EQUABLE

State of Pensions 2022

Equable Institute's Annual Report

The Era of Volatility: Asset Shocks, Inflation, and War

THIS IS THE STATE OF PENSIONS IN 2022

- *Takeaways from the 2022 Report*

  Read this if you don't have time for the whole report.

- *National Trends for State Pension Plans*

  The "market valued" funded ratio for state and local plans as of 2021 is *84.8%.* We estimate the funded ratio has fallen to *77.9%* as of June 30, 2022, based on forecasted financial losses for the fiscal year.

- *Public Pension Trends in 2022 and Beyond: The Illusion of Promise*

  The optimism coming out of 2021's once-in-a-generation bull run was premature, as 2022 brought significant economic and geopolitical challenges that significantly diminished last year's gains.

- *Special Section: The State of Inflation Protection*

  Record inflation not only affects the fiscal health of pension funds but also the adequacy of benefits, yet the landscape of inflation protection varies widely among the states.

- *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: Spotlight on Municipal Pension Plans*

  The funded ratio for municipal plans on their own as of 2021 is *86.2%*, which was near its high point over the past two decades. However, we estimate the funded ratio of local pension plans has fallen to *78.2%* for the 2022 fiscal year.

- *Within the Trends: Investment Assumptions*

  If assumed rates of return had matched interest rate trends over the past two decades, the national average would be considerably lower at *5.5%* versus the *6.9%* reported as of June 2022.

- *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.

- *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

Technical Note: As of this publication, some states had not yet released all of their FYE 2021 numbers. For these few plans we've rolled forward 2020 figures to 2021. As new data is released, we will update our figures online. See methodological notes at the end for more details.

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.

Read more about the State of Pensions report here.

For an interactive version of the report, visit Equable.org/stateofpensions2022.

Some states have not released their final data points for 2021. 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.

The State of Public Pensions in the United States is Fragile

The good news: While the state of public pensions is fragile, there has been a positive funded ratio trend on net over the past three years. But there is also bad news: Funded status in 2022 for state and local retirement systems has declined considerably from last year, the sharpest single-year decline since the Great Recession and financial crisis. Investment return volatility is contributing to some significant swings in funded levels.

There should be little surprise that America's pension funds have taken a financial hit this year, swinging backward the year following some of the best investment returns in history. Massive returns for public and private equity in 2021 didn't clearly align with any kind of obvious market fundamentals signaling persistent future growth. Inflation was already a concern before the year 2021 ended. And there were plenty of warning signs that strong 2021 investment returns were pulling forward financial gains from the future that would require a market correction. The question wasn't if a correction was coming, but when.

It turns out that market dip started around the time the calendar flipped years. Since 2022 started, public and private equity markets have plunged — consider that CalPERS lost $60 billion between December 2021 and June 2022, down from a peak of around $500 billion to roughly $440 billion. Meanwhile, war in Europe has played havoc with commodities prices — good news for certain investors, bad news for those with exposure to broader market negative volatility (e.g., most state and local pension funds). Even bond markets have produced negative returns overall. All this struck U.S. public retirement systems that are exposed to the volatility. The net result is that asset levels from 2021 to 2022 have had their sharpest decline since the financial crisis. That's a real problem for pension plans when liabilities continue to grow (as they do every year).

The silver lining in the data is that combined investment returns for FY 2021 and 2022 are still positive — losses this year didn't wipe out all of the gains from last year. There have been modest improvements in public retirement system funding from 2019 (72.8% funded ratio) to 2022 (77.9%).

The volatility and fragility of the past few years point to the clear reality: State and local retirement systems collectively are not going to invest their way out of their poor funded status. There must be other adjustments – which means either changes to contribution rates or benefit values, or both. Given the moral and legal limits on reducing benefit values, combined with the fact that many states have already taken steps to do what was legally permissible such as stripping away cost-of-living adjustments, the primary path forward for most pension funds with Fragile or Distressed funded ratios will require assumption changes and contribution increases.

Takeaways from the 2022 Report

- Preliminary 2022 investment returns are -10.4% on average for state and local plans. All plans will fail to achieve their assumed return (6.9% on average based on current policy). The net result is the largest single-year decline in assets since 2009.
- These poor returns have contributed to a decline in the projected funded status of state and local plans to 77.9% (Page 9). This is a loss of roughly half of last year's improvement.
- Negative trends from the past decade are persisting for member contributions rates (Page 14), government contributions (Page 15), and cash flows (Page 16).
- Strong investment returns in 2021 led to a decline in unfunded liabilities down to $933 billion (Page 10). We think pension debt will increase due to 2022 poor returns, back up to $1.4 trillion.
- Within the states, funded ratios and unfunded liability levels continue to vary considerably from state to state (Pages 17, 18, and 35). The vast majority have a Fragile or Distressed funded status (Page 36).
- Asset allocations continue to shift toward alternatives, including private equity, hedge funds, and real estate (Page 13). The share allocated to hedge fund managers and private equity strategies has grown to 14.9% (from 8% in 2008.)
- There are 84 state and local plans that assume investment returns below 7%, as of announcements through June 2022. This is up from 65 plans expecting 7% or less as of their 2020 valuations. Just 9.2% of state and local plans have assumed returns 7.5% or more (Page 25), while 14.9% of plans assume 6.5% of less now.
- Last year's incredible investment returns did include some future returns that were "pulled forward" and ultimately led to a market correction (Page 12). The average return for 2020 — 2022 is 5.6%, tracking the pessimistic capital market forecasts that suggest the average return over the next decade is likely to be around 6%.
- Public retirees may be more exposed to inflation than many assume, given the limited cost-of-living adjustment provisions that are available across the country (Page 29).

Major Contributing Factors to the Current Level of Unfunded Liabilities

1

Underperforming Investments

States have consistently overestimated their long-term investment returns. Even when performance has been positive, it has not always kept up with the assumed rate of return. This has led to a trend of states and cities taking on more investment risk by shifting pension assets to private equity, hedge funds, and other alternative strategies.

2

Lower Assumed Rates of Return

One positive response to underperforming investments has been state and local pension plans reducing their assumed rates of return, from 8% around the financial crisis to under 7% as of 2021. This is a good thing for the long-term sustainability of pension funds, but it means recognizing in the short term that previous valuation reports were understating the size of unfunded liabilities.

3

Interest on the Debt

States and cities have gotten better at paying their full actuarially required contributions. But those rates have often not been enough to keep up with growing interest on unfunded liabilities.

4

Too Many Separate Pension Fund Managers

Some states commingle the assets of various statewide pension funds to invest together, but many do not — Louisiana has at least 8 separately invested state funds. Across the country, state and local pension fund CIOs are looking for opportunities to buy equities at bargain prices or to invest in promising real estate. But statistically, these hundreds of CIOs and investment managers can't all find the same great deals. And in many cases the state pension funds might be competing against one another for investment opportunities and prices.

5

Negative Cash Flow + Low Funded Status

Maturing pension plans with negative cash flow mean each year there is less additional money being allocated to asset pools. This creates a problem for already poorly funded pension plans as there is less of an asset base than there should be upon which to earn investment returns.

Note: *Two commonly citied factors are not major contributors: mortality rates (this has been an issue, but not a large dollar effect) and failure to pay pension bills (after years of steady improvement, only a few large states are still paying less than their actuarial requirement). For more on this, see our preliminary analysis of historic actuarial gain/loss data.*

Comparing Equable's 2021 Forecast Against 2021 Actual Experience

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.

- We estimated (using preliminary returns as of September 2021 and projected asset class benchmarks to December 2021) that the FY 2021 average investment return for statewide retirement systems would be 20.5%.
  - The actual average return for FY 2021 reported by statewide plans is 25.3%.*

- We forecast as of June 30, 2021, an 80.9% market valued funded ratio among statewide plans ($1.08 trillion in unfunded liabilities).
  - The actual FY 2021 funded ratio among statewide plans that have reported actual data is 84.2%.
  - Once the final 34 plans (out of 228) that have yet to publish 2021 valuation reports or GASB data release final actuals, we forecast the FY 2021 funded ratio will be 84.8% with $933 billion in unfunded liabilities.*

- We warned in our 2021 report that "the double-digit returns this year have 'pulled forward' investment returns from future years, reflecting an overvaluing of certain public companies."
  - The actual experience of public equities for the year July 1, 2021 to June 30, 2022 was down 11.5% for the S&P 500, down 24.1% for the NASDAQ, and down 11.1% for the Dow Jones Industrial Average. Given the large exposure to public equities (47.6% of portfolios on average) this has translated into financial losses that effectively have wiped out a large portion of last year's returns.

** There are still a handful of retirement systems that have yet to release actual figures for the fiscal year ending 2021. As of this publication, actual FY 2021 figures have been reported for approximately 85% of total pension liabilities in our data set. The "actual average return" figure above only includes these plans with reported data. The estimated funded status data points above include our 2021 estimates for plans that have not yet released actual data for 2021.*

Looking to the future: We anticipate contribution rate increases continuing to grow as states, cities, counties, and school districts try to grapple with their unfunded liabilities. One of the drivers will be a continued decline in the average assumed rate of return — a policy move that will be positive for state and local pension plans in the long run, but budgetarily painful in the short run. Demographic turnover will continue to put pressure on cash flows, which could lead to added budgetary challenges too.

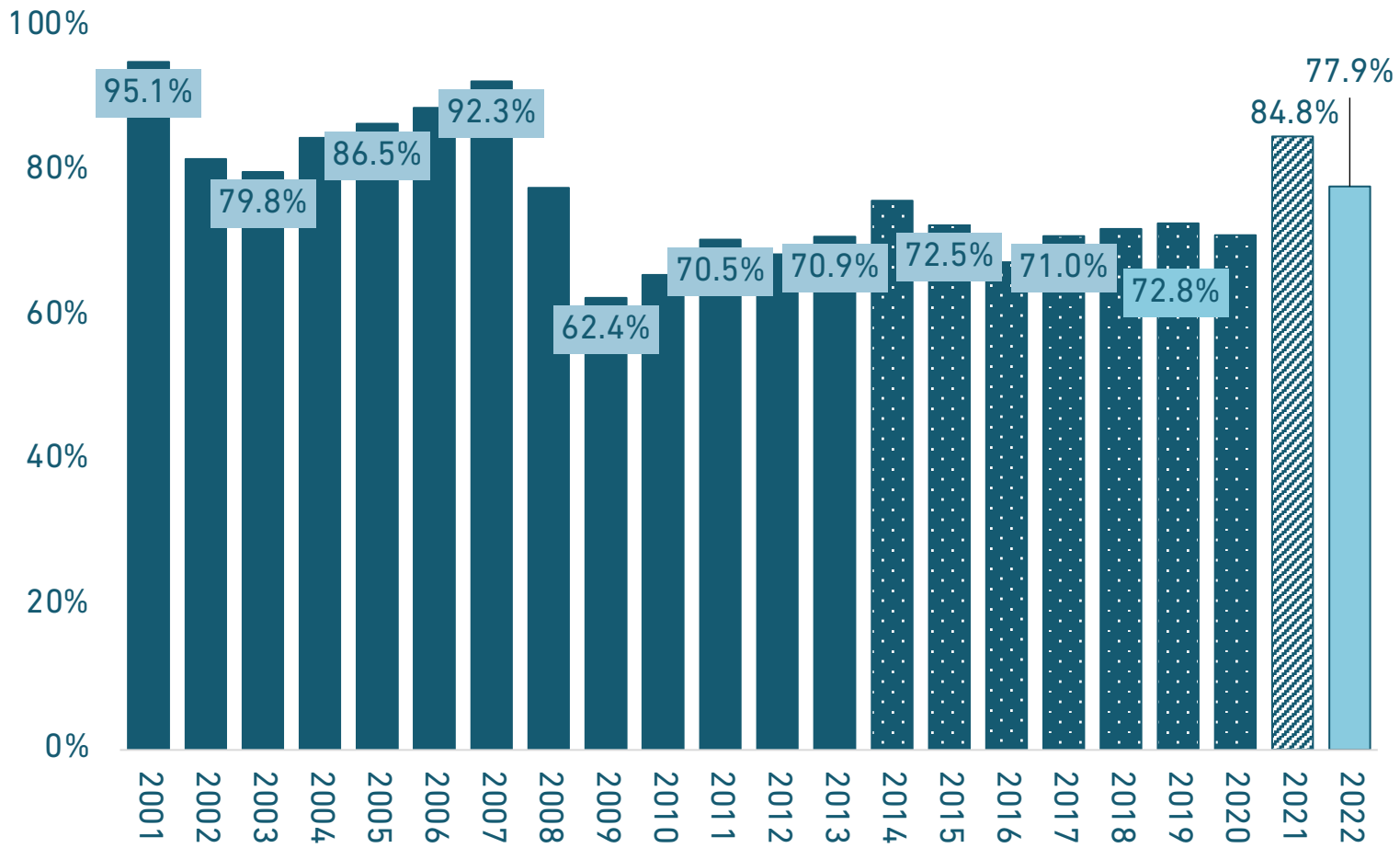
Two factors that remain unclear at this time: (1) whether public pension fund investment managers will continue to push into alternative investment categories like private equity, or if the lower assumed return rates will lead to a reassessment of how assets are distributed; and (2) whether the numerous supplemental payments made by states into their pension funds over the past year will have a meaningful influence on the trajectory of plan funded status.

National Trends for State & Local Pension Plans

FUNDED RATIO AVERAGE

FOR STATE & LOCAL PENSION PLANS | 2001–2021 + 2022

Estimate



The aggregate funded ratio for statewide and municipal plans collectively has lost about half of its gains since 2021.

This is the largest single-year decline in funded ratio since the Great Recession. The change over the past three years is also the sharpest period of volatility since the financial crisis.

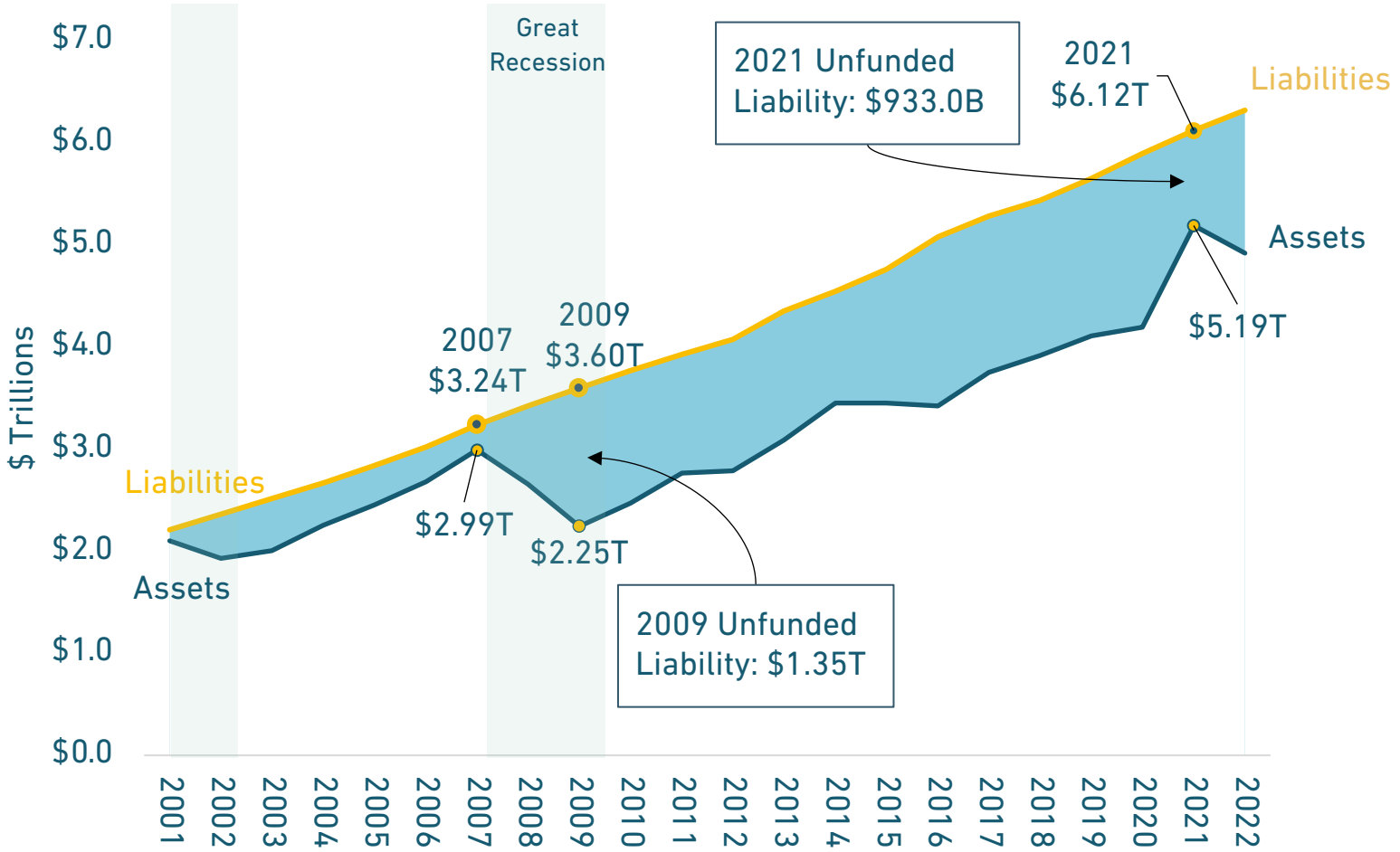
To view funded ratios by state, click here.

- Based on Accrued Liabilities
- Based on Total Pension Liabilities
- Based on 2021 Data Availability
- 2022 Estimate Based on June 30 Returns

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Data for 2001 to 2013 reflect the "actuarially accrued liabilities" reported by public plans. Data from 2014 onward use the new GASB 67 "total pension liability" measurement. See methodology section for details on 2022 estimate.

TOTAL UNFUNDED LIABILITIES

FOR STATE & LOCAL PENSION PLANS | 2001–2021 + 2022 Estimate



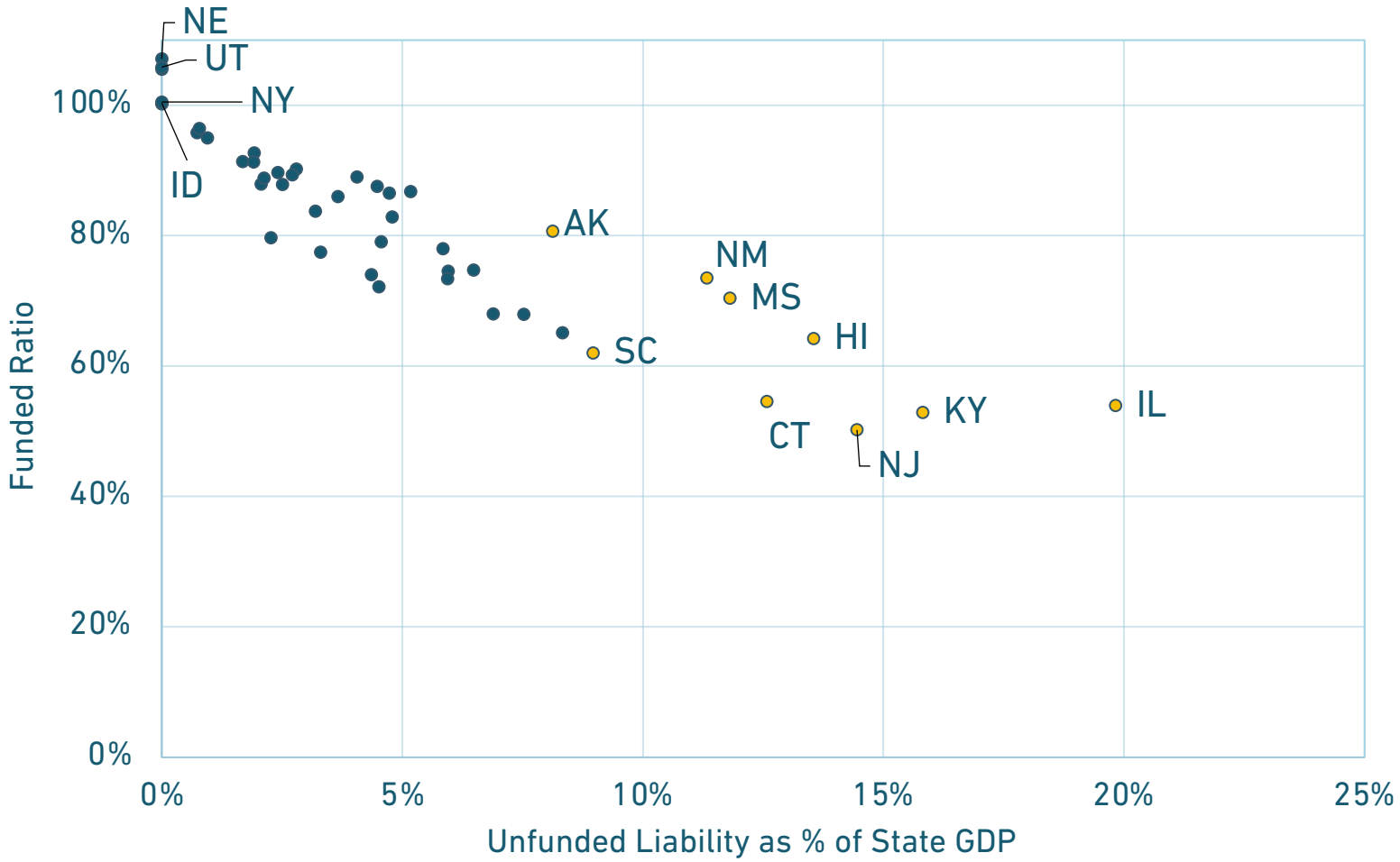
The pension asset shortfall for statewide plans declined in 2021 to the lowest amount since the financial crisis but then grew in 2022 to again eclipse $1 trillion in total unfunded liabilities.

Total unfunded liabilities for state and municipal plans exploded from $248.8 billion in 2007 to *$1.35 trillion* at the end of 2009. The funding shortfall increased to a peak of $*1.70 trillion* in 2020 before dropping back to $933.0 billion in 2021.

We estimate that unfunded liabilities will increase again up to *$1.40 trillion* in 2022 due to market underperformance.

Source: Equable Institute analysis of public plan valuation reports and ACFRs. 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 2022 estimate.

2021 FUNDED STATUS AS A SHARE OF STATE ECONOMIC OUTPUT



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.

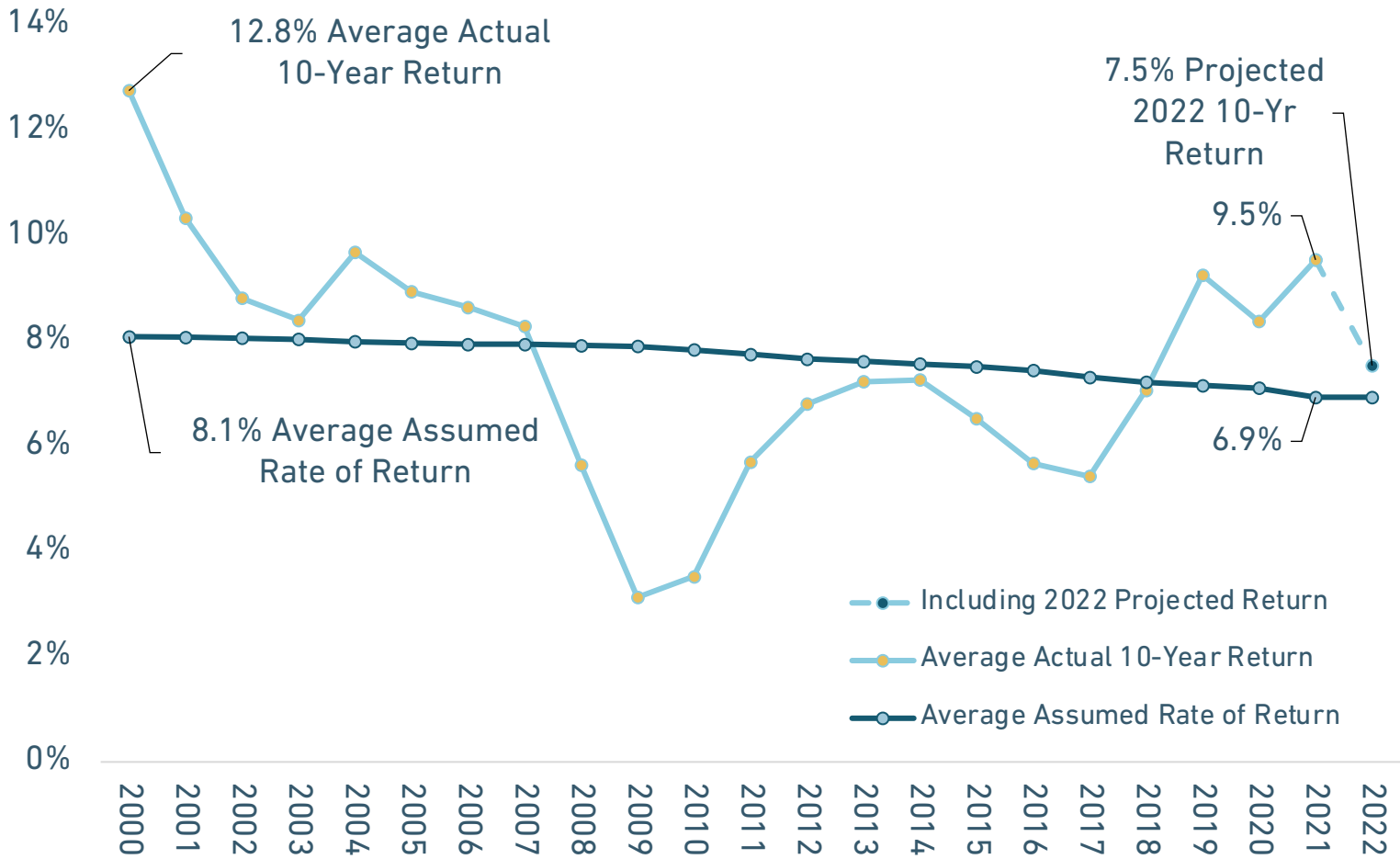
The major driver of changes in this analysis since 2021 are large asset gains, plus adjustments to the GASB-measured liabilities in states that were facing insolvency forecasts (e.g., NM and NJ).

Find your state with our interactive version

Source: Equable Institute analysis of public plan valuation reports and ACFRs; Bureau of Economic Analysis data for state GDP estimate in 2021. Unfunded liability and funded ratio data include statewide retirement plans and municipally-managed retirement plans. Funded ratios reflect a weighted average of assets and liabilities for plans within each state.

INVESTMENT RETURN AVERAGES

COMPARED TO ASSUMED RATES OF RETURN | 2001–2022



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

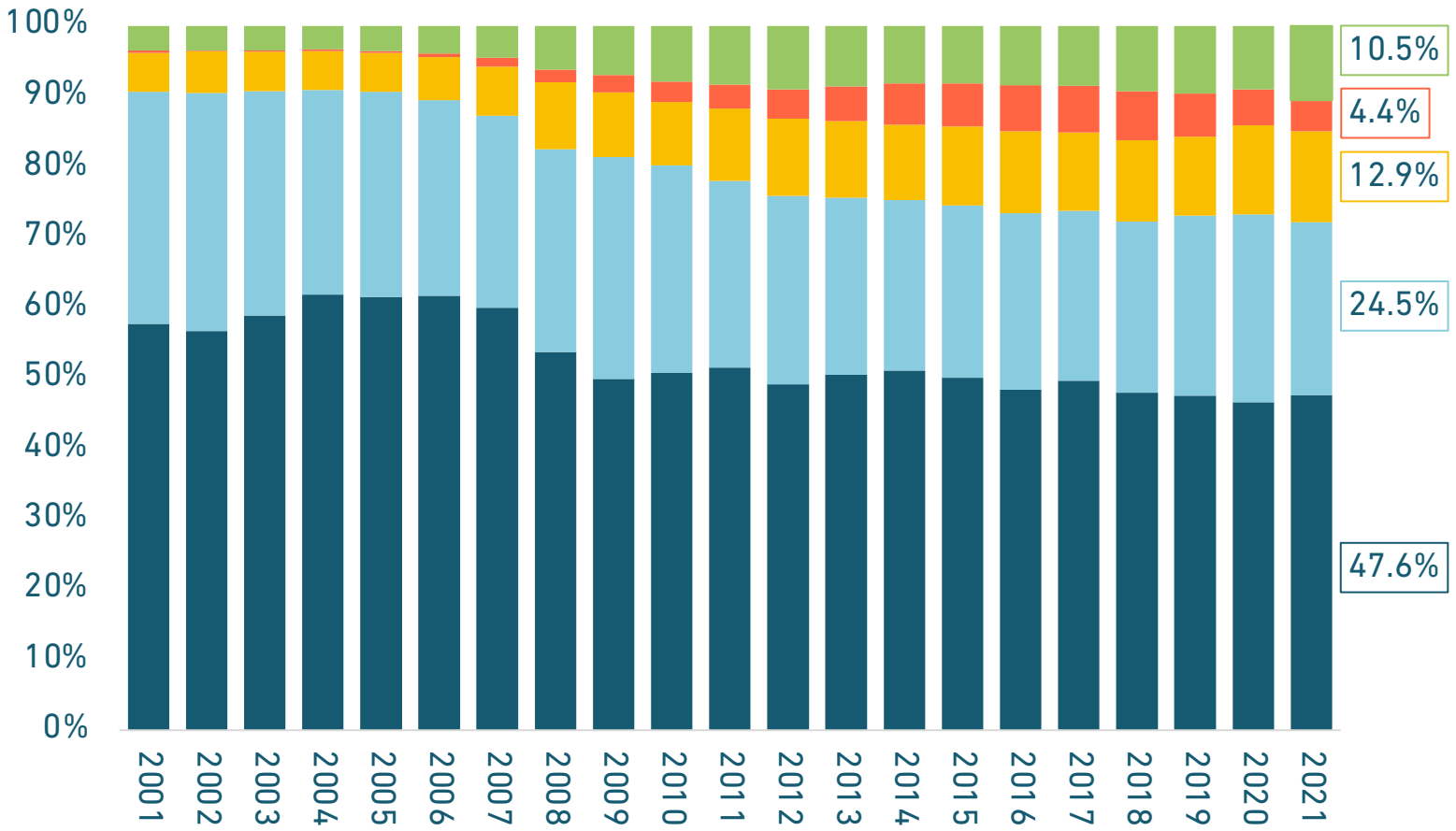
Fortunately, since 2019 the 10-year average return has remained above assumed returns, and this has helped stabilize funded levels.

We estimate 2022 returns will average -10.4% (for plans through June), which would be the first time since 2009 that state and local plans will post a negative average. Combining 2021 and 2022, the average 10-year return is 7.5%, which is fortunately still above the average assumed return (6.9%).

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Average 10-year return for 2021 is based on Equable's projected investment returns as of June 30, 2021.

ASSET ALLOCATION TREND

OF STATE & LOCAL PENSION FUNDS | 2001–2021



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

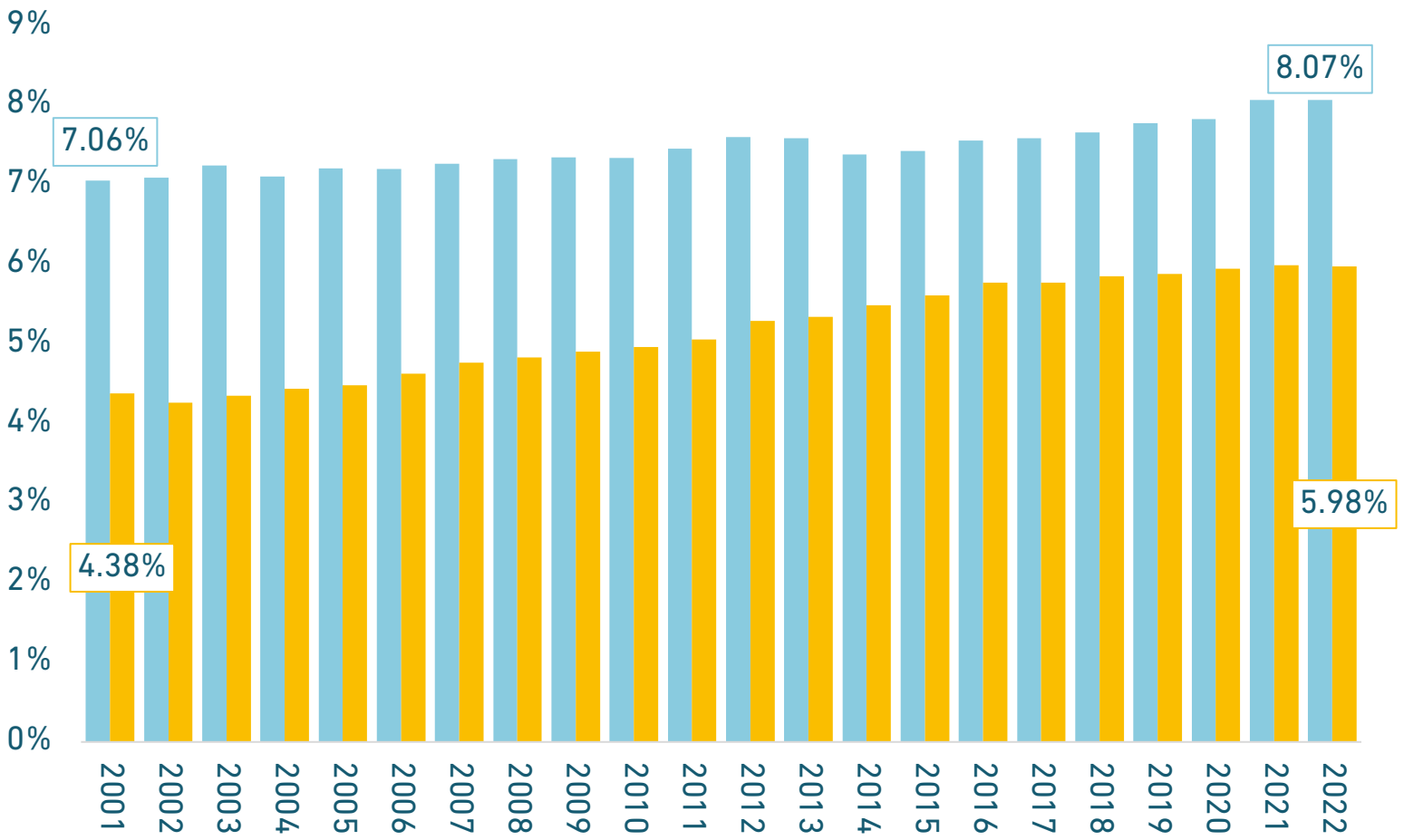
Notably, private equity investments are now more than 10% of portfolios — or, at least, they were at the end of 2021 before valuations crashed over the last six months.

- Private Equity Investments
- Hedge Fund Management
- Real Estate & Miscellaneous Alternatives
- Fixed Income & Cash Holdings
- Public Equities (U.S. & Global)

Source: Equable Institute analysis of public plan valuation reports and ACFRs.
Note: "Alternative" investments include private equity, hedge funds, real estate, commodities, and tactical asset allocations.

AVERAGE MEMBER CONTRIBUTIONS

BASED ON SOCIAL SECURITY PARTICIPATION | 2001–2022



State and local employee contributions to their own retirement plans have been steadily increasing.

Public sector workers who are also enrolled in Social Security paid *160 basis points more* (*a 36.5% increase*) during the 2022 fiscal year than they did during the 2001 fiscal year and *23.7% more* than they did in 2008 before the financial crisis.

Those who do not participate in Social Security paid *14.3% more this year* than in 2001 and *10.1% more* than 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.

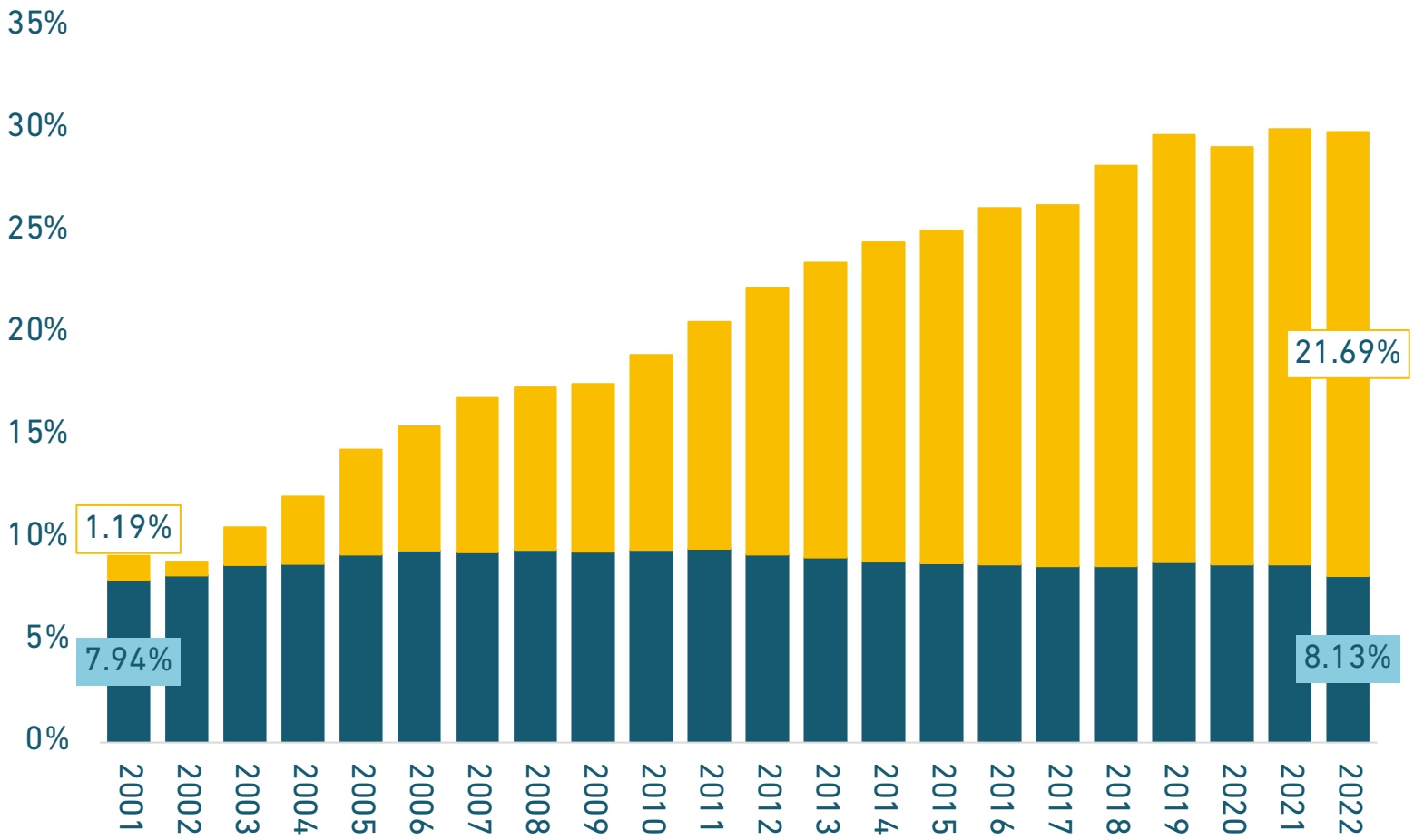
For Plans Not Participating in Social Security or with Mixed Levels of Participation

For Plans Participating in Social Security

Source: Equable Institute analysis of public plan valuation reports and ACFRs. 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 | 2001–2022



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

Combined state and local employer contributions in 2001 were *9.13%* of payroll. During the fiscal year ending 2022, employer contributions are *29.8%* of payroll.

Unfunded Liability Amortization Payments

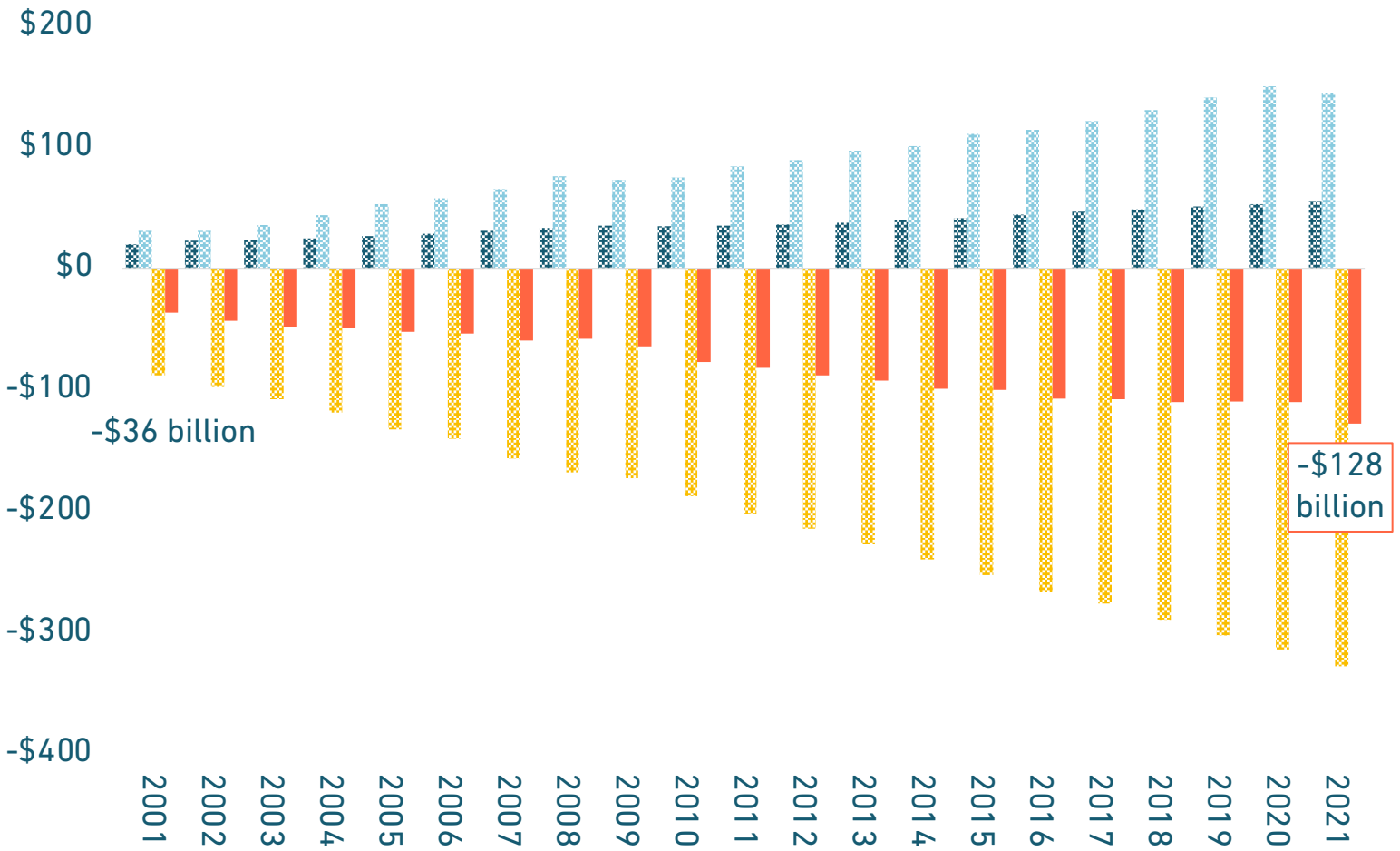
Normal Cost

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 ACFRs. 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 STATE & LOCAL PENSION PLANS | 2001–2021



See our interactive version for all values

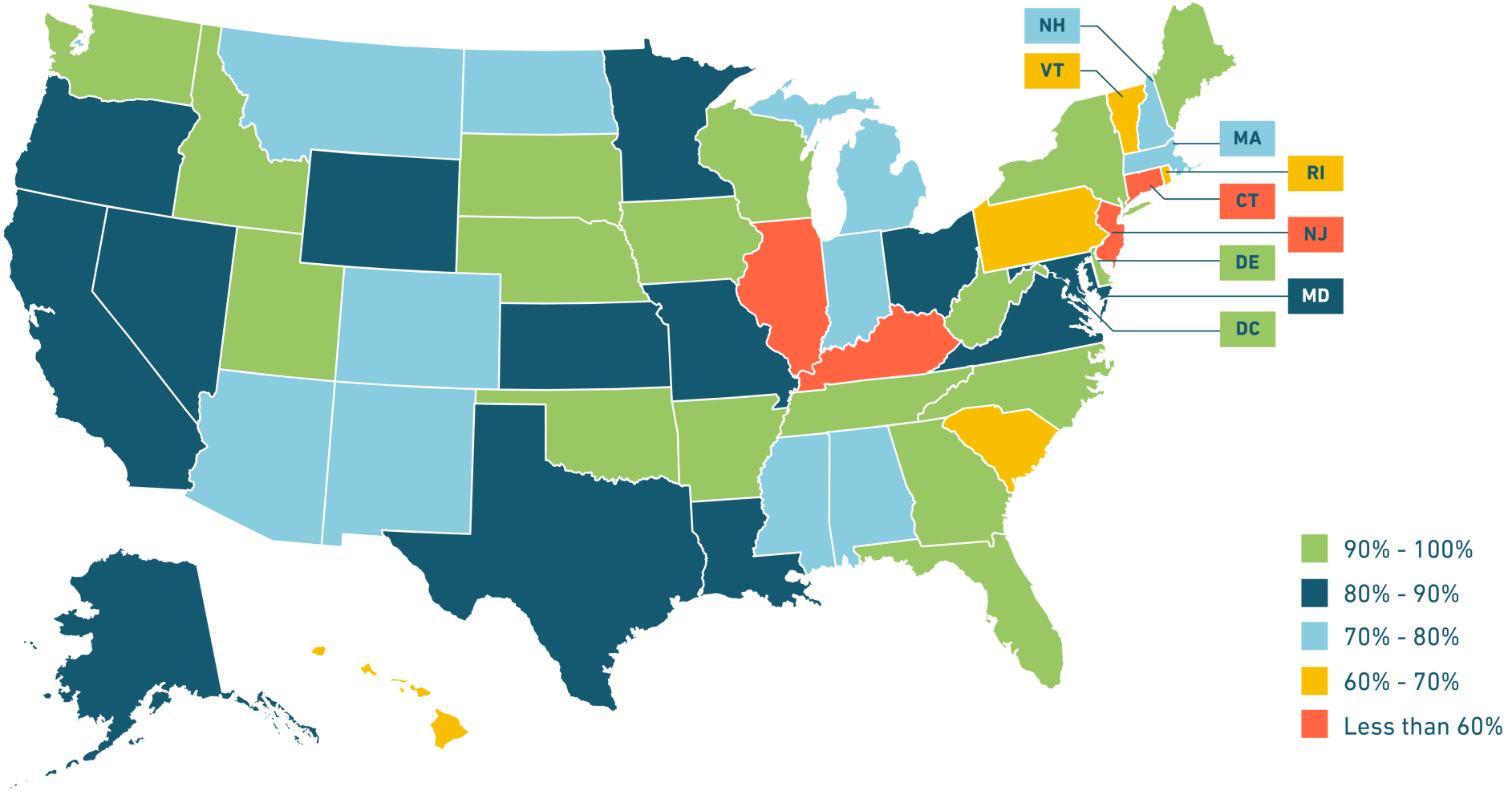
Negative net cash flows from contributions and benefit payments have steadily increased over the past two decades, reflecting more "mature" pension plans.

- Net Cash Flow
- Benefit Payments
- Employer Contributions
- Member Contributions

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

2021 FUNDED RATIOS, STATE AGGREGATES

BASED ON MARKET VALUED ASSETS REPORTED BY STATE & LOCAL PLANS



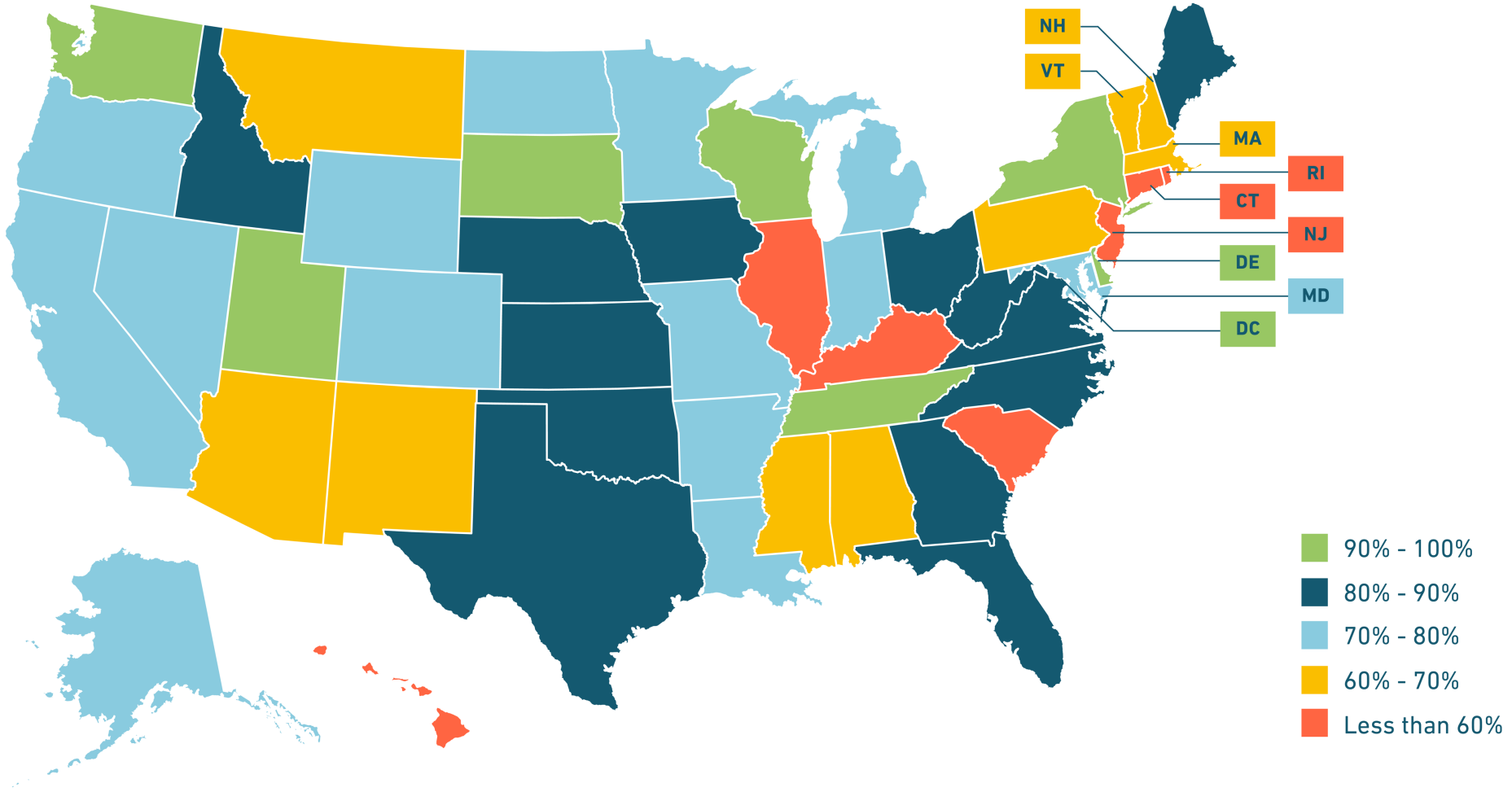
The state-by-state weighted average funded ratios as of the fiscal year ending 2021 looked as strong as they've been in more than a decade.

Among all statewide plans, 153 out of 167 have reported their final 2021 figures. Among local plans, 42 out of 61 have reported their 2021 data.

Source: Equable Institute analysis of public plan valuation reports and ACFRs. The funded ratio for each state is the weighted average of all pension plans in that state.

2022 ESTIMATED FUNDED RATIOS, STATE AGGREGATE

BASED ON ESTIMATED ASSETS FOR STATE & LOCAL PENSION PLANS



There is likely going to be a considerable decline in funded status among most state and local pension funds, leading to a decline in aggregate state funded ratio averages.

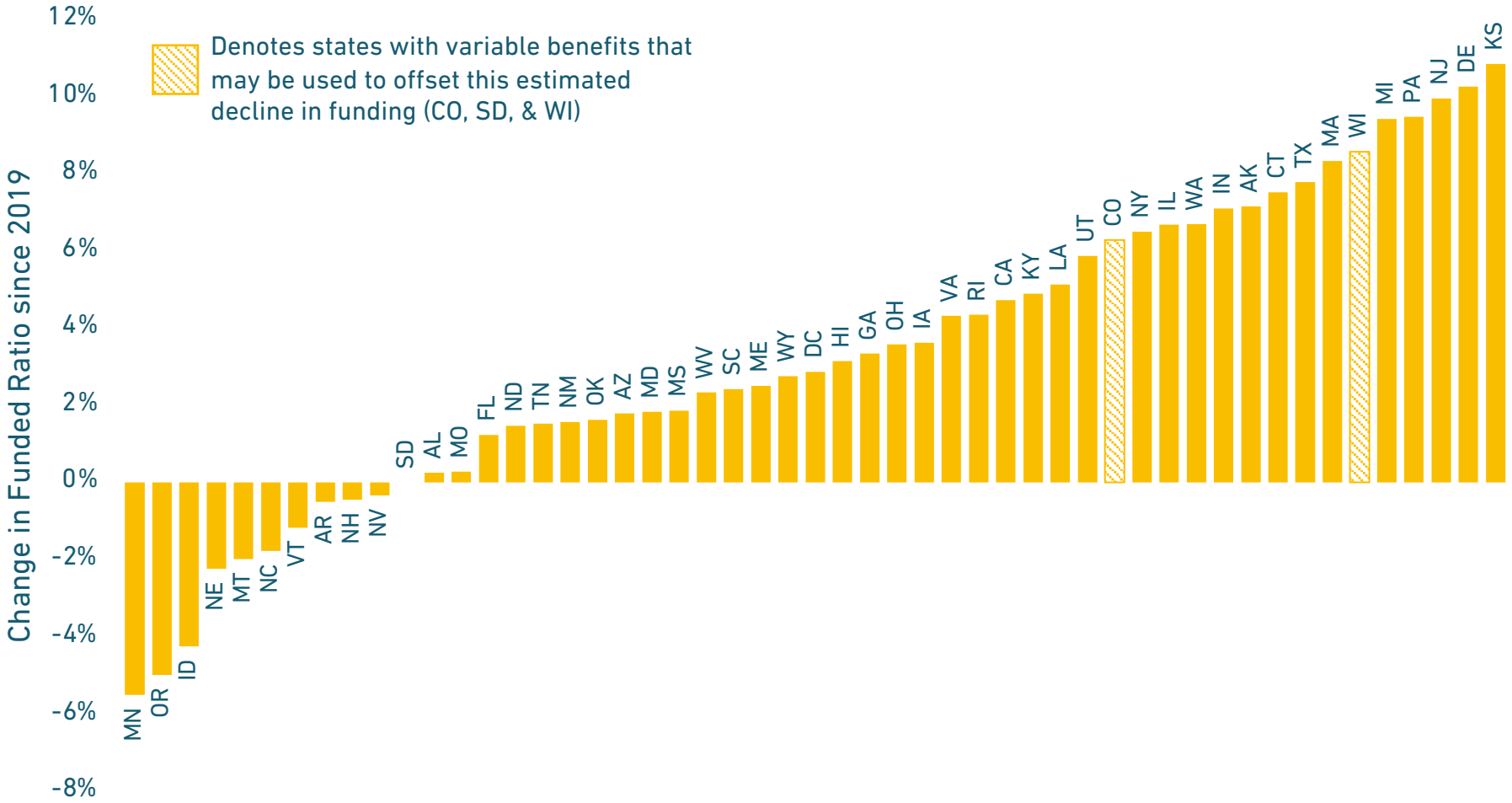
Of the 95 plans with a funded ratio above 90% in 2021 reported data, we estimate 34 will decline into the 80%s or 70%s.

We also estimate there will be 6 plans that fall from Fragile into Distressed funded status based on 2022 returns.

Source: Equable Institute forecast based on investment returns as of June 30, 2022 and reported asset allocation levels for each plan. For plans with fiscal year end dates after June 2022 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 2019–2022

ALL STATEWIDE & LOCAL PLANS COMBINED WITHIN EACH STATE



Financial market volatility has meant most plans' funded ratios declined between 2019 and 2020, then increased in 2021, and now are balancing out with weak 2022 investment performance.

There will be varied levels of funded ratio change from 2019 (pre-pandemic) to 2022 once final plan numbers are available.

However, it's likely that in 2022 the funded ratio for most states will be in a better condition than at the end of 2019.

Note: South Dakota was 100% funded in 2019 and we estimate it will remain 100% funded in 2022, no change.

Source: Equable Institute forecast based on investment returns as of June 30, 2022, and reported asset allocation levels for each plan. For plans with fiscal year end dates after June 2022 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.

Analysis: What We See in the National Trends

Unfunded liabilities declined significantly in 2021 due to a single year of exceptional investment returns; however, they have increased again this year as financial markets correct (Page 10). We estimate the 2022 funded ratio for state and local pension plans will decline from 84.8% to 77.9% based on anticipated changes to liabilities (Page 9). It is possible that the national funded ratio might turn out stronger once all state supplemental payments made over the past year have been accounted (Page 64). But overall, this means U.S. pension plans have still not recovered from 2008.

- Average investment returns for state and local pension plans over the past two decades have been mixed. There have been strong and weak years that have balanced one another out. For example, between 2020 and 2022, we estimate the average return is 5.62%, compared to the 7.2% investment assumption that plans were using before that period (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.

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: The Illusion of Promise

A TREND ANALYSIS THEME THIS YEAR: THE ILLUSION OF PROMISE ACROSS MULTIPLE ASPECTS OF PENSION MANAGEMENT

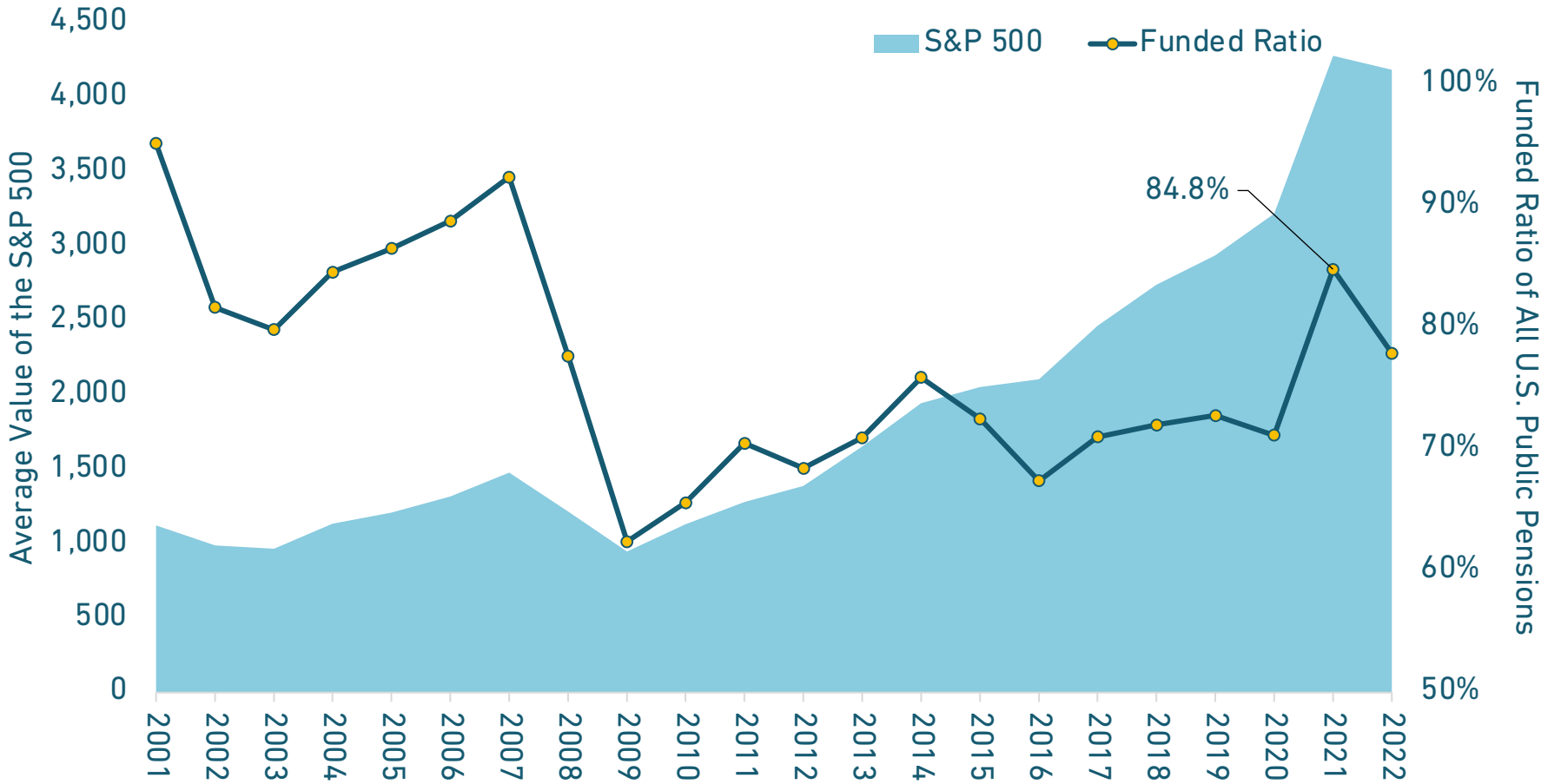
- A long-standing promise of pensions is that they provide secure retirement income — but income isn't secure if it is not adjusting for inflation and maintaining the purchasing power of the promised money. While a few state and local pension plans without cost-of-living adjustments have had to live through ***a lack of inflation protection*** for decades, most of the plans that do offer COLAs are now also struggling to keep pace with price inflation across the country.

- The implicit promise of investment returns above 7% has been shown by actual market performance to be an illusion, and increasingly, public retirement systems are embracing the reality that they need ***lower assumed rates of return***.

- Pension fund investment managers and trustees have promised to allocate assets responsibly, but the Russian war in Ukraine called into question choices made by numerous state and local pension plans who made direct investments in companies that helped finance the invasion. While the total exposure in American pension funds to Russian markets was under 1% of portfolios, there are reasonable questions about ***why there was any exposure to Russian markets*** which has carried the threat of sanctions since 2014 following the annexation of Crimea.

- There has been ***an increased "divestment" push*** by politicians and activists — and even some pension fund managers — with respect to a range of political and social issues, such as climate, oil and gas, guns, China, and Israel/Palestine. To the degree that these divestment topics are gaining traction, it is threatening to break the promise of trustees to manage funds in a fiduciarily responsible manner, and not based on politics or social pressure.

NATIONAL FUNDED RATIO RELATIVE TO POST-GREAT RECESSION FINANCIAL LANDSCAPE



The strong investment performance from 2021 has not saved state and local pension funds.

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

That fragility has been exposed with the financial market declines in 2022.

Source: Equable Institute analysis of public plan valuation reports and ACFRs; Yahoo Finance. S&P return data for 2022 as of the closing value on June 30.

PENSION FUND EXPOSURE TO INVESTMENTS IN RUSSIAN FINANCIAL MARKETS

1. Prior to Russia's invasion of Ukraine in March 2022, state and local pension funds held assets, securities, real property, and other financial interests in Russian markets worth an ***estimated $5.7 billion***. About $3.9 billion of these assets were in states that are aiming to divest. Most state retirement systems reported that their direct exposure to Russian markets constituted less than 1% of portfolio values as of spring 2022.

2. At least ***$80 million*** of this money from six retirement systems as invested in Sberbank, a majority state-owned financial institution in Russia that has come under sanctions in the U.S. and other foreign countries. These were: CalSTRS, Colorado PERA, Florida RS, Kentucky TRS, New Hampshire RS, and Oregon PERS.

3. Efforts to divest from Russian assets were formally adopted in 23 states, including:

24 retirement system boards or state investment boards that voluntarily voted to divest.

3 state treasurers or comptrollers who ordered divestment as sole fiduciaries.

6 state legislatures that adopted legislation directing divestment by all state pension funds.

See Appendix 2 for a complete list.

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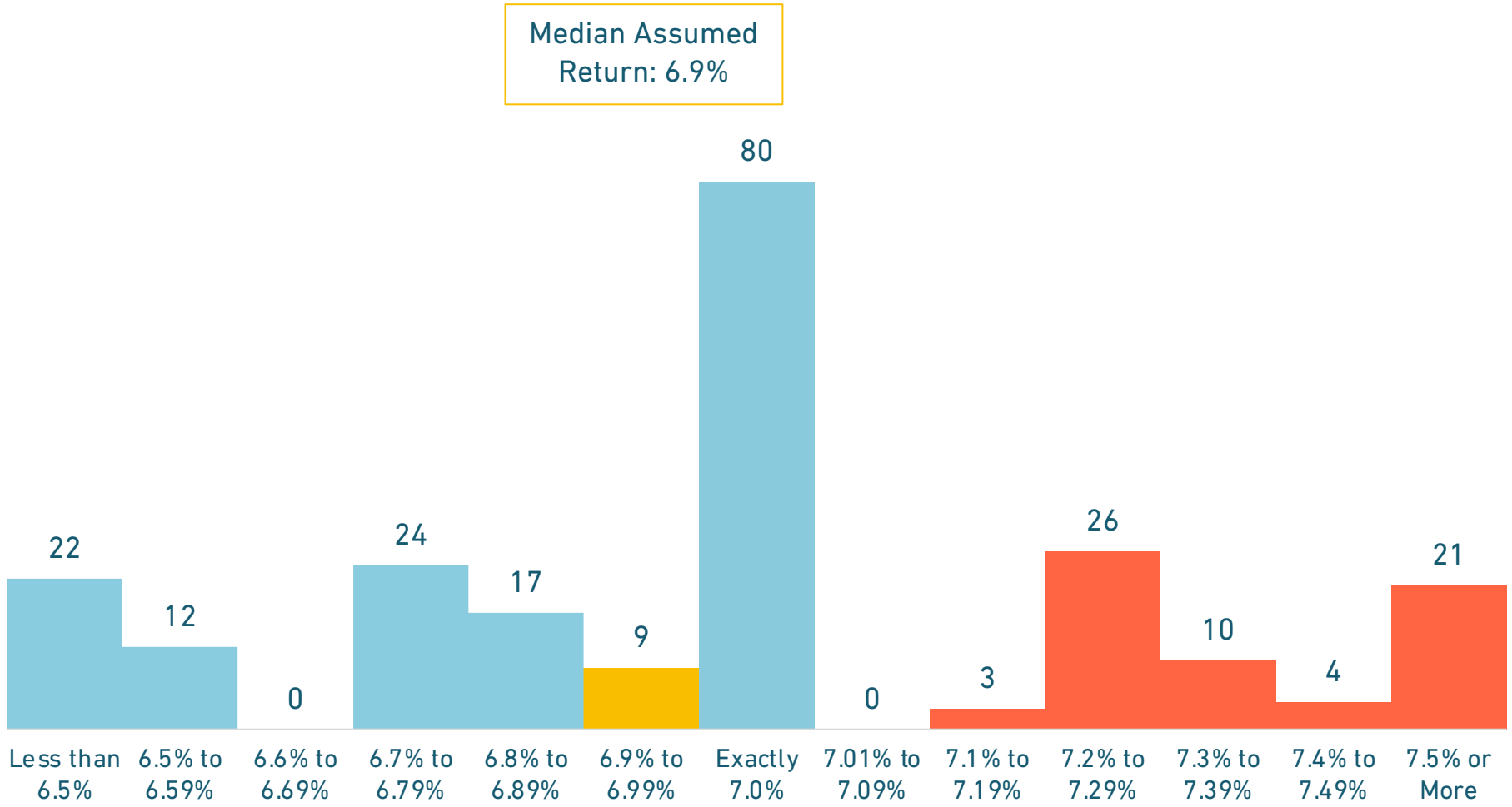
Note: The states listed are those that have acted as of May 11, 2022. As of this writing there were several divestment bills under review by state legislature and recommendations from governors that state and local pension funds consider voluntary divestment.

DISTRIBUTION OF ASSUMED RATES OF RETURN

BY PLAN, AS OF JUNE 2022



There are 64 plans with assumed rates of return above the current 6.9% median, including 21 plans with a 7.5% return assumption or higher.

There are 80 plans with a 7% assumed return, a category that included CalPERS until July 2021 (when they announced a shift to 6.8%).

Among the 84 plans that are ahead of their peers in adopting more conservative return assumptions, just 34 have assumed returns 6.5% or less.

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Assumed rates of return for 2022 were cross-checked against published board materials, news reports, and other secondary sources to corroborate any changes in plan assumptions from 2021 to 2022.

STATES BUYING DOWN THEIR ASSUMED RATE OF RETURN WITH SUPPLEMENTAL FUNDS

- A widespread trend around the country during the past year was to use supplemental funds, rainy-day funds, and budget surpluses to make one-time contributions into state pension funds:
  - Federal stimulus dollars paid to states as a response to the pandemic were often more than strictly necessary to manage state budgets. While the American Rescue Plan (ARP) explicitly restricted its distributions from going into state pension funds, states were able to find multiple ways to work around the limitation, such as using general fund dollars that would have otherwise gone toward expenses that ARP money was used for.
  - States also underestimated their tax revenues during the peak of the pandemic in 2020, leading to budget surpluses that could be deployed in a range of ways including supplemental pension fund payments.
  - Rainy-day funds that were built up during the years after the financial crisis in some states reached their legal maximum rates, leading to distributions that allowed for supplemental payments into state pension funds.

- One approach that state retirement systems have taken with their surge in assets (whether received via supplemental payments or due to strong investment returns in 2021) has been to effectively "buy down" their assumed returns:
  - Lowering assumed rates of return typically leads to an increase in unfunded liabilities (because it means recognizing larger valued accrued liabilities) and that means higher contribution rates.
  - However, instead of lowering contribution rates using the larger assets available, some state pension funds have increased their assumed returns by amounts that do mean increased accrued liabilities but don't mean increased unfunded liabilities.

Special Section: State of Inflation Protection

- Current Distribution of COLA Coverage
- Types of COLA Benefits Currently Offered

COLA PROVISIONS ARE INCONSISTENT ACROSS THE STATES

There are no consistent practices for providing inflation protection to public employee retiree benefits. Even within states, there are often varying sets of rules and provisions for how cost-of-living adjustments (or other forms of post-retirement benefit adjustments) are handled. However, while there is lots of variation a few trends are present among public state and local retirement systems:

Basic Policy Rules: There are typically two kinds of COLA policies: "Automatic" (post-retirement benefit adjustments that are automatically triggered based on preset conditions like funded status, inflation levels, fixed payment rates); and "Ad Hoc" (post-retirement benefits adjustments that are made on an ad hoc basis by a state legislature or pension board and may require some preset conditions such as funded status).

Payout Rules: When retiree benefits are adjusted, there are two basic approaches: "Compounding" (an increase to the base pension amount, upon which any future adjustments are also made); or "Non-Compounding" (a payout that provides additional retirement income but does not change the base benefit).

Amount: The amount of inflation protection provided is typically defined in two ways: "Fixed-Rate" (a pre-fixed specific percentage of benefit increase and/or minimum dollar amount); or "Up To" (a set of rules on what the COLA is linked to, like the Consumer Price Index or Social Security inflation rates, and a maximum percentage, like up to 2%).

THE SCOPE OF INFLATION PROECTION FOR STATE & LOCAL PUBLIC RETIREES

DISTRIBUTION OF COLA RULES AS OF 2022

Type of COLA Provisions	# of Plans or Tiers of Benefits	Average COLA Provided Based on 2021 Inflation*
No COLA Rules or COLA Currently Suspended	98	N/A
Ad Hoc COLAs Only	70	0.0%
Automatic COLA: Fixed Amount	46	1.84%
Automatic COLA: Linked to Plan Performance (e.g., Funded Status or Investment Returns)	14	1.89%
Automatic COLA: Linked to Inflation (e.g., National CPI, Local CPI, or Social Security Rates)	118	2.16%
Automatic COLA: Linked to Inflation & Performance	26	1.99%
*Total/Overall Average***	*372*	*1.58%*

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

State and local pension plans and hybrid plans currently provide a wide range of cost-of-living adjustment (COLA) rates and rules.

Most plans have linked COLA rates to inflation, but roughly 168 of state and local pension plans do not have automatic COLAs.

Comment: These data reflect both pension "plans" and "tiers of benefits." Some plans have multiple subsets of benefits typically based on hire date and/or profession. A common difference among tiers of benefits within the same plan are different COLA provisions. Consequently, the analysis here covers 372 tiers across the 228 total plans in our data set.

Note: * Data used are estimated COLAs based on rules and provisions outlined by each plan and may not reflect legislative or board decisions to modify COLAs separate from those rules/provisions. ** Not included in the table is the Maryland Judges plan that links COLAs to member salaries.

TREND TO WATCH: ARE COLAs KEEPING UP WITH INFLATION?

A large share of public retirees in about a dozen states currently have little or no hope that their benefits will keep up with inflation:

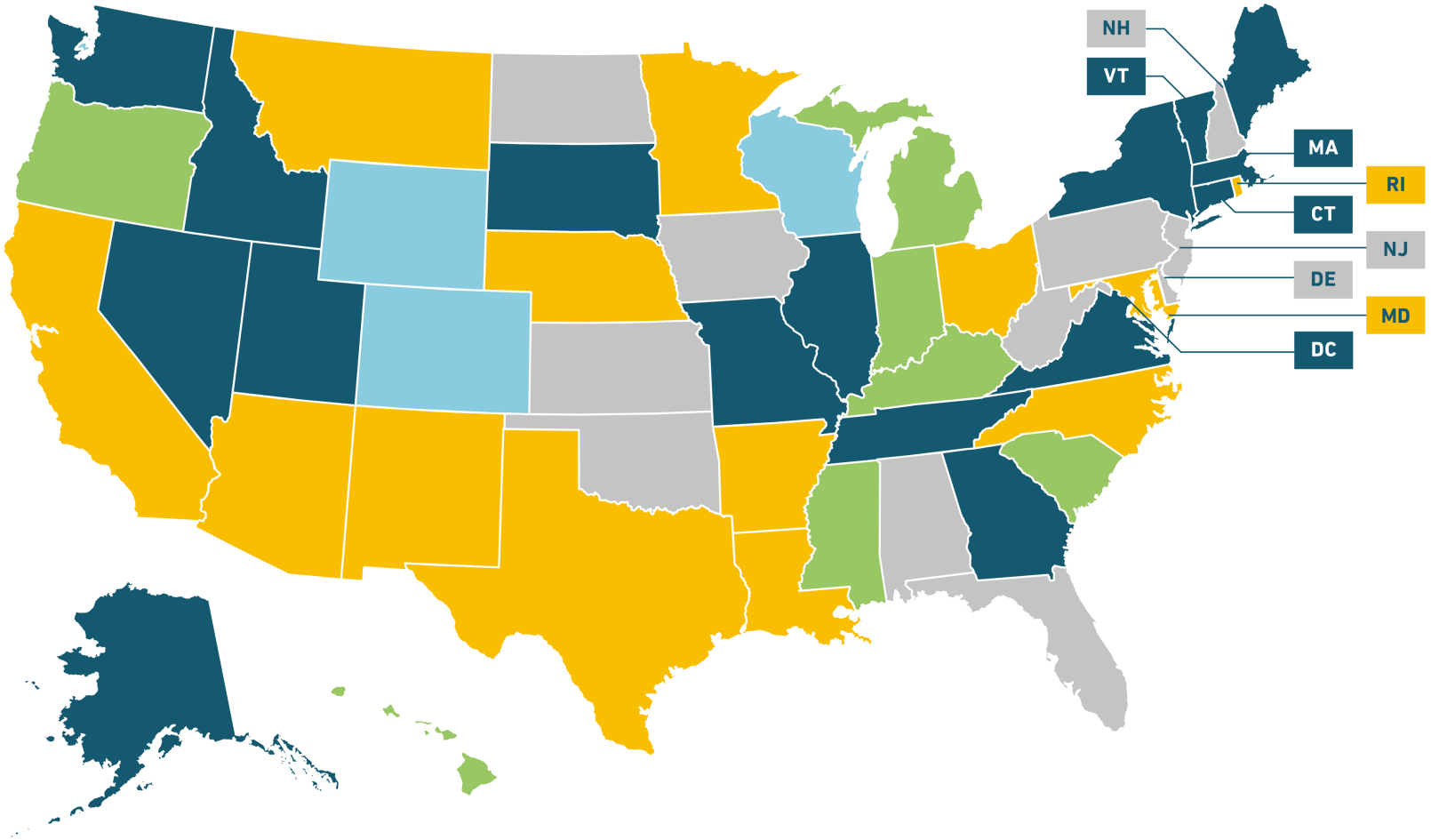
- There are eight states that have no COLA provisions for public retirees (AL, IA, KS, ME, MI, RI) or that are currently suspending COLAs until a future date (NJ, OK). Members of defined contribution plans typically also have no COLA provisions.
- In another two states (AZ, FL), the largest statewide retirement system has no COLA rules even though some smaller, municipal pension funds do. In one state (OH), the teachers' pension plan currently has a frozen COLA, while other plans for school employees, state workers, and public safety are offering COLAs.

Among the states that do have COLA rules, only a select group of public retirees have a reasonable hope that their pension benefits will keep up with inflation: those with automatic fixed-rate COLAs or automatic COLAs linked to inflation.

There are generally three policy frameworks for those who do have automatically granted COLAs:

- *Fixed-Rate COLAs:* A pre-fixed specific percentage of benefit increase (or minimum dollar amount).
- *COLAs Linked to Inflation:* A percentage increase to benefits based on the national consumer price index (CPI), a local CPI, or the Social Security inflation rate. The actual amount is typically "up to" a maximum rate, such as 2% or 3%.
- *COLAs Linked to Plan Performance:* A percentage increase to benefits that is dependent on the funded ratio and/or investment performance of the underlying pension plan. The actual amount is also typically "up to" a maximum rate, but that maximum rate is determined by the specific provisions around plan performance. For example, the maximum COLA rate may be cut in half or suspended if the pension fund is under 80%.

AUTOMATIC COLA POLICIES, BY STATE



All Plans That Do Have COLA Rules Are Linked to Inflation

All Plans That Do Have COLA Rules Are Linked to Plan Performance

All Plans That Do Have COLA Rules Have Automatic Fixed-Rate COLAs

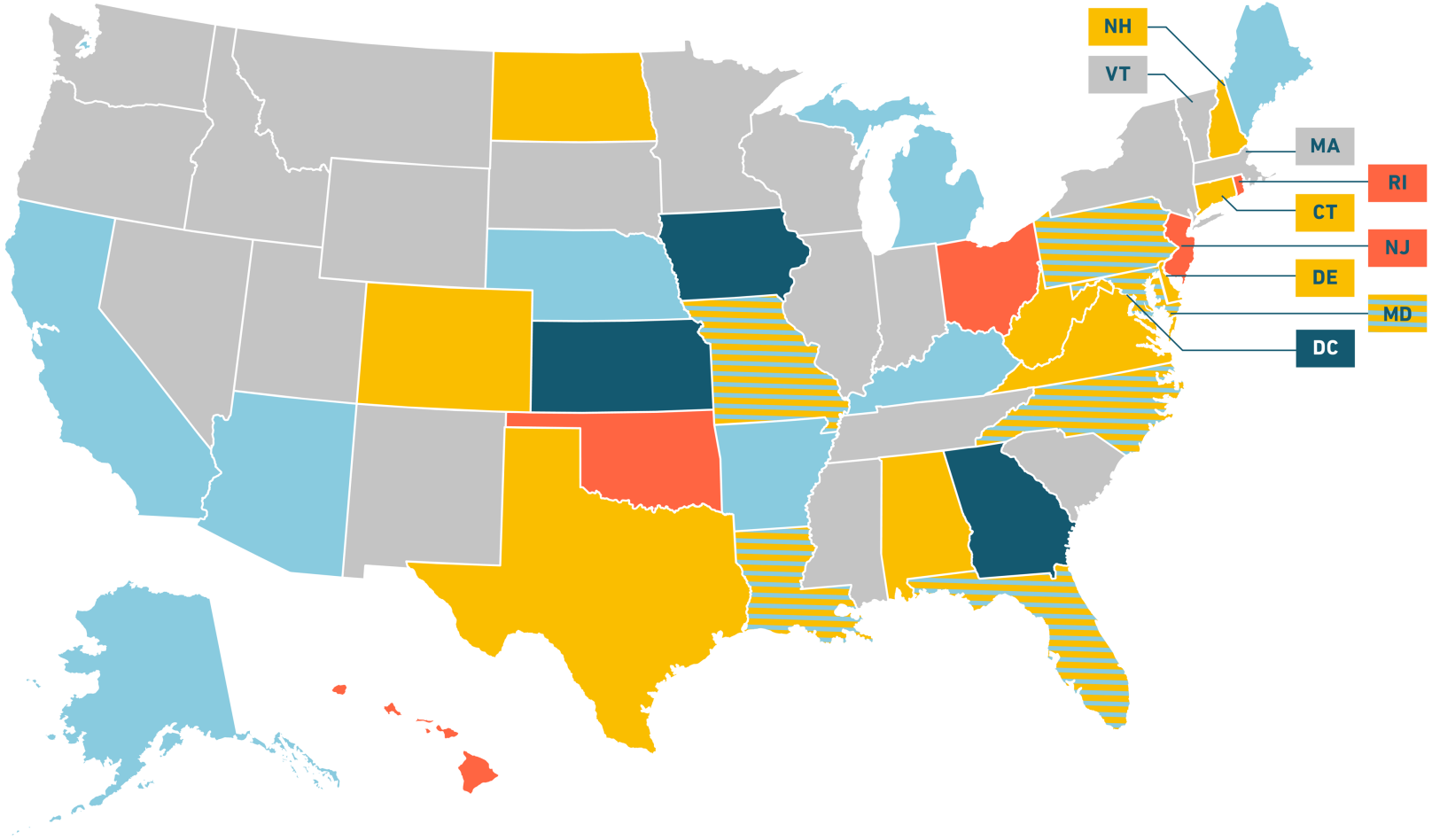
State Plans with COLAs Have a Mix of Rules Linked to Inflation, Plan Performance, and/or Fixed

For Statewide Plans:
No COLA Provisions or Ad Hoc COLA Only

See this interactive table for a list of plans in each category.

Note: Plans linked to inflation have provisions that define inflation based on national CPI, local CPI, and/or Social Security's inflation rate. Plans linked to performance have provisions that restrict COLAs based on funded ratios and/or pay COLAs out of funds using investment returns above the assumed rate of return.

LIMITS ON INFLATION PROTECTION, BY STATE



- No COLA Provisions for State or Local Plans
- At Least One Plan/Tier Without a COLA Provision and at Least One Other Plan With COLAs
- At Least One State or Local Plan with Ad Hoc COLA
- Mix of Plans with and Without Ad Hoc COLA
- At Least One State or Local Plan with Suspended COLA Rules
- All Plans Have Automatic COLA (see Pg. 31 map): Fixed, Inflation Linked, or Performance Linked

See this interactive table for a list of plans in each category.

Note: Plan provisions analyzed for this map include all the state and municipally-managed retirement systems with liabilities of $1 billion or more.

STATES WITH SUSPENDED COLAS FOR PUBLIC RETIREES

New Jersey

- The state legislature suspended COLA payments for all plans in 2011 as part of an effort to keep liabilities contained and avoid contribution rates increasing larger than they are already required to be.
- COLAs can be restored once the plan reaches 80% funded.

Oklahoma

- The state legislature adopted a law in 2011 freezing all future COLAs (applicable to all statewide retirement systems) unless a future state legislature agreed to fully fund the cost of the COLA in the year issued.
- In 2020, the state legislature suspended the requirement for a COLA to be fully paid for and authorized a one-time COLA to be granted for the fiscal year.

Ohio

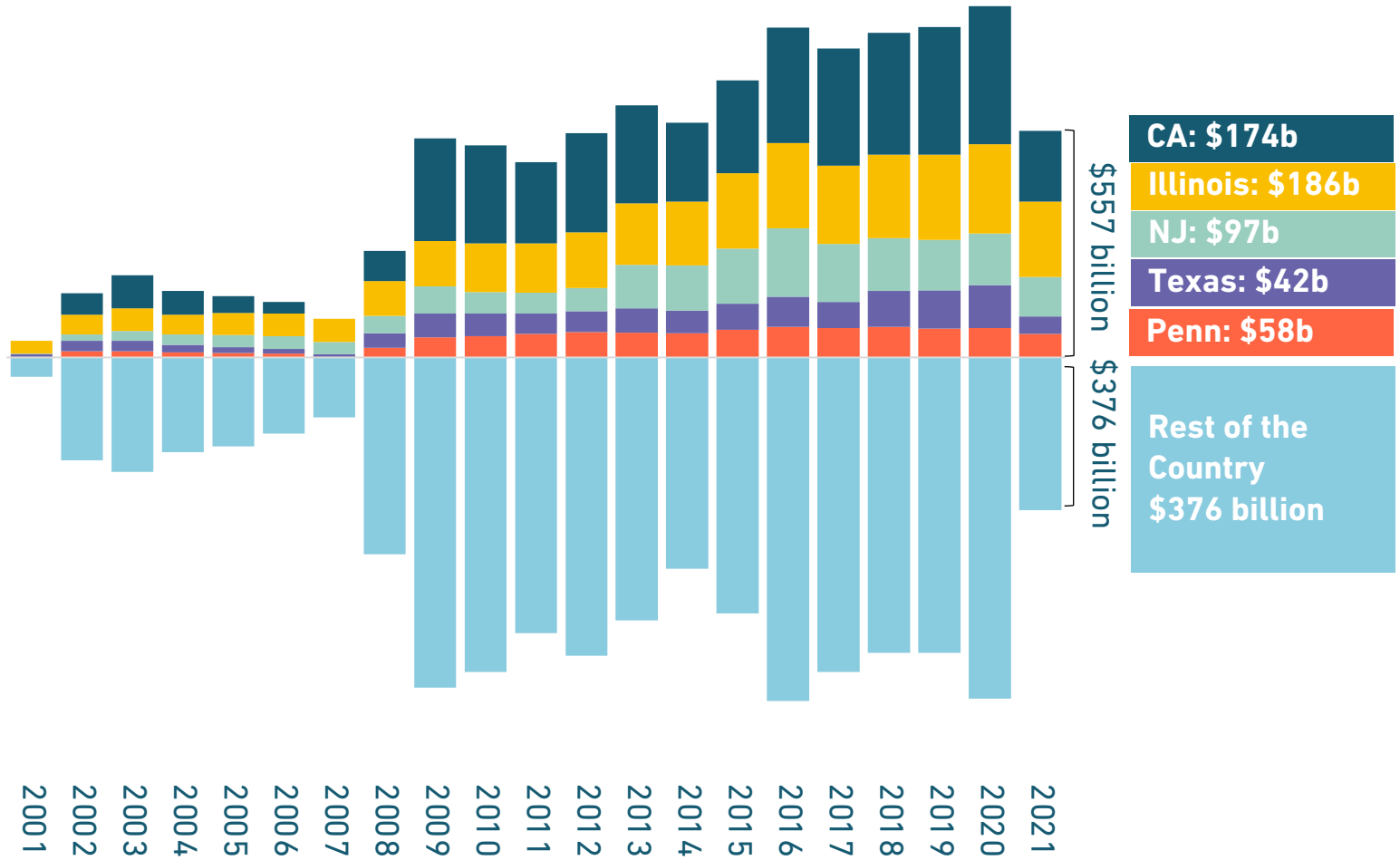
- The Ohio State Teachers Retirement System's (STRS) board of trustees has suspended the usual COLA offered to retirees since 2017 to keep liabilities down and support the plan's funded status.
- In 2022, the STRS board granted a one-time COLA under pressure from retirees and the state legislature to help adjust pensions for on-going inflation.
- The Cincinnati Employees' Retirement System adopted a similar three-year freeze in 2016.

Within the Trends: 2021 Funded Status

- Funded Ratio
- Unfunded Liabilities

UNFUNDED LIABILITY HISTORY

GROUPED BY STATE | 2001–2021

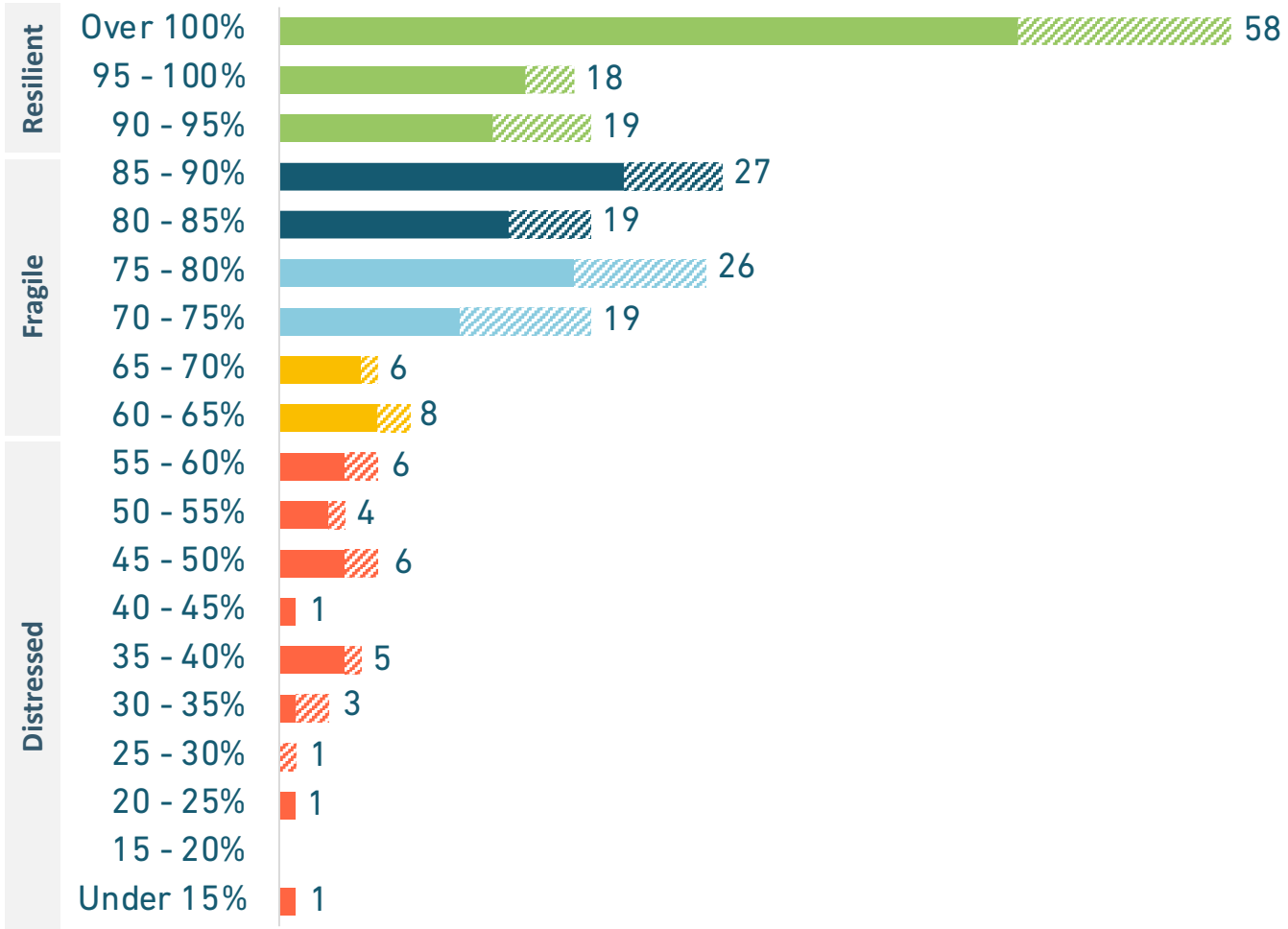


The five largest states by unfunded liabilities have a shortfall *($557.0 billion*) that is far more than the rest of the country combined *($376.0 billion*).

Illinois's combined unfunded liabilities from statewide plans and Chicago plans *($186 billion)* are roughly the same as three of the next largest states combined (New Jersey, Texas, and Pennsylvania)

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

STATE & LOCAL PENSION PLANS
2021 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 also matter.

A pension plan's funded ratio might have dipped because the pension board adopted more realistic actuarial assumptions.

Solid coloring indicates statewide plans

Textured patterning indicates local plans

Source: Equable Institute analysis of public plan valuation reports and ACFRs. See notes for a list of plans that have fiscal years ending in December and have not yet reported complete 2021 data; for these plans the figure above is based on estimates of their assets using actual reported investment returns as of December 31, 2021.

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 anytime 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.

2021: THE TOP 10 AND BOTTOM 10 STATEWIDE PLANS

AMONG STATE PLANS THAT HAVE REPORTED FYE 2021 DATA

Top 10 Statewide Plans, by Funded Ratio

Rank	Plan	Funded Ratio
#1	Washington Law Officers Plans 1 & 2*	152.0%
#2	Tennessee Teachers Hybrid	130.9%
#3	DC Police & Firefighters	129.3%
#4	Michigan Public Schools Pension Plus 2	124.1%
#5	Washington PSERS Plan 2	123.7%
#6	Utah Firefighters	122.4%
#7	Tennessee Teachers Legacy Pension	122.1%
#8	Wisconsin Retirement System	120.6%
#9	Washington PERS Plans 2 & 3	120.3%
#10	Tennessee Public Employees	119.2%

Bottom 10 Statewide Plans, by Funded Ratio

Rank	Plan	Funded Ratio
#158	Illinois State Employees	45.4%
#159	Illinois Teachers	45.1%
#160	Connecticut State Employees	44.5%
#161	Texas Law Officers Supplemental	37.2%
#162	Arizona Elected Officials	36.3%
#163	New Jersey Teachers	35.5%
#164	Indiana Teachers Pre-96**	35.4%
#165	Kentucky State Police	33.8%
#166	Kentucky State Employees	22.0%
#167	California Judges**	1.9%

Source: Equable Institute analysis of public plan valuation reports and ACFRs. | *Notes:* * Washington Law Officers Plans 1 & 2 reflect a 1969 founded plan that is 187.4% funded and a 1977 founded plan that is 142% funded. ** Indicates a pay-as-you-go plan that does not use traditional pre-funding methods.

2021: THE TOP 10 AND BOTTOM 10 LOCAL PLANS

AMONG LOCAL PLANS THAT HAVE REPORTED FYE 2021 DATA

Top 10 Local Plans, by Funded Ratio

Rank	Plan	Funded Ratio
#1	Detroit Police & Fire Plan 1	135.9%
#2	New York City Board of Education	122.0%
#3	Contra Costa County	119.7%
#4	Austin Firefighters	118.2%
#5	Montgomery County MD Employees	116.2%
#6	Nashville-Davidson Employees	115.8%
#7	Los Angeles Water and Power	111.1%
#8	Los Angeles Fire and Police	110.7%
#9	San Francisco City & County Employees	107.8%
#10	Houston Firefighters	105.9%

Bottom 10 Local Plans, by Funded Ratio

Rank	Plan	Funded Ratio
#52	Philadelphia Municipal	60.9%
#53	Cook County Employees	56.9%
#54	Birmingham Employees	56.4%
#55	Dallas Police and Firefighters	52.6%
#56	Chicago Teachers	47.6%
#57	Chicago Laborers	45.9%
#58	Chicago Municipal	36.4%
#59	Chicago Police	34.9%
#60	Chicago Firefighters	31.1%
#61	Providence Employees	26.3%

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

TYPES OF PENSION FUNDS AND THEIR FUNDED STATUS | 2021

	Plan Count	*Unfunded Liabilities*	*Funded Ratio*
Statewide Systems & Local Plans for Teachers and Public School Employees Only*	*51 Plans*	*$405.7 billion*	*81.4%*
Statewide Systems for Higher Education Only	*California URS + Illinois SURS*	*$34.4 billion*	*77.0%*
Statewide Systems for All Public Employees Doing Any Public Service Job in the State	*10 Plans*	*$25.9 billion*	*95.8%*
Statewide Systems for State Employees Only	*17 Plans*	*$145.9 billion*	*68.6%*
Statewide Systems for Municipal Civilian Employees	*21 Plans*	*$33.4 billion*	*90.4%*
Municipally-Managed Systems for Civilian Employees**	*40 Plans*	*$60.0 billion*	*87.4%*
Statewide Systems for Public Safety Only***	*39 Plans*	*$31.4 billion*	*88.1%*
Municipally-Managed Systems for Public Safety Only***	*14 Plans*	*$24.6 billion*	*83.7%*

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 without distinction (e.g., Florida).

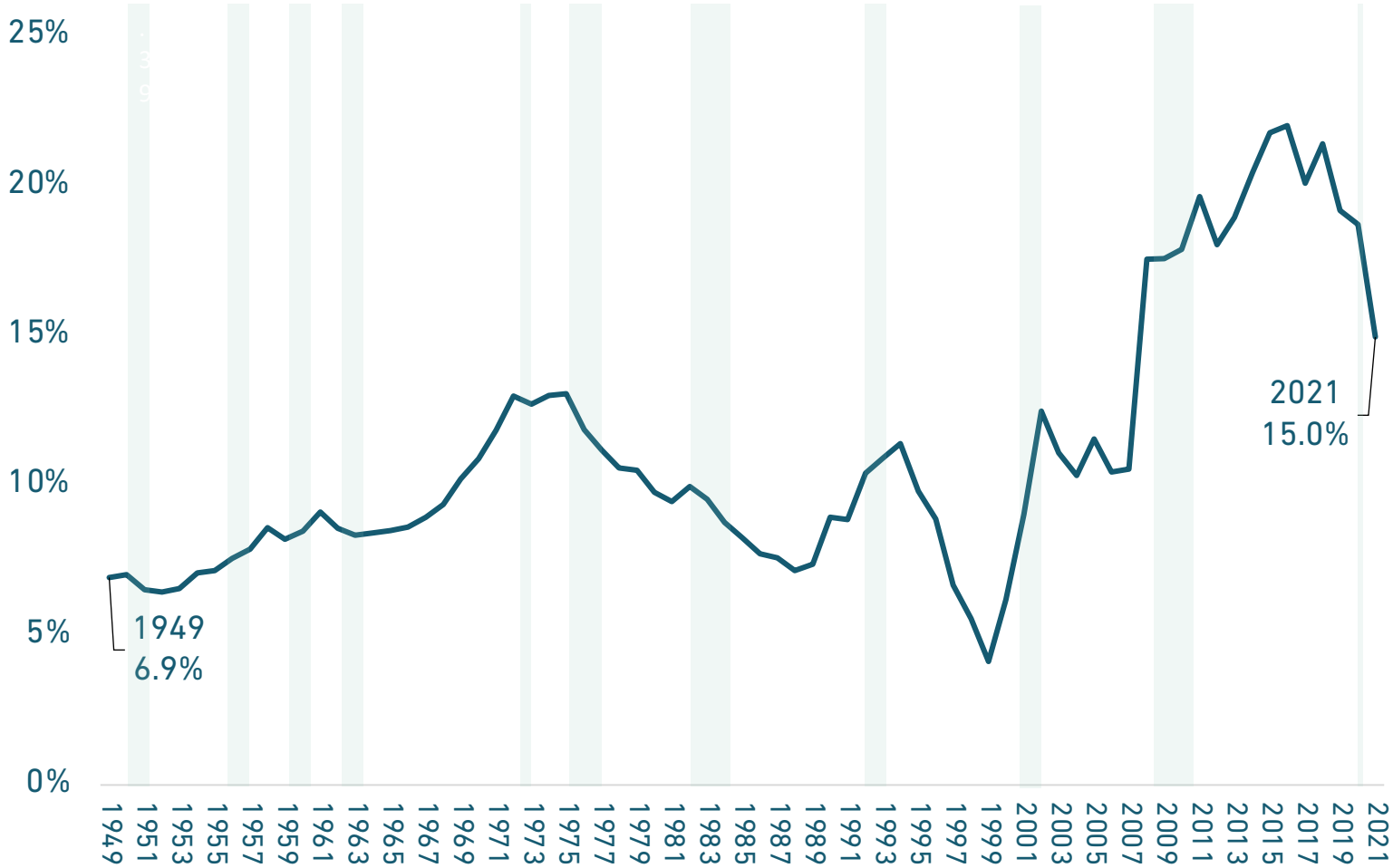
** Does not include plans that are only for teachers or school staff.

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

Source: Equable Institute analysis of public plan valuation reports and ACFRs. | ***Note:*** There are 34 other plans in our data set not represented on this list, including: CalPERS and 25 others that cover different combinations of state, local, public school, and public safety employees but not all of them; 7 for judges; and 1 for elected officials.

UNFUNDED LIABILITY OF PUBLIC PENSIONS

AS A SHARE OF NATIONAL GDP | 1949–2021



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:

2021 State & Municipal Debt: 13.4% GDP

2021 Total Student Debt: 7.2% GDP

2021 Consumer Credit Debt: 3.3% GDP

Source: Federal Reserve's measurement of U.S. public pension liabilities, assets, and GDP. See technical notes for more.

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 or Illinois Teachers Retirement System Tier 2, which has a funded status of over 100% when broken out from Tier 1).

- **Roughly half of national unfunded liabilities are for retirement systems that cover teachers and public school employees** (Page 40).

- Due to strong investment performance in 2021, **more than four out of every ten (43.7%) of major statewide plans and more than a third (36.1%) of municipally managed plans were above 90% funded** (Page 36).

- **A plurality of state and local plans (46.1%) are Fragile as of 2021,** with a funded ratio between 60% and 90% (Page 36). Many of these will report lower funded status with their 2022 returns, and most will remain Fragile.

- **Only roughly one-tenth of all statewide plans and local plans (12.3%) were Distressed as of 2021. These plans face a considerable uphill climb to recovery, despite strong returns in 2021** (Page 36). 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.

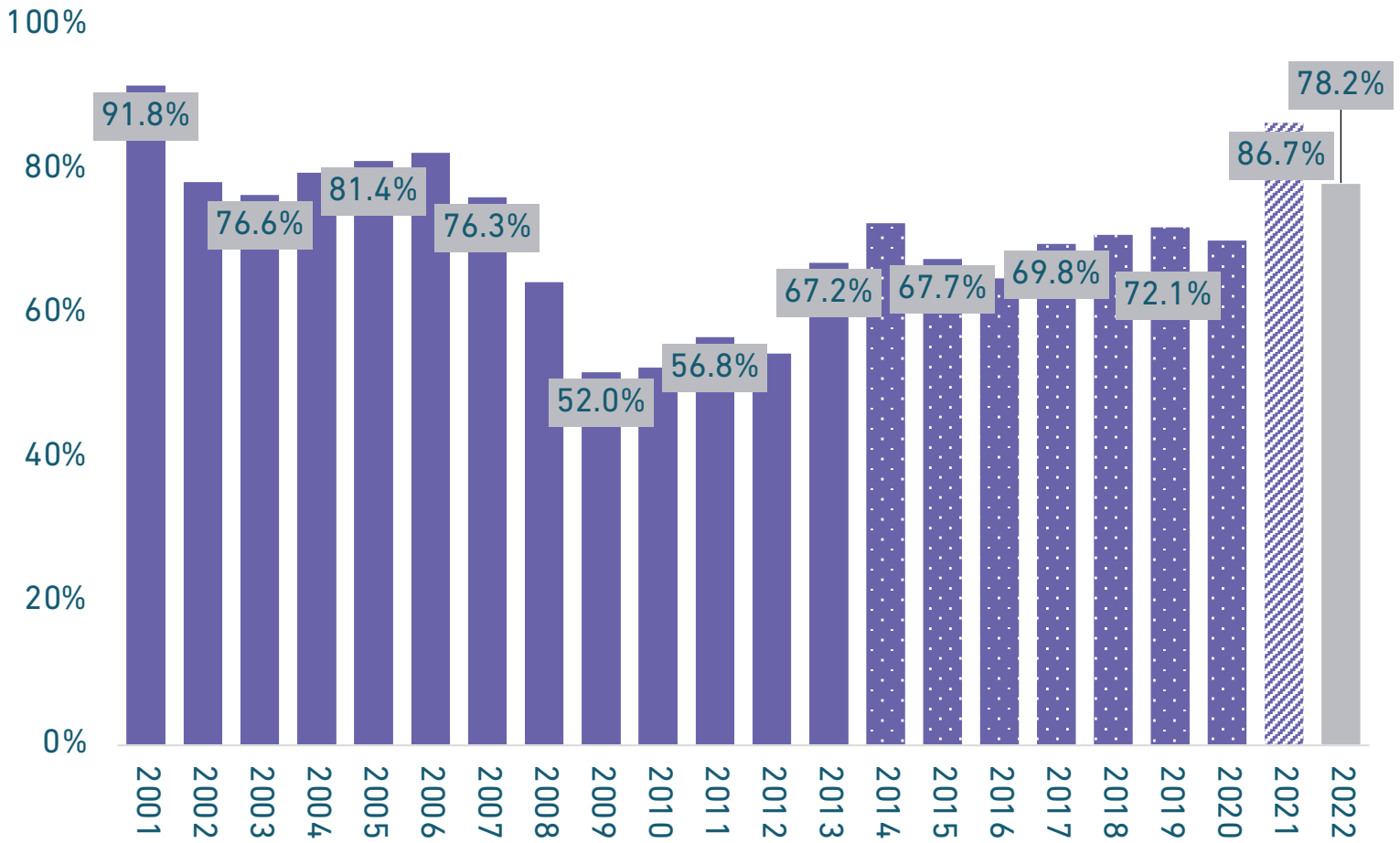
Moody's Analytics uses an alternative process for measuring liabilities from most actuaries and winds up with a discount rate usually 5% or less. Actuarial firm Milliman measures liabilities using an assumed rate of return (6.6%) that is much lower than the national average.

Within the Trends: Spotlight on Municipal Pension Plans

- Funded Ratio & Unfunded Liabilities
- Contribution Rates
- Comparison of Statewide and Local Plans

FUNDED RATIO AVERAGE

FOR LOCAL PENSION PLANS ONLY | 2001–2021 + 2022 Estimate



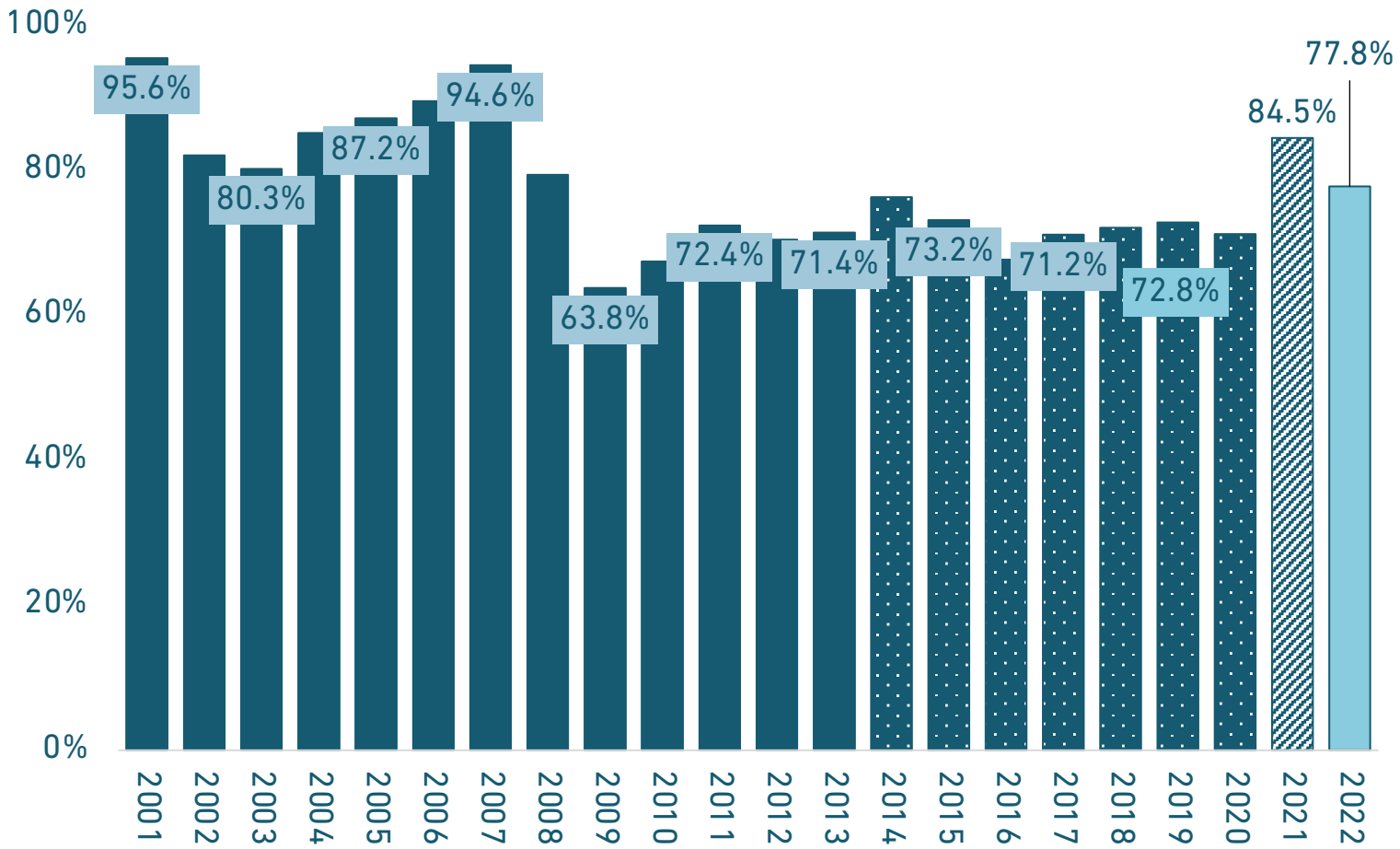
The aggregate funded ratio for municipally-managed plans in 2021 was collectively near its highest point in recent history.

- Based on Accrued Liabilities
- Based on Total Pension Liabilities
- Based on 2021 Data Availability
- 2022 Estimate Based on June 30 Returns

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Data for 2001 to 2013 reflect the "actuarially accrued liabilities" reported by public plans. Data from 2014 onward use the new GASB 67 "total pension liability" measurement. All years use market valued assets (MVA) except 2001-2003 due to poor reporting of MVA assets by plans for those years.

FUNDED RATIO AVERAGE

FOR STATEWIDE PENSION PLANS ONLY | 2001–2021 + 2022 Estimate



The aggregate funded ratio for statewide plans collectively is below 2008 levels. However, the trend from 2019 to 2022 still shows improvement, even despite losses in 2022.

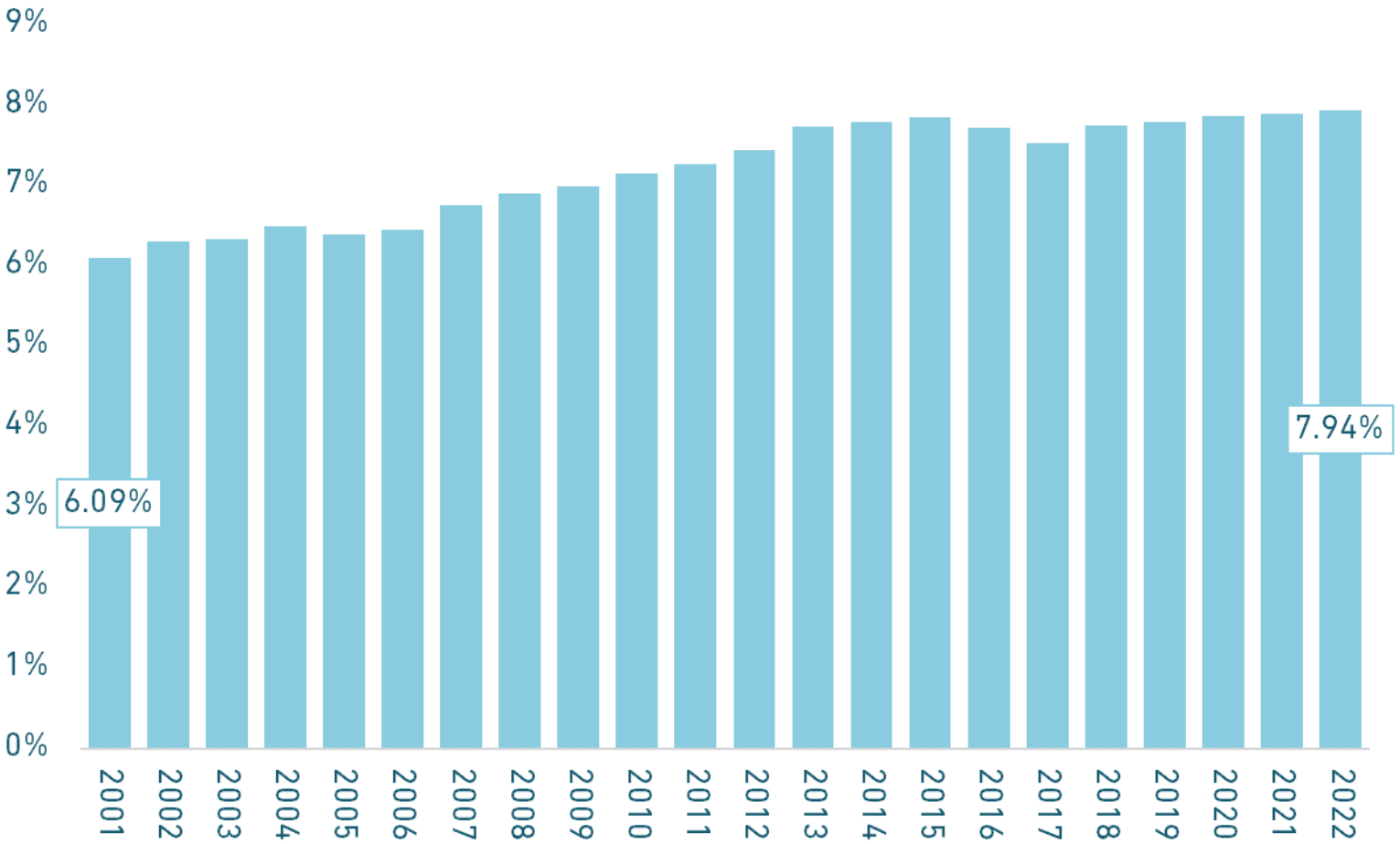
To view funded ratios by state, click here.

- Based on Accrued Liabilities
- Based on Total Pension Liabilities
- Based on 2021 Data Availability
- 2022 Estimate Based on June 30 Returns

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Data for 2001 to 2013 reflect the "actuarially accrued liabilities" reported by public plans. Data from 2014 onward use the new GASB 67 "total pension liability" measurement. See methodology section for details on 2022 estimate.

AVERAGE LOCAL PLAN MEMBER CONTRIBUTIONS

AS A PERCENTAGE OF PAYROLL | 2001–2022



Members of municipally-managed pension plans have experienced steadily increasing contribution rate requirement for their own retirement plans.

Public safety officers who are in municipally-managed plans tend to pay more than their civilian counterparts. During FY 2022 they will contribute 9.61% of salary (67 basis points more than in 2008).

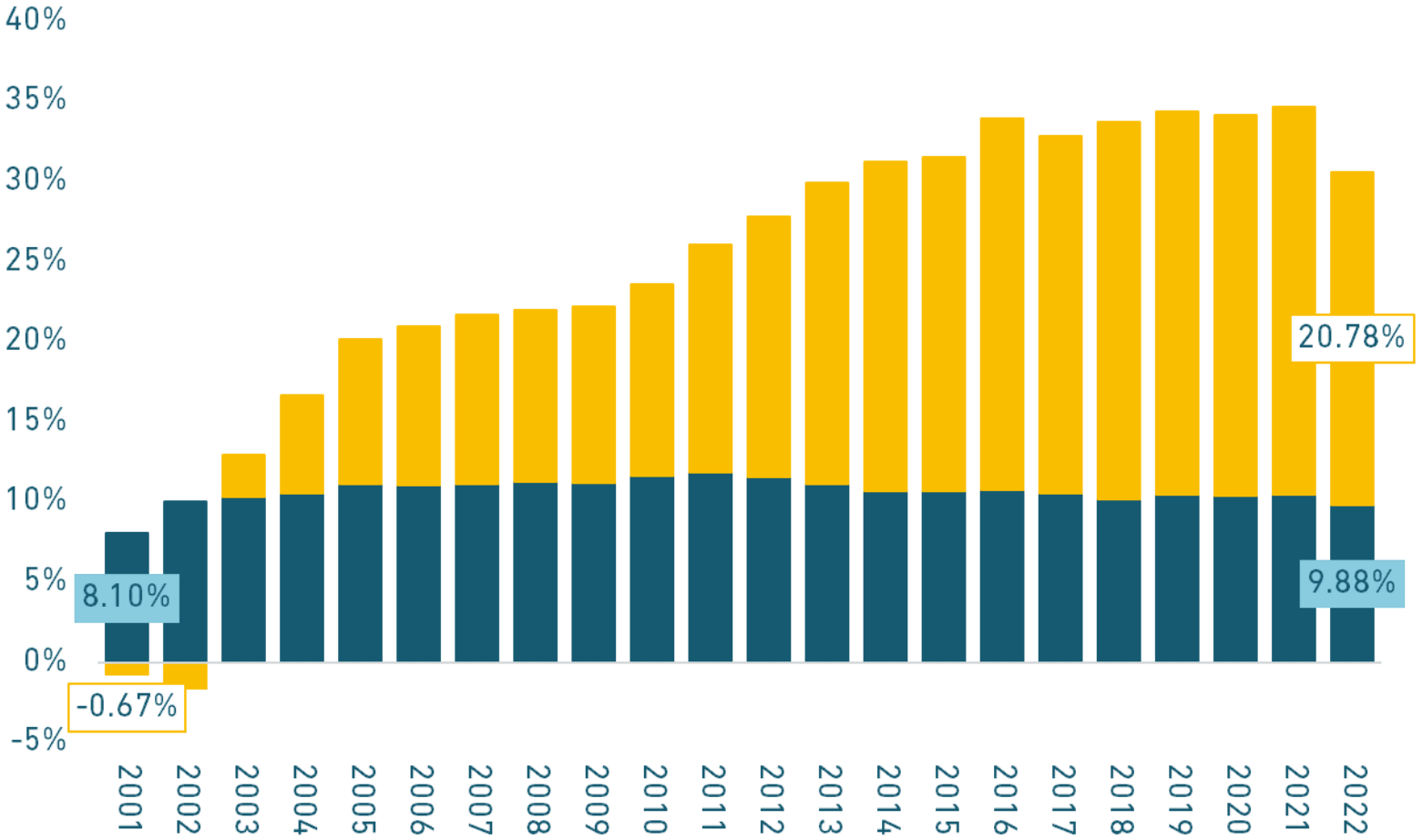
Civilian workers in city and county retirement plans will pay an average of 7.72% of salary during the 2022 fiscal year (128 basis points more than they did in 2008).

Local plan only member contribution rate, public safety and civilian plans combined

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Contribution rates show for the year actually paid.
Note: This chart shows only the employer contributions from municipalities who have their own, municipally-managed retirement plan with liabilities over $1 billion.

AVERAGE LOCAL EMPLOYER CONTRIBUTIONS

AS A PERCENTAGE OF PAYROLL | 2001–2022



Employer contributions from municipalities to their self-managed pension plans have steadily increased over the past two decades, mostly because of increased unfunded liability amortization payments.

Employer contributions in 2001 were 7.43% of payroll. During the fiscal year ending 2022, employer contributions are 35.27% 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 ACFRs. Contribution rates show for the year actually paid.
Note: This chart shows only the employer contributions from municipalities that have their own, municipally-managed retirement plan with liabilities over $1 billion.

COMPARING CHANGES IN UNFUNDED LIABILITY & FUNDED RATIO

STATEWIDE VERSUS LOCAL PLANS

	Statewide Retirement Plan Unfunded Liabilities & Funded Ratio	*Municipally-Managed* Plan Unfunded Liabilities & Funded Ratio	*Combined* Unfunded Liabilities & Funded Ratio
2019	*$1.35 trillion 72.8% funded*	*$192.08 billion 72.1% funded*	*$1.54 trillion 72.8% funded*
2020	*$1.49 trillion 71.2% funded*	*$215.28 billion 70.3% funded*	*$1.70 trillion 71.1% funded*
2021	*$833.48 billion 84.5% funded*	*$99.52 billion 86.7% funded*	*$932.99 billion 84.8% funded*
2022 (Estimate)	*$1.23 trillion 77.8% funded*	*$168.84 billion 78.2% funded*	*$1.40 trillion 77.9% funded*

Most public pension unfunded liabilities reside within statewide retirement systems, primarily because they are simply larger, with more members and more promised benefits.

The funded ratios for state and local plans also have tended to move together, as the same dynamics of underperforming investments and changes to actuarial assumptions have influenced overall finances.

Analysis: What We See in the Local Pension Data

The average funded ratio for municipally-managed plans on their own tends to follow a similar pattern as statewide retirement systems (Page 45). They are all facing the same financial market dynamics and need to improve actuarial assumptions.

- Local plans as a whole were not as well funded prior to the financial crisis as statewide plans; however, they have since caught up and are following a similar funded ratio trend line (Page 45). The overall average for local plans is heavily influenced by a few large systems in New York City, Chicago, and Los Angeles.
- New York City and Los Angeles local plans have a mix of Fragile plans (with funded ratios in the 70% to 80% range) and Resilient plans (at least two are likely to be roughly fully funded even after this year's losses). Chicago's plans are uniformly Distressed, with a few facing the risk of insolvency should asset shocks persist.

A notable difference between local plans and statewide plans is the member contribution rates amounts. While the growth trend has been similar for both sets of pension plans, contribution rates required from employees enrolled in local plans tend to be significantly higher compared to their counterparts in statewide-managed plans.

- In 2021 the average local plan member contribution rate (7.9% of salary) was 190 basis points larger than the 6% statewide contribution rate for members enrolled in Social Security (Pages 14 and 47). The spread comparison back in 2001 was similar, with a 150-basis point spread for the same plans.
- The reason for this difference may reflect the larger "normal costs" that municipal employers pay (9.9% of payroll in 2021) compared to statewide plans (7.7% of payroll), and/or could reflect the tighter budgetary restrictions at the local level leading to more costs being pushed from employers to employees (Pgs. 15 & 48).

Looking to the future: It is possible that the divergence in funded ratios within local plans could widen if Chicago plans for municipal or public safety workers enter an insolvency spiral while New York City and Los Angeles plans continue gradual improvement.

LOCAL PENSION PLANS ADDED TO DATA SET SINCE OUR LAST REPORT

- Previous State of Pensions report editions focused on the largest 167 statewide retirement systems. With this edition, we have now added 61 large municipally-managed retirement systems to the data set covered by the trend report analysis as well.

- These "local" pension plans have reported $745.9 billion in liabilities and manage $646.4 billion in assets, as of FYE 2021. These amounts are equal to 14.2% of the assets and 13.9% of the liabilities for statewide plans in the same year.

- The average assumed rate of return among statewide retirement systems is 6.9%, and the average for local plans is 7.1% (both figures as of June 2022 announcements).

- While most of the municipally-managed plans are modest in size compared to statewide retirement systems, a few large pension plans in Los Angeles and New York City are comparable:

  - The Los Angeles County Employees' Retirement Association is among the top 15 individual pension plans in the country by assets under management; and,

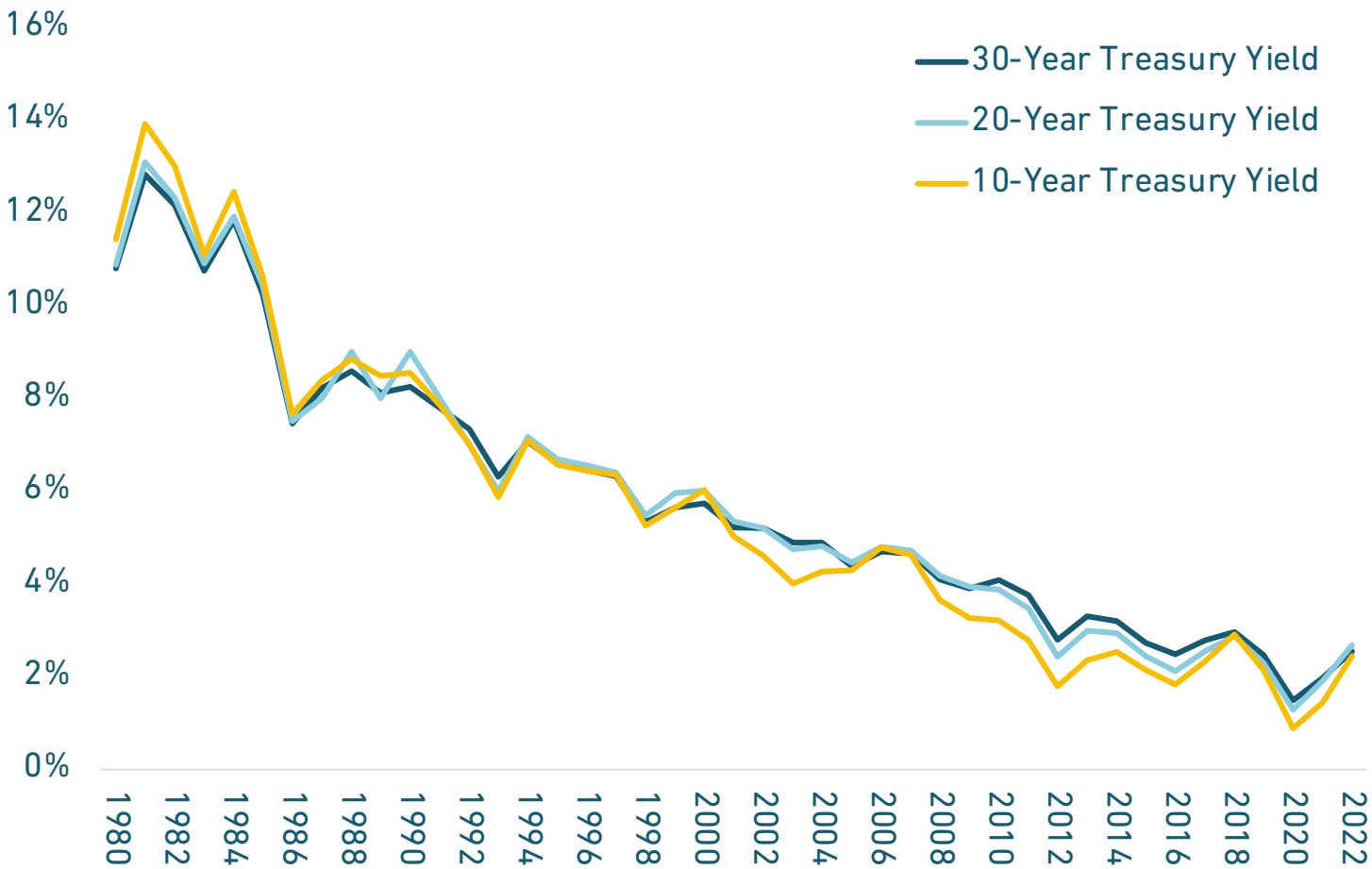
  - The pension plans for New York City municipal employees and teachers are in the top 20 plans by market valued asset size.

Within the Trends:
Investment Assumptions

- Interest Rates
- Assumed Rate of Return

INTEREST RATE TRENDS

TREASURY YIELDS IN DECLINE | 1980–2022



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

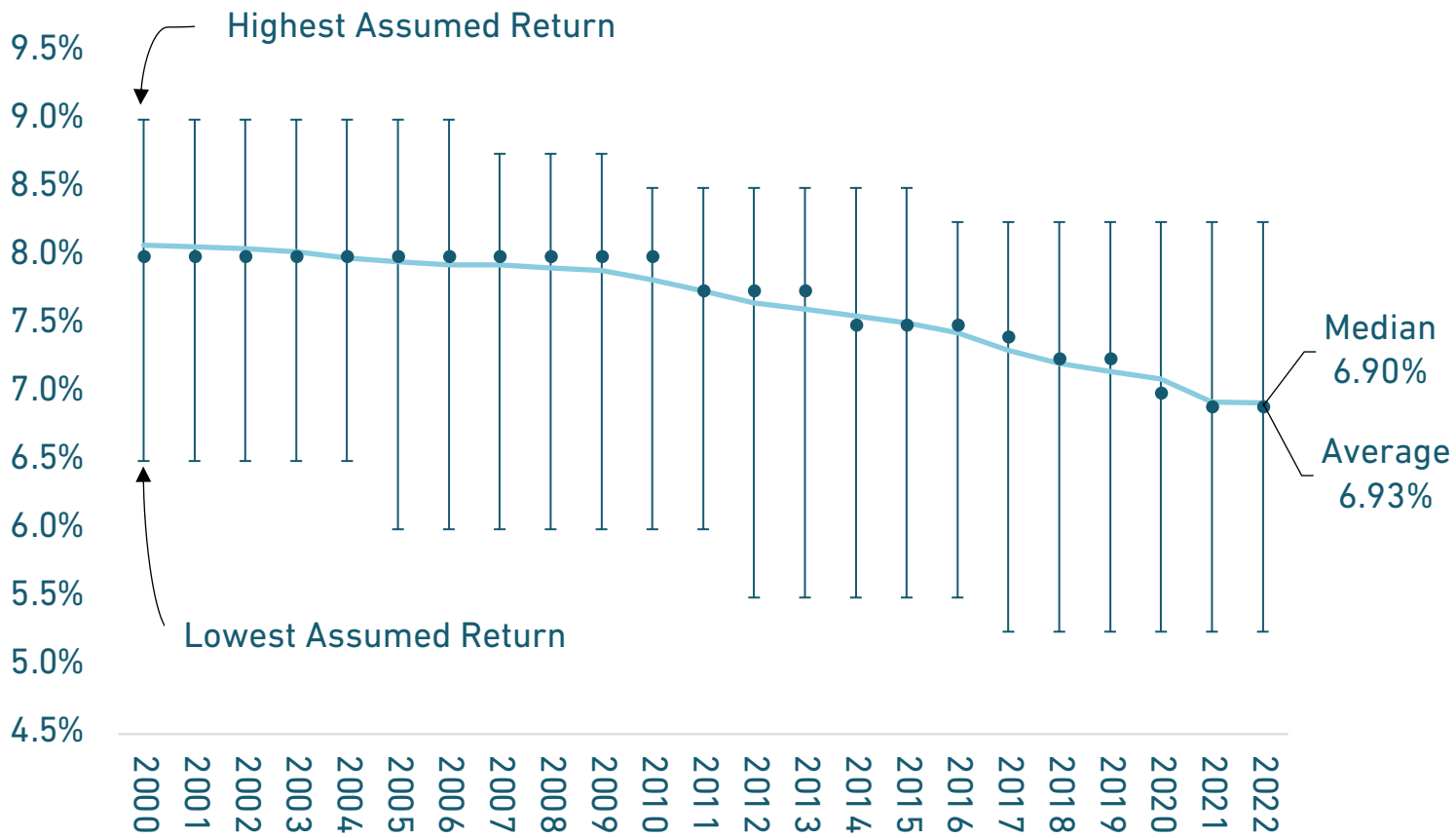
Lower interest rates have raised the costs of financial guarantees, like pensions and life insurance.

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

Source: Federal Reserve, annual average yields. See technical notes for more. | ***Notes:*** (1) 2022 yields are the average as of June 30, 2022. (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 STATE & LOCAL PLANS | 2001–2022



The average assumed rate of return has gradually declined from *8.05%* in 2001 to *6.93%* in 2022.

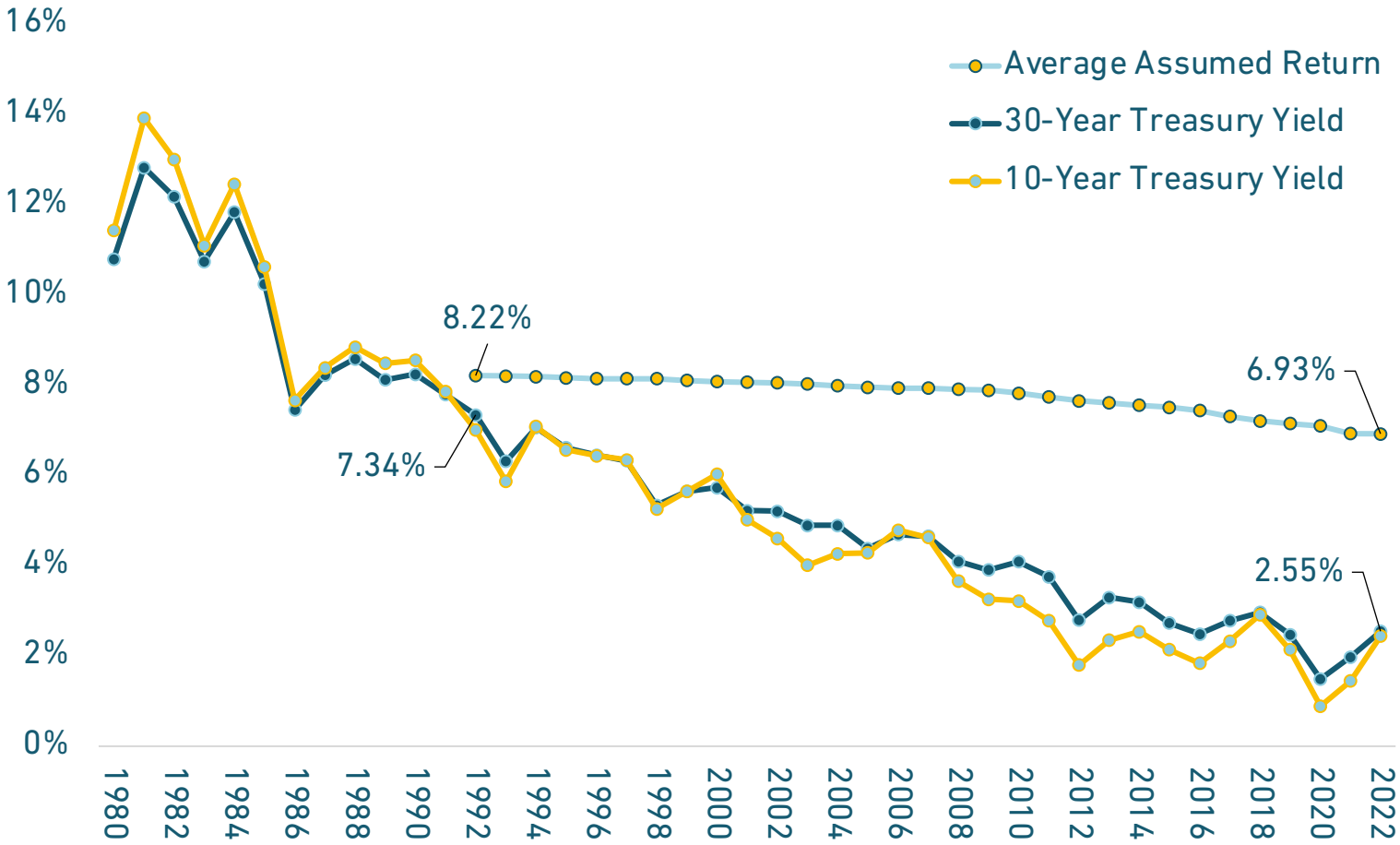
Over the past two decades there has been a wider range in assumptions adopted by plans. The lowest rate adopted by any plan is *5.25%*.

The highest rate currently used by a statewide plan is *7.55%*, and the highest rate by a local plan is *8.25%*.

Source: Equable Institute analysis of public plan valuation reports, ACFRs, and board of trustee reports.

INTEREST RATE TRENDS

ASSUMED RETURN VERSUS INTEREST RATES | 1980–2022



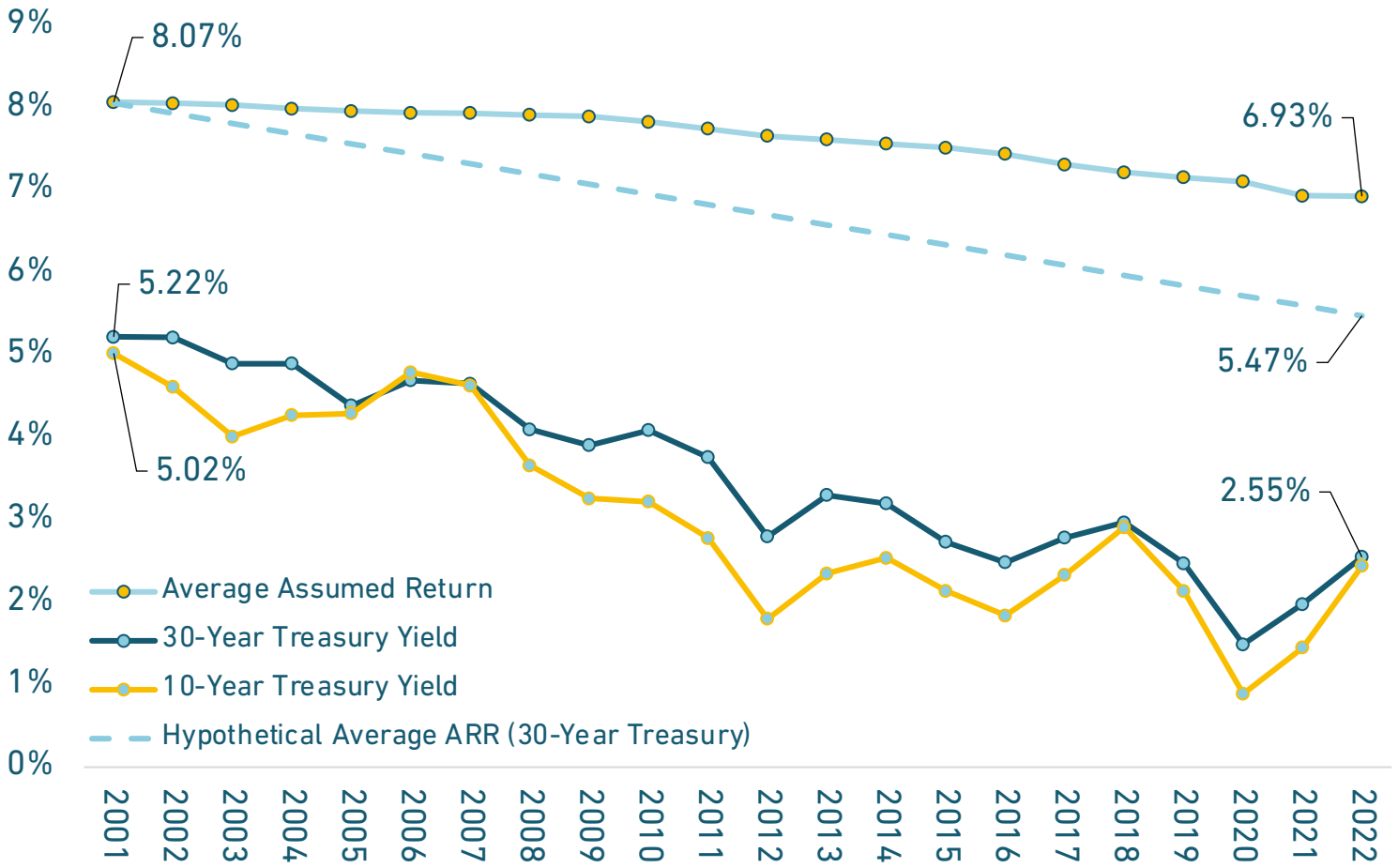
States and pension boards have been slow to reduce their assumed rates of return, relative to declining interest rates.

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

Source: Equable Institute analysis of public plan valuation reports and ACFRs. | ***Notes:*** (1) 2022 yields are the average as of June 2022. (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 | 2001–2022



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 trendlines.

If assumed returns had kept pace with declining interest rates since 2001, the average assumption in 2022 would have been around *5.47%*.

Source: Equable Institute analysis of public plan valuation reports and ACFRs. | *Notes:* (1) 2021 yields are the average as of June 2022. (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.

PLANS BEING LEFT BEHIND:
ASSUMED RETURNS 7.5% OR HIGHER
AS OF ANNOUCEMENTS THROUGH JUNE 2022

	Current Assumed Return	Reported Funded Ratio
Chicago Transit Authority Employees Retirement Plan	8.25%	53.3% (2020)
Omaha Police & Fire Retirement System	7.75%	55.1% (2020)
Mississippi Public Employees' Retirement System*	7.55%	70.4% (2021)

Plans with 7.5% Assumed Rates of Return as of FYE 2021

Arkansas State Highway Employees' Retirement System	Minnesota State Employees Retirement Fund
Arkansas Local Police and Fire Retirement System	Minnesota General Employees Retirement Plan
Birmingham (AL) Retirement & Relief System	Minnesota Public Employees Police & Fire Plan
Cincinnati Employees' Retirement System	Minnesota Teachers Retirement Association
Iowa Municipal Fire and Police Retirement System	Oklahoma Law Enforcement Retirement System
St. Paul (MN) Teachers Retirement Fund	Oklahoma Police Pension and Retirement System
Public School Retirement System of the City of St. Louis (MO)	Oklahoma Firefighters Pension & Retirement System
Milwaukee (WI) City Employees' Retirement System	Ohio Police and Fire Pension Fund**
Milwaukee (WI) County Employees' Retirement System	Texas County & District Retirement System
Montgomery County (MD) Employees' Retirement System	

The pension board trustees, state legislatures, and municipalities of the plans on these lists are embracing high risks that future asset growth will underperform expectations — leading to unfunded liabilities.

Note: Assumed returns shown are reported in each plan's most recent published actuarial valuation in 2020 or 2021.

* Mississippi PERS has adopted a policy to automatically decrease its assumed rate of return when actual investment returns exceed certain thresholds; that policy suggestions there will be no changes to the plan's assumed return in 2022 absent a separate decision by the board of trustees.

** Uses assumed return change publicly announced prior to the release of a 2021 actuarial valuation.

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

STATEWIDE PLANS ON THE MOVE:
MEANINGFUL ASSUMED RETURN REDUCTIONS OVER THE PAST YEAR

- For fiscal year 2021 actuarial valuations, there were ***55 statewide retirement systems (managing 111 pension, hybrid, and guaranteed returns plans)*** that lowered their assumed rate of return.

- The three of the most notable of these changes for FYE 2021 (two of which were previewed in last year's report):
  - CalPERS lowered their assumed return from 7% to 6.8%
  - New York State and Local Retirement System lowered their assumed return from 6.8% to 5.9%
  - Michigan adopted a 6% assumed return for their teacher plan (MPSERS, down from 6.8%) and state plan (MSERS, down from 6.7%)

- Five plans with particularly high assumed returns that made meaningful reductions (even if not completely sufficient):
  - Arkansas State Highway Employees' Retirement System (8% to 7.5%)
  - Ohio Police & Fire Retirement System (8% to 7.5%)
  - Kansas Public Employees Retirement Systems (7.75% to 7%)
  - Mississippi Public Employees Retirement System (7.75% to 7.55%)
  - Montana Public Employees Retirement Board (7.65% to 7.3%)

- Other notable FYE 2020 to 2021 changes :
  - Idaho Public Employees Retirement System (7.05% to 6.35%)
  - Indiana Public Employees Retirement System (6.75% to 6.25%)
  - Maryland State Retirement and Pension System (7.4% to 6.8%)
  - Philadelphia Municipal Retirement System (7.5% to 7.45%) + a pre-announcement for lowering to 7.4% as of FYE 2022

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Most plans use the same rate for both the assumed return and discount rate.

Analysis: What We See in the Investment Trends

There were 11 statewide plans with assumed rates of return above 7.55% as of 2020 valuation reports, but now there is just one statewide plan (Mississippi PERS). There are also now only two municipally-managed plans with assumptions above 7.55% (Page 57).

- States have finally moved away from unrealistic 8% investment return assumptions, but it has taken nearly 15 years. That slow pattern of change, compared to changes in interest rates (Pages 55 and 56) tacitly are meant pension funds took on two competing risks: (1) the risks associated with alternative investments which promise high returns (Page 13); and (2) the risk that pension funds won't earn their targeted return, in turn leads to a growth in unfunded liabilities.

- The average assumed rate of return (Page 54) is still very optimistic. Depending on whose capital market assumptions are used, the 50th percentile return — e.g., the return that has a 50/50 chance of being earned over the next decade — for a typical pension plan is between 5.5% and 7%.

There is a clear trend toward adopting assumed returns below 7% (Pages 25 and 58). Any state or retirement plan delaying the reduction of their investment assumption to below 7% is falling behind the pattern of other states making meaningful steps away from relatively high assumed returns.

- A frequent motive for keeping an assumed return above 7% is to avoid the contribution rate increases required with lower rates, but that strategy is effectively a tacit form of underfunding if the long-term trend under 7% means the state or retirement plan is going to reduce their assumed rate of return anyway.

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 trendline 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.

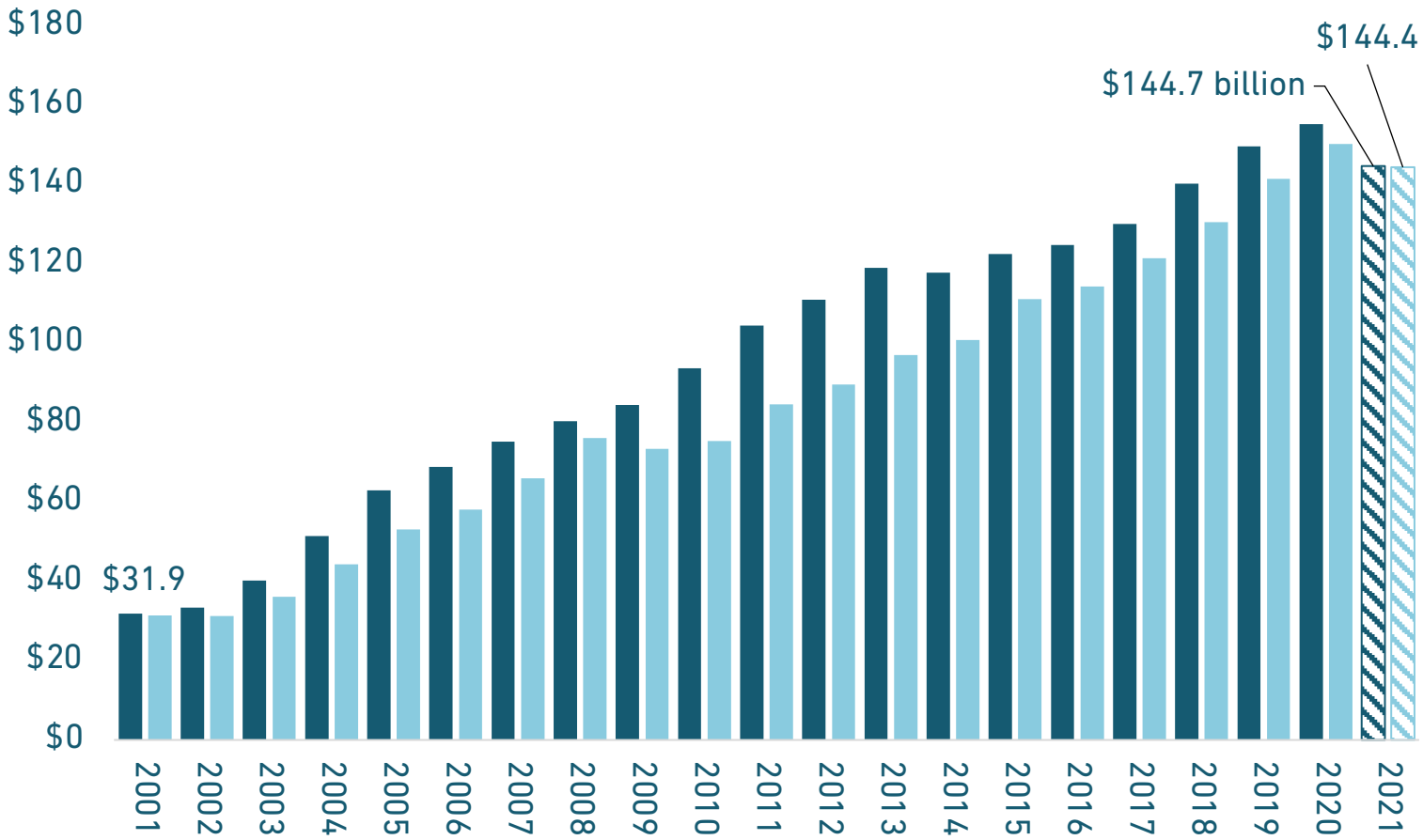
The assumed rate of return is used to help determine what the level of contributions is each year.

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 | 2001–2021



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 2001-2021 was $211.2 billion.

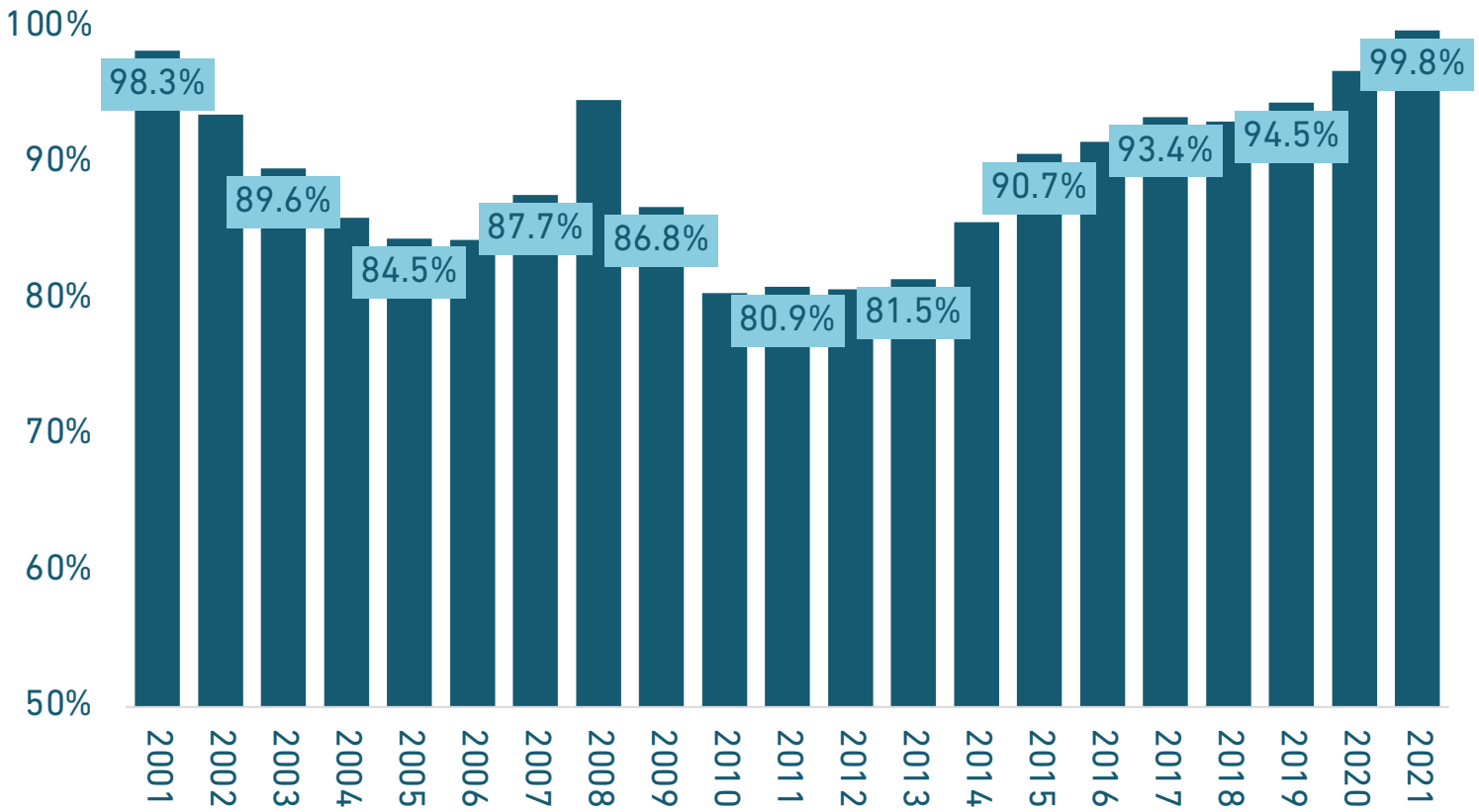
Actual Contributions (in billions)

Required Contributions (in billions)

Indicates that the data for 2021 are incomplete. There are 34 plans that have yet to report these data, including CalPERS. The chart will be revised in the fall update to these data.

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

SHARE OF REQUIRED CONTRIBUTIONS PAID BY STATEWIDE PLANS | 2001–2021



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 2021, on net, states collectively paid closer to the actuarially determined rates than in any year since 2001.

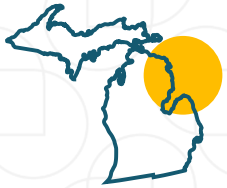
Source: Equable Institute analysis of public plan valuation reports and ACFRs. "Required" based on GASB definitions for ARC and ADC.

SNAPSHOT OF SUPPLEMENTAL PENSION PAYMENTS

More than a dozen states used budget surpluses and rainy-day funds to make supplemental payments this year or approve them in 2022–23 budgets, totaling more than $12 billion. Here are some select examples:

Connecticut (SERS & TRF)

Due to budget surplus, the state is allocating $2.7 billion to the State Employees Retirement System and $903 billion to the Teachers' Retirement Fund.

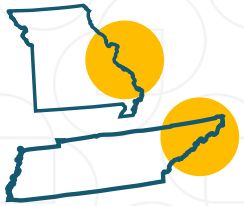


Michigan (MPSERS, SPRS)

One-time $1.3 billion supplemental payment into Michigan Teachers (MPSERS), plus $100 million to the State Police pension, plus $750 million incentive money for local plans to reduce unfunded liabilities.

Illinois (TRS, SERS, SURS, JRS, GARS)

Legislatively adopted appropriations to the "Pension Stabilization Fund" (which pays down unfunded liabilities for all five state plans faster): $300 million from the state's FY 2022 spending and $200 million allocated from the FY 2023 budget.



Missouri (MOSERS) & Tennessee (TCRS)

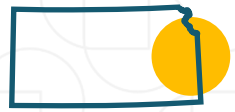
Legislatively adopted one-time supplemental payment to pay down unfunded liabilities: $500 million to MOSERS and $350 million to TCRS.

Arizona (PSPRS) & Hawaii (ERSHI)

Legislatively adopted one-time supplemental appropriations in the 2022–23 budget for paying down unfunded liabilities faster: $1.1 billion to PSPRS and $300 billion to ERSHI.

Kentucky (KERS, SPRS, TRS)

One-time supplemental payments totaling $894 million have been made into three of Kentucky's statewide retirement systems.



Kansas Public Employees RS

KPERS will be receiving $1.125 billion in five payments between May and December 2022: $254 million is to pay delayed contributions, while the remainder is to pay down unfunded liabilities faster.

Virginia (VRS)

The legislature is putting $750 million into VRS this year and allocating $250 million in supplemental payments in next years budget.

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, states now have a three-year stretch of paying at least 95% of their collective required contribution — including 99.8% paid in 2021 among states that have reported data thus far (Page 63).

- **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 **2021 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. (New Jersey is scheduled to make a full required contribution into its state pension funds starting with fiscal year 2022; Texas has a schedule in place that could result in making full required contributions as of fiscal year 2026).

Looking to the future: States on the cutting edge of pension plan management (e.g., MI, CO, NM) are focused on adopting risk-sharing policies that give pension boards tools to balance 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 over-allocation of resources to various policy goals and what tax rates are appropriate or not. 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 contribution 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.

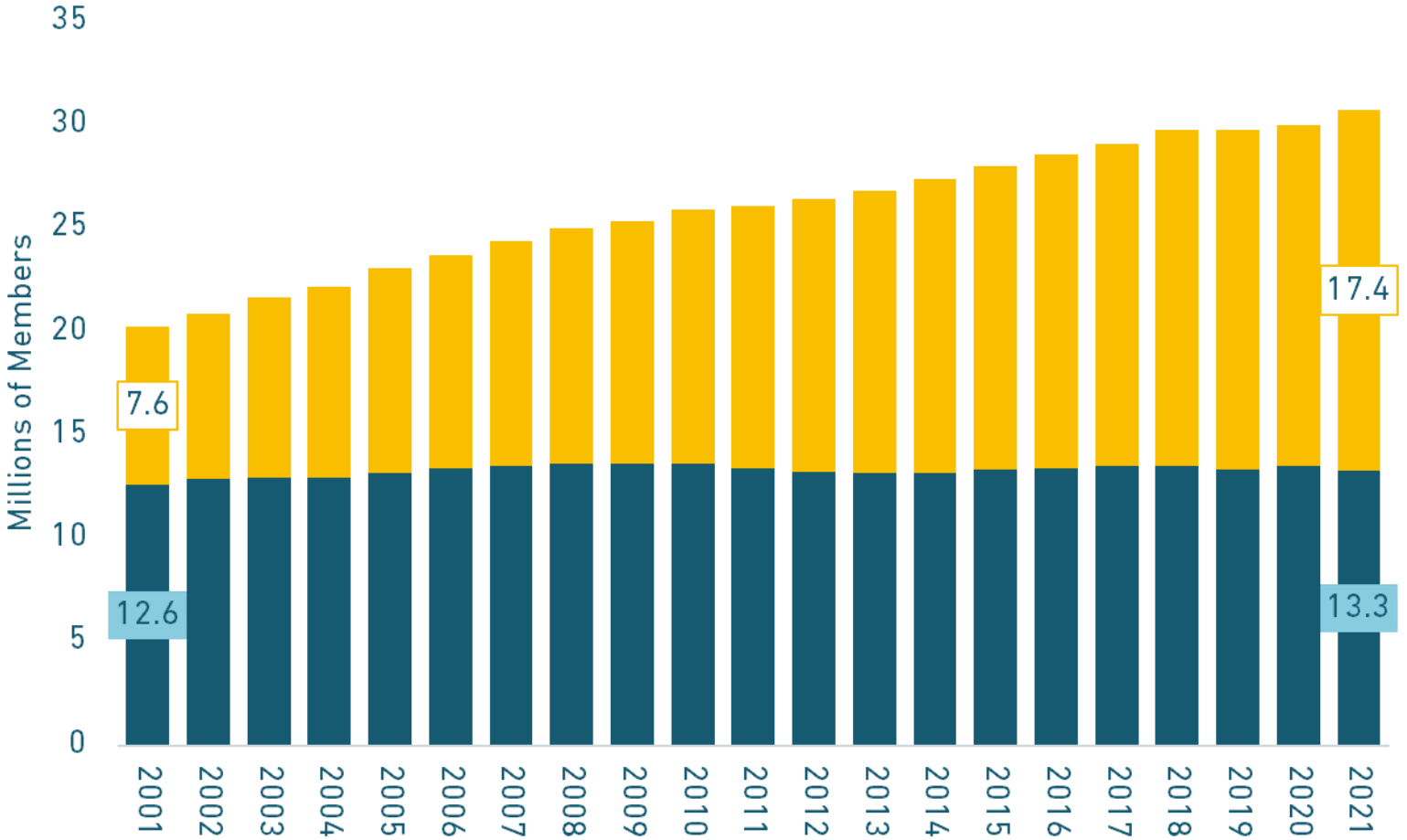
As a result, there are a number of states that pay their full ADC every year but still have mounting unfunded liabilities. Just paying the actuarially required rate each year is not enough on its own to ensure full funding in the long term.

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 | 2001–2021



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

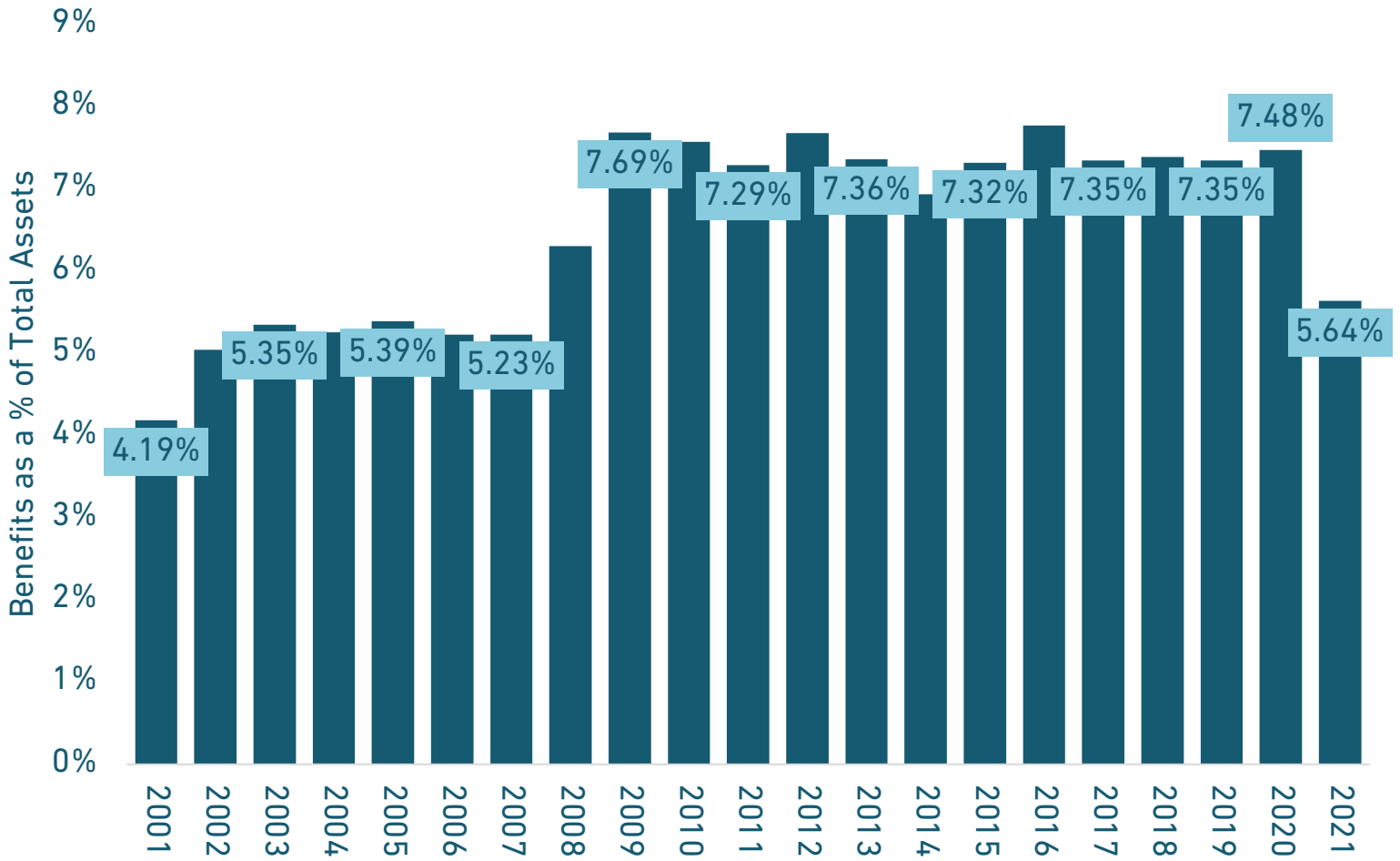
People are living longer and retiring faster (as the Baby Boomer generation phases out of the labor force). Public sector hiring rates slowed down after the Great Recession. The net result is active member counts have been relatively stable for the past few years, while the total number of retirees collecting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

Retired/Inactive

Active

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

BENEFIT PAYMENTS
AS A SHARE OF ASSETS | 2001–2021



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.

Benefit : Asset Ratio	
1 : 24	*1 : 18*
2001	2021

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

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 68). 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 69).
- 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 10), the ratio of benefits-to-assets has been trending down since 2001 (Page 69). 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-to-asset 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.

APPENDIX 1: GLOSSARY

KEY TERMS TO KNOW

Liabilities

- *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.

Assets

- *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.

Pension Debt

- *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.

KEY TERMS TO KNOW

Contributions

- *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: C*ontributions 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.

Assumptions

- *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.

Benefits

- *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 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 "pre-funds" 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.

APPENDIX 2: ADDITIONAL CHARTS AND DATA TRENDS

STATES AND SYSTEMS THAT HAVE DIVESTED FROM RUSSIAN FINANCIAL MARKETS

Retirement System Boards or State Investment Boards That Voluntarily Voted to Divest

Arizona State Retirement System

Colorado Public Employees Retirement Assoc.

Chicago Teachers' Pension Fund

Kentucky Teachers' Retirement System

Michigan Public School Employees' Retirement System

Michigan State Employees' Retirement System

Missouri State Employees' Retirement System

Montana Board of Investment

New Mexico Educational Retirement Board

New York State Teachers Retirement System

New York City Retirement Systems (5)

North Dakota State Investment Board

Ohio Public Employees' Retirement System

Ohio Police and Fire Pension Fund

Ohio State Teachers' Retirement System

Pennsylvania Public Schools Retirement System

Pennsylvania State Employees' Retirement System

Rhode Island State Investment Comm.

San Francisco Employees' Retirement System

Washington State Investment Board

State Legislatures That Adopted Legislation Ordering Divestment

Georgia (for Employees' Retirement System)

Idaho (for Public Employees' Retirement System)

Maryland (for State Retirement & Pension System)

Massachusetts (for all state pension plans)

Minnesota (for all state pension plans)

New Jersey (for all state pension plans)

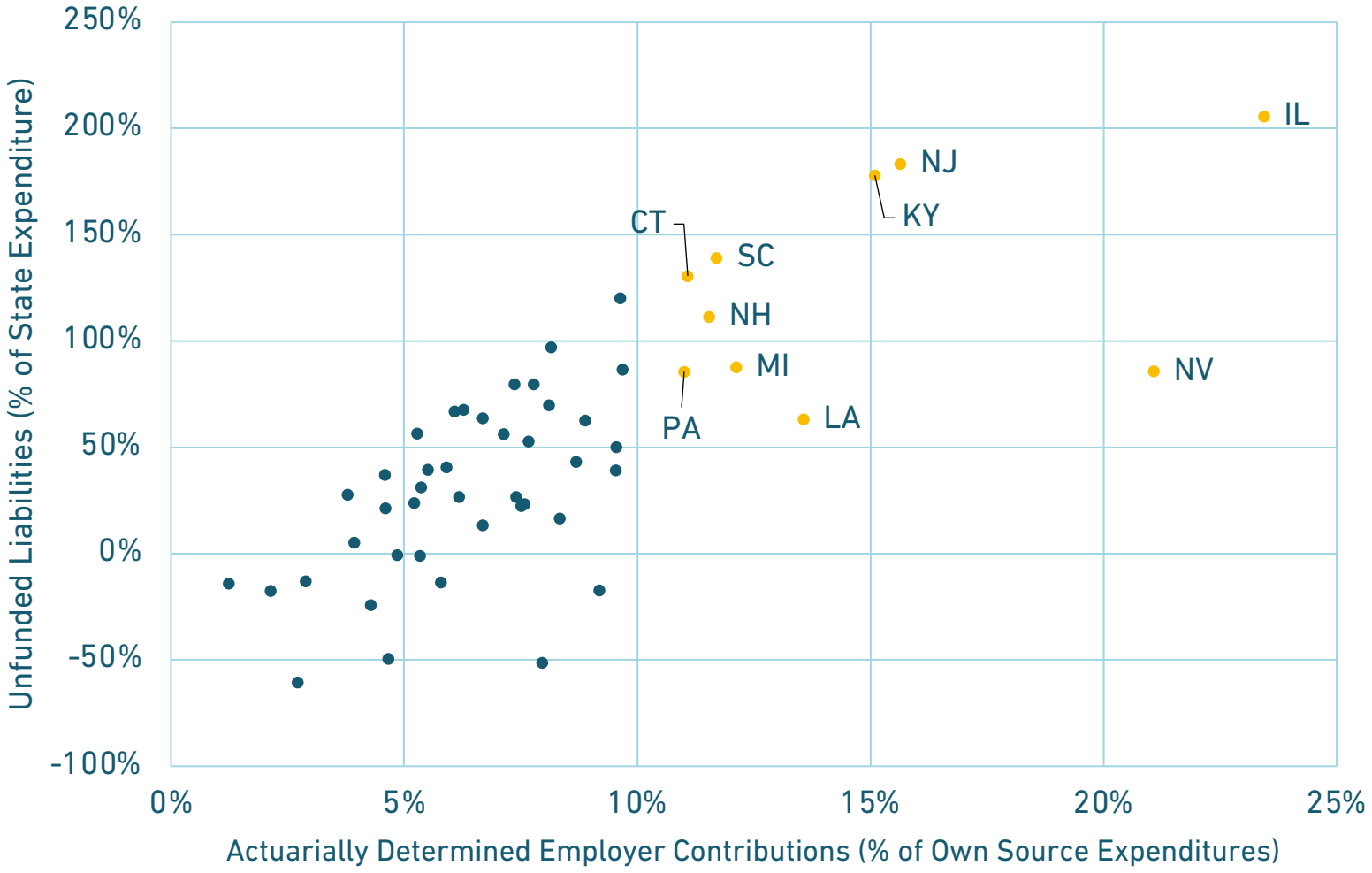
State Treasurers or Comptrollers (Sole Fiduciaries) Who Ordered Divestment

Connecticut State Treasurer

New York State Comptroller

Oregon State Treasurer

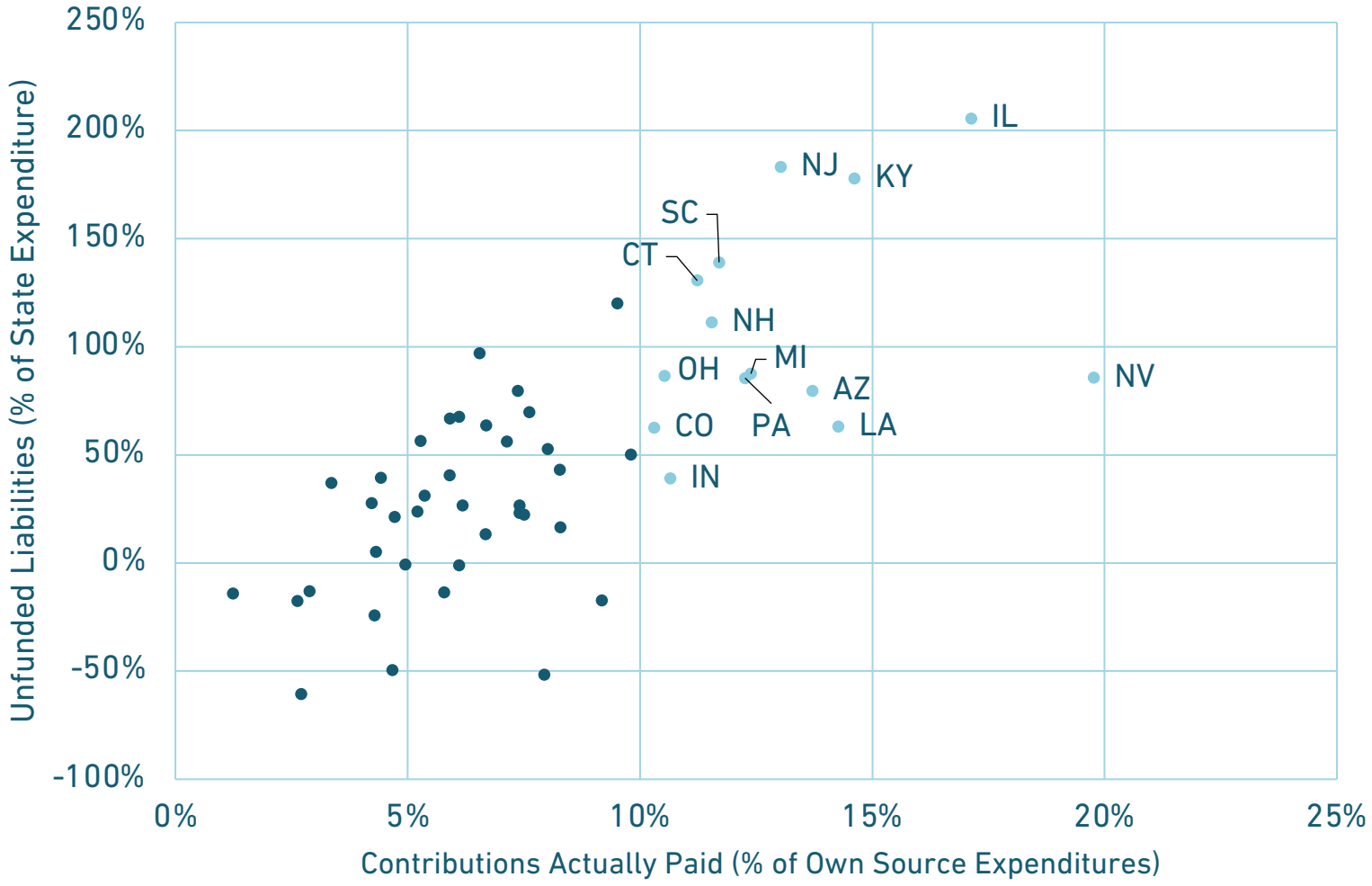
SHARE OF 2021 STATE BUDGETS REQUIRED BY ACTUARIALLY DETERMINED CONTRIBUTIONS



Actuarially Determined Employer Contribution for Statewide Plans as % of the State's General Fund Budget			
	2001	*2009*	*2021*
IL	7.0%	10.9%	23.4%
NV	18.0%	19.2%	21.1%
NJ	2.2%	10.1%	15.6%
KY	3.1%	7.3%	15.1%
LA	6.1%	8.3%	13.6%
MI	3.1%	5.7%	12.1%
SC	5.9%	7.0%	11.7%
NH	3.1%	7.9%	11.5%
CT	4.9%	7.6%	11.1%
PA	0.8%	5.8%	11.0%

Source: Equable Institute analysis of public plan valuation reports and ACFRs; NASBO for state expenditure data. | ***Note:*** 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 reflection of the actual amount of state expenditures on pension contributions.

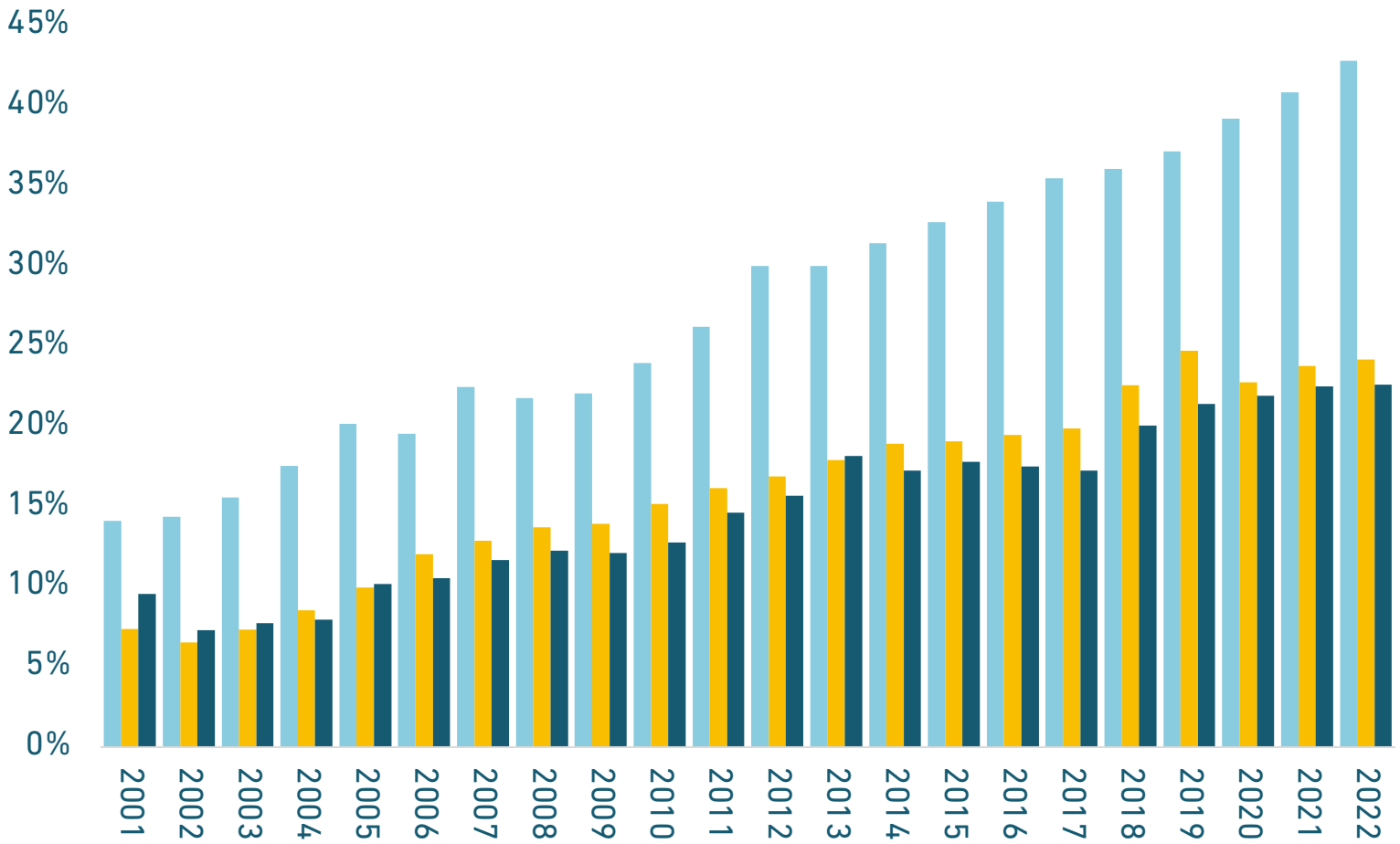
SHARE OF 2021 STATE BUDGETS REQUIRED BY ACTUAL CONTRIBUTIONS PAID



Actual Contributions to Statewide Plans as % of the State's General Fund Budget			
	2001	*2009*	*2021*
NV	18.0%	17.5%	19.8%
IL	5.8%	8.2%	17.1%
KY	3.2%	5.3%	14.6%
LA	6.7%	8.5%	14.3%
AZ	1.2%	6.8%	13.7%
NJ	0.4%	3.0%	13.0%
MI	3.1%	5.7%	12.4%
PA	0.9%	1.9%	12.3%
SC	5.9%	7.0%	11.7%
NH	3.1%	7.9%	11.5%

Source: Equable Institute analysis of public plan valuation reports and ACFRs; NASBO for state expenditure data. | ***Note:*** 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 reflection of the actual amount of state spending on pension contributions.

AVERAGE STATE PLAN EMPLOYER CONTRIBUTIONS BY SOCIAL SECURITY PARTICIPATION | 2001-2022



The total employer contribution rates for state and local pension plans vary depending on the degree to which those employers participate in Social Security.

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

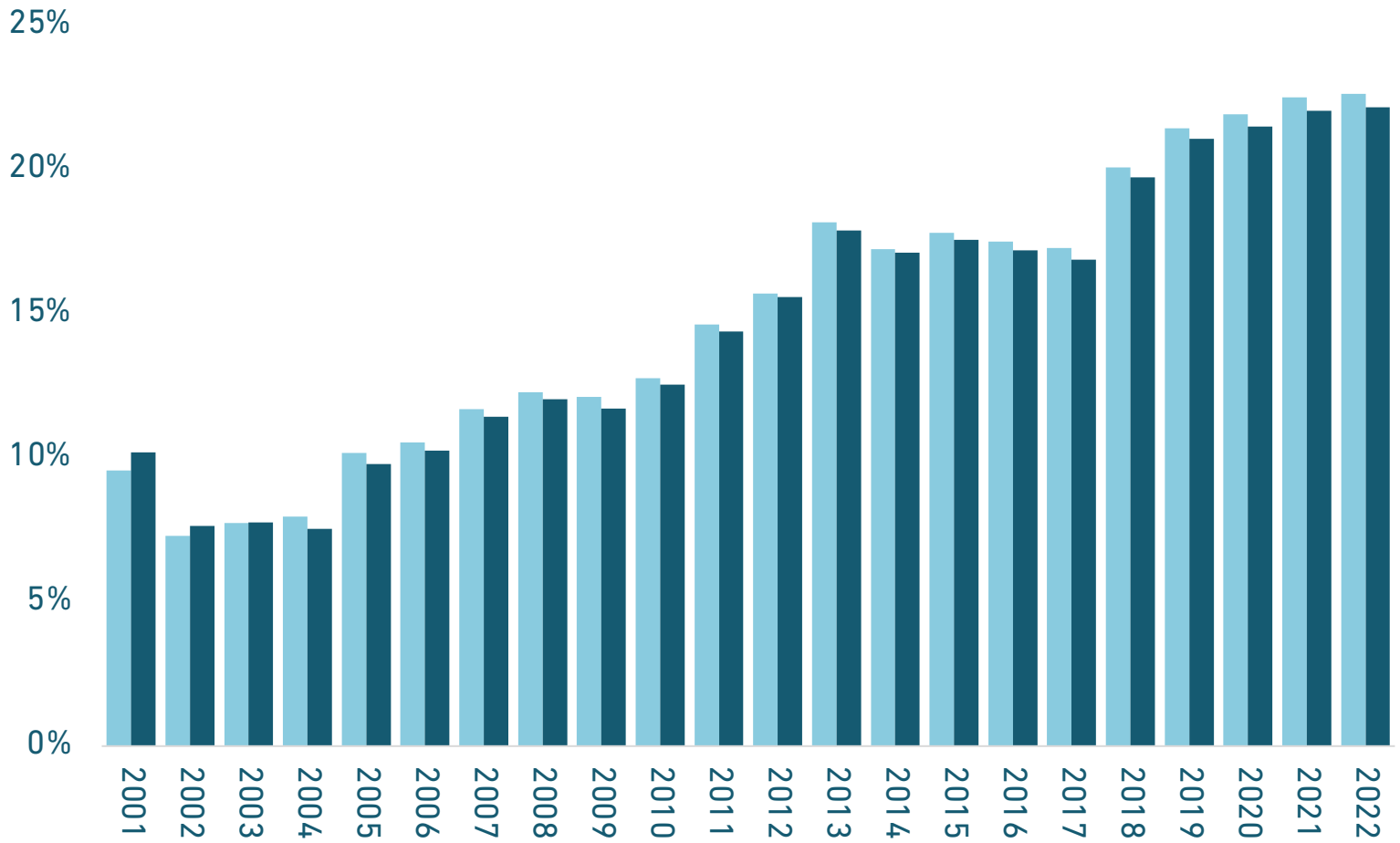
For Plans Not Participating in Social Security

For Plans Participating in Social Security

For Plans with Mixed Participation in SSA

Source: Equable Institute analysis of public plan valuation reports and ACFRs. Contribution rates show for the year actually paid.

AVERAGE STATE PLAN EMPLOYER CONTRIBUTIONS
FOR MIXED SSA PARTICIPATION PLANS | 2001-2022



Unlike member contribution rates, there is a similar average employer contribution rate trendline for state and local pension plans 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

For Plans With Mixed SSA, without CalPERS

Source: Equable Institute analysis of public plan valuation reports and ACFRs. 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*

  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; rate changes were modified in 2020.

- *South Carolina Retirement System, FY2017-18 to 2022-23*

  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.

- *Wyoming Retirement System, September 2018 to July 2021*

  Member and employer contributions increased in 25 basis point steps up to 9.25% and 9.37%, respectively.

- *Texas Teachers Retirement System, FY2019-20 to 2024-25*

  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).

- *Arkansas Teachers' Retirement System, FY2019-20 to 2023-24*

  District employers and members will each have a 25-basis-point-a-year increase in contributions for four years.

- *New Mexico PERA (State & Local), FY2020-21 to 2025-26*

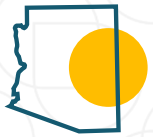
  Member and employer contributions increased 50 basis points a year for four years (two-year delay before municipal employee increase starts).

Source: Equable Institute analysis of public plan valuation reports, ACFRs, 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

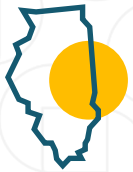
Arizona SRS (State & Local)

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 (7.66% 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 investment performance (2017)
- PA Teachers, linked to invest. performance (2017)
- CO PERA, linked to ADC change (2018)
- NM State & Local, linked to funded ratio (2020)
- 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.

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.

APPENDIX 3: METHODOLOGICAL NOTES

WHO ARE WE COUNTING?

- For our analyses we focus on statewide and municipally-managed retirement systems and the various Defined Benefit plans within those systems. Eligible plans hold at least $1 billion in accrued liabilities.
- For certain retirement systems we separate their respective plans (e.g., Colorado PERA is split into four plans) and count each separately 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 167 statewide retirement plans and 61 municipally-managed retirement plans across the 50 states and Washington, D.C. In total, this results in 228 plans that provide benefits for both state and local public employees being included in our analyses.
- A full list of included plans is available on pages 91 to 94.

WHAT YEARS ARE WE MEASURING?

- Our analyses focus on the years 2001 through 2021 (for reported data) and 2022 for our projections.
- We use reported figures for fiscal year ending (FYE) 2021 for all plans that 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 2020 when a roll-forward is not possible.
- We will update this report later this year when all FYE 2021 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 here.

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.

- 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 41: "Unfunded Liability of Public Pensions as a Share of National GDP" uses the Federal Reserve's asset and liability data, which differ 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), "student loans owned and securitized" (Student Debt), "revolving consumer debt" (Credit Card Debt).

- Pages 53, 55, & 56: A common proxy for the trendline 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 2021 is the actuarial valuation published by the retirement system.
- For pension finance data not available in the valuation, we also use the system's ACFR and separately published GASB 67 statements.
- State GDP data are compiled from both the Bureau of Economic Analysis and Federal Reserve.
- State budget data are drawn from the National Association of Budget Officers' annual State Expenditure Report.
- Interest rate data and pre-2001 pension finance data are drawn from the Federal Reserve.

HOW WE PRODUCED OUR 2022 FUNDED RATIO ESTIMATE

- We collected asset allocation data for each plan using their most recent published report, usually in the ACFR but occasionally via an investment report on the plan's website. We broke these 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 others 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 2022 unfunded liability and funded ratio levels.

- For plans with fiscal years ending later than June 2022, we only rolled their assets and liabilities forward as far as June 30, 2022. 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 2022 to vary from our current estimate.

APPENDIX 4: STATEWIDE RETIREMENT SYSTEMS IN OUR DATA SET

RETIREMENT SYSTEMS IN OUR DATA SET (Alameda County – Hartford Muni)

Retirement System Full Name	*Pension Plan Shorthand*
Alameda County Employees' Retirement Association	Alameda County ERS
Alaska Public Employees' Retirement System	Alaska PERS
Alaska Teachers' Retirement System	Alaska TRS
Arizona Corrections Officers Retirement Plan	Arizona CORP
Arizona Elected Officials Retirement Plan	Arizona EORP
Arizona Public Safety Personnel Retirement System	Arizona PSPRS
Arizona Public Safety Personnel Retirement System – Tier 3	Arizona PSPRS Tier 3
Arizona State Retirement System	Arizona SRS
Arkansas Local Police and Fire Retirement System	Arkansas Local P&F
Arkansas Public Employees Retirement System	Arkansas PERS
Arkansas State Highway Employees Retirement System	Arkansas DOT
Arkansas Teacher Retirement System	Arkansas TRS
Atlanta General Employees' Pension Fund	Atlanta ERS
Atlanta Police Officers' Pension Fund	Atlanta Police
Austin Firefighters Relief and Retirement Fund	Austin FRS
Baltimore Fire and Police Employees' Retirement System	Baltimore Fire and Police
Baton Rouge City Parish Employees' Retirement System	Baton Rouge City Parish RS
Birmingham Retirement & Relief System	Birmingham RRS
Board of Education Retirement System of the City of New York	New York City BERS
California Public Employees Retirement Systems – Judges	California JRF
California Public Employees Retirement Systems – PERF	CalPERS
California Public Employees Retirement Systems – Judges II	California JRF II
California State Teachers' Retirement System	CalSTRS
Chicago Metropolitan Water Reclamation District Retirement Fund	Chicago Water
Chicago Municipal Employees' Annuity Benefit Fund	Chicago Municipal
Chicago Policemen's Annuity Benefit Fund	Chicago Police
Cincinnati Employees' Retirement System	Cincinnati ERS
City of Austin Employees' Retirement System	Austin ERS
Colorado Fire and Police Pension Association	Colorado P&F
Colorado Public Employees Retirement Association – Judges	Colorado Judges
Colorado Public Employees Retirement Association – Denver Public Schools	Colorado DPS
Colorado Public Employees Retirement Association – Local	Colorado Local
Colorado Public Employees Retirement Association – Schools	Colorado Schools
Colorado Public Employees Retirement Association – State	Colorado State
Connecticut Municipal Employees Retirement System	Connecticut MERS
Connecticut State Employees Retirement System	Connecticut SERS
Connecticut State Teachers' Retirement System	Connecticut STRS
Contra Costa County Employees' Retirement Association	Contra Costa County
Cook County Employees' Annuity Benefit Fund	Cook County ERS
Dallas Police and Firefighters Retirement System	Dallas PFRS
Delaware State Employees' Pension Plan	Delaware SEPP
Denver Employees Retirement System	Denver ERS
Detroit General Retirement System - Component I	Detroit General RS 1
Detroit General Retirement System - Component II	Detroit General RS 2
Detroit Police and Fire Retirement System - Component I	Detroit PFRS 1
Detroit Police and Fire Retirement System - Component II	Detroit PFRS 2
District of Columbia Retirement Board – Teachers	D.C. TRP
District of Columbia Retirement Board – Police & Fire	D.C. POFRP
Educational Employees' Supplementary Retirement System of Fairfax County	Fairfax County Schools
Employees Retirement System of Texas – General	Texas ERS
Employees Retirement System of Texas – LECOS	Texas LECOS
Employees' Retirement System of Rhode Island – State	Rhode Island ERS-S
Employees' Retirement System of Rhode Island - Teachers	Rhode Island ERS-T
Employees' Retirement System of the State of Hawaii	Hawaii ERS
Fairfax County Employees' Retirement System	Fairfax County ERS
Firefighters Retirement System of Louisiana	Louisiana FRS
Firemen's Annuity and Benefit Fund of Chicago	Chicago Firemen
Florida Retirement System	Florida RS
Georgia Employees' Retirement System	Georgia ERS
Georgia Teachers Retirement System	Georgia TRS
Hartford Municipal Employees' Retirement Fund	Hartford MERF

RETIREMENT SYSTEMS IN OUR DATA SET (Houston Fire – Missouri DOT)

Retirement System Full Name	*Pension Plan Shorthand*
Houston Firefighters Relief and Retirement Fund	Houston PFRS
Houston Municipal Employees Pension System	Houston MEPS
Illinois Municipal Retirement Fund	Illinois MRF
Illinois State Employees Retirement System	Illinois SERS
Illinois State Teachers' Retirement System	Illinois TRS
Illinois State University Retirement System	Illinois SURS
Indiana Public Retirement System – Teachers Pre-96	Indiana TRF Pre-96
Indiana Public Retirement System – 1977 Police & Fire	Indiana 1977 P&F
Indiana Public Retirement System	Indiana PERF
Indiana Public Retirement System – Teachers 1996	Indiana TRF 1996
Iowa Municipal Fire and Police Retirement System	Iowa MFPRS
Iowa Public Employees' Retirement System	Iowa PERS
Jacksonville General Employees Retirement Plan	Jacksonville ERS
Judges' Retirement System of Illinois	Illinois JRS
Kansas City Missouri Employees' Retirement System	Kansas City Missouri ERS
Kansas City Missouri Public School Retirement System	Kansas City Missouri Schools
Kansas Public Employees' Retirement System – Schools	Kansas PERS-T
Kansas Public Employees' Retirement System – Local	Kansas PERS-L
Kansas Public Employees' Retirement System – Judges	Kansas JRS
Kansas Public Employees' Retirement System – State	Kansas PERS-S
Kansas Public Employees' Retirement System – Police & Fire	Kansas PF
Kentucky Retirement System – State	Kentucky ERS
Kentucky Retirement System – County	Kentucky CERS
Kentucky State Police Retirement System	Kentucky SPRS
Kentucky Teachers' Retirement System	Kentucky TRS
Kern County Employees' Retirement Association	Kern County ERS
Laborers' & Retirement Board and Employees' Annuity and Benefit Fund of Chicago	Chicago Laborers
Los Angeles City Employees' Retirement System	Los Angeles ERS
Los Angeles City Fire and Police Pension System	Los Angeles Fire and Police
Los Angeles County Employees Retirement Association	LA County ERS
Los Angeles Water and Power Employees' Retirement Plan	Los Angeles Water and Power
Louisiana Municipal Employees Retirement System	Louisiana MERS A
Louisiana Municipal Employees Retirement System	Louisiana MERS B
Louisiana Municipal Police Employees Retirement System	Louisiana MPERS
Louisiana School Employees' Retirement System	Louisiana SRS
Louisiana State Employees' Retirement System	Louisiana LASERS
Louisiana State Parochial Employees Retirement System	Louisiana SPERS A
Louisiana State Parochial Employees Retirement System	Louisiana SPERS B
Louisiana State Police Retirement System	Louisiana SPRS
Louisiana Teachers' Retirement System	Louisiana TRS
Maine Public Employees Retirement System – Local	Maine CPPLD
Maine Public Employees Retirement System – State & Teacher	Maine SETP
Maryland State Retirement and Pension System – Teachers	Maryland TCS
Maryland State Retirement and Pension System – General	Maryland ECS
Massachusetts State Employees' Retirement System	Massachusetts SERS
Massachusetts Teachers' Retirement System	Massachusetts TRS
Miami Firefighters' and Police Officers' Retirement Trust	Miami Fire and Police
Michigan Municipal Employees' Retirement System	Michigan MERS
Michigan Public School Employees' Retirement System	Michigan PSERS
Michigan Public School Employees' Retirement System – Pension Plus 2	Michigan PSERS PPP2
Michigan Public School Employees' Retirement System – Pension Plus	Michigan PSERS PPP
Michigan State Employees' Retirement System	Michigan SERS
Michigan State Police Retirement System	Michigan SPRS
Milwaukee City Employees' Retirement System	Milwaukee City ERS
Milwaukee County Employees' Retirement System	Milwaukee County ERS
Minnesota Public Employees Retirement Association – General	Minnesota GERF
Minnesota Public Employees Retirement Association – Police & Fire	Minnesota PEPFP
Minnesota State Employees Retirement Fund	Minnesota SERF
Minnesota Teachers Retirement Association	Minnesota TRA
Missouri Department of Transportation and Highway Patrol Employees' Retirement System	Missouri DOT

RETIREMENT SYSTEMS IN OUR DATA SET (Missouri LGERS – San Diego City)

Retirement System Full Name	*Pension Plan Shorthand*
Missouri Local Government Employees Retirement System	Missouri LGERS
Missouri PSRS/PEERS Combined System	Missouri PSRS
Missouri PSRS/PEERS Combined System	Missouri PEERS
Missouri State Employees' Retirement System	Missouri SERS
Montana Public Employees' Retirement System	Montana PERS
Montana Teachers' Retirement System	Montana TRS
Montgomery County (MD) Employees' Retirement System	Montgomery Co. Maryland ERS
Municipal Employees' Retirement System of Rhode Island	Rhode Island MERS
Nashville Davidson Metropolitan Employee Benefit System	Nashville-Davidson ERS
Nebraska Public Employees Retirement System - State Employees Cash Balance	Nebraska PERS-CB
Nebraska Public Employees Retirement Systems - School Employees Plan	Nebraska SEP
New Hampshire Retirement System	New Hampshire RS
New Jersey Police & Firemen's Retirement System – State	New Jersey PFRS-S
New Jersey Police & Firemen's Retirement System – Local	New Jersey PFRS-L
New Jersey Public Employees' Retirement System – Local	New Jersey PERS-L
New Jersey Public Employees' Retirement System – State	New Jersey PERS-S
New Jersey Teachers' Pension & Annuity Fund	New Jersey TPAF
New Mexico Educational Retirement Board	New Mexico ERB
New Mexico Public Employees Retirement Association	New Mexico PERA
New York City Employees' Retirement System	New York City ERS
New York City Fire Pension Fund	New York City Fire
New York Police Pension Fund	New York City Police
New York State Teachers' Retirement System	New York STRS
New York State and Local Retirement System – Police & Fire	New York SLRS PFRS
New York State and Local Retirement System – State	New York SLRS ERS
North Carolina Total Retirement Plans – Teachers and State Employees	North Carolina TSERS
North Carolina Total Retirement Plans – Local	North Carolina LGERS
North Dakota Public Employees Retirement System	North Dakota PERS
North Dakota Teachers' Fund for Retirement	North Dakota TFR
Ohio Highway Patrol Retirement System	Ohio HRS
Ohio Police and Fire Pension Fund	Ohio PFPF
Ohio Public Employees' Retirement System	Ohio PERS
Ohio School Employees' Retirement System	Ohio SERS
Ohio State Teachers' Retirement System	Ohio STRS
Oklahoma Firefighters Pension & Retirement System	Oklahoma FRS
Oklahoma Law Enforcement Retirement System	Oklahoma LERS
Oklahoma Police Pension and Retirement System	Oklahoma PPRS
Oklahoma Public Employees Retirement System	Oklahoma PERS
Oklahoma Teachers' Retirement System	Oklahoma TRS
Omaha Police & Fire Retirement System	Omaha Police and Fire
Orange County Employees Retirement System	Orange County ERS
Oregon Public Employees Retirement System	Oregon PERS
Pennsylvania Municipal Retirement System	Pennsylvania MRS
Pennsylvania Public School Employees' Retirement System	Pennsylvania PSERS
Pennsylvania State Employees' Retirement System	Pennsylvania SERS
Philadelphia Municipal Retirement System	Philadelphia Municipal
Phoenix Employees' Retirement System	Phoenix ERS
Providence Employee Retirement System	Providence ERS
Public Employee Retirement System of Idaho	Idaho PERS
Public Employees' Retirement System of Mississippi	Mississippi PERS
Public Employee's Retirement System of Nevada – Regular	Nevada PERS-R
Public Employee's Retirement System of Nevada – Police & Fire	Nevada PERS-PF
Public School Retirement System of the City of St. Louis	St. Louis School Employees
Public School Teachers' Pension and Retirement Fund of Chicago	Chicago Teachers
Retirement Plan for Chicago Transit Authority Employees	Chicago Transit
Retirement Systems of Alabama – State Employees	Alabama ERS
Retirement Systems of Alabama – Teachers	Alabama TRS
Richmond Retirement System	Richmond RS
Sacramento County Employees' Retirement System	Sacramento County ERS
San Diego City Employees' Retirement System	San Diego City ERS

RETIREMENT SYSTEMS IN OUR DATA SET (San Diego County - Wyoming)

Retirement System Full Name	*Pension Plan Shorthand*
San Diego County Employees Retirement Association	San Diego County
San Francisco City & County Employees' Retirement System	San Francisco City & County
Seattle Employees' Retirement System	Seattle ERS
South Carolina Police Officers' Retirement System	South Carolina PORS
South Carolina Retirement System	South Carolina RS
South Dakota Retirement System	South Dakota RS
St. Paul Teachers Retirement Fund	St. Paul Teachers
State Police Retirement System of New Jersey	New Jersey SPRS
Teachers' Retirement System of the City of New York	New York City Teachers
Tennessee Consolidated Retirement System – Teachers	Tennessee TRP
Tennessee Consolidated Retirement System – Public Employees Plan	Tennessee PERP
Tennessee Consolidated Retirement System – Teacher Legacy Plan	Tennessee TLPP
Texas County & District Retirement System	Texas CDRS
Texas Municipal Retirement System	Texas MRS
Texas Teachers Retirement System	Texas TRS
Tucson Supplemental Retirement System	Tucson Supplemental RS
University of California Retirement System	California URS
Utah Retirement System – Public Safety Noncontributory	Utah PSN
Utah Retirement System – Judges	Utah Judges
Utah Retirement System – Contributory	Utah CRS
Utah Retirement System – Fire	Utah FRS
Utah Retirement System – Public Safety Contributory Tier 2	Utah PSC-T2
Utah Retirement System – Contributory Tier 2	Utah CRS-T2
Utah Retirement System – Noncontributory	Utah NRS
Utah Retirement System – Public Safety Contributory	Utah PSC
Vermont Municipal Employees' Retirement System	Vermont Muni
Vermont State Employees' Retirement System	Vermont SERS
Vermont State Teachers' Retirement System	Vermont STRS
Virginia Retirement System – Judges	Virginia JRS
Virginia Retirement System – State Police	Virginia SPORS
Virginia Retirement System – Teachers	Virginia RS-T
Virginia Retirement System – State Employees	Virginia RS-S
Virginia Retirement System – Law Enforcement Officers	Virginia LORS
Virginia Retirement System – Political Subdivisions (Local)	Virginia RS-L
Washington Law Enforcement Officers' and Firefighters Retirement System	Washington LEOFF Plan 1
Washington Law Enforcement Officers' and Firefighters Retirement System	Washington LEOFF Plan 2
Washington Public Employees' Retirement System	Washington PERS 2/3
Washington Public Employees' Retirement System	Washington PERS 1
Washington Public Safety Employees' Retirement System	Washington PSERS 2
Washington School Employees' Retirement System	Washington SERS 2/3
Washington State Patrol Retirement System	Washington SPRS 1/2
Washington Teachers Retirement System	Washington TRS 2/3
Washington Teachers Retirement System	Washington TRS 1
West Virginia Public Employees' Retirement System	West Virginia PERS
West Virginia Teachers' Retirement System	West Virginia TRS
Wisconsin Retirement System	Wisconsin RS
Wyoming Retirement System	Wyoming RS

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. In effect, 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.

We focus in this report on the largest statewide and municipal retirement systems (measured as those with at least $1 billion in promised benefits). We use publicly available data reported by the retirement systems themselves, primarily from valuation reports and annual comprehensive financial reports.

Reviewing historic trends is an important assessment tool because it allows us to avoid becoming too caught up in the moment-to-moment data. Last year (FYE 2021) was one of the best years on record for annualized investment returns, followed up this year (FYE 2022) by widespread losses. And all of that was preceded by a highly volatile marketplace in 2020. At any point over the past three years pension funded status might have looked particularly good or bad. However, taken as a whole, the last three years have seen slight improvement.

Ultimately, the analysis of state and local retirement system trends leads to two enduring and essential points that should always be kept in mind when assessing a government pension plan:

> 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.

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 are released, we will update our figures online. See methodological notes for details.