



# THE FUNDING OF STATE AND LOCAL PENSIONS: 2011-2015

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## INTRODUCTION

The stock market hovers around pre-crisis peaks, tax revenues have rebounded, and plan sponsors have raised employee contributions for all workers and/or reduced benefits for new workers, yet the funded status of state and local pension plans has once again slipped. This result reflects slow growth in the value of actuarial assets as actuaries in the public sector tend to smooth gains and losses over several years, which was only partly mitigated by an unexpected reduction in liability growth. Because of smoothing, the funding results looked much better in 2009 and 2010 than developments warranted, but less good than developments in 2011. In order to highlight the impact of asset smoothing in the short run and the stock market in the slightly longer run, this *brief*

provides an update on the funded status of state and local plans in 2011 and also reports projections for the period 2012-2015.

The discussion is organized as follows. The first section reports that the ratio of assets to liabilities for our sample of 126 plans slipped to 75 percent in 2011. These funded ratios, however, are based on liabilities discounted by the expected long-term yield on plan assets, roughly 8 percent. So the second section revalues liabilities using the riskless rate, as advocated by most economists *for reporting purposes*, and shows an aggregate funded ratio in 2011 of 50 percent. The third section shifts from a snapshot of funded status to sponsors' payment of current costs. The update shows that Annual Required Contribution (ARC) rose to 15.7 percent of payrolls in 2011, and the percent of ARC paid dipped to 79 percent. The fourth section

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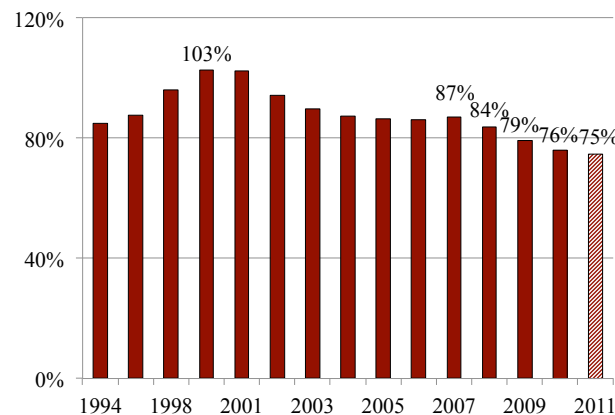
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projects funding for 2012-2015 and shows that, under the most likely of three stock market scenarios, the aggregate funded ratio will remain steady next year, but then gradually rise to 82 percent by 2015. The fifth section describes recent actions that states have taken to improve funding. The final section concludes that, in the short term, the reported funded status of public plans depends critically on the way the actuaries smooth assets. Because of the smoothing, funding will show little improvement next year, but thereafter, if financial markets do not collapse again, the public pension landscape will look better.

## FUNDED STATUS IN 2011

In 2011, the estimated aggregate ratio of assets to liabilities for our sample of 109 state-administered plans and 17 locally administered plans, based on GASB accounting methods, was 75 percent.<sup>1</sup> (The ratio for each individual plan appears in the Appendix). This figure was slightly lower than the previous year, but considerably below the high levels of funding in the 1990s and early 2000s (see Figure 1). From the mid-1990s to 2000, funding improved markedly in response to GASB funding standards and a rising stock market. In 2000, assets amounted to 103 percent of liabilities. With the bursting of the tech bubble at the turn of the century, funded levels dropped as years of low asset values replaced the higher values from the 1990s. Funding then stabilized with the run-up of stock prices, which peaked in 2007. But the collapse of asset values in 2008 has once again led to declining funded ratios.

FIGURE 1. STATE AND LOCAL PENSION FUNDED RATIOS, 1994-2011

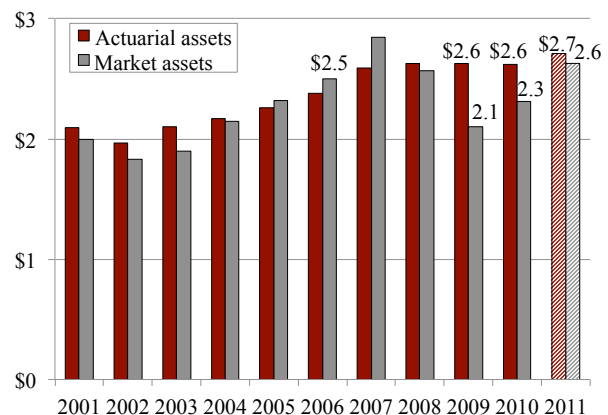


Note: See endnote 9. 2011 is authors' estimate.  
Sources: Various 2011 actuarial valuations; *Public Plans Database* (2001-2010); and Zorn (1994-2000).

Because only about half of our sample of 126 plans reported their funded levels by early May 2012, the 2011 aggregate figure is an estimate. As in previous years, for those plans without valuations, assets are projected on a plan-by-plan basis using the detailed process described in the valuations.<sup>2</sup> Applying our methodology retrospectively for each plan produced numbers for previous years that perfectly matched published asset values in half the cases and that came within 1 percent in the other half. Liabilities are projected based on the average rate of growth for plans already reporting. The initial estimates of assets and liabilities were then sent to the plan administrators and any suggested alterations were incorporated. This process resulted in a complete set of plan funded ratios for fiscal year 2011. In the aggregate, the actuarial value of assets amounted to \$2.7 trillion, and liabilities amounted to \$3.6 trillion, producing a funded ratio of 75 percent.

The reason for the slight decline in funded levels from 2010 to 2011 is that liabilities grew faster than assets. The growth in liabilities slowed noticeably in 2011, dipping to 3.4 percent from 4.6 percent in 2010 and about 6 percent in earlier years. On the other hand, the actuarial value of assets changed only modestly. The explanation for the slow growth in assets is that actuaries tend to smooth the fluctuations in market values by averaging generally over a five-year period (see Figure 2). So while market asset values in 2011 were significantly higher than in 2010, they were only slightly higher than in 2006, the year replaced in the five-year moving average.

FIGURE 2. ACTUARIAL VS. MARKET VALUE OF STATE AND LOCAL PENSION ASSETS, 2001-2011, TRILLIONS

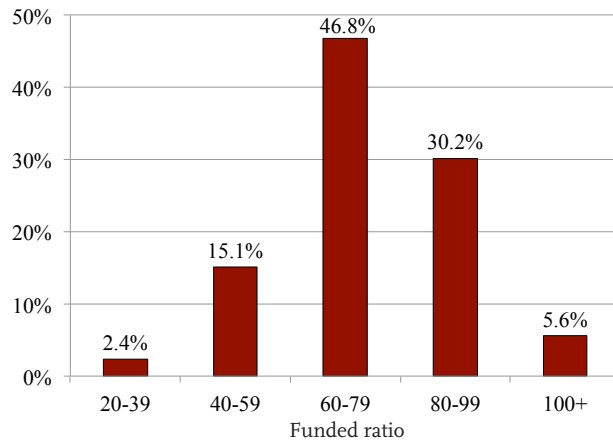


Note: 2011 is authors' estimate.

Sources: Various 2011 actuarial valuations; and *Public Plans Database* (2001-2010).

In 2011, as in earlier years, funded levels among plans vary substantially. Figure 3 shows the distribution of funding for our sample of plans. Sixty-four percent of plans had funded levels below 80 percent. Although many of the poorly-funded plans are relatively small, several large plans, such as those in Illinois (SERS, Teachers, and Universities) and Connecticut (SERS), had funded levels below 60 percent.

FIGURE 3. DISTRIBUTION OF FUNDED RATIOS FOR PUBLIC PLANS, 2011



Sources: Various 2011 actuarial valuations; and authors' calculations from the *Public Plans Database* (2010).

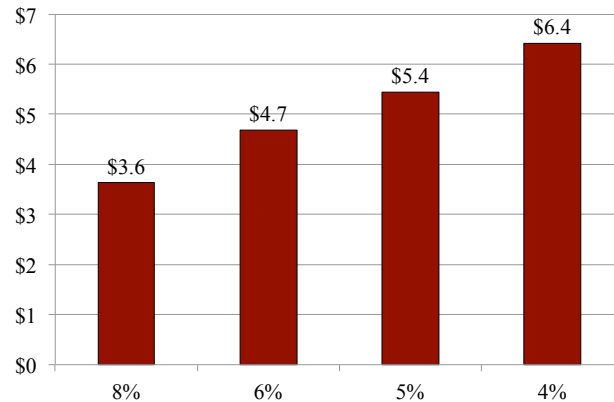
### FUNDED STATUS WITH RISKLESS RATE

The funded ratios presented above follow GASB's standards under which liabilities are discounted by the expected long-term yield on the assets held in the pension fund, roughly 8 percent. Standard financial theory, however, suggests that *for reporting purposes* future streams of payment should be discounted at a rate that reflects their risk.<sup>3</sup> In the case of state and local pension plans, the risk is the uncertainty about whether payments will need to be made. Since these benefits are protected under most state laws, the argument to date has been that payments are guaranteed. As events have unfolded in the wake of the financial crisis, benefits for current workers and retirees have been reduced in several states by suspending the cost-of-living adjustment. Nevertheless, core benefits will almost certainly be paid, so liabilities – for reporting purposes – should be discounted by something close to the risk-free interest rate.<sup>4</sup>

Figure 4 shows the value of liabilities for our sample of 126 plans under different interest rates. In 2011, the aggregate liability was \$3.6 trillion, calculat-

ed under a typical discount rate of 8 percent (although some sponsors have begun to lower their discount rates). A discount rate of 5 percent raises public sector liabilities to \$5.4 trillion.

FIGURE 4. AGGREGATE STATE AND LOCAL PENSION LIABILITY UNDER ALTERNATIVE DISCOUNT RATES, 2011, TRILLIONS

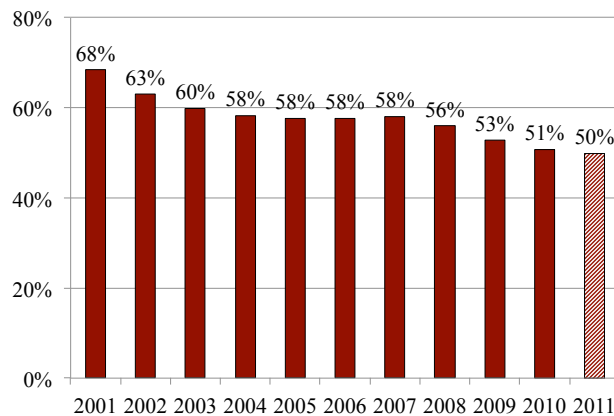


Note: The \$3.6 trillion figure is the value for the liabilities of plans in our sample, which – on average – are discounted at a rate of about 8 percent.

Source: Various 2011 actuarial valuations; and authors' calculations from the *Public Plans Database* (2010).

Recalculating the liabilities for each plan at 5 percent in 2011 produces a funded ratio of 50 percent, \$2.7 trillion in actuarial assets (the same value used earlier) compared to \$5.4 trillion in liabilities. The 2011 ratio of 8-percent liability to 5-percent liability was applied retroactively to derive funded ratios for earlier years (see Figure 5).

FIGURE 5. STATE AND LOCAL FUNDED RATIOS WITH LIABILITIES DISCOUNTED BY RISKLESS RATE, 2001-2011



Note: Authors' estimates. See endnote 9.

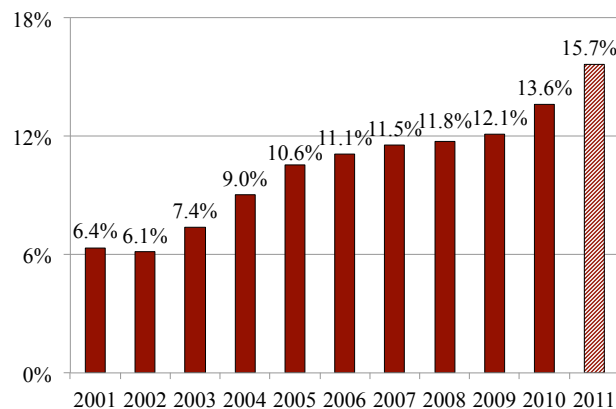
Sources: Various 2011 actuarial valuations; and *Public Plans Database* (2001-2010).

## THE ARC

The Annual Required Contribution (ARC), as defined by GASB, is the payment required to keep the plan on a steady path toward full funding. It equals normal cost – the present value of the liabilities accrued in a given year – plus a payment to amortize the unfunded liability, generally over a 30-year period. Each year the plan sponsor reports the ratio of the employer’s actual contribution to the ARC.

The ARC has increased significantly in the last two years, primarily because the financial crisis led to higher unfunded liabilities and thereby increased the amortization component of the ARC. In 2011, the ARC was 15.7 percent of payroll (see Figure 6).

FIGURE 6. ANNUAL REQUIRED CONTRIBUTION AS A PERCENT OF PAYROLL, 2001-2011

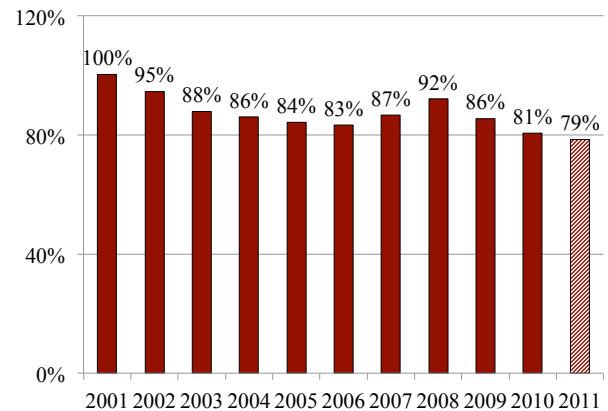


Note: 2011 is authors' estimate.

Sources: Various 2011 actuarial valuations; and *Public Plans Database* (2001-2010).

The increase in the ARC has occurred during a period when states and localities have seen a dramatic decline in their revenues. As a result, the percent of ARC paid has fallen (see Figure 7). In 2011, employer contributions equaled only 79 percent of the required payments. This decline reflects the pattern in the wake of the bursting of the dot.com bubble in 2000-2001, where the percent of ARC paid fell from 100 percent in 2001 to 83 percent in 2006. Thereafter, the percent paid increased until the financial crisis of 2008. As budgets recover and the unfunded liability stabilizes as a result of stock market gains, hopefully the ARC will stop rising and the percent of ARC paid will once again increase.

FIGURE 7. PERCENT OF ANNUAL REQUIRED CONTRIBUTION PAID, 2001-2011



Note: 2011 is authors' estimate.

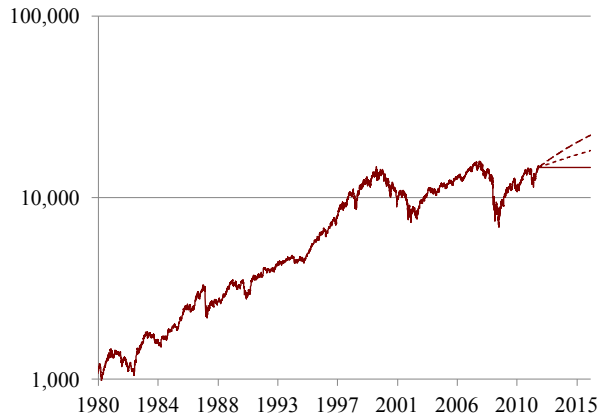
Sources: Various 2011 actuarial valuations; and *Public Plans Database* (2001-2010).

## PROJECTIONS FOR 2012-2015

In addition to an update for 2011, this *brief* includes projections for the period 2012-2015. The pattern of future funding depends very much on what happens to the stock market. To address uncertainty about future stock market outcomes, projections were made using three sets of assumptions for the Dow Jones Wilshire 5000 Index between now and 2015 (see Figure 8 on the next page).<sup>5</sup>

- **Optimistic:** Output grows on average 8 percent per year (3 percent inflation, 5 percent real), profits grow on average 4.5 percent per year, and the price/earnings (p/e) ratio rises to 17 (from 12 currently). The recovery gathers momentum, and the unemployment rate approaches 5 percent. In this case, stock prices rise at an average annual rate of 16 percent.
- **Middle:** Output grows 5 percent per year (2 percent inflation, 3 percent real), profits grow 3 percent per year, and the p/e ratio rises to 14. The recovery remains tepid, and the unemployment rate falls below 7 percent. Stock prices rise 8 percent annually.
- **Pessimistic:** Output grows on average 3 percent per year (2 percent inflation, 1 percent real), profits in 2015 are essentially no higher than they are today, and the p/e ratio remains at 12. Austerity bites, perhaps with a double-dip recession in Europe or the United States, and the unemployment rate exceeds 9 percent. Stock prices are no higher at the end of the 3-year interval than they are today.

FIGURE 8. DOW JONES WILSHIRE 5000 INDEX, 1980-2011, AND PROJECTIONS FOR 2012-15 UNDER ALTERNATIVE ASSUMPTIONS

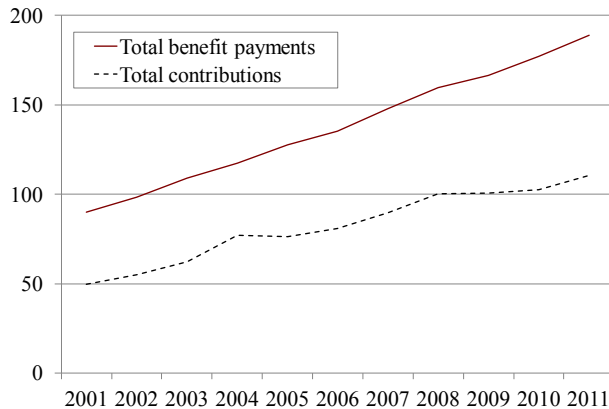


Sources: Wilshire Associates (2012); and authors' projections.

Estimating the 2012-2015 levels of actuarial assets for each plan in our dataset requires replicating the smoothing method detailed in the plan's actuarial valuation and used for the 2011 projection. This process is repeated for each set of assumptions regarding the Wilshire 5000.<sup>6</sup>

Assumptions are also required about the growth in contributions and benefits. Because these components rise slowly over time (see Figure 9), their average growth for the period 2012-2015 was assumed to equal their average growth over 2001-2011.

FIGURE 9. CONTRIBUTIONS AND BENEFITS IN STATE AND LOCAL PENSION PLANS, 2001-2011

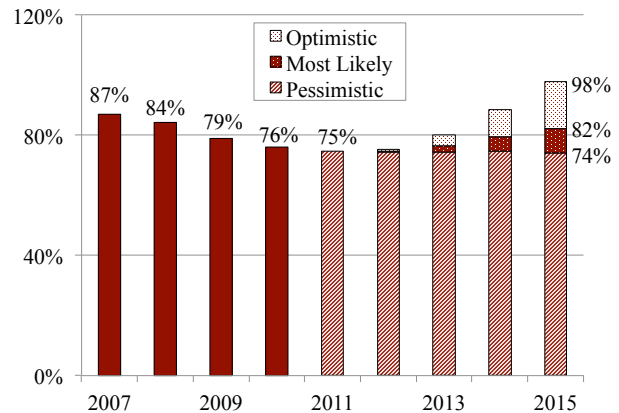


Sources: Various 2011 actuarial valuations; and *Public Plans Database* (2001-2010).

It is also necessary to make an assumption about the growth in liabilities. Over the period 2001-2009, liabilities grew at an average rate of about 6 percent. In 2010, the rate declined to about 4.6 percent, and, as discussed earlier, reported liabilities for 2011 suggest that the growth rate could be as low as 3.4 percent. This decline most likely reflects layoffs, wage freezes, and reductions or suspensions of cost-of-living increases. Given the one-shot nature of these developments, the assumption is that liability growth will slowly return to 4.5 percent over the period 2012-2015.

The projected funded ratios are shown in Figure 10. Certainly, the more distant the year, the more uncertain the projection. In all likelihood, the 2012 actuarial reports will continue to show assets equal to about 75 percent of promised benefits. What happens thereafter depends increasingly on future stock market performance. Under the most likely scenario, the funding ratio will start to rise as the weak stock market experienced in 2009 is fully phased out of the calculation and replaced by years of positive market performance. By 2015, the ratio of assets to liabilities is projected to equal 82 percent. The comparable 2015 ratio for the optimistic scenario is 98 percent and for the pessimistic scenario 74 percent.

FIGURE 10. PROJECTED STATE AND LOCAL FUNDING RATIOS UNDER THREE SCENARIOS, 2011-2015

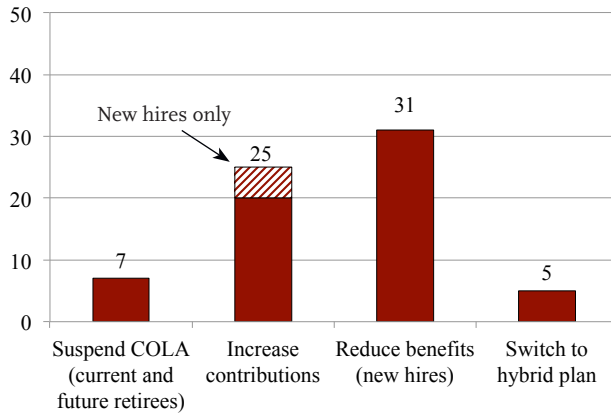


Sources: Authors' estimates for 2011-2015; and *Public Plans Database* (2007-2010).

## ACTIONS TO IMPROVE FUNDING

States and localities have been responding to their funding challenges by making four types of changes to their plans (see Figure 11 on the next page). Seven

FIGURE 11. NUMBER OF STATES MAKING CHANGES TO STATE OR LOCAL PENSIONS IN THE WAKE OF THE FINANCIAL CRISIS



Source: National Conference of State Legislatures (2008-2011); and Bradford (2012).

states have modified the cost-of-living adjustments for current and future retirees, with some linking future COLAs to the funded status of the plan or to returns on assets held in the fund.<sup>7</sup> Suspending the COLA immediately reduces accrued liabilities, improves the sponsor's funded ratio, and reduces the unfunded liability. Twenty states have raised employee contributions for current and future employees and five for new employees only. Once these additional contributions kick in, they should reduce the required employ-

er ARC payment. Thirty-one states have reduced benefits for new employees, generally by increasing the age when full benefits are paid, and five states have introduced a less expensive hybrid defined benefit/defined contribution system for new employees. As these benefit changes are limited to new employees, the changes will slow the growth in liabilities going forward but have no impact on the existing liability.<sup>8</sup>

## CONCLUSION

The funded status of state and local pensions has been front page news since the collapse of financial markets in 2008. At the time, it was clear that the funded ratios of public plans would continue to decline as actuaries gradually averaged in the losses. Indeed, the funded status for 2011 was 75 percent compared to 76 percent in 2010. The decline was mitigated somewhat by much slower liability growth.

The reason that the growth in liabilities has slowed is that states and localities have laid off some workers, frozen salaries, and reduced or suspended COLAs. Because many of these changes are one-shot, liability growth is likely to pick up somewhat in coming years.

Even if the liability growth rate picks up, however, phasing out years of low returns in the actuarial averaging process should lead to an increase in assets under our "most likely" stock market scenario. Specifically, if the stock market increases at about its historical rate over the next four years, the funded ratio for state and local plans should increase gradually to 82 percent in 2015.



## ENDNOTES

1 The sample covers the same plans as the *Public Fund Survey* (PFS) plus the University of California Retirement System. It represents about 90 percent of the assets in state-administered plans and 30 percent of those in plans administered at the local level. It differs from the PFS in three ways. First, it provides all information at the plan level rather than at the system level. Second, it includes a variety of actuarial data not available in the plan's Comprehensive Annual Financial Report (CAFR). Third, it presents the data on a consistent fiscal-year basis.

2 For those plans without published 2011 actuarial valuations, we estimated the percent change in actuarial assets between 2010 and 2011, calculated according to the plan's own methodology, and applied that change to its published 2010 GASB level of actuarial assets.

3 The analysis of choice under uncertainty in economics and finance identifies the discount rate for riskless payoffs with the riskless rate of interest. See Gollier (2001) and Luenberger (1997). This correspondence underlies much of the current theory and practice for the pricing of risky assets and the setting of risk premiums. See Sharpe, Alexander, and Bailey (2003); Bodie, Merton, and Cheeton (2008); and Benninga (2008).

4 Such an approach has been adopted by other public or semi-public plans, such as the Ontario Teachers' Pension Plan (2011) and the quasi-public defined benefit plans in the Netherlands (Ponds and van Riel, 2007). For a more detailed discussion of valuing liabilities for reporting purposes and the implications for funding and investments, see Munnell et al. (2010).

5 The alternative scenarios were constructed by our colleague Richard W. Kopcke. The total returns on assets are based on the assumptions that funds are 65 percent invested in equities and other risky assets and that dividend payments equal an additional 2 percent return on equities.

6 Projections assume that plans retain their method for calculating actuarial assets and their most recently reported investment return assumption. That is, they do not adjust their return assumption for different

stock market outcomes. Most plans then smooth assets by averaging the difference between the assumed return and the actual return over several years.

7 For example, in 2010 legislation, Colorado reduced the COLA for 2010 from 3.5 percent to the lesser of 2 percent or the average of the CPI-W for the 2009 calendar year (which resulted in a zero COLA for 2010) and a maximum of 2 percent thereafter (linked to investment returns) for current and future retirees. In Minnesota, in 2010 the state reduced the COLA for the State Employees' Retirement Fund from 2.5 percent to 2 percent and for the General Employees' Retirement Plan from 2.5 percent to 1 percent. The COLA for the Teachers' Retirement Association was suspended between 2011 and 2012, and reduced from 2.5 percent to 2 percent thereafter. In South Dakota, the decline of the funded ratio to 76 percent triggered a requirement to make immediate reforms to return to 100 percent funded. In response, legislation reduced the COLA from 3.1 percent to 2.1 percent for current and future retirees in 2010. Future adjustments will depend on the funded ratio as follows: 3.1 percent if the funded ratio is 100 percent or greater; between 2.9 and 2.1 (CPI-linked) if the funded ratio is between 90 and 100 percent; between 2.4 and 2.1 (CPI-linked) if the funded ratio is between 80 and 90 percent; and 2.1 if the funded ratio is less than 80 percent. In Rhode Island, in 2011 legislation, the state suspended the COLA beginning in 2012 until the aggregate plan funded ratio exceeds 80 percent. If the state returns to the 80-percent threshold, it would reinstate a COLA, but base it on investment returns and apply it only to the first \$25,000 in benefits, adjusted for inflation. (During the suspension period, this type of COLA will be awarded at five-year intervals.)

8 One exception is Rhode Island, which has introduced a hybrid that covers current, as well as new, employees.

9 Prior to 2007, aggregate cost plans did not report an accrued liability or funded ratio. After 2007, aggregate cost plans were required to report an accrued liability and funded ratio based on an entry age normal actuarial accounting method. Historical data presented in this *brief* differ from past *briefs* due to adjustments to convert pre-2007 data for aggregate cost plans to entry age normal.

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# APPENDIX

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APPENDIX: RATIO OF ASSETS TO LIABILITIES FOR STATE AND LOCAL PLANS 2001-2010 AND PROJECTIONS FOR 2011<sup>a</sup>

Plan name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Total	101.9	94.4	89.4	87.3	86.0	85.8	87.1	83.8	79.7	76.1	74.8
Alabama ERS	100.2	95.4	91.1	89.7	84.0	81.1	79.0	75.7	72.2	68.2	64.0 *
Alabama Teachers	101.4	97.4	93.6	89.6	83.6	82.8	79.5	77.6	74.7	71.1	66.3 *
Alaska PERS	100.9	75.2	72.8	70.2	65.7	78.2	77.8	78.8	63.0	62.4	64.2 *
Alaska Teachers	95.0	68.2	64.3	62.8	60.9	67.8	68.2	70.2	57.0	54.3	54.8 *
Arizona Public Safety Personnel	126.9	113.0	100.9	92.4	81.3	76.7	65.2	68.8	70.0	67.7	63.7
Arizona SRS	115.1	106.4	98.4	92.5	86.1	84.3	83.3	82.1	79.0	76.4	75.5
Arkansas PERS	106.0	100.0	95.0	89.0	86.0	83.0	89.0	90.0	78.0	74.1	70.7
Arkansas Teachers	95.4	91.9	85.9	83.8	80.4	80.3	85.3	84.9	75.7	73.8	72.0
California PERF	111.9	95.2	87.7	87.3	87.3	87.2	87.2	86.9	83.3	83.4	86.9 *
California Teachers	98.0		89.0	87.0	86.0	85.0	85.0	87.0	78.0	71.0	73.1 *
Chicago Teachers	100.0	96.3	92.0	85.9	79.0	78.0	80.1	79.4	73.6	67.1	61.6 *
City of Austin ERS	96.4	86.9	86.9	80.8	78.0	75.9	78.3	65.9	71.8	69.6	68.0 *
Colorado Municipal	104.3	93.6	80.2	77.2	78.0	79.5	81.2	76.4	76.2	73.0	69.8 *
Colorado School	98.2	87.9	75.2	70.1	73.9	74.1	75.5	70.1	69.2	64.8	59.4 *
Colorado State	98.2	87.9	75.2	70.1	71.5	73.0	73.3	67.9	67.0	62.8	56.9 *
Connecticut SERS	63.1	61.6	56.7	54.5	53.3	53.2	53.6	51.9		44.4	43.3 *
Connecticut Teachers		75.9		65.3		59.5		70.0		61.4	58.7 *
Contra Costa County	87.6	89.6	85.4	82.0	84.8	84.3	89.9	88.5	83.8	80.3	77.8 *
DC Police & Fire	81.1	76.6	78.3	81.9	85.1	91.6	101.0	99.8	100.7	100.7	108.6
DC Teachers	107.4	107.0	103.8	101.9	102.1	111.2	111.6	108.2	110.8	118.3	101.9
Delaware State Employees	112.4	109.6	106.9	103.0	101.6	101.7	103.7	103.1	98.8	96.0	94.0
Denver Employees	99.5	101.7	98.0	99.1	97.4	98.6	98.2	91.9	88.4	85.0	82.3 *
Denver Schools	97.0	91.0	90.6	88.2	87.9	88.3	87.7	84.3	88.3	88.9	85.3 *
Duluth Teachers	107.6	100.4	95.7	91.8	86.4	84.1	86.8	82.1	76.6	81.7	73.2
Fairfax County Schools	103.0	95.6	90.1	84.9	84.9	86.4	88.0	76.9	76.5	76.5	74.0 *
Florida RS	117.9	115.0	114.2	112.1	107.3	105.6	105.7	105.4	87.1	86.6	86.9
Georgia ERS	101.7	101.1	100.5	97.6	97.2	94.5	93.0	89.4	85.7	80.1	76.0
Georgia Teachers	103.9	102.0	101.1	100.9	98.0	96.5	94.7	91.9	87.2	85.7	84.0 **
Hawaii ERS	90.6	84.0	75.9	71.7	68.6	65.0	67.5	68.8	64.6	61.4	59.4
Houston Firefighters	113.0	98.0		88.0	86.0	87.0	91.0	96.0	95.0	93.0	90.6
Idaho PERS	97.2	84.9	83.8	91.7	94.2	95.2	105.5	93.3	74.1	78.9	90.2
Illinois Municipal	106.4	101.5	97.6	94.3	94.6	95.3	96.1	84.3	83.2	83.3	81.5 *
Illinois SERS	65.8	53.7	42.6	54.2	54.4	52.2	54.2	46.1	43.5	37.4	35.6
Illinois Teachers	59.5	52.0	49.3	61.9	60.8	62.0	63.8	56.0	52.1	48.4	46.5
Illinois Universities	72.1	58.9	53.9	66.0	65.6	65.4	68.4	58.5	54.3	46.4	44.3
Indiana PERF	105.0	99.2	102.9	100.1	96.4	97.6	98.2	97.5	93.1	85.2	80.5
Indiana Teachers <sup>b</sup>	43.0	42.1	44.4	44.8	43.4	44.3	45.1	48.2	41.9	44.3	43.8
Iowa PERS	97.2	92.6	89.6	88.6	88.7	88.4	90.2	89.1	81.2	81.4	79.9
Kansas PERS	85.0	78.0	75.0	70.0	69.0	69.0	71.0	59.0	64.0	62.0	59.2 *

Plan name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Kentucky County	141.0	125.3	114.1	101.0	90.7	81.4	80.1	77.1	70.6	65.5	62.9
Kentucky ERS	125.8	110.7	98.0	85.8	74.6	61.3	58.4	54.2	46.7	40.3	35.6
Kentucky Teachers	90.8	86.6	83.5	80.9	76.3	73.1	71.9	68.2	63.6	61.0	57.4
LA County ERS	100.0	99.4	87.2	82.8	85.8	90.5	93.8	94.5	88.9	83.3	80.6
Louisiana SERS	74.2	70.2	66.2	59.6	61.5	64.3	67.2	67.6	60.8	57.7	57.6
Louisiana Teachers	78.4	73.9	68.8	63.1	64.6	67.5	71.3	70.2	59.1	54.4	55.1
Maine Local	108.2	122.8	116.3	112.1	114.2	112.2	113.6	112.7	102.5	96.3	93.5
Maine State and Teacher	73.1	69.6	67.6	68.5	69.8	71.3	74.1	74.1	67.7	66.0	80.2
Maryland PERS	102.2	98.0	93.1	91.2	86.7	80.4	79.5	77.2	63.9	62.8	62.8
Maryland Teachers	95.3	92.0	92.8	92.8	89.3	84.2	81.1	79.6	66.1	65.4	66.3
Massachusetts SERS	94.0	79.5	83.9	82.8	81.5	85.1	89.4	71.6	76.5	81.0	73.3*
Massachusetts Teachers	76.2	64.5	69.6	67.6	67.2	71.0	73.9	58.2	63.0	66.3	60.3*
Michigan Municipal	84.3	79.8	78.7	76.7	76.1	76.4	77.3	75.0	75.5	74.5	75.4*
Michigan Public Schools	96.5	91.5	86.5	83.7	79.3	87.5	88.7	83.6	78.9	71.1	64.7**
Michigan SERS	107.6	98.7	88.8	84.5	79.8	85.1	86.2	82.8	78.0	72.6	65.5**
Minneapolis ERF	93.3	92.4	92.3	92.1	91.7	92.1	85.9	76.4	55.9	65.6	72.5
Minnesota PERF	87.0	85.0	81.3	76.7	74.5	74.7	73.3	73.6	70.0	76.4	75.2
Minnesota State Employees	112.1	104.5	99.1	100.1	95.6	96.2	92.5	90.2	85.9	87.3	86.3
Minnesota Teachers	105.9	105.3	103.1	100.0	98.5	92.1	87.5	82.0	77.4	78.5	77.3
Mississippi PERS	87.5	83.4	79.0	74.9	72.4	73.5	73.7	72.9	67.3	64.2	62.2
Missouri DOT and Highway Patrol	66.1	61.5	56.2	53.4	53.9	55.5	58.2	59.1	47.3	42.2	43.3
Missouri Local	104.0	100.4	96.4	95.9	95.1	95.3	96.1	97.5	80.0	81.0	81.6
Missouri PEERS	103.1	97.6	81.9	82.7	83.3	80.5	83.2	82.5	80.7	79.1	85.3
Missouri State Employees	97.0	95.9	90.9	84.6	84.9	85.3	86.8	85.9	83.0	80.4	79.2
Missouri Teachers	99.4	95.3	81.1	82.0	82.7	82.6	83.5	83.4	79.9	77.7	85.5
Montana PERS		100.0		86.7	85.5	88.3	91.1	90.3	84.0	74.0	70.0
Montana Teachers		86.6		76.6	73.4	76.1	79.6	79.9	66.2	65.5	61.5
Nebraska Schools	87.2	94.9	90.6	87.2	85.6	87.2	90.5	90.6	86.6	82.4	80.4
Nevada Police Officer and Firefighter	78.9	78.1	73.9	71.7	69.8	68.9	71.1	70.8	68.9	67.8	68.4
Nevada Regular Employees	85.5	83.5	83.2	80.5	77.3	76.5	78.8	77.7	73.4	71.2	70.6
New Hampshire Retirement System	85.0	82.1	75.0	71.1	60.3	61.4	67.0	67.8	58.3	58.5	57.4
New Jersey PERS	117.1	107.3	97.9	91.3	85.3	78.0	76.0	73.1	64.9	62.0	66.8
New Jersey Police & Fire	100.8	95.8	88.4	84.0	80.1	78.4	77.6	74.3	70.8	69.0	74.9
New Jersey Teachers	108.0	100.0	92.7	85.6	79.1	76.3	74.7	70.8	63.8	57.6	63.2
New Mexico PERF	105.4	103.1	97.3	93.0	91.6	92.1	92.8	93.3	84.2	78.5	70.5
New Mexico Teachers	91.9	86.8	81.1	75.4	70.4	68.3	70.5	71.5	67.5	65.7	63.0
New York City ERS	117.4	112.0	104.0	94.5	88.4	82.3	79.0	79.7	78.7	77.2	75.9*
New York City Teachers	98.0	93.6	88.2	81.1	77.1	71.8	69.6	65.2	64.1	62.9	62.3*
New York State Teachers	125.0	99.6	99.4	99.2	98.8	102.6	104.2	106.6	103.2	100.3	96.7**
North Carolina Local Government	99.3	99.4	99.3	99.3	99.4	99.5	99.5	99.6	99.5	99.6	99.6*

Plan name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
North Carolina Teachers and State Employees	111.6	108.4	108.1	108.1	106.5	106.1	104.7	99.3	95.9	95.4	93.1*
North Dakota PERS	110.6	104.2	98.1	94.0	90.8	86.8	93.4	92.6	85.1	73.4	70.5
North Dakota Teachers	96.4	91.6	85.1	80.3	74.8	75.4	79.2	81.9	77.7	69.8	66.3
NY State & Local ERS	119.3	118.5	98.9	101.6	102.8	104.1	105.8	107.3	101.0	93.9	90.2
NY State & Local Police & Fire	132.1	128.6	103.4	105.0	104.8	105.2	106.5	108.0	103.8	96.7	91.9
Ohio PERS	103.0	86.0	85.0	88.0	89.0	93.0	96.0	75.0	75.0	76.1	76.0*
Ohio Police & Fire	92.8	82.6	86.5	80.9	78.4	78.2	81.7	65.1	71.1	72.8	76.0*
Ohio School Employees	95.0	90.2	83.6	78.1	75.3	76.4	80.8	82.0	68.4	72.6	65.2
Ohio Teachers	91.2	77.4	74.2	74.8	72.8	75.0	82.2	79.1	60.0	59.1	58.8
Oklahoma PERS	82.6	79.8	76.8	76.0	72.0	71.4	72.6	73.0	66.8	66.0	80.7
Oklahoma Teachers	51.4	51.4	54.0	47.3	49.5	49.3	52.6	50.5	49.8	47.9	56.7
Oregon PERS	106.7	91.0	97.0	96.2	104.2	110.5	112.2	80.2	85.8	86.9	79.0*
Pennsylvania School Employees	114.4	104.8	97.2	91.2	83.7	81.2	85.8	86.0	79.2	75.1	69.1
Pennsylvania State ERS	116.3	107.2	104.9	96.1	92.9	92.7	97.1	89.0	84.4	75.2	68.2*
Phoenix ERS	102.5	91.6	88.5	84.2	84.2	81.3	83.9	79.1	75.3	69.3	66.7
Rhode Island ERS	77.6	72.6	64.3	59.4	55.8	53.4	56.2	61.5	58.5	48.4	44.7*
Rhode Island Municipal	118.1	111.3	100.7	93.2	87.2	87.1	90.3	92.8	88.3	74.0	71.1*
San Diego County	106.8	75.4	75.5	81.1	80.3	83.6	89.7	94.4	91.5	84.3	81.5
San Francisco City & County	129.0	117.9	109.0	103.8	107.6	108.7	110.3	103.8	97.0	91.1	88.0
South Carolina Police	94.6	93.0	91.5	87.7	87.4	84.7	84.7	77.9	76.3	74.5	72.4*
South Carolina RS	87.4	86.0	82.8	80.3	71.6	69.6	69.7	69.3	67.8	65.5	64.0**
South Dakota PERS	96.4	96.7	97.2	97.7	96.6	96.7	97.1	97.2	91.8	96.3	96.4
St. Louis School Employees	80.5	82.1	84.0	86.3	87.6	87.2	87.6	87.6	88.4	88.6	82.8*
St. Paul Teachers	81.9	78.8	75.6	71.8	69.7	69.1	73.0	75.1	72.2	68.1	70.0
Texas County & District	89.3	88.7	90.5	91.0	91.4	94.3	94.3	88.6	89.8	89.4	89.6*
Texas ERS	104.9	102.5	97.6	97.3	94.8	95.2	95.6	92.6	87.8	83.2	82.6
Texas LECOS	131.6	124.7	111.5	109.3	103.1	101.7	98.0	92.0	86.1	83.1	83.7
Texas Municipal	85.0	84.2	82.6	82.8	82.7	82.1	73.7	74.4	75.8	82.9	85.1**
Texas Teachers	102.5	96.3	94.5	91.8	87.1	87.3	89.2	90.5	83.1	82.9	82.7
TN Political Subdivisions	90.4		91.9		92.7		89.5		86.3		89.2
TN State and Teachers	99.6		99.8		99.8		96.2		90.6		92.1
University of California	147.7	138.4	125.7	117.9	110.3	104.1	104.8	103.0	94.8	86.7	82.5
Utah Noncontributory	102.8	92.2	94.4	92.3	93.2	95.8	95.1	86.5	85.7	82.2	78.4**
Vermont State Employees	93.0	97.4	97.5	97.6	97.8	99.3	100.8	94.1	78.9	81.2	79.6
Vermont Teachers	89.0	89.5	89.6	90.2	90.7	84.6	84.9	80.9	65.4	66.5	63.8
Virginia Retirement System <sup>c</sup>	107.3	101.8	96.4	90.3	81.3	80.8	82.3	84.0	80.2	72.4	69.9**
Washington LEOFF Plan 1	129.0	120.0	112.0	109.0	113.0	116.0	122.0	128.0	125.0	127.0	123.5*
Washington LEOFF Plan 2	119.5	111.0	211.7	198.2	103.3	108.5	120.2	126.4	119.9	117.0	125.6*
Washington PERS 1	91.0	86.0	81.0	77.0	71.0	73.0	71.0	71.0	70.0	74.0	70.2*

Plan name	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Washington PERS 2/3	125.0	115.1	107.9	105.4	101.7	100.8	101.5	101.1	99.3	97.2	103.1*
Washington School Employees Plan 2/3	123.5	113.8	105.6	103.6	95.5	103.8	106.8	104.3	100.4	98.5	103.0*
Washington Teachers Plan 1	94.0	92.0	88.0	84.0	78.0	80.0	77.0	77.0	75.0	85.0	80.0*
Washington Teachers Plan 2/3	133.6	130.2	122.7	119.3	106.1	110.5	112.7	107.9	101.8	100.5	105.4*
West Virginia PERS	84.4	75.4	73.1	80.0	83.6	86.8	97.0	84.2	65.9	74.6	78.4
West Virginia Teachers	21.0	19.2	19.1	22.2	24.6	31.6	51.3	50.0	41.3	46.5	53.7
Wisconsin Retirement System	96.5	97.1	99.2	99.4	99.5	99.6	99.6	99.7	99.8	99.8	99.8**
Wyoming Public Employees	103.2	92.2	91.7	96.0	95.1	94.4	94.0	78.6	87.5	84.6	81.9

\* Numbers are authors' estimates.

\*\* Received from plan administrator.

<sup>a</sup> Funded ratios may vary across plans because of the discount rate used to value liabilities. While the median discount rate is 8.0 percent, the rates range from 8.5 percent in Minnesota and 8.25 percent in New Jersey, to 7.0 percent in Virginia and 6.25 percent in Vermont.

<sup>b</sup> The reported funded ratios of the Indiana TRF are made up of two separately funded accounts, the pre-1996 account and the 1996 account. The pre-1996 account is for employees hired prior to 1996 and is funded under a pay-go schedule. The 1996 account is for employees hired afterwards and is pre-funded. The funded ratio for the pre-funded account is currently 91.7 percent. As expected, the pay-go account has a much lower funded ratio of 32.0 percent.

<sup>c</sup> The funded ratios presented represent the "VRS" plan only for the state employees, teachers and political subdivisions. They do not reflect the information in the other plans – SPORS, JRS and VaLORS.

Sources: Various 2011 actuarial valuations; and *Public Plans Database* (2001-2010).

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