# The funding of state and local pensions: 2015-2020

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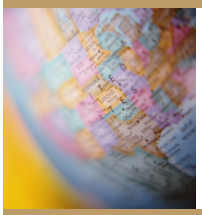

CENTER for RETIREMENT RESEARCH at BOSTON COLLEGE

State and Local Pension Plans

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# THE FUNDING OF STATE AND LOCAL PENSIONS: 2015-2020

*By Alicia H. Munnell and Jean-Pierre Aubry**

## Introduction

The funded status of state and local pension plans based on the Governmental Accounting Standards Board's traditional rules (GASB 25) increased slightly in 2015. The main reason is that, despite the poor stock market performance in 2015, returns over the last five years have been strong. Conversely, the funded status based on the new GASB 67 rules, with assets at market value, showed a slight decline in the funded rate primarily due to the subpar 2015 returns.

In 2015, most plan sponsors continued to maintain the traditional GASB rules (with smoothed assets and expected long-run returns for discounting) in their actuarial reports for the purposes of funding. For reporting in their financial documents, however, all plans adopted the new GASB rules of valuing assets at market, and 10 plans in the *Public Plans Database* also used a blended discount rate to account for a projected exhaustion of assets. This *brief* focuses more on the data in the actuarial reports used for funding purposes, because they provide the basis for historical comparisons and for funding decisions.

The discussion is organized as follows. The first section reports that the ratio of assets to liabilities for the 160 plans in the *Public Plans Database* increased slightly from 73 percent in 2014 to 74 percent in 2015. The second section shows that the required contribution, for the sample as a whole, increased to 18.6 percent of payrolls, while the percentage of required contribution paid increased to 91 percent from 86 percent in 2014. Given the controversy about the appropriate discount rate, the third section revalues liabilities and recalculates funded ratios using a variety of discount rates. The fourth section briefly examines the plans that, for reporting purposes, use a blended

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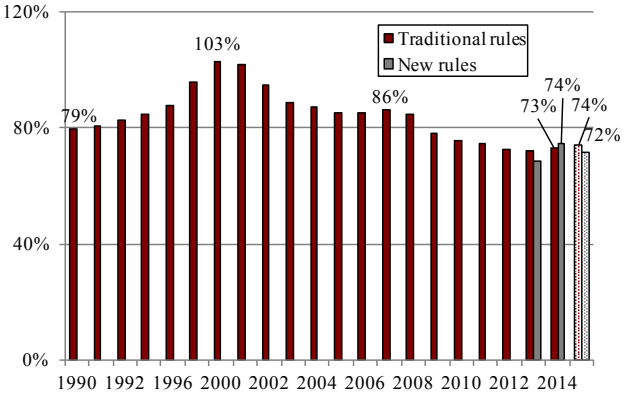
discount rate under the new GASB standards. The fifth section projects reported funded ratios for our sample plans for 2016-20 under the assumption that plans meet their expected returns and under an alternative assumption that they realize the substantially lower returns projected by many investment firms. The final section concludes that, if plans realize their assumed returns, the public pension landscape should continue to improve over the next few years; but if returns fall short, funded levels will deteriorate.

## Funded Status in 2015

This section reports funded ratios under both the traditional GASB rules and the new GASB rules, which first went into effect in 2014. The new rules involve two major changes relating to the valuation of assets and liabilities used to measure reported funded ratios. First, assets are reported at market value rather than actuarially smoothed. Second, projected benefit payments are discounted by a combined rate that reflects: 1) the expected return for the portion of liabilities that is projected to be covered by plan assets; and 2) the return on high-grade municipal bonds for any portion that is to be covered by other resources.[1]

Figure 1. State and Local Pension Funded Ratios, FY 1990-2015

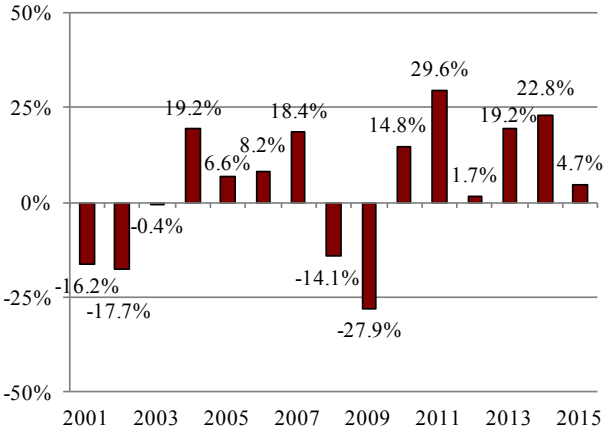



Notes: The 2013 funded ratio under the new rules was reported by plans to show the change between 2013 and 2014. 2015 involves projections for about one third of plans.
*Sources*: 2015 actuarial valuations; *Public Plans Database* (PPD) (2001-2015); and Zorn (1990-2000).

In fiscal year (FY) 2015, the estimated aggregate ratio of assets to liabilities for our sample of 160 state and local pension plans was 74 percent under the traditional rules and 72 percent under the new rules (see Figure 1).[2] (The ratio for each individual plan appears in the Appendix).

The 74-percent funded level from the actuarial reports reflects liabilities of $4.5 trillion and smoothed asset values of $3.4 trillion; the 72-percent level under the new rules reflects very similar liabilities but assets of $3.2 trillion. The difference in asset values is due to the performance of the stock market. The last five years have been a combination of three terrific years and two weak years; 2015 was one of the weak years (see Figure 2).

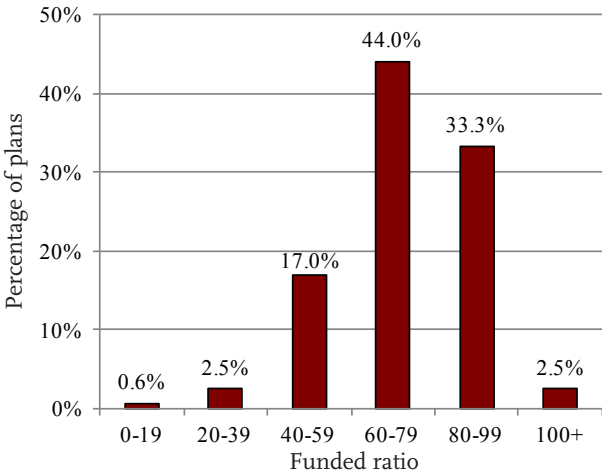
Figure 2. Percentage Change in Wilshire 5000 Index, FY 2001-2015




Note: Data for 2015 available through May 30, 2015.
*Source*: Wilshire Associates (2016).

In 2015, as in earlier years, funded levels among plans vary substantially. Figure 3 (on the next page) shows the distribution of funding for the sample of 160 plans under the traditional rules. Although many of the poorly-funded plans are relatively small, several large plans, such as three in Illinois (SERS, Teachers, and Universities) and one in Connecticut (SERS), had funded levels below 50 percent.

Figure 3. Distribution of Funded Ratios for Public Plans under Traditional Rules, FY 2015




*Sources*: 2015 actuarial valuations; and authors' calculations from PPD (2015).

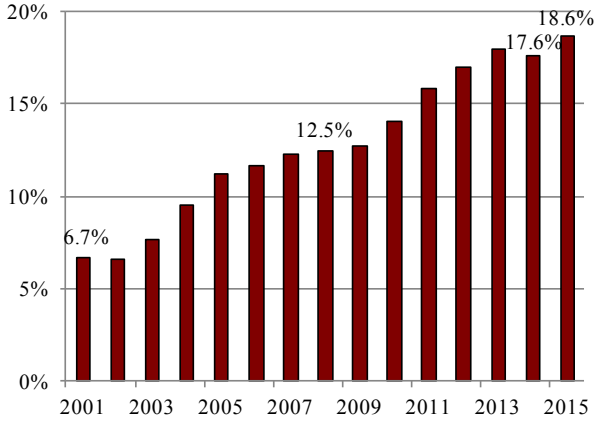
## The ADEC (Formerly the ARC)

Last year, the new GASB standards replaced the Annual Required Contribution (ARC) with the Actuarially Determined Employer Contribution (ADEC). Unlike with assets and liabilities, plans do not seem to be maintaining two sets of required-contribution numbers – one for the actuarial valuation and one for the financial statements – but rather have shifted to using the ADEC for both purposes.

While both the ARC and ADEC are meant to capture the employer's "required contribution" to keep the plan on a steady path toward full funding, the two concepts differ slightly. First, while GASB limited the range of allowable assumptions and methods that could be used to calculate the ARC, GASB allows more flexibility for calculating the ADEC. Second, for single-employer and agent plans that use a statutory contribution rate, GASB allows for the ADEC to reflect the statutory contribution rather than an actuarially calculated contribution. While conceptually these differences could cause a discontinuity between the ARC and the ADEC, in practice they do not appear to be consequential. Thus, it seems reasonable to extend our prior ARC series using the ADEC.

Both the ARC and the ADEC equal normal cost – the present value of the benefits accrued in a given year – plus a payment to amortize the unfunded liability, generally over 20-30 years. These measures have increased mainly because the financial crisis led to higher unfunded liabilities and, thereby, a higher amortization component of the calculation. In 2015, the ADEC was 18.6 percent of payroll for the sample as a whole, up sharply from 2014 (see Figure 4).

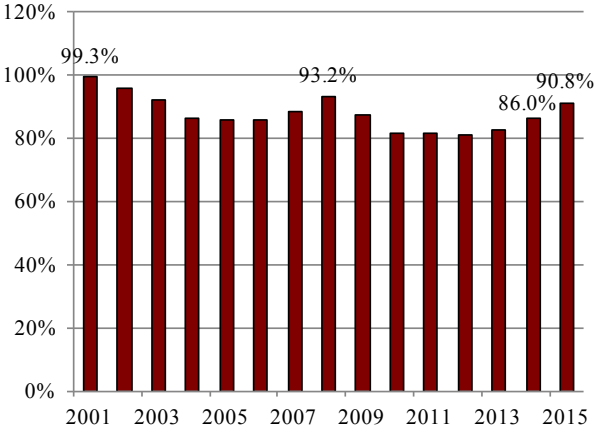
Figure 4. Required Contribution as a Percentage of Payroll, FY 2001-2015




Notes: The 2001-13 measure is the ARC ; the 2014-15 measure is the ADEC. The 2015 value involves projections for about one third of plans.
*Sources*: 2015 actuarial valuations; and PPD (2001-2015).

Despite the increase in the ADEC as a percentage of payroll, sponsors are paying an increasing share of their required contribution, rising to 91 percent in 2015 (see Figure 5). This improvement mirrors the

Figure 5. Percentage of Required Contribution Paid, FY 2001-2015



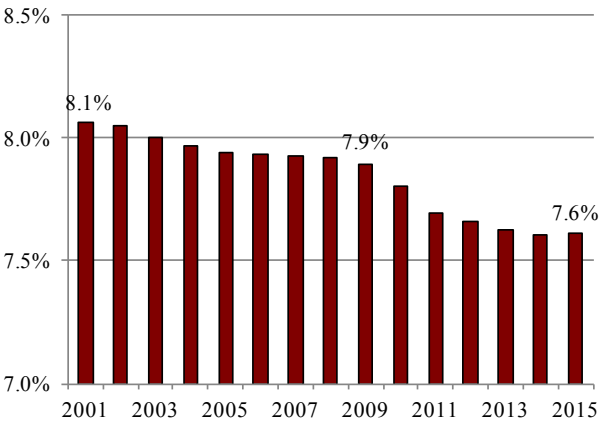

Notes: The 2001-2013 measure is the ARC; the 2014-15 measure is the ADEC. The 2015 value is authors' estimate.
*Sources*: 2015 actuarial valuations; and PPD (2001-2015).

pattern of decline and recovery in the percentage of required contribution paid in the wake of the bursting of the dot.com bubble at the turn of the century.

## Sensitivity of Funded Status to Assumed Discount Rate

Under GASB's traditional rules for funded ratios, assets are reported on an actuarially smoothed basis and the discount rate is the long-run expected rate of return. The discount rate has declined in recent years from around 8.0 percent to 7.6 percent in 2015 (see Figure 6).

Figure 6. Discount Rates for Public Plans under Traditional Rules, FY 2001-2015




*Sources*: 2015 actuarial valuations; and PPD (2001-2015).

Financial economists argue that – *for reporting purposes* – future streams of payment should be discounted at a rate that reflects their risk rather than at the expected return.[3] Moreover, even many who agree that the expected return may be appropriate for funding purposes are concerned about the level of assumed returns in the current financial market environment. Hence, Table 1 shows liabilities and funded ratios under alternative discount rate assumptions.

Table 1. Aggregate State and Local Pension Measures under Alternative Discount Rates, FY 2015, Trillions of Dollars

| Measure | Discount rate | | | | |
|---|---|---|---|---|---|
| | 7.6% | 7% | 6% | 5% | 4% |
| Total liability | $4.5 | $5.1 | $5.8 | $6.6 | $7.5 |
| Actuarial assets | 3.4 | 3.4 | 3.4 | 3.4 | 3.4 |
| Unfunded liability | 1.2 | 1.8 | 2.5 | 3.3 | 4.1 |
| Percent funded (Traditional rules) | 74% | 65% | 58% | 51% | 45% |

*Sources*: 2015 actuarial valuations; and authors' calculations from PPD (2015).

## GASB 67

As discussed, the new GASB 67 rules require plans to report their assets at market value and to use a blended discount rate if they expect to exhaust all of their assets. In 2015, 10 plans in our sample adopted a significantly lower blended rate (see Table 2). These 10 include the seven that had adopted a blended rate in 2014 plus Cincinnati ERS, Cook County, and Dallas Police & Fire – plans that were added as the sample was expanded from 150 to 160. Although the blended rate dramatically reduces the funded status of these plans, the change has only a small effect on overall funding because these plans account for only 6 percent of sample assets.

Table 2. Plans Adopting a Significantly Lower GASB 67 Blended Rate, 2015

| Plan | Rate | | Funded status | |
|---|---|---|---|---|
| | Actuarial | GASB 67 | Actuarial | GASB 67 |
| Cincinnati ERS | 7.5% | 5.6% | 64.3% | 57.5% |
| Cook County Employees | 7.5 | 4.5 | 57.6 | 41.4 |
| Dallas Police & Fire | 7.3 | 4.5 | 63.8 | 38.2 |
| Duluth Teachers | 8.0 | 5.4 | 56.9 | 46.8 |
| Kentucky Teachers | 7.5 | 4.9 | 55.3 | 42.5 |
| New Jersey PERS | 7.9 | 4.9 | 59.5 | 38.2 |
| New Jersey Police & Fire | 7.9 | 6.3 | 72.6 | 52.8 |
| New Jersey Teachers | 7.9 | 4.7 | 51.1 | 28.7 |
| Texas ERS | 8.0 | 6.9 | 76.3 | 64.4 |
| Texas LECOS | 8.0 | 5.0 | 72.0 | 47.8 |

*Sources*: 2015 actuarial valuations; and PPD (2015).

## Looking Beyond 2015

Future funded levels depend on three factors: 1) cash flows (contributions and benefits); 2) the growth in liabilities; and 3) the performance of the stock market. Both contributions and benefits rise slowly over time, so their average growth for the period 2016-2020 is assumed to equal their average growth over 2001-15.[4] Growth in liabilities, which will likely be restrained by the long-term benefit cutbacks enacted in recent years, is assumed to hold steady at the 2015 level of 4.2 percent.[5]

Public pensions currently hold about 70 percent of their assets in risky investments, including more than half of their assets in equities. As discussed, on average, plans assume a nominal return of 7.6 percent on their whole portfolios, which implies nominal stock returns of 9.6 percent. In contrast, many investment firms project much lower equity returns (see Table 3). To address uncertainty about the future performance of plan assets over the next five years, projections are made under two scenarios. Under the baseline scenario, plans achieve their assumed nominal returns of 7.6 percent on average. Under the alternative scenario, which assumes a 5.5-percent nominal return on risky assets, plans earn a return of 4.6 percent on their overall portfolio.

Table 3. Expected Nominal Returns for U.S. Equities from Selected Investment Firms

| Firm | Average annual nominal returns (%) | Horizon (years) |
|---|---|---|
| Bogle and Nolan[a] | 7 | 10 |
| Charles Schwab | 6.3 | 10 |
| Goldman Sachs | 4.7-5.5 | 5 |
| GMO | -0.1 | 7 |
| JP Morgan | 7 | 10-15 |
| McKinsey | Slow: 6.0-6.5<br>Recovery: 8.0-9.0 | 20 |
| Morningstar[b] | 6-7 | Next few decades |
| Research Affiliates[c] | 3.2 | 10 |

[a] The authors are affiliated with Vanguard's Bogle Center.
[b] Josh Peters, Director of Equity-Income Strategy.
[c] 1.2 percent real return + (our assumed) 2-percent inflation.
*Sources*: Bogle and Nolan (2015); GMO (2016); Goldman Sachs (2016); JP Morgan (2015); McKinsey Global Institute (2016); Morningstar (2015); and Research Affiliates (2016).

The projected funded ratios are shown in Table 4. After 2015 – if plans achieve their assumed returns – funded ratios drift slightly higher, as asset growth continues to exceed assumed liability growth.[6] If, instead, returns are at the lower rates predicted by the investment firms, funding starts to decline.

Table 4. Projected Funded Ratios under Traditional Rules for Two Scenarios of Asset Returns, FY 2016-2020

| Year | Baseline | Alternative |
|---|---|---|
| 2015 (actual) | 74.1% | 74.1% |
| 2016 | 74.9 | 74.7 |
| 2017 | 75.2 | 74.2 |
| 2018 | 75.5 | 73.3 |
| 2019 | 76.3 | 72.3 |
| 2020 | 77.6 | 71.2 |

*Source*: Authors' projections.

## Conclusion

The year 2015 produced little change in the funded status of state and local pension plans. Based on actuarial valuations, funding rose from 73 percent in 2014 to 74 percent in 2015. Under the new GASB rules, where assets are valued at market, funding declined slightly, reflecting the poor stock market performance in 2015.

2015 was the second year that the new rules were in effect for financial reporting. Under these provisions, funded ratios were based on market asset values and 10 plans – those with assets projected to be insufficient to cover future benefits – adopted a blended rate to calculate liabilities. As a result of these two provisions, the overall ratio of assets to liabilities was lower under the new rules than under the traditional rules.

What happens from here on out depends very much on investment performance. In 2020, assuming expected returns are realized, plans should be 78 percent funded. If returns are lower, as predicted by many investment firms, funding will drift lower.

## Endnotes

1 In addition, the entry age normal/level percentage of payroll would be the sole allocation method used for reporting purposes (roughly three quarters of plans already use this method).

2 The sample represents about 90 percent of the assets in state-administered plans and 30 percent of those in plans administered at the local level.

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 The focus here is on contributions, where growth remains fairly steady, rather than on the percentage of required contributions paid, which is more variable.

5 See Munnell et al. (2013). From 2001-2014, liabilities have grown an average of 5.6 percent annually. In 2014, liabilities grew by 4.9 percent in aggregate. For the 90 or so plans that did report in 2015, liabilities grew by 4.0 percent. For the remaining plans, we assume a 4.5-percent growth rate, resulting in aggregate liability growth of 4.2 percent for 2015.

6 Given the poor investment performance in 2016, nominal investment returns from 2017-2020 will need to be 9.7 percent for plans to realize their assumed return from 2015 to 2020.

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# APPENDIX

Appendix: Funded Ratio Under Traditional Rules for State and Local Plans, 2001, 2004, 2007, and 2010-2015

| Plan name | 2001 | 2004 | 2007 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Alabama ERS | 100.2 | 89.7 | 79.0 | 68.2 | 65.8 | 65.7 | 65.7 | 66.9 | 69.2* |
| Alabama Teachers | 101.4 | 89.6 | 79.5 | 71.1 | 67.5 | 66.5 | 66.2 | 67.5 | 69.8* |
| Alameda County Employee's Retirement Association | 105.8 | 82.1 | 89.2 | 77.5 | 76.6 | 73.9 | 75.9 | 74.8 | 76.0* |
| Alaska PERS | 100.9 | 70.2 | 77.8 | 62.4 | 61.9 | 57.1 | 54.5 | 59.7 | 58.6* |
| Alaska Teachers | 95.0 | 62.8 | 68.2 | 54.3 | 54.0 | 49.9 | 48.1 | 54.5 | 53.1* |
| Arizona Public Safety Personnel | 126.9 | 92.4 | 66.4 | 67.7 | 63.7 | 60.2 | 58.7 | 49.2 | 49.0 |
| Arizona SRS | 115.1 | 92.5 | 83.3 | 76.4 | 75.5 | 75.3 | 75.4 | 76.3 | 77.1 |
| Arizona State Corrections Officers | 140.0 | 104.8 | 84.6 | 83.8 | 76.6 | 70.7 | 66.9 | 57.3 | 57.3 |
| Arkansas PERS | 105.6 | 88.7 | 89.1 | 74.1 | 70.7 | 68.9 | 74.3 | 77.8 | 79.1 |
| Arkansas Teachers | 95.4 | 83.8 | 85.3 | 73.8 | 71.8 | 71.2 | 73.3 | 77.3 | 80.0* |
| Atlanta General Employees Pension Fund | | 61.3 | 52.2 | 53.7 | 51.2 | 51.0 | 51.2 | 55.5 | 54.7* |
| Baltimore Fire and Police Employees Retirement System | 100.1 | 96.8 | 91.9 | 83.2 | 82.0 | 77.6 | 76.6 | 74.2 | 72.8 |
| Baton Rouge City Parish Retirement System | 90.2 | 83.6 | 84.6 | 73.9 | 72.2 | 72.0 | 73.0 | 71.0 | 68.8* |
| Boston Retirement Board[a] | 70.3 | 63.3 | 67.6 | 63.1 | 61.4 | 61.9 | 59.5 | 61.0 | 60.9* |
| California PERF | 111.9 | 87.3 | 87.2 | 83.4 | 82.6 | 83.1 | 75.2 | 76.3 | 74.5* |
| California Teachers | 98.0 | 82.5 | 88.8 | 71.5 | 69.3 | 67.2 | 66.9 | 68.5 | 69.0* |
| Chicago Municipal Employees | 93.3 | 72.0 | 69.1 | 50.8 | 45.2 | 37.6 | 37.0 | 40.9 | 37.2* |
| Chicago Police | 70.5 | 55.9 | 51.5 | 40.4 | 36.2 | 31.3 | 29.7 | 26.1 | 26.8* |
| Chicago Teachers | 100.0 | 85.8 | 80.1 | 66.9 | 59.7 | 53.9 | 49.5 | 51.5 | 51.8 |
| Cincinnati Employees Retirement System | 115.4 | 94.7 | 86.2 | 75.1 | 66.8 | 61.3 | 63.2 | 64.3 | 65.6* |
| City of Austin ERS | 96.4 | 80.8 | 78.3 | 69.6 | 65.8 | 63.9 | 70.4 | 70.9 | 67.3* |
| Colorado Municipal | 104.3 | 77.2 | 81.2 | 73.0 | 69.3 | 74.5 | 73.1 | 78.7 | 80.8* |
| Colorado School | 98.2 | 70.1 | 75.5 | 64.8 | 60.2 | 62.1 | 60.3 | 60.9 | 62.5* |
| Colorado State | 98.2 | 70.1 | 73.3 | 62.8 | 57.7 | 59.2 | 57.5 | 57.8 | 59.3* |
| Connecticut Municipal | 109.3 | 102.9 | 103.7 | 88.4 | 88.3 | 85.0 | 87.5 | 87.8 | 87.8 |
| Connecticut SERS | 63.1 | 54.5 | 53.6 | 44.4 | 47.9 | 42.3 | 41.2 | 41.5 | 43.3 |
| Connecticut Teachers | | 65.3 | | 61.4 | | 55.2 | | 59.0 | 58.8* |
| Contra Costa County | 87.6 | 82.0 | 89.9 | 80.3 | 78.5 | 70.6 | 76.4 | 81.7 | 84.1* |
| Cook County Employees | 88.9 | 70.9 | 77.3 | 60.7 | 57.5 | 53.5 | 56.6 | 57.5 | 56.1* |
| Dallas Police and Fire | 84.5 | 80.8 | 89.4 | 79.5 | 74.0 | 78.1 | 75.6 | 63.8 | 57.3* |
| DC Police & Fire | | | 101.0 | 108.0 | 108.6 | 110.1 | 110.1 | 107.3 | 107.6 |
| DC Teachers | | | 111.6 | 118.3 | 101.9 | 94.4 | 90.1 | 88.6 | 88.7 |
| Delaware State Employees | 112.4 | 103.0 | 103.7 | 96.0 | 94.0 | 91.5 | 91.1 | 92.3 | 91.6 |
| Denver Employees | 99.5 | 99.1 | 98.2 | 85.0 | 81.6 | 76.4 | 76.4 | 76.4 | 74.7* |
| Denver Schools | 96.5 | 88.2 | 87.7 | 88.9 | 81.5 | 84.0 | 81.2 | 82.6 | 84.8* |
| Detroit Police and Fire Retirement System | 112.6 | 79.7 | 110.5 | 102.3 | 99.9 | 96.1 | 89.3 | 81.0 | 73.1* |

| Plan name | 2001 | 2004 | 2007 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Duluth Teachers | 107.6 | 91.8 | 86.8 | 81.7 | 73.2 | 63.4 | 54.0 | 56.9 | |
| Fairfax County Schools | 103.0 | | 86.4 | 75.6 | 76.4 | 75.6 | 75.4 | 76.7 | 77.7 |
| Florida RS | 117.9 | 112.1 | 105.6 | 88.0 | 86.9 | 86.4 | 85.4 | 86.6 | 86.5 |
| Georgia ERS | 101.7 | 97.6 | 93.0 | 80.1 | 76.0 | 73.1 | 71.4 | 72.8 | 72.8** |
| Georgia Teachers | 103.9 | 100.9 | 94.7 | 85.7 | 84.0 | 82.3 | 81.1 | 81.9 | 85.4* |
| Hawaii ERS | 90.6 | 71.7 | 67.5 | 61.4 | 59.4 | 59.2 | 60.0 | 61.4 | 62.2 |
| Houston Firefighters | 112.9 | 88.2 | 91.1 | 93.4 | 90.6 | 87.0 | 86.6 | 90.5 | 92.6* |
| Idaho PERS | 97.2 | 91.7 | 105.5 | 78.9 | 90.2 | 84.7 | 85.3 | 93.9 | 90.4 |
| Illinois Municipal | 106.4 | 94.3 | 96.1 | 83.3 | 83.0 | 84.3 | 87.6 | 87.3 | 89.0* |
| Illinois SERS | 65.8 | 54.2 | 54.2 | 37.4 | 35.5 | 34.7 | 34.2 | 33.7 | 36.2 |
| Illinois Teachers[b] | 59.5 | 61.9 | 63.8 | 48.4 | 46.5 | 42.1 | 40.6 | 40.6 | 42.0 |
| Illinois Universities | 72.1 | 66.0 | 68.4 | 46.4 | 44.3 | 42.1 | 41.5 | 42.3 | 43.3 |
| Indiana PERF | 105.0 | 100.1 | 98.2 | 85.2 | 80.5 | 76.6 | 80.2 | 82.4 | 78.6 |
| Indiana Teachers[c] | 43.0 | 44.8 | 45.1 | 44.3 | 43.8 | 42.7 | 45.7 | 48.1 | 46.4 |
| Iowa Municipal Fire and Police | | 84.2 | 87.2 | 81.1 | 78.2 | 73.7 | 73.9 | 77.8 | 80.8 |
| Iowa PERS | 97.2 | 88.6 | 90.2 | 81.4 | 79.9 | 79.9 | 81.0 | 82.7 | 83.7 |
| Jacksonville General Employee Pension Plan | 96.5 | 82.6 | 89.9 | 75.9 | 71.3 | 62.4 | 62.3 | 65.8 | 63.9* |
| Kansas PERS | 88.3 | 75.2 | 69.4 | 63.7 | 62.2 | 59.2 | 59.9 | 62.3 | 64.5* |
| Kentucky County | 141.0 | 101.0 | 80.1 | 65.5 | 62.9 | 60.0 | 59.5 | 61.9 | 59.7 |
| Kentucky ERS | 125.8 | 85.8 | 58.4 | 40.3 | 35.6 | 29.7 | 25.8 | 23.9 | 21.9 |
| Kentucky Teachers | 90.8 | 80.9 | 71.9 | 61.0 | 57.4 | 54.5 | 51.9 | 53.6 | 55.3 |
| Kern County Employees Retirement Association | 103.3 | 93.6 | 75.7 | 62.7 | 60.8 | 60.5 | 61.1 | 60.8 | 62.4 |
| LA County ERS | 100.0 | 82.8 | 93.8 | 83.3 | 80.6 | 76.1 | 75.0 | 79.5 | 83.3 |
| Los Angeles City Employees' Retirement System | 108.1 | 82.5 | 81.7 | 75.9 | 72.4 | 69.0 | 68.7 | 67.4 | 69.2* |
| Los Angeles Fire and Police | 118.9 | 103.0 | 99.2 | 91.6 | 86.3 | 83.7 | 83.1 | 86.6 | 89.0* |
| Los Angeles Water and Power | 109.9 | 97.3 | 91.9 | 81.5 | 80.3 | 78.1 | 78.8 | 80.9 | 86.9* |
| Louisiana Municipal Police | 101.1 | 72.9 | 89.1 | 59.9 | 58.1 | 59.8 | 64.2 | 68.1 | 69.9 |
| Louisiana Schools | 103.0 | 75.8 | 80.0 | 61.0 | 59.9 | 61.6 | 62.1 | 66.9 | 70.7 |
| Louisiana SERS | 74.2 | 59.6 | 67.2 | 57.7 | 57.6 | 55.9 | 60.2 | 59.3 | 62.1 |
| Louisiana State Parochial Employees | | 93.5 | 96.9 | 97.2 | 97.6 | 86.8 | 92.5 | 96.9 | 96.0* |
| Louisiana Teachers | 78.4 | 63.1 | 71.3 | 54.4 | 55.1 | 55.4 | 56.4 | 57.4 | 60.9 |
| Maine Local | 108.2 | 112.1 | 113.6 | 96.3 | 93.5 | 88.8 | 88.4 | 91.2 | 91.1* |
| Maine State and Teacher | 73.1 | 68.5 | 74.1 | 66.0 | 77.6 | 77.0 | 77.7 | 81.4 | 81.4* |
| Maryland PERS | 102.2 | 91.2 | 79.5 | 62.8 | 62.8 | 62.5 | 63.3 | 65.9 | 66.7 |
| Maryland Teachers | 95.3 | 92.8 | 81.1 | 65.4 | 66.3 | 65.8 | 67.1 | 70.7 | 71.9 |
| Massachusetts SRS | 91.8 | 83.9 | 85.1 | 76.5 | 81.0 | 73.8 | 69.1 | 70.3 | 67.5 |
| Massachusetts Teachers | 79.2 | 69.6 | 71.0 | 63.0 | 66.3 | 60.7 | 55.7 | 56.3 | 54.3 |
| Michigan Municipal | 84.3 | 76.7 | 77.3 | 74.5 | 72.6 | 71.4 | 71.7 | 70.6 | 70.5* |
| Michigan Public Schools | 96.5 | 83.7 | 88.7 | 71.1 | 64.7 | 61.3 | 59.6 | 59.9 | 58.5* |
| Michigan SERS | 107.6 | 84.5 | 86.2 | 72.6 | 65.5 | 60.3 | 60.3 | 61.6 | 60.9* |

| Plan name | 2001 | 2004 | 2007 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Milwaukee City ERS | 137.2 | 116.7 | 131.2 | 104.4 | 96.0 | 90.8 | 94.8 | 97.2 | 98.8* |
| Minneapolis ERF | 93.3 | 92.1 | 85.9 | 65.6 | 73.5 | 69.1 | 74.4 | 82.0 | 76.3 |
| Minnesota GERF | 87.0 | 76.7 | 73.3 | 76.4 | 75.2 | 73.5 | 72.8 | 73.5 | 76.3 |
| Minnesota Police and Fire Retirement Fund | 120.5 | 101.2 | 91.7 | 87.0 | 82.9 | 78.3 | 81.2 | 80.0 | 83.6 |
| Minnesota State Employees | 112.1 | 100.1 | 92.5 | 87.3 | 86.3 | 82.7 | 82.0 | 83.0 | 85.7 |
| Minnesota Teachers | 105.8 | 100.0 | 87.5 | 78.5 | 77.3 | 73.0 | 71.6 | 74.1 | 77.1 |
| Mississippi PERS | 87.5 | 74.9 | 73.7 | 64.2 | 62.2 | 58.0 | 57.7 | 61.0 | 60.4 |
| Missouri DOT and Highway Patrol | 66.1 | 53.4 | 58.2 | 42.2 | 43.3 | 46.3 | 46.2 | 49.2 | 52.9 |
| Missouri Local | 104.0 | 95.9 | 96.1 | 81.0 | 81.6 | 83.5 | 86.5 | 91.7 | 94.4 |
| Missouri PEERS | 103.1 | 82.7 | 83.2 | 79.1 | 85.3 | 82.5 | 81.6 | 85.1 | 86.8 |
| Missouri State Employees | 97.0 | 84.6 | 86.8 | 80.4 | 79.2 | 73.2 | 72.7 | 75.1 | 75.0 |
| Missouri Teachers | 99.4 | 82.0 | 83.5 | 77.7 | 85.5 | 81.5 | 80.1 | 82.8 | 83.9 |
| Montana PERS | | 86.7 | 91.0 | 74.2 | 70.2 | 67.4 | 80.2 | 74.4 | 76.1 |
| Montana Teachers | | 77.4 | 80.4 | 65.4 | 61.5 | 59.2 | 66.8 | 65.4 | 67.5 |
| Nashville-Davidson Metropolitan Employees Benefit Trust Fund | 94.1 | 93.2 | 89.6 | 90.8 | 88.7 | 84.7 | 82.6 | 89.7 | 93.4* |
| Nebraska Schools | 87.2 | 87.2 | 90.5 | 82.4 | 80.4 | 76.6 | 77.1 | 82.7 | 88.0 |
| Nevada Police Officer and Firefighter | 78.9 | 71.7 | 71.1 | 67.8 | 68.4 | 70.1 | 71.1 | 74.3 | 70.3* |
| Nevada Regular Employees | 85.5 | 80.5 | 78.8 | 71.2 | 70.6 | 71.2 | 68.9 | 70.8 | 72.5* |
| New Hampshire Retirement System[d] | 85.0 | 71.1 | 67.0 | 58.5 | 57.4 | 56.1 | 56.7 | 60.7 | 63.3* |
| New Jersey PERS | 117.1 | 91.3 | 76.0 | 69.5 | 66.8 | 63.6 | 62.1 | 60.9 | 59.5 |
| New Jersey Police & Fire | 100.8 | 84.0 | 77.6 | 77.1 | 75.0 | 74.3 | 73.1 | 72.6 | 72.6 |
| New Jersey Teachers | 108.0 | 85.6 | 74.7 | 67.1 | 62.8 | 59.5 | 57.1 | 54.0 | 51.1 |
| New Mexico Educational | 91.9 | 75.4 | 70.5 | 65.7 | 63.0 | 60.7 | 60.1 | 63.1 | 63.7 |
| New Mexico PERA | 105.4 | 93.1 | 92.8 | 78.5 | 70.5 | 65.3 | 72.9 | 75.8 | 74.9 |
| New York City ERS | 117.4 | 94.5 | 79.0 | 64.2 | 65.0 | 66.3 | 68.4 | 70.3 | 76.2* |
| New York City Fire | 84.7 | 63.9 | 55.1 | 48.2 | 50.3 | 52.3 | 54.3 | 56.6 | 59.0* |
| New York City Police | 104.5 | 80.1 | 68.9 | 60.1 | 61.1 | 63.7 | 66.8 | 66.9 | 68.7* |
| New York City Teachers | 98.0 | 81.1 | 69.6 | 58.9 | 58.2 | 57.6 | 57.7 | 57.7 | 68.7* |
| New York State Teachers | 125.0 | 99.2 | 104.2 | 100.3 | 96.7 | 89.8 | 87.5 | 92.9 | 93.6* |
| North Carolina Local Government[e] | 99.3 | 99.3 | 99.5 | 99.5 | 99.6 | 99.8 | 99.8 | 99.8 | 99.8 |
| North Carolina Teachers and State Employees[f] | 112.8 | 108.1 | 106.1 | 95.9 | 95.4 | 94.0 | 94.2 | 94.8 | 95.6 |
| North Dakota PERS | 110.6 | 94.0 | 93.3 | 73.4 | 70.5 | 65.1 | 62.0 | 64.5 | 68.6 |
| North Dakota Teachers | 96.4 | 80.3 | 79.2 | 69.8 | 66.3 | 60.9 | 58.8 | 61.8 | 61.6 |
| NY State & Local ERS | 120.1 | 100.5 | 105.8 | 93.9 | 90.2 | 87.2 | 88.5 | 92.0 | 93.8 |
| NY State & Local Police & Fire | 132.6 | 104.1 | 106.5 | 96.7 | 91.9 | 87.9 | 89.5 | 93.1 | 93.2 |
| Ohio PERS | 102.6 | 87.6 | 96.3 | 79.1 | 77.4 | 80.9 | 82.4 | 83.8 | 81.4* |
| Ohio Police & Fire | 92.7 | 80.9 | 81.7 | 69.4 | 63.1 | 64.2 | 66.7 | 70.8 | 64.3* |
| Ohio School Employees | 95.0 | 78.1 | 80.8 | 72.6 | 65.2 | 62.8 | 65.3 | 68.1 | 69.3* |
| Ohio Teachers | 91.2 | 74.8 | 82.2 | 59.1 | 58.8 | 56.0 | 66.3 | 69.3 | 69.3 |

| Plan name | 2001 | 2004 | 2007 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Oklahoma PERS | 82.6 | 76.1 | 72.6 | 66.0 | 80.7 | 80.2 | 81.6 | 88.6 | 93.6 |
| Oklahoma Police Pension and Retirement System | 91.4 | 81.1 | 79.9 | 74.9 | 93.0 | 90.2 | 89.3 | 94.6 | 98.2 |
| Oklahoma Teachers | 51.4 | 47.3 | 52.6 | 47.9 | 56.7 | 54.8 | 57.2 | 63.2 | 66.6 |
| Omaha School Employee Retirement System | 89.2 | 83.8 | 89.0 | 73.5 | 73.2 | 72.5 | 72.6 | 74.1 | 73.0 |
| Orange County ERS | 94.7 | 70.9 | 74.1 | 69.8 | 67.0 | 62.5 | 66.0 | 69.8 | 71.6* |
| Oregon PERS | 97.6 | 97.0 | 110.5 | 85.8 | 86.9 | 82.0 | 90.7 | 95.9 | 83.6 |
| Pennsylvania Municipal Retirement System | | 105.6 | 105.9 | 102.4 | 103.8 | 99.1 | 98.4 | 99.4 | 97.7* |
| Pennsylvania School Employees | 114.4 | 91.2 | 85.8 | 75.1 | 69.1 | 66.3 | 63.8 | 62.0 | 60.5 |
| Pennsylvania State ERS | 116.3 | 96.1 | 97.1 | 75.2 | 65.3 | 58.8 | 59.2 | 59.4 | 54.5* |
| Philadelphia Municipal Retirement System | 77.5 | 59.8 | 53.9 | 45.4 | 47.3 | 45.8 | 47.4 | 45.8 | 44.6 |
| Phoenix ERS | 102.5 | 84.2 | 83.9 | 69.3 | 66.6 | 62.2 | 64.2 | 58.7 | 55.4 |
| Portland Fire and Police Disability Retirement Fund[g] | 1.3 | 1.1 | 0.5 | 0.6 | 1.0 | 0.8 | 0.6 | 0.7 | 0.9* |
| Rhode Island ERS | 77.6 | 59.4 | 56.2 | 48.4 | 58.8 | 57.8 | 57.3 | 58.7 | 57.9 |
| Rhode Island Municipal | 118.1 | 93.2 | 90.3 | 73.6 | 84.3 | 82.5 | 82.1 | 84.1 | 83.8 |
| Sacramento County ERS | 107.7 | 93.3 | 93.4 | 87.7 | 87.0 | 83.3 | 82.8 | 85.2 | 85.3* |
| San Diego City ERS | 89.9 | 65.8 | 78.8 | 67.1 | 68.5 | 68.6 | 70.4 | 74.2 | 76.5* |
| San Diego County | 106.8 | 81.1 | 89.7 | 84.3 | 81.5 | 78.7 | 79.0 | 80.9 | 80.5 |
| San Francisco City & County | 129.0 | 103.8 | 110.2 | 91.1 | 87.7 | 82.6 | 80.6 | 85.3 | 85.6 |
| Seattle Employees Retirement System | | 85.9 | | 62.0 | 74.3 | 68.3 | 63.5 | 64.2 | 66.0 |
| South Carolina Police | 94.6 | 87.7 | 84.7 | 74.5 | 72.8 | 71.1 | 69.2 | 69.5 | 69.2 |
| South Carolina RS[h] | 87.4 | 80.3 | 69.7 | 65.5 | 67.4 | 64.7 | 62.5 | 62.7 | 62.0 |
| South Dakota RS[i] | 96.4 | 97.7 | 97.1 | 96.3 | 96.4 | 92.6 | 100.0 | 100.0 | 100.0 |
| St. Louis School Employees | 80.5 | 86.3 | 87.6 | 88.6 | 84.9 | 84.3 | 84.4 | 82.7 | 79.0* |
| St. Paul Teachers | 81.9 | 71.8 | 73.0 | 68.0 | 70.0 | 62.0 | 60.4 | 61.8 | 62.6 |
| Texas County & District | 89.3 | 91.0 | 94.3 | 89.4 | 88.8 | 88.2 | 89.4 | 90.5 | 92.6* |
| Texas ERS | 104.9 | 97.3 | 95.6 | 85.4 | 84.5 | 82.6 | 79.6 | 77.2 | 76.3 |
| Texas LECOS | 131.6 | 109.3 | 98.0 | 86.3 | 86.4 | 82.0 | 73.3 | 73.2 | 72.0 |
| Texas Municipal | 85.0 | 82.8 | 73.7 | 82.9 | 85.1 | 87.2 | 84.1 | 85.8 | 88.1* |
| Texas Teachers | 102.5 | 91.8 | 89.2 | 82.9 | 82.7 | 81.9 | 80.8 | 80.2 | 80.2 |
| TN Political Subdivisions | 90.4 | | 89.5 | | 89.1 | | 95.0 | 94.5 | 96.2* |
| TN State and Teachers | 99.6 | | 96.2 | | 92.1 | | 93.3 | 92.9 | 94.5* |
| University of California | 147.7 | 117.9 | 104.8 | 86.7 | 82.5 | 78.7 | 75.9 | 80.0 | 81.7 |
| Utah Noncontributory | 102.8 | 92.3 | 95.1 | 83.8 | 80.1 | 77.4 | 82.0 | 84.1 | 83.6* |
| Utah Public Safety | 100.8 | 88.3 | 90.7 | 77.1 | 75.4 | 73.0 | 79.3 | 82.8 | 82.3* |
| Vermont State Employees | 93.0 | 97.6 | 100.8 | 81.2 | 79.6 | 77.7 | 76.7 | 77.9 | 75.1 |
| Vermont Teachers | 89.0 | 90.2 | 84.9 | 66.5 | 63.8 | 61.6 | 60.5 | 59.9 | 58.6 |
| Virginia Retirement System[j] | 107.3 | 90.3 | 82.3 | 72.4 | 69.9 | 65.8 | 65.9 | 69.6 | 73.3 |
| Washington LEOFF Plan 2 | 154.4 | 116.9 | 128.8 | 119.0 | 118.7 | 119.0 | 114.6 | 107.1 | 109.3* |
| Washington PERS 2/3 | 179.1 | 134.4 | 119.9 | 112.7 | 111.6 | 111.3 | 102.3 | 90.0 | 90.9* |

| Plan name | 2001 | 2004 | 2007 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 |
|---|---|---|---|---|---|---|---|---|---|
| Washington School Employees Plan 2/3 | 197.0 | 136.9 | 126.1 | 112.5 | 110.2 | 109.9 | 101.9 | 91.4 | 92.3* |
| Washington Teachers Plan 2/3 | 197.4 | 152.6 | 130.4 | 115.5 | 113.4 | 114.1 | 104.9 | 93.6 | 95.2* |
| West Virginia PERS | 84.4 | 80.0 | 97.0 | 74.6 | 78.4 | 77.6 | 79.7 | 83.1 | 87.8* |
| West Virginia Teachers | 21.0 | 22.2 | 51.3 | 46.5 | 53.7 | 53.0 | 57.9 | 66.2 | 67.3* |
| Wisconsin Retirement System | 96.5 | 99.4 | 99.6 | 99.8 | 99.9 | 99.9 | 99.9 | 100.0 | 100.2* |
| Wyoming Public Employees | 103.2 | 96.0 | 94.0 | 84.6 | 81.9 | 78.6 | 77.6 | 79.0 | 79.8* |

Notes: The years reported for this table reflect the fiscal year end of the annual financial report for the plan, not the actuarial valuation date. For plans with valuation dates that are different from the fiscal year end dates of the annual financial reports, data are for the most recent valuation as of the fiscal year end date. Municipal agency plans such as Michigan Municipal and Illinois Municipal do not have a single funded ratio, as they are made up of individual retirement systems that each maintain their own liabilities and funded ratios. For these types of plans, the funded ratios reported above represent an aggregate of assets and liabilities of the individual systems.

* Numbers are authors' estimates. ** Received from plan administrator.

[a] For the Boston Retirement System, funded ratios are reported the fiscal year are actually for January 1 of the following year. For example, the funded ratio reported for fiscal year 2015 is the funded ratio as of January 1, 2016. If you include the Massachusetts Commonwealth's share of the Boston Retirement System's actuarial liability, the plan was 59.5% funded in fiscal year 2013 (without the Commonwealth's share the plan was 70.2% funded).

[b] Through 2008, the Illinois TRS funded ratio was based on the market value of assets. Beginning in 2009, the funded ratio was calculated using five-year smoothed actuarial assets.

[c] 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 92.5 percent. As expected, the pay-go account has a much lower funded ratio of 30.4 percent.

[d] Prior to 2007 the New Hampshire Retirement System used the Open Group Aggregate to calculate its funded ratio. Beginning in 2007 the entry age normal (EAN) was used.

[e] For North Carolina Local Government, data are as of December 31 acturial valuation of the previous year. For example, the funded ratio reported for 2015 is the funded ratio as of December 31, 2014.

[f] For North Carolina Teachers and State Employees, data are as of December 31 acturial valuation of the previous year. For example, the funded ratio reported for 2015 is the funded ratio as of December 31, 2014.

[g] The City of Portland funds the retirement costs of police and firefighters hired before 2007 on a pay-as-you-go basis, meaning the city relies on property taxes each year to pay benefits.

[h] The 2011 funded ratios for South Carolina RS and Police are calculated based on the plan design features and actuarial methods in place prior to passage of Act 278.

[i] For St. Louis School Employees, data are as of January 1 actuarial valuation of the following calendar year. For example the funded ratio reported for 2015 is the funded ratio as of January 1, 2016.

[j] 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.

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