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UNACCOUNTABLE AND UNAFFORDABLE

UNFUNDED PUBLIC PENSION LIABILITIES EXCEED

$5.9 TRILLION

ALEC American Legislative Exchange Council

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INTRODUCTION

Unfunded liabilities in public pension plans continue to loom over state governments nationwide. If net pension assets are determined using more realistic investment return assumptions, pension funding gaps are significantly wider than even the large sums reported in state financial documents. Unfunded liabilities of state-administered pension plans, using a proper, risk-free discount rate, now total over $5.96 trillion. The average state pension plan is funded at a mere 35 percent. This amounts to $18,300 of unfunded pension liabilities for every resident of the United States.

Much of this problem is due to state governments failing to make their annually required contributions (ARCs). ARCs represent the annual appropriation needed to cover the normal cost of future pension obligations accrued in the present, along with amortization of prior unfunded liabilities. ARCs have been called the "unofficial measuring stick of the effort states and local governments are making to fund their pension plans."[1] Unfortunately, many states consistently fail to make their full ARC payments; some even skip payments altogether. According to a 2017 report, only 32 states in FY 2015 made pension fund contributions sufficient enough to diminish accrued unfunded liabilities ("positive amortization").[2] Each contribution a state skips must be made up in the future along with foregone investment returns.

Current state workers and retirees are not the only people affected by the pension liability crisis. Taxpayers ultimately provide the wages for public sector employees and the financial resources to cover promised benefits of traditional, defined-benefit (DB) pension plans. Additionally, all residents are impacted when pension costs absorb limited government resources. Instead of funding core government services such as education and public safety, the dollars are used to backfill pensions.

For these reasons, the American Legislative Exchange Council (ALEC) continues to produce publications to educate policymakers and the public about the danger unfunded pensions pose to core services and the economy. This report surveys more than 290 state-administered public pension plans, detailing assets and liabilities over a five-year period. The unfunded liabilities are reported using three different calculations:

- a state's own estimates
- estimates using an alternative discount rate which reflects constitutional and other legal protections extended to state pension benefits
- estimates using a fixed rate which compares funding ratios and controls for changes in discount rate assumptions over time

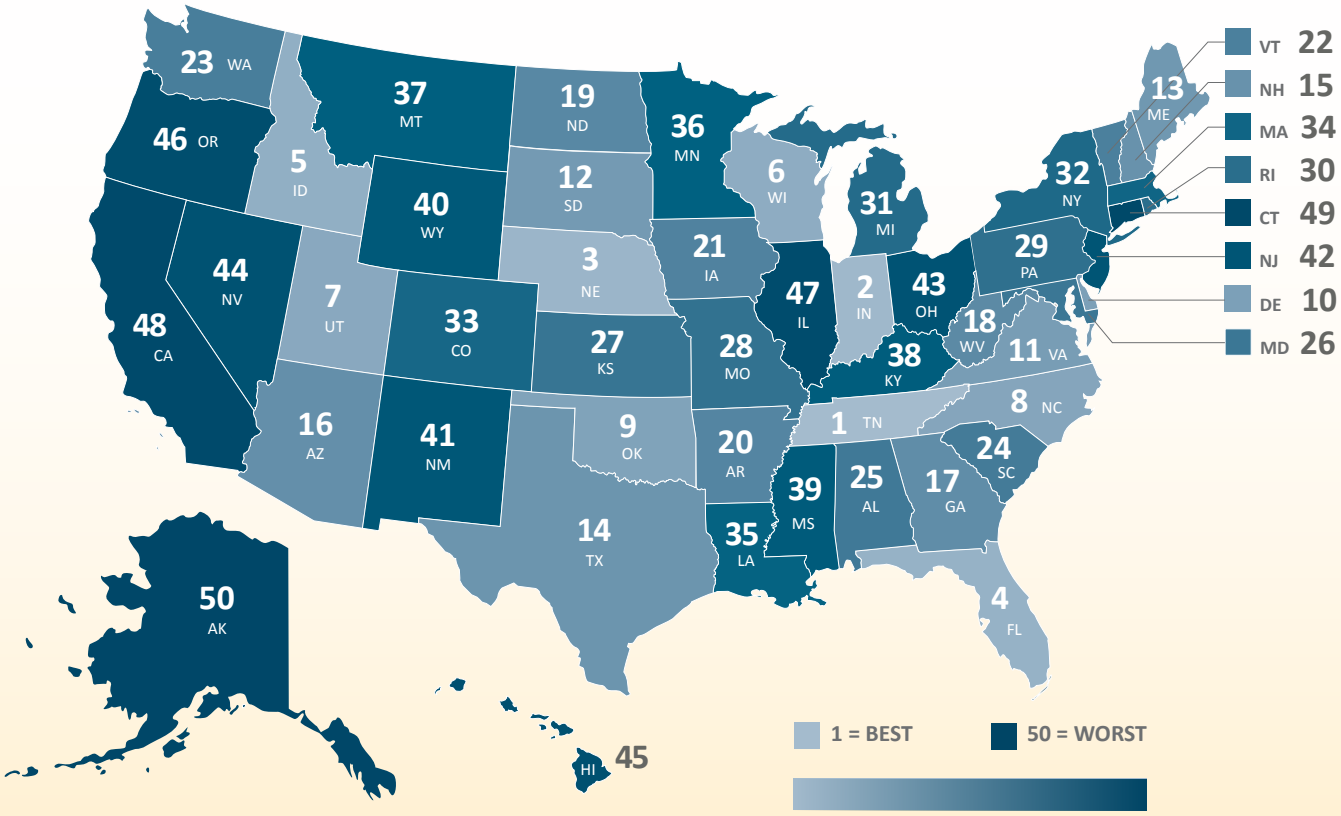
The first section of this report aggregates per capita unfunded pension liability, unfunded pension liability as a percentage of gross state product, funding ratio by state, and a percent change in funding ratio by state over the past five years. This section provides a concise national overview of the pension crisis, as well as warning signs for those states trending in the wrong direction.

The second section describes how different aspects of pension management contribute to the crisis. It includes subsections on actuarially accrued liabilities, investment rates of return, discount rates, actuarially required contributions, actuarially valued assets, membership, and transparency. This section provides background on how pensions operate, how errors transpire, how politics influences management decisions, and how mismanagement of each aspect adds to the current crisis.

The third section explores reforms states have pursued over the past decade to address growing unfunded liabilities. This section considers several different types of reforms, ranging from the most ideal — switching new hires to defined-contribution (DC) plans — to less aggressive solutions. However, even less aggressive pension reform can have a significant impact if embraced quickly, before liabilities have a chance to become unsustainable.

The appendix explains our research methodology, including the mathematics and financial economics behind how we calculate unfunded liabilities. The methodology in this report presents a more comprehensive picture of the pension crisis by re-estimating state liabilities using a fixed rate similar to what private sector pensions are mandated to use by federal law, and a risk-free rate which reflects the state constitutional and legal protections for state employee retirement benefits.

Figure 1, Table 1 **Unfunded Pension Liabilities Per Capita, 2018**



Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

UNFUNDED PENSION LIABILITIES PER CAPITA

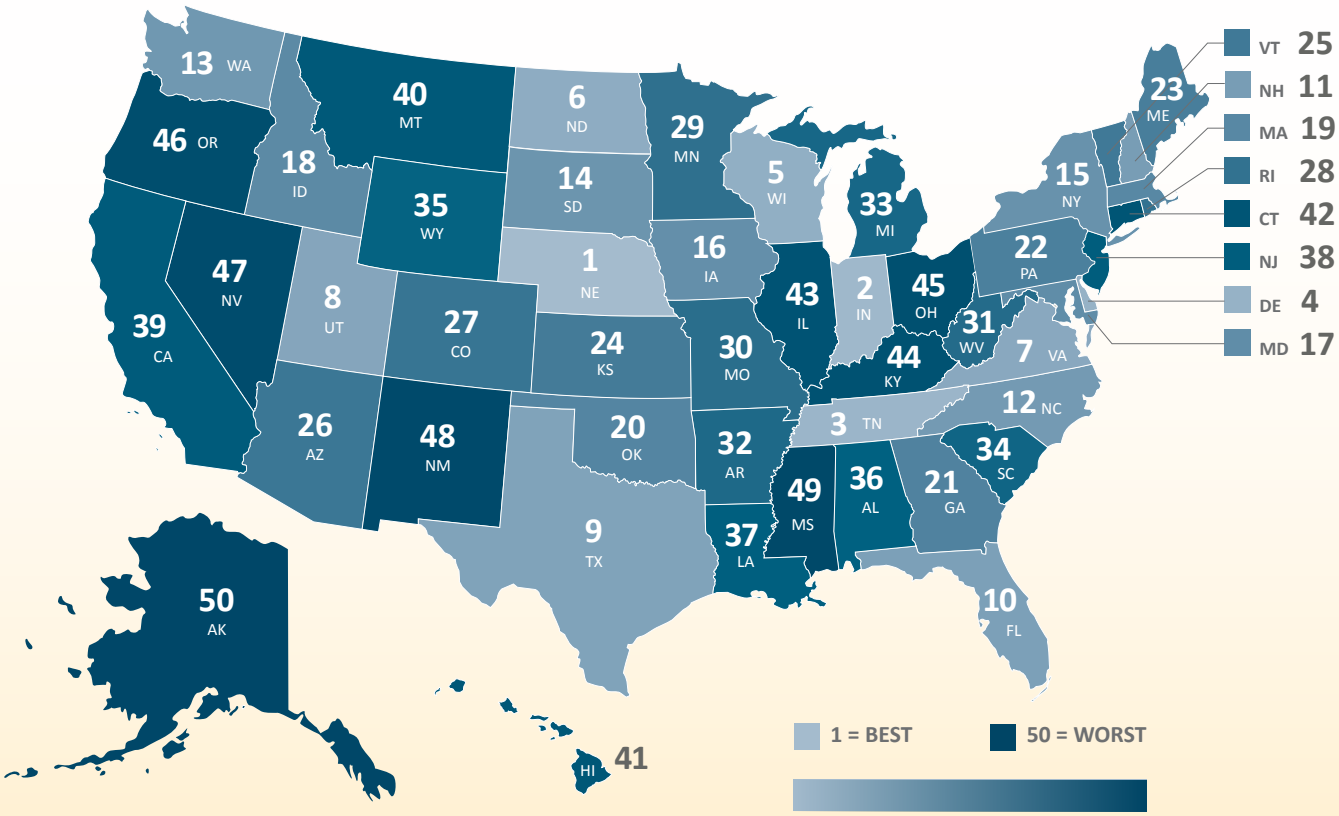
The accumulation of unfunded pension liabilities per capita is the most alarming facet of the pension crisis. This metric reveals the personal share of liability for every resident in each state, an indicator of potential future tax burdens to be borne by residents for pension promises made but not funded. In Alaska, each resident is on the hook for a staggering $46,774 — the highest amount across the states. Connecticut, California, Illinois, and Oregon have the next four highest unfunded pension liabilities per person. In total, states have accrued $5.96 trillion, or about $18,300 per capita. This is a slight decline from our last report, when liabilities totaled more than $6 trillion, but the improvement is primarily attributable to a rise in interest rates as reflected in the fixed rate analysis of unfunded liabilities, which holds the discount rate constant across time (see appendix).

Rank	State	Unfunded Liabilities Per Capita
1	Tennessee	$8,466
2	Indiana	$8,690
3	Nebraska	$9,043
4	Florida	$10,237
5	Idaho	$10,263
6	Wisconsin	$10,770
7	Utah	$11,604
8	North Carolina	$11,841
9	Oklahoma	$12,480
10	Delaware	$12,482
11	Virginia	$12,579
12	South Dakota	$13,075
13	Maine	$13,100
14	Texas	$13,172
15	New Hampshire	$13,405
16	Arizona	$13,882
17	Georgia	$13,947
18	West Virginia	$14,470
19	North Dakota	$14,489
20	Arkansas	$14,538
21	Iowa	$14,542
22	Vermont	$15,431
23	Washington	$15,466
24	South Carolina	$15,633
25	Alabama	$15,672

Rank	State	Unfunded Liabilities Per Capita
26	Maryland	$15,728
27	Kansas	$15,766
28	Missouri	$16,273
29	Pennsylvania	$16,550
30	Rhode Island	$17,205
31	Michigan	$17,874
32	New York	$17,932
33	Colorado	$18,615
34	Massachusetts	$19,569
35	Louisiana	$20,097
36	Minnesota	$20,149
37	Montana	$20,246
38	Kentucky	$21,022
39	Mississippi	$22,237
40	Wyoming	$25,127
41	New Mexico	$25,461
42	New Jersey	$26,174
43	Ohio	$26,178
44	Nevada	$26,543
45	Hawaii	$27,281
46	Oregon	$28,431
47	Illinois	$28,954
48	California	$29,137
49	Connecticut	$32,805
50	Alaska	$46,774

Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

Figure 2, Table 2 **Unfunded Liabilities as a Percentage of Gross State Product, 2018**



Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

UNFUNDED LIABILITIES AS A PERCENTAGE OF GROSS STATE PRODUCT

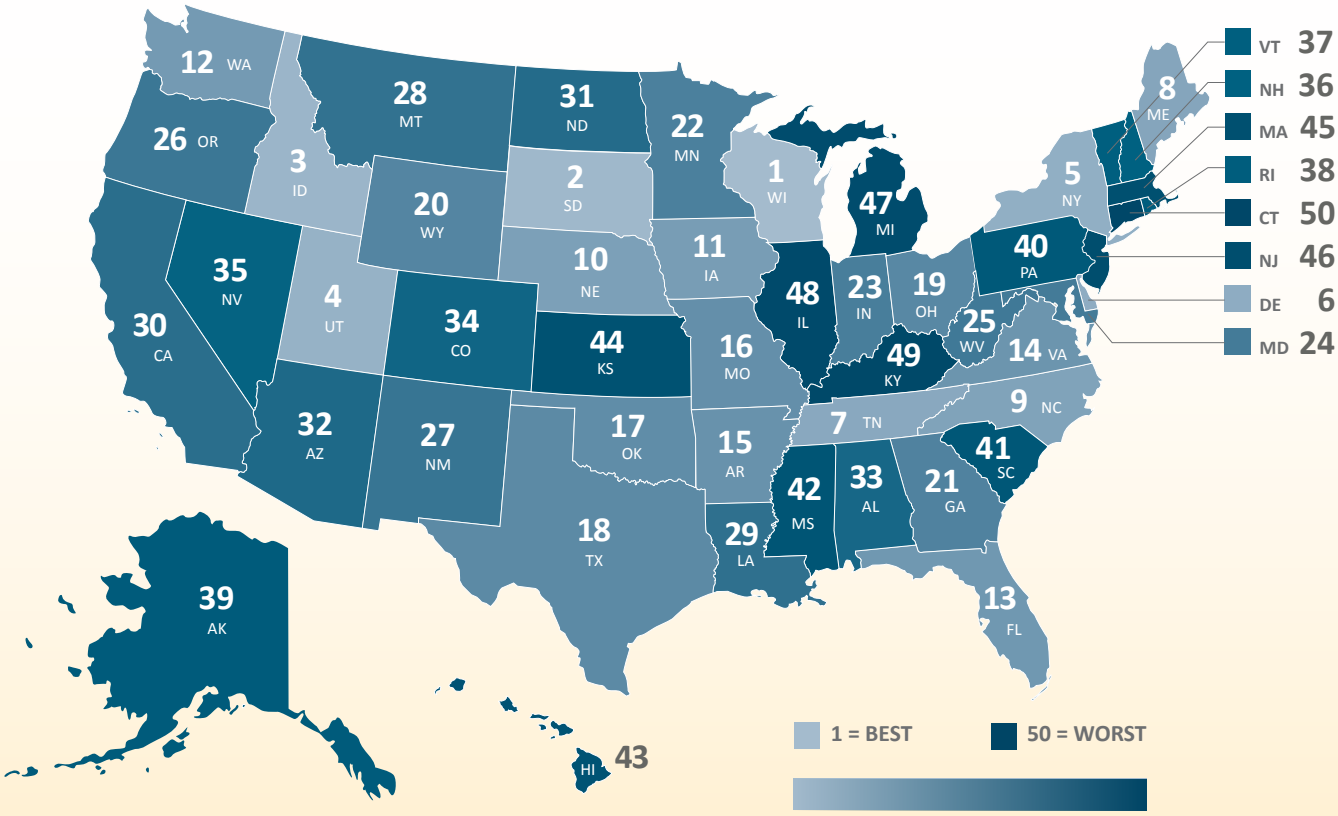
While per capita figures represent the unfunded liability accrued by the state apportioned out to each state resident, unfunded pension liabilities as a percentage of gross state product (GSP) estimates a state's ability to pay. Unfunded liabilities as a percentage of GSP illuminate the severity of pension crises in relatively small economies, like Kentucky, and in states receiving little national media attention, like Missouri.[3] Their pension unfunded liability as a percentage of GSP are 46.24 percent and 32.63 percent respectively.

Rank	State	Unfunded Liabilities as a Percentage of GSP
1	Nebraska	14.26%
2	Indiana	16.13%
3	Tennessee	16.31%
4	Delaware	16.33%
5	Wisconsin	19.19%
6	North Dakota	19.72%
7	Virginia	20.95%
8	Utah	21.75%
9	Texas	21.98%
10	Florida	22.20%
11	New Hampshire	22.36%
12	North Carolina	22.59%
13	Washington	22.62%
14	South Dakota	22.77%
15	New York	23.00%
16	Iowa	24.05%
17	Maryland	24.18%
18	Idaho	24.51%
19	Massachusetts	25.45%
20	Oklahoma	25.94%
21	Georgia	26.24%
22	Pennsylvania	28.19%
23	Maine	28.50%
24	Kansas	29.05%
25	Vermont	29.89%

Rank	State	Unfunded Liabilities as a Percentage of GSP
26	Arizona	30.45%
27	Colorado	30.45%
28	Rhode Island	30.67%
29	Minnesota	32.00%
30	Missouri	32.63%
31	West Virginia	34.46%
32	Arkansas	34.96%
33	Michigan	35.16%
34	South Carolina	35.85%
35	Wyoming	36.13%
36	Alabama	36.22%
37	Louisiana	38.23%
38	New Jersey	39.84%
39	California	41.71%
40	Montana	44.20%
41	Hawaii	44.20%
42	Connecticut	45.13%
43	Illinois	45.18%
44	Kentucky	46.24%
45	Ohio	47.02%
46	Oregon	49.18%
47	Nevada	49.91%
48	New Mexico	54.76%
49	Mississippi	59.40%
50	Alaska	65.70%

Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

Figure 3, Table 3 **Funding Ratio, 2018**



Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

FUNDING RATIO

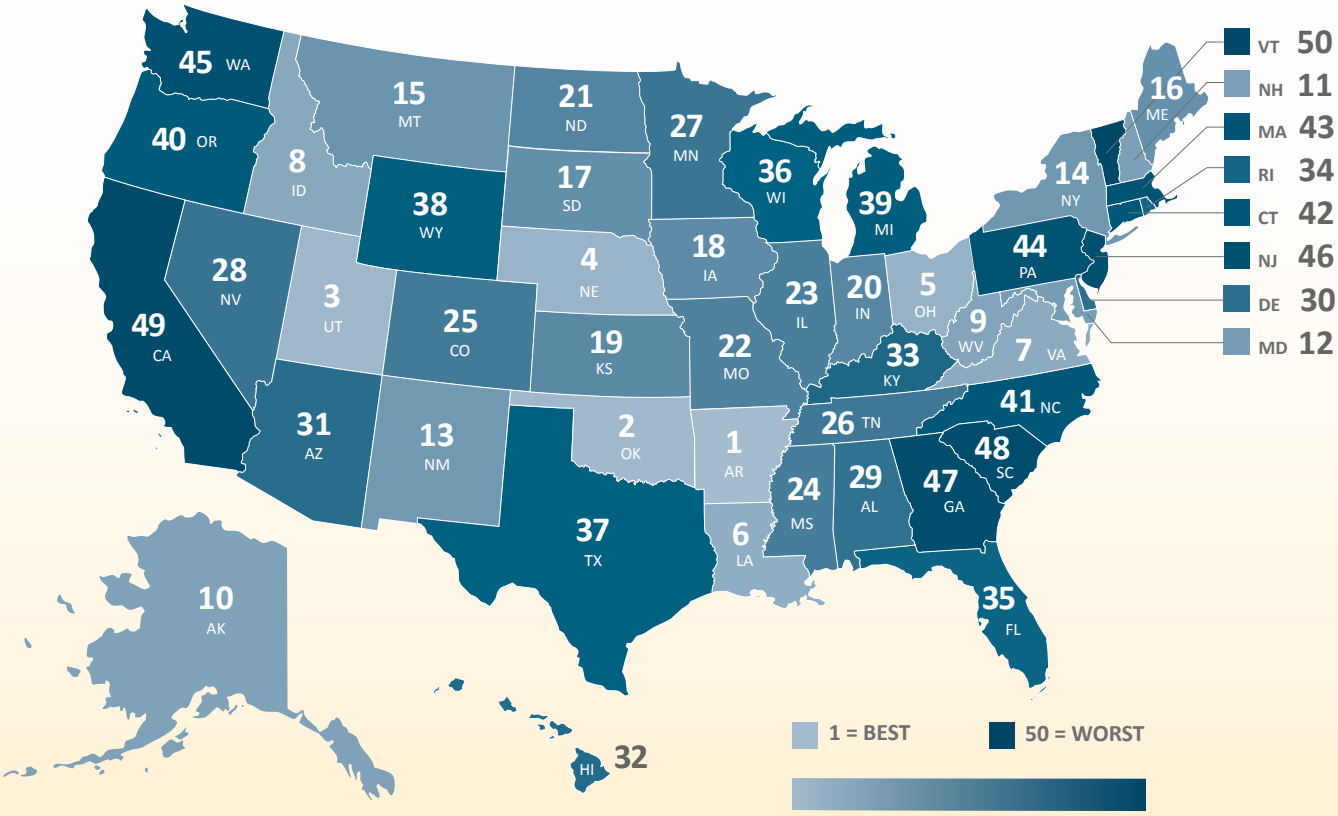
The funding ratio is also an important measure of the health of a pension fund. A higher funding ratio enables a pension fund to better withstand periodic economic shocks without placing future benefits at risk. Our figures deviate from state figures because our calculations use a risk-free rate to reflect the constitutional and legal protections extended to state employee retirement benefits. These findings are especially troubling as any plan below an 80 percent funding ratio is considered "at risk." All 50 state plans are well below the 80 percent risk threshold, with the average state funding ratio being 35 percent. Retirees and taxpayers alike could face reduced benefits, higher taxes, or both.

Rank	State	Funding Ratio
1	Wisconsin	60.54%
2	South Dakota	50.73%
3	Idaho	47.20%
4	Utah	46.17%
5	New York	45.54%
6	Delaware	44.48%
7	Tennessee	43.97%
8	Maine	43.72%
9	North Carolina	43.32%
10	Nebraska	43.31%
11	Iowa	42.33%
12	Washington	41.24%
13	Florida	41.22%
14	Virginia	40.27%
15	Arkansas	39.21%
16	Missouri	39.13%
17	Oklahoma	39.12%
18	Texas	38.36%
19	Ohio	37.63%
20	Wyoming	36.76%
21	Georgia	36.72%
22	Minnesota	36.16%
23	Indiana	35.96%
24	Maryland	35.06%
25	West Virginia	34.51%

Rank	State	Funding Ratio
26	Oregon	34.45%
27	New Mexico	34.39%
28	Montana	34.21%
29	Louisiana	33.12%
30	California	32.21%
31	North Dakota	32.13%
32	Arizona	32.07%
33	Alabama	31.95%
34	Colorado	31.73%
35	Nevada	31.58%
36	New Hampshire	31.33%
37	Vermont	30.42%
38	Rhode Island	30.41%
39	Alaska	29.75%
40	Pennsylvania	29.42%
41	South Carolina	28.91%
42	Mississippi	28.83%
43	Hawaii	28.72%
44	Kansas	28.48%
45	Massachusetts	28.39%
46	New Jersey	27.48%
47	Michigan	26.78%
48	Illinois	25.19%
49	Kentucky	24.81%
50	Connecticut	20.28%

Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

Figure 4, Table 4 **Percentage Change in Funding Ratio, 2013-2018**



Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

CHANGE IN FUNDING RATIO BETWEEN 2013 AND 2018

Between 2013 and 2018, several states improved their actuarial assumptions, increased their contributions, and pursued reforms such as switching to hybrid and DC plans. In addition to these reforms, interest rates have started to increase to pre-recession averages, increasing the risk-free discount rate. For these reasons, we use a fixed 4.5 percent discount rate to control for fluctuations in interest rates and discount rates when assessing long-term funding ratio performance. Many states have successfully improved their systems, but others are in a virtual free fall despite the current 10-year expansion in equities. The average change in funding ratio across the states is a mere 2.67 percent.

Rank	State	Percentage Change in Funding Ratio, 2013-2018
1	Arkansas	12.62%
2	Oklahoma	11.64%
3	Utah	11.37%
4	Nebraska	9.96%
5	Ohio	9.22%
6	Louisiana	8.18%
7	Virginia	8.05%
8	Idaho	7.82%
9	West Virginia	7.43%
10	Alaska	6.93%
11	New Hampshire	6.42%
12	Maryland	6.17%
13	New Mexico	6.14%
14	New York	6.08%
15	Montana	5.42%
16	Maine	5.20%
17	South Dakota	5.11%
18	Iowa	4.87%
19	Kansas	4.67%
20	Indiana	4.55%
21	North Dakota	4.28%
22	Missouri	4.22%
23	Illinois	3.77%
24	Mississippi	3.26%
25	Colorado	3.20%

Rank	State	Percentage Change in Funding Ratio, 2013-2018
26	Tennessee	3.07%
27	Minnesota	2.57%
28	Nevada	2.42%
29	Alabama	2.38%
30	Delaware	1.88%
31	Arizona	1.65%
32	Hawaii	1.05%
33	Kentucky	0.87%
34	Rhode Island	0.69%
35	Florida	0.27%
36	Wisconsin	0.09%
37	Texas	0.07%
38	Wyoming	-1.13%
39	Michigan	-1.88%
40	Oregon	-2.46%
41	North Carolina	-2.50%
42	Connecticut	-2.53%
43	Massachusetts	-2.61%
44	Pennsylvania	-2.87%
45	Washington	-3.55%
46	New Jersey	-3.73%
47	Georgia	-4.05%
48	South Carolina	-4.07%
49	California	-4.95%
50	Vermont	-13.98%

Source: Data are based on ALEC Center for State Fiscal Reform's calculations. To read the full report and methodology, see ALEC.org/PensionDebt2018

ACTUARIALLY ACCRUED LIABILITIES

Actuarially accrued liabilities estimate state pension obligations to current and future retirees. These obligations can stretch 75 years into the future, and even further in some cases. The youngest state employees may collect benefits into their 100s due to longer life expectancy. On average, the midpoint for these liabilities is 15 years and tapers out into the future. Small changes in the assumptions about these particularly long-term obligations can create large differences in total estimated liabilities.

Since 2008, states have experienced heightened pressure from organizations like the Governmental Accounting Standards Board (GASB) and the Society of Actuaries (SOA) to improve their actuarial assumptions to reflect economic and demographic changes. Part of the growth in unfunded liabilities over the past decade is attributable to more accurate estimates of future state obligations. For example, the Wyoming Air Guard Firefighters Pension Plan adopted a series of adjustments (summarized below) to their actuarial assumptions, which increased their accrued liability.

Below is a summary of the changes in assumptions:

1 **Inflation**: reduce the current assumption from 3.25% to 2.25%.
2 **Real rate of return**: increase the current assumption from 4.50% to 4.75%.
3 **Nominal rate of return**: decrease the nominal investment return assumption (the sum of inflation and the real rate of return) from 7.75% to 7.00%.
4 **Wage inflation**: reduce the wage inflation assumption from 4.25% to 2.50%.
5 **Payroll growth**: reduce the assumed growth in total payroll from 4.25% to 2.50%.
6 **Administrative expenses**: recommend reducing the assumed annual increase in expenses from 6.50% per year to 2.50%.
7 **Post-retirement mortality, disabled lives mortality, active life mortality**: update to the RP2014 table, projected generationally using MP 2017.
8 **Salary increase**: decrease the assumed salary increases and to move from age-based merit and promotion increases to service-based merit and promotion increases.
9 **Retirement (unreduced retirement)**: Increase the assumed final age of employment from 70 to 80 and modify the retirement rates to reflect actual experience.
10 **Early (reduced) retirement**: modify the retirement rates to reflect actual experience.
11 **Termination**: adjust rates to reflect observed experience.

The assumption changes the accrued liability by $327,140.

Source: Wyoming Air Guard Firefighters Pension Plan Valuation 2018

In the list above, the term "to reflect observed experience" is important because it refers to assumptions changed based on trends, which are unique to each plan. Each pension plan has unique characteristics based off factors such as vesting, retirement age, deferred retirement option plans (DROP), survivor beneficiary rules, demographics, payroll growth, mortality, and membership ratios. Future trends are informed by current national trends, but actuaries must be careful since national trends may or may not be representative of their own pension plans.

Historical trends may not be the best estimate of future conditions if underlying characteristics of the economy change, like the employment habits of young workers. The rate at which employees become vested as a percentage of current workers varies depending on the type of work and the vesting requirements for the plan. For example, the Michigan Public School Employee Retirement System (MPSERS) only had a 50 percent vesting rate with less than one-third of employees fully vesting.[4] This was due to its long vesting requirements relative to the duration of many younger workers in today's economy. DC plans are generally far more portable from job to job and thus many younger workers would benefit from them more than previous generations. This may be part of the reason school systems and state and local governments are having difficulty attracting talent in some regions of the country. Furthermore, demographic assumptions could shift dramatically because of social and technological changes. Confidence in the accuracy of estimates erodes the further out in time we make them, or, at least, it should. Policymakers must understand how all estimates of pension liabilities, this study included, are just that — estimates — which will evolve and change over time. While many different estimates of unfunded liabilities are produced each year, the most important public policy question is whether the estimates accurately reflect the constitutional and legal protections of pensions.

INVESTMENT RATE OF RETURN AND DISCOUNT RATES

Our nation is amid a rapid and extraordinary 10-year expansion in the equity market. However, there have been warning signs growth may be sputtering or, worse, a bubble is forming.[5] For many state pension assets, this bull market has been a godsend, particularly after the decimation caused by the 2008 market crash. Often, the strength of recent investment returns, partic-

ularly over the past five years, is used as justification for high discount rates between 7 and 8 percent. However, interest rates and discount rates are not interchangeable when the risk of an asset portfolio is different than the risk of the liabilities.

Assuming a well-functioning market, the interest rate represents the time value of money, plus the risk involved in lending money. The higher the risk of default, the higher the interest rate investors demand. Over the past four decades, pension funds have shifted from being primarily low-risk, fixed-income investments like bonds, toward an increasingly volatile portfolio of stocks, bonds, and other assets, like office buildings and golf courses.[6]

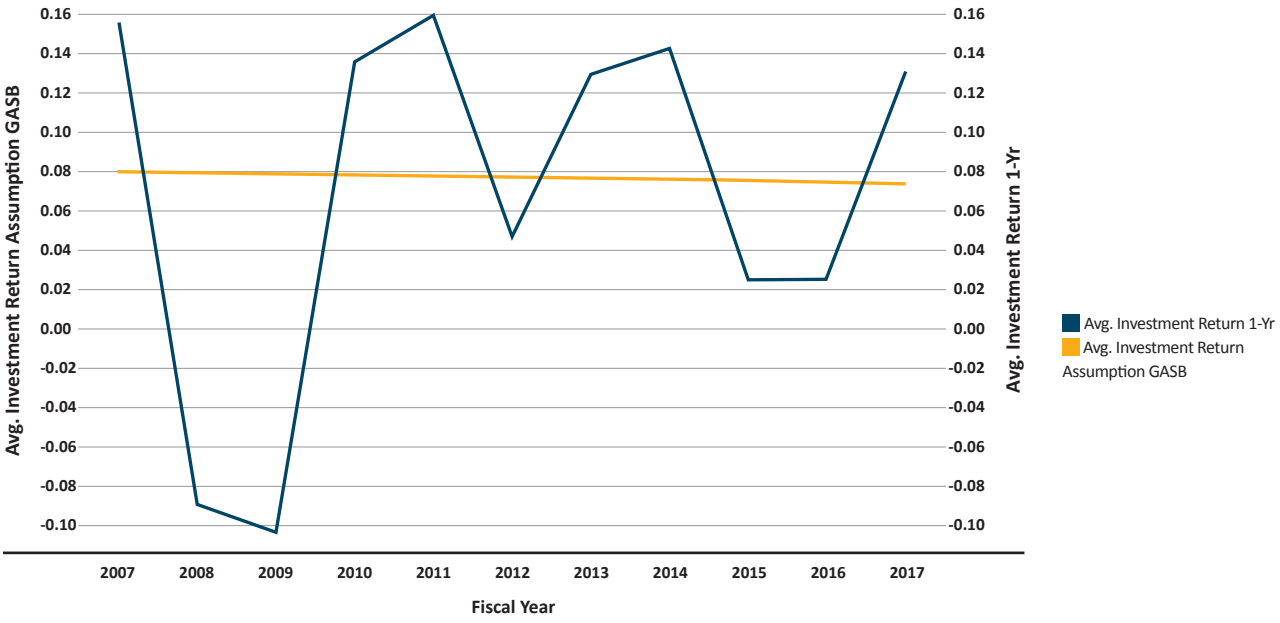
While pension assets have become riskier and more volatile in the pursuit of higher investment returns, legal and constitutional protections of pension plans have strengthened over the same time period. This means there is a divergence between the risk premium of pension assets and pension liabilities, and thus the interest rate and discount rate are not interchangeable. 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."[7] Because the federal government's 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 renowned pension researcher 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.
>
> – Joshua Rauh, Congressional Testimony. July 25, 2018[8]

Table 5, Figure 5 **Average Annual Investment Returns Relative to Average Discount Rate for All States, 2007-2017**

Fiscal Year

	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Avg. 1-Yr Investment Return	0.1557	-0.0899	-0.1037	0.1356	0.1597	0.0470	0.1291	0.1427	0.0246	0.0257	0.1306
Avg. Investment Return Assumption	0.0792	0.0791	0.0788	0.0785	0.0777	0.0771	0.0768	0.0763	0.0759	0.0749	0.0736



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

Even if one assumes rates of return assumptions are interchangeable with discount rates, the discount rates used by states are overly-optimistic by their own standards, depending on the timeframe. If the past recession is any indicator of the next one, the 2007 to 2017 window of investment returns may capture the full and most recent bear-to-bull cycle. The Public Plan Database developed by the Boston College Center for Retirement Research, sorted by fiscal year, shows investment returns from the largest state pension plans and is illustrated below.

Over the 11-year period, the average investment rate of return of state pension plan systems was 6.9 percent, whereas the average discount rate over the same period was 7.7 percent. A 1 percentage point difference in discount rate can produce a massive increase in projected liabilities, roughly a 31 percent increase over a 30-year period. In fact, overestimating investment returns by relying on simple arithmetic averages is a key source of chronic pension underfunding. Many well-meaning policymakers construct pension plans this way, but arithmetic averages are not the best measure of average compounding growth. Using a geometric measure, state investment returns averaged a mere 6.5 percent, about a 1.2 percentage point difference from the discount rate, which remains 7.7 percent using a geometric mean over a 30-year period.

Predictions about the future economy and how changes will impact the funding ratios of state pension systems should be approached in a radically different way than the status quo in many states. The discount rate is used to estimate total pension liabilities, which is then used to calculate the ARC, which is then used to inform annual contribution policy, which then determines the funding ratio in the future and thus the state's ability to meet its obligations to state employees. The benefit will not be paid out "on average" but must be paid out in accordance to state constitutions or other legal protections. In other words, the discount rate should price the liability assuming the worst-case scenario rather than the average scenario, thus eliminating the risk of chronic underfunding.

ACTUARIALLY RECOMMENDED CONTRIBUTIONS

Actuarially Recommended Contributions (ARC) have become highly politicized and misrepresented. Projected ARCs represent contributions necessary to reach full funding within an assumed amortization period, usually between 20 and 30 years, based on the estimated actuarial accrued liability. In this study, the term "ARC" refers to a cluster of terminology used by state plans in the Comprehensive Annual Financial Report's (CAFRs), valuations, and Governmental Accounting Standards Board (GASB) notes. Other terms include "actuarially determined contribution," "actuarially required contribution," and other terms for actuarial estimates. For the purposes of this report, when a contractual, legislative, or other non-actuarial cost estimate was used alongside an ARC, the ARC was selected. In cases where both a dedicated tax or fee revenue and employer contributions were combined to create a "ARC net of taxes or fees," the total contribution relative to the total ARC was used to reflect the contribution relative to funding the pensions rather than the accounting practices of the plan.

The ARC does not set the fund policy, but instead informs it. Often, state-administered plans will pay a percentage of payroll as determined by state employee contracts, which may be in excess or deficient relative to the ARC. In some cases, states have made it their policy to make contributions equal to the ARC. For example, in 2007 Connecticut issued a pension obligation bond and invested the proceeds into the state Teacher Retirement System (TRS). As a condition of the bond, the state agreed to pay the full ARC of the TRS plan until 2032, when both the bond matures and the TRS fund is projected to be fully funded. However, the TRS uses actuarial assumptions, which are far more optimistic than the norm. Therefore, the TRS is unlikely to reach full funding.[9]

Payments less than the ARC would likely result in a lower funding ratio. However, even payments equal to the ARC may result in a lower funding ratio when actuarial assumptions are overly-optimistic. For most plans in most years, states have made contributions equal to the ARC and have outperformed their assumed rate of return in the past few years — but funding ratios have slightly declined with time as the growth of liabilities outpaced expectations. Therefore, while the ARCs are important, their data can be misleading if the actuarial assumptions used to calculate them are not also considered.

ARCs are an evolving metric, as they are based on changes to actuarial assumptions, and thus accrued liability. States regularly revise projected ARCs, even the ARCs from previous fiscal years, to reflect changes in their assumptions. This can produce several different competing ARCs for a given fiscal year. In this study, we selected the ARC for each state from the most recent report, which reflects the most recent changes to the Schedule of Employer Contributions. For example, between 2014 and 2015, the Montana Firefighters' Unified Retirement System adjusted its ARC for FY 2014 from $17,922,000 to $13,699,000.

While most large plans have produced ARC estimates for more than a decade, many smaller plans began to produce their GASB

Table 6 **Percent of ARC Paid by New Jersey in FY 2017**

Plan and Source	ARC	ARC Paid	Percent ARC Paid
New Jersey Consolidated Police and Firemen Pension Fund (closed)	$884,680.00	$575,000.00	65.00%
New Jersey Police and Firemen's Retirement System (Local)	$807,438,390.00	$807,438,390.00	100.00%
New Jersey Police and Firemen's Retirement System (State)	$483,877,347.00	$195,221,000.00	40.35%
New Jersey Public Employees Retirement System (Local)	$866,468,492.00	$866,468,492.00	100.00%
New Jersey Public Employees Retirement System (State)	$1,263,740,460.00	$506,499,652.00	40.08%
New Jersey State Judiciary Retirement Fund	$44,807,771.00	$20,341,379.00	45.40%
New Jersey State Police Retirement System	$135,017,662.00	$53,006,614.00	39.26%
New Jersey Teachers Pension Annuity Fund	$2,737,175,151.00	$1,087,919,000.00	39.75%

Source: State of New Jersey Department of the Treasury, New Jersey Division of Pensions & Benefits

notes and Schedule of Employer Contribution tables in 2014, populating a 10-year series going forward. In theory, smaller plans will experience a greater variance in their liability estimates, and therefore ARCs, due to their small and usually less diverse pool of participants. Our preliminary data support this, but there are several equally valid causal explanations such as limited historical data, less diversified assets, and atypical demographics. Furthermore, the population of smaller plans with more complete reporting may not be random, and therefore not representative, of small plans in general.

Many state plans had an ARC between 3 and 6 percent of their accrued liability, depending on how funded their plan is. Outliers were typically closed plans, plans paying a percentage of payroll, and new tiers of existing plans. For example, as part of their 2010 pension reform, Utah created new tiers of their Public Employees and Public Safety and Fire retirement systems. A portion of the contributions made to these new tiers are diverted toward paying the unfunded portion of the original tiers. According to the Utah Retirement System 2017 CAFR, "Contributions for the Tier 1 Systems include contributions received on the Tier 2 payroll to help finance the unfunded actuarial accrued liability of the Tier 1 Systems."[10] Between the transfers and the fact new tiers start with very low liabilities, the ratio of ARC to Actuarial Accrued Liability (AAL) spiked in the earlier years of the plan and had slowly fallen to about 20 percent. As the original tier closes its unfunded liabilities, this rate will likely fall further to the norm.

Deviations from the chosen ARC are often a reflection of two forces: contracts and political expediency. For some plans, contractually-set contribution rates can result in payments less than the ARC, and ideally these rates will either prove enough in the long-run or be adjusted to improve the funding ratio of the plan. However, some states have deferred pension contributions to close budget gaps and fund other priorities. Few states have engaged in overt underfunding as egregious as New Jersey. In the table above the percent ARC paid, clustered by publication year, is shown for all but the Prison Officer Pension plan.

Only the local portion of the state-administered plans contributed an amount which would hypothetically meet their obligation to retirees. Policymakers might assume a plan making regular contributions approximately equal to the ARC is not a crisis. However, repeated underfunding of the New Jersey's pension system is inexcusable. The mismanagement of the New Jersey state pension system has put state retirees, taxpayers, and current state employees in jeopardy by the threat of lower benefits and higher taxes.

ACTUARIALLY VALUED ASSETS AND FUNDING RATIOS

Following the collapse of private sector pensions between the 1960s and 1980s, Congress pursued countless private sector pension reforms in an effort to ensure responsible pension man-

agement. For example, building on the Employee Retirement Income Security Act of 1974 (ERISA), the Pension Protection Act of 2006 attempted to provide greater security to the remaining private sector defined-benefit (DB) pension plans by articulating acceptable funding ratio levels.[11]

The Government Accountability Office (GAO) explained in testimony to the Joint Economic Committee, "The Pension Protection Act of 2006 provided that large private sector pension plans will be considered at risk of defaulting on their liabilities if they have less than 80 percent funding ratios under standard actuarial assumptions and less than 70 percent funding ratios under certain additional "worst-case" actuarial assumptions."[12] This 80 percent standard still falls far short of guidance provided by the American Academy of Actuaries. According to the Academy, "Pension plans should have a strategy in place to attain or maintain a funded status of 100 percent or greater over a reasonable period of time." By 2011, this standard was fully phased in for private sector DB plans.[13]

However, the Pension Protection Act does not apply to public sector DB pension plans. Using the states' own estimates of their liabilities and assets, 32 states are at risk of default by private sector standards. If the Pension Protection Act were applied to the public sector and states had to use a similar discount rate as the private sector, about 4.5 percent, only Wisconsin's pension system has enough assets to be considered stable. Using a discount rate which reflects constitutional and legal protections for state employee pension benefits, between 2 and 3 percent, no pension fund would be considered stable.

This fact highlights the value of the risk-free rate. There is a distribution of probable futures, and if plans averaged a 5 to 6 percent discount rate to calculate their liabilities and ARCs, they would likely cover most distributions. However, state employee pensions must always be paid in full, not just in comfortable economic times. Using a risk-free rate increases the estimated liability and thus the target asset to match it, eliminating the risk of default under the worst circumstances. If public pensions had been managed using a risk-free rate ahead of the recent economic shocks, pensions would be fully funded today.

While some pension systems have made headway in improving their actuarial assumptions to protect state employees and taxpayers alike, others have used their funds as political tools to be invested or divested along ideological lines, rather than pursuing the best returns.[14, 15] Furthermore, these political decisions are often made without much public involvement, despite the taxpayer having to make up the difference between the ideal investment and the politically-motivated one. Worse, the foregone returns grow over compounding periods to create a large, future economic loss for individuals currently too young to vote.

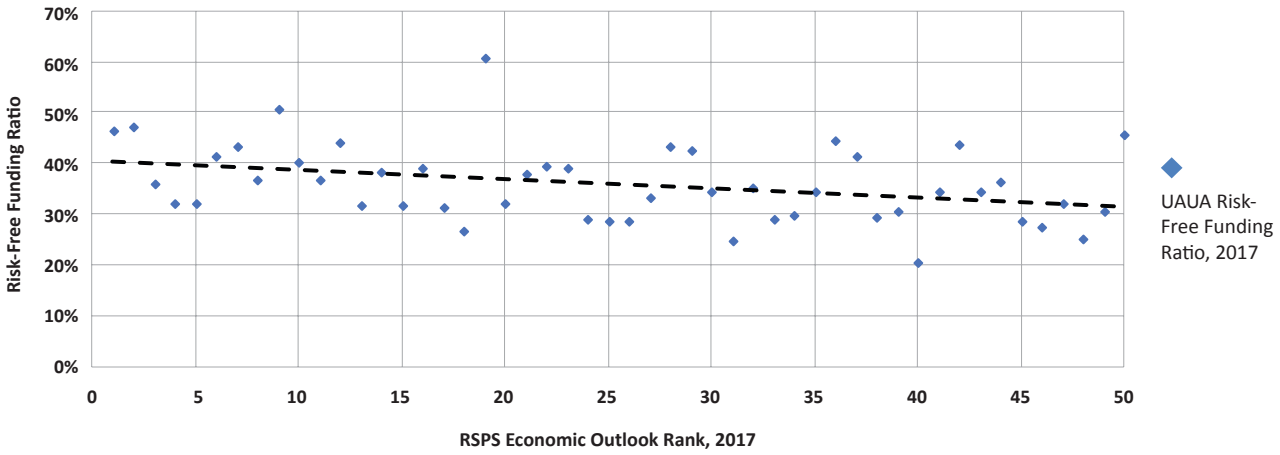
Ideological investments are incompatible with the purposes of a pension fund. Pensions exist to ensure retirement benefits for current and future retirees at a lower cost than a pay-as-you-go system by maximizing investment returns. The higher the returns, the larger the asset, the smaller contributions necessary to protect retirees. This is feasible and supported by ALEC research, since plans with very high funding ratios tend to have lower ARC payments as a percentage of their total liabilities.

FISCAL RESPONSIBILITY AND PRO-GROWTH POLICIES

States that practice fiscal responsibility and adopt pro-growth policies tend to have a higher funding ratio than states that do not. ALEC's annual *Rich States, Poor States* publication projects an economic outlook for each state, based on 15 policy variables demonstrably associated with growth in migration, jobs, and income.[16] The measure has been cross-validated by the Mercatus Center's State Fiscal Rankings publication, which correlates closely with *Rich States, Poor States* rankings.[17]

returns. For instance, managers have shifted from fixed-income instruments, such as treasury bonds and high-grade corporate bonds, to publicly traded equities and alternative investments.[18] The alternative class of investments, including private placement equity, real estate, and hedge funds, is particularly problematic. Although an opportunity for outsized gains may exist, these investments are often riskier, more difficult to value, and less liquid. Financial reporting standards or public documentation may be lacking as well. This added complexity makes management of such investments more expensive.

Figure 6 **Higher Risk-Free Funding Ratios Positively Correlates with More Competitive Economic Policies**



Source: Rich States, Poor States: ALEC-Laffer State Economic Competitiveness Index

In Figure 6, the average funding ratio of each state between 2013 and 2018 is displayed against the state's average *Rich States, Poor States* economic outlook ranking for the same years. A trend line highlights the direction of the relationship. States with a positive *Rich States, Poor States* economic outlook ranking tend to have higher funding ratios, protecting their state employees from reduced benefits and their residents from higher taxes.

Several causes could explain the correlation between state rankings and respective funding ratios. Perhaps most importantly, an expanded tax base, resulting from accelerated economic growth, can yield revenue growth exceeding the rising costs of state and local government. The additional revenue generated may be used to meet pension investment obligations more consistently.

Lack of proper funding and artificially high estimates of future returns have prodded many pension funds into chasing higher

Unfortunately for taxpayers, workers, and retirees, states continue to be plagued by increasingly inaccurate pension reporting and inadequate funding. We hope by clearly illustrating the current level of unfunded liabilities and the trends leading to its growth, the public will hold lawmakers accountable and demand meaningful steps toward pension reform. Addressing overly-optimistic assumptions, fully funding ARC payments, and considering modern alternatives to traditional pension plans are essential steps to solve the pension crisis.

TRANSPARENCY

Transparency enables voters, taxpayers, and other stakeholders to access, research, and understand the government operations and hold officials accountable for their actions. The digital world makes sharing and retrieving information easier and less

expensive than ever before. Governments no longer have the excuses of costs from compiling, printing, or sharing information.

In this new era, governments should place all government financial information disclosable to the public online in an accessible location and understandable format. For more than a decade, ALEC has called on state and local governments to put their budgets online in an accessible format for all taxpayers to see.[19]

In particular, state-administered public pension plans should disclose all relevant information on a regular and timely basis, such as the financial status of the system, all actuarial assumptions, the composition of the investment portfolio, investment decisions, investment performance, governance structures, benefits decisions, and findings of relevant independent assessments. All this information should be made available without fee and organized in a reasonably comprehensible manner.

Indiana, Kentucky, North Carolina, and Nebraska provide examples for every pension system to emulate in order to improve transparency. Each of these states provide updated, easily-located, comprehensive financial reporting for their state-administered pensions. Conversely, Louisiana and Georgia fail to provide such financial reports in an acceptable manner.

The Commonwealth of Kentucky catalogues most state-administered systems in the Kentucky Retirement System's (KYRET's) Comprehensive Annual Financial Report (CAFR). In addition, the financial, investment, actuarial, and statistical sections of the report are laid out in a clear, organized, rational manner.[20] In particular, the actuarial section contains all data required to compute unfunded actuarial accrued liability and presents this key number along with the funding ratio for all plans. Rather than merely presenting required information, such as the actuarial valuation of assets and liabilities, Kentucky provides raw data along with key fundamentals. Towards the front of the section, KYRET presents the funding levels of all plans for pensions and other post-employment benefits (OPEB) for the current and prior year.

Furthermore, written analyses and descriptions are understandable to the average reader. KYRET provides comprehensive summaries of the actuarial assumptions used, definitions for any industry terminology, and draws attention to portions warranting special consideration. The report also provides a comprehensive summary of all actuarial valuation data in a clear, organized format.

Further into the actuarial section, each state-administered plan is evaluated in even greater detail on its own with historical data presented for previous years. The inclusion of data for prior years provides an important benchmark to contrast management investment performance with market performance.

North Carolina also stands out due to their pension reporting having excellent location, ease-of-access to the documents, along with the informational organization. Unlike most states, which make pension fund financial documents available only through the pension organization itself (often distinct from any governmental agency), all pension fund financials are easily available from North Carolina's Department of State Treasurer.[21] Even better, separate web pages host the CAFRs and actuarial valuation reports, each categorized by year and plan name. Beyond this, the format consistency enhances ease of reading and understanding. Each report is well organized, and descriptively labeled. All financial fundamentals required to assess plan solvency — such as actuarial valuations and assumptions — are presented clearly.

Much like North Carolina, Nebraska's pension plans are all organized on a single website.[22] Key financial reports are organized on the same webpage with separate sections for actuarial reports, Governmental Accounting Standards Board (GASB) reports, investment reports, and a plethora of valuable and informative documentation. Nebraska's actuarial valuations, which are catalogued by the plan's name and by year, are particularly admirable. Further, within each report, actuarial valuations and investment assumptions are easy to find and understand.

Unfortunately, most states fail to mirror the highly transparent examples set by Kentucky, North Carolina, and Nebraska. This failure to respect taxpayers' rights to publicly disclosable information results in a lack of accountability.

Although a uniform approach is not always feasible, the basic principle of transparency should be followed. State-administered pension plans represent $3 trillion in assets and trillions more in pension promises. Transparency enhances the capability to hold policymakers and investment managers accountable for keeping promises made to workers, while simultaneously safeguarding taxpayers from undue risk. All such stakeholders deserve comprehensible, navigable, and accessible information.

CONCLUSION: POLICY RECOMMENDATIONS

Since 2008, states have pursued a wide spectrum of reforms, ranging from updating their actuarial assumptions, to creating new hybrid pension tiers for new hires, to transitioning away from defined-benefit (DB) pensions altogether in favor of defined-contribution (DC) plans. Minor reforms, such as tiering and updating

actuarial assumptions, can be viable long-term strategies if they are performed regularly and early. The New York state-administered pension system is an excellent example of regular tiering to maintain relative pension stability, and because of this it is the 5th best funded system, controlling for discount rates. However, most state-administered plans have resisted all reform efforts, which places retirees and taxpayers in a precarious position.

One reform most pension plans could immediately adopt is lowering their discount rate to the private sector average, or preferably, to a risk-free rate. As explained in previous sections, this change would shift the estimated liability from the average amount states would be liable for in the future, to an estimate which covers all potential futures. This change would ensure the constitutional and legal protections afforded to state pension benefits are being met. This will increase the ARCs, as the target asset will increase to match the risk-free liability. If contributions are made in accordance to the ARC, the health of the fund would rapidly improve. Even a global financial crisis would not threaten the fund's solvency — it would truly be a guaranteed, "defined benefit."

A second reform is variable benefit or contribution rates based on the funding on the plan. For example, Wisconsin has the best funded pension system in the country, controlling for difference in discount rates, 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 off the pension system's funding ratio. Meaning, economic shocks also lower the payments from the fund, allowing the fund to recover. While the plan has been criticized for diminishing benefits during economic downturns, it has succeeded in providing retirement security with few significant changes to the plan since 1975.[23]

In 2016, Maine pursued a series of reforms to implement variable contribution rates for their state pension system.[24] Normally, employer contribution rates fluctuate to meet the ARC or other contribution standard, whereas employee contributions are normally 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. Relative to the Wisconsin model, this may have a slight advantage during recessions, as public employee payroll varies less overtime, and thus the employees impacted by the increased contribution rates are in a better position than most.

The models share a key aspect — they often have automatic "triggers", either on contribution rates, benefit rates, or cost of living adjustments — which can 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.

Both models increase the "skin in the game" employees have, relative to the pension fund's market performance. Strong market returns reduce a pension plan's reliance on annual contributions. Under a variable benefit or contribution model, the market performance of a pension fund would have a direct impact on employee disbursements or paychecks, respectively. State employees would have a strong incentive to assist in guarding against politically-driven pension mismanagement, which could have a negative impact on fund performance. Additionally, state employees may become advocates against excessive pension management fees, which are correlated with lower funding performance.[25] Politically neutral, low-cost pension fund management would be a benefit for state employees and taxpayers alike under variable contribution or benefit plans.

The Wisconsin pension is a hybrid pension plan, albeit a unique one. The degree of balance between a DC and DB plan varies from plan to plan. In most cases, a hybrid is a relatively small DB pension plan offered in tandem with a DC plan, similar to a 401(k). The DB portion of these hybrids carry all the same risks as traditional pension plans, but are mitigated by the smaller size and, often, better contract terms, such as benefit formulas which block spiking or higher employee contribution rates.

However, there are other types of hybrid plans, such as the cash balance plan. For cash balance plans, the employer contributes a portion of the employee's salary into an account and invests it on behalf of the employee. Unlike a 401(k) plan, the employee is entitled to the funds at retirement, plus an interest rate stipulated in the employee contract. In this way, the benefit is "defined," as the employer is obligated to insure and pay any shortfall between the contractual and actual total interest gain. In other words, the employee is not exposed to market fluctuations, positive or negative. Then, the employee can purchase an annuity or take the lump sum. Cash balance plans may be more viable than the average hybrid plan depending on how the rate is selected, whether it is fixed or floating based on treasury yields.

The strategies above illustrate ways states may limit the risks associated with pension mismanagement, but states can shed these risks entirely by switching to DC plans. Under a DC plan, the employee contributes a percentage of their salary to an individual retirement account. The employee is, in most cases, responsible for selecting their investment strategy and the outcomes of their chosen strategy. For the employer, all costs are realized in the present, taking away the possibility for employers to underfund employee benefits altogether.

APPENDIX: METHODOLOGY

This study covers more than 290 state-administered public pension plans representing more than $3.2 trillion in assets. Data are drawn from actuarial valuation reports, Governmental Accounting Standards Board (GASB) 67/68 disclosures, Public Plan Databases, and Comprehensive Annual Financial Reports (CAFRs) provided by each plan or by state administrator. Data were gathered from the most recent available relevant report, as different variables are often reported in different documents. While the current publication year is 2019, most reports released in 2018 are an analysis of FY 2017. However, not all plans report on an annual basis or report at the same time of year. Some plans have an additional one-or two-year lag. For over 230 plans, data were collected from FY 2017, with data for the remaining plans coming from FYs 2015 and 2016. As new editions of this publication are released, some plans may be moved into the two-year lag grouping as our data collection this year may have placed some biannual reports in the FY 2017 grouping. In most cases, plans reported from FYs 2015 and 2016 are smaller plans.

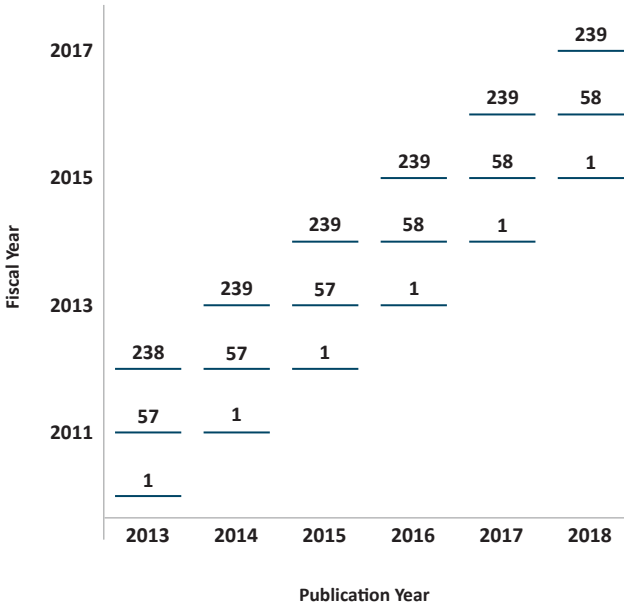
The annual nature of this report necessitates the formulation of smoothed figures for some years, as state valuations are sometimes released on a biannual, or even less frequent, basis. To overcome this challenge, we derive off-year figures by taking an average of the reported year figures, as liabilities, assets, and membership tend to grow in a linear fashion. For example, to find the odd-year liabilities of a plan which reports in even years only, we would average the even years to arrive at a synthetic figure for the unreported year. The lag in data reporting creates additional challenges in terms of measurement and clarity. Our priority is collecting data in one-year intervals to measure year-over-year changes. Matching fiscal years across all plans is a secondary priority for this report.

Seven plans included in the total number of plans have been consolidated into larger plans. For purposes of calculating liabilities, plans merged into larger plans, which are no longer reported, have NULL fields to avoid double counting. However, plans which have been merged or closed in favor of a new tier which are reported separately from the active plan are also reported separately in our study. The reason for this is twofold. First, our research team aims to report state liabilities in the way states report them, the only caveat being the risk-free rate. Second, states will often apply different assumptions to different tiers to reflect whether the plan is closed or not.

In the window studied, there were two main reasons for mergers; reducing management costs and/or rescuing insolvent plans. In 2015, the Wyoming Legislature consolidated the Wyoming EMT and voluntary firefighter pension plans, likely reducing administrative costs.[26] In some cases, data is not available for smaller plans after a merger. For example, in 2013 the Idaho Judicial Retirement plan was merged into the Public Employee Retirement System of Idaho (PERSI) and documentation from the previous plan administrators was either not generated or was not incorporated into historical documentation in the CAFR prepared by PERSI.

To estimate each plan's unfunded liabilities using a discount rate which reflects the state constitutional and statutory protections of state retiree benefits, this report uses the actuarial value of assets (AVA), actuarial accrued liability (AAL), and the plan's discount rate, which is sometimes incorrectly referred to as the assumed investment rate of return. Some plans provide only fair market valuations, in which case the fair market value of assets and liabilities were used in lieu of the AAL. Fair market values do not have the same smoothing techniques applied to them as actuarial values, and thus the position of the assets on the day of the valuation. However, in most cases, fair market values of large, institutional portfolios vary only slightly from actuarial values. Therefore, the limited use of fair market values in these cases is unlikely to substantially affect a state's unfunded liabilities and rankings.

Table 7 **Distribution of Fiscal and Publication Years**



Source: Authors' calculations

Table 8 **Risk-Free Rate by Fiscal Year**

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

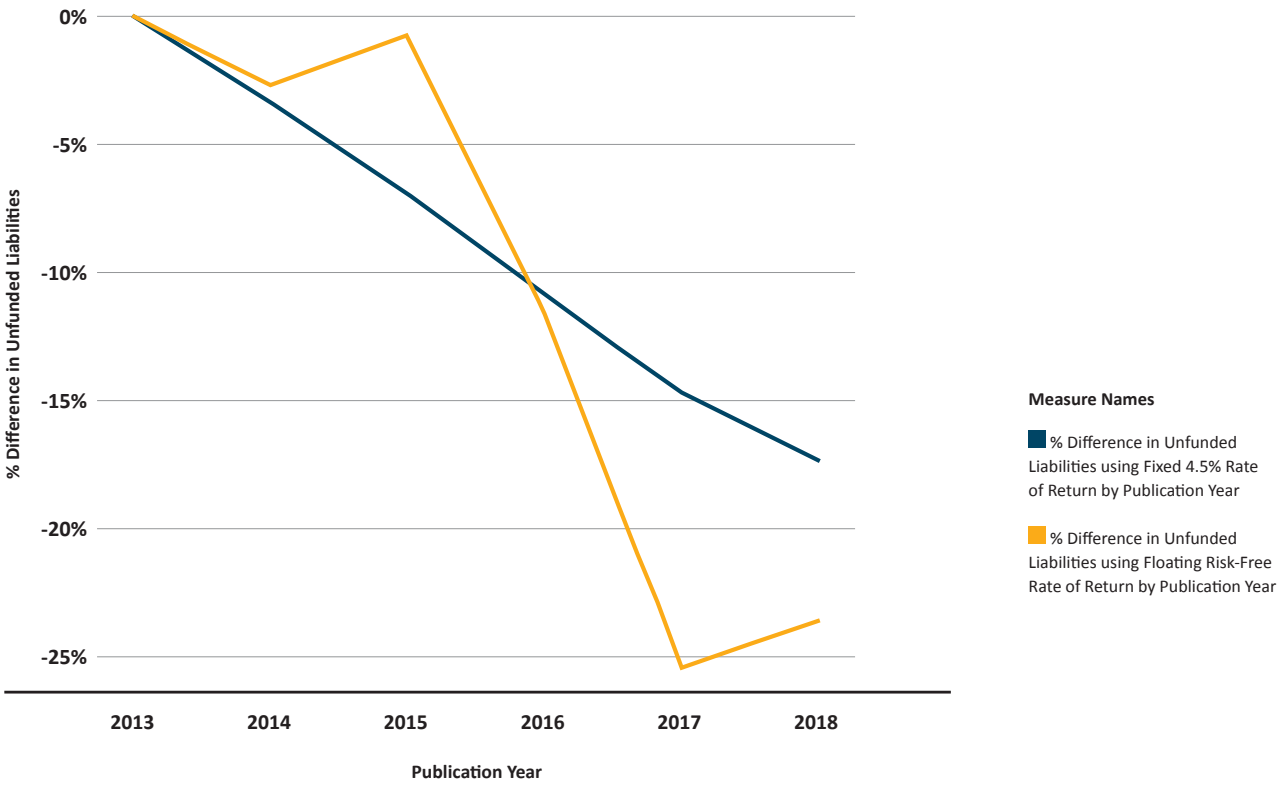
Source: Economic Research, Federal Reserve Bank of St. Louis

Many plans assume rates of return far higher than can be consistently expected of today's market, even under direction of the best asset managers. These decisions generate substantial perverse incentives for pension fund administrators and investment managers, often inviting politicized decision-making and risky fund allocations. ALEC uses a more prudent discount rate, based on the equivalent of a hypothetical 15-year U.S. Treasury bond yield. Since this is not presently offered as an investment instrument, the number is derived from an average of the 10- and 20-year bond yields. This creates a floating risk-free rate, which fluctuates year-to-year based largely on federal monetary policy.

Small changes in discount rates can yield large changes in unfunded liabilities depending on the size of the plan. In Figure 7, the year-to-year percent change in total unfunded pension liabilities, using both a floating risk-free rate and a static 4.5 percent rate, are visualized. Shifts in federal monetary policy, such as attempting to head off rising inflation by increasing short-term lending rates, can create the appearance of an improvement in pension fund management. For this reason, we have added a fixed rate to our annual analysis of state pension liabilities.

This publication makes several assumptions about the structure of state liabilities and the quality of the states' actuarial assumptions to make more realistic estimates of state liabilities. States are not required to report their liability projected over a time series, such as reporting the total liability due per year for the next 75 years. This publication must assume the midpoint of the state's liability in order to recalculate state liabilities under different discount rates. Barring states reporting their liabilities in detail, 15 years is a fair estimate of the average midpoint for pension plans and is used in this report.

Figure 7 **Floating Risk-Free Rate of Return Relative to 4.5 Percent Rate of Return**



Source: Authors' calculations

Other actuarial assumptions made by the states, such as mortality rates, are assumed to be accurate. This nudges our estimates downwards, since many state actuarial assumptions are, similarly to discount rates, overly-optimistic.[27]

Using a risk-free discount rate and an assumed liability mid-point, this study re-estimates state liabilities to reflect states' inability to default on their obligations to state retirees. The formula for calculating a present value which reflects the legal strength of pension promises requires first finding the future value of the liability. The formula, in which "i" represents a plan's assumed interest 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. The formula is PV = FV / (1+i) ^15, in which "i" represents the risk-free interest rate.

Using a risk-free rate ensures state officials cannot overestimate their asset performance and underestimate their required contributions to pensions. The public sector's current assumed rates of return significantly distort how much money is needed to fund plans to guarantee future benefits. Ultimately, this will result in broken promises to state employees and financial hardship for taxpayers.

States report their investment rates of return using a range of methods; market rates, actuarial (smoothed, geometrically or arithmetically), and with or without administrative expenses (such as fees) deducted. Reporting location and completeness also vary, with smaller plans reporting their investment returns less frequently than larger plans, and investment returns being reported in the "10-year schedule of investment returns" tables of CAFRs, which not all smaller plans produce. Furthermore, the smaller plans which 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. For this reason, this study excludes smaller plans and instead uses the Boston College Center for Retirement Research Public Plans Database investment rates of return to analyze larger state plans.

Membership figures are collected from CAFRs, valuations, and GASB notes, and are divided into active employees and beneficiaries; meaning 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, inactives entitled to a future benefit, and inactives not entitled to a benefit. Supporting documents were used to parse the two groups. For example, the Connecticut Municipal Employee Retirement System (CMERS) uses the term "inactive members" in their GASB 68 report ambiguously but clarifies the figure in their GASB 67 report by parsing the total into retirees currently receiving benefits and inactive members entitled to a benefit.

Actuarially recommended contributions (ARCs) and the percentage actuarially recommended contributions made were collected primarily from pension CAFRs, usually from tables titled "Schedule of Employer Contributions." Actuarially determined contributions, actuarially recommended contributions, actuarially determined contributions net of taxes and fees are reported as ARC in our study. Figures were collected from most recent to least recent year, in the aim of selecting actuarially recommended contribution rates which 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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