Alameda County Employees' Retirement Association
BOARD OF RETIREMENT

ACTUARIAL COMMITTEE/BOARD MEETING
NOTICE and AGENDA

THIS MEETING WILL BE CONDUCTED VIA TELECONFERENCE PER GOV'T CODE § 54953(e)

ACERA MISSION:

To provide ACERA members and employers with flexible, cost-effective, participant-oriented benefits through prudent investment management and superior member services.

Thursday, June 16, 2022
11:00 am

ZOOM INSTRUCTIONS	COMMITTEE MEMBERS	
The public can view the Teleconference and comment via audio during the meeting. To join this Teleconference, please click on the link below. https://zoom.us/join Call-In Number: 1 699 900 6833 Webinar ID: 879 6337 8479 Passcode: 699406 For help joining a Zoom meeting, see:https://support.zoom.us/hc/en-us/articles/201362193	**OPHELIA BASGAL, CHAIR**	**APPOINTED**
	HENRY LEVY, VICE CHAIR	**TREASURER**
	KEITH CARSON	**APPOINTED**
	LIZ KOPPENHAVER	**ELECTED RETIRED**
	GEORGE WOOD	**ELECTED GENERAL**

This is a meeting of the Actuarial Committee if a quorum of the Actuarial Committee attends, and it is a meeting of the Board if a quorum of the Board attends. This is a joint meeting of the Actuarial Committee and the Board if a quorum of each attends.

The order of agenda items is subject to change without notice. Board and Committee agendas and minutes, and all documents distributed to the Board or a Committee in connection with a public meeting (unless exempt from disclosure), are available online at www.acera.org.

Note regarding public comments: Public comments are limited to four (4) minutes per person in total.

Note regarding accommodations: The Board of Retirement will provide reasonable accommodations for persons with special needs of accessibility who plan to attend Board meetings. Please contact ACERA at (510) 628-3000 to arrange for accommodation.

ACTUARIAL COMMITTEE/BOARD MEETING

Call to Order: 11:00 am

Roll Call

Public Input

Action Items: Matters for Discussion and Possible Motion by the Committee

None

Information Items: These items are not presented for Committee action but consist of status updates and cyclical reports

1. Renewal of Segal Contract

   -Lisa Johnson

2. Segal presentation of the deterministic projections as part of the Risk Assessment Report based on the Acturarial Valuation and Review as of December 31, 2021

   -Lisa Johnson

   -Andy Yeung, Segal

   -Eva Yum, Segal

Trustee Input

Future Discussion Items

None

Establishment of Next Meeting Date

TBD

Adjournment

MEMORANDUM TO THE ACTUARIAL COMMITTEE

DATE: June 16, 2022

TO: Members of the Actuarial Committee

FROM: Lisa Johnson, Assistant Chief Executive Officer

SUBJECT: Engaging an Actuarial Consultant

Background

The original agreement between ACERA and Segal was for actuarial services beginning with the plan year ending December 31, 2004. Since then, the Board of Retirement (Board) has hired an auditing actuary to audit Segal's reports in lieu of issuing an RFP for an actuarial consulting firm. This decision is in accordance with the Government Finance Officers Association (GFOA) Best Practices for actuarial consulting services and provides an opportunity to evaluate a consulting actuary's work. The cost of the past actuary audits was approximately $120,000.

The Service Provider Policy (Policy) defines "Board Approved Service Providers" as those service providers that only the Board has the authority to appoint regardless of the estimated annual costs. For the purpose here, those service providers include the actuary and auditing actuary. The Policy states the **"The Board may determine whether to issue a Request for Information (RFI), a Request for Proposal (RFP), or make a selection based upon Staff recommendation or sole source options"** (Service Provider Policy [1] (2020), p.3, Section IV, (B) **1). Additionally, the Policy states that ACERA will not contract with the same Board Approved Service Provider for more than five (5) consecutive years without Board approval.**

Segal's current contract expires December 31, 2022. Staff is seeking guidance on how to procure actuarial services in anticipation of the current contract expiration date.

Proposed Options

1. Issue an RFP to engage an actuarial consultant. In creating the RFP, Staff seeks direction on whether the Board wants to specify that the qualification of an actuary must include "37 Act retirement system experience. (Note: Due to the length of our contract with Segal, ACERA has retained an unlimited liability clause. This level of liability coverage is no longer standard for actuarial firms. Consequently, if an RFP is conducted, it is unlikely that ACERA will retain this same level of liability coverage.)
2. Retain Segal and hire an actuarial firm to audit Segal's actuarial work.
3. As allowed by the Policy, the Board could also directly retain an actuarial consultant. If the Board selects this option, Staff recommends that the selected actuary undergo an evaluation of customer service, technical skills, etc. prior to contracting with the firm.

Prior Actuarial Audit Service Outreach

In 2016, there were three actuarial consulting firms in California providing services for and at the time engaged by the 20 county retirement systems governed by the County Employees' Retirement Law of 1937 ('37 Act). Of the three firms who were capable of performing the work requested, Segal, Cheiron, and Milliman , only two responded to the RFI – Segal and Cheiron.

[1] See Attachment 1, Service Provider Policy

Recommendation

Staff recommends option 2 for the following reasons: a). few firms possess breadth and depth of '37 Act, SRBR experience and knowledge of ACERA policies and past practices that Segal possesses; b). the probability of losing the unlimited liability option should ACERA engage in the RFP process; and c). the complexity of the health and SRBR liability valuations. By hiring an auditing actuary, ACERA can ensure the quality of the work performed by Segal.

ALAMEDA COUNTY EMPLOYEES' RETIREMENT ASSOCIATION

Service Provider Policy

I. Purpose

The purpose of the Service Provider Policy (Policy) is to establish the Board of Retirement's (Board) practices for selection and retention of Board Approved Service Providers and General Service Providers, as those terms are defined herein.

II. Definitions

A. "Board Approved Service Providers" refers to those service providers that only the Board has the authority to appoint regardless of the Estimated Annual Cost as defined below. These include: Actuary, External Auditor, Custodian Bank, and Actuarial Auditor.

B. "General Service Providers" refers to any business or individual retained by the Board to provide services to ACERA (including software providers), other than Investment Service Providers, Legal Service Providers, Product Providers, Temporary Employment Service Providers, and Government Providers, as those terms are defined herein.

C. "Investment Service Providers" refers to Investment Consultants, Investment Managers, or any individuals or businesses that provide investment-related services or products. The process for appointment of Investment Service Providers is set forth in ACERA's investment policies and guidelines.

D. "Legal Service Providers" refers to service providers that provide legal counsel, litigation support, investigative services and mediation services to ACERA. The process for engagement of Legal Service Providers is set forth in the Board's Outside Counsel Policy.

E. "Product Providers" refers to providers that supply products for ACERA's normal business needs (e.g., office supplies, furniture, computer hardware, etc.).

F. "Government Providers" refers to those county and state agencies that ACERA contracts with to obtain services. Such county and state agencies include, but are not limited to: Alameda County Registrar of Voters, Alameda County Human Resources Center, Alameda County Counsel's Office, and Alameda County Lakeside Group. "Government Provider" contracts include inter-agency agreements designed to clarify roles and

responsibilities between the various county agencies (i.e., 401(h) Inter-Agency Agreements with Participating Employers.)

G. "Temporary Employment Services Providers" refers to service providers that ACERA contracts with to supply temporary staffing.

H. "Contract" includes contracts, amended and restated contracts, amendments to contracts, and addenda.

I. "Estimated Annual Cost" of a Contract is the value of the Contract divided by the term (in years) of the Contract, based on a calendar year. Where there are multiple Contracts between ACERA and the same entity or a closely related subsidiary during a given calendar year, the "Estimated Annual Cost" is the combined value of the multiple Contracts.

J. "Project" is a Board-approved project for a specified amount of money that will be delegated to Staff to monitor and implement.

III. Scope

A. This Policy applies to Board Approved Service Providers and General Service Providers, as defined above.

B. This Policy does not apply to Investment Service Providers, Legal Service Providers, Product Providers, Government Providers and Temporary Employment Service Providers, as defined above.

C. The CEO is delegated authority over the selection and retention of Product Providers, Government Providers and Temporary Employment Service Providers.

IV. Policy Guidelines

A. General Guidelines

1. The selection and retention of Board Approved Service Providers and General Service Providers will be made in the best interests of the members and beneficiaries of ACERA, in keeping with the fiduciary responsibilities of the Board and Staff.

2. The selection of Board Approved Service Providers and General Service Providers will reflect a level of rigor that is commensurate with the importance and materiality of the service in question. The selection shall be efficient, diligent, transparent, economical and fair.

3. ACERA will consider as broad a universe of qualified service providers that is practical and reasonable given budgetary, staffing, time, and other relevant constraints.

4. Oral contracts are prohibited.

5. No Board member or Staff member may participate in any way in the selection of a Board Approved Service Provider or General Service Provider Contract (or any other Contract) if a conflict of interest exists pursuant to applicable conflict of interest laws, regulations, and Board policies. A Board or Staff member with any such conflict of interest must disclose that conflict of interest to the Chief Counsel, so that the Chief Counsel can ensure compliance with all conflict of interest laws.

B. Selection of Board Approved Service Providers

1. The Board selects and contracts with Board Approved Service Providers. The Board may determine whether to issue a Request for Information (RFI), a Request for Proposal (RFP), or select based upon Staff recommendation or sole source options.

2. If the Board decides to issue an RFP, the following steps provide guidance. Prior to conducting a search for a Board Approved Service Provider, Staff will present a written summary to the Board, which shall include:

   a. The type of service provider being sought and the supporting rationale;

   b. The objectives and selection criteria and their relative importance;

   c. An estimated timeline for completion of the search process; and

   d. A description of the search methodology that Staff deems most appropriate and cost effective under the particular circumstances, including:

      1) Whether a consultant is to be used in the search process;

      2) The due diligence efforts to be undertaken, including such efforts as site visits or reference checks. A copy of any criteria and weights to be used will be attached for information purposes.

3) A copy of the proposed RFP; and

4) Such other information that the Staff believes may assist the Board in better understanding the search process.

3. Staff will provide the Board or a designated committee of the Board with periodic reports on the status of all search processes involving Board Approved Service Providers.

4. Upon completion of the analysis and due diligence involved in a search process for a Board Approved Service Provider, Staff will provide the Board or a designated committee of the Board with a report containing, at a minimum:

   a. A description of the search activities undertaken;

   b. A list of finalist candidates and analysis concerning the candidates;

   c. Confirmation of compliance with the objectives, selection criteria and search methodology that were presented to the Board prior to the commencement of the search, or an explanation of any deviations that occurred; and

   d. A description of performance expectations.

5. The Board, or a committee of the Board, will interview candidates recommended for appointment as Board Approved Service Providers.

C. Selection of General Service Providers

1. General Service Providers will be selected and contracted with as follows:

   a. If the Estimated Annual Cost of the proposed Contract is less than $75,000, the CEO or Designee may select and contract with the Provider;

   b. If the Estimated Annual Cost of the proposed Contract is between $75,000 and $150,000, the CEO may select and contract with the Provider, with the Board Chair's written approval;

   c. If the Estimated Annual Cost of the proposed Contract is more than $150,000, the Board must approve ACERA's involvement in the Contract. In doing so the Board may issue an RFP, but is not required to do so.

d. In lieu of applying (a)–(c) above, if the Board approves the total cost allocation for a Project, the CEO or the CEO's designee can approve all contracts required to implement the Project, so long as the value of all the contracts for the Project do not exceed the Board's original cost allocation for the Project.

D. Monitoring

The CEO and/or appropriate Staff will monitor the performance and services provided by all Board Approved Service Providers and General Service Providers.

E. Contract Terms

1. ACERA will not contract with the same Board Approved Service Provider or General Service Provider for more than five consecutive years without Board approval of a longer term.

2. Except where business practices prohibit, all Contracts covered by this policy will provide that the CEO or the Board may terminate the Contract upon 30-day notice, with or without cause.

3. Contracts must require the filing of statements of economic interests (Fair Political Practices Commission Form 700) when such filings are required by ACERA's Conflict of Interest Code.

V. Policy Review

The Governance Committees shall review the Service Provider Policy at least every three years to ensure that it remains relevant and appropriate.

VI. Policy History

A. This policy was adopted by the Board at its September 29, 2004, Board Offsite Retreat.

B. The Board reviewed and amended on December 17, 2020.[1]

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[1] *The Board adopted this policy at its September 29, 2004, Board Offsite Retreat. The Board reviewed and amended the policy on August 16, 2007; June 17, 2010; August 18, 2011; December 15, 2011; March 21, 2013; December 19, 2013; December 17, 2015; and November 9, 2017.*

MEMORANDUM TO THE ACTUARIAL COMMITTEE

DATE: June 16, 2022

TO: Members of the Actuarial Committee

FROM: Lisa Johnson, Assistant Chief Executive Officer

SUBJECT: Actuarial Standard of Practice No 51 (ASOP No. 51), Risk Assessment, Including Review of Funded Status of the Pension Plan as of December 31, 2021

Executive Summary

On June 16, 2022 staff and Segal will present the results of a deterministic scenario test used to evaluate and address the risk exposure related to ACERA's Actuarial Valuation and Review as of December 31, 2021. In February 2019, staff obtained Board approval for Segal to provide risk reports that satisfy disclosure requirements for the (then) new ASOP No. 51, effective for a measurement date on or after November 1, 2018 and for ACERA's December 31, 2021 valuation.

Deterministic Scenario Test: Assesses the impact of one possible event or several events, for example, market return that is higher or lower than the assumed 7.00% in the next year.

Recommended Scenario Test for ACERA: Consider the impact of portfolio market return in 2022 at 0.00%, 7.00%, or 14.0% in December 31, 2021 risk report.

Attachment:

ACERA Risk Assessment, Including Review of Funded Status of the Pension Plan as of December 31, 2021

Alameda County Employees' Retirement Association

Risk Assessment

Including Review of Funded Status of the Pension Plan as of December 31, 2021

June 7, 2022

Andy Yeung, ASA, MAAA, FCA, EA
Eva Yum, FSA, MAAA, EA

Segal

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Section 1: Introduction and Executive Summary

Introduction

The purpose of this report is to assist the Board of Retirement,[1] participating employers and members and other stakeholders to better understand and assess the risk profile of the Association, as well as the particular risks inherent in using a fixed set of actuarial assumptions in preparing the results in our December 31, 2021 funding valuation for the Pension Plan ("the Plan") of the Alameda County Employees' Retirement Association ("ACERA").

The results included in our December 31, 2021 funding valuation report for the Pension Plan were prepared based on a fixed set of economic and non-economic actuarial assumptions under the premise that future experience of ACERA 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 December 31, 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 December 31, 2021. 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 December 31, 2021. 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. 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 it was effective with ACERA's December 31, 2018 actuarial valuation for benefits provided by the Pension Plan. 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

[1] This risk report has been prepared at the request of the Board of Retirement to assist in administering the Plan. This risk report may not otherwise be copied or reproduced in any form without the consent of the Board of Retirement 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.

relevant to ACERA 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 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 ACERA.

The Standard also requires disclosure of plan maturity measures and other historical information that are significant to understanding the risks associated with the Pension Plan and this information is included in this report. Besides information for the Pension Plan, we have included as part of the Plan design under Article 5.5 of the Statute the amount of "excess earnings" allocated from the Association's total investment portfolio to the Supplemental Retiree Benefit Reserve (SRBR) and the change in the sufficiency periods for benefits paid out of the SRBR. Based on our understanding of the statute which authorizes the SRBR, the investment return assumption used in the funding valuation has been developed without considering the impact of any future excess earnings allocation to the SRBR. However, for informational purposes, we have included in this report the same disclosure of such allocation that we have previously included in our funding valuation report.

Plan Risk Assessment

In Section 2, we start by discussing some of the historical factors that have caused changes in ACERA's 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 ACERA 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 portfolio coming in differently from the current 7.00% annual investment return assumption used in the December 31, 2021 valuation.

ASOP 51 also requires disclosure of plan maturity measures and other historical information that are significant to understanding the risks associated with the Pension Plan and this information is included in this report.

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. The unfunded actuarial accrued liability (UAAL)[2] and contribution rates[3] decreased primarily as a result of additional voluntary County Safety and Livermore Area Recreation and Park District (LARPD) General contributions made by the two employers to reduce their UAAL and associated contribution rates,[4] expected contributions to reduce the UAAL principal, and favorable investment and non-investment experience, offset somewhat by the strengthening of the actuarial assumptions used in preparing the valuations.

	Market Value Basis		Valuation Value Basis		Total (Aggregate) Employer Contribution Rate (% of Payroll)
Valuation Date	Funded Status	UAAL	Funded Status	UAAL	
December 31, 2012	75.4%	$1,625.0 M	73.9%	$1,729.0 M	24.2%
December 31, 2021	92.8%	$790.8 M	86.5%	$1,476.8 M	23.4%

Supplemental Retiree Benefit Reserve

In the 10 valuations from December 31, 2011 to 2020,[5] the assets available in the SRBR have increased from about $610 million to about $933 million. During this 10-year period, about $262 million in excess earnings were allocated to the SRBR. In the December 31, 2011 valuation, it was estimated that the assets in the SRBR would be sufficient to pay OPEB SRBR benefits for about 16 years (until around 2027) and non-OPEB SRBR benefits for about 20 years (until around 2031). In the December 31, 2020 valuation, it was estimated that the assets in the SRBR would be sufficient to pay OPEB SRBR benefits for about 22 years (until around 2042) and non-OPEB SRBR benefits for about 24 years (until around 2044).[6]

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[2] For instance, as a result of the last three experience studies, the UAAL increased by $460 million, $396 million, and $322 million in the December 31, 2014, December 31, 2017, and December 31, 2020 valuations, respectively, for a total of $1,178 million.

[3] For instance, as a result of the last three experience studies, the employer's total rate (normal cost plus UAAL) increased by 3.44% of payroll, 3.49% of payroll, and 2.44% of payroll in the December 31, 2014, December 31, 2017, and December 31, 2020 valuations, respectively, for a total of 9.37% of payroll.

[4] The County made voluntary County Safety contributions of $800 million on around June 29, 2021, and LARPD also made voluntary LARPD General contributions of $12.611 million on around June 29, 2021.

[5] We have not included the results from the December 31, 2021 SRBR valuation as the finalized results from that valuation will not be available until later in 2022.

[6] During the past 10 years, the Board took several actions to preserve the sufficiency period to pay benefits from the SRBR. For instance, the Board eliminated the Active Death Equity Benefit and froze the maximum Monthly Medical Allowance for several years.

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 unfavorable and favorable future market experience so that the impact of market performance can be better understood.

The total (aggregate) employer contribution rate for the plan is 23.4% of total payroll in the December 31, 2021 valuation. Using a deterministic projection,[7] this report shows the effect of either unfavorable (0.00%) or favorable (14.00%) hypothetical market returns for 2022 on key valuation results. In particular, the changes in the total employer contribution rate (relative to the December 31, 2021 valuation aggregate employer contribution rate of 23.4%) in the December 31, 2022 valuation and in the December 31, 2027 valuation (when all the investment gains or losses are fully recognized at the end of the five-year asset smoothing period) are as shown in the following table:

	2022 Single Plan-Year Investment Return		
Employer Contribution Rate Change	**0.00%**	**7.00% (Baseline)**	**14.00%**
December 31, 2022	-1.2% of payroll	-1.6% of payroll	-1.9% of payroll
December 31, 2027	-2.9% of payroll	-4.6% of payroll	-6.4% of payroll

Under the favorable (14.00%) and baseline hypothetical market return scenarios for 2022, the Association would be expected to reach or be close to full funding by December 31, 2028 and December 31, 2030, respectively, resulting in a larger relative change from the December 31, 2021 aggregate employer contribution rate than the unfavorable (0.00%) hypothetical market return scenario (as provided in Chart 6). Furthermore, under all three hypothetical market return scenarios for 2022, the Association would be expected to reach full funding within 11 years and the total employer contribution rate would be expected to approach about 10% of payroll.[8] This means that the Board's funding policy is very effective in achieving the general policy goal of achieving the long-term full funding of the costs of the benefits paid by ACERA.

[7] Based on our prior discussions with ACERA and the Board, in preparing the next Risk Report as of December 31, 2022 we will be supplementing the deterministic projections by another stochastic projection 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 December 31, 2022 valuation. In addition to providing the impact on employer rates and other metrics similar to those included in this Risk Report, we would also be able to quantify the impact of the 50/50 allocation of future excess earnings to the SRBR (for disclosure purposes) before we complete the next triennial experience study recommending assumptions for the December 31, 2023 valuation.

[8] This is the estimated normal cost rate for the employer, assuming no further assumption changes, method changes or experience that differs significantly from assumptions.

Plan Maturity Measures

During the past 10 valuations, the Association 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 31)* 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 32* and *Chart 14 on page 33,* respectively*)*. 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 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 ACERA continues 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

Funded Status and Change in Unfunded Actuarial Accrued Liabilities

One common measure of ACERA's financial status is the funded ratio. This ratio compares the valuation[9] and market value of assets to the actuarial accrued liabilities (AAL)[10] of ACERA. The overall level of funding of ACERA has increased mainly as a result of additional voluntary County Safety and LARPD General contributions made by the two employers in 2021 to reduce their UAAL and associated contribution rates, expected contributions to reduce the UAAL principal, and favorable investment and non-investment experience. The strengthening of the economic and non-economic assumptions especially in the last three triennial experience studies has had a somewhat offsetting impact. Those new actuarial assumptions were used starting in the December 31, 2014, 2017, and 2020 valuations. The funded ratios and the unfunded actuarial accrued liabilities[11] for the past 10 valuations from December 31, 2012 to 2021 measured using both actuarial and market value of assets bases are provided in *Chart 1*.

The factors that caused the changes in the UAAL for the past 10 valuations from December 31, 2012 to 2021 are specified in *Chart 2*. The results in *Chart 2* show the changes in the investment return assumption from 7.80% to 7.60% in the December 31, 2014 valuation, from 7.60% to 7.25% in the December 31, 2017 valuation, and from 7.25% to 7.00% in the December 31, 2020 valuation. These reductions together with the changes in the mortality tables and other assumptions from the last three triennial experience studies have by far the most impact on the UAAL for ACERA,[12] followed by the additional voluntary County Safety and LARPD General contributions in 2021 which had a somewhat offsetting impact.

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[9] The valuation value of assets is equal to the market value of assets excluding unrecognized returns from the last few years and any non-valuation reserves. 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 five-year period.

[10] 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.

[11] The amount by which the actuarial accrued liability of the plan exceeds (or is exceeded by) the assets of the plan.

[12] For instance, as a result of the last three experience studies, the UAAL increased by $460 million, $396 million, and $322 million in the December 31, 2014, December 31, 2017, and December 31, 2020 valuations, respectively, for a total of $1,178 million.

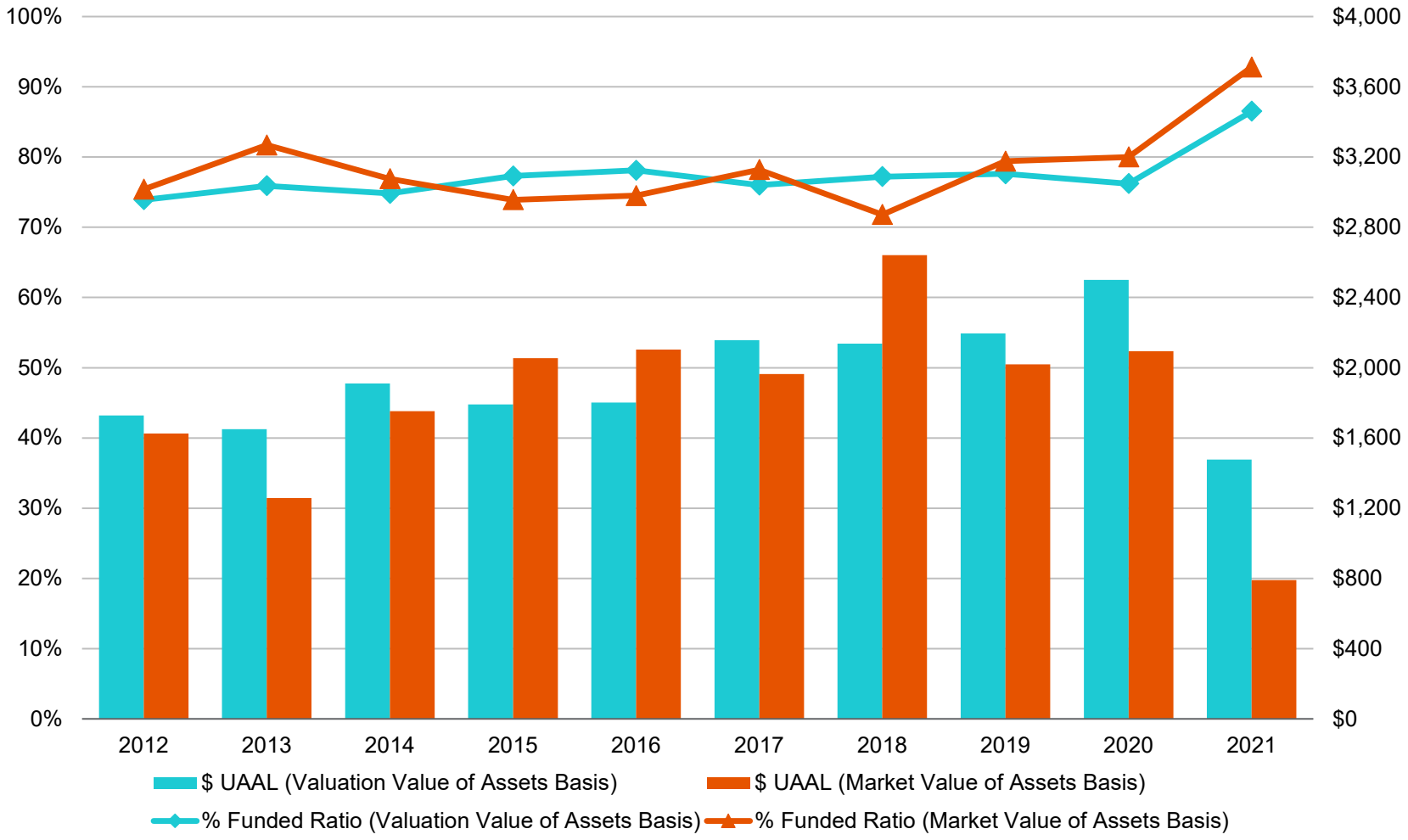
Chart 2 also shows overall favorable investment experience and favorable non-investment experience. The non-investment experience included smaller salary increases received by active members and smaller cost-of-living-adjustment (COLA) increases received by retirees and beneficiaries than expected under the actuarial assumptions. The non-investment experience also included the scheduled delay in implementing the contribution rates determined in the annual valuation.

Finally, prior to 2014, *Chart 2* shows some "negative amortization" under the longer amortization periods used in these years. Current amortization policy generally will not entail negative amortization in the future.

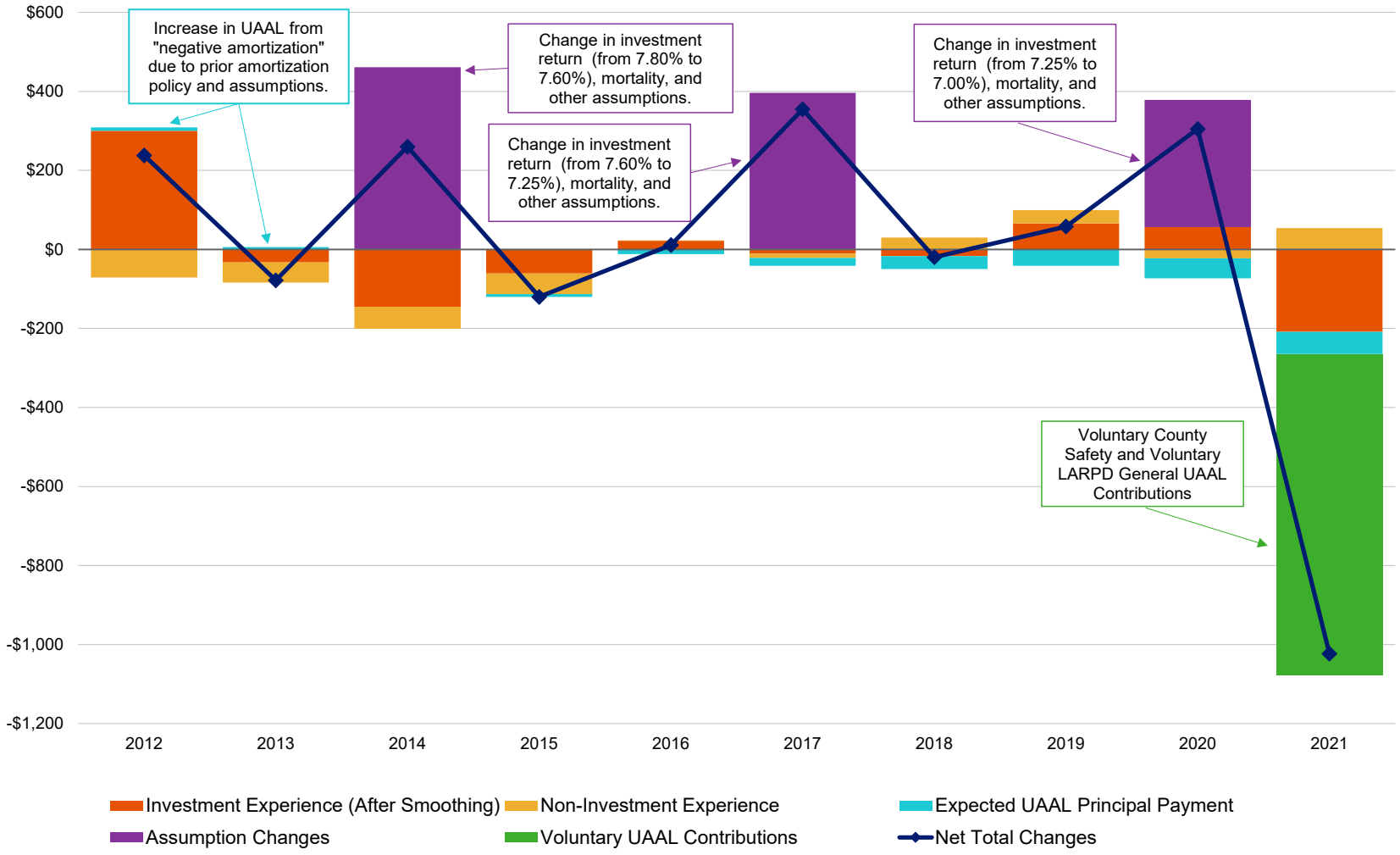
It is important to note that ACERA has taken strides in risk management and resulting long-term plan sustainability. This includes strengthening of assumptions, particularly the expected investment rate of return and mortality assumption (amount-weighted generational mortality tables for the Pension Plan), and adopting a funding policy that eliminates negative amortization and promotes intergenerational equity. Assumptions will continue to be reviewed in future experience studies to reflect the Plan's experience as well as future expectations. 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 are essential for ACERA's fiscal health going forward.

Chart 1

Funded Ratio (Percentages) and Dollar UAAL ($ Millions) in December 31, 2012 to 2021 Valuations



Factors that Changed UAAL in December 31, 2012 to 2021 Valuations ($ Millions)



Note: The primary source of investment losses starting in the December 31, 2008 valuation is the Great Recession, which was recognized in the valuation value of assets over five years ending December 31, 2012.

Employer Contribution Rates

The total (normal cost[13] plus UAAL payment) employer contribution rates determined in the December 31, 2012 to 2021 valuations are provided in *Chart 3* and the factors that caused the changes in the total aggregate employer rates[14] are provided in *Chart 4*.

The employer's aggregate normal cost rates in *Chart 3* has stayed relatively flat during the last 10 years. There had been increases in the employer's normal cost rates due to the changes in the actuarial assumptions. However, those increases were offset to some degree by the plan changes under the Public Employees' Pension Reform Act of 2013 (PEPRA) as new members have been enrolled in the lower cost PEPRA benefit tiers starting on January 1, 2013. *Chart 4* shows that the changes in the investment return (from 7.80% to 7.60% in the December 31, 2014 valuation, from 7.60% to 7.25% in the December 31, 2017 valuation, and from 7.25% to 7.00% in the December 31, 2020 valuation), mortality tables and other assumptions from the last three triennial experience studies have by far the most impact on increasing the UAAL contribution rates[15] for the employers. These UAAL rate increases were largely offset by the effect of the additional voluntary County Safety and LARPD General contributions in 2021.

[13] The normal cost is 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.

[14] There are separate contribution rates determined in the valuation for the General and Safety membership groups and for the different benefit tiers and employers. 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] For instance, as a result of the last three experience studies, the employer's total rate (normal cost plus UAAL) increased by 3.44% of payroll, 3.49% of payroll, and 2.44% of payroll in the December 31, 2014, December 31, 2017, and December 31, 2020 valuations, respectively, for a total of 9.37% of payroll.

Chart 3

Employer Contribution Rates in December 31, 2012 to 2021 Valuations
(% of Payroll)

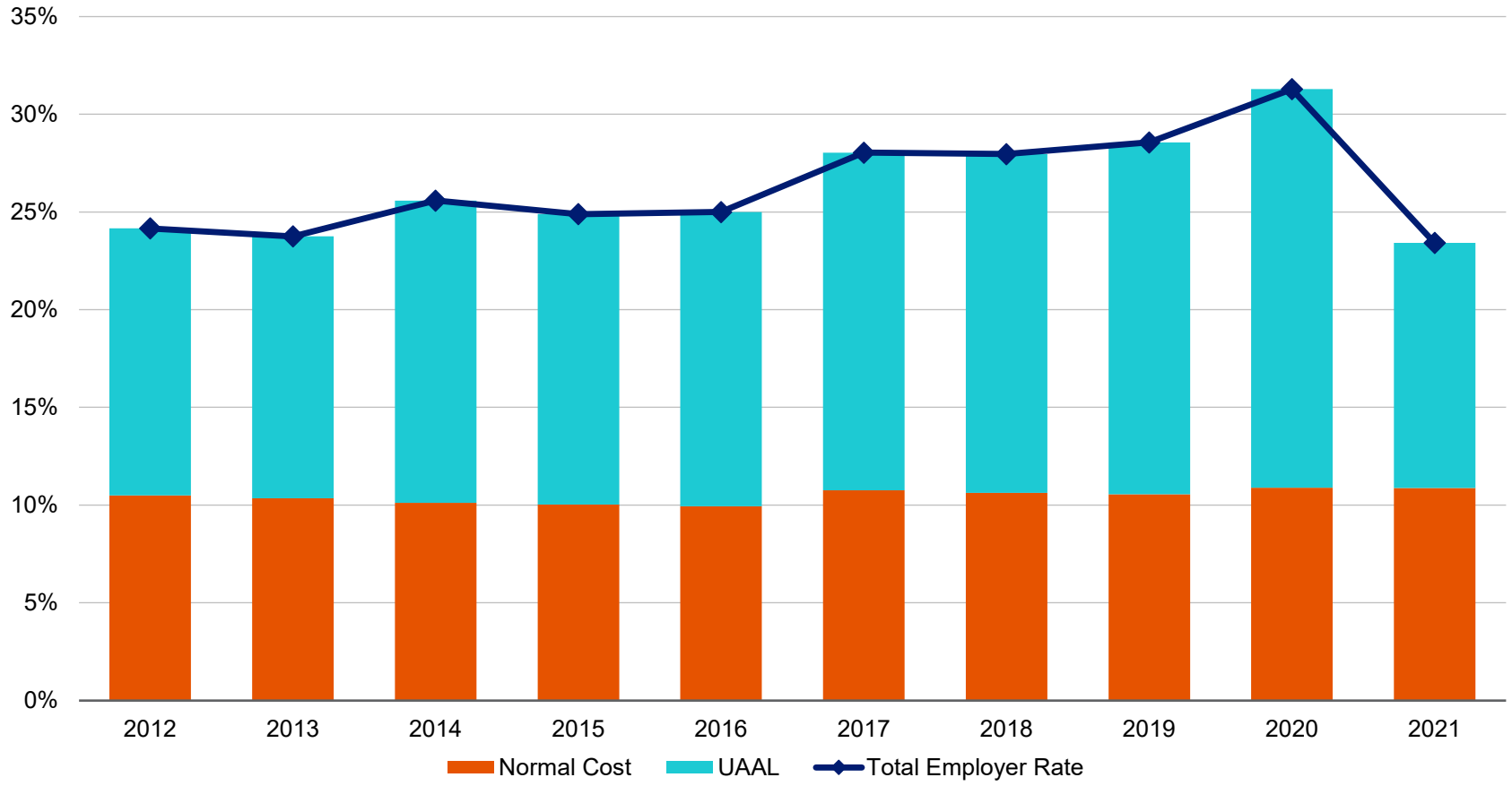
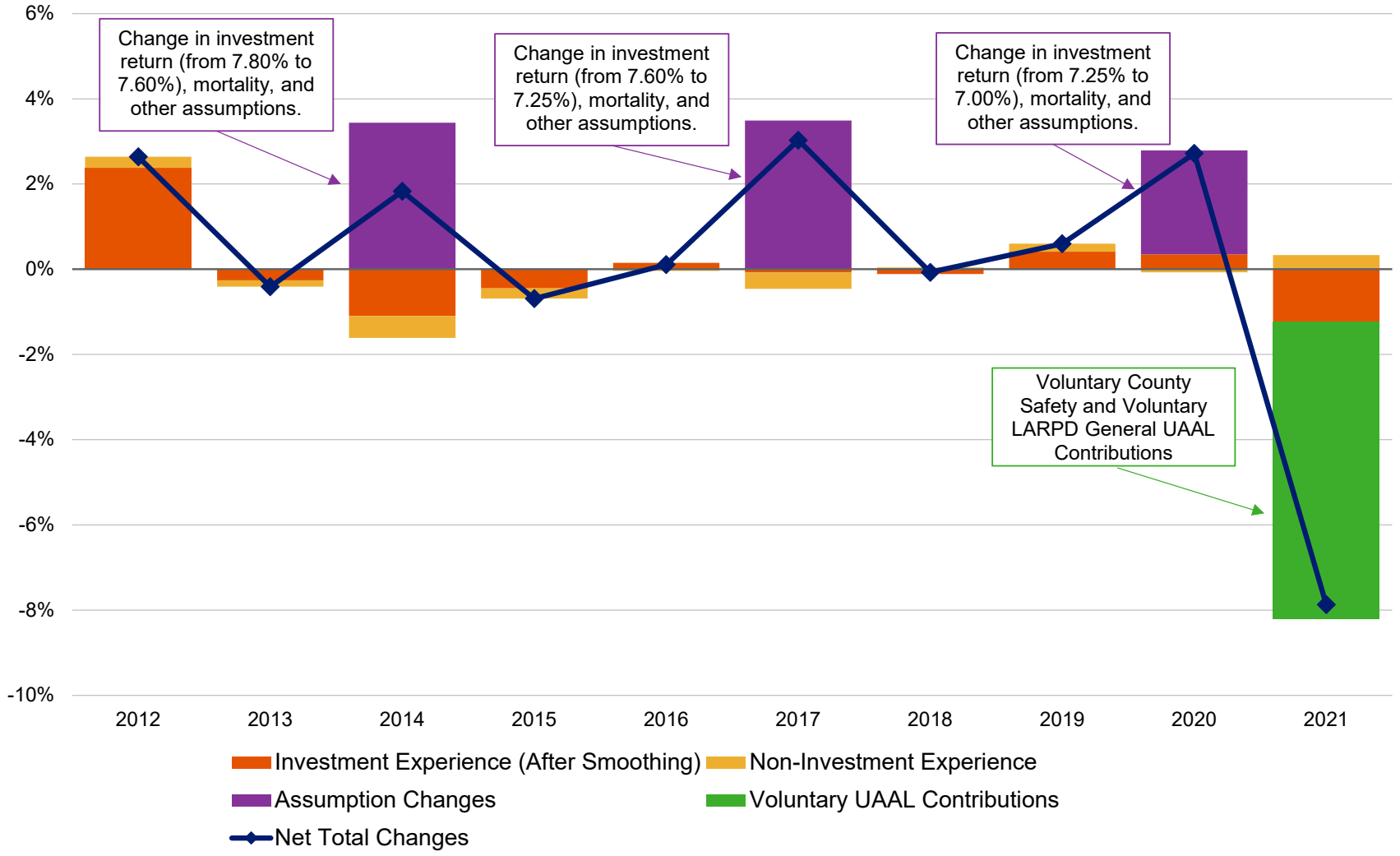


Chart 4

Factors that Affected Employer Contribution Rates in December 31, 2012 to 2021 Valuations (% of Payroll)



Note: The primary source of investment losses starting in the December 31, 2008 valuation is the Great Recession, which was recognized in the valuation value of assets over five years ending December 31, 2012.

Supplemental Retiree Benefit Reserve

As part of the Plan design, under Article 5.5 of the Statute, excess earnings[16] are allocated from the Association's total investment portfolio to the SRBR. As a result, besides paying benefits from the Pension Plan, ACERA also provides benefits using assets available in the SRBR. In the most recent actuarial study for the SRBR as of December 31, 2020,[17] there was about $933 million in assets available at the Board's discretion to provide non-vested retiree health subsidies[18] (other postemployment benefits or OPEB) and pension benefits[19] (non-OPEB).

In the 10 valuations from December 31, 2011 to 2020, the assets available in the SRBR have increased from about $610 million to about $933 million. During this 10-year period, about $262 million in excess earnings were allocated to the SRBR. In the December 31, 2011 valuation, it was estimated that the assets in the SRBR would be sufficient to pay OPEB SRBR benefits for about 16 years (until around 2027) and non-OPEB SRBR benefits for about 20 years (until around 2031). In the December 31, 2020 valuation, it was estimated that the assets in the SRBR would be sufficient to pay OPEB SRBR benefits for about 22 years (until around 2042) and non-OPEB SRBR benefits for about 24 years (until around 2044).[20]

[16] In general under the Board's interest crediting policy, earnings at one-half of the assumed annual valuation rate is credited every 6 months to reserves for the Pension Plan and the SRBR. After accumulating a 1% Contingency Reserve, any remaining earnings (excess earnings) is allocated on a 50/50 basis between the Pension Plan and the SRBR.

[17] We have not included the results from the December 31, 2021 SRBR valuation as the finalized results from that valuation will not be available until later in 2022.

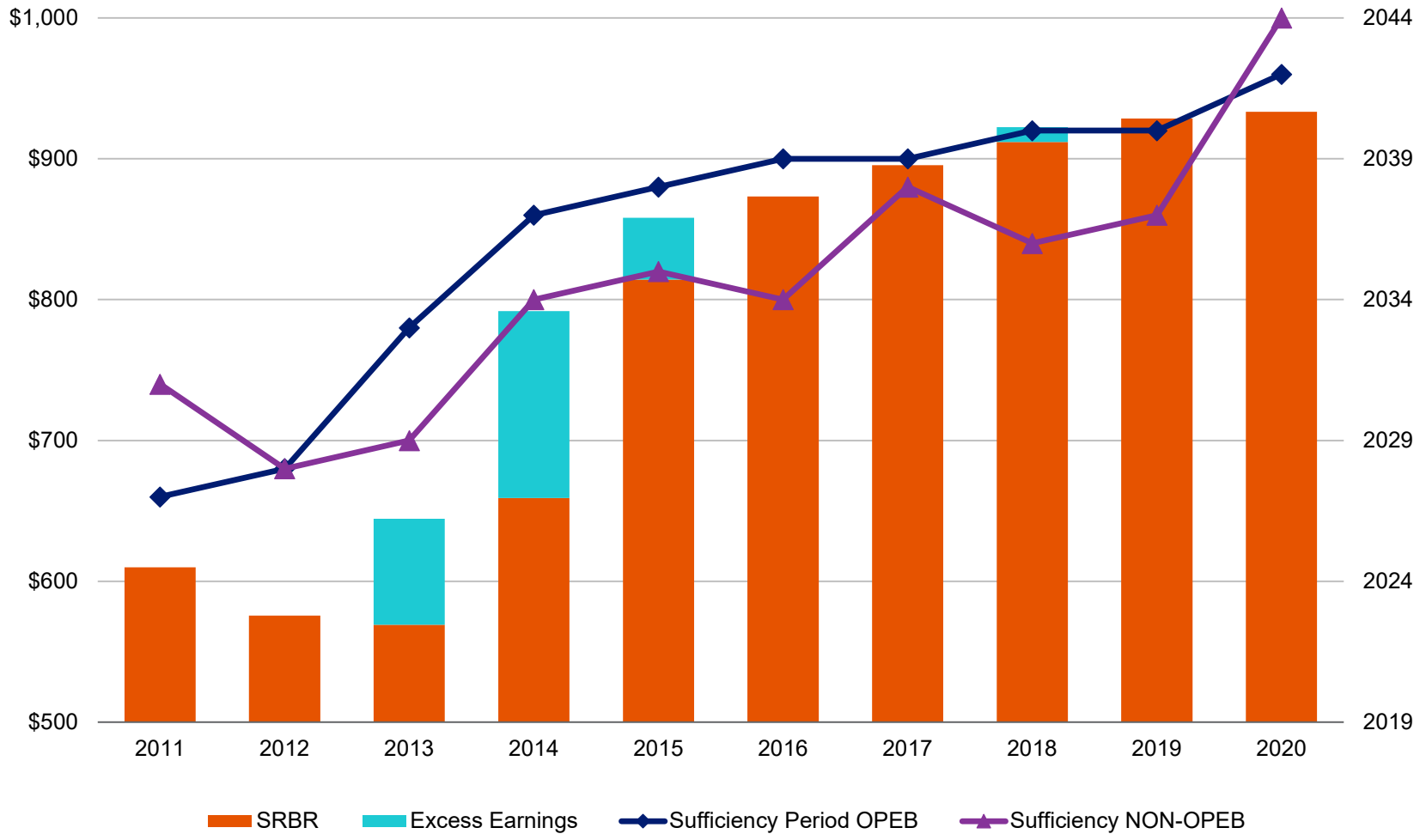
[18] The non-vested OPEB benefits include the Monthly Medical Allowance, reimbursement for premiums required for dental, vision and enrollment in Medicare Part B program.

[19] The non-vested pension benefits include supplemental COLAs and $1,000 lump sum retiree death benefits.

[20] During the past 10 years, the Board took several actions to preserve the sufficiency period to pay benefits from the SRBR. For instance, the Board eliminated the Active Death Equity Benefit and froze the maximum Monthly Medical Allowance for several years.

Chart 5

SRBR Assets ($ million) and Periods Benefits Can be Paid In December 31, 2011 to 2020 Valuations



Assessment of Primary Risk Factors Going Forward

As discussed in the Evaluation of Historical Trends section, in the 2012 to 2021 valuations the funded ratios and the employer contribution rates have changed mainly as a result of additional voluntary County Safety and LARPD General contributions made by the two employers in 2021 to reduce their UAAL and associated contribution rates, expected contributions to reduce the UAAL principal, and favorable investment and non-investment experience, offset somewhat by the changes in actuarial assumptions.

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 ACERA 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 for the Pension Plan: 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 employers the effect of unfavorable or favorable actuarial experience on the assets and the liabilities of ACERA.

- **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 later in this section so that ACERA can better understand the risk associated with earning either more or less than the assumed rate.

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

  The change to the amount-weighted mortality tables that reflect data from public sector retirement plans was the most major change to the non-economic assumptions in the last experience study. As can be observed from *Charts 2 and 4*, there had been relatively small impact on the UAAL and employer contribution rates due to non-investment related experience relative to the assumptions used in the last 10 valuations.

- **Plan design considerations** – the potential SRBR excess earnings allocations and the impact to investment return for the Pension Plan.

  As we have previously disclosed in the funding valuation report, the 7.00% investment return assumption used in the valuation for the Pension Plan has been developed without considering the impact of any future 50/50 excess earnings allocation to the SRBR. This is based on our understanding that Article 5.5 of the Statute, which authorizes the allocation of 50% of excess earnings to the SRBR, does not allow for the use of a different investment return for funding than is used for interest credit. This would appear in effect to preclude the prefunding of the SRBR through the use of an assumption lower than the market earnings assumption of 7.00%.

  Using a "stochastic" projection approach, we estimated that the 50/50 allocation of future excess earnings would have about the same impact as an "outflow" (i.e., assets not available to fund the benefits in the Pension Plan) that would average approximately 0.65% of assets over time. We note that the amount of deferred and unrecognized investment gains/losses as of the date of the valuation could have an impact on the measurement of the 50/50 allocation of excess earnings. For instance, if we were to take into consideration the $1,133 million in deferred investment gains as of December 31, 2021 and assumed that one-half of that gain would be allocated to the SRBR over the next 4.5 years, that "outflow" would average about 1.1% - 1.2% of assets over the next 4.5 years. However, as the amount of deferred and unrecognized investment gains/losses has fluctuated over time[21], we have continued to disregard those deferred and unrecognized investment gains/losses in measuring the 0.65% of assets impact.

  For informational purposes only, when we applied the results of our stochastic model to the December 31, 2021 valuation, we have estimated the approximate 0.65% of assets annual outflow would increase the Actuarial Accrued Liability in that valuation using a 7.00% investment return assumption by $0.88 billion and would increase the employer's UAAL contribution rate by about 5% - 6% of payroll.

[21] For instance, there were deferred and unrecognized investment losses of $569 million as of December 31, 2018 and deferred and unrecognized gains of $261 million as of December 31, 2019.

- **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. ACERA's employers have a well-established practice of making the actuarially determined contribution (ADC) determined in the annual actuarial valuations, based on the Board of Retirement's Actuarial Funding Policy. As a result, in practice ACERA has essentially no contribution risk.

  Furthermore, when ADCs determined in accordance with the ACERA Actuarial Funding Policy are made in the future by the employers (and contributions required by the statute are made by the employees), it is anticipated that the Association would have enough assets to provide all future benefits promised to the current members enrolled in the Association, 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: Deterministic Projections

Since 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 ACERA 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 ACERA were to earn a market return lower or higher than 7.00% in the next year following the December 31, 2021 valuation. In *Charts 6, 7* and 8, we show the aggregate employer contribution rates, funded ratios, and UAAL respectively assuming that the Association's portfolio market return in 2022 will be as follows:

Scenario 1: 0.00% (unfavorable)

Scenario 2: 7.00% (baseline)

Scenario 3: 14.00% (favorable)

The following table summarizes the resulting employer contribution changes (relative to the December 31, 2021 valuation aggregate employer contribution rate of 23.4%) in the next valuation (i.e., December 31, 2022) as well as in the December 31, 2027 valuation when all of the investment gains and losses are fully recognized in the (smoothed) valuation value of assets.

	2022 Single Plan-Year Investment Return		
Employer Contribution Rate Change	**0.00%**	**7.00% (Baseline)**	**14.00%**
December 31, 2022	-1.2% of payroll	-1.6% of payroll	-1.9% of payroll
December 31, 2027	-2.9% of payroll	-4.6% of payroll	-6.4% of payroll

Under the favorable (14.00%) and baseline hypothetical market return scenarios for 2022, the Association would be expected to reach or be close to full funding by December 31, 2028 and December 31, 2030, respectively, and the total employer contribution rate would be comprised of only normal cost contributions, resulting in a larger relative change from the December 31, 2021 aggregate employer contribution rate than the unfavorable (0.00%) hypothetical market return scenario (as provided in Chart 6). Furthermore, under all three hypothetical market return scenarios for 2022, the Association would be expected to reach full funding within 11 years and the total employer contribution rate would be

expected to approach about 10% of payroll.[22] This means that the Board's funding policy is very effective in achieving the general policy goal of achieving the long-term full funding of the costs of the benefits paid by ACERA.

While we have not assigned a probability on the 2022 market return coming in at these rates, the Board and other stakeholders monitoring ACERA can use these results to interpolate in order to estimate the funded status and employer contribution rates for the December 31, 2022 and next several valuations as the actual investment experience for the 2022 year becomes available throughout the year. Additionally, comparable experience in upcoming future years is likely to have a similar impact on the Association absent any significant plan or assumption changes.

SRBR Sufficiency Projection

We also provided in Charts 9, 10 and 11 the projection of the SRBR assets as well as the sufficiency period under each of the hypothetical market return Scenarios 1, 2 and 3, respectively. These projections are based on the preliminary results of the SRBR preview letter as of December 31, 2021 which estimated that the assets in the SRBR would be sufficient to pay OPEB SRBR benefits for about 24 years (until around 2045) and non-OPEB SRBR benefits for about 22 years (until around 2043). Of note is that under Scenario 3 (assuming 14.00% market return in 2022), even with the approximately $1,182 million in excess earnings projected to be added to the SRBR through December 31, 2041, the non-OPEB SRBR would only be sufficient to pay benefits through December 31, 2056. This is in contrast to the OPEB SRBR, which would be projected to be fully sufficient to pay benefits for the closed group of participants for the projection years as of December 31, 2024 through December 31, 2041.[23]

This difference can be explained by two factors. First, the sharp increase in expected non-OPEB SRBR benefits over the 20-year projection period relative to a more modest increase in expected OPEB SRBR benefits over the same period. Second, the allocation of excess earnings between the non-OPEB and OPEB reserves are assumed to be made proportional to those reserves. As the benefit levels expected to be paid from the non-OPEB SRBR rise relative to those expected to be paid from the OPEB SRBR, the value of the non-OPEB SRBR will fall relative to the value of the OPEB SRBR, and the share of excess earnings allocated to the non-OPEB SRBR will decrease.

For example, assets in the non-OPEB SRBR reserve represent just under 5% of SRBR reserves as of December 31, 2021. That means that the non-OPEB SRBR would be expected to receive about 5% of the excess earnings allocated to the SRBR in the near-term. However, by the end of the projection period non-OPEB benefits are expected to approach 10% of total SRBR benefits paid. Lower expected inflows (from excess earnings) and higher expected outflows (from benefit payments) result in less ability to pay non-OPEB benefits over the long term.

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[22] This is the estimated normal cost rate for the employer, assuming no further assumption changes, method changes or experience that differs significantly from assumptions.

[23] Because there is a disparity in the sufficiency period to pay non-OPEB and OPEB benefits when the deferred investment gains are recognized in future valuation, we would advise the Board on when it might be desirable to transfer some of the deferred investment gains from the OPEB SRBR to the non-OPEB SRBR as those gains are recognized in future valuations.

Since the $1,133 million deferred investment gain as of December 31, 2021 would be recognized in the next several years, there would be excess earnings projected under all three market return scenarios studied (including Scenario 1 assuming 0% return for 2022). However, for some other unfavorable market return scenarios that are lower than 0%, they could result in even less excess earnings and absent any action taken by the Board to change benefits or the proportional allocation of excess earnings between the non-OPEB and OPEB reserves, the non-OPEB SRBR assets might become depleted sooner than what we have projected above.

Chart 6

Projected Employer Contribution Rates Under Three Hypothetical Market Return Scenarios for 2022 (% of Payroll)

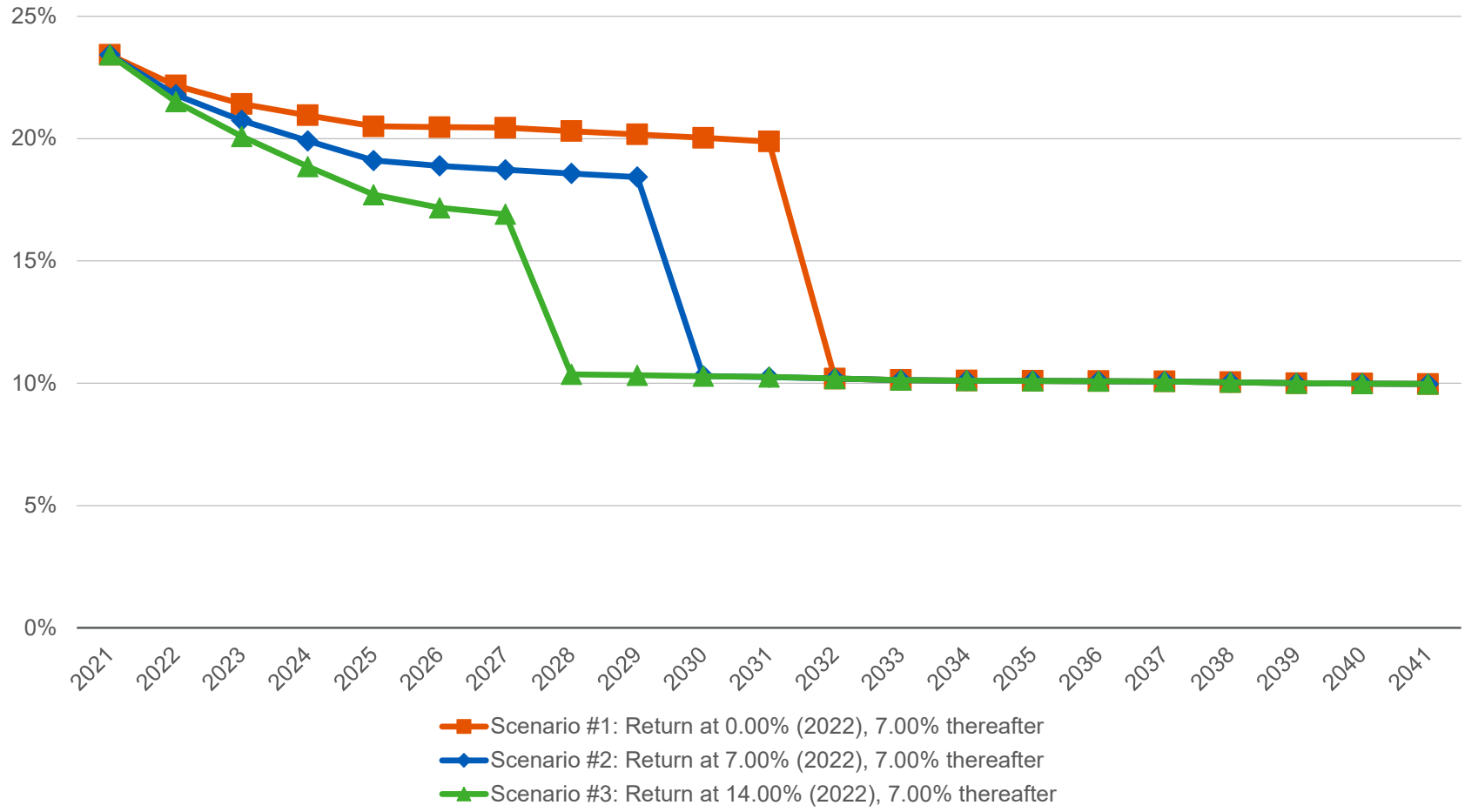


Chart 7

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

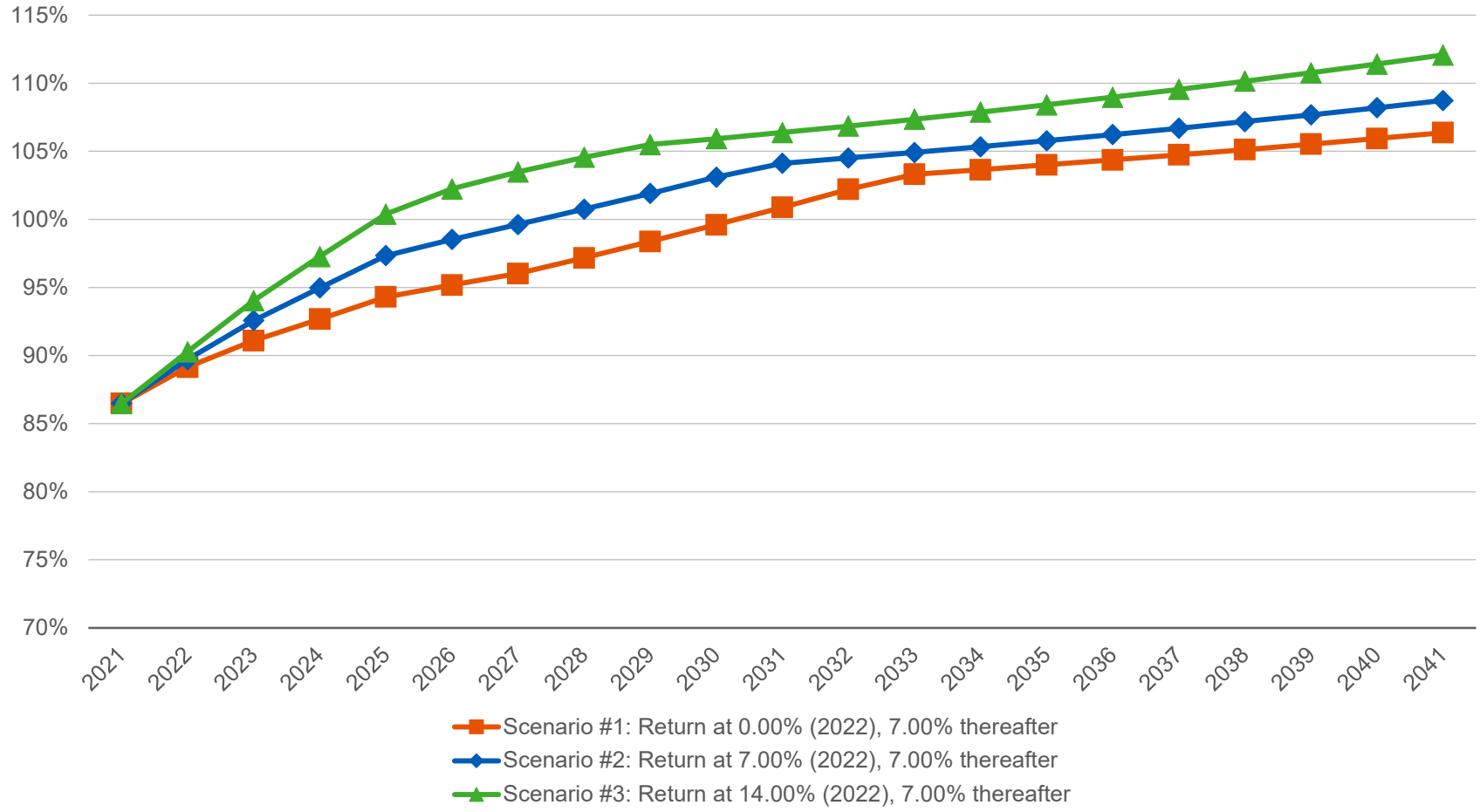


Chart 8

Projected UAAL (on Valuation Value of Assets Basis) Under Three Hypothetical Market Return Scenarios for 2022 ($ Millions)

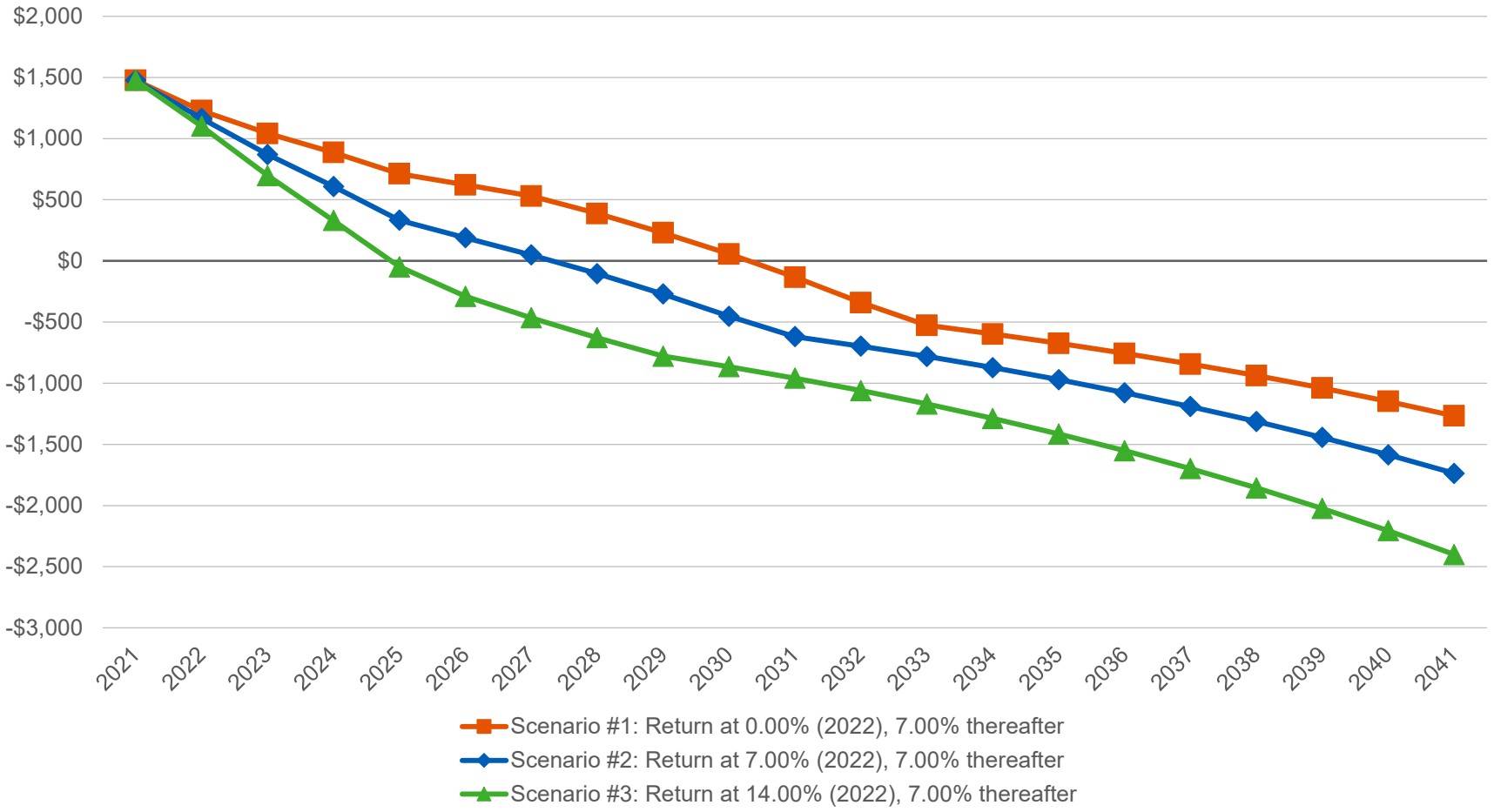
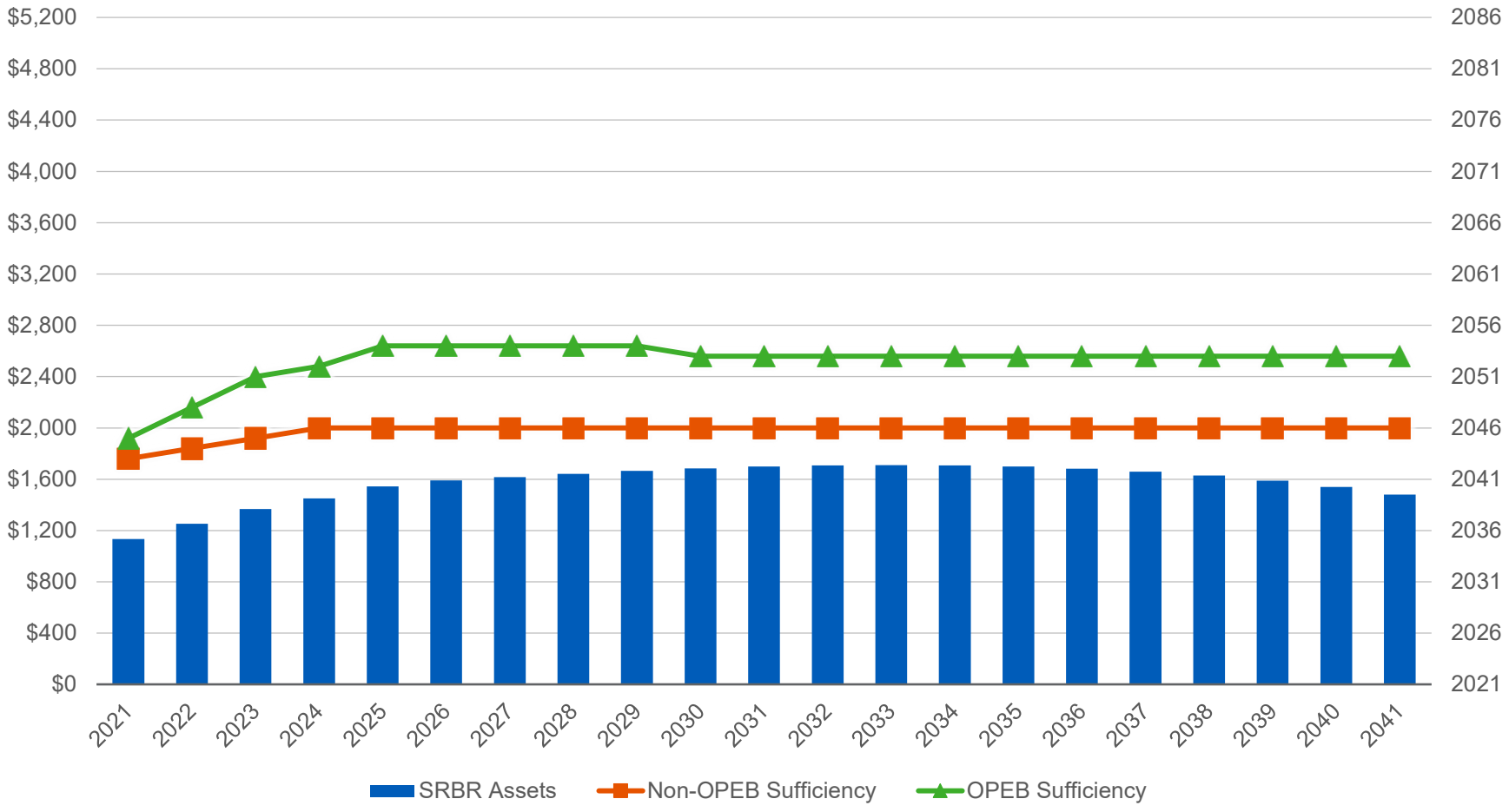
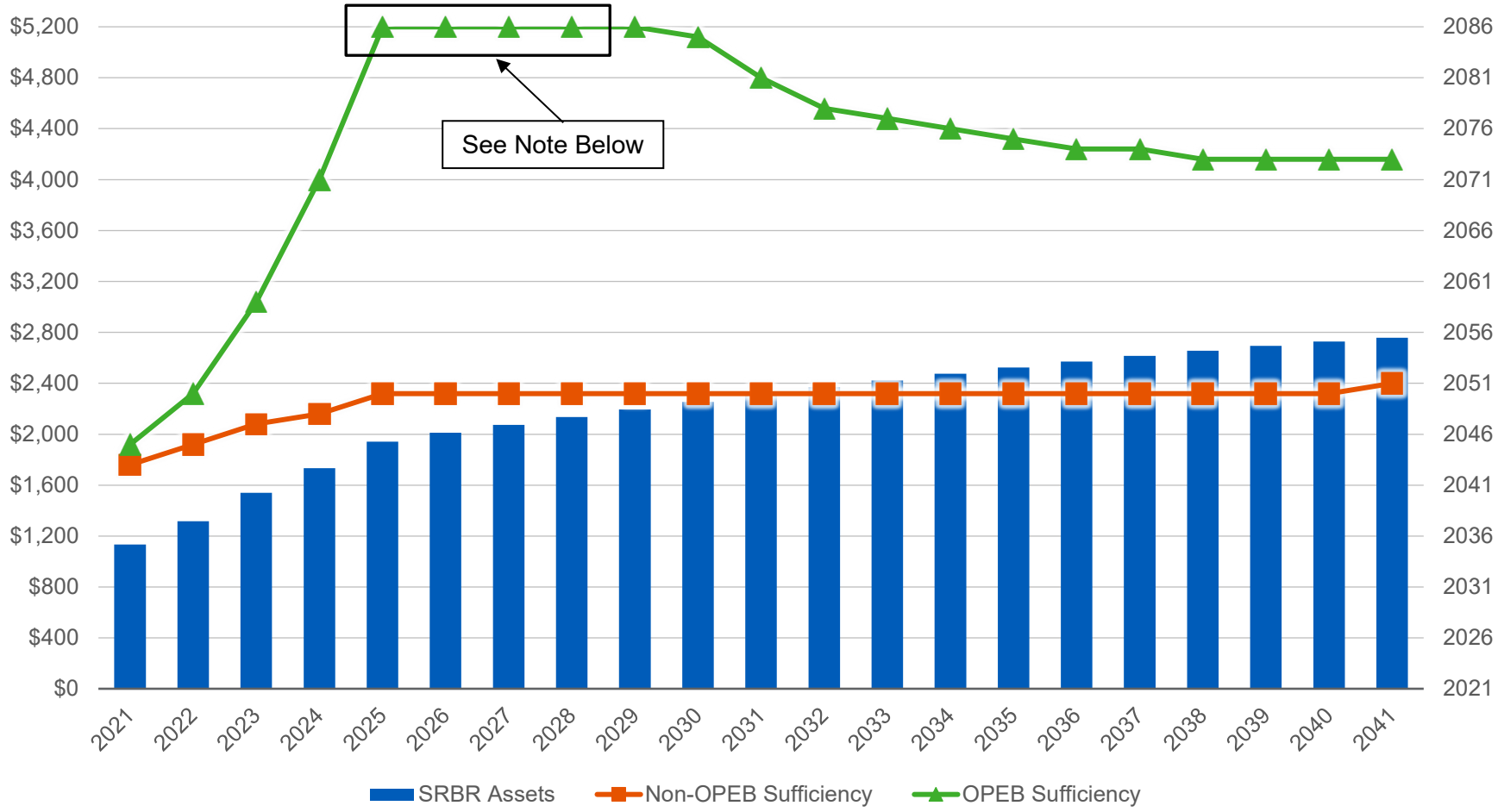


Chart 9

Projected SRBR Assets ($ Millions) Sufficiency Period Under Hypothetical Market Return Scenario #1 (Return at 0.00% for 2022)



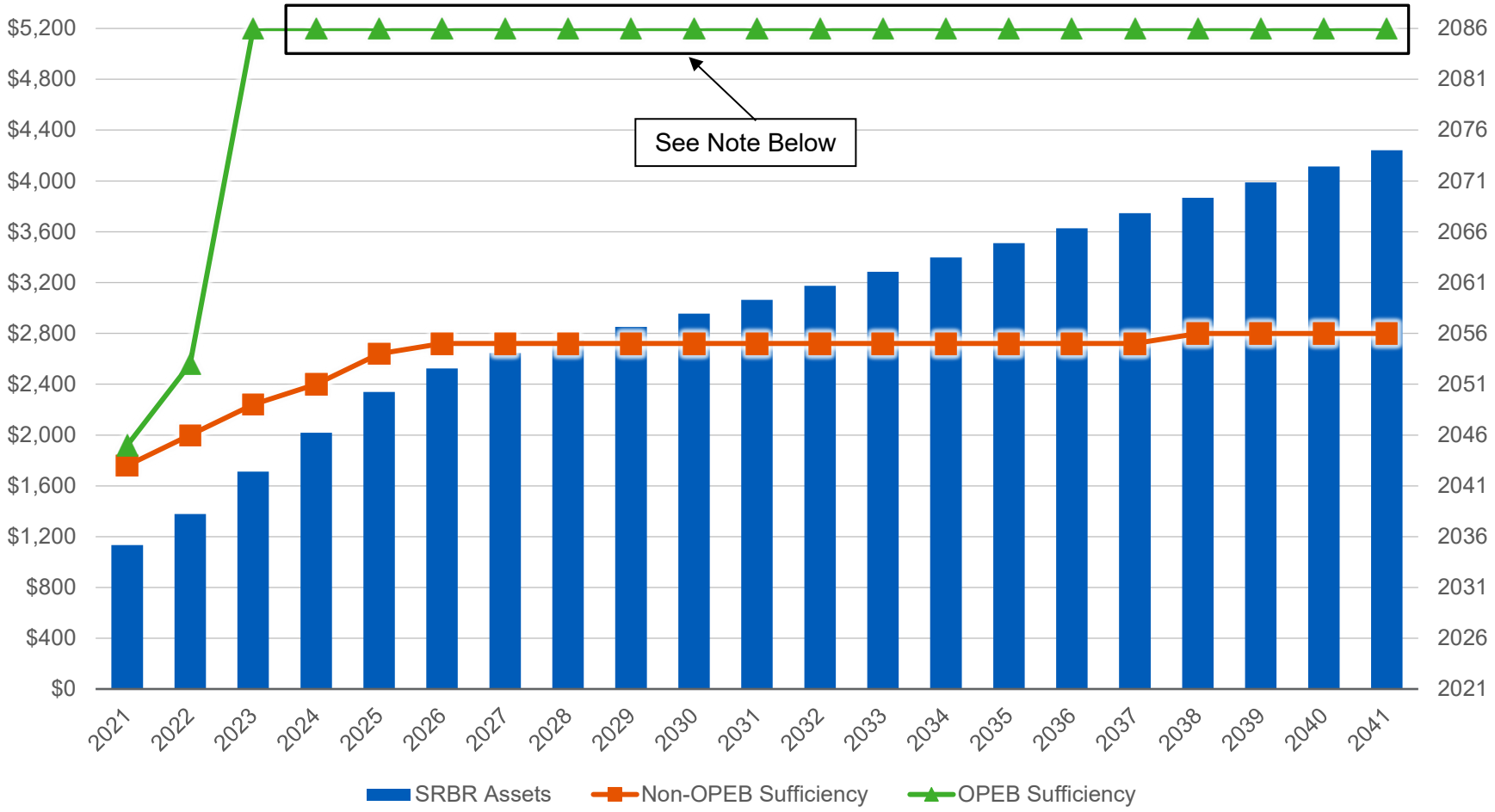
Projected SRBR Assets ($ Millions) Sufficiency Period Under Hypothetical Market Return Scenario #2 (Return at 7.00% for 2022)



Note: The OPEB SRBR is projected to be fully sufficient to pay benefits for the closed group of participants as of December 31, 2025 through December 31, 2028.

Chart 11

Projected SRBR Assets ($ Millions) Sufficiency Period Under Hypothetical Market Return Scenario #3 (Return at 14.00% for 2022)



Note: The OPEB SRBR is projected to be fully sufficient to pay benefits for the closed group of participants as of December 31, 2024 through December 31, 2041.

Plan Maturity Measures that Affect Primary Risks

The annual actuarial valuation considers 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 December 31, 2012 to 2021, ACERA has become more mature, indicated by the continued increase in the ratio of non-active to active members covered by the Association 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.

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 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, ACERA's AVR was 8.4 as of December 31, 2021. This means that a 1% asset gain or loss in 2022 (relative to the assumed investment return) would amount to 8.4% of one year's payroll. Similarly, ACERA's LVR was 9.1 as of December 31, 2021, so a 1% liability gain or loss in 2022 would amount to 9.1% of one year's payroll.[24] Based on ACERA's policy to amortize actuarial experience over a period of 20 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 0.6% 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 ratios for ACERA's Safety and General (LARPD) groups are higher than for the General (non-LARPD) groups. This means that both investment volatility and assumption changes will have a greater impact on the contribution rates of Safety and General (LARPD) groups than General (non-LARPD) groups. This is illustrated in the following table:

[24] The 8.4 and 9.1 are the AVR and LVR, respectively, for the entire Association. There are considerable differences in those ratios for the General and Safety membership groups.

	December 31, 2021			
Employee Group	**AVR**	**10% Loss Compares to**	**LVR**	**10% Change Compares to**
General (non-LARPD)	6.8	68% of payroll	7.8	78% of payroll
General (LARPD)	18.8	188% of payroll	17.5	175% of payroll
Safety	16.5	165% of payroll	15.8	158% of payroll
Combined	8.4	84% of payroll	9.1	91% of payroll

Chart 12

Ratios of Members in Pay-Status (Retirees and Beneficiaries) to Active Members & Non-Active Members (Inactive Vested, Retirees and Beneficiaries) to Active Members in December 31, 2012 to 2021 Valuations

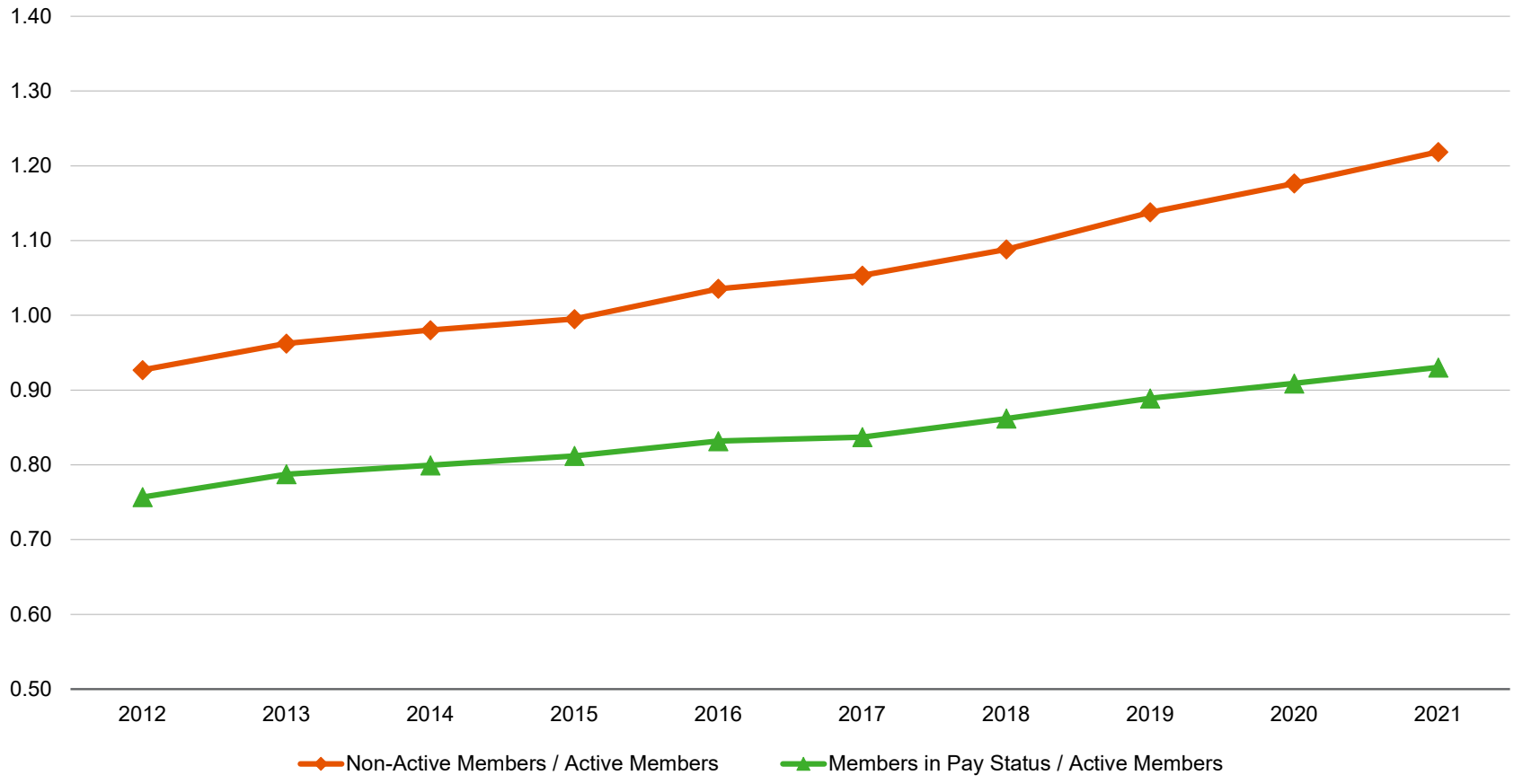


Chart 13

Asset Volatility Ratios in December 31, 2012 to 2021 Valuations

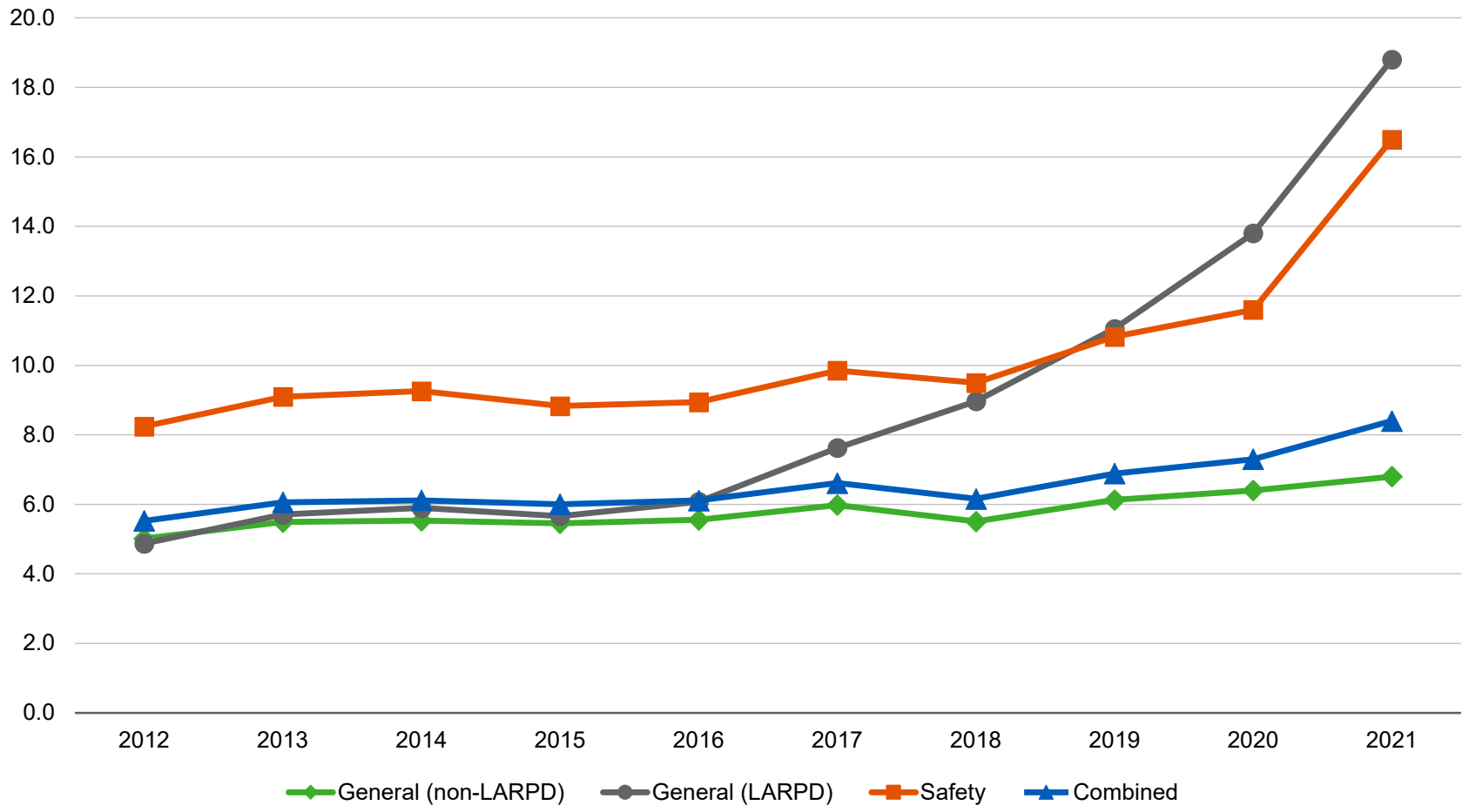
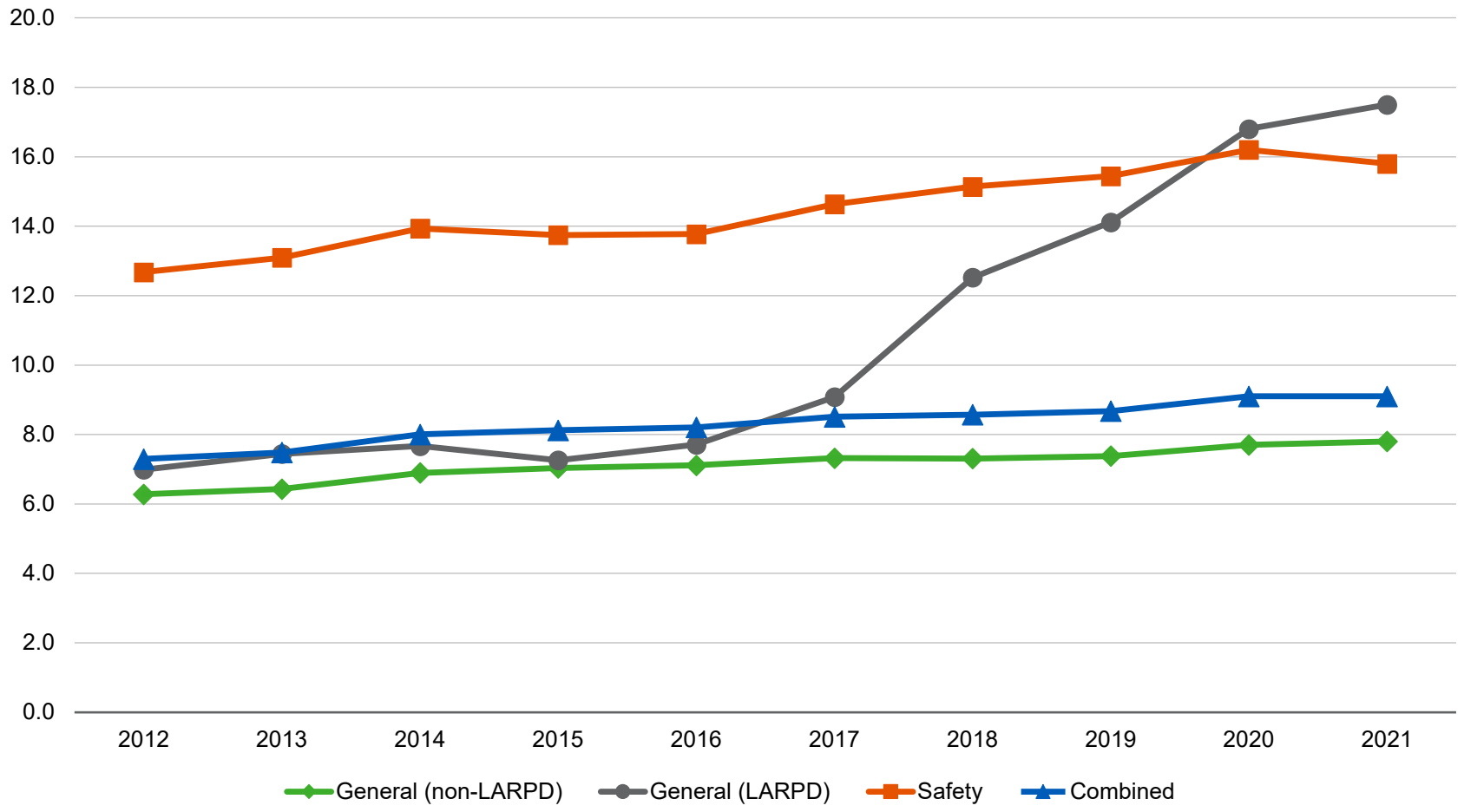


Chart 14

Liability Volatility Ratios in December 31, 2012 to 2021 Valuations



Appendix: Actuarial Assumptions & Methods and Actuarial Certification

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 December 31, 2021 valuation.

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 December 31, 2021 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 7.00% investment earnings and 3.25% active payroll growth assumptions.
- Deferred investment gains and losses will be recognized over a five-year period.
- All other actuarial assumptions used in the December 31, 2021 actuarial valuation will be realized.

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 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.

Actuarial Certification

The actuarial calculations in this report were completed under the supervision of Eva Yum, FSA, MAAA, Enrolled Actuary.

The actuarial opinions expressed in this report were prepared by Andy Yeung, ASA, MAAA, FCA, Enrolled Actuary and Eva Yum, FSA, 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.

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

Eva Yum, FSA, MAAA, EA
Vice President and Actuary