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CENTER *for* RETIREMENT RESEARCH *at* BOSTON COLLEGE

State and Local Pension Plans

Number 19, July 2011

UNIONS AND PUBLIC PENSION BENEFITS

*By Alicia H. Munnell, Jean-Pierre Aubry, Josh Hurwitz, and Laura Quinby**

Introduction

State and local pensions have been headline news since the 2008 financial collapse reduced the value of their assets, leaving a substantial unfunded liability. The deterioration in the funded status of these plans raised pension costs at the same time that the ensuing recession wreaked havoc with state and local budgets. Legislatures across the country have responded by reducing pension benefits – primarily for new employees – and increasing employer and employee contributions.[1] As part of that process, governors in several states have launched initiatives to curb collective bargaining in the public sector.[2] One possible implication is that governors view unions as responsible for pushing up state and local pension benefits. This *brief* identifies the impact of public sector unions and other factors on benefit levels, wages, and employment.

The *brief* is organized as follows. The first section summarizes what is known about pensions, wages, workers, and unionization in the public sector. The second section reports on a series of empirical exercises to determine the role of unions in explaining public pensions and wages. The results show that unions have no measurable effect on plan generosity or rate of growth in pension benefits, but do have a quantifiable impact on wage levels and perhaps number of workers. The third section presents a possible reason for this outcome. Public sector pensions are legislated, not bargained, so the articulateness and acumen of the lobbyists may be more important than the number of union members; in contrast, wages are bargained and union strength could have a more direct effect. The final section concludes that this area is ripe for further research because the results appear to contradict the general perception of commentators and politicians.

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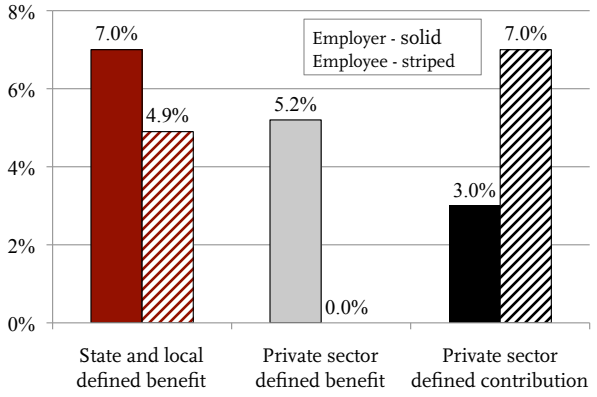
What We Know

While many aspects of the public sector labor market are a source of great controversy, other aspects are undisputed. This section presents some of the facts. The focus here is public sector workers; any comparison to private sector workers is used only as a metric for assessing public sector compensation and unionization.

Public Sector Pensions are More Generous

Pensions are more generous in the public sector as evidenced by the fact that, despite significant employee contributions, public employer costs are higher than private employer costs (see Figure 1). In addition, a greater percent of workers – 76 percent vs. 43 percent – have an employer-sponsored plan in the public sector than the private sector.

Figure 1. Employer and Employee Pension Cost, by Sector, 2009

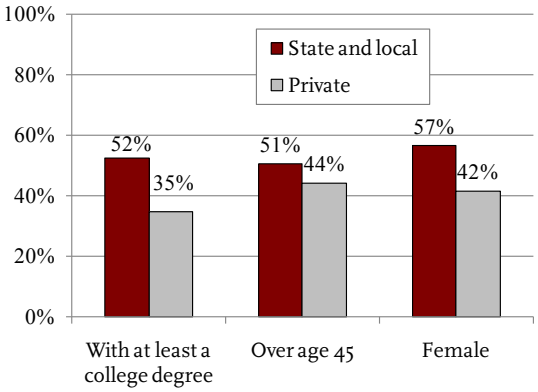


Note: State and local rates are for Social Security eligible employees. The rates for those without Social Security averaged 7.1 percent (employer) and 7.6 percent (employee). *Sources*: *Public Plans Database* (PPD) (2009); Towers Watson (2009); and Vanguard (2010).

Public Sector Workers Are Different

The public workforce looks different than the private workforce. The share of those with at least a college degree is 52 percent in the public sector compared to 35 percent in the private sector. The percent over age 45 is 51 percent in the public sector and 44 percent in the private sector. And the percent female is 57 percent in the public sector and 42 percent in the private sector (see Figure 2). Median tenure in the public sector is seven years compared to four in the private sector.[3] These characteristics are likely driven by teachers, who comprise a large portion of the public workforce.

Figure 2. Percent With At Least a College Degree, Over Age 45, and Female, by Sector, 2010

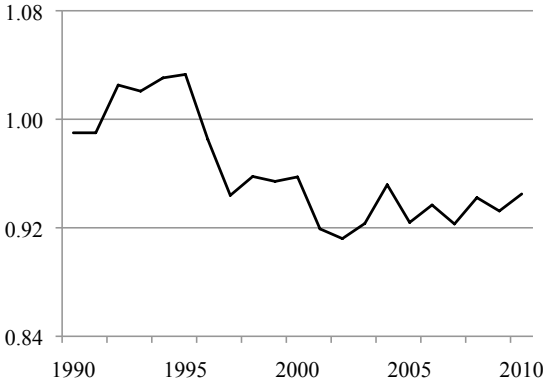


Source: Authors' calculations from the U.S. Census Bureau, *Current Population Survey* (CPS) (2010).

Public Sector Wages Are Lower

Whether public sector workers have higher or lower total compensation is an extremely contentious issue. It requires careful comparisons of people doing similar jobs in each sector. But the fact is that average wages in the public sector are lower than those in the private sector, and the ratio of public to private sector wages has declined over time (see Figure 3).

Figure 3. Ratio of Average Public to Private Sector Hourly Wages, 1990-2010

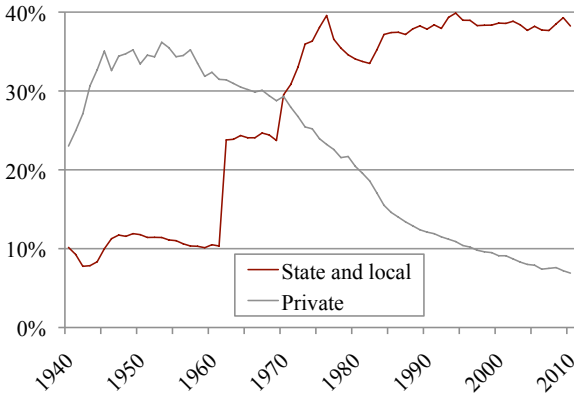


Source: Authors' calculations from CPS (2010).

Public Sector Unions Are More Important

The union picture for the public and private sectors is very different. While union membership in the private sector fell from 35 percent of the workforce in the 1950s to 7 percent in 2010, the rate in the public sector increased from about 10 percent in the 1950s to 38 percent today (see Figure 4). Union membership varies by region and type of job – for example, public safety employees tend to be more unionized than general employees.

Figure 4. Percent of Wage and Salary Workers in Unions, 1940-2010



Note: The percent in unions for state and local workers prior to 1962 includes federal workers. The jump in 1962 is due to the inclusion of associations.
Sources: Troy and Sheflin (1985); the U.S. Department of Labor (1939-1983); and Hirsch and Macpherson (1983-2010).

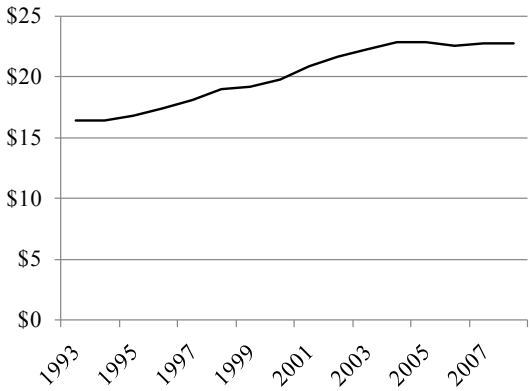
Sorting Out the Reasons

This section attempts to sort out the interactions of the facts presented above, with a special emphasis on the role of unions in influencing the growth of pension benefits, normal cost, wages, and the size of the workforce.

Growth in Pension Benefits

Figure 5 shows the average pension benefit over the period 1993-2008. Two interesting facts emerge. First, the average annual benefit in 2008 was $23,000, a figure substantially lower than most commentary would suggest. Second, the trend suggests a period of slower growth (1993-1998), a period of rapid growth (1999-2003), and then a period of stability (2004-2008).

Figure 5. Average State-Local Pension Benefit, 1993-2008, Thousands of 2010 Dollars



Source: Authors' calculations from the U.S. Census Bureau, *State and Local Government Public-Employee Retirement Systems* (1993-2008).

To figure out what was going on, we estimated an equation to explain the average annual rate of growth in each state over each of these three periods. Focusing on states, as opposed to plans, was necessary because consistent plan data are not available going back to the 1990s. Five variables were thought to be important:

Unionization. The recent actions by governors would suggest that union power led to increases in pension benefits. But pension benefits are generally set by the legislature, which suggests that lobbying expertise, rather than the percent of the public workforce that is a member of a union, may be the key factor.[4] (See Appendix A for an explanation of the union variable.) If union strength were an important factor, the coefficient would be positive.

Growth in the funded ratio. Stories abound about how over-funding can result in a push to liberalize benefits.[5] Indeed, much of the expansion in California in the late 1990s is attributed to their reporting funded ratios in excess of 100 percent.[6] However, the effect is not symmetric because most states cannot reduce benefits for current employees. Thus, the variable representing the change in the funded ratio is equal to 1 if the ratio increased and zero otherwise. This change is calculated over the four years prior to the relevant benefit growth period. That is, for 2004-2008, the funded variable reflects the change over the period 2000-2003. The coefficient should be positive.

Mean reversion. Some experts suggest that changes in states' pension policies are driven by what is going on around them. If neighboring states are raising benefits, then the lagging state will follow. To capture this phenomenon, this variable takes on a value of 1 if the state's pension benefit is lower than the average for the region in the four years prior to the relevant growth period. The coefficient of this variable should be positive. That is, if a state starts behind, it is more likely to raise benefits.

Debt to revenue. For politicians to expand pension benefits, the state's financial accounts, as well as the pension fund, have to be in good order. One key to fiscal well-being is the state's debt burden. To standardize for the size of the state, debt is measured relative to revenue. This variable is the average ratio of debt to revenue for the four years prior to the relevant benefit growth period. If a larger debt burden does restrain benefit growth, the coefficient would be negative.

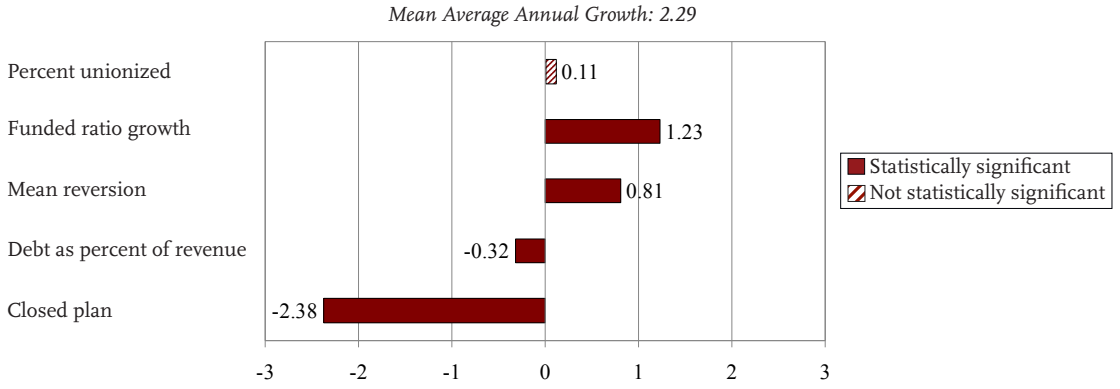
Closed plan. Some states have closed one or more of their defined benefit plans to new entrants. One would not expect benefits to increase under these circumstances. The variable is set equal to 1 if the state has a closed plan in the four years preceding the benefit growth period. The coefficient should be negative.

The bars in Figure 6 show the impact of each variable on the average annual growth rate of benefits. For "0/1" variables, such as growth in the funded ratio, starting below the mean, and closed plan, the bars represent the relationship between the characteristic and the growth rate; for continuous variables, the bars represent the impact of a one-standard-deviation change on the growth rate. The results suggest that an increase in the funded ratio and catching up with the neighbors – that is, mean reversion – are important factors in explaining the growth in public sector benefits. In addition, states with a higher ratio of debt to revenue and with a closed plan experience less benefit growth. But union strength does not have a statistically significant effect.[7] (See Appendix B for full regression results.)

Normal Cost

It could be possible that unions do not affect the *growth* in benefits because states with high levels of unionization always had a more generous benefit formula. In other words, unions pressed for high benefit factors early and therefore did not need to push for rapid growth. To test this hypothesis, we ran another regression to identify the factors that affect the generosity of benefits. Generosity is measured

Figure 6. Impact of Selected Factors on the Average Annual Growth Rate of State-Local Pension Benefits, 1994-1998, 1999-2003, and 2004-2008



Note: Solid bars indicate the coefficient is statistically significant at the 10-percent level or better. Standard errors have been adjusted for state-level clustering.
Sources: Authors' calculations from Hirsch and Macpherson (1990-2008); PPD (2001-2003); *Public-Employee Retirement Systems* (1993-2008); U.S. Census Bureau, *State and Local Government Finance* (1990-2003); and Zorn (1990-2000).

as normal cost – the amount needed to be put aside in a given year to cover benefits earned that year – as a percent of payrolls. By controlling for payrolls, the analysis focuses on the differences in benefits due to a more generous formula as opposed to the effect of higher wages feeding into the formula. The following variables are included in this equation:

Unionization. Unionization is measured slightly differently for this exercise. Because normal cost data are available only for those plans included in our *Public Plan Database* (PPD), the degree of unionization pertains only to plans included in the sample rather than the state's entire public sector workforce.[8] Again, if union strength affects the level of benefits, the coefficient would be positive.

Social Security coverage. Roughly 30 percent of public sector workers are not covered by Social Security. The plans for these workers would be expected to be more generous because these public employees have no other source of retirement income. Social Security coverage is measured as the percent of workers covered, so the coefficient would be negative – the more workers covered by Social Security, the less need for higher benefits.

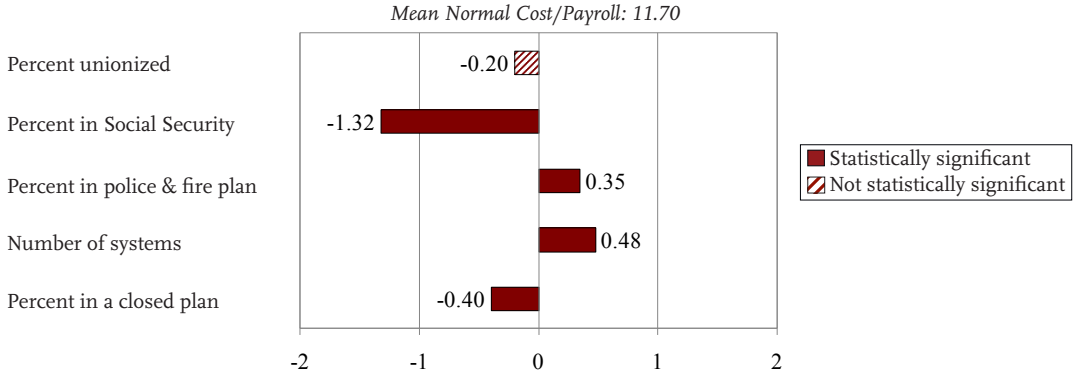
Police & Fire. Plans for police and fire employees are considerably more expensive than those for teachers or general employees, because public safety workers retire at a much younger age. Therefore, states with more workers in police and fire plans would have a higher average normal cost, and the coefficient would be positive.

Number of systems. The normal cost of plans at the local level tends to be higher than those administered by the state.[9] Therefore, states with many local plans would tend to have higher normal cost, and the coefficient would be positive.

Closed plan. If the state has closed the plan to new entrants, it has probably not increased benefits over time. As a result, normal cost would be expected to be lower and the coefficient negative.

This simple equation explains more than one-third of the variation in normal cost for the 50 states over the 2001-2008 period. And Social Security coverage, number of systems, percent in police and fire plans, and whether the plan is closed all have the expected effects and are statistically significant (see Figure 7). But union strength does not appear to have a direct impact on the generosity of benefits.

Figure 7. Impact of Selected Factors on Normal Cost as a Percent of Payroll, 2001-2008



Note: Solid bars indicate the coefficient is statistically significant at the 10-percent level or better. The results shown are for a one-standard-deviation change. Standard errors have been adjusted for state-level clustering. Additional controls not depicted include a vector of year dummy variables. "Percent unionized" reflects the percent of those state and local workers captured in the PPD who are allowed to collectively bargain under state law. West Virginia is omitted from 2001 through 2003 due to data unavailability.
Sources: Authors' calculations from Freeman and Valletta (1987); PPD (2001-2008); and *Public-Employee Retirement Systems* (2001-2008).

Wages

If union strength does not affect pension benefit growth or generosity, could it have an impact on wages, which are determined through bargaining rather than legislation? To test this hypothesis, we estimated an equation to explain the ratio of public to private sector wages[10] – where private sector wages serve as a control for variations in the cost of living among states – over the period 2001-2008, including the following variables:

Unionization. As in the first equation, unionization is measured as the percent of the public workforce that is a member of a union. If union strength were important, the coefficient would be positive.

Public to private educational attainment. This variable is the average years of education for public sector workers compared to private sector workers. To the extent that public workers have more years of education, their wages should be higher than workers in the private sector and the coefficient should be positive.

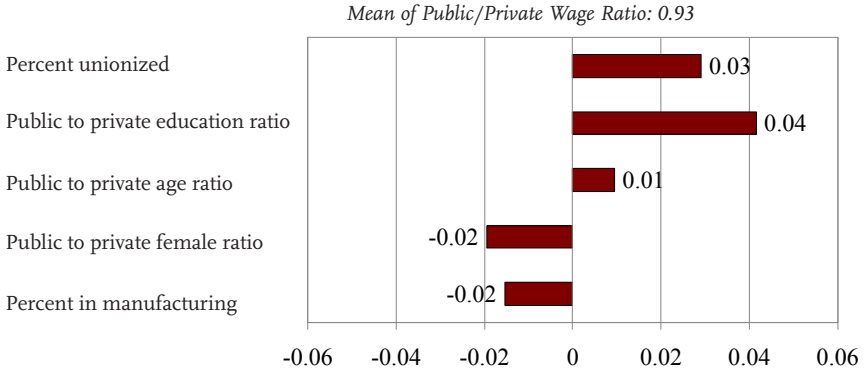
Public to private age. This variable is an attempt to measure the experience of public sector workers compared to that of private sector workers. To the extent that public workers have more years of experience, their wages should be higher than workers in the private sector and the coefficient should be positive.

Public to private percent female. Women continue to earn less than men. If the public sector workforce has more women, this pattern should have a negative effect on the ratio of public to private sector wages. Therefore, the coefficient should be negative.

Percent of workforce in manufacturing. The notion is that states with a higher percentage of the workforce in manufacturing would have higher private sector wages. Therefore, the coefficient would be negative.

The results suggest that after adjusting for differences in education, experience, percent of the workforce that is female, and percent of the total workforce in manufacturing – all of which have the expected and statistically significant effect – union strength has an important independent effect on the ratio of public sector to private sector wages (see Figure 8). On average over the 2001-2008 period, public sector wages were 93 percent of those in the private sector. Increasing the percent membership in a union by one standard deviation – that is, bringing it from 33 percent to 50 percent – raises the ratio of public to private wages to about 96 percent.

Figure 8. Impact of Selected Factors on the Ratio of State-Local to Private Sector Hourly Wages, 2001-2008



Note: All factors are statistically significant at the 10-percent level or better. The results shown are for a one-standard-deviation change. Standard errors have been adjusted for state-level clustering. Additional controls not depicted include a vector of year dummy variables.
Sources: Authors' calculations from Hirsch and Macpherson (2001-2008); and the CPS (2001-2008).

Workforce

One last thought. Some of the literature for the private sector – albeit not for the public sector – suggests that unions try to protect their existing workers by limiting the number of employees. The notion here is that the smaller the workforce, the easier it is to preserve wages and benefits.[11] To test this hypothesis, we estimated an equation to explain the percent of the workforce that is comprised of state and local workers using the following variables:

Unionization. Unionization is again measured as the percent of the public workforce that is a member of a union. If unions do attempt to hold down the number of state and local workers, the coefficient would be negative.

Unemployment rate. Because public sector jobs tend to be more secure than private sector jobs, they are somewhat less affected by economic fluctuations. Thus, when the unemployment rate is high, public workers as a share of the state's workforce would be greater and the coefficient positive.

Percent of workforce in manufacturing. The notion is that states with a higher percentage of the workforce in manufacturing would have a more extensive private sector. Therefore, the coefficient would be negative.

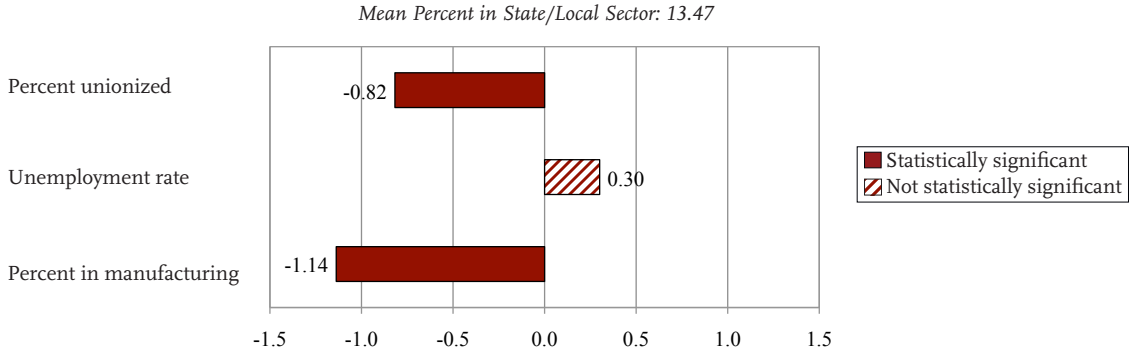
The results in Figure 9 show some support for the hypothesis that unions hold down the number of public sector workers. On average, state and local workers accounted for 13.5 percent of the workforce. Increasing the percent membership in a union by one standard deviation – that is, bringing it from 33 percent to 50 percent – is associated with a 0.82 reduction in that percent.

A Possible Story

The empirical analysis presented above is by no means definitive; rather, it should be viewed as the beginning of a conversation. That said, what is the best way to explain what could be going on?

One known fact is that pensions in the public sector are more generous than those in the private sector. That outcome could be the result of pensions being the avenue of least resistance when public employees deal with state and local employers. It is simply easier to offer employees a dollar of future pension benefits than to pay a dollar of wages, given the flexibility that public sector employers have in terms of funding their pension obligations. Interestingly, within the public sector, the generosity of the pension formula does not appear to differ between states with high levels of unionization and those with low levels. This result is most likely explained by the fact that pensions are legislated, not bargained,

Figure 9. Impact of Selected Factors on the Percent of the Workforce Employed by the State-Local Sector, 2001-2008



Note: Solid bars indicate the coefficient is statistically significant at the 10-percent level or better. The results shown are for a one-standard-deviation change. Standard errors have been adjusted for state-level clustering. Additional controls not depicted include a vector of year dummy variables.
Sources: Authors' calculations from Hirsch and Macpherson (2001-2008); and the CPS (2001-2008).

and the power to influence legislators is not simply related to membership figures. Particular groups can have disproportionate influence if they are articulate, politically active, locally well-respected, and organized, even if their numbers are small when measured on a statewide basis.

In contrast to pensions, public sector wages are bargained. And the known fact here is that the average wage in the public sector is below that in the private sector, even though public sector workers have more education and experience. Public sector workers likely face substantial resistance to wage increases. Such increases are very visible to taxpayers, and politicians may be unwilling to use their capital to argue the case for higher wages. Thus, the degree of success in the bargaining arena may well depend on the strength of union membership.

The last piece of the story is even more tentative – that is, an increase in union membership is associated with a decrease in the relative number of public sector workers. Such a finding would not be surprising in the private sector where, under a monopolistic model of price and quantity setting, studies have shown that unions hold down the number of workers in order to extract wage concessions from employers.[12] The results in the public sector, however, are less consistent.[13] And union representatives maintain that they never deliberately try to restrict hiring, and often argue for more adequate staffing to meet program objectives. But given that unions appear to raise wages, reductions in employment would not be unexpected.

Conclusion

This *brief* has attempted to explain trends in the level of public pension benefits. First, it is instructive to note that the average annual pension benefit in the public sector is $23,000. So while occasional abuses receive a lot of attention, many public employees end up with relatively modest amounts. Second, the extent of public sector union membership appears to have no measurable impact on the generosity of the benefit formula or the trend in benefits over time. This result likely reflects the fact that pensions are legislated, not bargained, and the power to influence legislators depends more on the articulateness and political acumen of the lobbyists than on union membership figures. In contrast, union membership appears to have a significant impact on the wage front, where increasing the percent unionized from one-third to one-half raises the ratio of public to private wages by about 3 percentage points. Finally, the results also suggest that unions hold down the number of public sector workers as a share of the workforce.

The big conclusion is that, despite all the recent hoopla, we really know relatively little about the workings of the public sector. In part, this ignorance reflects the fact that state and local activity has never been a sexy subject for academics because the data collection efforts and the need for knowledge of institutional detail are daunting. This *brief* should be viewed as the first pass at a story; much more work is required to understand the relationship between pension benefits and the role of unions.

APPENDICES

Appendix A. Measuring Union Power

Studies looking at collective bargaining in the public sector have traditionally relied on two broad measures of union strength.[14]

The first is membership, which can be measured in two ways:

- Percent of the public workforce that has membership in a union, and;
- Percent of the public workforce covered by a union contract.

The first variable only includes workers who pay union dues, while the second captures those who do not pay dues but still benefit from the union contract. Both of these variables come from tabulations of the *Current Population Survey's* outgoing rotation files.[15]

The second broad measure of union strength is labor law. Recent studies have defined this measure by four variables listed in descending order of union strength:

- Duty to collectively bargain;
- Right to collectively bargain;
- Right to work; and
- Prohibited from collectively bargaining.

"Duty" states are required by law to negotiate contracts with the union, while "Right" states are allowed, but not required, to bargain. In both cases, the state can either allow or disallow strikes. Right to work states allow public employees the choice of whether or not to join a union and preclude penalties for those who do not join. The most stringent law prohibits any collective bargaining whatsoever. These four variables are reported in the National Bureau of Economic Research's *Public Sector Collective Bargaining Law Data Set*.[16]

A recent study found a strong correlation between membership and labor law. Specifically, union membership is much higher in states where the legal environment is favorable toward unions.[17] As data on union membership are available annually, while the legal variables have been collected only until 1996, our analysis uses the simple union membership variable instead of the more complicated legal variables.

Appendix B. Regression Results

Table B1a. Regression Results on the Average Annual Growth Rate of State-Local Pension Benefits, 1994-1998, 1999-2003, and 2004-2008

Variable	Coefficient	
Percent unionized	0.01	
	(0.01)	
Funded ratio growth	1.23	***
	(0.39)	
Mean reversion	0.81	**
	(0.40)	
Debt as percent of revenue	-0.02	*
	(0.01)	
Closed plan	-2.38	***
	(0.41)	
Constant	2.53	
	(0.71)	
R-squared	0.11	
Number of observations	150	

Notes: Standard errors clustered at the state level are in parentheses. Coefficients are significant at the 10-percent level (*), 5-percent level (**), or 1-percent level (***).
Sources: Authors' calculations from Hirsch and Macpherson (1990-2008); PPD (2001-2003); *Public-Employee Retirement Systems* (1993-2008); U.S. Census Bureau, *State and Local Government Finances* (1990-2003); and Zorn (1990-2000).

Table B1b. Summary Statistics for Regression on the Average Annual Growth Rate of State-Local Pension Benefits, 1994-1998, 1999-2003, and 2004-2008

	Mean	Standard deviation	Min	Max
Benefit growth	2.29	2.61	-3.08	11.37
Percent unionized	33.68	17.15	7.90	70.48
Funded ratio growth	0.39	0.49	0.00	1.00
Mean reversion	0.49	0.50	0.00	1.00
Debt as a percent of revenue	79.89	20.49	41.79	138.20
Frozen plan	0.04	0.20	0.00	1.00

Sources: Authors' calculations from Hirsch and Macpherson (1990-2008); PPD (2001-2003); *Public-Employee Retirement Systems* (1993-2008); U.S. Census Bureau, *State and Local Government Finances* (1990-2003); and Zorn (1990-2000).

Table B2a. Regression Results on Normal Cost as a Percent of Payroll, 2001-2008

Variable	Coefficient	
Percent unionized	-0.01	
	(0.01)	
Percent in Social Security	-0.04	***
	(0.01)	
Percent in police & fire plan	0.12	*
	(0.06)	
Number of systems	0.00	***
	(0.00)	
Percent in a closed plan	-0.04	***
	(0.01)	
Constant	14.39	***
	(0.77)	
R-squared	0.35	
Number of observations	397	

Notes: Standard errors clustered at the state level are in parentheses. Coefficients are significant at the 10-percent level (*) or 1-percent level (***). "Percent unionized" denotes the percent of those state and local workers captured in the PPD who are allowed to collectively bargain under state law. West Virginia is omitted from 2001 through 2003 due to data unavailability. *Sources*: Authors' calculations from Freeman and Valletta (1988); PPD (2001-2008); and P*ublic-Employee Retirement Systems* (2001-2008).

Table B2b. Summary Statistics for Regression on Normal Cost as a Percent of Payroll, 2001-2008

	Mean	Standard deviation	Min	Max
Normal cost	11.70	2.61	1.68	21.31
Percent unionized	71.85	44.96	0.00	100.00
Percent in Social Security	80.77	35.50	0.00	100.00
Number of systems	50.90	136.08	1.00	903.00
Percent in police & fire plan	1.09	2.82	0.00	12.05
Percent in a closed plan	1.64	11.28	0.00	100.00

Sources: Authors' calculations from Freeman and Valletta (1988); PPD (2001-2008); and P*ublic-Employee Retirement Systems* (2001-2008).

Table B3a. Regression Results on the Ratio of State/Local to Private Sector Hourly Wages, 2001-2008

Variable	Coefficient	
Percent unionized	0.00	***
	(0.00)	
Public to private education ratio	1.70	***
	(0.24)	
Public to private age ratio	0.30	**
	(0.13)	
Public to private female ratio	-0.13	***
	(0.03)	
Percent in manufacturing	-0.00	*
	(0.00)	
Constant	-1.12	***
	(0.29)	
R-squared	0.32	
Number of observations	400	

Notes: Standard errors clustered at the state level are in parentheses. Coefficients are significant at the 10-percent level (*), 5-percent level (**) or 1-percent level (***).
Sources: Authors' calculations from Hirsch and Macpherson (2001-2008); and CPS (2001-2008).

Table B3b. Summary Statistics for Regression Results on the Ratio of State/Local to Private Sector Hourly Wages, 2001-2008

	Mean	Standard deviation	Min	Max
Public/private wage	0.93	0.09	0.74	1.30
Percent unionized	33.06	17.54	5.20	71.90
Public to private education ratio	1.09	0.02	1.00	1.17
Public to private age ratio	1.04	0.03	0.91	1.15
Public to private female ratio	1.38	0.16	0.93	1.88
Percent in manufacturing	8.39	6.05	0.00	20.43

Sources: Authors' calculations from Hirsch and Macpherson (2001-2008); and CPS (2001-2008).

Table B4a. Regression Results on the Percent of the Workforce Employed by the State and Local Sectors, 2001-2008

Variable	Coefficient	
Percent unionized	-0.05	***
	(0.02)	
Unemployment rate	0.23	
	(0.30)	
Percent in manufacturing	-0.19	*
	(0.10)	
Constant	13.73	***
	(1.65)	
R-squared	0.18	
Number of observations	400	

Notes: Standard errors clustered at the state level are in parentheses. Coefficients are significant at the 10-percent level (*) or 1-percent level (***).
Sources: Authors' calculations from Hirsch and Macpherson (2001-2008); and CPS (2001-2008).

Table B4b. Summary Statistics for Regression Results on the Percent of the Workforce Employed by the State and Local Sectors, 2001-2008

	Mean	Standard deviation	Min	Max
Percent state/local	13.47	2.52	7.89	23.80
Percent unionized	33.06	17.54	5.20	71.90
Unemployment rate	5.13	1.32	2.30	10.60
Percent in manufacturing	8.39	6.05	0.00	20.43

Sources: Authors' calculations from Hirsch and Macpherson (2001-2008); and CPS (2001-2008).

Endnotes

1 On the benefit side, 20 states have adjusted the benefit formula and/or the retirement age for new employees. These changes are limited to new employees because states' case law or their constitution, as well as political considerations, generally precludes reducing *future* benefits for current employees. A handful of states have attempted to cut the cost-of-living adjustment (COLA) for current retirees. These actions have resulted in lawsuits; judges in Colorado and Minnesota recently ruled that such cuts were permissible in their states. Meanwhile, 24 states have raised employer and/or employee contributions. See National Conference of State Legislatures (2008-2011) for more details.

2 Wisconsin, Michigan, and Oklahoma have passed laws in 2011 eliminating or curtailing collective bargaining of wages and/or benefits. Similar legislation is under discussion in Alaska, Indiana, Iowa, Kansas, Massachusetts, Nevada, New Hampshire, Ohio, Tennessee, and Washington. Anti-union bills were recently defeated in Colorado, Nebraska, and New Mexico. See National Conference of State Legislatures (2011).

3 U.S. Bureau of Labor Statistics (2010).

4 Zorn (1990-2000).

5 For example, see the history of pension changes in the Arizona State Retirement System (2010); the Teacher Retirement System of Texas (1999); the Tennessee Consolidated Retirement System (2010); and the Wyoming Retirement System (2005).

6 Little Hoover Commission (2011).

7 This finding is consistent with another recent study that also was unable to detect any impact of unions on pensions (Schieber 2011).

8 Because the PPD does not contain information on the unionization of plan members, we rely on the NBER's *Public Sector Collective Bargaining Law Data Set*, which can be merged with the PPD based on occupation (general employees, teachers, or police and fire) and jurisdiction (state or locally-administered plan). Plans where members are allowed to collectively bargain are assumed to be fully unionized.

9 Munnell et al. (2011).

10 The wage ratio variable is for full-time workers only.

11 See Freeman and Medoff (1984); Freeman and Valletta (1987); and Ehrenberg (1973).

12 See Freeman and Medoff (1984); and Freeman and Valetta (1987).

13 One study finds that the more favorable the legal environment for unions, which the author defines as the adoption of a union contract, the higher the public sector wages and employment (Zax 1985). However, a second study looks at the legal environment and the presence of a union contract separately (Freeman and Valetta 1987). Again, it finds that municipalities with union contracts have higher public wages and a greater number of public employees. But among those municipalities with contracts, strong unions exercise monopoly power, trading lower employment for higher wages. Thus, some precedent exists for the finding of a negative impact of unions on employment, but the results still need more explaining.

14 See Ashenfelter (1971); Belman, Heywood, and Lund (1997); Farber (2005); Freeman (1986); Freeman and Valletta (1987); and Zax (1985).

15 Hirsch and Macpherson (1983-2010) perform these tabulations annually and make them available online.

16 The dataset was originally collected by Valletta and Freeman (1988) for the years 1955 and 1984, and the data were updated through 1996 by Kim Reuben of the Urban Institute. The data contain nuanced information on the four basic variables described here.

17 Farber (2005) looks at averages across states from 1983 to 2004 and finds that union coverage is 17 percent in states that prohibit collective bargaining versus 50 to 75 percent in states that are required to bargain.

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