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American Enterprise Institute for Public Policy Research

Overpaid or Underpaid? A State-by-State Ranking of Public- Employee Compensation

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April 2014

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A State-by-State Ranking of Public-Employee Compensation

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Abstract

This paper ranks all 50 states according to how costly their public-employee compensation packages are relative to private-sector standards. Each state's package is placed into one of five categories: modest penalty, market level, modest premium, large premium, or very large premium. The results show that national-level analyses obscure significant differences in compensation from state to state. Connecticut, for example, pays its state employees 42 percent more than what similar private-sector workers receive, but Virginia pays its state workers about 6 percent *less*. State-by-state political interest in public-sector pay aligns fairly well with our results: In states where public-sector pay is an active political issue, state government employees appear to be better compensated than similarly-skilled private sector workers. In states where state government compensation is at or below market levels, pay for public employees is generally less controversial.

Introduction

Compensation for government employees has become a major policy issue across the nation. As governments at all levels struggle to balance their budgets, leading to tax increases and reductions in government services, many citizens have come to believe that government employees receive excessive compensation, especially in terms of retirement and healthcare benefits.

As the data outlined in this study will demonstrate, in some cases these beliefs are correct. However, a remarkably large variance exists in the way that different states pay their employees. For a number of states, public-sector compensation is not a major problem—in fact, some states appear to pay below-market compensation to their employees. In other states, however, state workers enjoy compensation that is far above market levels.

The purpose of this report is to document the state-by-state variation in government employee compensation, ranking all 50 states according to how costly their compensation packages are relative to what private-sector employers offer to similarly-skilled employees. We track the relative generosity of wages and benefits, including pensions, health coverage, retiree health care, paid time off, and taxes paid by employers on their employees' behalf. We also consider the value of job security and working conditions. Finally, we discuss some potential reforms to public-sector compensation in states in which changes may be desirable. The report has two main sections: first, a summary of the results in a readable format and then a detailed methodological appendix.

The Importance of Getting Public-Sector Pay Right

Most observers hold that a fairly-paid public employee is one who receives salaries, benefits, and job amenities equal in total value to what he or she would likely receive in a private-sector job. In other words, states should pay their employees the market value of their skills. If the total compensation package exceeds that value, then the public employee could be said to be “overpaid.” If it is below that value, then the employee is “underpaid.”

This standard for setting public-sector compensation tends to result in an efficient provision of government services and is intuitively fair to public workers. If a state offers below-market compensation to its workers, the state may have difficulty attracting and retaining the workers it needs. By contrast, paying above-market compensation to public employees imposes a needless cost on taxpayers.

This standard requires that we do more than simply compare average public-sector salaries to average salaries outside of government. Such an approach would be as faulty as claiming gender pay

discrimination by looking only at raw salary differences between men and women without considering non-discriminatory factors that might cause male and female pay to differ. Instead, we must look at the distinctive characteristics of the public-sector workforce--in terms of education, experience, and other factors--to estimate the salaries these individuals might receive outside of government. In addition, we must carefully consider the value of employee benefits, since public employees often receive defined benefit pensions and retiree health plans that are rare in the private sector. Finally, we analyze non-pecuniary aspects of public employment, with an emphasis on job security.

In general, private-sector employees will receive total compensation – salaries, fringe benefits, and job amenities – equal to their “marginal product,” an economists’ term indicating the additional dollar value of the goods and services that the employee produces. While many idiosyncratic reasons can cause a given employee’s pay to differ from his marginal product, market forces work to keep average pay in line with productivity. An employer who pays his employees less than what they produce risks losing his workers to rival companies, which could lure workers away with slightly higher pay while still making a profit. Likewise, employers who pay employees *more* than their marginal product risk going out of business when labor costs exceed sales revenues.

In the public sector, several factors make it less likely that pay and productivity will move in tandem.¹ First, the government does not generally sell the goods and services produced by public employees, so wage setters in the government lack a clear idea of the dollar value of what employees produce. Second, while governments have used pay studies to maintain comparability between public- and private-sector jobs, many occupations are unique to each sector, and the methodology behind such comparisons has not always been rigorous. Third, public employees can utilize political influence to raise their wages above market levels, such as through efforts to aid the election of favored officials.

But merely because public pay could in theory differ from private levels does not constitute evidence that it *does* differ. That evidence, if it exists, must be drawn from the data. In recent years, many articles and studies have been written on public-sector pay, including some by the authors of this analysis.² However, none have analyzed public-employee compensation on a comprehensive state-by-state basis. There are important reasons to fill this gap in the literature.

National-level analyses group all public employees together, thereby hiding potentially large compensation differences that exist from state to state. What matters for policymakers in a given state is not the nationwide average, but whether their own state is paying its employees appropriately. A state that pays its employees too much does not compensate for a state that pays its employees too little, even if

public employee compensation were “about right” on average. By comparing their own state to other states around the country, legislators, voters, and public employees may obtain policy-relevant information.

Our Study

We restrict our analysis to state government workers employed in non-public safety positions. The sheer number of different pay systems for local government employment make a comprehensive analysis of local government pay infeasible. Our results regarding state employee pay in a given state therefore should not be extended to local government employees in that state, as local government salaries and benefits can differ significantly from those paid by state governments.

We exclude public safety employees because their work conditions, which may include both threats to life and limb, differ from other government workers and from private-sector employees in general.³ Public safety employees also generally participate in different pension and retiree health plans, which would increase the number of pay systems to be analyzed.

Our study begins with comparisons of public and private salaries, then considers the value of the various fringe benefits received by state government and private-sector workers. We proceed to examine the relative levels of employment security enjoyed inside and outside of government, along with other positive or negative job characteristics that might influence pay. We conclude with measures of total public-employee compensation in the 50 states.

Our results are based solely on applying standard statistical and economic methods to available data, requiring few subjective judgments about one state relative to another. The numbers themselves tell the story. But the results confirm intuitive judgments in one important respect: in states in which public-sector compensation is a significant political issue, the data tend to show that state government employees receive a premium relative to private-sector workers. In states in which public-sector pay is less controversial, the data tend to show that state government employees are fairly paid or, at times, even underpaid.

A picture of the state government workforce

In analyzing public- and private-sector compensation, it is tempting to simply compare average salaries, and it is not uncommon to see such comparisons in the media. But a simple comparison of average salaries will be misleading without taking public-private skill differences into account.

Table 1 summarizes a number of characteristics of private-sector employees and state government workers employed in non-public safety occupations. The data in Table 1, and the broader analysis of pay in this study, are restricted to full-time employees, interpreted as individuals who work at least 50 weeks per year and at least 35 hours per week.

On average, private-sector workers earn slightly higher average annual wages but also have somewhat longer work weeks. State government employees are slightly older, slightly more likely to be married, and significantly more likely to be women. State governments employ a higher fraction of black employees but a lower fraction of Hispanics and immigrants than the private sector.

Education is an important driver of earnings, and state government employees have higher average educational attainment than private-sector workers. State government employees are less likely to be high school dropouts or high school graduates, and more likely to have a college or graduate degree.

Clearly, a simple salary-to-salary comparison leaves too many important workforce differences unaccounted for. Given these differences, one might be tempted to simply compare pay between public- and private-sector workers in the same occupations. However, most economists have rejected this approach. Many public-sector occupations don't exist in the private sector, making comparisons in those cases impossible. Moreover, even when comparable occupations do exist, we cannot be sure that either the job requirements or the skills of the employees who fill those jobs are equal between sectors. (See the methodological appendix for a more detailed discussion of these issues.)

Wages

Like most other studies conducted by academic economists, we compare public- and private-sector pay using the “human capital model” of wages, which the Congressional Budget Office (CBO) has termed “the dominant theory of wage determination in the field of economics.”⁴ The human capital model holds that pay is principally driven by the characteristics of the employee, with residuals due to geographic differences in costs of living and compensating pay differences for occupational characteristics. Regression analysis compares the pay of full-time state government and private-sector workers while controlling for differences in education, experience, and other characteristics that predict earnings. Any difference in earnings after controlling for these characteristics is taken to be driven by the sector in which the employee works. This statistical method has been used by economists for decades to examine pay differences attributable to race, gender, educational attainment, union membership, and other

factors. We use data from the Census Bureau's American Community Survey for the years 2009 through 2012.

Our analysis finds that the average state pays salaries around 12 percent below those paid by large private-sector employers for similarly-skilled workers. This confirms the traditional belief that public employees receive lower salaries than private-sector workers. However, as Figure 1 shows, this single national average hides considerable variation from state to state. There is a 23 percentage point gap between the lowest paying state – New Hampshire, with a public-employee wage penalty of 21 percent – and the highest-paying state, Connecticut, with a wage premium of 2 percent.

However, salaries are only one component of total employee compensation, which also includes fringe benefits such as health coverage, pensions, and paid leave. It is not possible to fully evaluate public-sector compensation without including benefits along with salaries.

Health Coverage for Active Employees

Employer premiums toward health coverage comprise a large and growing share of overall employee compensation. We gathered the dollar value of employer health contributions from data compiled by the National Conference of State Legislatures and from other sources. Because health care costs and the general cost of living vary from state to state, we express the value of employer-sponsored health coverage as a percentage of employees' average wages.

In 45 of the 50 states, public-employee health coverage is more valuable relative to wages than private-sector coverage. (See Figure 2.) The most generous health coverage relative to wages is paid to Wisconsin state employees, where employer contributions are equal to 32 percent of the average employee's wages, despite recent legislation passed in 2011 that increased employee health contributions. The least generous state employee health benefits are paid in Utah, where employer-provided health coverage is on average worth 10 percent of wages.

Retirement Programs

We calculate the value of traditional defined benefit (DB) pensions, defined contribution (DC) plans such as 401(k)s, and Social Security. Together these can be termed "pension compensation," as they constitute deferred income paid through retirement plans. We measure pension compensation net of employee contributions. Because the composition of retirement benefits can differ significantly between the public and private sectors and between states, Figure 3 combines these three components into a single measure of total retirement compensation. The most obvious result is that, in every state, the value of

retirement compensation for state government employees far outstrips the value for private-sector workers employed by larger companies. Even the least generous states pay pension compensation equal to over one-fifth of salaries, and the value of total pension compensation reaches almost half of employee wages in several cases. This holds true even when we account for the fact that many state government employees do not participate in Social Security.

Retirement benefits are more generous in the public sector principally due to DB pensions, which provide significantly higher benefits than the DC plans that most private-sector workers are offered. The generosity of public DB pensions is obscured, however, by accounting rules that allow public employers to make low pension contributions on the premise that their investments will earn high returns without risk. This accounting issue, which is extremely important in analyzing public-sector compensation, is discussed in depth in the methodological appendix.

Retiree Health Coverage

Most employees of state governments have access to retiree health coverage, which generally provides primary health insurance from retirement through Medicare eligibility at age 65, and supplementary health coverage thereafter. These benefits are referred to as OPEBs, meaning Other Post-Employment Benefits. Most pay studies to date have ignored the value of retiree health coverage, but the accruing costs of OPEBS to state governments – and the value of such benefits to employees – can be substantial. A number of states have reduced retiree health coverage in recent years, but these benefits remain generous compared to the private sector.

Figure 4 shows the value of retiree health coverage for state government employees. These figures represent the value of future benefits accruing to state employees in the current year (referred to as the “normal cost” of the benefits plan). Compared to pensions, implicit compensation through OPEBS is far more variable from one state to another. In certain states, retirees receive nothing more than the right to buy into the health plan offered to active public employees. In other states, the right to a generous future retiree health care plan is a major component of current employee compensation. New England in particular pays particularly generous retiree health coverage: in Connecticut, retiree health benefits are equivalent to receiving an additional 18 percent of wages every year of the employee’s working life; in Massachusetts, 18 percent, and in New Hampshire 19 percent.

As discussed in the methodological appendix, data on private-sector retiree health coverage are sparse. Many private companies are cutting off retiree health coverage for new retirees, and employers

that continue to offer coverage are increasing employee premiums and co-payments. Based on reasonable assumptions regarding these factors, we assume that retiree health coverage for private-sector workers has an average value of 0.5 percent of wages. However, the typical value of private-sector coverage varies from state to state.

Total Benefits

Health coverage, retirement income, and retiree health benefits are the three largest sources of non-salary compensation for state government employees. To calculate total benefits, we also include other benefits such as paid leave, unemployment insurance premiums, and employer contributions to Social Security and Medicare. (See the appendix for details on these miscellaneous benefits.)

Figure 5 shows total fringe benefits as a percentage of employee wages. In all cases, state government employees receive significantly greater benefits than private-sector employees working in large establishments. Even the least generous state governments – such as Colorado, Minnesota and Iowa, where average benefits exceed 50 percent of salaries – pay significantly more generous fringe benefits than even the best-paying states for private sector employees, where benefits for workers in larger firms top out at 41 percent of pay. In the most generous states, such as California, New Hampshire and New York, annual benefits including accrual of future pension and health entitlements are nearly as valuable as wages. For such employee, benefits constitute almost half of total compensation.

Total Wage and Benefit Compensation

Total compensation is measured as the sum of salaries and fringe benefits. Here we do not include the value of public-sector job security or other job amenities. Total compensation premiums or penalties are shown in Figure 6. These indicate the percentage difference in total wages and benefits between non-public safety state government employees and private-sector workers with similar education, experience, and other characteristics who are employed in large workplaces.

In the average state, state government employees receive a total compensation premium of around 10 percent relative to private-sector employment. However, because the most populous states tend to pay larger premiums, the average state government *employee* receives a slightly larger compensation premium. Nevertheless, substantial state-to-state variation means that national averages are not particularly meaningful. For instance, pay differentials range from a compensation penalty of 6 percent in Virginia to a premium of 42 percent in Connecticut.

Some states pay large compensation premiums that are difficult to explain as anything other than “rents” accruing to public employees. (Economic rents are payments in excess of what is needed to secure the goods or services provided by the recipient.) Public employees and the unions that represent them are influential players in the political processes of most states. It is not surprising when other powerful political interests such as corporations receive subsidies or other forms of economic rent. If public employees are able to secure similar subsidies, they would be paid as above-market wages or benefits. This appears to be the case in many states.

In other states, however, differences between public and private sector pay are modest. In a handful of states, public employees receive *lower* total salaries and benefits than comparable private sector workers. In these states, variations from pay comparability might be explainable via differences in non-pecuniary benefits such as job security. Alternately, there may be earnings-related differences between public and private sector worker characteristics that standard survey data cannot capture, such as initiative, leadership, and so on.⁵

One should not overestimate the importance of small differences between states. Salaries are calculated using survey data, meaning that there is sampling error. In addition, values for paid time off and legally-required benefits are averages calculated based upon Census regions, which are made up of several adjoining states. There also may be minor benefits outside of the main BLS categories that we have been unable to catch. Thus, it may be more useful to place states into different groups based upon their relative pay. (Table 2.) Within groups, states are listed from lowest- to highest-paid.

Distribution of pay premiums and penalties

The figures discussed above are for the typical state government employee, ignoring the fact that not every public-sector worker is treated the same. In particular, public-sector wages and salaries are relatively more generous for low-earning individuals than for highly-educated employees with advanced degrees. Similarly, the relative generosity of benefits will vary by wage level, because health benefits are paid on a flat-dollar basis: while each employee receives the same health benefits, these benefits are more generous relative to wages for low-earning employees. Finally, better-educated state employees may receive higher DB pension benefits relative to their lifetime earnings and contributions, because such workers tend to have more rapid earnings growth over the course of their careers. Since DB pensions are paid based on final earnings, individuals with steeper age-earnings profiles pay lower total lifetime contributions relative to the benefits they receive.

To track these trends, we calculate wage regressions for state employees broken down by educational attainment. For each educational group, we calculate the value of fringe benefits--accounting for health benefits paid on a flat-dollar basis as well as benefits, such as pensions, that are proportional to earnings. We also adjust DB pension benefits for the effects of different rates of earnings growth by educational category. Figure 7 displays these wage and total compensation premiums and penalties.

State government employees with less than a high school diploma receive salaries roughly on par with the private sector. But as educational attainment increases, state government salaries fall behind those paid to similarly educated individuals employed by large private sector businesses. Employees with bachelor's, master's, professional, or doctoral degrees are subject to average salary penalties in the range of 18 to 34 percent. However, more generous benefits compensate for lower average wages. When benefits are added, total compensation for less-educated state government employees lies around 20 percent above private sector levels. Total compensation for bachelor's degree holders is about even with private sector levels. Professional degree holders such as doctors or lawyers and individuals with doctoral degrees appear to receive total compensation roughly 18 percent below private-sector levels, although certain unmeasured factors may compensate. We discuss in the methodological appendix how state governments could continue to attract and retain professional and doctoral degree holders despite an apparent compensation penalty.

Employment security and other job characteristics

The human capital model holds that most pay differences between occupations are attributable to differences in employee skills, such as education and experience, rather than differences in job characteristics. However, job amenities or dis-amenities also can affect pay. Specifically, jobs with non-pecuniary benefits can pay lower wages and fringe benefits, while positions with poorer amenities must pay a compensating wage premium to attract employees.

Perhaps the most important non-pecuniary characteristic of occupations is job security. Public employees have greater protection against layoffs and terminations for cause than private-sector employees. This greater job security acts as an insurance policy against unemployment. If state government employment offers greater job security, then these positions should pay lower overall compensation than similar private-sector positions. However, the extent of public-sector employment security and its value as a form of compensation have rarely been examined in depth. We also analyze other job characteristics that might cause paid compensation to differ between the public and private sectors.

The extent of public sector employment security

Figure 8 shows unemployment rates for three groups of workers: state government employees (non-public safety); private-sector workers who are similar to state employees with respect to education, experience, and other characteristics; and all private-sector workers. Unemployment rates for state employees and all private workers are tabulated from ACS data for the years 2009-2011.⁶ Unemployment rates for private-sector workers with characteristics similar to public employees are calculated using a regression model in which the probability of being unemployed is calculated after controlling for a variety of characteristics, including being or having been a state government employee.

On average, state government employees had an unemployment rate of 3.9 percent during the 2009-2011 period. This rate is 5.9 percentage points lower than the overall unemployment rate. The two sets of individuals are not directly comparable due to skill differences. However, even after controlling for skills, the state government employee unemployment rate was 4.1 percentage points below private-sector levels.

There is no state in which government employees have unemployment rates equal to or higher than similar private-sector workers. Nevertheless, the job security advantage varies from state to state. In Alaska, for instance, public employees have unemployment rates only 0.6 percentage points lower than those of comparable private-sector workers; in North Carolina, by contrast, the difference is 6.5 percentage points.

State to state variation is driven in large part by differences in unemployment rate for private-sector employees, which vary more than unemployment rates for state government employees. Nevertheless, these figures help represent the value of job security for state government workers. Even assuming public employees in every state had precisely the same degree of job security, the *value* to employees of that job security would depend upon the unemployment rate outside of government. Job security would obviously have greater value in a state with a higher overall unemployment rate.

For reasons discussed in the appendix, it is difficult to quantify the degree to which positions offering greater job security should pay lower monetary compensation than less secure jobs. However, one research publication using Canadian data found that, all other things equal, occupations with 1 percentage point lower average unemployment rates have average wages around 2.7 percent lower than other jobs. Similarly, jobs with higher unemployment rates paid higher wages as compensation.

We employ a theoretical model for calculating the job security premium for public employees that incorporates state-specific data on unemployment rates, the duration of unemployment, the availability and generosity of unemployment benefits, and other factors. It generates a more conservative result that a 1 percentage point reduction in the unemployment rate for an occupation is worth about 1.4 percent of compensation. This implies that the effective value of job security for state government employees ranges from an additional 0.4 to 10.9 percent of wages, with a mean value of 4.5 percent. (Figure 9.)

Assigning a dollar value to public sector job security remains controversial, so these illustrative job security figures are *not* included in the calculations of total compensation premiums or penalties. Compensation premiums or penalties inclusive of job security are reported in the appendix.

Other job characteristics

We also investigate a number of other factors that have been shown to influence pay. Using the O*NET database of occupational characteristics compiled by the Department of Labor, we analyze four categories of negative job characteristics that have been found to generate compensating wage differentials: conflict, such as with customers or members of the public; physical environment, such as having a noisy, cold or dangerous workplace; physical demands, such as lifting, stooping, or climbing; and stressors, such as performing repetitive work or working under time pressure. Each is measured on a one-to-five scale, with a value of five representing a strong presence of the particular job disamenity. (Figure 10.)

In two of the four categories – conflict and job stressors – state government and private-sector occupations are approximately equal. In the remaining two categories, physical environment and physical demands, private-sector jobs are *more* unpleasant than state government occupations. If anything, we would expect that private-sector jobs should be paid a wage premium relative to state jobs to compensate for these negative job characteristics. If so, then the compensation premium paid to state government workers in most states may be understated.

Public pay reforms

As noted above, small positive or negative deviations from pay parity are not necessarily a major concern, given the uncertainties – ranging from sampling error, to the possible exclusion of minor benefits, to compensating wage differentials for job security and other job amenities – inherent in this type of analysis. However, in a number of states, compensation premiums are large both in percentage and dollar terms. These represent significant inefficiencies in public-sector human resource management.

Such inefficiencies imply that state governments could reduce compensation costs without endangering their ability to attract and retain the quality employees they need.

In theory, the savings could come from any part of compensation – wages, health coverage, pensions, and so on. But it may make sense to focus on aspects of compensation that are most generous relative to private-sector levels, as these are the areas in which public employees are likely to place the least value on marginal changes. For instance, if an employee already receives a retirement package of pensions and health coverage that is several times more generous than his private-sector counterparts, small increases or decreases in the value of this package are unlikely to cause that employee to quit. Fitzpatrick (2011) finds, for instance, that some public employees will not purchase additional pension benefits when given the opportunity to do so on very advantageous terms, even when the option is clearly explained. From this, Fitzpatrick calculates that “teachers would prefer \$2.00 increase in current wages to a \$10 increase in the PDV [present discounted value] of annuitized wealth in their retirement package.”⁷ In other words, public employees may be so saturated with pension benefits that they are unwilling to give up even a small portion of their wages to further increase their retirement income. A similar-sized reduction in government salaries—which are already below private-sector levels on average—could have more negative effects on governments’ ability to attract and retain employees.

In addition, it may make sense to address public-sector compensation in areas that are least transparent in terms of cost and value. The accounting standards for public-sector pensions present a misleadingly low value for these benefits. This lack of transparency confuses budgeting, makes it difficult to accurately compare public- and private-sector compensation, and may make public employment less attractive than a comparably sized increase in salaries.

In exchange for more competitive wages, state government employees might be willing to accept a more modest benefit package, such as shifting from generous defined benefit pensions to defined contribution plans, raising retirement ages, or accepting higher premiums and co-payments for their retiree health packages.

As an alternative to reductions in the generosity of DB pensions, certain cities and states have enacted pension reforms that incorporate greater risk-sharing between employers and employees. Since risk has a cost, such reforms do reduce both the overall value of pensions to public employees and the cost of such plans to employers. But they retain many of the attributes of DB plans – such as universal participation, lower administrative costs, and annuity payments in retirement – that public employees appear to value.

Conclusions

Public-employee compensation is an important and controversial policy issue in states around the country, but states differ greatly in their approach to it. For that reason, we have produced the first comprehensive state-by-state comparison of public- and private-sector compensation. We show that state government employees in most states receive greater total compensation than similarly educated and experienced private-sector employees who work for large employers. Public-employee wages in nearly all states fall below those paid in the private sector, but fringe benefits – in particular health and retirement benefits – are significantly more generous in government than in the private sector. In addition, public employees in every state have greater job security than they would likely enjoy outside of government.

The compensation premium is not uniform across the nation. Many states pay government employees at market levels. Others pay huge premiums, and still others fall somewhere in the middle. Because there are large differences from state to state, broad generalizations and national-level analyses are not especially useful to the policymakers who must make budgetary decisions for their own states. This analysis can inform those decisions.

Methodological Appendix

In this section we discuss our data and methods in more detail. Much of this material is necessarily more technical, but we have attempted to present it in as accessible a manner as possible. It is important for readers to understand how these figures are generated, in particular because alternate analyses may produce different results. Without understanding the pros and cons of the different methodologies applied, policymakers and the public are confronted with a “he said, she said” situation with regard to public-private comparisons, tempting some to simply throw up their hands and give up.

Previous literature

Modern analysis of public-sector pay began with the work of Cornell University economist Sharon Smith in 1976, who was the first to apply the now-standard human capital model to comparing salaries for federal government and private-sector employees.⁸ That analysis, and most others that followed, concluded that federal government employees receive a salary premium relative to similar private-sector workers. Following Smith, other economists both expanded on the human capital approach and adopted alternative methods. Princeton University economist Alan Krueger, who until 2013 served as the Obama administration’s chief economist, analyzed the number of applications for federal versus private-sector jobs, concluding that federal jobs on average received 25 percent to 38 percent more qualified applicants than private-sector positions.⁹ Dartmouth College economist Stephen Venti used a so-called “job queues” approach, finding that three to six times as many individuals would be willing to accept federal employment as there are jobs available.¹⁰ Due to this excess demand for federal jobs, Venti concluded, federal pay could be reduced without impacting the ability to attract qualified employees.

During the 1990s and 2000s, research on public- and private-sector pay was relatively quiet. Research picked up again beginning around 2010, most likely in response to the economic slowdown that began in late 2007.

In a 2010 study published by the Center for State and Local Government Excellence, Keith Bender and John Heywood of the University of Wisconsin-Milwaukee analyzed pay and benefits for state and local government employees on a national basis.¹¹ Bender and Heywood concluded that state and local government employees are slightly underpaid compared to similar private-sector workers. However, their study did not correctly value the defined benefit pensions offered to public employees and failed to count retiree health benefits. In addition, while Bender and Heywood calculated pay for several individual states, they did not do so on a 50-state basis.

A series of state-specific studies authored by Rutgers University economist Jeffrey Keefe and published in 2010 and 2011 by the Economic Policy Institute face similar issues. Keefe's papers, which generally show public employees to be equally paid or slightly underpaid in terms of total compensation, do not correctly value public pensions and in most cases do not include retiree health coverage. In addition, while Keefe's studies focused on states in which public pay has been controversial, the benefits data used in Keefe's studies is specific only to the Census region level, making detailed state-by-state comparisons impossible.

In 2010, John Schmitt of the Center for Economic and Policy Research analyzed wages for state and local government employees nationwide, with a particular focus on results by gender.¹² However, because Schmitt did not include fringe benefits, the study does not allow for comparisons of total compensation.

Beginning in 2010, we have authored a number of studies comparing federal, state, and local employees with similarly-skilled private workers.¹³ These studies were the first to analyze public pension compensation on a fair-value basis and to include retiree health coverage. However, these papers did not use state-specific values for employer-sponsored health coverage, instead relying upon Census Region-level data as Keefe did. Moreover, not every state was covered, and the methodology and assumptions changed as the literature progressed.

In 2011, Alicia Munnell, Jean-Pierre Aubry, Josh Hurwitz, and Laura Quinby published an analysis of state and local government pay for the Center for State and Local Government Excellence.¹⁴ Like our analysis, it valued DB pension compensation on a market basis and included the value of retiree health coverage. However, it valued DB pensions using a 6.25 percent discount rate, which is significantly higher than the interest rates that are commonly used in the academic literature. The Munnell et al. study also reduced the value of retiree health coverage by half as compensation for the possibility that future benefits may be reduced. We believe that this type of adjustment is inappropriate for a pay comparison, for reasons discussed below. The Munnell et al. study analyzed all state and local government employees as a group, concluding that on average they are about fairly compensated. However, nationwide averages may obscure large differences in compensation that exist from state to state.

In 2012 the Congressional Budget Office published two studies looking at federal employee compensation. The CBO's analysis of federal pay followed our approach to valuing DB pension compensation at fair market value and also included the value of retiree health coverage.¹⁵ The CBO

incorporated new methods in terms of analyzing public employee wages.¹⁶ Previous studies, including our own, used the natural log of employee wages as the dependent variable in a wage regression, a technique that has been utilized for decades and is used in most of the other pay studies discussed here. However, the CBO noted that, because the distribution of wages is more compressed in the public than the private sector, this approach can lead to distorted results. The CBO utilized an alternate specification to address these issues which showed a smaller wage premium for federal employees than the methods used in most previous studies. The CBO studies concluded that federal employees, on average, receive total compensation 16 percent above private sector levels.

Also in 2012, two Bureau of Labor Statistics economists, Maury Gittleman and Brooks Pierce, published an analysis of state and local government pay using a different dataset and techniques.¹⁷ Whereas most other studies analyzed human capital in terms of the education and experience of the employee, Gittleman and Pierce used a BLS dataset that includes an assessment of the skill requirements of the job position. Gittleman and Pierce concluded that state government employees receive wages slightly below, and local government employees slightly above, private sector jobs demanding similar levels of skill. When benefits are included, both state and local government employees receive total compensation premiums, although Gittleman and Pierce do not value DB pensions on a market basis and do not include retiree health coverage.

In a series of papers published in 2012 and 2013, William Even of Miami University and David Macpherson of Trinity University analyzed pay and benefits in specific states, generally finding total compensation premiums qualitatively similar to those reported here.¹⁸ Even and Macpherson value DB pension compensation at market value and include the value of retiree health coverage. Even and MacPherson do not control for differences in firm size, thus producing somewhat higher relative public-sector wages than in our analyses. However, Even and MacPherson adopt Munnell et al.'s reduction to retiree health coverage, a step that roughly offsets the effects of omitting a firm size adjustment for wages.

In this study, we have built on both our previous work and the work of others in an attempt to apply the most up-to-date methodologies and uniform standards to state government employees in each state.

Wages

The largest component of compensation for most employees is salaries. We compare salaries for state government, non-public safety employees to the salaries these individuals would likely earn in private-sector occupations. However, there are several approaches to making such comparisons.

Some studies compare salaries for public-sector occupations to the same occupations in the private sector. While intuitively reasonable, there are several problems with this approach. First, many jobs differ between government and the private sector, making direct job-to-job comparisons impossible. Belman and Heywood show that nearly one-third of public-sector jobs have no clear private-sector counterparts with which they could be compared.¹⁹

Second, even when jobs have the same occupational labels, we cannot be sure that the content of the job is comparable. In the federal government, for instance, a common problem is “over-grading”—that is, labeling a position as involving more difficult tasks or greater responsibility than it actually does.²⁰

Third, even when individuals hold the same job, they may bring different levels of skills to the table. A study of BLS occupational data by Famulari (2002) finds that, “Federal workers have significantly fewer years of education and experience than private sector workers in the same level of responsibility in an occupation.”²¹ If the same pattern held true for state government workers – or if state employees had *greater* skills than private-sector workers holding similar jobs – then a job-to-job comparison will report a pay premium or penalty where none may exist.

Some studies have attempted to address these problems by analyzing the skills required for public- and private-sector jobs. As discussed above, Gittleman and Pierce use BLS data that rate job skill requirements based on the General Schedule scale used for setting federal employee salaries.²² If both sectors are compared using the same criteria, Gittleman and Pierce’s dataset is potentially very useful. However, state-by-state job ratings are not publicly available.

Like most economists, we rely upon the “human capital model” to analyze wages. The human capital approach compares salaries after controlling for differences in other individual characteristics – including education, experience, and other factors – that have been shown to be significant drivers of salary variation among workers. In addition to numerous studies on the public sector, the human capital approach has been utilized for studies of pay differences due to race, gender, and union status. The human capital model is familiar to and accepted by nearly every trained economist.

We use data from the American Community Survey, an annual survey of households conducted by the Census Bureau. We choose the ACS over another popular dataset, the Current Population Survey, for three reasons: First, the ACS includes more detailed geographic data, which allow us to control for differences in average wage levels across geographic areas. Without such controls, we might compare public employees in a high-wage, high cost-of-living area to private workers in a low wage, low-cost area (or vice versa), thereby generating a phantom pay difference. Taylor (2008) shows that geographic factors are important in analyzing pay for public school teachers,²³ and our own experiments show that detailed geographic controls can also be important in analyzing state employee pay.

Second, the ACS contains data on the college majors of individuals with undergraduate degrees.²⁴ College majors are correlated with earnings in the workforce due to differences in demand for various majors, in the skills imparted during college, and in the pre-college abilities of individuals pursuing different courses of study. Data on college majors provide additional indicators of what state government employees would likely earn in the private sector. Controlling for college major generally makes public employees appear less well-paid relative to the private sector, meaning that it either reduces their salary premium or increases their salary penalty. This indicates that, in addition to having more years of education than the average private-sector worker, state government employees tend to have college majors in areas that garner above-average pay in the private sector.

Third, the ACS has a far larger sample size than the CPS. The ACS yearly sample size is roughly 15 times as large as the CPS. Sample sizes in the CPS would be inadequate for analyzing small states.

We assess public employee pay using regression analysis, which examines how differences in a number of independent variables – such as education, experience, whether the individual is employed in the public sector, and so on – translate into changes in the dependent variable, in this case annual earnings. The independent variables cannot perfectly predict salaries for any given individual. The regression analysis does, however, calculate values for the independent variables that minimize errors in predicting the value of the dependent variable. Thus, while regression analysis cannot prove that any single individual is over- or under-paid, it can indicate whether pay differs systematically between the public and private sectors.

Following standard practice, we regress the natural log of annual wages on controls for years of education, field of undergraduate study, and potential years of work experience, along with demographic variables including race, Hispanic ethnicity, gender, marital status, immigrant status, and geographic location, along with a dummy variable designating whether an individual is a state government employee

in a non-public safety position. All individuals in the sample are either state government employees or private sector workers. We restrict our sample to full-time employees, meaning individuals who work at least 50 weeks in a year and 35 or more hours per week.

The coefficient assigned to the dummy variable for state government employment represents the salary premium or penalty paid to state employees after controlling for the other variables present in the regression. Because salaries are expressed in log form, the coefficient is converted to a percentage.²⁵ This process is repeated on a state-by-state basis.

Taking the log of wages before running the regression has been standard practice for decades, as it provides a better fit for the model and allows for easy interpretation of wage difference as percentages. However, recent research has questioned the use of logs in wage regressions.²⁶ The reason is that private-sector wages exhibit greater variance (have more high earners and low earners) than state wages. Logs compress both wage distributions, effectively de-emphasizing some of the highest-paid private-sector workers but leaving state workers less affected. Taking the log could therefore make private workers appear less well-compensated (relative to state workers) than they really are.

As mentioned above, the CBO used a more sophisticated regression that does not involve taking logs.²⁷ Pierce and Gittleman did take logs but employed a post-hoc adjustment to account for the different error distributions. We do not consider either solution to be ideal. In our own work, we've found that non-logged wages produce an inferior fit, and the results are highly dependent in some states on the type of regression technique that is chosen. We also found the Pierce and Gittleman adjustment to be an *over*-correction in many cases, as it tends to make private-sector wages appear lower than even the non-logged approach. Nevertheless, the "log problem" in pay comparisons is a serious issue that demands more attention, and we hope to further address it in future versions of this paper.

More broadly, while the techniques and data we use are widely accepted, continued research on public-private salary differences is needed. While the ACS and similar datasets provide large sample sizes, the variables measured may hide heterogeneity between public and private workforces. For instance, while the ACS does allow us to differentiate workers by college major, it implicitly assumes that each worker of a given college major attended the same quality college, had the same academic record, and so on. Similarly, the standard experience variable in a wage regression is in fact a measure of potential work experience, but cannot distinguish individuals who work continuously from those who have taken time out of the workforce. These and other issues may be explored using alternate datasets,

albeit with other limitations such as smaller sample sizes and the inability to calculate pay differentials on a state-by-state basis.

Controlling for firm size in the public sector

While the ACS contains important geographic and educational data, it lacks information regarding the size of the firm for which employees work. Firm size has been shown to influence salaries independently of employee characteristics such as education and experience. Because state employees tend to work for larger employers than similarly-qualified private sector workers, a firm size adjustment will lower relative pay for state workers. Studies such as Keefe (2010), Munnell et al (2011) and our own prior work have included firm size controls.²⁸ Other recent studies, including Gittleman and Pierce (2012) and Even and Macpherson (2012), do not control for firm size.²⁹

Firm size controls remain controversial in public-private pay studies because it has not been established precisely *why* larger firms pay higher salaries than smaller employers. Moreover, while economists have suggested many potential reasons for the large-firm premium in the private sector, it is not clear how well those reasons apply to government.

For instance, it is possible that larger firms pay higher wages because these firms are more productive, and these productivity advantages are subsequently shared with workers. Even if true, however, it is unclear whether productivity and workforce size grow together in the public sector. It may be that smaller local governments, which focus on essential public goods such as police and fire protection, provide greater benefits relative to resources than larger governments that take on more marginal tasks. Larger units of government *could* have a greater ability to pay employees, given taxpayers' more limited ability to relocate to lower-tax jurisdictions, but this does not seem an appropriate reason to control for firm size in public-private pay comparisons.³⁰

Economists also argue that large firms may pay a wage premium to avoid the threat of unionization. The public sector, however, is already far more heavily unionized than the private sector, making such a precautionary wage premium unnecessary.

Economists have also suggested that large private firms might be forced to pay employees more as compensation for certain negative aspects of working for a large organization, such as bureaucracy and inflexibility. These may be more important factors in government than in the private sector. However, as we demonstrate in this study, it's not clear that public-sector jobs have more dis-amenities than private-sector jobs.

Finally, large employers may hire more skilled employees, even after controlling for differences in education and experience. For instance, a large business with a skilled human resources department might be better able to identify and recruit employees who are more productive than seemingly comparable workers in smaller firms. If governments can also utilize their size in this way, this would justify wages at the level of large private-sector firms.

There is evidence that the firm size premium has been declining, and that these reductions have been particularly large for less-educated employees.³¹ We treat the firm size premium as constant across worker educational attainments, although education-specific firm size salary differentials may be incorporated into future revisions.

At present it remains common to include a firm size adjustment, and we do so in our figures. We calculate firm-size controls on a state-by-state basis using data from the CPS, then apply the wage differential associated with being in a large firm to the salaries received by state government employees. This adjustment lowers state employees' relative salaries by an average of around 6 percentage points, with the smallest firm-size adjustment being 2 percent (Utah) and the largest 12 percent (Vermont). For researchers who feel that firm-size controls are inappropriate in public-private pay comparisons, the state firm-size adjustment factors are reported in Table 3.

Grafting a firm size adjustment derived from the CPS onto ACS data may produce erroneous results if variables included in the ACS regression but not the CPS, such as geographic units and college majors, correlate with firm size.³² If so, an ad hoc firm size adjustment will lower relative state employee pay too much. Nevertheless, we believe our basic approach is reasonable.

Benefits

Fringe benefits form a major component of overall compensation, particularly in the public sector. Moreover, while most state government employees receive a salary penalty, public-sector benefits are more generous than those outside of government. Thus, without a detailed examination of the relative generosity of public- and private-sector benefits, we can draw no solid conclusions regarding overall comparability of public-sector compensation.

Most analyses of public employee pay utilize the Bureau of Labor Statistics Employer Costs for Employee Compensation (ECEC) dataset, which tracks employer contributions toward a variety of different fringe benefits.³³ The BLS compiles data on benefits for private-sector employers and for state

and local governments. These data are collected through the National Compensation Survey. For simplicity, benefits are expressed as a percentage of worker salaries.

While we use the ECEC data in certain instances, it also has several important limitations. We rely much less on ECEC data than other researchers, for the following reasons:

First, for defined benefit pensions the ECEC records only the employer's pension contribution in a given year, which can differ significantly from the value of benefits accruing to employees in that year. As discussed later, we instead rely on data from state pension plans, with the discount rate adjusted to account for the guaranteed nature of public DB pension benefits.

Second, the ECEC does not record the value of retiree health coverage accruing to employees--as these benefits are generally unfunded, there is no employer contribution to record.³⁴ This, of course, does not mean that these benefits have no value to employees or no cost to employers. We turn to accounting reports made by state governments that disclose the value of accruing retiree health benefits.

Third, the ECEC dataset is not available on a state-by-state basis. This is not a disqualifying weakness for benefits that are smaller and more uniform from state to state, such as paid vacation and employer contributions to Social Security and Medicare, and we rely on the ECEC in such cases. Moreover, for private-sector employees, averaging across regions is not terribly problematic, as private-sector compensation is generally driven by market forces that cross over state lines. For governments, however, where compensation is set by specific policies, this averaging by region can introduce inaccuracies in the larger benefit categories. For that reason, for major benefits – health insurance, pensions, and retiree health coverage – we use state-specific data drawn from outside sources.

In cases in which we utilize ECEC data, we compare public-sector benefits to those paid to individuals employed in establishments of 100 or more employees. Establishment size refers to the number of employees at one work site, whereas firm size is the total number of employees working for a company regardless of location. BLS data indicate around 43 percent of the workforce is employed at establishments of 100 or more employees. This captures a similar percentage of the workforce as the firm size controls used in the wage regressions, where the largest firm size is categorized as 1,000 or more employees. Thus, we are in general comparing public employee salaries and benefits to those paid by larger private-sector employers.

Health coverage

According to the BLS, 99 percent of full-time state and local government employees are offered employer-sponsored health coverage.³⁵ Coverage is somewhat less prevalent in the private sector, although the vast majority of full-time employees at larger private-sector firms are offered health insurance. For instance, 86 percent of full-time private sector employees are offered health coverage, as are 85 percent of both full- and part-time employees in establishments of 100 or more workers.³⁶ While ECEC data do not allow us to calculate the conjunction of these classes, coverage among private-sector workers who are most analogous to state government employees is doubtless high. The BLS ECEC data provide the average value of health coverage for all employees, thereby accounting for the small number of private employees who are not covered.

As noted above, ECEC data are broken down only to the level of Census region, meaning that state-by-state figures are unavailable. For private-sector workers, this aggregation of states into regions is probably not of great importance, given that employee benefit costs are driven in large part by broader economic trends.

However, benefits for government employees can vary widely from state to state. Given the importance of health coverage in overall employee compensation, for public employees we compile health benefits on a state-by-state basis. Our principal source is data compiled by the National Conference of State Legislatures (NCSL).³⁷ These data show monthly employer and employee health premiums for individual and family coverage in 2012. In certain cases, data for 2012 were not available through the NCSL. In these cases we used NCSL data from prior years, adjusted upward by the rate of growth of overall health premiums through 2012. In several other cases, we obtained data directly from state sources, such as budget documents.

Employee contributions toward health coverage differ in the public and private sectors. On average, state and local government employees pay 13 percent of their total health care premiums,³⁸ versus 20 percent for private-sector workers in establishments of 100 or more employees.³⁹ Similarly, around 30 percent of state and local government employees make no contribution toward their health coverage,⁴⁰ versus 13 percent for private-sector employees.⁴¹ The median state and local government employee contributes \$70 per month toward single coverage and \$348 per month toward family coverage.⁴² Among private-sector employees, single coverage typically costs \$88 monthly and family coverage \$322.⁴³

But our approach is to capture the value of *employer* health care contributions. To the degree employees contribute out of their own funds this merely reduces their take-home pay, which already is counted via wages. Thus, we count only the employer contribution as part of employee compensation. Consistent with private-sector trends, we assume that half of employees choose individual coverage and half choose family coverage. Employer health contributions are divided by average annual full-time state employee salaries as reported by the Bureau of the Census to generate employee compensation via health coverage.

Pensions

Differences in structure between defined benefit (DB) and defined contribution (DC) pensions complicate the task of comparing the generosity of retirement benefits for public- and private-sector employees. The fact that they are set up so differently has generated confusion in comparing the levels of “pension compensation” received from the two plan types. As Belman and Heywood put it in 1993, “Since one type of plan fixes the costs, but provides an uncertain benefit, and the other type of plan fixes the benefit but gives employers an uncertain cost, it is very difficult to compare the relative costs and benefits of the plans. This complicates public/private comparisons because the private sector is more likely to provide defined contribution plans and the public sector defined benefit.”⁴⁴ Since that time, however, more attention has been paid to measuring pension compensation.

Most private-sector employees participate in DC plans. In a DC plan, the benefit received by the employee at retirement is a function of the employer and employee contributions, as well as interest earned on those contributions over time. Unlike a DB pension, an employer who sponsors a DC plan has no obligation to provide a specific benefit at retirement. The employer’s only obligation is to provide a given contribution to the employee’s account during his working years. For workers with DC plans, pension compensation is simply the pension contribution made by the employer in a given year.

The vast majority of state government employees participate in traditional DB pension plans, in which benefits at retirement are a function of the worker’s final salary and years of service. For instance, an employee might receive a benefit equal to 2 percent of final earnings multiplied by the number of years he was employed by the government.

For a DB pension participant, pension compensation is equal to the present discounted value of future pension benefits accrued in a given year, net of employee contributions. For instance, the System of National Accounts states that “compensation income is... the present value of the claims to benefits

earned by active participants through service to the employer.”⁴⁵ This value of benefits accruing in a given year is often referred to as the “normal cost” of the pension. It can differ, often significantly, from the amount that the employer contributes to the plan in a given year.

To calculate DB pension compensation, we first must know the future benefits to which an employee becomes entitled through an additional year of work. Actuaries employed by public pension plans perform such calculations based upon projections of earnings, quit rates, longevity, and other factors.

Second, we must choose an interest rate at which to discount those future benefits to the present. Importantly, *economists choose a discount rate that matches the risk characteristics of the benefit*. If the future benefit is guaranteed, then a low discount rate is used. If the future benefit is risky, meaning that it may vary or that it may not be paid in full, then a higher discount rate is used. This point is fundamental.

Discounting future benefits using a risk-adjusted interest rate is appropriate regardless of whether the future benefit is pre-funded (as are DB pensions) or unfunded (as are most retiree health benefits). Moreover, for pre-funded plans, the discount rate to be used is independent of the investments used to fund the future benefits. What matters is the risk associated with the *benefits*, not the risk or return of any investments used to fund those benefit. This approach is consistent with economic theory, with how assets and liabilities are valued in private financial markets, and with analyses conducted by a number of government agencies. (See Sidebar 1 for a summary of expert opinion on this issue.)

Since public employee pension benefits are intended to be guaranteed and in most cases are protected under state laws or constitutions, a low discount rate should be used to reflect that low risk. In its analysis of pension compensation for federal government employees, the Congressional Budget Office used an interest rate of 5 percent, approximately 1 percentage point above the Treasury yield, “because federal pension obligations are not protected by the constitution.” Since we are analyzing pensions that *do* carry legal protections, a lower discount rate is warranted. Academic analyses of state and local pensions, such as Novy-Marx and Rauh (2011) and Brown and Wilcox (2009), have generally used a discount rate derived from U.S. Treasury securities.

We choose to discount public pension benefits at 4.3 percent, which is the average yield over the past decade on 20-year Treasury securities. This is designed to reflect the typical accruals of benefits over the past decade. This approach is slightly different from the “market valuation” literature on public pension liabilities, which seeks to value liabilities at a given point in time and thus uses a discount rate

specific to that point in time. For perspective, the current yield on 20-year Treasuries is around 3.5 percent.⁴⁶

Other discount rates may reasonably be chosen. The important thing, as economist Barry Bosworth of the Brookings Institution stresses, is that the discount rate “should be derived from a fully taxable bond with risk characteristics (including inflation risk) as close as possible to those of the benefit liability.”⁴⁷ Discounting public pension benefits at the assumed interest rate on public pension investments, usually around 8 percent, is *not* appropriate because the risk of those investments is much higher than that of the benefits.

Measuring DB pension compensation becomes confused because some studies conflate the value of future DB pension compensation with the dollar amounts that public employers contribute to pensions today.⁴⁸ This approach is incorrect for two reasons.

First, part of the employer’s DB pension contribution goes toward paying off (or “amortizing”) unfunded benefit liabilities from prior years. Because this amortization payment is unrelated to benefits earned in the current year, it should not be counted as part of current employee compensation. Likewise, in other years states may make no pension contribution, either because they judge the payment unaffordable or, due to high investment returns in prior years, decided that a payment is not necessary. But the lack of an employer contribution in a given year does not imply that employees earned no benefits that year. In fact, benefits continue to be accrued as dictated under the plan’s benefit formula, and the state’s legal obligation to pay those benefits remains unchanged. *It is the benefit formula and the obligation to pay that determine the value of public pension benefits. The employer contribution made in a given year is irrelevant to the value of pension benefits accruing to employees in that year.* As the Bureau of Economic Analysis notes, “Contributions aren’t always a good approximation for the value of benefits accrued through service.”⁴⁹

Second, as mentioned above, states typically calculate their annual contributions using an interest rate of around 8 percent. For public employees *as a group*, this is mathematically identical to the employer guaranteeing an 8 percent return on both on the employer and employee contributions. This does not imply that every individual employee receives an implicit return equal to the discount rate; individual treatment varies, typically based on the employee’s length of service.⁵⁰ But employees as a group are guaranteed a return on their and their employers’ pension contributions equal to the assumed return on pension investments. Since there is no market investment that guarantees 8 percent returns, this

constitutes a subsidy that increases the employer's cost and increases the value of pension benefits to the employee. As Munnell et al (2012) note:

Contributions to private sector 401(k) plans and public sector defined benefit plans are not comparable. The public sector contribution guarantees a return of about 8 percent, whereas no such guarantee exists for 401(k)s. Thus, the public sector contribution under-states public sector compensation.⁵¹

Put simply, a dollar of employer DB pension contributions plus an effective guaranteed return of 8 percent is much more valuable than a dollar of DC pension contributions that does not include such a guarantee.

We estimate DB pension compensation by recalculating normal costs as reported by public pensions. We utilize all the underlying assumptions made by pension plans with the exception of the discount rate, which we set at a level appropriate to the risk of public pensions. The Congressional Budget Office recently used a similar approach in valuing pension benefits for federal government employees, and the National Income and Product Accounts published by the federal government now value state and local government employee pension compensation using a risk-adjusted discount rate.⁵² Thus, our approach is consistent with both economic theory and the practice of non-partisan government agencies.

It is important to note that discounting public pension benefits using a government bond interest rate is *not* the same as assuming that public pensions will invest only in government bonds. As the Brookings Institute's Bosworth puts it, "Discounting with a riskless asset does not imply that the fund must invest in riskless assets." It is mathematically straightforward to show that, even if a pension plan invests in stocks or other high-returning-but-risky assets, the total cost of guaranteeing the payment of a future liability can be calculated by discounting that liability at the interest rate on a guaranteed investment such as government bonds.⁵³ Thus, we are not making a statement regarding the investment practices of public employee pensions.

To calculate pension compensation paid from state government pensions, we must convert normal costs as published by those plans to a measure using risk-appropriate discount rates. To do so, we gathered data on over 20 plans from California, Florida, Colorado, Washington, and Rhode Island in which pensions' own actuaries have calculated pension costs under different discount rates. The median result indicates that a 1 percentage point reduction in the discount rate raises the normal cost of a plan by

around 36 percent. As a check, we performed our own calculations using workers stylized to be typical of state government employees, which produced similar results.

The factor to convert a normal cost would equal $1.36(r_e - r_{ra})$, where r_e equals the expected return on plan assets and r_{ra} the risk-adjusted discount rate. For instance, the factor to convert a normal cost calculated at 8 percent to a 4 percent discount rate would be $1.36^4 = 3.42$. From this risk-adjusted total normal cost we subtract the value of employee contributions to arrive at net pension compensation. For instance, a plan with a total normal cost of 10 percent of wages at an 8 percent discount rate would have a normal cost of 34.2 percent of pay using a 4 percent discount rate. If the employee contributes 5 percent of pay to the plan, his net pension compensation would be equal to 29.2 percent of wages.

In some states, employees share in the risk of plan financing and thus we must alter the calculations of pension compensation to account for this.⁵⁴ Risk-sharing reduces pension costs for employers but cuts employee compensation by a similar amount.

While the precise calculations differ by plan, these figures clearly imply pension compensation from public plans that typically far exceeds employer contributions to private-sector DC pensions. That fact stands in sharp contrast with comments from public pension administrators and government employee unions that public pension benefits are typically “modest.” It is worth highlighting why this view is mistaken. These claims often cite the average pension benefit paid by a given plan, which indeed often appears modest. But these averages include both benefits paid to new retirees who had only a few years of job tenure and thus very low benefits. It also includes benefits paid to older retirees who accrued their benefits when wages were significantly lower than they are for current employees.⁵⁵ If we conduct a side-by-side comparison of a public employee with a typical DB plan and a private worker with a DC plan, we find that a private sector worker’s 401(k) contributions would need to be extremely high to match both the level and the safety of the public employee’s benefits. These contributions closely correspond to the level of DB pension compensation we report for state government employees.

Sidebar 1: What do experts say about pension accounting rules?

Public employee unions and others sometimes argue that the risk-adjusted discounting of pension liabilities described in the text is a niche movement supported only by a handful of politically-motivated academics.⁵⁶ It is therefore important to emphasize how practically unanimous economists and policy analysts are in support of it.

For instance, Donald Kohn, then-Vice Chairman of the Federal Reserve Board, declared in a 2008 speech on public pensions:

While economists are famous for disagreeing with each other on virtually every other conceivable issue, when it comes to this one there is no professional disagreement: The only appropriate way to calculate the present value of a very-low-risk liability is to use a very-low-risk discount rate.⁵⁷

Similarly, the Fed's director of research and statistics, David W. Wilcox, testified in 2008 that:

These [public pension benefits] happen to be really simple cash flows to value. They're free of credit risk. There's only one conceptually right answer to how you discount those cash flows. You use discount rates that are free of credit risk. This is one of those things where it just really is that simple.⁵⁸

In a 2009 research paper, two economists from the federal Bureau of Economic Analysis note:

If the assets of a defined benefit plan are insufficient to pay promised benefits, the plan sponsor must cover the shortfall. This obligation represents an additional source of pension wealth for participants in an underfunded plan.⁵⁹

Any measurement of public pension liabilities, and the pension compensation conferred on employees, must capture the full value of this additional source of pension wealth. Since 2013, the National Income and Product Accounts, which are the official "books" of the United States economy, have measured DB pension compensation for public employees using a market-based measure that captures the value of benefit guarantees to employees.

In early 2012, the Congressional Budget Office issued a report on state and local pensions that was widely taken as a confirmation of the market valuation approach that we employ.⁶⁰ Later in 2012, the CBO issued a report on federal employee compensation that valued pensions using a discount rate chosen to match the risk of pension benefits, not the interest rate the federal employee pension plan assumes it will earn on its investments.⁶¹

In October 2012, the IGM Forum at the University of Chicago's Booth School of Business surveyed 39 professional economists with regard to public pension discount rates. This group of respected economists represents differing areas of expertise and a wide variety of outlooks on the role of government. They were asked to express their agreement or disagreement with the following statement: "By discounting pension liabilities at high interest rates under government accounting standards, many

U.S. state and local governments understate their pension liabilities and the costs of providing pensions to public-sector workers.” Thirty-eight of the 39 economists surveyed agreed, with half agreeing “strongly.” None of the economists surveyed disagreed.⁶²

In July 2012, Moody’s Investor Services announced that its ratings of state and local government debt would no longer incorporate pension liabilities measured using high 8 percent discount rates.⁶³ Instead, Moody’s will discount pension liabilities using a much lower bond yield, similar to the approach we have used here.

Additional issues

Data on pensions were gathered either from the Public Plans Database compiled by the Center for Retirement Research at Boston College⁶⁴ or directly from actuarial valuations published by the plans themselves. The key pieces of data are expected return on plan assets and the normal cost of pension benefits derived from it. Using these inputs, it is possible to convert the normal cost using a risk-adjusted discount rate.

In most cases, state government employees either do not participate in DC pensions or do not receive an employer match toward a DC plan. Thus, total pension compensation derives from their DB plan. Some states do have DC plans for public employees, either as an optional substitute for the DB plan or as a supplement to it. Given the generosity of DB plans versus the DC option, most employees opt to remain in the traditional program when given the option.

For supplemental DC plans, employers usually do not make matching contributions. One special case is Oregon. For most Oregon state employees, the 6 percent mandatory employee contribution to the DB pension is “picked up” by their employer and deposited into a DC account, and thus is included as part of pension compensation.

Finally, other states have instituted DC plans for public employees in place of DB pensions, but in most cases only newly-hired workers are affected. For instance, in Alaska only around 1,500 workers participated in the state’s DC plan in 2009, making up roughly 6 percent of the total workforce. In such states, this analysis can be interpreted as applying to the majority of public employees who continue to participate in the traditional DB pension plan.

For private-sector workers, pension compensation may come both from DC and DB plans. For DC pensions, we use the average employer contribution as reported in the ECEC dataset for the Census Region in which the worker resides. DB pension compensation is derived from the same ECEC data, but must be adjusted to account for the fact that part of the employer’s DB contribution funds amortization of unfunded liabilities rather than the accrual of new benefits. According to the PBGC, normal costs make up around 52 percent of total employer DB contributions.⁶⁵ This figure is relatively low because many private DB plans have been frozen to new employees or new benefit accruals; in these cases, the entire employer contribution may go toward paying off benefits earned in prior years.

We do not adjust the normal cost for private-sector DB pensions to the Treasury rate. These plans already calculate their liabilities using a corporate bond yield, as dictated by federal law. This implicitly

assumes that the risk of corporate DB pensions is equivalent to the risk of default on corporate bonds. In the absence of insurance from the Pension Benefit Guaranty Corporation, this is a good approximation: a company that is unable to service the explicit debt it has issued would also be likely to default on its pension obligations.

In practice, PBGC insurance makes corporate pension liabilities safer than corporate bonds, although not as safe as the legal guarantees applied to public employee pension benefits. The PBGC honors pension obligations only up to a limit based on the individual's retirement age, which means that high-income retirees or those who retire early could have their benefits cut.⁶⁶ Moreover, PBGC insurance is financed by additional contributions made by employers; it is not provided simply because employers discount their obligations of the corporate bond yield. Thus, the normal costs of corporate DB pensions as calculated under current law appear to be good approximations of pension compensation provided through these plans. In any case, the value of private-sector DB plans is so small relative to overall compensation that reasonable adjustments up or down would have little impact on the results of our study.

Retiree health benefits

According to the Government Accounting Standards Board (GASB), retiree health benefits “are a part of the compensation that employees earn each year, even though these benefits are not received until after employment has ended.”⁶⁷ Like a DB pension, a working-age employee who is eligible for retiree health benefits accrues the right to future health insurance or premium payments to be made by his employer. And, as with DB pensions, this accrual of future benefits should be counted as part of the employee's current compensation.

Health benefits can be extremely valuable for public employees who retire early. For instance, the California Department of Personnel Administration reports that average annual employer payments *begin* at slightly above \$9,600 in the first year of retirement, rising to \$21,000 in the 10th year and to nearly \$50,000 in the 20th year of retirement. Over the course of retirement, the Department points out, the typical state employee would receive \$493,851 in retiree health coverage.⁶⁸

As noted above, a number of analyses of public employee compensation omit retiree health care. But without capturing the value of retiree health coverage, it is impossible to provide a full picture of total employee compensation. But the value of retiree health coverage varies widely from state to state. A few state governments offer no coverage whatsoever to their employees. Others allow retirees to buy into the health plan offered to active employees. For these “access only” plans, states report an implicit subsidy,

as older retirees are offered the chance to purchase coverage at the lower rates offered to working-age individuals. Still other states offer partial or full coverage of health costs in retirement, a benefit that is of significant value to employees.

Unfortunately, retiree health coverage is not included in the ECEC data set. The reason is that, since most retiree health coverage is unfunded and financed on a pay-as-you-go basis, there is no employer contribution for current workers.⁶⁹

However, it is possible to estimate the value of public retiree health coverage through disclosures required by GASB. Despite the fact that most retiree health plans are unfunded, GASB reporting rules--specifically, rules 43 and 45--require that governments publish certain statistics that allow us to calculate the value of accruing retiree health benefits as a percentage of workers' salaries. As with pensions, this value is referred to as the "normal cost" of the plan. As the California Department of Education puts it, the normal cost "can be thought of as the cost for OPEB being earned by employees in exchange for [their] services now."⁷⁰

Gathering data on OPEBs is not straightforward, as there is no national database of plan statistics akin to the Public Plan database for pensions. Where possible, we collected retiree health data from actuarial reports issued by health plans serving state government employees. Sometimes states disclose normal costs and employee payroll directly; in these cases, compensation through retiree health coverage equals the normal cost as a percentage of employee payroll. This figure automatically incorporates factors such as eligibility for retiree health and employee participation in such programs. In a small number of cases, we rely upon data from Munnell et al (2011).

In other cases, only the dollar value of the plan's normal cost is published, and we obtain payroll data from pension actuarial reports, which generally cover the same populations of employees. In still other cases, governments do not publish the normal cost of benefits. However, governments almost always publish the Annual Required Contribution (ARC), which is composed of the normal cost plus amortization costs for past unfunded liabilities, and the total dollar value of the plan's unfunded liabilities. Governments are required to publish this figure even if they do not make the contribution or even intend to pre-fund future retiree health benefits. Given the ARC, the unfunded actuarial accrued liability, the assumed interest rate, and the general practice that unfunded liabilities are amortized over 30 years, it is possible to back out the value of the normal cost. We have crosschecked our data against Munnell et al (2011) and find that it is generally consistent.

Most retiree health plans are unfunded. Little or no assets have been set aside and benefits are financed on a “pay-as-you-go” basis. In valuing these future benefits, discount rates are generally derived from government borrowing costs or low-risk investments, although as Novy-Marx and Rauh (2013) note, even these rates are generally above current “riskless” yields. Thus, most OPEB plans don’t have the fundamental discount rate-based accounting issues that plague public pensions.⁷¹ However, OPEB discount rates do vary from state to state, and this affects the calculated normal costs for such plans. This seems inappropriate in valuing employee compensation unless these differences in discount rates reflect different levels of risk to employee benefits, which appears unlikely. Based on sensitivity analysis to discount rates that is often contained in OPEB actuarial reports, the normal cost of retiree health plans appears to vary by around 16 percent for each percentage point difference in the discount rate.

In addition, there is a small number of states with pre-funded retiree health plans. Based on GASB accounting rules, these states discount liabilities and calculate normal costs using the much higher expected return on investments.⁷²

For purposes of uniformity we adjust the normal costs of all retiree health plans to a constant discount rate of 4.3 percent, the same rate we apply to pension benefits. As with pensions, plausible alternate discount rate assumptions are possible. However, our approach is designed to result in uniformity of measurement from state to state. On average, normal costs for OPEBs increase by around 0.7 percentage points due to this adjustment. In around one-third of states the adjustment reduces normal costs of OPEBs, as the plan had already assumed a discount rate below 4.3 percent. In the remaining states the normal cost increased--in most cases only modestly, but with larger increases in the small number of states that pre-fund OPEBs and assume high returns on investment.⁷³

Retiree health coverage is far less common in the private sector, even among larger employers, and measuring the cost of plans that do exist in the private sector is a challenge. Data are sparse, and the landscape is changing rapidly. In addition to changes already under way, the introduction of health exchanges under the Affordable Care Act may prompt more private employers to drop retiree health coverage. All these factors make calculating the current value of future retiree health entitlements uncertain.

In its analysis of federal government employee compensation, the Congressional Budget Office assumed that one-third of private-sector workers employed by large firms were eligible for retiree health coverage, that the average annual premium in the private sector was \$9,423 in 2009, and that employers contribute 59 percent of the premium cost. The discounted value of these premiums were attributed to the

compensation of current employees, generating an implicit value equal to 2.2 percent of private sector workers' wages.⁷⁴

Using the CBO's value for private-sector retiree health coverage instead of our own does not have a significant impact on the overall results of the analysis. Nevertheless, the CBO's estimate of the value of private-sector coverage may be high for several reasons.

First, while one third of the largest private firms may offer health benefits to current retirees, Fronstin and Adams note that "these statistics should not be interpreted as meaning that [similar percentages] of workers should expect supplemental health coverage."⁷⁵ As of 2003, roughly one quarter of private firms paying benefits to current retirees do not offer them to new retirees.⁷⁶ This fraction surely has risen in the past decade. For instance, an Aon Hewitt survey found that in 2011-2012, 11-12 percent of large employers tightened eligibility requirements for current employees.⁷⁷ Similarly, a 2012 Mercer survey found that 17 percent of large employers who currently offer retiree health coverage will soon eliminate it for future retirees.⁷⁸ One cannot simply extrapolate from the share of current retirees receiving benefits to the share of current workers accruing benefits. Keefe (2011) makes a similar error.⁷⁹

Second, not every employee at firms that continue to offer health benefits for future retirees will qualify to receive such benefits. As Fronstin and Adams point out, part-time employees often are not eligible for retiree health coverage, nor are employees who retire without a required minimum job tenure. The normal cost figures cited above for public-sector employees factor in the possibility that an employee will not qualify for benefits at retirement. The CBO analysis for private-sector workers does not appear to do so.

Third, many private-sector firms offering retiree health coverage do so on an "access only" basis, meaning that retirees may buy into the health plan offered to employees but must do so using their own funds. As of 2010, half of firms offering retiree health coverage provided access with no premium support; 24 percent paid premiums up to a defined dollar limit; and 25 percent had no specified dollar limit.⁸⁰ In the public sector, a far greater share of the premium is covered by employers.⁸¹

For those reasons, it appears likely that the CBO figure overestimates the value of compensation received by current private-sector employees through the accrual of rights to future retiree health coverage.⁸²

For our own analysis, we assume that 25 percent of employees of large firms are offered retiree health coverage (versus CBO's assumption of 33 percent, based upon the number of retirees currently

receiving benefits); that one-half of that group will be eligible for benefits at retirement (CBO implicitly assumes 100 percent eligibility); and that their employer will cover 25 percent of premiums (versus the CBO assumption of 59 percent). Based upon these inputs, we assume an average value for compensation through retiree health coverage of 0.5 percent of wages, significantly lower than CBO's number.

That said, we recognize that the availability of retiree health coverage will vary from state to state. While we assumed 0.5 percent of wages as a nationwide average, we allow this value to vary from state to state based upon the availability of health coverage to current retirees.⁸³ The costs range from a low of 0.2 percent of wages (Oregon) to a high of 0.8 percent of wages (Arizona and Indiana).

To be clear, almost nothing rides upon these assumptions in terms of the conclusions to be drawn from this study. Nevertheless, we believe it is important to treat even small benefits as rigorously as possible, as a base upon which further research can be built.

Some studies argue that the true value of retiree health coverage to public employees is significantly lower than the figures used here. Keefe (2011) estimates the value of retiree health benefits by dividing the cost of benefits paid to current retirees by the wages paid to current employees.⁸⁴ Using the example of California, he states that retiree health outlays per worker equal just \$821 per year, worth only 1 percent of employee wages. By contrast, the normal cost of retiree health reported by California in GASB accounting disclosures is almost 13 percent of wages.

Keefe's approach has two errors. First, he divides benefits paid to one set of employees by wages paid to a different set of employees, and thus does not represent the value of the future benefits promised to current employees. It does not matter, as Keefe contends, that retiree health programs are not pre-funded. Because the normal cost of retiree health benefits calculated by plan actuaries is discounted, it reflects the value of those benefits regardless of when they are delivered or paid for.

Second, it appears that Keefe divides annual outlays for the California state retiree health plan by the number of state *and* local employees, even though most local employees are covered under separate retiree health plans. Using figures from the actuarial report for California state employees, annual retiree health outlays equal \$5,567 per covered worker, not the \$821 that Keefe claims.⁸⁵ More importantly, California retiree health outlays average \$10,388 *per retiree* per year. Assuming an average retirement age of 60, life expectancy of 83 and annual health cost increases as projected by the plan, a typical California state retiree would collect over \$500,000 in lifetime health benefits. This figure is very similar to that calculated and publicized by California's Department of Personnel Administration. These lifetime

retiree health benefits are equivalent to receiving at retirement a lump sum cash payment of around \$290,000. This amount far exceeds the 1 percent of pay that Keefe claims, even when accounting for interest, early deaths, and other factors. The actuarial valuations that we use take these (and many other factors) into account. They are the best expression of the value to current employees of the future benefits that are promised to them.

Some studies accept the normal costs of retiree health costs as the proper measure of employee compensation but suggest that, because retiree health benefits may be lowered in the future, their actuarial value should be reduced. Munnell et al (2011) reduce the normal costs of retiree health coverage by half to account for the risk of future benefit reductions, and Even and Mcpherson (2012) follow that practice.

But these adjustments obscure the basic goal of a pay comparison, which is to determine whether government employers promise compensation to public employees that is different from what is paid to private-sector workers. In effect, the Munnell adjustment assumes that pay reductions that *might* take place in the future have *already* taken place. In doing so, of course, these methods weaken the policy case for future benefit reductions because they make public-sector compensation appear more comparable to private-sector levels. Our approach is to calculate the value of the benefits that have been promised. If these benefits, combined with other employee compensation, are deemed by policymakers to be excessive, *then* reductions might be considered.

Other fringe benefits

Pensions, health coverage, and retiree health benefits are the three largest sources of non-salary compensation for state government employees. They are also the fringe benefits that vary the most from state to state. For those two reasons, we gathered data on the above benefits on a state-by-state basis using accounting disclosures and other data sources. The values of the remaining benefits are smaller and vary less. These other benefits include life and disability insurance, paid leave, and “legally-required benefits”-which include employer taxes toward Social Security, Medicare, unemployment insurance, and worker’s compensation. For these benefits we rely upon data from the BLS’s ECEC dataset. Because these ECEC-derived benefits are calculated at the regional level, we do not display results by state so as not to imply a false level of precision.

Paid leave

Paid leave encompasses sick time, vacation days, paid holidays, and personal leave. On average, paid leave is almost precisely the same in the private sector as in state government, with values of 11.11 percent and 11.06 percent of wages respectively. There are variations from region to region, with some

governments providing more paid leave than private employees and others less. Overall, however, differences between the public and private sector are quite small relative to other fringe benefits. It is unusual for the value of state and private paid leave to differ by more than 1 percent of wages.

Legally-Required Benefits and the Treatment of Social Security

Analysis of legally-required benefits must begin with a discussion of Social Security. As with DB pensions, the value of Social Security to employees is distinct from the contributions made to the program by employers.

Practically all private-sector employees participate in Social Security, meaning that they and their employers are required to pay taxes into the program. State government employees in 43 states participate in Social Security.⁸⁶ For employees in the remaining states, the employer contribution to Social Security is entered into our database as zero.

For private-sector and state government employees who do participate in Social Security, we must account for the fact that Social Security is significantly underfunded. Thus, part of the taxes paid into the system are effectively payments to address the program's unfunded liabilities – akin to the amortization payments to public DB pensions, which we exclude from our analysis – not “contributions” or “normal costs” that generate matching benefits in the future.

Because Social Security is financed on a “pay-as-you-go” basis rather than being “fully funded,” the program's actuaries don't calculate normal costs as public pension actuaries do. Moreover, unlike public DB pensions, Social Security is a progressive system. As a result, the de facto normal cost as a percentage of wages will differ based on the earnings level of the participant.

However, it is possible to estimate normal costs for Social Security participants. Social Security's actuaries publish “money's worth ratios,” which represent the ratio of lifetime benefits received to lifetime taxes paid, both in present value terms. These ratios are calculated for different worker types retiring in different years.⁸⁷ This ratio represents the share of the 12.4 percent Social Security payroll tax that can be considered the normal cost of the system – meaning the portion of payroll taxes the participant will receive back in full – with the remainder being a “pure tax” devoted to addressing the program's unfunded liabilities.

The SSA figures show that for a two-earner couple born in 1964 with earnings equal to 160 percent of the national average – a decent approximation of the typical state government employee –

Social Security will pay total lifetime benefits equal to 69 percent of the taxes paid into the program.⁸⁸ Multiplied by the 12.4 percent payroll tax generates a normal cost of 8.6 percent of wages.

But workers themselves contribute 6.2 percent of their pay to Social Security. To be consistent with our previous treatment of DB pensions, the employee contribution is subtracted from the gross normal cost to find the net component that adds to worker's compensation. This figure – which again is specific to the age and earnings level of the typical state government employee – is 2.4 percent of wages. This amount is entered into our database as the net compensation employees receive via participation in Social Security.

This approach may appear confusing at first. Employers do in fact contribute 6.2 percent of their workers' pay into Social Security, so why not include the full amount as part of their compensation? The reason, as discussed above, is that participants in Social Security lose, on average, around 3.8 percent of their lifetime wages to the system. That is, they pay this amount in but receive nothing in return for it. Those payments are, in effect, a "tax." Workers who *don't* participate in Social Security, by contrast, are exempt from that implicit tax. A comparison of pay that includes both participants and non-participants in Social Security must account for that difference.

As with our treatment of private-sector retiree health coverage, very little rides on these assumptions regarding Social Security. The overall results would be changed only slightly by attributing to employees the full employer contribution to the program rather than the net value that employees actually receive. In the vast majority of states, where both public- and private-sector workers take part in Social Security, the effect is zero. But our goal is to be as rigorous as possible in analyzing all forms of worker compensation, both large and small.

Other legally-required benefits

Other legally required benefits, such as Medicare, unemployment insurance, and worker's compensation, are calculated in terms of the level of employer contributions. In general, legally-required benefits are more generous in the private sector than in state government, at 11.2 percent and 8.8 percent of wages, respectively. Part of this is due to non-participation in Social Security by some state employees, but private-sector contributions to Medicare, unemployment, and workers compensation also are somewhat higher than in state government. For Medicare, this may be due to the uncapped payroll tax, which is more likely to affect private-sector workers, as very high wages are more common in private jobs. Employer contributions for unemployment insurance and worker's compensation are experience-

rated, and thus higher contributions would at least in part be due to the higher risk of unemployment or injury in these positions.

Total Paid Compensation

Total paid compensation is the sum of salaries and benefits. We derive the total compensation premium or penalty by multiplying wages by $(1 + \text{benefits as a percentage of wages})$, then re-running the original regression.⁸⁹

In both the public and private sectors there may be minor benefits that do not fit into the standard categories measured by the BLS ECEC survey. Moreover, as detailed below, in a competitive labor market job amenities and dis-amenities can influence the pay and benefits that a position must provide. Nevertheless, the total compensation figures illustrated in Figure 6 (above) represent, in our view, a reasonable measure of the relative pay of state government workers.

These figures confirm much of what ordinary Americans already believe about public-sector compensation, but they also contain some surprises. At a general level, they confirm that while state government employees may receive less generous average salaries than similar private sector workers, the more generous benefits package paid in government – in particular, retirement benefits – is sufficient to make state employment, on average at least, attractive relative to private-sector jobs.

The data also confirm that many of the states in which public-sector pay is controversial do indeed appear to “overpay” state government workers relative to their private-sector counterparts. No one would be surprised to see significant compensation premiums in California, New Jersey, or Illinois. Others, such as Pennsylvania and New York, have traditionally had strong public employee unions who are powerful political players.

Similarly, compensation is most comparable to private-sector levels in some of the states known for fiscal restraint. Indiana, for instance, never had strong public employee unions, and former Gov. Mitch Daniels recently reformed employee health plans. Likewise, Virginia is perceived as a business-friendly state and does not allow collective bargaining for public employees.

However, there are some surprises. One would not expect that traditionally liberal states such as Washington and Minnesota would pay state government employees below private-sector levels, Integrating the value of job security would increase these states’ total compensation packages somewhat, but even then they would not come close to the premiums in some of the higher-paying states.

Likewise, one would not necessarily expect states such as Wyoming or New Mexico to have among the largest premiums, yet that is what the data indicate. Wyoming pays a total compensation premium of 21 percent over private-sector levels, while New Mexico pays a premium of 20 percent.

While the principal comparison is of public employees in a given state to similarly-skilled private-sector workers in that state, our approach implicitly allows states to be compared to each other. Our results indicate that some state governments compensate their employees significantly more generously than others. Roughly speaking, the best-paid state (Connecticut) pays its employees approximately \$1.50 in total wages and benefits for each dollar that the lowest-paid state (Virginia) pays.

It is possible to crosscheck these results against more broad-based measures that would intuitively point toward public-sector pay differentials. Ruger and Sorens (2013) calculate an index of economic and personal freedoms by state.⁹⁰ Here we restrict our analysis to economic freedoms, which are compared to the total compensation premium or penalty calculated for each state. (Figure 11.) The trend indicates that states with lower economic freedom scores tend to have higher state employee compensation relative to similarly-skilled private sector employees in that state. The R-squared value is 0.27.

Similarly, Keating (2013) calculates a state index of policy factors relevant to the small business climate.⁹¹ States with a more business-friendly environment appear to pay state government employees a lower compensation premium (Figure 12). The measured R-squared value is 0.11.

Likewise, when our measured compensation differentials are expressed in rank form, they are correlated with rankings of state teacher union strength in Winkler, Scull and Zeehandelaar (2012).⁹² None of these measures are perfect checks, yet they may serve as proxies for some underlying factor affecting the generosity of public employee compensation.

Compensation at different pay levels

In addition to understanding relative compensation for the average state government employee, readers may be interested in how relative compensation varies at different pay levels within government. Generally, this is done by calculating relative compensation for employees with different levels of educational attainment, which is a strong predictor of earnings. While seemingly straightforward, that analysis must take into account three major factors.

First, and most basically, the wage penalty or premium that a state government pays is not uniform throughout the distribution of workers employed by the government. It is generally believed that,

due to the relative compression of wages paid in government, public employment is relatively more favorable to lower-skilled employees and less favorable to high-skill workers.

Second, the value of fringe benefits differs between high and low earners. Some fringe benefits, such as health coverage, have essentially the same dollar value for all employees. Others, such as pensions or paid time off, have a value that is proportional to the individual employee's wages. Fixed-dollar benefits will favor low earners and earnings-related benefits will favor high earners.

Third, the rate at which an individual's earnings grow through his career affects the value of pension compensation from a DB plan. The benefits an individual receive from a DB plan throughout his retirement are based upon his final earnings. The worker's contributions, by contrast, are a function of earnings over the worker's full career. Individuals with rapid earnings growth – so-called “high flyers,” who are predominantly better-educated employees – have low average lifetime earnings relative to their final earnings, and thus pay lower lifetime pension contributions relative to the benefits they receive. Koedel, Ni, and Podgursky (2013) note that school administrators have more rapid salary growth than classroom teachers. As a result, administrators receive higher retirement benefits relative to their lifetime salaries and contributions. For instance, relative to a career teacher, a school principal makes 14 percent higher lifetime contributions but receives 37 percent greater lifetime benefits. Similarly, a school superintendent makes 53 percent greater career contributions than a teacher but receives 89 percent higher total benefits.⁹³ Young (2012) illustrates this same point with reference to the Canadian public sector.⁹⁴

Analysis of the distribution of relative state government compensation follows three steps. First, we calculate wage penalties or premiums for state government workers of different educational attainments. Next, we estimate annual earnings growth for state government employees of different educational attainments, and use this information to calculate education-specific pension compensation. Third, based on relative levels of fixed- and earnings-related benefits, we calculate total compensation by educational attainment.

Table 4 shows wage premiums or penalties for state government employees by educational attainment. These are calculated using regression analysis controlling for the same factors as in the state-level wage regressions, but are calculated at a national level. Thus, these figures and the conclusions drawn from them should be treated as national averages only, bearing in mind the variation in overall compensation levels we have shown to exist from state to state. After adjusting for firm size effects, all educational groups appear to receive salary penalties in state government employment, although the size

of such penalties differ markedly. State employees with only a high school diploma receive salaries 3 percent below private sector levels, with this salary penalty rising to

Individuals with a high school diploma or less receive salaries that are very close to those paid in the private sector. All other educational attainments, however, appear to receive lower average salaries in state government than in the private sector, with the largest salary penalty of 37 percent received by state government employees with professional degrees. (Figure 7.) The major differences between our analysis and others is the inclusion of tighter geographic controls and, for college-educated individuals, a control variable for the subject the individual studied as an undergraduate.

Next, we divide public-sector fringe benefits into two types: flat-dollar benefits and earnings-related benefits. On average, state employees receive earnings-related benefits equal to 51 percent of their salaries and flat-dollar benefits equal to 24 percent of their salaries. For any given state employee, however, benefits are equal to 51 percent of his own salary and 24 percent of the *average salary* for state workers, which we calculate as \$53,341. In dollar terms these flat-dollar benefits are worth \$12,802 on average, which ranges from 43 percent of salary for state workers with less than a high school diploma to 13 percent of salary for state employees with a professional degree.

We then subdivide earnings-based benefits into pensions and other benefits. Pension compensation is on average worth 29 percent of salaries and other earnings-based benefits are valued at 22 percent of salaries. As noted above, however, pensions will be more valuable to individuals with rapid earnings growth, who are generally “high flyers” with greater educational attainments. To estimate the effects of earnings growth on pension compensation, we begin by calculating average rates of earnings growth for state employees with different levels of education. Using ACS data, earnings are tabulated by education for state workers aged 22 to 25 in 1980 and for employees aged 52 to 55 in 2010. While a rough method, this approach shows that earnings growth is higher for better-educated state employees. High school dropouts, high school graduates and individuals with some college education have the slowest rates of annual earnings growth, at approximately 5 percent, while state employees with professional degrees have the most rapid, at 8 percent.

Using these rates of earnings growth, we build a simple model to estimate the relationship between the present value of lifetime earnings – and lifetime pension contributions – to final earnings. For simplicity, each educational category is assumed to have the same final earnings and the same years of employment, and thus the same pension benefit. Each educational category also is assumed to collect benefits for the same period of 25 years. But due to different rates of earnings growth prior to retirement,

better-educated public employees will pay smaller contributions over their lifetimes relative to the DB pension benefits they will receive. The relative contributions of each educational category are compared to those of a stylized average workers whose wages grow by 6.1 percent annually. This ratio is multiplied by the overall average contribution rate of 6.8 percent of wages. This adjusted contribution rate is then subtracted from gross pension compensation – that is, net pension compensation of 28.9 percent of wages plus the average contribution rate of 6.8 percent – to produce adjusted net pension compensation by educational attainment.

As expected, lower educational categories of state employees receive somewhat lower pension compensation while more-educated state workers receive above-average pension compensation. For instance, high school graduates receive pension compensation equal to 27.6 percent of wages while state employees with professional degrees receive pension compensation of 30.8 percent of wages.

These adjusted pension compensation figures are incorporated into calculations of overall compensation, where for simplicity total compensation is taken as $wages * (1 + benefit\ ratio)$. The results show that the least-educated state employees receive sizable compensation premiums versus similar private-sector workers, while more-educated state workers receive modest to significant compensation penalties. Individuals with less than a high school education receive a total compensation premium of 22 percent; high school graduates receive a compensation premium of 19 percent; individuals with some college receive a premium of 13 percent; college graduates receive a premium of 2 percent; master's degree holders a penalty of 3 percent; professional degree holders a penalty of 17 percent; and PhDs a penalty of 18 percent.

These calculations generate several results. First, as expected, total compensation is more favorable to state government employees than wage income alone, due to relatively more generous benefits paid in the public sector. Second, while compensation penalties remain for better-educated state government employees, the largest compensation penalties are not for professional degree holders (such as doctors and lawyers) but for individuals with doctoral degrees. While both professional and doctoral degree holders appear to receive large wage penalties, the higher rate of wage growth for professional degree holders grants them more favorable DB pension compensation.

Nevertheless, a significant total compensation penalty remains for both professional and doctoral degree holders. It is worth considering how government may continue to attract better-educated employees despite a seeming compensation penalty.

One possibility is that, despite our efforts to increase the precision of data used in public-private pay comparisons, systematic but undetected differences remain between the two groups of employees. The inclusion of undergraduate degree fields reduces measured salary penalties for state government employees with professional and doctoral degrees by several percentage points. However, the ACS data do not allow us to control for the possibility that public service might attract individuals who obtained their degrees from less-prestigious universities or who performed less well in school. Some research has been conducted in this area using the National Longitudinal Survey of Youth. Black and Smith (2006) match NLSY data to common measures of college quality and competitiveness, finding that attending a higher quality college correlates with higher wages even after controlling for individual differences.⁹⁵

Gittleman and Pierce (2011) use an alternate approach to estimating public-private wage and compensation differentials, in which they compare pay for public and private jobs with similar skill requirements. Despite the fact that Gittleman and Pierce do not include retiree health benefits and do not value DB pensions on a market basis, they find that the vast majority of state government employees receive higher total compensation than private sector employees working in jobs with similar skill requirements. Even at the 90th percentile, private sector workers receive total compensation 5.5 percent below state government employees. (At the median private compensation is 9.3 percent lower and at the 10th percentile it is 13.2 percent lower). These results, in combination with our own, could indicate that state government employees have better educational credentials than private-sector workers but work in jobs whose skill demands exceed private levels by a smaller degree.

It also is worth considering how state government can attract and retain employees even assuming that a compensation penalty exists. One answer is greater job security, the value of which we attempt to quantify in a later section. The inclusion of job security alone would not close the compensation gap for highly-educated state employees, though it is possible that highly-educated individuals seeking out public employment are particularly risk-averse.

In addition, a number of occupation-specific factors may come into play. For instance, private physicians generally must pay their own malpractice insurance, which can be very expensive depending on the doctor's specialty and state of residence. Doctors employed by the government, by contrast, generally are protected by government indemnity rules and need not carry separate malpractice insurance. For context, in the year 2000, the most recent year for which survey data were available, malpractice insurance premiums equaled 8 percent of self-employed physician's net income.⁹⁶ Similarly, Dillon (2013) shows that occupations with high earnings risk pay higher average salaries as compensation.

Dillon shows that lawyers have among the highest earnings risk of professional occupations. Lawyers in the public sector may be willing to accept reduced average salaries in order to lower the volatility of their annual earnings.

While more difficult to quantify, government employment might also provide better quality of life, in terms of overtime work, stress, or other factors. We document these differences in later sections on an occupation-specific basis, but cannot determine if within specific occupations state government provides more attractive working conditions than the private sector.

The value of job security

Data from the American Community Survey indicate that state government employees have an unemployment rate roughly 4 percentage points lower than private-sector workers with similar education, experience, and other earnings-related attributes. Public employees in every state appear to have significantly greater job security than their private sector counterparts, though this advantage differs from state to state.

Some have argued that public-sector employees may not enjoy greater employment security than similar private-sector workers. For instance, Munnell et al. (2011) point out that employment levels for public employees have risen and fallen roughly in parallel to that of private-sector workers.⁹⁷ But this does not imply that job security is similar between the two sectors. For instance, if private sector unemployment rises from 6 to 8 percent while public sector unemployment rises from 2 to 4 percent, public employees nevertheless continue to have greater job security than private-sector workers.

Others have pointed to the decline in state and local government employment over the past several years as evidence that public employees lack job security.⁹⁸ However, data from the Bureau of Labor Statistics Job Openings and Labor Turnover Survey indicate that, while there have been layoffs in the public sector, layoffs have *not* been the main cause of reduced state and local government employment. For instance, the state and local government layoff rate rose from 5.6 percent of the workforce in 2001-2008 to 6.4 percent in 2009-2012, a 0.8 percentage point difference.⁹⁹ However, the hiring rate for new employees fell by more than three times that amount, from 17.7 to 14.9 percent. While there are exceptions, reductions in public-sector employment appear to be predominantly attributable to attrition, not involuntary job losses.

We have not argued that public employees have a job *guarantee*; we have shown, however, that state government employees have a far lower chance of becoming unemployed than private-sector

workers with similar qualifications. And this extra job security has a value. Labor economics holds that non-pecuniary differences between occupations, such as job security and work conditions, will be reflected in wages and other forms of compensation. To recruit employees to jobs with unattractive or unpleasant attributes – such as a lack of job security – employers must pay a compensating wage premium. Likewise, employees will accept lower wages or benefits if the other attributes of their job are particularly attractive.¹⁰⁰

Job security is not simply one among many non-pecuniary job characteristics. Human resource surveys show that job security is ranked alongside salary and benefits as the most important attributes of a position. For instance, the Society for Human Resource Management’s 2010 Employee Job Satisfaction Survey found that job stability was judged even more important than either benefits or salaries among workers surveyed.¹⁰¹ Other human resources studies have found job stability ranked equally with salaries and benefits, with other job amenities trailing significantly behind.¹⁰² Academic research also finds that job security ranks alongside pay and benefits and well ahead of other job attributes.¹⁰³

Differences in job security between public and private occupations mean that a simple comparison of wages and benefits will not fully account for the value of the respective compensation packages. Such simple comparisons are akin to comparing the returns on stocks and bonds without considering differences in their risk. Like a bond, a low-risk job may offer a lower expected payout; like a stock, a high-risk job must offer more.

The wage differential paid to compensate for unemployment risk should be greater than the expected value of income lost to unemployment, for several reasons. First, unemployment is most likely to occur at times when the economy is depressed, meaning that the individual loses income when the availability of other income sources is low. Second, unemployment is disruptive even if the worker quickly finds a new job. He must conduct a job search, attend job interviews, alter daily work schedules, and possibly lose personal and professional relationships established in his prior job. A spell of unemployment is *not* the same as period of unpaid vacation. Survey data indicate that the unemployed have significant feelings of anxiety, stress, and other negative emotions, particularly as the duration of unemployment continues.¹⁰⁴

While there is little disagreement that compensating wage differentials exist, the academic literature notes the difficulty in discerning such effects from the data. The principal reason is that the variables offered in most datasets – such as years of education or experience – are “broad buckets” that allow for variation in human capital among seemingly similar individuals. For instance, the experience

variable used in most wage regressions reflects only potential experience – the maximum years the individual could have worked – but does not track actual years in the workforce. Likewise, the education variable cannot distinguish the average college graduate from a person who earned a high GPA at a highly-selective school.

As a result, workers who appear similar may have different levels of productivity. All workers, regardless of productivity, will balance monetary compensation against job amenities, but more productive workers will tend to get more of both – that is, both higher pay *and* better amenities. Less productive workers, by contrast, will receive less pay and fewer non-pecuniary amenities. Hwang et al (1992) show that these unobserved productivity differences can cause researchers to understate true compensating wage differentials or even find the wrong sign—meaning, for instance, that jobs with less security would deceptively appear to pay *lower* wages. Analysis based on standard data sources and approaches is “likely to severely underestimate workers’ willingness to pay for job attributes.”¹⁰⁵ Some studies have argued that the difficulty in isolating job security-related wage differences in standard datasets means that they are of little importance.¹⁰⁶ However, as the research cited above explains, one would not *expect* to easily isolate compensating wage differences in datasets such as the ACS or CPS.

Researchers have adopted two approaches to addressing these problems. One approach is to use longitudinal datasets that follow individuals’ earnings volatility over time, rather than comparing earnings differences among individuals at a single point in time. Because the same person is being analyzed, the effect of unobserved productivity differences is minimized. Feinberg (1981) used the Panel Study of Income Dynamics to show that “a significant part of average hourly earnings represents compensation for earnings-risk.”¹⁰⁷ For the average earner in Feinberg’s analysis, roughly 16 percent of hourly earnings were compensation for volatility of earnings from year to year. Dillon (2012) also used the PSID, finding that compensation for earnings risk accounts for 17 percent of differences in overall pay between occupations.¹⁰⁸ For instance, she found that employees in financial occupations, which have both high average earnings and high earnings risk, would be willing to give up 20 percent of their earnings in order to avoid all earnings risk. Cubas and Silas (2012), using the Survey of Income and Program Participation, also find a correlation between earnings risk and salary levels between occupations.¹⁰⁹

Other researchers have maintained the use of cross-sectional analysis, but narrow the range of unobserved productivity differences by adding additional information to the standard wage regression. Kumar and Coates (1982) combined Canadian household survey data on personal characteristics such as education and experience with employer survey data on the skill requirements of different jobs. While

neither the household survey data nor the establishment data alone indicate a compensating wage differential for the risk of unemployment, Kumar and Coates use the combined dataset to show that a 1 percentage point increase in the unemployment rate for an occupation increases average wages by around 2.7 percent.¹¹⁰

It is difficult to apply the results of the Feinberg and Dillon longitudinal analyses to the cross-sectional data in the ACS or CPS. However, based on the Kumar-Coates figures, the effective value of job security for state government employees would range from an additional 2 to 18 percent of wages, based on state-by-state differences in public and private sector unemployment rates, with a mean value of 11 percent.

Estimating the value of job security for state government employees

As discussed above, data quality issues make it difficult to discern the values of compensating wage differentials for the risk of unemployment. For that reason, we turn to a simple expected utility model.

To illustrate the underlying logic, consider a simple game involving the flip of a coin. If the coin comes up heads, you receive \$100; if it comes up tails, you receive nothing. Thus, you have an *expected* gain of \$50, but no guarantee of anything. You are then offered a second option: receive a guaranteed cash payment in lieu of the coin flip. The question is, what is the lowest guaranteed payment you would accept rather than take the 50-50 chance of winning \$100? A person who was indifferent to risk would demand \$50, the expected value of the bet. But most individuals are risk-averse, meaning that they will accept a lower certain amount over a higher amount that comes with risk. The lower amount is referred to as a “certainty equivalent” value. And the more risk averse an individual is, the lower the certainty equivalent value he or she will accept. Some might demand \$40, while others might willingly accept only \$25.

Employment risk presents choices very similar to the simple game above. Some jobs have a great deal of employment risk, with a significant chance of being laid off due to the business cycle or poor performance. Other jobs have much greater job security. The question is, how much of a wage increase would employees demand to accept a job where employment risk is greater? Likewise, how much less would they accept to enjoy greater job security? Quantifying this compensating wage differential is more complex than in the coin flip game, but the underlying logic is the same.

To begin, we define a term called the Total Security Wage. For a given job, the Total Security Wage is the salary that workers would accept assuming there was *no* risk of unemployment. Obviously, the Total Security Wage will be lower than the actual wage, since all real jobs – including those in the public sector – carry *some* chance of dismissal. But how do we calculate this Total Security Wage? We begin with a plain-English discussion, then examine some of the numerical assumptions and calculations in greater detail.

A worker in a job with employment risk earns a given level of salary and benefits while on the job. Assuming he is not fired or laid off, he enjoys some level of well-being or “utility” from his compensation. This well-being can be quantified through a utility function that is commonly used by economists (and is explained in greater detail below). However, if that employee is fired or laid off, he goes through a period of unemployment in which his income is reduced and the utility he enjoys is lower. The expected utility he derives from the job is the weighted average of the two outcomes, reflecting both the income received while working and the risk of lost income through unemployment.

Using the same utility function, we can convert that expected utility back into a single dollar amount, which represents the Total Security Wage. This dollar amount, like the certainty equivalent value in the coin flip gain, will be less than the expected pay for the job. The Total Security Wage represents the lower salary the employee would agree to if his employment risk were reduced to zero. The pay difference between the job with employment risk and the Total Security Wage represents the compensating differential for job security. By definition, workers would be roughly indifferent between the lower-paid job with greater employment security and the higher-paid job with less employment security.

In practice, calculating the job security premium is more involved because neither private- nor public-sector jobs have perfect job security. In both cases there is the chance of dismissal, but state government employees have a significantly lower chance of becoming unemployed. To account for this, we perform the calculation detailed above twice, once for private-sector jobs and once for public-sector ones. Assuming equal pay in each job, the Total Security Wage will be lower for private-sector workers because their jobs carry greater employment risk. Put another way, a greater share of the private-sector wage is compensation for employment risk. Dividing the Total Security Wage for state employees by that for private-sector workers and subtracting one gives us the percentage job security premium for public-relative to private-sector positions.

The above paragraphs explain the underlying logic of calculating the job security premium, but calculating the figures requires a number of assumptions:

- *Utility*: we use an isoelastic/CRRA utility function of the form

$$u(c) = \frac{c^{1-\rho}}{1-\rho}$$

where u is the utility derived from consumption c , and ρ is the coefficient of constant relative risk aversion (CRRA). The CRRA value represents the degree to which an individual desires security and dislikes uncertainty. The utility function does not incorporate the value of additional leisure time when unemployed, on the assumption that this time is qualitatively different than leisure time when employed.

- *Risk aversion*: for state government employees we assume a CRRA of 5.4, which Munnell, Haverstick, and Soto (2007) derived for public employees from the Panel Study of Income Dynamics.¹¹¹ This figure is higher than the CRRA of 2.8 found in the PSID for private sector workers, indicating that public employees are on average more risk-averse.¹¹²
- *Unemployment rates*: State-specific unemployment rates are obtained from the American Community Survey for non-public safety state government employees and private sector workers with similar earnings-related characteristics.
- *Duration of unemployment*: We use state-specific values for 2009 derived from the Current Population Survey and reported in Anderson (2010).¹¹³ The average value in 2009 was 22 weeks, versus a current national average of around 37 weeks and a 2007 average of 16 weeks. The 2009 figure is roughly consistent with unemployment durations in the recessions of the early 1980s, early 1990s, and early 2000s. These figures may be considered conservative with regard to public employees and their private counterparts, as the duration of unemployment is generally higher for educated and professional employees.¹¹⁴ The job security premium rises rapidly along with the assumed duration of unemployment.
- *Unemployment Insurance*: We assume that state government employees are eligible for the maximum benefit paid in their state. The average maximum weekly benefit for 2009 is assumed to be \$413, ranging from a low of \$210 in Mississippi to a high of \$900 in Massachusetts. Less generous unemployment insurance payments increase the value of job security.

- *Eligibility for benefits:* Not every unemployed person is eligible to receive Unemployment Insurance benefits. Workers who were fired for cause or who had insufficient job tenure prior to unemployment usually cannot receive benefits. We use state-specific data for 2009 gathered by the National Employment Law Project showing the percentage of unemployed workers who are eligible for benefits. Because public employees and their private counterparts tend to be more educated and hold white collar jobs, we assume their eligibility rates will be higher than the average.¹¹⁵ On average, 59 percent of unemployed workers are assumed to be eligible for benefits, ranging from a low of 31 percent in South Dakota to a high of 83 percent in Pennsylvania.

We calculate utilities of income depending on whether the individual does or does not become unemployed in a given year. Expected utility is the probability-weighted sum of the utilities of income in the cases when the individual is discharged and when he is not:

$$E[u(c)] = p \cdot u(c)_d + (1 - p) \cdot u(c)_w,$$

where p is the probability of discharge, $u(c)_d$ is utility if discharged and $u(c)_w$ is the utility of income if the individual works throughout the year. We then convert the expected utility of income back to a dollar figure denoted as the Total Security Wage. The percentage difference between the actual wage and the Total Security Wage represents the compensating wage differential paid to a state job relative to an otherwise similar position with zero employment risk.

By comparing the Total Security Wages for state government and private-sector employees, we calculate the job security premium for state workers.

$$jsp = \frac{TSW_s}{TSW_p} - 1$$

These figures are reported below.

But first it is worth discussing some general factors influencing the size of the job security premium. The premium will obviously be higher in a state in which there is a greater difference in unemployment rates between public and private workers. More subtly, the premium depends upon whether unemployment is short or long-term. Consistent with empirical findings in Hamermesh and Wolfe (1990), the duration of unemployment in our model is more important than the probability of discharge.¹¹⁶ Holding the unemployment rate constant, job security is more valuable when unemployment

is infrequent but of long duration than when unemployment is frequent but lasts only a short period. The logic is that most workers could accommodate a short loss of income through savings or borrowing, but extended unemployment is more disruptive.

The premium also rises with the income of the employee. This is somewhat counterintuitive, as in a standard utility function additional dollars of income bring decreasing improvements to well-being. However, because unemployment insurance benefits are capped, the income reduction for a highly-paid worker who loses his job will be larger than for a low- or middle-earning employee.

Similarly, the job security premium will be lower in states with more generous unemployment insurance policies, as higher benefits protect individuals from the income loss due to unemployment. The job security premium will also be lower in states in which a larger share of unemployed workers are eligible for benefits.

The average job security premium for state government employee job security is 5 percent of total compensation, with a low value of 0.4 percent for Alaska state employees and a high value of 11 percent for state government employees in Michigan. While other factors matter, Alaska is a state with low private-sector unemployment, thereby reducing the value of public-sector job security, while private-sector unemployment in Michigan is relatively high.

The job security premium tends to be correlated with the salary/benefits premium, meaning that states with higher pay and fringe benefits also tend to grant their employees greater job security. Thus, including job security does not greatly alter the rankings of different states with regard to public employee compensation, but it does widen the distribution of outcomes. For instance, Virginia's 3.5 percent job security premium is sufficient to shift it from a compensation penalty of about 6 percent to a penalty of around 2 percent. Connecticut, which is the highest-paid state with a paid compensation premium of 42 percent, increases its total premium to 55 percent when its 9.6 percent job security premium is included.¹¹⁷

Figure 13 shows total compensation premiums or penalties for state government employees, inclusive of the value of job security. Since every state offers greater job security to its employees – even after controlling for worker skills – the inclusion of job security increases relative compensation for all state employees. But the increase is not uniform across states, of course, because of different levels of job security and related factors in each state.

Non-job security factors

While job security is the most important non-pecuniary job characteristic, other factors may also influence pay. For instance, compensating wage differentials might be paid in exchange for dangerous, unpleasant or stressful jobs. Likewise, jobs may pay lower salaries if they are intrinsically rewarding or help build skills for future employment.

Some have argued that, even if job security has a value for public employees, it may be outweighed by other negative characteristics of public employment.¹¹⁸ Quinn (1979) examined a number of non-job security employment characteristics for federal, state, and local employees, concluding that they do not differ dramatically between sectors, implying that a large compensating wage differential is unlikely to be justified.¹¹⁹ We perform a similar analysis using data from the Occupational Information Network (O*NET),¹²⁰ which includes a large number of variables describing work conditions and other characteristics of different occupations.

Using the O*NET Work Context file, we create four broad measurements of negative job characteristics:

- *Conflict*: addresses factors such as the frequency of conflict situations; working with unpleasant or angry people; and dealing with physically aggressive individuals.
- *Physical environment*: includes things such as working outdoors without protection from the weather; working in cramped or noisy conditions; being exposed to physically dangerous conditions; and so forth.
- *Physical demands*: addresses the physical demands of jobs, such as climbing, lifting, stooping, making repetitive physical motions, or being required to wear safety gear.
- *Job stressors*: includes factors such as working under time pressure, competition with others, the degree of automation of the job, the consequences of errors made by the employee, the irregularity of the work schedule, and similar factors.

For each occupation, O*NET numerically describes the degree to which each characteristic applies. For instance, for “time pressure” O*NET assigns a value of 1 when the occupation never is subject to time pressure; 2 when pressure occurs at least once a year but less than monthly; 3 when time pressure occurs monthly but not every week; 4 when time pressure occurs weekly but not daily; and 5

when time pressure occurs on a daily basis. For each occupation, we average the results for individual job characteristics to generate scores for our four broad categories.

For state government workers, we generate an average of the four negative job characteristics weighted by the proportion of state employees in each occupation. We then perform a similar analysis for private-sector employees whose age and years of education are within two years of the mean for state government employees. To crosscheck that this approach does not produce distorted results, we then repeat the analysis of state employees while restricting our analysis to state government employees whose age and education are within two years of the mean. (Table 5.)

These results do not indicate large negative job characteristics for state employees that would justify a significant compensating wage or benefits differential. The incidence of personal conflict is very similar for state and private workers. The physical environment and physical demands for private employees appears to be somewhat worse than for similar state government workers, and job stressors appear to be very similar.

Data from the International Social Survey Program (ISSP) can be used for similar analysis. The ISSP annually surveys individuals in 48 countries, supplementing each year's base survey with a module focusing on a specific issue. The 2005 supplement, titled "Work Orientations," provides responses to questions regarding respondents' desired non-pecuniary job characteristics and the degree to which their current employment fulfills these desires. Unfortunately, the ISSP does not differentiate between public employees at the federal, state and local levels. However, to the degree that governments at all levels share certain job characteristics, these findings may be informative.

Reponses are expressed on a one-to-five scale, with five designating strong agreement with the statement. (Figure 14.) U.S. public employees are more likely to state that their jobs are secure, interesting, helpful to other people and to society, not physically arduous, and skill-building. However, public employees also say that their jobs offer fewer opportunities to work independently and involve greater stress. There is no statistical difference between sectors in the reported danger of jobs.

Together, the O*NET and ISSP data indicate that one should not expect job characteristics other than employment security to play a major role, positive or negative, in setting pay for state government employees.

Tables and Figures

	Private sector	State government
Average salary	\$53,420	\$50,461
Weekly hours	43.7	41.9
Age (mean)	41	45
Married	54%	58%
Female	41%	58%
<i>Educational Attainment</i>		
Less than HS	11%	3%
HS	38%	24%
Associates degree	12%	13%
Bachelor's Degree	28%	32%
Master's degree	8%	18%
Professional degree	2%	6%
Doctoral Degree	1%	4%
<i>Race and Ethnicity</i>		
White	78%	76%
Black	9%	14%
Asian	5%	5%
Other	7%	5%
Hispanic	17%	9%
Immigrant	20%	10%
Notes: Tabulations are for employees who work at least 50 weeks per year and 35 hours per week. State government employees are in non-public safety occupations. Source: American Community Survey, 2009-2012.		

Table 3. Firm size adjustments to public employee wages

State	Adjustment
Alabama	-5.5%
Alaska	-4.3%
Arizona	-4.0%
Arkansas	-7.5%
California	-6.0%
Colorado	-3.6%
Connecticut	-5.9%
Delaware	-5.6%
Florida	-3.1%
Georgia	-3.7%
Hawaii	-4.0%
Idaho	-7.3%
Illinois	-5.2%
Indiana	-7.0%
Iowa	-8.1%
Kansas	-8.1%
Kentucky	-7.0%
Louisiana	-6.9%
Maine	-6.6%
Maryland	-5.3%
Massachusetts	-5.0%
Michigan	-6.3%
Minnesota	-7.2%
Mississippi	-6.2%
Missouri	-4.7%
Montana	-7.6%
Nebraska	-7.3%
Nevada	-3.7%
New Hampshire	-7.0%
New Jersey	-5.8%
New Mexico	-5.8%
New York	-8.2%
North Carolina	-5.1%
North Dakota	-7.1%
Ohio	-6.8%
Oklahoma	-5.0%
Oregon	-6.5%
Pennsylvania	-6.7%
Rhode Island	-7.2%
South Carolina	-5.0%
South Dakota	-7.7%
Tennessee	-4.0%
Texas	-5.2%
Utah	-2.4%
Vermont	-11.9%
Virginia	-5.7%
Washington	-6.8%
West Virginia	-7.6%
Wisconsin	-6.4%
Wyoming	-9.6%
Authors' calculations, Current Population Survey.	
Authors' calculations; Current	

Table 2. Total Compensation Categories		
Category label	Range	States
“Modest penalty”	-6% or less	Virginia
“Market level”	-5% to +5%	Kansas, Indiana, Minnesota, Georgia, West Virginia, Mississippi, South Dakota, North Carolina, Vermont, Colorado, Washington, South Carolina, Kentucky, Idaho, Arizona, Nebraska, Tennessee, Utah
“Modest premium”	+6% to +10%	Alaska, Missouri, Florida, Arkansas, Texas, Oklahoma, Maryland, Iowa, Montana, North Dakota, New Hampshire, Delaware
“Large premium”	+11% to +20%	Alabama, Louisiana, Wisconsin, Oregon, Ohio, Hawaii, Massachusetts, Nevada, Maine, New Mexico, Michigan
“Very large premium”	+20%	New Jersey, California, Rhode Island, Illinois, New York, Pennsylvania, Connecticut
Source: Authors’ calculations		

Table 4. The distribution of wages, benefits and total compensation by education level.						
Education Level	HS diploma	Some college	BA	MA	Professional	PhD
State-government employees						
State-private wage differential	-3%	-8%	-18%	-24%	-37%	-35%
State employee annual earnings growth	5%	5%	6%	7%	8%	7%
Elements of state government fringe benefits (percent of salaries)						
Pension compensation	24%	25%	28%	31%	40%	32%
Other earnings-based benefits	22%	22%	22%	22%	22%	22%
Flat-dollar benefits	38%	30%	25%	20%	13%	14%
Contributions						
Contributions delta	19%	14%	4%	-8%	-29%	-10%
Adjusted contribution rate	8%	8%	7%	6%	5%	6%
Adjusted pension compensation	27.6%	27.9%	28.6%	29.4%	30.8%	29.5%
Dollars						
Wages	33,854	42,940	51,578	62,834	97,685	89,309
Pension compensation	8,216	10,849	14,207	19,596	39,462	28,549
Other earnings-based benefits	7,448	9,447	11,347	13,824	21,491	19,648
Flat-dollar benefits	12,802	12,802	12,802	12,802	12,802	12,802
Total benefits	20,250	22,249	24,149	26,625	34,292	32,450
Total compensation	62,319	76,037	89,934	109,056	171,439	150,308
Private sector						
Wages	34,901	46,826	62,823	82,319	155,797	136,767
Earnings-based benefits	9,772	13,111	17,591	23,049	43,623	38,295
Flat-dollar benefits	7,573	7,573	7,573	7,573	7,573	7,573
Total benefits	17,345	20,684	25,163	30,622	51,196	45,868
Total compensation	52,246	67,510	87,987	112,942	206,993	182,635
Public-private compensation differential	19%	13%	2%	-3%	-17%	-18%

Table 5. Occurrence of negative occupational characteristics, by employee class				
Employee class	Conflict	Physical environment	Physical demands	Job stressors
State govt (all)	2.6	1.8	2.1	3.3
Private (age/ed match)	2.6	2.2	2.4	3.3
State govt (age/ed match to private)	2.6	2.0	2.2	3.3
Source: Authors' calculations based upon O*NET and ACS data.				

Figure 1. State employee wage differential versus comparable private sector employees

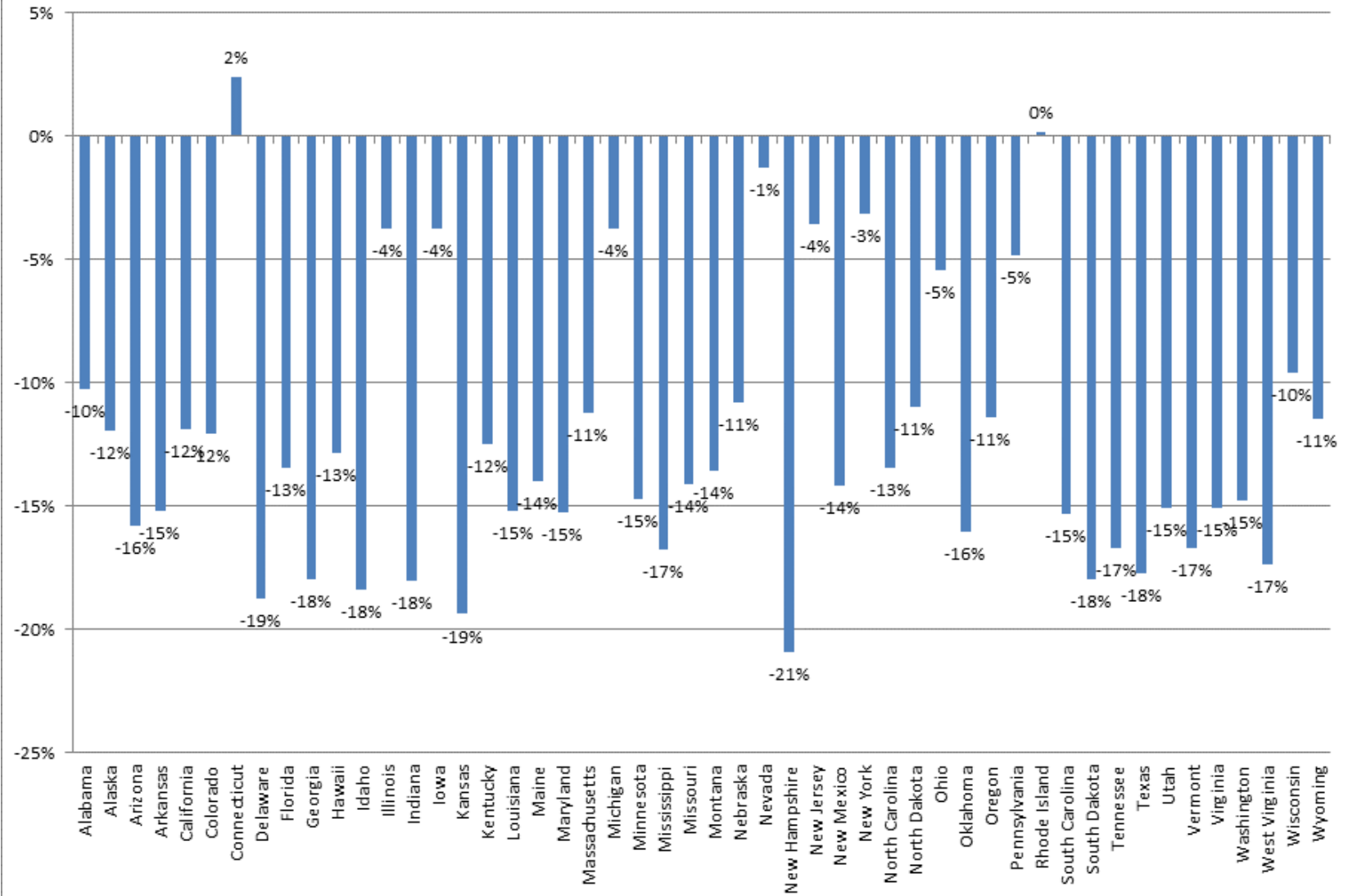


Figure 2. Employer-paid health premiums, state government and comparable private sector employees

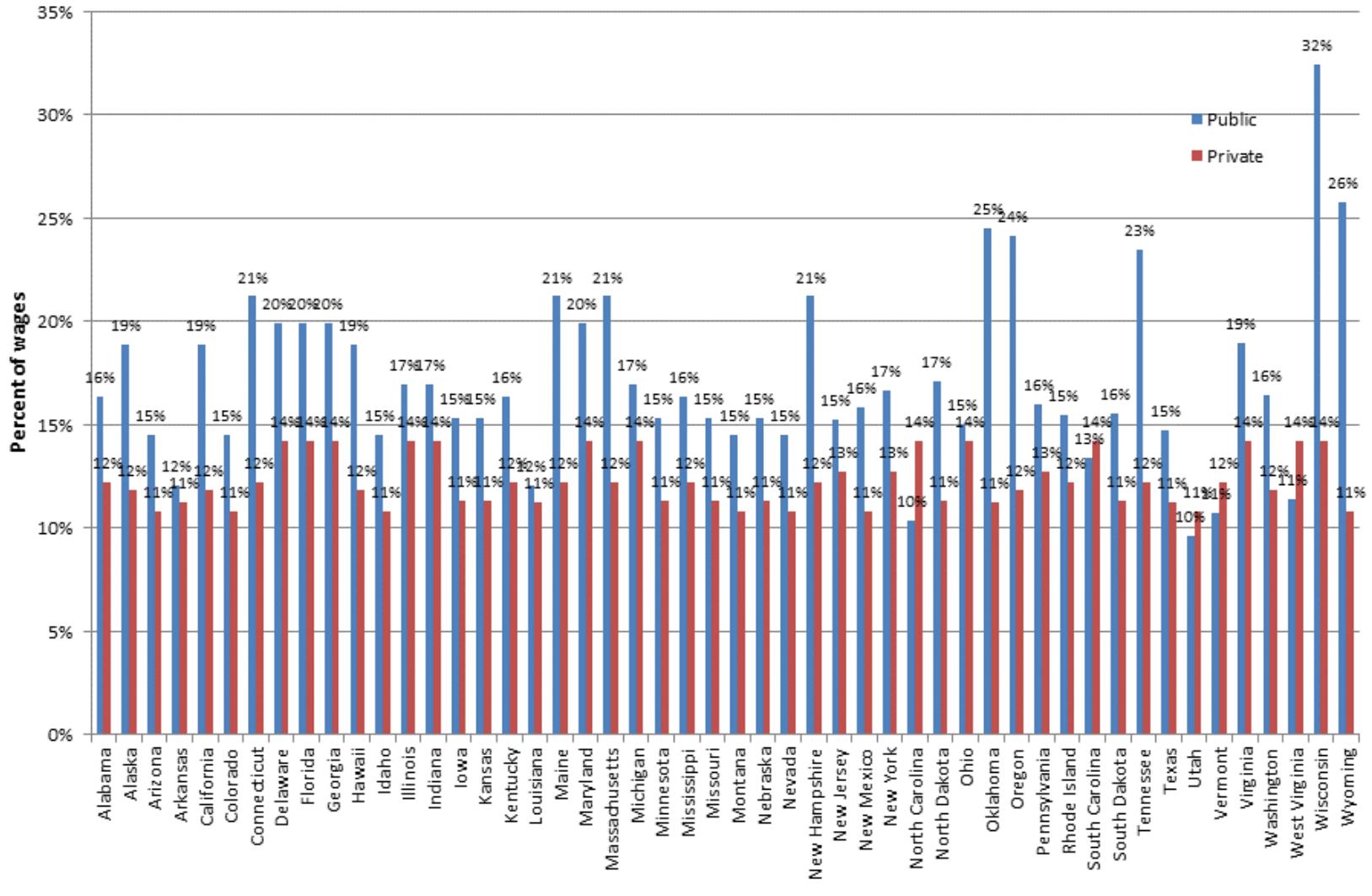


Figure 3. Combined DB, DC and Social Security pension compensation

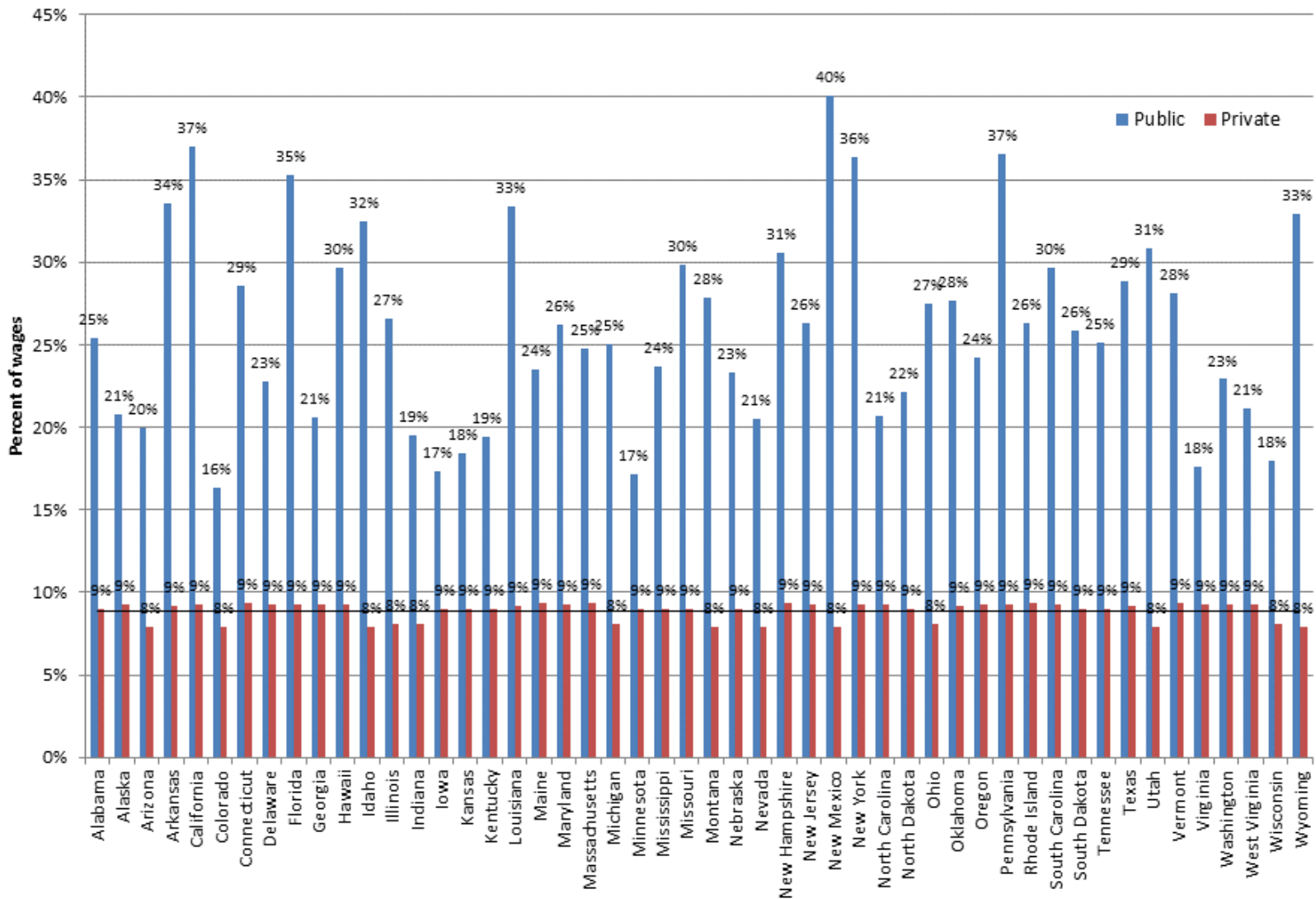


Figure 4. Value of accruing retiree health benefits

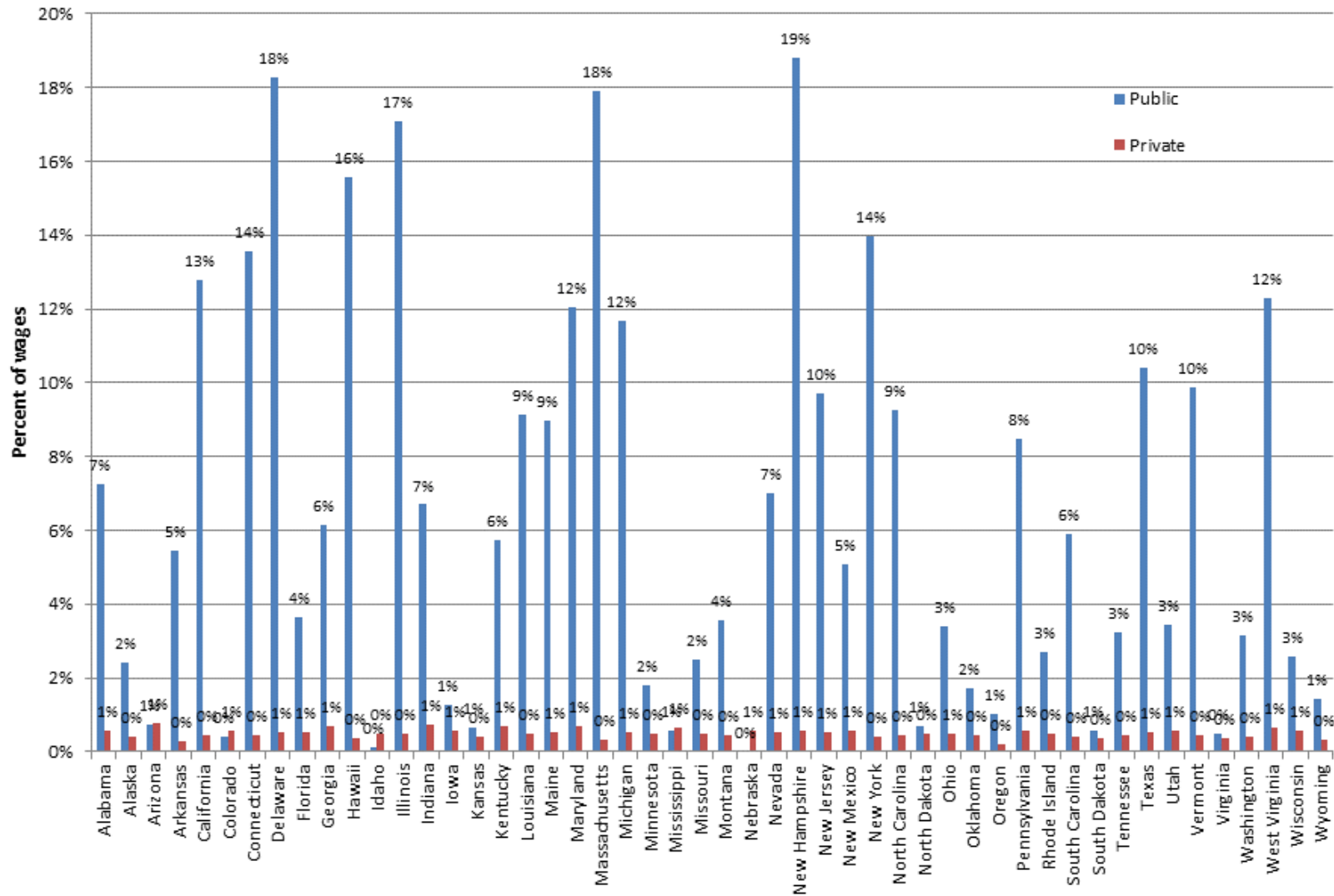


Figure 5. Total fringe benefits, state employees and comparable private sector workers

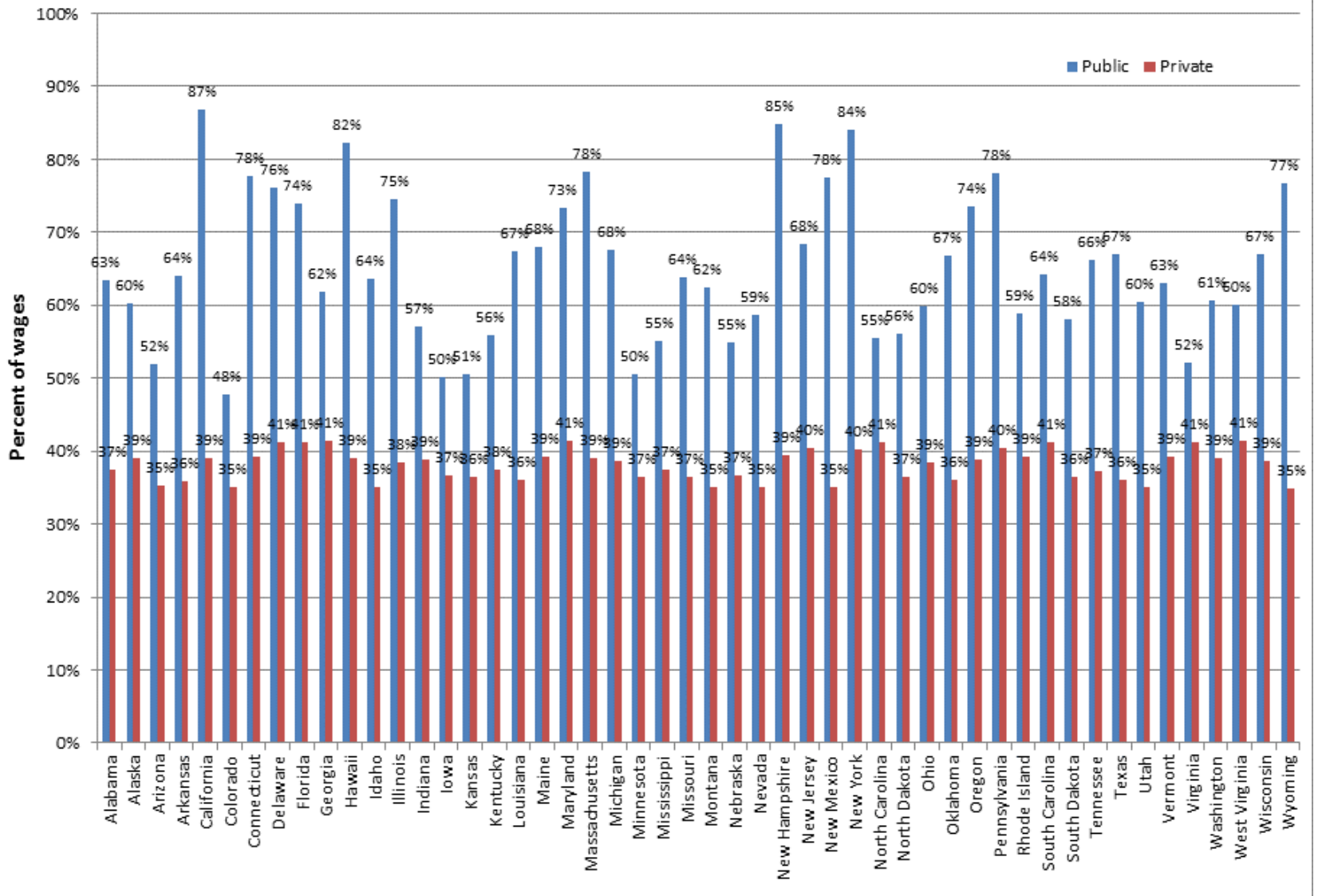


Figure 6. State employee total compensation differential versus comparable private sector workers

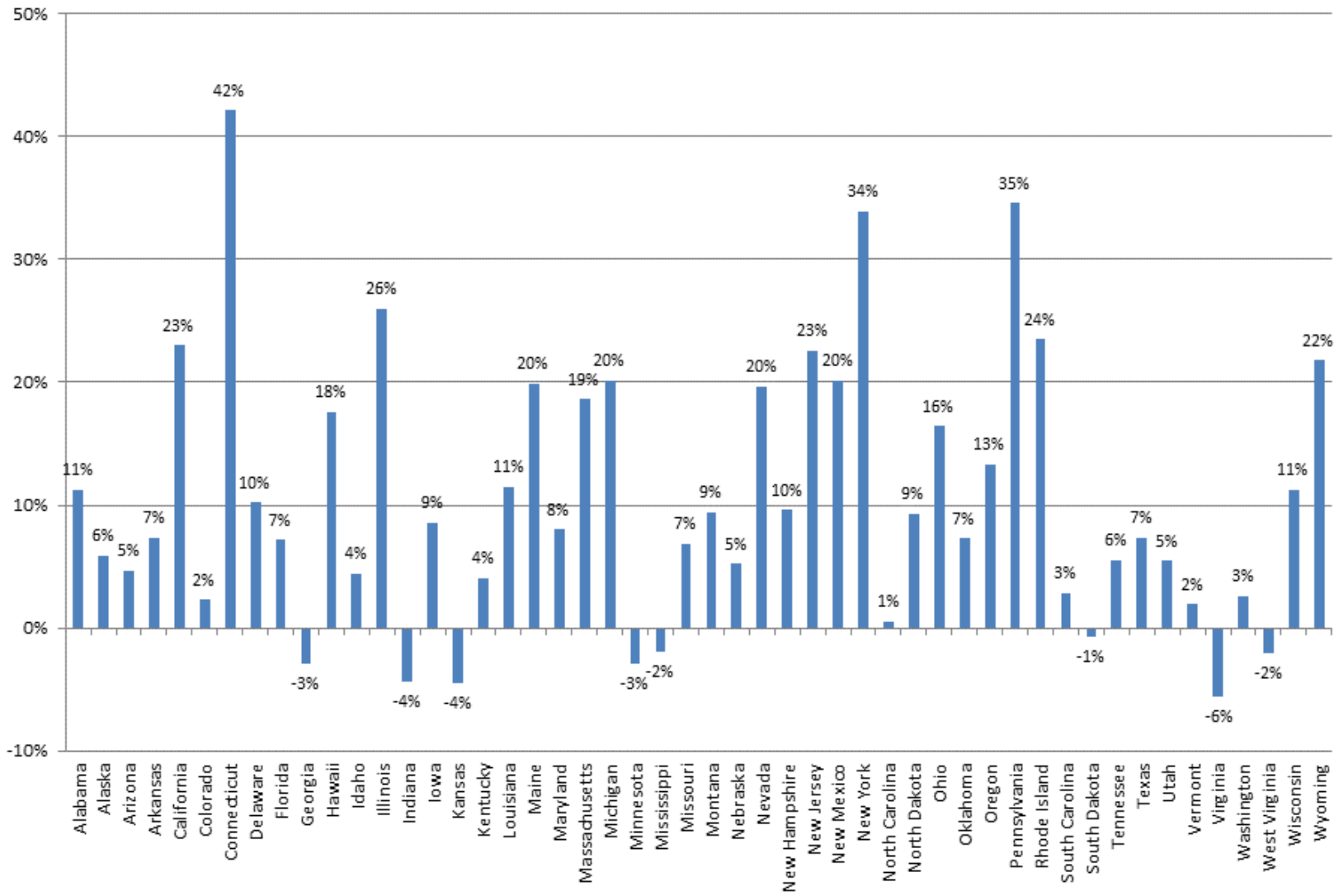


Figure 7. Wage and total compensation differentials by educational attainment

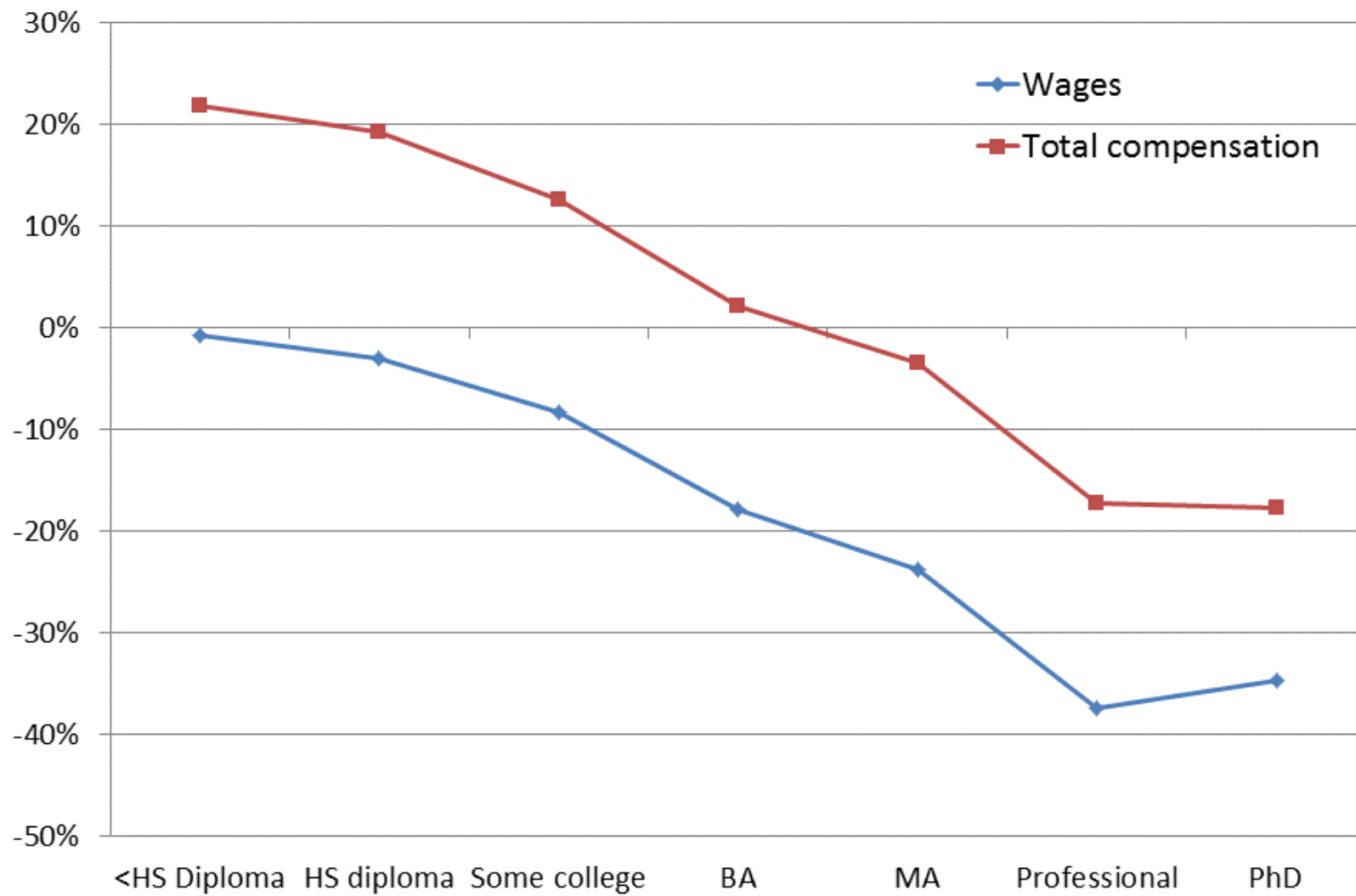


Figure 8. Unemployment rates for state government employees, comparable private sector workers, and all private sector workers, 2009-2011.

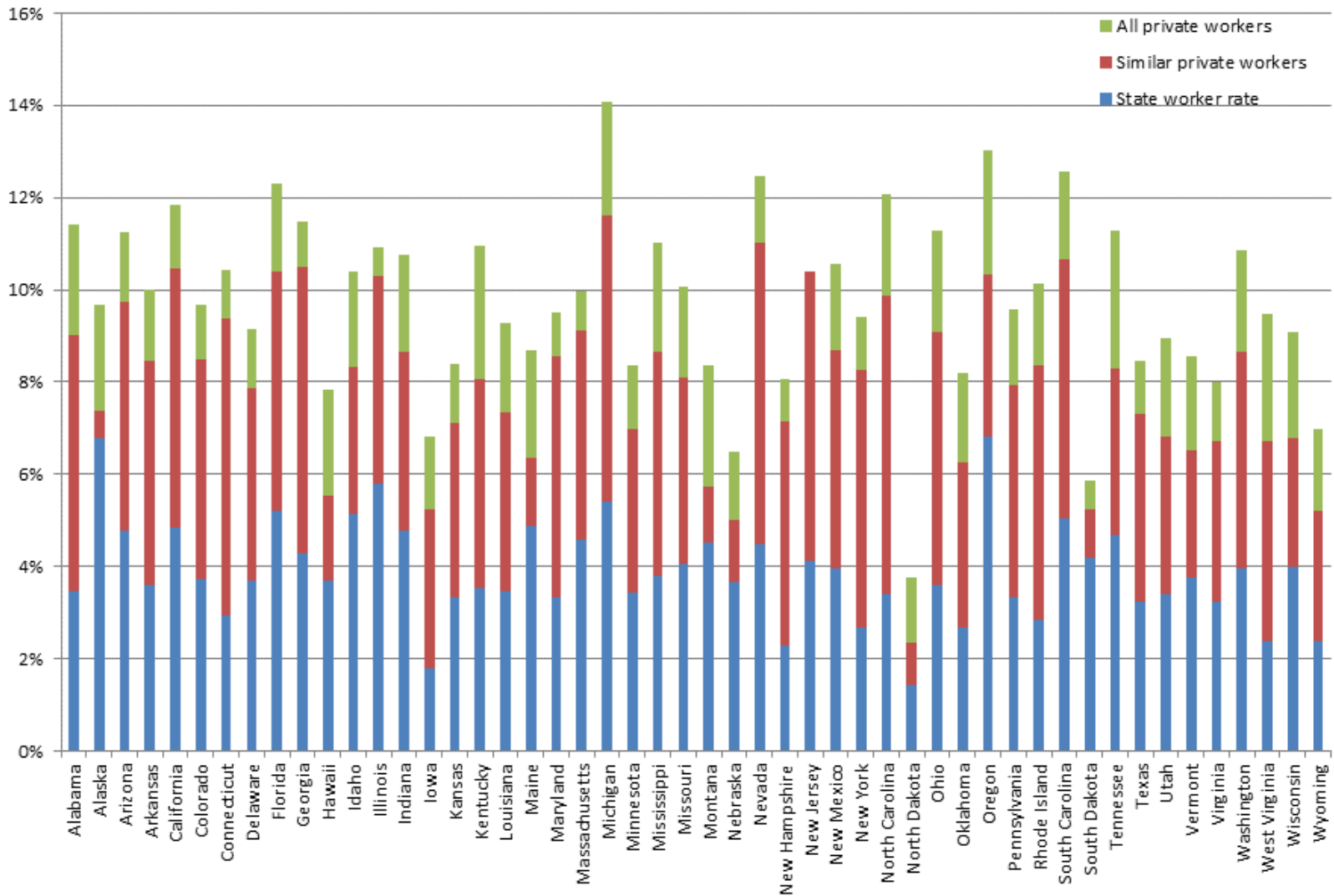


Figure 9. Value of state employee job security, as percentage of wages

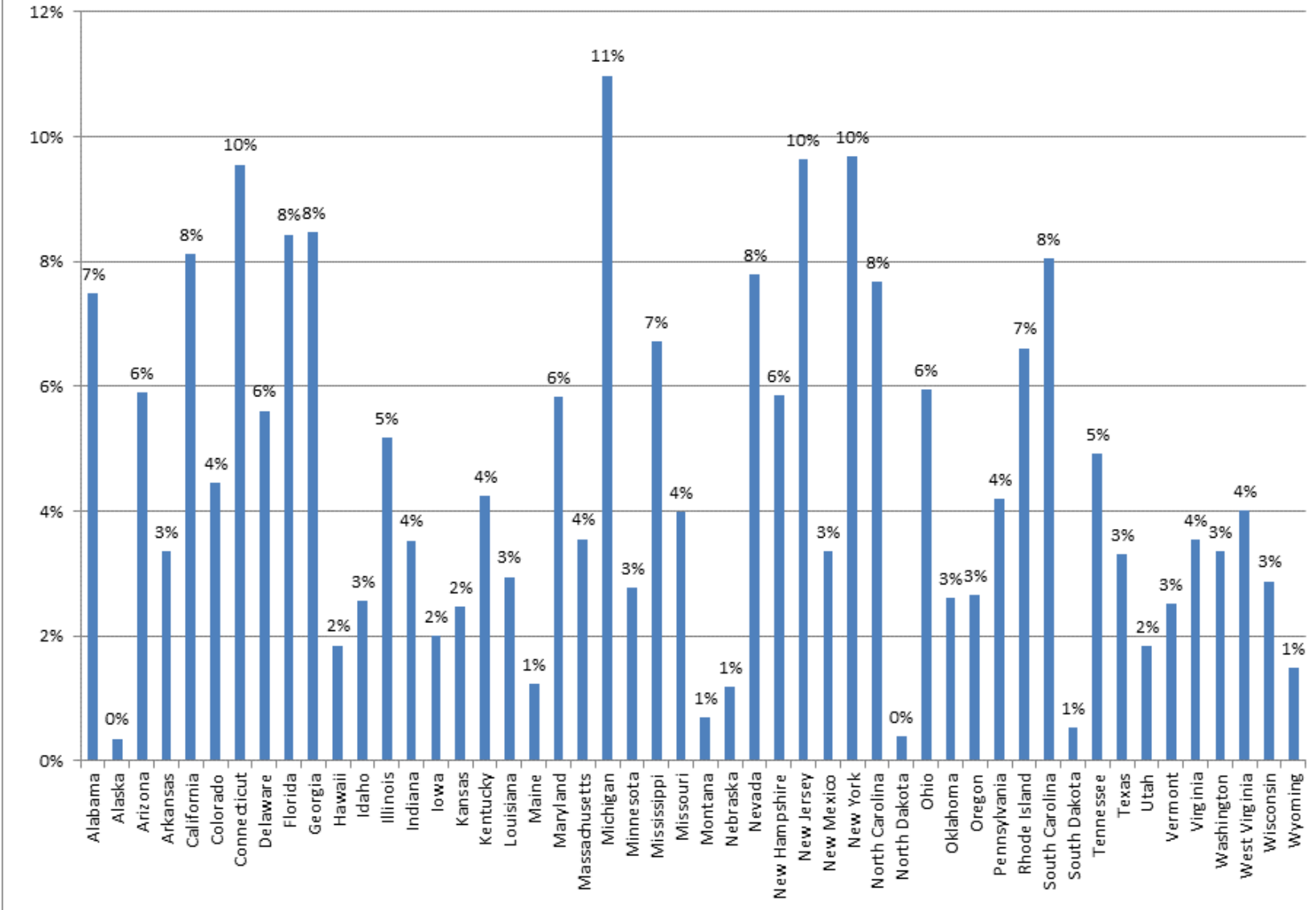


Figure 10. Occupational disamenities, state government and private occupations

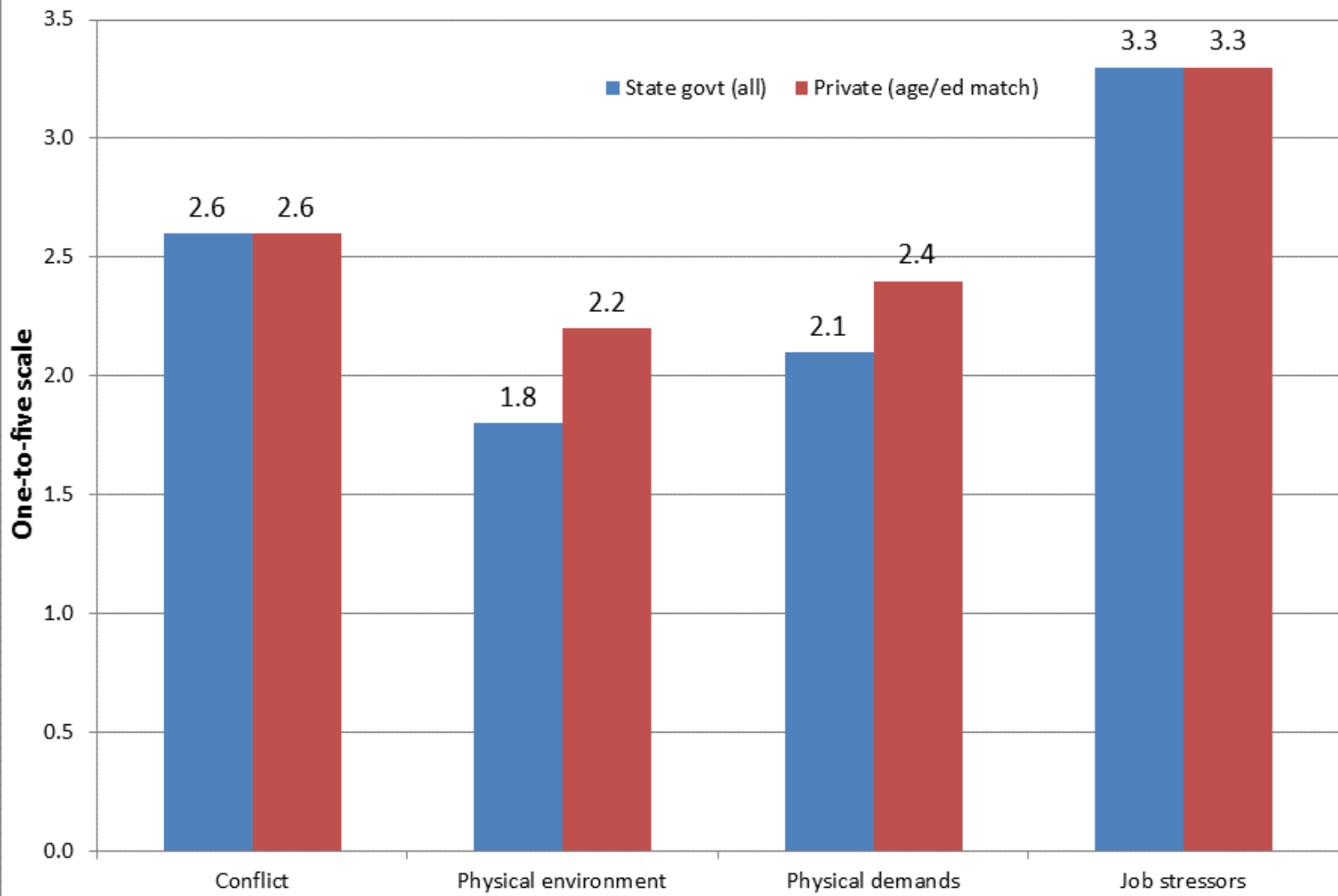


Figure 11. Total compensation differential and Ruger-Sorens (2013) economic freedom index score.

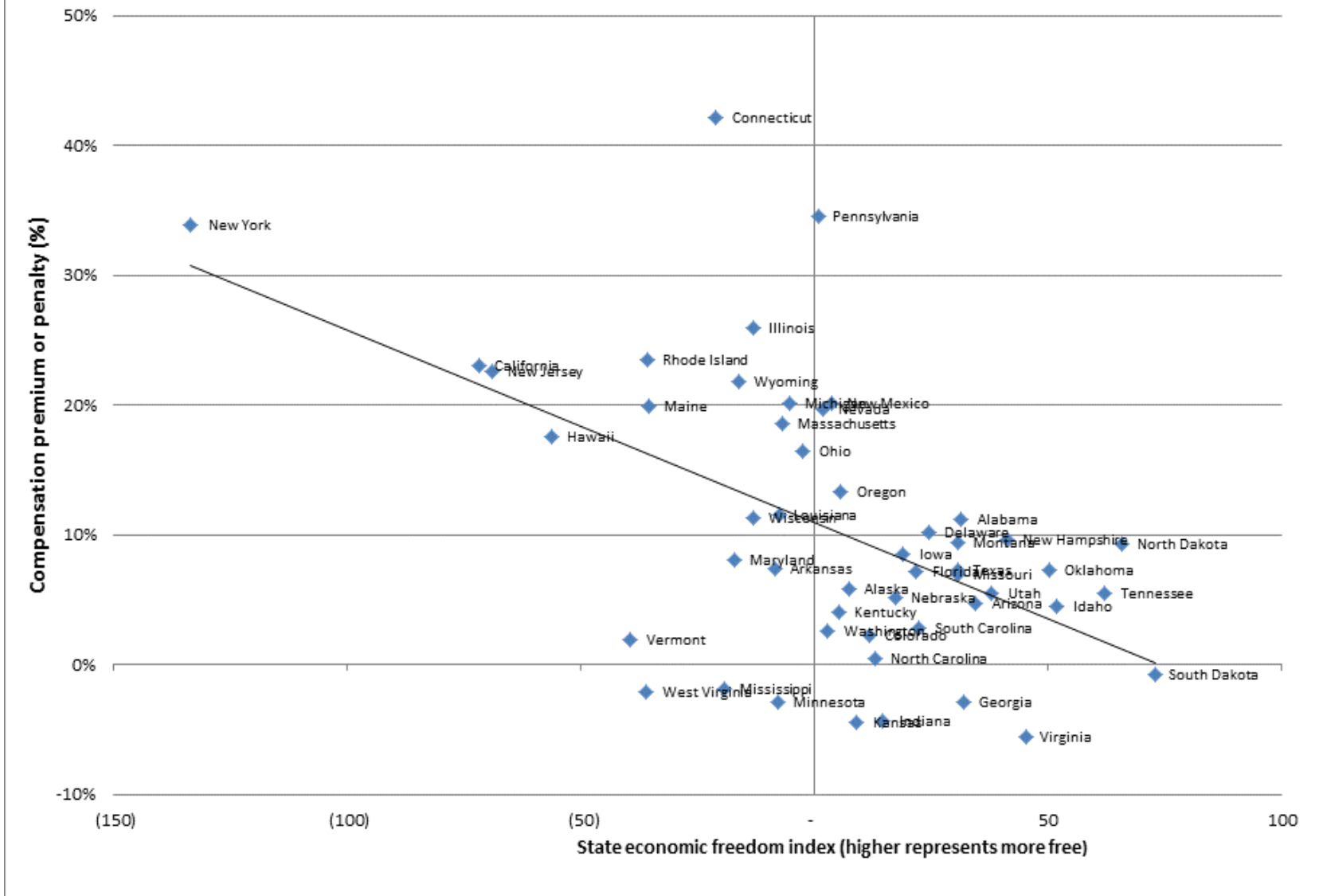


Figure 12. Total compensation differential and Keating (2013) small business index scores.

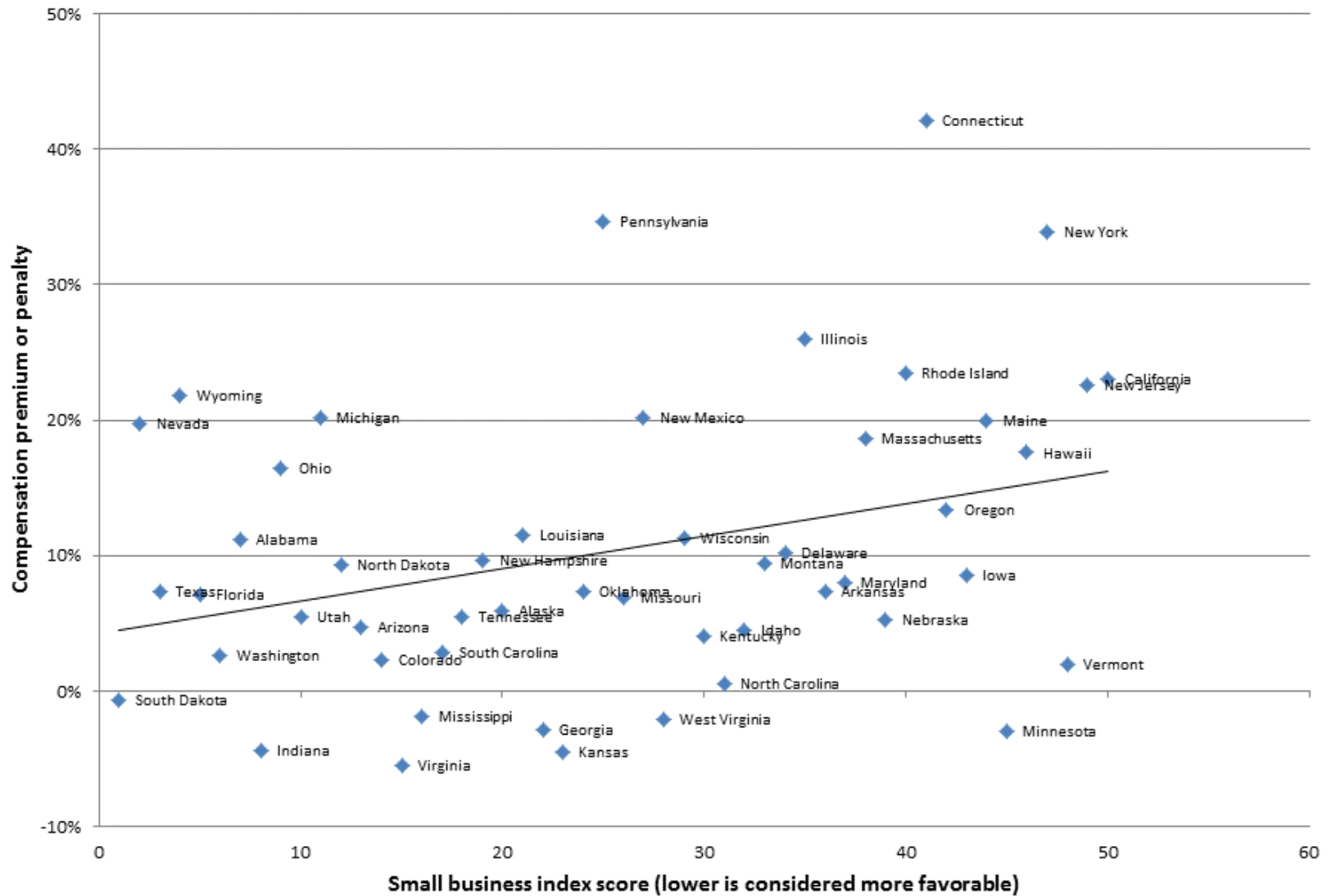


Figure 13. Total state employee compensation differential, inclusive of value of job security

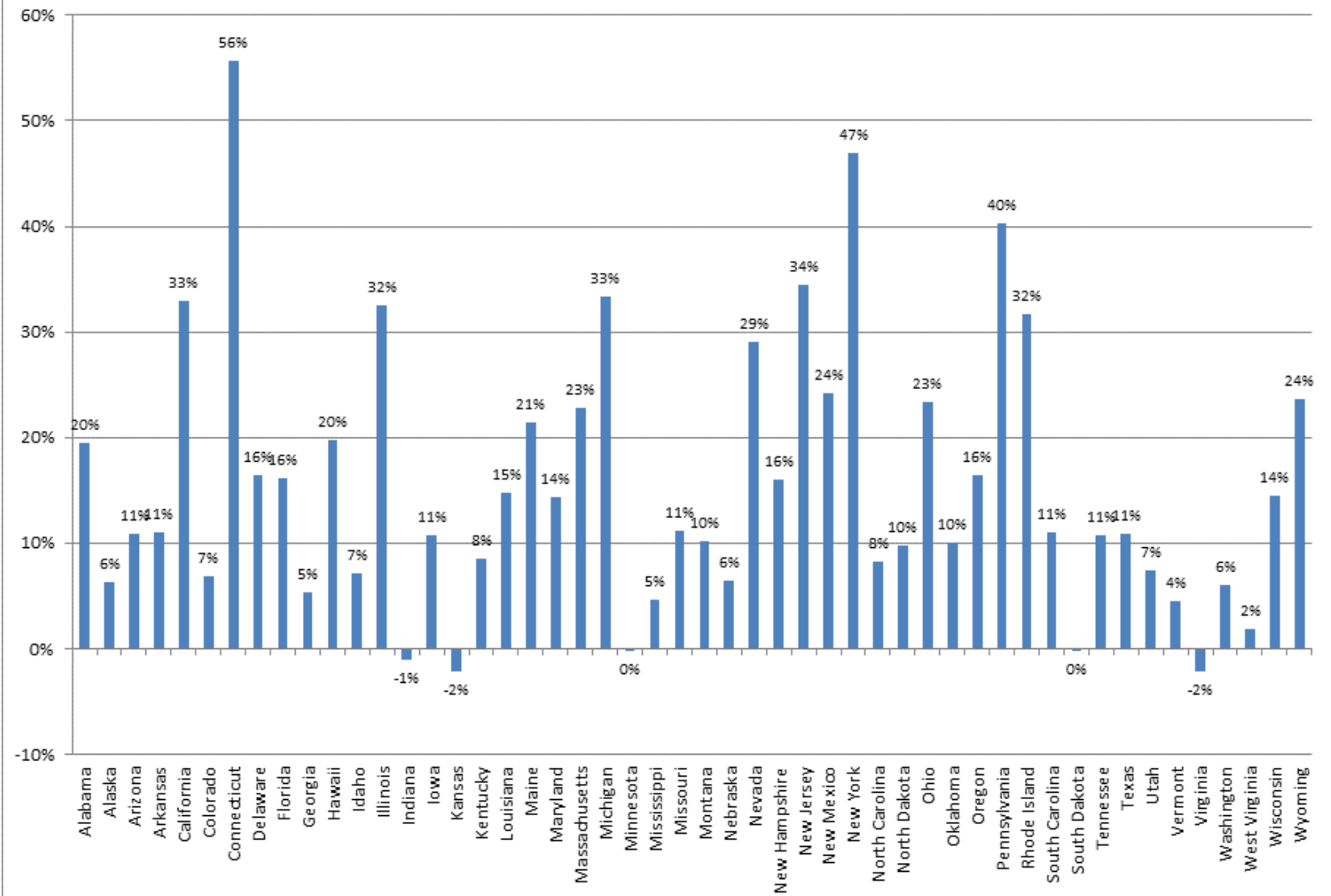
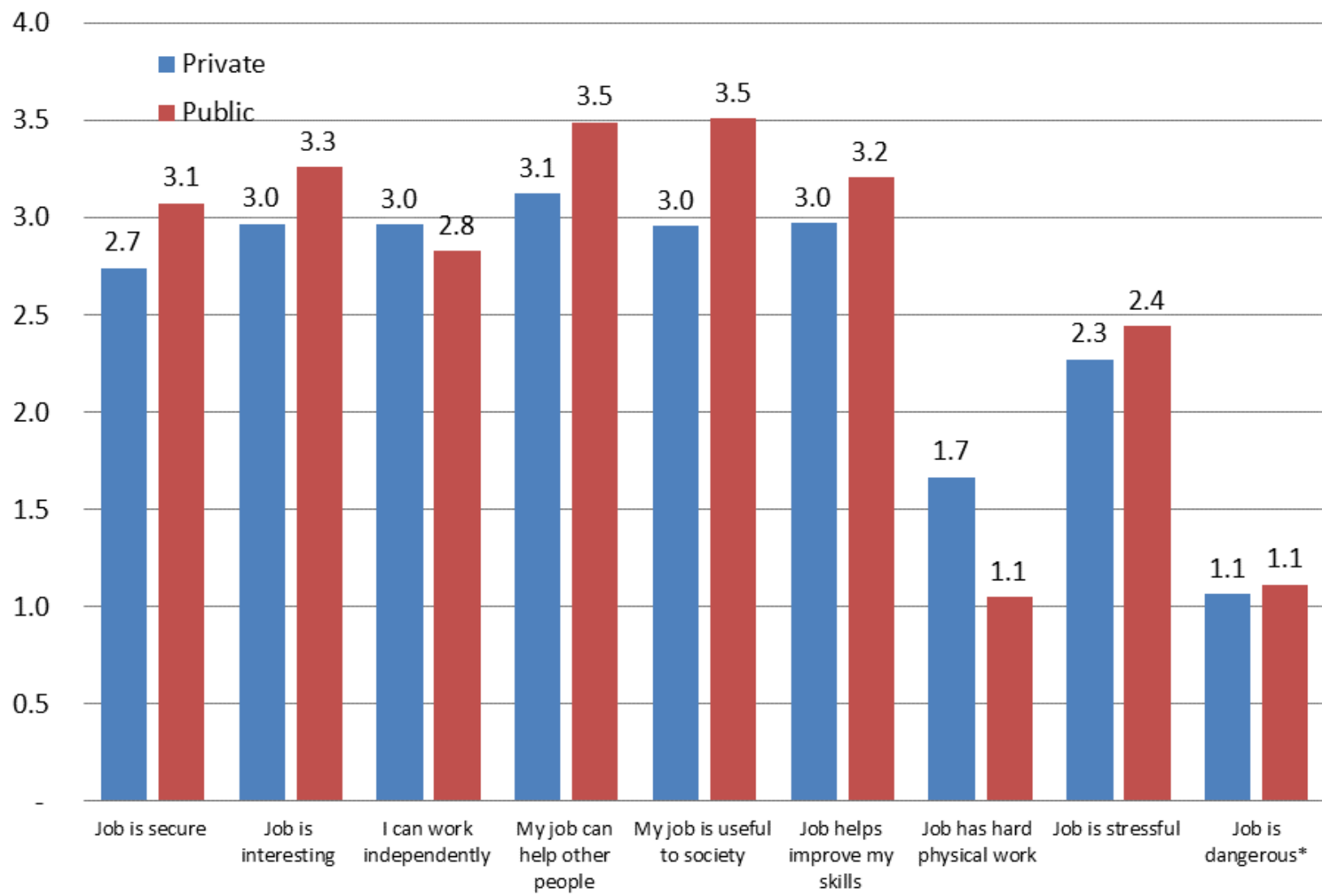


Figure 14. Non-pecuniary job characteristics, public and private sector. Source: ISSP, 2005.



Notes

¹ On this topic, see Morley Gunderson, “Earnings Differentials between the Public and Private Sectors,” *Canadian Journal of Economics*, Canadian Economics Association, vol. 12(2) (May 1979): 228-42.

² A brief review of the literature is included in the methodological appendix.

³ In theory, more dangerous occupations should pay a compensating wage differential. However, for reasons discussed at greater length in the section on valuing job security, this wage difference is not always easily distinguishable in standard datasets.

⁴ Congressional Budget Office, “Comparing the Pay of Federal and Nonfederal Law Enforcement Officers,” (August 2005).

⁵ In neither case, however, must we assume that these other factors would push pay premiums or penalties toward zero. It is possible that in a perfect comparison of public-private pay, states with pay penalties might have larger penalties, and states with pay premiums might have larger premiums.

⁶ These are years in which unemployment rates nationally were high. Note also that the ACS often reports somewhat different overall unemployment rates than the Current Population Survey, which is the source of official employment statistics. The ACS asks questions on employment status very similar to the CPS, but differs somewhat in how data are collected.

⁷ M.D. Fitzgerald, “How Much Do Public School Teachers Value Their Retirement Benefits ?” Department of Policy Analysis and Management, (working paper, Cornell University, 2011).

⁸ Sharon P. Smith, “Pay differential between federal government and private sector workers,” *Industrial and Labor Relations Review*, 29, issue 2 (1976): 179-197.

⁹ Alan B. Krueger, “The Determinants of Queues for Federal Jobs,” *Industrial and Labor Relations Review*, vol 41, no 4 (July 1988).

¹⁰ Steven F. Venti, “Wages in the Federal and Private Sectors” NBER Working Paper Series, Vol. w1641 (working paper, June 1985).

¹¹ Keith A. Bender and John S. Heywood, “Out of Balance? Comparing Public and Private Sector Compensation over 20 Years,” Center for State & Local Government Excellence (CSLGE), National Institute on Retirement Security, (April 2010).

¹² John Schmitt, “The Wage Penalty for State and Local Government Employees,” Center for Economic and Policy Research,(May 2010).

¹³ See, for instance, Andrew G. Biggs and Jason Richwine, “Finding Answers to the Public Compensation Question,” *Public Administration Review* (2012): 780-781; Andrew Biggs and Jason Richwine, “Comparing federal and private sector compensation,” American Enterprise Institute for Public Policy Research, AEI Economic Policy Working Paper 2 (working paper, 2011): 35-6; Andrew G. Biggs and Jason Richwine, “Public Vs. Private Sector Compensation in Ohio,” Ohio Business Roundtable, (2011); Jason Richwine and Andrew G. Biggs, “Assessing the Compensation of Public-School Teachers, A Report of the Heritage Center for Data Analysis,” (Washington, D.C.: Heritage Foundation, 2011).

¹⁴ Alicia Munnell, Jean-Pierre Aubry, Josh Hurwitz, and Laura Quinby, “Comparing Compensation: State-Local Versus Public Sector Workers,” (Chestnut Hill, MA: Center for Retirement Research at Boston College, September 2011).

¹⁵ Justin Falk, “Comparing Benefits and Total Compensation in the Federal Government and the Private Sector,” Congressional Budget Office Working Paper 2012-4 (working paper, January 2012).

¹⁶ Falk, Justin, “Comparing Wages in the Federal Government and the Private Sector,” Working Paper 2012-3 (Washington, DC: Congressional Budget Office, 2012).

¹⁷ Maury Gittleman and Brooks Pierce, “Compensation for State and Local Government Workers,” *Journal of Economic Perspectives* 26(1) (2011): 217-242.

¹⁸ For instance, see William Even and David Macpherson, “Methodology for Estimating Compensation Differentials for State and Local versus Private Sector Workers,” (WI: MacIver Institute, November, 2012).

¹⁹ D. Belman and J. S. Helman, “Public sector wage comparability: The role of earnings dispersion,” *Public Finance Review*, 32, (2004): 567–587.

²⁰ Government Accountability Office, “Comparison of Job Content with Grades Assigned in Selected Occupations,” GGD-96-20, (Nov 6, 1995).

²¹ M. Famulari, “What’s in a Name? Title Inflation in the US Federal Government,” (working paper, 2002), Revision requested by *Industrial and Labor Relations Review*.

²² Maury Gittleman and Brooks Pierce, “Compensation for State and Local Government Workers,” *Journal of Economic Perspectives* 26(1), (2011): 217-242.

²³ L.L. Taylor, “Comparing Teacher Salaries: Insights from the U.S. Census,” *Economics of Education Review*, 27(1), (2008): 48-57.

²⁴ For an example of analysis using ACS data on college majors, see Jonathan James, “The college wage premium,” Federal Reserve Bank of Cleveland. Economic Commentary 10 (2012): 2012-10.

²⁵ The displayed percentages are calculated by exponentiating the regression coefficient and subtracting one: $EXP(\text{coefficient}) - 1$.

²⁶ Blackburn, McKinley, “Estimating Wage Differentials Without Logarithms.” *Labour Economics*, vol. 14 (July 2007): 73–99.

²⁷ CBO (2012).

²⁸ See Jeffrey Keefe, “Are New Jersey public employees overpaid?” Economic Policy Institute (July 30, 2010) and other studies by the same author; Alicia H. Munnell, Jean-Pierre Aubry, Josh Hurwitz, and Laura Quinby. “Comparing Compensation: State-Local Versus Private Sector Workers,” Center for Retirement Research at Boston College, State and Local Pension Plans No. 20 (Chestnut Hill, MA: September 2011).

²⁹ William Even and David Macpherson, “Methodology for Estimating Compensation Differentials for State and Local versus Private Sector Workers,” (WI: MacIver Institute, November 2012).

³⁰ See Charles C. Brown and James Medoff, “Employer Size, Pay, and the Ability to Pay in the Public Sector,” in Richard Freeman and Casey Ichniowski, eds., *When Public Sector Workers Unionize*, (Chicago: University of Chicago Press, 1988).

³¹ William E. Even and David A. Macpherson, “Is bigger still better? The decline of the wage premium at large firms,” *Southern Economic Journal* 78.4 (2012): 1181-1201.

³² For instance, Gørlitz and Grave (2012) report that arts/humanities graduates in Germany are more likely to be employed by small firms or to be self-employed. Katja Gørlitz and Barbara S. Grave, “Wage Differentials by Field of Study – The Case of German University Graduates,” Ruhr Economic Paper No. 316 (February 1, 2012).

³³ See <http://www.bls.gov/news.release/ecec.toc.htm>

³⁴ The ECEC does implicitly include retiree health contributions in the small number of states in which the benefit is pre-funded.

³⁵ BLS, Employee Benefits Survey, “Healthcare benefits: Access, participation, and take-up rates. Table 9. Healthcare benefits: Access, participation, and take-up rates, State and local government workers, National Compensation Survey, March 2012.”

³⁶ BLS. Employee Benefits Survey. “Healthcare benefits: Access, participation, and take-up rates. Table 9. Healthcare benefits: Access, participation, and take-up rates, private industry workers,” National Compensation Survey, (March 2012).

³⁷ National Conference of State Legislatures, “2012 State Employee Health Benefits: Monthly premium costs,” Compiled by the NCSL Health Program, (July 2012).

³⁸ <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/govt/table06a.htm>

³⁹ <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/private/table06a.htm>

⁴⁰ <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/govt/table07a.htm>

⁴¹ <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/private/table07a.htm>

⁴² <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/govt/table11a.htm>

⁴³ <http://www.bls.gov/ncs/ebs/benefits/2012/ownership/private/table11a.htm>

⁴⁴ Dale Belman and John Heywood. “The Truth About Public Employees: Overpaid or Underpaid?” Economic Policy Institute. June 1, 1993.

⁴⁵ 2008 System of National Accounts (United Nations, et al., 2009).

⁴⁶ U.S. Department of the Treasury, “Daily Treasury Yield Curve Rates,” <http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/TextView.aspx?data=yield> (Accessed November 29, 2013).

⁴⁷ Barry Bosworth, “Comments on: Actuarial Measures of DB Pension Plans,” Presentation to Bureau of Economic Analysis (2012).

⁴⁸ See, for example, Keith A. Bender and John S. Heywood, “Out of Balance,” Center for State and Local Government Excellence, (April 2010), <http://www.slge.org/vertical/Sites/%7BA260E1DF-5AEE-459D-84C4-876EFE1E4032%7D/uploads/%7B03E820E8-F0F9-472F-98E2-F0AE1166D116%7D.PDF>; John Schmitt, “The Benefits of State and Local Government Employees,” Center for Economic and Policy Research (May 2010), <http://www.cepr.net/documents/publications/benefits-state-local-2010-04.pdf>; Sylvia A. Allegretto and Jeffrey Keefe, “The Truth About Public Employees in California: They Are Neither Overpaid Nor Overcompensated,” Center on Wage and Employment Dynamics *Policy Brief* (October 2010), <http://www.irl.berkeley.edu/cwed/wp/2010-03.pdf>; and Jeffrey Keefe, “Debunking the Myth of the Overcompensated Public Employee,” Economic Policy Institute *Briefing Paper* No. 276 (September 15, 2010), http://epi.3cdn.net/8808ae41b085032c0b_8um6bh5ty.pdf

⁴⁹ Marshall Reinsdorf, “Actuarial Measures of Defined Benefit Pension Plans for the National Accounts.” Presentation to BEA Advisory Committee Meeting (May 11, 2012).

⁵⁰ In general, short-term employees receive lower implicit returns from DB pensions while full-career employees receive higher returns. See Alicia H. Munnell, Jean-Pierre Aubry, Joshua Hurwitz and Laura Quinby, “Public Plans and Short-Term Employees,” NBER Working Paper No. w18448 (working paper, October 2012).

⁵¹ Alicia H. Munnell, Jean-Pierre Aubry, Josh Hurwitz, and Laura Quinby, “Comparing Compensation: State-Local Versus Private Sector Workers,” Center for Retirement Research at Boston College, State and Local Pension Plans No. 20 (Chestnut Hill, MA: September 2011).

⁵² Marshall B. Reinsdorf and David G. Lenze, “Defined Benefit Pensions and Household Income and Wealth,” Bureau of Economic Analysis, *Research Spotlight* (August 2009): 51, https://www.bea.gov/scb/pdf/2009/08%20August/0806_benefits.pdf

⁵³ Andrew G. Biggs, “Proposed GASB Rules Show Why Only Market Valuations Fully Capture Public Pension Liabilities,” *Financial Analysts Journal* 67 (March 2011): 1–5; and Andrew G. Biggs, “An Options Pricing Method for Calculating the Market Price of Public Sector Pension Liabilities,” *Public Budgeting and Finance* (Fall 2011).

⁵⁴ In Pennsylvania, employee contributions may rise up to 2 percentage points if plan investments underperform their projected rates. To account for this, we assume a 1 percentage point higher employee contribution, which reduces employee pension compensation by that amount.

In Nevada, employer and employees evenly split total plan contributions, including amortization payments for unfunded liabilities. Thus, plan risk is also evenly split between employer and employee. Employee pension compensation in this case is equal to the total cost at market value, divided by two. This significantly reduces pension compensation relative to a fixed employee contribution rate. Arizona calculates employee contributions in a similar way.

Beginning with reforms passed in 2011, Wisconsin splits the normal cost equally between employer and employees. Wisconsin state employees also receive post-retirement benefit adjustments that rise and fall based upon the performance of the plan’s fund, although benefits cannot fall below their starting value. Novy-Marx and Rauh estimate that this provision reduces overall Wisconsin Retirement System liabilities by around 12 percent. See Robert Novy-Marx and Joshua Rauh, “Linking Benefits to Investment Performance in US Public Pension Systems,” NBER Working Paper No. 18491 (working paper, October 2012). To link the two provisions, we first reduce the total normal cost for the WRS by 12 percent, then split it evenly between employer and employees.

In Iowa employees pay 40 percent of the total system contribution inclusive of amortization costs, with a limitation that employee contributions may not rise by more than one percentage point in a given year (which would be unusual in any case). Thus, we assume that Iowa employees bear 40 percent of the total normal cost at fair market value, which captures the risk of being required to finance unfunded liabilities.

Arizona passed similar legislation that would split the total pension contribution between employer and employees. However, employees sued under Arizona's constitutional protections for pensions and have won preliminary cases, with a final resolution expected by Arizona's state supreme court. For Arizona, we retain the assumption of a fixed employee contribution rate, though that could change in the future based upon the outcome of ongoing litigation.

Kansas recently enacted a cash balance plan that shares risk between employer and employees. However, because the cash balance plan will not be implemented until 2015 and will apply only to newly-hired employees, its effects are not modeled here.

⁵⁵ For elaboration of this point, see "Public Pension Fallacy #1" in: Jason Richwine, "Nine Fallacies Used to Defend Public-Sector Pensions," Heritage Foundation *Backgrounders* #2765 (February 5, 2013), <http://www.heritage.org/research/reports/2013/02/nine-fallacies-used-to-defend-public-sector-pensions>

⁵⁶ Richwine, "Public Pension Fallacy #4" in "Nine Fallacies"

⁵⁷ Donald L. Kohn, "Statement at the National Conference on Public Employee Retirement Systems Annual Conference," (New Orleans, LA: May 20, 2008).

⁵⁸ David Wilcox, Testimony before the Public Interest Committee Forum sponsored by the American Academy of Actuaries (September 4, 2008). Novy-Marx and Rauh present a similar argument; see Robert Novy-Marx and Joshua Rauh, "The Liabilities and Risks of State-Sponsored Pension Plans," *Journal of Economic Perspectives*, vol. 23, no. 4 (Fall 2009): 191–210. In analyzing federal employee pensions, the CBO used a discount rate 1 percentage point above the Treasury rate. However, the CBO explicitly noted that this was because federal pensions lack the legal protections that state pension plans like the WRS are entitled to.

⁵⁹ Marshall B. Reinsdorf and David G. Lenze, "Defined Benefit Pensions and Household Income and Wealth," Bureau of Economic Analysis. Research Spotlight, (August 2009). Also see David G. Lenze, "Accrual Measures of Pension-Related Compensation and Wealth of State and Local Government Workers," Bureau of Economic Analysis (April 2009).

⁶⁰ Congressional Budget Office, "The Underfunding of State and Local Pension Plans," (May 2011).

⁶¹ Justin Falk, “Comparing Benefits and Total Compensation in the Federal Government and the Private Sector,” Congressional Budget Office Working Paper 2012-4 (January 2012).

⁶² For details see http://www.igmchicago.org/igm-economic-experts-panel/poll-results?SurveyID=SV_87dlrIXQvZkFB1r

⁶³ Moody’s Investor Services, “Adjustments to US State and Local Government Reported Pension Data,” Request for Comment (July 2012).

⁶⁴ Available at <http://crr.bc.edu/data/public-plans-database/>

⁶⁵ Based on email correspondence with PBGC staff.

⁶⁶ In 2014, the maximum PBGC guaranteed benefit for an individual retiring at age 60 is \$3,213 per month. For illustration, in roughly half of states a full-career state government employee’s average pension would exceed this amount, though in most cases partial career employees would not. Note, however, that state employee pension plans do not participate in PBGC insurance and neither pay premiums, abide by PBGC regulations, or receive protections for benefits.

⁶⁷ Governmental Accounting Standards Board, “Other Postemployment Benefits: A Plain-Language Summary of GASB Statements No. 43 and No. 45,” (September 29, 2011), http://www.gasb.org/project_pages/opeb_summary.pdf

⁶⁸ California Department of Personnel Administration, “Total Compensation Survey–Benefits” (March 12, 2011), <http://www.dpa.ca.gov/tcs2006/benefits.htm#retirement>

⁶⁹ Recall that ECEC stands for “employer contributions for employee compensation.” Thus, employer contributions for current retirees’ health coverage is not included.

⁷⁰ California Department of Education, “Definitions of Key Terms,” (March 12, 2011), <http://www.cde.ca.gov/fg/ac/co/documents/gasb45attha.doc>.

⁷¹ Though see Novy-Marx and Rauh (2013) for a discussion of how to value retiree health coverage. Robert Novy-Marx and Joshua D. Rauh, “Funding Soft Liabilities,” (working paper, March 2013).

⁷² To the degree that pre-funding establishes an irrevocable employee benefit trust, this may make retiree health benefits more secure. As a result, in valuing those benefits for purposes of calculating employee compensation a lower, not higher, discount rate might be considered appropriate.

⁷³ Discount rates for most state OPEB plans are from actuarial reports or other financial disclosures. For some plans, rates are found in Robert Clark and Melinda S. Morrill, “The Funding Status of Retiree Health Plans in the Public Sector,” National Bureau of Economic Research, Working Paper 16450 (October, 2010).

⁷⁴ See Justin Falk, “Comparing Benefits and Total Compensation in the Federal Government and the Private Sector,” Congressional Budget Office Working Paper 2012-4 (January 2012).

⁷⁵ Paul Fronstin and Nevin Adams, “Employment-Based Retiree Health Benefits: Trends in Access and Coverage, 1997–2010,” Employee Benefit Research Institute. Issue Brief No. 377 (October 2012).

⁷⁶ Alice Zawacki, “Using The MEPS-IC To Study Retiree Health Insurance,” U.S. Bureau of the Census. CES 06-13 (April, 2006).

⁷⁷ Aon Hewitt, Hot Topics in Retirement (2012), www.aon.com/attachments/human-capital-consulting/2012_Hot_Topics_in_Retirement_highlights.pdf

⁷⁸ Mercer, “New options for retiree medical coverage,” (April 18, 2012) <http://mthink.mercer.com/new-options-for-retiree-medical-coverage/>

⁷⁹ Jeffrey H. Keefe, “Desperate Techniques Used to Preserve the Myth of the Overcompensated Public Employee,” Economic Policy Institute, (March 10, 2011).

⁸⁰ Fronstin and Adams (2012).

⁸¹ For instance, see Robert Clark and Melinda S. Morrill, “The Funding Status of Retiree Health Plans in the Public Sector,” NBER Working Paper No. 16450, (October 2010): Table 2.

⁸² In addition, availability of private sector health coverage is highly skewed based on the size of the firm. For instance, while 38 percent of firms of 1000 or greater employees offer coverage to current retirees, according to date from the Medical Expenditure Panel Survey, only 7 percent of firms in the 100 to 999 employee range offer such coverage, and only 3 percent of firms with 25 to 99 employees. In this instance, whether to control for firm size has a significant effect on our assumptions regarding the availability of private sector retiree health coverage.

⁸³ Medical Expenditure Panel Survey, Insurance Component. See Table II.A.2.h (2011). Percent of private-sector establishments that offer health insurance by health insurance offers to retirees by State: United States, 2011.

⁸⁴ Jeffrey Keefe, “Desperate Techniques Used to Preserve the Myth of the Overcompensated Public Employee,” Economic Policy Institute (March 10, 2011).

⁸⁵ Keefe’s figures rely upon “State of California Retiree Health Benefits Program.” Gabriel Roeder Smith & Company, (October 23, 2009). We use that report for these figures for illustrative purposes. However, our figures for compensation comparisons are derived from a more recent GRS actuarial valuation dated February 21, 2012.

⁸⁶ Non-participating states include Alaska, Colorado, Louisiana, Maine, Massachusetts, Nevada and Ohio. There also are many local government employees who do not participate in Social Security, though they are not included in this study.

⁸⁷ Office of the Chief Actuary, Social Security Administration, “Money’s Worth Ratios Under the OASDI Program for Hypothetical Workers,” (March, 2013).

⁸⁸ This is calculated under a baseline which accounts for Social Security being underfunded. See Table 3.

⁸⁹ We believe this is a more accurate method of combining wages and benefits than what we had been using in the past. Previously, we had combined the geometric means from the wage regression with the arithmetic mean of

benefits using the formula:
$$\frac{(1 + \text{salary premium}) * (1 + \text{benefits}_s)}{(1 + \text{benefits}_p)} - 1$$

⁹⁰ William Ruger and Jason Sorens, *Freedom in the 50 States, 2013 Edition: An Index of Personal and Economic Freedom*, The Mercatus Center at George Mason University, (Washington, D.C.: George Mason University, 2013).

⁹¹ Raymond J. Keating, “Small Business Policy Index 2013: Ranking the States on Policy Measures and Costs Impacting Small Business and Entrepreneurship. 18th Annual Edition,” Small Business & Entrepreneurship Council, (December 2013).

⁹² Amber M. Winkler, Janie Scull, and Dara Zeehandelaar, “How Strong Are US Teacher Unions? A State-by-State Comparison,” Thomas B. Fordham Institute (2012).

⁹³ Cory Koedel, Shawn Ni, and Michael Podgursky, “The School Administrator Payoff from Teacher Pensions.” *Education Next* Vol. 13, No. 4 (Fall 2013).

⁹⁴ Geoffrey Young, “Winners and Losers: The Inequities within Government-Sector, Defined-Benefit Pension Plans,” C.D. Howe Institute, Commentary No. 347 (April 2012).

⁹⁵ Dan A. Black and Jeffrey A. Smith, “Estimating the returns to college quality with multiple proxies for quality,” *Journal of Labor Economics* 24, no. 3 (2006): 701-728.

⁹⁶ Marc A. Rodwin, Hak J. Chang, Jeffrey Clausen, “Malpractice Premiums And Physicians' Income: Perceptions Of A Crisis Conflict With Empirical Evidence,” *Health Affairs* 25(3), (2006):750-758.

⁹⁷ Munnell, et al., “Comparing Compensation.”

⁹⁸ For instance, see Lisa Lambert. “Despite recovery, U.S. public employees face more layoffs,” Reuters, (April 8, 2012).

⁹⁹ Note that JOLTS counts as layoffs the termination of short-term and seasonal employees, which may not fit the common conception of a “layoff.”)

¹⁰⁰ Smith, Adam, *The Wealth of Nations*, 1776.

¹⁰¹ Society for Human Resource Management, “2010 Employee Job Satisfaction Survey,” (June 2010).

¹⁰² Robert Half, Inc., “Workplace Redefined: Shifting Generational Attitudes During Economic Change,” (2010).

¹⁰³ Andrew E. Clark, "What really matters in a job? Hedonic measurement using quit data," *Labour Economics*, Elsevier, vol. 8(2), (May 2001): 223-242.

¹⁰⁴ For instance, a 2010 survey of the unemployed reports that “Respondents express in the strongest terms the personal toll being exacted when they are asked about the most difficult thing about being unemployed. Many of the comments evidence a lack of self-worth, shrinking self-esteem, a diminished sense of self-confidence, and isolation.” Borie-Holtz, Debbie, Carl Van Horn, Cliff Zukin, “No End in Sight: The Agony of Prolonged Unemployment,” John J. Heldrich Center for Workforce Development, Rutgers University, (May 2010).

¹⁰⁵ Hae-shin Hwang, W. Robert Reed, and Carlton Hubbard, “Compensating Wage Differentials and Unobserved Productivity,” *The Journal of Political Economy*, Vol. 100, No. 4 (August 1992): 835–858. The basic logic is that many workers who appear similar may have different levels of productivity.

¹⁰⁶ Jeffrey Keefe, “Desperate Techniques Used to Preserve the Myth of the Overcompensated Public Employee,” Economic Policy Institute (March 10, 2011).

¹⁰⁷ R. Feinberg, “Earnings-risk as a compensating differential.” *Southern Economic Journal* 48, (1981):156-163.

¹⁰⁸ E. Dillon, “Risk and return tradeoffs in lifetime earnings,” mimeo, (AZ:Arizona State University, July 2012).

¹⁰⁹ German Cubas and Pedro Silos, “Comparative advantage and risk premia in labor markets” No. 2012-15 (working Paper, GA: Federal Reserve Bank of Atlanta, 2012).

¹¹⁰ Pradeep Kumar and Mary Lou Coates, “Occupational Earnings, Compensating Differentials, and Human Capital: An Empirical Study,” *The Canadian Journal of Economics*, Vol. 15, No. 3 (August 1982): 442-457

¹¹¹ Alicia H. Munnell, Kelly Haverstick, and Mauricio Soto, “Why Have Defined Benefit Plans Survived in the Public Sector?” State and Local Pension Plans Brief 2 (Chestnut Hill, MA: Center for Retirement Research at Boston College, 2007).

¹¹² Bellante and Link (1981) find similar results. Don Bellante and Albert N. Link, “Are Public Sector Workers More Risk Averse Than Private Sector Workers?” *Industrial and Labor Relations Review*, Vol. 34, No. 3 (April 1981): 408-412.

¹¹³ Sally L. Anderson, “Duration of unemployment in States, 2007–09,” *Monthly Labor Review*, (December 2010).

¹¹⁴ Bruce D. Meyer, “Unemployment Insurance and Unemployment Spells,” *Econometrica* 58(4), (1990): 757–782.

¹¹⁵ To approximate this we use the NRLP’s more expansive “all programs” coverage rate, which includes individuals covered under extensions of unemployment benefits and other benefits beyond standard rules. This produces a coverage rate around 15 percentage points above the “regular coverage” rate.

¹¹⁶ Daniel S. Hammermesh and John R. Wolfe, “Compensating Wage Differentials and the Duration of Wage Loss,” *Journal of Labor Economics*, University of Chicago Press, vol. 8(1), (January 1990): S175-97. For instance, if we increase the assumed duration of unemployment from 22 to 30 weeks while reducing the incidence of discharge to replicate the 1.41 percent baseline unemployment rate, the job security premium increases from the baseline of 1.3 percent of compensation to 2.8 percent.

¹¹⁷ The total premium would equal $(1 + comp_premium) * (1 + jobsec_premium) - 1$.

¹¹⁸ Munnell, et al., “Comparing Compensation.”

¹¹⁹ Joseph F. Quinn, “Wage Differentials among Older Workers in the Public and Private Sectors,” *The Journal of Human Resources* Vol. 14, No. 1 (Winter, 1979): 41-62.

¹²⁰ O*NET is the successor to the Dictionary of Occupational Titles.