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UNFUNDED PUBLIC PENSION LIABILITIES TOTAL NEARLY **$5 TRILLION**

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The ALEC Center for State Fiscal Reform strives to educate policymakers and the general public on the principles of sound fiscal policy and the evidence that supports those principles. We also strive to educate policymakers by outlining the policies that provide the best results for the hardworking taxpayers of America. This is done by personalized research, policy briefings in the states and by releasing nonpartisan policy publications for distribution such as *Rich States, Poor States: ALEC-Laffer State Economic Competitiveness Index.*

Managing Editors:

Jonathan Williams
Chief Economist
Executive Vice President of Policy
American Legislative Exchange Council

Thomas Savidge
Research Manager, Center for State Fiscal Reform
American Legislative Exchange Council

Lee Schalk
Senior Director, Tax and Fiscal Policy Task Force
American Legislative Exchange Council

Contributing Authors:

Thomas Savidge
Research Manager, Center for State Fiscal Reform
American Legislative Exchange Council

Jonathan Williams
Chief Economist
Executive Vice President of Policy
American Legislative Exchange Council

Bob Williams
Senior Fellow, Center for State Fiscal Reform
Founder, State Budget Solutions
American Legislative Exchange Council

Skip Estes
Legislative Manager, Center for State Fiscal Reform
American Legislative Exchange Council

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Contact Information:

American Legislative Exchange Council
2900 Crystal Drive, Suite 600
Arlington, VA 22202
Tel : 703.373.0933
Fax: 703.373.0927
www.alec.org

INTRODUCTION

Unfunded state pension liabilities total $4.9 trillion or $15,080 for every man, woman and child in the United States. State governments are often obligated, by contract and state constitutional law, to make these pension payments regardless of economic conditions. As these pension payments continue to grow, revenue that would have gone to essential services like public safety and education, or tax relief, goes to paying off these liabilities instead.

Unfunded liabilities have fallen in this year's report due to several factors:

- Improved pension reporting has allowed the authors to collect data from the same fiscal year (FY 2018) for all 50 states rather than collecting data from a spread of fiscal years.
- Some states have improved pension funding, with several states seeing the benefits of transitioning to hybrid pension plans (a mix of defined-benefit and defined-contribution).
- The risk-free discount rate has increased from 2.49% to 2.96%, lowering the present value of liabilities. In addition, numerous plans have lowered their own discount rates, thus affecting the valuation of liabilities.
- Strong market returns for pension fund portfolios have increased the value of pension fund assets.

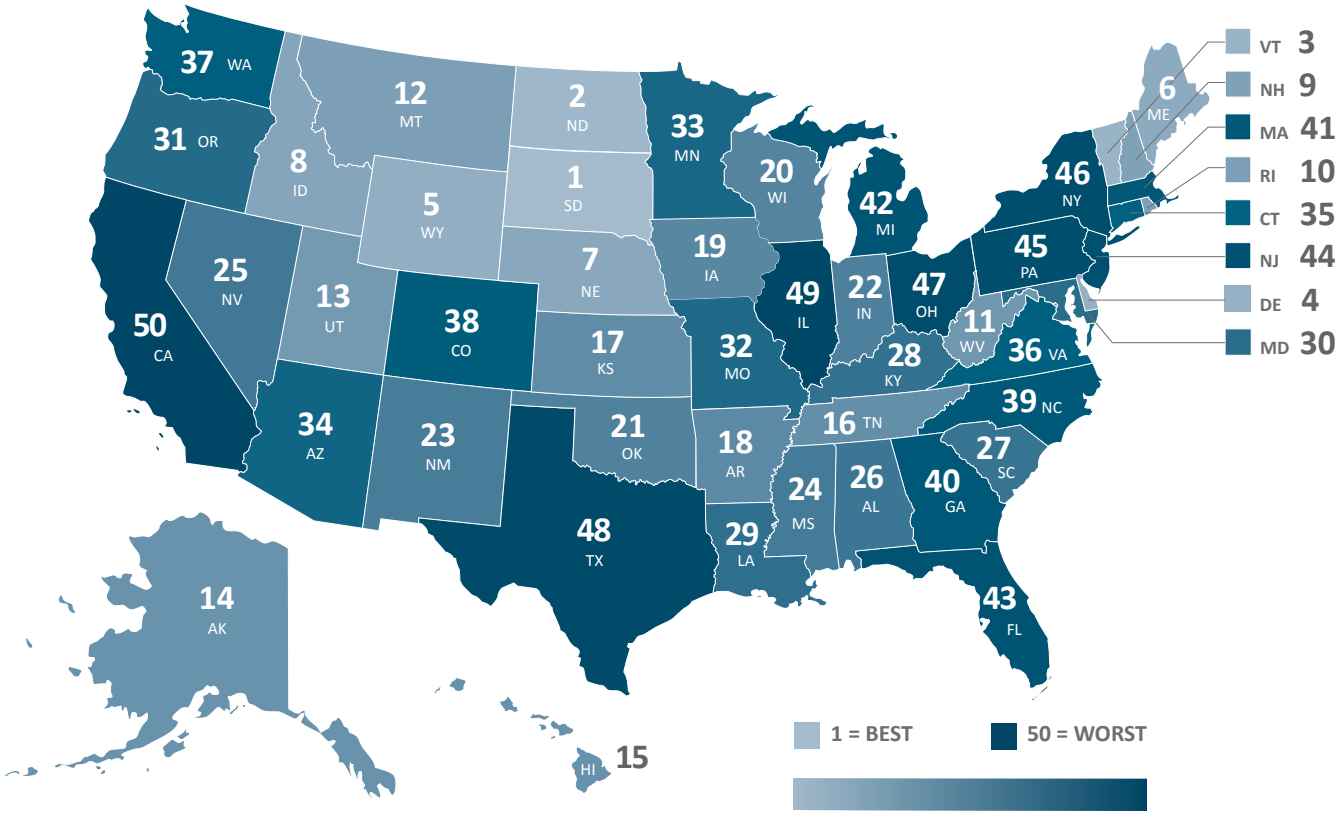
Yet, unfunded pension liabilities are still a $4.9 trillion problem exacerbated by constant underfunding of pension plans. Most state pension plans are structured as defined-benefit plans. Under a defined-benefit plan, an employee receives a fixed payout at retirement based on the employee's final average salary, the number of years worked and a benefit multiplier. Pension plans pay these benefits to millions of public workers across the country. They accrue assets through employee contributions, tax revenue and, in the worst case, by taking on debt to pay pension promises today. Paying pension obligations by issuing bonds only kicks the can down the road to future taxpayers, as they will ultimately be responsible for solving the pension funding crisis.

In most cases, states cannot avoid paying their pension obligations. There are important reforms, however, that can prevent unfunded liabilities from growing in the future. By offering newly elected employees defined-contribution plans (such as a 401(k) plan in the private sector), states can prevent the rapid growth of unfunded liabilities, give public workers greater flexibility with their retirement contributions and give them the ability to take their retirement savings with them to new positions or new careers.

Because of the significant impact unfunded pension liabilities have on state budgets and individual taxpayers, the American Legislative Exchange Council (ALEC) produces publications to educate policymakers and the public about the danger unfunded pension liabilities pose to core services, workers and the economy. This report surveys more than 290 state-administered public pension plans, detailing assets and liabilities from FY 2011-2018. The unfunded liabilities are reported using three different calculations:

- States' own estimates
- Estimates using a risk-free discount rate, which reflects constitutional and other legal protections extended to state pension benefits
- Estimates using a fixed rate of 4.50%, which compares funding ratios and controls for changes in discount rate assumptions over time

Figure 1, Table 1 **Total Unfunded Pension Liabilities, 2019**



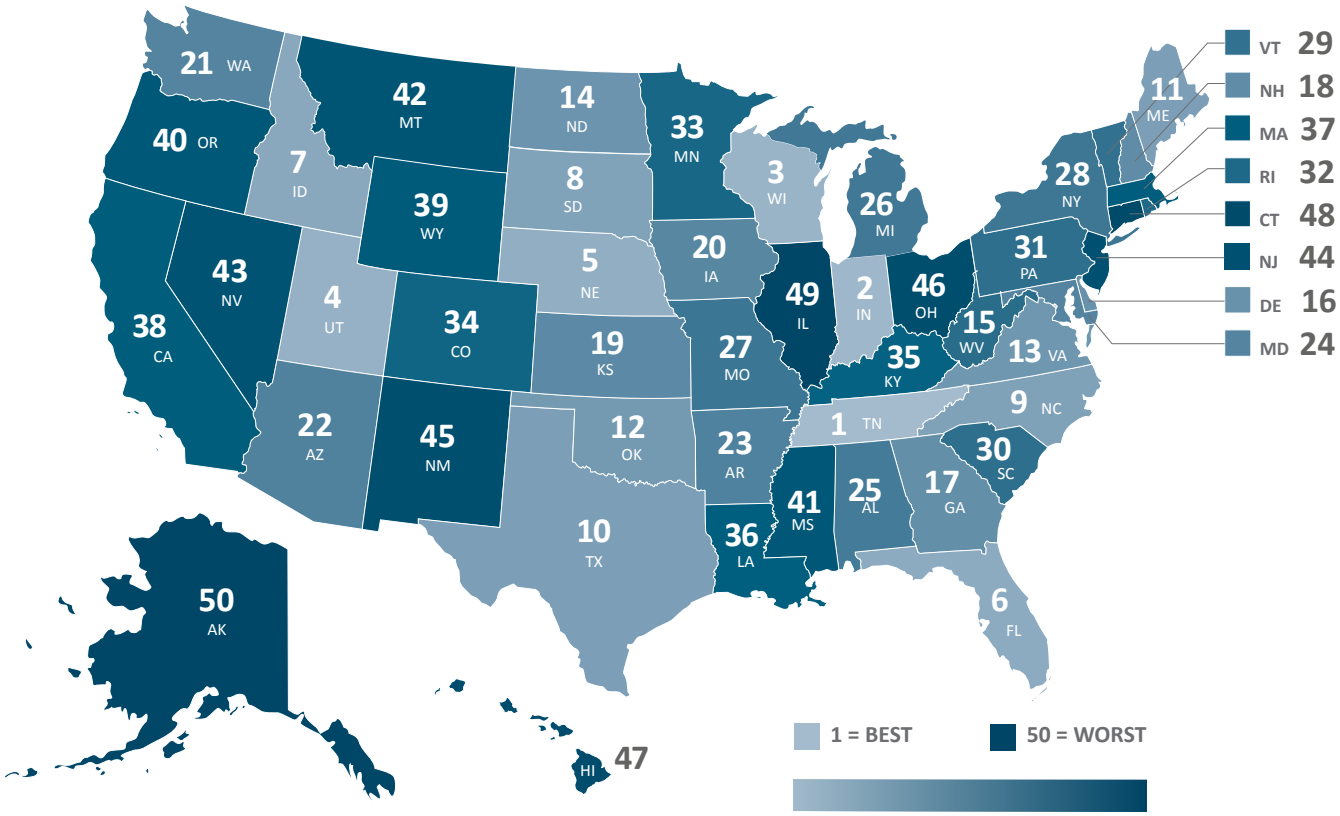
Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Rank	State	Risk-Free Unfunded Liabilities
1	South Dakota	$8,085,638,583.63
2	North Dakota	$8,761,680,266.46
3	Vermont	$8,954,116,122.98
4	Delaware	$11,209,552,268.25
5	Wyoming	$11,735,339,612.67
6	Maine	$14,333,176,211.72
7	Nebraska	$15,762,090,811.49
8	Idaho	$15,778,713,937.19
9	New Hampshire	$16,459,495,419.35
10	Rhode Island	$16,785,438,870.20
11	West Virginia	$20,842,708,876.79
12	Montana	$22,029,299,834.96
13	Utah	$24,281,056,135.81
14	Alaska	$29,459,806,480.10
15	Hawaii	$36,692,427,005.98
16	Tennessee	$36,924,390,920.51
17	Kansas	$37,662,386,691.31
18	Arkansas	$39,464,841,630.25
19	Iowa	$40,866,792,605.31
20	Wisconsin	$42,706,299,777.93
21	Oklahoma	$44,229,465,695.39
22	Indiana	$45,352,556,511.16
23	New Mexico	$49,127,169,375.79
24	Mississippi	$61,531,351,056.57
25	Nevada	$63,931,899,479.58

Rank	State	Risk-Free Unfunded Liabilities
26	Alabama	$67,437,993,673.53
27	South Carolina	$73,081,438,956.47
28	Kentucky	$78,757,474,540.66
29	Louisiana	$82,685,184,739.22
30	Maryland	$82,750,803,486.58
31	Oregon	$85,421,420,280.11
32	Missouri	$86,896,555,657.34
33	Minnesota	$90,103,122,717.00
34	Arizona	$93,703,276,877.31
35	Connecticut	$94,864,011,214.24
36	Virginia	$95,747,698,172.39
37	Washington	$98,108,228,076.09
38	Colorado	$99,566,298,766.88
39	North Carolina	$101,250,412,082.39
40	Georgia	$126,271,834,206.80
41	Massachusetts	$126,363,420,361.63
42	Michigan	$139,167,300,292.42
43	Florida	$175,122,110,438.56
44	New Jersey	$196,810,498,087.95
45	Pennsylvania	$200,517,027,371.72
46	New York	$277,576,023,216.61
47	Ohio	$290,905,972,324.24
48	Texas	$301,219,126,898.18
49	Illinois	$359,553,997,754.76
50	California	$780,051,066,093.13

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Figure 2, Table 2 **Total Unfunded Pension Liabilities Per Capita, 2019**



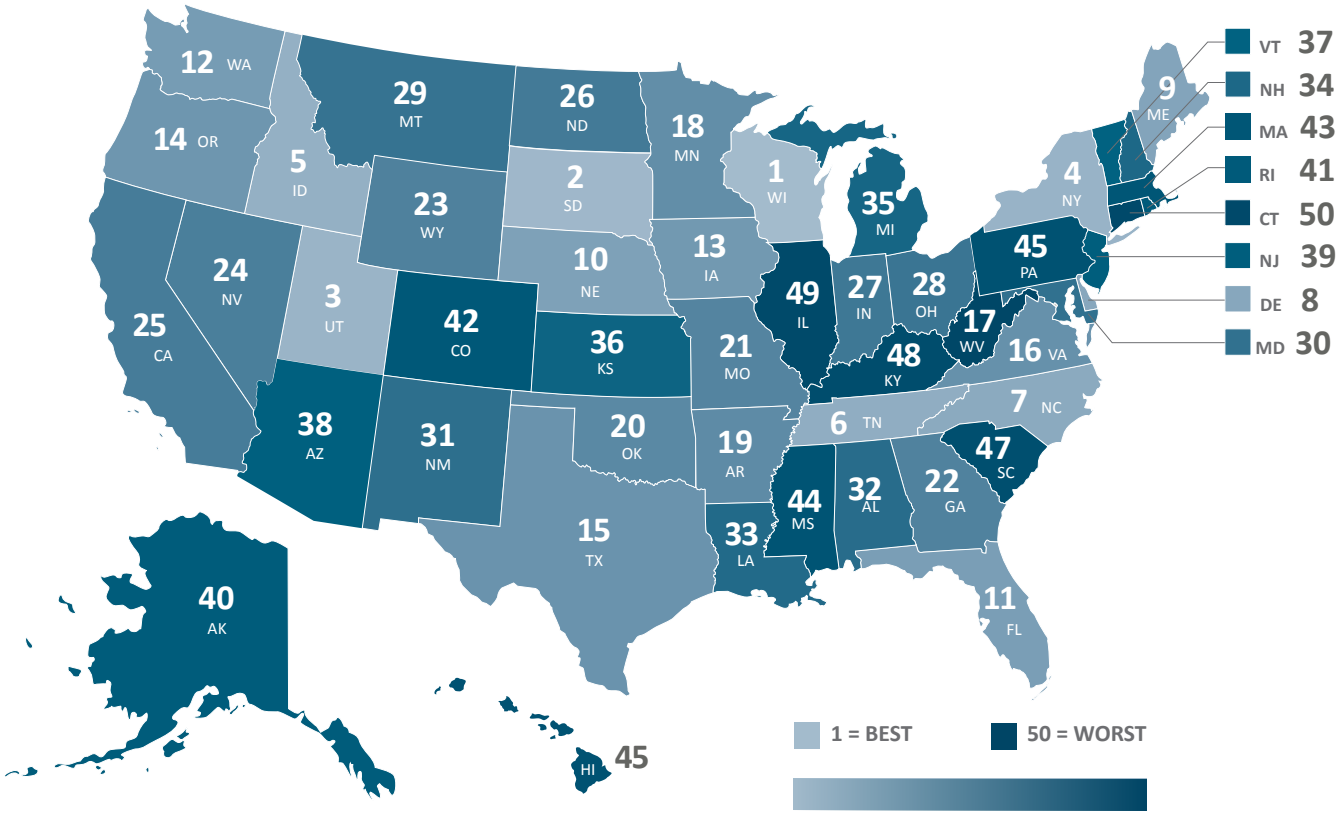
Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Rank	State	Unfunded Liabilities Per Capita
1	Tennessee	$5,454.11
2	Indiana	$6,777.25
3	Wisconsin	$7,345.97
4	Utah	$7,681.19
5	Nebraska	$8,169.99
6	Florida	$8,221.96
7	Idaho	$8,994.78
8	South Dakota	$9,164.95
9	North Carolina	$9,750.97
10	Texas	$10,494.77
11	Maine	$10,709.16
12	Oklahoma	$11,216.99
13	Virginia	$11,241.05
14	North Dakota	$11,516.75
15	West Virginia	$11,539.34
16	Delaware	$11,590.04
17	Georgia	$12,003.63
18	New Hampshire	$12,134.17
19	Kansas	$12,935.71
20	Iowa	$12,948.33
21	Washington	$13,019.31
22	Arizona	$13,065.80
23	Arkansas	$13,094.60
24	Maryland	$13,694.30
25	Alabama	$13,797.01

Rank	State	Unfunded Liabilities Per Capita
26	Michigan	$13,922.42
27	Missouri	$14,183.83
28	New York	$14,203.92
29	Vermont	$14,296.87
30	South Carolina	$14,374.43
31	Pennsylvania	$15,656.76
32	Rhode Island	$15,875.53
33	Minnesota	$16,057.79
34	Colorado	$17,482.42
35	Kentucky	$17,625.42
36	Louisiana	$17,743.69
37	Massachusetts	$18,307.84
38	California	$19,719.65
39	Wyoming	$20,312.60
40	Oregon	$20,383.51
41	Mississippi	$20,602.96
42	Montana	$20,737.26
43	Nevada	$21,069.10
44	New Jersey	$22,092.39
45	New Mexico	$23,444.93
46	Ohio	$24,886.22
47	Hawaii	$25,830.81
48	Connecticut	$26,552.73
49	Illinois	$28,220.06
50	Alaska	$39,948.86

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Figure 3, Table 3 **Pension Funding Ratios, 2019**



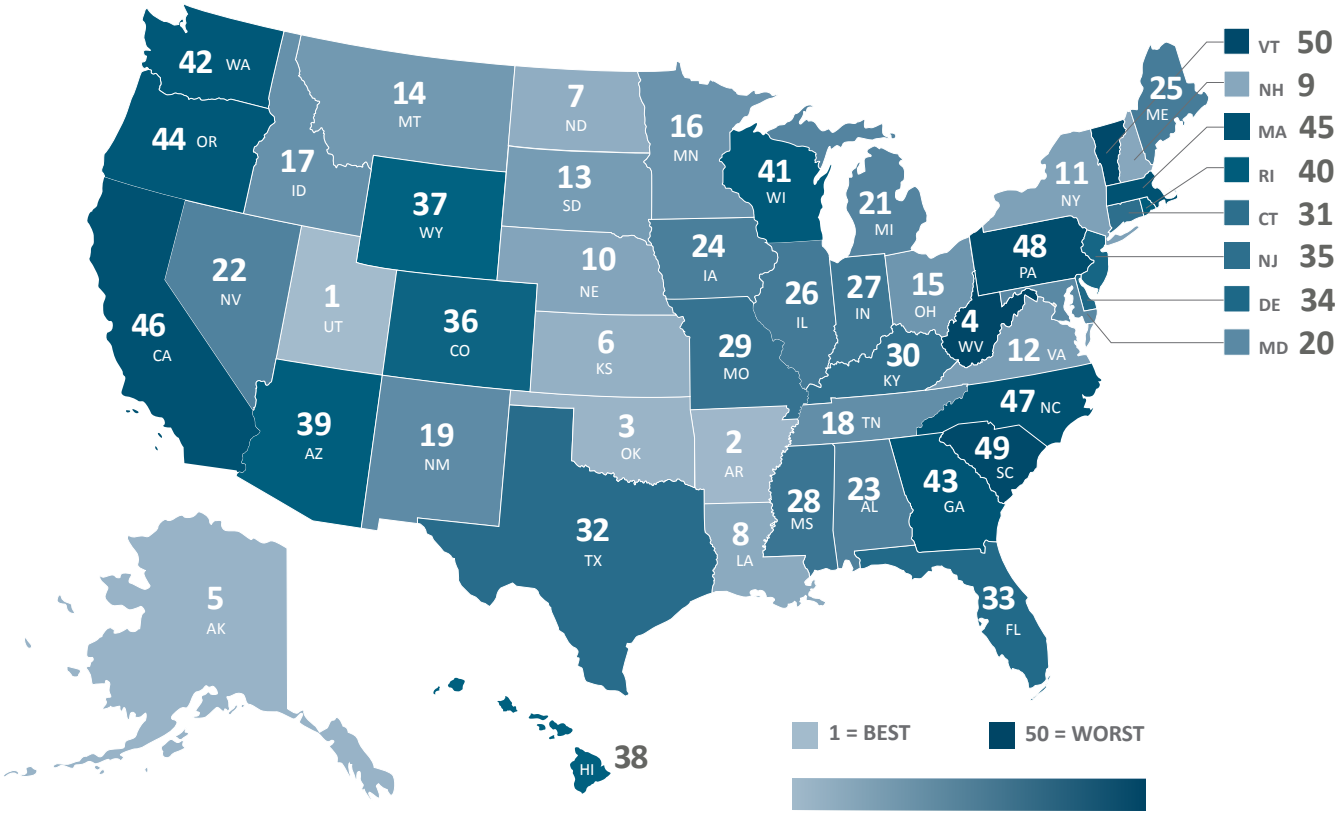
Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Rank	State	Funding Ratio
1	Wisconsin	70.37%
2	South Dakota	60.32%
3	Utah	56.71%
4	New York	54.54%
5	Idaho	51.50%
6	Tennessee	50.64%
7	North Carolina	49.74%
8	Delaware	48.21%
9	Maine	47.65%
10	Nebraska	47.41%
11	Florida	47.13%
12	Washington	47.01%
13	Iowa	46.55%
14	Oregon	44.80%
15	Texas	44.64%
16	Virginia	44.25%
17	West Virginia	43.23%
18	Minnesota	42.80%
19	Arkansas	42.74%
20	Oklahoma	42.69%
21	Missouri	42.57%
22	Georgia	42.27%
23	Wyoming	41.94%
24	Nevada	39.39%
25	California	39.19%

Rank	State	Funding Ratio
26	North Dakota	38.84%
27	Indiana	38.65%
28	Ohio	38.64%
29	Montana	38.15%
30	Maryland	37.46%
31	New Mexico	36.70%
32	Alabama	36.63%
33	Louisiana	36.33%
34	New Hampshire	35.08%
35	Michigan	34.85%
36	Kansas	34.57%
37	Vermont	34.10%
38	Arizona	33.93%
39	New Jersey	33.78%
40	Alaska	33.66%
41	Rhode Island	32.76%
42	Colorado	32.73%
43	Massachusetts	31.72%
44	Mississippi	31.26%
45	Hawaii	31.15%
46	Pennsylvania	30.90%
47	South Carolina	30.39%
48	Kentucky	28.57%
49	Illinois	26.66%
50	Connecticut	26.08%

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Figure 4, Table 4 **Percentage Change in Funding Ratios, 2012-2018**



Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

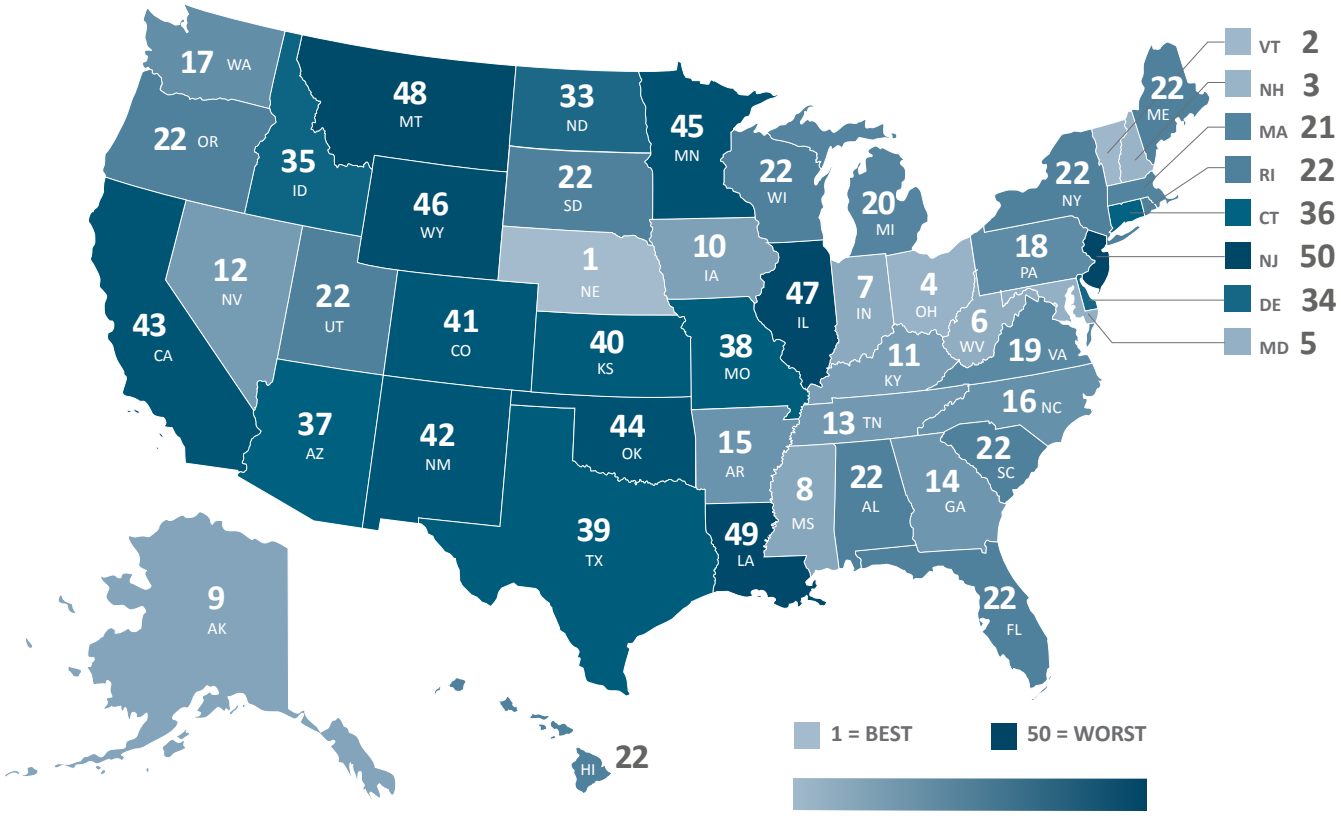
Rank	State	Percentage Change 2012-2018
1	Utah	40.55%
2	Arkansas	34.00%
3	Oklahoma	31.00%
4	West Virginia	30.63%
5	Alaska	27.61%
6	Kansas	25.46%
7	North Dakota	25.34%
8	Louisiana	23.98%
9	New Hampshire	23.47%
10	Nebraska	23.40%
11	New York	21.13%
12	Virginia	20.60%
13	South Dakota	20.09%
14	Montana	18.11%
15	Ohio	17.37%
16	Minnesota	16.68%
17	Idaho	16.26%
18	Tennessee	16.05%
19	New Mexico	14.97%
20	Maryland	14.83%
21	Michigan	14.28%
22	Nevada	13.68%
23	Alabama	13.28%
24	Iowa	12.35%
25	Maine	11.69%

Rank	State	Percentage Change 2012-2018
26	Illinois	11.21%
27	Indiana	10.86%
28	Mississippi	10.58%
29	Missouri	10.48%
30	Kentucky	10.37%
31	Connecticut	9.07%
32	Texas	8.79%
33	Florida	7.29%
34	Delaware	4.48%
35	New Jersey	4.21%
36	Colorado	4.17%
37	Wyoming	4.15%
38	Hawaii	4.09%
39	Arizona	2.72%
40	Rhode Island	2.33%
41	Wisconsin	1.51%
42	Washington	-0.02%
43	Georgia	-0.73%
44	Oregon	-2.29%
45	Massachusetts	-2.39%
46	California	-2.96%
47	North Carolina	-3.86%
48	Pennsylvania	-8.61%
49	South Carolina	-11.20%
50	Vermont	-22.09%

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Note: Previous publications have examined differences in percentage points between years for funding ratios. This year's publication examines the percentage change in funding ratio from FY 2012-2018.

Figure 5, Table 5 **Percent ARC Paid**



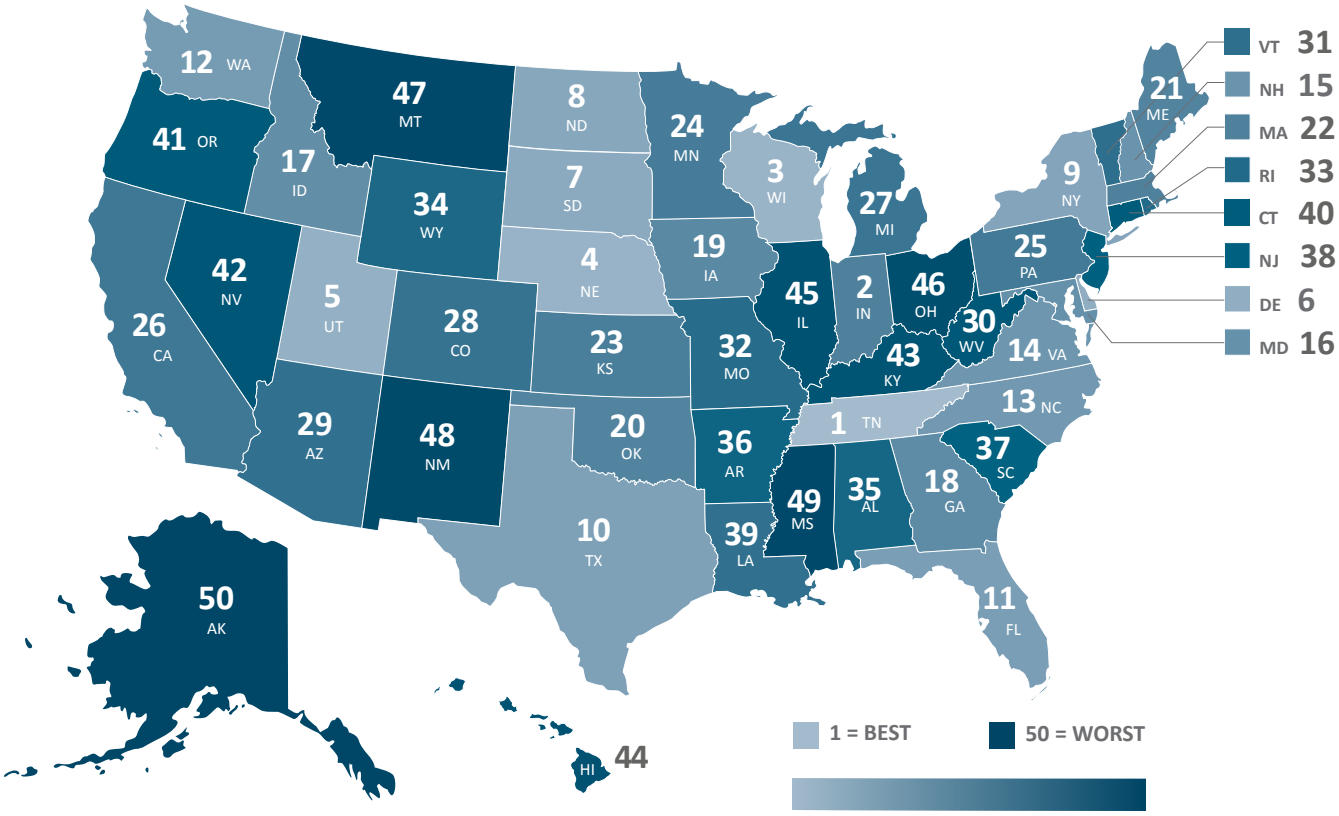
Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Rank	State	Percent ARC Paid
1	Nebraska	178.32%
2	Vermont	126.45%
3	New Hampshire	114.75%
4	Ohio	110.54%
5	Maryland	110.45%
6	West Virginia	110.27%
7	Indiana	109.77%
8	Mississippi	107.71%
9	Alaska	104.93%
10	Iowa	104.57%
11	Kentucky	104.06%
12	Nevada	102.55%
13	Tennessee	102.38%
14	Georgia	102.21%
15	Arkansas	100.910%
16	North Carolina	100.909%
17	Washington	100.26%
18	Pennsylvania	100.13%
19	Virginia	100.03%
20	Michigan	100.02%
21	Massachusetts	100.00%
22	Alabama	100.00%
22	Florida	100.00%
22	Hawaii	100.00%
22	Maine	100.00%

Rank	State	Percent ARC Paid
22	New York	100.00%
22	Oregon	100.00%
22	Rhode Island	100.00%
22	South Carolina	100.00%
22	South Dakota	100.00%
22	Utah	100.00%
22	Wisconsin	100.00%
33	North Dakota	99.25%
34	Delaware	98.94%
35	Idaho	98.06%
36	Connecticut	97.28%
37	Arizona	96.56%
38	Missouri	96.03%
39	Texas	95.38%
40	Kansas	87.20%
41	Colorado	82.23%
42	New Mexico	81.88%
43	California	81.86%
44	Oklahoma	78.94%
45	Minnesota	77.95%
46	Wyoming	73.73%
47	Illinois	65.76%
48	Montana	43.04%
49	Louisiana	31.50%
50	New Jersey	30.05%

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Figure 6, Table 6 **Unfunded Liabilities as a Percentage of Gross State Product (GSP)**



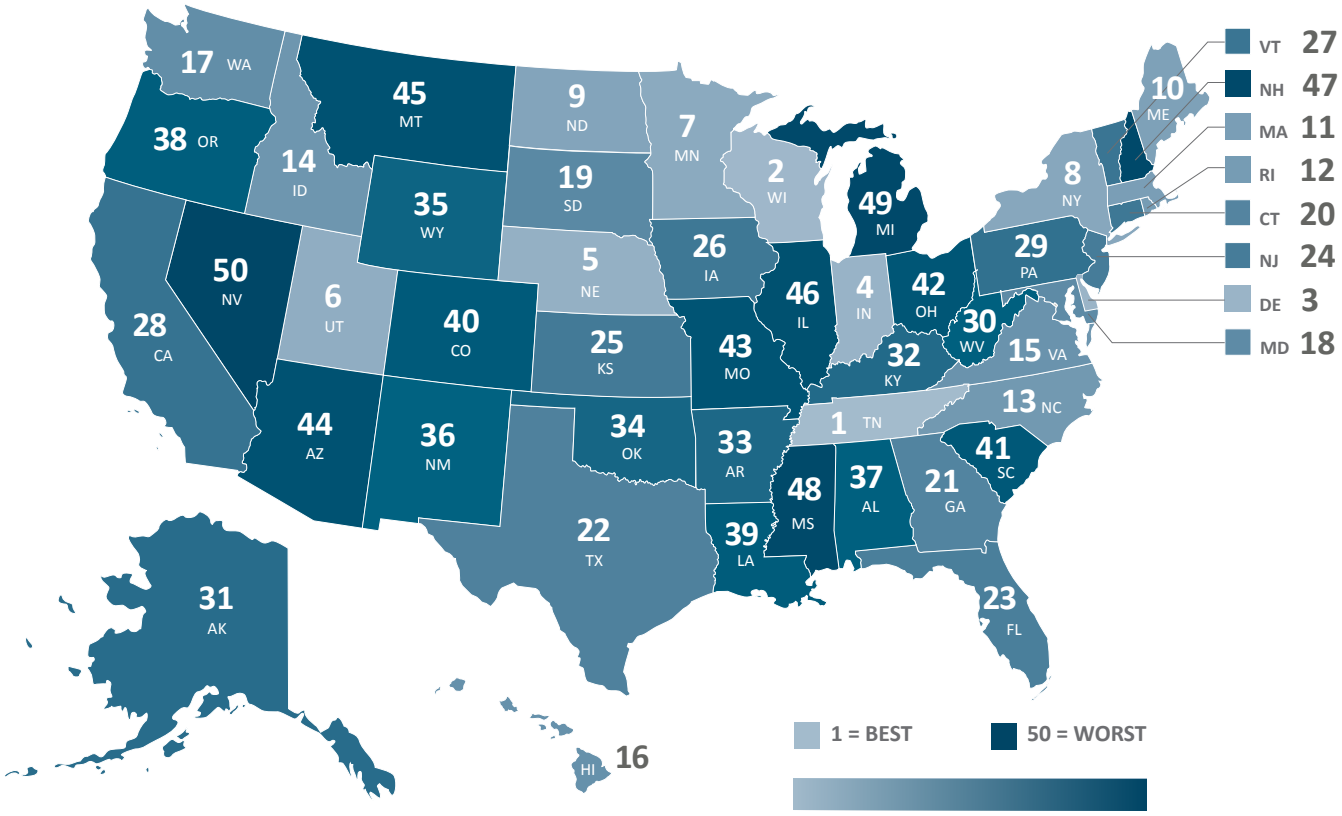
Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Rank	State	Unfunded Liabilities As A Percentage of GSP
1	Tennessee	10.14%
2	Indiana	12.36%
3	Wisconsin	12.70%
4	Nebraska	12.71%
5	Utah	13.63%
6	Delaware	15.25%
7	South Dakota	15.54%
8	North Dakota	15.62%
9	New York	16.63%
10	Texas	16.71%
11	Florida	16.85%
12	Washington	17.34%
13	North Carolina	17.96%
14	Virginia	17.97%
15	New Hampshire	19.49%
16	Maryland	20.06%
17	Idaho	20.48%
18	Georgia	21.32%
19	Iowa	21.54%
20	Oklahoma	21.84%
21	Maine	22.10%
22	Massachusetts	22.19%
23	Kansas	22.38%
24	Minnesota	24.43%
25	Pennsylvania	25.60%

Rank	State	Unfunded Liabilities As A Percentage of GSP
26	California	26.02%
27	Michigan	26.40%
28	Colorado	26.78%
29	Arizona	26.90%
30	West Virginia	35.65%
31	Vermont	26.92%
32	Missouri	27.25%
33	Rhode Island	27.70%
34	Wyoming	30.00%
35	Alabama	30.41%
36	Arkansas	30.73%
37	South Carolina	31.24%
38	New Jersey	31.64%
39	Louisiana	32.14%
40	Connecticut	34.41%
41	Oregon	35.62%
42	Nevada	37.76%
43	Kentucky	37.85%
44	Hawaii	39.12%
45	Illinois	41.55%
46	Ohio	43.04%
47	Montana	43.77%
48	New Mexico	48.98%
49	Mississippi	53.58%
50	Alaska	53.82%

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Figure 7, Table 7 **Unfunded Liabilities as a Percentage of 2018 State General Fund Expenditures**



Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

Rank	State	Liabilities as a Percentage of Expenditures
1	Tennessee	233.40%
2	Wisconsin	259.39%
3	Delaware	272.21%
4	Indiana	284.82%
5	Nebraska	362.35%
6	Utah	369.35%
7	Minnesota	397.01%
8	New York	398.11%
9	North Dakota	416.63%
10	Maine	419.59%
11	Massachusetts	437.30%
12	Rhode Island	438.03%
13	North Carolina	445.13%
14	Idaho	455.37%
15	Virginia	458.47%
16	Hawaii	470.18%
17	Washington	477.76%
18	Maryland	483.05%
19	South Dakota	508.21%
20	Connecticut	510.02%
21	Georgia	528.27%
22	Texas	537.42%
23	Florida	555.80%
24	New Jersey	557.16%
25	Kansas	562.80%

Rank	State	Liabilities as a Percentage of Expenditures
26	Iowa	563.06%
27	Vermont	564.22%
28	California	613.99%
29	Pennsylvania	626.67%
30	West Virginia	636.42%
31	Alaska	649.60%
32	Kentucky	700.90%
33	Arkansas	734.59%
34	Oklahoma	755.54%
35	Wyoming	767.02%
36	New Mexico	800.06%
37	Alabama	828.68%
38	Oregon	839.09%
39	Louisiana	858.18%
40	Colorado	881.66%
41	South Carolina	908.97%
42	Ohio	918.24%
43	Missouri	938.10%
44	Arizona	954.11%
45	Montana	982.57%
46	Illinois	1025.38%
47	New Hampshire	1078.60%
48	Mississippi	1106.66%
49	Michigan	1360.25%
50	Nevada	1597.26%

Source: Data are based on ALEC Center for State Fiscal Reform calculations. To read the full report and methodology, see ALEC.org/PensionDebt2019

SECTION 2: POOR ASSUMPTIONS MAKE POOR PENSIONS

State governments have experienced increased pressure in their balance sheets from growing pension liabilities. This pressure is becoming more apparent with improved financial reporting. The Governmental Accounting Standards Board (GASB) statements 67 and 68 went into effect in FY 2014 and 2015, respectively. GASB 67 focuses on how pension plans measure assets and liabilities.

The changes declared in GASB 67 require plan assets to be valued each year so pension trustees cannot engage in "asset smoothing." Asset smoothing is a process by which pension investment performance is averaged over a five-year period to "smooth out" swings in market performance. As noted by pension scholars Eileen Norcross and Sheila Weinberg, asset smoothing evens out investment swings and provides plan sponsors with predictability in annual contributions, but simultaneously hides the volatility of pension asset portfolios.[1] Under GASB 67, pension plan officials must provide an actuarial value of assets (AVA) for that given year, putting an end to asset smoothing. This report's analysis uses the AVA reported in state pension plan actuarial valuations each year.

Norcross and Weinberg also note under GASB 68, however, state governments can continue a form of asset smoothing. Governments are permitted to defer the recognition of the difference between the return expected on plan assets and the actual return, with this "deferred inflow of resources" occurring over a 5-year period. This is the same as asset smoothing, which permits the sponsor to gradually incorporate any changes to the market value of assets that differ from the expected value of assets over time. They note, "The consequences of this practice remain the same [as the consequences of asset smoothing]. Market declines and gains are only gradually recognized, likely increasing the riskiness of sponsor behavior."[2]

The new information required by GASB 67 and 68 is reported in the "Required Supplementary Information" section at the end of each state's comprehensive annual financial report (CAFR) and in actuarial valuation documents for each pension plan. These notes include a breakdown of the annual required contribution (ARC), asset valuations and fiduciary net position for all pension plans, how the pension plan discount rate is calculated and information about liability valuations.

Improved reporting and more accurate estimates of state obligations have shed light on the actual value of unfunded pension liabilities. Many of the changes in assumptions based on actuarial experience studies conducted in 2016 are still in place today (i.e., inflation assumption remains at 2.25%), while other assumptions have changed. For example, some plans have lowered discount rates drastically (such as several Wyoming state pension plans lowering the discount rate from 7.75% to 7.00% in FY 2017), while other plans have incrementally decreased discount rates (such as the California Public Employee Retirement Multiemployer Fund, which gradually decreased its discount rate from 7.50% in FY 2016, to 7.25% in FY 2017, and then at 7.00% in FY 2018).[3,4]

Last year's report (based on data from FY 2015-2017) estimated that unfunded liabilities totaled $5.9 trillion.[5] To provide a more accurate picture of unfunded liabilities, in FY 2017 there was a total of $5.5 trillion unfunded liabilities, $500 billion more than the $5 trillion amount in FY 2018. While the lower unfunded liabilities total may appear positive, states should not be too quick to celebrate. Increased pension contributions, changes to pension plans, and strong investment returns contributed to improved pension funds for FY 2018. However, the risk-free discount rate increased from 2.49% to 2.96% in FY 2018 (thus lowering the present value of liabilities), also contributing to the lower assessment of liabilities. Ultimately, the root causes of rapidly growing unfunded liabilities (such as states failing to contribute according to their ARC) were not addressed in FY 2018. This means unfunded liabilities will continue to grow, especially in years with poor investment returns.

Most pension plans use historical trends to estimate future conditions of assets and liabilities.[6] Past returns, however, are no guarantee of future performance. As state pension plans invest their funds in increasingly risky assets, the gap between expected rates of return and actual rates of return widens, with results falling far short of expectations.

The rate at which employees are vested (meaning the employee becomes eligible to secure rights to employer-provided pension benefits) varies with the type of work and the length of the vesting period. Public school teachers, for example, have an extremely low vesting rate. Since FY 2011, the Michigan Public Schools Employees' Retirement System (MPSERS), has had a vesting rate around 47%, with less than 33% of active employees fully vesting.[7] One reason for this low rate is that teachers often pay into a retirement system but leave the school district (usually to work as a teacher in another school district) before they become vested. When these teachers move districts before they become vested, the money their employers pay into the

retirement system does not move with them, but employee contributions do.

In contrast, defined-contribution pension plans allow workers to keep their retirement savings if they change locations or even if they choose to change careers entirely. As younger workers change jobs more frequently, the defined-contribution model, which allows workers take their retirement savings wherever they go, is particularly valuable to them.

Investment Rate of Return and Discount Rate

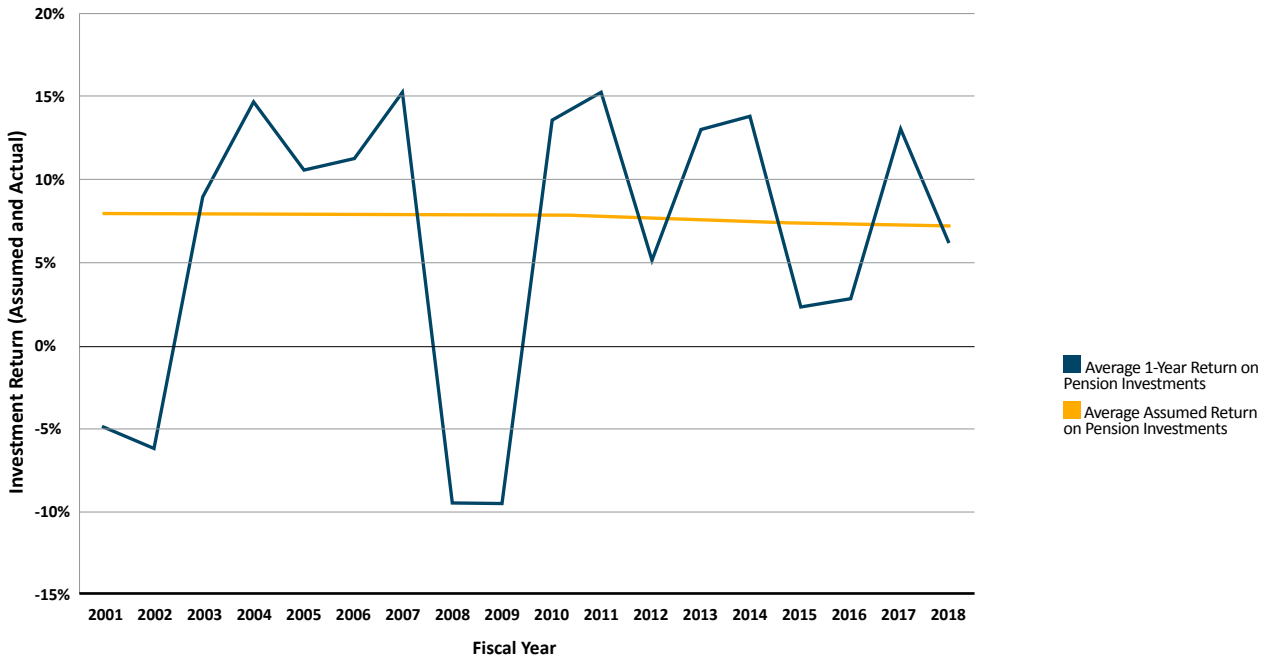
A plan's assumed investment rate of return is based on a pension plan's portfolio of investment assets and what those investments will earn. How much these investments will earn is subject to the interest rates and the risks associated with the assets. The assumed rate of return is thus a reflection of the risk of the plan's investment assets. The discount rate is the rate used to determine the value today of the amount a pension plan must pay retirees in the future. To make matters more confusing, investment rate of return and discount rate are often used interchangeably in state financial documents.

In the case of public pensions, however, investment rate of return and discount rate should not be used interchangeably, because there are different risk levels associated with pension assets and pension liabilities. Over the past four decades, pension asset funds have changed from low-risk, fixed income investments (such as U.S. Treasury bonds) to an increasingly volatile portfolio of stocks, bonds, and alternative investments such as office buildings and golf courses.[8] This is the result of lower bond yields, the desire to chase higher returns, and politicians and plan managers using pension funds to advance their own economic development or political agendas — a perfect storm of bad incentives.

The figure below shows the disparity between assumed rates of return (noted by the dotted line) and the actual annual return on investment (noted by the solid line). As pension plans invest in riskier assets, meeting the assumed rate of return for that year becomes less likely. Some years this pays off, and returns exceed expectations, while other years fall far short of assumed returns.

Figure 8, Table 8 — **Average 1-Year Returns on Pension Investments Relative to Average Assumed Return for Pension Investments for All States, 2001-2018**

Variable	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Average 1-Year Return on Pension Investments	-4.91%	-6.22%	8.95%	14.76%	10.55%	11.29%	15.25%	-9.49%	-9.42%	13.54%	15.31%	4.99%	13.05%	13.82%	2.32%	2.77%	13.06%	6.05%
Average Assumed Return on Pension Investments	7.99%	7.98%	7.95%	7.92%	7.92%	7.91%	7.90%	7.88%	7.85%	7.80%	7.74%	7.67%	7.63%	7.60%	7.54%	7.45%	7.33%	7.22%



Source: Public Plans Database, Boston College Center for Retirement Research

Despite these bad incentives, the strong U.S. economy in 2019 led to strong investment performance, which increased the value of plan assets, resulting in lower unfunded liabilities. FY 2017 saw asset returns average 13.06%, (drastically increasing the value of assets) and FY 2018 saw returns average 6.05% (a positive return but still below the assumed return average of 7.22%).

Meanwhile, as stated previously, many states are still contractually and constitutionally obligated to pay pension liabilities, so there has been a major divergence between the risk premiums of pension assets and liabilities. As the Society of Actuaries' Blue-Ribbon Panel on Public Pension Plan funding recommends, "the rate of return assumption should be based primarily on the current risk-free rate plus explicit risk premium or on other similar forward-looking techniques."[9]

Because U.S. Treasury bonds are insured with the full faith and credit of the United States government, the rate of return for these bonds is the best proxy for a risk-free rate. A valuation of liabilities based on a risk-free rate contrasts sharply with the overly optimistic assumptions used by nearly every public sector pension plan. As economist and pension scholar Joshua Rauh notes:

> *The logic of financial economics is very clear that measuring the value of a pension promise requires using the yields on bonds that match the risk and duration of that promise. Therefore, to reflect the present value cost of actually delivering on a benefit promise requires the use of a default-free yield curve, such as the Treasury yield curve. Financial economists have spoken in near unison on this point. The fact that the stock market, whose performance drives that of most pension plan investments, has earned high historical returns does not justify the use of these historical returns as a discount rate for measuring pension liabilities.*[10]

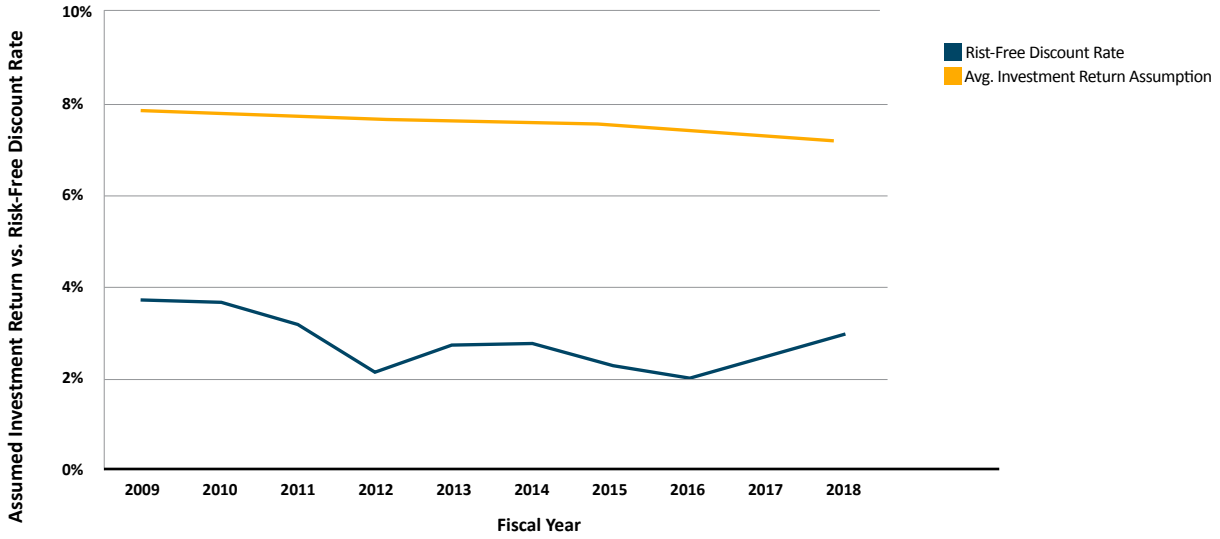
This report uses a more prudent discount rate calculated by averaging 10-year and 20-year U.S. Treasury bond yields to create a hypothetical 15-year bond yield to match the 15-year midpoint of paying pension liabilities. The discount rate calculated from these bond yields is the best proxy for a risk-free rate. The 15-year midpoint comes from GASB noting "the maximum acceptable amortization period [the length of time to pay liabilities] is 30 years."[11] In laymen's terms, GASB recommends that no pension plan take longer than 30 years to fully pay its liabilities. Thus, 15 years is the simple midpoint for paying off those liabilities.

With the risk-free discount rate depending upon the average yield of the U.S. Treasury bonds, there have been changes to the discount rate each year. For 2019, the risk-free discount rate was 2.96% (an increase from 2.49% in 2018). This increase contributed to the smaller unfunded liabilities in this report.

In addition, the risk-free discount rate creates a standard for measuring the present value of pension liabilities for plans throughout the 50 states. Discount rates can vary depending on the plan, even for different plans in the same state. This standard means of measurement allows for an accurate comparison of the value of liabilities across pension plans. The risk-free discount rate used in this year's report also sharply contrasts with the overly optimistic assumptions used in state financial documents, providing a more prudent estimate of the value of liabilities across pension plans. The figure and table below show the average assumed rate of return (this is a variable from the Boston Center on Retirement Research and can be taken as a proxy for a plan's discount rate)and the risk-free discount rate.[12]

Figure 9, Table 9 **Average Assumed Rate of Return vs. Risk-Free Discount Rate**

	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Risk-Free Discount Rate	3.69%	3.63%	3.20%	2.17%	2.74%	2.81%	2.35%	2.03%	2.49%	2.96%
Avg. Investment Return Assumption	7.85%	7.80%	7.74%	7.67%	7.63%	7.60%	7.54%	7.45%	7.33%	7.22%



Source: Public Plans Database, Boston College Center for Retirement Research; Federal Reserve Bank of St. Louis FRED Database

ACTUARIALLY RECOMMENDED CONTRIBUTION

The actuarially recommended contribution (ARC) refers to a cluster of terminology used by state plans in CAFRs, valuations and GASB notes and statements. Other terms include "actuarially determined contribution" and "annual required contribution," but they refer to the same definition. This report uses the term "actuarially recommended contribution."

An ARC is the amount of money state and local governments need to contribute every year to pension plans to meet accrued obligations to current and future retirees. The ARC is calculated based on certain parameters, including normal costs for the year and a component for amortization of the total unfunded actuarial accrued liabilities for a period no longer than 30 years. If a plan is consistently making ARC payments, it is better able to adjust to fluctuating variables (i.e., cost of living adjustments and life expectancy) and pay off its liabilities in a timely manner.

Illinois has the second largest unfunded pension liabilities in the country at $359 billion (only California has greater unfunded liabilities) and the third largest unfunded liabilities per capita at $28,220 per resident (after Connecticut and Alaska). This is, in part, due to Illinois' pension contributions failing to meet the ARC due to state statutes Public Acts 100-0023 and 100-0340 using a methodology that does not conform with ARC calculation methods set by GASB. Illinois plans always make payments based upon the state statutes and not the ARC.[13] The one notable exception, the Illinois Municipal Retirement Fund (which uses ARC methodology to determine the required contribution), has the highest funding ratio of Illinois plans (a lowly 48.80%) and has nearly $43 billion in unfunded liabilities. After years of not making the required contributions, liabilities have piled up, making Illinois' plans some of the worst funded pension plans in the country with nearly $360 billion in unfunded liabilities.

Funding Ratios: Fiscal Responsibility and Pro-Growth Policies

The funding ratio is the actuarial value of assets (AVA) divided by the actuarially accrued liabilities (AAL). The AVA is the value of pension plan contributions and investment returns that go toward paying the AAL. The AVA is the measure used by actuaries for the purpose of valuation.

Plans often have overly optimistic actuarial assumptions regarding assets and liabilities (see the section on rates of return and discount rates). These optimistic assumptions lead to overly optimistic funding ratios as well. The risk-free funding ratios calculated in Section 1 provide a more realistic estimate of each state's funded ratio. While this report uses the AVA, liabilities are valued using the risk-free discount rate. The risk-free funding ratio is the AVA divided by risk-free liabilities.

Wisconsin leads the states again this year in having the highest funding ratio, but under our methodology, Wisconsin's plans are still only 70.37% funded. Wisconsin does, however, have several fail-safe options to prevent unfunded liabilities from accumulating.[14] The Wisconsin pension system is described further in Section 3 as a recommendation for other pension plans. As recommended by the American Academy of Actuaries, plans should strive for 100% funding ratio or greater. While often repeated as fact, an 80% funding ratio should not be the benchmark for a healthy pension plan.[15] After the implementation of GASB 67 and 68, funding ratios were shown to be dangerously low, with the average funding ratio for FY 2015 only at 38.77% according to the authors' calculation of a weighted average.

Some of the states with better funding ratios (such as Wisconsin, South Dakota, and Utah) have increased their funding ratios

Table 10 **ARC Payments to Illinois Pension Plans**

Plan	ARC	ARC Paid	Percent of ARC Paid
Illinois General Assembly Retirement System	$32,084,644.00	$21,155,000.00	65.93%
Illinois Judges Retirement System	$168,056,916.00	$135,962,000.00	80.90%
Illinois Municipal Retirement Fund	$947,568,823.00	$947,568,823.00	100.00%
Illinois State Employees Retirement System	$2,739,377,709.00	$1,929,175,044.00	70.42%
Illinois Teachers Retirement System	$7,080,756.00	$4,178,650.00	59.01%
Illinois University Retirement System	$1,862,033.00	$1,607,880.00	86.35%

Source: Illinois State Treasurer and authors' calculations

every year since FY 2016 and remained above average, while the three worst funding ratios (Kentucky, Connecticut, and Illinois) have seen their funding ratios drop since FY 2016 and have remained below average.

This report does not normalize plan assumptions of mortality or demographics, and instead uses the assumptions provided in the plans. However, a recent mortality study found that public sector employees have longer life expectancies than the general population.[16] While it is great news that life expectancy has increased, this also means states must be prepared to pay out more pension benefits for longer periods of time than previously anticipated. States will eventually need to address these rising costs or radically change the benefits new employees receive.

Overall, states with better economic outlooks also tend to have higher risk-free funding ratios. In the figure below, the average funding ratio of each state between 2012 and 2018 is displayed against the state's average *Rich States, Poor States* economic outlook ranking over the same period. A trend line highlights the direction of the relationship. States with a positive Rich States, Poor States economic outlook ranking tend to have higher pension funding ratios.

SECTION 3: SOLUTIONS TO THE PENSION FUNDING CRISIS

Making the Switch to Defined-Contribution

Ultimately, one of the best ways to solve the pension crisis is to change the way pension plans are structured. Changing from the current defined-benefit system toward a defined-contribution system for new employees will improve the health of state pension plans by giving employees full control over their retirement savings.

One reform most pension plans could immediately adopt is lowering their discount rate closer to the private sector average of 4%, or better yet, to a risk-free rate.[17] The risk-free rate used in ALEC pension reports varies from year to year based upon the average of 10-year and 20-year U.S. Treasury bond yields. The table below shows the risk-free discount rate by fiscal year:

Table 11 **Risk-Free Discount Rate by Fiscal Year**

2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
3.69%	3.63%	3.20%	2.17%	2.74%	2.81%	2.35%	2.03%	2.49%	2.96%

Source: Federal Reserve Bank of St. Louis FRED Database and authors' calculations

Given the variance in discount rates, the authors of last year's report incorporated a fixed discount rate of 4.50%.[18] The fixed discount rate provides a basis of comparison in years that see large changes to the risk-free discount rate.

A second reform is to vary benefit or contribution rates based on the funding of the plan. It is worth revisiting the cases of Wisconsin and Maine from last year's report. Wisconsin, as mentioned above, has the best funded pension system in the country with a funding ratio of 70.37% because it has a variable benefit rate, meaning the disbursement varies over time. State retirees are entitled to a low, guaranteed pension payment paired with a variable payment based on the pension system's funding ratio.[19] This means when tax revenue is lower during economic recessions, the fund lowers payments to retirees and allows the fund to recover rather than exhausting the fund or taking on debt to keep making payments.[20] While the plan has been criticized for diminishing benefits during economic downturns, it has succeeded in providing retirement security.[21]

In 2016, Maine pursued a series of reforms to implement variable contribution rates for their state pension system.[22] Due to these reforms, Maine's unfunded pension liabilities have decreased by almost $10 billion (about 50%) over the past two years. Normally, employer contribution rates fluctuate to meet the ARC or other contribution standards, whereas employee contributions are a fixed rate set by contract. Under a "risk-sharing" plan, changes in the ARC result in changes in contributions for both employer and employee.

The models share a key aspect: both Maine and Wisconsin have automatic "triggers," either on contribution rates, benefit rates, or cost of living adjustments. These triggers serve as an objective management tool to ensure pensions are funded. Automatic adjustments based on actuarial science are difficult to argue against, particularly when the potential deviation will underfund the pension system.

In addition, numerous states (e.g., Michigan, Pennsylvania, Wisconsin, and Tennessee) have introduced hybrid pension plans and options for full defined-contribution pensions. In most cases, a hybrid is a relatively small defined-benefit pension plan offered in tandem with a defined-contribution plan. The defined-benefit portion of these hybrids carries all the same risks as traditional pension plans. The risks, however, are mitigated by the smaller size and, often, better contract terms, such as benefit formulas that block spiking (where employees convert certain benefits such as unused sick time or saved vacation pay to boost their pension benefits) or higher employer contribution rates.

Tennessee currently offers a hybrid pension plan for all state and higher education employees hired on or after July 1, 2014. All state and higher education employees hired before that date have been incorporated in the defined-benefit legacy plan.[23] The hybrid plan incorporates both a defined-benefit plan and the option to set aside money in a 401(k) plan. Tennessee is consistently one of the states with the best funding ratios and the lowest unfunded liabilities per capita in the ALEC pension reports since 2016. Unfunded liabilities will continue to fall as more retirees participate in hybrid pension plans and the state pays off its legacy pension plan liabilities.

Similarly, Michigan transitioned its Public School Employees' Retirement System (MPSERS) to a hybrid pension plan for all new hires in 2017. The plan auto-enrolls new hires in a defined-contribution plan, but new teachers have the choice of opting into a hybrid plan with a mix of defined-contribution and defined-

benefit plans.[24] The defined-benefit plan splits all costs 50-50 between employers and employees, and uses a 10-year amortization schedule and 6% discount rate. In addition, if the hybrid plan's funding ratio falls below 85% for two consecutive years, the plan is closed to new hires until the funding ratio rises above the 85% threshold for two consecutive years.[25]

In 1996, Michigan was the first state in the nation to close its defined-benefit Michigan State Employee Retirement System (MSERS) and enroll new hires in a hybrid plan. [26] However, other state employee plans (such as MPSERS, the State Police Retirement System State Judges Retirement System, Municipal Employees Retirement System and the Legislative Retirement System) kept the defined-benefit option open to new hires. Thus, unfunded liabilities continue to accumulate in the other Michigan pension plans.[27]

The case of Michigan demonstrates that a transition to defined-contribution plans does not mean unfunded liabilities will disappear overnight (or even in one fiscal year). Michigan still ranks 42nd in the nation on unfunded liabilities, but the counterfactual would be much worse. If these reforms were not in place, Michigan would resemble its neighbor to the southeast, Ohio, or nearby Illinois. Ohio (48th in the nation) has $290 billion in unfunded liabilities, while Illinois (49th in the nation) has nearly $360 billion in unfunded liabilities. A study conducted by Richard Dreyfuss for the Mackinac Center found that Michigan's unfunded liabilities would have been between $2.3-$4.5 billion greater if the reforms had not been made.[28] By continuing reforms to transition more pension plans to defined-contribution, Michigan can steadily improve its retirement plans and reduce its unfunded liabilities.

Transparency is Necessary for Accountable Government

To keep government accountable, taxpayers, public sector employees and other stakeholders must be able to view government financial documents in an easy and accessible manner. The call for greater transparency in government documents has remained constant throughout the various iterations of ALEC Center for State Fiscal Reform publications. Disclosing key financial information is required of publicly traded corporations — governments should be held to the same standard.

State and local governments can increase transparency by utilizing digital record keeping and disclosing all financial information to the public in accessible and understandable formats in a regular and timely manner. Failing to disclose key information (such as the financial status of the system, actuarial assumptions, investment portfolio composition and performance, investment decisions and findings of relevant independent assessments) keeps stakeholders in the dark. The ALEC "The Open Financial Statement Act" model policy outlines how digital records could modernize this process. The act replaces PDF-formatted audited financial statements of state, county, municipal and special district filings with filings utilizing Interactive Extensible Business Reporting Language (iXBRL). It also establishes these iXBRL audited financial statements as the only annual financial filing required from public agencies by the state, reducing duplicative reporting efforts and therefore reducing costs. The benefits of iXBRL are increased transparency, uniformity among state financial documents and ease of accessing information such as asset and liability valuations, discount rates and mortality rates across pension plans.[29]

Conclusion

The strategies explained above illustrate ways states may limit the risks associated with pension mismanagement, but states can shed these risks entirely by switching to defined-contribution plans. For the government employee, all costs are realized in the present, taking away the possibility of employers underfunding employee benefits. Employees can control where they invest retirement savings. Rather than leaving retirement investments at the discretion of the political process, defined-contribution plans give employees the flexibility to choose how much they contribute. More importantly, defined-contribution plans allow employees to take retirement savings with them when they change positions, locations, or careers.

APPENDIX: METHODOLOGY

This year's report features the most recently available data from FY 2017 and FY 2018. Since the previous edition of this report was published, states have improved their reporting of this data. As a result, this report also includes a more complete dataset from FY 2012 through FY 2018 that was not previously available.

Delaware, Indiana, North Carolina and Tennessee provided the most accessible and comprehensive data this year. The necessary information for each of these state pension plans could be found on a user-friendly website with easily accessible actuarial and financial document sections.[30] North Carolina has shown significant improvements in pension data reporting. Massachusetts also linked to its pension plan in the state CAFR — an excellent practice. However, data for some states — such as Alabama — required outreach to the state comptroller to acquire demographic information. This elongated process to acquire financial information (that Alabama is required to make public) is an unnecessary barrier to taxpayers who want to stay informed. It exemplifies how state reporting is critical to transparent and accountable pension policy.

This report uses each plan's actuarial value of assets (AVA) and actuarial accrued liability (AAL) to calculate unfunded liabilities. This report, however, makes several assumptions regarding the structure of state liabilities and the quality of the actuarial assumptions to present a different estimate of each state's liabilities than commonly is found in the state financial reports.

In addition, many plans use the phrase "rate of return" and "discount rate" interchangeably. Section 2 explained the differences between an investment rate of return and a discount rate. As discussed in Section 2, there is a major difference between assumed return on investments and actual return on investments.

Another important aspect highlighted in this report is how the discount rate affects the value of liabilities. Generally, the higher the discount rate, the lower the liability (and vice versa). Also mentioned in Section 2, assuming higher assumed rates of return and discount rates creates perverse incentives for policymakers to overvalue the returns on investment and undervalue liabilities. When this occurs, pension plans become underfunded.

For this report, a 15-year midpoint, using a hypothetical 15-year U.S. Treasury Bond yield, is used to derive an estimated risk-free discount rate of 2.96%. This is calculated as the average of the 10-year and 20-year bond yields. As stated in Section 2, the 15-year midpoint comes from the GASB recommendation that a pension plan take no longer than 30 years to pay off its pension liabilities. While states are not required to report their liabilities projected over a time series (i.e., reporting total liability due per year for the next 75 years), this report must assume the midpoint of state liabilities in order to recalculate state liabilities under different discount rate.

The risk-free rate is also used in the ALEC *Other Post-Employment Benefit Liabilities* report. Applying the risk-free rate to both pension and OPEB liabilities allows for more accurate cross-state comparisons than simply comparing liability values in state financial documents.

The valuations in this report are calculated based on the present value of those liabilities. While it is difficult to estimate how much future liabilities will cost (because of changes in inflation and mortality rates, for example) the value of those future liabilities can be estimated today by calculating their present value. Present value is the value today of an amount of money in the future.

The discount rate is the rate used to determine the value today of the amount a pension plan must pay retirees in the future.[31] A general rule is the higher the discount rate, the lower the present value of future pension liabilities and vice versa. This study uses a discount rate that is lower than the discount rate in many state financial documents. This is, in part, to show a more conservative valuation of those liabilities (compared to many state financial documents) and allow more accurate liability comparisons to be made between states.

Discount rates used for pension plans can vary even among plans within a state. The use of a risk-free discount rate normalizes discount rates across pension plans, providing the means to assess present value of liabilities across plans. This provides a basis of comparison for liabilities and funding ratios across the 50 states. Other variables provided by state financial documents such as mortality rates, demographics and health care costs were assumed to be correct and not normalized across plans.

This is a more prudent discount rate than many plans offer. The formula for calculating a risk-free present value for a liability requires first finding the future value of the liability. That formula, in which "i" represents a plan's assumed discount rate, is FV = AAL x (1+i) ^15. The second step is to discount the future value to arrive at the present value of the more reasonably valued liability. That formula is PV = FV / (1+i) ^15, in which "i" represents the risk-free discount rate.

This methodology was developed by Bob Williams and Andy Biggs when this report was created by State Budget Solutions, which is now a project of the Center State Fiscal Reform at ALEC. It normalizes the liability values across plans and presents a more prudent valuation of liabilities than many state benefits plans with more rosy assumptions (such as higher discount rates). The inclusion of the fixed discount rate of 4.5%, was added by Thurston Powers in *Unaccountable and Unaffordable, 2018*.[32]

Data quality has improved, which has yielded improvements for utilizing various discount rates for different types of plans (e.g., single employer, cost-sharing multiple employer and agent multiple employer). This reporting, however, is far from perfect, and there is much room for improvement. While some states did make clear distinctions between plan types, others aggregated pension liabilities and did not differentiate between plan types. For example, this year the California CalPERS plan was separated into the PERF A, PERF B, and PERF C plans, each with their own actuarial valuations instead of being aggregated into one CalPERS data entry.

Furthermore, the smaller plans that did report their investment rates of return tended to deviate from the national average more than larger plans, likely due to their smaller and less diversified funds. In some cases, smaller plans pool their assets with the state employee, teacher or police funds to reduce management costs. This created a comparison problem between states in terms of their investment rates of return. States with smaller plans tended to report a larger variance in their investment returns than states with consolidated funds as well as, problematically, states with smaller plans that did not report investment rates of return.

Membership figures are collected from CAFRs, valuations and GASB notes, and are divided into active employees and beneficiaries (i.e., current retirees, inactive employees entitled to benefits who have not yet retired and survivors entitled to benefits). Some state plans used the term "inactive" to refer to different aggregations of inactive employees, such as retirees, inactive employees entitled to a future benefit, and inactive employees not entitled to a benefit. Supporting documents were used to parse the two groups. For example, the Connecticut Municipal Employee Retirement System (CMERS) ambiguously uses the term "inactive members" in its GASB 68 report but clarifies the figure in its GASB 67 report by parsing the total into retirees currently receiving benefits and inactive members entitled to benefits.

Actuarially recommended contributions (ARCs) and the percentage of actuarially recommended contributions made were collected primarily from pension CAFRs, usually from tables titled "Schedule of Employer Contributions." Actuarially determined contributions, actuarially recommended contributions, and actuarially determined contributions net of taxes and fees are reported as ARC in this study. Figures were collected from most recent to least recent year, with the aim of selecting actuarially recommended contribution rates that reflect the most recent actuarial assumptions, except in cases where actuarially recommended contribution rates were retroactively replaced with contractually or legislatively required contribution rates.

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