
# State Pension Funds Reduce Assumed Rates of Return

Projections of lower economic growth fueling a 'new normal' in expected investment performance

## Overview

State and local public employee retirement systems in the United States manage over $4.3 trillion in public pension fund investments, with returns on these assets accounting for more than 60 cents of every dollar available to pay promised benefits. About three-quarters of these assets are held in what are often called risky assets—stocks and alternative investments, including private equities, hedge funds, real estate, and commodities.[1] These investments offer potentially higher long-term returns, but their values fluctuate with ups and downs in financial markets in the short term and the broader economy over the long run.

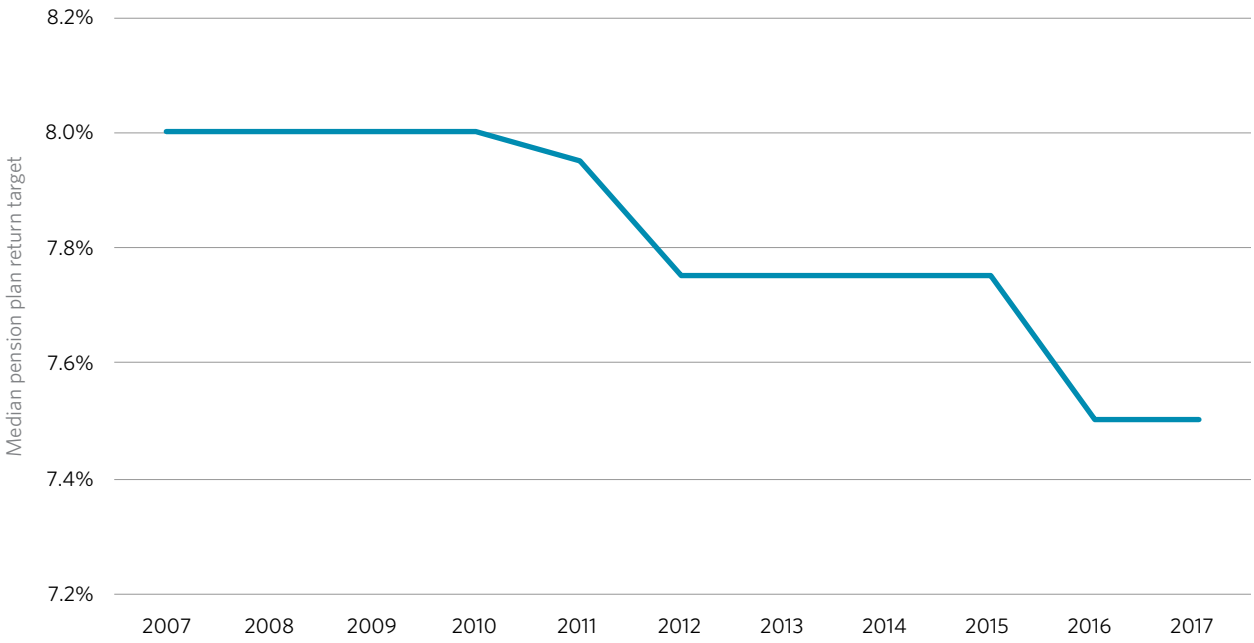
Financial analysts now expect public pension fund returns over the next two decades to be more than a full percentage point lower than those of the past, based on forecasts for lower-than-historical interest rates and economic growth. Research by The Pew Charitable Trusts shows that since the Great Recession—which started in late 2007 and officially ended in mid-2009—public pension plans have lowered return targets in response to changes in the long-term outlook for financial markets. (See Figure 1.)

Pew's database includes the 73 largest state-sponsored pension funds, which collectively manage 95 percent of all investments for state retirement systems. The average assumed return for these funds was 7.3 percent in 2017, down from over 7.5 percent in 2016 and 8 percent in 2007 just before the downturn began.

Figure 1

## Public Pension Fund Median Assumed Rate of Return

Plans lower return targets in anticipation of continued low economic growth




Sources: State Comprehensive Annual Financial Reports; state treasury reports; quarterly investment reports; and state responses to data inquiries



More than half of the funds in Pew's database lowered their assumed rates of return in 2017. Following the steep swings during the recession and in the years immediately afterward, these changes reflect a new normal in which forward-looking projections of expected economic growth and yields on bonds are lower than those that state pension funds have historically enjoyed. Reducing the assumed rate of return leads to increases in reported plan liabilities on fund balance sheets, which in turn increases the actuarially required employer contributions. Still, making such changes can ultimately strengthen plans' financial sustainability by reducing the risk of earnings shortfalls, and thus limiting unexpected costs.

Recently, many plans have worked to mitigate the higher required contributions that have been prompted by increased liabilities linked to more conservative investment assumptions. The present value of future liabilities is typically calculated using the assumed rate of return as the discount rate, which is used to express future liabilities in today's dollars; lower return assumptions yield higher calculated liabilities. Some state pension funds have phased in discount rate reductions—effectively altering how they compute future liabilities. That allows them to spread out increases in contributions over time.

For example, in 2016, the California Public Employees Retirement System (CalPERS)—the nation's largest public pension plan—announced it would decrease its assumed rate of return incrementally from 7.5 percent in 2017 to 7 percent by 2021.[2] Even such an incremental change can have a significant impact over time: a 1 percentage point drop in the discount rate would increase reported liabilities across U.S. plans by over $500 billion, a 12 percent rise.

As assumed returns have gone down, asset mixes have remained largely unchanged. For example, average allocations to stocks and alternative investments—which can provide higher yields but with greater risk, complexity, and cost—have remained relatively stable in recent years at around 50 percent and 25 percent of assets, respectively. This indicates that most fund managers and policymakers are adjusting their assumed rates of return in response to external economic and market forecasts, not based on shifts in internal investment policies.

This brief updates research published by Pew in 2017 and 2018 that provided data on asset allocation, performance, and reporting practices for funds in all 50 states. It explores the impact of continued slow economic growth on investment performance, as well as potential management and policy responses to lower returns. Finally, the brief highlights policies and solutions employed by well-funded plans, including the adoption of lower return assumptions, that have helped insulate the plans from economic volatility.

## Key Terms and Concepts

**Assumed rate of return:** The assumed, or expected, rate of return is the return target that a pension fund estimates its investments will deliver based on forecasts of economic growth, inflation, and interest rates. The median state pension fund had an assumed rate of return of 7.42 percent in 2017 and the average was 7.33 percent.

**Discount rate:** The discount rate is used to express future pension liabilities in today's dollars. Most state pension funds determine their discount rate based on their assumed rate of return. Decreasing a plan's discount rate leads to higher calculated liabilities, and higher required annual contribution payments. The median state pension fund had a discount rate of 7.25 percent in 2017 and the average was 7.11 percent.

**Investment fees:** Investment fees or expenses include any fees that a pension fund pays to professionals to allocate its assets. These can be administrative or money management fees, and would include any payments for performance or profit-sharing arrangements, if reported.

**Real and nominal returns:** The real return is the return an investor receives after the rate of inflation is subtracted from the nominal rate (real return = nominal return – inflation).

**Risky assets:** The Federal Reserve defines "safe assets" as fixed-income investments, cash, and other cash equivalents (e.g., certificates of deposit). Risky assets include other investments, such as equities (stocks), private equities, hedge funds, real estate, and commodities that are expected to generate higher returns but expose funds to greater market volatility.

**State pension fund and state pension plan:** States often sponsor more than one pension plan for participating workers and retirees; individual plans within a state are usually divided by the employing government agency. Plans are tasked with administering pension benefits, while state pension funds manage the investment of plan assets.

## Slow economic growth projected for the next decade

Forecasts of lower-than-historical economic growth and bond yields over the next 10 to 20 years drive the growing consensus among government and industry economists that pension funds will see lower long-term investment returns and suggest a new normal for public fund investments. For example, the U.S. experienced annual gross domestic product (GDP) growth of more than 5.5 percent from 1988 through 2007, while the Congressional Budget Office (CBO) now projects only 4 percent annual growth for the next decade. (See Figure 2.) And as economic growth is expected to perform more modestly, the long-term outlook for stocks and other investments that pension funds hold will be similar.

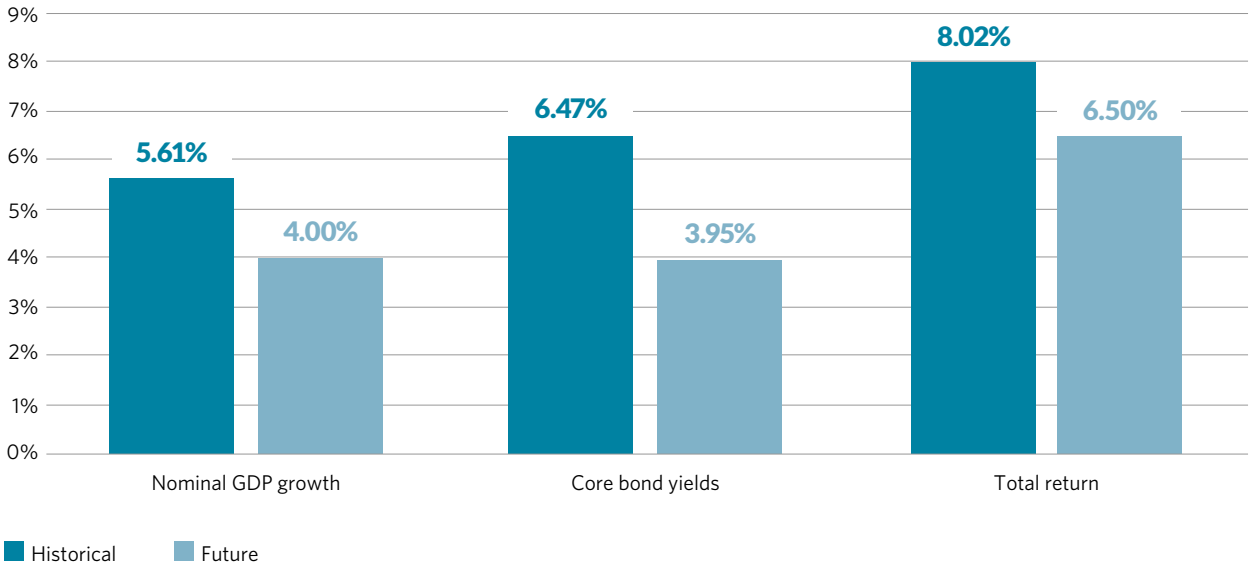
Returns on bonds, which make up about 25 percent of pension fund assets, are also projected to be lower than historical averages. Investment-grade bond yields between 1988 and 2007 averaged about 6.5 percent a year, but the CBO projects an average of just 3.7 percent annually through the next decade.[3]

Given these trends, market experts generally agree that lower investment returns will persist going forward. Pew forecasts a long-term median return of only 6.4 percent a year for a typical pension fund portfolio, considering expected GDP growth and interest rates.[4] Other analysts with similar projections include Voya Financial Advisors (6.4 percent), J.P. Morgan and Wilshire (both 6.5 percent), and Aon Hewitt (6.6 percent).[5]

Figure 2

### Returns Over the Next 20 Years Are Expected to Lag Behind Those Before the Great Recession

Projected nominal GDP growth and bond yields are at historic lows




Sources: Historical GDP based on annualized growth from 1988 to 2007. Future GDP based on Pew's capital market assumptions (CMA). Core bond yields represent the Barclays aggregate yield to worst index. Historical bond yields from January 1988 to December 2007. Future bond yields based on Pew's CMA. Total return based on Wilshire Trust Universe Comparison Service (TUCS) 20-year return from July 1995 to June 2015. Future return based on Pew's CMA.

# Key trend: Lower assumed returns

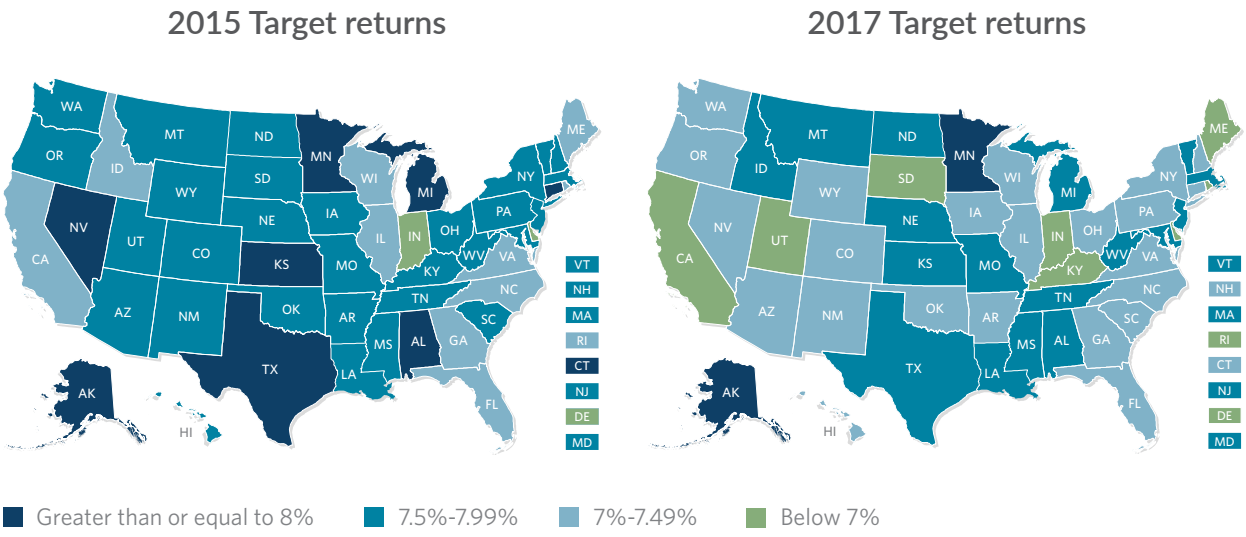
Investment returns make up more than 60 percent of public pension plan revenues—employer and employee contributions make up the rest—so funds need accurate return assumptions to ensure fiscal sustainability. A decade into the recovery, states have an opportunity to recalibrate policies to the economy's "new normal" by adopting return assumptions in line with current projections.

Many plans have lowered their assumed rates of return—which also affects discount rates—to reflect these economic realities, despite the near-term budget challenges they may face as contribution requirements rise with lower discount rates. For example, while only nine of the 73 funds in this study had an assumed rate below 7.5 percent in 2014, by the end of fiscal year 2017, about half had adopted assumed rates below that percentage. Forty-two of the funds reduced their assumed rate in 2017 to better account for lower expected investment returns. Several states—including Georgia, Louisiana, Michigan, and New Jersey—have followed the example of California's CalPERS fund by adopting multiyear strategies to ramp down assumed rates over the next several years.

Figure 3

## Target Rates of Return, 2015 and 2017

Most states have lowered investment assumptions significantly in recent years




Sources: State Comprehensive Annual Financial Reports, 2015 and 2017; state treasury reports; quarterly investment reports; and state responses to data inquiries

Policymakers may raise concerns about the rise in the present value of pension fund liabilities caused by lowering discount rates, the resulting reduction in funded ratios (the share of a plan's liabilities matched by assets), and the impact of these changes on required contributions for employers and workers. However, the impact on liabilities reflects accounting, not economics. Ultimately policymakers need to structure retirement systems to ensure fiscal sustainability throughout the economic cycle so members receive promised benefits. Although pension funds enjoyed robust investment returns in 2017 (the median one-year return across the 73 funds was 12.8 percent), funds continue to underperform relative to their long-term return targets. For example, in 2017 the median return over the prior 10 years was less than 5.5 percent, and none of the funds in our data met their investment target over that period.

## States acting to adopt more conservative assumptions

States are addressing these concerns. Recent reforms in Connecticut provide an example of how a reduction in discount rates can help mitigate long-term risks and avoid short-term spikes in contribution requirements. The state reduced the discount rates for the Connecticut State Employees' Retirement System (SERS) and Teachers' Retirement System (TRS) from 8 percent to 6.9 percent in 2017 and 2019 respectively. Concurrently, policymakers adopted a funding policy that would bring down the unfunded liability and stabilize long-term contribution rates.[6] Finally, they extended the time period for the state to pay down the more than $30 billion in pension debt to 30 years and added a five-year phase-in of the new funding policies. Collectively, these policies helped ensure that the impact of increased employer contributions would only gradually affect the state budget.

As expected, Connecticut's changes resulted in an increase in the state's reported pension debt—the recent reduction in the discount rate for the TRS raised the reported unfunded liability for that system alone from $13 billion to nearly $17 billion. But the changes ultimately set the state on a path to pay down that debt in a sustainable manner that increases the state's cost predictability and insulates the pension funds from market volatility. Indeed, rating agency analyses of Connecticut's credit have taken a forward-looking approach that considers future market risk and long-term financial sustainability side by side with the reported funding ratio.

For example, Fitch Ratings, in its analysis of Connecticut's 2019 TRS reform proposal, noted that the fund's previous assumed annual return of 8 percent was an "unrealistic target for future investment returns … resulting in actuarial contributions that are inadequate to support long-term funding improvement, thus exposing the state to severe fiscal risk." The rating agency noted the change to an expected return of 6.9 percent as a factor that would lower fiscal risks.[7]

Other states have adopted alternative approaches to increase cost predictability and create a margin of safety against inevitable market downturns. In California, CalPERS put in place a risk policy in 2015 that incrementally reduces the plan's assumed rate of return and shifts its investment mix to less risky assets each year that funded levels increase because of better-than-expected returns. Such policies help gradually reduce risk and increase cost predictability over the long term in a way that doesn't put short-term pressure on the state budget.[8]

The Wisconsin Retirement System (WRS) takes an innovative approach to managing risk through return assumptions. The WRS' long-term return assumption for 2017 was 7.2 percent; however, the plan uses a lower discount rate of 5 percent to calculate the cost of benefits for workers once they retire.[9] Even if investments fall short of the long-term return assumption, the amount set aside for each retiree should be enough to pay for the base benefit without additional contributions from taxpayers or current employees. And, if the returns exceed 5 percent, as they now are expected to do, the excess will be used to fund an annuity increase (similar to a cost of living adjustment). The system would not provide such a boost when returns fall below 5 percent.[10]

Finally, North Carolina effectively uses two discount rates to set contribution policy. The state determines a contribution floor based on the plan's investment return assumption of 7 percent, as well as a ceiling using yields on U.S. Treasury bonds as a proxy for what a risk-free investment could return.[11] That risk-free rate reflects what a guaranteed investment could deliver; state pension plans, like most other investors, take on risk to earn yields above that rate. If the plan is fully funded under the risk-free rate, then employer contributions would drop to simply pay for the cost of new benefits. Any year in which the contribution rate is between the floor and the ceiling, employers will put in an additional .35 percent of pay above the prior year's rate.

The policies put in place by CalPERS, Wisconsin, and North Carolina are designed to better ensure that adequate assets are set aside to pay for promised benefits, given the fundamental uncertainty of relying on risky investments over a decades-long time horizon. In addition, by lowering their assumed rates of return, more than half of state pension funds made it more likely that they'll be able to hit their investment targets in future years.

As well as adjusting return targets to reflect changing economic conditions, funds are looking more closely at the fees they pay investment managers. According to the Institutional Limited Partners Association (ILPA), over 140 institutions—including many state and local pension funds—have moved to increase disclosure and transparency for private equity performance fees (also known as carried interest).[12] These fees account for approximately $6 billion, or 30 percent of all fees U.S. state and local funds reported paying to investment managers in 2017 (management fees make up the rest). For state pension funds to accurately report their performance fees, private equity managers need to disclose the total price tag to their clients; an expectation that these fees would be disclosed only recently emerged across state pension funds.

Although fee levels in aggregate have remained relatively constant as a percentage of assets over the last decade or more, some funds have managed significant reductions. For example, in Pennsylvania, reported investment expenses as a percentage of assets have declined from 0.81 percent in 2015 to 0.74 percent in 2017, a shift that saves state pension plans more than $57 million annually in reduced fees. The state continues to focus on the issue, following the recommendations of its public pension management and asset investment review commission.[13] Lawmakers put the panel in place as part of the 2017 state pension reforms, and it has recommended actions projected to offer actuarial savings between $8 billion and $10 billion over 30 years.

### What factors drive projections of lower-than-historical market returns?

During the bull markets of the 1980s and 1990s, managers of state and local pension funds commonly assumed that over the long term they would earn an average of 8 percent returns, or higher, on their investments—assumptions that were, for the most part, fair given the prevailing market outlook of that time. However, years into the post-recession recovery of today, market experts project lower returns, in large part because of lower-than-historical economic growth and interest rates.

Economic growth is most commonly measured through changes in GDP, the aggregate level of goods and services produced in a national economy over a specific time period. That measure of growth, in turn, is reflected in market returns for stocks and the value of equity investments. Two key factors that spur growth are the size of the workforce and technology-driven increases in productivity (i.e., the output per worker).

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GDP growth since the Great Recession is lower than growth rates experienced during previous recoveries as well as long-term historical averages, in large part because reduced labor force participation has persisted throughout the recovery, despite an unemployment rate that has fallen to its lowest point since the 1960s (i.e., fewer people are in the job market now than in the past).[14] Labor force participation is expected to decline further, and remain below historical levels, primarily because the population is aging. And productivity increases, the other key driver of GDP growth, are expected to be modest, absent unforeseen significant technological innovations.[15]

At the same time, the amount of interest that government and corporate bonds pay has steadily declined over the past 30 years. After the recession, the U.S. entered an unprecedented period of low interest rates, with the Federal Reserve keeping short-term rates at or near zero from 2008 to the end of 2015. Yields on the 30-year Treasury note fell from 8 percent in 1990 to about 3 percent at the end of 2018, and recently have dropped even further.

Looking ahead, most experts do not expect a significant rise in interest rates in the near term for several reasons, prime among them that inflation has been low the past five years and is forecast to remain below average for the long term.[16] Factors that typically raise inflation, such as wage increases and economic development, are not expected to improve rapidly or put significant upward pressure on the cost of goods and services.[17]

# Conclusion

The economy is expected to grow at a modest rate over the next decade, and pension fund investment returns are unlikely to return to historic levels for the foreseeable future. In recognition of these trends, public plans are increasingly adjusting their return assumptions to rates more in keeping with economic forecasts.

Although reported liabilities will rise because plans are calculating the cost of pension promises using more conservative assumptions, the lower assumed rates of return ultimately decrease pension funds' investment risk, increase pension cost predictability for taxpayers, and factor positively in state credit analyses. By pairing the reductions in the discount rate with policies to smooth out the cost impact or by adopting such changes as part of broader reform efforts, policymakers can moderate the impact on state and local budgets.

States can adopt policies that provide a margin of safety for pension systems in the likely event of an eventual economic downturn. California, North Carolina, and Wisconsin provide examples of alternative approaches that can reduce investment risk for public pension funds and government budgets alike.

# Appendix

To examine investment practices of pension funds across the 50 states, Pew uses three sources covering the 73 largest state-sponsored pension funds, which collectively have assets under management of over $3 trillion (about 95 percent of all state pension fund investments). Twenty-two states have more than one fund:

- Data collected from state-sponsored plans' Comprehensive Annual Financial Reports, pension plan investment reports, and other relevant documents published by individual public pension plans from 1992 through 2017, with a primary focus on asset allocation, performance, and fees from 2006 to 2017. In addition, performance data from 2018 were collected from plan documents.
- The U.S. Federal Reserve Financial Accounts of the United States data, which include aggregate economic and investment data on public pensions from 1950 through 2018.
- The Wilshire Trust Universe Comparison Service (TUCS) performance comparison data, reported quarterly from 1991 through 2018.[18]

Together, these datasets provide more than 60 years of aggregate investment trends and allow for a detailed look at investment practices from 2006 to 2017 across most state public pension funds. Complete 2017 data—in tabular and graph form—can be found in the appendix.

Table A1

# Public Pension Investment Metrics Across the 50 States, 2017

## Wide variations in allocations, performance, and fees for 73 largest public funds

| Fund Name | State | Total Investments (Millions) | Total Equity | Total Fixed Income | Total Alternatives | Total Other | Investment Expense in BPS | External Management Fee in BPS | Target Return* | 10-Yr Return | 5-Yr Return | 1-Yr Return | Gross or Net | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Alabama State Retirement System** | AL | $12,010 | 70.7% | 19.6% | 9.7% | 0.0% | 0.03% | 0.00% | 7.75% | 4.88% | 10.04% | 12.86% | Gross | 9/30/17 |
| **Alabama Teachers' Retirement System** | AL | $24,390 | 70.5% | 19.7% | 9.9% | 0.0% | 0.04% | 0.00% | 7.75% | 5.04% | 9.95% | 11.77% | Gross | 9/30/17 |
| **Alaska Public Employees Retirement System** | AK | $8,748 | 53.0% | 13.3% | 31.7% | 2.0% | 0.05% | 0.82% | 8.00% | 4.97% | 9.24% | 13.35% | Net | 6/30/17 |
| **Alaska Teachers Retirement System** | AK | $5,205 | 53.0% | 13.3% | 31.7% | 2.0% | 0.05% | 0.68% | 8.00% | 5.00% | 9.27% | 13.36% | Net | 6/30/17 |
| **Arizona Public Safety Personnel Retirement System** | AZ | $6,615 | 30.4% | 18.1% | 49.6% | 1.9% | 0.61% | 0.57% | 7.40% | 3.98% | 7.95% | 11.85% | Net | 6/30/17 |
| **Arizona State Retirement System** | AZ | $35,888 | 48.4% | 26.6% | 19.7% | 5.3% | 0.56% | 0.53% | 7.50% | 5.60% | 9.60% | 13.90% | Net | 6/30/17 |
| **Arkansas Public Employees Retirement System** | AR | $7,808 | 63.8% | 16.1% | 19.7% | 0.4% | 0.46% | 0.40% | 7.15% | 5.44% | 9.85% | 12.30% | Gross | 6/30/17 |
| **Arkansas Teachers Retirement System** | AR | $15,992 | 54.2% | 16.8% | 27.5% | 1.4% | 0.25% | 0.00% | 7.50% | 6.00% | 10.60% | 16.10% | Net | 6/30/17 |
| **California Public Employees Retirement System** | CA | $326,406 | 48.3% | 19.4% | 19.7% | 12.6% | 0.27% | 0.18% | 7.00% | 4.40% | 8.80% | 11.20% | Net | 6/30/17 |
| **California State Teachers Retirement System** | CA | $229,079 | 56.4% | 16.0% | 26.1% | 1.5% | 0.14% | 0.07% | 7.00% | 4.95% | 10.05% | 13.44% | Net | 6/30/17 |
| **Colorado Public Employees Retirement Association** | CO | $47,996 | 57.7% | 21.9% | 20.0% | 0.4% | 0.36% | 0.32% | 7.25% | 6.00% | 9.50% | 18.10% | Net | 12/31/17 |

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| Fund Name | State | Total Investments (Millions) | Total Equity | Total Fixed Income | Total Alternatives | Total Other | Investment Expense in BPS | External Management Fee in BPS | Target Return* | 10-Yr Return | 5-Yr Return | 1-Yr Return | Gross or Net | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Connecticut Teachers Retirement Board** | CT | $17,127 | 52.3% | 26.5% | 21.2% | 0.0% | 0.30% | 0.24% | 8.00% | 4.97% | 8.80% | 14.38% | Net | 6/30/17 |
| **Connecticut State Employees Retirement System** | CT | $11,955 | 52.1% | 25.4% | 22.5% | 0.0% | 0.29% | 0.24% | 6.90% | 4.87% | 8.80% | 14.32% | Net | 6/30/17 |
| **Delaware Public Employees Retirement System** | DE | $9,097 | 47.2% | 26.6% | 22.7% | 3.5% | 0.27% | 0.25% | 6.76% | 6.10% | 8.30% | 11.30% | Gross | 6/30/17 |
| **Florida Retirement System** | FL | $156,435 | 57.8% | 17.9% | 23.5% | 0.8% | 0.37% | 0.33% | 7.50% | 5.46% | 9.51% | 13.77% | Net | 6/30/17 |
| **Georgia Teachers Retirement System** | GA | $69,376 | 70.9% | 29.1% | 0.0% | 0.0% | 0.06% | 0.04% | 7.40% | 6.10% | 9.40% | 12.50% | Net | 6/30/17 |
| **Georgia Employees Retirement System** | GA | $15,531 | 63.9% | 27.1% | 0.8% | 8.2% | 0.10% | 0.04% | 7.50% | 6.20% | 9.50% | 12.40% | Gross | 6/30/17 |
| **Hawaii Employees Retirement System** | HI | $13,493 | 53.3% | 29.1% | 17.6% | 0.0% | 0.59% | 0.25% | 7.00% | 5.29% | 9.28% | 13.68% | Gross | 6/30/17 |
| **Idaho Public Employee Retirement System** | ID | $15,631 | 60.0% | 28.6% | 9.9% | 1.5% | 0.30% | 0.28% | 7.50% | 5.30% | 8.60% | 12.70% | Gross | 6/30/17 |
| **Illinois State Employees Retirement System** | IL | $16,323 | 44.0% | 26.0% | 29.0% | 1.0% | 0.18% | 0.17% | 7.25% | 4.60% | 9.40% | 12.30% | Net | 6/30/17 |
| **Illinois Teachers Retirement System** | IL | $49,180 | 36.5% | 19.5% | 42.0% | 2.0% | 1.58% | 0.65% | 6.99% | 4.80% | 9.20% | 12.60% | Net | 6/30/17 |
| **Illinois State Universities Retirement System** | IL | $18,004 | 52.2% | 25.6% | 22.2% | 0.0% | 0.35% | 0.33% | 7.00% | 5.40% | 9.00% | 12.20% | Net | 6/30/17 |
| **Indiana Public Retirement System** | IN | $32,390 | 23.6% | 27.4% | 47.8% | 1.2% | 0.63% | 0.57% | 6.75% | 2.90% | 5.70% | 8.00% | Net | 6/30/17 |
| **Iowa Public Employees Retirement System** | IA | $29,875 | 38.0% | 28.0% | 30.0% | 4.0% | 0.23% | 0.20% | 7.00% | 5.89% | 8.65% | 11.70% | Net | 6/30/17 |

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| Fund Name | State | Total Investments (Millions) | Total Equity | Total Fixed Income | Total Alternatives | Total Other | Investment Expense in BPS | External Management Fee in BPS | Target Return* | 10-Yr Return | 5-Yr Return | 1-Yr Return | Gross or Net | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Kansas Public Employees Retirement System** | KS | $18,560 | 52.0% | 18.4% | 25.1% | 4.5% | 0.40% | 0.13% | 7.75% | 5.70% | 9.70% | 12.70% | Gross | 6/30/17 |
| **Kentucky Retirement Systems** | KY | $11,282 | 49.7% | 16.8% | 30.5% | 3.0% | 0.76% | 0.49% | 5.31% | 4.86% | 8.08% | 13.47% | Net | 6/30/17 |
| **Kentucky Teachers Retirement System** | KY | $18,512 | 62.8% | 16.2% | 11.3% | 9.7% | 0.31% | 0.29% | 7.50% | 6.29% | 10.09% | 15.37% | Gross | 6/30/17 |
| **Louisiana State Employees Retirement System** | LA | $11,491 | 56.3% | 16.0% | 26.5% | 1.2% | 0.66% | 0.63% | 7.70% | 5.60% | 9.00% | 15.80% | Gross | 6/30/17 |
| **Louisiana Teachers Retirement System** | LA | $19,205 | 48.9% | 18.1% | 27.6% | 5.4% | 0.53% | 0.52% | 7.70% | 5.80% | 10.80% | 16.50% | Gross | 6/30/17 |
| **Maine Public Employees Retirement System** | ME | $13,564 | 39.9% | 22.9% | 36.8% | 0.4% | 0.69% | 0.65% | 6.88% | 4.90% | 8.40% | 12.50% | Net | 6/30/17 |
| **Maryland State Retirement and Pension System** | MD | $51,614 | 38.2% | 32.2% | 29.5% | 0.1% | 0.65% | 0.63% | 7.50% | 4.20% | 7.64% | 10.02% | Net | 6/30/17 |
| **Massachusetts State Employees Retirement System & Teacher Retirement Board** | MA | $70,188 | 45.7% | 20.1% | 32.9% | 1.4% | 0.21% | 0.18% | 7.50% | 5.10% | 9.80% | 13.20% | Gross | 6/30/17 |
| **Michigan State Employees Retirement System** | MI | $11,694 | 42.9% | 12.3% | 40.2% | 4.6% | 0.39% | 0.41% | 7.50% | 5.80% | 10.30% | 13.80% | Gross | 9/30/17 |
| **Michigan Public School Employees Retirement System** | MI | $46,658 | 42.7% | 12.2% | 40.0% | 5.1% | 0.39% | 0.39% | 7.50% | 5.90% | 10.30% | 13.80% | Gross | 9/30/17 |
| **Minnesota (MSRS, TRA, and PERA)** | MN | $63,205 | 64.9% | 19.4% | 13.1% | 2.6% | 0.11% | 0.10% | 8.19% | 6.20% | 10.20% | 15.10% | Net | 6/30/17 |
| **Mississippi Public Employees Retirement System** | MS | $26,592 | 63.0% | 19.0% | 17.0% | 1.0% | 0.36% | 0.36% | 7.75% | 5.58% | 10.08% | 14.96% | Gross | 6/30/17 |

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| Fund Name | State | Total Investments (Millions) | Total Equity | Total Fixed Income | Total Alternatives | Total Other | Investment Expense in BPS | External Management Fee in BPS | Target Return* | 10-Yr Return | 5-Yr Return | 1-Yr Return | Gross or Net | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Missouri State Employees Retirement System** | MO | $9,019 | 12.1% | 45.6% | 32.4% | 9.9% | 1.56% | 1.50% | 7.60% | 4.50% | 5.90% | 3.50% | Net | 6/30/17 |
| **Missouri Public Schools Retirement System** | MO | $37,487 | 46.9% | 21.9% | 28.8% | 2.1% | 1.17% | 1.15% | 7.50% | 5.50% | 9.50% | 12.50% | Gross | 6/30/17 |
| **Montana Public Employees Retirement Board** | MT | $6,817 | 52.6% | 23.9% | 20.1% | 3.5% | 0.52% | 0.52% | 7.65% | 5.33% | 9.62% | 11.94% | Net | 6/30/17 |
| **Montana Teachers Retirement System** | MT | $3,843 | 53.9% | 24.4% | 20.5% | 1.1% | 0.52% | 0.39% | 7.75% | 5.34% | 9.62% | 11.92% | Net | 6/30/17 |
| **Nebraska Retirement Systems** | NE | $14,659 | 62.3% | 27.2% | 10.5% | 0.0% | 0.31% | 0.31% | 7.50% | 5.60% | 9.80% | 13.70% | Net | 6/30/17 |
| **Nevada Public Employees Retirement System** | NV | $38,261 | 63.2% | 27.3% | 9.1% | 0.4% | 0.12% | 0.12% | 7.50% | 6.00% | 9.60% | 11.90% | Gross | 6/30/17 |
| **New Hampshire Retirement System** | NH | $8,173 | 51.8% | 23.1% | 25.1% | 0.0% | 0.31% | 0.29% | 7.25% | 5.70% | 9.80% | 13.50% | Net | 6/30/17 |
| **New Jersey Division of Pension and Benefits** | NJ | $74,805 | 46.3% | 20.5% | 27.4% | 5.8% | 0.57% | 0.56% | 7.50% | 5.55% | 8.75% | 13.07% | Net | 6/30/17 |
| **New Mexico Educational Retirement Board** | NM | $11,908 | 33.0% | 29.0% | 35.0% | 3.0% | 0.87% | 0.83% | 7.25% | 5.20% | 8.70% | 12.00% | Net | 6/30/17 |
| **New Mexico Public Employees Retirement Association** | NM | $14,979 | 54.1% | 24.2% | 21.4% | 0.3% | 0.38% | 0.38% | 7.25% | 3.97% | 8.53% | 11.10% | Net | 6/30/17 |
| **New York State and Local Retirement Systems** | NY | $192,411 | 55.7% | 24.1% | 18.5% | 1.7% | 0.35% | 0.33% | 7.00% | 5.59% | 8.35% | 11.48% | Gross | 3/31/17 |
| **New York State Teachers Retirement System** | NY | $113,234 | 56.4% | 22.1% | 17.5% | 4.0% | 0.22% | 0.21% | 7.50% | 5.60% | 10.20% | 12.50% | Net | 6/30/17 |

*Continued on next page*

| Fund Name | State | Total Investments (Millions) | Total Equity | Total Fixed Income | Total Alternatives | Total Other | Investment Expense in BPS | External Management Fee in BPS | Target Return* | 10-Yr Return | 5-Yr Return | 1-Yr Return | Gross or Net | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **North Carolina Retirement Systems** | NC | $93,152 | 37.6% | 30.8% | 27.7% | 3.9% | 0.56% | 0.54% | 7.00% | 5.14% | 7.70% | 10.77% | Net | 6/30/17 |
| **North Dakota Public Employees Retirement System (PERS & Highway)** | ND | $2,776 | 51.3% | 27.1% | 21.2% | 0.4% | 0.59% | 0.56% | 7.75% | 4.28% | 9.16% | 13.05% | Net | 6/30/17 |
| **North Dakota Teachers Fund for Retirement** | ND | $2,309 | 55.0% | 23.0% | 21.0% | 1.0% | 0.57% | 0.55% | 7.75% | 3.81% | 9.18% | 12.92% | Net | 6/30/17 |
| **Ohio Public Employees Retirement System** | OH | $82,335 | 41.2% | 21.0% | 35.1% | 2.7% | 0.73% | 0.69% | 7.50% | 5.85% | 9.20% | 16.82% | Net | 12/31/17 |
| **Ohio State Teachers Retirement System** | OH | $71,754 | 53.3% | 18.9% | 26.2% | 1.6% | 0.34% | 0.28% | 7.45% | 6.80% | 10.06% | 14.29% | Gross | 6/30/17 |
| **Oklahoma Public Employees Retirement System** | OK | $9,661 | 68.3% | 31.3% | 0.1% | 0.2% | 0.11% | 0.11% | 7.00% | 5.86% | 9.07% | 12.75% | Gross | 6/30/17 |
| **Oklahoma Teachers Retirement System** | OK | $14,694 | 57.8% | 23.6% | 18.5% | 0.1% | 0.45% | 0.45% | 7.50% | 6.78% | 11.01% | 15.28% | Gross | 6/30/17 |
| **Oregon Public Employees Retirement System** | OR | $64,282 | 38.8% | 19.2% | 37.9% | 4.1% | 0.96% | 0.75% | 7.20% | 5.42% | 9.19% | 11.92% | Net | 6/30/17 |
| **Pennsylvania State Employees Retirement System** | PA | $29,701 | 53.0% | 14.5% | 26.4% | 6.2% | 0.45% | 0.43% | 7.25% | 4.10% | 8.30% | 15.10% | Net | 12/31/17 |
| **Pennsylvania Public School Employees Retirement System** | PA | $52,183 | 21.3% | 21.5% | 54.3% | 2.9% | 0.91% | 0.87% | 7.25% | 3.80% | 7.35% | 10.14% | Net | 6/30/17 |
| **Rhode Island Employees Retirement System** | RI | $8,066 | 45.6% | 18.7% | 32.0% | 3.6% | 0.93% | 0.97% | 7.00% | 4.40% | 7.80% | 11.60% | Net | 6/30/17 |
| **South Carolina Retirement Systems** | SC | $27,995 | 40.3% | 27.8% | 29.9% | 2.0% | 1.12% | 1.08% | 7.25% | 4.34% | 7.50% | 11.88% | Net | 6/30/17 |
| **South Dakota Retirement System** | SD | $11,606 | 34.2% | 24.3% | 17.0% | 24.5% | 0.29% | 0.29% | 6.50% | 6.10% | 11.00% | 13.80% | Net | 6/30/17 |

*Continued on next page*

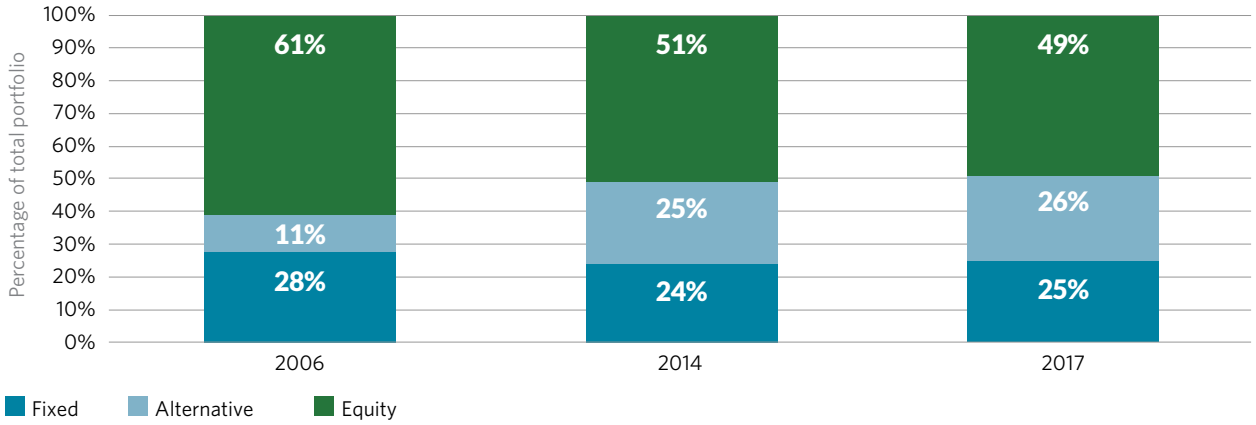
| Fund Name | State | Total Investments (Millions) | Total Equity | Total Fixed Income | Total Alternatives | Total Other | Investment Expense in BPS | External Management Fee in BPS | Target Return* | 10-Yr Return | 5-Yr Return | 1-Yr Return | Gross or Net | Period |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Tennessee Consolidated Retirement System** | TN | $46,886 | 48.2% | 30.2% | 16.8% | 4.8% | 0.12% | 0.09% | 8.00% | 5.87% | 8.70% | 11.42% | Net | 6/30/17 |
| **Texas Employees Retirement System** | TX | $26,790 | 46.5% | 22.8% | 29.4% | 1.3% | 0.13% | 0.61% | 7.50% | 5.67% | 8.43% | 12.15% | Gross | 8/31/17 |
| **Teacher Retirement System of Texas** | TX | $145,916 | 42.0% | 14.2% | 43.2% | 0.6% | 0.15% | 0.09% | 7.50% | 5.40% | 8.80% | 12.90% | Net | 6/30/17 |
| **Utah Retirement Systems** | UT | $32,125 | 37.8% | 14.2% | 39.4% | 8.6% | 0.18% | 0.14% | 6.95% | 6.08% | 9.20% | 13.57% | Gross | 12/31/17 |
| **Vermont State Employees Retirement System** | VT | $1,715 | 46.0% | 33.4% | 20.5% | 0.1% | 0.28% | 0.28% | 7.50% | 4.20% | 6.60% | 10.60% | Net | 6/30/17 |
| **Vermont Teachers Retirement System** | VT | $1,691 | 44.4% | 32.8% | 22.5% | 0.0% | 0.29% | 0.29% | 7.50% | 3.90% | 6.50% | 10.40% | Net | 6/30/17 |
| **Virginia Retirement Systems** | VA | $74,618 | 36.8% | 30.9% | 31.6% | 0.5% | 0.59% | 0.52% | 7.00% | 4.90% | 9.10% | 12.10% | Net | 6/30/17 |
| **Washington Department of Retirement Systems** | WA | $85,378 | 39.4% | 19.3% | 41.2% | 0.1% | 0.41% | 0.46% | 7.47% | 5.47% | 9.95% | 13.44% | Net | 6/30/17 |
| **West Virginia Consolidated Public Retirement Board (PERS)** | WV | $6,312 | 53.3% | 16.1% | 30.4% | 0.2% | 0.00% | 0.00% | 7.50% | 6.00% | 9.90% | 15.80% | Net | 6/30/17 |
| **West Virginia Consolidated Public Retirement Board (TRS)** | WV | $7,260 | 52.3% | 15.7% | 30.4% | 1.6% | 0.00% | 0.00% | 7.50% | 5.70% | 9.90% | 15.70% | Net | 6/30/17 |
| **Wisconsin Retirement System (Core)** | WI | $104,574 | 50.0% | 40.0% | 20.0% | 0.0% | 0.46% | 0.46% | 7.20% | 5.90% | 8.60% | 16.20% | Gross | 12/31/17 |
| **Wyoming Retirement System** | WY | $8,572 | 46.9% | 23.3% | 28.3% | 1.5% | 0.87% | 0.55% | 7.00% | 4.77% | 7.73% | 14.20% | Net | 12/31/17 |

Notes: *Target return is weighted average of all investment return assumptions by plans within a retirement system

Figure A1

## Average Public Pension Asset Allocation

Funds continue to allocate about 75 percent of assets in risky investments




Note: Risky investments include both equities and alternatives.

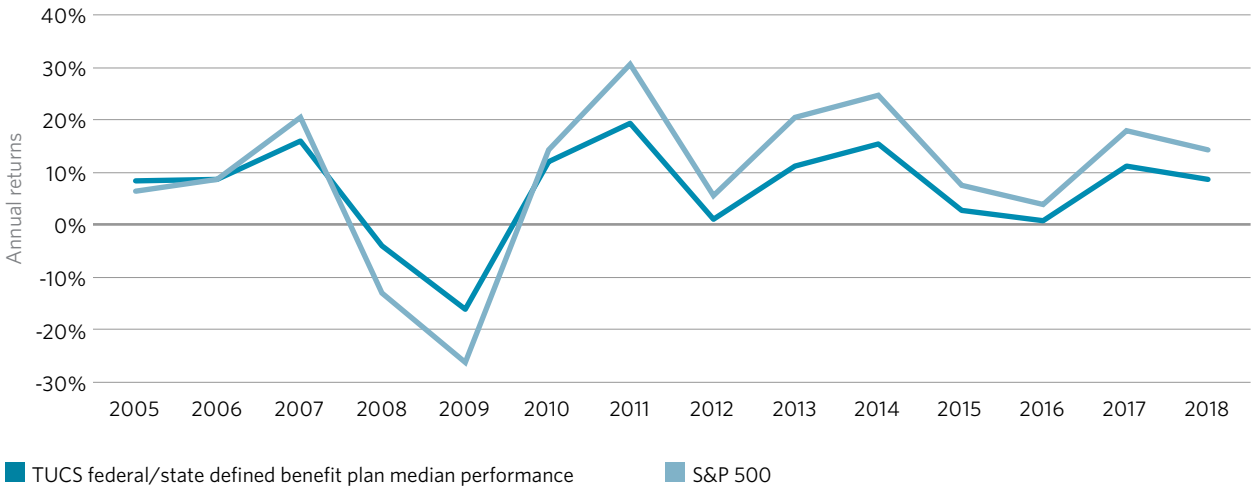
Sources: State Comprehensive Annual Financial Reports; state treasury reports; quarterly investment reports; and state responses to data inquiries



Figure A2

## Average Annual Stock Market and Public Pension Fund Returns, 2005 to 2017

Equity investments and pension fund yield track closely and are highly volatile, resulting in asset value fluctuations

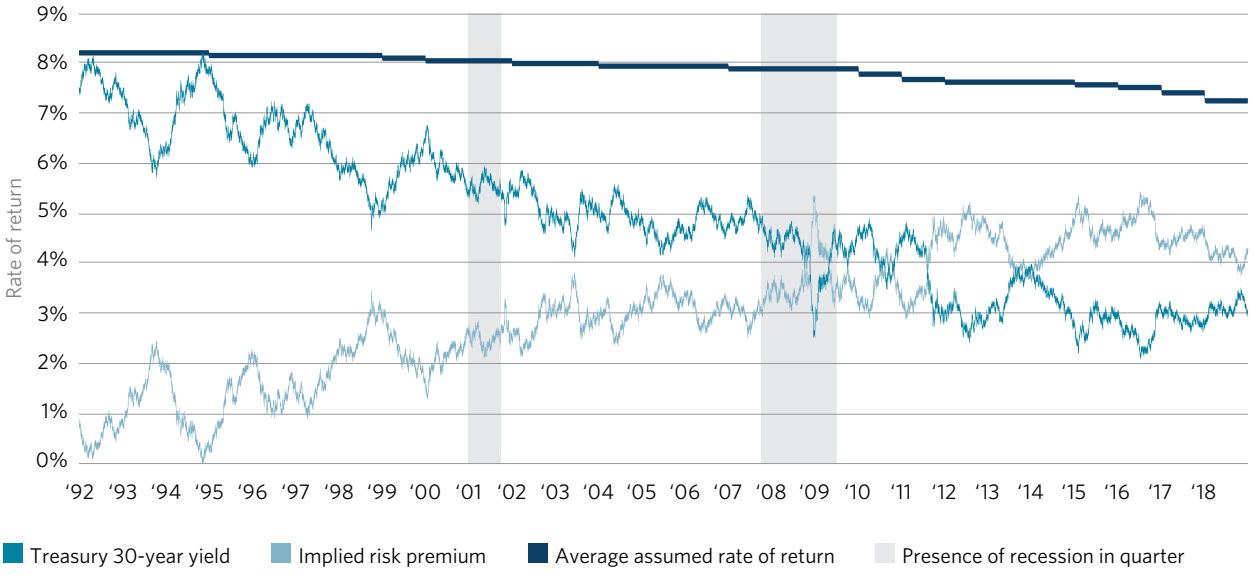



Source: Wilshire Trust Universe Comparison Service

Figure A3

## Risk Premium Remains High for U.S. Public Pension Funds

Plans' average assumed rates of return have dropped modestly, while bond yields have declined significantly



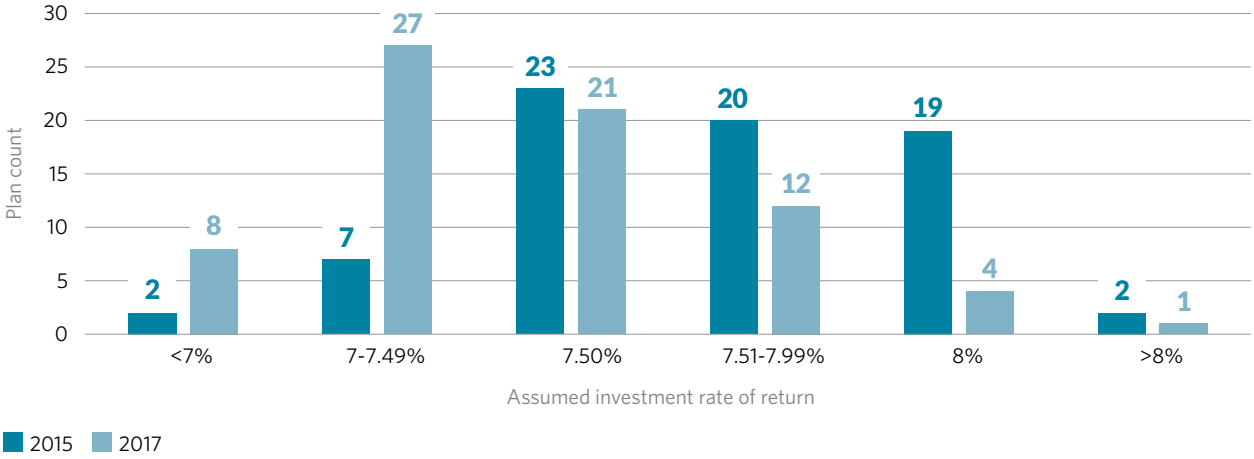

Sources: Pew analysis of Comprehensive Annual Financial Reports, actuarial valuations, and related reports from states; U.S. Treasury data; and Center for Retirement Research at Boston College, Center for State and Local Government Excellence, and National Association of State Retirement Administrators, Public Plans Data



Figure A4

## State Pension Fund Expected Rates of Return, 2015 and 2017

Investment return assumptions continue to decline

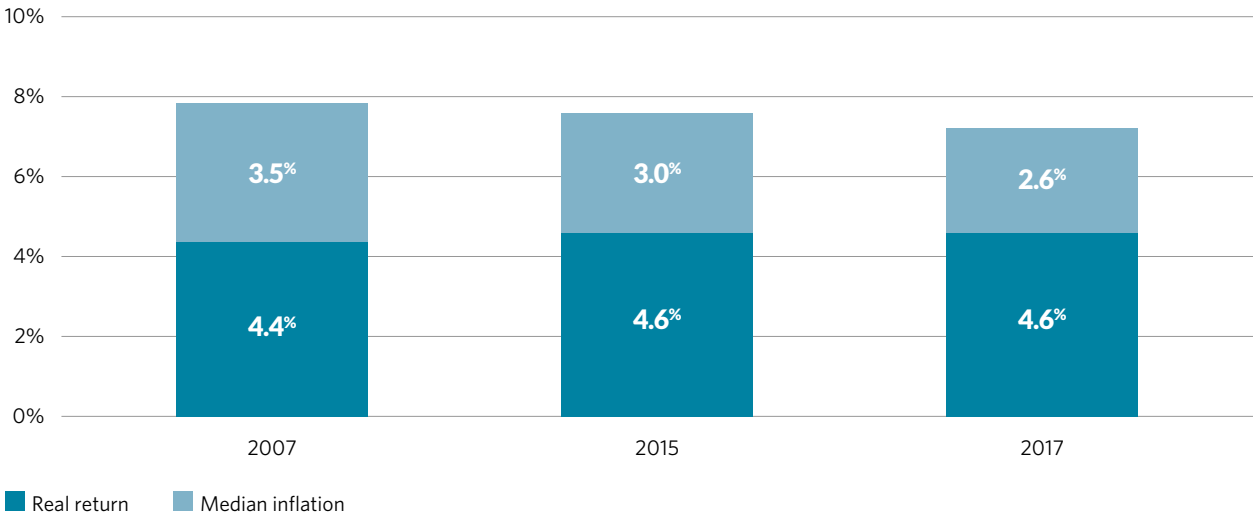



Sources: State Comprehensive Annual Financial Reports; state treasury reports; quarterly investment reports; and state responses to data inquiries

Figure A5

## Median Expected Nominal Returns for U.S. Public Pension Funds

Primary assumption change is in expected inflation




Note: Nominal returns equal real returns plus inflation

Sources: State Comprehensive Annual Financial Reports; state treasury reports; quarterly investment reports; and state responses to data inquiries

Figure A6

# 10-Year Returns for Funds Reporting Net of Fees on a June 30 Fiscal Year Basis, 2017

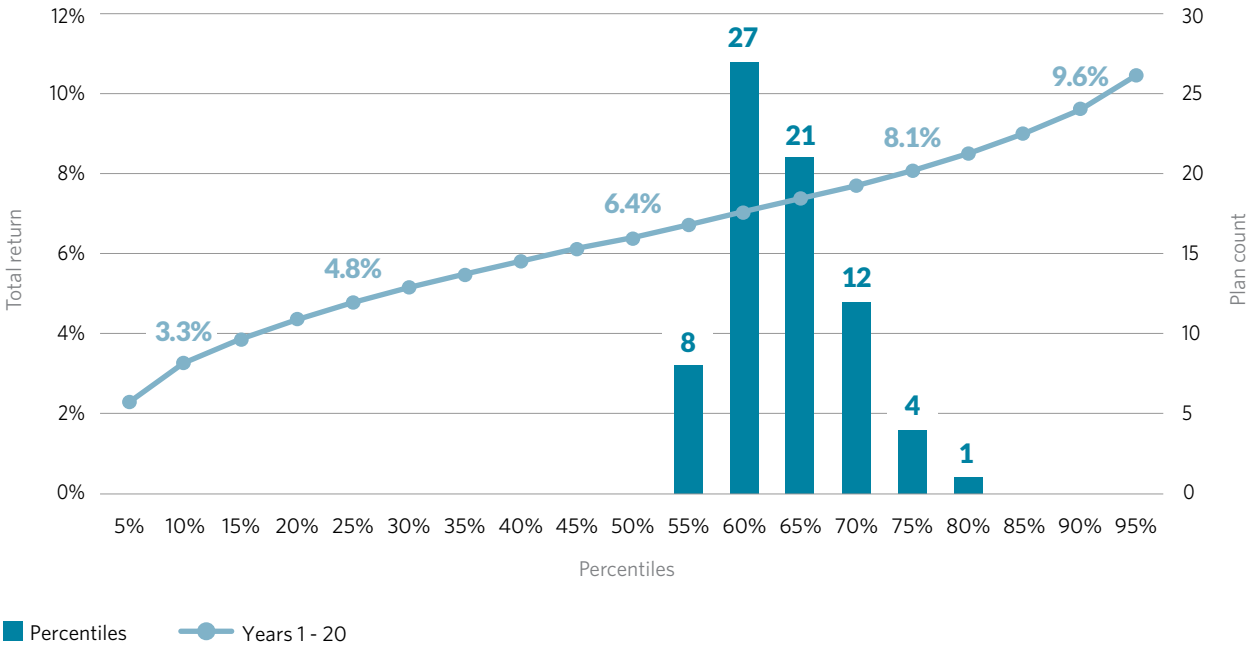
Returns range from 2.9 percent to 6.2 percent and no fund met its return target


Sources: State Comprehensive Annual Financial Reports, 2017; state treasury reports; quarterly investment reports; and state responses to data inquiries

Figure A7

## Distribution of 20-Year Returns for a Typical Portfolio

Median expected return of 6.4 percent is lower than nearly all funds' targets




Sources: The Terry Group and The Pew Charitable Trusts; State Comprehensive Annual Financial Reports, 2017; state treasury reports; quarterly investment reports; and state responses to data inquiries

# Endnotes

1 Board of Governors of the Federal Reserve System, "Z.1 Financial Accounts of the United States: Flow of Funds, Balance Sheets, and Integrated Macroeconomic Accounts, Fourth Quarter 2018," Table L.120, Federal Reserve Statistical Release, March 7, 2019, https://www.federalreserve.gov/releases/z1/20190307/z1.pdf.

2 See California Public Employees Retirement System, "CalPERS to Lower Discount Rate to Seven Percent Over the Next Three Years," news release, December 21, 2016, https://www.calpers.ca.gov/page/newsroom/calpers-news/2016/calpers-lower-discount-rate; and Sovereign Wealth Fund Institute, "Top 100 Largest Public Pension Rankings by Total Assets," https://www.swfinstitute.org/fund-rankings/public-pension.

3 Congressional Budget Office, "The Budget and Economic Outlook: 2019 to 2029" (2019), https://www.cbo.gov/system/files/2019-03/54918-Outlook-3.pdf.

4 G. Mennis, S. Banta, and D. Draine, "Assessing the Risk of Fiscal Distress for Public Pensions: State Stress Test Analysis" (Mossavar-Rahmani Center for Business and Government Associate Working Paper No. 92, Harvard Kennedy School, 2018).

5 See P. Zemsky and B. Reinhard, "2019 Capital Market Assumptions" (2018), New York: Voya Investment Management; and J.P. Morgan Asset Management, "2017 Long-Term Capital Market Assumptions" (2017), New York: J.P. Morgan Chase & Co.; and A. Foresti and M. Rush, "2017 Asset Allocation Return and Risk Assumptions" (2017), Santa Monica, California: Wilshire Consulting.

6 Actuarial funding policies for pension plans are split between those using level dollar payments for fund pension debt, where the dollar amount going to close the funding gap is expected to stay stable over time, and level percent of payroll funding policies, where the debt payment will stay constant as a share of total salary but will grow in dollar terms. The former has a higher initial dollar cost but pays down debt faster and offers greater budgetary stability.

7 See Fitch Ratings, "Fitch Ratings: Connecticut Teacher Pension Changes Costly, but Lower Fiscal Risks," news release, Feb. 28, 2019, https://www.fitchratings.com/site/pr/10064878.

8 CalPERS' funding risk mitigation policy is described here: https://www.calpers.ca.gov/docs/funding-risk-mitigation-policy.pdf.

9 The Wisconsin Retirement System's assumed rate was decreased to 7 percent as of 2018 and will affect required state and worker contributions beginning in 2020.

10 Wisconsin bases its post-retirement annuity benefit increases or decreases on the plan's investment performance. At retirement, funds from a participant's account and the employer reserve account that are sufficient to pay an annuity for the retiree's projected lifetime are transferred to the annuity reserve account. Annual interest is credited to this account; when the funds in the annuity reserve exceed the amount needed to pay for the existing benefit, an annuity increase is granted automatically. When funds are insufficient, the annuity payment is decreased to make up for the shortfall. More details are available at: https://etf.wi.gov/retirement/planning-retirement/annuity-payments-and-adjustments.

11 The present value of liabilities—and therefore the actuarially determined contribution rate—is lower when calculated using a discount rate of 7 percent than when calculating using the lower risk-free rate (typically the return on a 30-year Treasury bill, currently less than 2.5 percent).

12 See Institutional Limited Partners Association, "Template Endorsers," https://ilpa.org/reporting-template/template-endorsers/.

13 Public Pension Management and Asset Investment Review Commission, "Final Report and Recommendations" (2018), https://patreasury.gov/pdf/2018-PPMAIRC-FINAL.pdf.

14 Congressional Budget Office, "The Budget and Economic Outlook: 2019 to 2029" (2019), https://www.cbo.gov/publication/54918.

15 Additional contributors to lower-than-historical labor force participation include a slowdown in immigration, other demographic shifts, and low rates of employment among people with less than a college degree.

16 Federal Reserve Bank of Cleveland, "Inflation Expectations," last modified Sept. 12, 2019, https://www.clevelandfed.org/our-research/indicators-and-data/inflation-expectations.aspx.

17 Even if bonds yields increased significantly, this would lower the value of current bond holdings in pension funds. In a rising interest rate environment, plans would suffer losses if they needed to sell bonds they purchased when yields were lower.

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## For further information, please visit:

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