Sacramento County Employees' Retirement System

Risk Assessment

Based on the Actuarial Valuation and Review of the Pension Plan as of June 30, 2024

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April 29, 2025

Board of Retirement
Sacramento County Employees' Retirement System
980 9th Street, Suite 1900
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Dear Board Members:

We are pleased to submit this Risk Assessment based on the Actuarial Valuation and Review for the Sacramento County Employees' Retirement System ("SCERS" or "the System") as of June 30, 2024.

This risk report has been prepared at the request of the Board of Retirement to assist in administering the Retirement Plan ("the Plan"). It includes discussion of the key risks that may have an ongoing influence on the Plan's financial health, as well as various projections of future results under different investment return scenarios together with the assumptions adopted for the June 30, 2024 valuation.

The actuarial calculations in this report were completed under the supervision of Andy Yeung, ASA, MAAA, FCA, Enrolled Actuary.

The actuarial opinions expressed in this report were prepared by Todd Tauzer, FSA, MAAA, FCA, CERA, Andy Yeung, ASA, MAAA, FCA, Enrolled Actuary, and Molly Calcagno, ASA, MAAA, Enrolled Actuary. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Sincerely,

Todd Tauzer, FSA, MAAA, FCA, CERA
Senior Vice President and Actuary

Andy Yeung, ASA, MAAA, FCA, EA
Vice President and Actuary

Molly Calcagno, ASA, MAAA, EA
Senior Actuary

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Section 1: Introduction and Executive Summary

Introduction

The purpose of this report is to assist the Board of Retirement, participating employers and members and other stakeholders to better understand and assess the risk profile of the Plan, as well as the particular risks inherent in using a fixed set of actuarial assumptions in preparing the results in our June 30, 2024 funding valuation for SCERS.

The results included in our June 30, 2024 funding valuation report for SCERS were prepared based on a specific set of economic and non-economic actuarial assumptions under the premise that future experience of SCERS would be consistent with those assumptions. While those assumptions are generally reviewed every three years (with the assumptions from the last triennial experience study adopted by the Board of Retirement for use starting with the June 30, 2023 valuation), there is a risk that emerging results may differ significantly as actual experience is fluid and will not completely track current assumptions.

It is important to note that this risk assessment is based on plan assets as of June 30, 2024. The Plan's funded status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the plan year. While it is impossible to determine the market conditions and other demographic experience of the plan in future valuations, the single year investment return scenario test included within this report provides an illustration of the impact of short-term market fluctuations on the plan. Additionally, Segal is available to prepare other projections of selected potential outcome scenarios upon request.

Actuarial standard of practice on risk assessment

The Actuarial Standards Board approved the Actuarial Standard of Practice No. 51 (ASOP 51) regarding risk assessment when performing a funding valuation and SCERS elected early implementation of the Standard starting with the June 30, 2018 actuarial valuation. ASOP 51 requires actuaries to identify and assess risks that "may reasonably be anticipated to significantly affect the plan's future financial condition." Examples of key risks listed that are particularly relevant to SCERS are asset/liability mismatch risk, investment risk, and longevity and other demographic risks. ASOP 51 also requires an actuary to consider if there is any ongoing contribution risk to the plan; however, it does not require the actuary to evaluate the ability or willingness of contributing entities to make contributions when due, nor does it require the actuary to assess the likelihood or consequences of future changes in applicable law.

The actuary's assessment can be strictly a qualitative discussion about potential adverse experience and the possible effect on future results, but it may also include quantitative numerical demonstrations where informative. The actuary is also encouraged to consider a recommendation as to whether a more detailed risk assessment would be significantly beneficial for the intended user to

examine particular financial risks. When making that recommendation, the actuary will consider such factors as the plan's design, risk profile, maturity, size, funded status, asset allocation, cash flow, possible insolvency and current market conditions. This report incorporates a more detailed risk assessment as agreed upon with SCERS.

Plan risk assessment

In *Section 2*, we start by discussing some of the historical factors that have caused changes in SCERS' funded status and employer contribution rates. It is important to understand how the combination of decisions and experience has led to the current financial status of the Plan.

We follow this with a discussion of the most significant risk factors going forward. Based on our discussions with SCERS, we have provided a more detailed risk assessment that illustrates the impact on the funded status and employer contribution rates using relevant economic scenario tests. These tests illustrate the effect of future investment returns on the Plan's portfolio coming in differently from the current 6.75% annual investment return assumption used in the June 30, 2024 valuation. We have also included a projection of future results based on stochastic modeling of future investment returns for 2024/2025 and thereafter. The stochastic modeling is useful for assessing the distribution of future results based on random variations in actual investment returns each year and introduces a relative likelihood to the range of potential outcomes.

ASOP 51 also requires disclosure of plan maturity measures and other historical information that are significant to understanding the risks associated with the System and this information is included at the end of *Section 2*.

Executive summary

Historical funded status and employer contribution rates

The following table provides a summary of financial changes to the Plan over the last 10 valuations. In the June 30, 2015 through June 30, 2024 valuations, the unfunded actuarial accrued liability (UAAL) and contribution rates increased primarily as a result of strengthening the actuarial assumptions used in preparing the valuations ($1.02 billion increase in UAAL and 10.0% increase in contribution rates) and unfavorable non-investment experience ($0.50 billion net increase), offset to some degree by favorable investment experience ($0.30 billion net decrease after asset smoothing) and employer contributions made to amortize the UAAL.

Valuation Date	Funded Status Market Value Basis	UAAL Market Value Basis	Funded Status Actuarial Value Basis	UAAL Actuarial Value Basis	Total Aggregate Employer Contribution Rate (% of Payroll)
June 30, 2015	87.3%	$1.1 billion	86.8%	$1.2 billion	22.54%
June 30, 2024	88.7%	$1.7 billion[1]	88.1%	$1.8 billion	28.74%

Future funded status and employer contribution rates

In this report, we highlight key factors besides assumption changes that may affect the financial profile of the Plan going forward. As investment experience in the past 10 years has had a significant impact on the funded status and employer contribution rates, we have also provided deterministic projections (using select scenarios for illustration) under hypothetical favorable and unfavorable future market experience so that the impact of market performance can be better understood. We have also included stochastic projections to assess the projected distribution of future results along with introducing a relative likelihood to the range of those potential outcomes.[2]

Deterministic projections

The total aggregate employer contribution rate is 28.74% of payroll in the June 30, 2024 valuation. Using a deterministic projection, this report shows the effect of unfavorable (0.00%), baseline (6.75%) or favorable (13.50%) hypothetical market returns for FY 2025 on key valuation results. In particular, the projected changes in the total aggregate employer contribution rate, relative to the total aggregate employer contribution rate of 28.74% in the June 30, 2024 valuation, in the June 30, 2025 valuation and in the June 30, 2031 valuation (after recognizing deferred investment gains or losses under the seven-year asset smoothing period) are shown in the following table. Except as noted in the next paragraph, these projections assume no further assumption changes or method changes, and no non-investment experience that differs from the assumptions.

[1] The UAAL calculated on a market value basis takes into account $100 million in net deferred investment gains. Those net deferred investment gains will be recognized in the valuation value of assets and the determination of the UAAL calculated on a valuation value basis over the next six years.

[2] We assume in all scenarios tested and the stochastic projection in this report that the amount in the Contingency Reserve as of June 30, 2024 remains unchanged (i.e., the Contingency Reserve will not be increased above 3% of the market value of assets as of June 30, 2024 nor will it be used to offset any future actuarial losses). As we point out in our June 30, 2024 valuation report, if the $399.3 million in the Contingency Reserve were utilized to determine the employer's contribution rate in that valuation, the aggregate employer contribution rate in that valuation would decrease by about 2.1% of payroll.

Total Aggregate Employer Contribution Rate Change

Valuation Date	0.00% Return for FY 2025	6.75% Return for FY 2025[1]	13.50% Return for FY 2025
June 30, 2025	-0.02% of payroll	-0.69% of payroll	-1.36% of payroll
June 30, 2031	+2.70% of payroll	-2.54% of payroll	-17.62% of payroll

Under the unfavorable (0.00%), baseline (6.75%), or favorable (13.50%) hypothetical market return scenarios for FY 2025, the Plan would be expected to reach full funding on an actuarial value basis in 2039, 2034, and 2030, respectively, and the total employer contribution rate would be expected to converge to the total employer normal cost rate a few years later at the time of full funding on a valuation value basis.[2] The employer normal cost rate is about 10% of payroll as of June 30, 2045 when the Plan would be expected to have reached full funding on a valuation value basis under all three scenarios. That normal cost is the ongoing employer contribution rate after all of SCERS' UAAL layers as of June 30, 2024 are paid off over periods ranging from 9 to 20 years and any new UAAL resulting from hypothetical market experience in FY 2025 is paid off over 20 years pursuant to the Board's actuarial funding policy. These scenarios illustrate that the Board's funding policy is very effective in reaching the general policy goal of providing for the long-term full funding of the costs of the benefits paid by SCERS.

Stochastic projections

The stochastic projection models market returns over the next 20 years by using expected return, standard deviation and other information specific to SCERS' asset portfolio. For the stochastic modeling, we have used information about SCERS' asset portfolio that we used in developing the 6.75% expected investment return assumption we recommended to the Board for the June 30, 2023 valuation together with updated asset allocation.[3] However, instead of using the expected return from the 2022 capital market assumptions compiled by Horizon Actuarial Services based on their then most recent survey published in August 2022 when we reviewed and prepared our recommended investment return assumption, we have used the 2024 capital market assumptions they published in August 2024. As we pointed out in our triennial experience study recommending the 6.75% investment return assumption, we anticipated an increase in the likelihood of achieving the 6.75% investment return assumption when we switch to the 2023 and later capital market assumptions. (We also note that the increase in the real rates of return provided by the investment consulting firms for 2024 versus 2022 might be due to the very low returns earned in the 2021/2022 plan year, as well as the increase in the federal funds rate during 2022, and so should be used with caution in selecting a long-term investment return

[1] This differs from our Seven-Year Projection of Employer Contribution Rates dated December 20, 2024 primarily due to reflecting the gradual savings in normal cost as active members in the legacy tiers are replaced by new members in the PEPRA tiers. For instance, this normal cost savings is 0.2% of payroll in the June 30, 2025 valuation.

[2] Under the unfavorable, baseline, or favorable hypothetical market return scenarios for FY 2025, the Plan would be expected to reach full funding on a valuation value basis (excluding the Contingency Reserve from the assets) in 2045, 2036, and 2031, respectively.

[3] Cash allocation was increased from 1.00% to 2.00% and Liquid Real Return allocation was decreased from 2.00% to 1.00%.

assumption. Recent capital market assumptions have been notably higher than they have been in the previous 10 years.) The stochastic projections in this report show there is a 50% chance that the employer contribution rates would be between 11% and 36% of payroll at the end of 10 years (with a median rate of 11% of payroll) and between 10% and 24% of payroll at the end of 20 years (with a median rate of 10% of payroll).[1] Furthermore, there is a 57% chance SCERS would be fully funded at the end of 10 years and a 67% chance SCERS would be fully funded at the end of 20 years. The stochastic projections reflect the margin of better than 58% chance of achieving the 6.75% investment return assumptions in our future valuations over the next 20 years.

Plan maturity measures

During the past 10 valuations, the System has become more mature as evidenced by an increase in the ratio of members in pay status (retirees and beneficiaries) to active members (as shown in *Section 2, Chart 12* on page 32) and by an increase in the ratios of plan assets and liabilities to active member payroll (as shown in *Section 2, Chart 13* on page 33 and *Chart 14* on page 34, respectively). Even though the ratios have been dampened somewhat due to the increase in number of active employees and their associated payroll in the past three valuations, we expect these trends to continue going forward. This is significant for understanding the volatility of both historical and future employer contribution rates because any increase in UAAL due to unfavorable investment and non-investment experience for the relatively larger group of non-active members would have to be amortized and funded over the payroll of the relatively smaller group of active members. Put another way, as a plan grows more mature, its contribution rate becomes more sensitive to investment volatility and liability changes. As SCERS continues to mature with time, its risk profile will continue to evolve in this way and contributions will grow more sensitive to plan experience.

[1] SCERS' funding policy requires any surplus over 120% to be amortized over a rolling 30-year period after other conditions in PEPRA are met. As we have not included these other conditions in our stochastic projections, these projections do not apply any surplus amortization to reduce the employer's normal cost.

Section 2: Key Plan Risks

Evaluation of historical trends

Funded status and change in unfunded actuarial accrued liabilities

One common measure of SCERS' financial status is the funded ratio. This ratio compares the actuarial and market value of assets to the actuarial accrued liabilities (AAL) of SCERS. The overall level of funding of SCERS on an actuarial value of assets basis has increased slightly as a result of growing positive amortization contributions and the size of the Plan as a whole growing faster than the UAAL. The unfavorable non-investment experience and favorable investment experience (after smoothing) have also had an impact. The UAAL and funded ratios are provided for the past 10 valuations from June 30, 2015 to June 30, 2024 measured using both actuarial and market value of assets bases in *Chart 1*.

The factors that caused the changes in the UAAL in the past 10 valuations from June 30, 2015 to 2024 are shown in *Chart 2*. The results in *Chart 2* reflect that the reductions in the investment return assumption in the June 30, 2017 and June 30, 2020 valuations, together with the changes in the mortality tables and other assumptions from the three triennial experience studies recommending assumptions used in the June 30, 2017, 2020 and 2023 valuations, have had the following impact on the UAAL for SCERS:

UAAL Impact from Assumption Changes

Valuation Date	Total UAAL Change
June 30, 2017	$824 million
June 30, 2020	216 million
June 30, 2023	(21) million
Net Change	**$1,019 million**

Chart 2 also shows that the generally favorable investment experience (i.e., investment returns after asset smoothing greater than expected) and employer contributions made to amortize the UAAL were offset to some degree by unfavorable non-investment experience. The non-investment experience included higher or lower than expected COLAs granted to retirees and beneficiaries, and higher or lower than expected salary increases for continuing actives. The non-investment experience also included the scheduled 12-month lag in implementing the contribution rates determined in the annual valuation.

Section 2: Key Plan Risks

Chart 2(a) displays the aggregate change in unfunded liability by source over the last 10 years. In particular, it shows the substantial effort made by SCERS in strengthening actuarial assumptions in a challenging economic and demographic environment. This chart also shows the strength of the System's adopted funding policy in working to reduce the unfunded liability consistently each year.

It is important to note that SCERS has taken strides in risk management and resulting long-term plan sustainability. This includes strengthening the assumptions, particularly lowering the expected investment rate of return from 7.50% to 6.75% over the last 10 years and adopting amount-weighted generational mortality assumptions. Those changes may result in higher contributions in the short term, but in the medium to longer term **avoid** both deferring contributions and allowing unmanaged growth in the UAAL. We believe these actions, where appropriate, are essential for SCERS' fiscal health going forward.

Chart 1

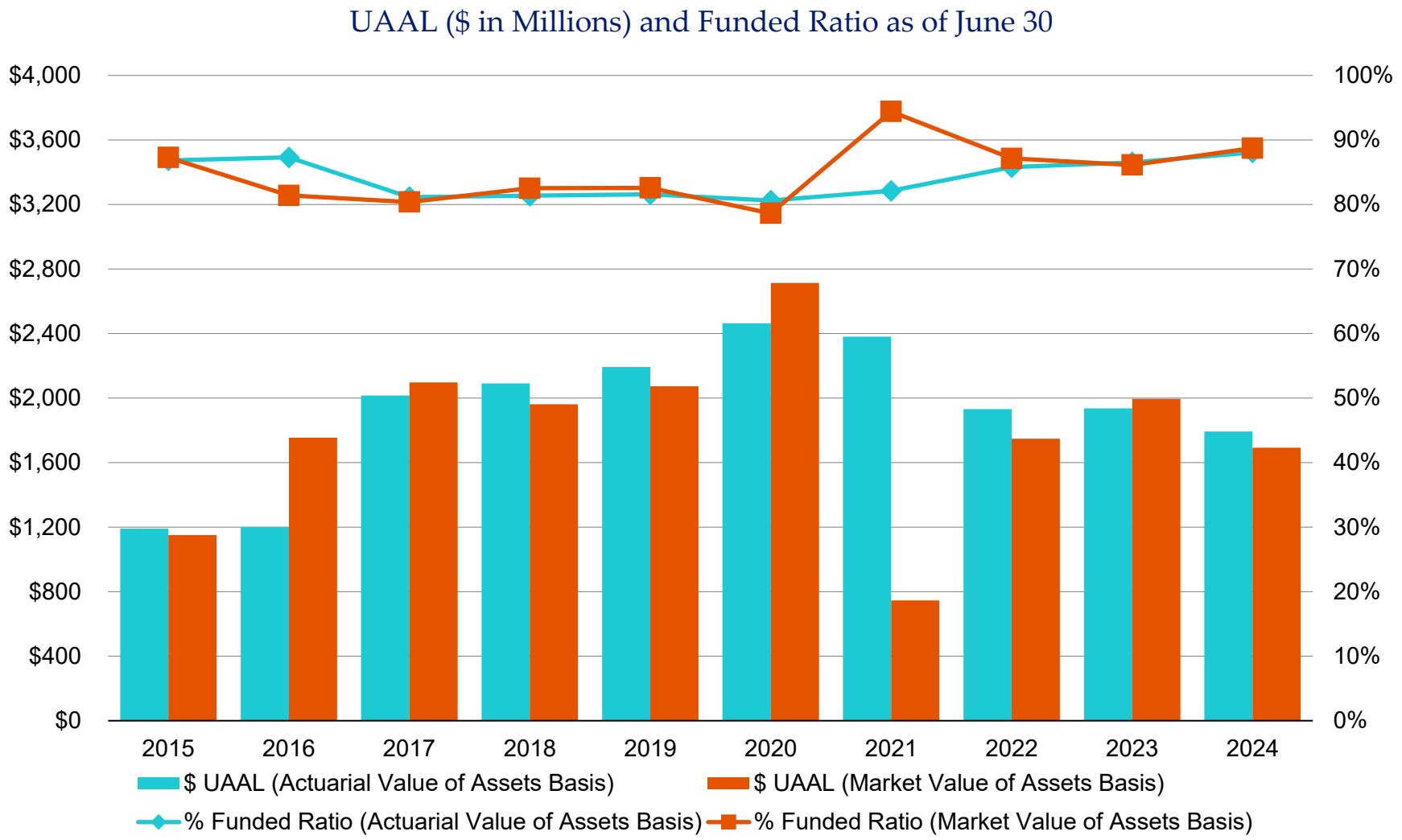

UAAL ($ in Millions) and Funded Ratio as of June 30
$4,000
$3,600
$3,200
$2,800
$2,400
$2,000
$1,600
$1,200
$800
$400
$0
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2015
2016
2017
2018
2019
2020
2021
2022
2023
2024
$ UAAL (Actuarial Value of Assets Basis)
$ UAAL (Market Value of Assets Basis)
% Funded Ratio (Actuarial Value of Assets Basis)
% Funded Ratio (Market Value of Assets Basis)

Chart 2

Factors that Changed UAAL for Year Ended June 30
($ in Millions)

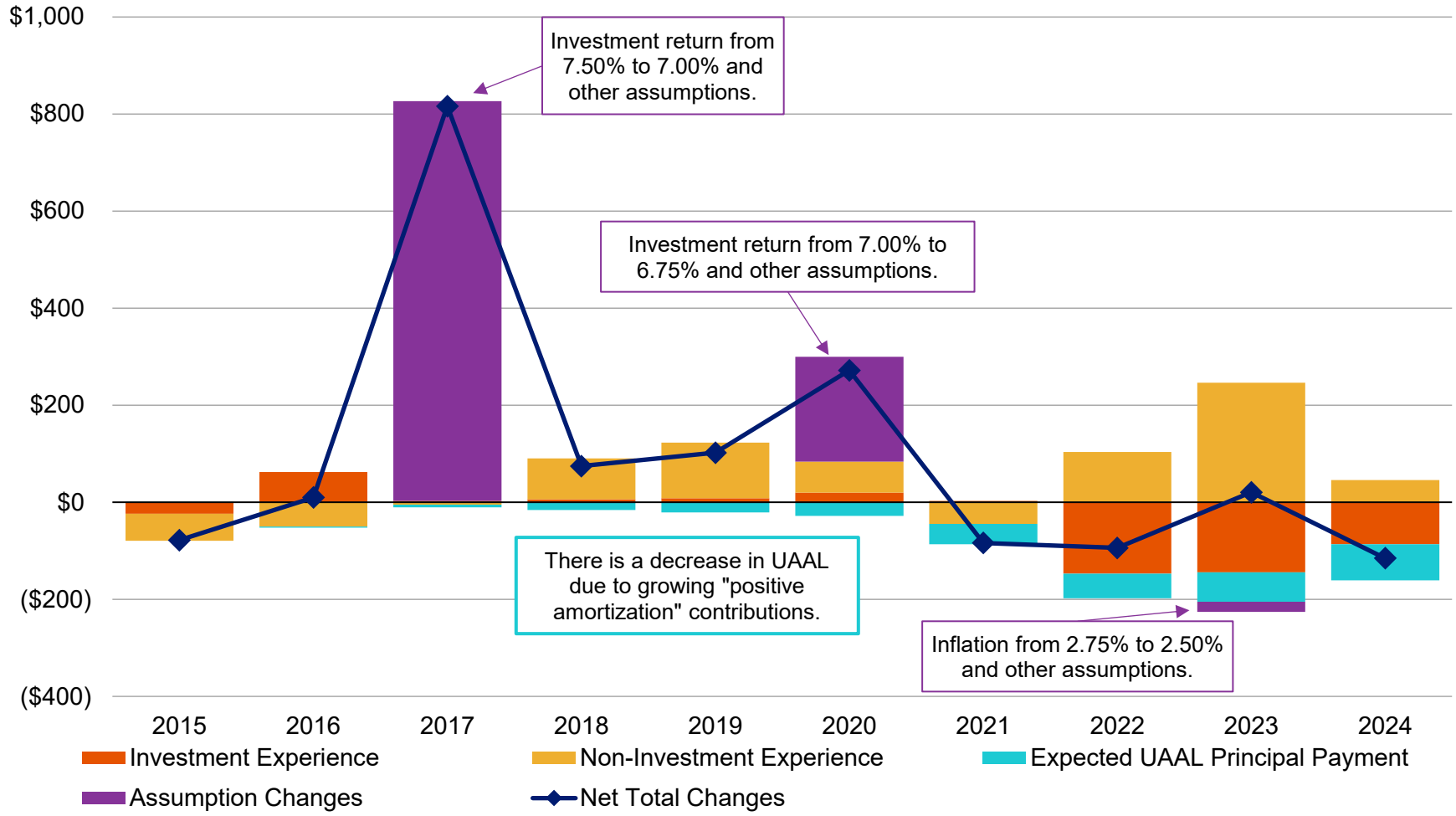
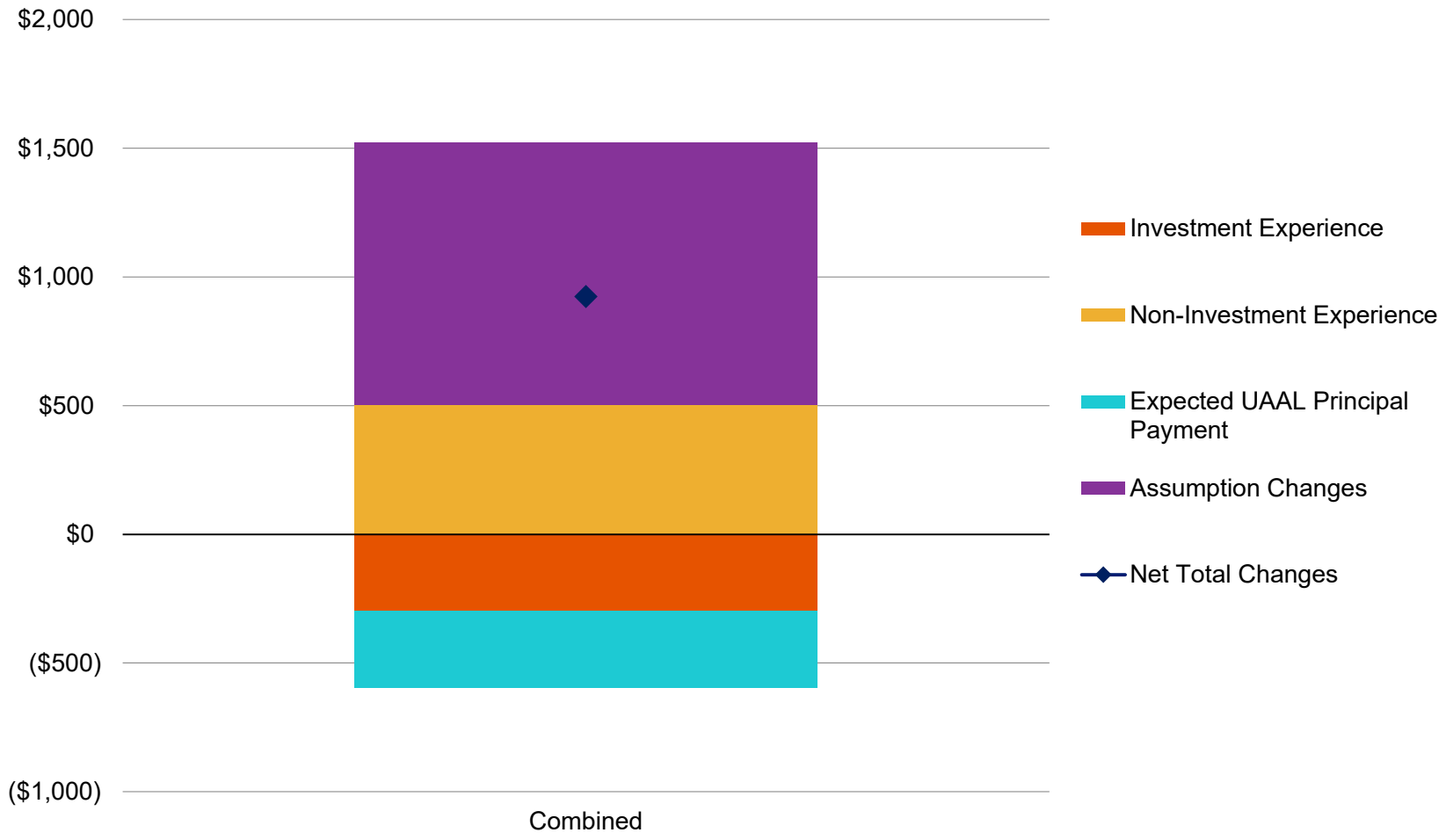


Chart 2(a)

Combined Factors that Changed UAAL in the June 30, 2015 to 2024 Valuations
($ in Millions)



Note: This summation of UAAL changes by source does not account for the timing of when they occurred nor any resulting compounding effects. Also, the investment experience shown is investment returns after asset smoothing compared to the expected returns.

Employer contribution rates

The total (normal cost plus UAAL payment) employer contribution rates[1] determined in the June 30, 2015 to 2024 valuations are provided in *Chart 3* and the factors that caused the changes in the total employer contribution rates are provided in *Chart 4*.

The employer's aggregate normal cost rates in *Chart 3* have gradually decreased during the last 10 years due to the effect of plan changes under the Public Employees' Pension Reform Act of 2013 (PEPRA) as County legacy members agreed to pay additional normal cost contributions and new members have been enrolled in the lower cost PEPRA benefit tiers starting on January 1, 2013. These decreases were offset to some extent by changes in actuarial assumptions.

Chart 4 shows that the changes in the investment return, mortality tables and other assumptions have had the most impact on increasing the contribution rates for employers. The next greatest impact was from County legacy members agreeing to pay additional normal cost contributions. Favorable non-investment[2] and investment experience have decreased the contribution rates.

Employer Contribution Rate Impact from Assumption Changes

Valuation Date	Total Aggregate Employer Contribution Rate Change
June 30, 2017	7.76% of payroll
June 30, 2020	2.39% of payroll
June 30, 2023	-0.12% of payroll
Net Change	**10.03% of payroll**

[1] There are separate contribution rates determined in the valuation for the Miscellaneous and Safety membership groups and for the different benefit tiers. The aggregate contribution rates shown herein have been calculated based on an average of those rates weighted by the payrolls of the active members reported in those valuations.

[2] This includes experience that has an impact on the contribution rate determination but does not have a direct impact on the UAAL such as a reduction in the UAAL rate due to amortizing the UAAL over a larger than expected projected payroll in the June 30, 2023 and 2024 valuations.

Chart 3

Employer Contribution Rates Calculated as of June 30
(% of Payroll)

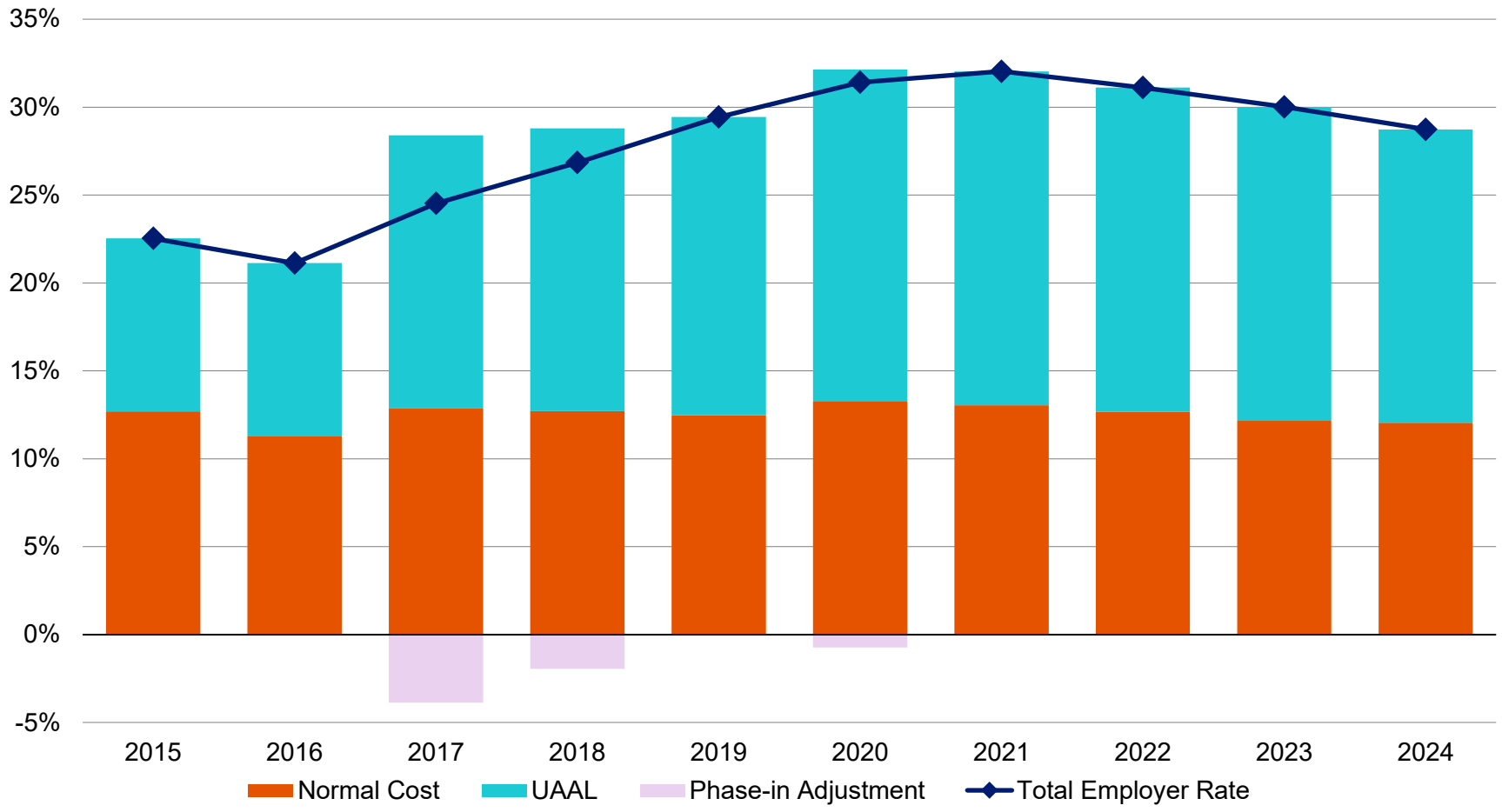
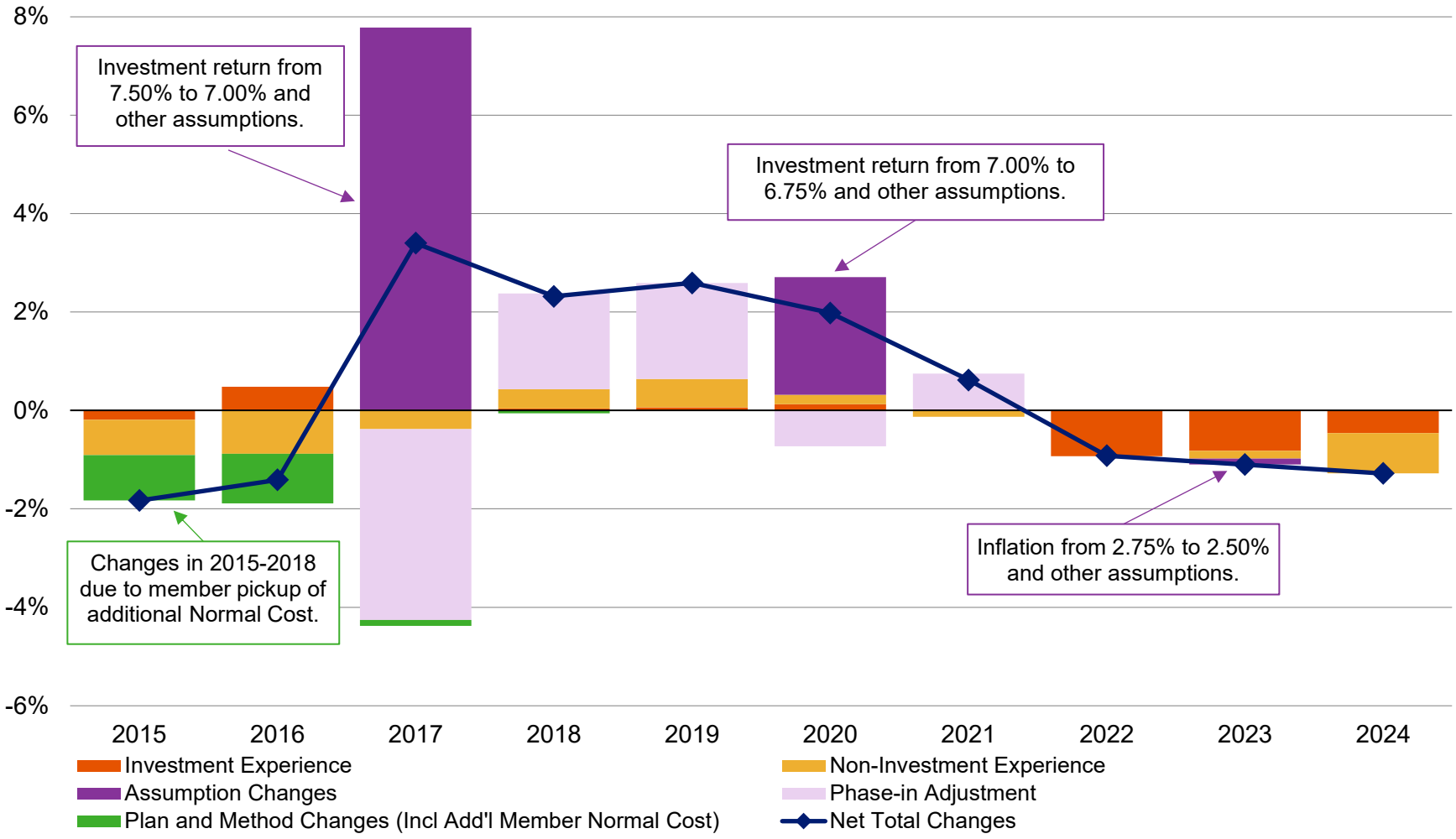


Chart 4

Factors that Affected Employer Contribution Rates Calculated as of June 30
(% of Payroll)



Assessment of primary risk factors going forward

As discussed under the evaluation of historical trends section, the funded ratios and employer contribution rates have changed mainly due to changes in actuarial assumptions, investment experience, and non-investment experience in the last 10 valuations.

In general, we anticipate the following risk factors to have an ongoing influence on those metrics in our future valuations:

- **Asset/liability mismatch risk** – the potential that future plan experience does not affect asset and liability values in the same way, causing them to diverge.

  The most significant asset/liability mismatch risk to SCERS is investment risk, as defined below. In fact, investment risk has the potential to impact asset/liability mismatch in two ways. The first mismatch is evident in annual valuations; when asset values deviate from assumptions, those changes are typically independent from liability changes. The second mismatch can be caused when systemic asset deviations from assumptions may signal the need for an assumption change, which causes liability values and contribution rates to move in the opposite direction from any change in the expected experience of asset growth rates.

  Asset/liability mismatch can also be caused by longevity and other demographic assumption risks, which affect liabilities but have no impact on asset levels. These risks are also discussed below.

  It may be informative to use the asset volatility and liability volatility ratios and associated contribution rate impacts provided in the following plan maturity measures section when discussing with the employers the effect of unfavorable or favorable actuarial experience on the assets and the liabilities of SCERS.

- **Investment risk** – the potential that future market returns will be different from the current expected 6.75% annual return assumption.

  The Board has a policy of reviewing the investment return and the other actuarial assumptions generally every three years, with the next triennial experience study (recommending assumptions for the June 30, 2026 actuarial valuation) scheduled to be performed in 2026.

  The investment return assumption is a long-term, deterministic assumption for valuation purposes even though in reality market experience can be quite volatile in any given year. We have included deterministic scenario tests later in this section so that SCERS can better understand the risk associated with earning either less or more than the assumed rate.

- **Longevity and other demographic risks** – the potential that mortality or other demographic experience will be different than expected.

  The move to using generational amount-weighted mortality tables that reflect data from public sector retirement plans was the most major change to the non-economic assumptions in the 2020 experience study. As can be observed from *Chart 2* and *Chart 4*, there have been some changes in the UAAL and employer contribution rates due to demographic experience relative to the assumptions

(mainly due to COLA increases for retired members and salary increases for active members higher than the assumption in the June 30, 2022, 2023, and 2024 valuations) used in the last 10 valuations.

- **Contribution risk** – the potential that actual future contributions will be different from expected future contributions.

  ASOP 51 does not require the actuary to evaluate the ability or willingness of the plan sponsor or other contributing entity to make contributions to the plan when due. However, it does require the actuary to consider the potential for actual contributions deviating from expected in the future. SCERS' employers has a well-established practice of making the actuarial determined contribution (ADC) calculated in the annual actuarial valuations, based on the Board of Retirement's Actuarial Funding Policy. As a result, in practice SCERS has essentially no contribution risk.

  Furthermore, when ADCs determined in accordance with the SCERS Actuarial Funding Policy are made in the future by the employers (and contributions required by statute are made by the employees), it is anticipated that the Plan would have enough assets to provide all future benefits promised to the current members enrolled in the Plan, if all of the actuarial assumptions used in the valuation are met.

ASOP 51 also lists interest rate risk as an example of a potential risk to consider. However, the valuations of the Plan's liabilities are not linked directly to market interest rates, so the resulting interest rate risk exposure is minimal.

Scenario tests

Since the funded ratio, UAAL and the employer contribution rates have fluctuated as a result of deviations in investment experience in the last 10 valuations, in this section we have examined this risk for SCERS using projections under a deterministic and stochastic approach.[1]

Deterministic projections

To measure such risk, we have included scenario tests to study the change in the UAAL and employer contribution rates if SCERS were to earn a market return higher or lower than the assumed rate of 6.75% in the fiscal year following the June 30, 2024 valuations. In *Chart 5, Chart 6* and *Chart 7*, we show the total aggregate employer contribution rates, funded ratios, and UAAL, respectively, assuming the System's portfolio market return in FY 2025 will be as follows:

[1] We assume in all scenarios tested and the stochastic projection in this report that the amount in the Contingency Reserve as of June 30, 2024 remains unchanged (i.e., the Contingency Reserve will not be increased above 3% of the market value of assets as of June 30, 2024 nor will it be used to offset any future actuarial losses). As we point out in our June 30, 2024 valuation report, if the $399.3 million in the Contingency Reserve were utilized to determine the employer's contribution rate in that valuation, the aggregate employer contribution rate in that valuation would decrease by about 2.1% of payroll.

Section 2: Key Plan Risks

- Scenario 1: 0.00% market return for FY 2025
- Scenario 2: 6.75% market return for FY 2025 (baseline)
- Scenario 3: 13.50% market return for FY 2025

All other assumptions used in the projections can be found in *Appendix A*, including the assumption that the Plan will earn the assumed 6.75% market return per year beginning July 1, 2025 under all three scenarios.

In *Appendix B*, we have taken the aggregate employer contribution rates determined under the three market return scenarios and applied those to the projected payrolls for the Fiscal Years that begin one year after the date of the valuations in estimating the approximate dollar amount of ADC for those future Fiscal Years.

The following table summarizes the projected total aggregate employer contribution rate changes for the Plan, relative to the total aggregate employer contribution rate of 28.74% of payroll in the June 30, 2024 valuation, in the next valuation (i.e., June 30, 2025) as well as in the June 30, 2031 valuation after recognizing deferred investment gains and losses in the (smoothed) valuation value of assets. These results assume no further assumption changes, method changes or experience that differs significantly from the assumptions.

Total Aggregate Employer Contribution Rate Change

Valuation Date	0.00% Return for FY 2025	6.75% Return for FY 2025[1]	13.50% Return for FY 2025
June 30, 2025	-0.02% of payroll	-0.69% of payroll	-1.36% of payroll
June 30, 2031	+2.70% of payroll	-2.54% of payroll	-17.62% of payroll

Under the unfavorable (0.00%), baseline (6.75%), and favorable (13.50%) hypothetical market return scenarios for FY 2025, the System would be expected to reach full funding on an actuarial value basis in 2039, 2034, and 2030, respectively and the total employer contribution rate would be expected to converge to the total employer normal cost rate a few years later at the time of full funding on a valuation value basis.[2] The employer normal cost rate is about 10% of payroll as of June 30, 2045 when the Plan would be expected to have reached full funding on a valuation value basis under all three scenarios. That normal cost is the ongoing employer contribution rate after all of SCERS' UAAL layers as of June 30, 2024 are paid off over periods ranging from 9 to 20 years

[1] This differs from our Seven-Year Projection of Employer Contribution Rates dated December 20, 2024 primarily due to reflecting the gradual savings in normal cost as active members in the legacy tiers are replaced by new members in the PEPRA tiers. For instance, this normal cost savings is 0.2% of payroll in the June 30, 2025 valuation.

[2] Under the unfavorable, baseline, or favorable hypothetical market return scenarios for FY 2025, the Plan would be expected to reach full funding on a valuation value basis (excluding the Contingency Reserve from the assets) in 2045, 2036, and 2031, respectively.

and any new UAAL resulting from hypothetical market experience in FY 2025 is paid off over 20 years pursuant to the Board's actuarial funding policy. These scenarios illustrate that the Board's funding policy is very effective in reaching the general policy goal of providing for the long-term full funding of the costs of the benefits paid by SCERS.

While we have not assigned a probability on the FY 2025 market return coming in at these rates, the Board and other stakeholders monitoring SCERS can use these results to interpolate in order to estimate the funded status and employer contribution rates for the June 30, 2025 and next several valuations as the actual investment experience for the FY 2025 year becomes available. Additionally, comparable experience in upcoming future years is likely to have a similar impact on the Plan absent any significant plan or assumption changes.

Chart 5

Projected Employer Contribution Rates Under Hypothetical Market Return Scenarios for FY 2025

(% of Payroll)

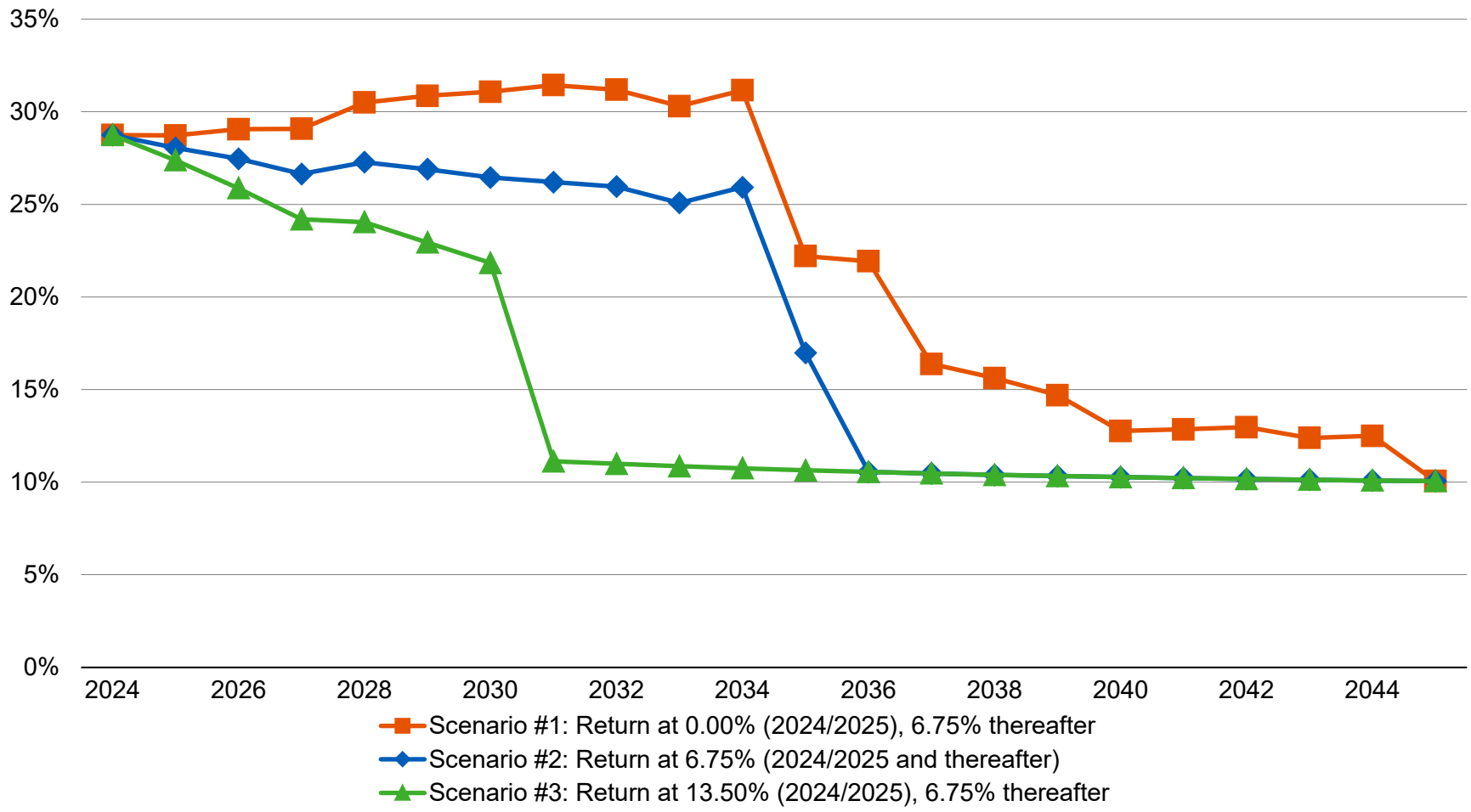


Chart 6

Projected Funded Ratios Under Hypothetical Market Return Scenarios for FY 2025
(Actuarial Value of Assets Basis)

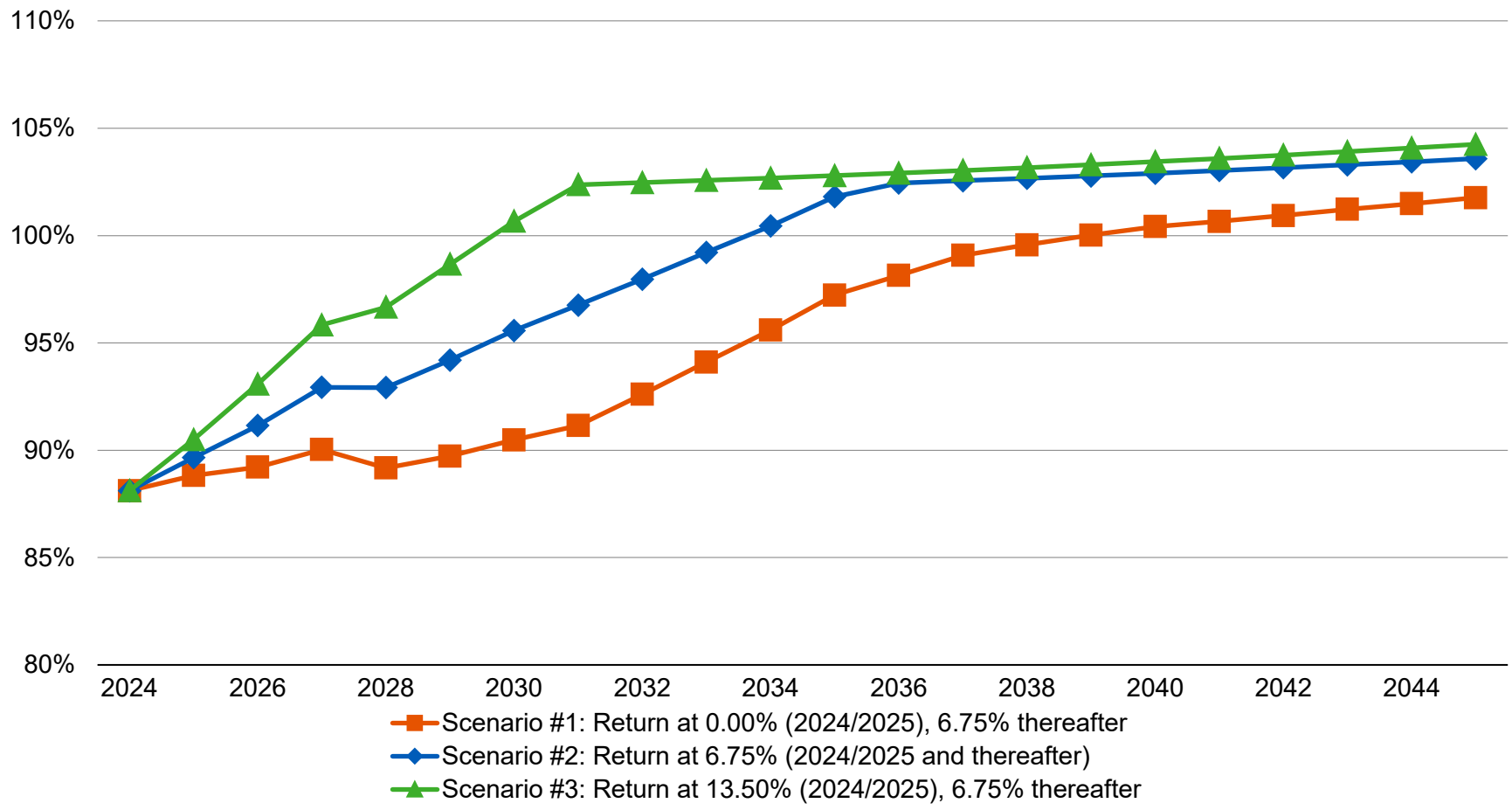
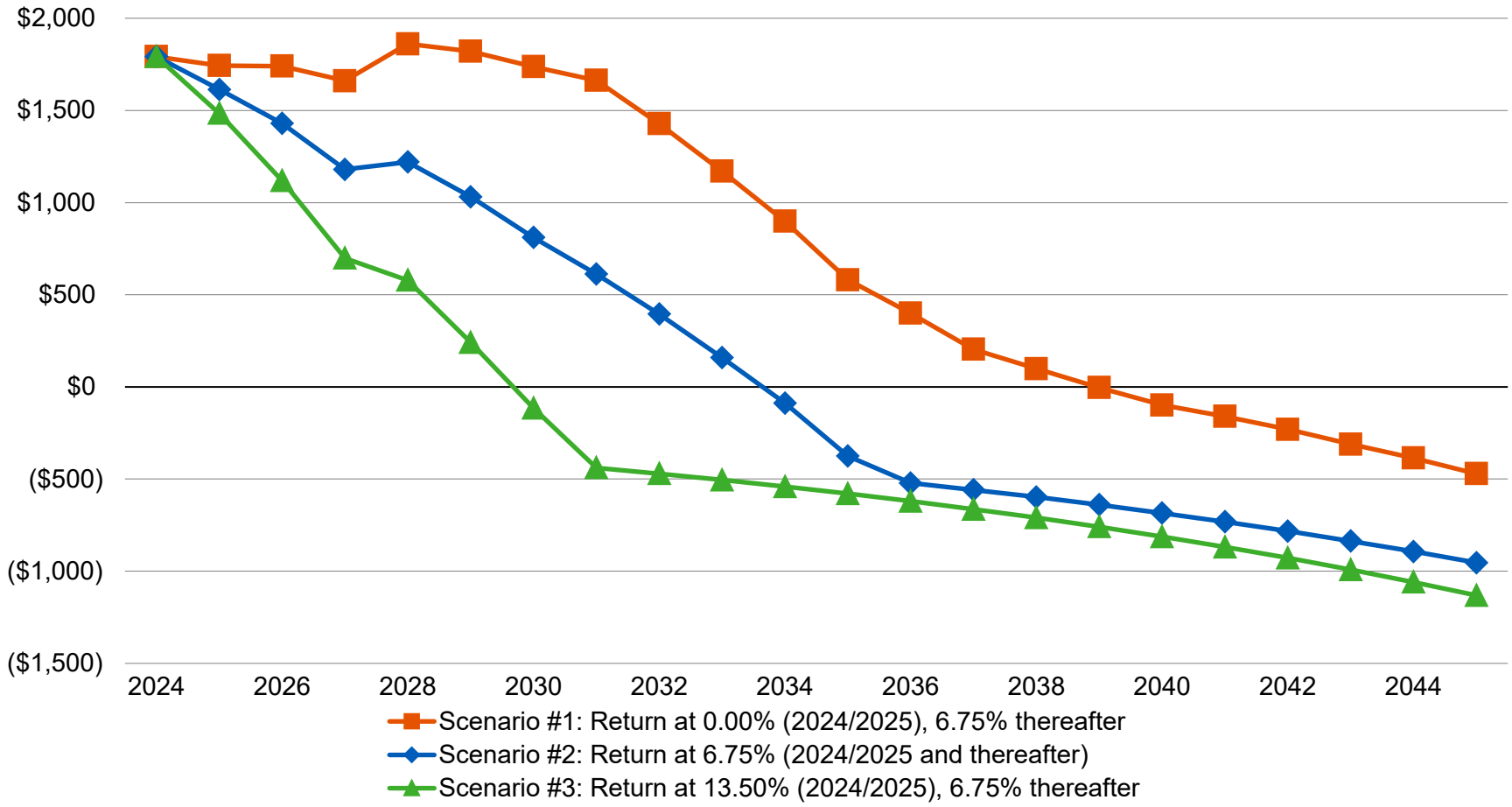


Chart 7

Projected UAAL Under Hypothetical Market Return Scenarios for FY 2025

(Actuarial Value of Assets Basis – $ in Millions)



Section 2: Key Plan Risks

Stochastic projections

Based on our discussions with SCERS, we have also been directed to supplement the deterministic scenario tests by another analysis that shows the range of possible changes in funded status and contribution rates under a statistical distribution of potential market returns for 20 years following the June 30, 2024 valuation. We have accomplished the stochastic modeling of future market returns by using the expected return, standard deviation and other information about SCERS' asset portfolio[1] as provided in *Appendix A* of this report, assuming no future assumption or method changes to the plan.

In *Chart 8*, we summarize the cumulative compounded rate of return of SCERS' investment portfolio over the next 20 years based on performing 10,000 trial outcomes of future market returns. The projected funded ratios for those trials are provided in *Chart 9*. The UAAL and the resultant employer contribution rates are provided in *Chart 10 and Chart 11*, respectively.

At the end of 20 years, there is a 50% chance[2] that the annual return of SCERS' investment portfolio would average between 5.7% and 9.3%, the funded ratio would be between 92% and 177% and the corresponding UAAL would be between $2,116 billion and a surplus (or a negative UAAL) of $19,876 billion.

On an actuarial (smoothed) value of assets basis, the funded ratio for the Plan is about 88.1% as of the June 30, 2024 valuation compared to 86.5% as of the June 30, 2023 valuation. There is a 57% chance SCERS would be fully funded at the end of 10 years and a 67% chance SCERS would be fully funded at the end of 20 years. The probabilities that the funded ratio would fall below 50%, 60% or 70% at any point in the next 20 years as projected in the current analysis as of June 30, 2024 and the prior analysis as of June 30, 2022 are as follows:

Probability of Various Funded Ratios

	Below 50%	Below 60%	Below 70%
Current (6/30/2024) Analysis Probability	1%	5%	15%
Prior (6/30/2022) Analysis Probability	3%	10%	23%

The total employer contribution rate is about 28.74% of payroll based on the June 30, 2024 valuation, as compared to about 30.02% of payroll in the June 30, 2023 valuation. Stochastic modeling can help assess the range and relative likelihood of potential future contribution rates. At the end of 10 years (i.e., the June 30, 2034 valuation), there is a 50% chance that the employer contribution

[1] For the stochastic modeling, we have used information about SCERS' asset portfolio that we used in developing the 6.75% expected investment return assumption we recommended to the Board for the June 30, 2023 valuation, together with updated asset allocation, expected return, standard deviation, and other information as outlined in *Appendix A*. This modeling assumes no further assumption changes, method changes or non-investment experience that differs significantly from assumptions. For a detailed discussion regarding the target asset allocation used in the stochastic projections, see *Appendix A*, page 36.

[2] This is based on the 25th to the 75th percentile results.

rates would be between 11% and 36% of payroll (with a median rate of 11% of payroll). At the end of 20 years (i.e., the June 30, 2044 valuation), there is a 50% chance that the employer contribution rates would be between 10% and 24% of payroll (with a median rate of 10% of payroll).[1] The probabilities that the total employer contribution rate would increase at least by 5%, 10% or 15% of payroll at any point in the next 20 years as projected in the current analysis as of June 30, 2024 and the prior analysis as of June 30, 2022 are as follows:

Probability of Total Employer Rate Increases

	5% of Payroll (to 33% of Payroll)	10% of Payroll (to 38% of Payroll)	15% of Payroll (to 43% of Payroll)
Current (6/30/2024) Analysis Probability	42%	31%	22%
Prior (6/30/2022) Analysis Probability	48%	38%	30%

Finally, stochastic modeling can help assess the potential impact of investment experience on contribution volatility in any given year. The probabilities that the total employer contribution rate would spike by 2%, 4% or 6% of payroll in any single year during the next 20 years as projected in the current analysis as of June 30, 2024 and the prior analysis as of June 30, 2022 are as follows:

Probability of Total Employer Rate Spike in a Single Year

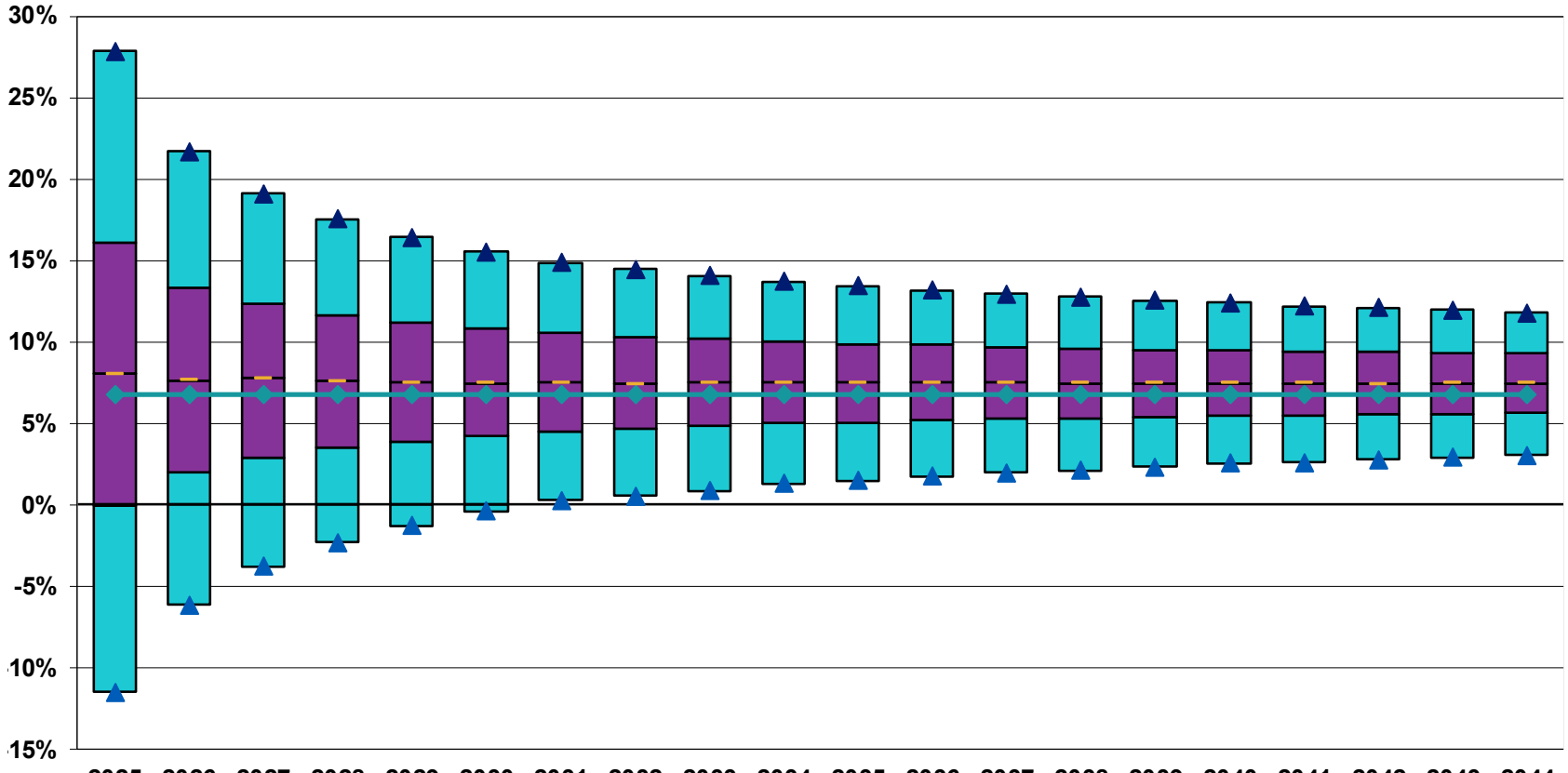
	2% of Payroll	4% of Payroll	6% of Payroll
Current (6/30/2024) Analysis Probability	12%	4%	2%
Prior (6/30/2022) Analysis Probability	16%	6%	2%

[1] SCERS' funding policy requires any surplus over 120% to be amortized over a rolling 30-year period after other conditions in PEPRA are met. As we have not included these other conditions in our stochastic projections, these projections do not apply any surplus amortization to reduce the employer's normal cost.

Section 2: Key Plan Risks

Chart 8

Projected Cumulative Investment Return for Plan Years Ending June 30

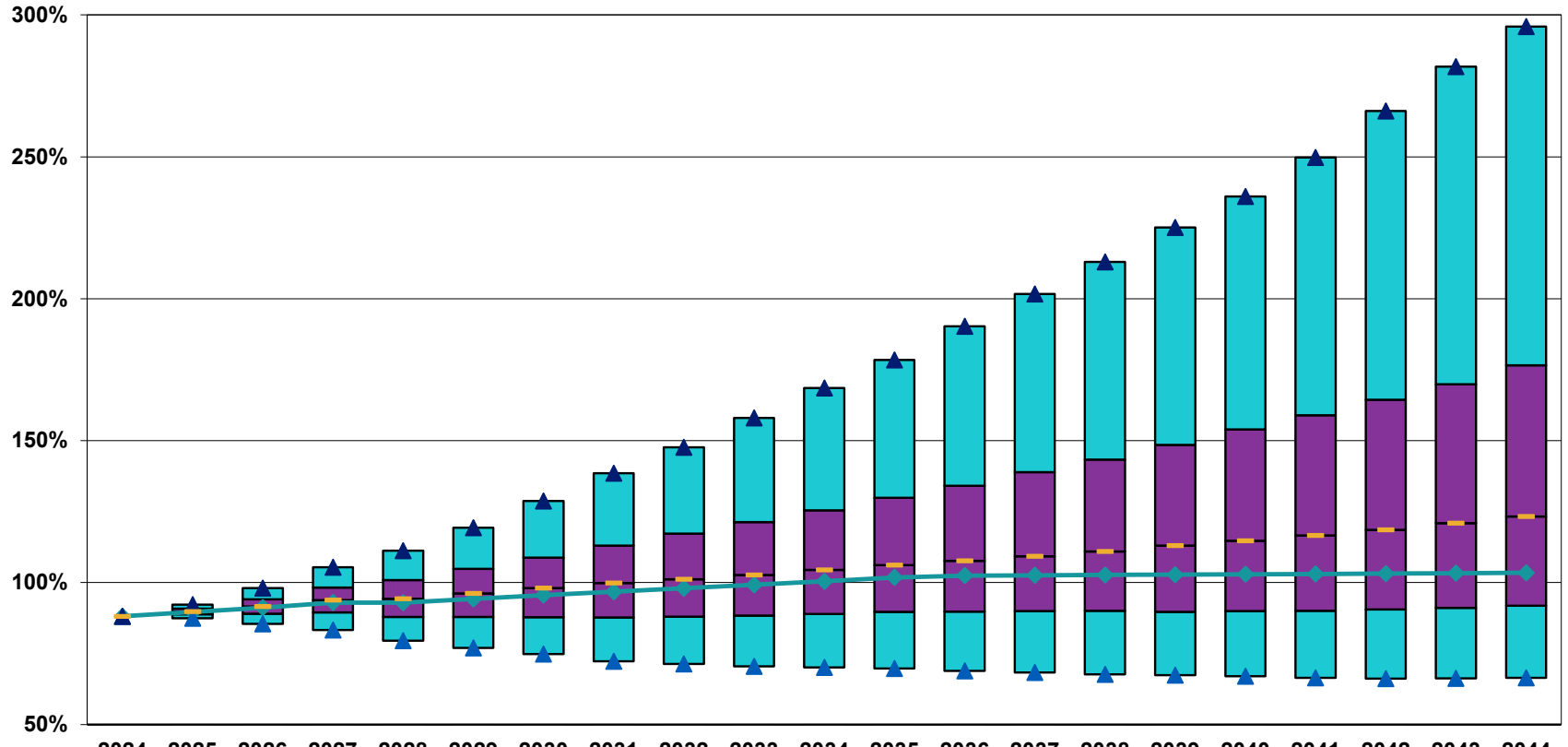


	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	27.8%	21.7%	19.1%	17.5%	16.4%	15.5%	14.8%	14.5%	14.1%	13.7%	13.4%	13.2%	13.0%	12.7%	12.5%	12.4%	12.2%	12.1%	12.0%	11.8%
— 75th	16.1%	13.4%	12.3%	11.6%	11.2%	10.8%	10.5%	10.3%	10.2%	10.0%	9.9%	9.8%	9.7%	9.6%	9.5%	9.4%	9.4%	9.4%	9.3%	9.3%
▬ 50th	8.0%	7.7%	7.8%	7.6%	7.5%	7.5%	7.5%	7.4%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.4%	7.5%	7.4%	7.4%	7.4%	7.4%
— 25th	-0.1%	2.0%	2.9%	3.5%	3.8%	4.3%	4.5%	4.7%	4.8%	5.0%	5.1%	5.2%	5.2%	5.3%	5.4%	5.4%	5.5%	5.5%	5.6%	5.7%
▲ 5th	-11.5%	-6.2%	-3.8%	-2.3%	-1.3%	-0.4%	0.3%	0.5%	0.8%	1.3%	1.5%	1.7%	2.0%	2.1%	2.3%	2.5%	2.6%	2.8%	2.9%	3.0%
◆	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%

◆ Current investment return assumption

Chart 9

Projected Funded Ratios
(Actuarial Value of Assets Basis)



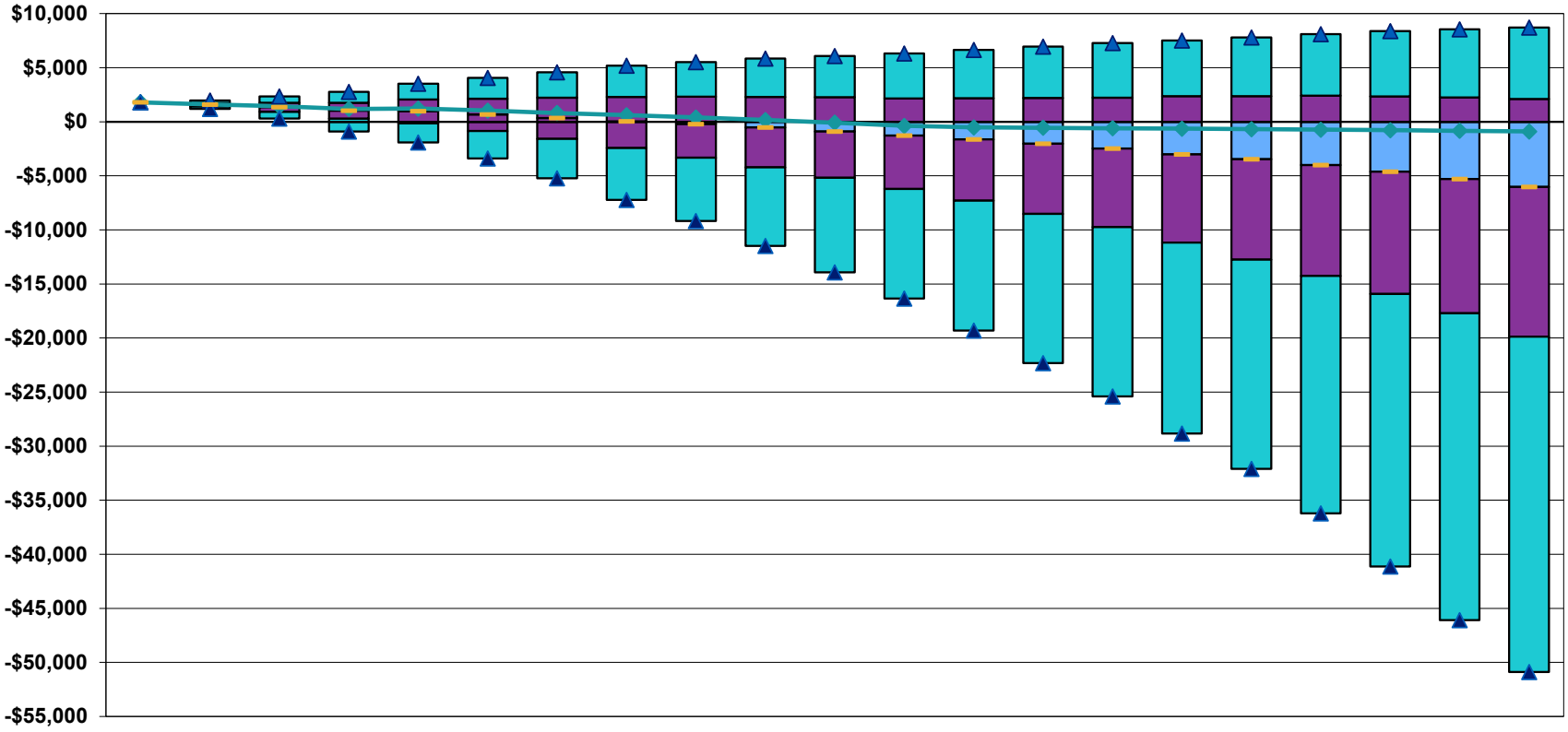
	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	88.1%	92.3%	98.1%	105.4%	111.2%	119.3%	128.7%	138.5%	147.7%	158.0%	168.5%	178.4%	190.2%	201.7%	213.0%	225.2%	236.0%	249.8%	266.1%	281.8%	295.9%
— 75th	88.1%	90.8%	94.1%	98.3%	100.8%	104.8%	108.7%	113.0%	117.2%	121.3%	125.4%	129.8%	134.1%	138.9%	143.4%	148.5%	154.0%	158.9%	164.4%	169.9%	176.5%
▬ 50th	88.1%	89.8%	91.6%	93.8%	94.3%	96.1%	98.0%	99.8%	101.2%	102.7%	104.5%	106.1%	107.7%	109.3%	111.0%	113.1%	114.7%	116.6%	118.6%	120.9%	123.2%
— 25th	88.1%	88.8%	89.1%	89.5%	87.9%	87.9%	87.8%	87.7%	88.0%	88.4%	88.9%	89.7%	89.8%	90.0%	90.1%	89.7%	90.0%	90.0%	90.5%	91.1%	91.9%
▲ 5th	88.1%	87.4%	85.4%	83.3%	79.5%	77.0%	74.8%	72.3%	71.3%	70.5%	70.1%	69.7%	68.9%	68.3%	67.6%	67.4%	67.0%	66.4%	66.1%	66.3%	66.4%
◆	88.1%	89.7%	91.1%	92.9%	92.9%	94.2%	95.6%	96.8%	98.0%	99.2%	100.4%	101.8%	102.5%	102.6%	102.7%	102.8%	102.9%	103.0%	103.2%	103.3%	103.4%

◆ Baseline deterministic projection with current assumptions

Section 2: Key Plan Risks

Chart 10

Projected UAAL
(Actuarial Value of Assets Basis – $ in Millions)

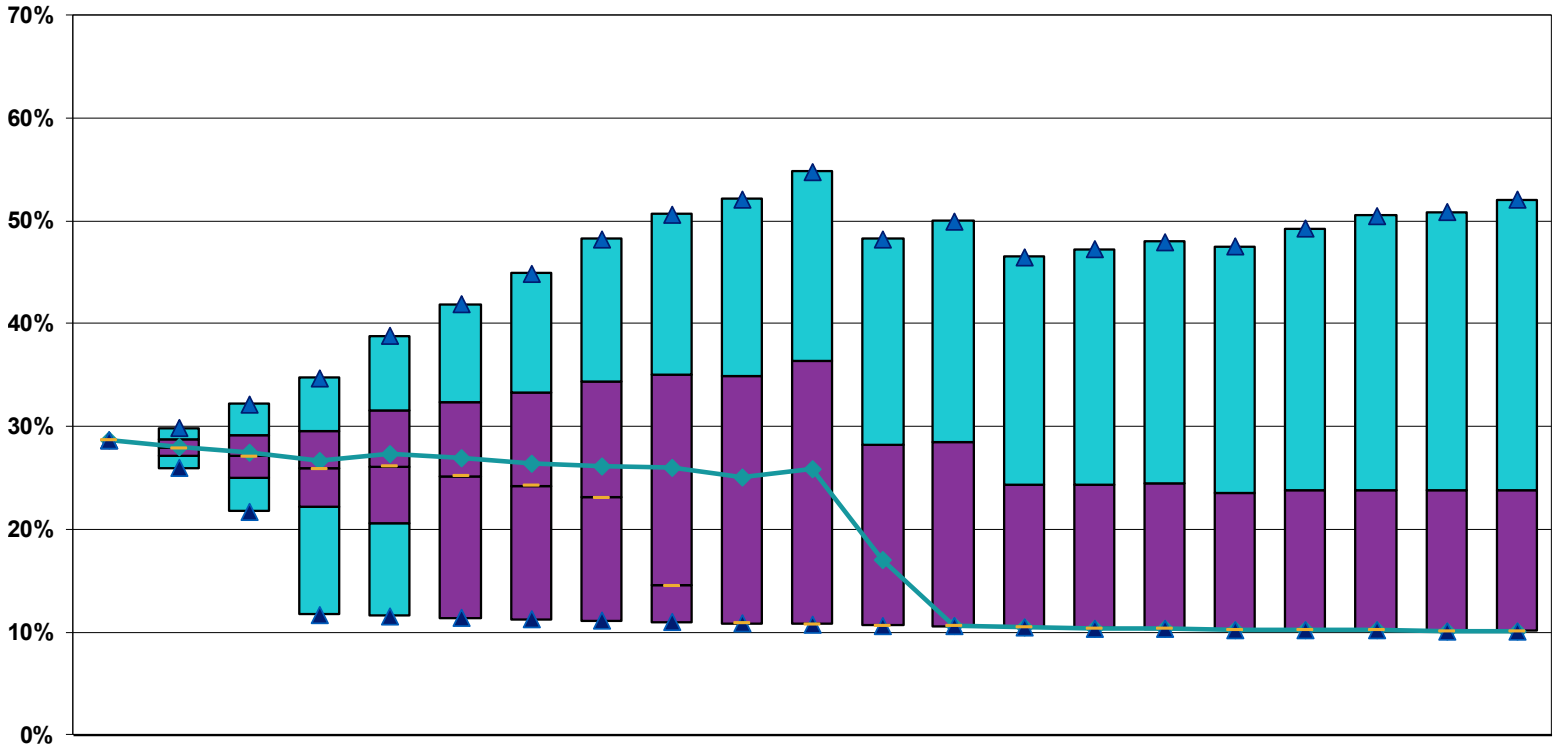


	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	1,792	1,200	309	-891	-1,918	-3,405	-5,229	-7,219	-9,188	-11,481	-13,928	-16,358	-19,311	-22,309	-25,402	-28,833	-32,106	-36,206	-41,129	-46,095	-50,895
— 75th	1,792	1,425	940	286	-144	-846	-1,592	-2,440	-3,319	-4,221	-5,170	-6,223	-7,303	-8,525	-9,747	-11,165	-12,741	-14,248	-15,935	-17,715	-19,876
— 50th	1,792	1,580	1,347	1,030	974	682	356	34	-225	-534	-908	-1,274	-1,637	-2,037	-2,470	-3,009	-3,465	-4,003	-4,606	-5,297	-6,039
— 25th	1,792	1,736	1,756	1,746	2,067	2,142	2,216	2,308	2,315	2,301	2,261	2,150	2,185	2,202	2,234	2,369	2,361	2,406	2,352	2,252	2,116
▲ 5th	1,792	1,955	2,341	2,773	3,512	4,063	4,578	5,195	5,527	5,840	6,074	6,313	6,657	6,944	7,278	7,507	7,788	8,111	8,384	8,558	8,721
◆	1,792	1,614	1,430	1,180	1,220	1,031	811	612	395	158	-88	-375	-522	-559	-598	-639	-685	-732	-783	-836	-893

◆ Baseline deterministic projection with current assumptions

Chart 11

Projected Employer Contribution Rates
(% of Payroll)



	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	28.7%	26.0%	21.8%	11.7%	11.6%	11.4%	11.3%	11.1%	11.0%	10.9%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%
— 75th	28.7%	27.1%	25.0%	22.2%	20.5%	11.4%	11.3%	11.1%	11.0%	10.9%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%
50th	28.7%	27.9%	27.1%	25.9%	26.1%	25.2%	24.3%	23.1%	14.5%	10.9%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%
— 25th	28.7%	28.7%	29.2%	29.5%	31.5%	32.4%	33.3%	34.3%	35.0%	34.9%	36.3%	28.2%	28.4%	24.3%	24.3%	24.5%	23.6%	23.9%	23.8%	23.8%	23.8%
▲ 5th	28.7%	29.9%	32.2%	34.7%	38.8%	41.9%	44.9%	48.2%	50.7%	52.2%	54.8%	48.3%	50.0%	46.5%	47.2%	48.0%	47.5%	49.2%	50.5%	50.8%	52.0%
◆	28.7%	28.1%	27.5%	26.6%	27.3%	26.9%	26.5%	26.2%	26.0%	25.1%	25.9%	17.0%	10.6%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%

◆ Baseline deterministic projection with current assumptions

Note: these projections do not apply any surplus amortization to reduce the employer's normal cost.

Plan maturity measures that affect primary risks

The annual actuarial valuations consider the number and demographic characteristics of covered members, including active members and non-active members (inactive members, retirees and beneficiaries). Over the past 10 valuations from June 30, 2015 to 2024, SCERS has become more mature, indicated by the general increase in the ratio of non-active to active members covered by the System, except from June 30, 2022 to 2024 where the ratio has decreased slightly as there were larger increases in the number of active members relative to non-active members than prior years as shown in *Chart 12*. The chart also shows the ratio of members in pay status (retirees and beneficiaries) to active members. This ratio excludes the inactive vested members who have relatively smaller liabilities. The increase in the ratios is significant because any increase in UAAL due to unfavorable future investment and non-investment experience for a plan with a relatively larger group of non-active members would have to be amortized and funded using the payroll of a relatively smaller group of active members.

Another indicator of a more mature plan is relatively large amounts of assets and/or liabilities compared to active member payroll, which leads to increasing volatility in the level of required contributions. The **Asset Volatility Ratio (AVR)**, which is equal to the market value of assets divided by total payroll, provides an indication of contribution sensitivity to changes in the current level of assets and is detailed in *Chart 13*. The **Liability Volatility Ratio (LVR)**, which is equal to the actuarial accrued liability divided by payroll, provides an indication of the contribution sensitivity to changes in the current level of liability and is detailed in *Chart 14*. Over time, the AVR should approach the LVR because when a plan is fully funded the assets will equal the liabilities. As such, the LVR also indicates the long-term contribution sensitivity to the asset volatility, as the plan approaches full funding.

In particular, SCERS' AVR was 9.8 as of June 30, 2024.[1] This means that a 1% asset gain or loss in FY 2025 (relative to the assumed investment return) would amount to 9.8% of one year's payroll. Similarly, SCERS' LVR was 11.0 as of June 30, 2024,[2] so a 1% liability gain or loss in FY 2025 would amount to 11.0% of one year's payroll. Based on SCERS' policy to amortize actuarial experience over a period of 20 years, there would be a 0.7% of payroll decrease or increase in the required contribution rate for each 1% asset gain or loss, respectively, and a 0.8% of payroll decrease or increase in the required contribution rate for each 1% liability gain or loss, respectively.

It is also informative to note that the AVR and LVR for SCERS' Safety group are significantly higher than for the Miscellaneous group. This means that both investment volatility and assumption changes will have a greater impact on the contribution rates of the Safety group than on the contribution rates of the Miscellaneous group. This is illustrated in the following table:

[1] SCERS' AVR as of June 30, 2023 was 9.9.
[2] SCERS' LVR as of June 30, 2023 was 11.5.

Section 2: Key Plan Risks

Plan	AVR	10% Investment Loss Compares to	LVR	10% Liability Change Compares to
Miscellaneous	8.0	80% of payroll	8.9	89% of payroll
Safety	16.4	164% of payroll	19.1	191% of payroll
Combined	**9.8**	**98% of payroll**	**11.0**	**110% of payroll**

Chart 12

Ratio of Retirees and Beneficiaries (Pay Status) to Active Members &
Ratio of Inactive, Retirees and Beneficiaries (Non-Active) to Active Members as of June 30

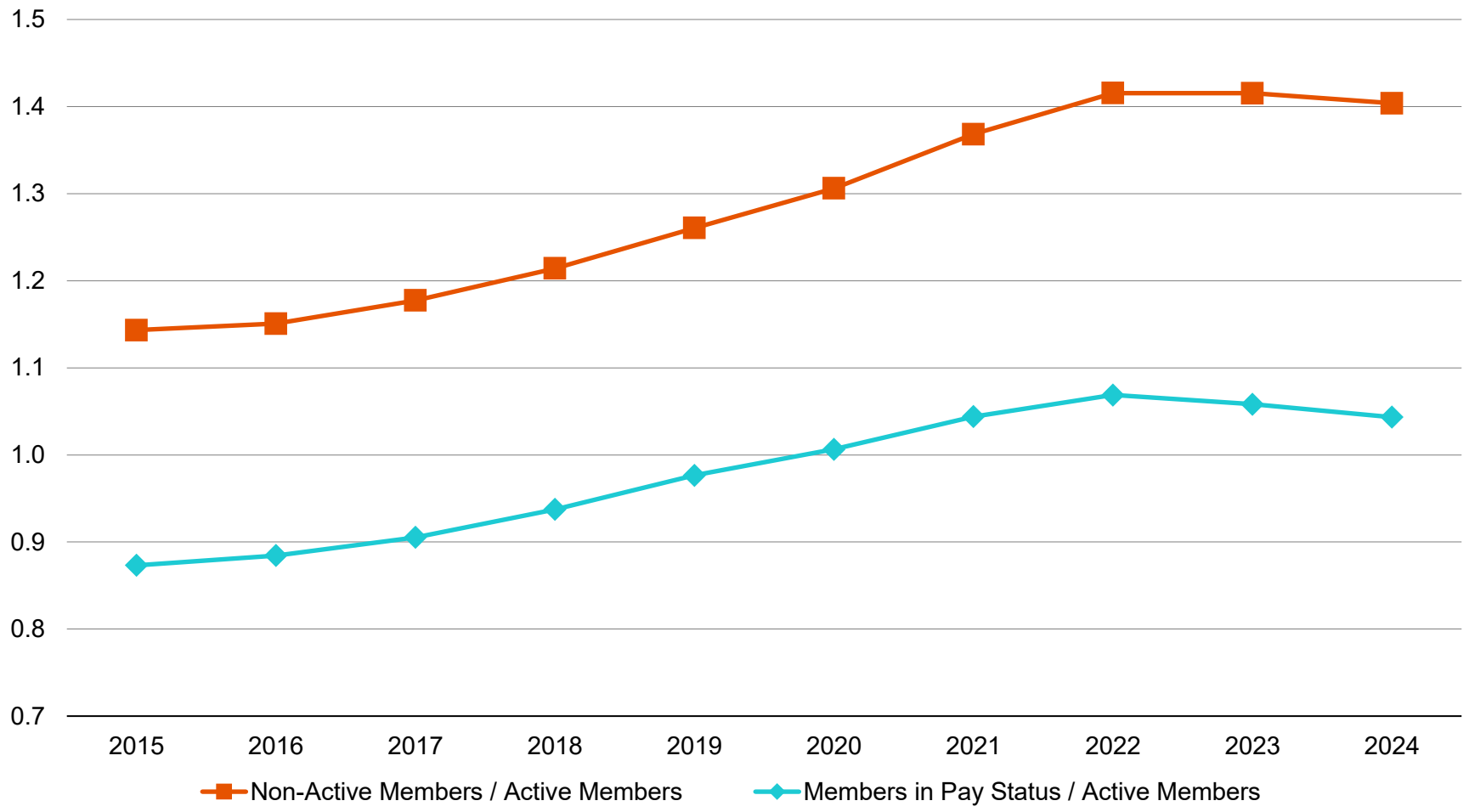


Chart 13

Asset Volatility Ratios as of June 30

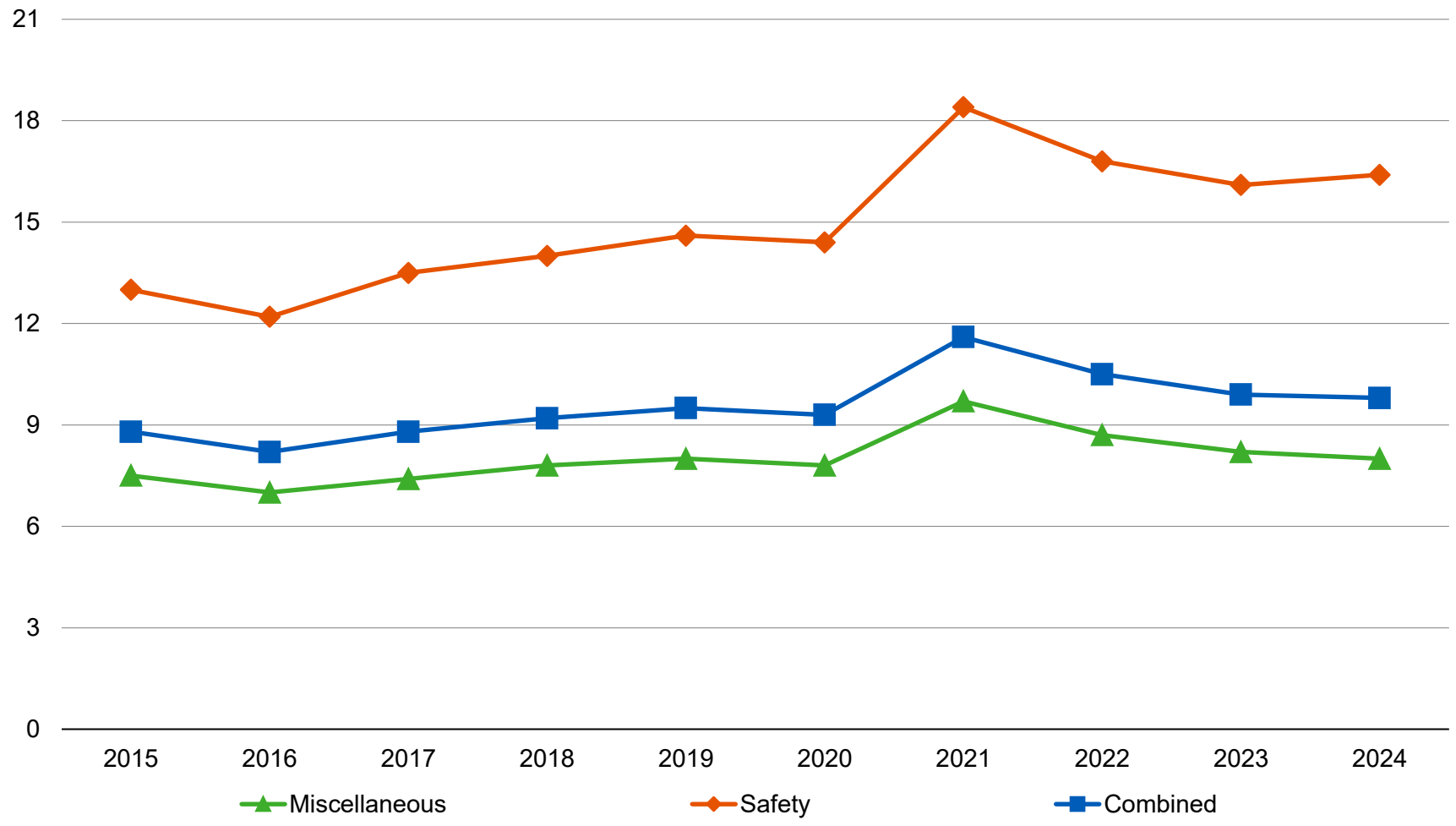
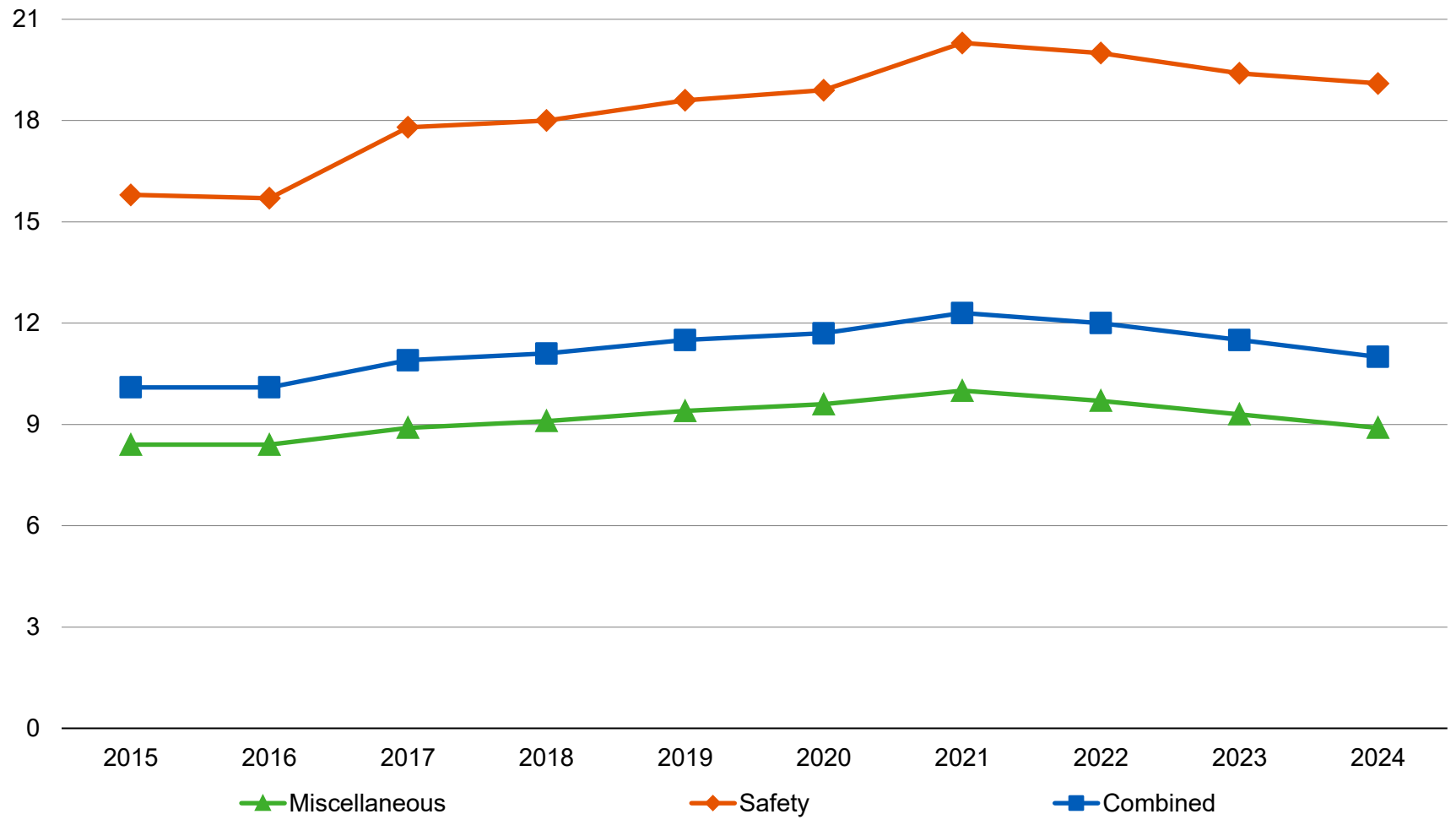


Chart 14

Liability Volatility Ratios as of June 30



Appendix A: Actuarial Assumptions & Methods

Unless otherwise noted, the results included in this report have been prepared based on the assumptions and methods used in preparing the June 30, 2024 actuarial valuation.

Deterministic projection

In addition, we have prepared the deterministic projection using the following assumptions and methods applied in the June 30, 2024 actuarial valuation:

- Non-economic assumptions will remain unchanged.
- Retirement benefit formulas will remain unchanged.
- 1937 Act and PEPRA statutes will remain unchanged.
- UAAL amortization method will remain unchanged (i.e., 20-year layers and level percent of pay).
- Economic assumptions will remain unchanged, including the annual 6.75% investment earnings and 2.75% active payroll growth assumptions.
- Deferred investment gains and losses will be recognized over a seven-year period.
- Using a simplifying assumption, we assume in all scenarios tested and the stochastic projection in this report that the amount in the Contingency Reserve as of June 30, 2024 remains unchanged (i.e., the Contingency Reserve will not be increased above 3% of the market value of assets as of June 30, 2024 nor will it be used to offset any future actuarial losses). As we point out in our June 30, 2024 valuation report, if the $399.3 million in the Contingency Reserve were utilized to determine the employer's contribution rate in that valuation, the aggregate employer contribution rate in that valuation would decrease by about 2.1% of payroll.
- SCERS' funding policy requires any surplus over 120% to be amortized over a rolling 30-year period after other conditions in PEPRA are met. As we have not included these other conditions in our projections, these projections do not apply any surplus amortization to reduce the employer's normal cost.
- All other actuarial assumptions used in the June 30, 2024 actuarial valuations will be realized.

Stochastic projection

Besides the assumptions and methods discussed above for the deterministic projection, the following additional assumptions or parameters are used in projecting SCERS' investment portfolio over the next 20 years based on performing 10,000 trial outcomes of future market returns.

Target asset allocation

The target asset allocation is based on that provided by SCERS at the last triennial experience study and used by Segal to set the investment return assumption of 6.75%, updated for SCERS current target asset allocation (Cash allocation was increased from 1% to 2% and Liquid Real Return allocation was reduced from 2% to 1%). That target asset allocation is as follows:

Target Asset Allocation

Asset Class	Target Allocation
Global equity	40.00%
Private equity	11.00%
Public credit – high yield	1.00%
Public credit – leveraged loan	1.00%
Private credit	5.00%
Fixed income – core	12.00%
Fixed income – U.S. Treasury	4.00%
Core real estate	6.00%
Value added real estate	1.50%
Opportunistic real estate	1.50%
Absolute return	7.00%
Real assets	7.00%
Liquid real return	1.00%
Cash	2.00%
Total	**100.00%**

Appendix A: Actuarial Assumptions & Methods

Simulation of future returns

In preparing the 10,000 trial outcomes of future market returns, we performed simulations using assumptions regarding the 20-year arithmetic returns, standard deviations and correlation matrix that were found in the 2024 survey prepared by Horizon Actuarial Services.[1] We used the assumptions that were closest to the asset classes found in SCERS' investment portfolio.

A summary of the 20-year arithmetic returns,[2] standard deviations and correlation matrix for each of the different asset classes used in the modeling is as follows:

20-Year Arithmetic Return and Standard Deviation

Asset Class	20-Year Arithmetic Return	Standard Deviation
Non-US Equity - Developed	9.08%	18.06%
US Corporate Bonds - Core	5.04%	5.90%
US Corporate Bonds - High Yield	6.86%	9.94%
US Treasuries (Cash Equivalents)	3.44%	1.10%
Real Estate	7.38%	16.61%
Hedge Funds	6.52%	8.03%
Commodities	6.56%	17.81%
Infrastructure	8.56%	16.02%
Private Equity	12.33%	22.57%
Private Debt	9.09%	12.00%

[1] That survey included responses from 41 investment advisors, including SCERS' investment advisor at Verus.

[2] Note that only 26 investment advisors provided long-term (e.g. 20-year) capital market assumptions in the survey. These returns are gross of inflation and before any adjustment for administrative and investment expenses. The annual inflation assumption based on the Horizon Survey was 2.44%. The annual adjustment for administrative and investment expenses (excluding investment management fees) was 0.15%.

Appendix A: Actuarial Assumptions & Methods

Correlation Matrix

Asset Class	1	2	3	4	5	6	7	8	9	10
1. Non-US Equity - Developed	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2. US Corporate Bonds - Core	0.26	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
3. US Corporate Bonds - High Yield	0.64	0.49	1.00	N/A	N/A	N/A	N/A	N/A	N/A	N/A
4. US Treasuries (Cash Equivalents)	-0.02	0.14	-0.03	1.00	N/A	N/A	N/A	N/A	N/A	N/A
5. Real Estate	0.50	0.27	0.49	-0.03	1.00	N/A	N/A	N/A	N/A	N/A
6. Hedge Funds	0.68	0.26	0.63	-0.01	0.45	1.00	N/A	N/A	N/A	N/A
7. Commodities	0.42	0.06	0.37	0.00	0.25	0.40	1.00	N/A	N/A	N/A
8. Infrastructure	0.64	0.29	0.60	-0.01	0.50	0.57	0.42	1.00	N/A	N/A
9. Private Equity	0.66	0.18	0.55	-0.07	0.48	0.62	0.29	0.56	1.00	N/A
10. Private Debt	0.52	0.17	0.66	-0.08	0.37	0.55	0.33	0.48	0.58	1.00

Other considerations

This risk report has been prepared for the exclusive use and benefit of SCERS, based upon information provided by SCERS and SCERS' other service providers or otherwise made available to Segal at the time this document was created. The results presented in this report are intended to provide insight into key plan risks that can inform financial preparation and future decision making. However, Segal makes no representation or warranty as to the accuracy of any forward-looking statements and does not guarantee any particular outcome or result. The modeling projections are intended to serve as illustrations of future financial outcomes that are based on the information available to us at the time the modeling is undertaken and completed, and the agreed-upon assumptions and methodologies described herein. Emerging results may differ significantly if the actual experience proves to be different from these assumptions or if alternative methodologies are used. Actual experience may differ due to such variables as demographic experience, the economy, stock market performance and the regulatory environment.

Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative and client requirements. Deterministic cost projections are based on a proprietary forecasting model. Our Actuarial Technology and Systems unit, comprising both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a

Appendix A: Actuarial Assumptions & Methods

modular structure that allows for a high degree of accuracy, flexibility and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuary.

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Appendix B: Detailed Scenario Test

The following page contains an illustration of projected employer contribution rates and projected employer actuarially determined contribution amounts.

In addition to the assumptions outlined in *Appendix A* of this report, we have used the following market return assumptions to model three hypothetical market return scenarios:

- Scenario 1: Assumed market return of 0.00% for fiscal year FY 2025, 6.75% market return thereafter
- Scenario 2: Assumed market return of 6.75% for fiscal year FY 2025, 6.75% market return thereafter
- Scenario 3: Assumed market return of 13.50% for fiscal year FY 2025, 6.75% market return thereafter

While we have not assigned a probability on the FY 2025 market return coming in at these rates, the System can use these results to interpolate in order to estimate the employer contribution rates and amounts for the June 30, 2025 and next several valuations as the actual investment experience for FY 2025 becomes available. Additionally, comparable experience in upcoming future years is likely to have a similar impact on the Plan absent any significant plan or assumption changes.

Appendix B: Detailed Scenario Test

Illustration of Projected Employer Contribution Rates and Amounts *($ in Millions)*

Valuation Date	Employer Rate Scenario 1	Employer Rate Scenario 2	Employer Rate Scenario 3	Fiscal Year End	Employer Contributions Scenario 1	Employer Contributions Scenario 2	Employer Contributions Scenario 3
June 30, 2024	28.74%	28.74%	28.74%	2026	$401	$401	$401
June 30, 2025	28.72%	28.05%	27.38%	2027	412	402	393
June 30, 2026	29.06%	27.46%	25.87%	2028	428	405	381
June 30, 2027	29.08%	26.64%	24.19%	2029	440	403	366
June 30, 2028	30.50%	27.28%	24.04%	2030	475	424	374
June 30, 2029	30.86%	26.90%	22.94%	2031	493	430	367
June 30, 2030	31.08%	26.45%	21.83%	2032	511	435	359
June 30, 2031	31.44%	26.20%	11.12%	2033	531	442	188
June 30, 2032	31.19%	25.96%	10.99%	2034	541	450	191
June 30, 2033	30.30%	25.08%	10.86%	2035	540	447	194
June 30, 2034	31.16%	25.92%	10.75%	2036	571	475	197
June 30, 2035	22.21%	16.98%	10.64%	2037	418	319	200
June 30, 2036	21.93%	10.55%	10.55%	2038	424	204	204
June 30, 2037	16.38%	10.47%	10.47%	2039	325	208	208
June 30, 2038	15.62%	10.39%	10.39%	2040	319	212	212
June 30, 2039	14.70%	10.33%	10.33%	2041	308	217	217
June 30, 2040	12.76%	10.27%	10.27%	2042	275	221	221
June 30, 2041	12.85%	10.22%	10.22%	2043	285	226	226
June 30, 2042	12.97%	10.17%	10.17%	2044	295	231	231
June 30, 2043	12.39%	10.13%	10.13%	2045	290	237	237
June 30, 2044	12.50%	10.09%	10.09%	2046	300	242	242
June 30, 2045	10.06%	10.06%	10.06%	2047	248	248	248

Appendix C: Definition of Pension Terms

The following list defines certain technical terms as they relate to SCERS for the convenience of the reader:

Term	Definition
Actuarial accrued liability for actives	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial accrued liability for retirees and beneficiaries	Single-sum present value of the lifetime benefits expected to be paid to the existing retirees and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial value of assets	The value of the Plan's assets that is equal to the market value of assets less unrecognized returns. Unrecognized returns are equal to the difference between the actual market return and the expected return on the market value and are recognized over a seven-year period per SCERS' funding policy.
Employer normal cost	The portion of the normal cost to be paid by the employer. This is equal to the normal cost less expected member contributions.
Funded ratio	The ratio of the actuarial value of assets to the actuarial accrued liability. Plans sometimes also calculate a market funded ratio, using the market value of assets, rather than the actuarial value of assets.
Generational mortality	A generational mortality table provides dynamic projections of mortality experience for each cohort of current and future retirees. For example, the mortality rate for someone who is 65 next year will be slightly less than for someone who is 65 this year. In general, using generational mortality anticipates increases in the cost of the Plan over time as participants' life expectancies are projected to increase. This is in contrast to updating a static mortality assumption with each experience study as we had proposed in experience studies prior to 2020.
Normal cost	The amount of contributions required to fund the portion of the level cost of the member's projected retirement benefit that is allocated to the current year of service.
Unfunded actuarial accrued liability	The excess of the actuarial accrued liability over the actuarial value of assets. This value may be negative, in which case it may be expressed as a negative unfunded actuarial accrued liability, also called the funding surplus or an overfunded actuarial accrued liability.
Valuation value of assets	The portion of the total actuarial value of assets reduced by the value of non-valuation reserves.

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Sacramento County Employees' Retirement System

ASOP 51 Risk Assessment

As of June 30, 2024

May 21, 2025 / Todd Tauzer / Molly Calcagno

Segal

Purpose and Basis

Actuarial Standard of Practice 51 – Risk Assessment

Evaluation of Historical Plan Trends

Quantitative Risk Assessments Methods

Plan Maturity Measures

Risk Assessment

Risk Assessments for SCERS

Some information already included in funding report

- Qualitative and quantitative measures
  - Asset/liability mismatch risk
  - Investment risk
  - Longevity risk
  - Reconciliation of changes in UAAL, employer and employee rates
- Historical trends
  - Funded ratios and UAAL amounts
  - Returns on assets
- Plan maturity information
  - Ratio of payees to actives
  - Asset and liability volatility ratios

Risk Assessments for SCERS

Additional information included in risk report

- Detailed historical information displays
  - Aggregation of historical results and analysis
- Deterministic and stochastic projections

Evaluation of Historical Plan Trends

Historical Information

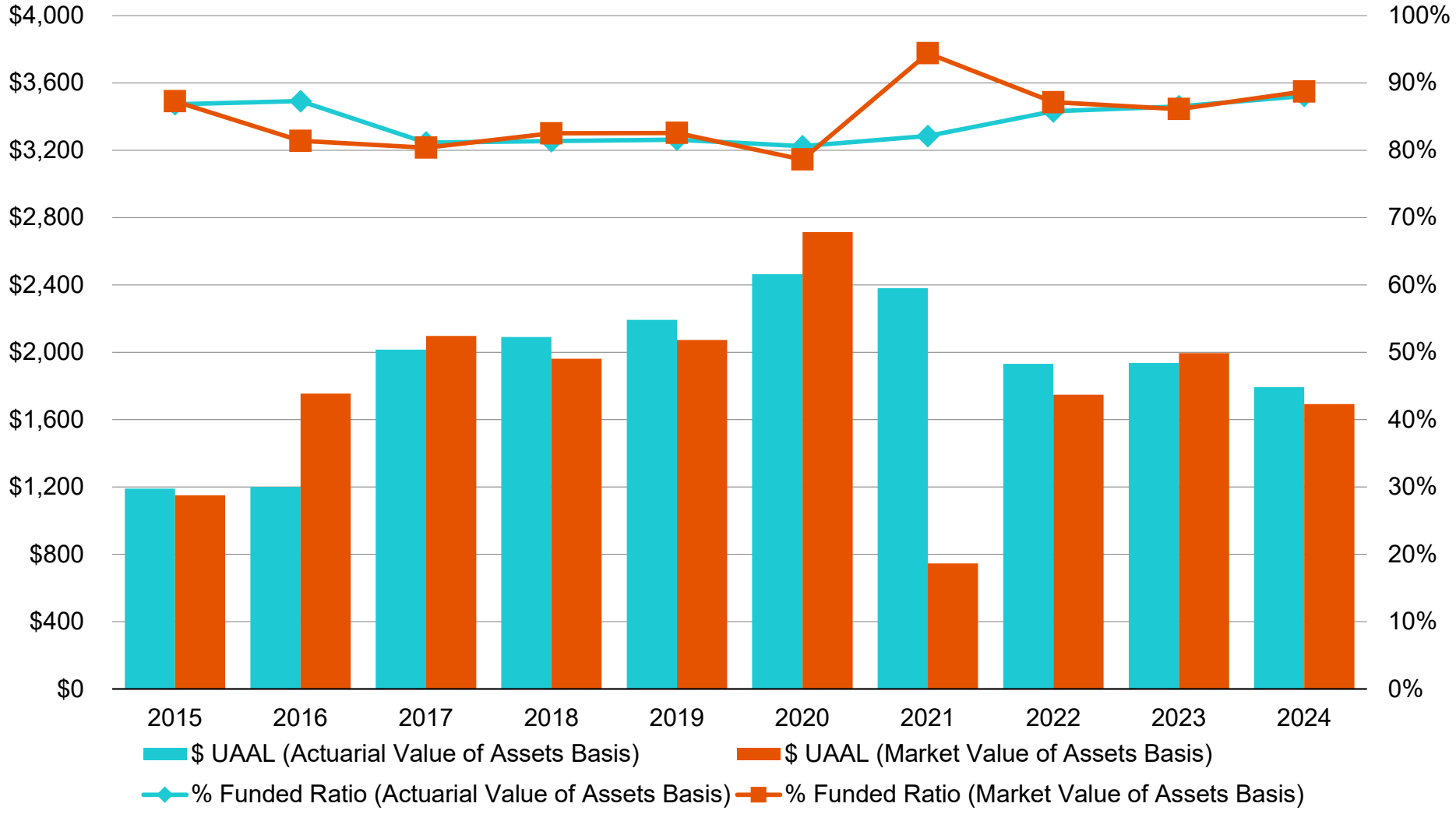
10-year comparison

Valuation Date	Funded Status (MVA basis)	UAAL (MVA basis)	Funded Status (AVA basis)	UAAL (AVA basis)	Aggregate Employer Contribution Rate (% Payroll)
June 30, 2015	87%	$1.1 billion	87%	$1.2 billion	23%
June 30, 2024	89%	$1.7 billion	88%	$1.8 billion	29%

- Increase in UAAL and employer contribution rates in the last 10 valuations primarily from strengthening actuarial assumptions
  - $0.6B increase in UAAL (actuarial value of assets basis)
  - 6% of payroll rate increase
  - $1.02B increase in UAAL and 10% of payroll rate increase directly from strengthening actuarial assumptions

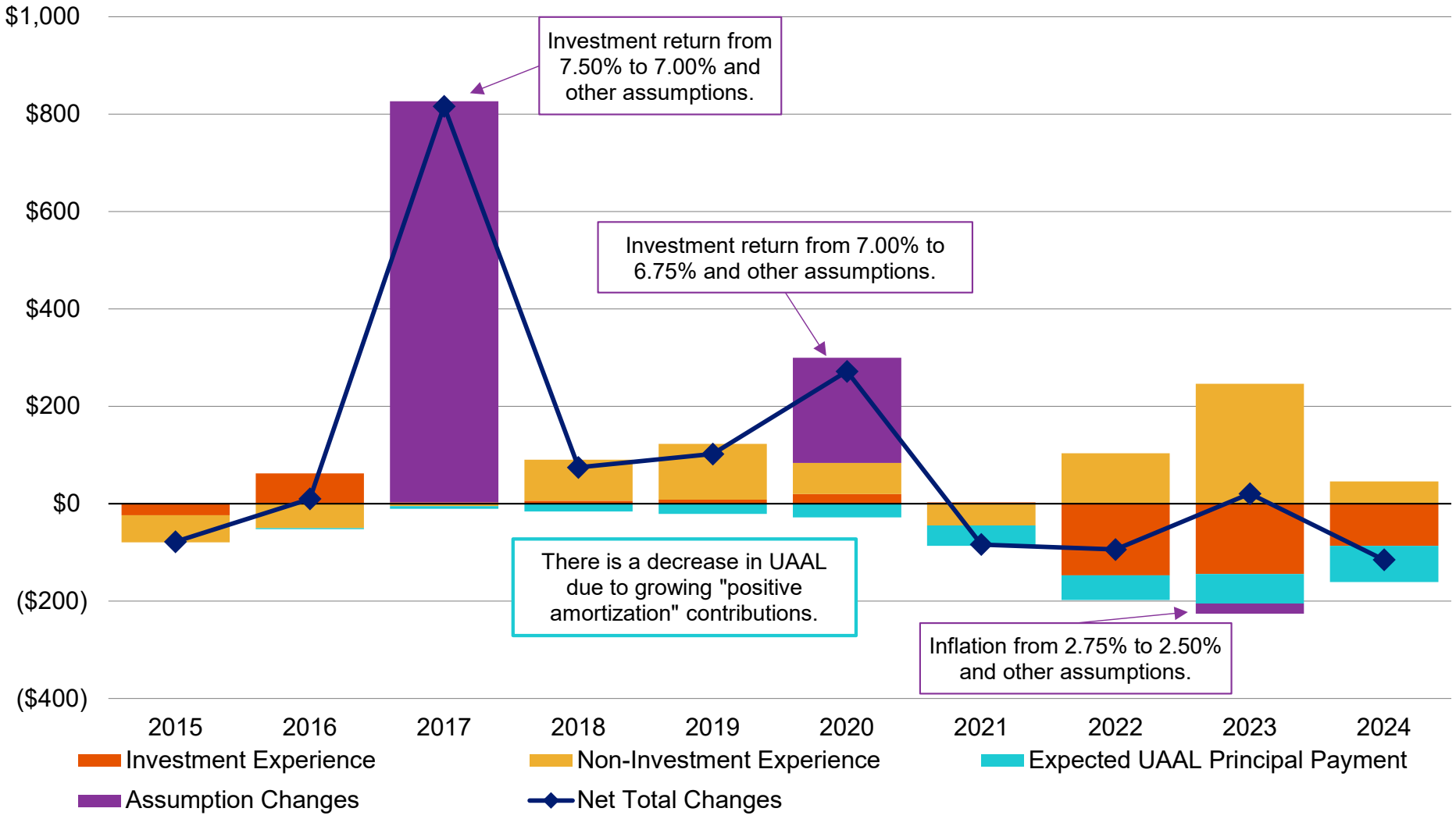
Reference pages 5-6 of the Risk Assessment as of June 30, 2024.

Funded Ratio (Percentages) and Dollar UAAL ($ Millions)



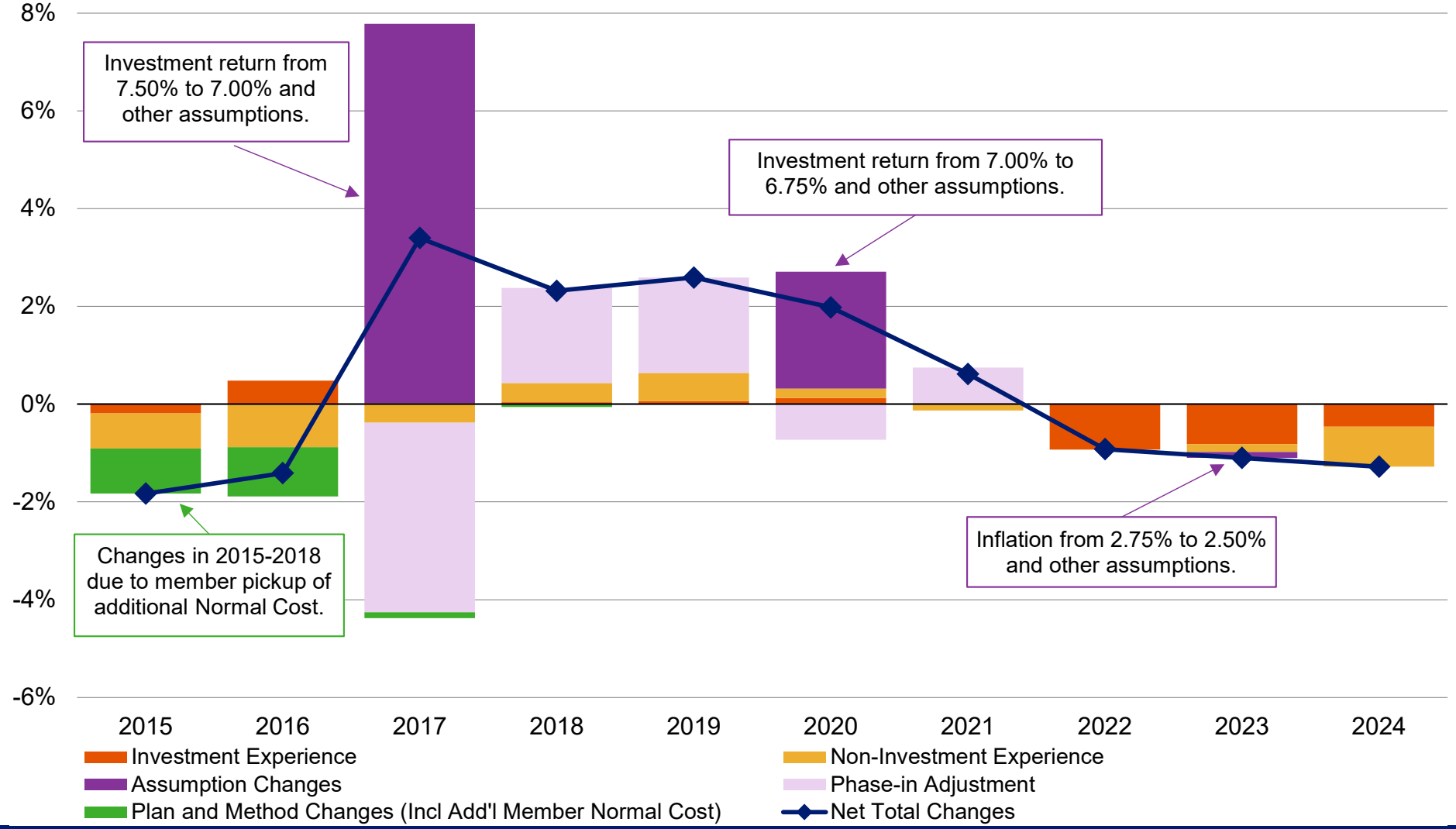
The overall level of funding of SCERS has increased slightly on an actuarial value of assets basis as a result of growing positive amortization contributions and the size of the plan as a whole growing faster than the UAAL.

Factors that Affected the UAAL ($ Millions)



Assumption changes from the 2017 and 2020 experience studies have by far the most impact on the UAAL for SCERS, followed by the unfavorable non-investment experience during 2017 to 2024.

Factors that Affected Employer Contribution Rates (% Payroll)



Assumption changes from the 2017 and 2020 experience studies have by far the most impact on increasing the contribution rates for the employers during 2015 to 2024.

Quantitative Risk Assessments Methods

Quantitative Risk Assessment

Scenario tests

- Baseline projection: assets earn expected return every year
- Scenario tests: one year of asset gain or loss
  - Actual return is either 2x assumed or zero
  - Illustrates the impact of one year of favorable or unfavorable market return on all future years of funding
- Realistic range of short-term experience
  - Avoids looking like a forecast
  - Useful for employer budgeting as actual experience emerges

Practical Investment Return Scenario Tests

Employer contribution rate change

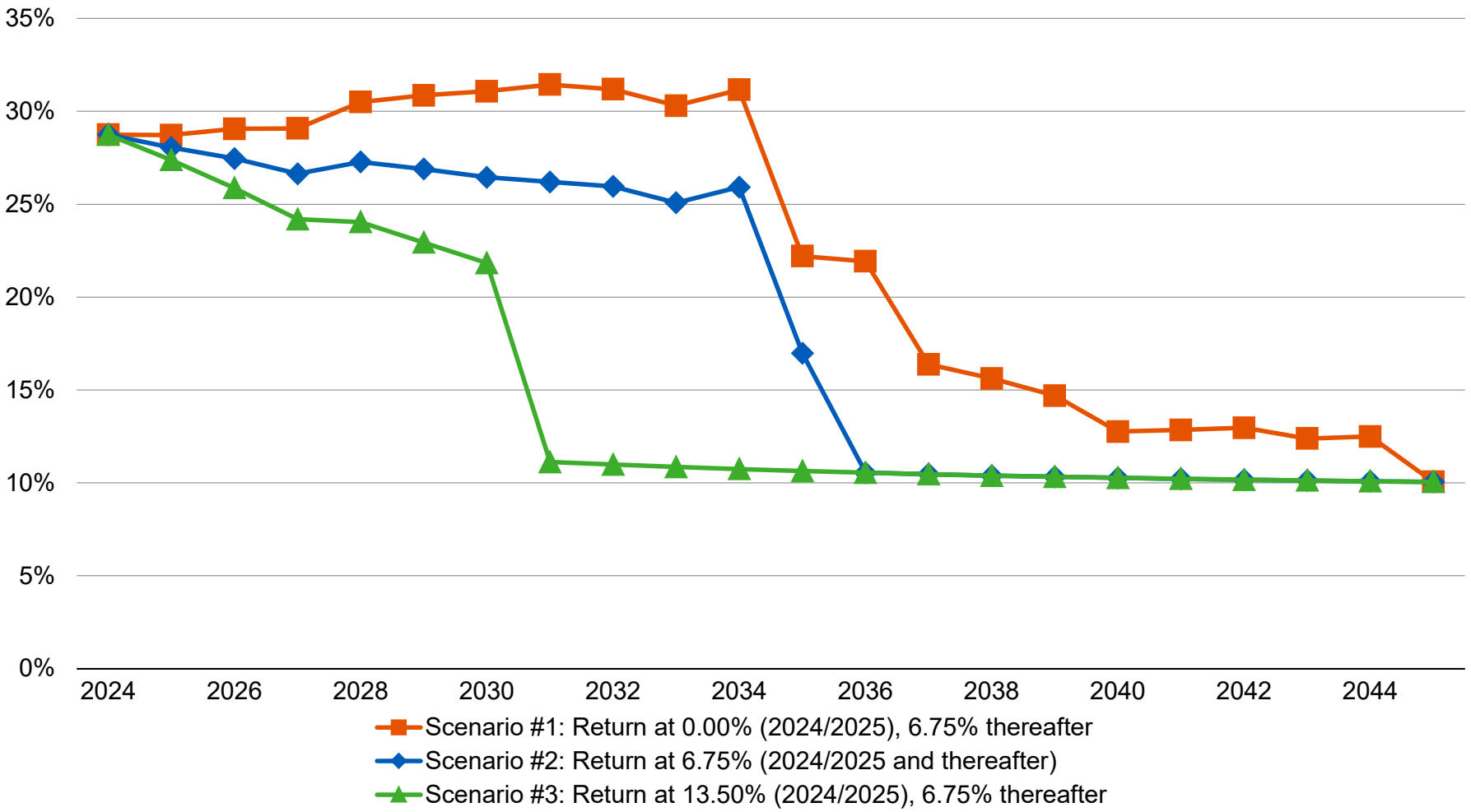
2024/2025 Single Plan Year Investment Return without Considering Amount in Contingency Reserve as of June 30, 2024

Valuation Date	0.00%	6.75% (baseline)	13.50%
June 30, 2025	-0.0% of payroll	-0.7% of payroll	-1.4% of payroll
June 30, 2031	+2.7% of payroll	-2.5% of payroll	-17.6% of payroll

- Short term difference in investment return will cause fluctuation in employer's contribution rate
  - Smoothed over 7 years under asset smoothing
  - Experience will be amortized over 20 years under Board's funding policy
- Board's funding policy is very effective in achieving long-term full funding of cost of benefits

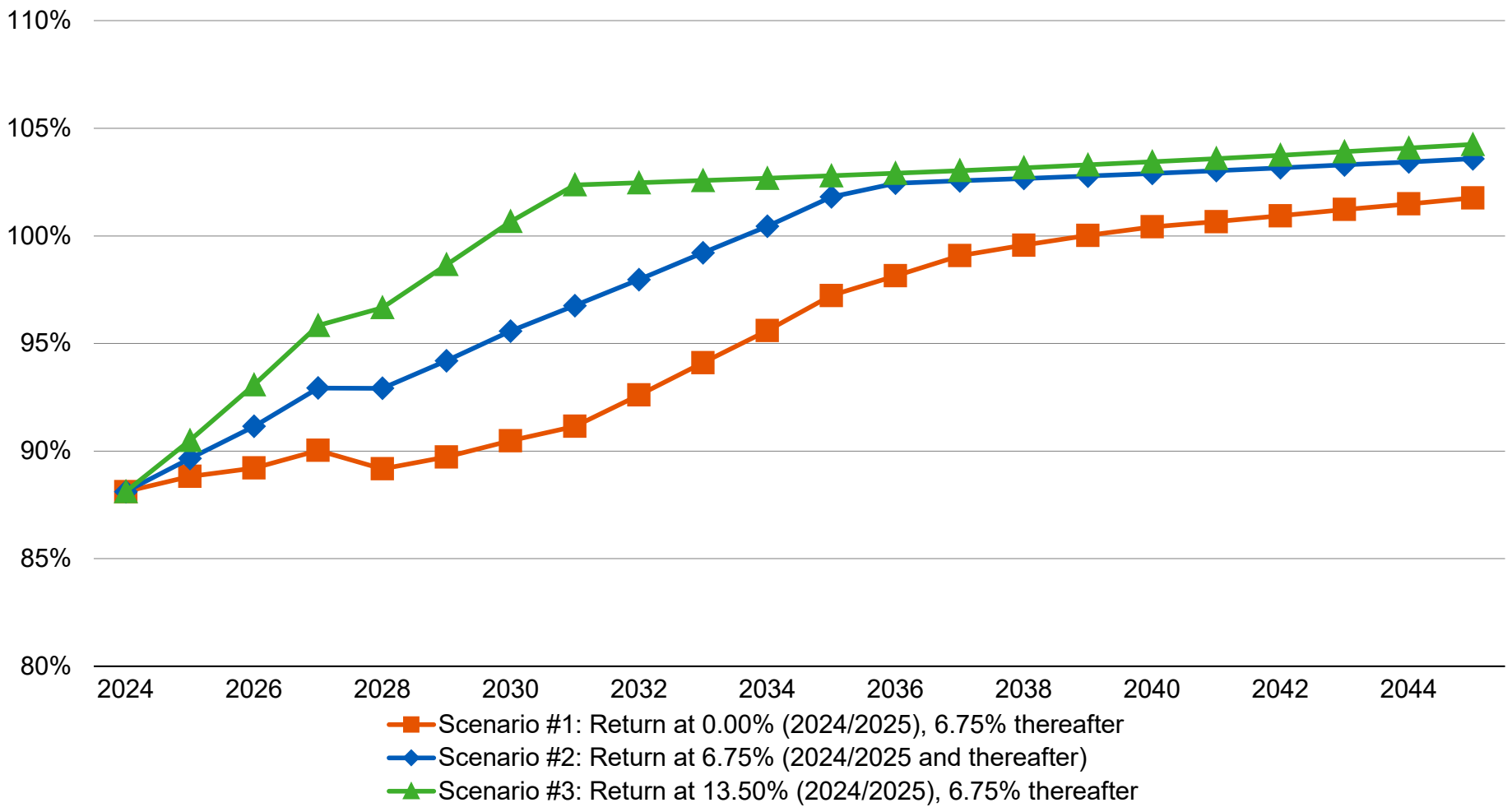
Reference page 19 of the Risk Assessment as of June 30, 2024.

Scenario Tests – Projected Employer Contribution Rates



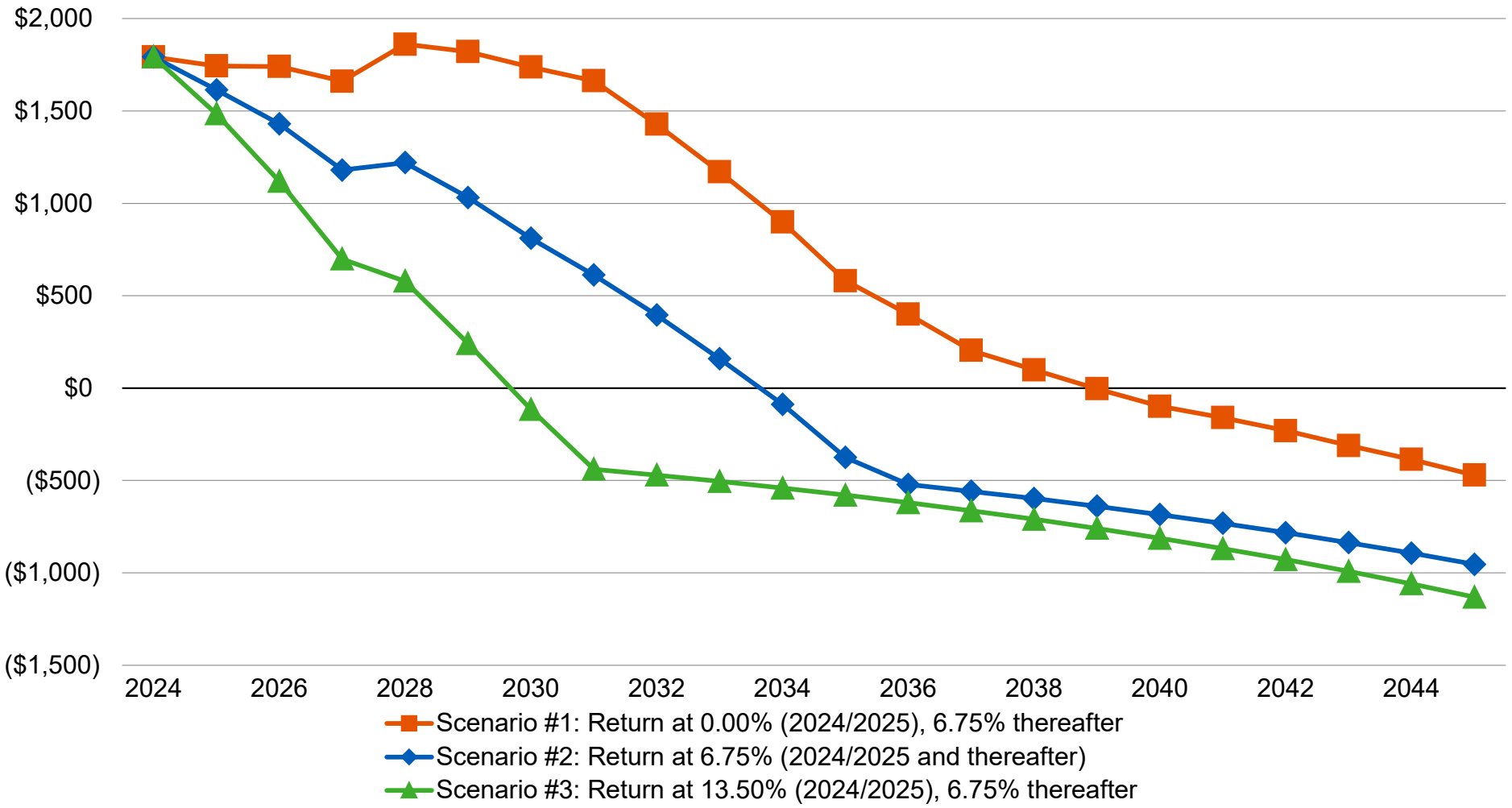
The total employer contribution rate would be equal to the normal cost rate (10%-11% of payroll) once the System reaches full funding on a VVA basis.

Scenario Tests – Projected Funded Ratios (Percentages)



The System would be expected to reach full funding on an AVA basis four years earlier than the baseline under Scenario #3 and five years later than the baseline under Scenario #1.

Scenario Tests – Projected UAAL ($ Millions)



UAAL decreases every year under Scenario #3 while there is an increase in UAAL in 2028 under Scenarios #1 and Scenario #2 related to the recognition of the residual investment losses from 2021/2022 under asset smoothing.

Quantitative Risk Assessment

Stochastic projection

- Probabilities that the **funded ratio** would fall below 70%, 60% or 50% at any point in the next 20 years
  - Probabilities less likely due to higher capital market assumptions
  - But does reflect a larger drop (e.g., a 38% drop from 88% to 50% funded in the 2024 analysis compared to a 36% drop from 86% to 50% funded in the 2022 analysis)

Valuation Date	Below 50%	Below 60%	Below 70%
Current (6/30/2024 Analysis Probability)	1%	5%	15%
Prior (6/30/2022 Analysis Probability)	3%	10%	23%

Reference page 24 of the Risk Assessment as of June 30, 2024.

Quantitative Risk Assessment

Stochastic projection

- Probabilities that the total **employer contribution rate** would increase by at least 5%, 10% or 15% of payroll at any year during the next 20 years
  - Probabilities less likely due to higher capital market assumptions, along with the progression of the amortization schedule

Valuation Date	Increase by at least 5% of Payroll (to 33% of Payroll)	Increase by at least 10% of Payroll (to 38% of Payroll)	Increase by at least 15% of Payroll (to 43% of Payroll)
Current (6/30/2024 Analysis Probability)	42%	31%	22%
Prior (6/30/2022 Analysis Probability)	48%	38%	30%

Reference page 25 of the Risk Assessment as of June 30, 2024.

Quantitative Risk Assessment

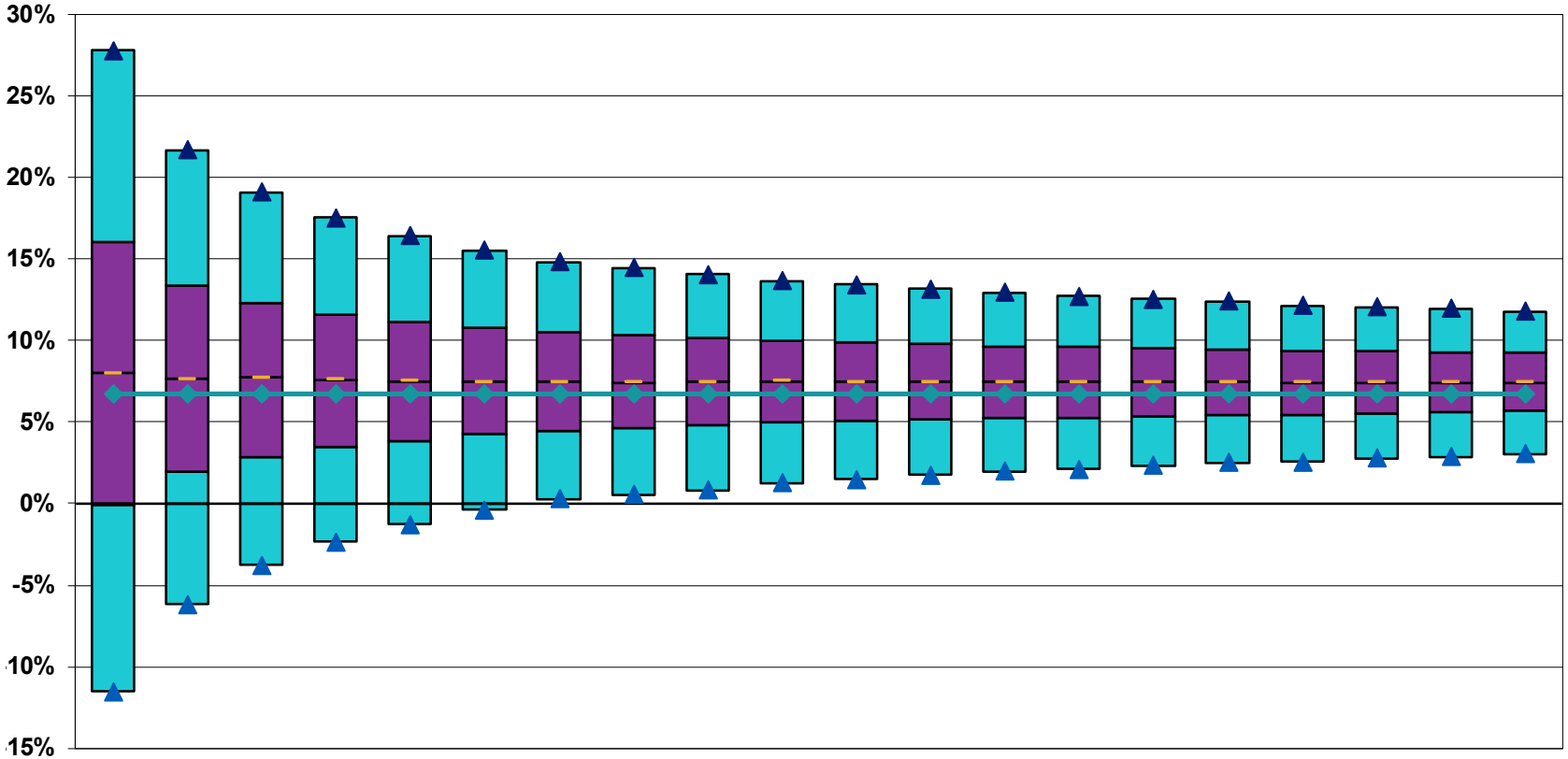
Stochastic projection

- Probabilities that the total **employer contribution rate** would spike by 2%, 4%, or 6% of payroll in any single year during the next 20 years
  - Probabilities slightly less likely due to higher capital market assumptions

Valuation Date	Increase by at least 2% of Payroll	Increase by at least 4% of Payroll	Increase by at least 6% of Payroll
Current (6/30/2024 Analysis Probability)	12%	4%	2%
Prior (6/30/2022 Analysis Probability)	16%	6%	2%

Reference page 25 of the Risk Assessment as of June 30, 2024.

Stochastic Modeling – Projected Cumulative Investment Return

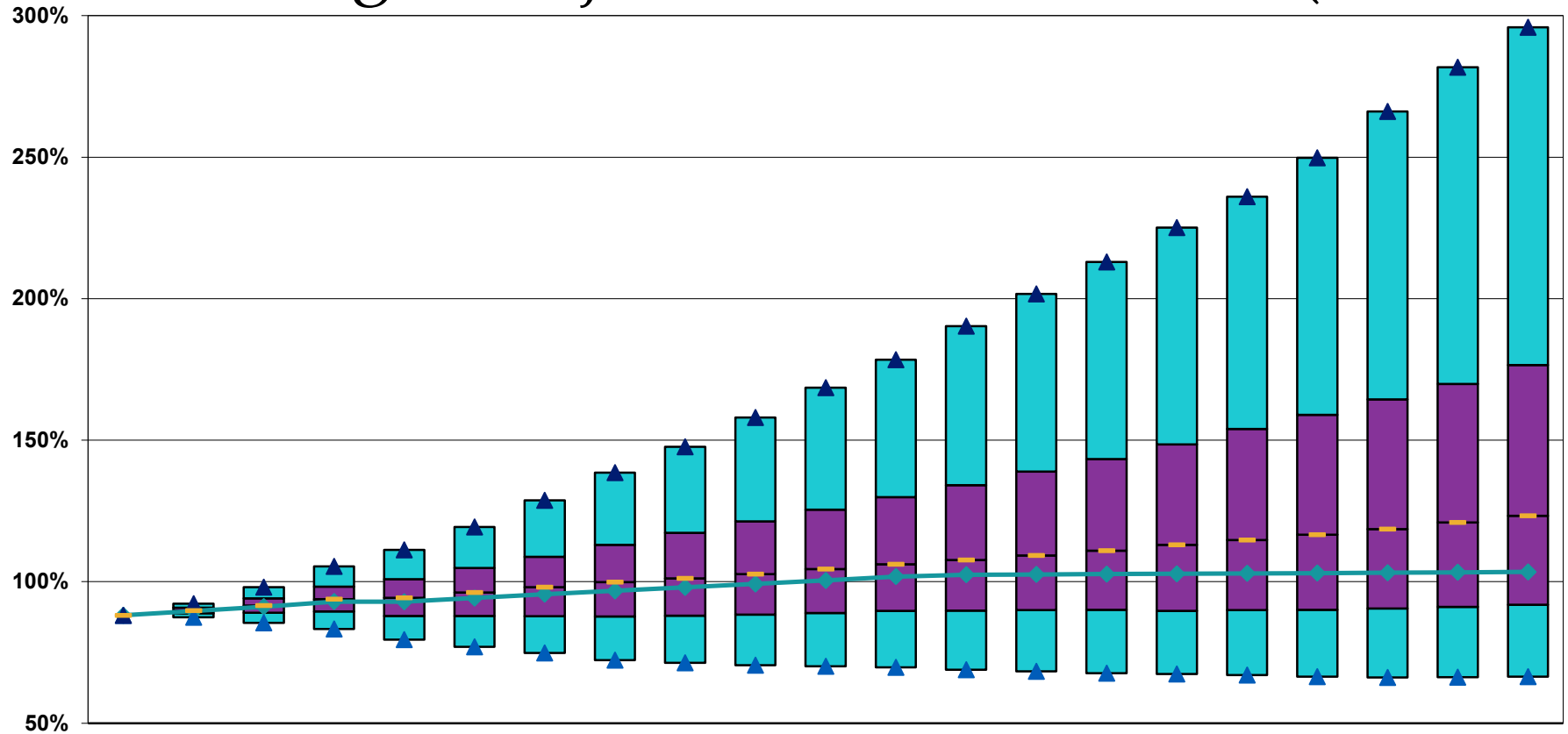


	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	27.8%	21.7%	19.1%	17.5%	16.4%	15.5%	14.8%	14.5%	14.1%	13.7%	13.4%	13.2%	13.0%	12.7%	12.5%	12.4%	12.2%	12.1%	12.0%	11.8%
— 75th	16.1%	13.4%	12.3%	11.6%	11.2%	10.8%	10.5%	10.3%	10.2%	10.0%	9.9%	9.8%	9.7%	9.6%	9.5%	9.4%	9.4%	9.4%	9.3%	9.3%
— 50th	8.0%	7.7%	7.8%	7.6%	7.5%	7.5%	7.5%	7.4%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.4%	7.5%	7.4%	7.4%	7.4%	7.4%
— 25th	-0.1%	2.0%	2.9%	3.5%	3.8%	4.3%	4.5%	4.7%	4.8%	5.0%	5.1%	5.2%	5.2%	5.3%	5.4%	5.4%	5.5%	5.5%	5.6%	5.7%
▲ 5th	-11.5%	-6.2%	-3.8%	-2.3%	-1.3%	-0.4%	0.3%	0.5%	0.8%	1.3%	1.5%	1.7%	2.0%	2.1%	2.3%	2.5%	2.6%	2.8%	2.9%	3.0%
◆	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%	6.8%

◆ Current investment return assumption

At the end of 20 years, there is a 50% chance that the annual return would average between 5.7% and 9.3%.

Stochastic Modeling – Projected Funded Ratios (Percentages)

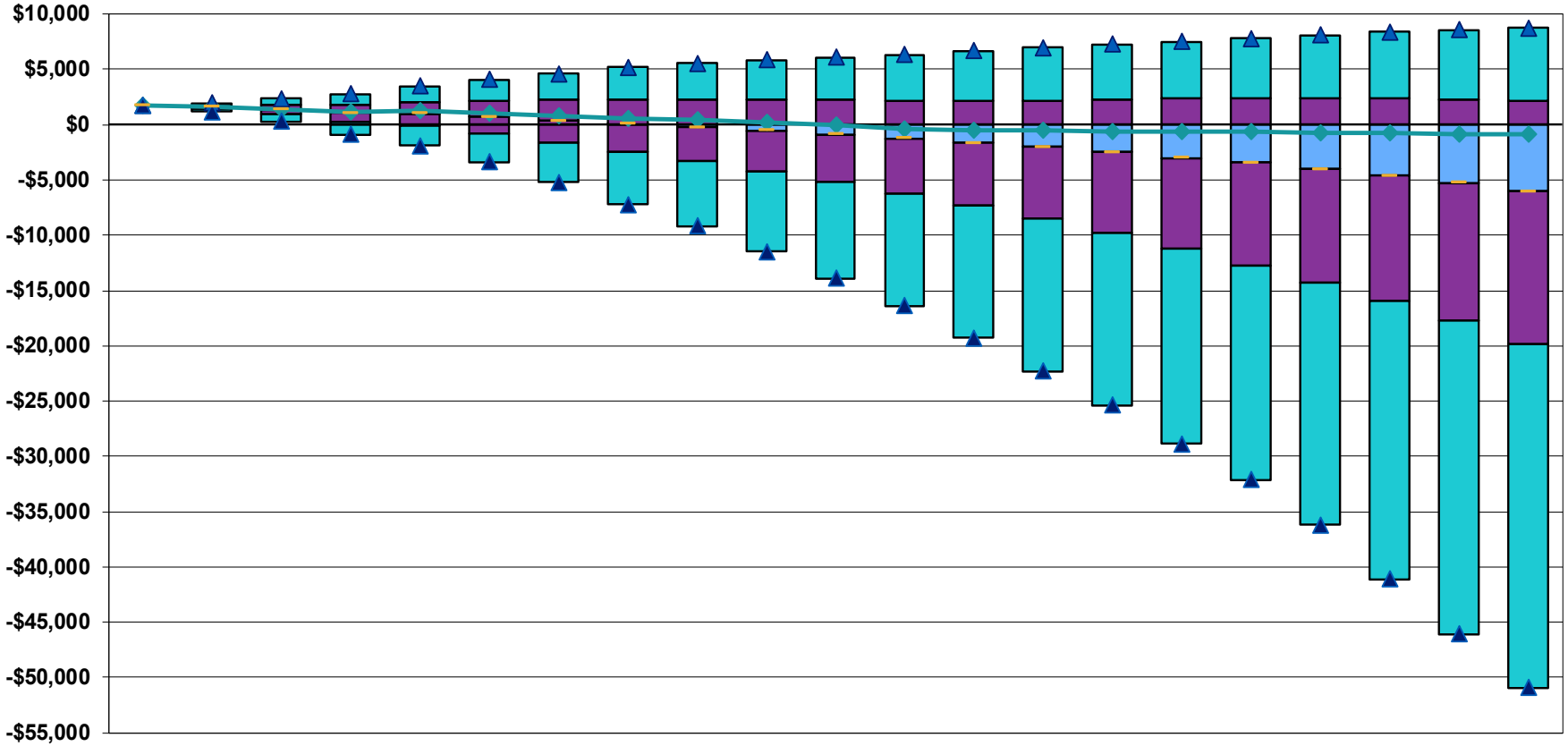


	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	88.1%	92.3%	98.1%	105.4%	111.2%	119.3%	128.7%	138.5%	147.7%	158.0%	168.5%	178.4%	190.2%	201.7%	213.0%	225.2%	236.0%	249.8%	266.1%	281.8%	295.9%
— 75th	88.1%	90.8%	94.1%	98.3%	100.8%	104.8%	108.7%	113.0%	117.2%	121.3%	125.4%	129.8%	134.1%	138.9%	143.4%	148.5%	154.0%	158.9%	164.4%	169.9%	176.5%
— 50th	88.1%	89.8%	91.6%	93.8%	94.3%	96.1%	98.0%	99.8%	101.2%	102.7%	104.5%	106.1%	107.7%	109.3%	111.0%	113.1%	114.7%	116.6%	118.6%	120.9%	123.2%
— 25th	88.1%	88.8%	89.1%	89.5%	87.9%	87.9%	87.8%	87.7%	88.0%	88.4%	88.9%	89.7%	89.8%	90.0%	90.1%	89.7%	90.0%	90.0%	90.5%	91.1%	91.9%
▲ 5th	88.1%	87.4%	85.4%	83.3%	79.5%	77.0%	74.8%	72.3%	71.3%	70.5%	70.1%	69.7%	68.9%	68.3%	67.6%	67.4%	67.0%	66.4%	66.1%	66.3%	66.4%
◆	88.1%	89.7%	91.1%	92.9%	92.9%	94.2%	95.6%	96.8%	98.0%	99.2%	100.4%	101.8%	102.5%	102.6%	102.7%	102.8%	102.9%	103.0%	103.2%	103.3%	103.4%

◆ Baseline deterministic projection with current assumptions

At the end of 20 years, there is a 50% chance that the funded ratio would be between 92% and 177%.

Stochastic Modeling – Projected UAAL ($ Millions)

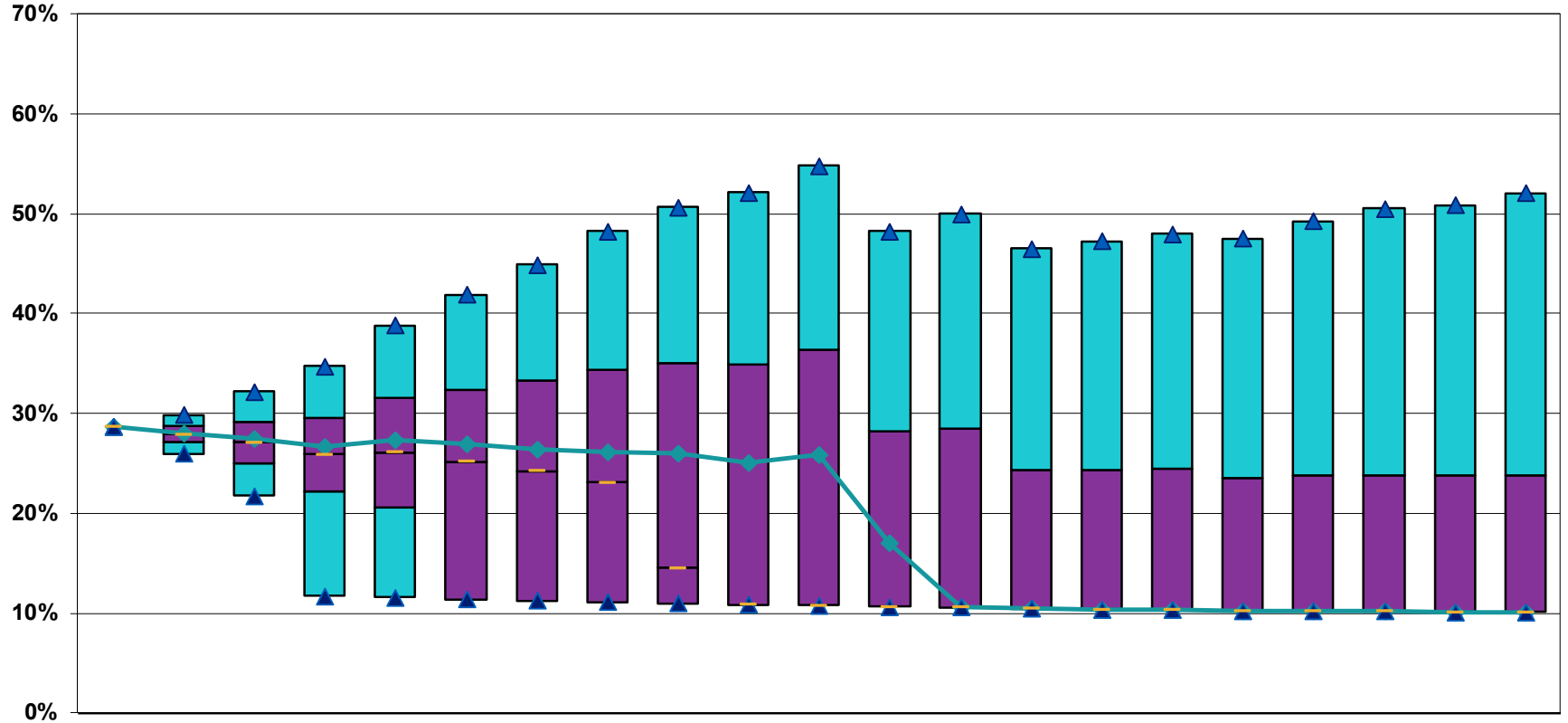


	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	1,792	1,200	309	-891	-1,918	-3,405	-5,229	-7,219	-9,188	-11,481	-13,928	-16,358	-19,311	-22,309	-25,402	-28,833	-32,106	-36,206	-41,129	-46,095	-50,895
— 75th	1,792	1,425	940	286	-144	-846	-1,592	-2,440	-3,319	-4,221	-5,170	-6,223	-7,303	-8,525	-9,747	-11,165	-12,741	-14,248	-15,935	-17,715	-19,876
— 50th	1,792	1,580	1,347	1,030	974	682	356	34	-225	-534	-908	-1,274	-1,637	-2,037	-2,470	-3,009	-3,465	-4,003	-4,606	-5,297	-6,039
— 25th	1,792	1,736	1,756	1,746	2,067	2,142	2,216	2,308	2,315	2,301	2,261	2,150	2,185	2,202	2,234	2,369	2,361	2,406	2,352	2,252	2,116
▲ 5th	1,792	1,955	2,341	2,773	3,512	4,063	4,578	5,195	5,527	5,840	6,074	6,313	6,657	6,944	7,278	7,507	7,788	8,111	8,384	8,558	8,721
◆	1,792	1,614	1,430	1,180	1,220	1,031	811	612	395	158	-88	-375	-522	-559	-598	-639	-685	-732	-783	-836	-893

◆ Baseline deterministic projection with current assumptions

At the end of 20 years, there is a 50% chance that the UAAL would be between $2.1B and ($19.9B).

Stochastic Modeling – Projected Employer Contribution Rates



	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042	2043	2044
▲ 95th	28.7%	26.0%	21.8%	11.7%	11.6%	11.4%	11.3%	11.1%	11.0%	10.9%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%
— 75th	28.7%	27.1%	25.0%	22.2%	20.5%	11.4%	11.3%	11.1%	11.0%	10.9%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%
— 50th	28.7%	27.9%	27.1%	25.9%	26.1%	25.2%	24.3%	23.1%	14.5%	10.9%	10.7%	10.6%	10.5%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%
— 25th	28.7%	28.7%	29.2%	29.5%	31.5%	32.4%	33.3%	34.3%	35.0%	34.9%	36.3%	28.2%	28.4%	24.3%	24.3%	24.5%	23.6%	23.9%	23.8%	23.8%	23.8%
▲ 5th	28.7%	29.9%	32.2%	34.7%	38.8%	41.9%	44.9%	48.2%	50.7%	52.2%	54.8%	48.3%	50.0%	46.5%	47.2%	48.0%	47.5%	49.2%	50.5%	50.8%	52.0%
◆	28.7%	28.1%	27.5%	26.6%	27.3%	26.9%	26.5%	26.2%	26.0%	25.1%	25.9%	17.0%	10.6%	10.5%	10.4%	10.3%	10.3%	10.2%	10.2%	10.1%	10.1%

◆ Baseline deterministic projection with current assumptions

At the end of 20 years, there is a 50% chance that employer rates would be between 10% and 24% of payroll.

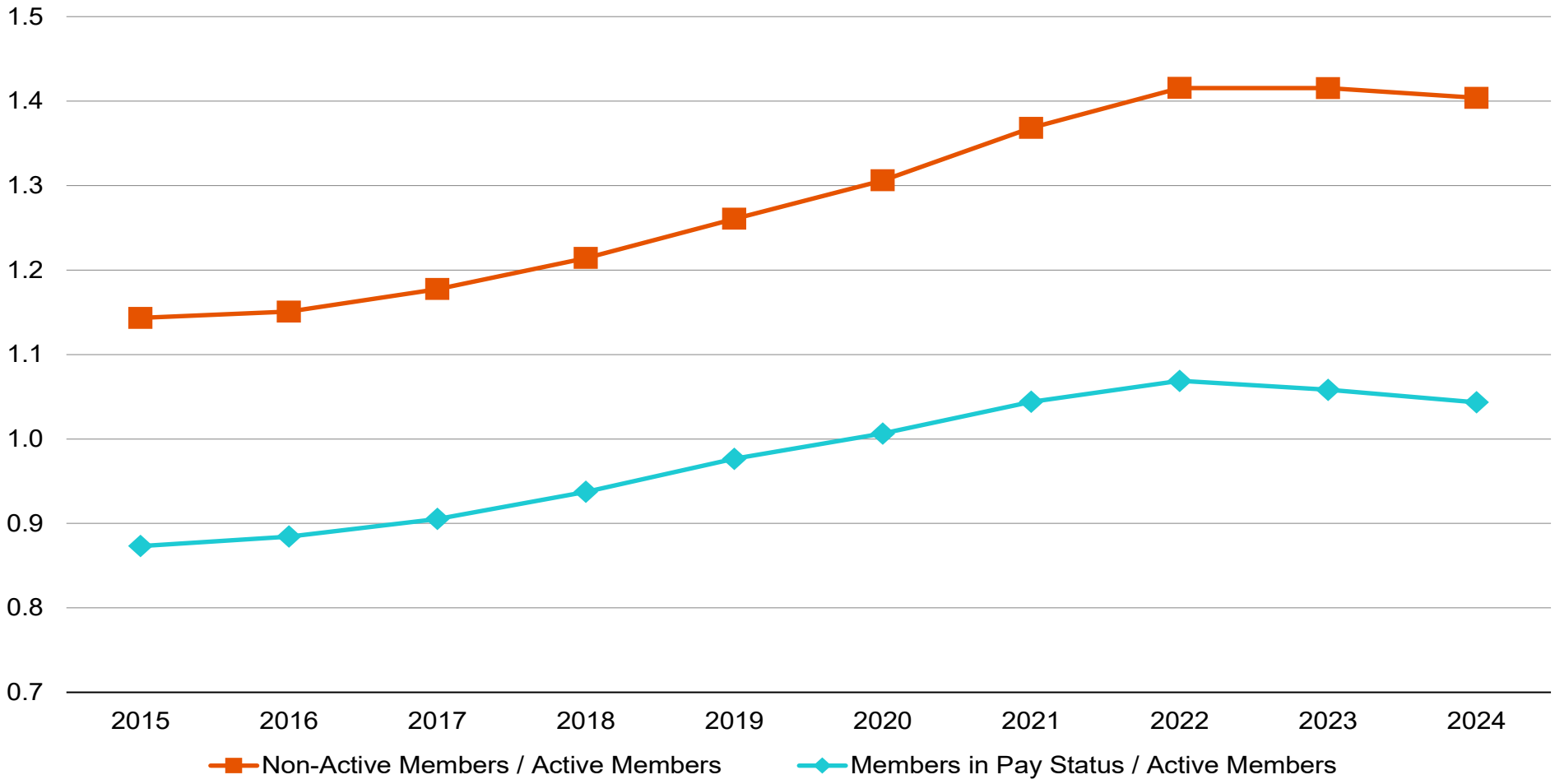
Plan Maturity Measures

Plan Maturity Measures

- Ratios of members in pay-status (retirees and beneficiaries) and non-active members (inactive vested, retirees and beneficiaries) to actives
- Asset volatility ratio (AVR): ratio of assets to payroll
- Liability volatility ratio (LVR): ratio of liabilities to payroll
- AVR and LVR are quantitative measures that can be used to estimate contribution rate impact due to changes in assets and liabilities
  - Higher ratios for Safety groups compared to Miscellaneous groups indicate greater relative cost volatility for Safety groups

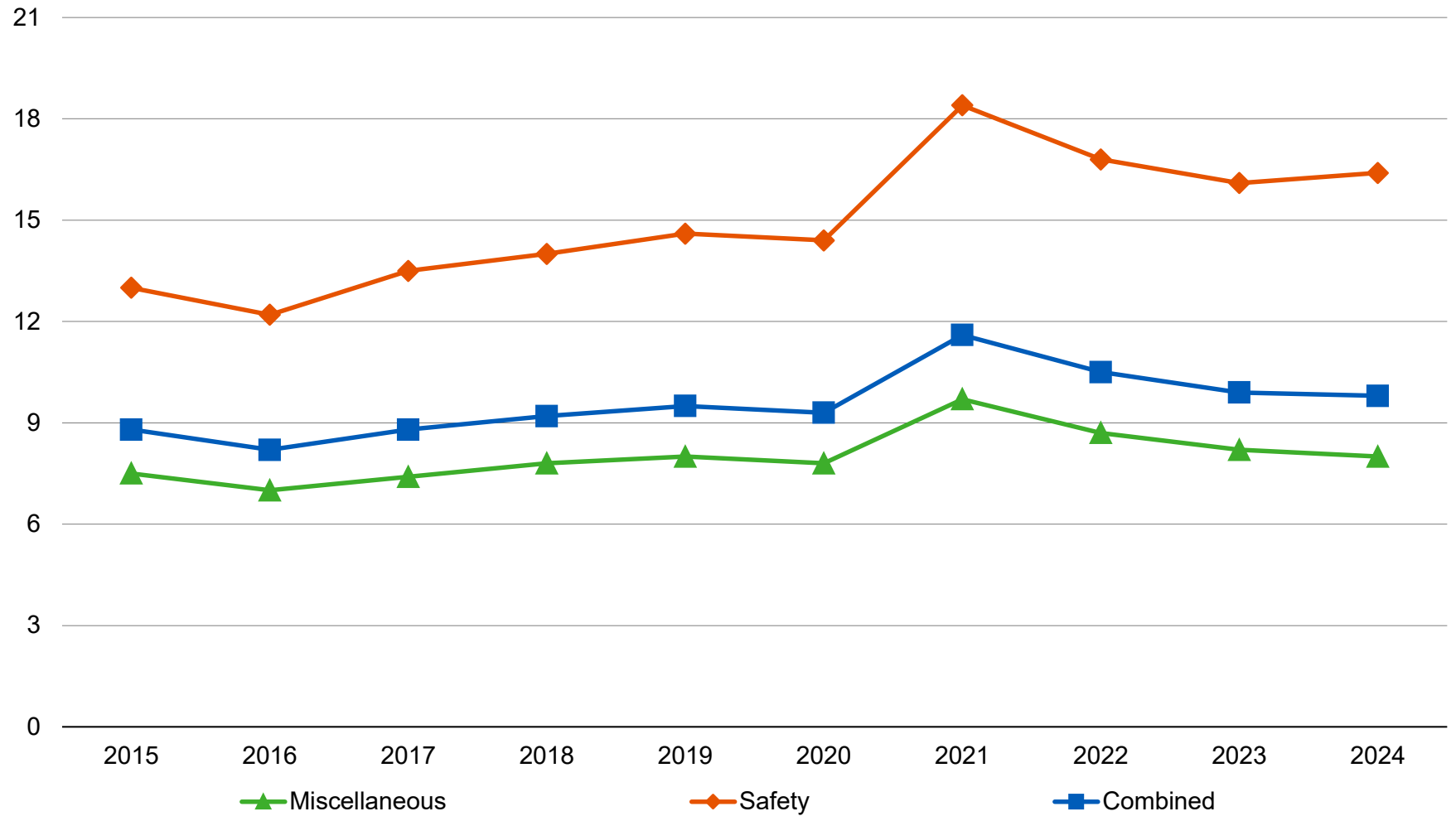
Reference page 30 of the Risk Assessment as of June 30, 2024.

Plan Maturity Measures: Headcount



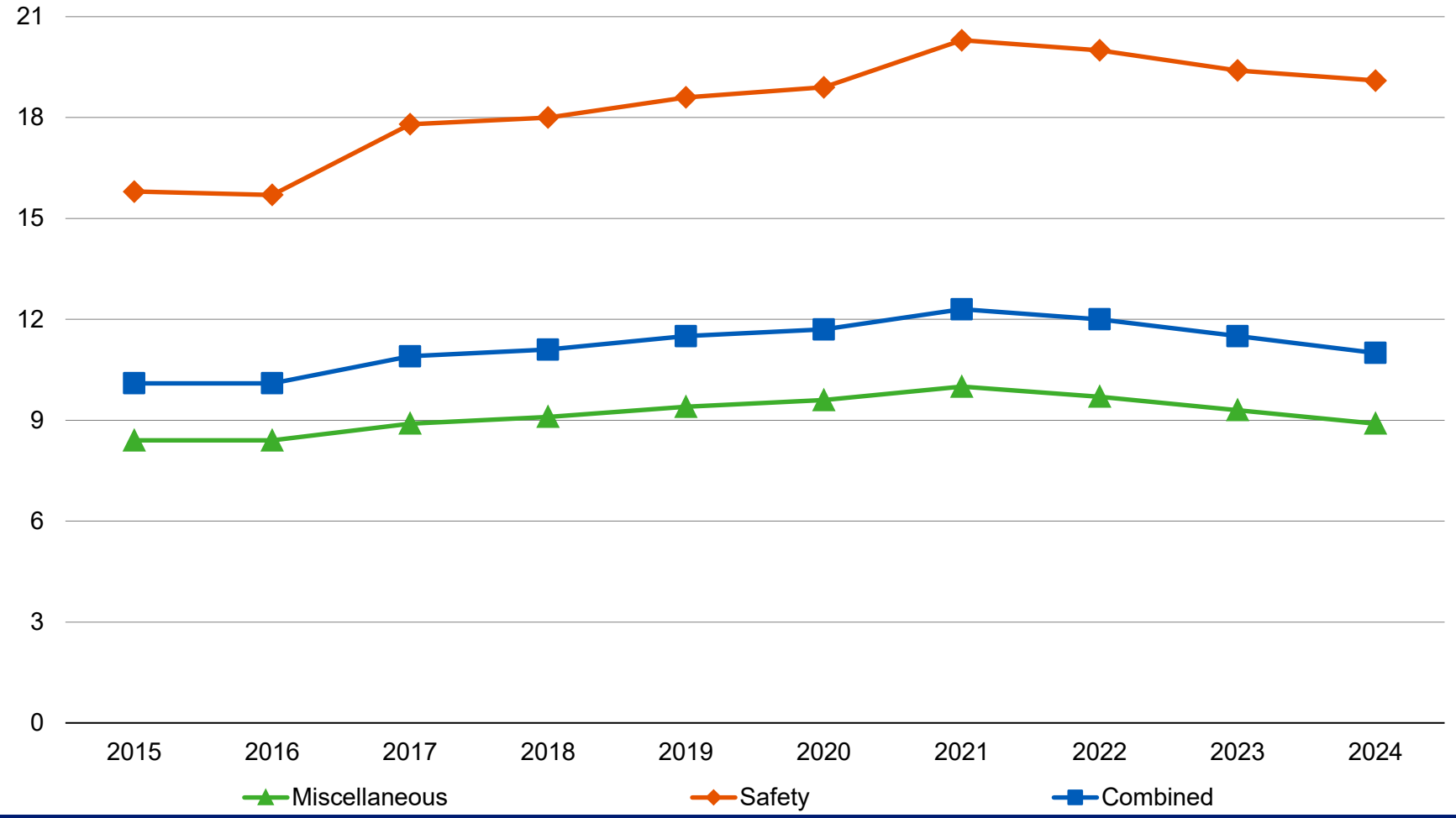
In the past 10 valuations, SCERS has become more mature, indicated by the general increase in the ratio of non-active to active members. This trend has stabilized in the last few years.

Plan Maturity Measures: Asset Volatility Ratio



SCERS' AVR was 9.8 as of June 30, 2024. This means that a 1% asset gain or loss in 2024/2025 (relative to the assumed investment return) would amount to 9.8% of one year's payroll.

Plan Maturity Measures: Liability Volatility Ratio



SCERS' LVR was 11.0 as of June 30, 2024, so a 1% liability gain or loss in 2024/2025 would amount to 11.0% of one year's payroll.

Looking Forward

- SCERS has an experience study scheduled for 2026
  - Will examine both economic and demographic assumptions
- Changes under AB 1383 are pending in the front of the Legislature. If implemented, there could be a cost impact for Miscellaneous and Safety members.
- There is opportunity to develop a more comprehensive Surplus Management Policy as we approach full funding.

Thank You

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