



Public Fund Survey

SUMMARY OF FINDINGS FOR FY 2022

NOVEMBER 2023



ABOUT THE PUBLIC FUND SURVEY

The Public Fund Survey is an online compendium of key characteristics and trends affecting most of the nation's largest public retirement systems. The Survey is provided by the National Association of State Retirement Administrators.

First published in 2003 based on FY 02 findings including comparatives from FY 01, this marks the 21st edition of the Public Fund Survey Summary of Findings. The Survey contains data on public retirement systems that provide pension and other benefits for 13.1 million active (working) members and 10.6 million annuitants (those receiving a regular benefit, including retirees, disabilitants and surviving beneficiaries). At the end of fiscal year 2022, systems in the Survey held combined defined benefit plan assets of \$4.5 trillion. The membership and assets of systems included in the Survey comprise nearly 90 percent of the entire state and local government defined benefit plan community. Since FY 13, portions of survey data have been collected from Public Plans Data (PPD), an online, interactive resource containing public retirement system information culled chiefly by the Center for Retirement Research at Boston College from public retirement system annual financial reports and actuarial valuations. In addition to the Center for Retirement Research at Boston College, the PPD is sponsored also by NASRA, MissionSquare Research Institute, and the Government Finance Officers Association. This report, focusing on FY 22, uses graphs and narrative to illustrate and describe changes in selected elements of public retirement systems and the pension plans and funds they oversee.

Some of the information in this report is presented in the context of changes to median, or midpoint, data. Presenting changes based on a median, rather than aggregate (total) basis, reduces the effects of very large plans and plans with extreme or exceptional results, enabling readers to focus on the experience of a more typical plan instead of results that could be skewed by the experience of one or a few outliers.

PANDEMIC MARKET VOLATILITY

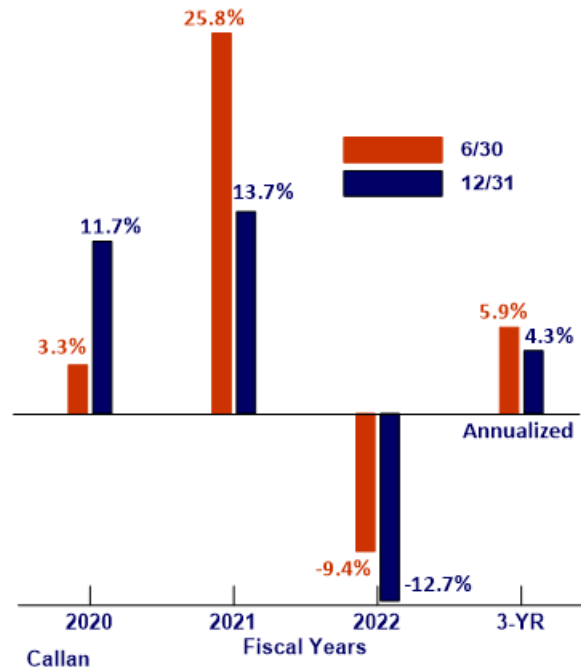
The pandemic affected public retirement systems in multiple ways, including through its effects on labor and capital markets, the US and global economies, state and national fiscal conditions, and changes in mortality rates. Because over time investment earnings account for most public pension fund revenue, a pension fund's investment experience can have a significant effect on its funding condition, especially in cases when that experience varies considerably from the plan's investment return assumption.

Following the onset of the COVID-19 pandemic in early 2020, the US economy and US and global capital markets began a period of exceptional volatility that lasted through 2022. After dropping by more than one-third from February to March, the S&P 500 rose from its low point in March 2020 by more than 65 percent at year's end. As shown in Figure 1, these strong equity gains that began in March contributed to a robust median public pension fund investment return for calendar year 2020 of 11.7 percent. Those gains continued through 2021, producing a median public pension fund return of over 25 percent for the year ended 6/30 and 13.7 percent for calendar year 2021. Markets then turned sharply lower in 2022; when pension plans' assumed investment returns are factored in, 2022 investment losses cancelled out the 2021 gains.



Figure 1 also shows the median annualized 3-year returns: a tepid 5.9 percent and 4.3 percent, respectively, for the pandemic period. Despite periods of spectacular gain, public pension funds in the median experienced investment results below their assumed rates of return.

Figure 1



SUMMARY OF FINDINGS

Figure A plots the aggregate actuarial funding level and the combined actuarial values of assets and liabilities among plans in the Survey since its inception in FY 2001. The aggregate funding level in FY 22 was 76.1 percent, down from 76.9 percent in FY 21. The decline in the aggregate funding level in FY 22 is attributable chiefly to the recognition of investment returns below assumptions in previous years, combined with investment returns in FY 22, that not only fell short of actuarial assumptions, but as shown in Figure O, were sharply negative.

The aggregate actuarial value of assets grew in FY 22 by 3.1 percent, from \$4.35 trillion to \$4.49 trillion. The actuarial value of assets reflects the periods most plans use to phase in investment gains and losses, a calculation also known as smoothing. Smoothing reduces year-to-year volatility in a pension plan's funding level and required cost. Because of actuarial smoothing, the aggregate value of actuarial assets increased despite the strongly negative investment returns, as prior years' investment gains offset the losses experienced in FY 22.

A few plans report their funding condition using their market value of assets and do not phase in, or smooth, investment gains and losses. One of these plans is the California Public Employees' Retirement System (CalPERS), which is the largest public pension plan in the nation as measured by



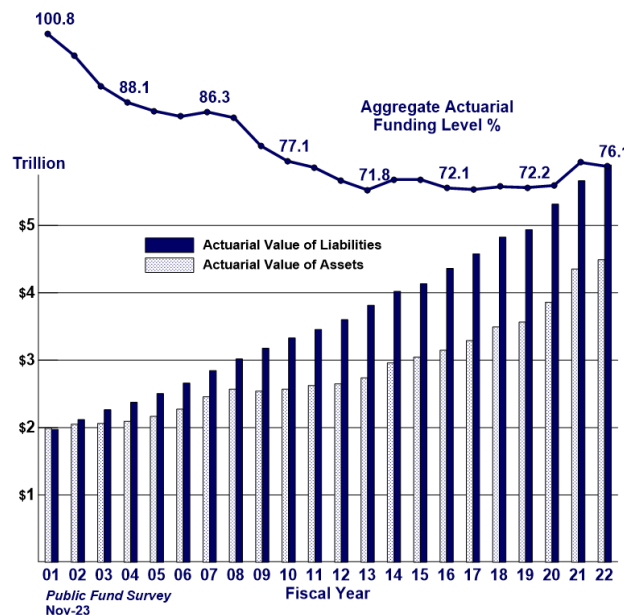
both assets and liabilities. Because of its size—CalPERS’ liabilities account for more than 10 percent of the total liabilities in the Survey—and because the plan does not smooth its investment gains and losses, in years when the CalPERS investment experience is dramatically above or below its actuarially assumed rate of return, the change in the plan’s funding level can have a material effect not just on the plan’s funding level, but also on the aggregate public pension funding level. This was the case this year, as the value of CalPERS’ assets declined from FY 21 to FY 22 by approximately \$38 billion, or 8.6 percent, dropping the plan’s actuarial funding level from 81.2 percent to 71.9 percent. If the CalPERS results were excluded from the Survey, the aggregate funding level would have risen marginally.

Combined liabilities of plans in the Survey grew by 4.1 percent, from \$5.66 trillion to \$5.90 trillion. Liabilities change as a result of four factors: a) because liabilities are a present value, they increase at a rate of interest equal to the prior year’s discount rate; b) new benefit accruals resulting from active participants accruing an additional year of service credit; c) payment of benefits to retired participants (which reduces liabilities); and d) changes in actuarial assumptions and actuarial experience that differs from assumptions.

Since the market decline of 2008-09 and the Great Recession, every plan in the Public Fund Survey has reduced its most consequential actuarial assumption—the rate of expected investment return. These lower investment return assumptions have created a strong headwind to efforts by public retirement systems and their plan sponsors to improve funding levels. Many plans also have adjusted other actuarial assumptions, including mortality assumptions to reflect expected longer lives. Like a lower investment return assumption, improved mortality assumptions result in a reduced plan funding level and higher cost, as plan participants are projected to receive benefits for a longer period of time.

See the [NASRA issue brief on investment return assumptions](#).

Figure A





FY 22 funding levels of the 130 plans in the Survey are depicted in Figure B. The size of each circle is roughly proportionate to the size of each plan's actuarial liabilities—larger bubbles reflect larger plans and smaller bubbles reflect smaller plans. The median funding level is 77.1 percent and the range is 21.8 percent to 114.7 percent. This chart illustrates the wide distribution of funding conditions among public pension plans, which is one outcome of the unique combination of the actuarial experience, assumptions, and methods of each plan in the Survey.

Figure B

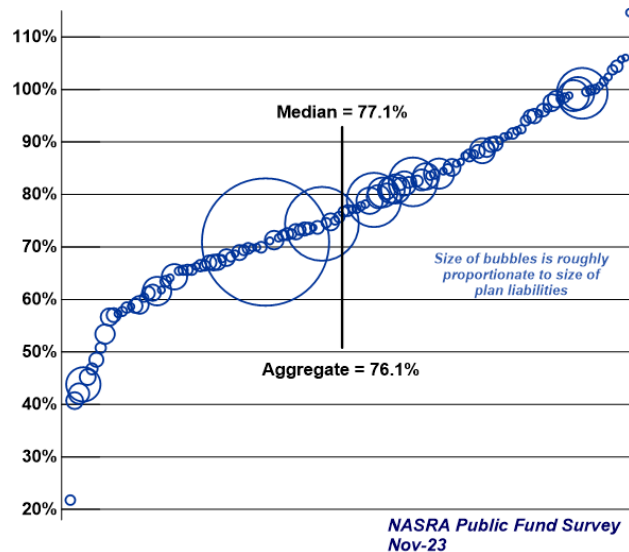


Figure C plots the median annual change since FY 02 among plans in the Survey in the actuarial value of assets and liabilities. For a pension plan's funding level to improve, its actuarial value of assets must grow faster than its liabilities. At a median rate below 4.0 percent for the fifth consecutive year, liability growth remains below historical rates and extends a trend of lower rates that began following the Great Recession. Low liability growth generally is due to factors that vary by plan, but typically include actual inflation below expectations (which generally results, among other things, in slower salary growth); plan maturity (i.e., fewer active (working) participants relative to the number of annuitants); and the effects of many reforms (predominantly reductions) in pension benefits **enacted in recent years**. Rates of liability growth would be even lower were many plans not also reducing their investment return assumptions (see Figure P), and adjusting mortality assumptions to reflect longer lives, changes that increase a plan's liabilities.

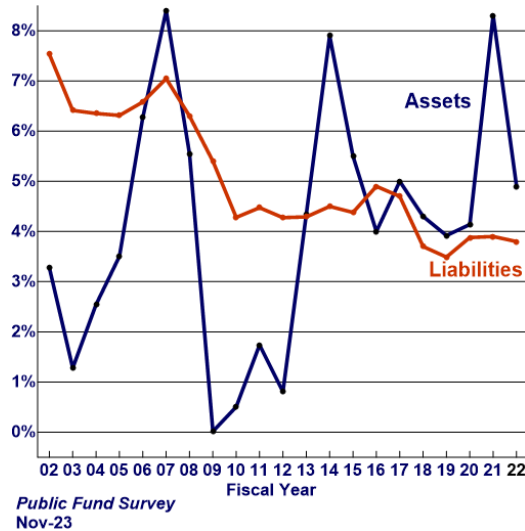
Approximately two-thirds of plans in the survey smooth their investment gains and losses over five years, and four-year smoothing is the second-most common period. The remaining plans phase in gains and losses over periods that range from zero (meaning no smoothing and using only the market value of assets), to 10 years.

Because five years is the predominant period used by plans to recognize investment gains and losses, a five-year investment return measure (as shown in Figure O) can be instructive in discerning the effect of recent market performance on the funding level of individual plans (where relevant) and in the aggregate. This is because a plan's investment performance can have a relatively large impact on its funding condition, particularly if the plan's return is significantly higher or lower than the plan's



assumed rate of investment return. For example, in the case of a theoretical plan with an investment return assumption of 7.0% and an actual annualized five-year investment return of 6.0%, assuming the plan achieved its other actuarial assumptions, that plan's funding level is likely to be lower because of its actual investment return underperforming its assumed investment return.

Figure C



The Survey measures two types of retirement system members: actives and annuitants. Actives are those who currently are working and earning retirement service credits; nearly all actives also make contributions toward the cost of their pension benefit. Annuitants are those who receive a regular benefit from a public retirement system; these are predominantly retired members, but also include those who receive a disability benefit (disabilitants), and survivors of deceased retired members.

As shown in Figure D, the median rate of increase in annuitants among systems in the Survey continued its trend of slower growth, increasing in FY 22 below 3.5 percent for the seventh consecutive year. Each year since FY 16, median growth in the number of annuitants has been below 3.5 percent, following a six-year period of growth above 3.5 percent. The number of active members grew modestly in FY 22, consistent with the trend of six years of marginal growth which occurred prior to a sharp one-year decline in FY 21, likely a result of pandemic-driven labor market disruptions. This pattern of change in the number of active members is consistent with US Census Bureau reports showing an increase in the number of state and local government employees, a trend Census data shows began in FY 14 and continued through early 2020 before the pandemic-induced employment declines, and has resumed with 19 consecutive months of growth in state and local employment as of October 2023.

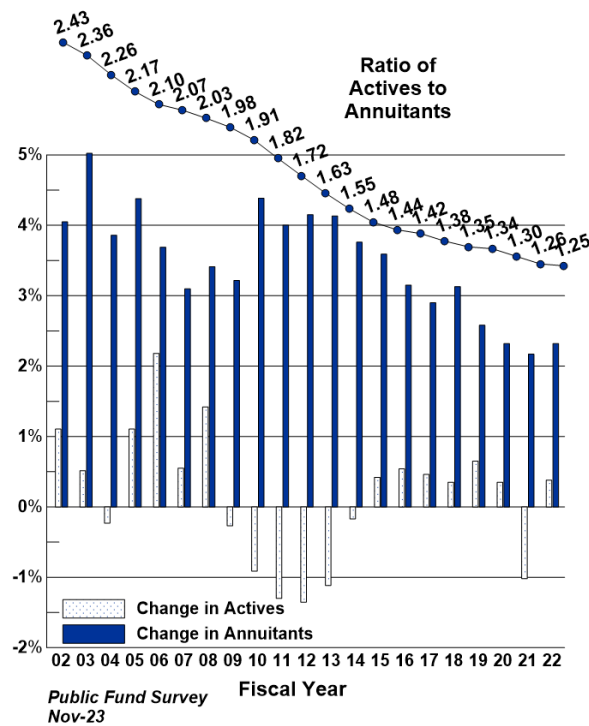
The difference between the continued increase in annuitants and a declining or slowly rising number of active members is driving a long-term reduction in the overall ratio of actives to annuitants. In FY 22, this ratio dropped to 1.25, a slower rate of decline driven by modest growth in the number of active members and continued slower growth in the number of annuitants.



A low or declining ratio of actives to annuitants is not necessarily problematic for a public pension plan. This is because the typical public pension funding model features accumulation, during plan participants' working years, of assets needed to fund their expected retirement benefits, in anticipation of higher rates of payout as members retire.

When combined with an unfunded liability, however, a low or declining ratio of actives to annuitants can cause financial distress for a pension plan sponsor. An unfunded liability represents a shortfall in accumulated assets and results in a cost of the plan above the normal cost (the cost of benefits earned each year); this additional cost is required to amortize or eliminate the unfunded liability over a period of years. (See more: [Overview of Public Pension Plan Amortization Policies](#), NASRA, April 2022) A lower ratio of actives to annuitants results in applying costs to amortize a plan's unfunded liability over a relatively smaller payroll base, which increases the cost of the plan as a percentage of employee payroll. Thus, although a declining active-annuitant ratio does not, by itself, pose an actuarial or financial problem, when combined with a poorly-funded plan, a low or declining ratio of actives to annuitants can result in higher required pension costs.

Figure D



On a market value basis, as of FY 22, systems in the Survey held a combined \$4.54 trillion in assets, a decline of 7.4 percent from FY 21. Figure E, which plots the fiscal year-end value of public pension funds in the Survey, reflects the result of market volatility in recent years. The change in the aggregate market value of assets from FY 10-FY 20 ranged from a decline of 0.6 percent to an increase of nearly 14 percent, with an average increase of 7.5 percent. The most recent two-year period has seen incredible volatility, with an exceptional increase in FY 21 driven by strong investment returns followed by a sharp decline of over seven percent in FY 22, which marks the largest decline in the aggregate market value of assets since FY 09. As the aggregate market value of



funds in the Public Fund Survey has grown by roughly \$1.7 trillion over the past decade, these same plans also have paid out approximately \$2.7 trillion in benefits. Collectively, the portion of assets held by the systems in the Survey represents nearly 90 percent of the total FY 22 public pension assets identified by the U.S. Census Bureau.

Figure E

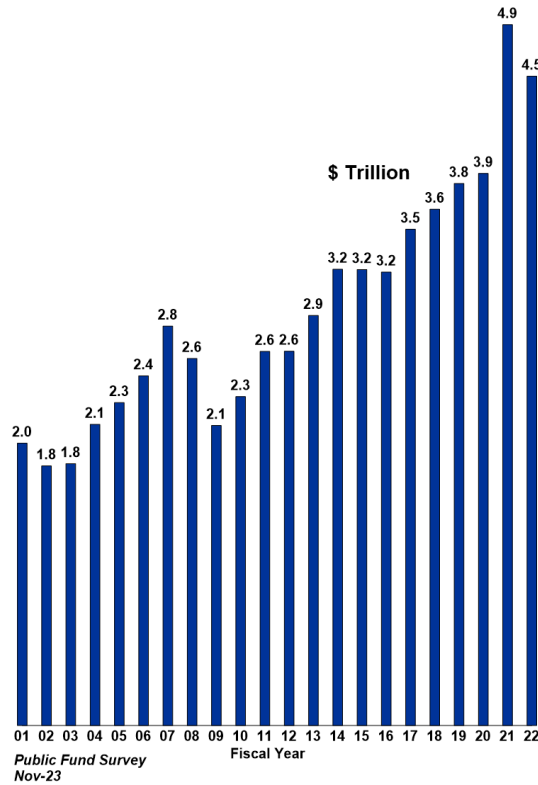


Figure F plots the combined revenues and expenditures of the systems in the Public Fund Survey. The green line reflects investment gains and losses, which vacillate as investment markets fluctuate. Blue bars indicate contributions, from employees and employers, and red bars show benefit payments. Contributions and benefit payments grow at mostly steady and predictable rates, while growth or decline in investment earnings is much more volatile, corresponding with volatility in global capital markets. This volatility is especially evident in the aggregate investment earnings for FY 21, which were by far the highest level in the measurement period, and the substantial market decline in FY 22. Because most plans pay out more each year in benefits than they receive in contributions, contributions are used to pay current benefits (as shown in Figure I), while most investment earnings accrue to pension trust funds. Pension trust funds are established for the sole purpose of paying benefits and funding administrative costs. The benefits paid by public retirement systems are paid from these trust funds, not from state and local government operating budgets or general funds.

Growth in levels of contributions and benefits is mostly stable and predictable over time. Investment earnings, which comprise over 60 percent of public pension revenues over the past 30 years, vacillate, often appreciably, depending on market performance (see Figure N).



Figure F

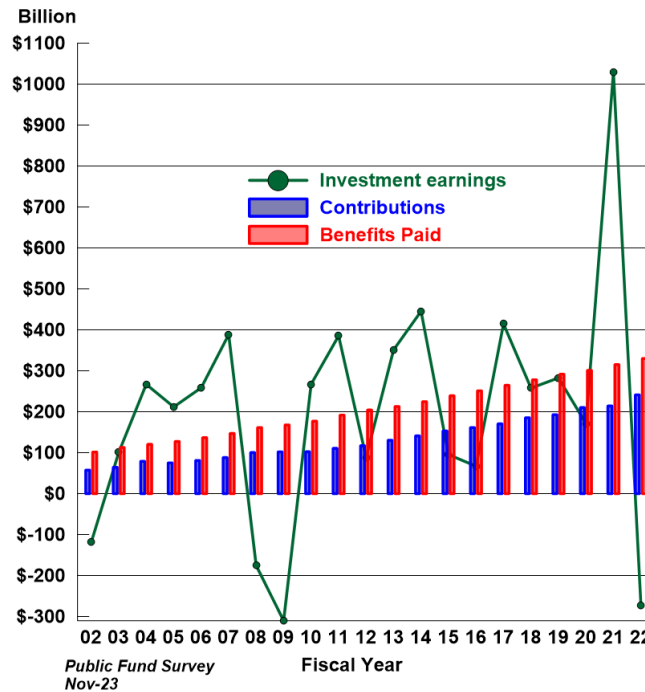


Figure G plots the distribution of the median annual change in payroll from FY 02 to FY 22 among plans in the Survey for which this data is available. (The chart excludes plans in the Survey that are closed to new hires. Closed plans have no new, active members joining, and the number of annuitants grows each year as active members retire or terminate.)

As Figure G shows, the median change in payroll was either negative or in decline from the prior year from FY 08 to FY 12, and increased slowly but steadily since, before reaching the lower end of a more typical range in FY 19 and FY 20. Declining state and local employment and slower state and local employee wage growth in FY 21 resulted in a sharp decline in the median change in payroll, to below two percent in FY 21, which was the lowest level since FY 13. Accelerating growth in state and local employment and wage growth resulted in a sharp increase in median payroll growth to just over four percent in FY 22, which marks the highest level since FY 08. Negative or slow payroll growth reflects one or both of two basic factors: stagnant or declining employment levels, and modest salary growth among employees of state and local government.

The payroll experience pattern of public pension plans following the Great Recession is corroborated by information provided by the U.S. Bureau of Labor Statistics, indicating that state and local employment levels stagnated before accelerating since FY 14, while annual growth in wages and salaries for employees of state and local government increased at a slower pace, remaining below two percent for seven years until FY 16. FY 19 saw the highest level of state and local employment growth since FY 07, and annualized state and local employee wage growth reached 2.5 percent in FY 19, which corresponds to median FY 19 public pension payroll growth above three percent for the first time since FY 09. Slow growth in state and local employment and employee wages during the pandemic resulted in a sharp decline in median payroll growth in FY 21, before a sharp reversal of those trends caused median payroll growth to accelerate in FY 22.



Payroll growth affects a pension plan actuarially because the long-term funding of most pension plans is based partly on expected growth in a pension plan's payroll base. When a plan's payroll grows at a rate less than expected, the base that is used to amortize the plan's unfunded liability is smaller, meaning that the cost as a percentage of payroll of amortizing the unfunded liability is larger. This situation is analogous to a mortgage, in which the mortgage-holder anticipates a growing salary to make her or his monthly mortgage payment. When salary growth does not materialize as anticipated, the cost of the mortgage payment as a percentage of expected income is higher.

Many pension plans in recent years have reduced their payroll growth assumption to reflect changing economic realities and expectations. As a result, higher payroll growth experience and assumptions for future payroll growth are converging.

Figure G

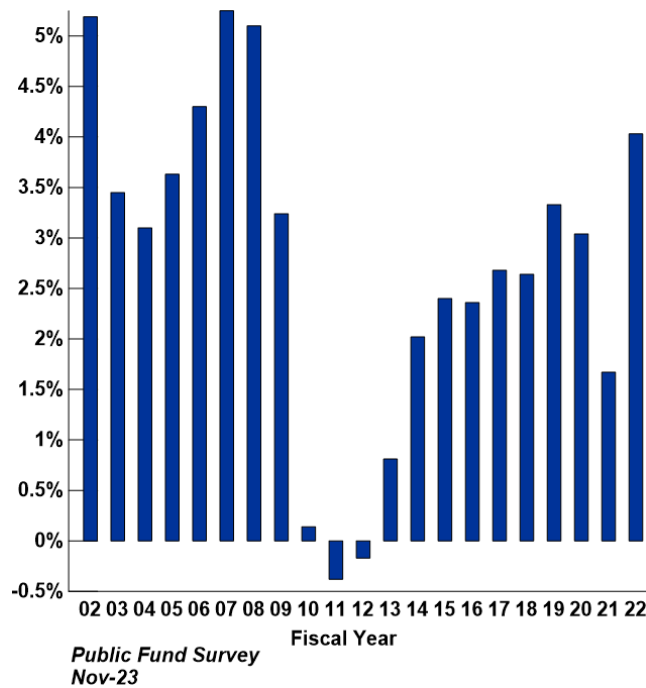


Figure H presents the distribution of change in payroll from FY 21 to FY 22, and the median payroll growth, for the 121 plans in the Survey that are open to new hires. The individual plan experience ranged from a decline of 3.6 percent to an increase of 13.9 percent, creating a wide range of outcomes between those two extremes.



Figure H

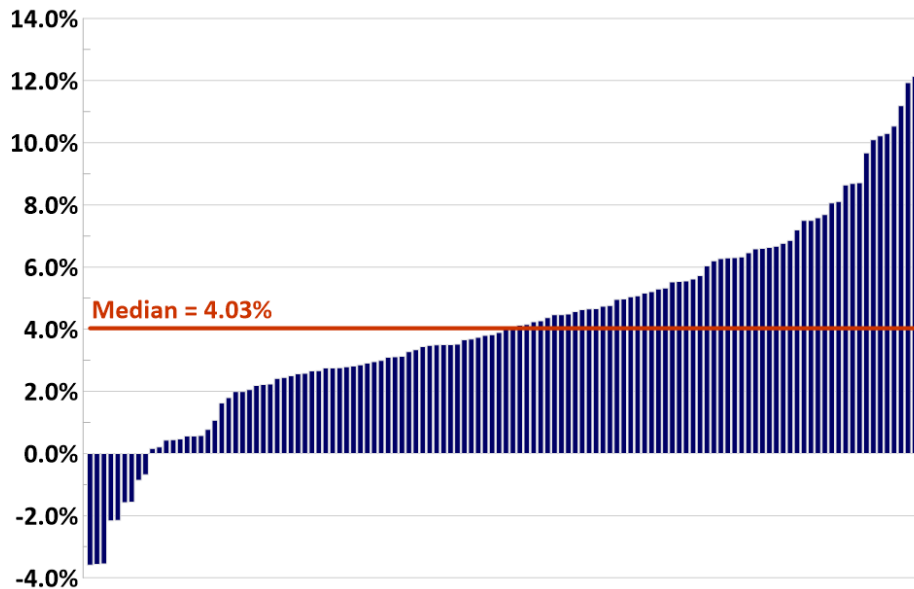


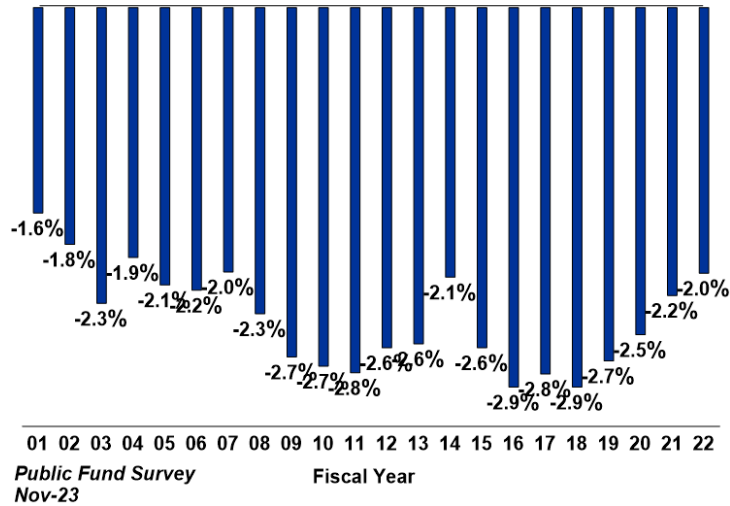
Figure I plots the median external cash flow as a percentage of assets since FY 01. External cash flow is the difference between a system’s revenue from contributions, and payouts for benefits and administrative expenses. External cash flow excludes investment gains and losses. Dividing a system’s cash flow into the market value of the system’s assets produces the measure of cash flow as a percentage of assets. A growing number of annuitants, combined with slow or negative growth in active members, will result in a reduction in a retirement system’s external cash flow. Conversely, a growing asset base will offset a rate of negative cash flow. Contributions made below the actuarially recommended rate can also contribute to a plan’s negative cash flow.

Nearly all systems in the survey have an external cash flow that is negative, meaning they pay out each year more in benefits and administrative expenses than they collect in contributions. Negative cash flow is not, by itself, an indication of financial or actuarial distress: the purpose of accumulating assets is to eventually pay them out as benefits. As a system matures, i.e., as its members age, and ultimately retire, the system will inevitably pay out in benefits relatively more compared to a less mature, younger system with fewer retirees. A lower (more negative) cash flow may require the system’s assets to be managed more conservatively, with a larger allocation to more liquid assets to meet current benefit payroll requirements. For example, in 2018, the Kentucky Public Pensions Authority reduced the investment return assumption of one of its plans—the Kentucky Employees’ Retirement System—to 5.25 percent, because the plan’s funding level (then below 20 percent) requires the fund to maintain a relatively large portion of its assets in more liquid securities that do not generate a significant investment return.

The median external cash flow increased for the fourth consecutive year in FY 22, to -2.0 percent, the highest rate since FY 07. This increase is most likely a result of a) higher levels of pension contributions received by many plans, including excess contributions above actuarial requirements, and b) slower rates of growth in the number of annuitants, to whom benefits are paid, in recent years.



Figure I



Figures J and K reflect changes in median employee and employer contribution rates. Figure J includes active members and employers for participants who also participate in Social Security; Figure K includes those participants and their employers who do not participate in Social Security. These contribution rates apply predominantly to general employees and public school teachers and do not reflect those for public safety workers and narrow employee groups, such as legislators, judges, etc.

Approximately one-quarter of employees of state and local government do not participate in Social Security, including approximately 40 percent of all public school teachers, and a majority to substantially all state and local government workers in seven states: Alaska, Colorado, Louisiana, Maine, Massachusetts, Nevada, and Ohio.

Nearly every state has made changes to its pension plan(s) design or financing arrangement, or both, since 2009; the most common change has been an increase in required employee contribution rates. This trend is reflected in Figures J and K. Following a lengthy period at 5.0 percent, Figure J shows the median employee contribution rate for employees participating in Social Security holding at 6.30 percent in FY 22, after several years at 6.0 percent and rising gradually to reach 6.30 percent in FY 21. Median contribution rates for non-Social Security-participating employees remained steady in FY 22 after reaching 9.0 percent first in FY 20, following many years at 8.0 percent.

Contribution rates among employers both in and out of Social Security have increased considerably since the inception of the Survey. This increase is due primarily to the increase in unfunded pension liabilities and, more recently, a strengthened effort among many employers to increase their contribution effort to pay a greater share of the actuarially determined contribution. FY 02, the first year of the contribution rates measurement period, was at or near the all-time low point for employer contribution rates. These low rates were a result partly of strong investment earnings in the late 1990s, as aggregate unfunded liabilities for the public pension community were around zero.



Figure J

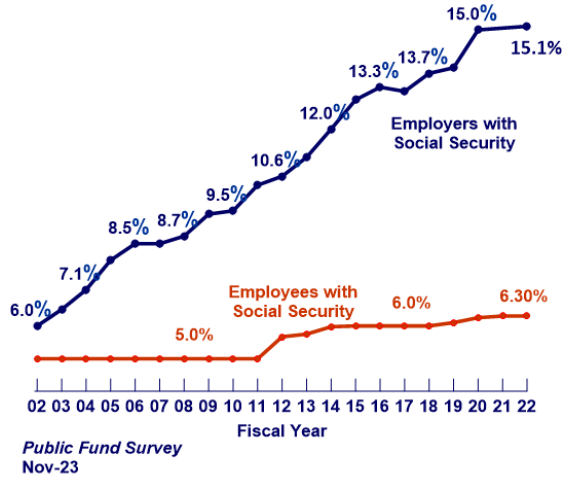


Figure K

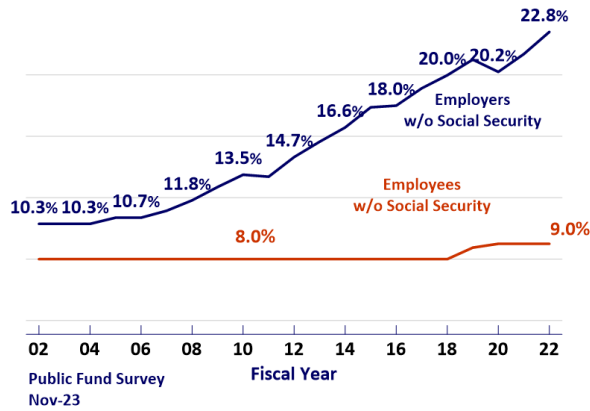


Figure L displays the range of employer contribution rates paid in FY 22 for plans whose members participate in Social Security. The lowest rate is 5.4 percent and the highest is 74.6 percent.

Figure M displays the range of employer contribution rates paid in FY 22 for plans whose members do not participate in Social Security. The lowest rate is 9.45 percent and the highest is 61.7 percent.



Figure L

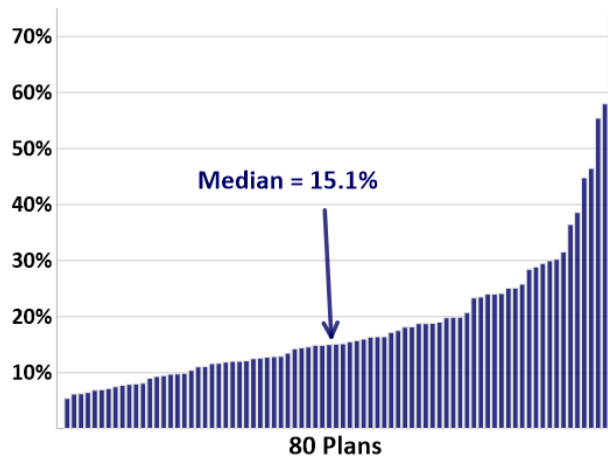


Figure M

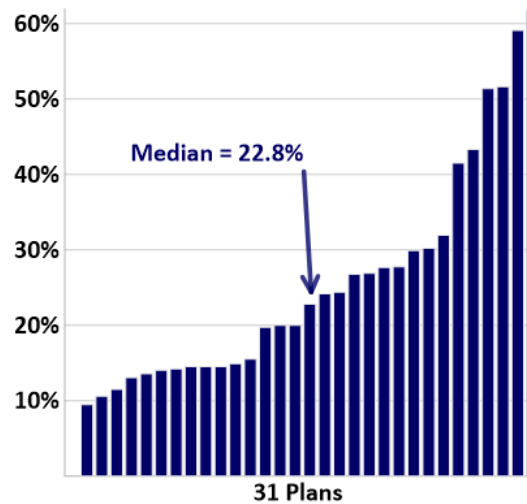
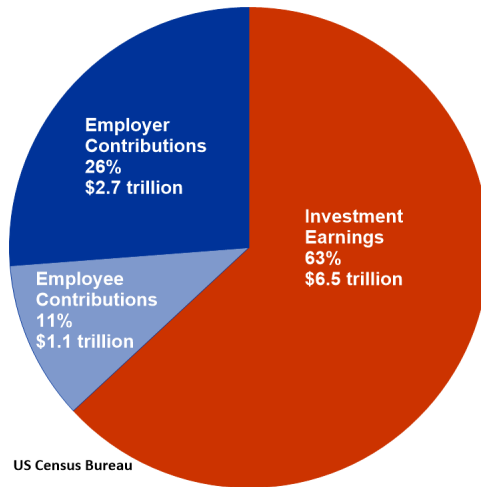


Figure N presents the cumulative sources of revenue into public pension funds for the 30 years ended in 2022. Over time, investment earnings consistently account for between 60 percent and 65 percent of public pension fund revenue. This chart illustrates the important role that investment earnings play in funding public pension benefits. The large portion of revenue from investment earnings also helps to show why even a relatively small change in a plan's investment return assumption can have a large effect on the plan's funding level and required cost.



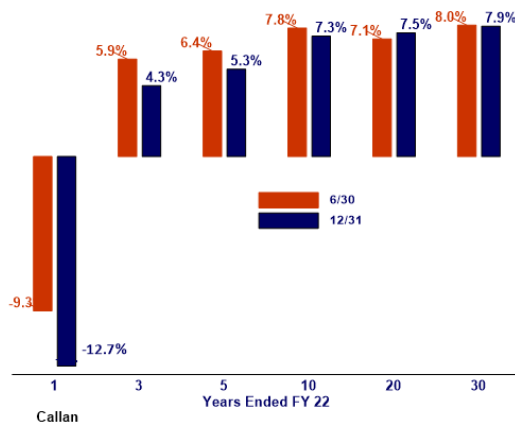
Figure N



As shown in Figure O, according to investment consultant Callan, the median investment return for plans with a FY-end date of June 30, 2022, (the FY-end date used by approximately three-fourths of the funds in the survey), was negative 9.35 percent; the return for plans whose fiscal year-end is 12/31 (used by most other plans) was negative 12.7 percent. These returns mark a sharp reversal of rates from the prior fiscal year and effectively cancel out, on an actuarial basis, the previous year's positive returns. As discussed in the narrative accompanying Figure C, because most plans phase in, or smooth, their investment gains and losses over several years (five years for most plans), returns over periods of four or five years are more consequential to funding levels than the return of any single year.

The median annualized returns for the five years ended in FY 22 that fell below the typical public pension investment return assumption of 7.0 percent were an important contributor to the lower funding level in FY 22.

Figure O





Of all actuarial assumptions, a public pension plan's investment return assumption has the greatest effect on the plan's funding level and its projected long-term cost. This is because, as shown in Figure N (above), over time, a majority of revenue of a typical public pension fund come from investment earnings.

As shown in Figures P and Q, from the beginning of this survey (and for several years preceding), until FY 11, the median investment return assumption used by the 131 public pension plans in the Survey was 8.0 percent. Following the sharp decline in global capital markets in 2008-09 and the decline in interest rates and projected returns on major asset classes that followed the Great Financial Crisis, every plan in the Survey reduced its assumed investment return, many more than once. This trend resulted in a reduction to the median return assumption to 7.0 percent in FY 21, where it remained in FY 22. Figure P compares the distribution of investment return assumptions for each fiscal year since the inception of the Survey, and Figure Q illustrates the steady reduction in assumed rates of return, particularly since 2009.

Reducing a plan's investment return assumption increases its projected liabilities and the plan's cost. The extended period of reductions in the investment return assumption has created a strong headwind to pension plans' efforts to improve their funding level: even as benefit levels have been reduced and contribution rates increased, funding levels for many plans have struggled to improve due partly to lower investment return assumptions.

Figure P

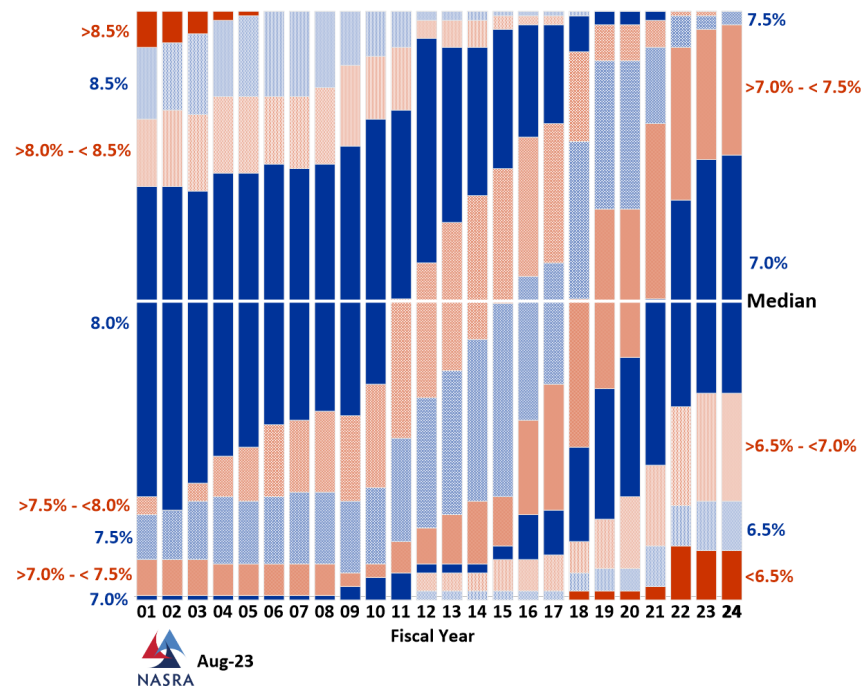




Figure Q reflects the investment return data shown in Figure P (above) after distilling the information into an average and median.

Figure Q

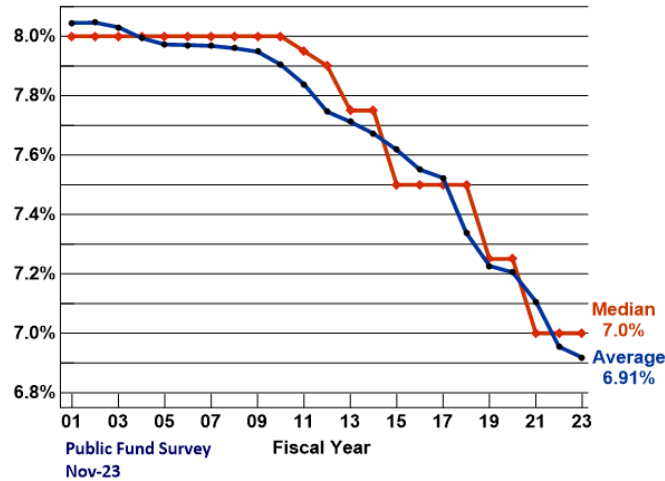


Figure R plots the average asset allocation of 90 funds in the Public Fund Survey since FY 05. The average allocation to public equities has steadily declined since the major drop in global capital markets in 2008-09. This secular decline in the allocation to public equities continues a trend that reached its lowest point--42.2 percent--in FY 22 since the beginning of the measurement period. Similarly, at 20.6 percent, the average allocation to fixed income also reached its lowest level in the history of the Survey. Declines in allocations to these major asset classes, which traditionally have constituted the bulwark of public pension portfolios, have given way to continuous growth in allocations to alternatives and real estate, reaching their highest levels in FY 22. Low interest rates since the Great Financial Crisis have contributed to more diversified portfolios, featuring smaller allocations to public equities and fixed income in lieu of asset classes expected to produce higher returns.



Figure R

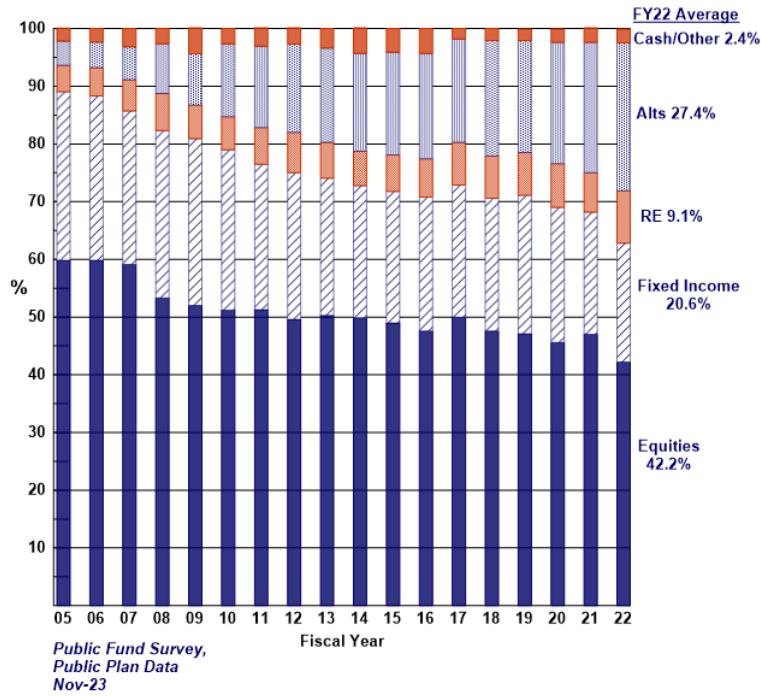
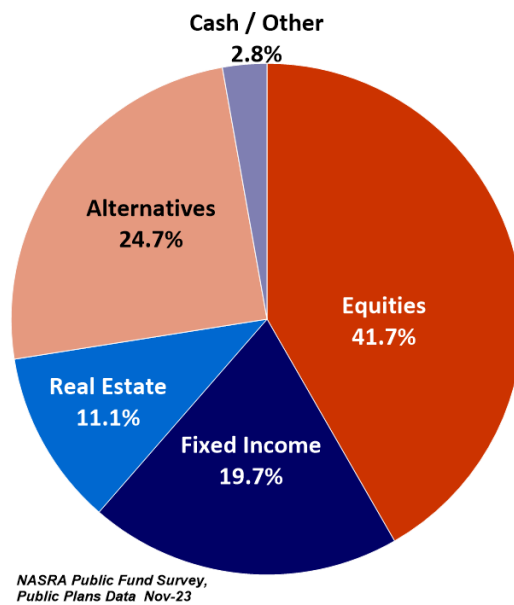


Figure S presents the FY 22 asset allocation weighted by the market value of assets of funds in the Survey. Compared to the simple average allocation shown in Figure R, the weighted asset allocation reveals a larger commitment to alternatives—chiefly private equity and hedge funds—and real estate, and smaller allotments to equities and fixed income.

Figure S





- [Appendix A: Public Retirement System Assets and Membership](#)
- [Appendix B: Actuarial Funding Levels for FY 22](#)

See Also

- [Public Plans Data](#)
- [NASRA Issue Briefs, Papers & Analysis](#)

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