Appendix: Methodology

The Pew Charitable Trusts' brief, "Successful Retirement Systems Offer a Roadmap for Other States," reports findings for the following nine metrics, each of which involves a distinct methodology. For information on what these metrics measure and how they can be used to evaluate retirement plan sustainability, please see the full brief. The individual metrics' methodologies are as follows:

Replacement income ratio

Pew calculated the replacement rate for 81 public sector retirement systems, including each state's primary plan for general state workers and teachers and for other school employees. In most cases, these plans do not cover public safety employees, judges, or legislators. Of the systems studied, 63 participate in Social Security and 18 do not.

Pew's analysis assumes that workers become eligible for retirement benefits after 35 years of service, based on a start age of 30 and retirement at age 65. The starting salary and payroll growth assumptions are based on an analysis of new employees in several state pension plans.

For defined benefit (DB) plans, Pew calculates the base benefit using plan-specific multipliers and final average salary calculations, as well as the 35-years-of-service assumption. For defined contribution (DC) plans, Pew determines the DC account balance at retirement, which consists of plan-specific annual employer and employee contributions, plus 6% accrued annual interest. The balance is then converted into lifetime payments using an annuity rate of 3%, which is based on applicable federal rates.[i] For hybrid plans, Pew uses a combination of the methods, and for cash balance plans, it uses plan-specific interest crediting rates and annuitization rates.

Most plans offer a post-retirement benefit increase or cost-of-living adjustment (COLA) to address inflation, but the adjustments usually are not sufficient to completely offset rising costs of living. Pew uses common mortality assumptions to estimate how many years an employee will spend in retirement, assumes a 2.2% inflation rate, and makes plan-specific COLA assumptions to calculate the average replacement ratio during retirement.

Pew's Social Security calculations replicate the official Social Security calculator, using inputs for work start and end years, salary, and salary growth. Benefits typically range from 30% to 40% of final salary and Pew uses an estimate of 33% for this calculation.

The final adjustment to the replacement income metric is to determine the extent to which retirement benefits replace take-home pay rather than final salary. To calculate take-home pay, Pew subtracts the employee's contributions to Social Security, Medicare, and the state retirement system from the final salary.

Pew used the following assumptions in the replacement income metric calculation:

Annual inflation rate	2.2%
Annual payroll growth rate	3.0%
DC annuitization rate	3.0%
DC interest rate	6.0%
Age at exit	65
Years of service	35
Starting salary	$27,453
Expected number of years in retirement	23
Social Security replacement rate	33%
Social Security and Medicare contribution rate	7.65%

Savings rate

Pew calculated the savings rate for 81 public sector retirement systems, including each state's primary plan for general state workers and teachers and for other school employees. In most cases, these plans do not cover public safety employees, judges, or legislators. Of the systems studied, 63 participate in Social Security and 18 do not.

For each retirement system, Pew calculated the savings rate for new plan members by adding all employee contributions to any employer contributions that the employee is able to withdraw at separation.

Nine state systems offer workers the choice between a plan with a DB component—either a standard DB plan or hybrid plan—and a DC plan. For these states, Pew based its analysis on the default plan. In most cases, the savings rates for the default and alternative plans are very similar. However, they differ substantially in a few instances. In particular, the North Dakota Public Employees Retirement System's and South Carolina Retirement System's defined contribution plans have savings rates that meet the 12% benchmark, but the default defined benefit options do not.

In some systems, contributions vary from year to year based on actuarially determined rates. For these plans, Pew used contribution rates as of 2023.

Although nearly all public sector workers have the choice to also participate in defined contribution accounts as a supplement to their DB plans, Pew did not include these accounts in its analysis because participation is optional and employee contributions are typically low.[ii]

Net amortization

For the three fiscal sustainability metrics—net amortization, operating cash flow, and historical contribution volatility—Pew aggregates data collected from more than 230 state pension plans. Pew assigns funding data to a year based on the valuation period, rather than on when the data is reported. Because of the lags in valuation in many state pension plans, 2022 is the most recent year for which comprehensive data was available for all 50 states.

Pew first calculates a net amortization benchmark for each state pension plan. This calculation begins with adding the service cost and the interest on the pension debt and then subtracting employee contributions to determine the contribution amount needed from employers. To deal with timing issues—employer and employee contributions usually come in over the course of the fiscal year, but pension plan reporting is based on the results at the end of the fiscal year—Pew also adds half a year's worth of interest to employer and employee contributions.

Using this benchmark, Pew then determines each plan's net amortization. Pew has established baselines for positive, negative, and stable amortization based on whether contributions exceed, fall short of, or meet the benchmark. Pew defines positive amortization as when employer contributions exceed the benchmark by at least 0.5% of payroll, negative amortization as when contributions fall short of the benchmark by at least 0.5% of payroll, and stable amortization as when contributions that fall between those thresholds. Categorizing states as stable when the difference, as a share of payroll, between employer contributions and the benchmark is within a one percentage point helps address volatility of plan funding and timing gaps between when plans set their contribution targets and when payments are made.

These calculations are based on state pension plans' own reported numbers and rely on the information in the Government Accounting Standards Board-required disclosures included in state and local pension plans' financial reports.

Operating cash flow

For the three fiscal sustainability metrics—net amortization, operating cash flow, and historical contribution volatility—Pew aggregates data collected from more than 230 state and local pension plans. Pew assigns funding data to a year based on the valuation period, rather than on when the data is reported. Because of the lags in valuation in many state pension plans, 2022 is the most recent year for which comprehensive data was available for all 50 states.

The operating cash flow ratio is the difference, as a share of plan assets, between benefit payments and other expenses versus employer and employee contributions. For purposes of this calculation, "plan assets" are those that each plan reports at the start of the fiscal year.

Historical contribution volatility

For the three fiscal sustainability metrics—net amortization, operating cash flow, and historical contribution volatility—Pew aggregates data collected from more than 230 state pension plans. Pew assigns funding data to a year based on the valuation period, rather than on when the data is reported. Because of the lags in valuation in many state pension plans, 2022 is the most recent year for which comprehensive data was available for all 50 states.

Historical contribution volatility measures the difference between the highest and lowest employer contribution rates from 2008 to 2022. Pew calculated this measure for all 50 states based on a review of well-funded state plans that had stable costs and were able to minimize changes in pension costs without sacrificing plan funding or long-term sustainability over the studied years.

Risk reporting

Pew reviewed publicly available actuarial valuations and other financial and actuarial reports for 100 public pension plans that account for 90% of state pension liabilities to determine whether at least one retirement system in each state conducted and published forward-looking assessments of investment risk on plan balance sheets and required contributions.

Pew did not review asset-liability studies, which can sometimes include investment risk assessments, because such reports target the investment portfolio or manager rather than plan fiduciaries or governmental plan sponsors.

Normal cost sensitivity

Normal cost sensitivity measures the expected volatility of employer costs for future benefits under a low-return scenario, based on the level of benefit, the assumed rate of return, and the presence or absence of tools to manage and mitigate risk. Pew sets the low return scenario at 5%.

This is a relative measure based on practices across the 50 states and applied to the 81 public sector retirement systems, including each state's primary plan for general state workers and teachers and other school employees. Pew evaluates systems based on the latest tier of benefits available to new workers.

Transparent fee disclosures

To evaluate governance transparency in public pension plans, Pew's team focused on the 73 largest state-sponsored pension funds, including at least one from each state. Together, these funds manage the majority of the nearly $5 trillion in assets under public pension plans in 2021. The data sources include plans' comprehensive annual financial reports, actuarial valuations, and other relevant documents published until 2022.

Pew's evaluation of fee disclosure practices focused on whether states' report investment performance net of fees or gross of fees. These plan-level evaluations were then combined to provide a state-level result. States were rated "net" if all their funds reported returns net of fees, as "multiple" if they had more than one plan and the various funds reported returns differently (e.g., one plan reporting net of fees and another reporting gross of fees), and as "gross" if all a funds reported gross of fees.

Investment policy statement

This evaluation considered whether plans' statements are comprehensive, transparent, and readily accessible to the public. These three criteria, in turn, were assessed based on three factors: whether a plan provides a standalone document that is easily accessible to stakeholders online, whether the plan articulates detailed investment strategies and asset allocation information, and whether it includes performance benchmarks. These plan-level evaluations were then combined to provide a state-level result.

As with transparent fee disclosures, Pew focused on the 73 largest state-sponsored pension funds, including at least one from each state. Together, these funds manage the majority of the nearly $5 trillion in assets under public pension plans in 2021. Data sources included plans' comprehensive annual financial reports, actuarial valuations, and other relevant documents published until 2022.

States where all funds provided a statement that met Pew's criteria, received a "Yes" rating. Those where no funds provided a statement that met Pew's criteria were rated "No." And states with multiple plans that had differing results (e.g., one plan receiving a "Yes" and another receiving a "No"), were coded "Partial."

Endnotes

[i] "Section 7520 Interest Rates for Prior Years," Internal Revenue Service, https://www.irs.gov/businesses/small-businesses-self-employed/section-7520-interest-rates-for-prior-years#2016. Calculating an annuity from accumulated retirement savings requires assumptions about the interest that can be generated from the savings used to fund the annuity through the recipient's retirement. Pew takes a 15-year average of 120% of the federal midterm rate.

[ii] Matt Petersen and Jack VanDerhei, "The State of Public Sector DC Plans: A First Look at the PRRL Database," Public Retirement Research Lab, 2021, https://www.nagdca.org/wp-content/uploads/2021/02/PRRL-Study_The-State-of-DC-Plans_A-First-Look_FINAL.pdf.