## State of Pensions 2021

Equable Institute's Second Annual Report

Pension Trends in an Era of Accelerating Volatility

### **ABOUT THIS REPORT**

State of Pensions an annual report on the status of statewide public pension systems, put into a historic context. State and local governments face a wide range of challenges in general – and some of the largest are growing and unpredictable pension costs. The scale and effects of these challenges is best understood by considering the context of multi-decade financial trends that have brought public sector retirement systems to this moment.

Our analyses begin with the topline, aggregated trends over the past two decades, and proceed by digging into some of those data points to show how the trends vary across the states and over time.

Learning from history and looking beyond the headline figures is important for finding paths into the future that can bring states closer to sustainable and accountable retirement systems that ensure retirement security for all public workers.

We focus in this report on the largest statewide retirement systems (measured as those with at least \$1 billion in promised benefits). We use publicly available data reported by the retirement systems themselves. In future reports, we intend to expand the scope to cover large municipal retirement systems too.

The financial market volatility over the past 18 months of the COVID-19 pandemic has ultimately been a positive investment climate for institutional investors like state pension plans. And the federal government has provided substantial financial aid to states and municipalities, smoothing over what could have been seismic budgetary shortfalls in some jurisdictions due to tax revenue declines. The combined historically unprecedented nature of these events continues to create an unpredictable environment for state pension plans. However, we can use patterns of behavior from the past two decades as a guide to what might happen in the coming decade and identify areas of concern that should be monitored closely or acted upon immediately.

Looking closely at these trends in public pension plans underscores two essential points:

There is a wide range of financial performance for pension plans; a few states are well managed, some states are on the brink of pension insolvency, and most are somewhere in-between. The problems facing states are not an inherent result of offering pensions in the first place; the problems stem from a political apathy toward the steadily growing rate of unfunded liabilities and the costs they produce.

#### EQUABLE

Technical Note: As of this publication, some states had not yet released all of their FYE 2020 numbers. For these few plans we've rolled forward 2019 figures to 2020. As new data is released, we will update our figures online. See methodological notes at the end for more details.

## THIS IS THE STATE OF PENSIONS IN 2021

#### Takeaways from the 2021 Report

Read this if you don't have time for the rest of it.

#### National Trends for State Pension Plans

The funded ratio for statewide plans as of 2020 is **71%**. We estimate it will rise to **80.9%**, finally returning funding levels last seen during the 2008 financial crisis.

#### Public Pension Trends to Watch Beyond 2021

The record returns in 2021 are unlikely to continue and states will need to address unfunded liabilities in the absence of federal stimulus funds that are intended to provide relief.

#### Within the Trends: Funded Status

There is a lot of variance between the states when looking deeper into funded ratios, grouping plans by historic behavior, or dividing up where the unfunded liabilities are.

#### Within the Trends: Investment Assumptions

If assumed rates of return had matched the trend in interest rates over the past 20 years, the national average would be considerably lower at 4.3% versus the 7.03% reported as of August 2021.

#### Within the Trends: Contribution Policy

A handful of states began adopting policies over the past decade to improve their odds of fully funding pensions.

#### Within the Trends: Cash Flows & Maturing Plans

It is going to be hard (or impossible) for pension funds to invest their way back to fiscal health in part because of negative cash flow trends.

#### Within The Trends: State of Benefits

The past decade has seen a vast expansion of alternative benefit designs for new hires.

#### Methodology, Glossary, and Appendices

Appendix 1: Glossary Appendix 2: Additional Charts and Data Trends Appendix 3: Methodological Notes Appendix 4: Statewide Retirement Systems in Our Data Set

#### <sup>2</sup> EQUABLE

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## ABOUT EQUABLE INSTITUTE

Equable is a bipartisan non-profit that works with public retirement system stakeholders to solve complex pension funding challenges with data-driven solutions.

For an interactive version of the report, visit Equable.org/stateofpensions2021.

Some states have not released their final data points for 2020. We will be updating our graphics and figures throughout the year as more states release information.

#### About the Authors:

Anthony Randazzo (Executive Director) is a national expert on public sector pension policy and has provided technical assistance to more than a dozen states and cities on ways to improve retirement plan sustainability.

Jonathan Moody, PhD (Research VP) has developed a wide range of academic and policy research on municipal finance subjects, including state budgeting and reserve funds, state credit ratings, state fiscal management, and public retirement benefits.





## Takeaways from the 2021 Report

- Preliminary 2021 investment returns (20.7% return on average) for state plans show most far exceeding the average assumed return (7.03% for this year). This is the highest return for public plans this century by a wide margin.
- These returns have caused a jump our projected funded status of statewide plans nationally to 80.9% (Page 9). That is positive but still lower than the funded ratios in 2007 or 2008.
- Negative trends from the past decade are persisting for member contributions rates (<u>Page 14</u>), government contributions (<u>Page 15</u>), and cash flows (<u>Page 16</u>).
- Investment volatility meant 133 (of 159) state retirement plans missed their assumed return in 2020, causing unfunded liabilities to grow to \$1.48 trillion (Page 10). We think 2021 returns will shrink this pension debt to \$1.08 trillion.
- Within the states, funded ratios and unfunded liability levels continue to vary considerably from state to state (Page 28). The vast majority have a Fragile or Distressed funded status.

- Asset allocations continue to shift toward alternatives, including hedge funds, private equity, and real estate (Page 12). The share allocated to hedge fund managers and private equity strategies has grown to 13.1% (from 8.6% in 2008.)
- Five plans in 2020 that had assumed returns over 7.5% lowered their expectations during the past year (Page 43), leaving just 10 plans above that high-water mark. The number of state plans with investment assumptions below 7% grew from 48 to 54, as of those announced by August 2021.
- This year's incredible investment returns (Page 12) also likely include some future returns that have been "pulled forward" into this point in time (Page 23). Major indicators like "PE ratios" say that markets are overvalued. Plus, most capital market forecasts released in the past few months are more pessimistic than they were at the same time last summer (before vaccines and federal fiscal stimulus). So, in some respect the high returns this year can also be viewed in part as a warning about more muted financial performance in the coming years.

## Narratives to Watch Beyond 2021

- Contribution rate increases are, in some respects, a positive development because most pension funds will not be able to invest their way out of their current shortfall in assets needed to pay promised benefits. The reality is that more money is needed in state pension funds in order to move from fragility to resilience. However, the persistent drip each year of increasing contributions is not an ideal policy solution it makes it hard for employers like school districts and towns to manage their budgets, and it creates a kind of persistent threat of compensation reduction for public employees.
- Two new retirement plans were created during the spring's legislative session (Page 59) one Guaranteed Return Plan and one Hybrid Plan. This continues the expansion of alternatives to pension-only plan designs. A new section "State of Benefits" in this report details benefit provisions currently available to new public sector hires, including a review of how designs and options have evolved over the last two decades (Page 57).

 Investment returns this year have balanced out underperformance from 2020, but that still leaves plans with historically high contribution rates and doesn't change any of the demographic dynamics public plans are facing. The range of policy interventions that could help improve the trends outlined in this report vary from state to state.

Fortunately, there are examples of states and plans that have adopted substantive improvements to funding policy, risk-sharing, assumptions, and more. It would be prudent for states with fragile plans to not wait for the next market shock and move now toward resilience. *Looking to the future:* We anticipate that state retirement plans will continue to lower their investment assumptions (though we don't think it will happen as quickly as it should), and this will mean increase in the measurement of unfunded liabilities. That means contribution rates will continue to increase, which will create political pressure to better manage costs. Funded ratios are, on average, in their best place since 2008. But investment outlooks are modest at best. So, we expect that in a search for higher yields, public plans will continue to leverage alternative investments like hedge fund strategies — which should create more pressure from stakeholders to demand transparency around how pension fund money is being managed.

## Comparing Equable's 2020 Forecast Against Actual 2020 Experience

Forecasts for the most recent year, FY 2020:

• We forecast a 2.14% average return based on performance through September 2020 — the actual average return through December 31, 2020 was 4.22%.

- We forecast a 69.4% market valued funded ratio for statewide plans with \$1.55 trillion in unfunded liabilities (in our December 2020 update) the actual reported totals were 71.0% and \$1.48 trillion.
- We said the pandemic-related market volatility would prevent pension funds from earning their assumed rates of return in 2020

   this was mostly correct, only 26 in 159 plans met their target, and of those, 24 measured their returns on December 31, 2020.

We have several on-going, multi-year forecasts; these are discussed on Page 27.

Pension funds use assumptions about the future to determine contribution rates and then are measured relative to those forecasts and predictions. Equable is measuring itself on a similar standard. Each year we review the projections we made in previous reports and measure them against actual experience.

# National Trends for State Pension Plans

## FUNDED RATIO AVERAGEFOR STATEWIDE PENSION PLANS2001-2020 + 2021 Estimate



The aggregate funded ratio for statewide plans collectively is at its highest point since 2008 (using market valued assets).

To view funded ratios by state, click here.



Based on Accrued Liabilities



Based on Total Pension Liabilities



Based on 2019 Data Availability



2020 Estimate Based on June 30 Returns

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Data for 2001 to 2013 reflects the "actuarially accrued liabilities" reported by public plans. Data from 2014 onward uses the new GASB 67 "total pension liability" measurement. See methodology section for details on 2021 estimate.

# TOTAL UNFUNDED LIABILITIESFOR STATEWIDE PENSION PLANS2001-2020 + 2021 Estimate



The pension asset shortfall for statewide plans grew in 2020 (to a historic high) but will improve notably in 2021 (to roughly where unfunded liabilities were in 2009 at the end of the Great Recession).

Total unfunded liabilities for statewide plans were roughly \$100 billion back in 2001. The shortfall grew to *\$1.15 trillion* at the end of 2009, and a peak of *\$1.48 trillion* in 2020.

We estimate that unfunded liabilities will decline to *\$1.08 trillion* in 2021 due to historic market performance.

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Source: Equable Institute analysis of public plan valuation reports and CAFRs. Trendline shown is based on market value of assets; using the "actuarial" value of assets shows a similar trend. See methodology section for details on 2021 estimate.

## 2020 FUNDED STATUS AS A SHARE OF STATE ECONOMIC OUTPUT

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Funded ratio and unfunded liability levels on their own are not perfect indicators of a retirement plan's fiscal health.

Understanding the size of unfunded liabilities relative to the size of a state's economy gives a sense of what scale of resources will be needed from a local tax base to improve retirement plan funded status.

Find your state with our interactive version

#### INVESTMENT RETURN AVERAGES COMPARED TO ASSUMED RATES OF RETURN 2001-2021



Average investment returns were consistently below assumed rates of return over most the past decade. This contributed to the growth in unfunded liabilities for public plans.

The 10-year average return is now well above assumed returns, with one-year returns beating assumed returns five of the last 10 years.

2021 returns (averaging 20.5% for plans through June) will easily be the best performance for public plans this century. The final return will exceed the one-year return rates from in 2013 (12.6%), 2014 (14.7%), and 2017 (12.7%).

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### ASSET ALLOCATION TREND OF STATEWIDE PENSION FUNDS 2001-2020



Asset allocations have shifted away from relatively safe fixed income investments into riskier categories in a search for stronger investment returns.

"Alternative" investments include private equity, hedge funds, real estate, commodities, and tactical asset allocations.



## AVERAGE MEMBER CONTRIBUTIONS BASED ON SOCIAL SECURITY PARTICIPATION 2001-2021



Employee contributions to their own retirement plans have been steadily increasing.

Public sector workers who are also enrolled in Social Security paid 143 basis points more (a 31.4% increase) during the 2021 fiscal year than they did during the 2001 fiscal year and 20.0% more than they did in 2008 before the financial crisis.

Those who do not participate in Social Security will pay *13.1% more* than in 2001 and *9.8% more* than in 2008.

*Note:* Public employees are not uniformly covered by Social Security. Some states never opted into Social Security, and therefore typically have higher valued benefits and relatively higher contribution rates than for statewide systems where members also have access to Social Security benefits.



For Plans Not Participating in Social Security or With Mixed Levels of Participation

For P

or Plans Participating in Social Security

Source: Equable Institute analysis of public plan valuation reports and CAFRs. Contribution rates show for the year actually paid. Notes: (1) Increased contributions do not increase the value of a pension, which is based on years of service and final average salary. (2) Contribution rates are required and set by the sponsoring government.

### AVERAGE EMPLOYER CONTRIBUTIONS AS A PERCENTAGE OF PAYROLL 2001-2021



Government employer contributions have steadily increased over the past two decades, mostly because of increased unfunded liability amortization payments.

Employer contributions in 2001 were **9.44%** of payroll. During the fiscal year ending 2021, employer contributions are **28.74%** of payroll.

Unfunded Liability Amortization Payments

Normal Cost

*Note:* Normal cost is the contribution necessary to fund pension benefits earned each year, assuming some future investment income. The normal cost payments pay in advance for pension benefits promised. Unfunded liability amortization payments are contributions made to close a pension plan's funding shortfall over time.

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Contribution rates show for the year actually paid. Note: For a look at this trendline broken out by Social Security participation see Appendix 2.

#### AGGREGATE CASH FLOW FOR STATEWIDE PENSION PLANS 2001-2020



See our interactive version for all values

Negative net cash flows from contributions and benefit payments have steadily increased over the past two decades, reflecting more "mature" pension plans. The growth rate may have stabilized in the past two years.



#### 2020 AGGREGATE STATE FUNDED RATIOS, BY STATE BASED ON MARKET VALUED ASSETS REPORTED BY STATE PLANS



EQUABLE Source: Equable Institute analysis of public plan valuation reports and CAFRs.

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Analysis: What We See in the National Trends Unfunded liabilities reached their largest level in history in 2020 but will improve considerably once full 2021 data become available (Page 10). Still, despite best-thiscentury returns, the funded ratio for statewide retirement plans has only rebounded to 2008, mid-recession levels. Nationwide funded status has not fully recovered its value from before the financial crisis (Page 9).

- Average public retirement system investment returns over the past two decades have been mixed. A few strong years over the past decade have helped improve the 10-year average but for much of the 20<sup>th</sup> century average returns have been less than assumed in part because while interest rates fell sharply assumed returns declined only gradually (Page 12).
- States have more than tripled their contributions into pension funds since 2010 (Page 15), both because of the persistence of pension funding shortfalls and because of improved efforts to pay required contributions based on those unfunded liabilities. But even the increased contributions from government employers and employees (inflows) have been less than the steady increase in benefit payments (outflows) over the past two decades. As a result, statewide pension plans collectively face consistent "negative cash flow" (Page 16). This puts pressure on investment returns to make up the difference between inflows/outflows.
- In a search to improve investment returns and manage negative cash flow pressure, pension fund managers have allocated an increasing share of public employee money to alternative asset classes, such as hedge funds, private equity, and real estate (Page 13). These kinds of investments often carry more risk than traditional fixed income or public equities and have less transparency. This shift also happened during a bull market for equities and may have not provided adequate returns to justify the strategy.

Looking to the future: There is a theoretical limit to the contribution rates that state leaders will want to have drawing from their general funds, school district funding, or city budgets. The larger a state's unfunded liability relative to GDP, the harder it will be for that state's tax base to pay down the pension funding shortfall.

# Public Pension Trends to Watch Beyond 2021

## 2021 ESTIMATED AGGREGATE STATE FUNDED RATIOS, BY STATE



Equable estimates the average investment return for statewide plans as of June 30, 2021 is 20.69% based on the most recent asset allocation reports from each plan. This is 1,366 basis points above the average 7.03% assumed return for the fiscal year.

Of the 14 plans with a Distressed funded ratio based on 2020 reported data, we estimate 9 will improve to Fragile funded status. Most public plans improved their funded ratios generally this year but are still fragile.

20 EQUABLE Source: Equable Institute forecast based the change in funded ratio shown is bas

*Source:* Equable Institute forecast based on investment returns as of June 30, 2021 and reported asset allocation levels for each plan. For plans with fiscal year end dates after June 2021 the change in funded ratio shown is based only on the part of their fiscal year complete as of the measurement date. See methodology section for complete details.

#### ESTIMATED CHANGE IN FUNDED RATIO FROM 2019 TO 2021



Financial market volatility meant most plans saw reduced funded ratios from 2019 to 2020, but these will be more than balanced out with 2021 investment performance.

We estimate that there will be varied levels of improvement from 2019 to 2021 once final numbers are available. Only New Mexico, North Dakota, and New Hampshire are likely to have their state plans collectively in worse financial condition than in 2019 (primarily because of insolvency forecasts for certain pension plans).

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Source: Equable Institute forecast based on investment returns as of June 30, 2021 and reported asset allocation levels for each plan. For plans with fiscal year end dates after June 2021 the change in funded ratio shown is based only on the part of their fiscal year complete as of the measurement date. See methodology section for complete details.

### HOW THE PANDEMIC HAS AFFECTED PUBLIC RETIREMENT SYSTEMS

1. Investment volatility in 2020 meant only two of the 112 state retirement plans with a June 30 fiscal yearend earned their assumed return, and this caused unfunded liabilities to grow.\* By contrast 24 of the 31 plans with December 31 fiscal year-ends beat their investment assumptions.

2. Most plans will far exceed assumed returns in 2021, according to preliminary reports. These returns will improve funded ratios to a better place than 2019; however, depending on how many plans decide to adopt lower investment returns this year, the net effect may be less improvement than currently anticipated.

3. Federal stimulus helped most states avoid reducing their contributions into pension funds, however concerns about overall volatility and forecasts of low future returns have meant states are still looking to:

Reduce benefits (where legal), such as cutting retiree COLAs & lowering future worker benefits Reduce assumed return rates, which means recognizing higher unfunded liability levels. Utilize alternative investments like hedge funds and private equity to chase higher returns.

## NATIONAL FUNDED RATIO RELATIVE TO POST-GREAT RECESSSION FINANCIAL LANDSCAPE



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The funded status for 2020 could have been a lot worse. And returns in 2021 are a huge help for state pension funds. Those positives should not be overlooked.

However, the strong investment performance has not saved state pension funds.

Pre-existing unfunded liability levels were high enough that 2021 returns are likely only going to bring funded ratios back to 2008 levels, which was a Fragile funded status.

Source: Equable Institute analysis of public plan valuation reports and CAFRs; Yahoo Finance. S&P return data for 2021 is as of the closing value on August 1.

### HOW THE STRONG INVESTMENT RETURNS FOR PENSION PLANS SHOULD BE INTERPRETED

1. The bull market between 2009 and February 2020 created large financial gains for institutional investors worldwide, but statewide pension funds still entered the Covid-19 pandemic with a lower funded status (72.6%) than they did going into the Great Recession (93.8%). Following the Covid market crash, markets bounced back quickly in 2020 and surged even more in 2021, which will translate into a sharp increase in funded ratios for statewide pension plans on a market value basis. However, there are reasons to believe plans are unlikely to enjoy record returns in the years to come.

2. Capital market forecasts are warning that future returns are likely to be muted, perhaps in part because the double-digit returns this year have "pulled forward" investment returns from future years, reflecting an overvaluing of certain public companies.

3. Assumed rates of return are likely to be reduced by retirement systems in the coming years because of the collective evidence and forecasts pointed toward a future of 5% to 6% average returns for public plans — not the 7.0% currently assumed. Lower investment assumptions mean recognizing higher levels of unfunded liabilities, so it is reasonable to expect that the overall funded status for state pension funds is only going to marginally improve in the coming years absent considerable additional funding.

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#### DISTRIBUTION OF ASSUMED RATES OF RETURN BY PLAN, AS OF AUGUST 2021



There are 73 state plans with assumed rates of return above the current 7% median, including a plurality of plans with a 7.5% returns assumptions or higher.

There are 31 plans with a 7% assumed return, a category that included CalPERS until July 2021 (when they announced a shift to 6.8%).

Among the 55 plans that are ahead of their peers in adopting more conservative return assumptions, just 24 have assumed returns 6.5% or less.

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Source: Equable Institute analysis of public plan valuation reports and CAFRs. Assumed rates of return for 2021 were cross checked against published board materials, news reports, and other secondary sources to corroborate any changes in plan assumptions from 2020 to 2021.

#### CAPITAL MARKET WARNINGS PROBABILITY THAT A STANDARD PENSION PLAN COULD EARN A 6% TO 8% INVESTMENT RETURN OVER THE NEXT 10-YEARS

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The odds that a standard pension fund could earn a 7% return have been trending down over the past several years.

The Horizon Survey of capital market forecasts from the summer of 2021 shows expectations on returns are even lower this year than they were last summer.

Source: Horizon Survey of Capital Market Assumptions, 2017-2021 Editions; these figures are for the 10-year average capital market forecast. Probabilities are higher and lower when considering just the forecasts for optimistic advisors and conservative advisors.

### MULTI-YEAR FORECASTS FROM EQUABLE

- Last year we said the budgetary pressure that states were feeling due to the economic recession would lead to governments reducing their own pension contributions, increasing employee contribution rates, and reducing benefits.
  - A few states did undercut contributions in the near term (most notably New Jersey shifting out contributions between their fiscal years). However, the American Recovery Plan provided unprecedented fiscal stimulus to state governments that helped prevent a wave of initial contribution reductions and it is likely to prevent most governments from the kind of drastic underfunding behavior witnessed after the financial crisis.
  - But the budgetary effects of the pandemic on pensions are going to be spread out over the next four years, so this forecast still needs to be monitored.
- Last year we said the pandemic would lead to higher unfunded liability to GDP ratios because of increasing funding shortfalls and economic contraction. Federal fiscal stimulus is likely to mitigate much of the expected GDP decline but the funded ratio dynamics are still at play.
- Last year we said asset allocations would shift to riskier investments over time in a search for yield, COLA distributions would be reduced, assumed returns would decline, and more states would adopt risk-sharing tools.
  - A number these conditions have started including 42 plans reducing their assumed return and two states (Texas and Kentucky) changing a plan from Pension-only to a Guaranteed Return and Hybrid, respectively.

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# Within the Trends: Funded Status

Funded Ratio

Unfunded Liabilities

#### UNFUNDED LIABILITY HISTORY GROUPED BY STATE 2001-2020



The five largest states by unfunded liabilities have a shortfall (\$729 billion) that is roughly the same as the rest of the country combined (\$752 billion).

CalPERS 2020 unfunded liabilities (\$162 billion) are 10.9% of the nation's total statewide pension plan funding shortfall. Illinois TRS unfunded liabilities (\$86 billion) alone are larger than nearly any other single state's funding shortfall.

## STATE PENSION PLANS 2020 FUNDED RATIO



The funded ratio is a quick first look at the health of a pension plan but isn't the only factor to measure.

Actuarial assumptions, funding policies, and governance should also be considered. A pension plan's funded ratio might have dipped because the pension board adopted more realistic actuarial assumptions.

 $^{30}$   $\blacksquare$  EQUABLE

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. See notes for a list of plans that have fiscal years ending in December and have not yet reported complete 2020 data; for these plans the figure above is based on estimates of their assets using actual reported investment returns as of December 31, 2020.

#### **Defining "Resilient" Funded Status**

We think about the sustainability of state-managed pension funds in three groups: Resilient, Fragile, and Distressed. No single data point on its own should be used to measure a pension plan's fiscal health, so we use a multi-factor matrix when thinking about plan sustainability. This includes funded ratio, unfunded liability as a share of GDP, the assumed return, share of required contributions received, and availability of risk-sharing tools. Here is a breakdown of how we think about the first of these factors, the funded ratio :

*Resilient:* A resilient pension system has a funded ratio of 90% or more for at least three years in a row. These plans are generally in a strong position to recover from financial downturns as funding policy improvements are easier to make when the plan's finances are stable.

*Fragile:* A fragile pension fund is consistently between 60% and 90% funded. While these plans aren't going insolvent any time soon, they will be building up unfunded liabilities that will gradually become a strain on budgets and government revenues. A plan that is 85% funded for several years in row is healthier than one 65% funded but is still exposed to risk. One or two asset shocks could send the plan into a downward spiral.

*Distressed*: Pension systems with funding levels below 60% should be looking to make immediate steps toward fixing their problems. While the specific threshold may vary across plans, at a certain point it is much harder for a plan to return to fiscal health.



## 2020: THE TOP 10 AND BOTTOM 10 PLANS

AMONG STATE PLANS THAT HAVE REPORTED FYE 2020 DATA

#### Top 10 Plans, by Funded Ratio

Rank	Plan	Funded Ratio	
#1	Washington Law Officers Plan 1	146.9%	
#2	Washington Law Officers Plan 2	115.8%	
#3	Tennessee Teachers Hybrid	115.3%	
#4	Utah Firefighters	111.7%	
#5	Nebraska PERS – Cash Balance	110.9%	
#6	DC Police & Firefighters	109.9%	
#7	Wisconsin Retirement System	108.4%	
#8	Colorado Police & Firefighters	106.9%	
#9	Louisiana Parochial Plan B	106.8%	
#10	Michigan Public Schools Pension Plus 2	105.7%	

#### Bottom 10 Plans, by Funded Ratio

Rank	Plan	Funded Ratio
#150	Connecticut State Employees	36.0%
#151	Illinois State Employees	35.5%
#152	New Jersey State Police	34.3%
#153	Texas Law Officers Supplemental	33.1%
#154	Arizona Elected Officials	29.8%
#155	Kentucky State Police	28.0%
#156	Indiana Teachers Pre-96*	26.2%
#157	New Jersey Teachers	24.6%
#158	Kentucky State Employees	16.9%
#159	California Judges*	1.4%

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Note: \* Indicates a pay-go plan that does not use traditional pre-funding methods.

## UNFUNDED LIABILITY BREAKDOWN BY TYPE OF PENSION FUND 2020

	Plan Count	Unfunded Liabilities	Funded Ratio
Statewide Systems for Teachers and Public School Employees Only*	44 Plans	\$660.8 billion	67.0%
Statewide Systems for State Employees Only	17 Plans	\$217.8 billion	54.3%
Statewide Systems for All Public Employees Doing Any Public Service Job in the State	10 Plans	\$108.0 billion	81.7%
Statewide Systems for Municipal Civilian Employees	17 Plans	\$61.7 billion	78.5%
Statewide Systems for Public Safety Only**	35 Plans	\$61.0 billion	74.3%
Statewide Systems for Higher Education Only	California URS + Illinois SURS	\$52.3 billion	63.4%

Note: There are 32 other statewide plans in our dataset not represented on this list, including 26 that cover different combinations of state, local, public school, and public safety employees but not all of them; 5 for judges; and 1 for elected officials.

Funded ratio and unfunded liability figures vary depending on the kind of employees that the retirement system covers.

Retirement systems for educators are often the largest pension plans in a state, based on the value of promised benefits. The funded status of systems managed solely for public safety or municipalities are also generally better funded than plans for educators.

#### Notes:

\* Includes standalone systems for teachers, standalone systems for public school employees, and plans for teachers or public school employees that are part of broader systems but are valued and reported on separately; does not include teacher benefits that are provided by statewide systems including other kinds of employees and blended together (ex. Florida).

\*\* Includes police only systems, firefighter only systems, general public safety systems, and public safety portion of statewide plans that is independently valued and reported.

#### **UNFUNDED LIABILITY OF PUBLIC PENSIONS AS A SHARE OF NATIONAL GDP** 1947-2020



The value of the dollar changes over time, so looking at public sector unfunded liabilities as a percentage of the nation's economy is a helpful way to understand just how big the funding shortfall has become.

It is unlikely that state pension funding shortfalls will be solved at a national level. But measuring unfunded liabilities as a share of the national GDP gives a sense of the nation's collective ability – all states combined – to pay down the funding shortfall.

*Comparisons:* 

2020 Municipal Debt: 14% GDP

2020 Total Student Debt: 8% GDP

2020 Consumer Credit Debt: 5% GDP

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## Analysis: What We See in the Funded Status Trends

#### Funded ratio and unfunded liability levels vary considerably from state to state.

- A small group of states has historically Resilient statewide pension systems including New York, South Dakota, and Wisconsin. There are also a few recently created pension plans with strong funded status that are a part of otherwise Fragile or Distressed retirement systems (e.g., Michigan Teachers "Pension Plus 2" as a fully funded plan managed by the "fragile" Michigan Public School Employees' Retirement System).
- Roughly half of national unfunded liabilities are for retirement systems that cover teachers and public school employees (Page 33).
- Even with poor investment performance in 2020, a quarter (26%) of major statewide plans were above 90% funded (Page 30).
- A plurality of statewide plans (49%) as of 2020 are Fragile (Page 30), with a funded ratio between 60% and 90%. Many of these will report improved funded status with their 2021 returns, but most will remain fragile.
- Another quarter (25%) of statewide plans were Distressed as of 2020 and face a considerable uphill climb to recovery, even with strong returns in 2021 (Page 30). The costs of paying down unfunded liabilities for these plans (e.g., Illinois Teachers, Kentucky State) are challenging for state budgets but the costs of insolvency and shifting to "pay-as-you-go" could be even more expensive.

Looking to the future: States that have Fragile, but not Distressed pension plans should be looking to make funding policy improvements while the costs of doing so are not prohibitively expensive, as is likely the case for states with some of the worst-funded plans.
## FACTORS DRIVING OUR ANALYSIS

Funded status matters because it reflects both the solvency of a pension fund and the underlying costs of providing the benefit.

There is no inherent reason that a pension fund needs to be exactly 100% funded every year. The funded level of a plan will fluctuate over time. However, if a pension fund remains at 70% or 80% funded perpetually, the costs of funding benefits will grow.

A plan that is consistently below 100% funded for more than 2 to 3 years will have consistent unfunded liabilities. The costs of carrying unfunded liabilities for a long period of time can grow exponentially.

While a pension fund that is 80% funded for 10 years in a row is at no risk of near-term insolvency, their unfunded liability amortization payments could very well double in that time frame, making the costs of providing the same benefit higher than necessary over the long-term. Reported funded ratio and unfunded liability numbers are only as good as the underlying assumptions.

Funded ratios and unfunded liability numbers depend on accurately measuring the value of promised liabilities and assets. This means the reported funded status is dependent on accurate assumptions like mortality rates used to measure promised benefits, and valuation methods used to measure assets.

There is an academic debate about whether pension plans should use the assumed rate of return on assets as the discount rate for liabilities. There is a separate debate about whether the assumed rates of return used by plans (current median is 7%) is too high.

Moody's Analytics uses an alternative process for measuring liabilities from most actuaries and winds up with a discount rate usually 5% or less. Actuarial firm Milliman measures liabilities using an assumed rate of return (6.6%) which is much lower than the national average.

# Within the Trends: Investment Assumptions

- Interest Rates
- Assumed Rate of Return

#### INTEREST RATE TRENDS TREASURY YIELDS IN DECLINE 1980-2021



One of the most significant events to influence public pensions over the past 50 years was the steady decline in interest rates.

Lower interest rates have raised the costs of financial guarantees, like pensions and life insurance.

Lower interest rates have also meant pension funds have earned steadily lower yields on fixed-income investments like bonds.

<sup>38</sup> EQUABLE

Source: Federal Reserve, annual average yields. See technical notes for more. Notes: (1) 2021 yields are the average as of August 2021. (2) 20-year treasury bonds were not issued until 1993 but the Federal Reserve has imputed values for prior years; no 30-year treasury bonds were issued between February 18, 2002, and February 8, 2006.

### AVERAGE ASSUMED RATE OF RETURN FOR STATEWIDE PLANS 2001-2021



The average assumed rate of return has gradually declined from 8.05% in 2001 to 7.03% in 2021.

Over the past two decades there has been a wider range in assumptions adopted by plans. The lowest rate adopted by any plan is *5.25%*, while the highest rate currently used is *8%*.

EQUABLE

## INTEREST RATE TRENDS ASSUMED RETURN VERSUS INTEREST RATES 1980-2021



States and pension boards have been slow to reduce their assumed rates of return, relative to declining interest rates.

The growing gap between interest rates and assumed rates of return reflects as an increased amount of risk that pension funds are accepting.

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Notes: (1) 2021 yields are the average as of August 2021. (2) No 30-year treasury bonds were issued between February 18, 2002, and February 8, 2006, but the Federal Reserve has imputed yields for those periods.

## INTEREST RATE TRENDS ASSUMED RETURN VERSUS INTEREST RATES 2001-2021



EQUABLE

Looking at the same comparison of assumed returns and interest rates over the past two decades provides a clearer picture of the divergence between these trend lines.

If assumed returns had kept pace with declining interest rates since 2001, the average assumption in 2021 would have been around 4.3%.

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Notes: (1) 2021 yields are the average as of August 2021. (2) No 30-year treasury bonds were issued between February 18, 2002, and February 8, 2006, but the Federal Reserve has imputed yields for those periods.

## STATEWIDE PLANS BEING LEFT BEHIND: AS OF ANNOUCEMENTS THROUGH AUGUST 2021

	Current Assumed Return	Reported Funded Ratio
Ohio Police and Fire Pension Fund	8%	73.2%
Arkansas State Highway Employees' Retirement System	8%	82.4%
Kansas Police and Firefighters' Retirement System	7.75%	91.6%
Kansas Public Employees Retirement System*	7.75%	94.1%
Mississippi Public Employees' Retirement System**	7.75%	75.3%
Alabama Employees' Retirement System	7.7%	75.9%
Alabama Teachers' Retirement System	7.7%	76.1%
Montana Public Employees Retirement Board	7.65%	74.6%

The states and pension boards for these plans are embracing the highest risks that asset growth will underperform expectations of any statewide pension funds in the country.

#### Notes:

\* There are four plans that are all part of the Kansas PERS system
– State, Local, School, and Judges. Their funded ratios differ, but
they all use the same assumed return of 7.75%. The funded ratio
reported here is the average of those four plans.
\*\* Mississippi PERS adopted a policy in 2019 that should mean they
reduce their assumed rate of return in fiscal 2022. Formal details
were not available as of August 2021.

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## STATEWIDE PLANS ON THE MOVE:

## MEANINGFUL ASSUMED RETURN REDUCTIONS OVER THE PAST YEAR

- There were 30 retirement systems that lowered their investment assumption, affecting 44 plans (pension and guaranteed return).
- CalPERS, the largest retirement system in the country, announced that it will be lowering its assumed return from 7% to 6.8%. The
  move was automatically triggered by a policy adopted several years ago to lower the investment assumption in years when investment
  returns are particularly strong.
- New York State and Local Retirement System (with assets managed in the New York Common Fund) will be using a 5.9% assumed rate of return as of April 1, 2021, down from 6.8%. This makes them the largest retirement system with an assumption below 6%.
- The following plans lowered their investment assumptions from rates above 7.5%:
  - Texas County & District Retirement System: from 8% to 7.5%
  - North Dakota Teachers Fund for Retirement: from 7.75% to 7.25%
  - Michigan Municipal Employees' Retirement System: from 7.75% to 7.35%.
  - Louisiana State Employees Retirement System: from 7.6% to 7.4%.\*
  - Louisiana Teachers Retirement System: from 7.55% to 7.45%.\*
- Indiana Public Employees Retirement System lowered its assumed return for all its plans from 6.75% to 6.25%.
- Maryland State Retirement and Pension System dropped its investment assumption from 7.4% to 6.8%.
- North Carolina Retirement Systems reduced its 7% return assumption to 6.5% for all plans it manages.

#### 43 EQUABLE

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. \* Two Louisiana plans use an "investment return" assumption above 7.5% but make adjustments that result in a "discount rate" that is now lower than 7.5%. Most plans use the same rate for both the assumed return and discount rate.

Analysis: What We See in the Investment Trends The cost of making financial guarantees has grown over time as interest rates have declined. The cost of guaranteeing payments just 10 years in the future is nearly 10 times more expensive today than in the 1980s.

## An increasing number of state plans have made meaningful steps away from relatively high assumed returns (Page 25), though they remain in the minority.

• The slow pattern of assumed return reduction relative to interest rates (Page 40) has tacitly meant pension funds are taking on risks: both the risk associated with alternative investments (Page 13), and the risk that pension funds won't earn their targeted return (which in turn will produce unfunded liabilities).

• Overly optimistic assumed rates of return also likely mean that the reported value of promised benefits today is too low. Depending on whose capital market assumptions are used, the 50th percentile return for the asset allocation of statewide plans is between 5.5% and 7%. For example, Milliman estimates the expected return for the nation's largest public plans is 6.6%, which is more than 50 basis points below the average rate being used.

*Looking to the future:* Public plans are likely to continue the trend of lowering their assumed returns in the coming years due to lower probable actual returns. The speed at which this change is made will likely influence how much risk persists within public plans.

## FACTORS DRIVING OUR ANALYSIS

The most significant problem for pension fund investments currently is low interest rates.

Interest rates are an important trend line for retirement systems because they reflect the kind of financial market that pension funds are investing in. If interest rates are low, it makes it harder to earn higher returns from relatively safe, fixed income investments like bonds.

Since the Great Recession, low interest rates have caused pension funds to shift their assets into higher risk categories to try and earn high returns. The most important actuarial assumption for public pension resilience is the assumed rate of return.

The assumed rate of return is used to help determine what the level of contributions is each year.

The assumed rate of return is the annual target for a pension fund. Just earning a return greater than 0% is not good enough. If a state plan is assuming 7.25%, then anything less than that will add unfunded liabilities.

# Within the Trends: Contribution Policy

- Actuarially Determined Employer Contributions
- Funding Policy Trends for Select States
- Risk-Sharing Trends for Select States
- Employee Contributions

### ACTUAL v. REQUIRED EMPLOYER CONTRIBUTIONS 2001-2020

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Actuarially required contributions have grown steadily over the past two decades, and in many years, states have struggled to keep up.

The total dollar amount of required contributions that were not paid between 2001-2020 was \$176.9 billion.

Actual Contributions (in billions)

Re

Required Contributions (in billions)

### SHARE OF REQUIRED CONTRIBUTIONS PAID BY STATEWIDE PLANS 2001-2020



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EQUABLE

States have steadily improved their commitment to paying actuarially required contributions over the past several years after reaching a modern low point in 2012, following the Great Recession.

While a few states did not fully fund their required contributions in 2020, on net states collectively paid closer to the actuarially determined rates than in any year since 2001.

Source: Equable Institute analysis of public plan valuation reports and CAFRs. "Required" based on GASB definitions for ARC and ADC.

## STATES THAT UNDER OR OVER FUNDED CONTRIBUTIONS SINCE THE ONSET OF THE PANDEMIC



#### Colorado PERA (State, Local, Teachers)

The state cut a \$225 million planned supplemental payment that was intended to get total actual contributions up to the actuarially required rate.



#### Pennsylvania State

Received \$1.06 billion in a one-time lump sum from Penn State University, pushing Pennsylvania SERS contributions well above required rates.



#### South Carolina RS (State & Local)

The state froze contributions instead of continuing forward with a scheduled 1% of payroll increase in contribution rates.



#### New Jersey

The legislature delayed nearly \$1 billion in contributions from the state budget to various state pension plans during the summer of 2020; but they made up for it with the fiscal year 2021 budget.



#### Arizona Police & Fire

Received \$1 billion in supplemental funding from the state legislature.

#### Tennessee Consolidated

Received \$250 million in supplemental funding from the state legislature.



Analysis: What We See in the Contribution Trends After decades of states failing to ensure they were paying at least the actuarially determined contribution rates, in 2020 states collectively paid all their bills (Page 48).

- States have a historically inconsistent record with paying required contributions. Even though pension funds are supposed to be pre-funded, many states did not get serious about trying to make such contributions until as late as the 1990s.
- Contributions relative to requirements were particularly low in the years after the Great Recession. Though the economy recovered, tax revenues took years to bounce back from their decline in 2008. Fortunately for state finances, federal fiscal stimulus in 2020 and early 2021 has helped prevent a similar economic catastrophe that might have led to similar underfunding behavior.
- While 2020 was the best year on record for paying actuarially determined contributions since 2001, there were still several states including large plans in IL, NJ, and TX that did not have every plan paying their full actuarially determined contribution.

Looking to the future: States on the cutting edge of pension plan management (ex. MI, CO, NM) are focused on adopting risk-sharing policies that give pension boards tools to balancing the goals of protecting benefits and ensuring a well-funded plan. The best-funded plans historically — South Dakota and Wisconsin — have benefited from risk-sharing tools built into their plans decades ago. More states would benefit from adopting similar policies now.

## FACTORS DRIVING OUR ANALYSIS

Ensuring the actuarially determined contribution rate is fully paid each year is the minimum states can do if their goal is to ensure resilient, sustainable retirement systems.

There are reasonable debates to be had over public policy priorities for any given state or municipality, including overallocation of resources to various policy goals and what tax rates are appropriate. Whether or not states should use resources to pre-fund retirement benefits is often a part of these debates.

While state and local leaders might have acceptable arguments for a choice that trades-off fully funding a pension plan, if a state has the goal of maintaining a sustainable retirement system then the bare minimum requirement each year is paying at least 100% of the ADC. Actuarially determined contributions rates are only as sound as the underlying assumptions used to calculate them.

Actuarially determined contribution rates are based on numerous actuarial assumptions (investment returns, mortality, payroll growth, etc.) that factor into measuring liabilities. In addition, pension boards can set amortization policies that target 100% funding over an excessive period of time (more than 25 years), or in some cases target less than full funding in the first place.

As a result, there are a number of states that pay their full ADC every year but still have mounting unfunded liabilities. Just paying the actuarially required rate each year is not enough on its own to ensure full funding in the long-term.

If the assumptions and funding policies are flawed, then the ADC alone cannot put a pension plan on the path to full funding.

# Within the Trends: Cash Flows & Maturing Plans

Active Members to Retirees Ratio

Benefit to Asset Ratio

## RATIO OF ACTIVE MEMBERS TO RETIREES | 2001-2020



The ratio of active workers to retirees provides a signal about cash flows into and out of pension funds.

People are living longer and retiring faster (as the Baby Boomer generation phases out of the labor force). Public sector hiring rates slowed down after the Great Recession. The net result is active member counts have been relatively stable for the past few years, while the total number of retirees collecting benefits has grown.



EQUABLE

### BENEFIT PAYMENTS AS A SHARE OF ASSETS 2001-2020



The benefit-to-asset ratio is a helpful metric for states and pension boards to monitor whether they are at risk of running into a liquidity crunch. The closer a pension plan is to a 1:1 ratio, the closer they are to running out of cash.

But beyond solvency, there is also an investment concern here: As more of the asset base is being used to pay benefits, there is less money that can be invested in long-term assets to earn returns.



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Analysis: What We See in the Cash Flow Trends It is going to be harder in coming years to earn massive investment returns. Plans are cash flow negative from contributions and benefit payments (Page 16). And the available asset base to earn investments from is improving, but still at least a trillion dollars less than it should be (Page 10).

- Total retirees passed active members for the first time in 2015 (Page 53). This is driving ever-increasing benefit payments.
- Collectively, there are more benefit payment outflows than contribution inflows (Page 16), and this is not going to change at any point in the near-term. Benefit payments relative to assets are at their highest point ever (Page 54)
- Because investment returns have been less than expected in most years during the past two decades (Page 12) and asset values haven't kept up (Page 9), the ratio of benefits-to-assets has been trending down since 2001 (Page 54). This is a vicious cycle because negative cash flow from contributions puts additional pressure on plan investment returns to meet or exceed expectations.
- As that measure of liquidity shifts toward 1:1 pension fund managers will find it increasingly harder to make investment decisions. There will simply be fewer assets that can be invested flexibly.

Looking to the future: It will be very difficult (in some cases impossible) for public plans to invest their way back to fiscal health. Contributions are being fully consumed by benefit payments, and pension funds are relying on investment returns to make up the balance (meaning less exponential investment growth) and pre-fund benefits for active members (which are not being fully funded, meaning continued unfunded liabilities). Each year investment returns underperform expectations, it perpetuates a vicious cycle.

## FACTORS DRIVING OUR ANALYSIS

If public plans were fully funded, the active-to-retiree and benefit-to-asset ratios would not be a concern.

Pensions are supposed to be "pre-funded" with contributions plus investment earnings. The benefits earned each year are supposed to be matched by contributions that will be sufficient to pay those benefits, assuming (a) the value of the benefits was calculated correctly, and (b) the contributions earn assumed investment earnings.

This means that new members and their contributions should not be necessary to pay retiree benefits.

In practice, there isn't a problem with a pension fund paying out all its assets if there is enough to meet all promises.

If a fully funded pension plan were to stop adding new members, it could be gradually wound down over time without fear of running out of money, because it was appropriately pre-funded. Each passing year the ratio of retirees to active members would grow and the benefit-toasset ratio would shift toward 1:1 or worse, but that would be expected and not a problem. Simply hiring more people would improve near-term cash flows, but it would also mean faster growth of promised benefits which is already outpacing assets.

A frequently proposed solution to cash flow problems is hiring more people, because this will mean more contributions. However, this also means more promised benefits. And the existing challenge for statewide pension plans is that promised benefits are outpacing the growth of assets (Page 10). So, hiring more people could exacerbate the long-term problem.

The additional "contributions" that come from hiring more workers are all coming from government resources in the first place member contributions are from their paychecks; employer contributions are from taxpayer resources. If there is money available to hire more workers, then those funds, including the amounts for paychecks, in theory could be used to pay down existing funding shortfalls without taking on the additional liabilities that come from hiring more members.

This is not to say governments should not hire more people — there are plenty of public policy reasons why that might or might not be appropriate for any given state at any given time. This is to say that hiring more people is not a solution to the cash flow problem.

# Within the Trends: State of Benefits

Current Distribution of Plan Designs

- Recent Changes to Plan Design
- COLA Policies and Trends

## RETIREMENT PLANS AND BENEFIT TIERS AVAILABLE TO NEW HIRES



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Over the past two decades the number of public retirement plans available to new hires has grown, particularly as states add options and design more specific benefits for narrower segments of the workforce.

This expansion of benefit designs generally has focused on adding "Hybrid" plans that combine guarantees with individual accounts, while stand alone Defined Contribution and Guaranteed Return Plans have also increased in availability over the past decade.



*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Single retirement systems might offer more than one set of "plan" provisions. One retirement plan might have multiple "tiers" or "classes" of benefits depending job description. The figures above represent the full range of plan tiers and classes available to new members as of July 1, 2021.

#### **RECENT MAJOR BENEFIT DESIGN CHANGES**

#### Kentucky leachers

#### Kentucky Teachers' Retirement System

All new members as of January 1, 2022 will be enrolled in a Hybrid (Pension/Guaranteed Return) Plan.

- Members will contribute 9% of salary to their pension plan, plus 2% to their guaranteed return plan notional account.
- Employers pay a fixed, statutory rate of 10.75% of payroll, of which 2% is for contributions to guaranteed return plan accounts.
- The system will manage investments and guarantee returns equal to the 5-year rolling average of 30-year Treasury bonds.
- A risk-sharing element requires members to make increased contributions to the pension plan if its funded ratio falls below 90%.

#### Texas Employees' Retirement System

- All new members as of September 1, 2022 will be enrolled in a Guaranteed Return Plan.
- Members will contribute 6% of salary. Employers will contribute 9% of payroll.
- Law enforcement members will contribute an additional 2%, and their employers will contribute an additional 6%.
- The system will manage investments and guarantee returns equal 4% annually. Any returns earned above 4% will be split evenly between members and employer accounts, up to a maximum 7% return for members.



#### LANDSCAPE OF INFLATION PROTECTION FOR PENSION, HYBRID, & GUARANTEED RETURN PLANS

Type of COLA Provisions	# of Plans or Tiers	Average COLA Provided*
No COLA Rules	49	N/A
Ad Hoc COLAs Only	49	0.47%
Automatic COLA, Fixed Amount	40	1.75%
Automatic COLA, Linked to Funded Status	8	2.22%
Automatic COLA, Linked to Inflation	149	2.10%
Total/Overall Average	295	1.48%

Inflation protection of benefits is important for ensuring they continue to provide retirement income security as intended.

Pension plans (including hybrids where a portion is a pension benefit) currently provide a range of cost-ofliving adjustments, depending on the local rules.

Most states have linked COLAs to inflation, but roughly 1/3 of pension plans do not have automatic COLAs.

60 EQUABLE

*Source:* Equable Institute analysis of public plan valuation reports and CAFRs. Plans that offer variable COLAs do not, by definition, offer the same rate each year. Actuaries make assumptions about what rates will be paid in the future. For the purposes of this chart, we assume that 75% of the maximum available COLA will be paid.

## APPENDIX 1: GLOSSARY

#### **KEY TERMS TO KNOW**

- Accrued liability (AAL): Total amount of promised pension benefits, counting up all expected pension checks for active members and retirees, and then reporting those in today's dollars.
- Total pension liability (TPL): A technical definition from the Governmental Accounting Standards Board for the value of promised benefits. All retirement systems that want to comply with GASB reporting requirements are required to measure their pension obligations in a particular way that sometimes can be slightly different from AAL.
- Actuarial value of assets (AVA): A "smoothed" value of assets, typically used for the purposes of determining contribution rates and measuring unfunded liabilities. Actuaries "smooth" any gains and losses of a particular number of years to minimize year-to-year changes in the value of the AVA. For example, actuaries typically smooth investment gains and losses over a five-year period, only recognizing 20% of the market valued return each year for the purposes of determining the AVA.
- Market value of assets (MVA): The actual, fair market value of the plan's total assets, measured by the price that would be received to sell an asset in an orderly transaction.
- *Fiduciary net position:* A technical definition from the Governmental Accounting Standards Board for the market value of assets. All retirement systems that want to comply with GASB reporting requirements are required to measure the real value of their assets, instead of the actuarial value.

- Unfunded liabilities: The difference between the value of promised benefits and assets available to pay those benefits. This is the shortfall in assets that should be in the pension fund and invested so that all promised benefits can be paid. An easy way to think about unfunded liabilities is as pension debt.
- Net pension liability (NPL): A technical definition from the Governmental Accounting Standards Board for pension funding shortfalls. All retirement systems that want to comply with GASB reporting requirements are required to measure their obligations as total pension liabilities (TPL), and their assets using a market value called fiduciary net position (FNP). The difference between these two accounting metrics is the net pension liability.
- Pension debt: A non-technical way to think about "unfunded liabilities," which is the difference between the value of promised benefits and the assets available to pay those benefits. Pension debt isn't like typical government debt. Money isn't borrowed and put into the pension fund. Instead, it is money the pension fund needs to make up for past contributions that weren't enough to appropriately pre-pay for benefits.

#### 62 EQUABLE

abilities

Assets

Debt

Pension

### **KEY TERMS TO KNOW**

- Actuarially determined contribution (ADC): Annual amount actuarially necessary to cover the normal cost and amortization payment. (Previously known as the "annual required contribution" or ARC payment.)
- Actuarially determined employer contribution (ADEC): The value of the ADC after accounting for any employee contributions.
- Amortization payments: Contributions necessary to pay down the unfunded liability shortfall over time. These can be stretched over varying periods of time, and based on an equal dollar per year basis, or calculated as an equal percentage of payroll for each year of the amortization schedule.
- *Funded ratio:* The funded ratio measures the ratio of dollars in the pension fund compared to the value of promised lifetime income benefits.
- Actuarial assumptions: Estimates used to forecast uncertain future events affecting future benefits or costs associated with a pension fund. Examples of these assumptions include investment rate of return, inflation, payroll growth, mortality, retirement patterns, and other demographic data.
- Assumed rate of return (ARR): The investment return on assets that the pension fund expects to earn over a long-term period of time.
- Expected rate of return: This term is often used interchangeably with "assumed rate of return." Technically, the expected rate of return refers to the middle of the possible investment returns for a given pension fund's portfolio. Investment advisors forecast what the probability is for different rates of return based on a given portfolio (such as the mix of stocks and bonds). The 50th percentile—or 50% probability—in that forecast is formally known as the expected rate of return. Pension board trustees do not always choose the expected rate of return as the assumed rate of return, but they do use it as a guidepost.
- Payroll: The total amount paid to employees that are participating in a retirement system. The costs and contribution rates of a pension plan are often expressed as a percentage of the total plan payroll.
- *Cost-of-living adjustment (COLA):* An annual change to a pension benefit for retirees, usually pegged to some measure of the rate of inflation.
- Defined benefit plan: A retirement plan that determines benefits by a formula in advance of your retirement. This term is often used to refer to pensions, but technically it can refer to a range of retirement plan designs.
- Normal cost: The contribution necessary to pay for benefits earned each year. This amount gets invested, and the combined total is intended to pay all promised benefits. The normal cost "prefunds" or "pays in advance" for promised pension benefits.
- Pension plan: A guaranteed income plan that provides a fixed, guaranteed monthly income based on two factors: years worked and average salary during final working years. The years worked are usually multiplied by an accrual rate as a component of the benefit.

ontributions

 $\bigcirc$ 

Assumptions

Benefits

## APPENDIX 2: ADDITIONAL CHARTS AND DATA TRENDS

#### SHARE OF 2020 STATE BUDGETS REQUIRED BY ACTUARIALLY DETERMINED CONTRIBUTIONS

Actuarially Determined Employer Contribution as % of the State's General Fund Budget

	2001	2009	2020
IL	7.0%	10.9%	23.3%
NV	18.0%	19.2%	17.7%
MI	2.9%	8.5%	15.3%
NJ	2.2%	10.1%	14.5%
KY	3.0%	7.3%	13.7%
SC	5.9%	7.0%	11.2%
СТ	4.9%	7.6%	11.1%
PA	0.8%	5.8%	11.0%
LA	6.1%	8.0%	11.0%
NH	3.1%	7.9%	10.9%



65 EQUABLE

Source: Equable Institute analysis of public plan valuation reports and CAFRs; NASBO for state expenditure data. Note that some statewide plans are funded with contributions from local employers that draw on local revenues. This matrix reflects the size of required contributions relative to state expenditures as a common cross-state measurement, not as a reflect of the actual amount of state expenditures on pension contributions.

#### SHARE OF 2020 STATE BUDGETS REQUIRED BY ACTUAL DETERMINED CONTRIBUTIONS

Actual Contributions as % of the State's General Fund Budget

					2001	2009	2020
				NV	18.0%	17.5%	19.4%
	• NJ	• 11		MI	3.0%	8.5%	18.3%
• NM				IL	5.8%	8.2%	16.5%
MS –	CT • KY			KY	3.2%	5.3%	12.7%
•	AZ	• MI • NV	-	PA	0.9%	1.9%	12.7%
	• PA			LA	6.6%	8.2%	11.7%
				SC	5.9%	7.0%	11.2%
• •				NJ	0.4%	3.0%	11.2%
5% 10	% 15%	20%	25%	NH	3.1%	7.9%	10.9%
Contributions Actual	y Paid (% of Gen Fun	d Expenditures)		СТ	4.7%	7.3%	10.8%

66 EQUABLE

300%

250%

200%

150%

100%

50%

0%

0%

Unfunded Liabilities (% of GFE)

Source: Equable Institute analysis of public plan valuation reports and CAFRs; NASBO for state expenditure data. Note that some statewide plans are funded with contributions from local employers that draw on local revenues. This matrix reflects the size of all employer contributions relative to state expenditures as a common cross-state measurement, not as a reflect of the actual amount of state spending on pension contributions.

## AVERAGE EMPLOYER CONTRIBUTIONS, BASED ON SOCIAL SECURITY PARTICIPATION 2001-2021



The total employer contribution rates for statewide pension plans varies depending on the degree to which those employers participate in Social Security.

However, the overall trend of increases employer contributions has been consistent across all three kinds of participation levels.



or Plans Not Participating in Social Security



For Plans Participating in Social Security

For Plans with Mixed Participation in SSA

## AVERAGE EMPLOYER CONTRIBUTIONS FOR MIXED SSA PARTICIPATION PLANS 2001-2021



Unlike member contribution rates, there is a similar average employer contribution rate trendline for retirement systems with mixed participation in Social Security.

Like member contributions, the absolute average does increase slightly when adding CalPERS costs into the average.



For Plans With Mixed SSA, including CalPERS

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For Plans With Mixed SSA, without CalPERS

• EQUABLE Source: Equable Institute analysis of public plan valuation reports and CAFRs. Contribution rates show for the year actually paid. Note: In these cases the pension benefit levels tend to be the same across all plans, so the contributions into the retirement system for members (and employers) are also the same even if Social Security taxes are collected at the same time.

#### FUNDING POLICY TRENDS, EXAMPLES SINCE THE GREAT RECESSION: ADOPTING A PLAN TO RAMP UP CONTRIBUTION RATES OVER TIME

California Teachers' Retirement System, FY2014-15 to 2023-24	<ul> <li>Texas Teachers Retirement System, FY2019-20 to 2024-25</li> </ul>
Phased-in rate increase for district employers (8.25% to 20.25%), members (8% to 9.2% or 10.25% depending on hire date), and the state's supplemental payment; rates changes were modified in 2020.	Phased-in rate increase for the state (6.8% to 8.25% in two steps over five-years), members on a two-year delay (7.7% to 8.25% between FY22-24), and district employers (10 basis points steps between FY21-25).
South Carolina Retirement System, FY2017-18 to 2022-23	Arkansas Teachers' Retirement System, FY2019-20 to 2023-24
A five-year, 100 basis point ramp up of employer contributions following a first year 200 basis point increase from the previous 11.56% rate.	District employers and members will each have a 25 basis points a year increase in contributions for four years.
• Wyoming Retirement System, September 2018 to July 2021	<ul> <li>New Mexico PERA (State &amp; Local), FY2020-21 to 2025-26</li> </ul>
Member and employer contributions increased in 25 basis point steps up to 9.25% and 9.37%, respectively.	Member and employer contributions increased 50 basis points a year for four years (two-year delay before municipal employee increase starts).

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EQUABLE

Source: Equable Institute analysis of public plan valuation reports, CAFRs, and legislation. Descriptions here are highly summarized for space, contact the authors for more complete details.

#### FUNDING POLICY TRENDS, EXAMPLES SINCE THE GREAT RECESSION: ADOPTED AUTOMATIC CONTRIBUTION INCREASE POLICY LINKED TO EXPERIENCE

Iowa Public Employees' Retirement System, adopted in 2011

The board has authority (from the legislature) to set the contribution rate based on actuarial analysis, but the increase can not be more than 100 basis points a year.

Houston MEPS (Municipal), POPS (Police), FRRF (Fire), adopted in 2016

Contribution rates are set by the board based on actuarial experience within an established "risk-corridor" that is 500 basis points plus or minus the city's contribution rate in FY2018.

#### Colorado PERA (State, Teacher, Local), adopted in 2018

In any year where statutory contributions are less than the ADC, then both employer and member contributions should be increased by up to 50 basis points a year and the retiree COLA should be reduced by an equivalent amount (no more than 50 basis points in a year); total contribution rates are capped at FY 2018 rates plus 200 basis points.

Source: Equable Institute analysis of public plan valuation reports, CAFRs, and legislation. Descriptions here are highly summarized for space, contact the authors for more complete details.

#### STATES THAT REQUIRE EMPLOYEES TO PAY FOR A PORTION OF UNFUNDED LIABILITY COSTS



#### Arizona SRS (State & Local) Members explicitly pay 50% of unfunded liability payments.



#### Arizona PSPRS Tier 3 (Police & Fire)

Members explicitly pay 50% of unfunded liability payments.



#### Illinois TRS (Teachers)

Member contribution rate for Tier 2 (9% of payroll) is larger than the normal cost for the plan (7.57% of payroll), meaning they tacitly cover a portion of unfunded liability costs, too.

#### Ohio TRS (Teachers)



Member contribution rate (14% of payroll) is larger than the normal cost for the plan (10.8% of payroll), meaning they tacitly cover a portion of unfunded liability costs, too.



#### Nevada PERA (State & Local)

Members of the "Employer-Employee Pay" plan share the costs of paying the required contribution rate 50/50.
# RISK-SHARING POLICIES ADOPTED SINCE THE GREAT RECESSION

#### *Employer-Employee Cost-Sharing Arrangements*

- CalPERS, 50/50 normal cost share (adopted 2012)
- CalSTRS, 50/50 normal cost share (2012)
- AZ Police & Fire Tier 3, 50/50 share (2016)
- AZ Probation Tier 3, 40/60 share (2018)
- MI Teachers Pension Plus 2, 50/50 share (2017)
- ME Local Districts, 55/45 share (2018)

These are preset arrangements that divide up actuarially determined contribution rates between employers and employees based on a fixed percentage. In some cases, the normal cost is divided; in other cases the entire actuarially determined contribution is divided, including unfunded liability payments.

#### Variable Employee Contribution Rates

- Utah RS, max employer rate (adopted 2010)
- CT State, linked to ARR change (2017)
- PA State, linked to ROA performance (2017)
- PA Teachers, linked to ROA performance (2017)
- CO PERA, linked to ADC change (2018)
- NM State & Local, linked to funded ratio (2020)

#### New this year:

#### • KY Teachers, linked to funded ratio (2021)

These are funding policies that will automatically increase the contribution rate paid by members based on experience, such as a change to the assumed return, actual return, or funded status.

#### Retiree Risk-Sharing

- MD State & Teachers (adopted 2011)
- RI State & Teachers/Local (2011)
- AZ Police & Fire (2016)
- CO PERA (2018)
- NM State & Local (2020)

These are tools for a pension board to use when funded status declines and usually include reducing cost-of-living adjustments for current retirees. This reduces the unfunded liability level for the pension plan, which in turn reduces required contribution rates from members and employers.

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*Note:* A "Risk-Sharing Policy" is any provision that automatically adjusts employer contributions, employee contributions and/or retiree benefits based on a predetermined set of criteria (such as an increase in unfunded liabilities or to accomplish a funded status goal). The "risk" being shared is the risk that actual experience will differ from actuarial assumptions.

# WHAT HAPPENED AFTER THE GREAT RECESSION IS A GUIDE TO WHAT IS LIKELY TO TRANSPIRE OVER THE NEXT DECADE

- From 2008 to 2010 there was a drop off in the percentage of required contributions that was actually paid by state governments (Page 36), driven by low tax revenues and budget constraints.
  - States began to improve their funding practices in 2013 and 2014, around five years after the recession ended.
- Unfunded liabilities jumped because of losses during the Financial Crisis and grew steadily in the decade that followed. This led to a steady increase in employer contributions, doubling from 14.01% to 27.9% as a percentage of payroll between 2009 and 2019 (Page 11).
  - The funded ratio average leveled off between 2011 and 2019. But remaining perpetually underfunded has contributed to ever growing costs.
- States turned to member contributions to help pay for increasing costs following the Great Recession (Page 10).
  - Within six years of the Great Recession, employees were paying over 0.75% more from their paychecks for the same (or lessor) benefits, with the average increasing from 5.84% to 6.66% of payroll.
- A positive trend (from the perspective of long-term resilience) was in the decline of assumed rates of return (Pages 27, 29, 30). But states did not start making meaningful moves until around three to four years after the end of the Great Recession.
- States increased their asset allocations to higher risk, higher reward investments, starting in 2008, to try and increase returns (Page 9).
- States also pursued various changes to benefits that would reduce their long-term costs, including the reduction or elimination of cost-of-living adjustments.\* Sometimes these changes were for new members, other times (where legal) they were for active employees and/or retirees.

# APPENDIX 3: METHODOLOGIAL NOTES

## WHO ARE WE COUNTING?

- For our analyses we focus on statewide retirement systems and the various defined benefit plans within those systems. Eligible plans hold at least \$1 billion in accrued liabilities.
- We note, however, that we separate several retirement systems into their respective plans (e.g. Colorado PERA is split into 4 plans), as they have independently measured and reported assets, liabilities, contribution rates, and other data.
- Numerous states have hybrid systems (e.g. Michigan, Pennsylvania, and Tennessee) that include both Defined Benefit and Defined Contribution portions. For those plans we include the defined benefit portions in our data and analyses.
- We treat guaranteed return/cash balance plans in the same fashion as hybrid plans. We report defined benefit totals as they are presented in plan actuarial valuations and comprehensive annual financial reports.
- The result of this approach is a population of 159 retirement plans across the 50 states and Washington, D.C.
- A full list of included plans is available on slides 81 to 83.



## WHAT YEARS ARE WE MEASURING?

- Our analyses focus on the years 2001 through 2020 (for reported data) and 2021 for our projections.
- We use reported figures for fiscal year ending (FYE) 2020 for all plans who have published their actuarial valuation reports or annual reports for those years. For all plans that do not yet report those values, we either roll them forward using the reported assumptions of the retirement system (e.g., payroll growth) or simply carry forward their reported values for FYE 2019 when a roll-forward is not possible.
- We will update this report later this year when all FYE 2020 data have been reported.
- We have also published a table online with each plan, the measurement date, the topline funding numbers, assumed returns, and other metrics used in our analyses. That table can be accessed <u>here</u>.

## **TECHNICAL NOTES ON SELECT CHARTS**

- **Page 9.** "Funded Ratio Average for Statewide Pension Plans" measures the aggregate funded ratio for statewide pension plans weighted by total liabilities. The trendline shown here is using the fair market value of assets to measure funded status. An alternative measure using an "actuarial" value of assets shows 2020 funded ratios were virtually unchanged from 2019.
- Page 25. "Distribution of Assumed Rates of Return" shows the current assumed rates of return used by public plans. Most of the
  rates here are the most recently published in 2020 actuarial valuations. Plans that have announced in the past few months that their
  boards of trustees have voted to adopt a new assumed rate of return were updated to include that figure in this chart (which will be
  confirmed when 2021 actuarial valuations are published.
- Page 26. "Capital Market Warnings" draws data from multiple Horizon surveys of capital market forecasts over the past few years. To read the 2021 survey, follow this link.
- Page 36. "Unfunded Liability of Public Pensions as a Share of National GDP" uses the Federal Reserve's asset and liability data, which differs from the rest of the asset and liability data in this report on two points: (1) the total plans covered are larger, meaning the asset base is larger; (2) the Federal Reserve applies their own methodology for measuring pension liabilities that differs from how some states report their own accrued liabilities, usually resulting in a higher estimation of the value of promised benefits and thus a higher unfunded liability figure. The points of comparison on the slide are formally defined by the Federal Reserve as "state and local government debt securities" (Municipal Debt), "outstanding university student debt" (Student Debt), "revolving consumer debt" (Credit Card Debt).
- Page 40. A common proxy for the trend line of interest rates is the yield on Treasury bonds as they represent a "risk-free" rate of return. We show the 10-year, 20-year, and 30-year returns to demonstrate that at issue is not the specific yield, but rather the overall downward trend.



## **DATA SOURCES**

- Our primary source for state plan data between 2001 and 2020 is the actuarial valuation published by the retirement system.
- For pension finance data not available in the valuation, we also use the system's CAFR and separately published GASB 67 statements.
- State GDP data are compiled from both the Bureau of Economic Analysis and Federal Reserve.
- State budget data is drawn from the National Association of Budget Officers' annual State Expenditure Report.
- Interest rate data and pre-2001 pension finance data is drawn from the Federal Reserve.

## HOW WE PRODUCED OUR 2021 FUNDED RATIO ESTIMATE

- We collected asset allocation data for each plan using their most recent published report, usually in the CAFR but occasionally via an investment report on the plan's website. We broke this data into the following categories: U.S. Equities, Global Equities, U.S. Fixed Income, Global Fixed Income, Private Equity, Hedge Funds, Real Estate, Commodities, and Cash.
- We collected actual returns for benchmarks for these categories and applied those benchmarks to each plan's allocation to get an approximate estimated return.
- This methodology has some clear disadvantages: it does not account for the actual strategies employed by each fund, for instance the actual equity allocation may differ significantly from broad market metrics; it does not account for special leverage or hedges that might aid or harm a fund's overall performance. However, as a tool for approximating a return our methodology has the advantage of working with many plans. For some we will overestimate, and other underestimate.
- We rolled forward each plan's liabilities using their TPL (or AAL if the TPL was not available) as the base. We rolled forward each plan's assets using their FNP (or MVA if the FNP was not available) and the approximate return generated by the above methodology.
   Back tests of these methodologies were with a reasonable range of actual figures on a one- and two-year roll forward basis.
- We used these approximate figures for assets and liabilities to estimate 2021 unfunded liability and funded ratio levels.
- For plans with fiscal years ending later than June 2021, we only rolled their assets and liabilities forward as far as June 30, 2021.
   Their actual asset performance during the rest of their fiscal year may vary considerably based on market trends, and could cause the final funded ratio figure for the full fiscal year ending 2021 to vary from our current estimate.



# APPENDIX 4: STATEWIDE RETIREMENT SYSTEMS IN OUR DATA SET

## STATEWIDE RETIREMENT SYSTEMS IN OUR DATA SET (Alabama - Maryland)

Retirement System Full Name Alabama Employees' Retirement System Alabama Teachers' Retirement System Alaska Public Employees' Retirement System Alaska Teachers' Retirement System Arizona Corrections Officers Retirement Plan Arizona Elected Officials Retirement Plan Arizona Public Safety Personnel Retirement System Arizona Public Safety Personnel Retirement System - Tier 3 Arizona State Retirement System Arkansas State Highway Employees Retirement System Arkansas Public Employees Retirement System Arkansas Teacher Retirement System California Judges Retirement Fund California Judges Retirement Fund II University of California Retirement System California Public Employees Retirement Fund California State Teachers' Retirement System Colorado Public Employee Retirement Association - Denver Public Schools Fund Colorado Public Employee Retirement Association - Local Division Fund Colorado Fire and Police Pension Association Colorado Public Employee Retirement Association - Schools Division Fund Colorado Public Employee Retirement Association - State Division Fund Connecticut Municipal Employees Retirement System Connecticut State Employees Retirement System Connecticut State Teachers' Retirement System District of Columbia Police Officers and Fire Fighters' Retirement Fund District of Columbia Teachers' Retirement Fund Delaware State Employees' Pension Plan Florida Retirement System - Defined Benefit Plan Georgia Employees' Retirement System

Pension Plan Shorthand Alabama ERS Alabama TRS Alaska PERS Alaska TRS Arizona CORP Arizona EORP Arizona PSPRS Arizona PSPRS Tier 3 Arizona SRS Arkansas DOT Arkansas PERS Arkansas TRS California JRF California JRF II California URS CalPERS CalSTRS Colorado DPS Colorado Local Colorado P&F Colorado Schools Colorado State Connecticut MERS Connecticut SERS Connecticut STRS D.C. POFRP D.C. TRP Delaware SEPP Florida RS Georgia ERS

Georgia Teachers Retirement System Employees' Retirement System of the State of Hawaii Public Employee Retirement System of Idaho Judges' Retirement System of Illinois Illinois Municipal Retirement Fund Illinois State Employees Retirement System Illinois State University Retirement System Illinois State Teachers' Retirement System Indiana 1977 Police Officers' and Firefighters' Pension and Disability Fund Indiana Public Employees Retirement Fund Indiana State Teachers Retirement Fund - 1996 Account Indiana State Teachers Retirement Fund - Pre-1996 Account Iowa Municipal Fire and Police Retirement System Iowa Public Employees' Retirement System Kansas Retirement System for Judges Kansas Public Employees Retirement System - Local Employees Kansas Public Employees Retirement System - State Employees Kansas Public Employees Retirement System - School Employees Kansas Police and Firefighter's Retirement System Kentucky County Employees' Retirement System Kentucky Employees' Retirement System Kentucky State Police Retirement System Kentucky Teachers' Retirement System Louisiana State Employees' Retirement System Louisiana Municipal Police Louisiana State Parochial Employees Retirement System - Plan A Louisiana State Parochial Employees Retirement System - Plan B Louisiana State Police Retirement System Louisiana School Employees' Retirement System Louisiana Teachers' Retirement System Maine Public Employees Retirement System -Consolidated Plan for Participating Local Districts

Georgia TRS Hawaii ERS Idaho PERS Illinois JRS Illinois MRF Illinois SERS Illinois SURS Illinois TRS Indiana 1977 P&F Indiana PERE Indiana TRF 1996 Indiana TRF Pre-96 Iowa MFPRS Iowa PERS Kansas JRS Kansas PERS-L Kansas PERS-S Kansas PERS-T Kansas PF Kentucky CERS Kentucky ERS Kentucky SPRS Kentucky TRS Louisiana LASERS Louisiana MPERS Louisiana SPERS A Louisiana SPERS B Louisiana SPRS Louisiana SRS Louisiana TRS Maine CPPLD

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### STATEWIDE RETIREMENT SYSTEMS IN OUR DATA SET (Maryland - Texas)

#### Retirement System Full Name

Maine Public Employees Retirement System - State Employee and Teacher Program Maryland State Retirement and Pension System - Employees Combined System Maryland State Retirement and Pension System - Teachers' Combined System Massachusetts State Employees' Retirement System Massachusetts Teachers' Retirement System Michigan Municipal Employees' Retirement System Michigan Public School Employees' Retirement System Michigan Public School Employees' Retirement System Pension Plus Plan Michigan Public School Employees' Retirement System Pension Plus Plan 2 Michigan State Employees' Retirement System Michigan State Police Retirement System Minnesota General Employees Retirement Plan Minnesota Public Employees Police & Fire Plan Minnesota State Employees Retirement Fund Minnesota Teachers Retirement Association Public Employees' Retirement System of Mississippi Missouri Department of Transportation and Highway Patrol Employees' Retirement System Missouri Local Government Employees Retirement System Missouri Public Education Employee Retirement System Missouri Public School Retirement System Missouri State Employees' Retirement System Montana Public Employees' Retirement System Montana Teachers' Retirement System Nebraska Public Employees Retirement System - State Employees Cash Balance Nebraska Public Employees Retirement Systems - School Employees Plan Public Employees' Retirement System of Nevada - Police and Firefighters Subfund Public Employees' Retirement System of Nevada - Regular Subfund

New Hampshire Retirement System

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New Jersey Public Employees' Retirement System - Local Plan New Jersey Public Employees' Retirement System - State Plan

#### Pension Plan Shorthand

Maine SETP Maryland ECS Maryland TCS Massachusetts SERS Massachusetts TRS Michigan MERS Michigan PSERS Michigan PSERS PPP Michigan PSERS PPP2 Michigan SERS Michigan SPRS Minnesota GERF Minnesota PEPFP Minnesota SERF Minnesota TRA Mississippi PERS Missouri DOT Missouri LGERS Missouri PEERS Missouri PSRS Missouri SERS Montana PERS Montana TRS Nebraska PERS-CB Nebraska SEP Nevada PERS-PF Nevada PERS-R New Hampshire RS New Jersev PERS-L New Jersey PERS-S

New Jersey Police & Firemen's Retirement System - Local Division New Jersey Police & Firemen's Retirement System - State Division State Police Retirement System of New Jersey New Jersey Teachers' Pension & Annuity Fund New Mexico Educational Retirement Board New Mexico Public Employees Retirement Association New York State and Local Retirement System - Employees' Retirement System New York State and Local Retirement System - Police and Fire Retirement System New York State Teachers' Retirement System North Carolina Local Government Employees' Retirement System North Carolina Teachers' and State Employees' Retirement System North Dakota Public Employees Retirement System North Dakota Teachers' Fund for Retirement Ohio Public Employees' Retirement System Ohio Police and Fire Pension Fund Ohio School Employees' Retirement System Ohio State Teachers' Retirement System Oklahoma Law Enforcement Retirement System Oklahoma Public Employees Retirement System Oklahoma Police Pension and Retirement System Oklahoma Teachers' Retirement System Oregon Public Employees Retirement System Pennsylvania Municipal Retirement System Pennsylvania Public School Employees' Retirement System Pennsylvania State Employees' Retirement System Employees' Retirement System of Rhode Island - State Employees Employees' Retirement System of Rhode Island - Teachers Municipal Employees' Retirement System of Rhode Island South Carolina Police Officers' Retirement System South Carolina Retirement System

New Jersey PFRS-L New Jersev PFRS-S New Jersey SPRS New Jersey TPAF New Mexico ERB New Mexico PERA New York SLRS ERS New York SLRS PFRS New York STRS North Carolina LGERS North Carolina TSERS North Dakota PERS North Dakota TFR Ohio PERS Ohio PFPF Ohio SERS Ohio STRS Oklahoma LERS Oklahoma PERS **Oklahoma PPRS** Oklahoma TRS Oregon PERS Pennsylvania MRS Pennsylvania PSERS Pennsylvania SERS Rhode Island ERS-S Rhode Island ERS-T Rhode Island MERS South Carolina PORS South Carolina RS

### STATEWIDE RETIREMENT SYSTEMS IN OUR DATA SET (Texas - Wyoming)

#### Retirement System Full Name

South Dakota Retirement System Tennessee Public Employees Retirement Plan Tennessee Teacher Legacy Pension Plan Tennessee Teacher Retirement Plan Texas County & District Retirement System Texas Law Enforcement & Custodial Officer Supplemental Retirement Plan Texas Municipal Retirement System Texas Teachers Retirement System Utah Public Employees Contributory Retirement System Utah Tier 2 Public Employees Contributory Retirement System Utah Firefighters Retirement System Utah Public Employees Noncontributory Retirement System Utah Public Safety Retirement System - Contributory Utah Tier 2 Public Safety and Firefighter Contributory Retirement System Utah Public Safety Retirement System - Noncontributory Vermont Municipal Employees' Retirement System Vermont State Employees' Retirement System Vermont State Teachers' Retirement System Virginia Judicial Retirement System Virginia Law Officers' Retirement System Virginia State Police Officers' Retirement System Virginia Retirement System - Political Subdivisions Virginia Retirement System - State Employees Division Virginia Retirement System - Teachers Division Washington Law Enforcement Officers' and Firefighters Retirement System - Plan 1 Washington Law Enforcement Officers' and Firefighters Retirement System - Plan 2 Washington Public Employees' Retirement System - Plan 1 Washington Public Employees' Retirement System - Plan 2 & 3 Washington Public Safety Employees' Retirement System - Plan 2

Pension Plan Shorthand South Dakota RS Tennessee PERP Tennessee TLPP Tennessee TRP Texas CDRS Texas LECOS Texas MRS Texas TRS Utah CRS Utah CRS-T2 Utah FRS Utah NRS Utah PSC Utah PSC-T2 Utah PSN Vermont Muni Vermont SERS Vermont STRS Virgina JRS Virgina LORS Virgina SPORS Virginia RS-L Virginia RS-S Virginia RS-T Washington LEOFF Plan 1 Washington LEOFF Plan 2 Washington PERS 1 Washington PERS 2/3 Washington PSERS 2

Washington School Employees' Retirement System - Plan 2/3 Washington State Patrol Retirement System Plan 1 & 2 Washington Teachers Retirement System Plan 1 Washington Teachers Retirement System Plan 2 & 3 West Virginia Public Employees' Retirement System West Virginia Teachers' Retirement System Wisconsin Retirement System Wyoming Retirement System Washington SERS 2/3 Washington SPRS 1/2 Washington TRS 1 Washington TRS 2/3 West Virginia PERS West Virginia TRS Wisconsin RS Wyoming RS

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