



Los Angeles City Employees' Retirement System

Risk Assessment

**Including Review of Funded Status of the
Retirement and Health Plans as of June 30, 2022**

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Table of Contents

Section 1: Introduction and Executive Summary.....	3
Introduction.....	3
Executive Summary.....	5
Section 2: Key Plan Risks on Funded Status, Unfunded Actuarial Accrued Liabilities, and Employer Contribution Rates.....	8
Evaluation of Historical Trends – Retirement and Health Plans.....	8
Assessment of Primary Risk Factors Going Forward	21
Plan Maturity Measures that Affect Primary Risks	33
Appendix: Actuarial Assumptions & Methods, Actuarial Certification, and Detailed Scenario Test Results	39
Actuarial Assumptions & Methods	39
Actuarial Certification.....	43
Detailed Scenario Test Results	44
Historical Funded Status, UAAL, and Employer Contribution Rates	53

Section 1: Introduction and Executive Summary

Introduction

The purpose of this report is to assist the Board of Administration,¹ participating employers and members and other stakeholders to better understand and assess the risk profile of the Los Angeles City Employees' Retirement System (LACERS), as well as the particular risks inherent in using a fixed set of actuarial assumptions in preparing the results in our June 30, 2022 funding valuations for LACERS.

The results included in our June 30, 2022 funding valuation reports for the Retirement and Health Plans were prepared based on a fixed set of economic and non-economic actuarial assumptions under the premise that future experience of LACERS 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 Administration for use starting with the June 30, 2020 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, 2022. Due to the COVID-19 pandemic, market conditions have changed significantly since the onset of the Public Health Emergency. 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. Moreover, this risk assessment does not include any possible short-term or long-term impacts on mortality of the covered population that may emerge after June 30, 2022. While it is impossible to determine how the pandemic will affect 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. In addition to the stochastic projections prepared for the next 20 years included in this report, 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 it was effective with LACERS' June 30, 2019 actuarial valuation for benefits

¹ This risk report has been prepared at the request of the Board of Administration to assist in administering the Fund. This risk report may not otherwise be copied or reproduced in any form without the consent of the Board of Administration and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this risk report may not be applicable for other purposes.

provided by the Retirement Plan.² 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 LACERS are asset/liability mismatch risk, investment risk, and longevity and other demographic risks. The Standard 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 particular 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 initial 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 in order to examine particular financial risks. When making that recommendation, the actuary will take into account 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 LACERS.

Plan Risk Assessment

In Section 2, we start by discussing some of the historical factors that have caused changes in LACERS’ 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. Even though we have not included a numerical analysis of all the risk factors, based on our discussions with LACERS we have illustrated 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 System’s portfolio coming in differently from the current 7.00% annual investment return assumption used in the June 30, 2022 valuations. We have also included a projection of future results based on a stochastic modeling of future investment returns for 2022/2023 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 for the range of potential outcomes.

The Standard also requires disclosure of plan maturity measures and other historical information that are significant to understanding the risks associated with the Retirement and Health Plans and this information is included in this report.

² ASOP 51 does not actually apply to actuaries performing services related to other post-employment benefits; however, as the same kind of information is useful for the administration of the Health Plan, after discussions with LACERS the System has requested Segal to include information on the Health Plan in this risk report.

Executive Summary

Historical Funded Status and Employer Contribution Rates

The following table provides a summary of financial changes to the Retirement and Health Plans over the last 10 valuations by showing the beginning and ending year results over that period. The full set of results for each of the 10 years is provided in *Appendix D*.

The unfunded actuarial accrued liability (UAAL)³ and contribution rates⁴ increased primarily as a result of the strengthening of the actuarial assumptions used in preparing the valuations and unfavorable investment experience that were offset to some degree by favorable non-investment experience.

Valuation Date	Market Value Basis		Valuation Value Basis		Aggregate Employer Contribution Rate (% of Payroll – Contributions Received on July 15)
	Funded Status	UAAL	Funded Status	UAAL	
June 30, 2013	68.7%	\$5.4B	69.1%	\$5.3B	26.56%
June 30, 2022	73.6%	\$7.3B	76.4%	\$6.5B	33.36%

Future Funded Status and Employer Contribution Rates

In this report, we highlight key factors that may affect the financial profile of the Plans 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 unfavorable and favorable future market experience so that the impact of market performance can be better understood.

³ For example, the UAAL increased by \$920.7 million in the June 30, 2014 valuations, \$461.9 million in the June 30, 2017 valuations, \$593.6 million in the June 30, 2018 valuations, and \$626.6 million in the June 30, 2020 valuations (for a total of \$2.6B), as a result of the assumptions adopted by the Board following the economic assumptions study and the experience studies over the last ten years.

⁴ For example, the increase in the employer's total rate (normal cost plus UAAL) was 3.20% in the June 30, 2014 valuations, 2.03% in the June 30, 2017 valuations, 2.09% in the June 30, 2018 valuations, and 3.94% in the June 30, 2020 valuations (for a total of 11.26%), as a result of the assumptions adopted by the Board following the economic assumptions study and the experience studies over the last ten years.

The total (aggregate) employer contribution rate is 33.36% of total payroll in the June 30, 2022 valuations. Using a deterministic projection, this report shows the effect of either unfavorable (0.00%) or favorable (14.00%) hypothetical market returns for 2022/2023 on key valuation results. In particular, the changes in the total employer contribution rate (relative to the June 30, 2022 valuations aggregate employer contribution rate of 33.36%) in the June 30, 2023 valuations and in the June 30, 2029 valuations (when all the investment gains or losses are fully recognized at the end of the seven-year asset smoothing period) are as shown in the following table:⁵

Employer Contribution Rate Change			
Valuation Date	2022/2023 Single Plan-Year Investment Return		
	0.00%	7.00% (Baseline)	14.00%
June 30, 2023	1.0% of payroll	0.2% of payroll	-0.5% of payroll
June 30, 2029	7.8% of payroll	1.5% of payroll	-4.7% of payroll

Under the hypothetical market return scenarios we have studied, the Retirement Plan is projected to reach full funding by around 2042 under Scenarios 1, 2 and 3, and the Health Plan is projected to reach full funding by around 2043 under Scenarios 1 and 2 or as soon as 2027 under Scenario 3. Note that under each of the hypothetical market return scenarios for 2022/2023, the total employer normal cost contribution rate would be expected to approach about 9.7% of payroll when both of the Retirement and Health Plans reach full funding.

Using a stochastic projection that models market return over the next 20 years by using expected return, standard deviation and other information about LACERS' asset portfolio,⁶ there is a 50% chance that the employer contribution rates would be between 0% and 53% of payroll at the end of 10 years and between 0% and 32% of payroll at the end of 20 years. Furthermore, there is a 34% chance LACERS would be fully funded at the end of 10 years and a 59% chance LACERS would be fully funded at the end of 20 years.

Plan Maturity Measures

During the past 10 valuations, the Plans have 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, Charts 12a and 12b* on pages 35 and 36) and by an increase in the ratios of plan assets and liabilities to active member payroll (as shown in *Section 2, Charts 13a and 13b* on pages 37 and 38). We expect these trends to continue going forward. This is significant for understanding

⁵ Assuming no further assumption changes, method changes or experience that differs significantly from assumptions.

⁶ For the stochastic modeling, we have used the allocation that we understand was approved by the Board in September 2021, as provided by LACERS, and which represents the long term targets expected to be achieved by July 1, 2025, together with updated expected return, standard deviation, and other information as outlined in the Appendix. 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 41.

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 and active members would have to be amortized and funded over the payroll of the relatively smaller group of only active members. Put another way, as a plan grows more mature, its contribution rate becomes more sensitive to investment volatility and liability changes. As the Plans continue to mature with time, its risk profile will continue to evolve in this way and contributions will grow more sensitive to plan experience.

Section 2: Key Plan Risks on Funded Status, Unfunded Actuarial Accrued Liabilities, and Employer Contribution Rates

Evaluation of Historical Trends – Retirement and Health Plans

Funded Status and UAAL

One common measure of LACERS' financial status is the funded ratio. This ratio compares the valuation⁷ and market value of assets to the actuarial accrued liabilities (AAL)⁸ of LACERS. After accounting for contributions made at the Actuarially Determined Contribution (ADC) amount, the overall level of funding of LACERS has remained relatively level as a result of favorable non-investment and investment experience, offset by the strengthening of the actuarial assumptions. The funded ratios and UAAL are provided separately for the Retirement and Health Plans for the past 10 valuations from June 30, 2013 to 2022 measured using both valuation and market value of assets in *Charts 1a* and *1b*, respectively.

The factors that caused the changes in the UAAL for the past 10 valuations from June 30, 2013 to 2022 are provided separately for the Retirement and Health Plans in *Charts 2a* and *2c*, respectively.⁹ The results in *Charts 2a* and *2c* show that the reductions in the investment return assumption in the June 30, 2014, 2017, and 2020¹⁰ 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, 2014, 2018, and 2020¹⁰ valuations, have had the most impact on the UAAL for LACERS.¹¹

⁷ The valuation value of assets is the portion of the total actuarial value of assets allocated for the Retirement and Health Plans. The actuarial value of assets is equal to the market value of assets less unrecognized returns in each of the last seven years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized over a seven-year period.

⁸ For the actives, the actuarial accrued liability is the value of the accumulated normal costs allocated to the years before the valuation date. For the pensioners, beneficiaries and inactive vested members, the actuarial accrued liability is the single-sum present value of the lifetime benefit expected to be paid to those members.

⁹ For the Health Plan, *Chart 2c* shows changes only for the past nine valuations, from June 30, 2014 to 2022, because detailed information regarding the change in UAAL is not readily available in Segal's valuation report for June 30, 2013.

¹⁰ The Board has a practice of reviewing the investment return and other actuarial assumptions at the same time in the triennial experience study. However, the full (economic and demographic) 2017 experience study was delayed one year to 2018 to allow more time for Segal to study and the Board to discuss and approve the assumptions, and a 2017 study of only the economic assumptions was completed as part of the June 30, 2017 valuations.

¹¹ For example, for the Retirement and Health Plans combined, the UAAL increased \$920.7 million in the June 30, 2014 valuations, \$461.9 million in the June 30, 2017 valuations, \$593.6 million in the June 30, 2018 valuations, and \$626.6 million in the June 30, 2020 valuations (for a total of \$2.6B), as a result of the assumptions adopted by the Board following the economic assumptions study and the experience studies over the last ten years.

For the Retirement Plan, *Chart 2a* shows favorable non-investment experience, which included lower than expected COLAs granted to retirees and beneficiaries, and lower than expected salary increases for continuing actives. For the Health Plan, *Chart 2c* also shows favorable non-investment experience, which included premiums and medical subsidies lower than projected. The non-investment experience for both plans also included the scheduled 12-month delay in implementing the contribution rates determined in the annual valuation.

Finally, *Charts 2a* and *2c* show some “negative amortization” due to the initial 30-year amortization of the combined base established June 30, 2012. The negative amortization from the combined base for both the Pension Plan and the Health Plan is not expected to continue after June 30, 2022. Current assumptions and amortization policy generally will not entail negative amortization for any new UAAL identified in the future. For the Health Plan, there was some additional “negative amortization” in past years through the operation of the amortization policy. Reductions in UAAL from favorable premium renewal and other experience gains were amortized over 15 years while increases in UAAL through assumption changes were amortized over 20 years. However, as part of the June 30, 2022 valuation, LACERS lined up the amortization periods for the recent experience gains and had them amortized over the same 20-year period used to amortize the total pre-June 30, 2021 bases.

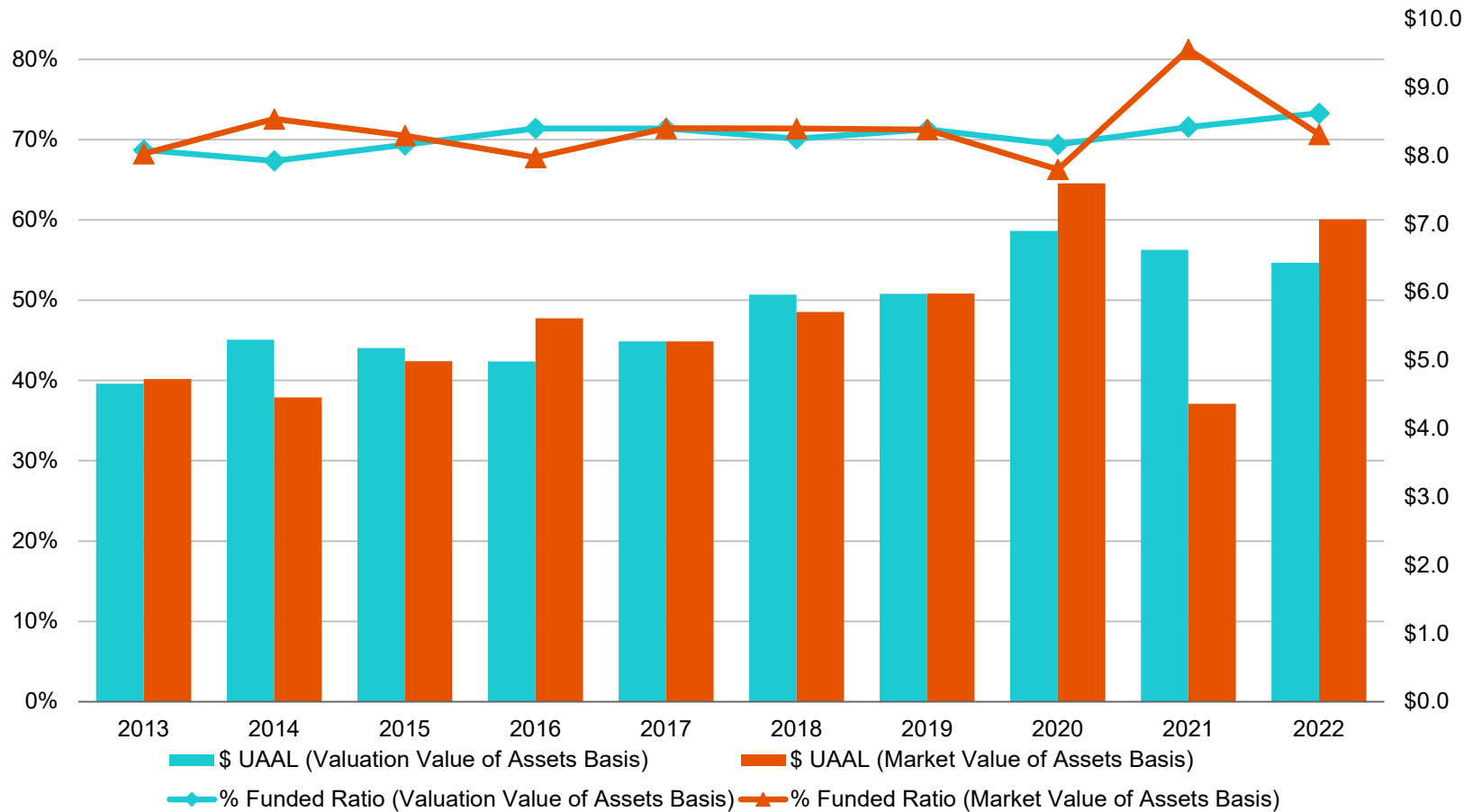
Charts 2b and 2d display the aggregate changes in unfunded liability by source over the last ten years for the Retirement Plan and over the last nine years for the Health Plan.¹² In particular, it shows the substantial effort made by LACERS in strengthening actuarial assumptions in a challenging economic and demographic environment.

It is important to note that LACERS has strengthened the assumptions over time, particularly lowering the expected investment rate of return, utilizing a generational mortality assumption, and adopting a funding policy that controls future negative amortization. These 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 are essential for LACERS’ fiscal health going forward.

¹² For the Health Plan, Chart 2d shows aggregate changes only for the past nine valuations, from June 30, 2014 to 2022, because detailed information regarding the change in UAAL is not readily available in Segal’s valuation report for June 30, 2013.

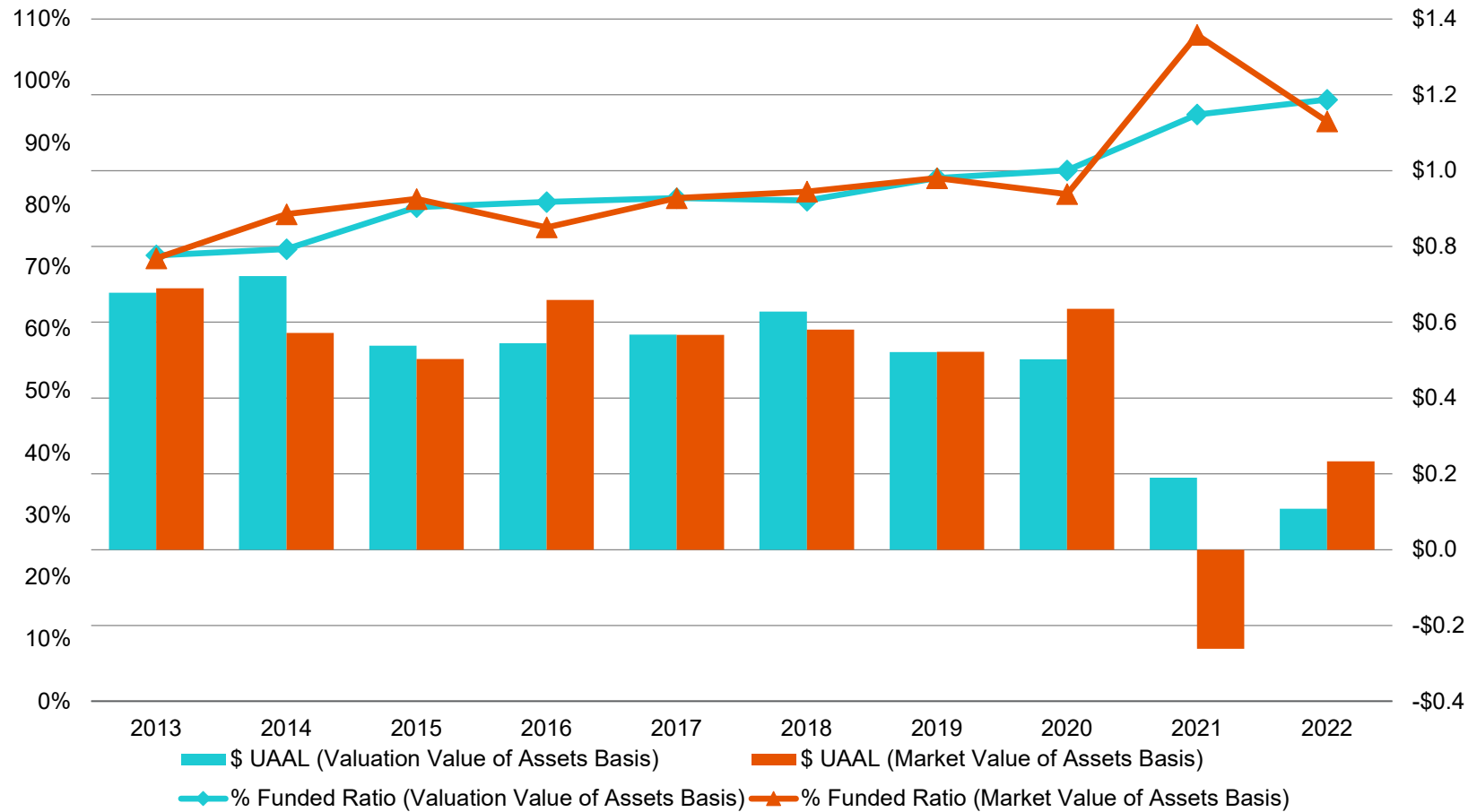
RETIREMENT PLAN

Funded Ratio (Percentages) and Dollar UAAL (\$ Billions)
in June 30, 2013 to 2022 Valuations



HEALTH PLAN

Funded Ratio (Percentages) and Dollar UAAL (\$ Billions)
in June 30, 2013 to 2022 Valuations



RETIREMENT PLAN

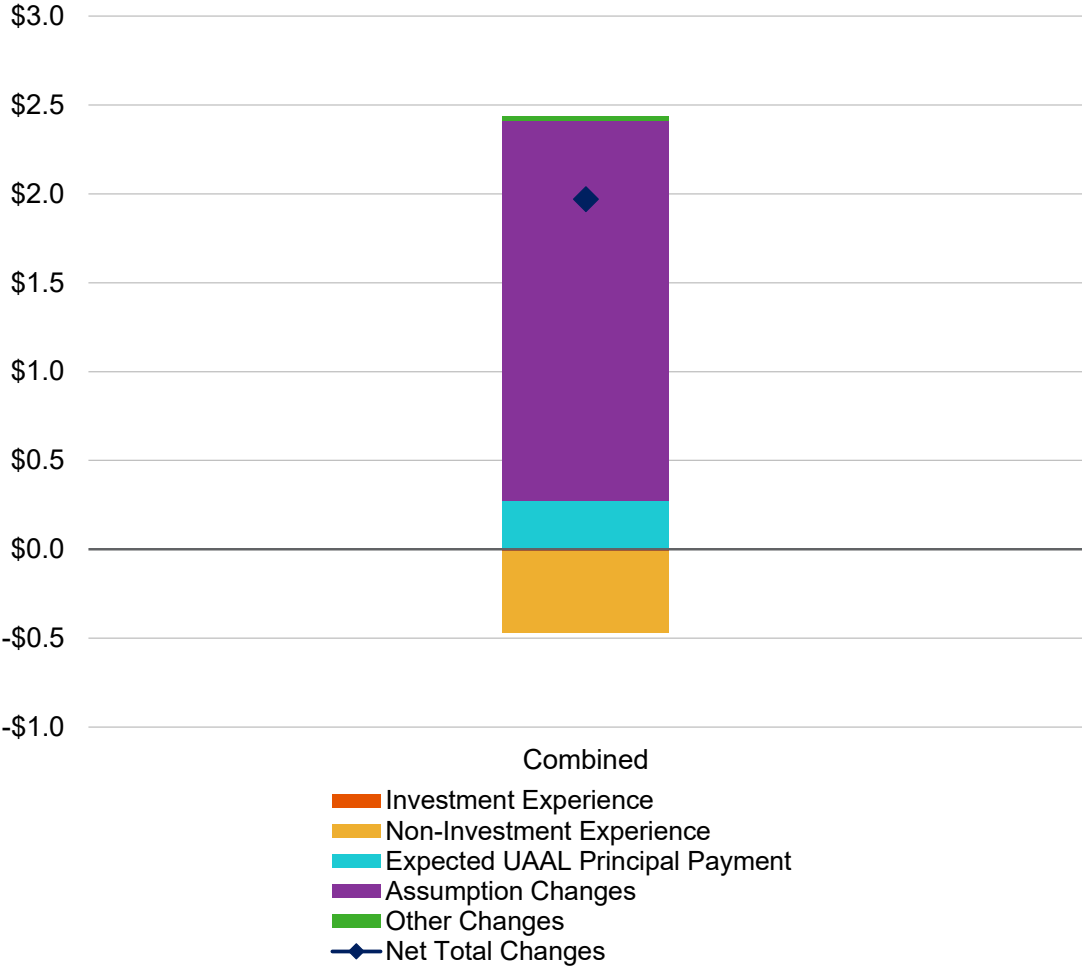
Factors that Changed UAAL in June 30, 2013 to 2022 Valuations (\$ Billions)



Note: The primary source of investment losses starting in the June 30, 2009 valuation is the Great Recession, which was recognized in the valuation value of assets over several years.

RETIREMENT PLAN

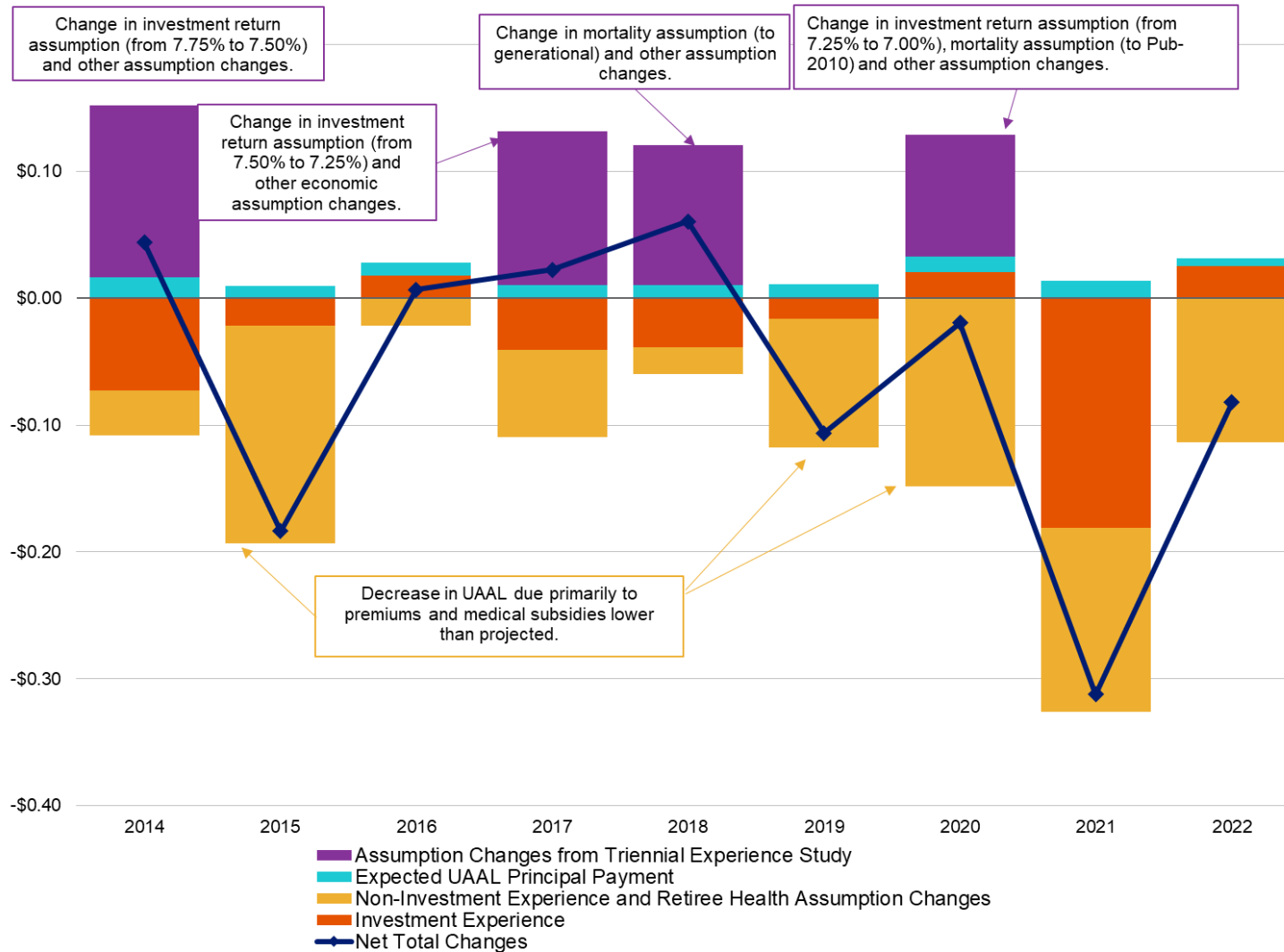
Factors that Changed UAAL in June 30, 2013 to 2022 Valuations (\$ Billions)



Note: This summation of UAAL changes by source does not account for the timing of when they occurred nor any resulting compounding effects.

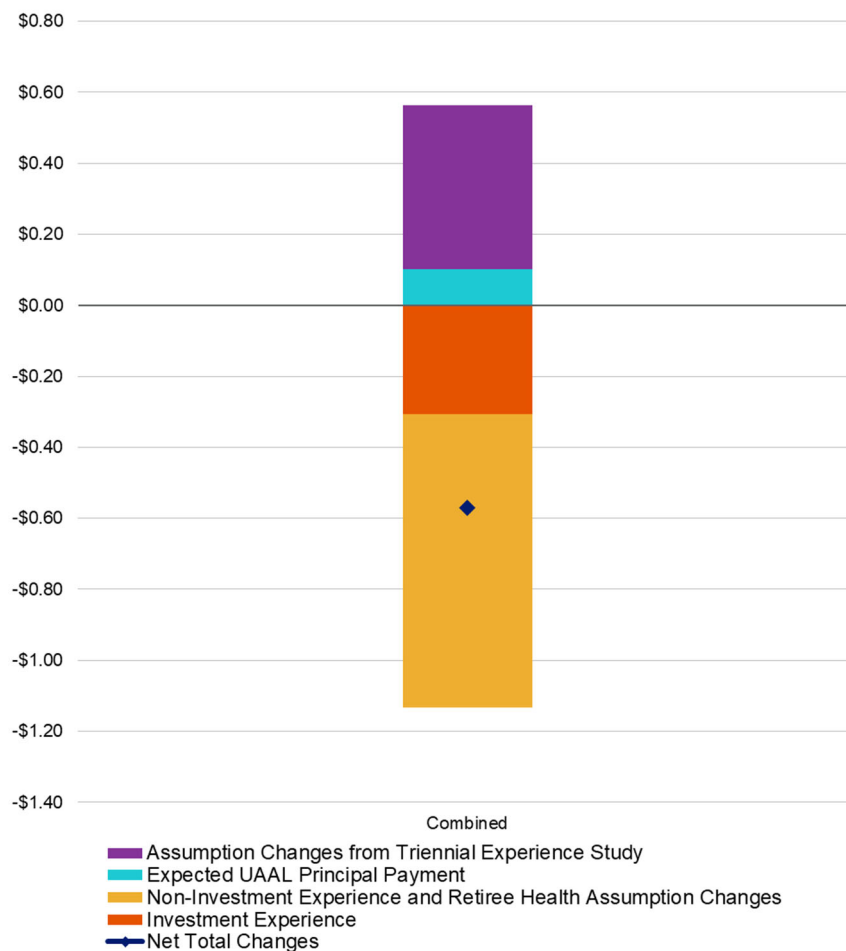
HEALTH PLAN

Factors that Changed UAAL in June 30, 2014 to 2022 Valuations (\$ Billions)



HEALTH PLAN

Factors that Changed UAAL in June 30, 2014 to 2022 Valuations
(\$ Billions)



Note: This summation of UAAL changes by source does not account for the timing of when they occurred nor any resulting compounding effects.

Employer Contribution Rates

The total (normal cost¹³ plus UAAL payment) employer contribution rates determined in the June 30, 2013 to 2022 valuations for the Retirement and Health Plans are provided in *Charts 3a* and *3b*, respectively, and the factors that caused the changes in the total aggregate employer rates¹⁴ for the Retirement and Health Plans are provided in *Charts 4a* and *4b*, respectively.

The aggregate employer normal cost rates for the Retirement and Health Plans as shown in *Charts 3a* and *3b* have stayed relatively flat since the June 30, 2013 valuation. For the Retirement Plan, the UAAL rate generally increased between the June 30, 2013 and the June 30, 2022 valuations primarily due to changes in actuarial assumptions. While there have also been increases in the normal cost rates due to the changes in the actuarial assumptions, those increases were offset to some degree by the plan changes – with the introduction of Tier 3 – as new members have been enrolled in the lower cost benefit tier since February 21, 2016. Furthermore, beginning with the June 30, 2012 valuation, an additional employee contribution (either 2% or 4%, becoming 4% for all affected employees effective January 1, 2013) was implemented by the City for certain bargaining groups and for all non-represented employees.¹⁵ For the Health Plan, the UAAL rate generally decreased between the June 30, 2013 and the June 30, 2022 valuations. The primary sources of the decrease include health related assumption changes and other actuarial experience (primarily medical premiums and subsidies lower than projected).

For the Retirement Plan, *Chart 4a* shows that the changes in the expected investment return, mortality tables and other assumptions have had the most impact on increasing the UAAL contribution rates¹⁶ for the City. Favorable non-investment experience has partially offset the contribution rate increases during 2013 to 2020.

For the Health Plan, *Chart 4b* shows that the non-investment experience¹⁷ (primarily medical premiums and subsidies lower than projected) has had the most impact on decreasing the UAAL contribution rates¹⁶ for the City, offset somewhat from changes in the expected investment return, mortality tables and other assumptions.

¹³ The normal cost is the amount of contributions required to fund the portion of the level cost of the member's projected retirement and health benefits that is allocated to the current year of service.

¹⁴ There are separate contribution rates determined in the valuation for Tier 1 and Tier 3 (previously Tier 2, through the June 30, 2015 valuation). The aggregate contribution rates have been calculated based on an average of those rates weighted by the payrolls of the active members reported in those valuations.

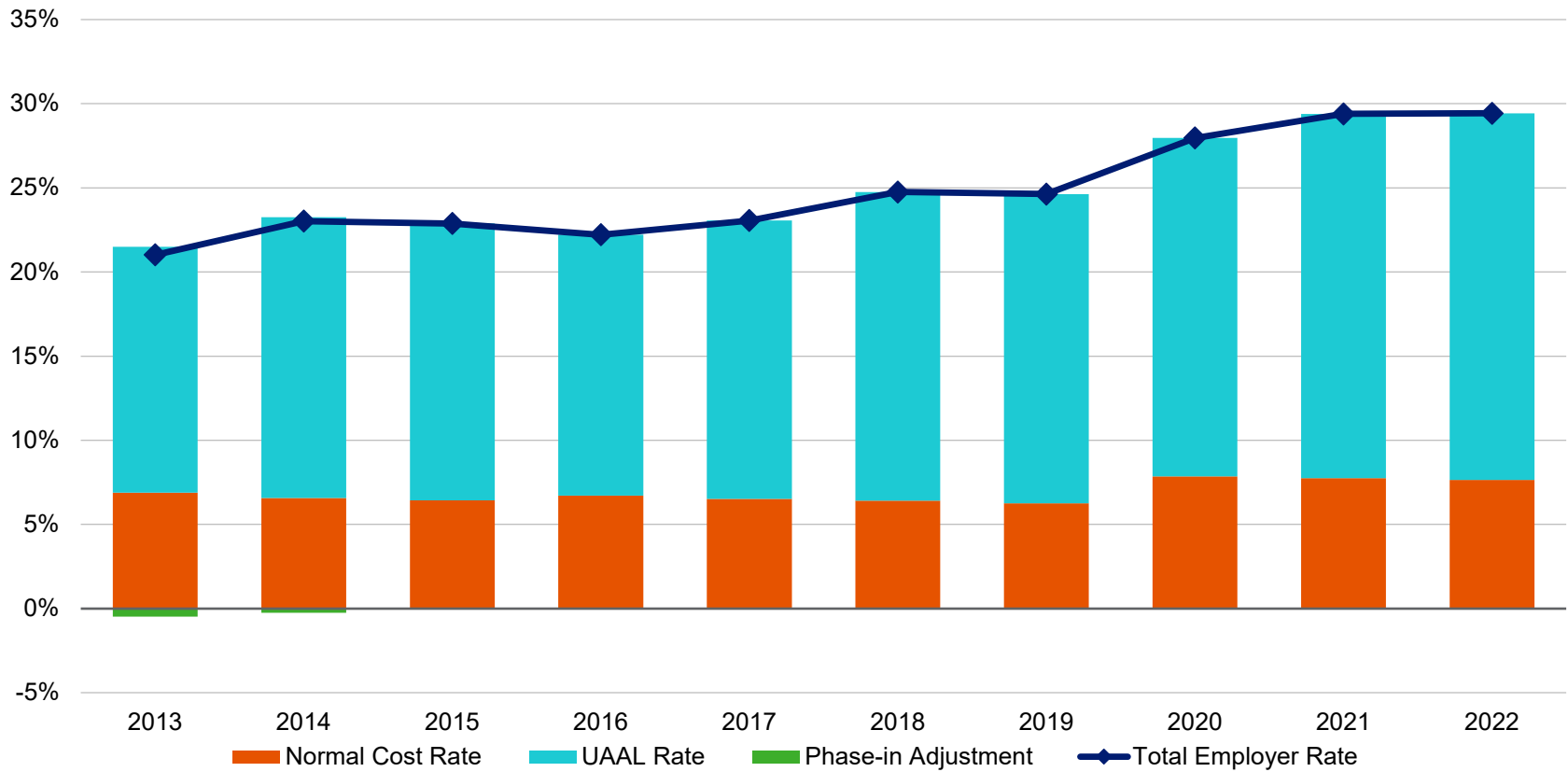
¹⁵ As of the June 30, 2012 valuation, roughly 95% of active members were required to pay an additional member contribution rate. By the June 30, 2020 valuation, all active members were paying an additional member contribution rate (which was increased to 4.5% for less than 1% of active members).

¹⁶ For example, for the Retirement and Health Plans combined, the increase in the employer's total rate (normal cost plus UAAL) was 3.20% in the June 30, 2014 valuations, 2.03% in the June 30, 2017 valuations, 2.09% in the June 30, 2018 valuations, and 3.94% in the June 30, 2020 valuations (for a total of 11.26%), as a result of the assumptions adopted by the Board following the economic assumptions study and the experience studies over the last ten years.

¹⁷ Includes the impact of the annual review and adjustment of the medical trend assumptions.

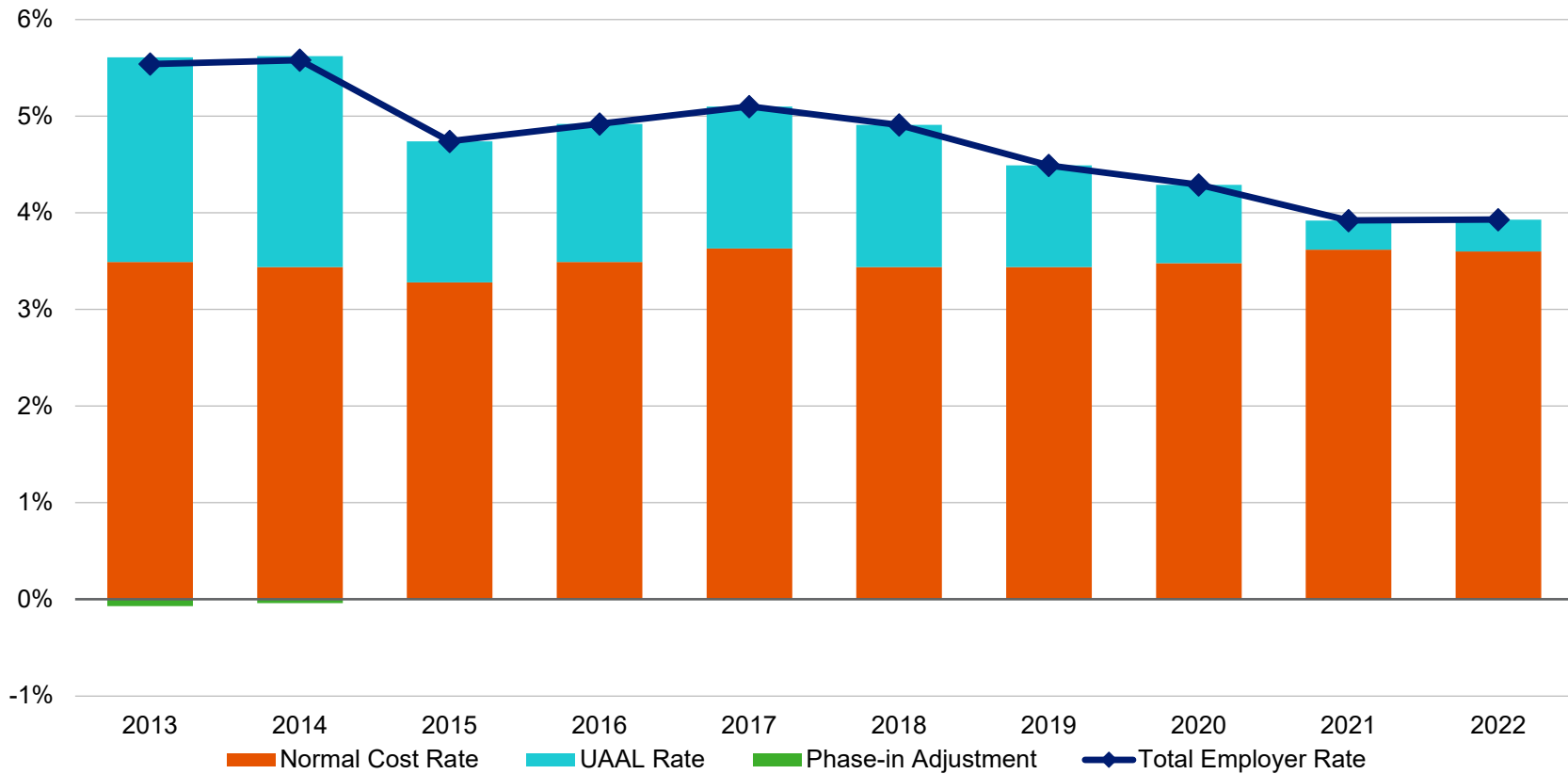
RETIREMENT PLAN

Employer Contribution Rates in June 30, 2013 to 2022 Valuations
(% of Payroll – Contributions Received on July 15)



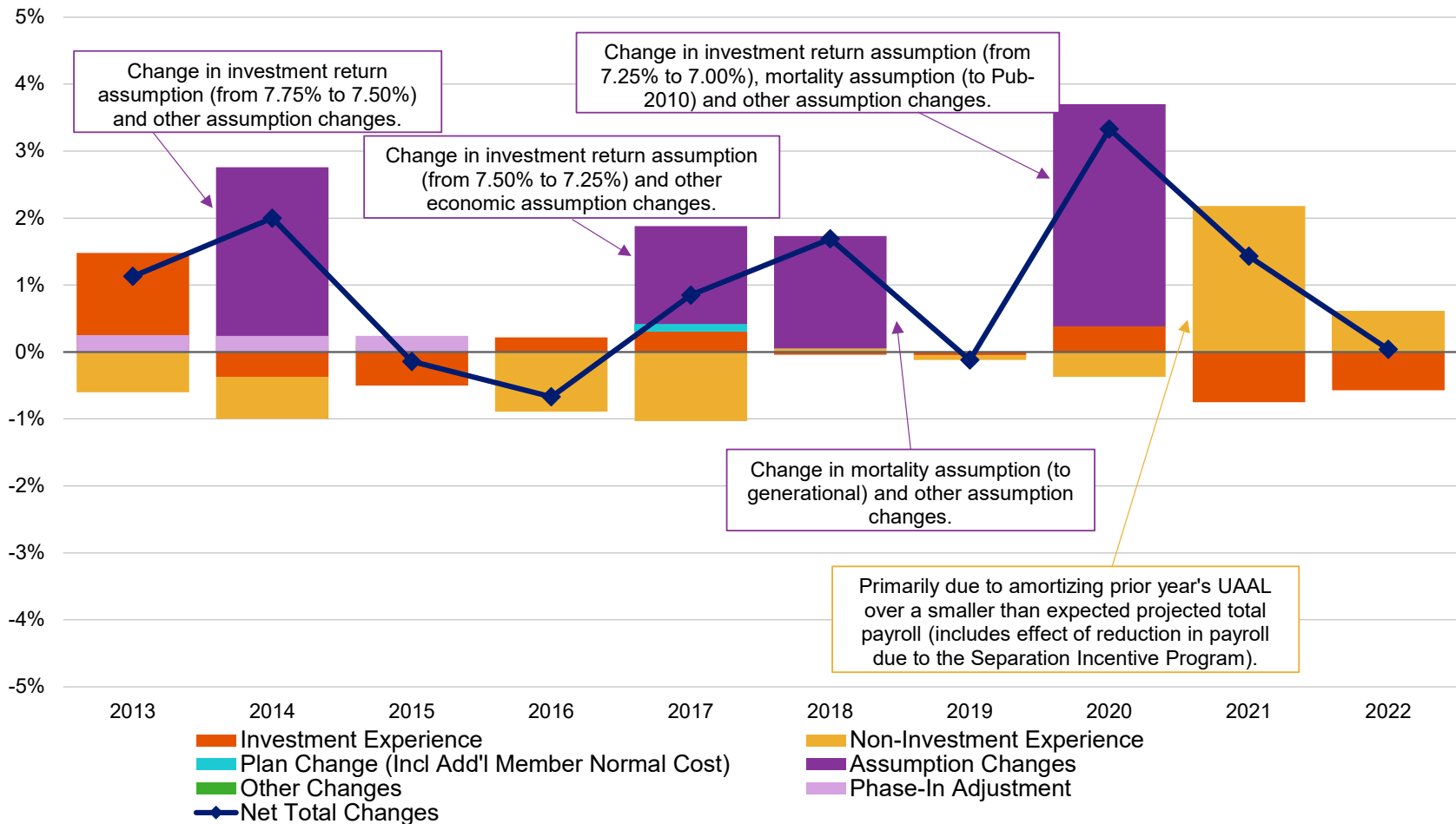
HEALTH PLAN

Employer Contribution Rates in June 30, 2013 to 2022 Valuations
(% of Payroll – Contributions Received on July 15)



RETIREMENT PLAN

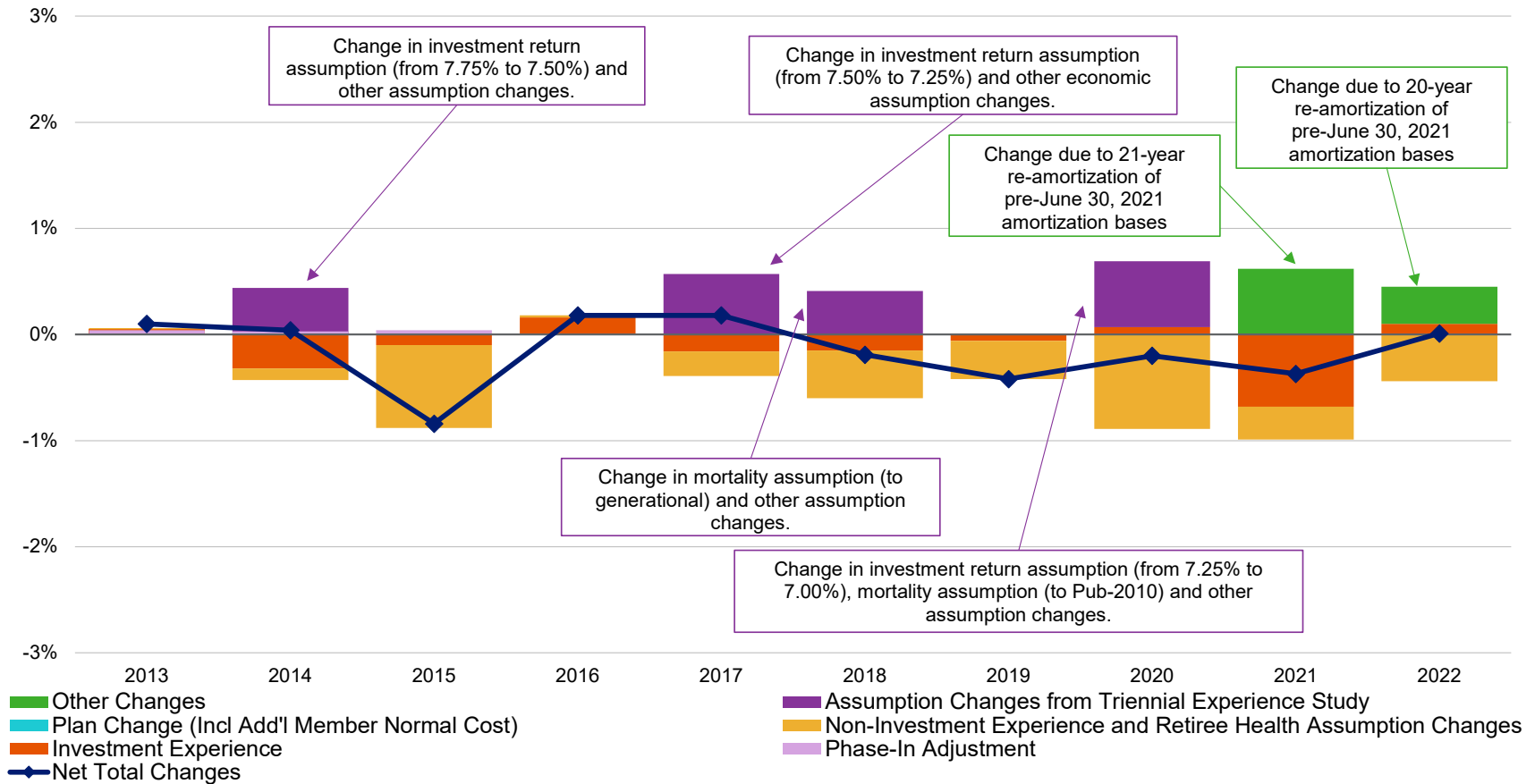
Factors that Affected Employer Contribution Rates
in June 30, 2013 to 2022 Valuations
(% of Payroll – Contributions Received on July 15)



Note: The primary source of investment losses starting in the June 30, 2009 valuation is the Great Recession, which was recognized in the valuation value of assets over several years.

HEALTH PLAN

Factors that Affected Employer Contribution Rates
in June 30, 2013 to 2022 Valuations
(% of Payroll – Contributions Received on July 15)



Assessment of Primary Risk Factors Going Forward

As discussed in the Evaluation of Historical Trends section, in the 2013 to 2022 valuations the funded ratios and the employer contribution rates have changed mainly as a result of changes in actuarial assumptions, investment experience, and non-investment experience.

In general, we anticipate the following risk factors to have an ongoing influence on those financial 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 LACERS 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 essentially 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 the experience of the asset values.

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 City the effect of unfavorable or favorable actuarial experience on the assets and the liabilities of LACERS.

- Investment risk – the potential that future market returns will be different from the current expected 7.00% annual return assumption.

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 and stochastic projections later in this section so that LACERS can better understand the risk associated with earning either less or more than the assumed rate.

The Board has a policy of reviewing the investment return and the other actuarial assumptions generally every three years, the next triennial experience study (recommending assumptions for the June 30, 2023 actuarial valuations) is scheduled to be performed in the first half of 2023.

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

For the Retirement Plan, the change in the merit and promotion salary increase assumption was the most significant change to the non-economic assumptions in the last experience study conducted before the June 30, 2020 valuation. As can be observed from *Charts 2a, 2c, 4a, and 4b*, there had been relatively small unfavorable impact on the UAAL and employer contribution rates due to non-investment related experience relative to the assumptions 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 particular 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 and impact of actual contributions deviating from expected in the future. The City has a well-established practice of making the ADC determined in the annual actuarial valuations, based on the Board of Administration's Actuarial Funding Policy. As a result, in practice LACERS has essentially no contribution risk.

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

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

Note that other events that could affect costs going forward, such as future plan changes, are not included herein.

Scenario Tests: Deterministic Projections

Because the funded ratio, UAAL and the employer contribution rates have fluctuated as a result of deviation in investment experience in the last 10 valuations, we have examined the risk for LACERS associated with earning either lower or higher than the assumed rate of 7.00% in future valuations using projections under a deterministic approach.

To measure such risk, we have included scenario tests to study the change in the UAAL and contribution rates if LACERS were to earn a market return lower or higher than 7.00% in the next year following the June 30, 2022 valuations. In *Charts 5, 6 and 7*, we show the aggregate employer contribution rates, funded ratios, and UAAL respectively assuming that the System’s portfolio market return in 2022/2023 will be as follows:

- Scenario 1: 0.00%
- Scenario 2: 7.00% (baseline)
- Scenario 3: 14.00%.

In the past, LACERS allowed us to assist the City in their budgeting process by providing a 6-year illustration of the financial position of LACERS assuming the System was to earn the assumed rate of investment return in all future years. The detailed employer contribution rates, funded ratios and UAAL developed for each of the Retirement and Health Plans, and in total, are provided in *Appendix C* of this report for this reason.

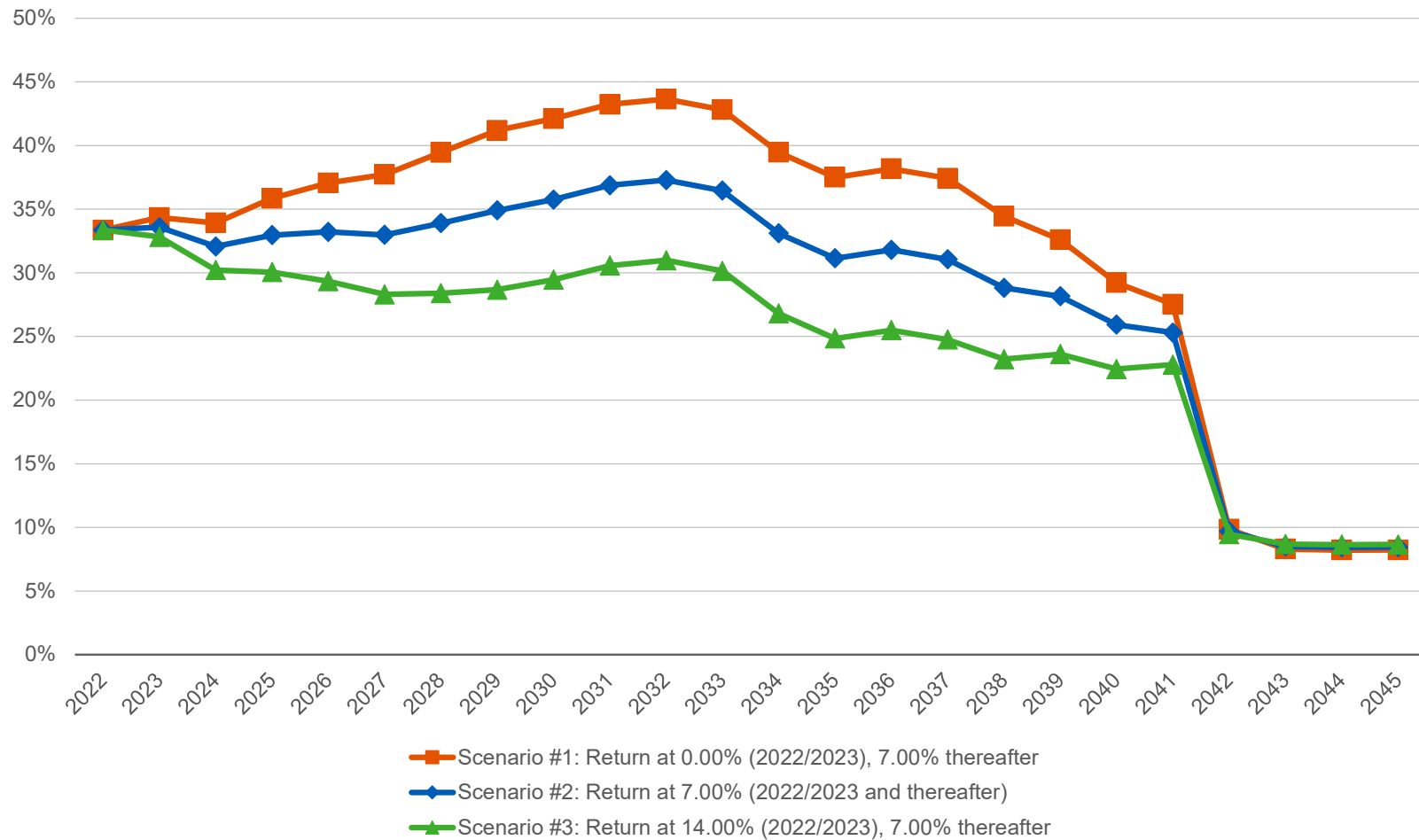
The following table summarizes for the Retirement and Health Plans the resulting aggregate contribution changes (relative to the June 30, 2022 valuations aggregate employer contribution rate of 33.36%) in the next valuations (i.e., June 30, 2023) as well as in the June 30, 2029 valuations when all of the investment gains and losses are fully recognized in the (smoothed) actuarial value of assets.

Employer Contribution Rate Change			
Valuation Date	2022/2023 Single Plan-Year Investment Return		
	0.00%	7.00% (Baseline)	14.00%
June 30, 2023	1.0% of payroll	0.2% of payroll	-0.5% of payroll
June 30, 2029	7.8% of payroll	1.5% of payroll	-4.7% of payroll

Under the hypothetical market return scenarios we have studied, the Retirement Plan is projected to reach full funding by around 2042 under Scenarios 1, 2 and 3, and the Health Plan is projected to reach full funding by around 2043 under Scenarios 1 and 2 or as soon as 2027 under Scenario 3. Note that under each of the hypothetical market return scenarios for 2022/2023, the total employer normal cost contribution rate would be expected to approach about 9.70% of payroll when both of the Retirement and Health Plans reach full funding.

While we have not assigned a probability on the 2022/2023 market return coming in at these rates, the Board and other stakeholders monitoring LACERS can interpolate between these scenarios to estimate the funded status and employer contribution rates for the June 30, 2023 and next several valuations as the actual investment experience for the 2022/2023 year becomes available throughout the year. Additionally, comparable experience in upcoming future years is likely to have a similar impact on the System absent any significant plan or assumption changes.

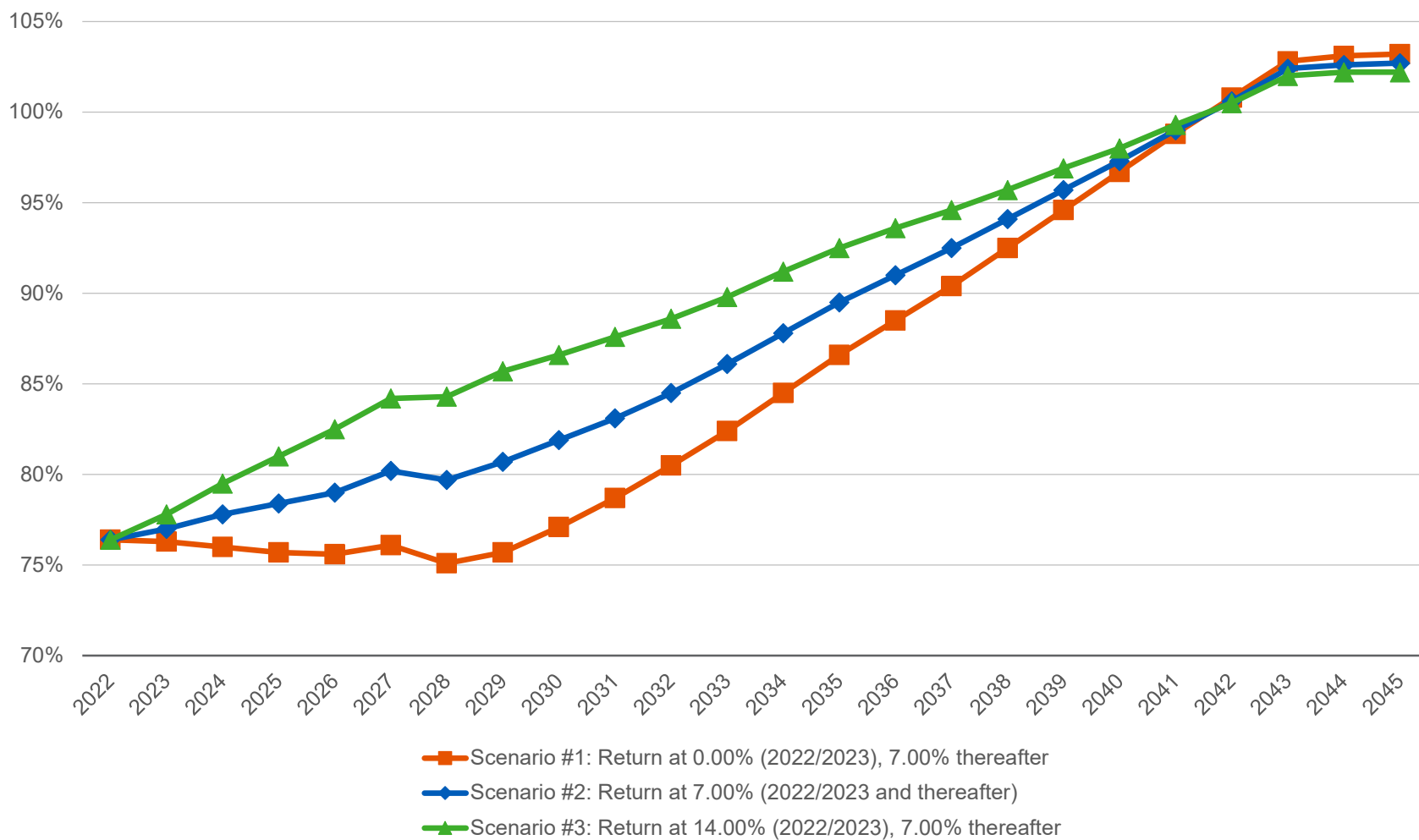
RETIREMENT AND HEALTH PLANS
 Projected Employer Contribution Rates
 Under Three Hypothetical Market Return Scenarios for 2022/2023
 (% of Payroll – Contributions Received on July 15)



Note: The total employer normal cost contribution rate would be expected to approach about 9.7% of payroll when both of the Retirement and Health Plans reach full funding.

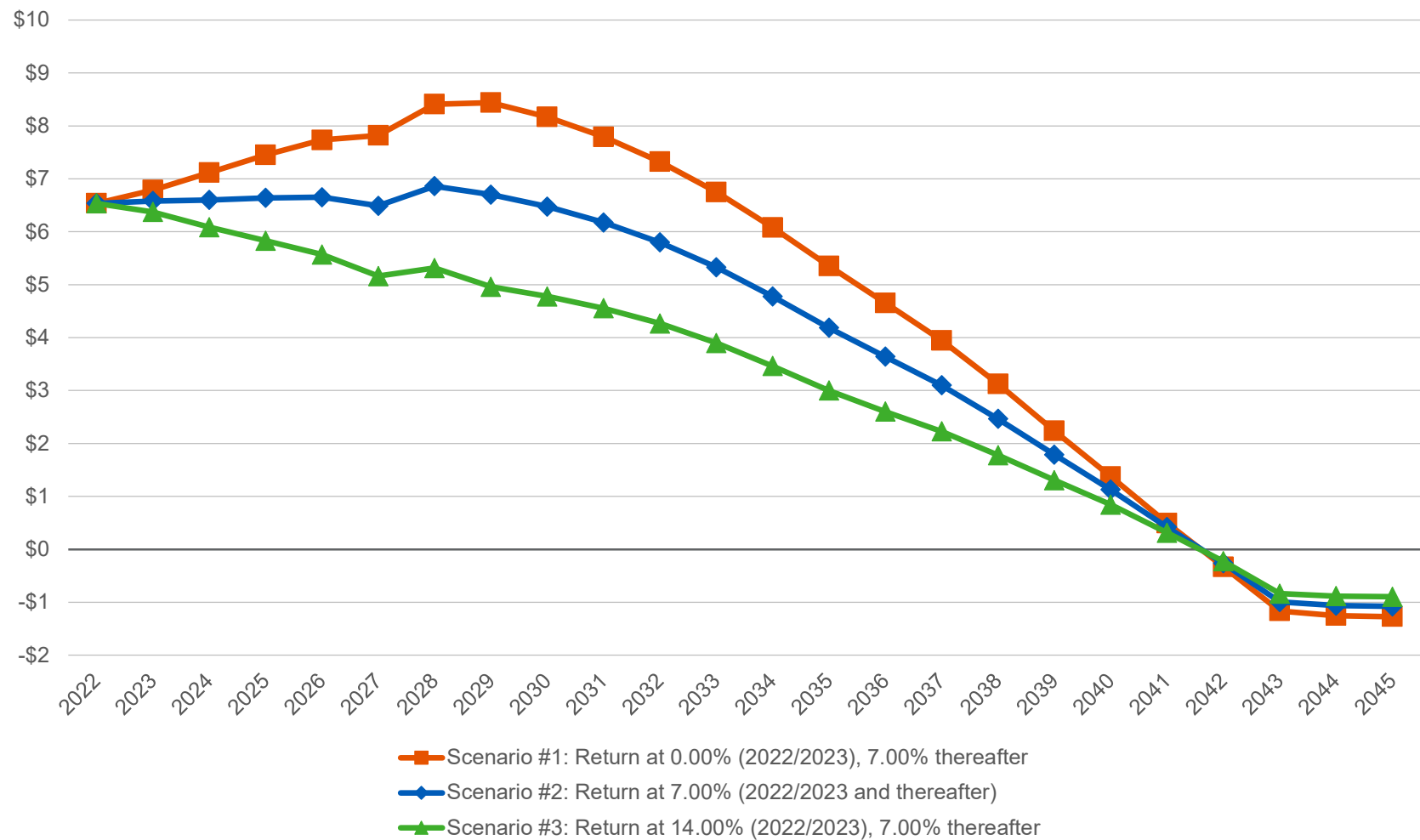
RETIREMENT AND HEALTH PLANS

Projected Funded Ratios (on Valuation Value of Assets)
Under Three Hypothetical Market Return Scenarios for 2022/2023



RETIREMENT AND HEALTH PLANS

Projected UAAL (on Valuation Value of Assets)
Under Three Hypothetical Market Return Scenarios for 2022/2023
(\$ Billions)



Stochastic Projection

Based on our discussions with LACERS, we have also been directed to supplement the deterministic scenario tests with a stochastic 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, 2022 valuations. We have performed the stochastic modeling of future market returns using the expected return, standard deviation and other information about LACERS' asset portfolio¹⁸ as provided in the Appendix 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 LACERS' 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 *Charts 10 and 11*, respectively. The results in *Charts 9 – 11* are for the Retirement and Health Plans combined.

At the end of 20 years, there is a 50% chance¹⁹ that the annual return of LACERS' investment portfolio would average between 5.5% and 9.6%, the funded ratio would be between 85% and 147% and the corresponding UAAL would be between \$6.1 billion and a surplus (or a negative UAAL) of \$19.5 billion.

On an Actuarial (smoothed) Value of Assets basis, the funded ratio for the Retirement and Health Plans combined is about 76.4% as of the June 30, 2022 valuation compared to 74.6% as of the June 30, 2021 valuation. There is a 34% chance LACERS would be fully funded at the end of 10 years and a 59% chance LACERS would be fully funded at the end of 20 years. The probabilities that the funded ratio would fall below 70%, 60% or 50% at any point in the next 20 years as projected in the current analysis as of June 30, 2022 and the prior analysis as of June 30, 2021 are as follows:

	Funded Ratio		
	Below 70%	Below 60%	Below 50%
Current (6/30/2022) Analysis Probability	40%	18%	5%
Prior (6/30/2021) Analysis Probability	27%	12%	3%

The probabilities of a drop in funded ratio are higher under the current analysis than under the prior analysis. This is due to net unrecognized investment losses of 3.7% of the market value of assets in the June 30, 2022 valuation compared to

¹⁸For the stochastic modeling, we have used the allocation that we understand was approved by the Board in September 2021, as provided by LACERS, and which represents the long-term targets expected to be achieved by July 1, 2025, together with updated expected return, standard deviation, and other information as outlined in the Appendix. 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 41.

¹⁹This is based on the 25th to the 75th percentile results.

net unrecognized gains of 11.9% of the market value of assets in the June 30, 2021 valuation.

The total employer contribution rate is about 33% of payroll based on the June 30, 2022 and June 30, 2021 valuations. 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, 2032 valuation), there is a 50% chance that the employer contribution rates would be between 0% and 53% of payroll. At the end of 20 years (i.e., the June 30, 2042 valuation), there is a 50% chance that the employer contribution rates would be between 0% and 32% of payroll. 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, 2022 and the prior analysis as of June 30, 2021 are as follows:

	Total Employer Rate Increases by at least		
	5% of Payroll (to 38% of Payroll)	10% of Payroll (to 43% of Payroll)	15% of Payroll (to 48% of Payroll)
Current (6/30/2022) Analysis Probability	58%	50%	43%
Prior (6/30/2021) Analysis Probability	41%	35%	30%

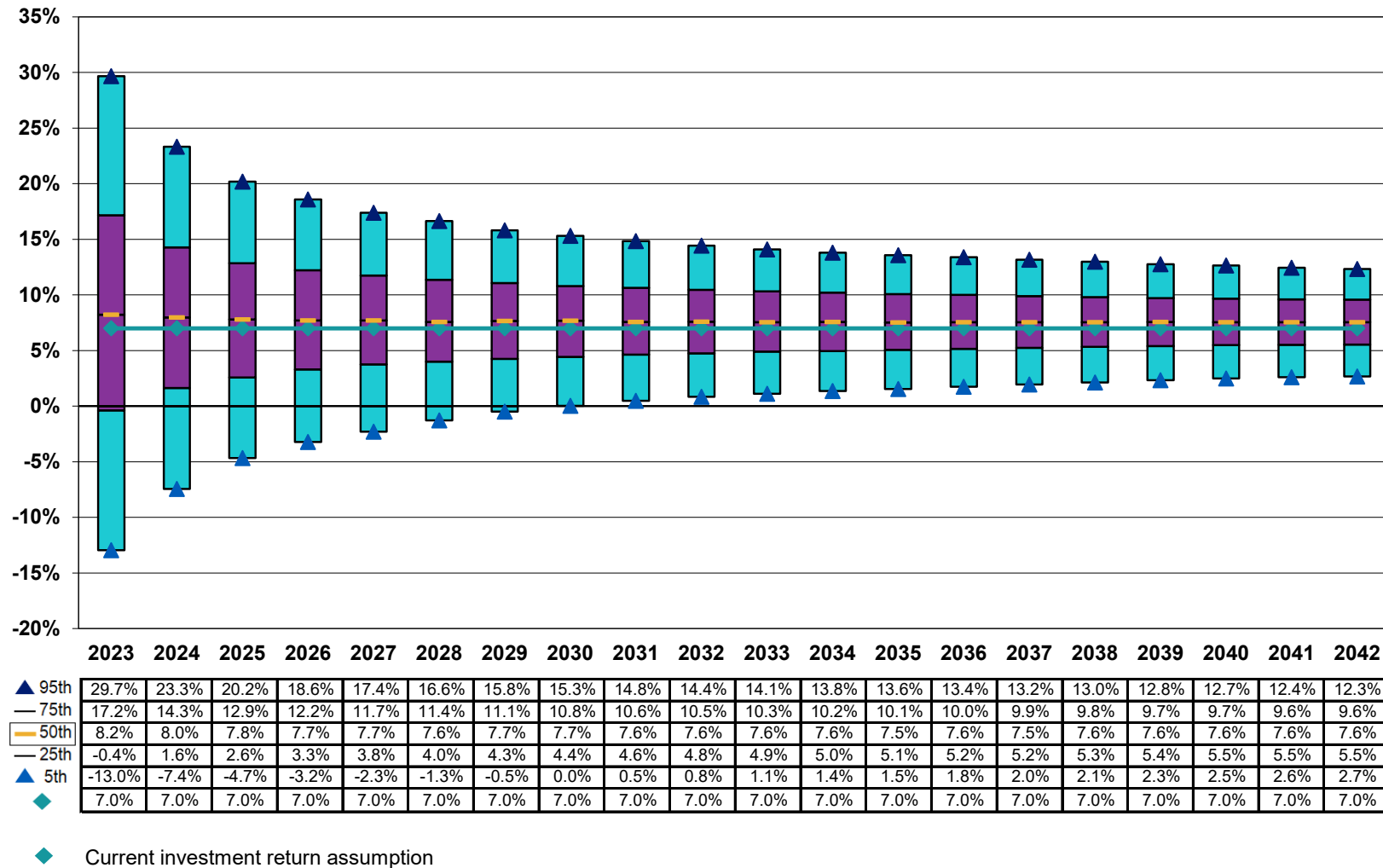
The probabilities of increase in employer rates during the next 20 years are higher in the current analysis compared to the prior analysis as a result of net unrecognized investment losses of 3.7% of the market value of assets in the June 30, 2022 valuation compared to net unrecognized gains of 11.9% of the market value of assets in the June 30, 2021 valuation.

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, 2022 and the prior analysis as of June 30, 2021 are as follows:

	Total Employer Rate Spikes in a Single Year by		
	2% of Payroll	4% of Payroll	6% of Payroll
Current (6/30/2022) Analysis Probability	24%	11%	4%
Prior (6/30/2021) Analysis Probability	22%	11%	5%

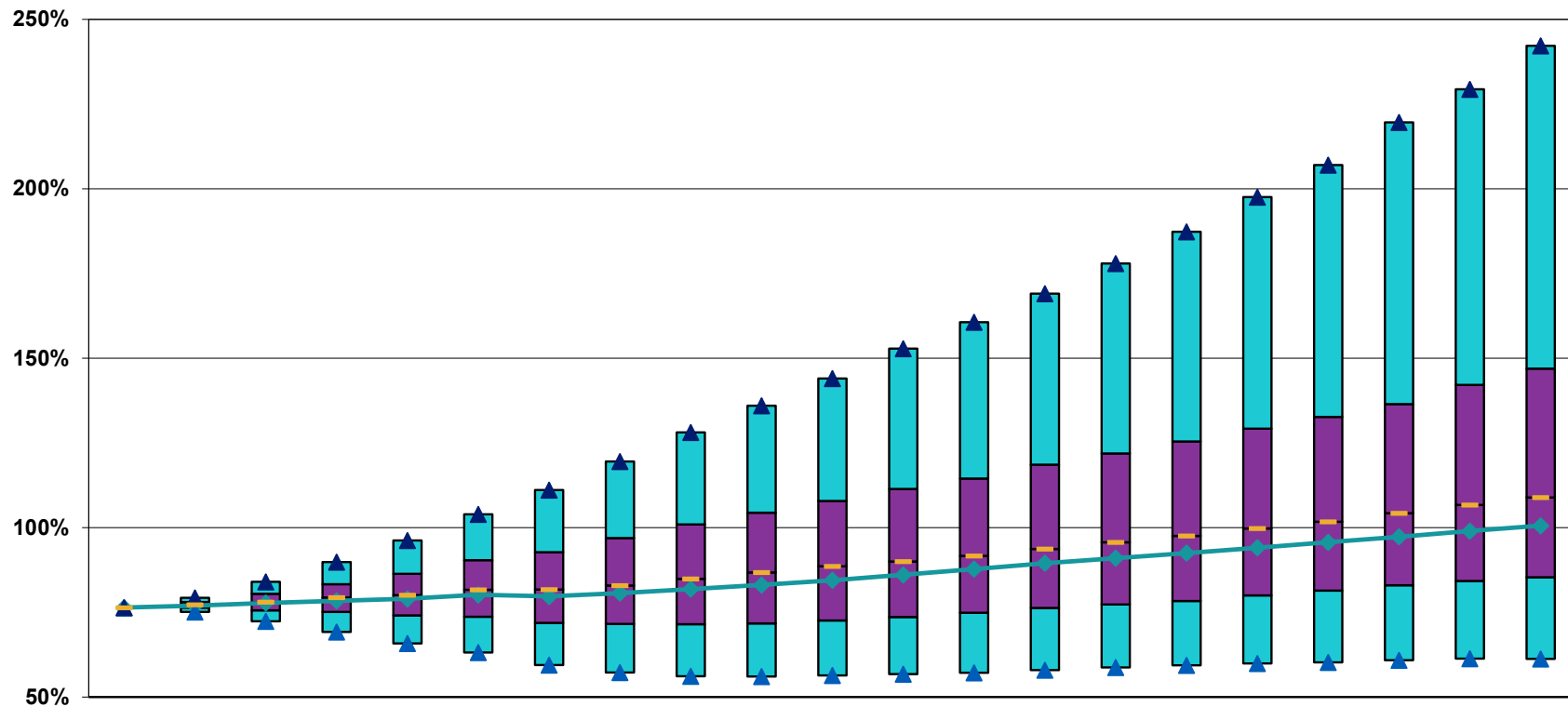
Based on the above results, the probabilities of the total employer contribution rate spiking by 2%, 4% or 6% of payroll in a single year are not materially different between the current and the prior analysis.

Projected Cumulative Investment Return for Plan Years Ending June 30



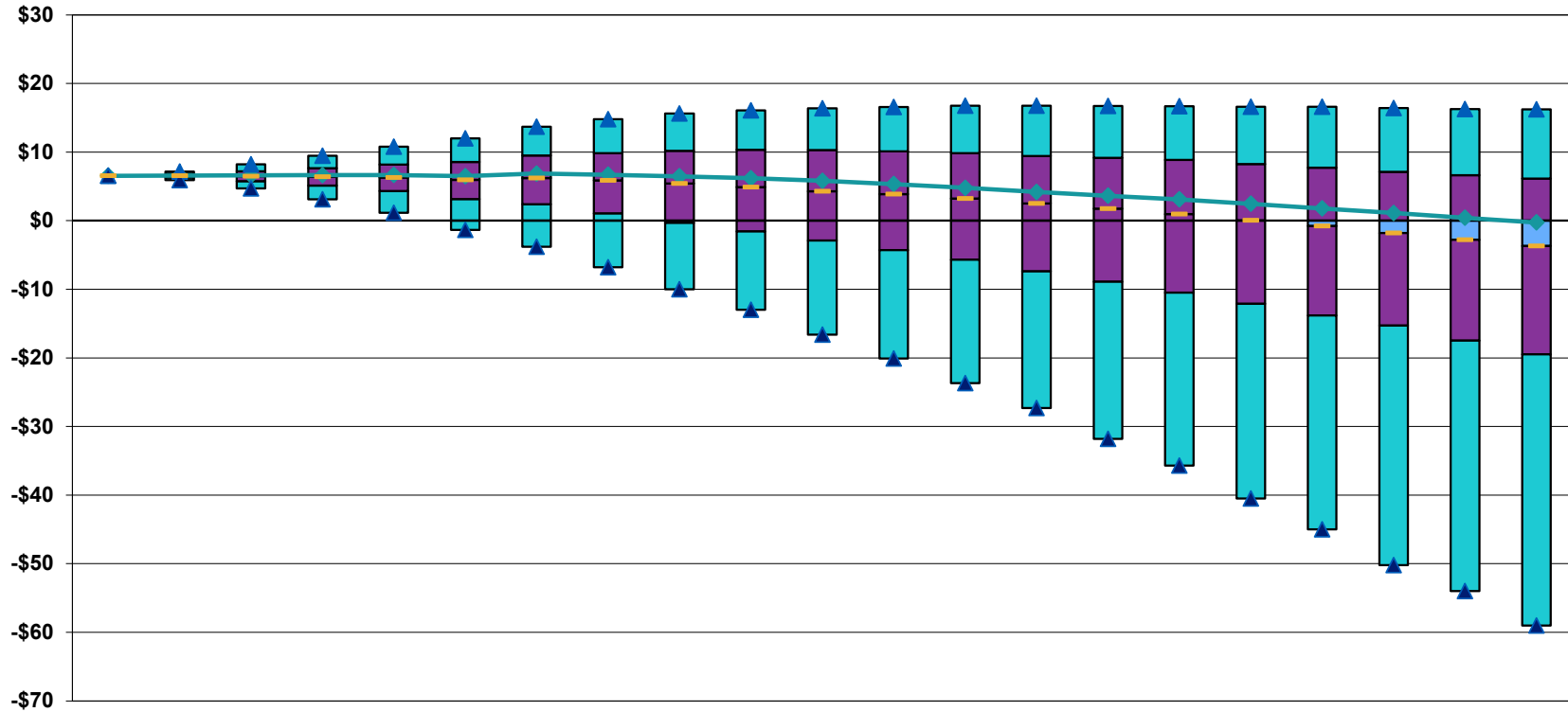
Note: In our triennial experience study for the June 30, 2020 valuations, we estimated that over a 15-year period there would be a 59% likelihood that the future average geometric return would meet or exceed the 7.00% investment return assumption. Due to updated assumptions in Horizon’s 2022 survey and LACERS’ new target asset allocation, the above results reflect a 57% likelihood that the future average geometric return would meet or exceed the 7.00% investment return assumption over a 20-year period.

Projected Funded Ratios (on Actuarial Value of Assets Basis)



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
▲ 95th	76.4%	79.3%	84.1%	89.9%	96.3%	104.0%	111.1%	119.5%	128.1%	136.0%	144.1%	152.9%	160.7%	169.0%	177.9%	187.3%	197.6%	207.0%	219.6%	229.4%	242.2%
— 75th	76.4%	78.1%	80.5%	83.3%	86.4%	90.4%	92.8%	96.9%	101.0%	104.4%	107.9%	111.4%	114.5%	118.6%	121.9%	125.4%	129.2%	132.6%	136.5%	142.1%	147.0%
— 50th	76.4%	77.2%	78.0%	79.3%	80.1%	81.7%	81.7%	82.9%	84.9%	86.7%	88.6%	90.0%	91.7%	93.7%	95.7%	97.6%	99.8%	101.7%	104.3%	106.7%	108.9%
— 25th	76.4%	76.4%	75.6%	75.1%	74.1%	73.7%	71.9%	71.6%	71.5%	71.8%	72.6%	73.7%	74.9%	76.3%	77.4%	78.4%	80.0%	81.4%	83.0%	84.3%	85.4%
▲ 5th	76.4%	75.1%	72.4%	69.3%	65.8%	63.1%	59.5%	57.2%	56.2%	56.1%	56.4%	56.8%	57.2%	58.0%	58.8%	59.4%	60.0%	60.3%	60.9%	61.4%	61.3%
◆ Baseline deterministic projection	76.4%	77.0%	77.8%	78.4%	79.0%	80.2%	79.7%	80.7%	81.9%	83.1%	84.5%	86.1%	87.8%	89.5%	91.0%	92.5%	94.1%	95.7%	97.3%	99.0%	100.6%

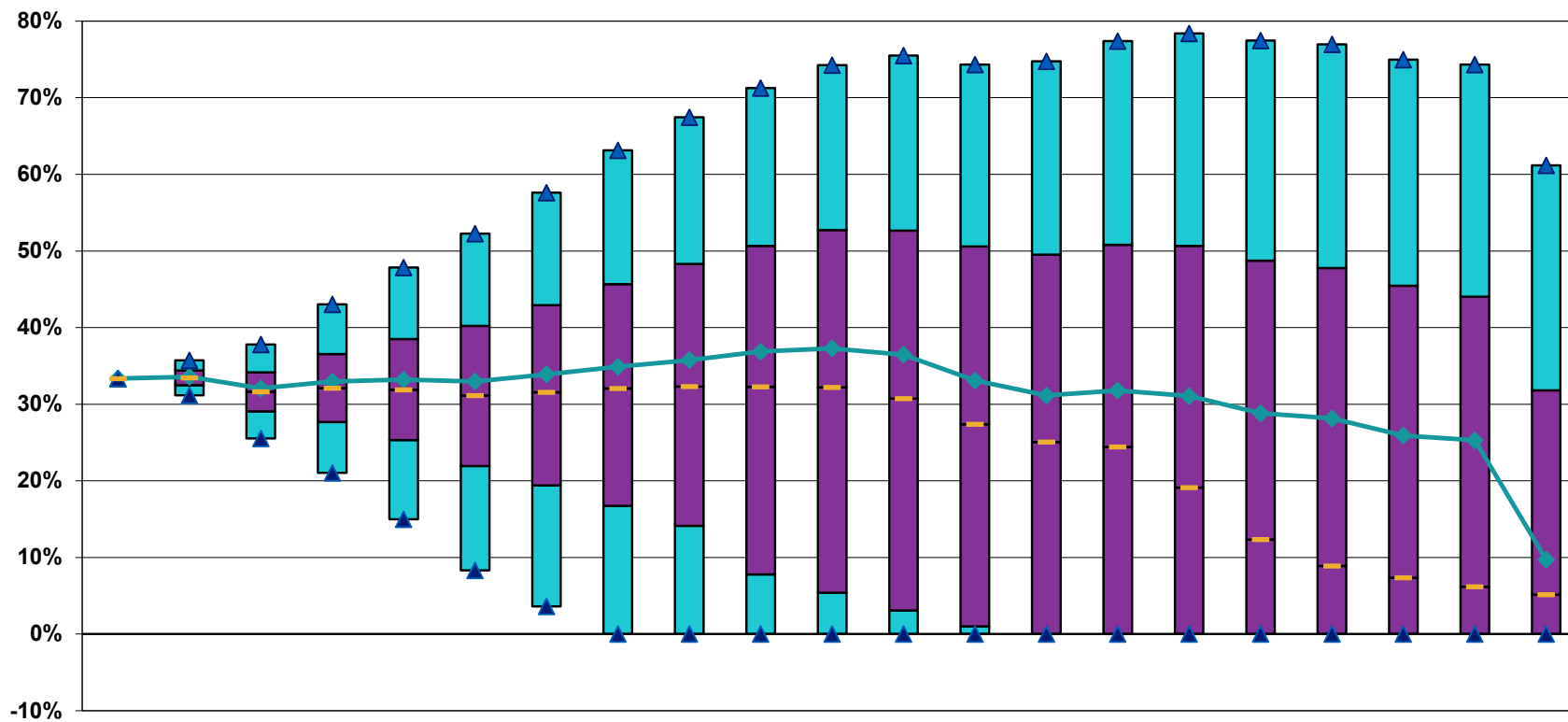
Projected UAAL (on Actuarial Value of Assets Basis) \$ in Billions



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
▲ 95th	6.5	5.9	4.7	3.1	1.1	-1.4	-3.8	-6.8	-10.0	-13.0	-16.6	-20.1	-23.7	-27.3	-31.8	-35.7	-40.5	-45.0	-50.2	-54.0	-59.0
— 75th	6.5	6.3	5.8	5.1	4.3	3.2	2.4	1.1	-0.3	-1.6	-2.9	-4.3	-5.7	-7.4	-8.9	-10.5	-12.1	-13.8	-15.3	-17.5	-19.5
— 50th	6.5	6.5	6.5	6.4	6.3	6.0	6.2	5.9	5.4	4.9	4.3	3.9	3.2	2.5	1.8	1.0	0.1	-0.8	-1.8	-2.8	-3.7
— 25th	6.5	6.8	7.2	7.7	8.2	8.6	9.5	9.8	10.2	10.3	10.3	10.1	9.8	9.4	9.2	8.9	8.3	7.7	7.1	6.6	6.1
▲ 5th	6.5	7.2	8.2	9.5	10.8	12.0	13.7	14.8	15.6	16.1	16.4	16.6	16.8	16.8	16.7	16.7	16.6	16.6	16.4	16.3	16.2
◆	6.5	6.6	6.6	6.6	6.7	6.5	6.9	6.7	6.5	6.2	5.8	5.3	4.8	4.2	3.6	3.1	2.5	1.8	1.1	0.4	-0.3

◆ Baseline deterministic projection

Projected Employer Contribution Rates Percent of Payroll



	2022	2023	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039	2040	2041	2042
▲ 95th	33.4%	31.2%	25.5%	21.1%	15.0%	8.3%	3.6%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
— 75th	33.4%	32.5%	29.1%	27.7%	25.3%	21.9%	19.4%	16.7%	14.1%	7.8%	5.4%	3.1%	1.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
— 50th	33.4%	33.5%	31.6%	32.1%	31.9%	31.1%	31.5%	32.1%	32.3%	32.3%	32.2%	30.7%	27.4%	25.1%	24.4%	19.1%	12.4%	8.9%	7.4%	6.2%	5.1%
— 25th	33.4%	34.4%	34.2%	36.6%	38.5%	40.2%	42.9%	45.7%	48.3%	50.7%	52.7%	52.7%	50.6%	49.5%	50.8%	50.7%	48.7%	47.8%	45.5%	44.0%	31.8%
▲ 5th	33.4%	35.7%	37.8%	43.1%	47.9%	52.3%	57.6%	63.1%	67.4%	71.3%	74.3%	75.5%	74.3%	74.8%	77.4%	78.4%	77.5%	77.0%	75.0%	74.3%	61.2%
◆	33.4%	33.6%	32.1%	33.0%	33.2%	33.0%	33.9%	34.9%	35.8%	36.9%	37.3%	36.5%	33.1%	31.1%	31.8%	31.1%	28.8%	28.2%	25.9%	25.3%	9.7%

◆ Baseline deterministic projection

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 vested, retirees and beneficiaries). In the past 10 valuations from June 30, 2013 to 2022, LACERS has become more mature, indicated by the continued increase in the ratio of non-active to active members covered by the Retirement and Health Plans as shown in *Charts 12a* and *12b*, respectively. The Charts also show 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 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.

Besides the ratio of members in pay status to 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 for the Retirement and Health Plans in *Charts 13a* and *13b*, respectively. 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 also detailed for the Retirement and Health Plans in *Charts 13a* and *13b*, respectively. 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, the Retirement Plan's AVR was 7.5 as of June 30, 2022. This means that a 1% asset gain or loss in 2022/2023 (relative to the assumed investment return) would amount to 7.5% of one year's payroll. Similarly, the Retirement Plan's LVR was 10.7 as of June 30, 2022, so a 1% liability gain or loss in 2022/2023 would amount to 10.7% of one year's payroll. Based on LACERS' policy to amortize actuarial experience over a period of 15 years, there would be a 0.6% of payroll decrease or increase in the required contribution rate for each 1% asset gain or loss, respectively, and a 0.9% of payroll decrease or increase in the required contribution rate for each 1% liability gain or loss, respectively, for the Retirement Plan.

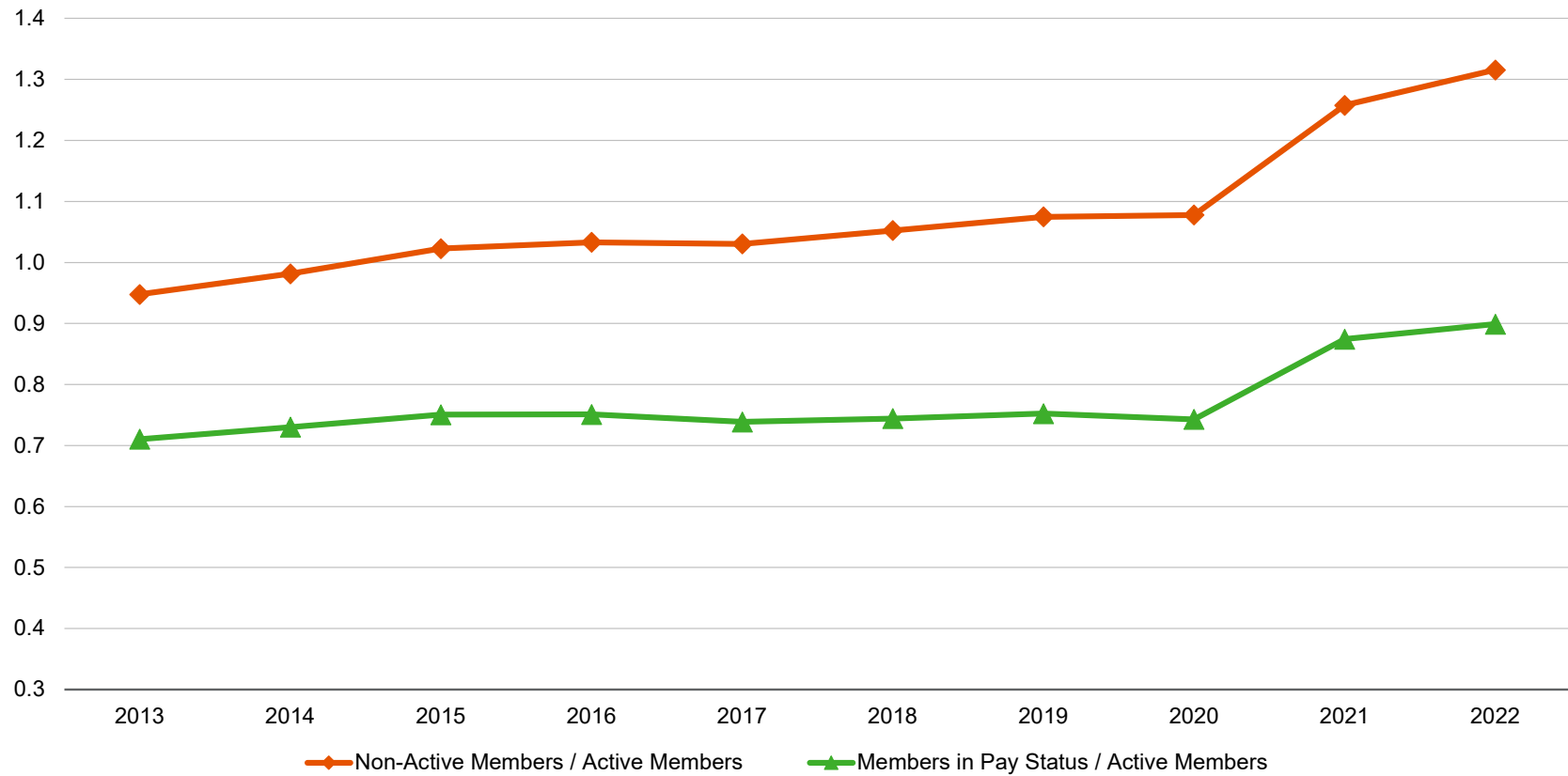
It is also informative to note that the AVR and LVR for the Retirement Plan are significantly higher than for the Health Plan. This means that both investment volatility and assumption changes will have a greater impact on the contribution rates of the Retirement Plan than on the contribution rates of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

June 30, 2022

Plan	AVR	10% Investment Loss Compares to	LVR	10% Liability Change Compares to
Retirement Plan	7.5	75% of payroll	10.7	107% of payroll
Health Plan	1.5	15% of payroll	1.6	16% of payroll
Combined	9.0	90% of payroll	12.3	123% of payroll

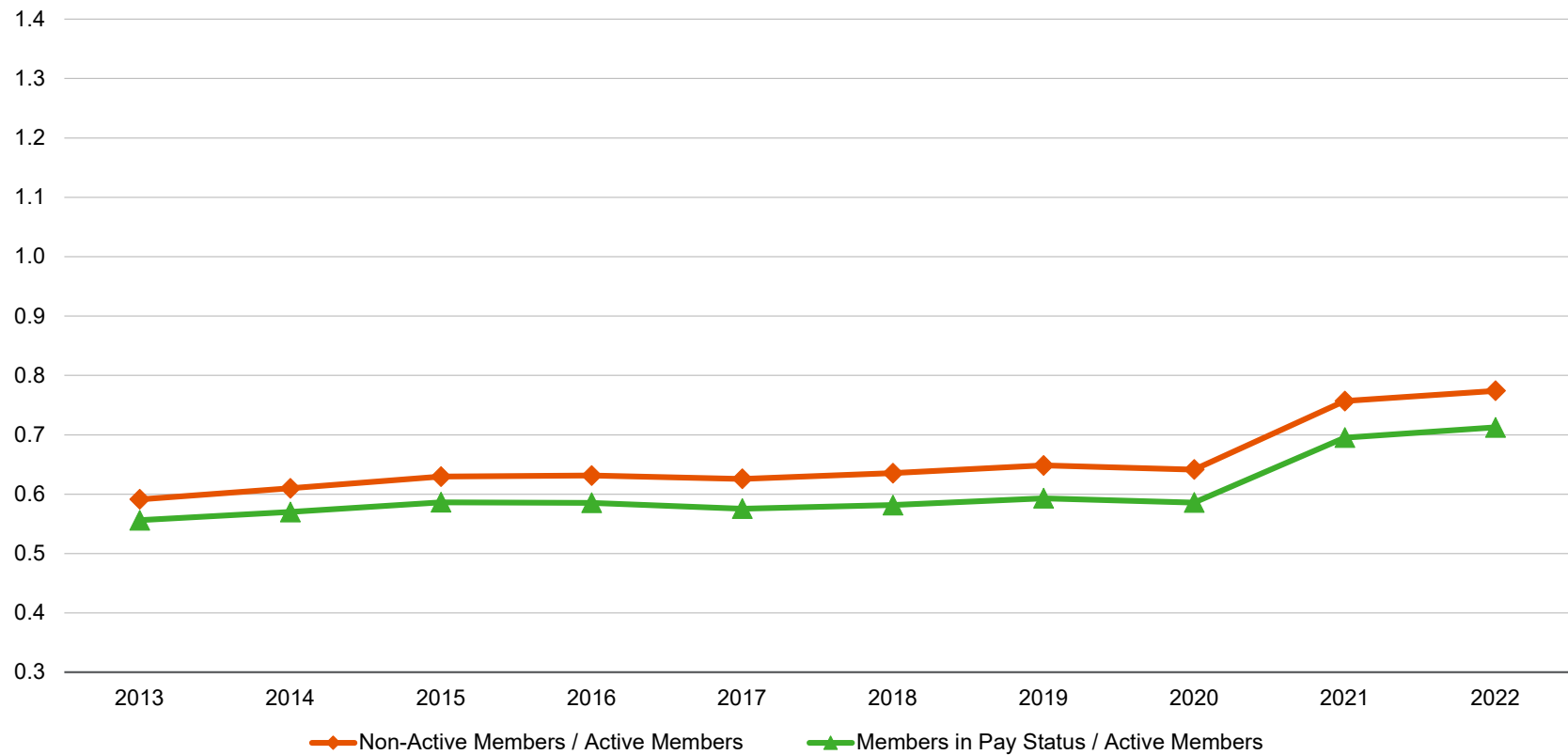
RETIREMENT PLAN

Ratios of Members in Pay-Status (Retirees and Beneficiaries) to Active Members & Non-Active Members (Inactive Vested, Retirees and Beneficiaries) to Active Members



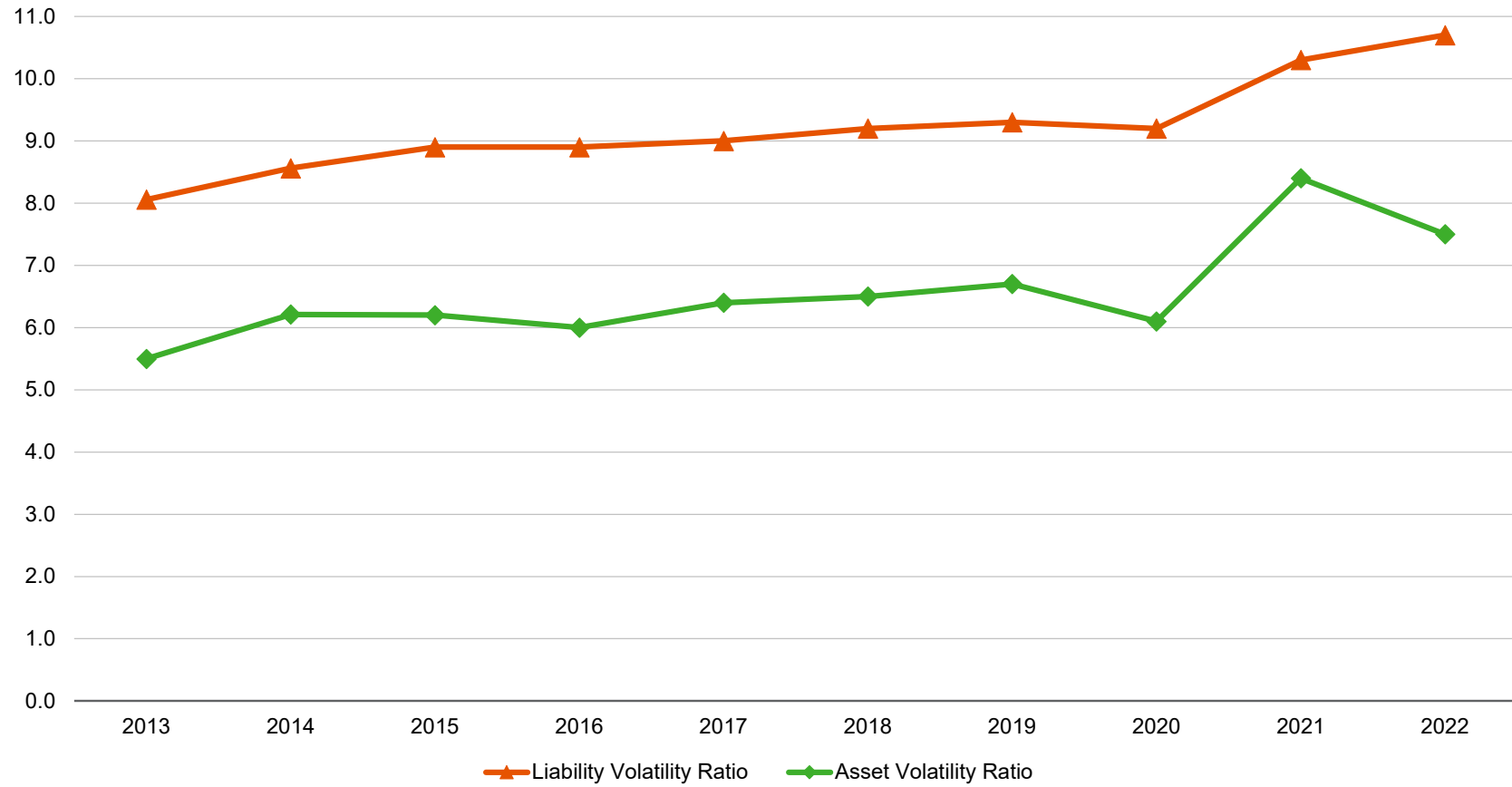
HEALTH PLAN

Ratios of Members in Pay-Status (Retirees and Beneficiaries) to Active Members & Non-Active Members (Inactive Vested, Retirees and Beneficiaries) to Active Members

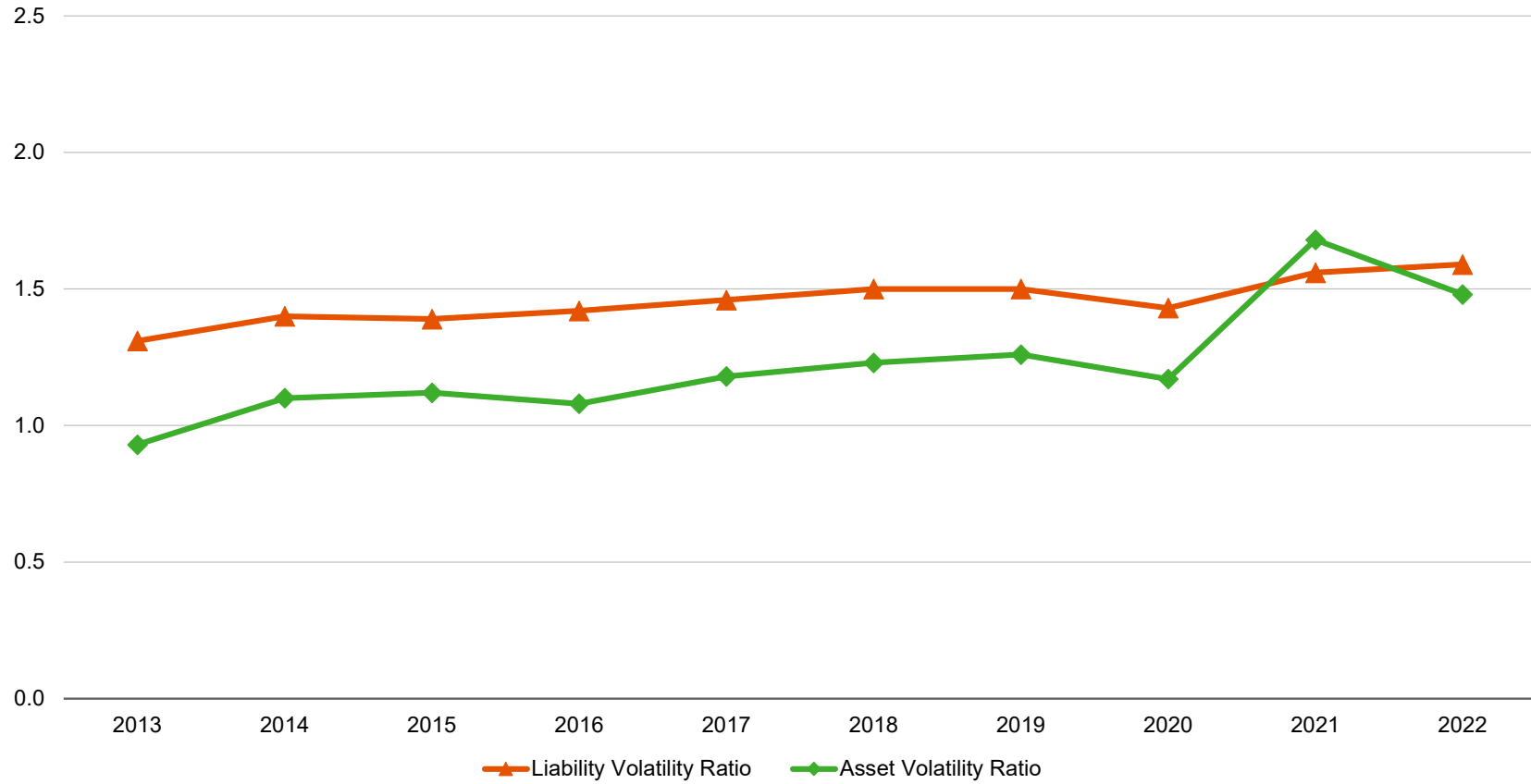


RETIREMENT PLAN

Volatility Ratios



HEALTH PLAN Volatility Ratios



Appendix: Actuarial Assumptions & Methods, Actuarial Certification, and Detailed Scenario Test Results

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, 2022 valuations.

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, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a 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.

Deterministic Projection

In addition, we have prepared the deterministic projection using the following assumptions and methods applied in the June 30, 2022 actuarial valuation:

- Non-economic assumptions will remain unchanged.
- Retirement benefit formulas will remain unchanged.
- Los Angeles Charter and Administrative Code will remain unchanged.
- UAAL amortization method will remain unchanged (i.e., 15-year layers for actuarial gains/losses, 20-year layers for assumption or method changes, 30-year layers for actuarial surplus, and level percent of pay).
- Economic assumptions will remain unchanged, including the annual 7.00% investment earnings and 3.25% active payroll growth assumptions.
- Deferred investment gains and losses will be recognized over a seven-year period.

- In estimating the benefit payments for the open group, we have assumed that the annual payments will increase by 5.5% for both the Retirement and Health Plans. The assumption for the Retirement Plan, which was unchanged from last year since we ignored the effect of the 2020 City Separation Incentive Program, was developed by analyzing the increase in the actual benefit payments over the five years ending June 30, 2020, combined with the increase in the projected benefit payments based on the actuarial assumptions described herein for the five years after July 1, 2020. (We understand that the fiscal year 2020/2021 actual benefit payments may include only a partial year of LACERS retirement income for participants of the City Separation Incentive Program whereas fiscal year 2021/2022 actual benefit payments may include a full year of LACERS retirement income for participants of the City Separation Incentive Program, thereby affecting year-to-year comparability.) The assumption for the Health Plan was updated from 6.0% to 5.5% based on a review of actual benefit costs for the five years preceding June 30, 2022 and projected benefit costs for the five years after June 30, 2022.
- All other actuarial assumptions used in the June 30, 2022 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 LACERS' 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 the allocation that we understand was approved by the Board in September 2021, as provided by LACERS, and which represents the long term targets expected to be achieved by July 1, 2025. That target asset allocation is as follows:

Asset Class	Target Allocation
Large Cap U.S. Equity	15.00%
Small/Mid Cap U.S. Equity	6.00%
Developed International Large Cap Equity	15.00%
Developed International Small Cap Equity	3.00%
Emerging International Large Cap Equity	6.67%
Emerging International Small Cap Equity	1.33%
Core Bonds	11.25%
High Yield Bonds/Bank Loans	3.00%
TIPS	3.60%
Emerging Market Debt	4.00%
Real Estate	7.00%
Cash	1.00%
Private Equity	16.00%
Private Credit/Debt	5.75%
REITS	<u>1.40%</u>
Total	100.00%

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 2022 survey prepared by Horizon Actuarial Services.²⁰ We used the assumptions that were closest to the asset classes found in LACERS' investment portfolio.

A summary of the 20-year arithmetic returns,^{21,22} standard deviations and correlation matrix for each of the different asset classes used in the modeling is as follows:

Asset Class	20-Year Arithmetic Return	Standard Deviation	Correlation Matrix													
			1	2	3	4	5	6	7	8	9	10	11	12		
1 Large Cap U.S. Equity	7.82%	16.33%	1	1.00	-	-	-	-	-	-	-	-	-	-	-	-
2 Small/Mid Cap U.S. Equity	8.98%	20.34%	2	0.90	1.00	-	-	-	-	-	-	-	-	-	-	-
3 Developed International Equity	8.67%	18.09%	3	0.82	0.77	1.00	-	-	-	-	-	-	-	-	-	-
4 Emerging International Equity	10.67%	23.92%	4	0.71	0.69	0.79	1.00	-	-	-	-	-	-	-	-	-
5 Core Bonds	3.65%	5.36%	5	0.18	0.13	0.18	0.16	1.00	-	-	-	-	-	-	-	-
6 High Yield Bonds, Bank Loans	5.43%	9.90%	6	0.65	0.65	0.63	0.62	0.41	1.00	-	-	-	-	-	-	-
7 Emerging Market Debt	5.88%	10.92%	7	0.50	0.47	0.53	0.60	0.51	0.62	1.00	-	-	-	-	-	-
8 US Treasuries, Cash	2.00%	1.12%	8	(0.08)	(0.10)	(0.07)	(0.06)	0.13	(0.09)	0.02	1.00	-	-	-	-	-
9 TIPS	2.84%	5.79%	9	0.05	0.02	0.06	0.11	0.63	0.24	0.36	0.15	1.00	-	-	-	-
10 Real Estate, REITS	7.32%	17.00%	10	0.59	0.59	0.54	0.46	0.25	0.51	0.41	(0.02)	0.16	1.00	-	-	-
11 Private Equity	12.50%	22.13%	11	0.75	0.75	0.70	0.63	0.11	0.56	0.40	(0.07)	0.03	0.49	1.00	-	-
12 Private Credit/Private Debt	7.83%	11.49%	12	0.57	0.58	0.55	0.52	0.22	0.72	0.43	(0.10)	0.06	0.43	0.59	1.00	-

Other Considerations

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, we emphasize that deterministic and stochastic projections, by their nature, are not a guarantee of future results. 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.

²⁰ That survey included responses from 40 investment advisors, including LACERS' investment advisor at NEPC.

²¹ Note that only 24 investment advisors provided long-term (e.g., 20-year) capital market assumptions in the survey.

²² These returns are gross of inflation and before any adjustment for administrative expenses. The annual inflation assumption based on the Horizon Survey was 2.45%. The annual adjustment for administrative expenses was 0.15%.


Actuarial Certification

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

The actuarial opinions expressed in this report were prepared by Paul Angelo, FSA, MAAA, FCA, Enrolled Actuary, Andy Yeung, ASA, MAAA, FCA, Enrolled Actuary, and Todd Tauzer, FSA, MAAA, FCA, CERA. 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.



Paul Angelo, FSA, MAAA, FCA, EA
Senior Vice President and Actuary



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



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

Detailed Scenario Test Results – Under Scenario 1 (Assuming 0.00% Market Return for 2022/2023)

RETIREMENT PLAN

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

Valuation Year	June 30 of Valuation Year		Fiscal Year End	City Contributions (July 15)					
	UAAL	Funded Ratio		Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 6,621,308	71.6%	2023	\$ 2,258,725	7.75%	21.64%	29.39%	\$ 663,839	
2022	\$ 6,429,484	73.3%	2024	\$ 2,332,133	7.64%	21.79%	29.43%	\$ 686,347	\$ 22,508
2023	\$ 6,627,230	73.4%	2025	\$ 2,407,928	7.38%	22.79%	30.17%	\$ 726,472	\$ 40,125
2024	\$ 6,883,949	73.3%	2026	\$ 2,486,185	7.24%	22.22%	29.46%	\$ 732,430	\$ 5,958
2025	\$ 7,143,710	73.2%	2027	\$ 2,566,986	7.68%	23.41%	31.09%	\$ 798,076	\$ 65,646
2026	\$ 7,363,210	73.2%	2028	\$ 2,650,413	7.51%	24.53%	32.04%	\$ 849,192	\$ 51,116
2027	\$ 7,416,150	73.8%	2029	\$ 2,736,552	7.33%	25.20%	32.53%	\$ 890,200	\$ 41,008
2028	\$ 7,886,441	72.9%	2030	\$ 2,825,490	7.16%	26.65%	33.81%	\$ 955,298	\$ 65,098
2029	\$ 7,883,656	73.6%	2031	\$ 2,917,318	6.99%	28.39%	35.38%	\$ 1,032,147	\$ 76,849
2030	\$ 7,627,995	75.1%	2032	\$ 3,012,131	6.83%	29.43%	36.26%	\$ 1,092,199	\$ 60,052
2031	\$ 7,273,878	76.8%	2033	\$ 3,110,025	6.66%	30.68%	37.34%	\$ 1,161,283	\$ 69,084
2032	\$ 6,832,592	78.7%	2034	\$ 3,211,101	6.50%	31.22%	37.72%	\$ 1,211,227	\$ 49,944
2033	\$ 6,288,594	80.7%	2035	\$ 3,315,462	6.35%	30.51%	36.86%	\$ 1,222,079	\$ 10,852
2034	\$ 5,654,739	83.0%	2036	\$ 3,423,214	6.21%	27.26%	33.47%	\$ 1,145,750	\$ (76,329)
2035	\$ 4,967,150	85.3%	2037	\$ 3,534,469	6.08%	25.40%	31.48%	\$ 1,112,651	\$ (33,099)
2036	\$ 4,315,261	87.3%	2038	\$ 3,649,339	5.97%	26.14%	32.11%	\$ 1,171,803	\$ 59,152
2037	\$ 3,656,352	89.4%	2039	\$ 3,767,943	5.87%	25.47%	31.34%	\$ 1,180,873	\$ 9,070
2038	\$ 2,891,584	91.6%	2040	\$ 3,890,401	5.78%	22.73%	28.51%	\$ 1,109,153	\$ (71,720)
2039	\$ 2,067,522	94.0%	2041	\$ 4,016,839	5.69%	21.21%	26.90%	\$ 1,080,530	\$ (28,623)
2040	\$ 1,266,061	96.3%	2042	\$ 4,147,386	5.63%	18.15%	23.78%	\$ 986,248	\$ (94,282)
2041	\$ 443,504	98.7%	2043	\$ 4,282,176	5.56%	16.76%	22.32%	\$ 955,782	\$ (30,466)
2042	\$ (331,783)	101.0%	2044	\$ 4,421,347	5.50%	-0.40%	5.10%	\$ 225,489	\$ (730,293)
2043	\$ (1,122,024)	103.4%	2045	\$ 4,565,041	5.45%	-1.35%	4.10%	\$ 187,167	\$ (38,322)
2044	\$ (1,183,062)	103.6%	2046	\$ 4,713,404	5.41%	-1.38%	4.03%	\$ 189,950	\$ 2,783
2045	\$ (1,201,402)	103.8%	2047	\$ 4,866,590	5.38%	-1.36%	4.02%	\$ 195,637	\$ 5,687

Detailed Scenario Test Results – Under Scenario 1 (Assuming 0.00% Market Return for 2022/2023)

HEALTH PLAN

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

June 30 of Valuation Year			City Contributions (July 15)						
Valuation Year	UAAL	Funded Ratio	Fiscal Year End	Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 189,701	94.6%	2023	\$ 2,258,725	3.62%	0.30%	3.92%	\$ 88,542	
2022	\$ 107,741	97.0%	2024	\$ 2,332,133	3.60%	0.33%	3.93%	\$ 91,653	\$ 3,111
2023	\$ 160,518	95.7%	2025	\$ 2,407,928	3.65%	0.52%	4.17%	\$ 100,411	\$ 8,758
2024	\$ 231,248	94.1%	2026	\$ 2,486,185	3.68%	0.78%	4.46%	\$ 110,884	\$ 10,473
2025	\$ 306,477	92.5%	2027	\$ 2,566,986	3.73%	1.03%	4.76%	\$ 122,189	\$ 11,305
2026	\$ 369,144	91.4%	2028	\$ 2,650,413	3.75%	1.27%	5.02%	\$ 133,051	\$ 10,862
2027	\$ 402,547	91.0%	2029	\$ 2,736,552	3.78%	1.41%	5.19%	\$ 142,027	\$ 8,976
2028	\$ 522,787	88.8%	2030	\$ 2,825,490	3.82%	1.82%	5.64%	\$ 159,358	\$ 17,331
2029	\$ 555,020	88.6%	2031	\$ 2,917,318	3.84%	1.97%	5.81%	\$ 169,496	\$ 10,138
2030	\$ 539,809	89.4%	2032	\$ 3,012,131	3.86%	1.99%	5.85%	\$ 176,210	\$ 6,714
2031	\$ 517,320	90.2%	2033	\$ 3,110,025	3.90%	1.99%	5.89%	\$ 183,180	\$ 6,970
2032	\$ 490,967	91.1%	2034	\$ 3,211,101	3.93%	1.99%	5.92%	\$ 190,097	\$ 6,917
2033	\$ 460,435	92.0%	2035	\$ 3,315,462	3.97%	1.99%	5.96%	\$ 197,602	\$ 7,505
2034	\$ 425,694	92.9%	2036	\$ 3,423,214	3.99%	2.00%	5.99%	\$ 205,051	\$ 7,449
2035	\$ 386,046	93.8%	2037	\$ 3,534,469	4.02%	2.00%	6.02%	\$ 212,775	\$ 7,724
2036	\$ 341,400	94.7%	2038	\$ 3,649,339	4.06%	2.00%	6.06%	\$ 221,150	\$ 8,375
2037	\$ 291,273	95.6%	2039	\$ 3,767,943	4.08%	2.01%	6.09%	\$ 229,468	\$ 8,318
2038	\$ 234,865	96.6%	2040	\$ 3,890,401	4.11%	1.82%	5.93%	\$ 230,701	\$ 1,233
2039	\$ 172,156	97.6%	2041	\$ 4,016,839	4.15%	1.55%	5.70%	\$ 228,960	\$ (1,741)
2040	\$ 110,434	98.5%	2042	\$ 4,147,386	4.18%	1.26%	5.44%	\$ 225,618	\$ (3,342)
2041	\$ 53,267	99.3%	2043	\$ 4,282,176	4.21%	1.00%	5.21%	\$ 223,101	\$ (2,517)
2042	\$ 2,839	100.0%	2044	\$ 4,421,347	4.23%	0.52%	4.75%	\$ 210,014	\$ (13,087)
2043	\$ (41,884)	100.5%	2045	\$ 4,565,041	4.25%	-0.05%	4.20%	\$ 191,732	\$ (18,282)
2044	\$ (68,379)	100.8%	2046	\$ 4,713,404	4.27%	-0.08%	4.19%	\$ 197,492	\$ 5,760
2045	\$ (69,737)	100.8%	2047	\$ 4,866,590	4.29%	-0.08%	4.21%	\$ 204,883	\$ 7,391

Detailed Scenario Test Results – Under Scenario 1 (Assuming 0.00% Market Return for 2022/2023)

RETIREMENT AND HEALTH PLANS

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

Valuation Year	June 30 of Valuation Year		Fiscal Year End	City Contributions (July 15)					
	UAAL	Funded Ratio		Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 6,811,009	71.6%	2023	\$ 2,258,725	11.37%	21.94%	33.31%	\$ 752,381	
2022	\$ 6,537,225	76.4%	2024	\$ 2,332,133	11.24%	22.12%	33.36%	\$ 778,000	\$ 25,619
2023	\$ 6,787,748	76.3%	2025	\$ 2,407,928	11.03%	23.31%	34.34%	\$ 826,883	\$ 48,883
2024	\$ 7,115,197	76.0%	2026	\$ 2,486,185	10.92%	23.00%	33.92%	\$ 843,314	\$ 16,431
2025	\$ 7,450,187	75.7%	2027	\$ 2,566,986	11.41%	24.44%	35.85%	\$ 920,265	\$ 76,951
2026	\$ 7,732,354	75.6%	2028	\$ 2,650,413	11.26%	25.80%	37.06%	\$ 982,243	\$ 61,978
2027	\$ 7,818,697	76.1%	2029	\$ 2,736,552	11.11%	26.61%	37.72%	\$ 1,032,227	\$ 49,984
2028	\$ 8,409,228	75.1%	2030	\$ 2,825,490	10.98%	28.47%	39.45%	\$ 1,114,656	\$ 82,429
2029	\$ 8,438,676	75.7%	2031	\$ 2,917,318	10.83%	30.36%	41.19%	\$ 1,201,643	\$ 86,987
2030	\$ 8,167,804	77.1%	2032	\$ 3,012,131	10.69%	31.42%	42.11%	\$ 1,268,409	\$ 66,766
2031	\$ 7,791,198	78.7%	2033	\$ 3,110,025	10.56%	32.67%	43.23%	\$ 1,344,463	\$ 76,054
2032	\$ 7,323,559	80.5%	2034	\$ 3,211,101	10.43%	33.21%	43.64%	\$ 1,401,324	\$ 56,861
2033	\$ 6,749,029	82.4%	2035	\$ 3,315,462	10.32%	32.50%	42.82%	\$ 1,419,681	\$ 18,357
2034	\$ 6,080,433	84.5%	2036	\$ 3,423,214	10.20%	29.26%	39.46%	\$ 1,350,801	\$ (68,880)
2035	\$ 5,353,196	86.6%	2037	\$ 3,534,469	10.10%	27.40%	37.50%	\$ 1,325,426	\$ (25,375)
2036	\$ 4,656,661	88.5%	2038	\$ 3,649,339	10.03%	28.14%	38.17%	\$ 1,392,953	\$ 67,527
2037	\$ 3,947,625	90.4%	2039	\$ 3,767,943	9.95%	27.48%	37.43%	\$ 1,410,341	\$ 17,388
2038	\$ 3,126,449	92.5%	2040	\$ 3,890,401	9.89%	24.55%	34.44%	\$ 1,339,854	\$ (70,487)
2039	\$ 2,239,678	94.6%	2041	\$ 4,016,839	9.84%	22.76%	32.60%	\$ 1,309,490	\$ (30,364)
2040	\$ 1,376,495	96.7%	2042	\$ 4,147,386	9.81%	19.41%	29.22%	\$ 1,211,866	\$ (97,624)
2041	\$ 496,771	98.8%	2043	\$ 4,282,176	9.77%	17.76%	27.53%	\$ 1,178,883	\$ (32,983)
2042	\$ (328,944)	100.8%	2044	\$ 4,421,347	9.73%	0.12%	9.85%	\$ 435,503	\$ (743,380)
2043	\$ (1,163,908)	102.8%	2045	\$ 4,565,041	9.70%	-1.40%	8.30%	\$ 378,899	\$ (56,604)
2044	\$ (1,251,441)	103.1%	2046	\$ 4,713,404	9.68%	-1.46%	8.22%	\$ 387,442	\$ 8,543
2045	\$ (1,271,139)	103.2%	2047	\$ 4,866,590	9.67%	-1.44%	8.23%	\$ 400,520	\$ 13,078

Detailed Scenario Test Results – Under Scenario 2 (Assuming 7.00% Market Return for 2022/2023)

RETIREMENT PLAN

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

June 30 of Valuation Year			City Contributions (July 15)						
Valuation Year	UAAL	Funded Ratio	Fiscal Year End	Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 6,621,308	71.6%	2023	\$ 2,258,725	7.75%	21.64%	29.39%	\$ 663,839	
2022	\$ 6,429,484	73.3%	2024	\$ 2,332,133	7.64%	21.79%	29.43%	\$ 686,347	\$ 22,508
2023	\$ 6,454,240	74.1%	2025	\$ 2,407,928	7.38%	22.15%	29.53%	\$ 711,061	\$ 24,714
2024	\$ 6,453,204	75.0%	2026	\$ 2,486,185	7.24%	20.67%	27.91%	\$ 693,894	\$ (17,167)
2025	\$ 6,465,508	75.7%	2027	\$ 2,566,986	7.68%	20.98%	28.66%	\$ 735,698	\$ 41,804
2026	\$ 6,457,341	76.5%	2028	\$ 2,650,413	7.51%	21.30%	28.81%	\$ 763,584	\$ 27,886
2027	\$ 6,304,021	77.7%	2029	\$ 2,736,552	7.33%	21.23%	28.56%	\$ 781,559	\$ 17,975
2028	\$ 6,590,571	77.3%	2030	\$ 2,825,490	7.16%	22.01%	29.17%	\$ 824,195	\$ 42,636
2029	\$ 6,427,930	78.5%	2031	\$ 2,917,318	6.99%	23.13%	30.12%	\$ 878,696	\$ 54,501
2030	\$ 6,210,345	79.7%	2032	\$ 3,012,131	6.83%	24.11%	30.94%	\$ 931,953	\$ 53,257
2031	\$ 5,920,873	81.1%	2033	\$ 3,110,025	6.66%	25.36%	32.02%	\$ 995,830	\$ 63,877
2032	\$ 5,556,017	82.7%	2034	\$ 3,211,101	6.50%	25.90%	32.40%	\$ 1,040,397	\$ 44,567
2033	\$ 5,099,362	84.4%	2035	\$ 3,315,462	6.35%	25.19%	31.54%	\$ 1,045,697	\$ 5,300
2034	\$ 4,564,706	86.3%	2036	\$ 3,423,214	6.21%	21.94%	28.15%	\$ 963,635	\$ (82,062)
2035	\$ 3,989,189	88.2%	2037	\$ 3,534,469	6.08%	20.08%	26.16%	\$ 924,617	\$ (39,018)
2036	\$ 3,463,339	89.8%	2038	\$ 3,649,339	5.97%	20.81%	26.78%	\$ 977,293	\$ 52,676
2037	\$ 2,945,614	91.4%	2039	\$ 3,767,943	5.87%	20.14%	26.01%	\$ 980,042	\$ 2,749
2038	\$ 2,338,438	93.2%	2040	\$ 3,890,401	5.78%	18.03%	23.81%	\$ 926,304	\$ (53,738)
2039	\$ 1,690,143	95.1%	2041	\$ 4,016,839	5.69%	17.49%	23.18%	\$ 931,103	\$ 4,799
2040	\$ 1,057,496	96.9%	2042	\$ 4,147,386	5.63%	15.39%	21.02%	\$ 871,781	\$ (59,322)
2041	\$ 379,796	98.9%	2043	\$ 4,282,176	5.56%	14.89%	20.45%	\$ 875,705	\$ 3,924
2042	\$ (277,469)	100.8%	2044	\$ 4,421,347	5.50%	-0.35%	5.15%	\$ 227,699	\$ (648,006)
2043	\$ (978,684)	102.9%	2045	\$ 4,565,041	5.45%	-1.18%	4.27%	\$ 194,927	\$ (32,772)
2044	\$ (1,032,528)	103.2%	2046	\$ 4,713,404	5.41%	-1.21%	4.20%	\$ 197,963	\$ 3,036
2045	\$ (1,048,633)	103.3%	2047	\$ 4,866,590	5.38%	-1.19%	4.19%	\$ 203,910	\$ 5,947

Detailed Scenario Test Results – Under Scenario 2 (Assuming 7.00% Market Return for 2022/2023)

HEALTH PLAN

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

June 30 of Valuation Year			City Contributions (July 15)						
Valuation Year	UAAL	Funded Ratio	Fiscal Year End	Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 189,701	94.6%	2023	\$ 2,258,725	3.62%	0.30%	3.92%	\$ 88,542	
2022	\$ 107,741	97.0%	2024	\$ 2,332,133	3.60%	0.33%	3.93%	\$ 91,653	\$ 3,111
2023	\$ 126,987	96.6%	2025	\$ 2,407,928	3.65%	0.40%	4.05%	\$ 97,521	\$ 5,868
2024	\$ 147,755	96.2%	2026	\$ 2,486,185	3.68%	0.48%	4.16%	\$ 103,425	\$ 5,904
2025	\$ 174,964	95.7%	2027	\$ 2,566,986	3.73%	0.57%	4.30%	\$ 110,380	\$ 6,955
2026	\$ 193,485	95.5%	2028	\$ 2,650,413	3.75%	0.65%	4.40%	\$ 116,618	\$ 6,238
2027	\$ 186,654	95.8%	2029	\$ 2,736,552	3.78%	0.64%	4.42%	\$ 120,956	\$ 4,338
2028	\$ 271,138	94.2%	2030	\$ 2,825,490	3.82%	0.91%	4.73%	\$ 133,646	\$ 12,690
2029	\$ 272,424	94.4%	2031	\$ 2,917,318	3.84%	0.94%	4.78%	\$ 139,448	\$ 5,802
2030	\$ 264,641	94.8%	2032	\$ 3,012,131	3.86%	0.95%	4.81%	\$ 144,884	\$ 5,436
2031	\$ 254,729	95.2%	2033	\$ 3,110,025	3.90%	0.95%	4.85%	\$ 150,836	\$ 5,952
2032	\$ 243,192	95.6%	2034	\$ 3,211,101	3.93%	0.95%	4.88%	\$ 156,702	\$ 5,866
2033	\$ 229,591	96.0%	2035	\$ 3,315,462	3.97%	0.95%	4.92%	\$ 163,121	\$ 6,419
2034	\$ 214,080	96.4%	2036	\$ 3,423,214	3.99%	0.96%	4.95%	\$ 169,449	\$ 6,328
2035	\$ 196,159	96.8%	2037	\$ 3,534,469	4.02%	0.96%	4.98%	\$ 176,017	\$ 6,568
2036	\$ 175,948	97.3%	2038	\$ 3,649,339	4.06%	0.96%	5.02%	\$ 183,197	\$ 7,180
2037	\$ 153,192	97.7%	2039	\$ 3,767,943	4.08%	0.97%	5.05%	\$ 190,281	\$ 7,084
2038	\$ 127,339	98.2%	2040	\$ 3,890,401	4.11%	0.90%	5.01%	\$ 194,909	\$ 4,628
2039	\$ 98,629	98.6%	2041	\$ 4,016,839	4.15%	0.82%	4.97%	\$ 199,637	\$ 4,728
2040	\$ 69,642	99.1%	2042	\$ 4,147,386	4.18%	0.72%	4.90%	\$ 203,222	\$ 3,585
2041	\$ 40,565	99.5%	2043	\$ 4,282,176	4.21%	0.64%	4.85%	\$ 207,686	\$ 4,464
2042	\$ 12,767	99.8%	2044	\$ 4,421,347	4.23%	0.31%	4.54%	\$ 200,729	\$ (6,957)
2043	\$ (14,766)	100.2%	2045	\$ 4,565,041	4.25%	-0.02%	4.23%	\$ 193,101	\$ (7,628)
2044	\$ (29,427)	100.4%	2046	\$ 4,713,404	4.27%	-0.03%	4.24%	\$ 199,848	\$ 6,747
2045	\$ (29,525)	100.3%	2047	\$ 4,866,590	4.29%	-0.03%	4.26%	\$ 207,317	\$ 7,469

Detailed Scenario Test Results – Under Scenario 2 (Assuming 7.00% Market Return for 2022/2023)

RETIREMENT AND HEALTH PLANS

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

Valuation Year	June 30 of Valuation Year			City Contributions (July 15)					
	UAAL	Funded Ratio	Fiscal Year End	Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 6,811,009	71.6%	2023	\$ 2,258,725	11.37%	21.94%	33.31%	\$ 752,381	
2022	\$ 6,537,225	76.4%	2024	\$ 2,332,133	11.24%	22.12%	33.36%	\$ 778,000	\$ 25,619
2023	\$ 6,581,227	77.0%	2025	\$ 2,407,928	11.03%	22.55%	33.58%	\$ 808,582	\$ 30,582
2024	\$ 6,600,959	77.8%	2026	\$ 2,486,185	10.92%	21.15%	32.07%	\$ 797,319	\$ (11,263)
2025	\$ 6,640,472	78.4%	2027	\$ 2,566,986	11.41%	21.55%	32.96%	\$ 846,078	\$ 48,759
2026	\$ 6,650,826	79.0%	2028	\$ 2,650,413	11.26%	21.95%	33.21%	\$ 880,202	\$ 34,124
2027	\$ 6,490,675	80.2%	2029	\$ 2,736,552	11.11%	21.87%	32.98%	\$ 902,515	\$ 22,313
2028	\$ 6,861,709	79.7%	2030	\$ 2,825,490	10.98%	22.92%	33.90%	\$ 957,841	\$ 55,326
2029	\$ 6,700,354	80.7%	2031	\$ 2,917,318	10.83%	24.07%	34.90%	\$ 1,018,144	\$ 60,303
2030	\$ 6,474,986	81.9%	2032	\$ 3,012,131	10.69%	25.06%	35.75%	\$ 1,076,837	\$ 58,693
2031	\$ 6,175,602	83.1%	2033	\$ 3,110,025	10.56%	26.31%	36.87%	\$ 1,146,666	\$ 69,829
2032	\$ 5,799,209	84.5%	2034	\$ 3,211,101	10.43%	26.85%	37.28%	\$ 1,197,099	\$ 50,433
2033	\$ 5,328,953	86.1%	2035	\$ 3,315,462	10.32%	26.14%	36.46%	\$ 1,208,818	\$ 11,719
2034	\$ 4,778,786	87.8%	2036	\$ 3,423,214	10.20%	22.90%	33.10%	\$ 1,133,084	\$ (75,734)
2035	\$ 4,185,348	89.5%	2037	\$ 3,534,469	10.10%	21.04%	31.14%	\$ 1,100,634	\$ (32,450)
2036	\$ 3,639,287	91.0%	2038	\$ 3,649,339	10.03%	21.77%	31.80%	\$ 1,160,490	\$ 59,856
2037	\$ 3,098,806	92.5%	2039	\$ 3,767,943	9.95%	21.11%	31.06%	\$ 1,170,323	\$ 9,833
2038	\$ 2,465,777	94.1%	2040	\$ 3,890,401	9.89%	18.93%	28.82%	\$ 1,121,213	\$ (49,110)
2039	\$ 1,788,772	95.7%	2041	\$ 4,016,839	9.84%	18.31%	28.15%	\$ 1,130,740	\$ 9,527
2040	\$ 1,127,138	97.3%	2042	\$ 4,147,386	9.81%	16.11%	25.92%	\$ 1,075,003	\$ (55,737)
2041	\$ 420,361	99.0%	2043	\$ 4,282,176	9.77%	15.53%	25.30%	\$ 1,083,391	\$ 8,388
2042	\$ (264,702)	100.6%	2044	\$ 4,421,347	9.73%	-0.04%	9.69%	\$ 428,428	\$ (654,963)
2043	\$ (993,450)	102.4%	2045	\$ 4,565,041	9.70%	-1.20%	8.50%	\$ 388,028	\$ (40,400)
2044	\$ (1,061,955)	102.6%	2046	\$ 4,713,404	9.68%	-1.24%	8.44%	\$ 397,811	\$ 9,783
2045	\$ (1,078,158)	102.7%	2047	\$ 4,866,590	9.67%	-1.22%	8.45%	\$ 411,227	\$ 13,416

Detailed Scenario Test Results – Under Scenario 3 (Assuming 14.00% Market Return for 2022/2023)

RETIREMENT PLAN

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

Valuation Year	June 30 of Valuation Year			City Contributions (July 15)					
	UAAL	Funded Ratio	Fiscal Year End	Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 6,621,308	71.6%	2023	\$ 2,258,725	7.75%	21.64%	29.39%	\$ 663,839	
2022	\$ 6,429,484	73.3%	2024	\$ 2,332,133	7.64%	21.79%	29.43%	\$ 686,347	\$ 22,508
2023	\$ 6,281,249	74.8%	2025	\$ 2,407,928	7.38%	21.52%	28.90%	\$ 695,891	\$ 9,544
2024	\$ 6,022,459	76.6%	2026	\$ 2,486,185	7.24%	19.12%	26.36%	\$ 655,358	\$ (40,533)
2025	\$ 5,787,306	78.3%	2027	\$ 2,566,986	7.68%	18.55%	26.23%	\$ 673,321	\$ 17,963
2026	\$ 5,551,205	79.8%	2028	\$ 2,650,413	7.51%	18.06%	25.57%	\$ 677,711	\$ 4,390
2027	\$ 5,191,608	81.6%	2029	\$ 2,736,552	7.33%	17.25%	24.58%	\$ 672,644	\$ (5,067)
2028	\$ 5,294,681	81.8%	2030	\$ 2,825,490	7.16%	17.36%	24.52%	\$ 692,810	\$ 20,166
2029	\$ 4,972,474	83.4%	2031	\$ 2,917,318	6.99%	17.87%	24.86%	\$ 725,245	\$ 32,435
2030	\$ 4,793,288	84.4%	2032	\$ 3,012,131	6.83%	18.79%	25.62%	\$ 771,708	\$ 46,463
2031	\$ 4,568,502	85.4%	2033	\$ 3,110,025	6.66%	20.03%	26.69%	\$ 830,066	\$ 58,358
2032	\$ 4,279,798	86.6%	2034	\$ 3,211,101	6.50%	20.58%	27.08%	\$ 869,566	\$ 39,500
2033	\$ 3,910,509	88.0%	2035	\$ 3,315,462	6.35%	19.86%	26.21%	\$ 868,983	\$ (583)
2034	\$ 3,475,078	89.5%	2036	\$ 3,423,214	6.21%	16.61%	22.82%	\$ 781,178	\$ (87,805)
2035	\$ 3,011,662	91.1%	2037	\$ 3,534,469	6.08%	14.75%	20.83%	\$ 736,230	\$ (44,948)
2036	\$ 2,611,882	92.3%	2038	\$ 3,649,339	5.97%	15.49%	21.46%	\$ 783,148	\$ 46,918
2037	\$ 2,235,752	93.5%	2039	\$ 3,767,943	5.87%	14.82%	20.69%	\$ 779,587	\$ (3,561)
2038	\$ 1,786,229	94.8%	2040	\$ 3,890,401	5.78%	13.33%	19.11%	\$ 743,456	\$ (36,131)
2039	\$ 1,313,364	96.2%	2041	\$ 4,016,839	5.69%	13.78%	19.47%	\$ 782,079	\$ 38,623
2040	\$ 849,157	97.5%	2042	\$ 4,147,386	5.63%	12.63%	18.26%	\$ 757,313	\$ (24,766)
2041	\$ 316,331	99.1%	2043	\$ 4,282,176	5.56%	13.02%	18.58%	\$ 795,628	\$ 38,315
2042	\$ (223,341)	100.7%	2044	\$ 4,421,347	5.50%	-0.27%	5.23%	\$ 231,236	\$ (564,392)
2043	\$ (835,543)	102.5%	2045	\$ 4,565,041	5.45%	-1.01%	4.44%	\$ 202,688	\$ (28,548)
2044	\$ (882,678)	102.7%	2046	\$ 4,713,404	5.41%	-1.03%	4.38%	\$ 206,447	\$ 3,759
2045	\$ (896,598)	102.9%	2047	\$ 4,866,590	5.38%	-1.01%	4.37%	\$ 212,670	\$ 6,223

Detailed Scenario Test Results – Under Scenario 3 (Assuming 14.00% Market Return for 2022/2023)

HEALTH PLAN

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

June 30 of Valuation Year			City Contributions (July 15)						
Valuation Year	UAAL	Funded Ratio	Fiscal Year End	Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 189,701	94.6%	2023	\$ 2,258,725	3.62%	0.30%	3.92%	\$ 88,542	
2022	\$ 107,741	97.0%	2024	\$ 2,332,133	3.60%	0.33%	3.93%	\$ 91,653	\$ 3,111
2023	\$ 93,456	97.5%	2025	\$ 2,407,928	3.65%	0.28%	3.93%	\$ 94,632	\$ 2,979
2024	\$ 64,262	98.4%	2026	\$ 2,486,185	3.68%	0.18%	3.86%	\$ 95,967	\$ 1,335
2025	\$ 43,450	98.9%	2027	\$ 2,566,986	3.73%	0.10%	3.83%	\$ 98,316	\$ 2,349
2026	\$ 17,826	99.6%	2028	\$ 2,650,413	3.75%	0.02%	3.77%	\$ 99,921	\$ 1,605
2027	\$ (28,965)	100.7%	2029	\$ 2,736,552	3.78%	-0.05%	3.73%	\$ 102,073	\$ 2,152
2028	\$ 20,067	99.6%	2030	\$ 2,825,490	3.82%	0.06%	3.88%	\$ 109,629	\$ 7,556
2029	\$ (11,897)	100.2%	2031	\$ 2,917,318	3.84%	-0.02%	3.82%	\$ 111,442	\$ 1,813
2030	\$ (13,885)	100.3%	2032	\$ 3,012,131	3.86%	-0.02%	3.84%	\$ 115,666	\$ 4,224
2031	\$ (13,327)	100.3%	2033	\$ 3,110,025	3.90%	-0.02%	3.88%	\$ 120,669	\$ 5,003
2032	\$ (12,365)	100.2%	2034	\$ 3,211,101	3.93%	-0.02%	3.91%	\$ 125,554	\$ 4,885
2033	\$ (11,576)	100.2%	2035	\$ 3,315,462	3.97%	-0.03%	3.94%	\$ 130,629	\$ 5,075
2034	\$ (10,640)	100.2%	2036	\$ 3,423,214	3.99%	-0.01%	3.98%	\$ 136,244	\$ 5,615
2035	\$ (9,526)	100.2%	2037	\$ 3,534,469	4.02%	-0.01%	4.01%	\$ 141,732	\$ 5,488
2036	\$ (8,605)	100.1%	2038	\$ 3,649,339	4.06%	-0.02%	4.04%	\$ 147,433	\$ 5,701
2037	\$ (7,595)	100.1%	2039	\$ 3,767,943	4.08%	-0.01%	4.07%	\$ 153,355	\$ 5,922
2038	\$ (6,437)	100.1%	2040	\$ 3,890,401	4.11%	0.00%	4.11%	\$ 159,895	\$ 6,540
2039	\$ (5,001)	100.1%	2041	\$ 4,016,839	4.15%	-0.01%	4.14%	\$ 166,297	\$ 6,402
2040	\$ (3,777)	100.1%	2042	\$ 4,147,386	4.18%	0.00%	4.18%	\$ 173,361	\$ 7,064
2041	\$ (2,320)	100.0%	2043	\$ 4,282,176	4.21%	0.00%	4.21%	\$ 180,280	\$ 6,919
2042	\$ (1,168)	100.0%	2044	\$ 4,421,347	4.23%	0.00%	4.23%	\$ 187,023	\$ 6,743
2043	\$ (352)	100.0%	2045	\$ 4,565,041	4.25%	0.00%	4.25%	\$ 194,014	\$ 6,991
2044	\$ 661	100.0%	2046	\$ 4,713,404	4.27%	0.00%	4.27%	\$ 201,262	\$ 7,248
2045	\$ 1,693	100.0%	2047	\$ 4,866,590	4.29%	0.00%	4.29%	\$ 208,777	\$ 7,515

Note: The timing lag between the normal cost calculated as of the valuation year and the actual normal cost in the year the contribution is made creates a small drag on the funded ratio starting in valuation year 2031. This drag is usually offset by the interest on the overfunded position. However, because the overfunded position is so small in this scenario, 100.3% in 2030, the interest credit is less than the impact of the normal cost timing delay. From a practical standpoint, the funded ratio in this scenario is essentially 100% starting in 2029.

Detailed Scenario Test Results – Under Scenario 3 (Assuming 14.00% Market Return for 2022/2023)

RETIREMENT AND HEALTH PLANS

Projection of UAAL, Funded Ratio and City Contributions
(Contributions Received on July 15)
(\$ In Thousands)

Valuation Year	June 30 of Valuation Year		Fiscal Year End	City Contributions (July 15)					
	UAAL	Funded Ratio		Fiscal Year Pay	Normal Cost	UAAL Amortization	Total Rate	Contribution Amount	Incremental Increase
2021	\$ 6,811,009	71.6%	2023	\$ 2,258,725	11.37%	21.94%	33.31%	\$ 752,381	
2022	\$ 6,537,225	76.4%	2024	\$ 2,332,133	11.24%	22.12%	33.36%	\$ 778,000	\$ 25,619
2023	\$ 6,374,705	77.8%	2025	\$ 2,407,928	11.03%	21.80%	32.83%	\$ 790,523	\$ 12,523
2024	\$ 6,086,721	79.5%	2026	\$ 2,486,185	10.92%	19.30%	30.22%	\$ 751,325	\$ (39,198)
2025	\$ 5,830,756	81.0%	2027	\$ 2,566,986	11.41%	18.65%	30.06%	\$ 771,637	\$ 20,312
2026	\$ 5,569,031	82.5%	2028	\$ 2,650,413	11.26%	18.08%	29.34%	\$ 777,632	\$ 5,995
2027	\$ 5,162,643	84.2%	2029	\$ 2,736,552	11.11%	17.20%	28.31%	\$ 774,717	\$ (2,915)
2028	\$ 5,314,748	84.3%	2030	\$ 2,825,490	10.98%	17.42%	28.40%	\$ 802,439	\$ 27,722
2029	\$ 4,960,577	85.7%	2031	\$ 2,917,318	10.83%	17.85%	28.68%	\$ 836,687	\$ 34,248
2030	\$ 4,779,403	86.6%	2032	\$ 3,012,131	10.69%	18.77%	29.46%	\$ 887,374	\$ 50,687
2031	\$ 4,555,175	87.6%	2033	\$ 3,110,025	10.56%	20.01%	30.57%	\$ 950,735	\$ 63,361
2032	\$ 4,267,433	88.6%	2034	\$ 3,211,101	10.43%	20.56%	30.99%	\$ 995,120	\$ 44,385
2033	\$ 3,898,933	89.8%	2035	\$ 3,315,462	10.32%	19.83%	30.15%	\$ 999,612	\$ 4,492
2034	\$ 3,464,438	91.2%	2036	\$ 3,423,214	10.20%	16.60%	26.80%	\$ 917,422	\$ (82,190)
2035	\$ 3,002,136	92.5%	2037	\$ 3,534,469	10.10%	14.74%	24.84%	\$ 877,962	\$ (39,460)
2036	\$ 2,603,277	93.6%	2038	\$ 3,649,339	10.03%	15.47%	25.50%	\$ 930,581	\$ 52,619
2037	\$ 2,228,157	94.6%	2039	\$ 3,767,943	9.95%	14.81%	24.76%	\$ 932,942	\$ 2,361
2038	\$ 1,779,792	95.7%	2040	\$ 3,890,401	9.89%	13.33%	23.22%	\$ 903,351	\$ (29,591)
2039	\$ 1,308,363	96.9%	2041	\$ 4,016,839	9.84%	13.77%	23.61%	\$ 948,376	\$ 45,025
2040	\$ 845,380	98.0%	2042	\$ 4,147,386	9.81%	12.63%	22.44%	\$ 930,674	\$ (17,702)
2041	\$ 314,011	99.3%	2043	\$ 4,282,176	9.77%	13.02%	22.79%	\$ 975,908	\$ 45,234
2042	\$ (224,509)	100.5%	2044	\$ 4,421,347	9.73%	-0.27%	9.46%	\$ 418,259	\$ (557,649)
2043	\$ (835,895)	102.0%	2045	\$ 4,565,041	9.70%	-1.01%	8.69%	\$ 396,702	\$ (21,557)
2044	\$ (882,017)	102.2%	2046	\$ 4,713,404	9.68%	-1.03%	8.65%	\$ 407,709	\$ 11,007
2045	\$ (894,905)	102.2%	2047	\$ 4,866,590	9.67%	-1.01%	8.66%	\$ 421,447	\$ 13,738

Historical Funded Status, UAAL, and Employer Contribution Rates

RETIREMENT AND HEALTH PLANS

Valuation Date	Market Value Basis		Valuation Value Basis		Aggregate Employer Contribution Rate (% of Payroll – Contributions Received on July 15) ⁽¹⁾
	Funded Status	UAAL	Funded Status	UAAL	
June 30, 2013	68.7%	\$5.4B	69.1%	\$5.3B	26.56%
June 30, 2014	73.4%	\$5.0B	68.1%	\$6.0B	28.60%
June 30, 2015	71.9%	\$5.5B	70.7%	\$5.7B	27.62%
June 30, 2016	69.0%	\$6.3B	72.6%	\$5.5B	27.13%
June 30, 2017	72.8%	\$5.8B	72.8%	\$5.8B	28.16%
June 30, 2018	72.9%	\$6.3B	71.6%	\$6.6B	29.66%
June 30, 2019	73.1%	\$6.5B	73.1%	\$6.5B	29.12%
June 30, 2020	68.4%	\$8.2B	71.6%	\$7.4B	32.25%
June 30, 2021	84.7%	\$4.1B	74.6%	\$6.8B	33.31%
June 30, 2022	73.6%	\$7.3B	76.4%	\$6.5B	33.36%

⁽¹⁾ For the June 30, 2013 – 2014 valuation dates, the rates shown are with adjustment for the five-year phase-in of the increase in the employer contribution rates due to assumption changes from the 2011 experience study. The rates without adjustment for those years were 27.11% and 28.88%, respectively.