MILLIMAN WHITE PAPER

2022 Public Pension Funding Study

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Milliman

Introduction

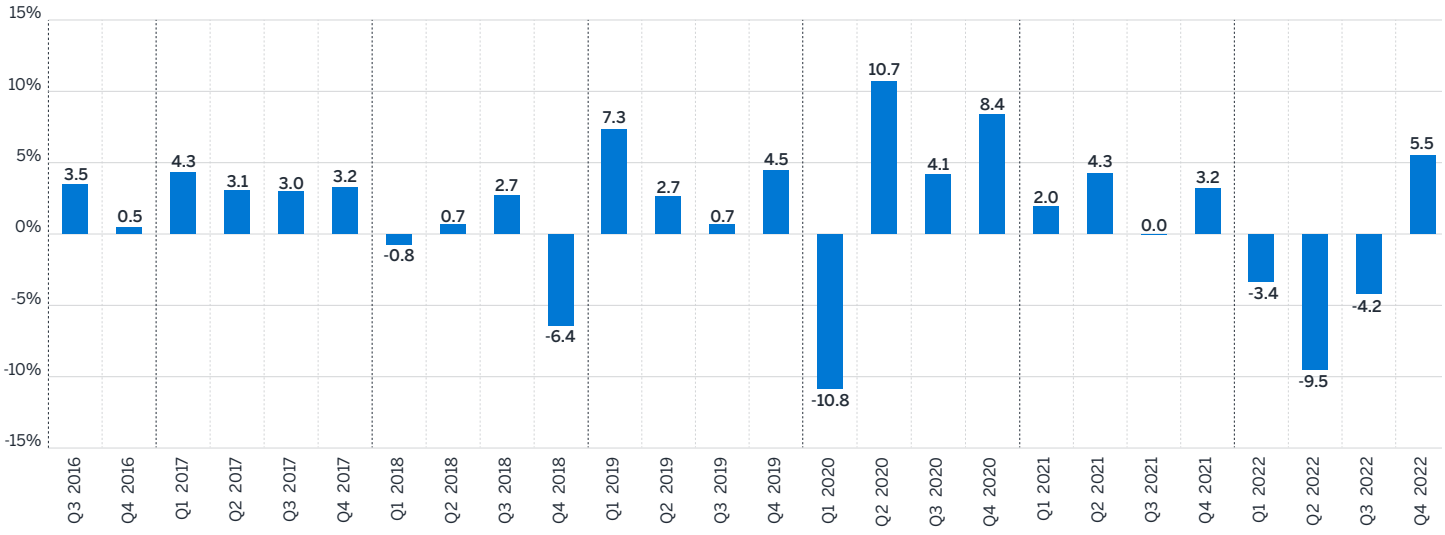
The Milliman Public Pension Funding Study annually explores the funded status of the 100 largest U.S. public pension plans. We report the plans' own assessments of how well funded they are. We also recalibrate the liability for each plan based on our independent assessment of the expected real return on each plan's investments.

This 2022 report is based on the most recently published fiscal year-end reports available for each plan—June 30, 2021, is the *measurement date* for three-quarters of the plans in our 2022 study. Some plans have subsequently issued data regarding their investment performance for more recent time periods, but that information has not been incorporated into this study. For 91 of the 100 plans in this study with a measurement date between June 30, 2021, and December 31, 2021, the reported asset levels reflected the robust market recovery that followed the market drop at the onset of the COVID-19 pandemic. The strong market returns for the period from late spring of 2020 through March 2022 brought the aggregate plan funded status from a low of 66.0% as of March 31, 2020, to a peak of 85.5% as of December 31, 2021. These two endpoints represent both the lowest and the highest funding levels we have measured since our study began in 2012. However, the robust run-up in funded status proved to be short-lived, as markets dropped significantly in April 2022 and have been quite volatile in the months since. Aggregate plan assets that were reported as of the most recent measurement dates stood at $4.80 trillion, but we estimate that asset levels dropped to $4.35 trillion as of June 30, 2022, and stood at about that same level as of December 31, 2022. We estimate that the plans experienced a median annualized return on assets of -8% in the period between their measurement dates and June 30, 2022. Our estimated aggregate return on assets for the 2022 calendar year is -11.6%.

Highlights

- As of December 31, 2022, the aggregate funded ratio has fallen to 72.6%, erasing the market gains experienced in 2020 and 2021 after the COVID-19 market crash
- 2022 market underperformance has widened the funding gap between plan assets and liabilities to a new high of $1.63 trillion as of December 31, 2022
- Current market expectations slightly exceed plan investment return assumptions for the first time since the inception of this study

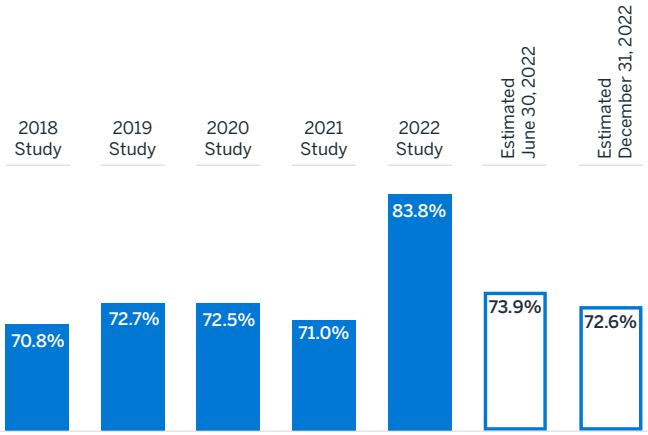
FIGURE 1: QUARTERLY INVESTMENT RETURNS



The aggregate Total Pension Liability reported at the measurement dates was $5.72 trillion, growing from $5.50 trillion as of the prior measurement dates. We estimate that the Total Pension Liability has further increased to $5.90 trillion as of June 30, 2022, and $5.98 trillion as of December 31, 2022. The aggregate plan-reported underfunding as of the measurement dates stood at $0.92 trillion, which is lower than the $1.60 trillion of underfunding a year earlier, and marks the lowest level of underfunding since our study commenced in 2012. However, as mentioned earlier, the poor market performance since the measurement dates has significantly under-paced the liability growth, and we estimate that the gap between assets and liabilities has widened to $1.55 trillion as of June 30, 2022, and $1.63 trillion as of December 31, 2022. To the extent that plans lowered their interest rate assumptions (often referred to as the investment return assumption) after measurement dates reflected in this report, our estimated figures as of June 30, 2022, and December 31, 2022, likely understate the aggregate liability and the aggregate underfunding.

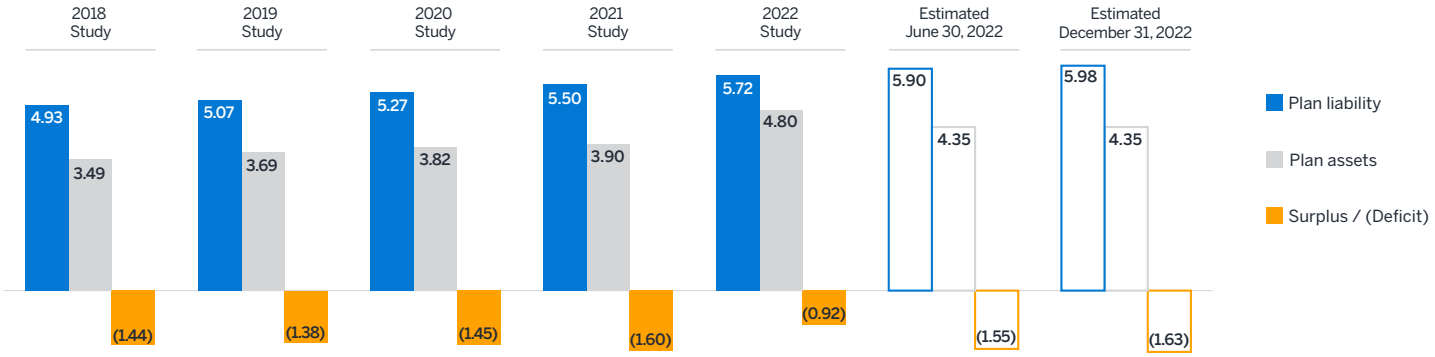
The aggregate funded ratio reported by plan sponsors as of the most recent measurement dates improved dramatically since our prior study, from 71.0% to 83.8%, primarily because the asset levels reported on the most recent measurement dates reflect the market rebound after the onset of the COVID-19 pandemic but not the subsequent market drop. However, we estimate that the market drop has caused the aggregate funded ratio to fall significantly; we estimate that it stood at 73.9% as of June 30, 2022, and at 72.6% as of December 31, 2022.

FIGURE 3: AGGREGATE PLAN-REPORTED FUNDED RATIO



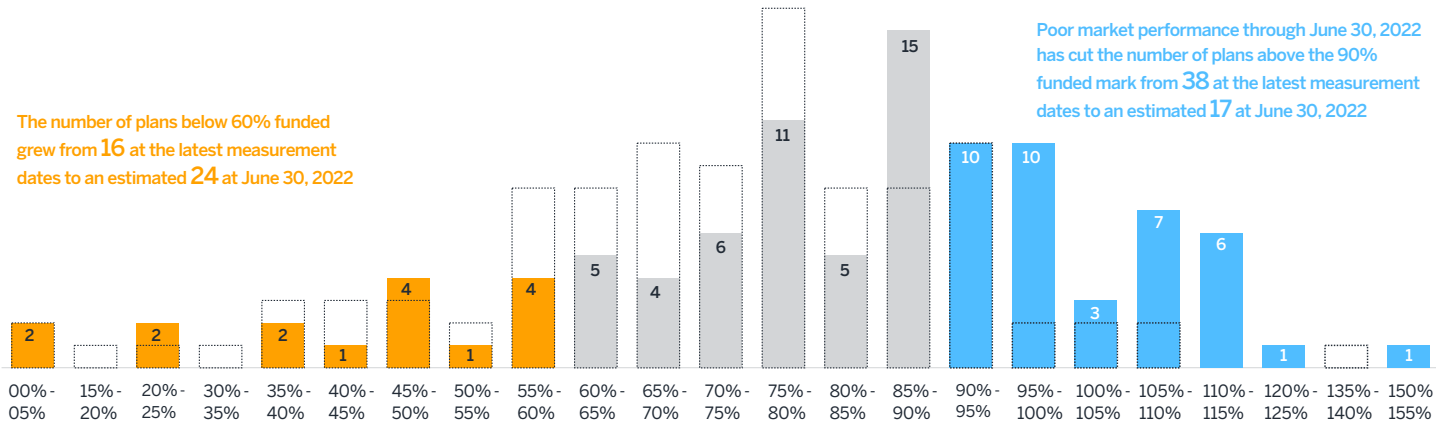
Note: Yearly study results (solid bars) generally reflect measurements from one year prior.

FIGURE 2: AGGREGATE PLAN-REPORTED FUNDED STATUS ($ TRILLIONS)



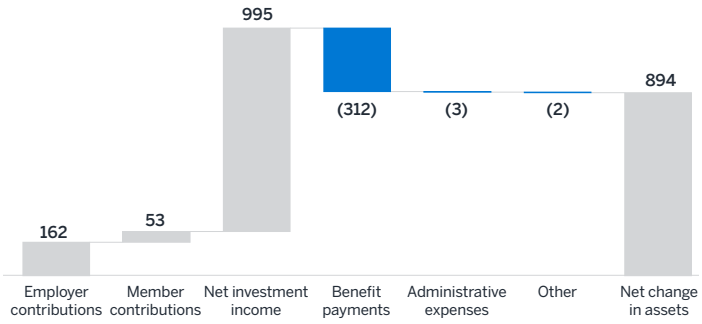
Note: Yearly study results (solid bars) generally reflect measurements from one year prior.

FIGURE 4: INDIVIDUAL PLAN-REPORTED FUNDED RATIOS AT MEASUREMENT DATES (SOLID BARS) AND ESTIMATED AT JUNE 30, 2022 (DOTTED LINES)



Overall, the 100 plans reported benefit payouts totaling $312 billion in their most recent measurement years. Reported contributions totaled $215 billion, with $162 billion and $53 billion provided by employers and members, respectively. Figure 5 summarizes the change in asset balances reported by the plans in their most recent measurement years.

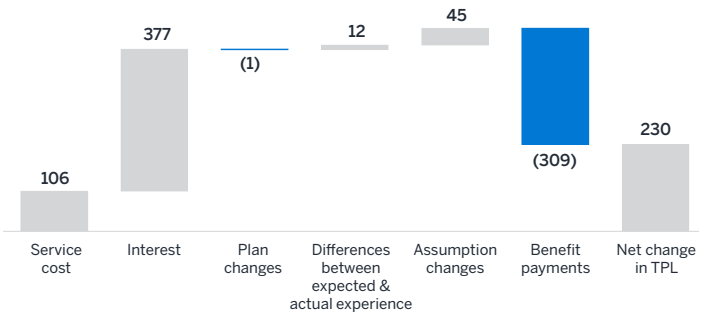
FIGURE 5: REPORTED CHANGE IN ASSETS, MOST RECENT MEASUREMENT YEAR ($ BILLIONS)



We project that in the period July 2022 to June 2023 the plans will receive combined contributions from employers and members of $230 billion and pay out a total of $340 billion in benefits and administrative expenses, for a net cash outflow of $110 billion. This continues a steady trend of increases in both contributions flowing into the plans *and* benefits flowing out of the plans, as shown in Figure 6.

Figure 7 summarizes the change in Total Pension Liability reported by the plans in their most recent measurement years. In general, a plan's liability is increased by service cost and interest, and reduced by benefit payments. Changes in assumptions or plan provisions can increase or decrease a plan's liability, depending on the nature of the change.

FIGURE 7: REPORTED CHANGE IN TOTAL PENSION LIABILITY, MOST RECENT MEASUREMENT YEAR ($ BILLIONS)



Liabilities

The plans reported an aggregate Total Pension Liability of $5.72 trillion for the 27.6 million members covered by the plans in the study. The plans continue the trend of growing more mature. Figure 8 illustrates that the number of active members covered by these plans has been essentially flat for the past 10 years, while the number of retired and inactive members has increased each year.

FIGURE 8: NUMBER OF PLAN MEMBERS (MILLIONS)

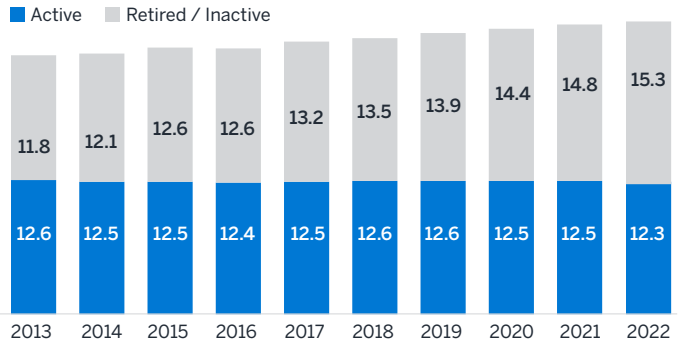
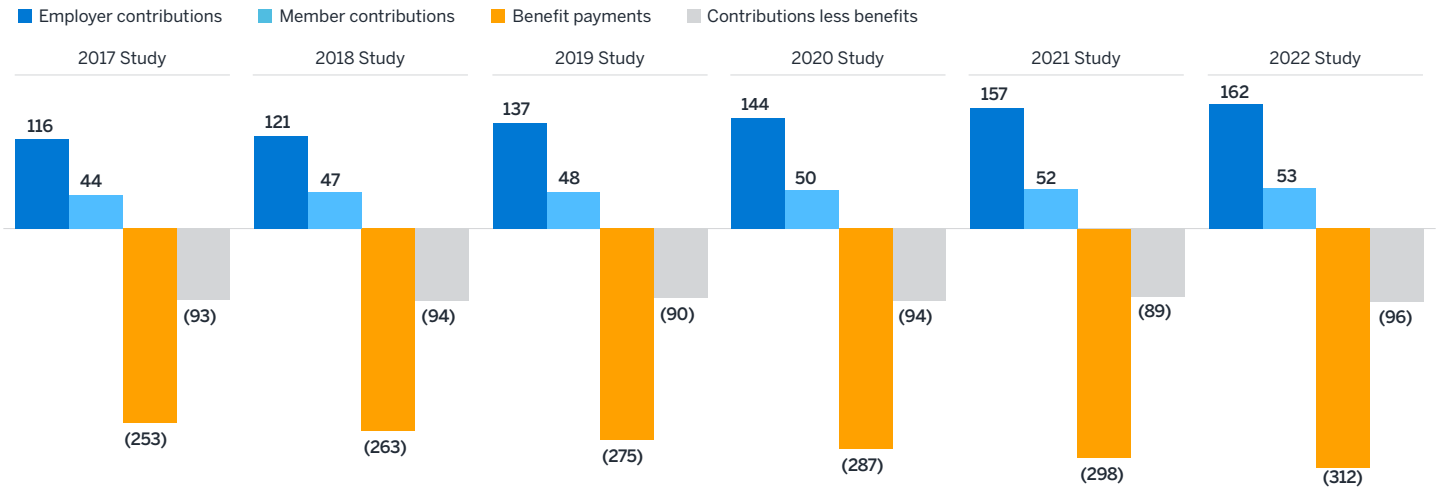


FIGURE 6: REPORTED CASH FLOWS ($ BILLIONS)



The 100 public plans individually range in size of Total Pension Liability from $11 billion to $544 billion. Collectively, the 10 largest plans (ranked by liability) cover 36% of the total members, hold 40% of the aggregate assets, and have 38% of the aggregate liability.

FIGURE 9: COMPARISON OF PLANS RANKED BY TOTAL PENSION LIABILITY

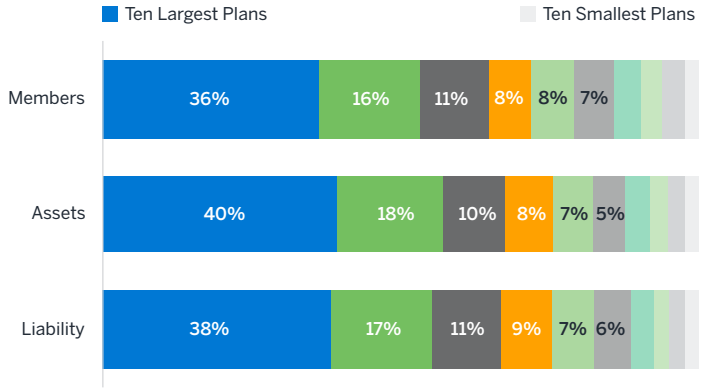


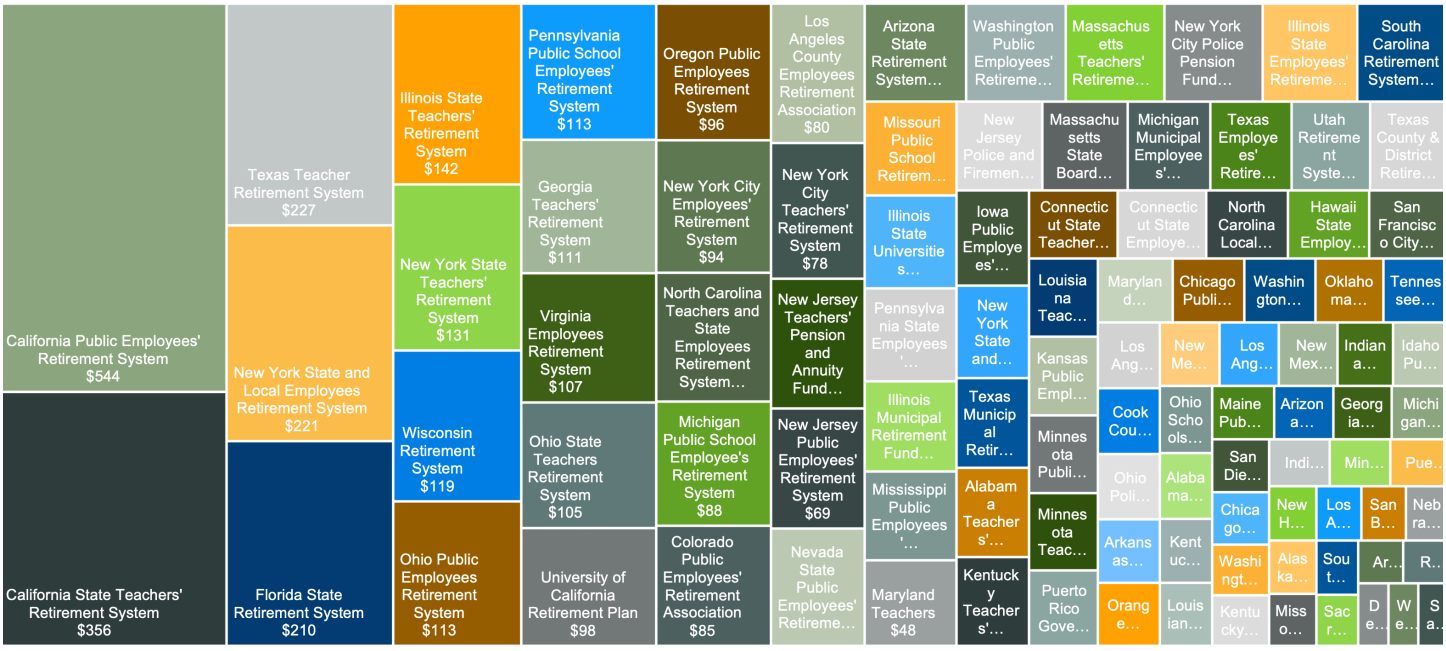
Figure 10 illustrates the relative size of the Total Pension Liability for the 100 plans in this study.

Cost of benefits earned each year

Service cost is the portion of the actuarial present value of projected benefit payments that is attributable to a given year. In other words, it is the cost to the plan to provide the benefits that active members earn by working one more year. The plans report the service cost in their Governmental Accounting Standards Board (GASB) 67/68 disclosures as a component of the change in the Total Pension Liability from one reporting date to the next.

In order to determine the relative value of pension benefits the plans provide annually to their active members, we started with each plan's reported service cost. We then subtracted out the portion of that cost that is paid for with contributions from the active members during the year. And we then divided by each plan's total payroll so that we could adjust for the relative size of a plan. The resulting metric is the net employer-paid service cost as a percentage of payroll and represents the relative richness of the pension benefits that are being paid for by the employers.

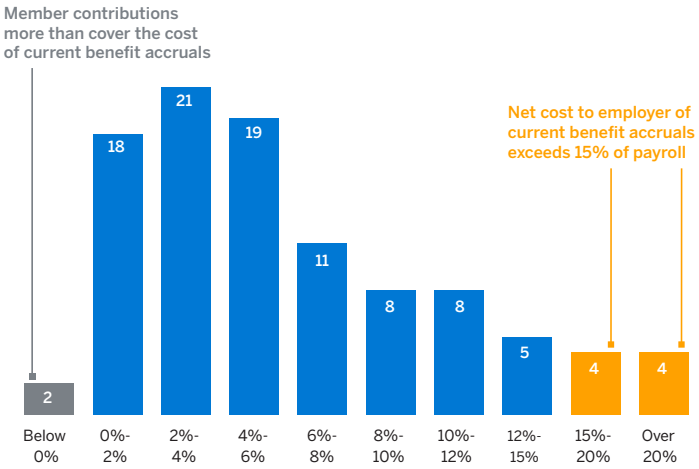
FIGURE 10: TOTAL PENSION LIABILITY ($ BILLIONS)



Note: For plans where Total Pension Liability figures are not published on an aggregate basis, we have estimated this figure based on available data.

Overall, 80% of the plans provide an estimated employer-paid pension benefit in the range of 0% to 10% of payroll; the most common level of employer-paid pension benefits is 2% to 4% (21 plans). There are two plans with a negative net service cost, which means that contributions from active members more than cover the annual cost of their own annual pension accruals. On the flip side, there are eight plans with a net cost of 15% of payroll or more, indicating relatively costly benefits.

FIGURE 11: EMPLOYER-PAID NET SERVICE COST AS PERCENTAGE OF PAYROLL

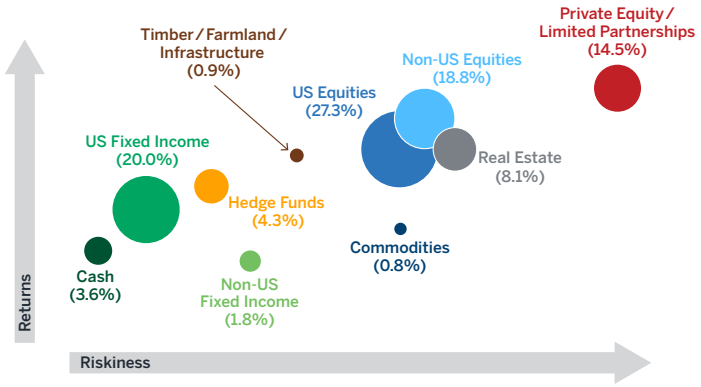


There is very little correlation between the richness of the benefits provided and the funded status of the plan; that is, plans with generous benefits are neither better funded nor more poorly funded than plans with modest benefits.

Assets

The plans included in this study are invested in a mix of asset classes with different risk/return characteristics, as illustrated in Figure 12.

FIGURE 12: ASSET ALLOCATION, 2022 STUDY

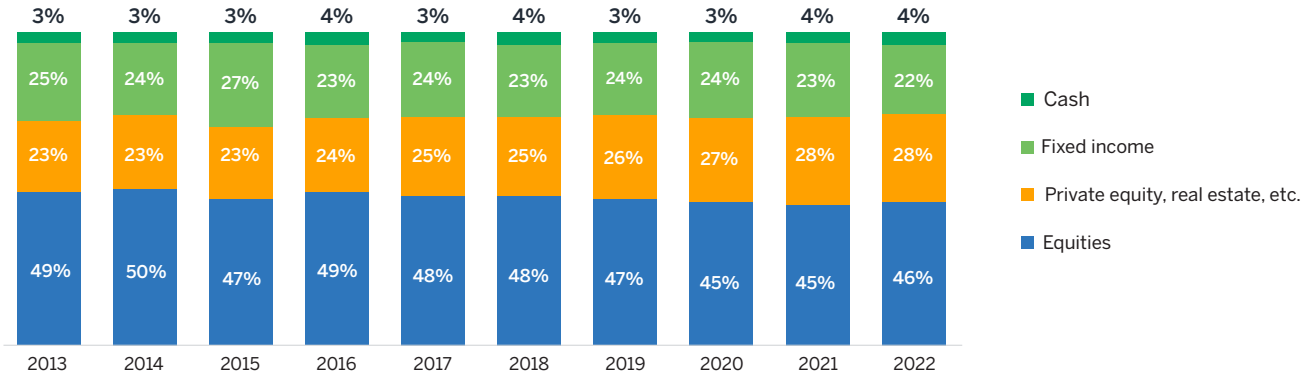


Note: The expected return and riskiness metrics are based on Milliman's capital market assumptions as of June 30, 2022.

Over the past 10 years there has been very little change in the overall asset allocation of these plans (see Figure 13), with just a modest, gradual shift from equities and fixed income to alternative investments.

We found little correlation between plans' asset allocations or reported interest rate assumptions and how well funded or poorly funded (as measured by their funded ratios) the plans are.

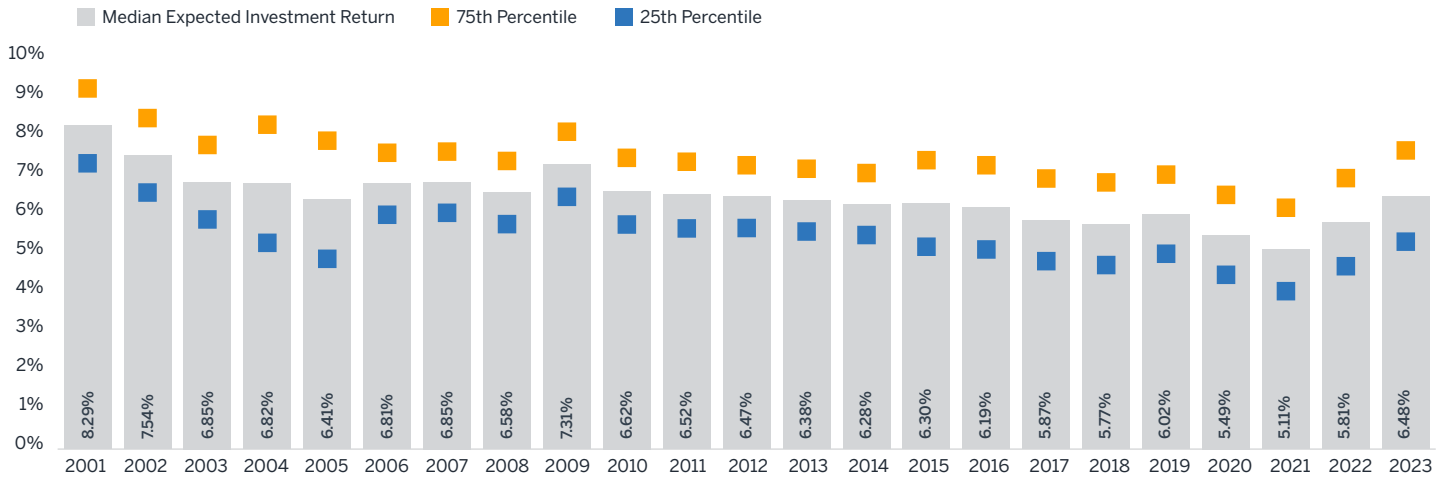
FIGURE 13: AGGREGATE ASSET ALLOCATIONS OVER TIME



The market's consensus views on long-term future investment returns have been declining since the turn of the millennium. Figure 14 illustrates this trend by showing the expected long-term future return for a hypothetical asset allocation, based on Milliman's capital market assumptions for each year since 2000. Over this period, the median expected investment return for the illustrated hypothetical asset allocation fell from 8.29% for 2001 to a low of 5.11% at the start of 2021. Reflecting this decline, where interest rate assumptions of 8.00% were once the norm, 99 of the plans in the study now have assumptions of 7.50% or below (compared to 95 in the 2020 study). Forty-five of the plans lowered their assumptions from Milliman's 2021 study to the 2022 study; all plans have lowered their assumptions at least once since our inaugural 2012 study. Since early 2021, however, the expected investment return surged upward to 5.81% at the start of 2022, and it stands at 6.48% at the start of 2023. This rapid rise reflects the recent combination of high inflation, high interest rates, and depressed equity markets. In the midst of the current economic turmoil, there is considerable uncertainty over when and how much equity markets will recover, and where inflation and interest rates will settle out. If inflation and interest rates return to their very low pre-pandemic levels, then plan sponsors are unlikely to raise their expected investment return assumptions. But if the "new normal" of inflation and interest rates is somewhat higher than was the case through 2019, then there may be some upward movement in expected investment returns.

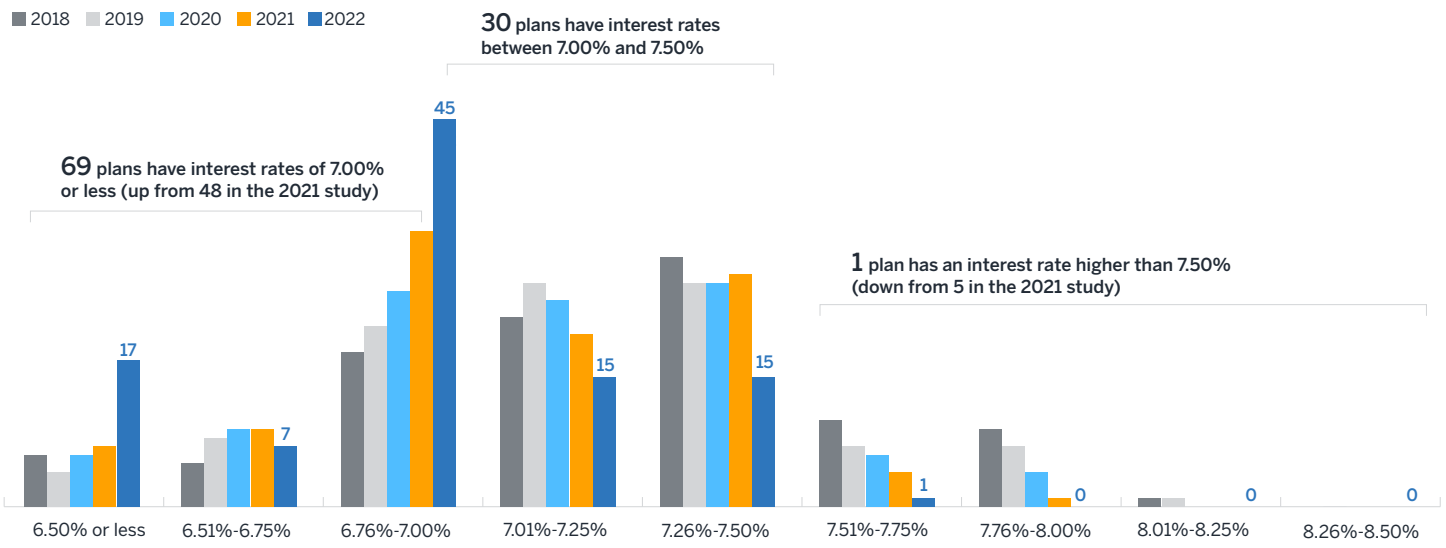
The terms "interest rate" and "discount rate" are often used interchangeably; both represent a rate that is used to translate future expected benefit payments into current liabilities. For this study, we use the term "interest rate" to indicate the assumption the plan has chosen to determine contribution amounts, and we use the term "discount rate" to indicate the rate that is used to measure liabilities for GASB 67/68 financial reporting purposes. Interest rates have continued to move lower each year, with a median of 7.00% and ranges from 2.21% to 7.55% (see Figure 15). For most of the plans in this study, the funding interest rate and the financial reporting discount rate are the same. However, GASB 67/68 reporting requires that the discount rate be adjusted downward in situations where current contribution policy is projected (using the GASB-mandated testing methodology) to result in a plan running out of plan assets at some future date. Such a downward adjustment currently occurs for five of the plans in the study.

FIGURE 14: EXPECTED 30-YEAR COMPOUNDED ANNUAL RETURN FOR A HYPOTHETICAL ASSET ALLOCATION BASED ON MILLIMAN'S CAPITAL MARKET ASSUMPTIONS



Note: Hypothetical asset allocation consists of 35% broad U.S. equities, 15% developed foreign equities, 25% core fixed income, 5% high-yield bonds, 10% mortgages, 5% real estate, and 5% short-term investments; the inflation assumption is fixed at 2.5% for all years.

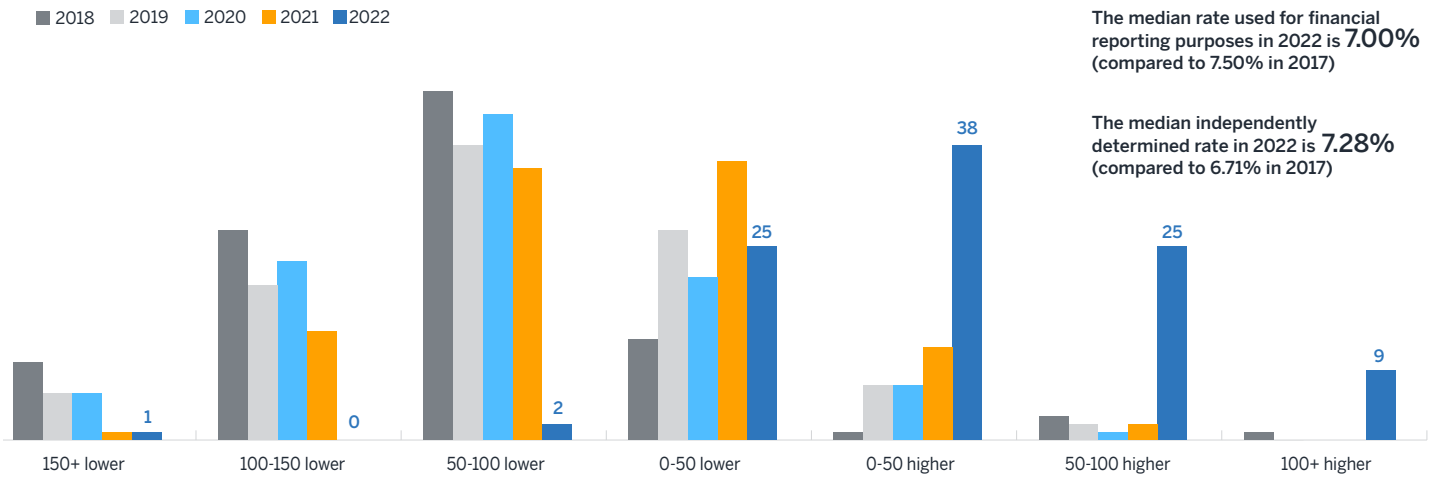
FIGURE 15: PLAN-REPORTED FUNDING INTEREST RATE



Recalibrating the Total Pension Liability

Using each plan's specific asset allocation, we determined the 50th-percentile 30-year geometric average annual real rate of return based on Milliman's June 30, 2022, capital market assumptions. We then applied each plan's reported inflation assumption to arrive at our independently determined expected investment return for that plan. For purposes of the following analysis, we will use these expected returns as if they were the investment return assumptions for each plan. The median of the resulting independently determined investment return assumptions is 7.28%, which is 28 basis points higher than the 7.00% median discount rate used by the plans. This marks the first time in the history of our study that our independently determined investment return assumption is higher than the median reported discount rate. As discussed above, however, our independently determined figures reflect current economic conditions as of June 30, 2022, which may prove to be transitory; plan sponsors may wait until markets return to more normal levels before concluding that an increase in their investment return assumption is appropriate. Figure 16 shows that 72 of the plans have an independently determined interest rate that is higher than the reported discount rate.

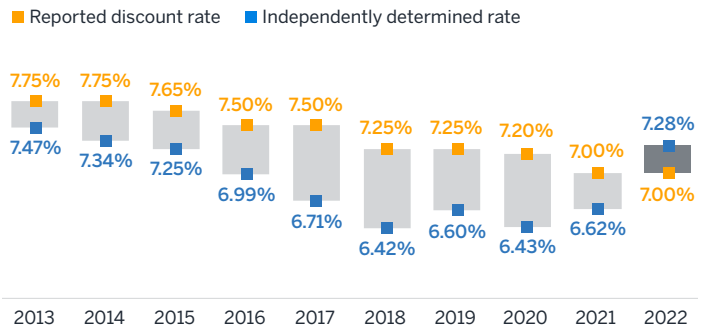
FIGURE 16: GAP BETWEEN INDEPENDENTLY DETERMINED AND PLAN-REPORTED RATES



Note: Difference shown is in basis points, so "100+ higher" indicates at least a 1.00% difference.

Plans periodically reassess their interest rate assumptions to ensure that they reflect updated market expectations about future investment returns. The frequency of reassessment varies by plan, with some plans reassessing annually and others using as long as five-year or six-year review cycles. As Figure 14 above illustrates, market expectations had been falling for the past two decades, but ticked upward this past year. Plans have been lowering their interest rate assumptions, but have often failed to keep pace with market expectations. This year we see the reverse occurring, where plans understandably have not reacted quickly to changing market expectations. The increase in the median independently determined interest rate from 6.62% in 2021 to 7.28% in 2022 represents a marked increase and has led to an inversion of the gap between reported discount rates and Milliman's independently determined rate (shown in Figure 17). Forty-five of the plans in the study have lowered their interest rate assumptions since the previous study.

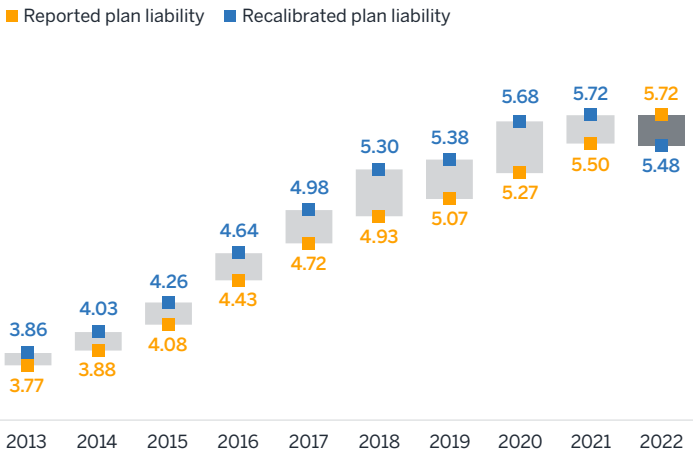
FIGURE 17: REPORTED VS. INDEPENDENTLY DETERMINED RATES



The 2022 gap between the 7.00% median discount rate used for financial reporting purposes and the 7.28% median independently determined rate indicates it is possible that plans may consider an increase to their interest rate assumptions.

We used each plan's independently determined investment return assumption to recalibrate the plan's Total Pension Liability. In aggregate, these plans have a recalibrated Total Pension Liability of $5.48 trillion, compared with a plan-reported Total Pension Liability of $5.72 trillion. Similar to the gap movement in the investment return assumption analysis above, the difference in the recalibrated versus plan-reported liability has flipped such that the recalibrated plan liability is currently less than the reported plan liability.

FIGURE 18: AGGREGATE RECALIBRATION RESULTS ($ TRILLIONS)



ASOP 51 and plan maturity measures

Actuarial Standards of Practice (ASOP) 51 directs pension actuaries to provide plan sponsors with information regarding the risks faced by pension plans. Pension actuaries in particular are directed to include metrics with respect to each plan's maturity level, because a plan's maturity affects everything from how sensitive the liability is to changes in the discount rate to asset allocation decisions to cash management and liquidity considerations. Figure 19 illustrates the range of maturity levels for the plans in this study using five of the maturity metrics discussed in ASOP 51.

Market value of assets compared to payroll: This metric, also known as the *Asset Volatility Ratio*, helps plan sponsors anticipate the impact of investment volatility on actuarially determined contribution rates. A lower ratio means that plan assets are relatively small compared to payroll; this implies that a single-year deviation in asset performance may not move the contribution rate much. A higher ratio, on the other hand, signals that a similar single-year asset gain or loss could translate into a signficiant shift in the actuarially determined contribution rate. It is unsurprising that, as pension plans have accumulated assets and their member populations have matured, asset volatility rates have risen. These higher ratios mean that actuarially determined contribution rates are now more sensitive than they once were to investment volatility, despite the use of asset-smoothing methods to help mitigate the impact of market movements.

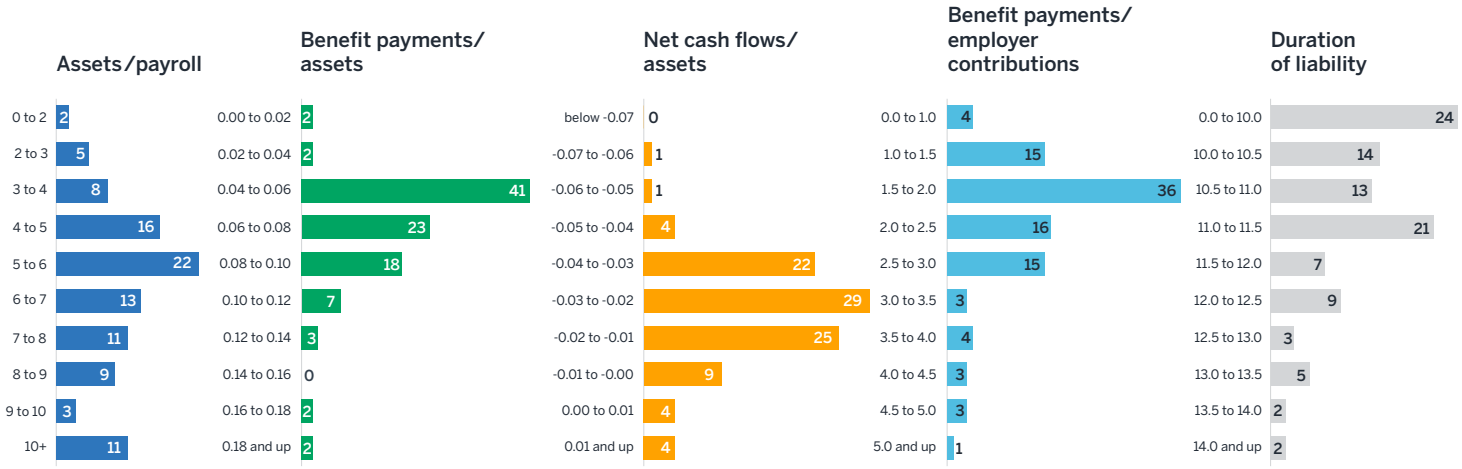
Benefit payments compared to market value of assets: This metric provides the plan sponsor with insight into managing the plan's liquidity needs. If annual benefit payouts are small relative to the overall size of plan assets, the liquidity needs of the plan will be low and more of the assets can be invested in longer-term or less liquid holdings. However, as a plan's membership shifts to more retirees drawing monthly benefits, care is needed to ensure that cash is available to pay benefits.

Net cash flows compared to market value of assets: The liquidity pressures caused by high levels of benefit payments may be mitigated by similarly high levels of contributions flowing into the plan from employers and members. Plans with net cash flows close to zero may therefore be in better positions to invest in longer-term or less liquid holdings even though significant funds are being expended annually on benefits. Nearly all of the plans in this study have negative cash flows, meaning that benefit payments and administrative expenses exceed incoming contributions.

Benefit payments compared to employer contributions: As with the preceding two metrics, this metric helps plan sponsors understand and manage their cash flows and liquidity needs. For plans where benefit payouts are significantly higher than incoming contributions, greater attention may need to be devoted to investments that throw off higher interest or dividend income in order to meet cash flow needs.

Duration of the liability: This metric helps plan sponsors understand how sensitive their liabilities are to a change in discount rates of 100 basis points. A relatively small change in the discount rate can have a significant impact on the Total Pension Liability. A less mature plan with more active members than retirees typically has a higher sensitivity to discount rate changes than a more mature plan with a bigger retiree popoulation. Other factors, such as automatic cost-of-living features, also come into play in determining a plan's sensitivity.

FIGURE 19: MATURITY METRICS



Financial Reporting vs. Funding

The Governmental Accounting Standards Board (GASB) sets the accounting standards for public entities. Statements No. 67 and 68 specify the financial reporting requirements for U.S. public pension plans and their participating employers. These standards require all plans to report a standardized measure of actuarial liability, referred to as the *Total Pension Liability*. The Total Pension Liability must be calculated using a uniform actuarial cost method (the individual entry age cost method), which may differ from the actuarial cost method the plan uses to determine contribution amounts. Under certain circumstances, generally when the plan is receiving a low level of funding, the discount rate used to calculate the Total Pension Liability may be lower than the investment return assumption used for funding purposes. Consequently, for some plans, the liability measurement used in determining amounts that should be contributed to fund the plan differs from the Total Pension Liability. Additionally, each plan is required to disclose how sensitive its Total Pension Liability is to changes in the discount rate.

Methodology

This study is based on the most recently available Annual Comprehensive Financial Reports for the 100 largest public pension plans, which reflect measurement dates ranging from June 30, 2019, to December 31, 2021; 91 are from June 30, 2021, or later. For the purposes of this study, the reported asset allocation of each of the plans has been analyzed to determine an independent measure of the expected long-term median real rate of return on plan assets. The plan-reported Total Pension Liability for each plan has then been recalibrated to reflect this independently determined investment return assumption. This study therefore adjusts for differences between each plan's reported discount rate and an independently calibrated current market assessment of the expected real return based on actual asset allocations. This study is not intended to price the plans' liabilities for purposes of determining contribution amounts or near-term plan settlement purposes nor to analyze the funding of individual plans.

Acknowledgements

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Study technical appendix: Methodology

EXPECTED INVESTMENT RETURN

For the purposes of this study, we recalibrated liabilities for included plans to reflect discounting at our independently calculated expected rate of return on current plan assets. To develop the expected rate of return used in these calculations, we relied on the most recently available asset statements for each plan, particularly on Statements of Plan Net Assets as disclosed in published Annual Comprehensive Financial Reports. We did not make adjustments for potential differences between actual asset allocations and target policy asset allocations.

Our method to calculate the expected rate of return was a "building-block method," using geometric averaging methodology. We used Milliman's June 30, 2022, capital market assumptions to calculate the 50th-percentile 30-year real rate of return, and then combined the estimated real rate of return with the plan's inflation assumption to arrive at the total expected investment return on plan assets. Where the plan inflation assumption was not available, we used an inflation assumption of 2.50%. We did not make any adjustment to the expected rate of return for plan expenses, nor did we include any assumption for investment alpha (i.e., we did not assume any excess return over market averages resulting from active versus passive management).

LIABILITY RECALIBRATION

We performed the recalibration of liabilities for pension plans included in the study using the sensitivity information disclosed in published Comprehensive Annual Financial Reports. Where this information was not available, we made adjustments based on available information.

Appendix

SPONSOR-REPORTED DATA

Plan Name	Measurement Date	GASB 68 Discount Rate	Total Pension Liability ($ millions)	Fiduciary Net Position ($ millions)	Net Pension Liability ($ millions)	Funded Ratio	Count of Active Members	Count of Inactive / Retired Members
Alabama Employees' Retirement System	9/30/21	7.45%	21,064	15,479	5,584	73.5%	85,485	96,216
Alabama Teachers' Retirement System	9/30/21	7.45%	39,982	30,562	9,420	76.4%	132,707	125,521
Alaska Public Employees' Retirement System	6/30/21	7.38%	15,581	11,912	3,668	76.5%	10,066	41,816
Arizona Public Safety Personnel Retirement System	6/30/21							
Arizona State Retirement System	6/30/21	7.00%	61,342	48,202	13,140	78.6%	212,088	415,887
Arkansas Public Employees Retirement System	6/30/21	7.15%	11,954	11,185	769	93.6%	42,667	55,564
Arkansas Teacher's Retirement System	6/30/21	7.25%	24,238	21,469	2,769	88.6%	70,098	64,979
California Public Employees' Retirement System	6/30/21							
California State Teachers' Retirement System	6/30/21	7.10%	355,801	310,293	45,508	87.2%	429,681	551,183
Chicago Municipal Employees' Annuity and Benefit Fund	12/31/21	7.00%	18,402	4,308	14,093	23.4%	32,925	27,884
Chicago Public Schools	6/30/21	5.96%	28,100	13,373	14,727	47.6%	31,215	34,268
Colorado Public Employees' Retirement Association	12/31/21	7.25%	84,537	65,595	18,942	77.6%	207,269	165,126
Connecticut State Employees Retirement System	6/30/20	6.90%	36,971	13,249	23,722	35.8%	47,662	54,935
Connecticut State Teachers' Retirement System	6/30/20	6.90%	37,128	18,282	18,846	49.2%	50,951	48,906
Cook County Employees' Annuity and Benefit Fund	12/31/21	4.38%	25,119	14,282	10,837	56.9%	18,320	37,169
Delaware State Employees' Pension Plan	6/30/21	7.00%	11,632	12,851	(1,219)	110.5%	38,518	33,665
Florida State Retirement System	6/30/21	6.80%	209,636	202,082	7,554	96.4%	457,249	573,186
Georgia Employees' Retirement System	6/30/21	7.00%	18,887	16,548	2,339	87.6%	53,330	120,833
Georgia Teachers' Retirement System	6/30/21	7.25%	110,991	102,147	8,844	92.0%	227,953	261,829
Hawaii State Employees' Retirement System	6/30/21	7.00%	34,139	21,936	12,203	64.3%	65,561	83,855
Idaho Public Employee Retirement System	6/30/21	6.35%	21,692	21,771	(79)	100.4%	73,563	65,430
Illinois Municipal Retirement Fund	12/31/21							
Illinois State Employees' Retirement System	6/30/21	6.20%	56,984	23,883	33,101	41.9%	62,253	104,435
Illinois State Teachers' Retirement System	6/30/21	7.00%	142,224	64,213	78,011	45.1%	159,027	273,287
Illinois State Universities Retirement System	6/30/21	6.12%	52,297	23,768	28,528	45.4%	60,397	156,246
Indiana Public Employees' Retirement Fund	6/30/21	6.25%	17,563	16,247	1,316	92.5%	125,386	128,782
Indiana State Teachers' Retirement Fund	6/30/21	6.25%	21,856	13,062	8,794	59.8%	68,241	70,615
Iowa Public Employees' Retirement System	6/30/21	7.00%	42,545	42,890	(345)	100.8%	173,186	208,736
Kansas Public Employee Retirement System	6/30/21	7.25%	33,054	25,255	7,799	76.4%	145,880	164,971
Kentucky County Employees Retirement System	6/30/21	6.25%	20,518	11,480	9,038	56.0%	86,540	130,598
Kentucky Employees Retirement Systems	6/30/21	5.33%	17,647	3,885	13,763	22.0%	34,013	86,279
Kentucky Teachers' Retirement System	6/30/21	7.10%	39,542	25,936	13,606	65.6%	69,256	68,003
Los Angeles City Employees' Retirement System	6/30/21	7.00%	23,282	18,918	4,364	81.3%	25,176	24,535
Los Angeles City Water and Power Employees' Retirement Plan	6/30/21	7.00%	15,009	16,667	(1,659)	111.1%	10,605	11,272
Los Angeles County Employees Retirement Association	6/30/21	7.13%	80,304	73,012	7,292	90.9%	99,101	86,685
Los Angeles Fire and Police Pension Plan	6/30/21	7.00%	25,161	27,862	(2,702)	110.7%	12,823	14,160
Louisiana State Employees' Retirement System	6/30/21	7.40%	20,220	14,716	5,504	72.8%	38,572	112,034
Louisiana Teachers' Retirement System	6/30/21	7.40%	33,059	27,720	5,339	83.9%	85,980	117,897

Appendix

SPONSOR-REPORTED DATA (CONTINUED)

Plan Name	Measurement Date	GASB 68 Discount Rate	Total Pension Liability ($ millions)	Fiduciary Net Position ($ millions)	Net Pension Liability ($ millions)	Funded Ratio	Count of Active Members	Count of Inactive / Retired Members
Maine Public Employees Retirement System	6/30/21	6.50%	20,205	18,768	1,437	92.9%	52,041	59,217
Maryland State Employees' Combined System	6/30/21	6.80%	29,412	22,577	6,835	76.8%	79,854	106,462
Maryland Teachers	6/30/21	6.80%	48,150	41,121	7,029	85.4%	109,958	105,248
Massachusetts State Board of Retirement System	6/30/21							
Massachusetts Teachers' Retirement System	6/30/21	7.00%	59,795	37,088	22,707	62.0%	96,527	68,780
Michigan Municipal Employees' Retirement System	12/31/21	7.60%	45,184	48,872	(3,688)	108.2%	27,139	53,859
Michigan Public School Employee's Retirement System	9/30/21	6.80%	87,569	63,332	24,237	72.3%	159,863	239,919
Michigan State Employees Retirement System	9/30/21	6.70%	18,547	14,482	4,065	78.1%	5,714	62,706
Minnesota Public Employees Retirement Association	6/30/21	6.50%	32,858	28,588	4,270	87.0%	168,781	198,325
Minnesota State Retirement System	6/30/21	6.50%	17,522	17,440	82	99.5%	50,889	62,747
Minnesota Teachers Retirement Association	6/30/21	7.00%	32,738	28,362	4,376	86.6%	81,821	125,050
Mississippi Public Employees' Retirement System	6/30/21	7.55%	49,997	35,217	14,780	70.4%	145,673	197,071
Missouri Public School Retirement System	6/30/21	7.30%	52,834	50,621	2,214	95.8%	78,944	75,552
Missouri State Employees' Plan	6/30/21	6.95%	15,111	9,520	5,591	63.0%	42,829	69,986
Nebraska Public Employees Retirement Systems School Retirement System	6/30/21	7.30%	14,279	15,693	(1,413)	109.9%	43,423	33,663
Nevada State Public Employees' Retirement System	6/30/21	7.25%	67,578	58,459	9,119	86.5%	106,930	94,826
New Hampshire Retirement System	6/30/21	6.75%	15,956	11,524	4,432	72.2%	48,582	43,704
New Jersey Police and Firemen's Retirement System	6/30/21	7.00%	46,973	33,543	13,429	71.4%	42,432	46,638
New Jersey Public Employees' Retirement System	6/30/21	7.00%	69,310	35,708	33,602	51.5%	246,776	185,652
New Jersey Teachers' Pension and Annuity Fund	6/30/21	7.00%	74,699	26,533	48,166	35.5%	156,047	110,031
New Mexico Educational Retirement Board	6/30/21	7.00%	23,449	16,362	7,087	69.8%	58,988	104,326
New Mexico Public Employees Retirement Association	6/30/21	7.25%	23,061	17,814	5,247	77.2%	48,818	62,846
New York City Employees' Retirement System	6/30/21	7.00%	93,553	87,139	6,414	93.1%	187,338	229,709
New York City Police Pension Fund	6/30/21	7.00%	59,303	57,266	2,037	96.6%	34,581	57,591
New York City Teachers' Retirement System	6/30/21	7.00%	78,418	78,347	71	99.9%	123,336	101,917
New York State and Local Employees Retirement System	3/31/21	5.90%	220,680	220,581	100	100.0%	469,968	628,874
New York State and Local Police & Fire	3/31/21	5.90%	41,237	39,501	1,736	95.8%	31,922	41,383
New York State Teachers' Retirement System	6/30/21	6.95%	130,819	148,148	(17,329)	113.2%	249,355	185,593
North Carolina Local Governmental Employees' Retirement System	6/30/21	6.50%	34,180	32,647	1,534	95.5%	132,397	162,470
North Carolina Teachers and State Employees Retirement System	6/30/21	6.50%	91,074	86,391	4,683	94.9%	308,181	419,216
Ohio Police and Fire Pension Fund	12/31/21	7.50%	25,024	18,777	6,247	75.0%	29,363	30,414
Ohio Public Employees Retirement System	12/31/20	7.20%	113,333	98,814	14,519	87.2%	279,485	892,074
Ohio Schools Employees' Retirement System	6/30/21	7.00%	21,530	17,840	3,690	82.9%	146,646	86,693
Ohio State Teachers Retirement System	6/30/21	7.00%	104,591	91,806	12,786	87.8%	166,427	321,142
Oklahoma Teachers' Retirement System	6/30/21	7.00%	26,608	21,499	5,109	80.8%	89,945	80,666

Appendix

SPONSOR-REPORTED DATA (CONTINUED)

Plan Name	Measurement Date	GASB 68 Discount Rate	Total Pension Liability ($ millions)	Fiduciary Net Position ($ millions)	Net Pension Liability ($ millions)	Funded Ratio	Count of Active Members	Count of Inactive / Retired Members
Orange County Employees Retirement System	12/31/21	7.00%	23,972	21,922	2,050	91.4%	22,011	27,064
Oregon Public Employees Retirement System	6/30/21	6.90%	96,298	84,331	11,967	87.6%	180,685	204,336
Pennsylvania Public School Employees' Retirement System	6/30/21	7.00%	113,024	71,967	41,057	63.7%	248,091	269,731
Pennsylvania State Employees' Retirement System	12/31/20	7.00%	52,254	35,028	17,226	67.0%	100,962	140,190
Puerto Rico Government Employees Retirement System	6/30/20	2.21%	31,690	0	31,690	0.0%	96,001	123,784
Puerto Rico Teachers Retirement System	6/30/19	3.50%	16,802	0	16,802	0.0%	26,283	48,196
Rhode Island Employees Retirement System	6/30/21	7.00%	11,861	7,729	4,132	65.2%	24,672	30,365
Sacramento County Employees' Retirement System	6/30/21	6.75%	12,986	12,564	421	96.8%	12,500	17,105
San Bernardino County Employees' Retirement Association	6/30/21	7.25%	14,955	13,637	1,318	91.2%	21,500	22,489
San Diego City Employees' Retirement System	6/30/21	6.50%	11,470	9,446	2,025	82.3%	5,068	13,705
San Diego County Employees Retirement Association	6/30/21	7.00%	18,522	16,126	2,395	87.1%	18,200	27,504
San Francisco City and County Employees' Retirement System	6/30/21	7.40%	33,089	35,674	(2,585)	107.8%	33,644	41,980
South Carolina Retirement System	6/30/21	7.00%	55,132	33,490	21,641	60.7%	201,144	345,057
South Dakota Retirement System	6/30/21	6.50%	13,866	14,632	(766)	105.5%	41,305	42,552
Tennessee Consolidated Retirement System	6/30/21	7.25%	25,420	31,050	(5,630)	122.1%	50,944	84,736
Texas County & District Retirement System	12/31/21							
Texas Employees' Retirement System	8/31/21	7.00%	44,184	33,608	10,575	76.1%	136,726	135,161
Texas Municipal Retirement System	12/31/21							
Texas Teacher Retirement System	8/31/21	7.25%	227,273	201,807	25,466	88.8%	918,545	575,034
University of California Retirement Plan	6/30/21	6.75%	97,664	91,750	5,914	93.9%	131,098	189,303
Utah Retirement Systems	12/31/21	6.85%	42,805	45,053	(2,248)	105.3%	98,154	136,161
Virginia Employees Retirement System	6/30/21	6.75%	107,430	95,289	12,142	88.7%	334,673	275,991
Washington Public Employees' Retirement System	6/30/21	7.40%	59,943	68,683	(8,740)	114.6%	163,728	149,810
Washington State Law Enforcement Officer's and Fire Fighters' Plan 1 and 2	6/30/21	7.40%	17,746	26,980	(9,234)	152.0%	18,700	15,747
Washington State Teachers' Retirement System	6/30/21	7.40%	27,883	29,958	(2,076)	107.4%	79,759	141,419
West Virginia Teachers' Retirement System	6/30/21	7.25%	11,478	9,915	1,563	86.4%	34,753	39,835
Wisconsin Retirement System	12/31/20	7.00%	118,723	124,966	(6,243)	105.3%	259,249	393,431