STATE-LOCAL PENSION COSTS: PRE-CRISIS, POST-CRISIS, AND POST-REFORM

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Abstract

State and local governments have been facing an extraordinarily difficult fiscal environment in recent years. One of many challenges has been restoring public pension plans to a sound fiscal footing after the economic crisis of 2007-09. States have begun to respond by enacting a mix of revenue increases and benefit cuts. These changes will, over time, improve the financial outlook for plans and help ease their impact on other budget priorities. This study analyzes the nature and magnitude of these effects by analyzing pension costs before the financial crisis, after the financial crisis, and after reforms for a sample of 32 plans in 15 states. The results show that most of the sample plans responded with significant pension reforms, generally increasing employee contributions and lowering benefits for new employees; the changes were largest for plans with serious underfunding and those with generous benefits; in most cases, reforms fully offset or more than offset the impact of the financial crisis on the sponsors' annual required contribution; and employer contributions to accruing benefits for new employees were cut in half, sharply lowering compensation for future workers. In short, states have made more changes than commonly thought. Whether these changes stick or not is an open question.

Introduction

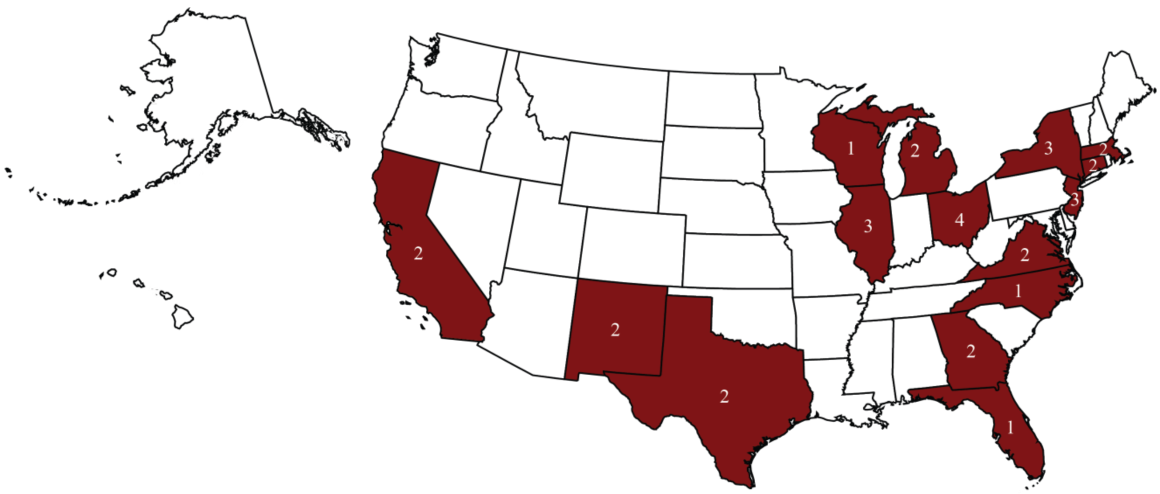
States have begun to respond to the pension challenge by enacting a mix of revenue increases and benefit cuts. These changes will, over time, improve the financial outlook for plans and help ease their impact on other budget priorities. But, to date, the specific nature and magnitude of these effects on plan finances and overall state budgets has received little attention. This *brief* reports on a study designed to fill the void with an analysis of pension costs before the financial crisis, after the financial crisis, and after reforms for a sample of 32 plans in 15 states. The study also introduces a companion series of fact sheets on each of the sample plans and states.

The discussion is organized as follows. The first section describes the data and methodology used in the analysis. The second section reports the activity at the plan level with the presentation of both the employer's normal cost – the cost of accruing benefits – and annual required contribution (ARC) before the 2008 financial crisis, after the financial crisis, and after reforms. The third section quantifies the budgetary impact at the state as a whole by looking at the ARCs as a percent of state-local own-source revenues. It also assesses the additional cost burden of retiree health plans and describes a sensitivity analysis that tests the effects of higher or lower asset returns on the pension projections. The final section concludes that most of the sample plans responded with significant pension reforms, generally increasing employee contributions and lowering benefits for new employees; the changes were largest for plans with serious underfunding and those with generous benefits; in most cases reforms fully offset or more than offset the impact of the financial crisis on the sponsors' ARC; and employer contributions to accruing benefits for new employees were cut in half, sharply lowering compensation for future workers. In short, states have made more changes than commonly thought. Whether these changes stick or not is an open question.

Data and Methodology

The sample consists of all of the major state-administered pension plans in 15 states, for a total of 32 plans (see Figure 1). These plans represent 70 percent of aggregate liabilities and 65 percent of members in the *Public Plans Database* (PPD). The sample states were chosen to represent a mix of troubled states (Illinois and New Jersey), model states (Florida and North Carolina), states with expensive plans (California and New York), states that have made dramatic pension changes (Georgia and Michigan), and states that have made only minor changes (Texas and Wisconsin). See Appendix Table A-1 for a list of the pension plans included in the sample. The main data sources used in the analysis – in addition to the PPD – were the actuarial valuation reports for each plan.

Figure 1. *Sample States and Number of State-Administered Plans*



Source: Authors' illustration.

The exercise involves projecting each plan's ARC under three scenarios: pre-crisis, post-crisis, and post-reform. The projections are made separately for the two components of the ARC: the employer's contribution to cover its share of normal cost (the cost of accruing benefits) and the payment required to amortize the unfunded liability.[1] In all three scenarios, plans are assumed to pay their full ARC each year and thus gradually pay off past unfunded liabilities. As a result, the amortization payment component of the ARC declines modestly over time relative to total payroll. The precise pattern of the decline varies depending on each plan's amortization schedule.

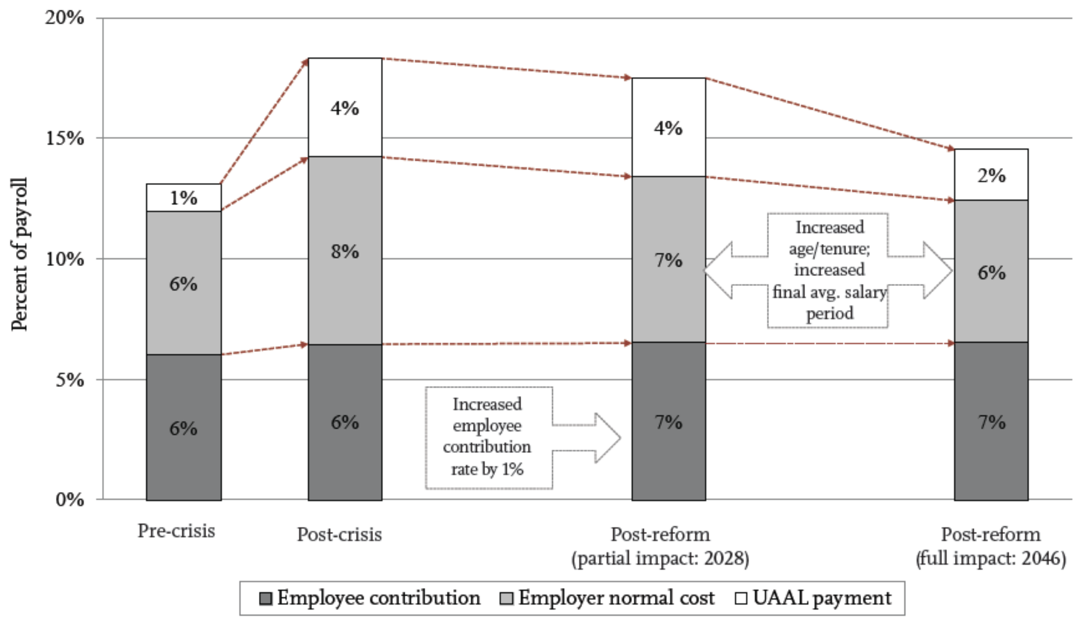
In terms of normal cost, the pre-crisis level is taken from each plan's 2007 actuarial valuation and is assumed to remain constant through 2046. The post-crisis normal cost is taken from the latest valuation before any reforms were undertaken, generally 2010, and again is assumed to remain constant. The projections of post-reform normal costs depend on the specific actions taken by each plan. Since most reforms apply to new hires only, the impact is very small in the short term and then grows over time. To capture this pattern requires knowing the normal cost for new hires under the reformed benefit schemes. For half the plans, the new hire normal cost was available in the plan's actuarial valuation; for the the other half, the figure was acquired by calling the plan's actuary, was calculated using the Center's Pension Model, or was adopted from a third-party analysis. To project the trajectory of normal costs post-reform, we simply assume that the current normal cost for the whole population declines linearly from its current level to the normal cost for new hires by 2046, the point at which the system consists only of new hires.

Plan Level Results

[1] For any given year, the contribution rate resulting from this analysis is the rate calculated in that year's actuarial valuation. These contribution rates are often prospective and, in most cases, are applied to payroll two years after the valuation is performed.

Figure 2 shows an example of the projections using the Texas Employees Retirement System (ERS) plan. The economic crisis drove up the employer's annual required contribution; in particular, the amortization payment to cover unfunded liabilities jumped from 1 percent of payroll to 4 percent of payroll. In the wake of the crisis, the Texas ERS plan responded by increasing the employee contribution rate from 6 to 7 percent of payroll. The sponsor also tightened eligibility requirements and lengthened the averaging period used for calculating benefits for new hires, which gradually reduce the projected employer's contribution to normal cost from 8 percent of payroll today to 6 percent in 2046. Assuming the sponsor pays the full ARC, the employer's UAAL payment will drop from 4 percent to 2 percent. In total, the employer's cost moves from 7 percent pre-crisis, to 12 percent post-crisis, and eventually to 8 percent post-reform.[2]

Figure 2. *Plan-Level Projections of the ARC as a Percent of Payroll for Texas Employees Retirement System: 2011-2046*



Sources: Authors' projections based on plan actuarial valuations and *Public Plans Database*.

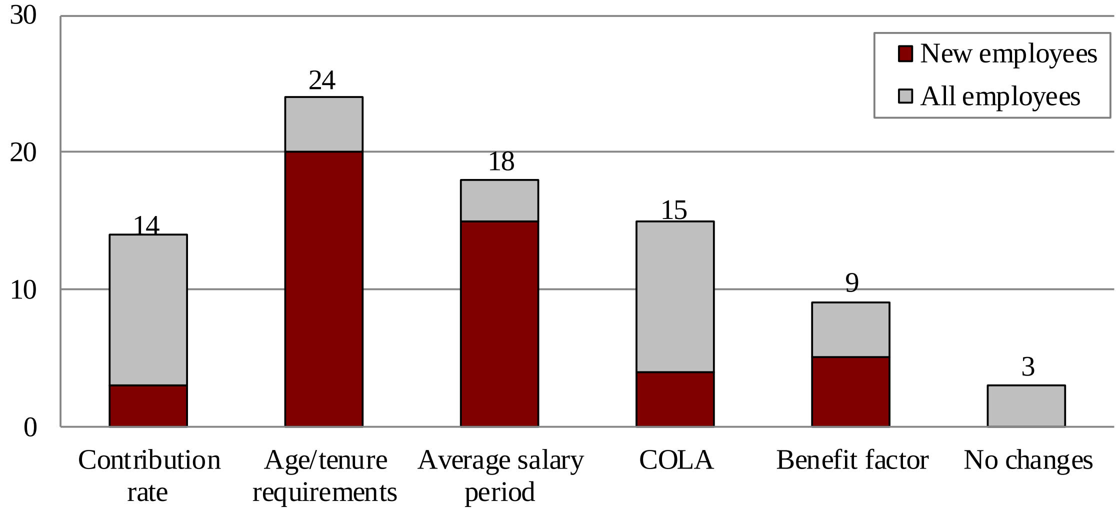
An analysis similar to that in Figure 2 was done for each of the 32 plans in the sample, which allows for some generalizations.

First, nearly all of the plans in the sample (29 out of 32) enacted some reforms since the crisis in order to reduce future costs. On the contribution side, 14 plans increased employee contribution rates (see Figure 3). On the benefit side, the most common type of change, adopted by 24 plans, was tightening age and tenure requirements for benefits. Other changes included increases in the salary averaging period used in determining

[2] These figures are available for all of the sample plans in the fact sheets on the *Public Plans Database* website (http://pubplans.bc.edu).

benefits, reductions in the benefit accrual factor, and cuts in cost-of-living adjustments (sometimes for current retirees as well as new hires).

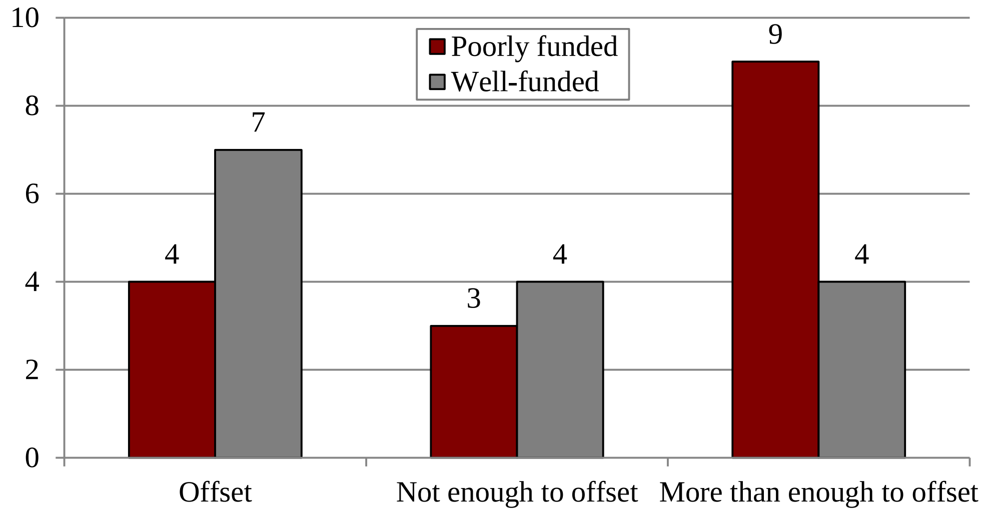
Figure 3. *Sample Plans Making Pension Changes, by Type of Change*



Sources: Actuarial valuation reports and National Conference of State Legislatures (2008-2012, 2011).

Second, about a third of the plans took actions that roughly offset the impact of the financial crisis on the employer's ARC, less than one third did not make enough changes to fully offset the impact of the financial crisis, and slightly more than a third of the sample appeared to take the crisis as an opportunity to reduce costs below pre-crisis levels (see Figure 4). Poorly funded plans were more likely to "overshoot" than well-funded plans, suggesting an inclination to take more sweeping actions given a more severe problem. Poorly funded plans are defined as those plans with pre-crisis funded ratios below 80 percent that generally pay less than 80 percent of their annual required contribution.

Figure 4. *Extent of Reform Actions Compared to Impact of Crisis Based on Annual Required Contribution as Percent of Payroll, by Plan Funding Health*



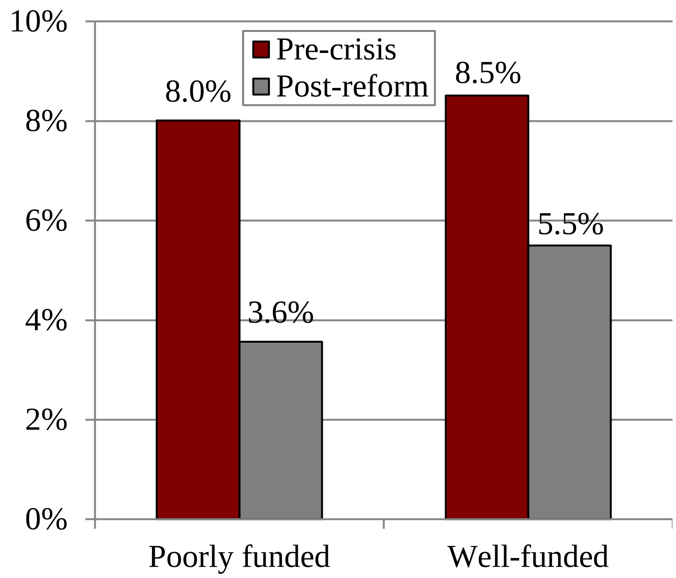
Source: Authors' calculations and actuarial valuations.

Third, the reduction in employer contributions to normal cost – the cost of accruing benefits – was large. As discussed, the ARC consists of two components: contributions to normal cost and payments to amortize the unfunded liability. The only way to reduce the unfunded liability is to cut COLAS for current employees, and some plans did choose this option.[3] The main lever available to employers is to reduce the employer's contribution to normal cost, by making employees pay more and/or reducing benefits (generally for new employees). Overall, the employer's normal cost payment, a measure of the generosity of the plan, drops by nearly half – from 8.2 percent to 4.4 percent once the reforms are fully phased in. Workers will not necessarily see a 45-percent reduction in their benefit checks, because in many instances the decline in employer cost is simply a shift of the cost to the employee rather than a decrease in total benefits.

Fourth, changes in the employer normal cost contributions were systematically related to plan characteristics. The plans with the largest projected reductions are those that were poorly funded and those with generous benefits. The poorly funded plans reduced their normal cost as a share of payroll from 8.0 percent to 3.6 percent, on average, compared to 8.5 percent to 5.5 percent for well-funded plans (see Figure 5). The story is similar when comparing generous – those in the top half of the sample in terms of total normal costs – to plans with low to average benefits (see Figure 6). This behavior may be encouraging in that it suggests that plans were generally reacting in ways that were calibrated to the size of the challenge they faced.

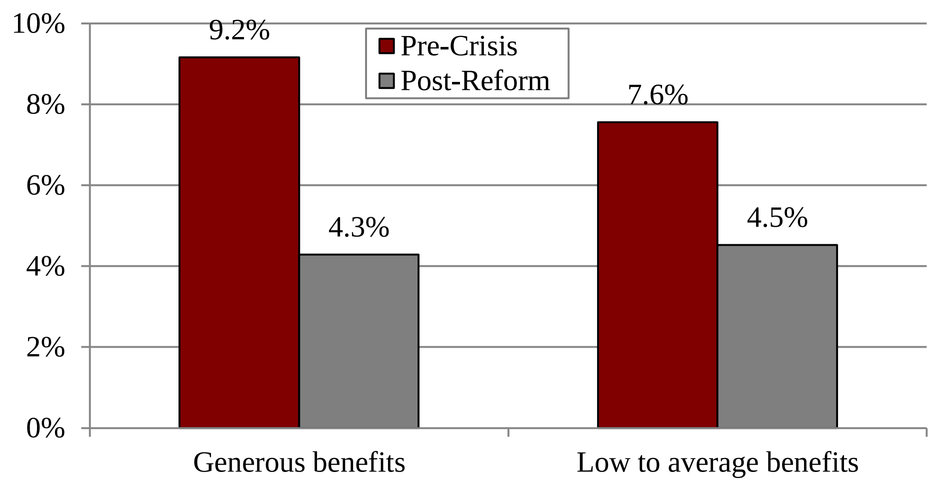
Figure 5. *Employer Normal Costs as Percent of Payroll, Pre-Crisis and Post-Reform, by Plan Funded Status*

[3] Since, in most cases, the cost of the COLAs for current workers and retirees is included in the liability calculations, suspending or reducing the COLA for current participants lowers the calculated liability.



Source: Authors' calculations and actuarial valuations.

Figure 6. *Employer Normal Costs as Percent of Payroll, Pre-Crisis and Post-Reform, by Plan Generosity*



Source: Authors' calculations and actuarial valuations.

Finally, in addition to revisions in benefits and contributions, many plans also changed their amortization periods and/or their assumed rate of return used to discount future benefits. Thirteen plans changed their amortization periods, with six plans lengthening the period and seven plans shortening the period. Lengthening the amortization period stretches out the schedule for paying off unfunded liabilities; a longer amortization period lowers the required amortization payments and provides some immediate relief in the form of lower ARC payments. Shortening the period has the opposite effect; it raises a plan's ARC. With respect to assumed rate of return, all of the changes went in the same direction with 10 plans lowering their rates, typically by about 0.5 percentage points.[4] Lower discount rates *raise* the ARC by increasing plan liabilities; these changes are clearly a reaction to the post-financial crisis environment in which the traditional assumed asset return of 8 percent is considered too optimistic by many.

Projecting Impact on State-Local Budgets

From a policy perspective, the key issue is the total budgetary commitment represented by all pension plans in the state. To assess the impact of employer pension costs on overall state budgets, the ARCs for all of the state-administered pension plans in each state are combined with those for local plans. The projected costs for state-administered plans are based on the detailed calculations described above; the costs for the locally-administered plans in each state are assumed to stay at current levels.[5] These costs are then expressed as a percent of the budget, defined as general own-source state-local revenues (which exclude revenues received from other levels of government, such as federal payments for Medicaid).[6]

Figure 7 shows the projections for the state of Texas. In this case, the combined effect of all of the state's plans shows that the economic crisis increased the share of the state/local budget devoted to pensions from 3.1 percent to 4.3 percent. The reforms themselves, with all plans combined, were modest because Texas Teachers, which accounts for 80

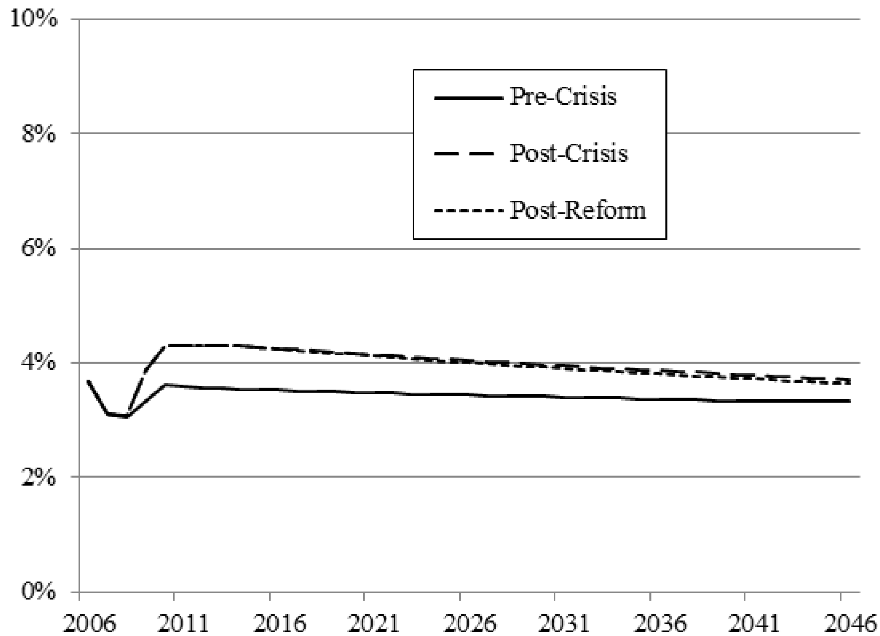
[4] The discount rate for Georgia TRS actually increased after the crisis due to their unique method for calculating the assumed investment return (discount rate). Georgia TRS's discount rate accounts for recent investment experience and increases or decreases the future expected return so that the long-term return equals 8 percent. This approach has the effect of lowering expected returns after periods of market gains, and increasing expected returns after market troughs.

[5] This assumption is realistic for states like New Mexico and Wisconsin where all plans are state-administered and for states like Florida, where the local plans have taken no action despite the reform at the state level. The assumption is less good for Massachusetts where the local plans have followed changes adopted at the state level.

[6] The most important projection for this analysis is the ratio of payroll to revenue, as pension costs are first estimated as a percent of payroll and then multiplied by the ratio of payroll to revenue in each year in order to report pension costs as a percent of revenue. This analysis assumes that the payroll-to-revenue ratio remains constant at 2010/2011 levels. However, based on Census data, the ratio of state and local payroll to general own-source revenues has been declining over the past 20 years. This decline was the result of strong growth in government revenue rather than a decline (or weak growth) in payrolls. After the 2008/2009 financial crisis, however, governments actively cut their payrolls through workforce reductions, wage freezes, or furloughs. If these payroll cuts are short-term, rapid rehiring may raise the payroll-to-revenue ratio. If recent payroll reductions are part of a more permanent policy, then the payroll-to-revenue ratio may continue to fall as revenues rebound. Given the uncertainty, assuming that the 2010/2011 ratio remains constant is a reasonable approach.
The analysis also assumes a constant ratio of state and local revenues to national GDP, a common practice among researchers projecting long-term state and local finances. Historically, this ratio has fluctuated very little for most states. However, there are some notable exceptions. Over a period of decades, the revenue-to-GDP ratio for Southern states has grown in relative terms, while the ratio for Midwestern states has shrunk. For states included in this analysis, Texas and Florida have steadily grown relative to GDP, while Michigan, Ohio, and Illinois have all shrunk. Thus, using the assumption of a steady relationship between revenue and GDP will result in somewhat of an understatement of the pension burden for Midwestern states and an overstatement for Southern states.

percent of membership, made no changes. As a result, the post-crisis path is nearly the same as the post-reform path.

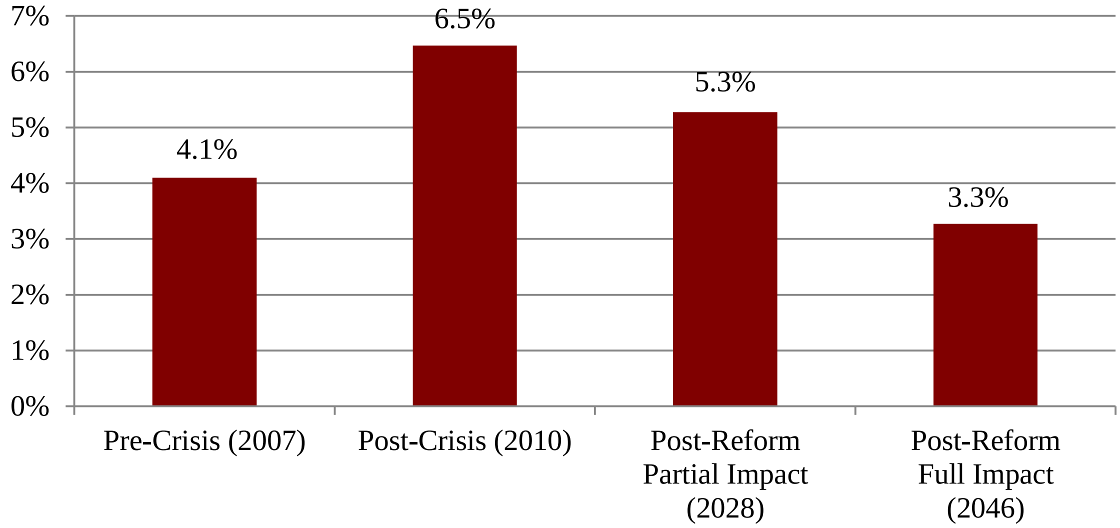
Figure 7. *State-Level Projections for Texas: Employer Pension and Retiree Health Costs as a Percent of Budget, 2011-2046*



Source: Authors' projections based on plan actuarial valuations, *Public Plans Database*, and U.S. Census Bureau .

Again, an analysis similar to that portrayed above for Texas was undertaken for each of the 15 states, allowing an assessment of the overall impact of the changes. Before the economic crisis, the ARC for the sample was 4.1 percent of own-source state and local revenues; this share jumped to 6.5 percent after the crisis (see Figure 8). The post-crisis ARCs varied considerably across states: Connecticut's post-crisis pension cost was 7.0 percent of its budget, while Wisconsin's was only 3.4 percent. Regardless of their circumstances, all of the sample states experienced a significant increase in pension costs as a result of the economic crisis. This increased budgetary pressure, of course, is one of the factors driving the pension reform activity described above. As shown, the reforms are projected to gradually reduce budget pressures for the sample states so that, when fully phased in by 2046, pension costs will drop down to 3.3 percent of budgets, below the pre-crisis level. Pension expense, however, is not the only commitments that states and localities have to retirees; they are also responsible for retiree health insurance.

Figure 8. *Pension Costs as a Percent of State-Local Budgets, Sample Average, Pre-Crisis through Post-Reform*



Source: Authors' calculations and actuarial valuations.

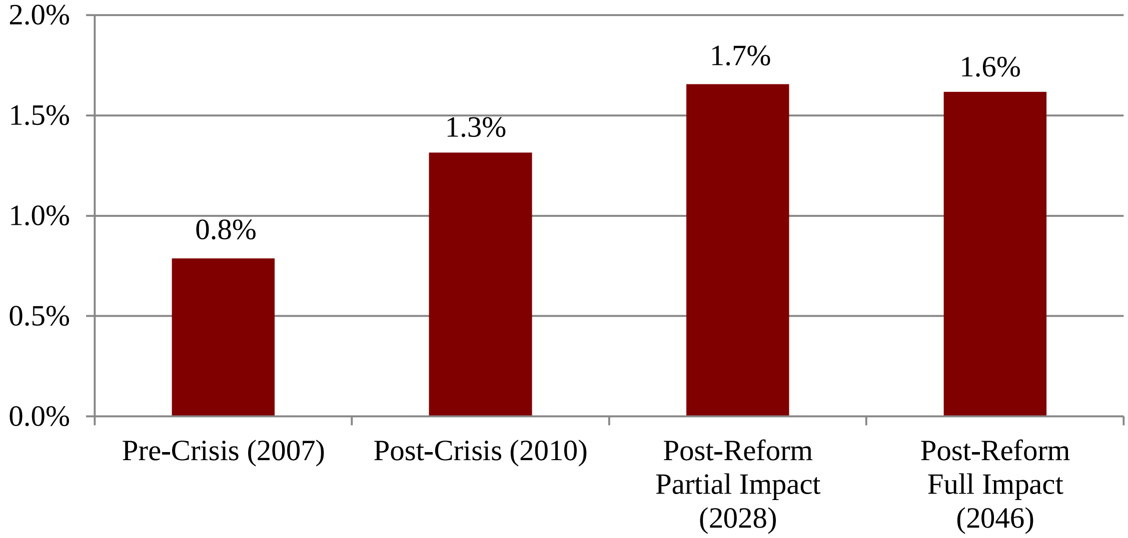
Impact of Retiree Health

Retiree health programs represent a smaller financial commitment than pensions – both in terms of annual cost and unfunded liabilities – but they still pose a significant potential concern for state budget policy. One reason is that, since they are generally funded on a pay-as-you-go basis, costs will naturally rise as baby boomers retire. Another reason is the high inflation associated with health care costs.

The baseline data for the retiree health cost projections come from each plan's latest actuarial valuation. The baseline cost level is then assumed to grow with health care cost inflation over time.[7] On average, for the sample states, retiree health plans currently account for 1.3 percent of budgets, a figure that will grow over time (see Figure 10). Given that these programs are a smaller portion of state budgets today and they are generally not subject to the same funding discipline, the political pressure to scale them back has not been as intense as for pensions. Nevertheless, some of the sample states have made cutbacks in these programs, mainly by tightening eligibility requirements and shifting more costs to participants. These changes are reflected in the 1.3 percent number for 2010, which comes from the 2010-2011 actuarial valuations.

[7] Ideally, the projections would be based on projections of both health care costs and the expected number of retirees each year. But retiree data are not available, so the retiree population is assumed to remain constant. As a result, the projections will understate costs in the early years during the baby boomer retirement, but will then overstate costs in the later years. On balance, these effects will likely offset one another over the 35-year period.

Figure 9. *Retiree Health Costs as a Percent of State-Local Budgets, Sample Average, Pre-Crisis through Post-Reform*



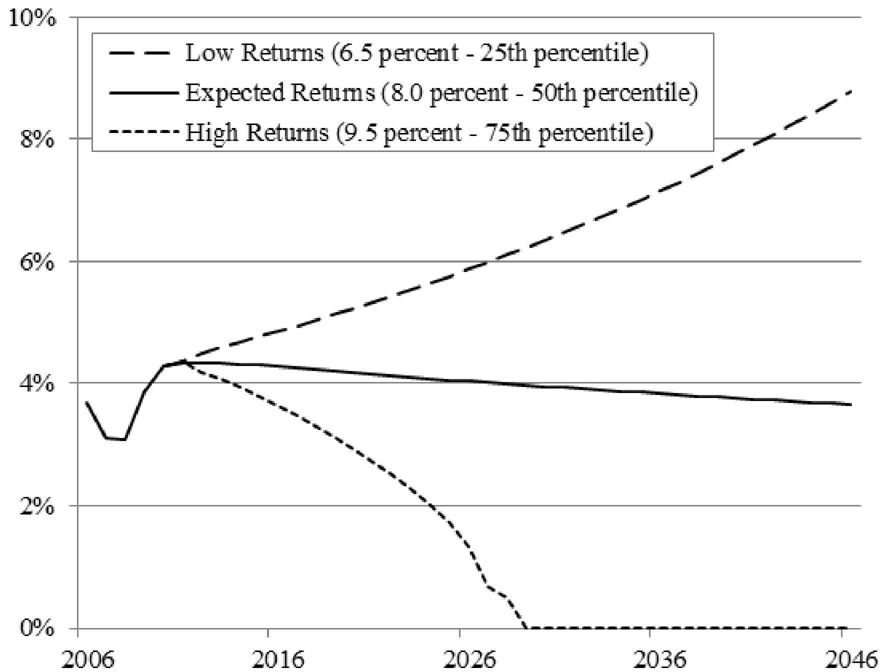
Source: Authors' calculations and actuarial valuations.

Sensitivity Analysis of Projections to Asset Returns

One important determinant of the funding health of pension plans is the long-term rate of return earned on plan assets. The projections summarized above use each plan's assumed long-term rate, which is generally around 8 percent. To test the sensitivity of the results, a Monte Carlo analysis was performed for one state – Texas – that shows potential variations in the rate of return. This example illustrates the likely range of effects that other sample plans would experience.

The results of the exercise show that pension costs as a share of the budget in Texas could vary from almost 9 percent under a low return of 6.5 percent (representing the 25th percentile of possible outcomes) to zero percent under a high return of 9.5 percent (representing the 90th percentile of possible outcomes). The high return outcome assumes that the sponsor uses any overfunding to cover normal cost. The point, however, is that future outcomes depend crucially on what plan sponsors earn on their assets.

Figure 10. *Annual Required Contribution as Percent of Payroll, State of Texas, by Assumed Rate of Return*



Source: Authors' calculations based on actuarial valuations.

Conclusion

State and local governments have been facing an extraordinarily difficult fiscal environment in recent years. One of many challenges has been restoring public pension plans to a sound fiscal footing after the damage caused by the economic crisis of 2007-09. The results of this analysis are generally encouraging as they suggest that, in many states, policymakers have made serious efforts to get their plans back on track. It also appears that states have tended to calibrate their responses to the size of the problems that they face.

Several caveats are important. First, whether plans stick with the reforms or instead expand benefits again when the economy improves is an open question. Second, the projections presented in this study assume that plans consistently make their annual required contribution, a degree of fiscal discipline that has been lacking in some jurisdictions. Third, retiree health plans represent an additional and growing claim on state-local budgets, given the rising number of retirees and health care cost inflation. Finally, plan finances are sensitive to the performance of the stock market, so lower-than-expected returns going forward could raise costs.

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Appendix

Table A1. Sample Plans

Plan
California Public Employees Retirement Fund
California State Teachers Retirement System
Florida Retirement System
Employees' Retirement System of Georgia - ERS
Teachers Retirement System of Georgia - TRS
Illinois University Retirement System
Illinois Teachers Retirement System
Illinois State Employees Retirement System
Massachusetts State Board of Retirement System
Massachusetts Teachers Retirement Board
Michigan State Employees Retirement System
Michigan Public School Employees Retirement Fund
New Jersey Public Employees Retirement System
New Jersey Police and Firemen's Retirement System
New Jersey Teachers Pension Annuity Fund
New York State and Local Employees Retirement System
New York State and Local Police and Fire Retirement System
New York State Teachers Retirement System
North Carolina State and Teachers Retirement System
Ohio Public Employees Retirement System
Ohio Police and Firemens Pension Fund
Ohio School Employees Retirement System
Ohio State Teachers Retirement System
Connecticut State Employees Retirement System (SERS)
Connecticut State Teachers' Retirement System (TRS)
Texas Employees Retirement System (ERS)
Texas Teachers Retirement System (TRS)
Virginia Teachers Retirement System (TRS)
Virginia State Employees Retirement System (SERS)
New Mexico Public Employees Retirement Association (PERA)
New Mexico Educational Retirement Board (ERB)
Wisconsin Employees Retirement System

THE STATE OF CALIFORNIA

The plans:
California has two large state-administered pension systems, the University of California Retirement System, three small state-administered systems, and many locally-administered systems. The state also maintains one retiree health plan for state government employees. For this analysis, we focus primarily on the two large state-administered pension systems – the California Public Employee Retirement System (CALPERS) and the California State Teachers' Retirement System (CALSTRS) – which together make up nearly 75 percent of active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the payments required to amortize unfunded liabilities increased for both CALSTRS and CALPERS. For CALSTRS, these payments more than tripled during the crisis, jumping from 4 percent to 15 percent of payrolls. CALSTRS' statutory contribution was consistently well below the annual required contribution (ARC) over the period, exacerbating the impact of the crisis on plan finances. By comparison, the jump in the payments for CALPERS, which fully pays the ARC, was much smaller. It increased from 5 percent to 6 percent of payroll. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 5.5 percent to 8.2 percent.

The impact of pension plan reforms:
Both systems responded to their increased costs by reducing benefits for new hires. The reductions included lowering the age-related benefit factor, increasing the age for normal retirement, and lengthening the final average salary period. Also, both systems increased employee contributions for new hires. For current employees, contributions are set as a fixed percent of payroll which covers about 40 percent of the total normal cost. Going forward, employee contributions for new hires will be set as 50 percent of the total normal cost.

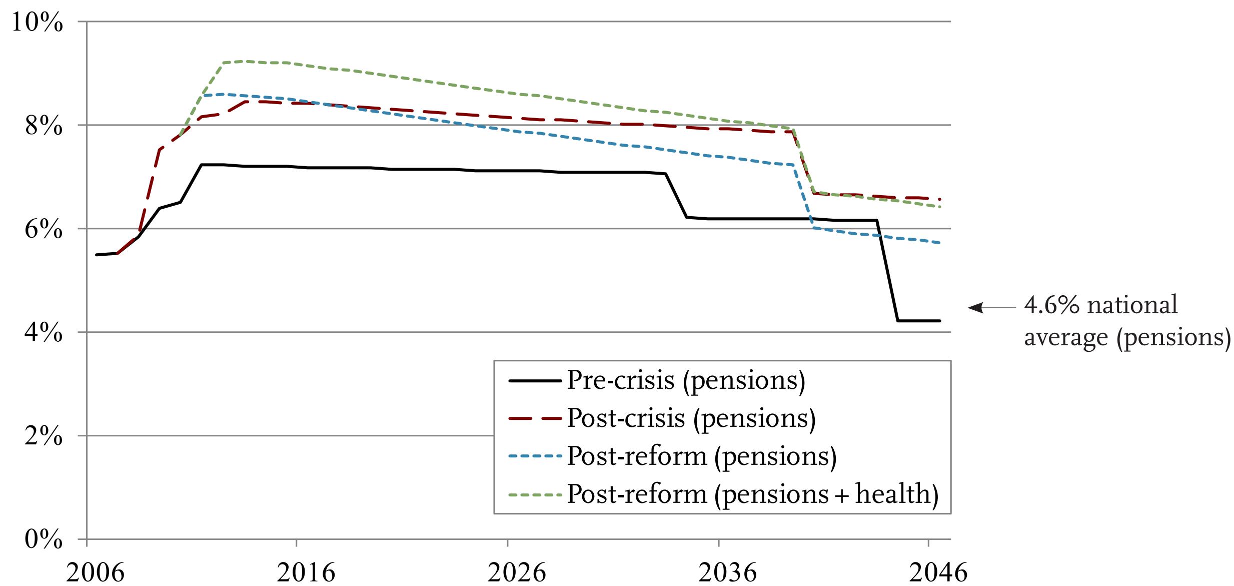
Benefit reductions for new hires are projected to gradually reduce the employers' contributions to the normal cost by 2046, at which point all active employees will be covered under the new benefit structure. If employers pay the full ARC and assumed returns materialize, their unfunded liability payments will also decline. Taking both elements into account, the share of state and local budgets devoted to pensions is projected to drop from 8.2 percent today to 5.7 percent by 2046. Overall, pension reforms were commensurate with the challenges caused by the crisis and are projected to return total costs near pre-crisis levels by 2046.

Total state costs:
In California, the state government also provides health benefits, which amount to about 0.6 percent of state and local budgets. When retiree health and pension costs are combined, California's total retirement benefit costs as a percent of state and local budgets equaled 6.1 percent prior to the crisis, increased to 8.8 percent during the crisis, and are projected to drop to 6.4 percent in 2046 after the pension reforms take full effect.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

CALIFORNIA: TOTAL PENSION AND RETIREE HEALTH COSTS

FIGURE 1. EMPLOYER PENSION AND RETIREE HEALTH COSTS AS PERCENT OF BUDGET: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



Note: Budget = general own source revenues of all California state/local governments. Retiree health costs assumed pay-as-you-go.

TABLE 1. EMPLOYER PENSION AND RETIREE HEALTH COSTS AS PERCENT OF BUDGET, BY PLAN

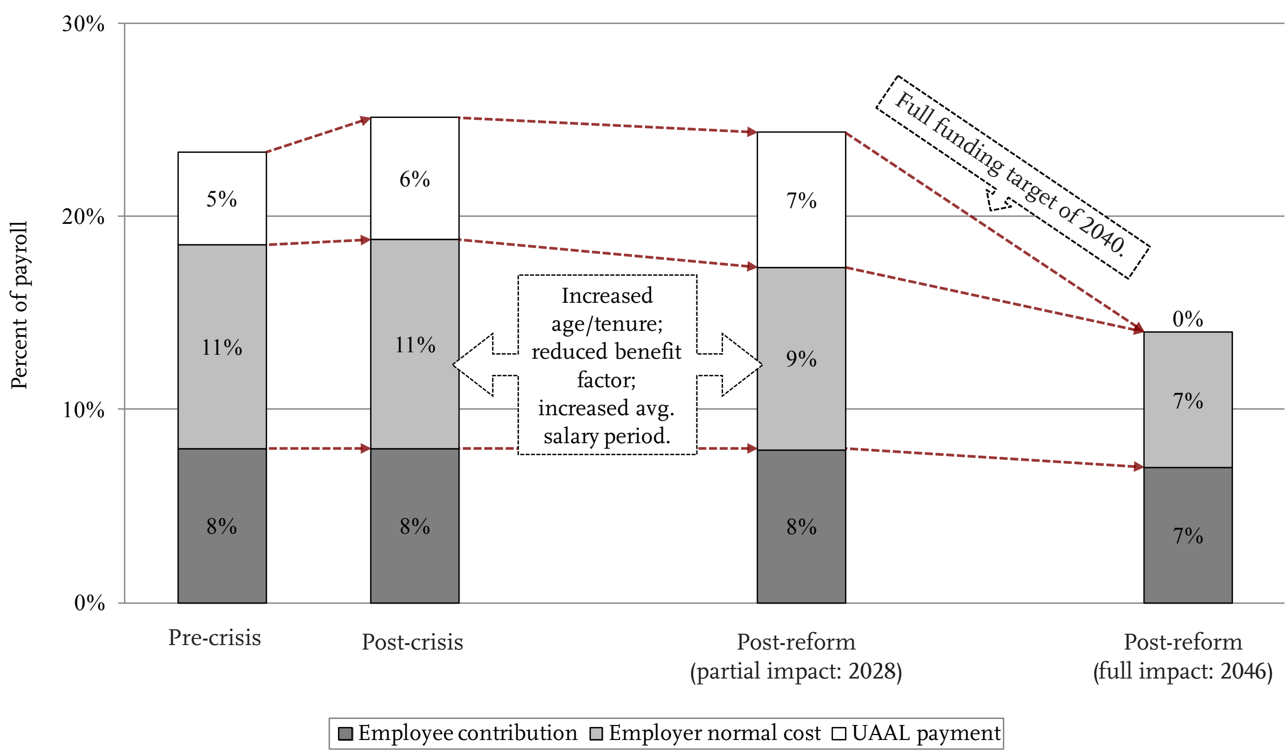
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	5.5 %	8.2 %	7.8 %	5.7 %
California PERF[a]	2.4	3.1	2.8	1.3
California STRS	1.5	2.2	2.1	1.5
Other pension plans[b]	1.6	2.9	2.9	2.9
Total retiree health	0.6	0.6	0.7	0.7
California retiree health	0.6	0.6	0.7	0.7
Total	6.1	8.8	8.5	6.4

[a] California PERF represents more than 95 percent of CalPERS's total assets and 90 percent of CalPERS's total membership.
[b] Includes four state-administered plans to cover University of California employees, judges, legislators, and volunteer firefighters.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

CALIFORNIA PUBLIC EMPLOYEES RETIREMENT FUND (PERF)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Has always paid 100 percent of its GASB required ARC.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

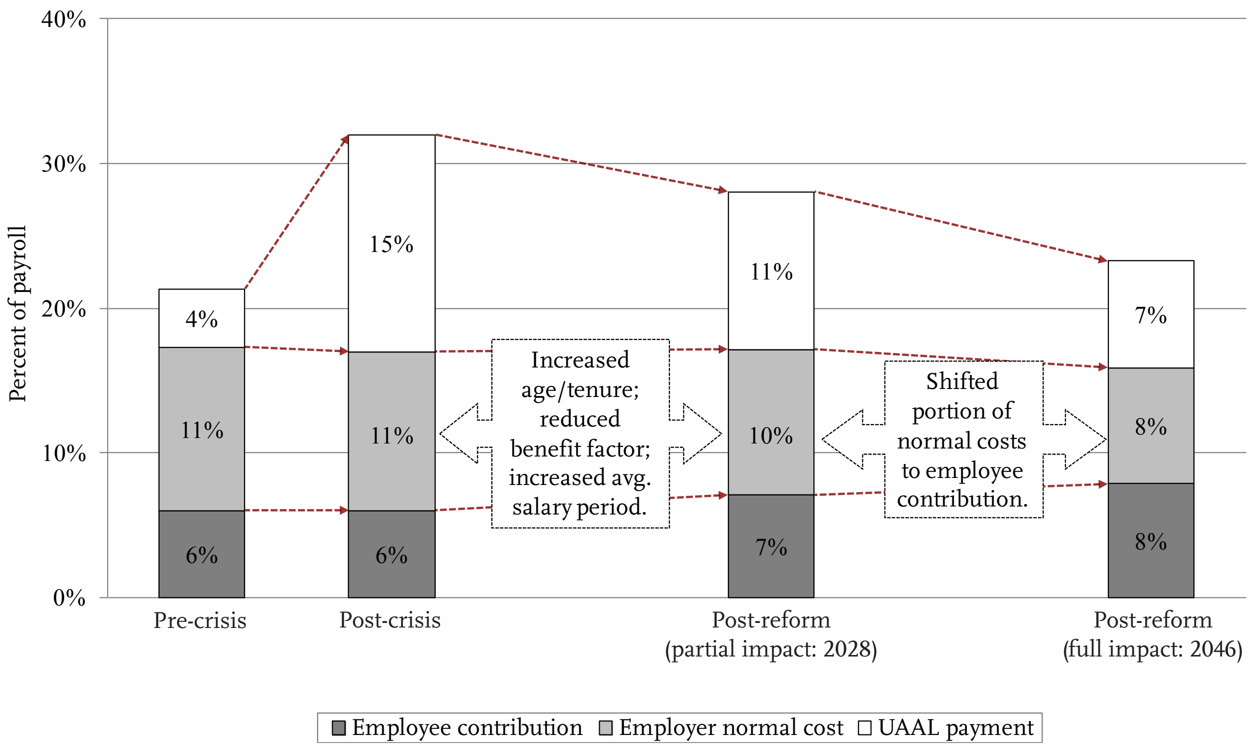
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	87.2 %	83.4 %	–	–
Employer ARC rate	15.3	17.2	15.7	7.9
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	7.75	7.50	7.50	7.50
Payroll growth	3.25	3.25	3.25	3.25
Amortization period	27 yrs.	29 yrs.	12 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

CALIFORNIA STATE TEACHERS RETIREMENT SYSTEM (CALSTRS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Pre-crisis, averaged 82 percent of GASB-required ARC. Post-crisis, the rate has averaged 58 percent.

Plan design changes

- ☐ Cut COLA
- ☑ Increased employee contribution: new hires only
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

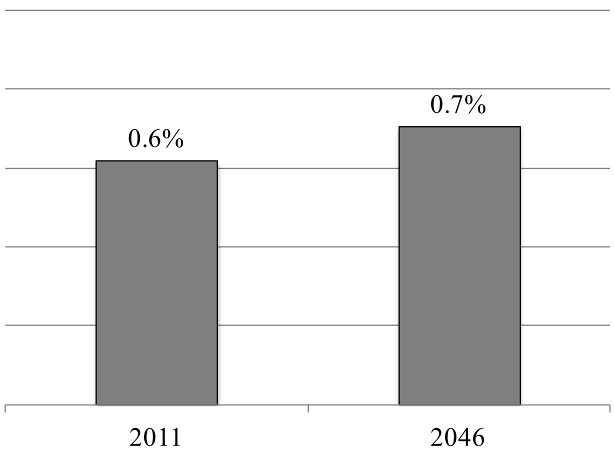
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	88.8 %	69.1 %	–	–
Employer ARC rate	15.3	26.3	22.3	17.9
Percent of ARC paid	67.0	47.0	100	100
Assumptions				
Discount rate	8.0	7.5	7.5	7.5
Payroll growth	4.25	3.75	3.75	3.75
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

STATE OF CALIFORNIA RETIREE HEALTH BENEFITS PROGRAM

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go. However, the program plans to prefund retiree health benefit obligations starting in 2012.
- Medical inflation rate: 9 percent, drops to 4.5 percent by 2020.
- Employer contribution: 0.5 percent of compensation in 2010 and have agreed to raise employee and employer contributions to 4 percent of compensation in 2013. Updated annually.

Benefits and membership

- Benefit eligibility: Any member who retires within 120 days of separation from employment and receives a monthly CalPERS pension benefit.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 259,440
- Beneficiaries: 152,734
- Most recent actuarial valuation: 6/30/11

THE STATE OF CONNECTICUT

The plans:

Connecticut has two large state-administered pension systems, four smaller state-administered systems, and many locally-administered systems. The state also maintains two retiree health plans. This analysis focuses primarily on the two large state-administered systems – the Connecticut State Employees Retirement System (SERS) and the Connecticut Teachers Retirement System (TRS) – which make up about 80 percent of public plan active membership in the state.

The impact of the crisis:

As a result of the economic crisis, the amount required to amortize unfunded liabilities increased for both SERS and TRS. For SERS, it jumped from from 13 percent to 22 percent of payroll. For TRS, the jump was similar in magnitude, increasing from 12 percent to 20 percent of payroll. Both systems have been relatively responsible funders. Over the crisis period, SERS has paid 90 percent of the annual required contribution (ARC) on average. TRS took a different approach to the funding challenge by issuing $2 billion in pension obligation bonds in 2008. Since that time, TRS has paid 100 percent of the ARC. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 5.5 percent to 7.0 percent.

The impact of pension plan reforms:

In the wake of the crisis, SERS cut benefits for current employees and new hires, while TRS made no changes to benefits for current employees or new hires. For SERS, benefit changes included tightening eligibility requirements and decreasing the cost-of-living adjustment. These changes combined reduce the projected employer's contribution to the normal cost from 9 percent to 7 percent of payroll. A key element in the projected pension costs for SERS and TRS will be their ability to stick with their funding schedule. If both systems adhere to their current funding goals – the full funding date for SERS and TRS is 2032 and 2035 respectively – and assumed returns materialize, the share of state and local budgets devoted to pensions are projected to drop from 7.0 percent today to 2.2 percent by 2046.

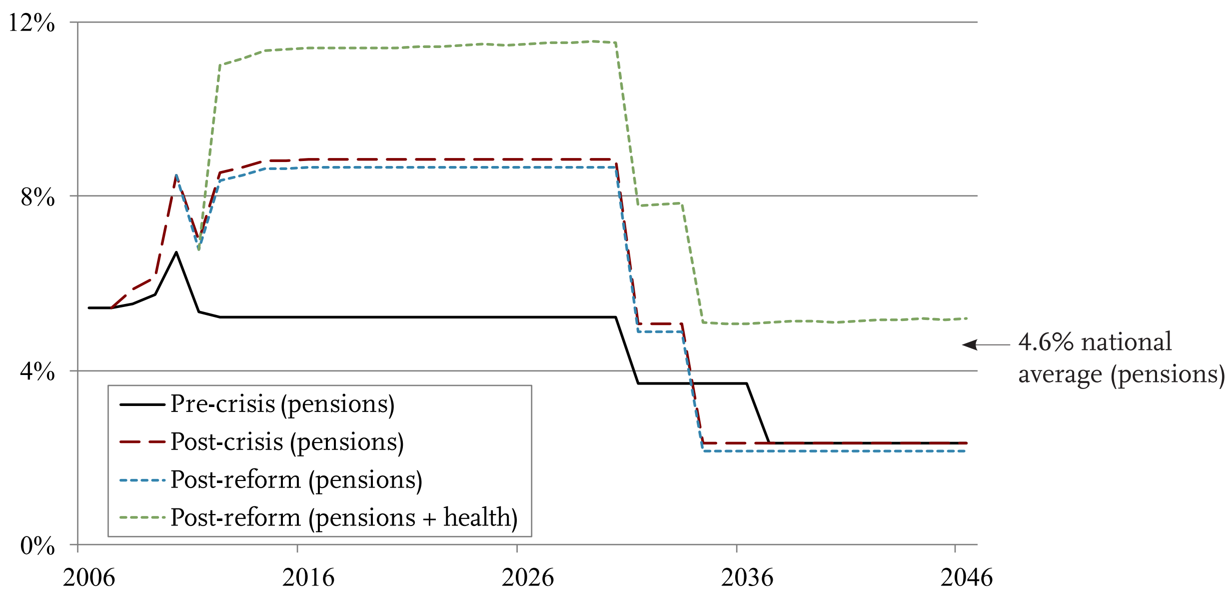
Total state costs:

In Connecticut, the state also provides retiree health benefits, which amounted to about 2.7 percent of state and local budgets prior to the crisis and are projected to grow to 3.1 percent by 2046. When retiree health and pension costs are combined, Connecticut's total retirement benefit costs as a percent of state and local budgets equaled 8.2 percent prior to the crisis, increased to 9.7 percent during the crisis, and are projected to drop to 5.3 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

CONNECTICUT: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all Connecticut state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

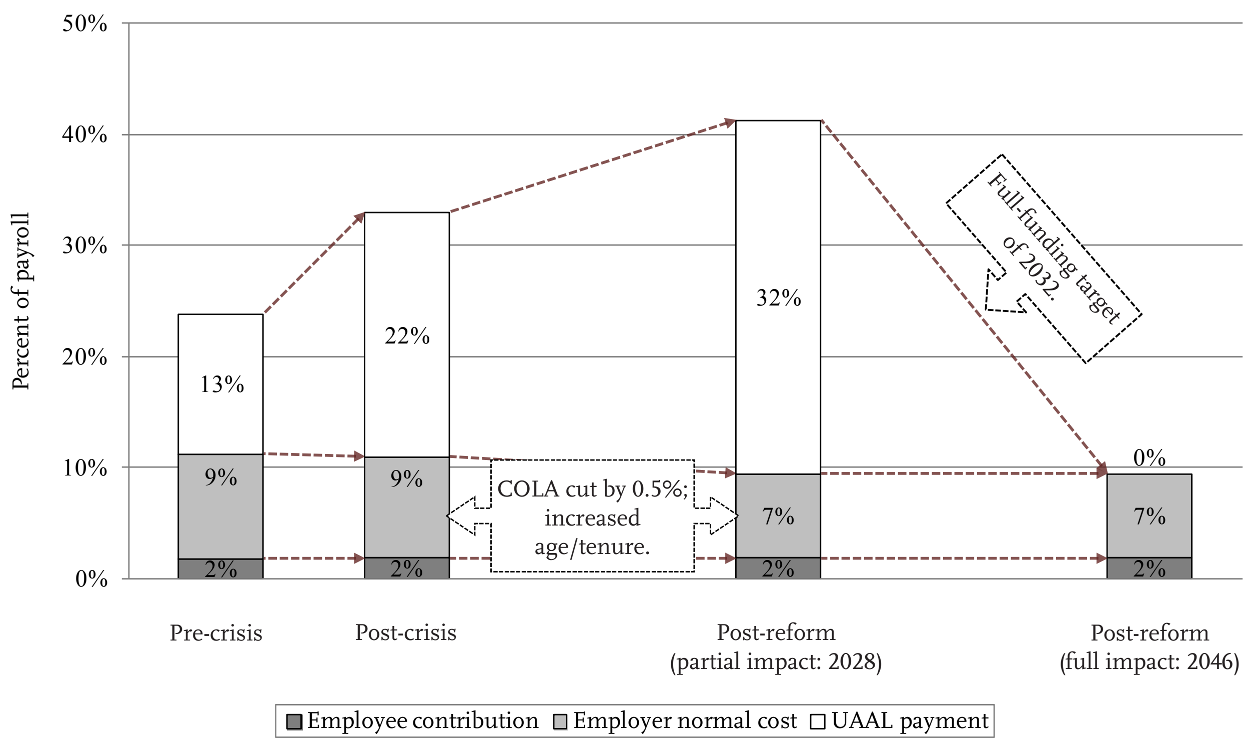
Plan	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Total pensions	5.5 %	7.0 %	8.6 %	2.2 %
Connecticut SERS	2.8	3.6	4.6	0.9
Connecticut TRS	1.9	2.6	3.2	0.5
Other pension plans[a]	0.8	0.8	0.8	0.8
Total retiree health	2.7	2.7	2.8	3.1
Connecticut state retiree health	2.0	2.0	2.2	2.4
Connecticut TRS retiree health	0.7	0.7	0.6	0.7
Total	8.2	9.7	11.4	5.3

[a] Includes three small state-administered plans to cover general assembly and judges, one state-administered municipal plan – Connecticut Municipal Employees Retirement System – as well as all the locally-administered plans within Connecticut.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

CONNECTICUT STATE EMPLOYEES RETIREMENT SYSTEM (SERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Pre-crisis, averaged 100 percent of the GASB-required ARC. Post-crisis rate has averaged 92 percent, with a low of 80.3 percent in 2010.

Plan design changes

- ☑ Cut COLA: all employees
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: all employees
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

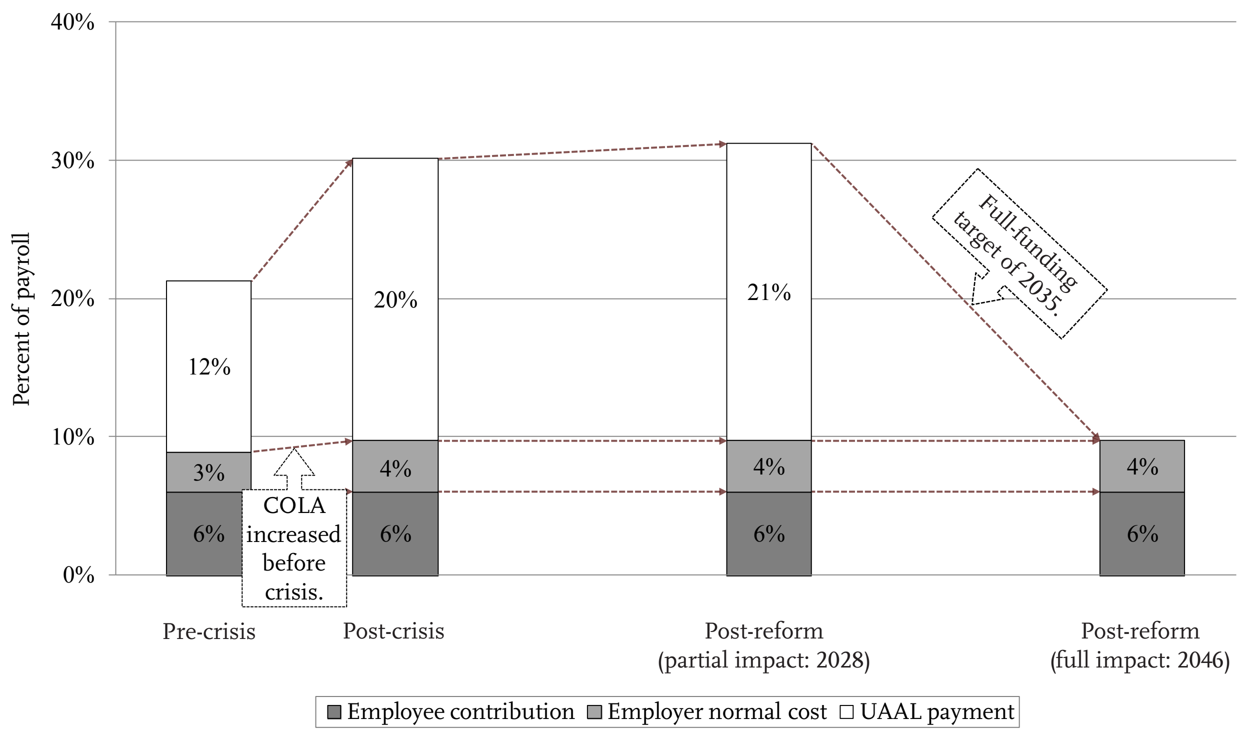
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	53.6 %	44.4 %	–	–
Employer ARC rate	22.0	31.1	39.3	7.5
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	8.50	8.25	8.00	8.00
Payroll growth	5.0	4.0	3.8	3.8
Amortization period	24 yrs.	19 yrs.	3 yrs.	0 yrs.

Sources: Actuarial valuation and CRR calculations.

CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM (TRS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Pre-crisis, averaged 85 percent of the GASB-required ARC. In 2008, $2 billion in bond proceeds were deposited into the fund. Since then, TRS has paid 100 percent of the ARC.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☐ Increased age/tenure eligibility
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☑ None

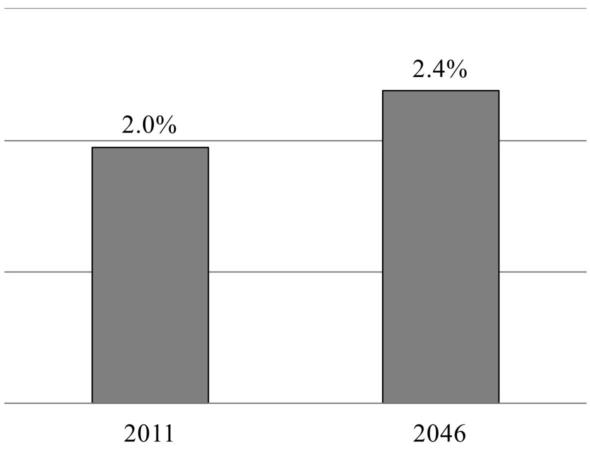
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	65.4 %	61.4 %	–	–
Employer ARC rate	15.3	24.1	25.2	3.7
Percent of ARC paid	96.9	100.0	100	100
Assumptions				
Discount rate	8.5	8.5	8.5	8.5
Payroll growth	4.0	3.75	3.75	3.75
Amortization period	27 yrs.	22 yrs.	6 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

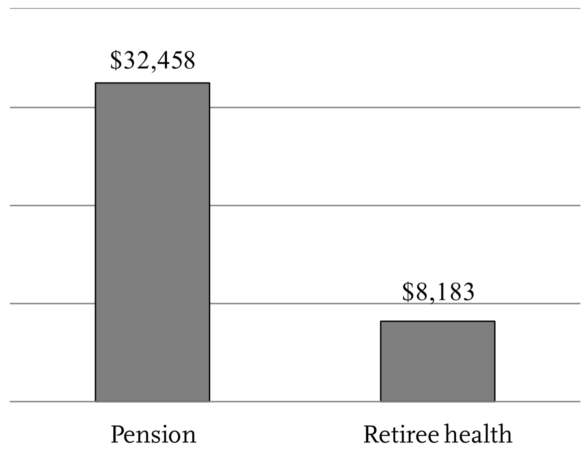
STATE OF CONNECTICUT OTHER POST-EMPLOYMENT BENEFITS PROGRAM

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

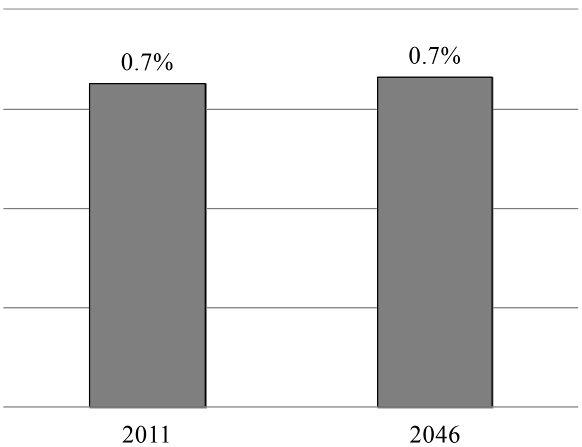
- Funding method: Pay-as-you-go with 3 percent contribution by active employees.
- Medical inflation rate: 8.5 percent, drops to 5 percent.
- Employer contribution: Retirees to pay portion of premium for healthcare benefits. In 2011, the average retiree contribution was $341 for medical benefits and $320 for dental benefits.

Benefits and membership

- Benefit eligibility: Retiree must be receiving a normal, early, disabled, or pre-retirement survivor pension from one of five state-administered pension systems.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 56,968
- Beneficiaries: 64,860
- Most recent actuarial valuation: 6/30/11

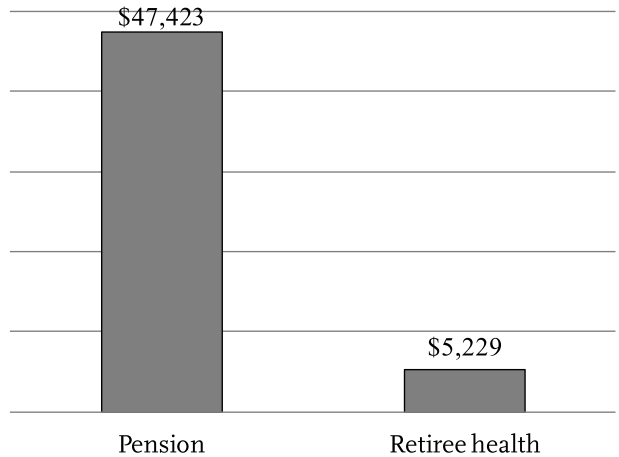
CONNECTICUT STATE TEACHERS' RETIREMENT SYSTEM RETIREE HEALTH INSURANCE PLAN

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go with 1.25 percent contribution made by active employees on salaries in excess of $500,000.
- Medical inflation rate: 7 percent, drops to 5 percent by 2017.
- Employer contribution: As of 2011, the state subsidizes $110 to $220 of monthly premium based on plan selection and eligibility.

Benefits and membership

- Benefit eligibility: Any member currently receiving a retirement or disability benefit.
- Benefits provided for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 49,808
- Beneficiaries: 35,215
- Most recent actuarial valuation: 6/30/2011

THE STATE OF FLORIDA

The plans:
Florida has only one state-administered pension system and many locally-administered systems. The state also maintains one retiree health plan. This analysis focuses primarily on the state-administered system – the Florida Retirement System (RS)– which makes up just over 85 percent of public plan active membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize the unfunded liabilities increased from 0 percent to 4 percent of payroll for RS. Nevertheless, the system remained a responsible funder over the crisis period, continuing to fund 100 percent of the annual required contribution (ARC). For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 3.0 percent to 4.5 percent.

The impact of pension plan reforms:
In the wake of the crisis, RS cut benefits for current employees and new hires. Cuts limited to only new hires included tightening retirement eligibility requirements and lengthening the averaging period used for calculating benefits. However, the cut that had the largest impact was the removal of cost-of-living adjustments on future benefit accruals for current employees and new hires. The RS also increased the employee contribution rate for all employees from 0 to 3 percent of payroll. All of these changes combined reduce the projected employer's contribution to the normal cost from 12 percent of payroll today to 5 percent by 2046, at which point all active employees will be covered under the new benefit structure.

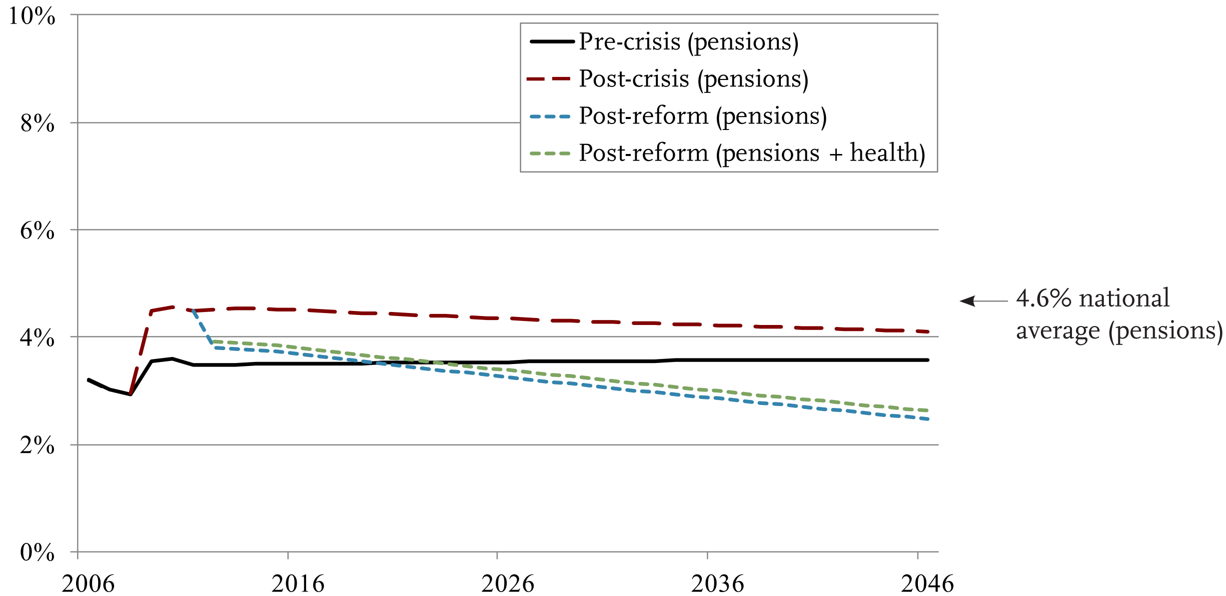
Going forward, if the system continues to pay the full ARC – as it has historically done – and assumed returns materialize, the payments required to amortize the unfunded liability will decline. Taking into account both the benefit changes and paying down the unfunded liability, the share of state and local budgets devoted to pensions is projected to drop from 4.5 percent today to 2.5 percent by 2046. Overall, pension reforms were more than commensurate with the challenges caused by the crisis and are expected to bring total pension costs well below pre-crisis levels by 2046.

Total state costs:
Florida state government also provides retiree health benefits, which amounted to 0.1 percent of state and local budgets prior to the crisis and are projected to grow to 0.2 percent by 2046. When retiree health and pension costs are combined, Florida's total retirement benefit costs as a percent of state and local budgets equaled 3.1 percent prior to the crisis, increased to 4.6 percent during the crisis, and are projected to drop to 2.7 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

FLORIDA: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all Florida state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

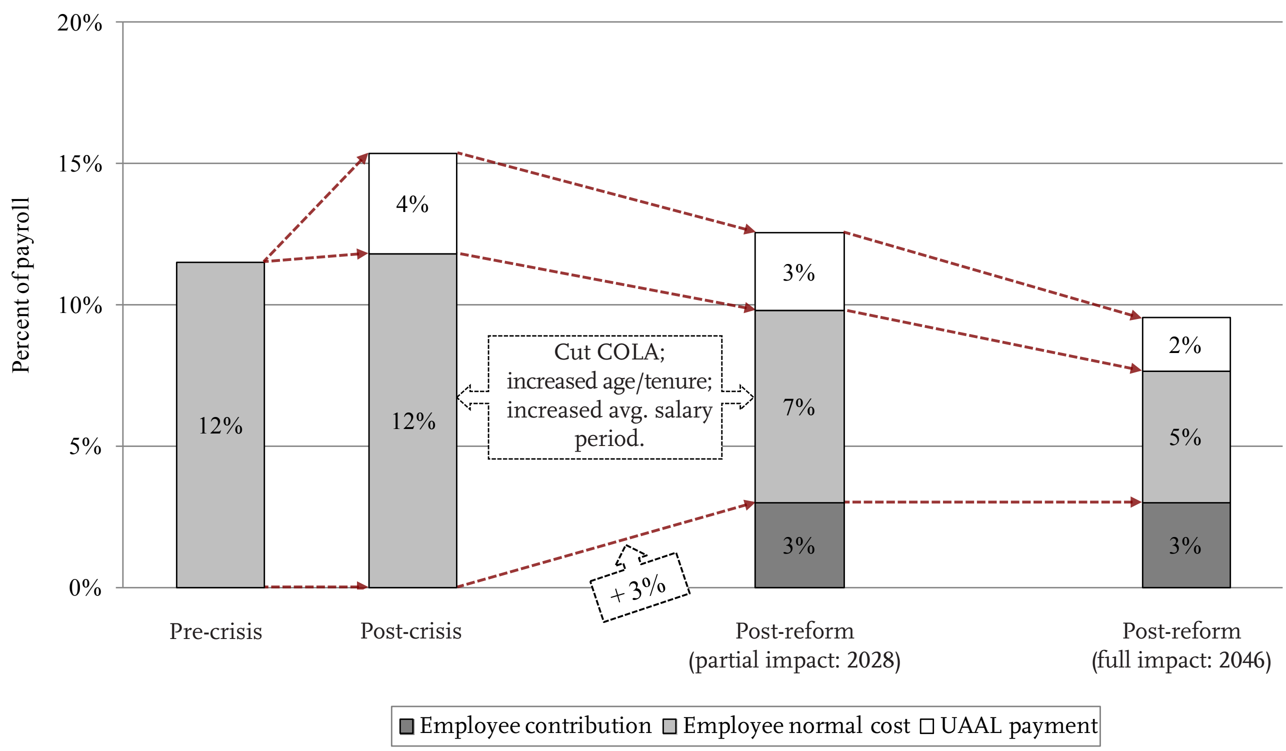
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	3.0 %	4.5 %	3.2 %	2.5 %
Florida RS	2.6	3.5	2.2	1.5
Other pension plans[a]	0.5	1.0	1.0	1.0
Total retiree health	0.1	0.1	0.1	0.2
Florida state retiree health	0.1	0.1	0.1	0.2
Total	3.1	4.6	3.3	2.7

[a] Includes all the locally-administered plans within Florida.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

FLORIDA RETIREMENT SYSTEM (RS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Pre-crisis, averaged 100 percent of GASB-required ARC. Post-crisis, the rate dropped to 83 percent in 2011.

Plan design changes

- ☑ Cut COLA: all employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

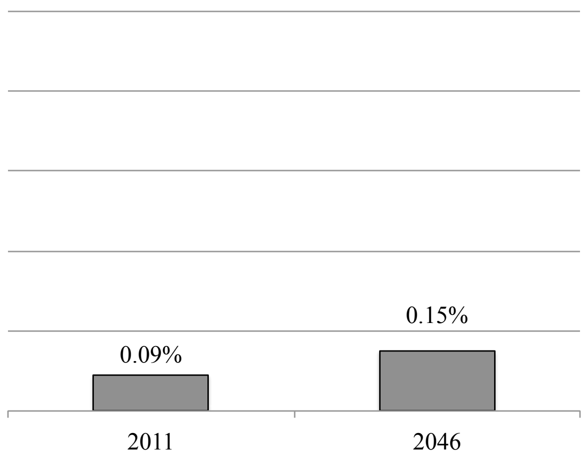
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	105.6 %	86.6 %	–	–
Employer ARC rate	10.7	15.0	9.5	6.5
Percent of ARC paid	111.0	111.0	100	100
Assumptions				
Discount rate	7.75	7.75	7.75	7.75
Payroll growth	4.0	4.0	4.0	4.0
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

STATE OF FLORIDA DIVISION OF STATE GROUP INSURANCE

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuation; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuation.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 6.5 percent by 2015, and 5 percent by 2082.
- Employer contribution: The plan requires retirees to pay 100 percent of the premium.

Benefits and membership

- Benefit eligibility: State workers who retire and immediately sign up for pension benefits.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Actives employees: 139,823
- Beneficiaries: 36,215
- Most recent actuarial valuation: 7/1/11

THE STATE OF GEORGIA

The plans:
Georgia has three large state-administered pension systems, six smaller state-administered systems, and many locally-administered systems. The state also maintains two retiree health plans. This analysis focuses primarily on two of the three large state-administered systems – the Georgia Employees' Retirement System (ERS) and the Georgia Teachers Retirement System (TRS) – which make up 75 percent of public plan active membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize unfunded liabilities increased for both ERS and TRS. For ERS, the amount jumped from 4 percent to 12 percent of payroll. However, much of this increase stems from a drop in the assumed payroll growth used in the amortization of the unfunded liabilities. For TRS – which did not lower its payroll growth assumption – the increase was more modest, rising from 2 percent to 6 percent of payroll. Over the crisis period, both systems continued to pay 100 percent of the annual required contribution (ARC). For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 3.1 percent to 4.4 percent.

The impact of pension plan reforms:
In the midst of the financial crisis, ERS made a major structural change in 2009 when it introduced a hybrid system for new hires that combined a traditional defined benefit (DB) pension with a defined contribution (DC) plan. Benefits under the DB portion of the new hybrid system provide a lower benefit factor for each year of service and no cost-of-living adjustment. At a minimum, employees and employers each contribute 1 percent of payroll to the DC portion of the hybrid. The dramatic plan design change will gradually reduce the projected employer's contribution to the normal cost from 6 percent of payroll today to 3 percent in 2046, when all active employees will be covered under the hybrid system.

For TRS, no plan design reforms were introduced. However, the system did implement a variable discount rate. The variable rate automatically increases after periods of lower-than-expected returns and decreases after periods of greater-than-expected returns.

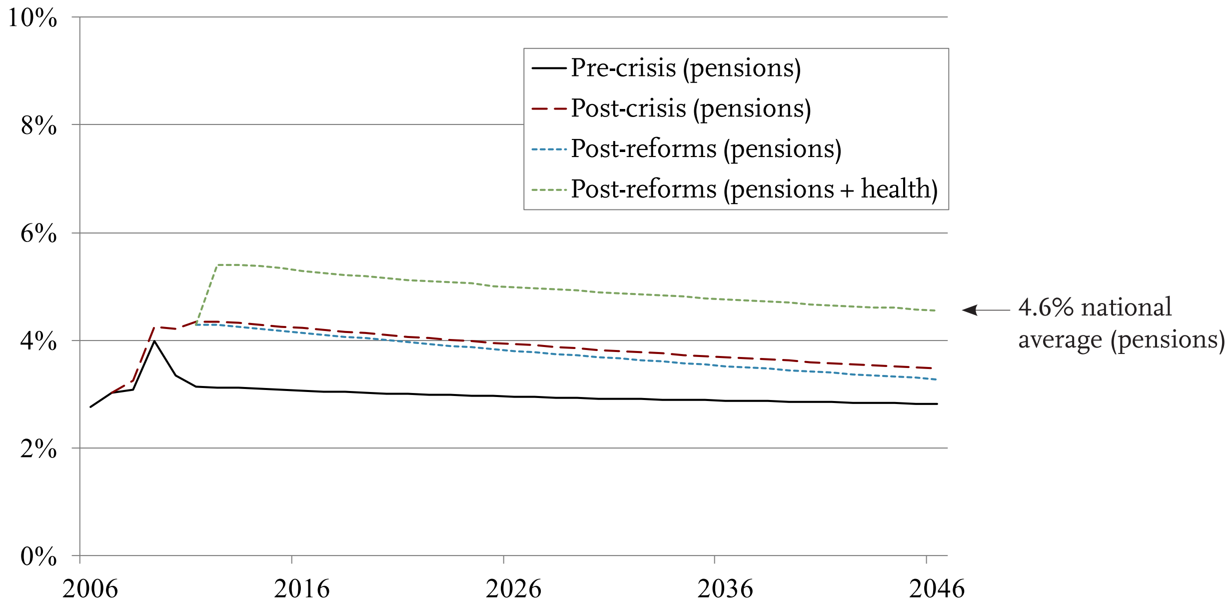
If both systems continue to pay the full ARC and assumed returns are realized, the payments required to amortize the unfunded liability will decline. But because TRS did not make any benefit changes and consitutes over 50 percent of active membership in the state, the total impact of reforms is modest. Taking into account both the benefit changes by ERS and paying down the unfunded liability, the share of state and local budgets devoted to pension costs is projected to drop from 4.4 percent today to 3.4 percent by 2046. Overall, pension reforms were less than commensurate with the challenges caused by the crisis, leaving employer costs above pre-crisis levels in 2046.

Total state costs:
In Georgia, the state also provides retiree health benefits, which amount to about 1.2 percent of state and local budgets. When retiree health and pension costs are combined, Georgia's total retirement benefit costs as a percent of state and local budgets equaled 4.3 percent prior to the crisis, increased to 5.4 percent during the crisis, and are projected to drop to 4.6 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

GEORGIA: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Notes: Budget = general own source revenues of all Georgia state/local governments. Retiree health costs assumed pay-as-you-go. Pension costs include 1 percent employer match to Georgia State Employees Pension and Savings Plan (GSEPS).

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

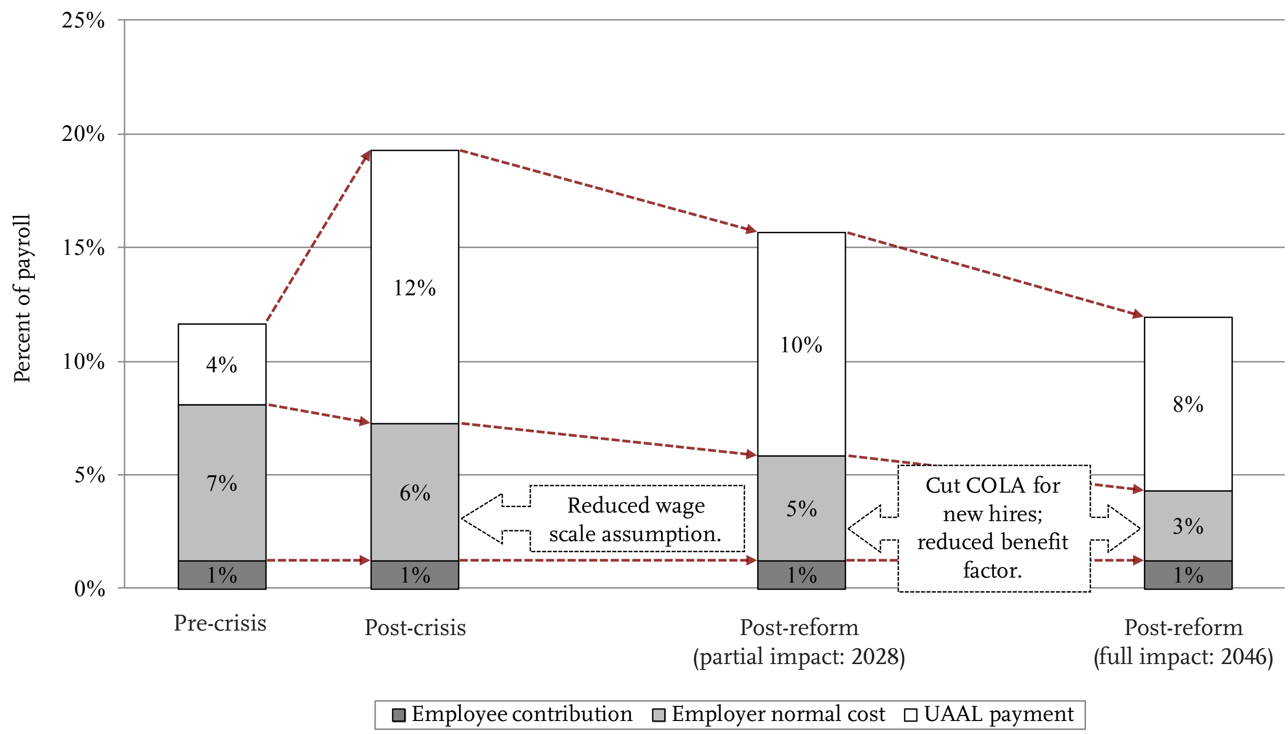
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	3.1%	4.4%	3.8%	3.4%
Georgia ERS	0.6	1.0	0.8	0.6
Georgia TRS	1.9	2.6	2.2	2.0
Other pension plans[a]	0.6	0.8	0.8	0.8
Total retiree health	1.2	1.2	1.2	1.2
Georgia ERS	0.4	0.4	0.4	0.4
Georgia schools	0.8	0.8	0.8	0.8
Total	4.3	5.4	5.0	4.6

[a] Includes five small state-administered plans to cover firemen, peace officers, judges, court clerks, and public school employees who are not teachers, as well as all the locally-administered pension plans within Georgia.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

EMPLOYEES' RETIREMENT SYSTEM OF GEORGIA (ERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Mandated to contribute 100 funding of ARC, as determined by actuaries using board's assumptions.

Plan design changes

- ☑ Cut COLA: new hires only
- ☐ Increased employee contribution
- ☐ Increased age/tenure eligibility
- ☐ Increased average salary period
- ☑ Reduced benefit factor: new hires only
- ☐ None

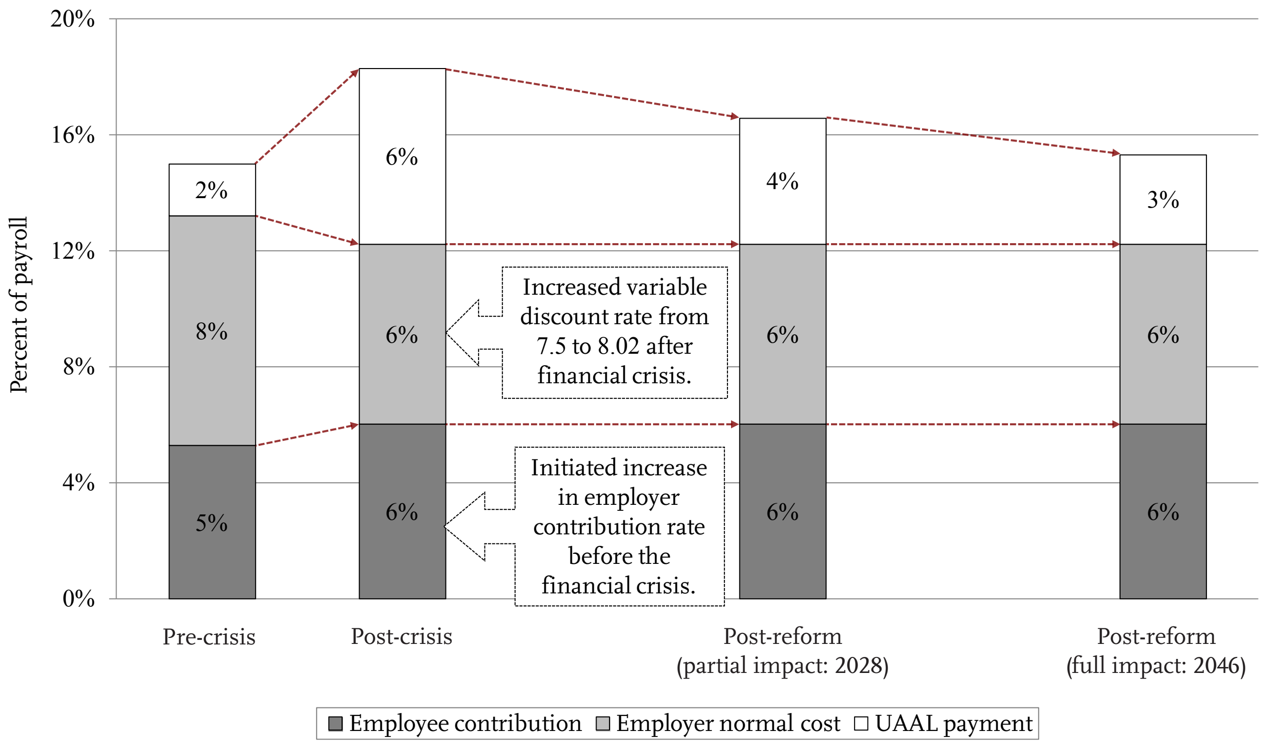
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	93.0 %	76.0 %	–	–
Employer ARC rate	10.4	17.8	14.1	10.7
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	7.5	7.5	7.5	7.5
Payroll growth	3.75	1.00	n/a	n/a
Amortization period	15 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

TEACHERS RETIREMENT SYSTEM OF GEORGIA (TRS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Has historically funded 100 percent of ARC calculated by its actuaries based on assumptions set by board.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☐ Increased age/tenure eligibility
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☑ None

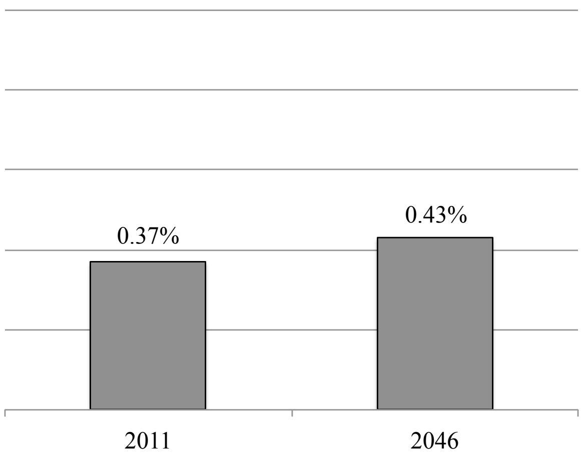
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	94.7 %	84.0 %	–	–
Employer ARC rate	9.7	12.3	10.6	9.3
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	7.5	7.5	7.5	7.5
Payroll growth	3.75	3.75	3.75	3.75
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

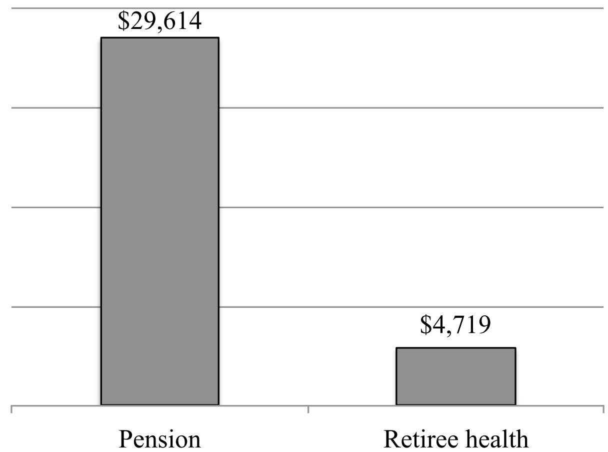
GEORGIA STATE HEALTH BENEFIT PLAN: GENERAL EMPLOYEES

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

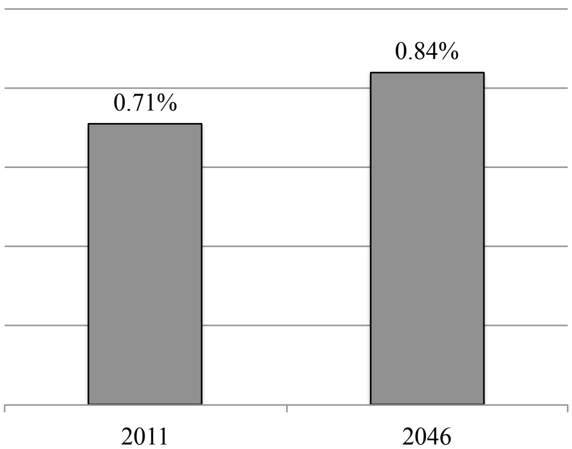
- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 5 percent by 2018.
- Employer contribution: Fixed annual premiums based on plans elected. Retirees also pay a portion of the premium.

Benefits and membership

- Benefit eligibility: Employees who claim pension benefits immediately upon retirement.
- Benefits for Medicare-eligible retirees: The program offers subsidized Medicare-Advantage plans for members over age 65.
- Active employees: 69,277
- Beneficiaries: 41,971
- Most recent actuarial valuation: 6/30/10

GEORGIA STATE HEALTH BENEFIT PLAN: SCHOOL EMPLOYEES

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 5 percent by 2018.
- Employer contribution: Fixed annual premiums based on plans elected. Retirees also pay a portion of the premium.

Benefits and membership

- Benefit eligibility: Employees who claim pension benefits immediately upon retirement.
- Benefits for Medicare-eligible retirees: The program offers subsidized Medicare-Advantage plans for members over age 65.
- Active Employees: 261,982
- Beneficiaries: 81,777
- Most recent actuarial valuation: 6/30/10

THE STATE OF ILLINOIS

The plans:
Illinois has four large state-administered pension systems, two smaller state-administered systems, and a smattering of locally-administered systems. The state also maintains four retiree health plans. This analysis focuses primarily on three of the large state-administered systems – the Illinois State Employees Retirement System (SERS), Teachers' Retirement System (TRS), and State Universities Retirement System (SURS) – which make up 75 percent of public pension active membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize the unfunded liabilities increased dramatically for all Illinois plans. For SERS, the required payment jumped from 5 percent to 19 percent of payroll. For TRS, the increase was similar, with the unfunded liability payment going from 8 percent to 22 percent of payroll. SURS was hit hardest, with its unfunded liability payment jumping from 3 percent to 22 percent. Although much of the increase in costs can be attributed to the drop in asset values, some of the increase was due to a change in assumptions by the plans – a drop in the discount rate and in the assumed payroll growth used in the amortization of the unfunded liabilities. Over the crisis period, the three systems continued to pay 100 percent of their statutory annual required contribution (ARC), although the statutory amount was consistently below the GASB ARC over that period. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 5.5 percent to 13.8 percent.

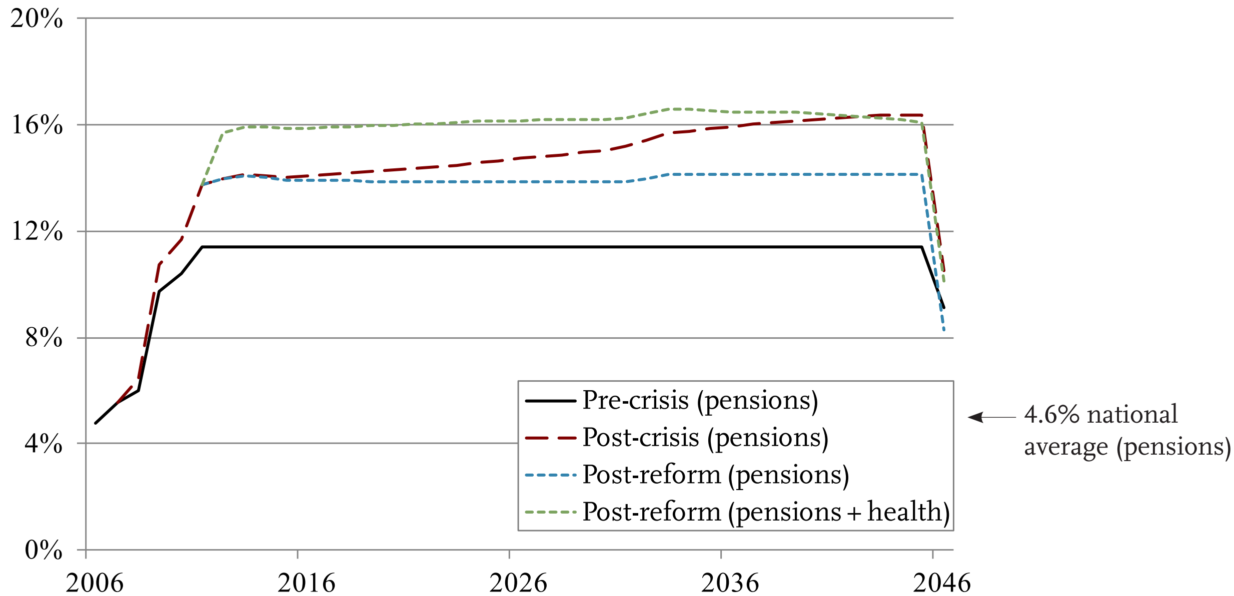
The impact of pension plan reforms:
In the wake of the financial crisis, Illinois made major cuts to pension benefits for new hires. Benefit changes for all three systems included tightening retirement eligibility requirements, lengthening the vesting period and average salary period, and decreasing the COLA cost-of-living adjustment. For TRS and SURS, these changes reduce the projected employer's contribution to 0 percent of payroll by 2046. For SERS, the changes reduce the contribution from 14 percent to 5 percent. A key element in the projected pension costs for the SERS, TRS, and SURS will be each plan's ability to stick with their funding schedules. If the three systems adhere to their current funding goals –a 90 percent funded ratio by 2045 – and assumed returns are realized, the share of state and local budgets devoted to pensions is projected to drop from 13.8 percent today to 8.3 percent by 2046.

Total state costs:
Illinois state government also provides retiree health benefits, which amounted to about 1.6 percent of state and local budgets prior to the crisis, and are projected to grow to 1.8 percent by 2046. When retiree health and pension costs are combined, Illinois' total retirement benefit costs as a percent of state and local budgets equaled 7.1 percent prior to the crisis, increased to 15.5 percent during the crisis, and are projected to drop to 10.1 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

ILLINOIS: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all Illinois state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

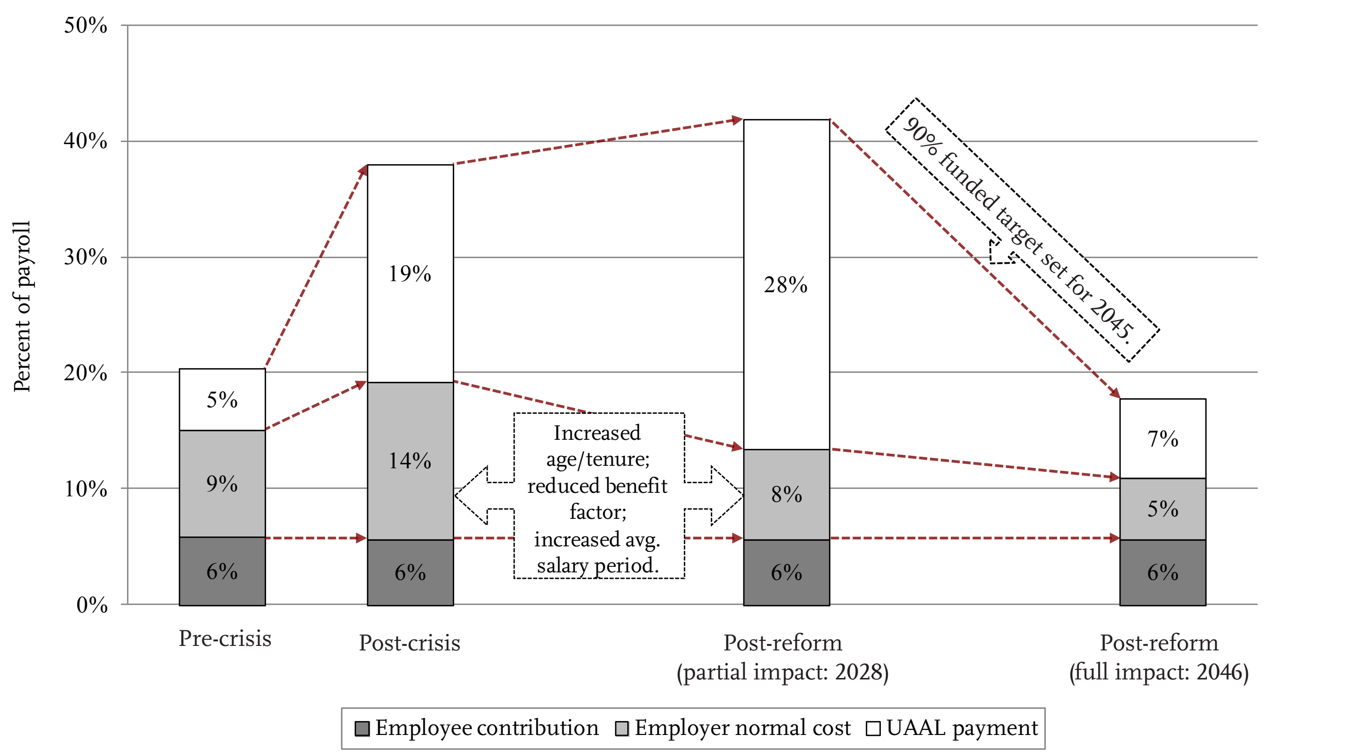
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	5.5%	13.8%	13.9%	8.3%
Illinois SERS	0.7	1.8	2.0	0.7
Illinois TRS	1.9	3.6	3.5	0.4
Illinois SURS	0.5	1.5	1.5	0.3
Other pension plans[a]	2.4	6.9	6.9	6.9
Total retiree health	1.6	1.7	2.4	1.8
Illinois state employees	1.2	1.2	1.5	0.9
Illinois teachers	0.4	0.5	0.8	0.8
Illinois community college employees	0.0	0.0	0.1	0.1
Total	7.1	15.5	16.3	10.1

[a] Includes one large state-administered municipal plan – Illinois Municipal Retirement System – and two small state-administered plans to cover judges and the general assembly.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

STATE EMPLOYEES' RETIREMENT SYSTEM OF ILLINOIS (SERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

In 1995, the Illinois legislature mandated a statutory ARC be phased in by 2010 to achieve 90-percent funded ratio by 2045.

Plan design changes

- ☑ Cut COLA: new hires only
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

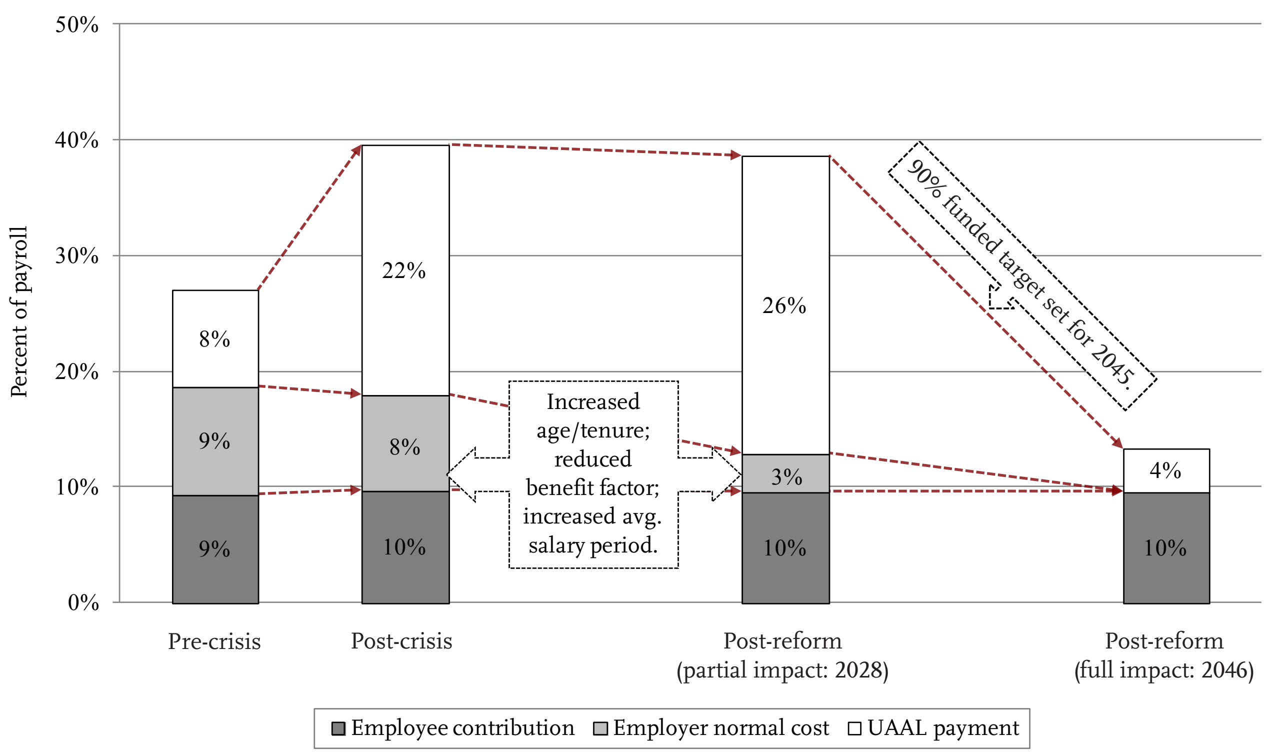
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	54.2 %	35.5 %	–	–
Employer ARC rate	14.5	32.3	36.1	12.1
Percent of ARC paid	43.6	87.5	100	100
Assumptions				
Discount rate	8.50	7.75	7.75	7.75
Payroll growth	3.7	3.0	3.0	3.0
Amortization period	38 yrs.	34 yrs.	17 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

TEACHERS' RETIREMENT SYSTEM OF THE STATE OF ILLINOIS (TRS)

FIGURE 3. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

In 1995, the Illinois legislature mandated a statutory ARC be phased in by 2010 to achieve 90-percent funded ratio by 2045.

Plan design changes

- ☑ Cut COLA: new hires only
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

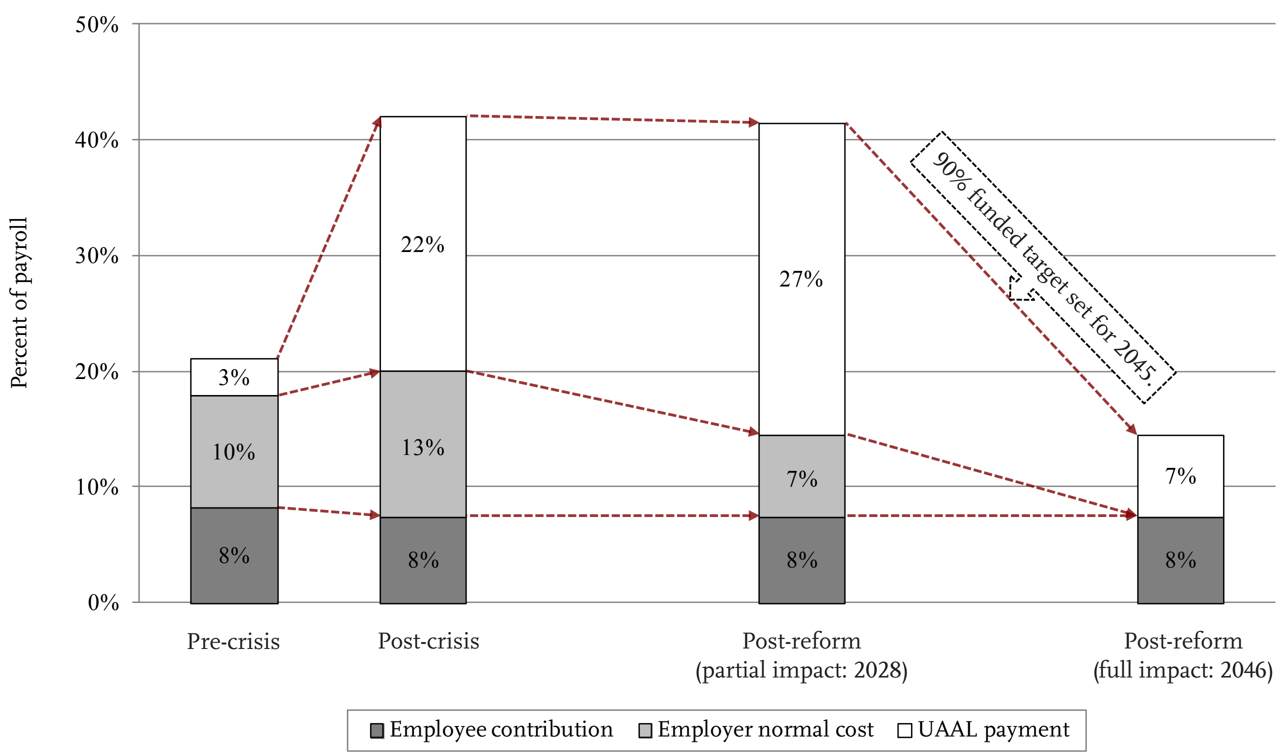
TABLE 3. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	63.8 %	46.5 %	–	–
Employer ARC rate	17.7	29.8	29.0	3.8
Percent of ARC paid	39.8	84.7	100	100
Assumptions				
Discount rate	8.5	8.5	8.5	8.5
Payroll growth	4.6	1.3	1.3	1.3
Amortization period	38 yrs.	34 yrs.	17 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

STATE UNIVERSITIES RETIREMENT SYSTEM OF ILLINOIS (SURS)

Figure 4. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

In 1995, the Illinois legislature mandated a statutory ARC be phased in by 2010 that would result in 90-percent funded ratio by 2045.

Plan design changes

- ☑ Cut COLA: new hires only
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

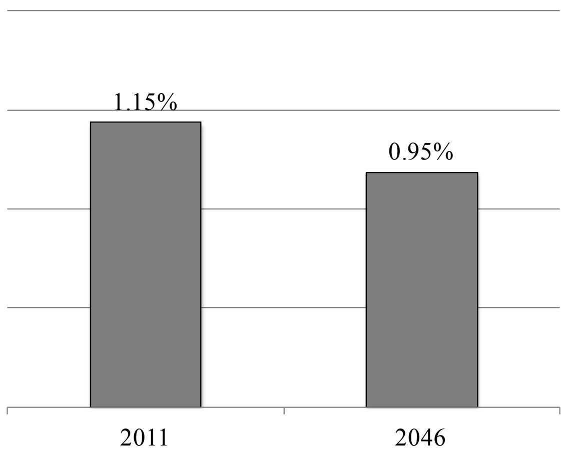
Table 4. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	58.5 %	44.3 %	–	–
Employer ARC rate	18.6	34.5	33.9	6.8
Percent of ARC paid	48.8	61.4	100	100
Assumptions				
Discount rate	8.50	7.75	7.75	7.75
Payroll growth	4.4	2.4	2.4	2.4
Amortization period	38 yrs.	34 yrs.	17 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

ILLINOIS STATE EMPLOYEES GROUP INSURANCE PROGRAM (SEGIP)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

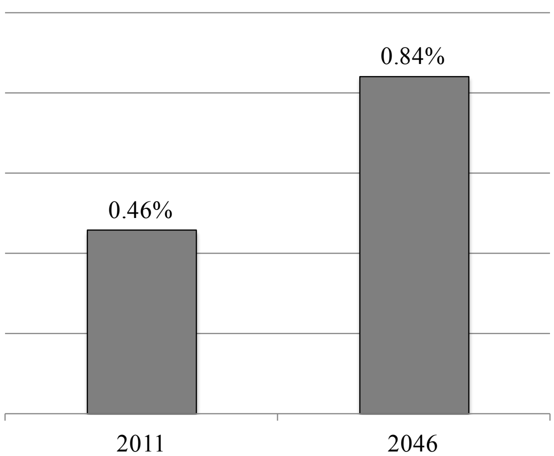
- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 5.6 percent by 2019.
- Employer contribution: Pays 100 percent of insurance premums for employees hired before 1998. Employees hired later receive 5 percent of the premium per year of service, up to 100 percent.

Benefits and membership

- Benefit eligibility: Members of IL SERS, TRS, JRS, GARS and SURS (not receiving benefits via CIP) who retire and begin to receive retirement benefits immediately are eligible to continue medical enrollment as retirees.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 119,849
- Beneficiaries: 83,352
- Most recent actuarial valuation: 6/30/11

TEACHER'S RETIREMENT INSURANCE PROGRAM OF THE STATE OF ILLINOIS (TRIP)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

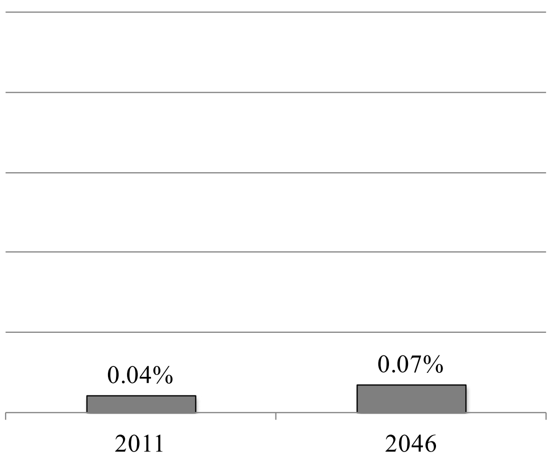
- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 5.6 percent by 2019.
- Employer contribution: The state and school districts contributed 38 percent of the cost of benefit payments in 2011.

Benefits and membership

- Benefit eligibility: Members of IL TRS who retire with at least eight years of creditable service and begin to receive retirement benefits are eligible for benefits.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 162,127
- Beneficiaries: 59,358
- Most recent actuarial valuation: 6/30/11

COLLEGE INSURANCE PROGRAM OF THE STATE OF ILLINOIS (CIP)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 5.6 percent by 2019.
- Employer contribution: Employers contributed 31 percent of the cost of benefits in 2011.

Benefits and membership

- Benefit eligibility: All members receiving benefits from SURS who have been full-time employees of a community college district or an association of a community college and who paid the required active member CIP contributions prior to retirement.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 22,603
- Beneficiaries: 5,240
- Most recent actuarial valuation: 6/30/11

THE STATE OF MASSACHUSETTS

The plans:
Massachusetts has two large state-administered pension systems, four smaller state-administered systems, and many locally-administered systems. The state also maintains one retiree health plan. This analysis focuses primarily on the two large state-administered systems – the Massachusetts State Employees' Retirement System (SERS) and the Massachusetts Teachers' Retirement System (TRS) – which make up nearly 60 percent of active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize unfunded liabilities increased for both SERS and TRS. For SERS, the amount jumped from 4 percent to 11 percent of payroll. TRS experienced a jump of similar magnitude, with the amount increasing from 12 percent to 20 percent of payroll. Over the crisis period, both systems continued to pay 100 percent of their annual required contribution (ARC). For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 3.1 percent to 4.4 percent.

The impact of pension plan reforms:
In response to the financial crisis and subsequent spike in pension costs, SERS and TRS went through a series of plan reforms that significantly reduced benefits for new hires. These reductions include increasing the required age for full pension benefits, reducing the age-related benefit factor, and increasing the average salary period. The result is that employers'contributions to the normal cost are projected to be cut in half by 2046, when all employees will be covered under the reduced benefits. For SERS, employer normal costs are projected to drop from 4 percent today to 2 percent of payroll in 2046. For TRS, that drop is from 2 percent to 1 percent of payroll.

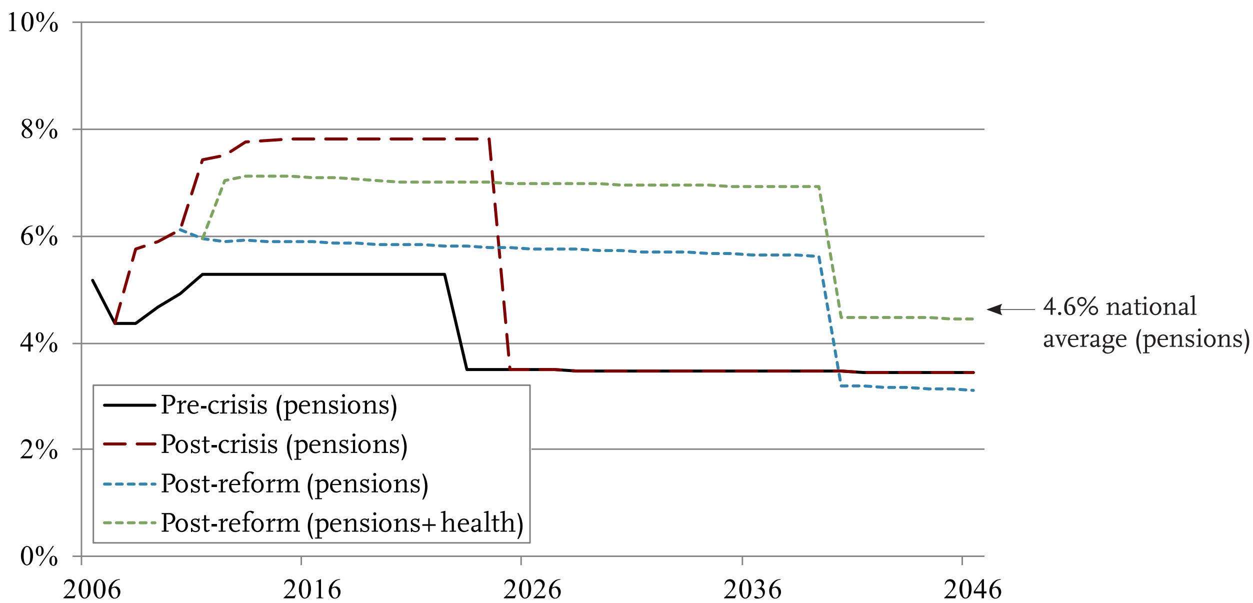
If both systems continue to pay the full ARC and assumed returns are realized, the payments required to amortize the unfunded liability will decline. Taking into account both their benefit reductions and paying down their unfunded liabilities, the share of state and local budgets devoted to pension costs is projected to drop from 7.4 percent today to 3.2 percent by 2046. A key element in the projected pension costs for SERS and TRS will be each system's ability to stick to their funding schedule. Currently, both systems have in place a 2040 target date for full funding.

Total state costs:
Massachusetts also provides retiree health benefits, which amounted to about 0.8 percent of state and local budgets prior to the crisis, but are projected to grow to 1.3 percent by 2046. When retiree health and pension costs are combined, Massachusetts' total retirement benefit costs as a percent of state and local budgets equaled 5.1 percent prior to the crisis, increased to 8.5 percent during the crisis, and are projected to drop to 4.5 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

MASSACHUSETTS: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all Massachusetts state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

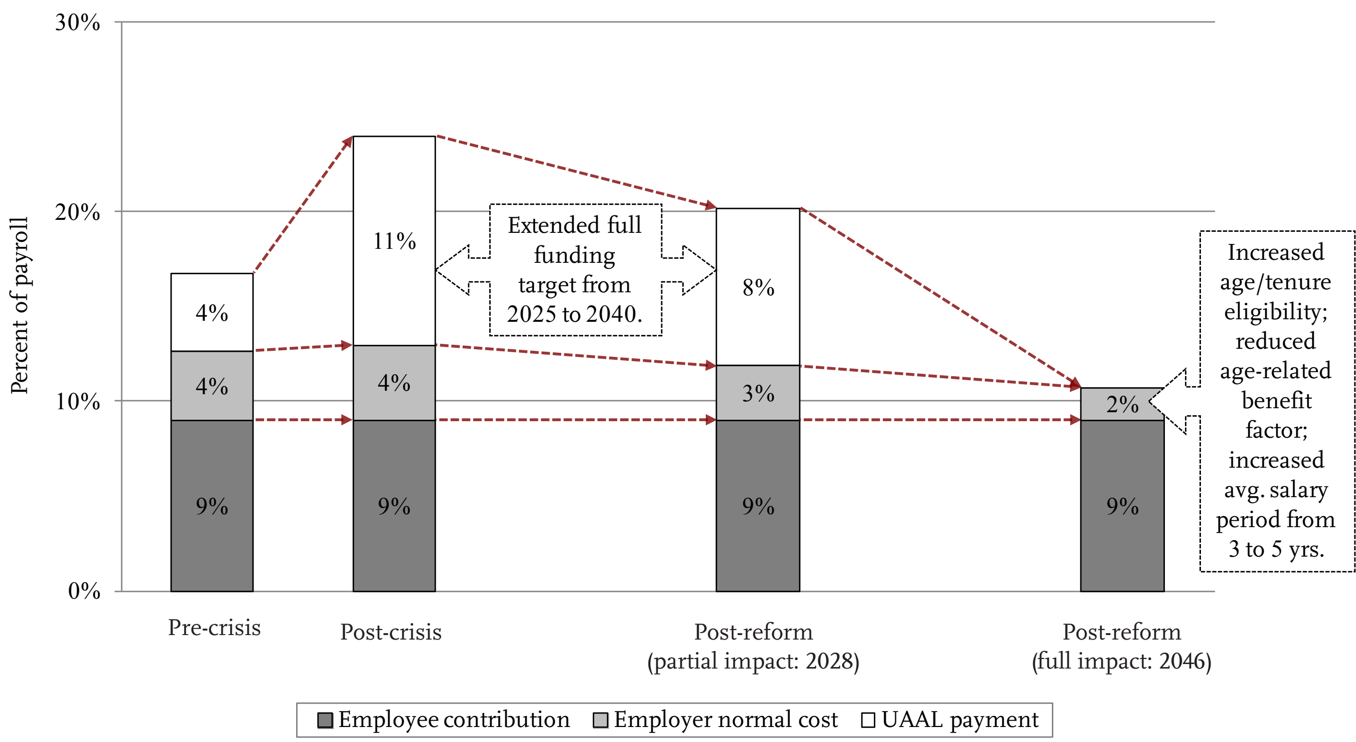
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	4.3 %	7.4 %	5.7 %	3.2 %
Massachusetts SERS	0.8	1.7	1.1	0.2
Massachusetts TRS	1.6	2.8	1.7	0.1
Other pension plans[a]	1.9	2.9	2.9	2.9
Total retiree health	0.8	1.1	1.2	1.3
Massachusetts GIC	0.8	1.1	1.2	1.3
Total	5.1	8.5	6.9	4.5

[a] Includes seven state-pooled municipal retirement systems (Berkshire, Essex, Franklin, Hampden, Hampshire, Middlesex counties, and the City of Worcester), three authorities (Massachusetts Port Authority, Turnpike Authority, and Water Resources Authority), the Massachusetts Housing Finance Agency, and all the locally-administered pension plans within Massachusetts.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

MASSACHUSETTS STATE BOARD OF RETIREMENT SYSTEM (SERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Contributions based on slowly rising payments over a fixed UAAL amortization period. Post-crisis, the state increased amortization period from 14 to 29 years.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

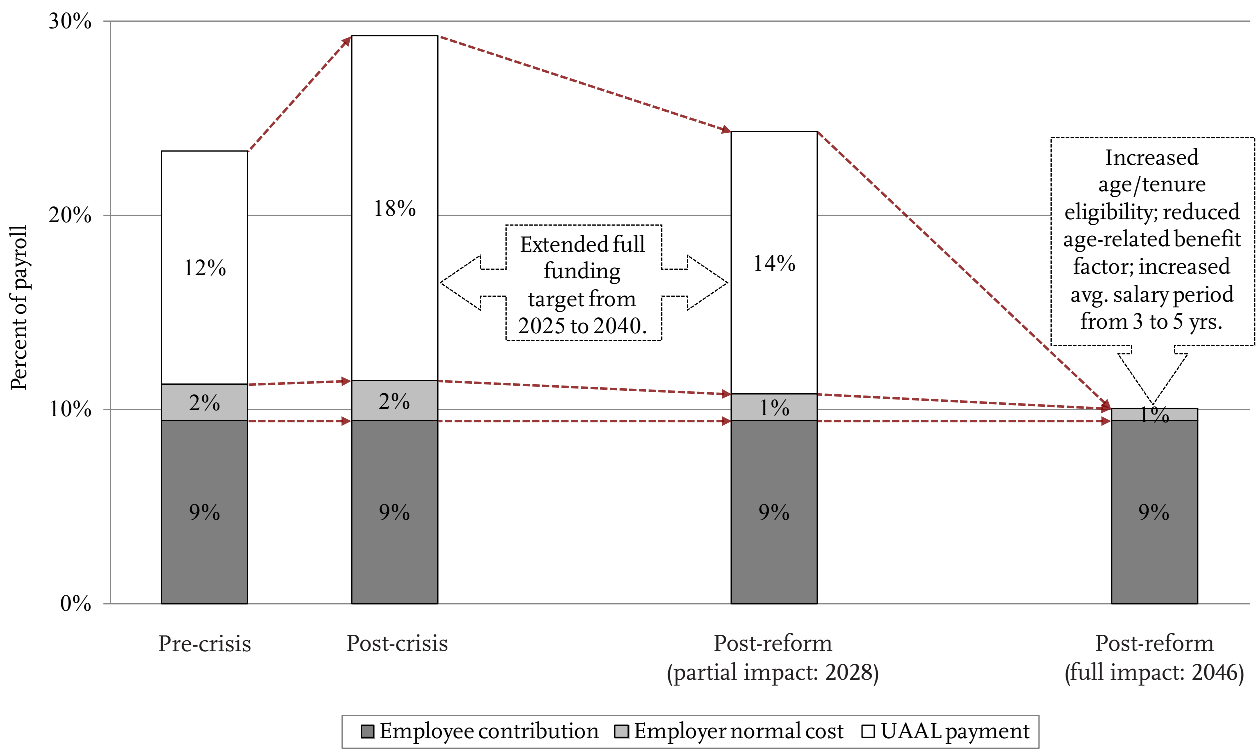
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	89.4%	71.6%	–	–
Employer ARC rate	7.7	14.2	11.2	1.7
Percent of ARC paid	101.0	125.0	100	100
Assumptions				
Discount rate	8.25	8.25	8.25	8.25
Payroll growth	4.5	4.0	4.0	4.0
Amortization period	16 yrs.	14 yrs.	12 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

MASSACHUSETTS TEACHERS RETIREMENT BOARD (TRS)

FIGURE 3. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Contributions based on slowly rising payments over fixed UAAL amortization period. Post-crisis, the state increased amortization period from 14 to 29 years.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

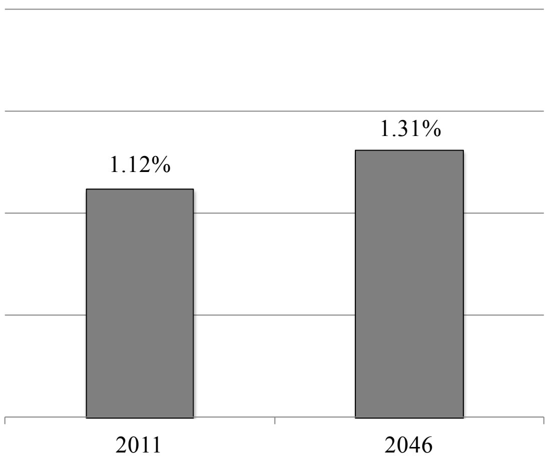
TABLE 3. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	73.9 %	58.2 %	–	–
Employer ARC rate	13.9	20.4	14.9	0.6
Percent of ARC paid	98.0	108.0	100	100
Assumptions				
Discount rate	8.25	8.25	8.25	8.25
Payroll growth	4.5	4.0	4.0	4.0
Amortization period	16 yrs.	14 yrs.	12 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

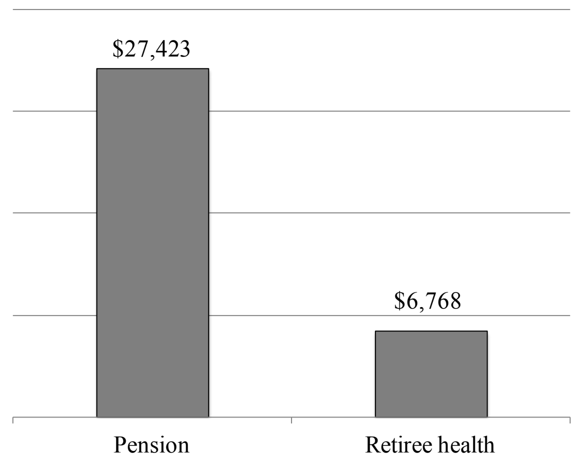
COMMONWEALTH OF MASSACHUSETTS GROUP INSURANCE COMMISSION (GIC)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 8.5 percent, drops to 5 percent in 2017.
- Employer contribution: Pays 80 percent, 85 percent, or 90 percent of insurance premiums based on year of hire and employee classification.

Benefits and membership

- Benefit eligibility: Retired members who are eligible for pensions can receive coverage with the employer subsidy upon retirement.
- Benefits for Medicare-eligible retirees: The Commonwealth subsidizes two plans.
- Active employees: 73,646
- Beneficiaries: 70,070
- Most recent actuarial valuation: 10/30/10

THE STATE OF MICHIGAN

The plans:
Michigan has two large state-administered pension systems, one large state-administered municipal system, three smaller state-administerd systems, and many locally-administered systems. The state also maintains two retiree health plans. This analysis, focuses on two of the three large state-administered systems – the Michigan Employees' Retirement System (SERS) and the Michigan Public School Employees Retirement System (PSERS) – which make up nearly 80 percent of active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize unfunded liabilities increased dramatically for SERS and PSERS. For SERS, the amount jumped from 9 percent to 39 percent of payroll. Much of this large increase is due to the fact that SERS amortizes its unfunded liability in level dollar amounts, which has the effect of front loading amortization payments compared to rates calculated as level percent of payroll each year. Additionally, the SERS' defined benefit plan was closed to new entrants in 1997 and has a declining payroll, which further inflates percent-of-payroll figures. For PSERS – which remains open to new entrants but also amortizes a portion of its unfunded liability in level dollar amounts – the increase in amortization payments was smaller but still significant, rising from 3 percent to 17 percent of payroll. Over the crisis period, both systems paid more than 80 percent of their annual required contribution. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 4.7 percent to 8.4 percent.

The impact of pension plan reforms:
In 2012, PSERS made a major structural change in its retirement system, introducing a hybrid plan for new hires that combined a traditional definedbenefit (DB) pension with a defined contribution (DC) plan. Compared to the original DB plan, the DB portion of the new hybrid system has a higher minimum retirement age, a longer average salary period and no cost-of-living adjustments. For the DC portion of the hybrid, employees contribute 2 percent of payroll, and the state pays a minimum of 1 percent. The plan design change will gradually reduce the projected employer's contribution to the normal cost from 4 percent of payroll today to 3 percent in 2046, at which point all active employees will be covered under the hybrid system.

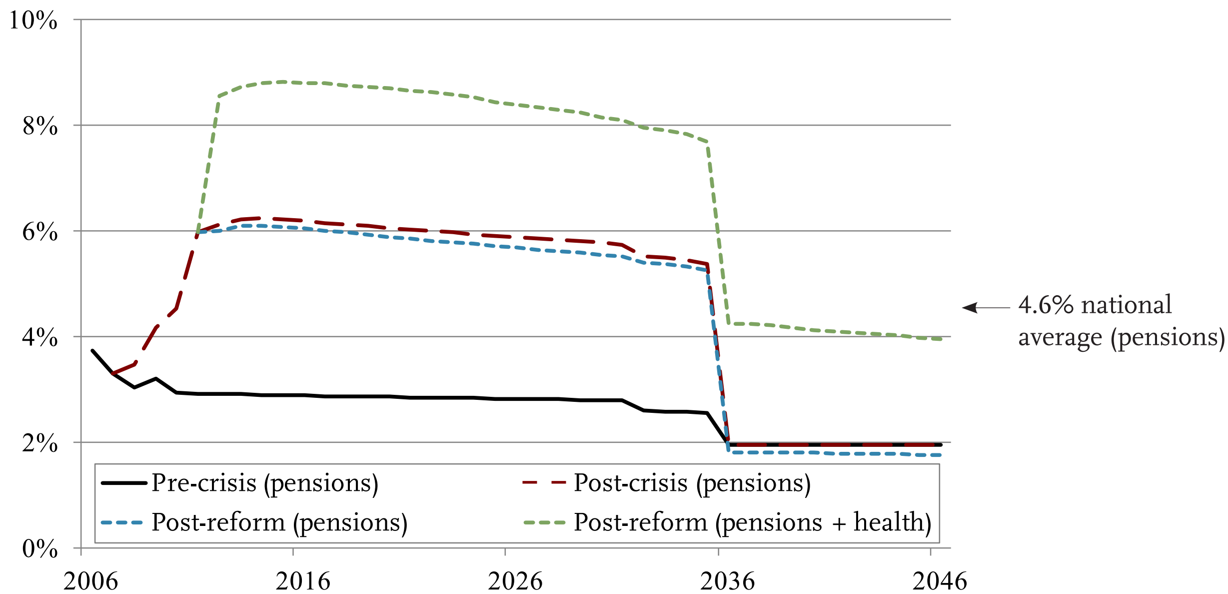
Since SERS is a closed plan with no new entrants, it simply increased current employee contributions in response to the crisis. A key element in the projected pension costs for SERS and PSERS will be each plan's ability to stick with its funding schedule. If they succeed – the full funding date for SERS and PSERS is 2036 – and assumed returns materialize, the share of state and local budgets devoted to pension costs is projected to drop from 8.4 percent today to 3.9 percent by 2046.

Total state costs:
Michigan government also provides retiree health benefits, which amounted to 1.7 percent of state and local budgets prior to the crisis and are projected to grow to 2.2 percent by 2046. When retiree health and pension costs are combined, Michigan's total retirement benefit costs as a percent of state and local budgets equaled 4.7 percent prior to the crisis, increased to 8.4 percent during the crisis, and are projected to drop to 3.9 percent in 2046 after pension reforms fully take effect.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

MICHIGAN: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all Michigan state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

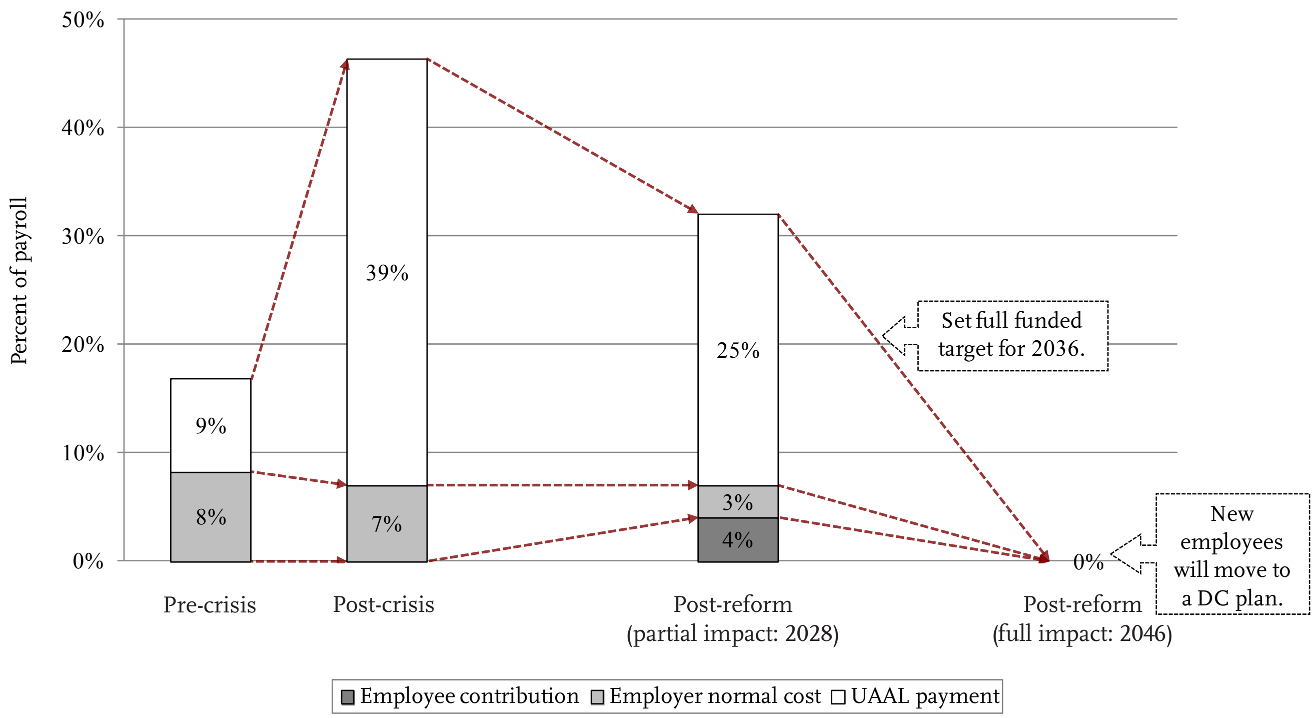
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	3.0 %	5.9 %	5.6 %	1.7 %
Michigan SERS	0.5	1.3	0.8	0.0
Michigan PSERS	1.3	3.3	3.5	0.4
Other pension plans[a]	1.2	1.3	1.3	1.3
Total retiree health	1.7	2.5	2.7	2.2
State employees	0.6	0.8	0.8	0.7
Public school employees	1.1	1.7	1.9	1.5
Total	4.7	8.4	8.3	3.9

[a] Includes the Michigan State Legislative, Judges, Police, and Municipal Employees retirement systems, as well as all the locally-administered plans within Michigan.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

MICHIGAN STATE EMPLOYEES RETIREMENT SYSTEM (SERS)

FIGURE 2. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Closed to new hires in 1997. Due to declining payroll, UAAL is amortized as level dollar rather than constant percent of payroll.

Plan design changes

- ☐ Cut COLA
- ☑ Increased employee contribution: all employees
- ☐ Increased age/tenure eligibility
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

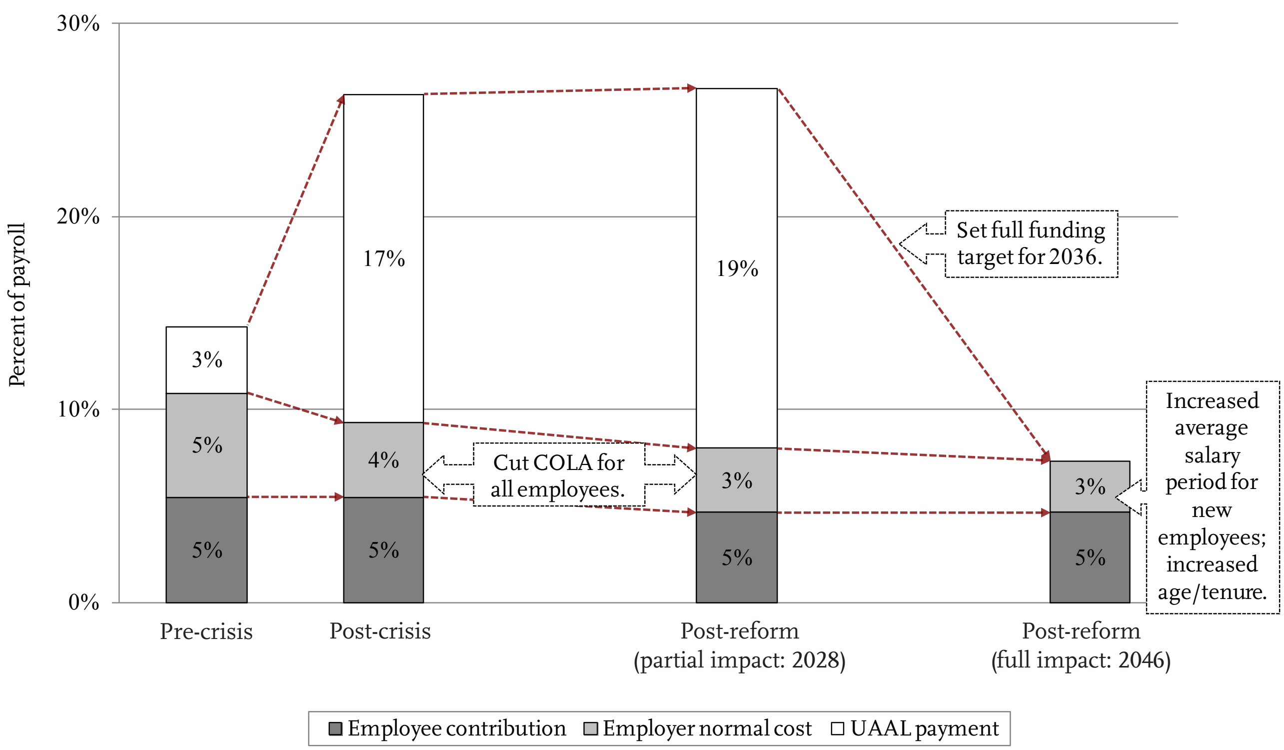
TABLE 2. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	86.2 %	65.5 %	–	–
Employer ARC rate	16.8	46.4	28.1	0.0
Percent of ARC paid*	47.7	94.8	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	3.5	3.5	3.5	3.5
Amortization period	29 yrs.†	25 yrs.†	8 yrs.†	0 yrs.†

* Percent of ARC paid is calculated ex-post-facto. Each year, the system pays the full ARC as it is known at the beginning of the year.
† Level dollar amortization.
Sources: Actuarial valuations and CRR calculations.

MICHIGAN PUBLIC SCHOOL EMPLOYEES RETIREMENT SYSTEM (PSERS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Pre-crisis, averaged 93 percent of GASB-required ARC. Post-crisis, the rate dropped to 81.5 percent in 2011.

Plan design changes

- ☑ Cut COLA: new hires only
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

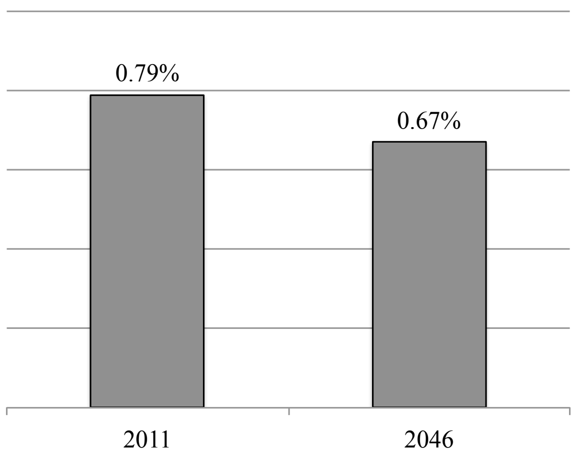
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	88.7 %	64.7 %	–	–
Employer ARC rate	8.9	21.0	22.0	2.7
Percent of ARC paid	90.8	81.5	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	3.5	3.5	3.5	3.5
Amortization period	29 yrs.	25 yrs.	8 yrs.	0 yrs.

Sources: Actuarial valuations and CRR calculations.

MICHIGAN STATE EMPLOYEES' RETIREE HEALTH BENEFITS

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

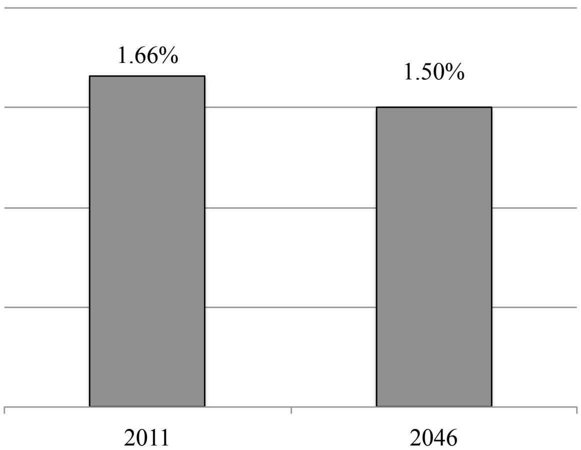
- Funding method: Pay-as-you-go
- Medical inflation rate: 9.0 percent, drops to 3.5 percent by 2023.
- Employer contribution: Pays 90 percent of premium for retirees under age 65, and 100 percent of premium for Medicare-eligible retirees.

Benefits and membership

- Benefit eligibility: Any member receiving a pension benefit is eligible for retiree health benefits.
- Benefits for Medicare-eligible retirees: Participate in the same plans as non-Medicare eligible participants, but pay lower premiums.
- Active employees: 50,861
- Beneficiaries: 55,648
- Most recent actuarial valuation: 9/30/11

MICHIGAN PUBLIC SCHOOL EMPLOYEES' RETIREE HEALTH BENEFITS

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 8.5 percent, drops to 3.5 percent by 2023.
- Employer contribution: Pre-2008 retirees are fully paid for if on Medicare, and pay a premium equal to the Medicare rate if not on Medicare.

Benefits and membership

- Benefit eligibility: Pension recipients are eligible for subsidized coverage.
- Benefits provided for Medicare-eligible retirees: Covered by a Medicare-Advantage plan.
- Active employees: 236,660
- Beneficiaries: 192,435
- Most recent actuarial valuation: 9/30/11

THE STATE OF NEW JERSEY

The plans:
New Jersey has three large state-administered pension systems, three smaller state-administered systems, and some locally-administered systems. The state also maintains one retiree health plan. This analysis focuses primarily on the three large state-administered systems – the New Jersey Public Employees' Retirement System (PERS), the New Jersey Teachers' Pension and Annuity Fund (TPAF), and the New Jersey Police and Firemen's Retirement System (PFRS) – which make up the vast majority of the active public pension membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize the unfunded liabilities increased for all New Jersey plans. For PERS and TPAF, amortization payments increased from 4 to 8 percent, and from 8 to 12 percent of payroll, respectively. For PFRS, costs jumped from 10 to 16 percent of payroll. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 5.6 percent to 8.5 percent.

The impact of pension plan reforms:
In the wake of the financial crisis, New Jersey made substantial changes to various aspects of its plans in order to reduce employer costs, limit employee benefits, and shore up funding. To mitigate the employer costs, employee contributions were increased, and the New Jersey legislature provided additional short-term relief to the employer by allowing for underpayment of the annual required contribution (ARC) until 2016. The benefit cut with the greatest impact on costs was removal of the cost-of-living adjustment (COLA) for all active employees, retirees, and new hires. In addition to eliminating the COLA, all three systems tightened the retirement eligibility and lengthened the average salary period for new hires. Reduced benefits and increased employee contributions caused the employer's projected contributions to the normal cost to decline substantially for all three large systems. PERS' contribution will decline from 6 percent today to 1 percent of payroll by 2046. TPAF will decline from 8 percent today to 2 percent of payroll by 2046, and PFRS will fall from 19 percent to 10 percent of pay.

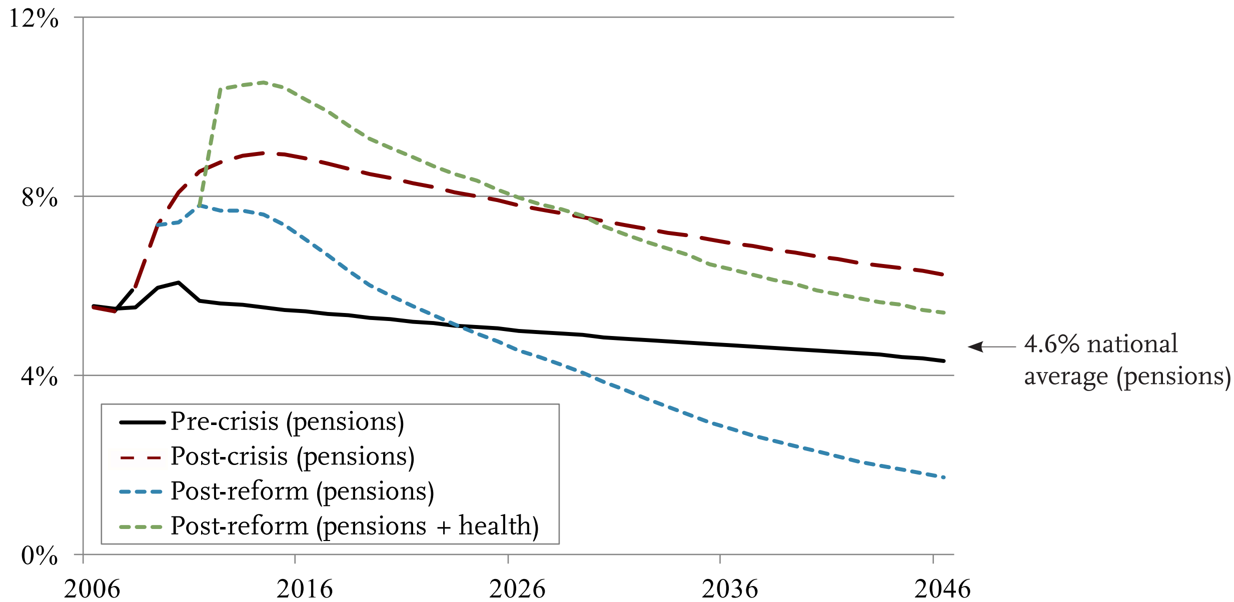
The systems also introduced measures to pay down their unfunded liabilities sooner. They implemented a declining amortization period that is 30 years initially and decreases gradually to 20 years by 2021. In addition to this shorter amortization period, the systems shifted from a level-percent-of-payroll amortization method to a level-dollar method, which will hasten the decrease in the unfunded liabilities by requiring greater amortization payments up front. If the systems adhere to the new funding schedule and assumed returns materialize, the share of state and local budgets devoted to pensions is projected to drop from 8.5 percent during the crisis to 1.8 percent in 2046, at which point all employees will be covered by the reduced benefits.

Total state costs:
New Jersey government also provides retiree health benefits, which amounted to about 1.7 percent of state and local budgets prior to the crisis, but are projected to grow to 3.7 percent by 2046. When retiree health and pension costs are combined, New Jersey's total retirement benefit costs as a percent of state and local budgets equaled 7.3 percent prior to the crisis, increased to 10.9 percent during the crisis, and are projected to drop to 5.5 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

NEW JERSEY: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all New Jersey state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

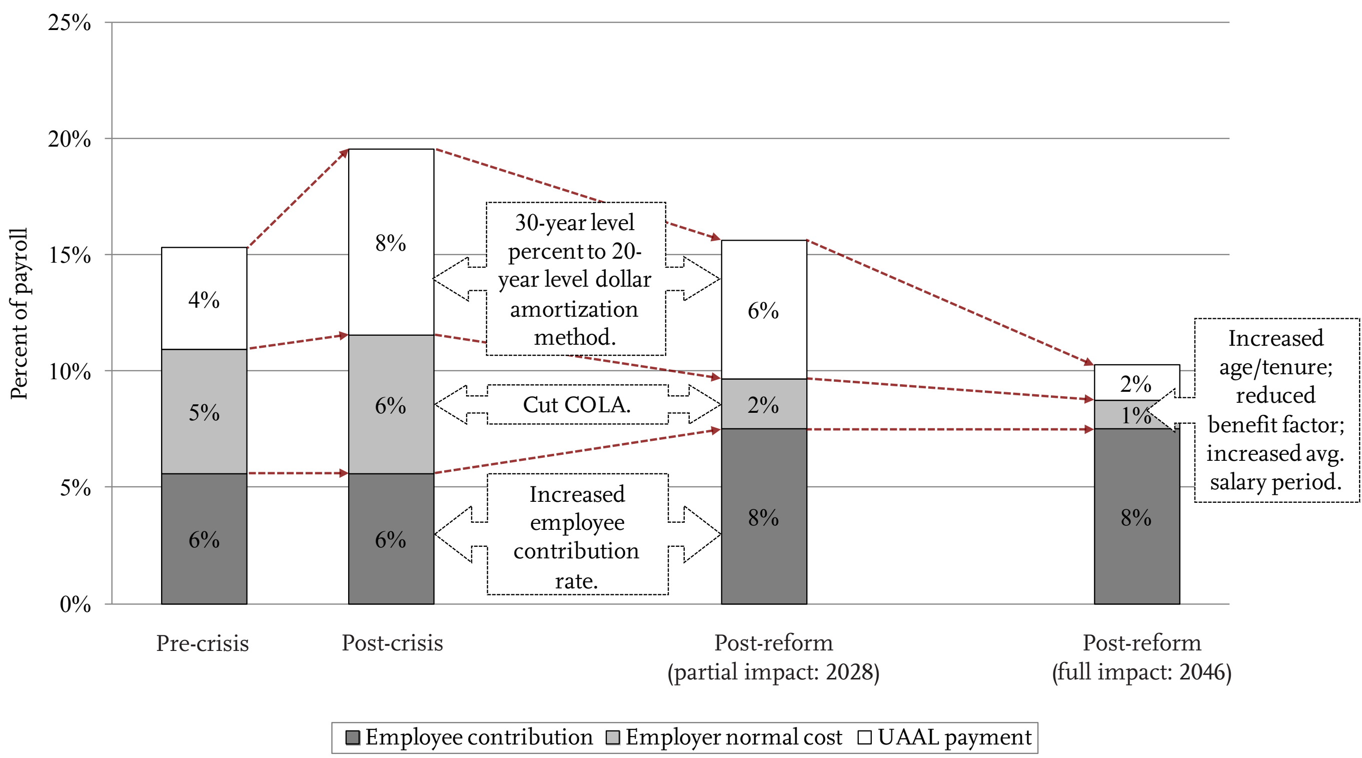
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	5.6 %	8.5 %	4.2 %	1.8 %
New Jersey PERS	1.7	2.8	1.3	0.5
New Jersey TPAS	2.2	3.5	1.7	0.6
New Jersey PFRS	1.6	2.2	1.2	0.7
Other pension plans[a]	0.1	0.0	0.0	0.0
Total retiree health	1.7	2.4	3.5	3.7
New Jersey SHBP	1.7	2.4	3.5	3.7
Total	7.3	10.9	7.7	5.5

[a] Includes a total of four small state-administered plans covering police, prison-workers, and judges, and locally-administered plans not participating in the state system.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

NEW JERSEY PUBLIC EMPLOYEES RETIREMENT SYSTEM (PERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☑ Actuarially determined

State excused from paying ARC in 2009, but must pay 1/7th of ARC in 2010, 2/7th in 2011, until full ARC is paid in 2017. Localities deferred paying 50 percent of ARCs in 2009 but now required to pay in full.

Plan design changes

- ☑ Cut COLA: all employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

Table 2. Pension Finances and Actuarial Assumptions

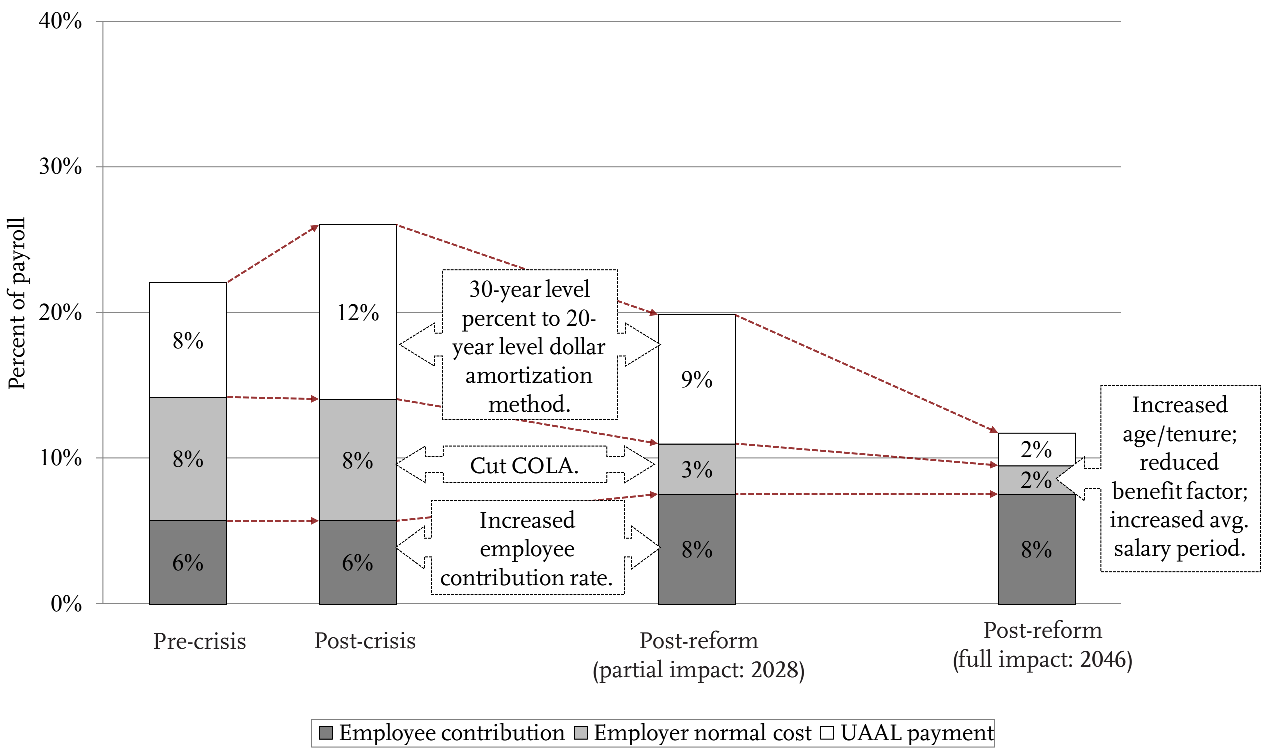
Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	76.0 %	64.8 %	–	–
Employer ARC rate	9.7	14.0	8.1	2.7
Percent of ARC paid	60.1	48.8	100	100
Assumptions				
Discount rate	8.25	8.25	8.25	8.25
Payroll growth	4.0	4.0	4.0	4.0
Amortization period	30 yrs.	30 yrs.	20 yrs.*	20 yrs.*

* Level dollar amortization.

Sources: Actuarial valuations and CRR calculations.

NEW JERSEY TEACHERS PENSION ANNUITY FUND (TPAS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☑ Actuarially determined

State excused from paying ARC in 2009, but must pay 1/7th of ARC in 2010, 2/7th in 2011, until full ARC is paid in 2017. Localities deferred paying 50 percent of ARCs in 2009 but now required to pay in full.

Plan design changes

- ☑ Cut COLA: all employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

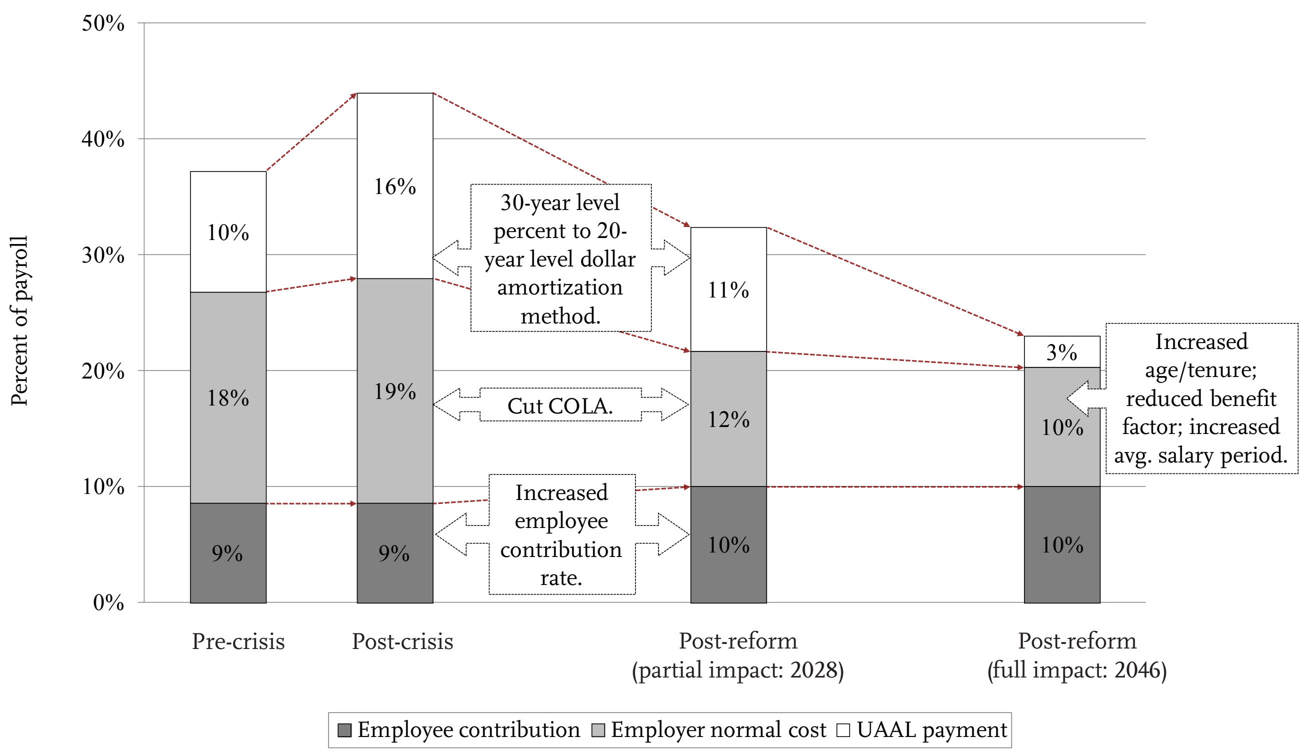
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	74.7 %	63.8 %	–	–
Employer ARC rate	16.3	20.1	12.3	4.2
Percent of ARC paid	49.1	6.0	100	100
Assumptions				
Discount rate	8.25	8.25	8.25	8.25
Payroll growth	4.0	4.0	4.0	4.0
Amortization period	30 yrs.	30 yrs.	20 yrs.*	20 yrs.*

* Level dollar amortization.
Sources: Actuarial valuations and CRR calculations.

NEW JERSEY POLICE AND FIREMEN'S RETIREMENT SYSTEM (PFRS)

Figure 4. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☑ Actuarially determined

State excused from paying ARC in 2009, but must pay 1/7th of ARC in 2010, 2/7th in 2011, until full ARC is paid in 2017. Localities deferred paying 50 percent of ARCs in 2009 but now required to pay in full.

Plan design changes

- ☑ Cut COLA: all employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

Table 3. Pension Finances and Actuarial Assumptions

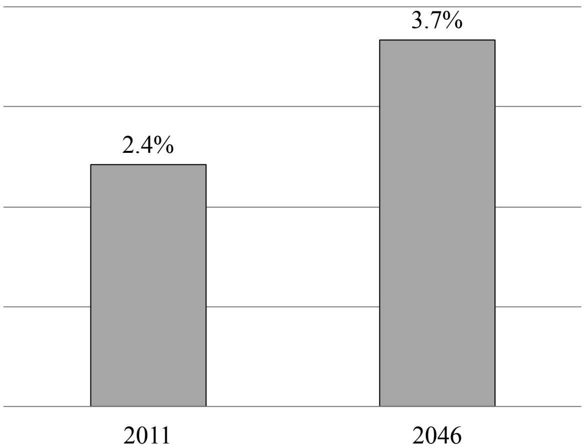
Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	77.6 %	70.1 %	–	–
Employer ARC rate	28.6	35.7	22.4	13.0
Percent of ARC paid	68.7	68.3	100	100
Assumptions				
Discount rate	8.25	8.25	8.25	8.25
Payroll growth	4.0	4.0	4.0	4.0
Amortization period	30 yrs.	30 yrs.	20 yrs.*	20 yrs.*

* Level dollar amortization.

Sources: Actuarial valuations and CRR calculations.

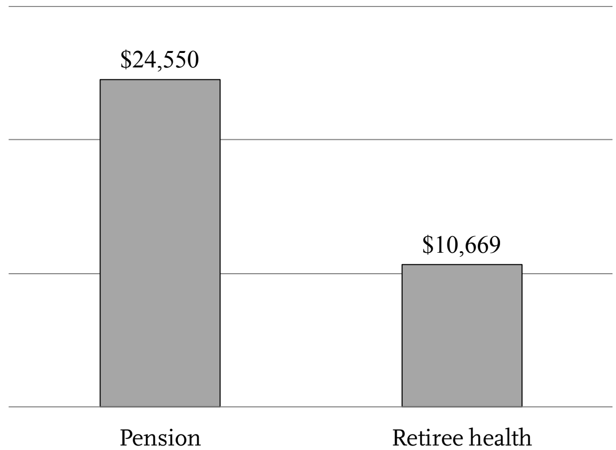
NEW JERSEY STATE HEALTH BENEFITS PROGRAM FOR RETIREES (SHPB)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 9 percent, drops to 5 percent by 2019.
- Employer contribution: Employer and federal government cover 98 percent of cost of benefits for state workers and 95 percent of cost of benefits for local workers.

Benefits and membership

- Benefit eligibility: Full-time state employees eligible for or covered by SHBP and part-time state employees and faculty enrolled in SHPB at time of retirement are eligible.
- Benefits for Medicare-eligible retirees: Enroll in the same health plan as active employees.
- Active employees: 410,806
- Beneficiaries: 83,352
- Most recent actuarial valuation: 8/9/11

THE STATE OF NEW MEXICO

The plans:
New Mexico has two large state-administered pension systems and three smaller state-administered systems. The state also maintains one retiree health plan. This analysis focuses primarily on the two large state-administered systems – the New Mexico Public Employees Retirement Association (PERA) and the New Mexico Educational Retirement Board System (ERB) – which make up 95 percent of active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the payments required to amortize unfunded liabilities increased for both PERA and ERB. For PERA, the payments jumped from 5 percent to 14 percent of payroll. Part of the reason for such a dramatic increase was the lowering of the discount rate from 8 percent to 7.75, as well as a drop in the payroll growth assumption. Over the crisis period, PERA continued to pay 100 percent of its annual required contribution (ARC). ERB experienced a much smaller jump, with amortization payments increasing from 8 percent to 10 percent of payroll. ERB also reduced its discount rate to 7.75 percent and only to paid 85 percent of its annual required contribution (ARC) over the crisis period. The reason for the smaller increase in amortization payments for ERB is that ERB is a less generous plan. From 2001 to 2011, ERB's liabilities grew at 6.6 percent annually, while PERA grew at 7.7 percent. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 2.3 percent to 3.1 percent.

The impact of pension plan reforms:
In response to the financial crisis, PERA and ERB made changes to benefits, contributions, and actuarial assumptions. In terms of benefits, the age and tenure requirements for normal retirement benefits were lengthened for new hires. These changes will have minimal impact on costs and will not be fully felt for many years. In order to provide employers more immediate relief from increased costs, employee contributions for both systems were temporarily increased, but are due to return to pre-crisis levels in 2014. Actuarial assumptions play an important role in the projected costs for PERA and ERB. Both systems lowered their disocunt rate from 8 percent to 7.75 percent in 2011. PERA also lowered its assumption for future salary growth. For PERA, the reduction in new hire benefits and lower assumption for future salary levels reduces costs despite the lower discount rate. The projected employers' contribution to the normal cost drops from 10 percent today (once employee contributions return to pre-crisis levels) down to 9 percent of payroll by 2046. For ERB, the employer's contribution to the normal costs remain constant at 4 percent or payroll, as the impact of new hire benefit cuts alone is offset by the lower discount rate.

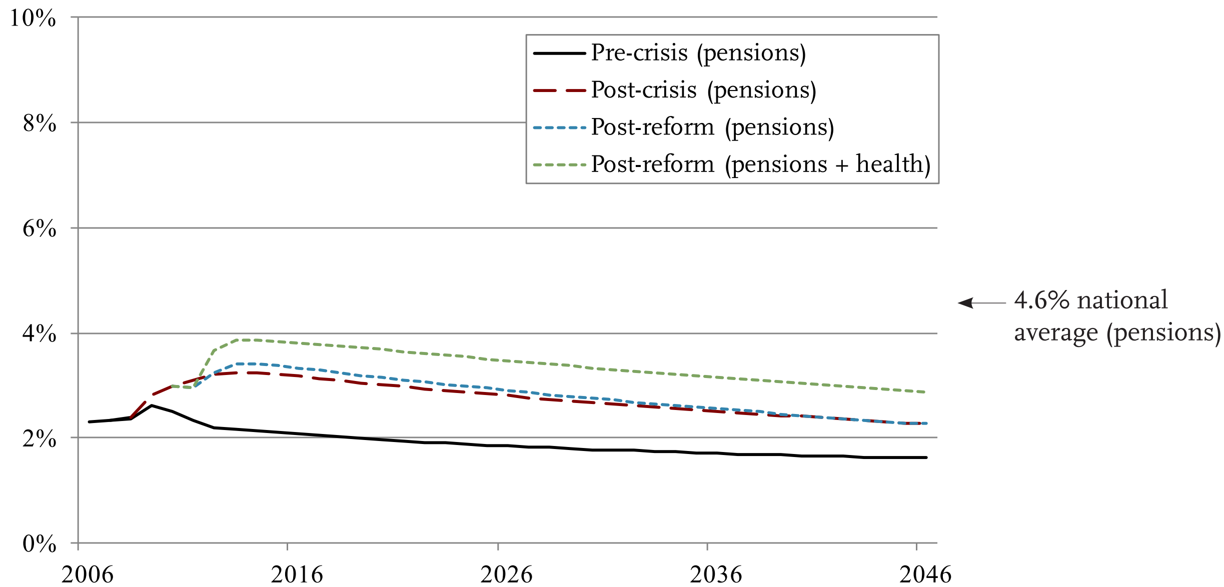
If both systems continue to pay the full ARC and assumed returns are realized, the payments required to amortize the unfunded liability will decline. Taking into account both the plan design changes and paying down the unfunded liabilities, the share of state and local budgets devoted to pension costs is projected to drop from 3.1 today to 2.3 percent by 2046.

Total state costs:
New Mexico also provides retiree health benefits, which amounted to about 0.4 percent of state and local budgets prior to the crisis, but are projected to grow to 0.6 percent by 2046. When retiree health and pension costs are combined, New Mexico's total retirement benefit costs as a percent of state and local budgets equaled 2.7 percent prior to the crisis, increased to 3.5 percent during the crisis, and are projected to drop to 2.9 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

NEW MEXICO: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all New Mexico state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

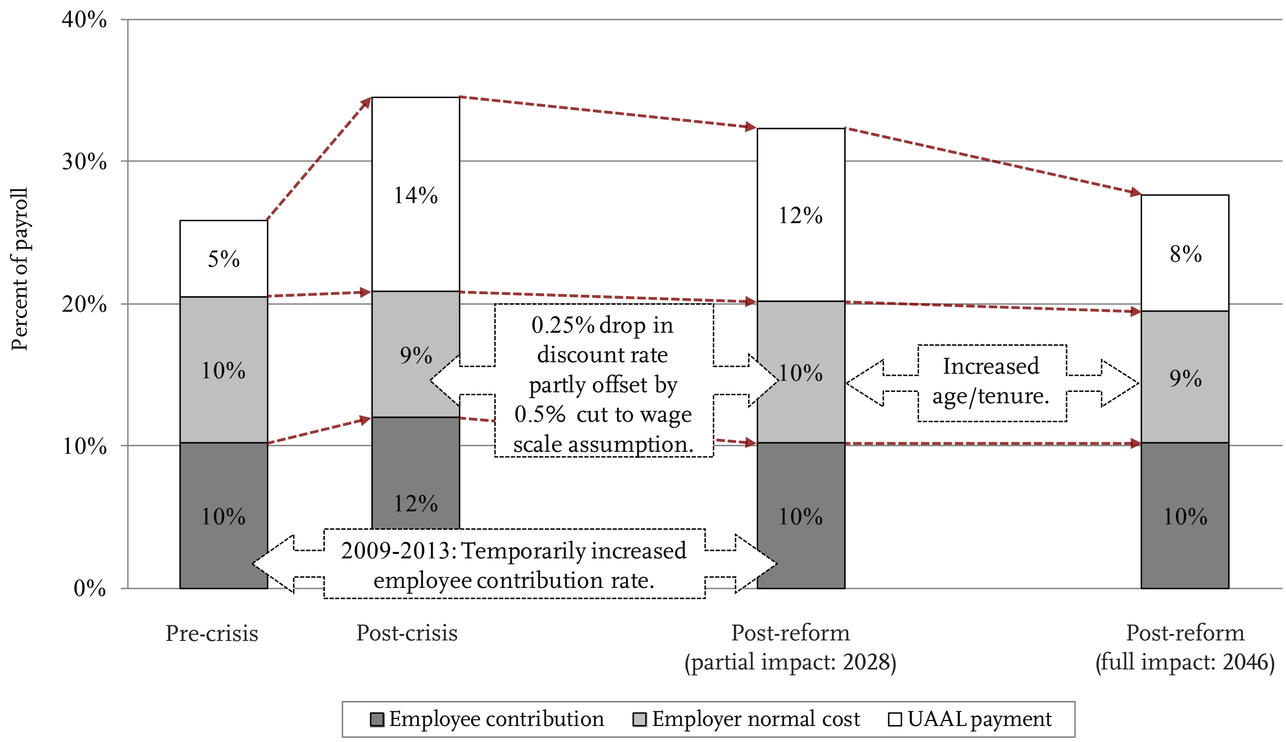
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	2.3 %	3.1%	2.8%	2.3 %
New Mexico PERA	1.1	1.6	1.5	1.2
New Mexico ERB	1.2	1.5	1.3	1.1
Other pension plans[a]	0.0	0.0	0.0	0.0
Total retiree health	0.4	0.4	0.6	0.6
New Mexico retiree health	0.4	0.4	0.6	0.6
Total	2.7	3.5	3.4	2.9

[a] Includes three small state-administered plans to cover judges, magistrates, and firefighters.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

NEW MEXICO PUBLIC EMPLOYEES RETIREMENT ASSOCIATION (PERA)

FIGURE 2. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Pre-crisis, contributions averaged 100 percent of GASB-required ARC. Post-crisis, the rate has averaged 98 percent.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

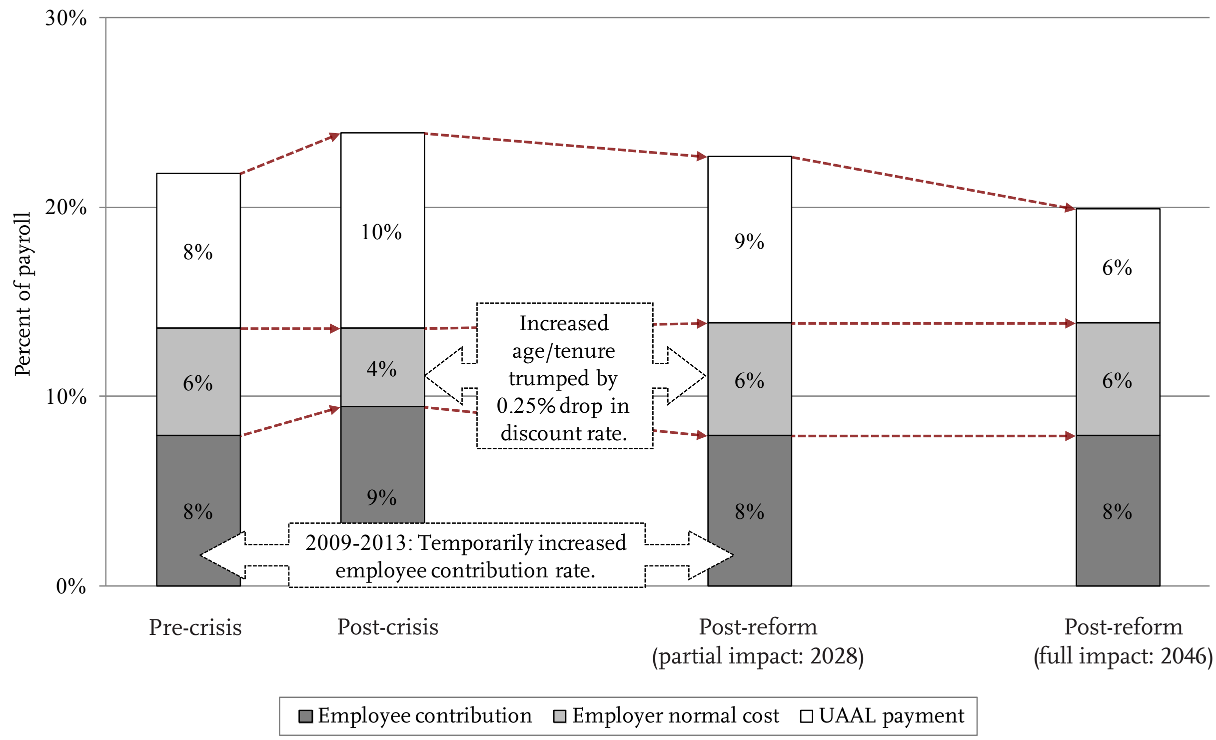
TABLE 2. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	93.3 %	70.5 %	–	–
Employer ARC rate	15.7	22.5	22.1	17.5
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	8.00	7.75	7.75	7.75
Payroll growth	4.5	4.0	4.0	4.0
Amortization period	13 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuation; and CRR calculations.

NEW MEXICO EDUCATIONAL RETIREMENT BOARD (ERB)

FIGURE 3. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Pre-crisis, contributions averaged 87 percent of GASB-required ARC. Post-crisis, the rate averaged 85 percent, even with employees contributing greater percent of pay.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

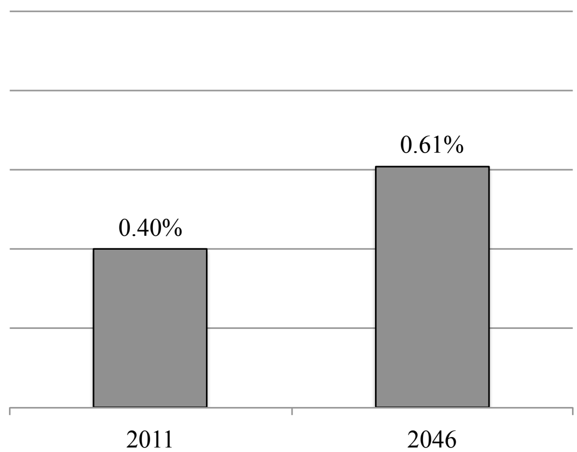
TABLE 3. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	71.5 %	63.0 %	–	–
Employer ARC rate	13.5	14.5	14.7	12.0
Percent of ARC paid	79.0	81.6	100	100
Assumptions				
Discount rate	8.00	7.75	7.75	7.75
Payroll growth	3.75	3.75	3.75	3.75
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations; and CRR calculations.

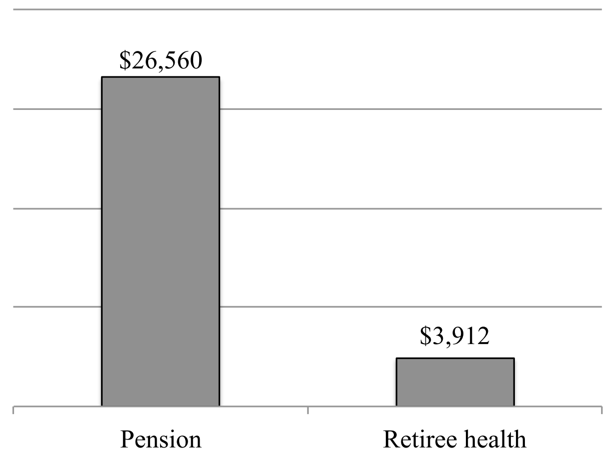
NEW MEXICO RETIREE HEALTH CARE AUTHORITY (NMRHCA)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 8 percent, drops to 5 percent by 2025.
- Employer contribution: Automatically contributes 1.7 percent of pay, and active employees contribute 0.8 percent to fund employer subsidy of retiree premiums. The NMRHCA subsidizes 6.25 percent of the premium for each year of service earned by the retiree, beginning with 6.25 percent for 5 years of service to full subsidization for 20 years of service.

Benefits and membership

- Benefit eligibility: Retirees who were employees of either the PERA group or a participating ERB employer and are eligible to receive a pension.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 95,513
- Beneficiaries: 39,792
- Most recent actuarial valuation: 6/30/10

THE STATE OF NEW YORK

The plans:

New York has three large state-administered pension systems, and some locally-administered systems. The state also maintains one retiree health plan. This analysis focuses primarily on the three large state-administered systems – the New York State and Local Employees Retirement System (ERS), The New York State Teachers Retirement System (NYSTRS), and The New York State and Local Police and Firemen Retirement System (PFRS) – which make up about 70 percent of public pension active membership in the state.

The impact of the crisis:

Unlike most public sector retirement systems, the three large state-administered retirement systems in New York use an aggregate cost actuarial accounting method. This method does not separately account for normal cost contributions and unfunded liability amortization payments. Instead, it generates a single contribution rate that is necessary to ensure that benefits are fully funded over the average career of the members of the system. This rate is called the aggregate normal cost. As a result of the economic crisis, the employer's contribution to the aggregate normal cost increased for all three systems. For ERS, the cost jumped from 7 percent to 18 percent of payroll. For NYSTRS, it went from 7 percent to 13 percent of payroll. Finally, for PFRS, costs went from 14 percent to 25 percent of payroll. Importantly, all three systems remained responsible funders over the crisis period, continuing to fund 100 percent of the annual required contribution (ARC). For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 5.0 percent to 8.3 percent.

The impact of pension plan reforms:

In response to the financial crisis, substantial cuts were made to benefits for new hires. All three systems increased the age and tenure required to received normal retirement benefits, increased the salary averaging period and, most importantly, reduced the benefit factor. In addition to the benefit cuts, all three systems also increased employee contributions. The benefit cuts, in conjunction with increased employee contributions, substantially decreased the projected employer's contribution to the aggregate normal cost for all three systems. ERS employer costs are projected to drop from 18 percent today to 2 percent of payroll by 2046. For NYSTRS, the employer's contribution will decline from 13 percent today to 1 percent of payroll by 2046. And for PFRS, employer costs will fall from 25 percent to 7 percent of pay. The decline in the aggregate normal costs depends heavily on the continued full payment of the ARC and on assumed returns materializing. If those two conditions are met, the aggregate normal cost payments will decline and the share of state and local budgets devoted to pensions is projected to drop from 3.2 today to 2.5 percent by 2046.

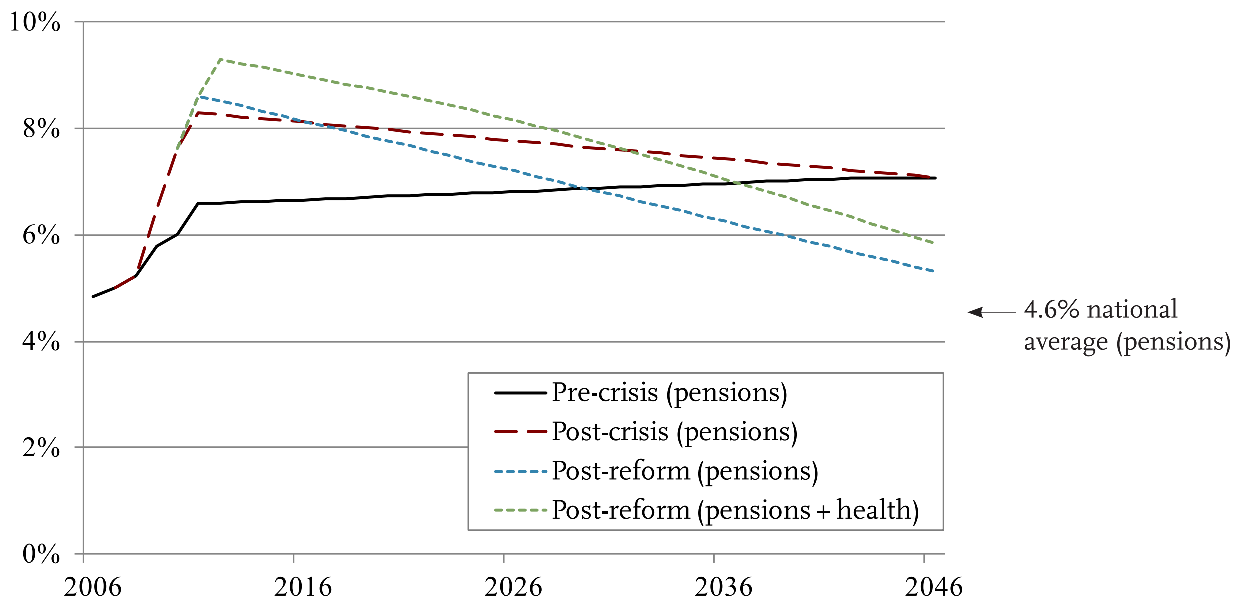
Total state costs:

New York state government also provides retiree health benefits, which amounted to about .7 percent of state and local budgets prior to the crisis, but are projected to reamin steady at .5 percent by 2046. When retiree health and pension costs are combined, New York's total retirement benefit costs as a percent of state and local budgets equaled 5.7 percent prior to the crisis, increased to 9.0 percent during the crisis, and are projected to drop to 5.8 percent in 2046, when pension reforms will be in force for all employees.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

NEW YORK: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all New York state/local governments. Retiree health costs assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

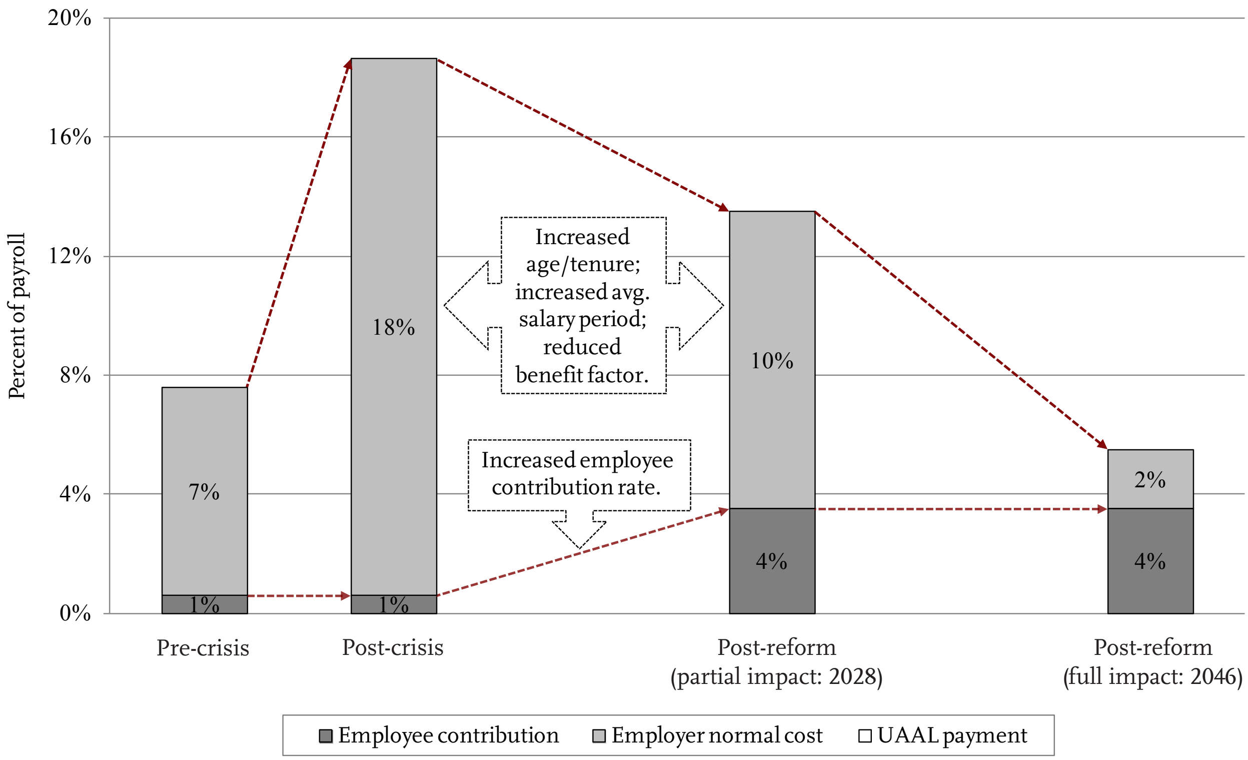
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	5.0 %	8.3 %	7.0 %	5.3 %
New York State and Local ERS	1.0	2.1	1.3	0.3
New York STRS	0.7	1.0	0.6	0.1
New York State and Local PFRS	0.2	0.4	0.3	0.1
Other pension plans[a]	3.1	4.8	4.8	4.8
Total retiree health	0.7	0.7	0.9	0.5
New York SHIP	0.7	0.7	0.9	0.5
Total	5.7	9.0	7.9	5.8

[a] Includes all the locally administered plans within the state of New York.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

NEW YORK STATE AND LOCAL EMPLOYEES RETIREMENT SYSTEM (ERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Has always paid 100 percent of its ARC. The system uses an aggregate cost method that does not separate the ARC into normal cost and UAAL amortization payment.

Plan design changes

- ☐ Cut COLA
- ☑ Increased employee contribution: new hires only
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

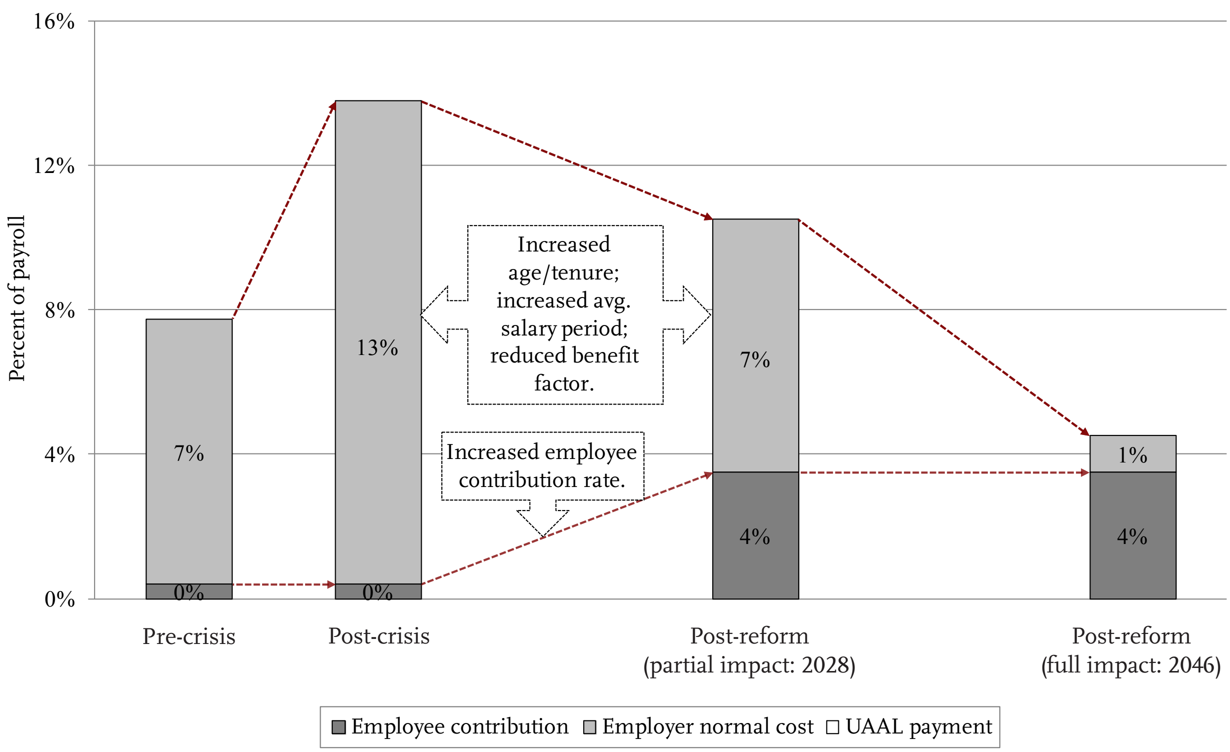
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	107.3 %	90.2 %	–	–
Employer ARC rate	7.0	18.0	10.3	2.2
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	8.0	7.5	7.5	7.5
Payroll growth	5.4	4.8	4.8	4.9
Amortization period	–	–	–	–

Sources: Actuarial valuations and CRR calculations.

NEW YORK STATE TEACHERS RETIREMENT SYSTEM (NYSTRS)

FIGURE 3. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Has always paid 100 percent of its ARC. The system uses an aggregate cost method that does not separate the ARC into normal cost and UAAL amortization payment.

Plan design changes

- ☐ Cut COLA
- ☑ Increased employee contribution: new hires only
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

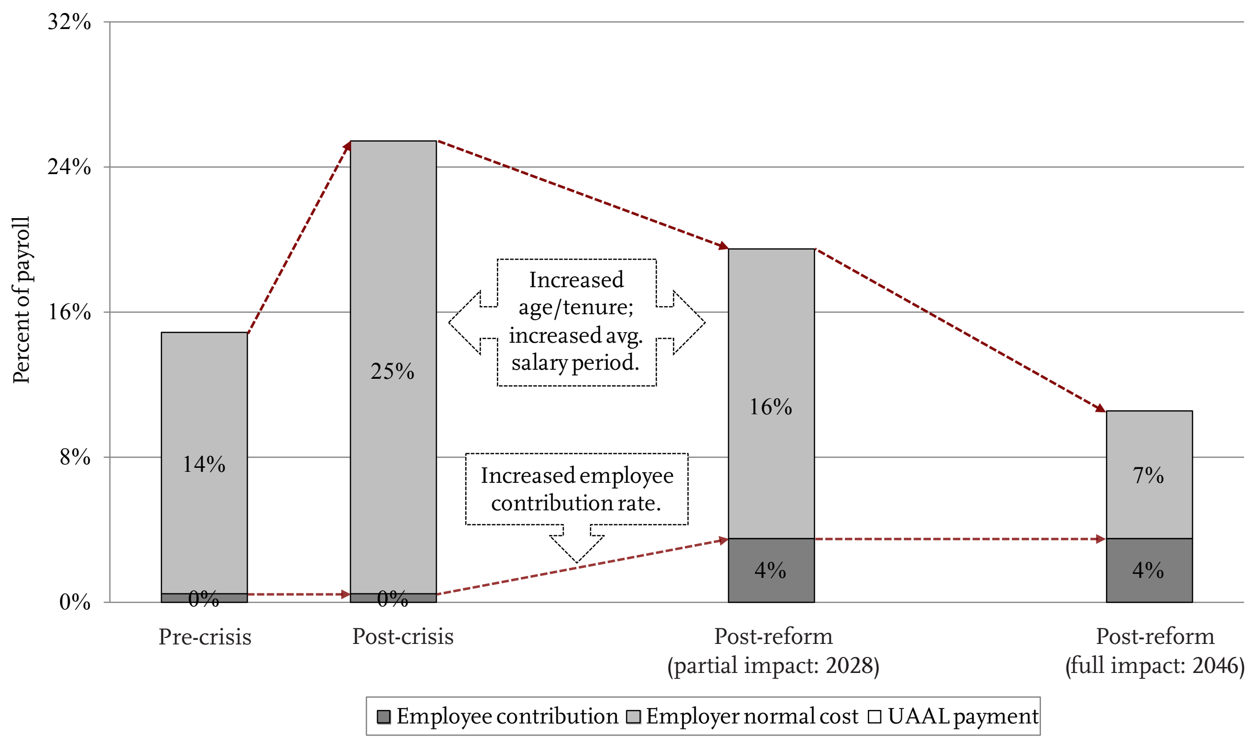
TABLE 3. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	106.6 %	96.7 %	–	–
Employer ARC rate	7.4	13.4	7.4	1.1
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	6.5	5.6	5.6	5.6
Amortization period	–	–	–	–

Sources: Actuarial valuations and CRR calculations.

NEW YORK STATE AND LOCAL POLICE AND FIRE RETIREMENT SYSTEM (PFRS)

FIGURE 4. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Has always paid 100 percent of its ARC. The system uses an aggregate cost method that does not separate the ARC into normal cost and UAAL amortization payment.

Plan design changes

- ☐ Cut COLA
- ☑ Increased employee contribution: new hires only
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☐ Reduced benefit factor
- ☐ None

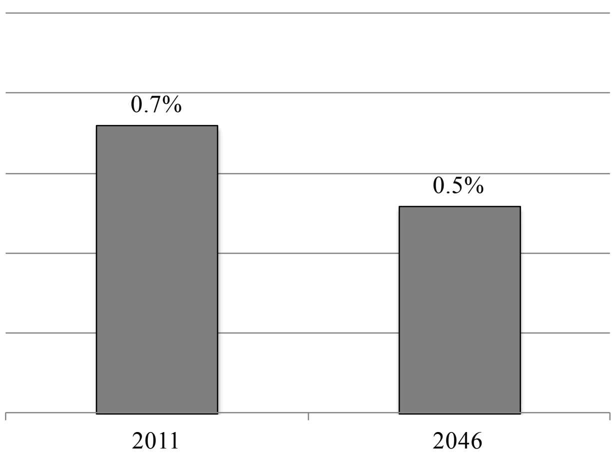
TABLE 4. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	108.0 %	91.9 %	–	–
Employer ARC rate	14.5	25.1	16.3	7.0
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	8.0	7.5	7.5	7.5
Payroll growth	6.7	5.4	5.4	5.4
Amortization period	–	–	–	–

Sources: Actuarial valuations and CRR calculations.

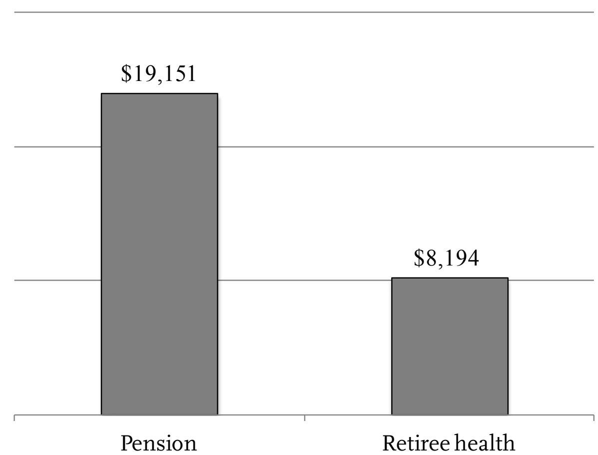
NEW YORK STATE HEALTH INSURANCE PROGRAM (NYSHIP)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 10 percent, drops to 5 percent by 2015.
- Employer contribution: Varying percentages of premium, depending upon retiree's date of retirement. The most common arrangement is for employers to pay 90 percent of cost of single coverage and 25 percent of dependent coverage.

Benefits and membership

- Benefit eligibility: Must have at least 10 years of service, be receiving pension benefits, and have been enrolled in NYSHIP when they retired.
- Benefits provided for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 200,225
- Beneficiaries: 130,457
- Most recent actuarial valuation: 4/1/08

THE STATE OF NORTH CAROLINA

The plans:
North Carolina has two large state-administered pension systems, three smaller state-administered systems, and many locally-administered systems. The state also maintains one retiree health plan for state employees. This analysis focuses primarily on the largest state-administered system – the North Carolina Retirement Teachers' and State Employees' Retirement System (TSERS) – which makes up just over 65 percent of active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize the unfunded liabilities increased from 0 percent to 4 percent of payroll for TSERS. However, the system remained a responsible funder over much of the crisis period, continuing to fund 100 percent or more of the annual required contribution (ARC) except for in 2011 when the system paid only 73 percent of the ARC. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 2.9 percent to 4.2 percent.

The impact of pension plan reforms:
In the wake of the crisis, TSERS introduced a minor reduction to new-hire benefits by increasing the tenure required to qualify for normal retirement benefits from five to ten years of service. This change had a neglible impact on the system's normal cost.

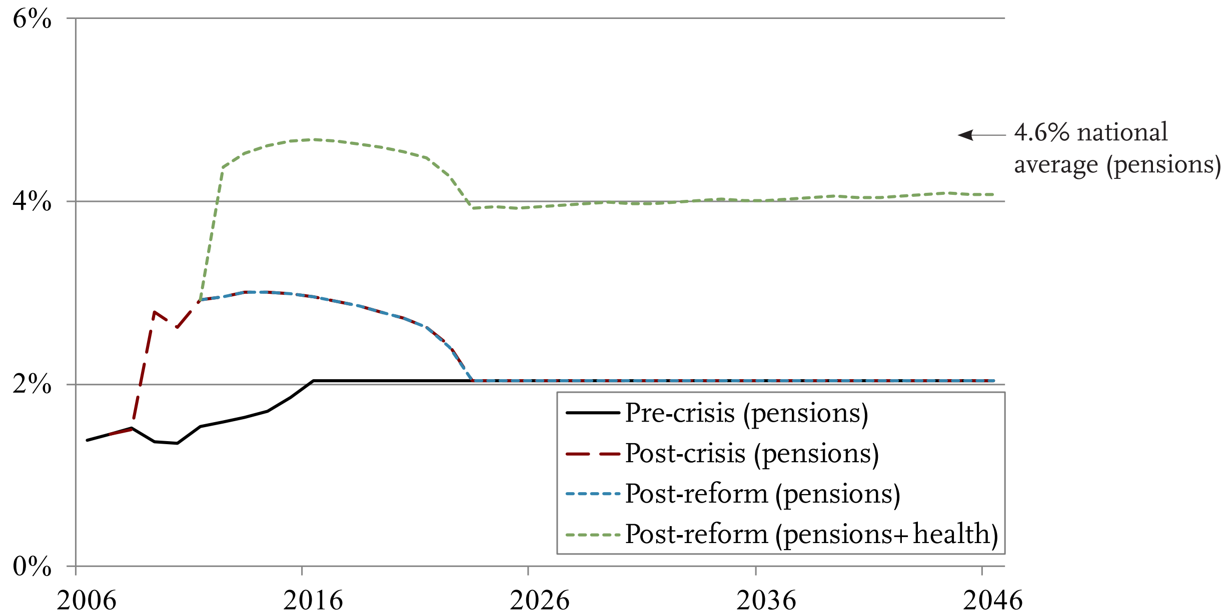
Because TSERS's benefit changes are projected to have almost no impact on pension costs, any decline in future costs is likely to stem from paying down the system's unfunded liabilities. If the system continues to pay the full ARC – as it has historically done – and assumed returns materialize, the share of state and local budgets devoted to pensions is projected to drop from 2.9 percent today to 2.1 percent by 2046. A key element in the projected pension costs for TSERS will be its ability to stick to the funding schedule. Currently, the system has in place a target date for full funding of 2023.

Total state costs:
North Carolina state government also provides retiree health benefits, which amounted to 1.5 percent of state and local budgets prior to the crisis and are projected to grow to 2.1 percent by 2046. When retiree health and pension costs are combined, North Carolina's total retirement benefit costs as a percent of state and local budgets equaled 2.9 percent prior to the crisis, increased to 4.2 percent during the crisis, and are projected to remain at 4.2 percent into 2046 as the long-term decline in pension costs offsets increases in health costs.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

NORTH CAROLINA: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all North Carolina state/local governments. Retiree health costs are assumed pay-as-you-go.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	1.4%	2.9%	2.1%	2.1%
North Carolina TSERS	0.8	2.1	1.3	1.3
Other pension plans[a]	0.6	0.8	0.8	0.8
Total retiree health	1.5	1.3	1.9	2.1
North Carolina State retiree health	1.5	1.3	1.9	2.1
Total	2.9	4.2	4.0	4.2

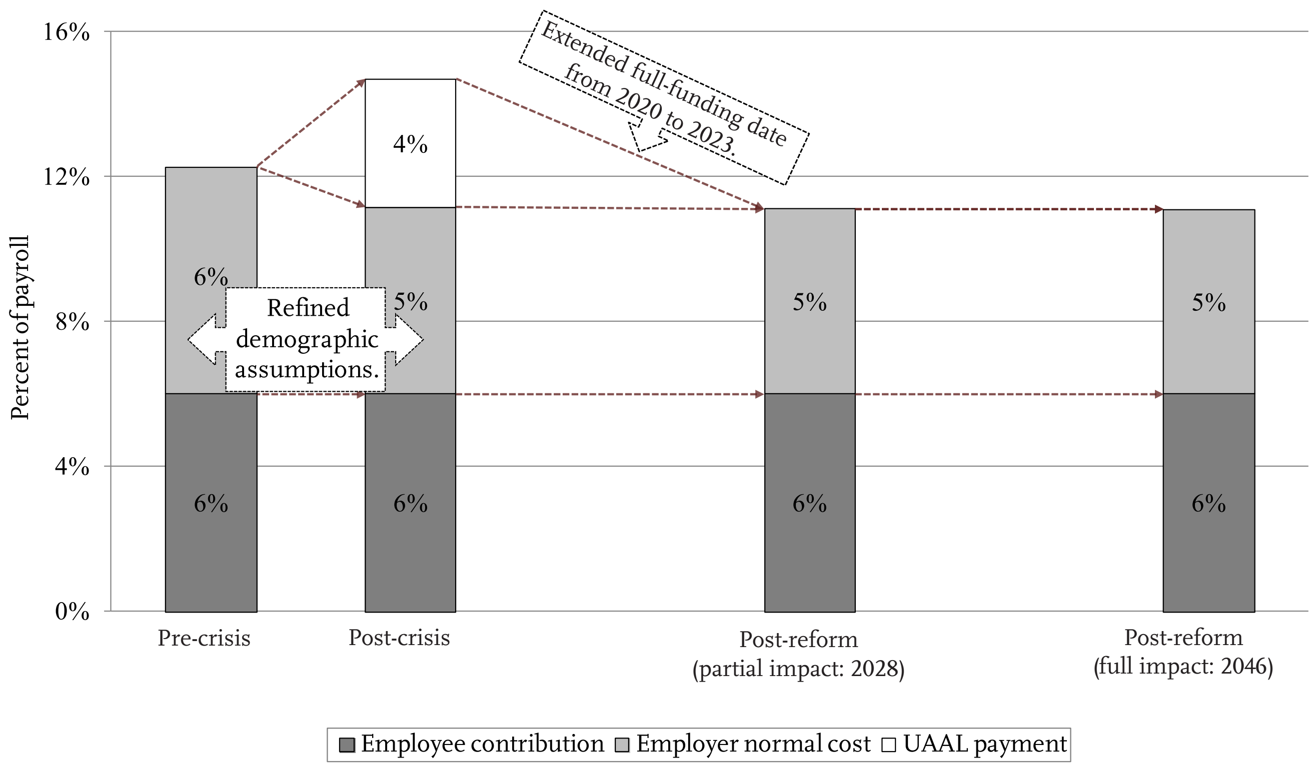
[a] Includes a state-administered municipal retirement system – the North Carolina Local Government Employee Retirement System – three small state-administered plans for legislators, judges, and the national guard, as well as all the locally-administered pension plans within the state of North Carolina.

Note: Since a detailed analysis was undertaken only for TSERS, when projecting total state pension burden the costs of North Carolina LGERS and other plans were assumed to remain a constant percent of state and local budgets in all three scenarios.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

NORTH CAROLINA TEACHERS AND STATE EMPLOYEES RETIREMENT SYSTEM (TSERS)

FIGURE 2. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Pre-crisis, the system averaged 100 percent of the GASB-required ARC. Post-crisis, the rate has been 100 percent or higher, except for 2011 when it dropped to 73 percent.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

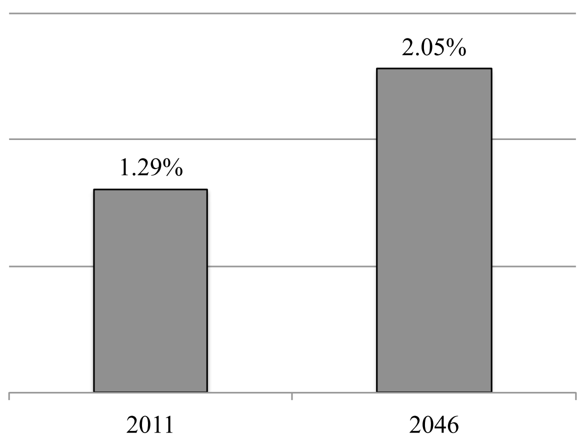
TABLE 2. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	104.7 %	94.0 %	–	–
Employer ARC rate*	3.4	7.7	5.1	5.1
Percent of ARC paid	100.0	73.0	100	100
Assumptions				
Discount rate	7.25	7.25	7.25	7.25
Payroll growth	4.50	4.25	4.25	4.25
Amortization period	9 yrs.	12 yrs.	12 yrs.	12 yrs.

* The reported employer ARC rate for a given year is that provided in that year's actuarial valuation. For TSERS, the rate is applied to payroll two years after the valuation is performed.
Sources: Actuarial valuations and CRR calculations.

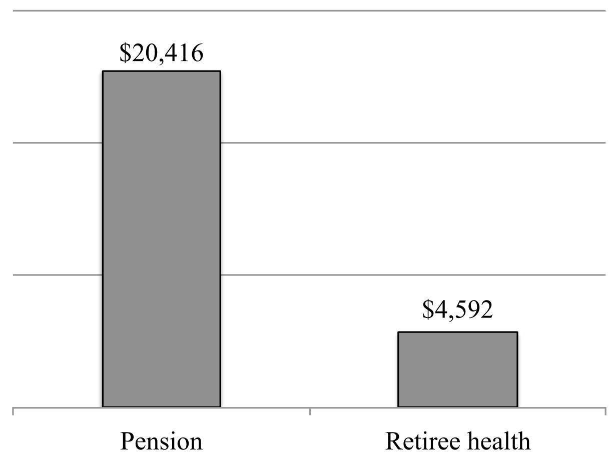
NORTH CAROLINA STATE HEALTH PLAN

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances.*

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 8 percent, drops to 5 percent by 2020.
- Employer contribution: Depending on the health plan, retirees may be required to pay a premium. In no case is the retiree premium more than the premium for active employees.

Benefits and membership

- Benefit eligibility: Hired after October 1, 2006 - 20 years of service credit. All others - 5 years of service credit.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 341,500
- Beneficiaries: 179,120
- Most recent actuarial valuation: 12/31/11

THE STATE OF OHIO

The plans:
Ohio has four large state-administered pension systems, two smaller state-administered systems, and some locally-administered systems. The state also maintains four retiree health plans. This analysis focuses primarily on the four large state-administered systems – the Ohio Public Employees Retirement System (PERS), the State Teachers Retirement System of Ohio (STRS), the School Employees Retirement System of Ohio (SERS), and the Ohio Police and Fire Pension Fund (P&F) – which make up nearly all active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize the unfunded liabilities increased dramatically for all Ohio plans. For PERS and SERS, which fully paid their annual required contribution (ARC) throughout the crisis and subsequent economic downturn, the required payment increased by 6 percent of payroll. For STRS and P&F, which were less consistent funders during the crisis, amortization payments increased much more. STRS was hit hardest, with its unfunded liability payment going from 8 percent to 21 percent of payroll. P&F's amortization payment to jumped from 8 percent to 19 percent of payroll. The increase in costs was dampened by refined demographic assumptions, which lowered the total liability. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 4.0 percent to 7.7 percent.

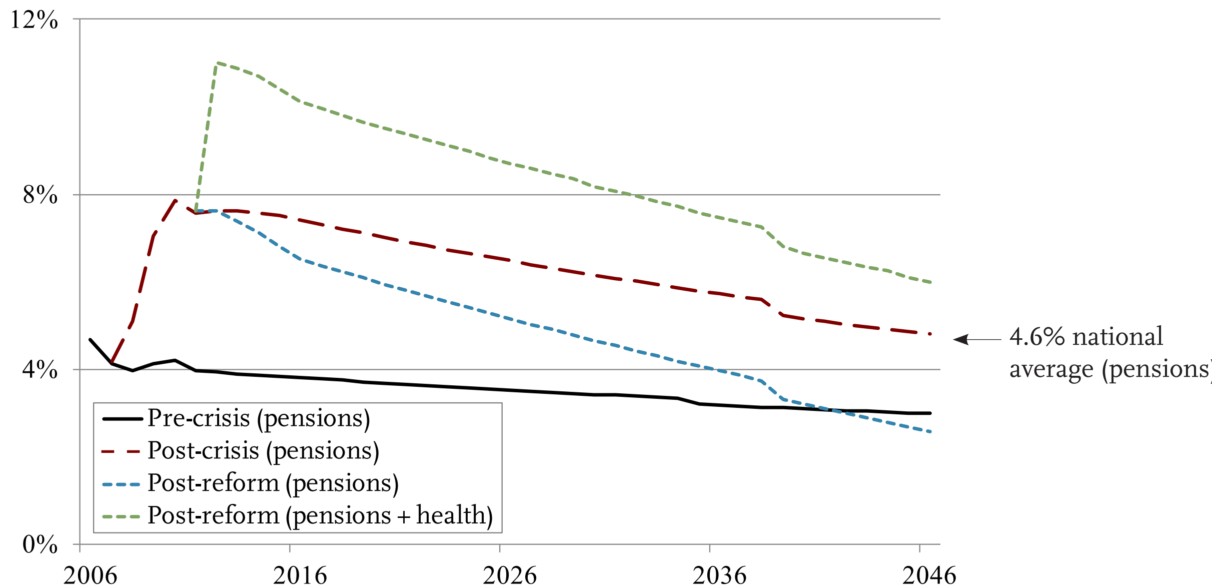
The impact of pension plan reforms:
In response to the financial crisis, Ohio enacted substantial plan design changes. First, all systems, except SERS, increased the employees' contributions. Second, all four systems reduced their benefits. PERS and STRS were the most aggressive, tightening retirement eligibility requirements, lengthening the average salary period, reducing the benefit factor, and decreasing the cost-of-living adjustment for both current employees and new hires. P&F's less aggressive reforms lengthened the average salary period and decreased the cost-of-living adjustment for current employees and new hires, but tightened retirement eligibility requirements for new hires only. SERS put in place only one form of benefit reduction, tightening retirement eligibility requirements for current employees and new hires. Across the four systems, these changes will reduce the employers' portion of the normal cost by about 3 percentage points, to 4 percent of payroll by 2046. If each system pays its full GASB ARC – something that STRS and P&F historically have not done – and assumed returns materialize, the amortization payments will also decline. Taking into account both the benefit changes and paying down the unfunded liabilities, the share of state and local budgets devoted to pensions is projected to drop from 7.7 percent today to 2.5 percent by 2046.

Total state costs:
Ohio state government also provides retiree health benefits, which amounted to about 2.6 percent of state and local budgets prior to the crisis, and are projected to grow to 3.5 percent by 2046. When retiree health and pension costs are combined, Ohio's total retirement benefit costs as a percent of state and local budgets equaled 6.6 percent prior to the crisis, increased to 10.9 percent during the crisis, and are projected to drop to 6.0 percent in 2046 after pension reforms are fully in place.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

OHIO: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Note: Budget = general own source revenues of all Ohio state/local governments. Retiree health costs assumed pay-as-you-go.

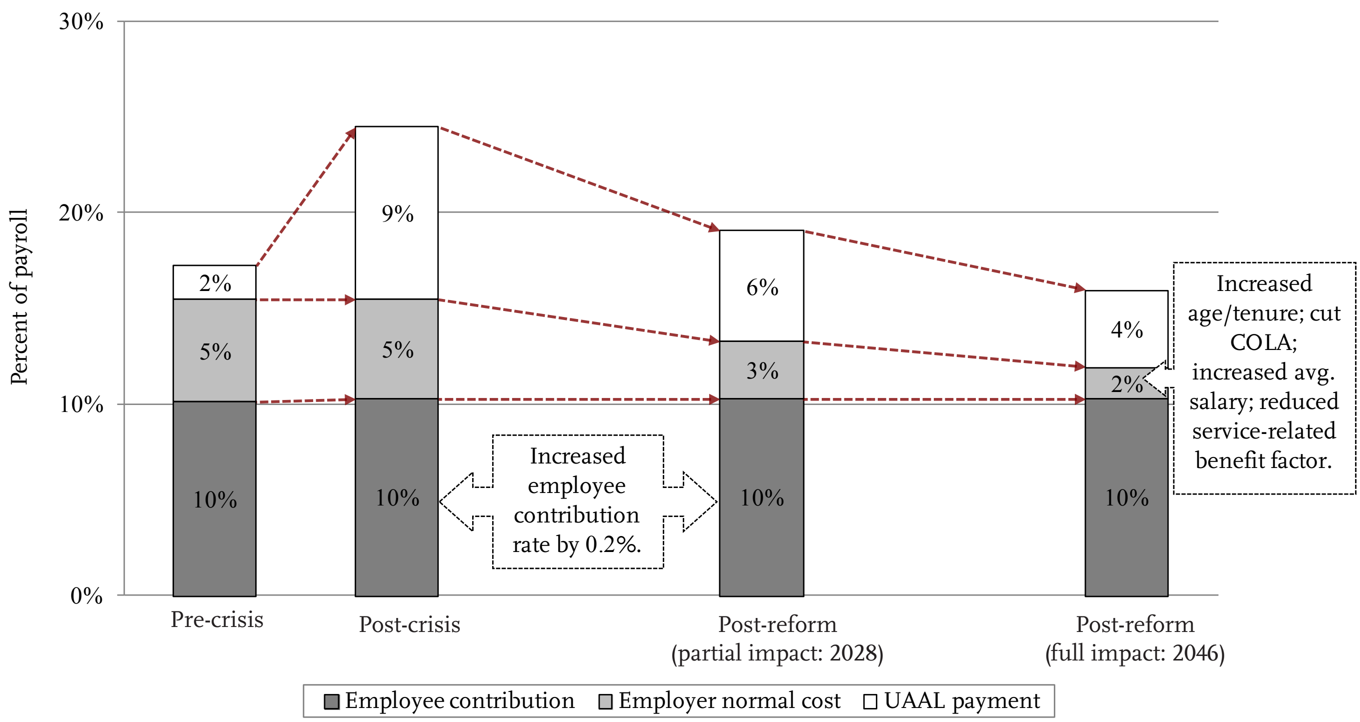
Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	4.0 %	7.9 %	5.0 %	2.5 %
Ohio PERS	1.3	2.6	1.7	1.0
Ohio STRS	1.8	4.0	2.2	1.1
Ohio P&F	0.6	0.9	0.6	0.3
Ohio SERS	0.2	0.3	0.4	0.0
Other pension plans[a]	0.1	0.1	0.1	0.1
Total retiree health	2.6	3.2	3.6	3.5
Ohio PERS retiree health	1.7	2.1	2.1	1.9
Ohio STRS retiree health	0.5	0.6	0.8	0.9
Ohio P&F retiree health	0.1	0.1	0.2	0.2
Ohio SERS retiree health	0.3	0.4	0.5	0.5
Total	6.6	11.1	8.6	6.0

[a] Includes the Ohio State Highway Patrol Retirement System and all the locally-administered plans within Ohio.
Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

OHIO PUBLIC EMPLOYEES RETIREMENT SYSTEM (PERS)

FIGURE 2. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Employer contributions have equaled or been greater than 100 percent of the ARC.

Plan design changes

- ☑ Cut COLA: all active employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: all employees
- ☑ Increased average salary period: all employees
- ☑ Reduced benefit factor: all employees
- ☐ None

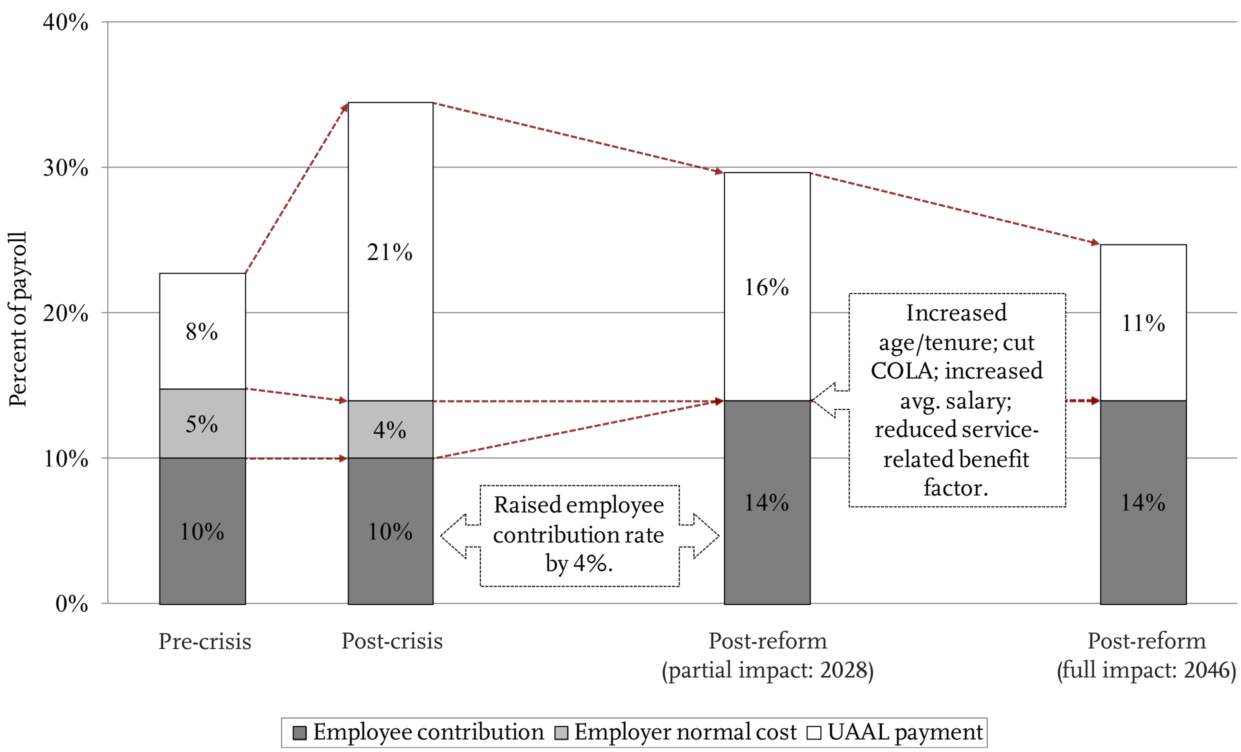
TABLE 2. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	96.3 %	77.4 %	–	–
Employer ARC rate	7.1	14.2	9.2	5.7
Percent of ARC paid	100.0	100.0	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	4.0	4.0	4.0	4.0
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

OHIO STATE TEACHERS RETIREMENT SYSTEM (STRS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Currently uses statutory rate well below GASB-required contribution: 51 percent of the GASB ARC in 2011. Under current statutory rate, system will never pay down unfunded liability.

Plan design changes

- ☑ Cut COLA: all employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: all employees
- ☑ Increased average salary period: all employees
- ☑ Reduced benefit factor: all employees
- ☐ None

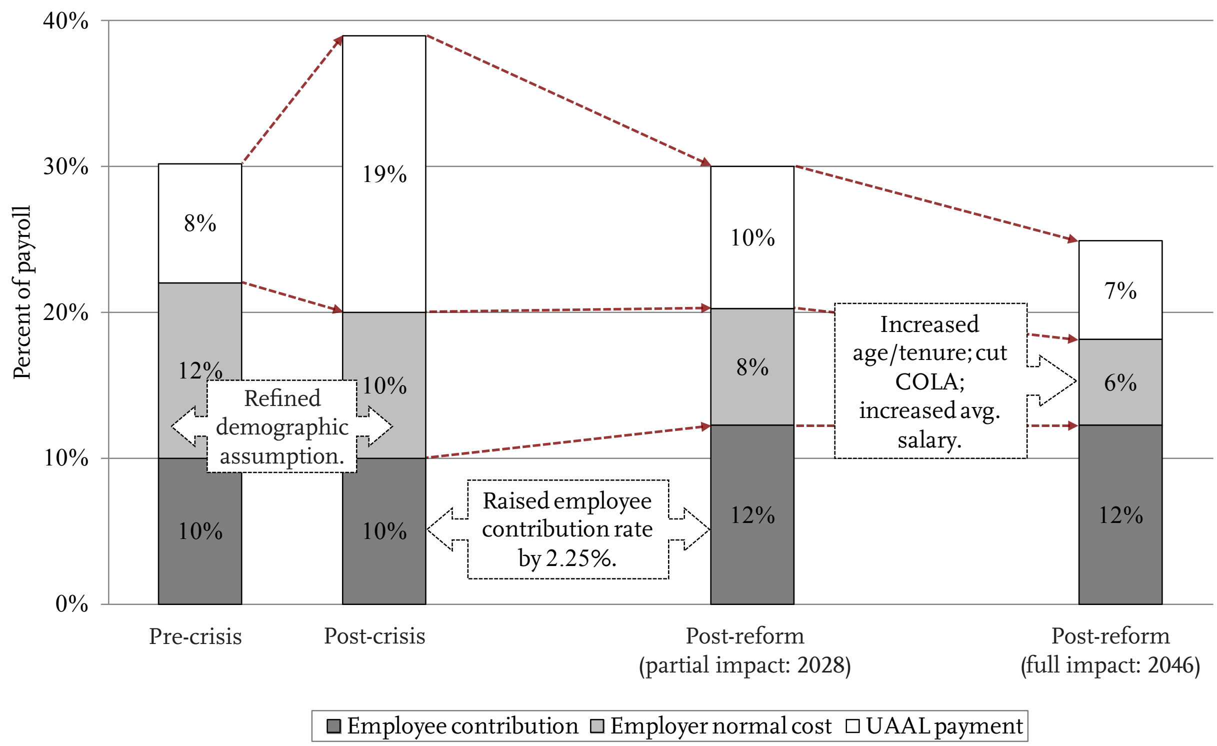
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	82.2 %	59.1 %	–	–
Employer ARC rate	12.7	24.5	13.6	6.6
Percent of ARC paid	83.0	52.0	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	3.5*	3.5**	3.5**	3.5**
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

* 3.5 percent for 11 years, then 4 percent.
** 3.5 percent for 7 years, then 4 percent.
Sources: Actuarial valuations and CRR calculations.

OHIO POLICE AND FIRE PENSION FUND (P&F)

Figure 4. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Statutory contribution rate equaled 77 percent of the GASB ARC in 2007 but fell to 62 percent of the GASB ARC in 2010. Unfunded liability will never be paid off at current statutory rate.

Plan design changes

- ☑ Cut COLA: all active employees
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: employees < 15 yrs. of service
- ☐ Reduced benefit factor
- ☐ None

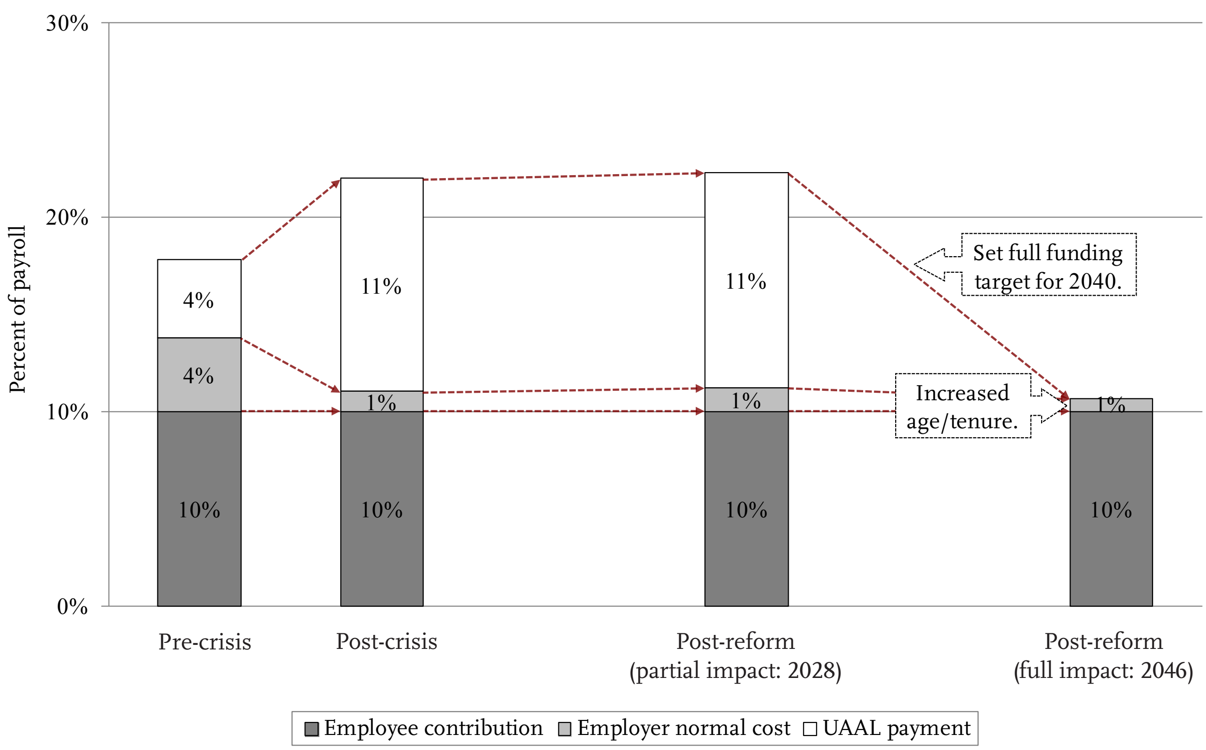
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	81.7 %	63.1 %	–	–
Employer ARC rate	20.2	28.7	17.8	12.7
Percent of ARC paid	77.0	57.0	100	100
Assumptions				
Discount rate	8.25	8.25	8.25	8.25
Payroll growth	4.00	3.75	3.75	3.75
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

OHIO SCHOOL EMPLOYEES RETIREMENT SYSTEM (SERS)

Figure 5. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Historically, the statutory rate has equaled or been greater than 100 percent of the ARC rate required to pay down the unfunded liability within a 30-year period. In 2009, changed its closed funding period from 28 years to 30 years in response to the crisis.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: all employees
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

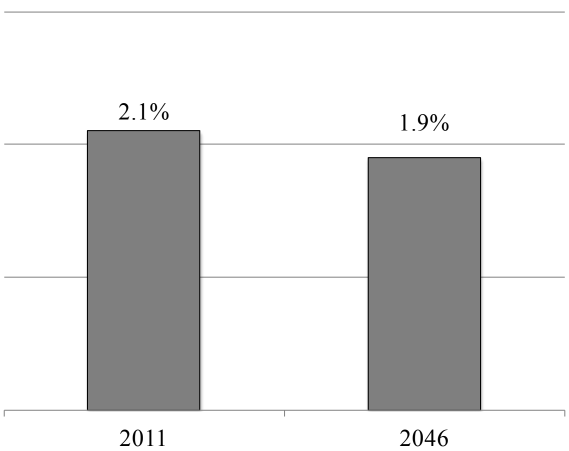
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	80.8 %	72.6 %	–	–
Employer ARC rate*	9.8	12.6	11.6	0.0
Percent of ARC paid*	90.0	100.0	100	100
Assumptions				
Discount rate	8.00	8.00	8.00	7.75
Payroll growth	4.0	4.0	4.0	4.0
Amortization period	29 yrs.	28 yrs.	11 yrs.	0 yrs.

* ARC = GASB required ARC.
Sources: Actuarial valuations and CRR calculations.

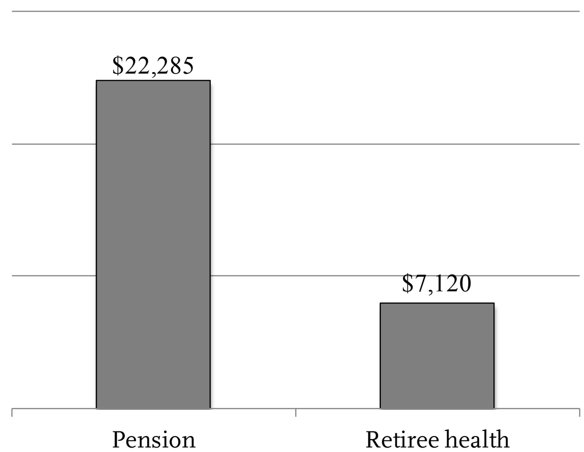
OHIO PUBLIC EMPLOYEES RETIREE HEALTH AND MEDICARE BENEFITS

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

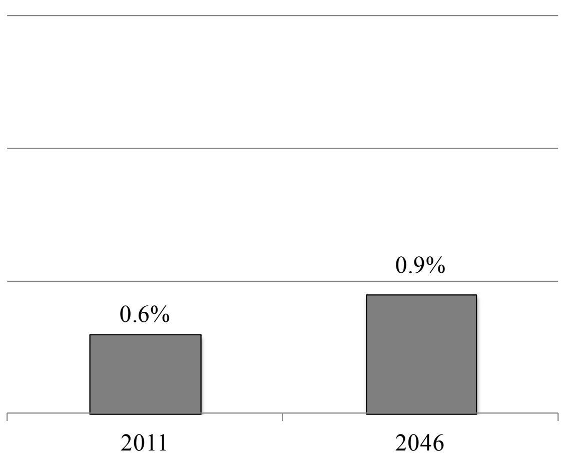
- Funding method: Pension allocation. Rate was 4 percent of payroll in 2011.
- Medical inflation rate: 8.5 percent, drops to 4 percent by 2018.
- Employer contribution: Approximately 85 percent of the cost of insurance in 2010, with employer and federal government paying remainder.

Benefits and membership

- Benefit eligibility: Members applying for age-and-service retirement with 10 or more years of Ohio service credit.
- Benefits for Medicare-eligible retirees: The plan replaces Medicare coverage, and Medicare-eligible retirees are eligible for premium reimbursement.
- Active employees: 348,112
- Beneficiaries: 186,987
- Most recent actuarial valuation: 1/1/10

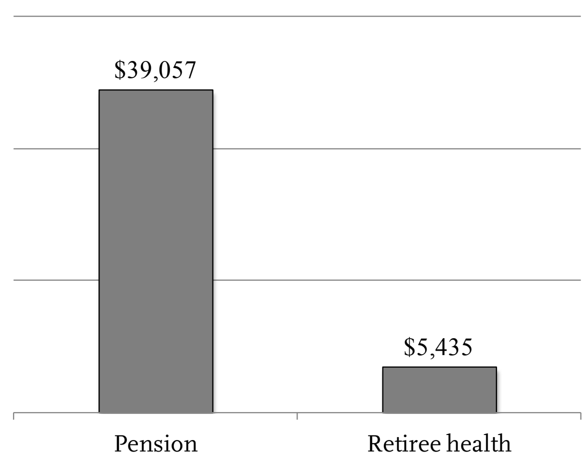
STATE TEACHERS RETIREMENT SYSTEM OF OHIO RETIREE HEALTH CARE BENEFITS

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

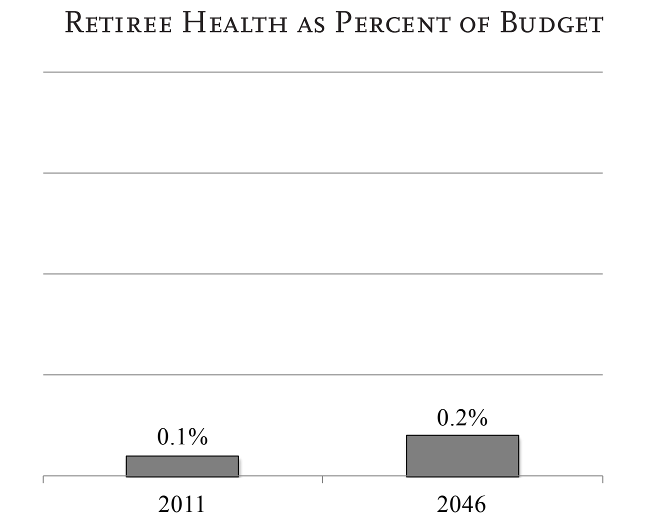
Retiree health funding and costs

- Funding method: Statutory rate funds a trust. Rate was 1 percent of payroll in 2011.
- Medical inflation rate: 9.8 percent, down to 5 percent by 2021.
- Employer contribution: Members contributed around 37 percent of the cost of insurance.

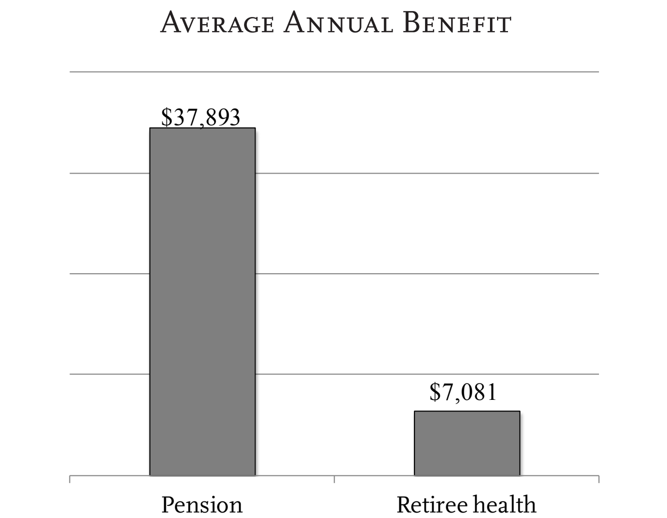
Benefits and membership

- Benefit eligibility: Members with 15 or more years of service are eligible for subsidized health care coverage.
- Benefits provided for Medicare-eligible retirees: Medicare-Advantage plan and part-B premium reimbursement provided.
- Active employees: 175,842
- Beneficiaries: 115,754
- Most recent actuarial valuation: 4/30/12

OHIO POLICE AND FIRE RETIREE HEALTH CARE BENEFITS



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

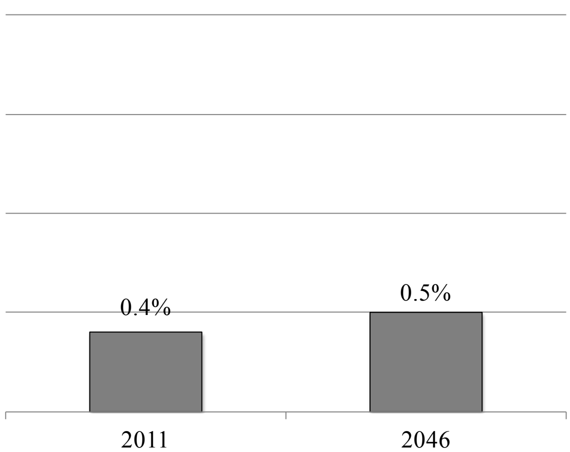
- Funding method: The plan is funded by statute. In 2011, 6.25 percent of payroll was allocated to fund the Retiree Health Care Stabalization Fund.
- Medical inflation rate: 6 percent, down to 5 percent by 2019 (varies by cost source).
- Employer contribution: Members contribute between 75 percent and 25 percent of premiums. Contributions averaged 35 percent of benefits paid in 2011.

Benefits and membership

- Benefit eligibility: All pension benefit recipients.
- Benefits for Medicare-eligible retirees: Three Medigap plans are offered.
- Active employees: 27,463
- Beneficiaries: 25,003
- Most recent actuarial valuation: 1/30/12

OHIO POLICE AND FIRE RETIREE HEALTH CARE BENEFITS

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Trust fund started in 2007, 13.7 percent fund in 2010.
- Medical inflation rate: 9.5 percent, down to 5 percent by 2017.
- Employer contribution: Retirees contribute 50 percent of medical premiums starting in 2011; earlier retirees contribute 25 percent to 50 percent.

Benefits and membership

- Benefit eligibility: Members hired after May 13, 2008 must be 62 with at least 10 years of service, 60 with 25 years of service, or 55 with 30 years of service.
- Benefits provided for Medicare-eligible retirees: four Medicare-Advantage plans are available.
- Active employees: 126,015
- Beneficiaries: 50,605
- Most recent actuarial valuation: 6/30/10

THE STATE OF TEXAS

The plans:
Texas has four large state-administered pension systems, two smaller state-administered systems, and many locally-administered systems. The state also maintains two retiree health plans. This analysis focuses primarily on two of the four large state-administered systems – the Texas Employees Retirement System (ERS) and the Teacher Retirement System (TRS) – which make up nearly 80 percent of public plan active membership in the state.

The impact of the crisis:
As a result of the economic crisis, the amount required to amortize the unfunded liabilities increased for both ERS and TRS. For ERS, it jumped from from 1 percent of payroll to 4 percent of payroll. For TRS, the jump was smaller, increasing from 2 percent to 4 percent of payroll. Over the crisis period, the statutory contribution rate was consistently less than the annual required contribution (ARC), which exacerbated the impact of the crisis on pension costs. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 3.1 percent to 4.2 percent.

The impact of pension plan reforms:
In the wake of the crisis, ERS made modest changes to benefits for new hires, while TRS focused only on curtailing pension abuses. For ERS, benefit changes included tightening eligibility requirements and lengthening the averaging period used for calculating benefits. ERS also increased the contribution rate for all employees from 6 percent to 7 percent of payroll. All of these changes combined will gradually reduce the projected employer's contribution to the normal cost from 8 percent of payroll today to 6 percent in 2046, at which point all active employees will be covered under the new benefit structure.

For TRS, stronger anti-spiking language was introduced to limit the practice of increasing pay or other compensation for the purpose of boosting pension benefits. The system also increased the cost of purchasing service for members. These reforms were meaningful but had a negligable impact on costs.

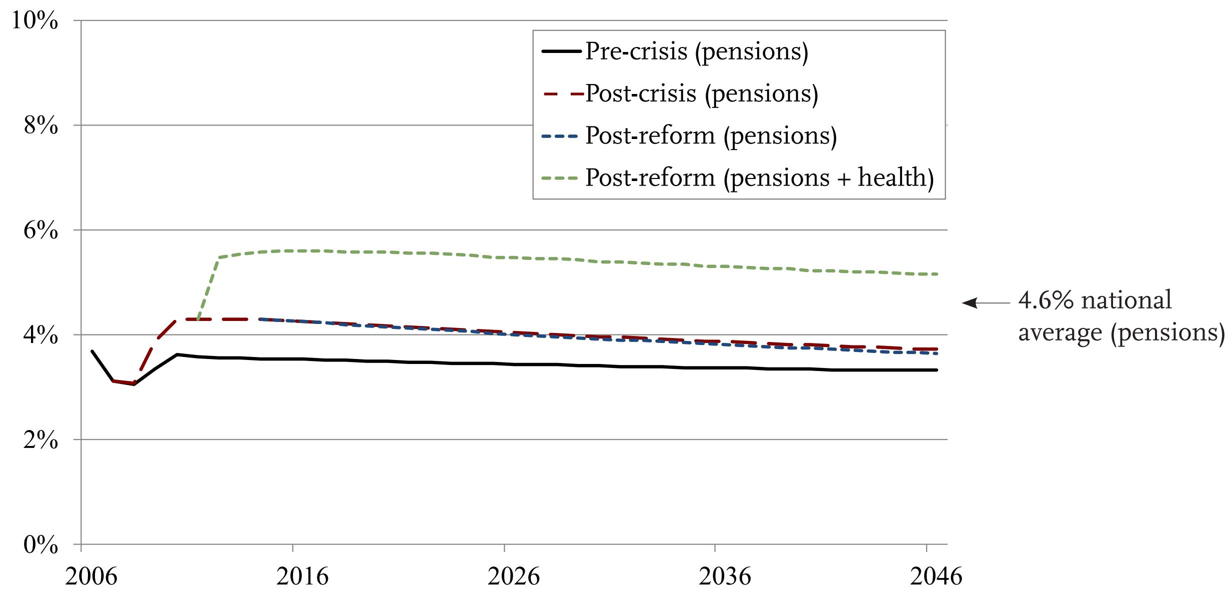
Going forward, if both systems pay the full ARC – something they have not done in recent years – and assumed returns materialize, the payments required to amortize the unfunded liability will decline. Taking into account both the benefit changes and paying down the unfunded liabilities, the share of state and local budgets devoted to pensions is projected to drop from 4.2 today to 3.6 percent by 2046.

Total state costs:
In Texas, the state also provides retiree health benefits, which amounted to about 1.2 percent of state and local budgets prior to the crisis, and are projected to grow to 1.5 percent by 2046. When retiree health and pension costs are combined, Texas' total retirement benefit costs as a percent of state and local budgets equaled 4.3 percent prior to the crisis, increased to 5.4 percent during the crisis, and are projected to drop to 5.1 percent in 2046 after pension reforms.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

TEXAS: TOTAL PENSION AND RETIREE HEALTH COSTS

FIGURE 1. EMPLOYER PENSION AND RETIREE HEALTH COSTS AS PERCENT OF BUDGET: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



Note: Budget = general own source revenues of all Texas state/local governments. Retiree health costs assumed pay-as-you-go.

TABLE 1. EMPLOYER PENSION AND RETIREE HEALTH COSTS AS PERCENT OF BUDGET, BY PLAN

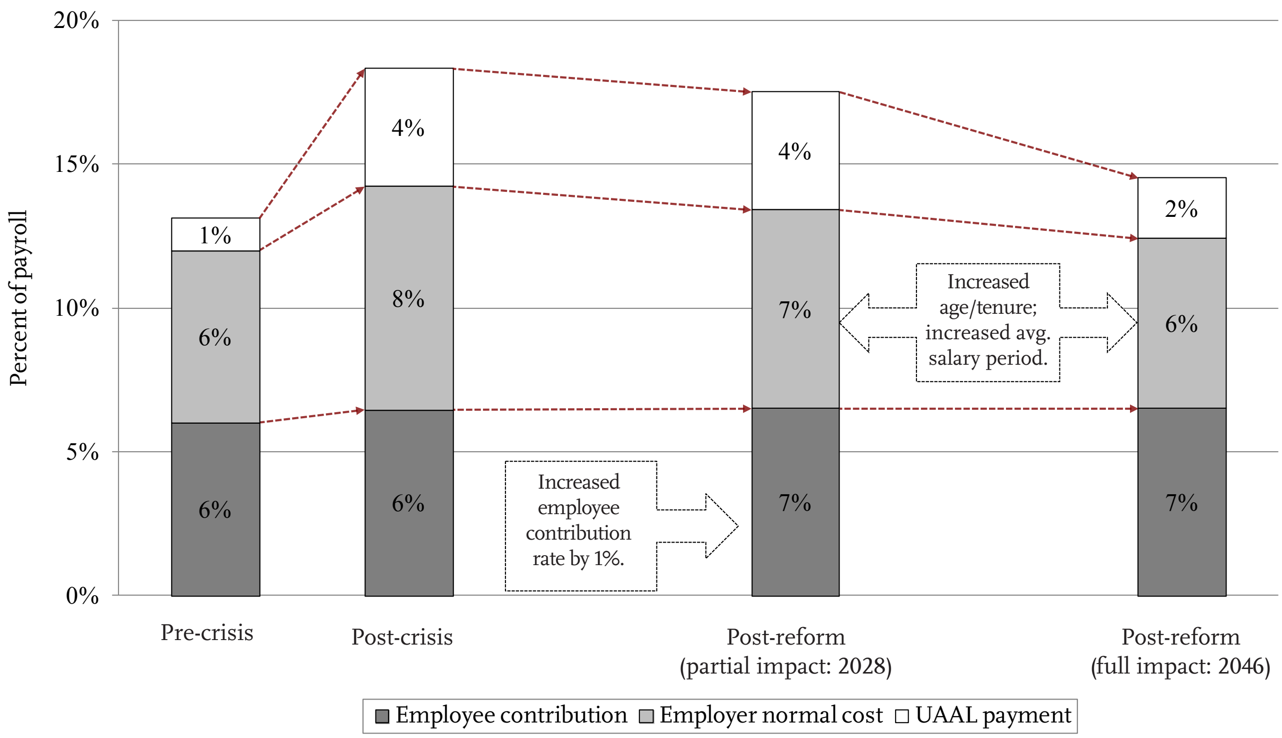
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	3.1 %	4.2 %	4.0 %	3.6 %
Texas ERS	0.3	0.5	0.5	0.4
Texas TRS	1.6	2.2	2.0	1.7
Other pension plans[a]	1.2	1.5	1.5	1.5
Total retiree health	1.2	1.2	1.5	1.5
Texas ERS retiree health	0.5	0.5	0.6	0.7
Texas TRS retiree health	0.7	0.7	0.9	0.8
Total	4.3	5.4	5.5	5.1

[a] Includes two state-administered municipal retirement systems – Texas County and District Retirement System and Texas Municipal Retirement System – as well as all locally-administered plans within Texas.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

TEXAS EMPLOYEES RETIREMENT SYSTEM (ERS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- [x] Social Security coverage
- [x] Defined benefit
- [ ] Defined contribution/hybrid

Funding method and history

- [x] Set by statute
- [ ] Actuarially determined

Pre-crisis, the statutory rate averaged 80 percent of the GASB-required ARC. Post-crisis, the rate dropped to 58.5 percent in 2011.

Plan design changes

- [ ] Cut COLA
- [x] Increased employee contribution: all employees
- [x] Increased age/tenure eligibility: new hires only
- [x] Increased average salary period: new hires only
- [ ] Reduced benefit factor
- [ ] None

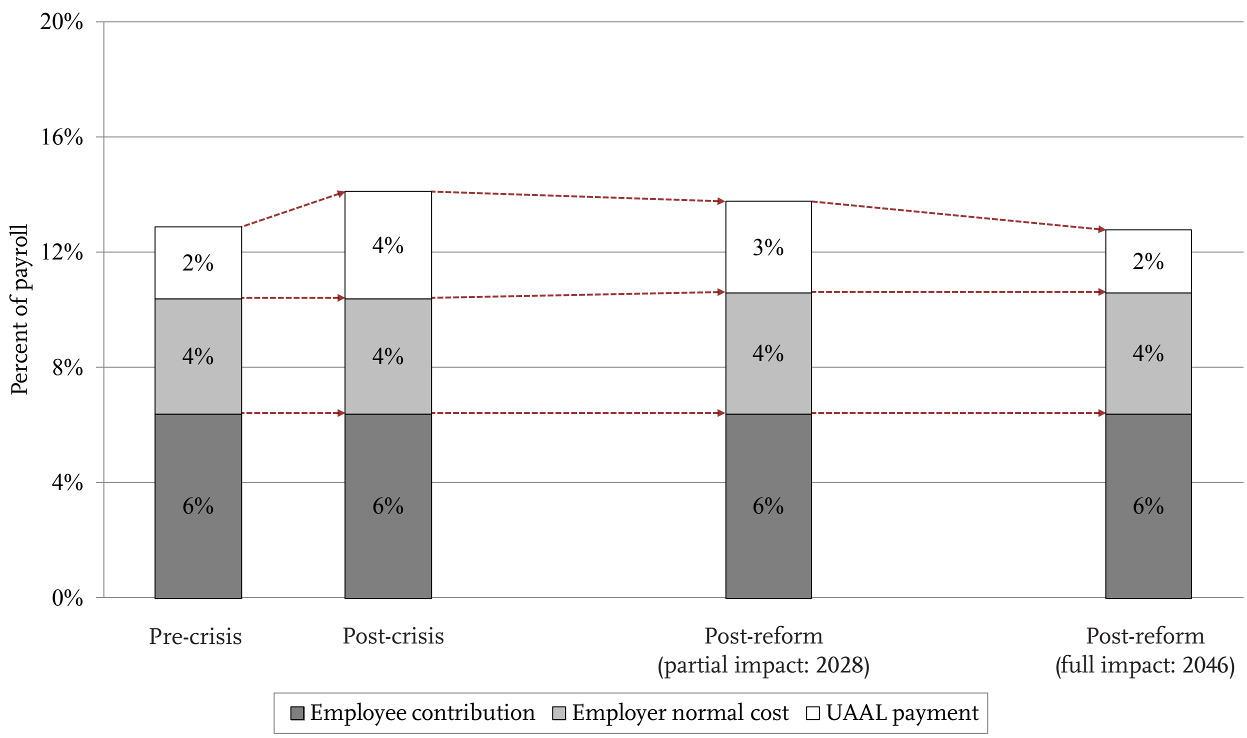
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	95.6 %	84.5 %	–	–
Employer ARC rate	7.1	12.2	10.6	8.6
Percent of ARC paid	88.9	58.5	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	4.0	3.5	3.5	3.5
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

TEXAS TEACHERS RETIREMENT SYSTEM (TRS)

Figure 3. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☑ Set by statute
- ☐ Actuarially determined

Pre-crisis, the statutory rate has equaled 80 percent or more of the GASB-required ARC. Post-crisis, the rate rose to 85 percent in 2011.

Plan design changes

- ☐ Cut COLA
- ☐ Increased employee contribution
- ☐ Increased age/tenure eligibility
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☑ None

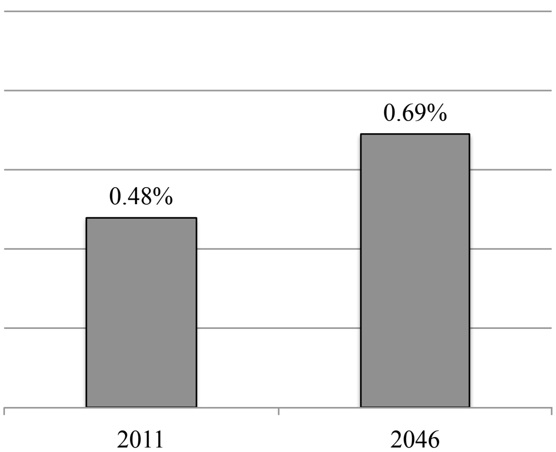
Table 3. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	90.5 %	82.7 %	–	–
Employer ARC rate	6.1	7.8	7.2	6.3
Percent of ARC paid	102.0	85.0	100	100
Assumptions				
Discount rate	8.0	8.0	8.0	8.0
Payroll growth	3.5	3.5	3.5	3.5
Amortization period	30 yrs.	30 yrs.	30 yrs.	30 yrs.

Sources: Actuarial valuations and CRR calculations.

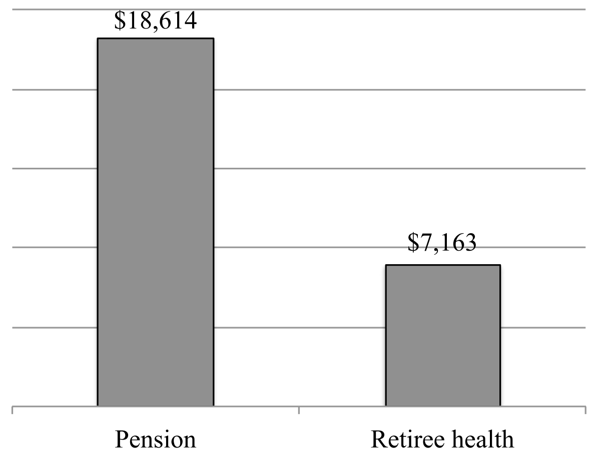
TEXAS EMPLOYEES GROUP BENEFITS PROGRAM

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

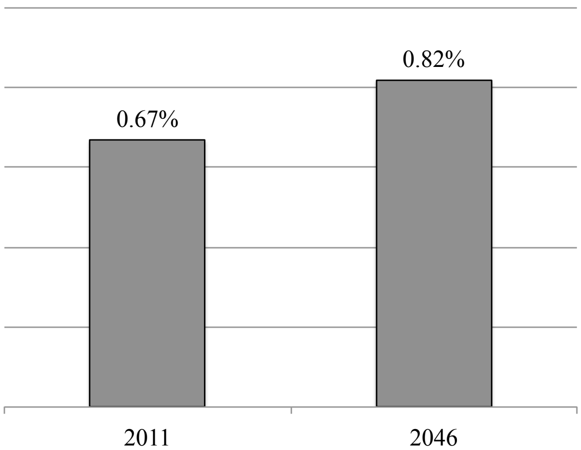
- Funding method: Pay-as-you-go.
- Medical inflation rate: 8 percent, drops to 5.5 percent by 2018.
- Employer contribution: Fixed dollar amount updated annually.

Benefits and membership

- Benefit eligibility: Retiree must be receiving pension benefits to be eligible for retiree health.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 227,786
- Beneficiaries: 90,213
- Most recent actuarial valuation: 6/30/11

TEXAS TRS-CARE RETIREE HEALTH CARE PLAN

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 10 percent, drops to 4.5 percent by 2020.
- Employer contribution: Basic coverage is available at no cost to the retirees. Retiree must contribute toward any additional cost in excess of base coverage.

Benefits and membership

- Benefit eligibility: Retiree must be receiving pension benefits to be eligible for retiree health.
- Benefits for Medicare-eligible retirees: Secondary coverage provided by the plan.
- Active employees: 681,457
- Beneficiaries: 222,454
- Most recent actuarial valuation: 8/31/11

THE STATE OF VIRGINIA

The plans:
Virginia has two large state-administered pension systems, four smaller state-administered plans for various state and municipal workers and many locally-administered systems. The state also maintains one retiree health plan. This analysis focuses primarily on the two large state-administered systems – the Virginia State Employees Retirement System (SERS) and the Virginia Teachers Retirement System (TRS) – which make up about 60 percent of active public plan membership in the state.

The impact of the crisis:
As a result of the economic crisis, the payments required to amortize unfunded liabilities increased for both SERS and TRS. For SERS, it jumped from from 4 percent to 9 percent of payroll. For TRS, the jump was similar in magnitude, increasing from 7 percent to 11 percent of payroll. For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 5.5 percent to 7.0 percent.

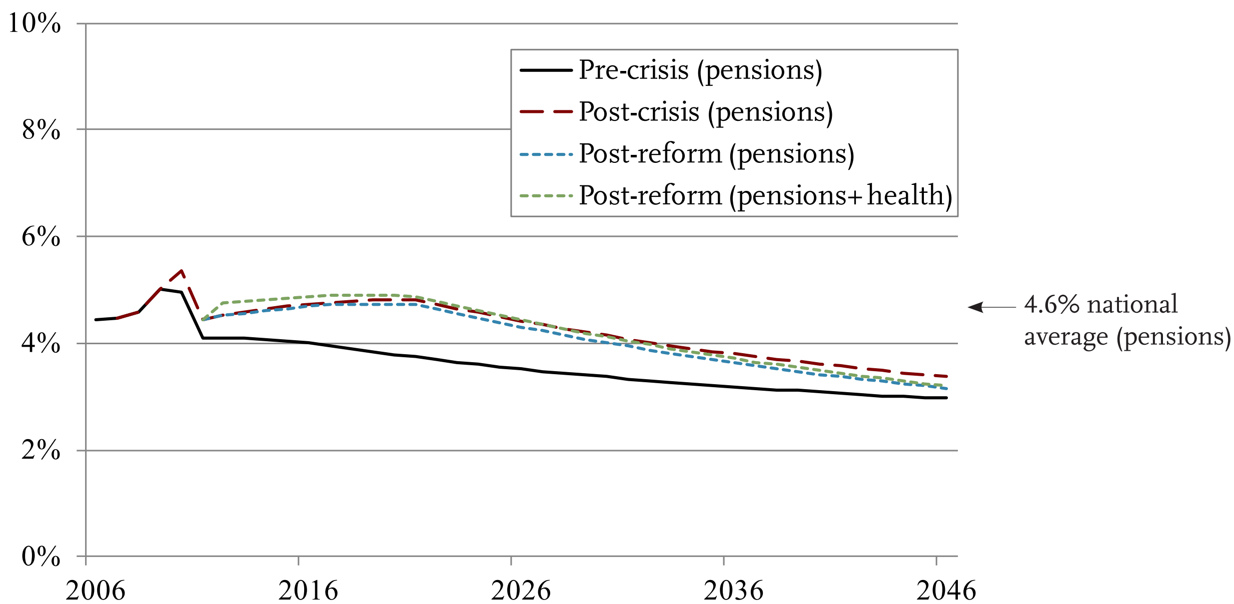
The impact of pension plan reforms:
In reponse to the crisis, Virginia made a multitude of changes. The most important was the introduction of a hybrid system for new hires that combines a traditional defined-benefit (DB) pension with a defined contribution (DC) plan. DB benefits under the new hybrid system provide a lower benefit factor for each year of service than under the old system and a reduced cost-of-living adjustment. The DC portion of the hybrid requires that employees and employers each contribute, at minimum, 1 percent of their gross pay and payroll, respectively. For SERS, the dramatic design change will gradually reduce the projected employer's contribution to the normal cost from 4 percent of payroll today to 1.6 percent in 2046. For TRS, the projected employer's contribution to the normal cost will drop from 6 percent of payroll today to 3.3 percent in 2046. To provide short-term relief from increased costs due the the crisis, the Virginia legislature extended the period for paying down unfunded liabilities to 30 years from 20 years, and allowed for underpayment of the annual required contribution (ARC) until 2019. However, by 2021 the amortization period will return to 20 years. Overall, if the systems pay their ARCs in full from 2019 onward, and assumed returns materialize, the share of state and local budgets devoted to pensions will drop from 4.6 percent today to 2.6 in 2046, at which point all employees will be covered under the new hybrid system.

Total state costs:
The Virginia state government also provides retiree health benefits, which cost about 0.2 percent of state and local budgets and are projected to decline in the future. When retiree health and pension costs are combined, Virginia's total retirement benefit costs as a percent of state and local budgets equaled 4.6 percent prior to the crisis, remained at 4.6 percent during the crisis, and are projected to drop to 2.6 percent in 2046 after pension reforms are in force for all employees.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

VIRGINIA: TOTAL PENSION AND RETIREE HEALTH COSTS

Figure 1. Employer Pension and Retiree Health Costs as Percent of Budget: Pre-Crisis, Post-Crisis, and Post-Reform



Notes: Budget = general own source revenues of all Virginia state/local governments. Retiree health costs assumed pay-as-you-go. Pension costs include 1 percent mandatory employer match to defined contribution portion of hybrid plan.

Table 1. Employer Pension and Retiree Health Costs as Percent of Budget, by Plan

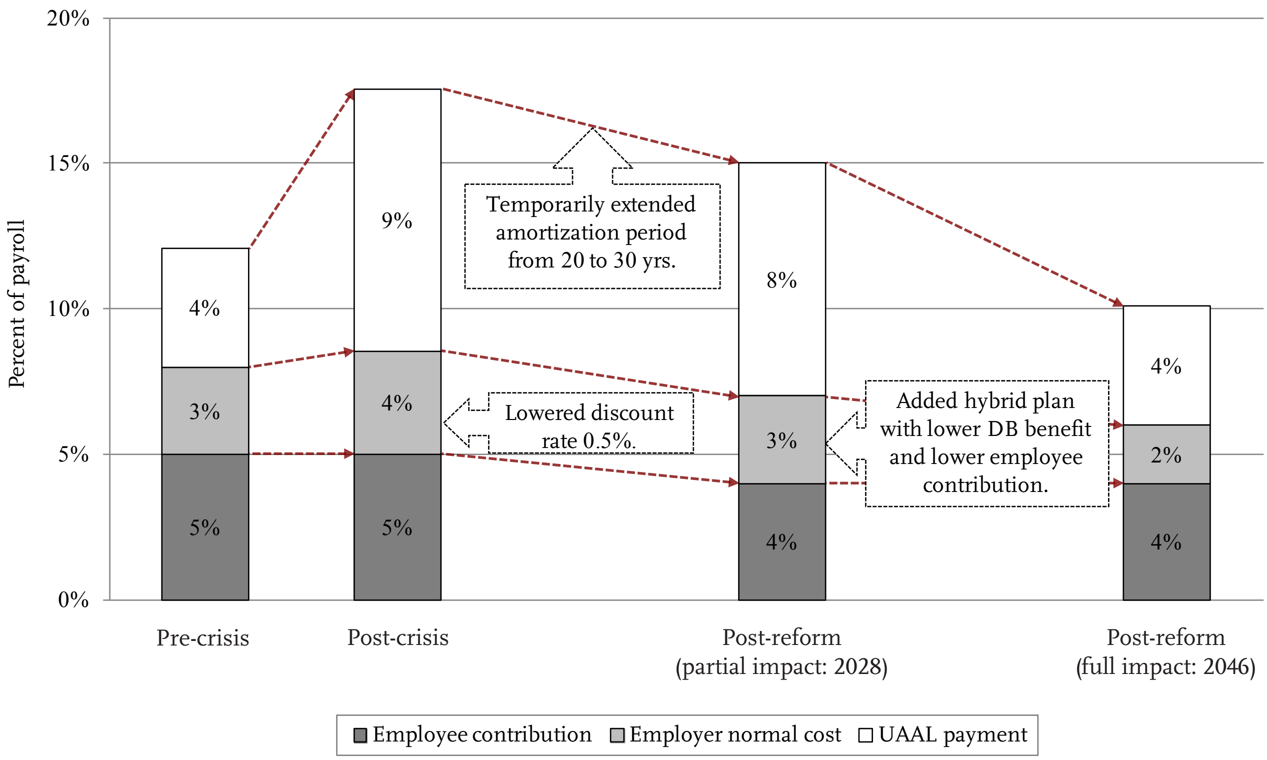
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	4.4%	4.4%	4.0%	2.9%
Virginia SERS	0.6	0.8	0.7	0.3
Virginia TRS	1.6	2.0	1.7	1.0
Other pension plans[a]	2.2	1.6	1.6	1.6
Total retiree health	0.2	0.2	0.1	0.0
Virginia HICP	0.2	0.2	0.1	0.0
Total	4.6	4.6	4.1	2.9

[a] Includes one large state-administered municipal plan to cover employees of certain political subdivisions, three small state-administered plans to cover the state police, law officers, and judges, and all the locally-administered plans within Virginia.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

VIRGINIA STATE EMPLOYEES RETIREMENT SYSTEM (SERS)

FIGURE 2. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- [x] Social Security coverage
- [x] Defined benefit
- [x] Defined contribution/hybrid

Funding method and history

- [ ] Set by statute
- [x] Actuarially determined

Pre-crisis, averaged 75 percent of GASB-required ARC. Post-crisis rate averaged 55 percent.

Plan design changes

- [x] Cut COLA: employees not yet vested by 1/1/13
- [ ] Increased employee contribution
- [x] Increased age/tenure eligibility: new hires only
- [x] Increased average salary period: new hires only
- [x] Reduced benefit factor: new hires only
- [ ] None

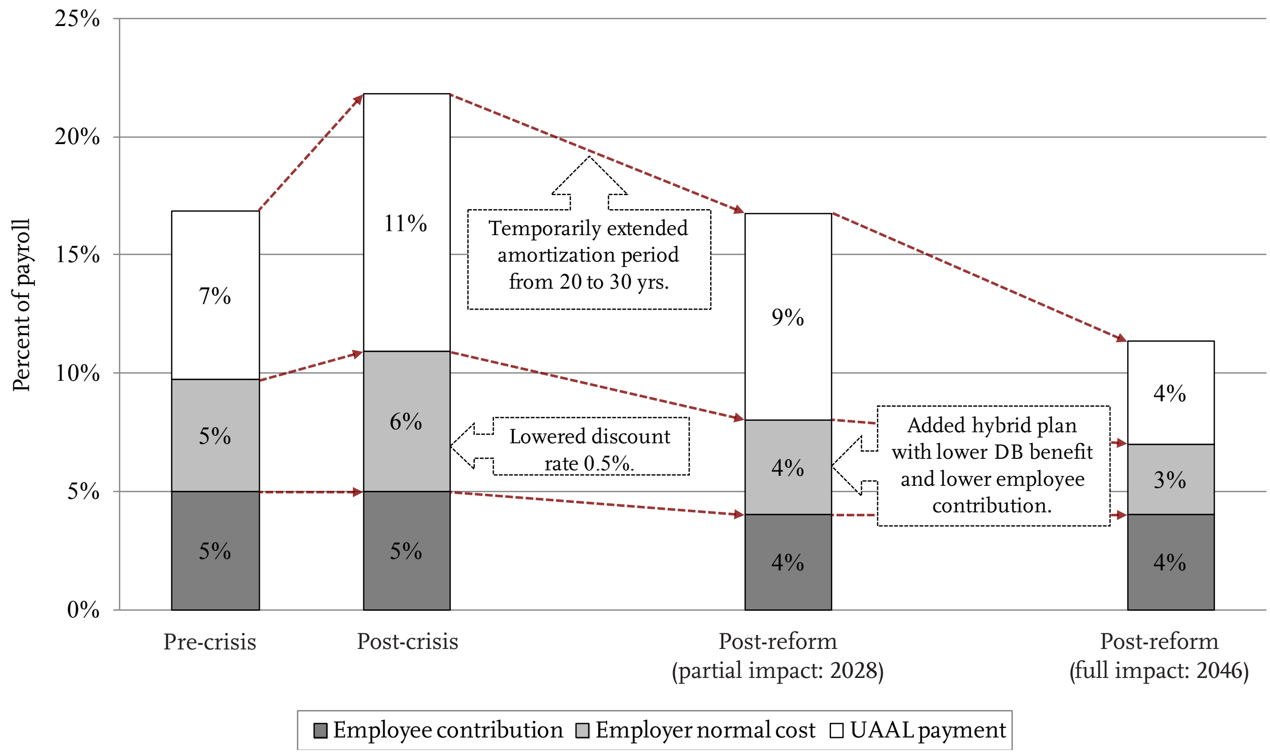
TABLE 2. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	88.0 %	70.6 %	–	–
Employer ARC rate	7.1	13.1	9.3	5.7
Percent of ARC paid	83.9	25.2	100	100
Assumptions				
Discount rate	7.5	7.0	7.0	7.0
Payroll growth	3.0	3.0	3.0	3.0
Amortization period	20 yrs.	30 to 20 yrs.	20 yrs.	20 yrs.

Sources: Actuarial valuations and CRR calculations.

VIRGINIA TEACHERS RETIREMENT SYSTEM (TRS)

FIGURE 3. PENSION COSTS AS PERCENT OF PAYROLL: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



KEY FACTS

Structure of retirement system

- ☑ Social Security coverage
- ☑ Defined benefit
- ☑ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

Pre-crisis, averaged 87 percent of GASB-required ARC. Post-crisis rate has averaged 53 percent.

Plan design changes

- ☑ Cut COLA: employees not vested by 1/1/13
- ☐ Increased employee contribution
- ☑ Increased age/tenure eligibility: new hires only
- ☑ Increased average salary period: new hires only
- ☑ Reduced benefit factor: new hires only
- ☐ None

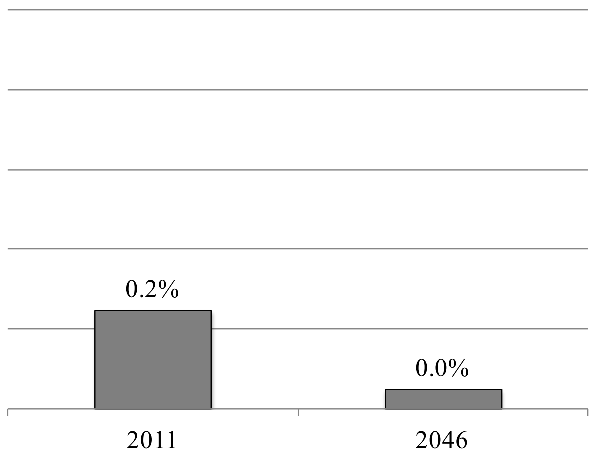
TABLE 3. PENSION FINANCES AND ACTUARIAL ASSUMPTIONS

Item	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Plan finances				
Funded ratio	79.8 %	66.6 %	–	–
Employer ARC rate	12.0	16.8	12.5	6.9
Percent of ARC paid	92.1	30.4	100	100
Assumptions				
Discount rate	7.5	7.0	7.0	7.0
Payroll growth	3.0	3.0	3.0	3.0
Amortization period	20 yrs.	30 to 20 yrs.	20 yrs.	20 yrs.

Sources: Actuarial valuations and CRR calculations.

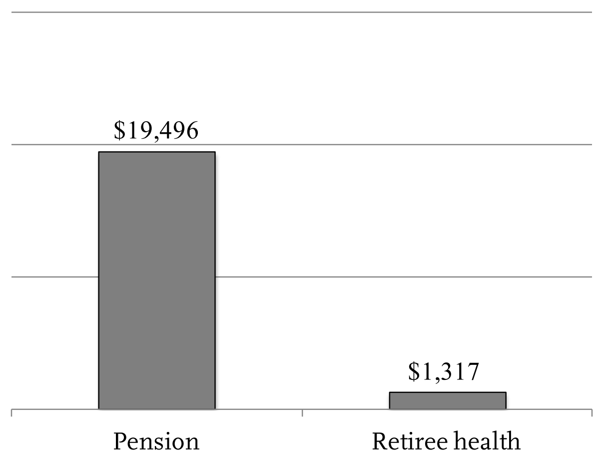
VIRGINIA RETIREMENT SYSTEM HEALTH INSURANCE CREDIT PROGRAM (HICP)

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit



Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pre-funded.
- Medical inflation rate: N/A.
- Employer contribution: 1 percent of payroll.

Benefits and membership

- Benefit eligibility: Must have accrued 15 years of service and be retired under one of four state employee retirement systems or teachers retirement system.
- Benefits for Medicare-eligible retirees: $4 towards monthly health care premium for every year of service.
- Active employees: 251,338
- Beneficiaries: 93,639
- Most recent actuarial valuation: 6/30/11

THE STATE OF WISCONSIN

The plans:
Wisconsin has only one state-administered pension system. The state also maintains one retiree health plan. This analysis focuses primarily on the state-administered pension system – the Wisconsin Retirement System (RS)– which makes up just over 95 percent of public plan active membership in the state.

The impact of the crisis:
Unlike most public sector retirement systems, the Wisconsin RS uses an aggregate cost actuarial accounting method. This method does not separately account for normal cost contributions and unfunded liabiity amortization payments. Instead, it generates a single contribution rate that is necessary to ensure that benefits are fully funded over the average career of the members of the system. This rate is called the aggregate normal cost. As a result of the economic crisis, the employer's contribution to the aggregate normal cost increased from 6 percent to 7.1 percent of payroll for RS. Importantly, the system remained a responsible funder over the crisis period, continuing to fund 100 percent of the annual required contribution (ARC). For the state as a whole, the economic crisis increased the share of state and local budgets devoted to pensions from 2.2 percent to 3.2 percent.

The impact of pension plan reforms:
In the wake of the crisis, RS made only minor benefits cuts. The system introduced a five year vesting period for new hires, where there was no vesting period prior. This change has a neglible impact on costs. In terms of employer costs, the most important change was an increase in employee's share of the normal cost. RS increased the employee's share of the normal cost from 40 percent to 50 percent. In total, these two plan design changes reduce the projected employer's contribution to the aggregate normal cost from 7.1 percent of payroll today to 6.9 percent by 2046, at which point all active employees will be covered under the new benefit structure.

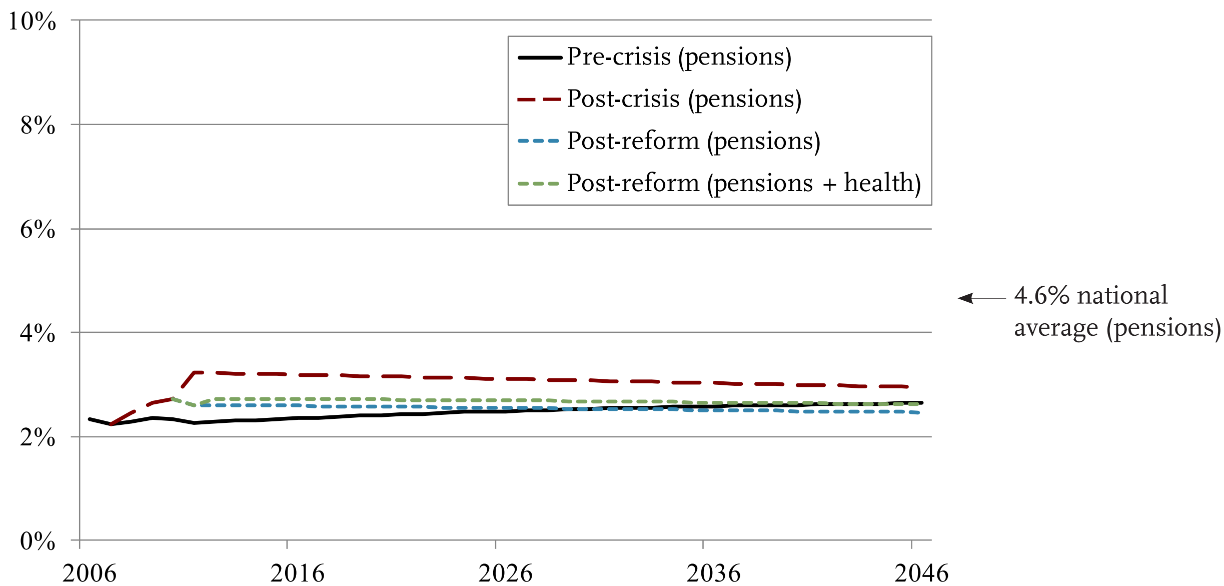
Going forward, if the system continues to pay the full ARC – as it has historically done – and assumed returns materialize, the aggregate normal cost payments will decline and the share of state and local budgets devoted to pensions is projected to drop from 3.2 today to 2.5 percent by 2046. Overall, pension reforms were commensurate with the challenges caused by the crisis and are expected to bring total pension costs just below pre-crisis levels by 2046.

Total state costs:
Wisconsin state government also provides retiree health benefits, which amounted to 0.1 percent of state and local budgets prior to the crisis and are projected to grow to 0.2 percent by 2046. When retiree health and pension costs are combined, Wisconsin's total retirement benefit costs as a percent of state and local budgets equaled 2.3 percent prior to the crisis, increased to 3.3 percent during the crisis, and are projected to drop to 2.6 percent in 2046 after pension reforms are in force for all employees.

PENSION AND RETIREE HEALTH COSTS: PRE- AND POST-CRISIS

WISCONSIN: TOTAL PENSION AND RETIREE HEALTH COSTS

FIGURE 1. EMPLOYER PENSION AND RETIREE HEALTH COSTS AS PERCENT OF BUDGET: PRE-CRISIS, POST-CRISIS, AND POST-REFORM



Note: Budget = general own source revenues of all Wisconsin state/local governments. Retiree health costs assumed pay-as-you-go.

TABLE 1. EMPLOYER PENSION AND RETIREE HEALTH COSTS AS PERCENT OF BUDGET, BY PLAN

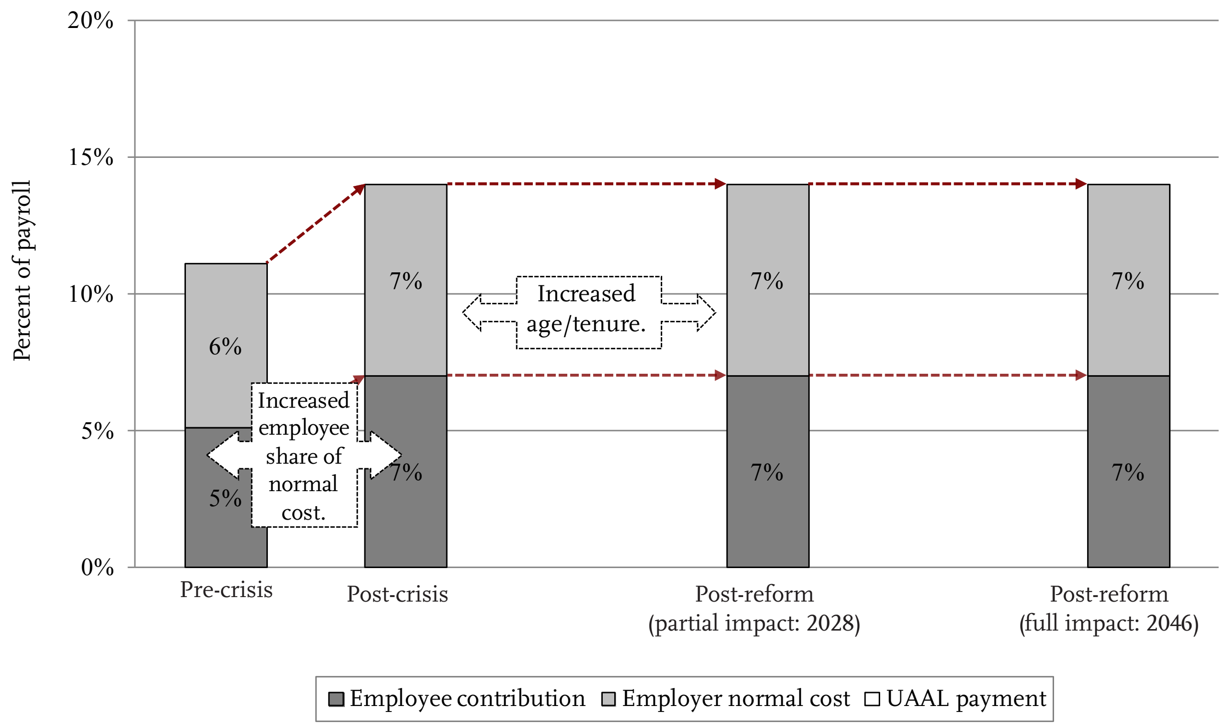
Plan	Pre-crisis	Post-crisis	Post-reform	
			2028	2046
Total pensions	2.2 %	3.2 %	2.5 %	2.5 %
Wisconsin RS	2.1	3.1	2.4	2.4
Other pension plans[a]	0.1	0.1	0.1	0.1
Total retiree health	0.1	0.1	0.2	0.2
Wisconsin retiree health	0.1	0.1	0.1	0.2
Total	2.3	3.3	2.7	2.7

[a] Includes all the locally-administered plans within Wisconsin.

Sources: CRR calculations from plan actuarial valuations; and U.S. Census Bureau, *State and Local Government Finances* and *State and Local Public-Employee Retirement Systems.*

WISCONSIN RETIREMENT SYSTEM (RS)

Figure 2. Pension Costs as Percent of Payroll: Pre-Crisis, Post-Crisis, and Post-Reform



KEY FACTS

Structure of retirement system

- ☐ Social Security coverage
- ☑ Defined benefit
- ☐ Defined contribution/hybrid

Funding method and history

- ☐ Set by statute
- ☑ Actuarially determined

In 1990, a 40-yr. UAAL amortization schedule was established (equal to about 0.1 percent of payroll). Since 1990, the plan has been funded using the aggregate cost method, which does not separate employer costs into normal costs and UAAL payments.

Plan design changes

- ☐ Cut COLA
- ☑ Increased employee contribution: all employees
- ☑ Increased age/tenure eligibility: new hires only
- ☐ Increased average salary period
- ☐ Reduced benefit factor
- ☐ None

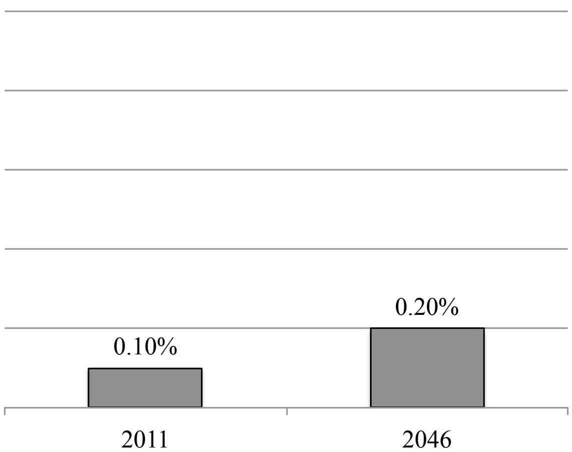
Table 2. Pension Finances and Actuarial Assumptions

Item	Pre-crisis	Post-crisis	Post-reform 2028	Post-reform 2046
Plan finances				
Funded ratio	103.8 %	99.9 %	–	–
Employer ARC rate	6.0	7.1	7.3	7.4
Percent of ARC paid	100.0	104.0	100	100
Assumptions				
Discount rate*	7.8	7.8	7.2	7.2
Payroll growth	4.1	3.2	3.2	3.2
Amortization period	20 yrs.	20 yrs.	20 yrs.	20 yrs.

* The discount rate for benefits paid to current retirees is 5 percent.
Sources: Actuarial valuation; and CRR calculations.

STATE OF WISCONSIN RETIREE HEALTH PROGRAM

Retiree Health as Percent of Budget



Sources: CRR calculations from plan actuarial valuation; and U.S. Census Bureau, *State and Local Government Finances*.

Average Annual Benefit

Source: CRR calculations from plan actuarial valuations.

Retiree health funding and costs

- Funding method: Pay-as-you-go.
- Medical inflation rate: 7 percent, drops to 5 percent by 2024.
- Employer contribution: Retirees pay 100 percent of insurance premiums. Employer contributions pay for the implicit insurance rate subsidy retirees receive in the plan.

Benefits and membership

- Benefit eligibility: Members receiving pension benefits or terminated members with 20 years of service.
- Benefits for Medicare-eligible retirees: Same plan as active employees and non-Medicare-eligible retirees, but lower premiums.
- Active employees: 57,934
- Beneficiaries: 7,021
- Most recent actuarial valuation: 1/1/12