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# Comparing Federal and Private Sector Compensation

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# Comparing Federal and Private Sector Compensation

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## Abstract

Public sector compensation has come under increased scrutiny from politicians and the media, but comprehensive technical comparisons of federal and private compensation have been largely absent from the discussion. Drawing from the academic literature and using the most recent government data, this report measures the generosity of federal salaries, benefits, and job security. Compared to similar private sector workers, we estimate that federal workers receive a salary premium of 14 percent, a benefits premium of 63 percent, and extra job security worth 17 percent of pay. Together, these generate an overall federal compensation premium of approximately 61 percent. Reducing federal employee compensation to market levels could save taxpayers roughly \$77 billion per year.

## Introduction

Compensation of public sector employees was a major political issue during the 2010 election campaign, and the new Congress is considering reform of the federal pay system. It is essential that lawmakers, political commentators, and voters know whether and to what extent federal workers are paid more than what they could earn in the private sector.

Partisans on both sides of this issue have been given to extreme and unsupported claims. Politicians and journalists have exaggerated the federal-private pay disparity by comparing raw salary figures without considering the above-average skills of federal workers. Defenders of federal pay, particularly public sector unions, have claimed in turn that federal workers are *underpaid* and described evidence to the contrary as “lies” and “scapegoating.”<sup>1</sup>

In response to both sides, we offer this analysis of federal compensation. Drawing on three decades of academic research, the latest Census Bureau micro data, official government reports, and standard economic tools, we document the extent to which federal workers are “overpaid” by private sector standards. We conclude that the total federal compensation premium—combining cash wages, fringe benefits, and job security—is approximately 61 percent, or about \$77 billion annually.

## Cash Wages

Federal salaries are significantly higher on average than private sector salaries, but this comparison is simplistic and misleading. Since federal workers have more skills and experience on average than private workers, we would expect federal salaries to be higher. The relevant question is whether federal workers earn more than *comparable* private sector workers.

The standard method in the academic literature for making apples-to-apples wage comparisons is regression analysis, which allows economists to control for “human capital” – that is, the earnings-related skills and personal characteristics of workers in each sector. The Congressional Budget Office (CBO) has termed the human capital approach “the dominant

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<sup>1</sup> See comments from union leaders in Davidson, Joe. “Dissatisfaction in federal employee pay sign of disconnect.” *Washington Post*, October 18, 2010, at <http://www.washingtonpost.com/wp-dyn/content/article/2010/10/18/AR2010101805719.html> (January 19, 2011).

theory of wage determination in the field of economics,”<sup>2</sup> and for good reason. Similar methods have been utilized for studies of the union pay premium and discrimination by race or gender. This basic approach is familiar to and accepted by nearly every trained economist. If federal salaries are still higher after controlling for a large set of earnings-related differences, then federal workers receive a wage premium—that is, they receive higher wages relative to what they could earn in the private sector.

For over three decades, academic economists beginning with Smith (1976) have run regressions with various specifications to estimate the federal premium or penalty.<sup>3</sup> Though they have used different datasets with different control variables covering different time periods, their results have been largely consistent. The typical finding is a federal salary premium in the range of 10 to 20 percent, meaning a federal worker receives \$1.10 to \$1.20 for every \$1.00 in salary earned by a comparably-skilled private worker.<sup>4</sup>

Last year we employed the standard regression methodology using 2009 wage data from the Current Population Survey (CPS), a monthly survey run by the Census Bureau. As reported in the *Wall Street Journal*, we found a 12 percent federal premium for 2009, right in line with other economists’ estimates.<sup>5</sup>

**Data and Methods.** For this larger study of federal compensation, we average wage estimates over the past five years, meaning the 2006 through 2010 years of the CPS. The five-year average is more representative of recent trends in federal salaries, and the larger sample size allows us to use a more detailed set of control variables.

We use the Annual Demographic Supplement of the CPS, which contains information on annual earnings. The analysis is limited to adult civilians working full-time for a wage or a salary during the whole previous year. Workers with imputed earnings were dropped, since the imputation process does not account for government employment status and thus could generate misleading results. People with annual earnings less than \$9,000 were not likely to be full-time

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<sup>2</sup> Congressional Budget Office. “Comparing the Pay of Federal and Nonfederal Law Enforcement Officers.” August, 2005.

<sup>3</sup> Smith, Sharon P. “Pay Differentials Between Federal Government and Private Sector Workers,” *Industrial and Labor Relations Review*, January 1976.

<sup>4</sup> *Handbook of Labor Economics*, 1999.

<sup>5</sup> <http://online.wsj.com/article/SB10001424052702303828304575180421298413374.html>

workers and therefore dropped. We also excluded postal employees, since they are part of a quasi-independent agency with a different salary structure than other federal workers.

In addition to dummy variables for federal, state, and local government employment, we used the following controls: usual hours worked per week, experience,<sup>6</sup> experience-squared to account for non-linear effects, years of education, firm size (6 categories), broad occupation (10 categories), immigration status, state of residence, race, gender, marital status, and year dummies to account for inflation. We also included interaction terms: experience x education, experience-squared x education, marital status x gender, and gender x race.

**Choice of Controls.** Most control variables in wage regressions are uncontroversial, but there is some debate among economists over including certain ones. For example, our inclusion of firm size means that federal workers are compared only to workers at large firms (1,000 or more employees), which tend to offer higher salaries and greater benefits than smaller firms. Since firm size is a characteristic of employers rather than employees, this is controversial. Some economists argue that larger firms tend to pay higher wages because they are more successful; that the federal government cannot be “successful” in any market sense, and therefore a firm size control is inappropriate.

However, working at a large firm may indicate higher levels of skill not captured by traditional control variables. We would want to account for those skills in any salary comparison. Workers at large firms may also demand a compensating differential to make up for the bureaucracy and lack of control that most large firms exhibit. If so, the federal government would need to pay higher salaries in order to compete with firms that do not suffer from those drawbacks.

Whatever the reason that large firms tend to pay more, working at a large firm partly reflects an employee’s preferences for whatever characteristics large firms tend to exhibit. A current federal worker might consider a large private firm as his best alternative employment, although this would need to be empirically verified. If federal workers are tempted to leave for large firms, compensation at the level paid by large firms will be needed to keep the government competitive in the labor market.

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<sup>6</sup> Experience is generally measured as age minus years of education minus six.

For all of those reasons, we believe controlling for firm size is the better choice for both wages and benefits. Excluding the firm size control would make the observed federal premium substantially *higher* than what we are reporting here.<sup>7</sup>

Some economists also control for union status, but we do not believe that is appropriate. Congress’s decision to allow federal workers to unionize is in effect a policy decision that leads to increased compensation. One could argue that union membership, like firm size, is also a federal worker’s revealed preference that he would continue to seek in the private sector. Unlike firm size, however, this preference could be driven mainly by the higher wages and benefits of unionized labor, which should be included in the federal premium. Controlling for union status would slightly lower our premium estimates but would not change any of our conclusions.

**Results.** We regressed the log of annual earnings on the control variables listed above, and the results are shown in Table 1. The first column lists key independent variables, while the

**Table 1: Wage Regression Results, 2006-2010.**

Independent Variable	Coefficient (%)
hours worked (per week)	1.4
experience (in years)	1.8
education (in years)	8.8
foreign-born	-7.4
married	20.1
Black	-14.1
Hispanic	-10.6
woman	-14.7
<b>federal worker</b>	<b>14.1</b>
state worker	-13.7
local worker	-6.4
<b>Observations</b>	<b>285,874</b>
<b>Adjusted r-squared</b>	<b>0.471</b>

Source: Authors’ calculations from Current Population Survey.

second column shows the percentage increase in wages associated with a one unit increase in each variable.<sup>8</sup> For example, an additional year of education for the average worker leads to 8.8 percent higher wages, all else equal.

The most important variable in the list for our purposes is the dummy variable for federal government status. Even after controlling for observable skills and a detailed list of personal characteristics, federal workers earn about 14 percent more in wages than private sector workers. This conclusion is broadly consistent with existing academic research on the subject.

<sup>7</sup> Without a firm size control, the federal premium would be 21.9 percent.

<sup>8</sup> The displayed percentages are calculated by exponentiating the regression coefficient and subtracting one: EXP(coefficient) - 1.

*Distribution of the Premium.* The federal salary premium is generally smaller for more educated workers and larger for more experienced workers. As Table 2 shows, federal employees with only a high school education receive salaries over 22 percent higher than comparable private workers, while holders of graduate degrees make just 3.9 percent more. Greater experience tends to increase the federal premium, but the effect is not large until employees have worked for about 30 years.

**Table 2: Wage Premium by Experience-Education Group**

Education ↓	Experience (years) →				
	all	under 10	10-19	20-29	30+
All	14.1	10.3	12.0	12.2	18.0
High school	22.3	17.0	18.8	20.2	23.6
Two-year college	10.5	10.1	10.0	6.0	14.1
Four-year college	7.7	9.6	7.3	3.7	11.2
Graduate school	3.9	-5.8	0.8	7.3	9.2

Source: Authors' calculations from Current Population Survey.

The most educated federal employees have the smallest salary premium overall, but the steepest improvement in relative salaries as they gain seniority. For individuals with graduate degrees, the difference in relative salaries between 10 and fewer years of experience

and 30 or more years is 15 percent of the market wage, versus just a 6.6 percent difference for workers with high school educations.

*State and Local Government Employees.* Unlike federal workers, state and local workers as a group receive a wage *penalty* compared to private workers, although there are significant variations in relative wages from state to state. Whether state and local employees are undercompensated in total (after including the value of benefits and job security) is an issue that we have addressed elsewhere.<sup>9</sup>

**Fixed Effects Analysis of Federal Wages.** The cross-sectional human capital model is the standard in labor economics, but critics have suggested that unobserved worker characteristics—such as intelligence, education quality, leadership ability, etc.—could affect the premium estimate. An alternative model that follows the same workers over time as they switch

<sup>9</sup> Existing studies undercount and omit certain fringe benefits, thereby underestimating state and local compensation relative to comparable private workers. We elaborate in a Heritage Foundation report: “Are California Public Employees Overpaid?” available at: <http://www.heritage.org/Research/Reports/2011/03/Are-California-Public-Employees-Overpaid>



between private and federal employment helps to answer those critics. Several “fixed effects” approaches have found that private workers who switch to federal employment get bigger raises than private workers who get another private job.<sup>10</sup> Our analysis, using the 2004 and 2008 panels of the Survey of Income and Program Participation, finds that private-to-federal switchers receive a real wage gain of 9 percent, while private-to-private switchers see only a 1 percent gain.<sup>11</sup> Because the same worker’s wage is changing, all of his time-invariant abilities—whether we can directly observe them or not—are naturally controlled for.

Low sample sizes and the greater possibility of measurement error mean that fixed effects models are not necessarily superior to cross-sectional human capital models. The fixed effects estimate is often considered a lower bound on the true wage premium, meaning it strongly affirms the cross-sectional results. Moreover, the fixed effects model captures only the initial salary premium or penalty upon switching jobs, while the cross-sectional regressions indicate that the federal salary premium increases with experience.

**The Pay Agent’s Method.** In our wage analysis, we matched workers in each sector using their skills and personal characteristics. This follows the “human capital model” of wages, the overwhelming preference of labor economists, which holds that workers are paid according to their abilities.

When the federal government conducts its annual federal-private salary comparison, it compares job levels rather than workers. The analysis is overseen by the President’s Pay Agent—not an actual person, but a function headed by the Secretary of Labor and the directors of the Office of Management and Budget (OMB) and Office of Personnel Management (OPM). The 2010 report concludes that federal workers are underpaid in wages by 24 percent relative to the private sector.<sup>12</sup>

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<sup>10</sup> See, for example: Sang-Hyop Lee, “A Reexamination of Public-Sector Wage Differentials in the United States: Evidence from the NLSY with Geocode,” *Industrial Relations*, Vol. 43, No. 2 (April 2004), pp. 448-472; Alan Krueger, “Are Public Sector Workers Paid More Than Their Alternative Wage? Evidence from Longitudinal Data and Job Queues,” National Bureau of Economic Research, Working Paper No. 2500, January 1988.

<sup>11</sup> Jason Richwine, “Same Worker, Higher Wage: How It Pays to Switch from Private to Federal Employment,” Heritage Foundation Center for Data Analysis Report, Forthcoming.

<sup>12</sup> [http://www.govexec.com/story\\_page.cfm?articleid=46420&dcn=e\\_gvet](http://www.govexec.com/story_page.cfm?articleid=46420&dcn=e_gvet)

The process is complex, but the Pay Agent essentially seeks to assign a general schedule (GS) level to a variety of private sector jobs within a broad set of occupational categories. Salaries for these jobs are then compared to salaries for federal positions at the same GS level. Private sector jobs assigned to a given GS level are typically seen to be more highly paid than their federal counterparts.

There are several reasons that this method has been, in the words of one study, “severely criticized” by economists.<sup>13</sup> Congressional Budget Office (2005) points to three main issues<sup>14</sup>: First, the Pay Agent’s process involves “subjective choices regarding which grades and steps and which experience profiles to use for the comparisons.” That is, different analysts may come to different conclusions regarding where to place a given private sector job on the federal GS scale. Second, the job-matching procedure measures only salaries, omitting any measurement of benefits, job security, and work conditions that determine the overall desirability of federal or private employment. As a later section of our paper will show, benefits are of particular importance in comparisons of federal and private compensation.

Third, and most importantly, the Pay Agent’s approach fails to account for different skill levels that private and public workers may possess in seemingly similar jobs. More specifically, there is evidence that the federal government hires workers at higher positions than they could hold in the private sector and then promotes them more quickly as well. This means, for example, that a senior accountant in government might qualify only as a junior accountant in the private sector. This senior accountant would be “underpaid” compared to private sector employees only because he is under-qualified by private sector standards.

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.”<sup>15</sup> Famulari finds that these differences play out through federal hiring and promotion practices:

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<sup>13</sup> Krueger, Alan. “The Determinants of Queues for Federal Jobs.” National Bureau of Economic Research. Working Paper 2499. January 1988.

<sup>14</sup> Congressional Budget Office. “Comparing the Pay of Federal and Nonfederal Law Enforcement Officers.” August, 2005.

<sup>15</sup> Famulari, M. “What’s in a Name? Title Inflation in the US Federal Government.” Working paper. 2002. Revision requested by *Industrial and Labor Relations Review*.

The Federal government, particularly in Washington, DC, hires workers at initially higher levels of work. These differentials are so large that, even after a number of years on the job, private sector workers are employed at substantially lower levels of responsibility than the starting levels of responsibility for DC Federal government workers. In addition, the Federal government, particularly in DC, promotes workers more quickly than in the private sector, conditional on observed worker characteristics.

Famulari concludes: “The large private sector premium paid to workers in an occupation and level is largely explained by the more valuable skills of private sector workers within an occupation and level.”

A 1984 CBO study concluded that the average federal worker resides two-thirds of one pay grade above a similar private sector employee.<sup>16</sup> A 1997 academic study by Famulari found a larger gap of three-quarters of a grade.<sup>17</sup> As a result, the Pay Agent’s statistics are skewed. As CBO (2005) notes, “unless the job matches are identical, differences that an analysis reveals may be caused by differences in the jobs and the people who hold them rather than by the pay structures of the employing governments.”

While the Pay Agent’s approach may show that federal jobs pay lower salaries, it cannot tell us whether federal *employees* are overpaid or underpaid. A person-to-person, human capital-based approach remains the preference among economists.

**Summary.** The standard methodology used by economists to compare federal and private salaries is regression analysis that controls for worker characteristics. Using the same technique, we estimate that the federal wage premium between 2006 and 2010 was about 14 percent, a number in line with the past literature. The wage premium is confirmed by studies of workers who get larger raises when switching from private to federal employment compared to workers who switch jobs within the private sector. The government’s job-based comparison, which suggests federal workers are significantly underpaid, fails to account for the different skills of federal and private sector employees who hold similar jobs. It is rejected by most labor economists.

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<sup>16</sup> Congressional Budget Office. “Reducing Grades of the General Schedule Workforce.” September, 1984.

<sup>17</sup> See Famulari, Melissa. “Maintaining a Labor Force Under Wage Controls: The Case of the Federal Government.” Working paper. University of Texas at Austin, 1997.

## Benefits

Non-wage compensation—“benefits,” for short—is an important part of overall compensation and must be evaluated if meaningful comparisons are to be made. Common benefits include paid leave, health and life insurance, retirement benefits, and taxes paid on employees’ behalf. Although a significant part of overall compensation for federal and private workers, benefits are difficult to compare between sectors. We have no comprehensive benefits dataset that would allow for the kind of clean and direct comparison that we presented in our section on salaries.

The Bureau of Labor Statistics (BLS) does compile some data on benefits for private sector employers and for state and local governments, as shown in Table 3. These data are collected through the National Compensation Survey and published through the Employer Costs for Employee Compensation series.<sup>18</sup> Unfortunately, the BLS data do not include federal employee benefits, which we need to find elsewhere. Our principal sources for federal benefits are data from OMB and OPM, which we combine to provide a measure of total average federal fringe benefits that nearly matches the level of detail provided by BLS for state and local workers.<sup>19</sup>

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<sup>18</sup> See <http://www.bls.gov/news.release/ecec.toc.htm>

<sup>19</sup> One substitute approach relies on the National Income and Product Accounts (NIPA), which tracks wages and other forms of compensation by industry. But NIPA data may overstate or understate federal employee compensation depending on the category. For instance, NIPA pension contributions include both the cost of currently accruing benefits *and* contributions to amortize the value of past unfunded liabilities, but the latter should not be counted as employee compensation. On the other hand, NIPA data do not include the value of fringe benefits such as paid time off.

**Table 3. Benefits as a percentage of salaries, for private sector employees (100+) and state/local government employees, 2009.**

	Private 100+	State/Local
<b>Total benefits</b>	<b>45.7%</b>	<b>48.0%</b>
<b>Paid leave</b>	<b>11.4%</b>	<b>12.5%</b>
Vacation	5.9%	4.4%
Holiday	3.5%	4.1%
Sick leave	1.5%	3.1%
Other paid leave	0.6%	0.9%
<b>Supplemental pay</b>	<b>4.4%</b>	<b>1.4%</b>
Overtime and premium	1.5%	0.7%
Shift differentials	0.6%	0.2%
Nonproduction bonuses	2.4%	0.5%
Other (federal premium pay)		
<b>Insurance plans</b>	<b>13.3%</b>	<b>17.2%</b>
Life insurance	0.3%	0.4%
Health insurance	12.4%	16%
Short-term disability insurance	0.3%	0.1%
Long-term disability insurance	0.3%	0.2%
<b>Retirement and savings</b>	<b>5.4%</b>	<b>9.0%</b>
Defined benefit*	2.0%	6.7%
Defined contribution	3.4%	1.3%
<b>Legally required benefits</b>	<b>11.3%</b>	<b>9.0%</b>
Social Security and Medicare	8.5%	7.1%
Social Security	6.7%	5.5%
Medicare	1.6%	1.6%
Federal unemployment	0.1%	0.0%
State unemployment	0.7%	0.2%
Workers' compensation	1.9%	1.7%

Source: BLS, Employer Contributions for Employee Compensation.

\*Authors' calculations to net out costs of amortizing unfunded liabilities from cost of accruing benefits.

**Benefits Relative to Salaries.** For simplicity, benefits are expressed as a fraction of workers' salaries. This makes total compensation equal to  $salaries \times (1 + benefits)$ . This approach has advantages and disadvantages. Some studies represent benefits as a share of total compensation. However, this implies that an increase in one form of benefit would produce a decrease in others, since the total cannot exceed 100 percent. However, when comparing benefits to wages we should be aware that, as shown above, wages for federal employees are roughly 14 percent higher than those paid to similar private sector workers. Therefore, even if public and

private workers receive a similar level of benefits relative to wages, the higher wages paid to federal employees would imply more generous benefits.

**Choice of Private Sector Comparison Group.** We begin with the principal benefit categories reported by BLS for private sector and state and local government workers in 2008. Here we face a choice regarding the private sector workers whose benefits we should measure. Unlike salaries, where the CPS allows us to control for the earnings-related characteristics of individual employees, benefits are semi-aggregated based on a limited number of employer and employee characteristics. On the employer side, BLS records benefits by establishment size, industry, union status of workforce, and other factors. On the employee side, benefits are recorded for worker characteristics such as full- or part-time employment, worker position (management, professional and related), occupation (teacher, nurse, and so on). Benefits are available in greater detail at the employer level than at the employee level. For instance, at the employer level retirement benefits can be broken down into employer contributions for defined benefit (DB) versus defined contribution (DC) plans, while at the employee level retirement is a single category that cannot be disaggregated.

To take advantage of the greater detail of BLS data, we choose to concentrate on benefits measured at the employer level, where we compare federal benefits to those paid to individuals employed in establishments of 100 or more employees, which BLS data indicates includes around 43 percent of the workforce.<sup>20</sup> This produces a similar match to the firm size controls used in the CPS salary regressions, where the largest firm size (to which federal workers belong) is 1,000 or more. About 44.5 percent of full-time workers in the CPS work for firms with 1,000 or more employees.<sup>21</sup> Table 3 shows the categories and values for private sector workers in establishments of 100+ and for state and local government employees. One initial adjustment to compensation is to exclude from DB pensions any employer contributions used to amortize past unfunded benefit liabilities rather than fund the accrual of benefits in the current year.<sup>22</sup> Based

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<sup>20</sup> Benefits are in general more generous in the 100+ establishment size category than in an alternate employee-based category, such as “full-time, professional and related” employees.

<sup>21</sup> “Establishment size” refers to the number of employees at one work site, whereas “firm size” is the total number of employees working at a firm regardless of location.

<sup>22</sup> BLS contributions to DB pensions include both contributions to cover the cost of benefits accruing in a year (termed the “normal cost”) and contributions to amortize unfunded liabilities from prior years. Only the former

on this initial rendering, benefits for private sector employees equal 45.7 percent of salaries while benefits for state and local government employees equal 48.0 percent of salaries.

**Calculating Federal Benefits.** We now populate the BLS benefit categories with benefits for federal employees. Our first source of information is cost factors published by OMB in 2008 and reproduced in Table 4.<sup>23</sup> These cost factors express the value of certain federal benefits as a percentage of salaries and are used to compare the compensation of federal employees relative to those of private workers who might perform the same duties.

**Table 4. Elements of the Civilian Position Full Fringe Benefit Cost Factor, 2008.**

Element	Cost factor
Insurance and Health Benefit	7.00%
Standard Civilian Retirement Benefit	26.10%
Medicare Benefit	1.45%
Miscellaneous Fringe Benefit	1.70%
<b>Total Civilian Position Full Fringe Benefit</b>	<b>36.25%</b>

Source: Office of Management and Budget

The “Insurance and Health Benefit” category includes the cost of life insurance (0.2 percent of salary) and health insurance (6.8 percent). “Standard Civilian Retirement Benefit” includes the annual accruing cost for pension benefits, including Social Security, the DC Thrift Savings Plan, the DB Federal Employees or Civil Service Retirement Systems, and retiree health benefits.<sup>24</sup> These

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is true current compensation. For state and local employees, the BLS reported employer contribution is 10.5 percent of wages. However, the Center for Retirement Research’s Public Plans Database reports that for Fiscal Year 2009 the average total normal cost of pensions was approximately 12.14 percent of payroll, from which is subtracted an average employee contribution of 5.45 percent of wages to produce an average employer normal cost of around 6.7 percent of wages. (Authors’ calculations from Public Plans Database, Center for Retirement Research. Calculations based on 78 state and local plans. Any plan for which payroll, normal cost or employee contribution data was not available was excluded.)

We use this as our initial employer contribution rate, subject to adjustments detailed in following sections. Private DB pension contributions are reported by BLS as equaling 3 percent of employee payroll. Data on private DB contributions is difficult to track; it can be obtained on a case-by-case basis from company annual reports, but contributions generally are not reported as a percentage of payroll and national level data appears to be unavailable. For simplicity, we assume that 2 percentage points of the total contribution cover normal costs while the remainder amortizes unfunded liabilities. Since most private DB plans have been closed to new entrants, this may overstate true compensation. Given the small role played by private DB plans today, the effects on overall compensation would be small.

<sup>23</sup> Memorandum for the Heads of Executive Departments and Agencies. From Jim Nussle, Director, Office of Management and Budget. March 11, 2008. Subject: “Update to Civilian Position Full Fringe Benefit Cost Factor, Federal Pay Raise Assumptions, and Inflation Factors used in OMB Circular No. A-76, ‘Performance of Commercial Activities.’”

<sup>24</sup> The Administration’s Fiscal Year 2012 budget reports (p. 1157) that in 2012 the FERS normal cost was slightly below the 2008 levels used in the OMB memoranda but will be slightly above those levels in FY 2012.

retirement benefits total 26.1 percent of wages.<sup>25</sup>

The “Medicare Benefit” category includes the 1.45 percent employer’s share of the Medicare payroll tax. The components of the “Miscellaneous Fringe Benefit” category include payments for workman’s compensation, unemployment premiums, bonuses, and certain types of employee awards.

The OMB cost factors allow for the full or partial population of the “Insurance plans,” “Retirement and Savings,” and “Legally Required Benefits” categories as outlined by BLS. However, they do not provide full information regarding the value of “Paid Leave,” “Supplemental Pay,” and several small subcategories.

For these, we turn to the OPM publication “Federal Civilian Work Force Statistics: Work Years and Personnel Costs, Fiscal Year 2005.”<sup>26</sup> It provides useful data regarding paid time off, supplemental pay, and other areas. This report does not appear to have been published subsequent to 2005, though it is unlikely that federal benefit costs have shifted significantly since that time. The figures reported below are for non-postal federal employees. Additional detail on the calculation of various benefit categories is included in the appendix.

This information allows us to populate most of the benefit categories the BLS uses for private sector and state and local government employees. To facilitate comparability, the estimated value of federal Social Security payroll taxes is deducted from OMB’s retirement cost factor and added to BLS’s Legally Required Benefits category. The employer’s share of the 12.4 percent total Social Security tax is 6.2 percent. But since only around 83.1 percent of total federal payrolls are subject to Social Security taxation, the 6.2 percent employer share is adjusted downward to 5.15 percent.<sup>27</sup> While an approximation, total non-wage benefits will not be affected if the true value of federal payroll tax payments is higher or lower than estimated, since these would be netted against other retirement-related contributions.

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<sup>25</sup> These cost factors do not include the cost of amortizing unfunded benefit liabilities from prior years; thus, they represent what actuaries refer to as the “normal cost” of each program, the value of pension compensation earned in a given year.

<sup>26</sup> Available at <http://www.opm.gov/feddata/html/wypc/2005/2005wypc.pdf>; 2005 is the most recent year for which this publication is available online.

<sup>27</sup> As of 2010, 83.1 percent of total federal payroll was in the FERS pension plan, which includes Social Security coverage, while 16.9 percent was under CSRS, where most workers do not participate in Social Security.



To aid in further analysis of pension benefits, the total federal pension cost of 21.0 percent of direct pay is divided into DB and DC portions and the normal cost of retiree health coverage. This disaggregation becomes important when the relative values of DB and DC pensions are adjusted below. The DB share is calculated as the weighted average of the normal costs of the FERS and CSRS programs, equaling 12.73 percent of pay.<sup>28</sup> The remaining 8.2 percent of payroll consists of employer contributions to the Thrift Savings Plan DC pension and the normal costs of accruing retiree health coverage.

The normal cost of retiree health coverage can be estimated at around 6 percent of employee wages based on a 2001 Congressional Budget Office analysis.<sup>29</sup> However, the true value of retiree health benefits to federal retirees is understated, as these cost factors represent the employer's cost without reflecting the approximately 25 percent higher price that retirees would pay for health coverage in the individual market.<sup>30</sup> That is to say, were federal retirees not eligible for health coverage they otherwise would pay the higher individual market price. For this reason, we gross retiree health coverage up to 7.25 percent of wages.

BLS data do not report on retiree health coverage for private sector or state and local government employees as these plans are generally unfunded, meaning there are no current employer contributions to measure. In the private sector this omission is relatively unimportant, as private-sector retiree health coverage has grown rare and less generous even when offered.<sup>31</sup> National level data on retiree health coverage is not available for state and local government employees, but a sampling of financial disclosures from state plans finds an average normal cost

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<sup>28</sup> See "Annual Report of the Board of Actuaries, Civil Service Retirement and Disability Fund Fiscal Year Ended September 30, 2009. September 30, 2009. The employer normal cost of the FERS program is measured at 11.5 percent of payroll while the normal cost of CSRS is 18.8 percent of payroll. As FERS constitutes 83.1 percent of total payroll, the weighted average is 12.73 percent of pay.

<sup>29</sup> The CBO reports an annual accrual cost for retiree health coverage in 2001 of \$3,246 per employee; based in NIPA data, the average full time equivalent federal salary in 2001 was \$54,154, generating a normal cost of 6.0 percent. See Congressional Budget Office. "The President's Proposal To Accrue Retirement Costs For Federal Employees." June 2002.

<sup>30</sup> Melinda Beeuwkes Buntin, José S. Escarce, Kanika Kapur, Jill M. Yegian and M. Susan. "Trends and Variability In Individual Insurance Products." *Health Affairs*. September 24, 2003.

<sup>31</sup> For instance, an average California state employee accrues \$7,493 in future retiree health coverage in a given year, while an average General Electric employee accrues only \$3,299 and an average IMB employee only \$524. See Biggs, Andrew and Jason Richwine. "Public-Sector Compensation: Correcting the Economic Policy Institute, Again." Heritage Foundation Backgrounder #2539. March 31, 2011.

of 8.9 percent of wages, which adjusted to reflect higher costs in the individual market would equal 11.1 percent of pay.

*Implicit subsidies in the Thrift Savings Plan.* The remaining 2.2 percent of wages in the OMB retirement benefit category represents employer matching contributions to the Thrift Savings Plan. This level seems reasonable, given that federal employees covered by the CSRS pension are not eligible for matching funds. However, there is a significant implicit subsidy to federal employees in the TSP's government bond fund (known as the "G Fund") that should be included as part of total compensation. The G fund is the largest fund in the TSP, holding \$128.6 billion of the \$291 billion TSP total as of December 21, 2010. The G Fund invests solely in special-issue, non-tradable short-term Treasury securities, which implies that there is neither credit risk nor interest rate risk on the fund.

However, the interest rate attributed to those short-term securities is based upon the weighted average yield on all outstanding Treasury securities with a duration to maturity of 4 or more years. As the TSP states in G Fund literature:

G Fund securities usually earn a higher rate of return than do short-term marketable Treasury securities.... From January 1988 through December 2010, the G Fund rate was, on average, 1.77 percentage points higher per year than the 3-month T-bill rate.<sup>32</sup>

In effect, federal employees receive the risk premium attached to long-term Treasury securities but enjoy the lower risk of short-term securities. The average implicit subsidy to federal employees equals the 1.77 percent interest rate differential multiplied by the balance of the G Fund. Given a current G Fund balance of around \$129 billion, the annual subsidy equals \$2.28 billion, which is equal to around 2.0 percent of total federal employee payroll.

*Summary.* Given the number of variables and the differences in benefit categorizations between BLS and OMB/OPM, it is likely that small errors have entered these calculations. For research purposes it would be very desirable if BLS were to undertake a uniform measurement of federal non-wage compensation. Nevertheless, it seems unlikely that these small errors alter the final benefits figure significantly in either direction.

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<sup>32</sup> Thrift Savings Plan. G Fund Fact Sheet. Available at <https://www.tsp.gov/PDF/formspubs/GFund.pdf>

In sum, federal employees receive non-wage benefits equal to approximately 63.3 percent of salaries, versus 45.7 percent for private sector workers in establishments of 100+ employees and 64.6 percent for state and local government employees. However, these figures are not properly adjusted for the relative generousities of DB and DC pension plans. Failure to account for important differences in pension funding practices will lead to errors in comparing total pension compensation.

**Making DB and DC pensions comparable.** An important difference between public and private sector compensation is the prevalence of traditional DB pensions in the public sector versus 401(k)-type DC plans in the private sector. Benefit comparisons to date have failed to accurately capture important distinctions between the two.

Unlike a DC pension where the employer contribution *is* the compensation the worker receives, employer contributions to DB plans are only representative of the benefits to which employees become entitled. The true benefit is a payment upon retirement determined by a benefit formula based upon salary and years of service and guaranteed in most states by law or state constitutions. How a DB pension is funded is distinct from the benefit owed at retirement. Indeed, even if an employer made zero contributions to its pension plan in a given year, the obligation to pay pension benefits would remain unchanged. However, by understanding how DB pensions are funded we can more accurately estimate the future benefits that will be paid.

DB pension contributions are calculated by discounting the future benefit liabilities accrued in a given year to the present using a chosen interest rate, then contributing that amount to the pension fund. Employer contributions are generally calculated as a percentage of employee payroll that, compounded at the chosen interest rate, will be sufficient to fund future benefits. For any given level of future benefits, a higher assumed interest rate will lead to lower current contribution. Since an overall compensation analysis is concerned with benefit levels, not the current cost of funding benefits, we must control for different methods of calculating current employer contributions.

Federal pension plans assume a 6.25 percent interest rate, meaning that the government discounts its future benefit obligations at that rate and plans its current contributions accordingly. This means, in effect, that federal employees on average earn a guaranteed 6.25 percent annual return on both their pension contributions and those made by their employer. Private sector DB

plans discount their obligations using the yield on a portfolio of high quality corporate bonds, currently around 5.5 percent.<sup>33</sup> State and local pensions generally assume a higher 8 percent return, implying that these plans would contribute significantly less for any given dollar of future benefits than would federal or private DB plans. For DC pensions there are no such accounting rules for funding, because the benefit at retirement is a function of the individual's own investment choices.

Put simply, DB pensions use more aggressive funding strategies for future benefits than do DC plans, and the aggressiveness of DB funding varies from sector to sector. This means that for any given dollar of guaranteed future retirement income, employers may make and report different levels of current contributions. If we fail to account for different funding strategies we will misstate the true benefits from DB plans.

To make DC pension compensation comparable to that from DB plans, we must choose an investment that mirrors the level of safety offered by DB pensions. Since public sector DB plans offer government guaranteed benefits, we assume that DC plans invest in similarly guaranteed investments, U.S. Treasury Securities. These currently yield around 4 percent over 20 years, a typical holding period for a full career employee. A low 4 percent return implies a higher contribution today to fund any given level of guaranteed income at retirement.<sup>34</sup>

To account for these differences, we adjust DB pension contributions to make them comparable to employer contributions to DC plans. These adjustments effectively calculate the cost of funding accruing pension benefits in a given year – what actuaries refer to as the “normal cost” – assuming that all pension plans use the same discount rate. Specifically, we calculate the required savings rate for a worker with a DC plan holding Treasury securities to match the

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<sup>33</sup> Here we use the Citigroup Pension Discount Curve as of December 21, 2010.

<sup>34</sup> If the riskless interest rate increases, then all other things equal the value of DB pensions will decline relative to DC pensions. For instance, while the yield on Treasury securities is currently around 4 percent, the CBO and Social Security Trustees project nominal interest rates of 5.5 and 5.7 percent, respectively. However, the discount rates used for DB pensions are chosen with the riskless interest rate in mind, meaning that a higher riskless interest rate may justify higher DB discount rates.

benefits paid at retirement by a DB pension.<sup>35</sup> In this way, our method isolates the value of benefits distinct from the manner in which benefits are financed.

Actuarial reports for the FERS and CSRS pension programs do not conduct sensitivity analysis for different interest rates, so we rely on studies of state government pension plans. Our principal source is a March 2011 analysis prepared for the Florida Retirement System (FRS) by the actuarial firm Milliman, in which the normal cost of the FRS is calculated under a variety of discount rates.<sup>36</sup> The FRS analysis is supported by a similar analysis of an unnamed state pension plan by actuaries at the firm Gabriel Roeder Smith and Company.<sup>37</sup> An analysis of the Washington state pensions conducted by the State Actuary finds somewhat larger effects than the FRS study we rely upon.<sup>38</sup> While the population characteristics of state pension plans may differ from those of the FERS and CSRS programs, these estimates are likely to be more accurate than a stylized approach that lacks any population-level data.<sup>39</sup>

The FRS analysis calculates the normal costs of nine Florida pension programs under a variety of discount rates, as well as calculating composite figures for the FRS as a whole. We rely upon these composite figures in generating our adjustment factors. The FRS analysis calculates the normal costs of FRS plans under discount rates ranging from the 7.75 percent return assumed by the FRS, to 6.0 percent, 5.0 percent, 4.0 percent and 3.0 percent. This presents some complications, as the study does not make direct calculations for the 6.25 percent discount rate used by federal pensions, the 5.5 percent rate used by private DB plans or the 8 percent average rate used by state and local pensions. However, the normal costs calculated for the FRS

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<sup>35</sup> If future benefits were known, this approach would be equivalent to discounting the future benefit amount back to the present at a risk-adjusted interest rate and expressing the present value as a percentage of wages.

<sup>36</sup> Robert S. DuZebe. “Study Reflecting Impact to the FRS of Changing the Investment Return Assumption to one of the following: 7.5%, 7.0%, 6.0%, 5.0%, 4.0% and 3.0%.” Milliman. March 11, 2011.

<sup>37</sup> See Jones, Norman L., Brian B. Murphy, and Paul Zorn. “Actuarial Methods and Public Pension Funding Objectives: An Empirical Examination.” Presented at Society of Actuaries Public Pension Finance Symposium. May 2009.

<sup>38</sup> Office of the State Actuary. “Washington State 2009 Actuarial Valuation Report.” October 2010; and Office of the State Actuary. “2010 Risk Assessment: Moving Beyond Expectations.” August 31, 2010.

<sup>39</sup> For instance, the FRS memorandum actually analyzes eight different pension plans within the FRS, which presumably have different demographic characteristics, and the proportionate increase in costs when the discount rate is lowered to 4 percent is similar between the plans. In a prior version of this paper we utilized a stylized approach to adjusting benefit accruals for changes in discount rates; this approach produced a smaller adjustment to pension accruals than does the FRS analysis based on actual pension data.

vary nearly linearly with the natural log of the discount rate, making it easy to estimate normal costs under a variety of discount rates.

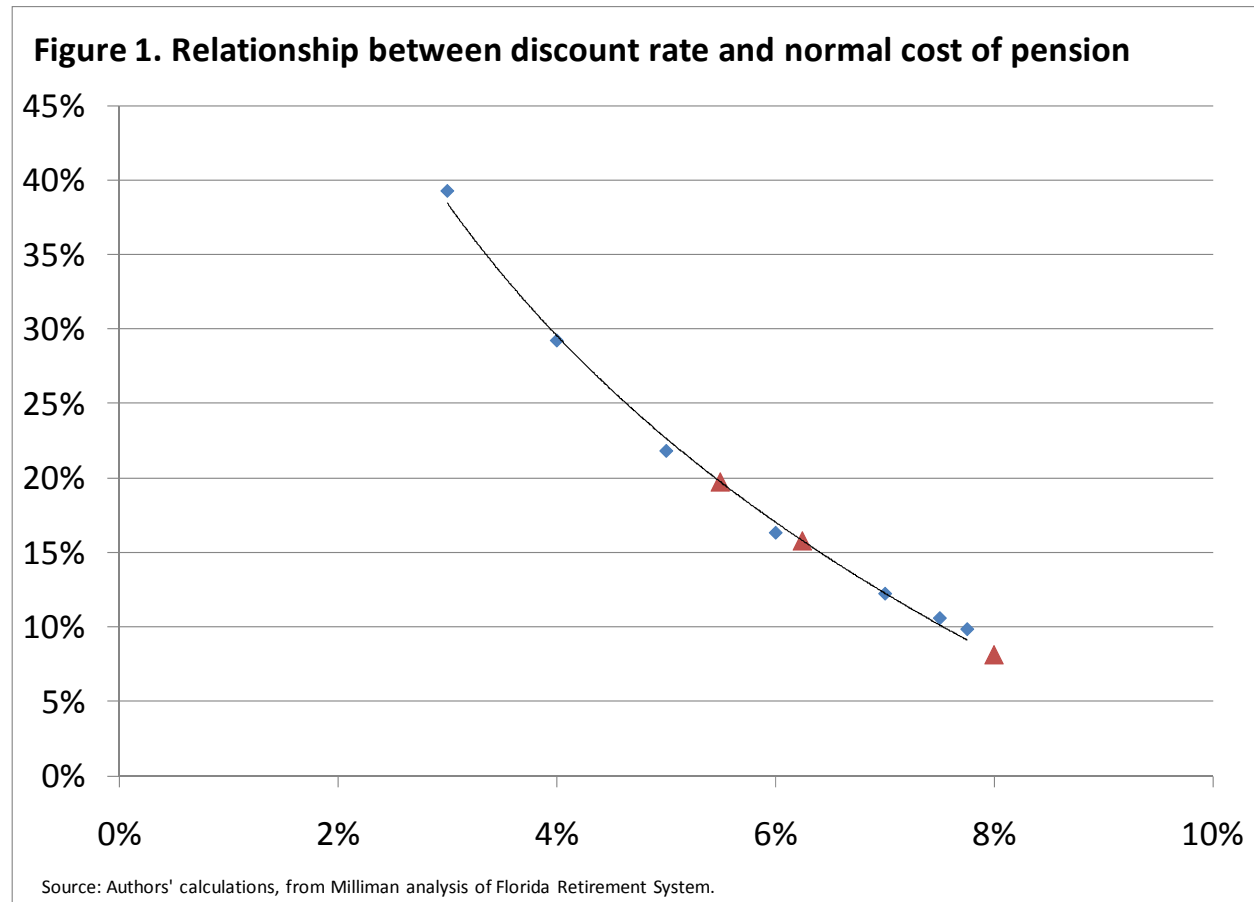


Figure 1 shows the values calculated by Milliman for the FRS as well as estimated normal costs (in red) assuming discount rates of 5.5 percent (private sector), 6.25 percent (federal) and 8 percent (state and local). Discount rates alter normal costs in a non-linear fashion, meaning that the increase in the normal cost for a given percentage point reduction in the discount rate increases as the base discount rate falls.<sup>40</sup>

The adjustment process is as follows. The adjustment factor for a given plan equals the ratio of the normal cost of the FRS plan at a 4 percent discount rate to the FRS normal cost at the sector's current chosen discount rate. This factor is multiplied by the total normal cost of the DB

<sup>40</sup> For instance, reducing the discount rate from 8 percent to 7 percent raises the normal cost of plan by 2.4 percentage points, while lowering the discount rate from 7 to 6 percent raises the normal cost by 4.1 percentage points. These effects can be dramatic if the baseline discount rate is high, as it is for state and local pension plans.

pension of the particular sector at that sector's average discount rate, and then employee contributions are subtracted. Thus, the adjusted normal cost equals:

$$\frac{NC_{.04}^{FRS}}{NC_r^{FRS}} * NC_r^S - \textit{employee\_contrib},$$

where  $NC$  designates normal cost, the superscript designates the Florida Retirement System or the sector (federal, private, or state and local), and  $r$  denotes the interest rate at which the sector discounts its liabilities.

The net effect of this adjustment on overall compensation depends both upon the share of baseline compensation received through DB pensions and the difference between the risk-adjusted discount rate of 4 percent and the sector's chosen discount rate.

For the federal sector the adjustment factor equals 1.85, the total normal cost equals 12.3 percent of wages, and the employee contribution equals 0.8 percent of wages. Total effective DB pension compensation is equal to 23.6 percent of wages, an increase of 10.8 percent of wages from the baseline value. This means that an employee would need to invest 23.6 percent of his wages in a DC pension holding Treasury bonds yielding 4 percent to generate the same income in retirement as an average federal employee receives from his DB plan.

For state and local pensions, the adjustment factor equals 3.59. The payroll weighted average normal cost as of 2009 was approximately 12.14 percent of payroll, and the average employee contribution was 5.45 percent of wages.<sup>41</sup> This results in effective DB pension compensation for state/local employees of 24.1 percent of wages, an increase of 17.4 percent of wages from the baseline value.

For the private sector, the adjustment factor equals 1.48 and the assumed normal cost of accruing benefits is 2 percent of wages. Private DB plans generally require no employee contributions. Adjusted DB pension compensation is 3 percent of wages, an increase of 1 percent from the unadjusted value.

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<sup>41</sup> Authors' calculations from Public Plans Database, Center for Retirement Research. Calculations based on 78 state and local plans. Any plan for which payroll, normal cost or employee contribution data was not available was excluded.

**Table 5. Adjustment factors for defined benefit pensions**

Pension sector	Sector discount rate	FRS normal cost at sector discount rate	Unadjusted normal cost	Adjustment factor	Employee contribution	Adjusted normal cost
Private sector	5.50%	19.72%	2.0%	1.48	0.0%	3.0%
State and local	8.00%	8.15%	12.14%	3.59	5.45%	23.6%
Federal	6.25%	15.77%	12.7%	1.85	0.8%	24.1%
Risk-adjusted	4.00%	29.21%				

Source: Authors' calculations

Following these adjustments, federal employees on average receive non-wage benefits equal to approximately 76.1 percent of salaries. Private sector employees at establishments of 100 or more employees receive benefits equal to 46.7 percent of salaries, while state and local government employees receive average benefits equal to 81.9 percent of salaries.

It is important to note that all benefit figures are averages. In addition to variations from employer to employer, benefits relative to salaries will vary based on the salary level of the individual. Benefits such as health insurance have roughly the same dollar value for each individual, while most other benefits – such as paid vacation and pensions – are proportional to earnings. Benefits will favor lower earners to the degree that fixed dollar benefits are higher relative to the total. State and local benefits would be the most progressive on average, with total health coverage including retiree health equaling 34 percent of total benefits; health constitutes 27 percent of total benefits in the private sector and 19 percent in the federal sector.

**Summary.** Incomplete and at times inconsistent data make it difficult to compare the relative generosity of non-wage compensation for federal employees to those of private sector and state and local government workers. However, by combining data from OMB and OPM, we are able to fill most of the gaps to make better comparisons. Federal workers receive around 63 percent higher total benefits per dollar of salaries than workers in private establishments of 100 or more employees.

While not a substitute for data collected by government agencies, our measures do show that benefits play a significantly larger role for federal workers than for private sector employees.



Adjusting pension compensation to account for the higher implicit rates of return paid by DB pensions increases the role of benefits for both federal and state and local government employees, where DB plans remain the predominant providers of retirement income.

**Estimating the overall wage and benefit premium.** The cross sectional regressions indicate a federal salary premium of 14 percent over otherwise similar private sector workers employed by large firms. We estimate a federal benefits premium of approximately 63 percent relative to benefits paid by large private employers. Combined, these generate a total wage and benefit premium of 37 percent.<sup>42</sup>

### Job Security

The third major factor we consider is job security. Greater job security effectively gives public sector employees an insurance policy against being discharged. This insurance does not come without a cost to the government, which is restricted in its ability to terminate poor performing employees and to recast the skill set of the federal workforce according to changing needs. Here we attempt to assign a dollar value to federal job security.

Adam Smith in *The Wealth of Nations* originated the idea of what economists today call “compensating wage differentials”—that is, differences in wages to balance the positive or negative non-pecuniary characteristics of jobs. Smith explains how this applies to the risk of unemployment:

Employment is much more constant in some trades than in others. In the greater part of manufactures, a journeyman may be pretty sure of employment almost every day in the year that he is able to work. A mason or a bricklayer, on the contrary, can work neither in hard frost nor in foul weather, and his employment at all other times depends on the occasional calls of his customers. He is liable, in consequence, to be frequently without any. What he earns, therefore, while he is employed must not only maintain him while he is idle, but make him some compensation for those anxious and desponding moments which the thought of so precarious a situation must sometimes occasion.... *The high*

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<sup>42</sup> To illustrate, if the salary of a comparable private sector employee is \$100, the federal employee on average can expect to receive \$114. With a benefits-to-salary ratio of 0.467, the private sector employee receives total compensation of \$146.7 while the federal employee with a benefits-to-salary ratio of 0.761 (63 percent greater than .467) receives \$200.75, for a wage/salary premium of  $(200.75-146.7)/146.7 = 36.8$  percent.

*wages of those workmen, therefore, are not so much the recompense of their skill as the compensation for the inconsistency of their employment.*<sup>43</sup>

While there is little disagreement that compensating wage differentials exist, the literature notes the difficulty in discerning such effects from the data. Duncan and Stafford (1980) note that, with the exception of jobs bearing the risk of injury or death, “a positive relation between bad working conditions and wages is *not* typical for cross-sectional analysis.”<sup>44</sup> Hwang, Reed, and Hubbard (1992) found that due to unobserved productivity differences between individuals, traditional approaches can understate true wage differentials by a factor of 10, sometimes even finding the wrong sign—meaning, for instance, that jobs with less security would deceptively appear to pay *lower* wages.<sup>45</sup>

However, there is some direct evidence of compensating wage differentials within federal employment based upon job security. Members of Congress and Congressional staff do not enjoy the same job protections as other federal employees: Congressmen can be voted out of office and Congressional staff can be dismissed at any time. According to the Congressional Research Service, the lack of job security for Congressmen and staff was a direct factor in granting them more generous pensions than other federal employees.

Because of the uncertain tenure of congressional service, FERS was designed, as CSRS had been, to provide a larger benefit for each year of service to Members of Congress and congressional staff than to most other federal employees.<sup>46</sup>

Most federal employees receive a DB pension equal to 1 percent of final earnings multiplied by the number of years of service, while Congressional employees receive a replacement factor of 1.7 percent of final earnings. All other things equal, this compensating differential in pension

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<sup>43</sup> Smith, Adam. *The Wealth of Nations*. 1776.

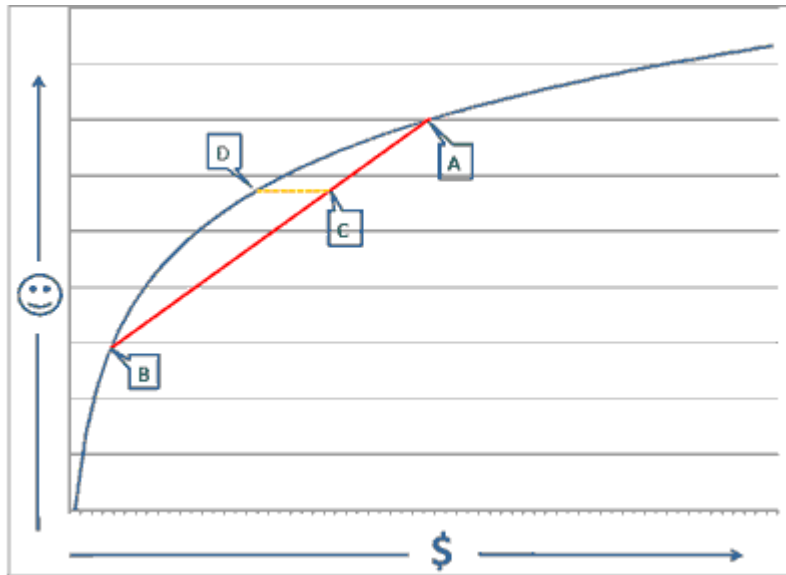
<sup>44</sup> Greg J. Duncan and Frank P. Stafford, “Do Union Members Receive Compensating Differentials,” *American Economic Review*, 70 (June 1980): 355-71.

<sup>45</sup> 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), pp. 835–858.

<sup>46</sup> Congressional Research Service. “Retirement Benefits for Members of Congress.” Updated February 9, 2007.

generosity implies an increase in total compensation of approximately 3.8 percent for Members of Congress and 3.0 percent for Congressional staff.<sup>47</sup>

**Figure 2. Illustrating the value of job security.**



For simplicity, however, we estimate the value of job security using an analytical device rather than attempting to discern a compensating wage differential from earnings and benefits data. The underlying intuition can be illustrated using a simple chart. Figure 2 shows a stylized utility function, where the curved line signifies the relationship between income (on

the horizontal axis) and utility (on the vertical axis). Higher income generates greater utility, but at an ever-declining rate. Point A represents the income/utility if the individual keeps his job throughout the year, while Point B represents the income/utility should he lose his job. Point C, which lies between the two, represents the individual's expected utility from his employment – that is, the probability-weighted average of the utilities at Points A and B.

The point on the utility curve immediately above Point C represents the utility of expected income, which is distinct from and higher than the expected utility of income. The vertical distance between Point C and the utility curve represents the reduction in utility attributable to income uncertainty. Point D lying directly to the left of Point C represents the certainty equivalent income, that is, the compensation with zero probability of discharge that

<sup>47</sup> According to the Office of Personnel Management, the normal cost of pensions for Members of Congress (calculated using a 6.25 percent discount rate) in 2010 was 19.2 percent of salaries and for Congressional staff was 17.7 percent of salaries, while for ordinary federal employees the normal cost was 12.5 percent of salaries. Federal Register. Vol. 75, No. 118. Monday, June 21, 2010. Other categories of federal employees, such as air traffic controllers and law enforcement officers, also have pension normal costs distinct from the broad class of federal employees.

would generate the same utility as the non-guaranteed compensation the individual currently receives. The dollar difference between Points C and D represents the job security compensation premium – that is, the reduction in compensation from an uncertain job that an individual would willingly accept to have zero chance of being discharged.

**Data.** As with benefits, finding appropriate data to estimate the value of job security poses a significant challenge. We need information on involuntary discharges that is consistent between sectors and broken down by worker skill. No dataset is perfectly suitable, but we can still put together a meaningful analysis.

The BLS Job Openings and Labor Turnover Survey (JOLTS) records discharge rates for the public and private sectors and allows for comparability between the two. In JOLTS, a discharge is defined as an involuntary job separation initiated by the employer, distinguishing it from separations driven by retirement, quits, transfers, or other reasons.<sup>48</sup> However, JOLTS does not disaggregate discharges into subcategories, making it impossible to differentiate the end of seasonal employment from other discharges that might be considered more unexpected or disruptive. According to JOLTS data, from 2002 through 2009 a private sector worker had a 20.1 percent annual probability of being discharged, while for both federal and state and local employees the probability was 6.0 percent.<sup>49</sup>

OPM data provide additional detail on separations from federal employment. Table 7 details several types of separations from federal service. In total, 0.57 percent of federal employees were fired for cause in 2009. Federal separations for cause are heavily weighted toward new employees, who are easier to terminate under federal law. Fifty-six percent of all federal terminations for cause are for employees with less than two years of service. Among employees with three or more years of service, the annual termination rate falls to 0.27 percent. An additional 0.021 percent of federal employees lost their positions due to “reductions in

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<sup>48</sup> Discharges can include: layoffs with no intent to rehire; discharges because positions were eliminated; discharges resulting from mergers, downsizing, or plant closings; firings or other discharges for cause; terminations of seasonal employees; and layoffs lasting or expected to last more than 7 days.

<sup>49</sup> Private sector discharge rates decline as establishment size increases: for establishments up to 1,000 employees the discharge rate remained roughly constant at around 20 percent, but fell to 11 percent for establishments of 1,000 to 4,999 employees and 10 percent for establishments with 5,000 or more employees. Note that only around 10 percent of employees work in establishments of 1,000 or more employees, with presumably smaller percentage in the private sector due to large average establishment sizes in state and local government.

force,” the federal equivalent to private sector layoffs. By far the largest number of separations, 2.8 percent per year, is due to the expiration of a temporary appointment or for other reasons.

**Table 7. Causes of separation from federal service, 2009.**

Years of service (years)	Percent of employees	Terminations (for cause)	Reductions in force	Terminations (expired appointment, other)
Less than 1	8.4%	2.48%	0.007%	17.8%
1 - 2	10.8%	1.05%	0.018%	6.6%
3 - 4	8.2%	0.67%	0.029%	3.0%
5 - 9	18.4%	0.48%	0.034%	1.1%
10 - 14	10.5%	0.35%	0.028%	0.6%
15 - 19	11.1%	0.24%	0.028%	0.2%
20 - 24	12.9%	0.19%	0.018%	0.2%
25 - 29	9.8%	0.15%	0.011%	0.2%
30 - 34	6.4%	0.08%	0.006%	0.3%
35 or more	3.6%	0.02%	0.004%	0.8%
<i>All</i>		<i>0.57%</i>	<i>0.021%</i>	<i>2.8%</i>

Source: Authors’ calculations from Office of Personnel Management data.

While both datasets provide insights, each has shortcomings. JOLTS separates public and private sector workers but does not disaggregate discharges into subcategories more applicable for assessing job security. Moreover, JOLTS data include postal employees, who may have different probabilities of discharge than non-postal federal employees. Conversely, OPM data provide better detail on federal discharges but include no comparable measures for the private sector.

Neither dataset accounts for important differences between federal and private sector employees. For instance, federal employees tend to be better educated, and such individuals are

less likely to be unemployed.<sup>50</sup> Federal workers are also more likely to be older, female, and non-white, each of which could affect the incidence and duration of job loss in the private sector.

For that reason, we turn to unemployment rates calculated from the CPS. The CPS allows us to control for the personal characteristics of federal employees that might affect their likelihood of unemployment. Unlike JOLTS discharge rates, unemployment rates naturally encompass both the incidence of discharge and the duration of unemployment following job loss, which may differ between sectors.

We use regression analysis of CPS data to calculate the effect on unemployment of being a federal employee. The coefficient attached to a dummy variable for federal employment signifies the reduction in the probability of unemployment for federal workers after holding human capital constant. The obvious choices for control variables are the same ones we used for the wage regression in the first section. Most CPS questions regarding employers refer to the individual's prior job if he is unemployed. This means it is easy to know, for example, whether an unemployed person last worked in the public or private sector.

Unfortunately, the firm size variable refers to each respondent's longest job in the past year, not his immediate prior job. This means that firm size is a noisy indicator of past employment, but it is important enough that we run the regression both with and without it. Using all of the control variables from our wage regression, except firm size and hours worked, federal employees have an unemployment rate 2.5 percentage points lower than similar private sector workers. When firm size is included, the fit of our model goes down, and the federal-private unemployment difference becomes 1.5 percentage points.<sup>51</sup>

The above figures designate only the unemployment rate, but individuals may be unemployed for a variety of reasons beyond involuntary discharge. For instance, individuals who leave a position voluntarily may be unemployed for a period, as would individuals who re-enter

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<sup>50</sup> For instance, see Table A-4 at <http://www.bls.gov/news.release/pdf/empsit.pdf>

<sup>51</sup> The CPS's baseline unemployment rate (without controls) over the 2006-2010 period was 7.7 percent, while federal employees had an average unemployment rate of 3.2 percent. The regressions indicate that private sector workers with similar human capital to federal employees had an unemployment rate of around 5.7 percent while those with similar human capital and similar firm size would have had an unemployment rate of around 4.7 percent. This implies that federal employees had unemployment rates 45 percent lower or 35 percent lower, respectively, than similar private sector employees.

the workforce but have not yet found a new position. For that reason, we limit unemployment to people who describe themselves as “job loser/on layoff” or “other job loser.” Among individuals describing themselves as federal employees, 1.34 percent report being unemployed due to job loss or layoff. The relevant figure for the private sector, after controlling for personal characteristics, is 3.35 percent, a 2.01 percentage point difference. If we control for both personal characteristics and firm size, the difference goes down to 1.45 percentage points. While this latter estimate including firm size lowers the fit of the model, we use it for the sake of completeness. We estimate the value of federal job security by calculating the reduced utility an individual would suffer based upon a 1.45 percentage point probability of becoming unemployed due to job loss or layoff.<sup>52</sup>

**Method.** In practice, estimating the job security compensation premium is more complex than illustrated in Figure 2 because a number of additional parameters must be specified. We need to quantify the risk aversion of the individual, which determines the shape of the utility curve, and the level of unemployment insurance (UI) benefits that might be collected in the case of job loss. In addition, if the employee is earning a wage and benefit compensation premium in his current position, greater job security protects not only against a temporary income loss but also against the probability of returning to work in a lower paying position.

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  $\rho$  is the coefficient of constant relative risk aversion (CRRA). The CRRA value represents the degree to which an individual desires security and dislikes uncertainty.

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<sup>52</sup> This approach still has weaknesses. For instance, given that most federal discharges are for workers with less than two years of service, discharged federal workers likely would have invested less in obtaining job-specific skills whose benefits may be lost in a new position. Thus, federal discharge rates may overstate the welfare cost to terminated employees because those employees who are terminated have invested less time in their positions. Likewise, the job security offered in the public sector may attract employees who would particularly benefit from it, meaning those who might be discharged at higher rates were they in the private sector. At the same time, if federal employees desire job security they may work harder than private sector workers to avoid job loss. While complications exist, this approach nevertheless appears to be the best given the data available.

We begin with a baseline CRRA of 2.8 that Munnell, Haverstick and Soto (2007) derive for private-sector workers from the Panel Study on Income Dynamics.<sup>53</sup> We assume total compensation of \$141,470, which equals the 2010 average federal civilian salary of \$81,258 plus total benefits equal to 74.1 percent of salaries.

We first calculate the utility of income of the baseline compensation. We then calculate the utility of income if the individual becomes unemployed. We assume a 1.45 percent unemployment rate, which equals the difference between the human capital-adjusted rates for private and federal workers. The unemployment rate is equal to *discharge probability \* duration/52 weeks*. We generate this unemployment rate using an assumed duration of unemployment of 22 weeks, which is the average for unemployed federal workers from 2005 through 2010.<sup>54</sup> We calibrate an annual discharge probability of 3.43 percent to generate the assumed unemployment rate of 1.45 percent. Note that this overstates the probability of involuntary discharge by a factor of over five relative to OPM data, but is necessary to match CPS unemployment rates.

We assume that unemployment effectively begins on January 1st of each year, during which time the individual receives \$380 per week in unemployment insurance benefits (the maximum payable in Virginia and Maryland), after which he returns to work at the baseline earnings level.<sup>55</sup> Since unemployment benefits are not payable for terminations for cause, the unemployment benefit is multiplied by the percentage of federal involuntary discharges generated by reductions in force relative to terminations for cause; based on the OPM data in Table 7, layoffs account for approximately 3.55 percent of involuntary federal discharges.

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:

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

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<sup>53</sup> Munnell, Alicia H., 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.

<sup>54</sup> Based on unpublished data courtesy of the BLS.

<sup>55</sup> Virginia grants the maximum unemployment benefit at a relatively low level of earnings, meaning that in practice most unemployed federal workers would receive this maximum.



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. The percentage difference between the dollar value of expected utility and the base salary under the assumption of no probability of discharge represents the job security premium.

**Results.** There is a baseline job security premium of 1.3 percent of compensation when assuming a 1.45 percent reduction in the probability of termination or layoff for a federal employee versus a private sector worker. For comparison, if we assume a non-firm sized adjusted difference in discharges of 2.45 percentage points, the job security premium rises to 6.4 percent of compensation. These figures represent the value of federal job security for a typical individual isolated from all other factors specific to federal employment.<sup>56</sup>

It is difficult to judge the intuitive reasonableness of these estimates given the paucity of other research on the value of job security. Based on some recent findings, these results may be considered conservative. The job security premium in our model is less than half the compensating differential attached to Congressional pensions, discussed above. Moreover, Pfeifer (2011) reports on German survey respondents who were asked the salary change they would demand to be subject to private rather than public sector levels of job security, with a mean result of approximately 12 percent.<sup>57</sup>

Consistent with Hamermesh and Wolfe (1990), the duration of unemployment in our model is a more important factor than the probability of discharge.<sup>58</sup> According to BLS data, federal employees have slightly longer durations of unemployment than other broad classes of workers, with an average difference of around two weeks. However, as Meyer (1990) finds, this

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<sup>56</sup> If unemployment benefits are not included, the 1.3 percent rises to 1.9 percent of compensation.

<sup>57</sup> Christian Pfeifer, "Risk Aversion and Sorting into Public Sector Employment," *German Economic Review*, Vol. 12, No. 1 (February 2011), pp. 85–99.

<sup>58</sup> Hamermesh, Daniel S and Wolfe, John R, 1990. "Compensating Wage Differentials and the Duration of Wage Loss." *Journal of Labor Economics*, University of Chicago Press, vol. 8(1), pages S175-97, January. 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.

may be due in part to longer durations of unemployment for individuals with greater education or experience.<sup>59</sup>

Next, we alter the model's parameters to account for two factors. First, public sector employees are likely more risk-averse than private sector workers, which means they would tend to place greater value on job security. Munnell, Haverstick, and Soto (2007) report a CRRA value of 5.8 for state and local government employees, which we adopt for use with federal employees. Other studies have also found that public employees are more risk averse than private sector workers.<sup>60</sup> This parameter change increases the baseline job security premium to 3.1 percent.

Second, we incorporate the previously calculated wage and benefit premiums of 35 percent into the model. This accounts for the fact that job security is more valuable if it protects a position that pays more than the individual would receive in alternate employment. Here we assume that an individual who becomes unemployed returns to work for the remainder of the year at his market rate of compensation – that is, his federal compensation minus the 35 percent combined average federal wage and benefits premium. This assumption presumably understates the value of federal job security, as it does not account for the fact that loss of a premium-paying position could mean lower earnings in many or all future years of employment. Accounting for the wage and benefit premium increases the total job security premium to 17.3 percent.

**Summary.** In previous sections we calculated a federal salary premium of 14 percent and a benefits premium of 63 percent, which together produce a wage and benefit premium of 37 percent. Adding a job security premium of 17 percent of compensation generates an overall federal compensation premium of approximately 61 percent.<sup>61</sup>

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<sup>59</sup> Meyer, Bruce D. 1990. "Unemployment Insurance and Unemployment Spells." *Econometrica* 58(4):757–782.

<sup>60</sup> Bellante, Don and Albert N. Link, "Are Public Sector Workers More Risk Averse Than Private Sector Workers?" *Industrial and Labor Relations Review*. Vol. 34, No. 3 (Apr., 1981), pp. 408-412.

<sup>61</sup> To illustrate, if the salary of a comparable private sector employee is \$100, the federal employee on average can expect to receive  $\$100 \times (1.14) \times (1.761) \times (1.173) = \$235.48$ , due to the salary premium, benefits, and job security premium, respectively. With a benefits-to-salary ratio of 0.467, the private sector employee receives total compensation of \$146.7, meaning total federal compensation is  $(235.48-146.7)/146.7 = 60.5$  percent higher.

## **Job Queues and Quit Rates**

Although not central to our estimate of the federal compensation premium, job queues and quit rates offer a test of our findings. If its workers are overpaid, the federal government should have high application rates and low turnover, indicating that the government's overall compensation package is highly desirable.

**Job Queues.** While data on the number of applicants per federal or private sector job are scant, Krueger (1988) concluded that federal jobs on average received 25 percent to 38 percent more applicants than private sector positions.<sup>62</sup> Venti (1985) concluded that roughly three times as many men would be willing to accept federal employment as are actually offered federal jobs; for women, the ratio is six times. These results, Venti concluded, suggest “the government could continue to attract a workforce of current size with substantially lower wages.”<sup>63</sup> Heywood and Mohanty (1995) examine the confluence of queues for unionized jobs and queues for federal jobs and conclude that there is excess demand for federal employment.<sup>64</sup> Their work supports our decision not to include union status as a control variable in our wage regressions, as part of the demand for federal employment they observed is due to the characteristics it shares with unionized positions.

Queue models of federal employment generally use data from the 1980s, and more recent data would be helpful. Nevertheless, the historical evidence clearly points toward queues for federal jobs.

**Quit Rates.** According to JOLTS data, federal employees quit their jobs at around one-third the rate of employees in large private firms. Many have taken this to imply that federal employees are overpaid relative to what they could receive in alternate employment. Low quit rates are certainly indicative of general job satisfaction. Both common sense and economic

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<sup>62</sup> Krueger, Alan B. “The Determinants of Queues for Federal Jobs.” *Industrial and Labor Relations Review*, vol 41, no 4, July 1988.

<sup>63</sup> Venti, Steven F., *Wages in the Federal and Private Sectors* (June 1985). NBER Working Paper Series, Vol. w1641.

<sup>64</sup> Heywood, John S & Mohanty, Madhu S, 1995. “Estimation of the US Federal Job Queue in Presence of an Endogenous Union Queue.” *Economica*. London School of Economics and Political Science, vol. 62(248), pages 479-93, November.

research have indicated that low quit rates are correlated with employee reports of general job satisfaction.<sup>65</sup>

*Alternative Explanations.* However, two alternate explanations for low federal quit rates are available. First, it is possible that risk-averse individuals will be less likely to quit a current job in favor of a new one even if they are not overcompensated in their current position. It is not possible to say at the moment how large a role individual risk preferences play. Note, though, that there is a see-saw effect with regard to the job security bonus: if we wish to explain low federal quit rates by the risk aversion of federal employees, we also must acknowledge that the federal job security compensation premium is large.

A second potential explanation of low federal quit rates is the incentive effects of DB pensions. Due to the structure of DB benefit formulas, the implicit annual compensation from DB pensions is larger as job tenure increases. This gives employees with DB pensions a greater incentive to remain with a job. Ippolito (1987) posits that the incentive effects of DB pensions generally explain low federal quit rates,<sup>66</sup> and this finding has been cited to that effect.

However, Ippolito notes that this argument may be testable: were federal employees to shift from a DB to a DC pension structure, he says, quit rates should increase. As it happens, in the 1980s the federal government made a partial switch when the FERS pension plan was introduced. Unlike the prior CSRS pension, which was entirely DB, federal employees hired after 1984 participate in a reduced DB plan (FERS) and a DC program, the Thrift Savings Plan (TSP). With younger federal employees having about half as much compensation devoted to DB pensions as older employees under the CSRS program, one would expect that quit rates among younger federal workers would rise.

To analyze this question, we first tabulate quit rates for current federal workers covered under the FERS/TSP pension combination. These workers will tend to be younger, as they would have been hired subsequent to the CSRS/FERS transition in 1984. We then compare these quit

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<sup>65</sup> Freeman, R. B. "Job Satisfaction as an Economic Variable." *The American Economic Review*. Vol. 68, No. 2, Papers and Proceedings of the Ninetieth Annual Meeting of the American Economic Association (May, 1978).

<sup>66</sup> Ippolito, Richard A. "Why Federal Workers Don't Quit." *The Journal of Human Resources*, Vol. 22, No. 2. Spring, 1987.

rates to those for individuals with similar years of service in 1984; these individuals would have been covered under the prior CSRS pension plan and thus have had less powerful incentives to quit. To the degree that current quit rates exceed those in 1984, we can infer that changes in pension structures may have played a role. Given the limitations of the data, certain small approximations are unavoidable, but the overall trends should be clear.

**Table 8. Federal quit rates by years of service, 1984 and 2008.**

Years of service	1984	Years of service	2008
Under 5	15.1%	Under 5	12.6%
6 to 15	6.6%	6 to 14	3.2%
16 to 20	2.7%	15 to 19	1.2%
21 to 25	1.6%	20 to 24	0.7%

Sources: Congressional Budget Office and Office of Personnel Management

Table 8 details quit rates in 1984 and 2008. In 1984 the economy-wide unemployment rate was 7.5 percent while in 2008 average unemployment was 5.8 percent. Thus, given the wider availability of alternate private sector jobs, federal quit rates in 2008 *should* be higher than in 1984 even without the change in pension structures. However, federal quit rates in all relevant age

categories were *lower* in 2008 than in 1984, despite lower unemployment and changes to federal pension structures.

*Summary.* While it is likely that even the reduced FERS DB pension tends to lower federal quit rates relative to private sector levels, it does not seem that pensions alone can fully explain why federal employees are so much less likely to quit their jobs than workers employed by large private sector firms. The parsimonious explanation is that few federal employees believe there are better options in the private sector, just as many private workers line up to join them in the public sector.

## Conclusions

Given rising federal budget deficits and persistently high unemployment in the private sector, it is understandable that federal employee compensation would come under increased scrutiny. Many claims made regarding federal compensation – either that it is obscenely generous or that it leaves federal workers substantially underpaid – do not stand up to scrutiny. Using standard econometric methods, we find that federal workers receive salaries about 14 percent above those paid to similar private sector workers and benefits around 63 percent more generous per dollar of salary than those paid in large private sector firms. The greater job security enjoyed by federal government employees is equivalent to a compensation increase of

around 17 percent. Together, these generate an overall federal compensation premium of approximately 61 percent.

Federal civilian, non-postal payroll as of 2011 is approximately \$115 billion.<sup>67</sup> Including the full value of benefits, total cash compensation equals about \$202 billion annually. Assuming a 61 percent total compensation premium, the market value of federal compensation is approximately \$125 billion, meaning that payment at market rates would reduce federal outlays by approximately \$77 billion per year.

Aside from the cost savings at stake for taxpayers, a major theme of this paper is the need for better methodology and data collection on the part of the federal government. The Pay Agent's deeply flawed method for comparing public and private salaries requires fundamental reform—specifically, switching from comparing jobs to comparing people. In addition, the Pay Agent should collect and use systematic, comprehensive, and consistent benefits data for both sectors. Finally, the Pay Agent needs to do both theoretical and empirical work on the value of job security in the federal government, which it currently (implicitly) considers to be zero. These reforms would lead to a fairer and more cost-effective federal compensation system.

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<sup>67</sup> Source: United States Census Bureau, as of 12/15/2010.  
<http://www.census.gov/compendia/statab/2011/tables/11s0495.xls>

## Appendix

The following provides greater detail on the calculation of benefits for federal employees based upon OPM data.

*Vacation:* OPM reports that non-postal federal employees used an average of 20.1 days of annual leave in 2005, equal to 7.7 percent of base pay assuming a 260 day work year. However, this figure excludes lump sum payments for unused annual leave, which totaled 0.7 percent of direct pay in 2005. Total compensation via annual leave in 2005 therefore equaled 8.5 percent of direct pay. For private sector and state and local government employees the corresponding figures are 4.9 percent and 4.4 percent, respectively.<sup>68</sup>

*Holidays:* OPM reports that non-postal federal employees used an average of 8.9 holidays per year, which equals approximately 3.4 percent of federal salaries.<sup>69</sup> For private sector and state and local government employees the corresponding figures are 3.1 percent and 4.1 percent, respectively.

*Sick leave:* OPM reports that federal employees used an average of 9.4 sick days per year.<sup>70</sup> Assuming a standard work year of 52 five-day weeks, sick time would account for 3.6 percent of federal salaries. However, this figure does not include unused sick days converted to pay at retirement.<sup>71</sup> For private sector and state and local government employees the corresponding figures are 1.2 percent and 3.1 percent, respectively.

Overall, federal employees receive paid leave equal to approximately 16.5 percent of pay, versus 9.5 percent for the private sector and 12.5 percent for state/local government employees.

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<sup>68</sup> OPM (2005), p. 66.

<sup>69</sup> OPM (2005), p. 66.

<sup>70</sup> OPM (2005), p. 66.

<sup>71</sup> Older federal employees under the CSRS retirement system have a greater ability to cash out unused sick days than younger employees covered by FERS, although recent steps have been taken to grant FERS employees the same privilege.

*Overtime:* OPM reports that overtime for non-postal federal employees in 2005 equaled 4.7 percent of base pay.<sup>72</sup> For private sector and state and local government employees the corresponding figures are 1.5 percent and 0.7 percent, respectively.

*Shift differentials:* Here we include holiday pay (0.3 percent), Sunday pay (0.3 percent), night differentials (0.4 percent) and hazardous duty pay (0.1 percent), for a total of 1.1 percent of pay.<sup>73</sup> For private sector and state and local government employees the corresponding figures are 0.4 percent and 0.2 percent, respectively.

*Non-production bonuses:* OPM reports that in 2005 non-postal federal employees received cash awards equal to 1.4 percent of pay.<sup>74</sup> For private sector and state and local government employees the corresponding figures from BLS are 2.5 percent and 0.5 percent, respectively.

*Other supplemental pay:* Pay for post differentials (0.1 percent); physician's comparability allowance (0.6 percent); and other (0.6 percent) together total of 1.3 percent of pay.<sup>75</sup> To the degree these payments exist in the private sector they likely would be included in an existing BLS category. As it is unclear which BLS category to ascribe them to, we create a new category called "Other supplemental pay."

Overall, supplemental pay for federal employees equals 8.5 percent of salaries, versus 4.3 percent for private sector employees and 1.4 percent for state and local government workers.

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<sup>72</sup> OPM (2005), p. 25.

<sup>73</sup> OPM (2005), p. 25.

<sup>74</sup> OPM (2005), p. 25.

<sup>75</sup> OPM (2005), p. 25.