-32.5	-33.4	-34.1	-34.7
Hawaii	-16.6	-16.7	-16.6	-17.6
Idaho	-22.5	-23.9	-24.8	-24.3
Illinois	-21.8	-24.4	-26.0	-27.4
Indiana	-24.1	-27.0	-29.6	-31.1
Iowa	-16.7	-19.9	-22.2	-22.9
Kansas	-29.2	-32.4	-33.6	-34.6
Kentucky	-23.4	-25.1	-27.8	-29.1
Louisiana	-26.2	-27.1	-28.8	-30.4
Maine	-21.1	-21.6	-22.8	-23.9
Maryland	-23.4	-25.3	-25.8	-27.1
Massachusetts	-20.8	-23.2	-24.7	-25.2
Michigan	-21.6	-24.0	-25.5	-26.7
Minnesota	-26.4	-29.0	-29.4	-30.7
Mississippi	-23.0	-24.3	-26.3	-27.0
Missouri	-29.7	-30.4	-31.0	-32.3
Montana	-6.1	-11.0	-14.0	-12.6
Nebraska	-22.9	-24.8	-25.5	-27.2
Nevada	-23.0	-24.5	-25.2	-26.1
New Hampshire	-29.1	-32.1	-33.1	-33.9
New Jersey	-12.9	-16.4	-15.9	-17.5
New Mexico	-22.3	-25.0	-26.4	-27.2
New York	-14.0	-15.6	-16.7	-17.1
North Carolina	-30.5	-31.9	-32.7	-33.6
North Dakota	-14.0	-18.3	-20.7	-22.7
Ohio	-18.9	-21.0	-23.3	-24.7
Oklahoma	-33.6	-35.1	-37.2	-38.6
Oregon	-29.0	-29.8	-31.1	-32.2
Pennsylvania	-9.0	-12.0	-13.8	-15.7
Rhode Island	-12.8	-12.4	-12.2	-10.8
South Carolina	-25.5	-27.1	-29.9	-30.9
South Dakota	-16.0	-19.3	-24.7	-23.5
Tennessee	-27.4	-27.9	-29.8	-30.6
Texas	-30.5	-31.4	-32.7	-33.4
Utah	-28.9	-29.6	-31.4	-32.3
Vermont	-19.4	-14.8	-19.0	-19.3
Virginia	-30.2	-31.3	-31.8	-32.7
Washington	-31.3	-32.7	-33.9	-34.3
West Virginia	-16.0	-21.1	-24.0	-24.6
Wisconsin	-21.8	-25.2	-27.1	-28.4
Wyoming	-10.7	-11.9	-16.8	-16.4

Notes: Estimates are the percentage difference between the predicted wages of non-teachers and teachers ((1-(TchrWage/NonTchrWage))*100), controlling for weeks/year, hours/week, and education. For more details about the model, see documentation at: http://schoolfinancedata.org.
Variables used: *sal_parity25, sal_parity35, sal_parity45, sal_parity55*

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