Pennsylvania Public School Employees' Retirement System

Stress Testing Analysis Report
Prepared as of June 30, 2024

March 2025

Gallagher

Insurance | Risk Management | Consulting

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March 2025

Board of Trustees
Pennsylvania Public School Employees' Retirement System
5 North 5th Street
Harrisburg, PA 17101

Ladies and Gentlemen:

This report presents the stress testing results for the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) as of June 30, 2024.

The purpose of this report is to satisfy the annual stress testing requirements of Pennsylvania Title 24, § 8510. A full summary of Pennsylvania Title 24, § 8510 can be found in Appendix A. This report is intended to assist the PSERS Board of Trustees, the Governor of Pennsylvania, the General Assembly, Independent Fiscal Office, and other stakeholders to better understand and assess the risks inherent in the funding of the Retirement System. Use of this report for any other purpose than as stated, or by anyone other than the Board of Trustees or the staff of PSERS or employers or its auditors, may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Gallagher should be asked to review any statement to be made on the basis of the results contained in this report. Gallagher will accept no liability for any such statement made without prior review by Gallagher.

Except as noted herein, where presented, references to "funded ratio" and "unfunded accrued liability" typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented may be appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e., purchase annuities) for a portion or all of its liabilities.

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Gallagher uses the following:

- the GEMS® Economic Scenario Generator from Conning & Company was used to assess the reasonability of the interest rate used for the valuation and the baseline scenarios herein. It was also used to develop the capital market assumptions used in the stochastic analysis. GEMS® uses a multifactor model to create internally consistent, realistic economic scenarios (paths) that reflect the current economic environment as a starting point. Asset class correlations may vary from year to year (just as in the real world), as well as from path to path. The model generates results that are not normally distributed, with fatter tails, and should therefore estimate the probabilities of rare events more realistically than a pure mean-variance model.
- third-party software in the performance of annual actuarial valuations and projections to calculate the liabilities associated with the provisions of the Retirement System using data and assumptions as of the measurement date under the funding methods specified in this report as well as specified in each scenario and risk assessment.
- an internally developed model that applies applicable funding methods and policies to the liabilities derived from the output of the third-party software and other inputs, such as Retirement System assets and contributions, to generate many of the exhibits found in this report.

Gallagher has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from

expectations are investigated. Other outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability, and consistency with prior results. Gallagher also reviews the third-party model when significant changes are made to the software or model. The review is performed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked, and reviewed by multiple experts within the company who are familiar with the details of the required changes.

Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: Retirement System experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law. Such changes in law may include additional costs resulting from future legislated benefit improvements or cost-of-living pension increases or supplements, which are not anticipated in this report. Gallagher performed analysis of the potential range of such future differences, but due to the need to limit the scope to a reasonable sampling of possible differences there are still many other possible outcomes and ranges of results.

This report was prepared under the supervision of Christopher Snel, an Associate of the Society of Actuaries, an Enrolled Actuary, a CFA Charterholder, and a Member of the American Academy of Actuaries; and David Driscoll, a Fellow of the Society of Actuaries, an Enrolled Actuary, and a Member of the American Academy of Actuaries, who have met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. We are available to answer any questions on the material in this report or to provide explanations or further details as appropriate. We are not aware of any direct or material indirect financial interest or relationship, including investments or other services that could create a conflict of interest, or that would impair or appear to impair the objectivity of our work.

Gallagher Benefit Services, Inc. (hereinafter "Gallagher")

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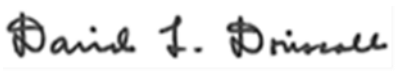
Principal, Investment Actuary



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Executive Summary

Overview

An actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) is performed annually to measure the ongoing costs and progress towards the funding goals of the Retirement System over time. The financing objective of the Retirement System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method,
- Liquidate the unfunded accrued liability based on level percentage of pay amortization schedules required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code) as amended by Act 120 of 2010, which requires amortization over 24 years of the unfunded accrued liability as of June 30, 2010, and of each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any increases in the unfunded liability arising from legislation enacted after June 30, 2010, are to be amortized over 10 years.

The contribution policy of the Retirement System is set by statute. The Commonwealth's General Assembly has the authority to amend the benefit terms and funding policy for PSERS by passing bills in the Senate and House of Representatives and sending them to the Governor for approval.

In accordance with Section 8510 of the Retirement Code, the Board of Trustees shall conduct an annual stress test of the Retirement System and submit the results of the stress test to the Governor, the General Assembly and the Independent Fiscal Office. The full text of Section 8510 is included in Appendix A.

Stress testing is designed to measure the potential effect on the plan of future economic or demographic outcomes that vary significantly from actuarial assumptions. Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. We have performed stress testing in this report using two projection methods: deterministic forecasting and stochastic modeling. Deterministic forecasting is based on one or more specific scenarios in the future. Stochastic modeling gathers projected asset return streams covering a wide range of potential future outcomes, simulating the volatility of annual investment returns.

The stress test considers all of the promised pension benefits to which members are entitled as of June 30, 2024, including pension and survivor benefits, and as required by the Retirement Code, is the basis for the projections. The relevant benefit and contribution provisions are summarized in Appendix B. The Retirement System's Health Insurance Premium Assistance and Defined Contribution Plan assets and liabilities have been excluded from this analysis.

As required under Section 8502(j) of the Retirement Code, experience studies are performed for PSERS every five years, the most recent having been made as of June 30, 2020. The stress test was prepared on the basis of the demographic and economic assumptions that were recommended on the basis of the July 1, 2015 – June 30, 2020 Experience Review and approved by the Board of Trustees at its March 5, 2021, June 11, 2021 and August 6, 2021 meetings, which includes a 7.00% per annum rate of investment return. The baseline projection is based on the June 30, 2024 actuarial valuation results and assumptions. A full description of assumptions can be found in Appendix C.

Executive Summary (continued)

Purpose

The purpose of this report is to satisfy Section 8510 stress testing requirements as of June 30, 2024. This report is intended to assist the PSERS Board of Trustees and staff, the Governor of Pennsylvania, the General Assembly, Independent Fiscal Office, and other stakeholders to better understand and assess the risks inherent in the funding of the Retirement System. This report is a means of assessing the financial health and sustainability of PSERS under a variety of hypothetical economic and demographic scenarios. It helps provide information to decision makers to help ensure that the applicable pension liabilities and funding mechanisms are managed in a manner that promotes sustainability.

Actuarial assumptions are a key component of the measurements in the actuarial valuation process and the projection of future valuation results. The investment return is the most significant assumption and the element of experience that produces the most volatility in results due to actual asset returns varying significantly (and both favorably and unfavorably) from one year to the next. This report focuses on the variable impact of the investment return volatility. This report also demonstrates the impact to PSERS if excess or low contributions are made, salary increases differ from those assumed, and mortality differs from expected levels.

The analyses contained herein are useful for anticipating trends and comparing various outcomes, under a given methodology, rather than predicting a future state of events. Future actuarial measurements may differ significantly from what has been modeled due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in analysis in financial projections or required disclosed information.

It is important to clarify that this stress test is not an assessment of the reasonability of the investment return assumption, nor is it a study to recommend an investment return assumption. The intent is to provide a sensitivity analysis of how 1) a change in the investment return assumption, 2) deviations in asset returns from the expected investment return assumption, 3) deviation in contributions made from actuarially determined employer contributions, and 4) deviations in certain elements of demographic experience from the corresponding actuarial assumptions would impact key valuation outputs.

Note that this report focuses primarily on several adverse projections in which poor asset performance is assumed to help identify those areas of risk that generally provide the greatest challenges to plan sponsors. However, probabilities exist for both positive and negative scenarios, as shown in the stochastic analysis. Further, stress on the Retirement System can occur in scenarios other than those investigated in the stress test. Stress on the Retirement System based on factors other than future investment returns on assets, contributions, and the demographic scenarios shown in this report are beyond the scope of this analysis.

Risk

Measuring pension obligations and actuarially determined contributions requires the use of assumptions regarding future economic and demographic experience. Whenever assumptions are made about future events, there is risk that actual experience will differ from that projected by the actuarial assumptions used in the annual valuations. The sensitivity analysis, deterministic forecasts, and stochastic modeling include the risk that actual future measurements will deviate from expected future measurements due to actual experience that differs from the actuarial assumptions. The most significant risks inherent in PSERS valuations and projections are as follows:

- Investment Risk – the potential that investment returns will be different than expected. Sections 1, 3 and 6 of this report demonstrate the sensitivity of future projected results to asset returns deviating from expected returns. Note that although 5,000 simulated returns are shown in stochastic modeling in Section 3, there are other possible paths that could occur for PSERS.

- Longevity and Other Demographic Risks – the potential that demographic experience will be different than expected. Section 5 of this report demonstrates the results of mortality and salary increases being different than assumed.

Executive Summary (continued)

- Interest Rate Risk – To the extent significant changes in capital market assumptions or asset allocations affect the expected return on assets, there is a risk of resulting change in the discount rate used to determine the present value of liabilities and actuarial valuation results. Section 2 of this report demonstrates the sensitivity of valuation results to different discount rates.
- Contribution Risk – The potential that actual contributions will differ from actuarially determined contributions. Sections 1 and 6 show scenarios that demonstrate the effect on PSERS when actual contributions are lower than the actuarially determined contributions.
- Liquidity Risk – The potential that the Retirement System may not have enough liquid assets to meet its short-term obligations, such as paying out retirement benefits, without having to sell investments at unfavorable prices. Section 4 of this report presents the results of tests of PSERS' liquidity risk.

Actuary's Comments and Observations

The current assumed long-term rate of return for PSERS is equal to the valuation interest rate of 7.00%. As of the most recent valuation, market value returns were slightly higher than expected, with return of approximately 8.14% during fiscal year end 2024. Market value returns for the prior year were lower than expected, with an approximate return of 3.54%. The market value return for the 20-year period ended June 30, 2024 was 7.05%. The assumed rate of return is a long-term assumption, i.e., we expect on average for the Retirement System to achieve this return based on its target allocation and anticipated benefits to be paid from the plan. Volatility in the markets is not necessarily unanticipated. However, the volatility must be accounted for in assessing the impact of varying returns on the funding of the plan both over the short and long terms.

The assumed rate of investment return is the most significant assumption and the one that associated with the volatility in results caused by actual returns varying significantly (both favorably and unfavorably) from one year to the next. However, the effect of investment performance on the funded ratio and actuarially determined employer contributions is delayed due to the 10-year asset smoothing method, which is intended to dampen market volatility. One-tenth of each year's difference of actual asset returns from their expected level is recognized each year; the first amount is recognized in the valuation immediately succeeding the experience and the final amount recognized nine years later.

The Board establishes the asset allocation targets and ranges and reviews them annually. The Board, with the assistance of its investment consultant and actuary, undertakes a comprehensive strategic asset/liability review designed to assess the continuing appropriateness of this policy at least every three years or when material changes to the liabilities take place (e.g., plan design changes, material changes in underlying assumptions, etc.).

In addition to the above, experience studies performed every five years by PSERS, along with an annual review of the reasonability of the expected return assumption and demographic assumptions, lessen the likelihood of sustained periods of adverse deviations of experience from the Retirement System's adopted actuarial assumptions.

Section 1: Scenario Analysis

Pennsylvania Title 24, § 8510 requires a scenario analysis projecting assets, liabilities, unfunded actuarial accrued liabilities, the change in unfunded actuarial accrued liabilities, employer contributions, benefit payments, service costs, payroll and calculations of the ratios of assets to liabilities, employer contributions to payroll and operating cash flow to assets in sufficient number as determined prudent by the board as informed by "recognized industry standards." A summary of the scenarios is described to satisfy the scenario analysis are described as followed:

- A **Baseline** scenario, in which the asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%).
- An **Excess Return** scenario, in which the asset return for the next 20 years is 2.00% higher (9.00%) than the Retirement System's expected return assumption, and for the following 10 years is equal to the Retirement System's expected return assumption (7.00%) .
- A **Low Return** scenario, in which the asset return for the next 20 years is 2.00% lower (5.00%) than the Retirement System's expected return assumption, and for the following 10 years is equal to the Retirement System's expected return assumption (7.00%)
- A **Low Contribution** scenario, in which the asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%). Contributions for the next 20 years are 80% of the actuarially determined employer contributions (ADEC), and for the following 10 years are equal to the full actuarially determined employer contributions.

Additional detail for these scenarios can be found in Appendix D of this report.

Section 1: Scenario Analysis (continued)

Results

A summary of the cumulative actuarially determined employer contribution (ADEC) amounts, funded ratio on an actuarial value of assets (AVA) basis, and the ADEC rate are shown below at five, ten, and thirty years.

Scenario	5 Years			10 Years			30 Years		
	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate
Baseline	$27.2	74.7%	34.6%	$58.0	88.6%	37.7%	$85.6	99.8%	1.2%
Excess Return	27.1	76.7%	34.2%	56.5	97.0%	34.8%	73.4	202.6%	0.8%
Low Return	27.4	72.6%	35.0%	59.6	80.7%	40.6%	141.2	73.5%	22.8%
Low Contribution	27.7	70.0%	36.1%	61.2	79.0%	42.1%	123.1	94.2%	9.7%

Additional commentary and graphs displaying the ADEC amounts, funded ratio on AVA basis, and ADEC rate over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054 can be found in the remainder of Section 1. Below are key takeaways of Section 1:

- Future asset returns are uncertain and any deviation from the expected return assumption of 7.0% will have an impact on the ADEC and funded ratio for PSERS, especially in instances where the asset returns are consistently higher or lower than assumed.
  - ADEC will increase over time if asset returns experienced are lower than assumed and will decrease over time if asset returns experienced are higher than assumed.
  - Funded status will increase over time if asset returns experienced are higher than assumed and will decrease over time if asset returns experienced are lower than assumed.
- The Low and Excess Return scenarios in this section are severe scenarios but displays the importance of selecting an asset return assumption that best represents future expectations for the Retirement System.
- The Low Contribution scenario displays how contributing the full ADEC rate is an essential step to bringing PSERS back to a fully funded status.
- The effect of investment performance on the funded ratio is delayed due to the 10-year asset smoothing method.

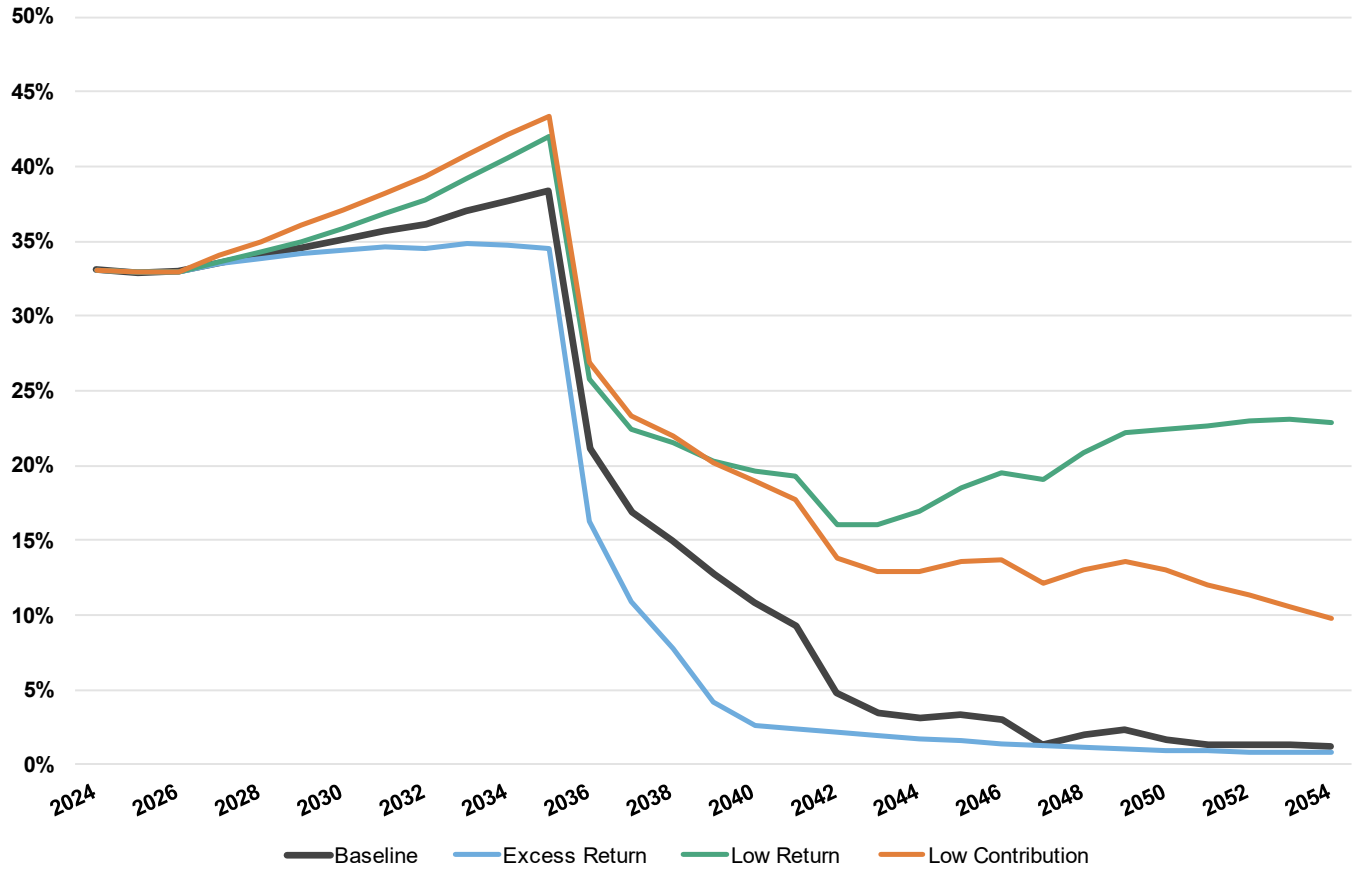
Section 1: Scenario Analysis (continued)

Actuarially Determined Employer Contribution (ADEC)

The Retirement System's ADEC rate is the statutory annual employer contribution as a percentage of covered payroll. A summary of the Retirement System's actuarial cost method and assumptions used to determine the ADEC can be found in Appendix C.

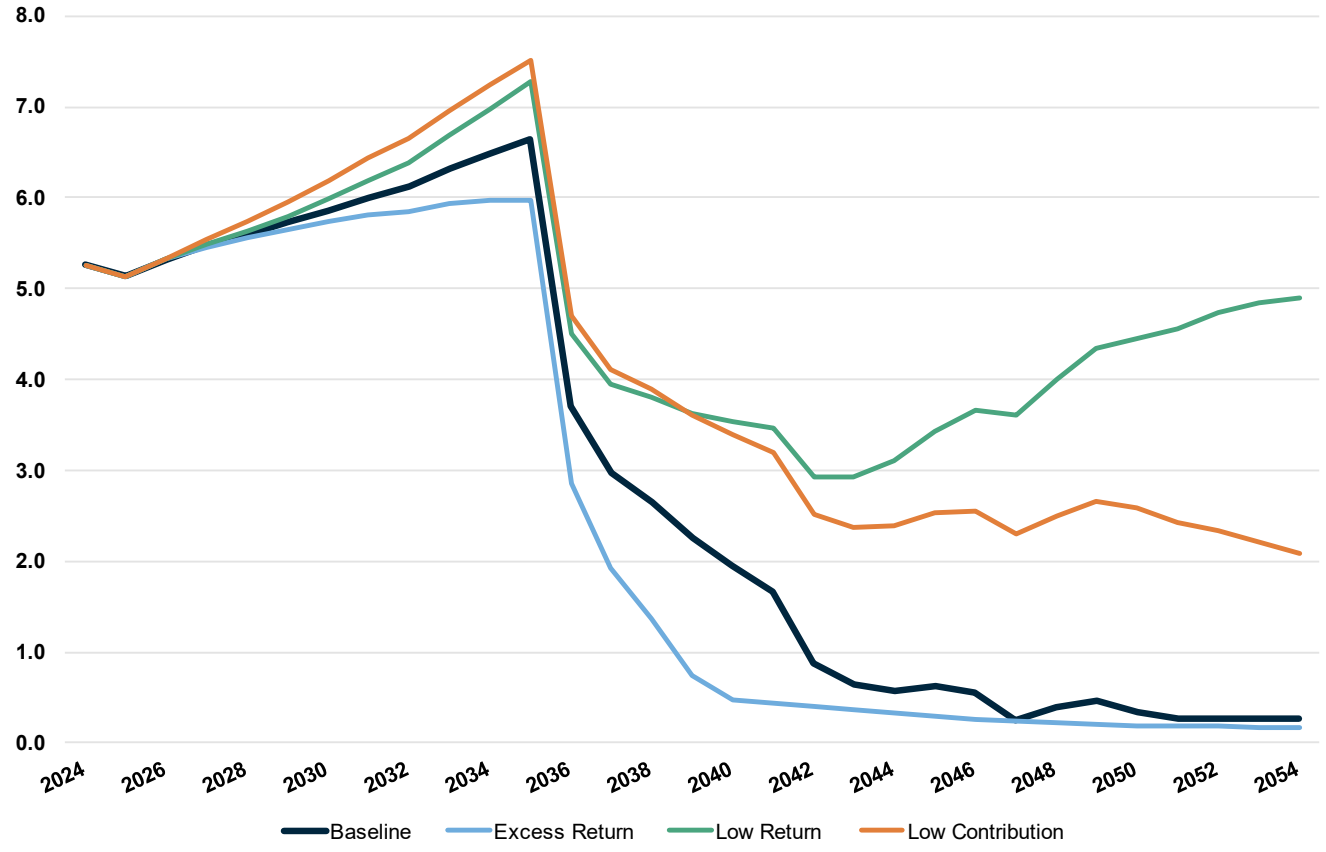
The projected ADEC rates as a percentage of covered payroll and ADEC in dollars for each scenario are shown over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054, in the graphs below.

ADEC Rate % of Covered Payroll



Section 1: Scenario Analysis (continued)

ADEC ($ Billions)



The Act 2010-120 unfunded accrued liability will be fully amortized by June 30, 2035. As a result, the projected ADEC will decrease beginning June 30, 2036 for all scenarios.

The effect of investment performance on the ADEC is delayed due to the 10-year asset smoothing method, which is intended to dampen market volatility. One-tenth of each year's difference of actual asset returns from their expected level is recognized each year; the first amount is recognized in the valuation immediately succeeding the experience and the final amount recognized nine years later.

The Baseline projected ADEC aligns to the statutory annual employer contribution: employer normal cost, amortization of the June 30, 2024, unfunded accrued liability and recognition of deferred investment experience in the asset smoothing method. By the end of the projection period, the ADEC begins to approach the Act 2010-120 minimum normal cost contribution rate.

In comparison to the Baseline:

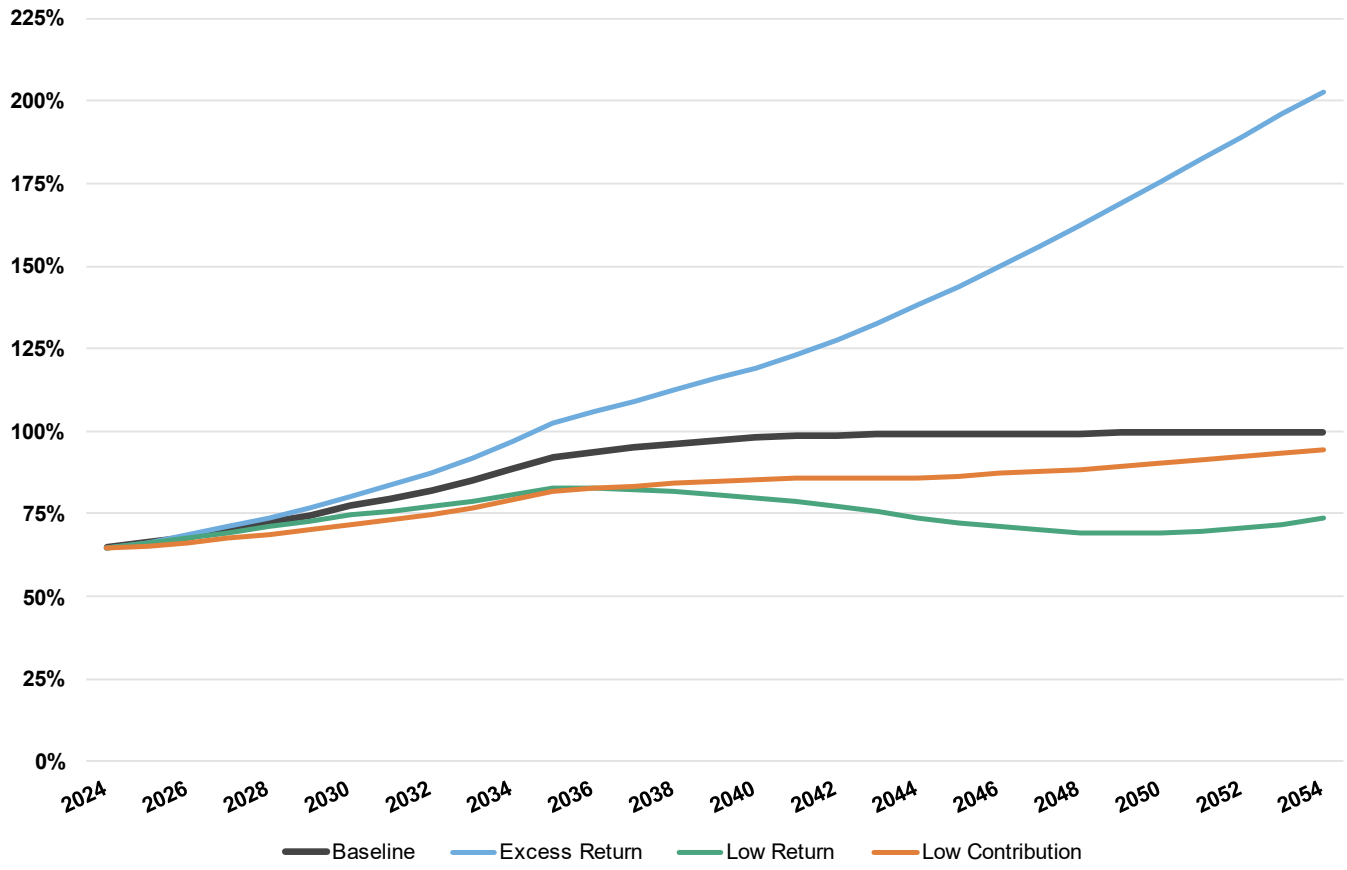
- Excess Return scenario: favorable asset performance decreases the ADEC. Beginning June 30, 2040, the ADEC reflects the Act 2010-120 minimum normal cost contribution rate.
- Low Return scenario: unfavorable asset performance will increase the ADEC. Due to the asset smoothing method, investment losses which occurred through June 30, 2044, continue to affect the ADEC through June 30, 2054.
- Low Contribution scenario: results in an immediate increase in the ADEC due to the deferral of current obligations for future payment. The increased ADEC will continue until the amortization of the deferred obligations are paid.

Section 1: Scenario Analysis (continued)

Funded Ratio: Actuarial Value of Assets (AVA) Basis Projection

The Retirement System's total funded ratio is measured by comparing the actuarial value of assets (based on a 10-year moving average market value) to the accrued liability. The accrued liability is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active members.

The projected funded ratios for each scenario are shown over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054, in the graph below.



Section 1: Scenario Analysis (continued)

The Baseline scenario shows the funded ratio approaching 100% soon after the legacy Act 2010-120 unfunded accrued liability base is fully amortized in fiscal year ending June 30, 2035.

In comparison to the Baseline:

- Excess Return scenario: favorable asset performance increases funded ratio. The funded ratio is projected to exceed 100% due to the Act 2010-120 minimum normal cost contribution. The higher-than-expected return results in PSERS approaching 100% funded ratio at a much quicker pace.
- Low Return scenario: unfavorable asset performance decreases the funded ratio. Due to the asset smoothing method, investment losses which occurred through June 30, 2044, will continue to suppress the funded ratio through the end of the thirty-year projection.
- Low Contribution scenario: results in an immediate decrease in the funded ratio due to the deferral of current obligations for future payment. The funded ratio will gradually improve as amortization of the deferred obligations are paid.

Section 2: Sensitivity Analysis

Discount Rate Sensitivity Analysis

Sensitivity analysis, or sensitivity testing, examines the effect on the plan of using different actuarial assumptions and methods. Pennsylvania Title 24, § 8510 requires a sensitivity analysis including:

1. Estimates of the total normal cost and employer normal cost for new employees, calculated using various investment return assumptions in sufficient number as determined prudent by the board as informed by "recognized industry standards"

2. Estimates of the unfunded actuarial accrued liability and unfunded liability, calculated using various annual assumed rates of return in sufficient number as determined prudent by the board as informed by "recognized industry standards"

For purposes of this section, we use the same census data, plan provisions, actuarial assumptions and methods as used for the June 30, 2024 valuation of PSERS. However, we estimated the potential impact on normal cost and net pension liability if the investment return assumption was 1.00% lower and 1.00% higher than the current investment return assumption of 7.00%.

Key Takeaways

- Decreasing the investment return assumptions by 1.00% from the current investment return assumption to 6.00% results in a higher actuarial accrued liability (AAL) and a higher total normal cost (TNC) for the Retirement System. The higher AAL and TNC would increase total employer cost, increase net pension liability, and decrease funded ratio.
- Increasing the investment return assumptions by 1.00% from the current investment return assumption to 8.00% results in a lower actuarial accrued liability (AAL) and a lower total normal cost (TNC) for the Retirement System. The lower AAL and TNC would decrease total employer cost, decrease net pension liability, and increase funded ratio.
- The Board adopted the 7.00% investment return assumption for the June 30, 2021 valuation based on the analysis provided by the Retirement System's investment consultant and Gallagher's Financial Risk Management practice. Section 8502(j) of the Retirement Code requires an experience study and review of actuarial assumptions at least once in each five-year period. The next experience study will be implemented for the June 30, 2026, valuation to determine if the 7.00% investment return assumption will remain.
- In addition to an experience study every five years, the actuary reviews the investment return assumption to determine if it is reasonable for the actuarial valuation each year.
- Ongoing experience studies and annual review of the investment return assumption to determine reasonableness, lessen the likelihood of significant deviations from the Retirement System's investment return assumption when changes are approved by the Board.

Section 2: Sensitivity Analysis (continued)

Results

The table below estimates the total normal cost and employer normal cost for new employees as a percentage of covered payroll calculated using investment return assumption 1.00% lower and 1.00% higher than the current investment return assumption of 7.00%.

	1.00% Decrease (6.00%)	Current Investment Return (7.00%)	1.00% Increase (8.00%)
a. Total Normal Cost Rate	7.55%	6.32%	5.40%
b. Employer Normal Cost Rate	2.06%	0.83%	0.00%

The table below estimates the net pension liability using investment return assumption 1.00% lower and 1.00% higher than the current investment return assumption of 7.00%.

($ Billions)	1.00% Decrease (6.00%)	Current Investment Return (7.00%)	1.00% Increase (8.00%)
a. Market Value of Assets excluding Health Insurance Premium Assistance	$ 76.5	$ 76.5	$ 76.5
b. Actuarial Accrued Liability	132.6	119.2	107.8
c. Estimated Net Pension Liability at 6/30/2024* (b. – a.)	56.1	42.7	31.3
d. Market Value of Assets Funded Ratio (a. / b.)**	57.7%	64.2%	71.0%

*Estimated June 30, 2024, GASB 67 Net Pension Liability equals the Total Pension Liability minus the Fiduciary Net Position assuming a June 30, 2024, valuation date. Please refer to the June 30, 2024, GASB 67 report for the actual June 30, 2024, GASB 67 Net Pension Liability.

**The funded ratio presented makes no assessment regarding the funded status of the plan if the plan were to settle (i.e., purchase annuities) for a portion or all of its liabilities.

Section 3: Simulation Analysis

Stochastic Modeling

Pennsylvania Title 24, § 8510 requires projections of the range of required employer contributions for each of the next 20 years, based on analysis that simulates the volatility of annual investment returns above and below the assumed rate of return, applying methodology determined prudent by the board as informed by "recognized industry standards."

We have modeled this range of employer contributions by performing a stochastic analysis. The analysis produces 5,000 randomized trials of projected 30-year investment return paths. Each 30-year path is modeled in the projected asset values and compared to the deterministic liability projection using current actuarial assumptions and methods to produce hypothetical valuation results including the projected actuarially determined employer contributions (ADEC). Note that the projection assumptions defined in Section 1, other than the assumed future rates of investment return, also apply to the analysis within this section.

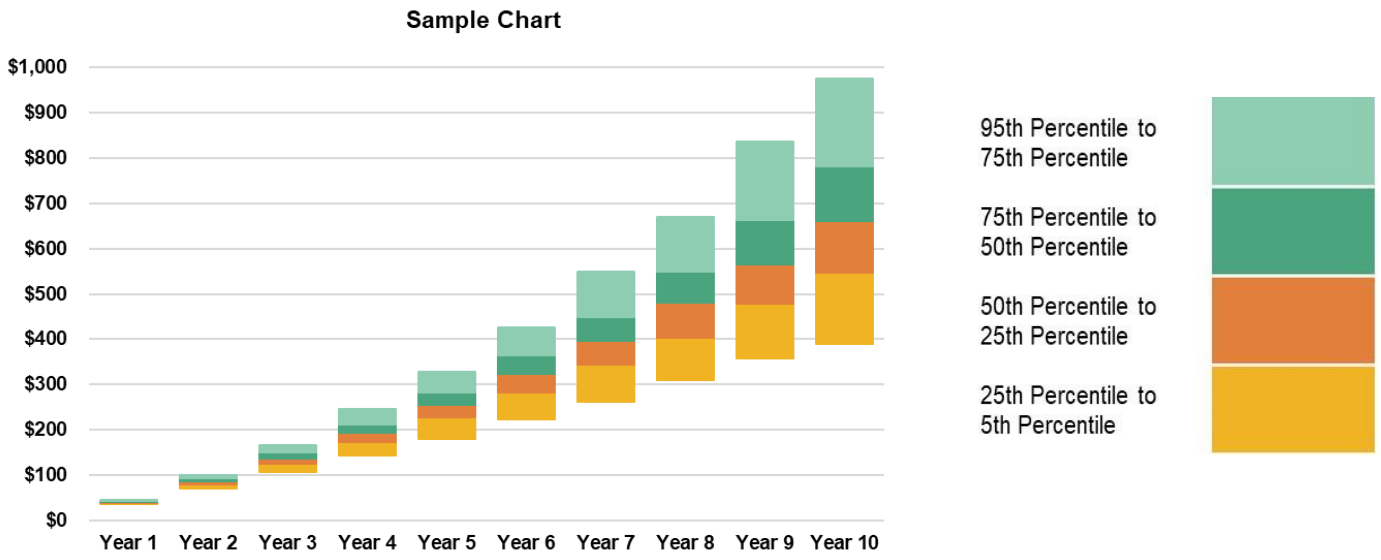
The simulated returns were calculated by Gallagher's Financial Risk Management (FRM) practice based on Gallagher's Capital Market Assumptions (CMAs) and the target allocation defined in the PSERS Financial Statements. We have shown the modeled allocation in Appendix E.

We review the results of the stochastic projection in this report not just for the resulting ADEC, but for the impact to the overall funded status of PSERS. We summarize and rank stochastic results for each metric. For purposes of this analysis, we define the range of likely results to be outcomes between the 25th and 75th percentiles. In effect, this means there is a 50% probability of achieving the results within the range of these percentiles under the 5,000 simulated investment return paths. We show supporting detail in Appendix E. Charts on the following pages show results between the 5th and 95th percentiles. Although not visible on the charts, outcomes below the 5th or above the 95th percentile are possible.

Results are shown in bar graphs (see exhibit below) that display results from the highest value to the lowest value. The 95th percentile result represents the 250th highest value out of 5,000 values and the 5th percentile represents the 250th lowest value. Results shown are as of 6/30 of the displayed year.

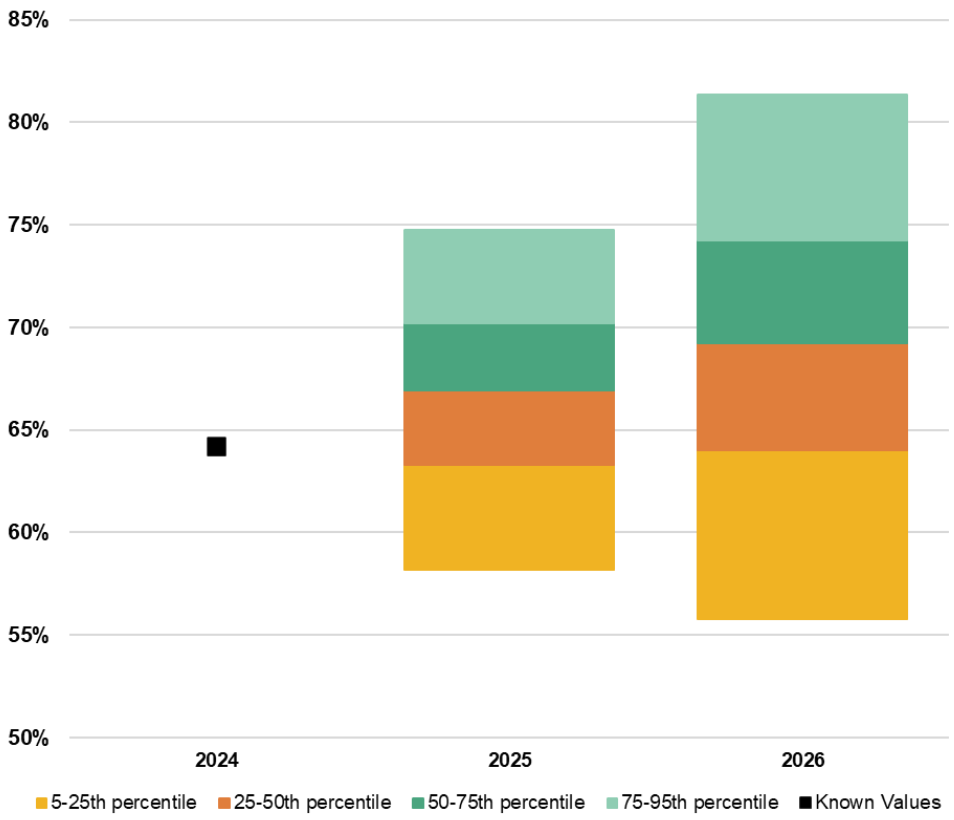
In evaluating a result:

- **For asset and funded percent metrics, the 95th percentile, represented as light green, is relatively favorable**
- **For cost metrics, the relatively favorable light green will be on the bottom and represent the 5th percentile**



Section 3: Simulation Analysis (continued)

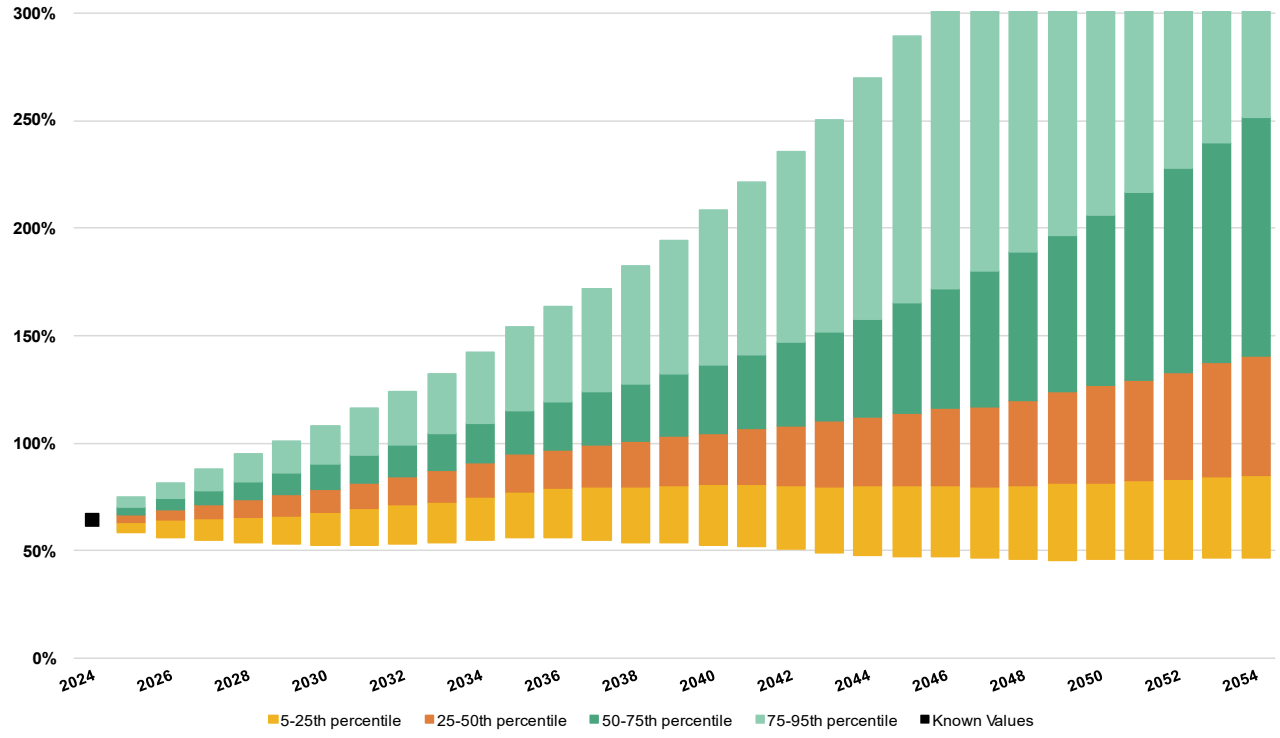
Market Value of Assets and Actuarial Liability Funded Ratio – Short-Term Risk



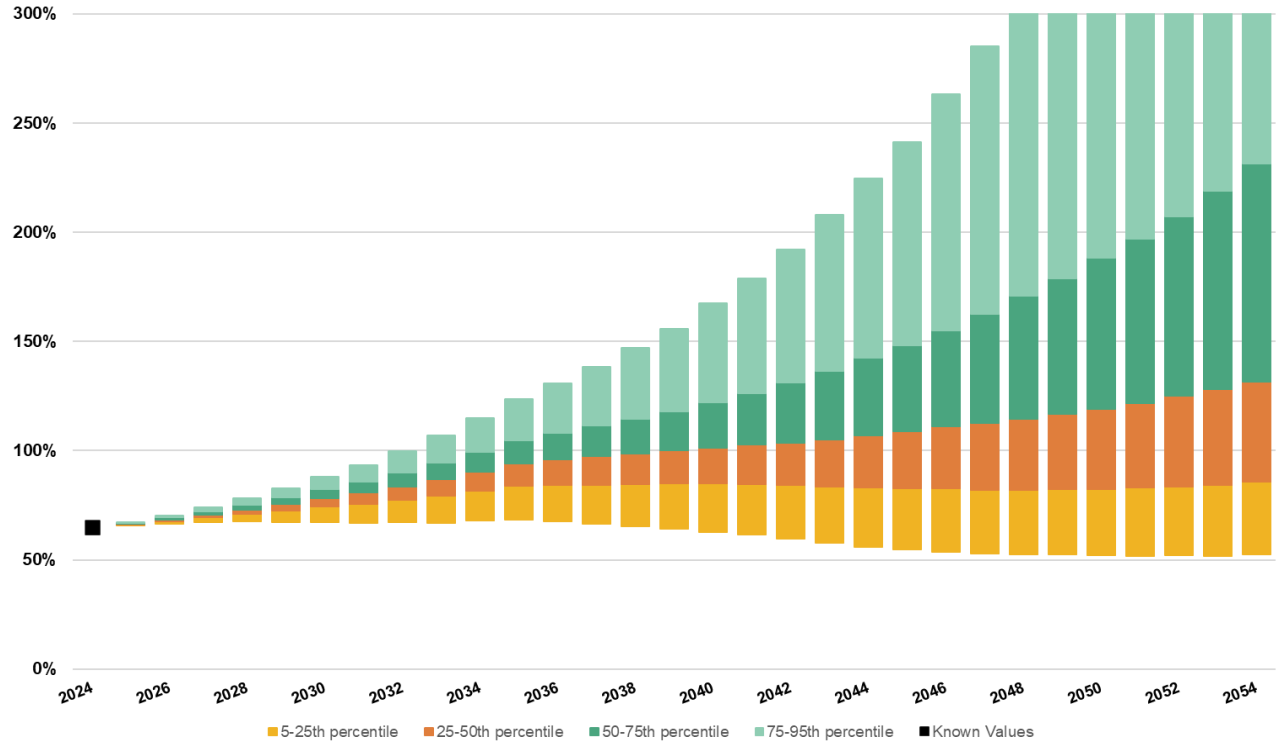
The above chart demonstrates the large amount of funded ratio volatility that can be observed over a short period of time. The Retirement System is ~64% funded on a market value of assets basis as of 6/30/2024. Over the next 2 years, economic factors can lead to a large range of possible funded ratios, ranging from just above 55% at the 5th percentile to over 80% at the 95th percentile. In other words, there is roughly a one-in-twenty chance the funded ratio will fall to 55% or lower, and another one-in-twenty chance it will be above 80%.

Section 3: Simulation Analysis (continued)

Market Value of Assets and Actuarial Liability Funded Ratio – Long-Term Trends



Actuarial Value of Assets and Actuarial Liability Funded Ratio – Long-Term Trends



Section 3: Simulation Analysis (continued)

These charts similarly demonstrate the volatility of the Retirement System, but particularly highlight the long-term uncertainty of the funded ratio of the plan.

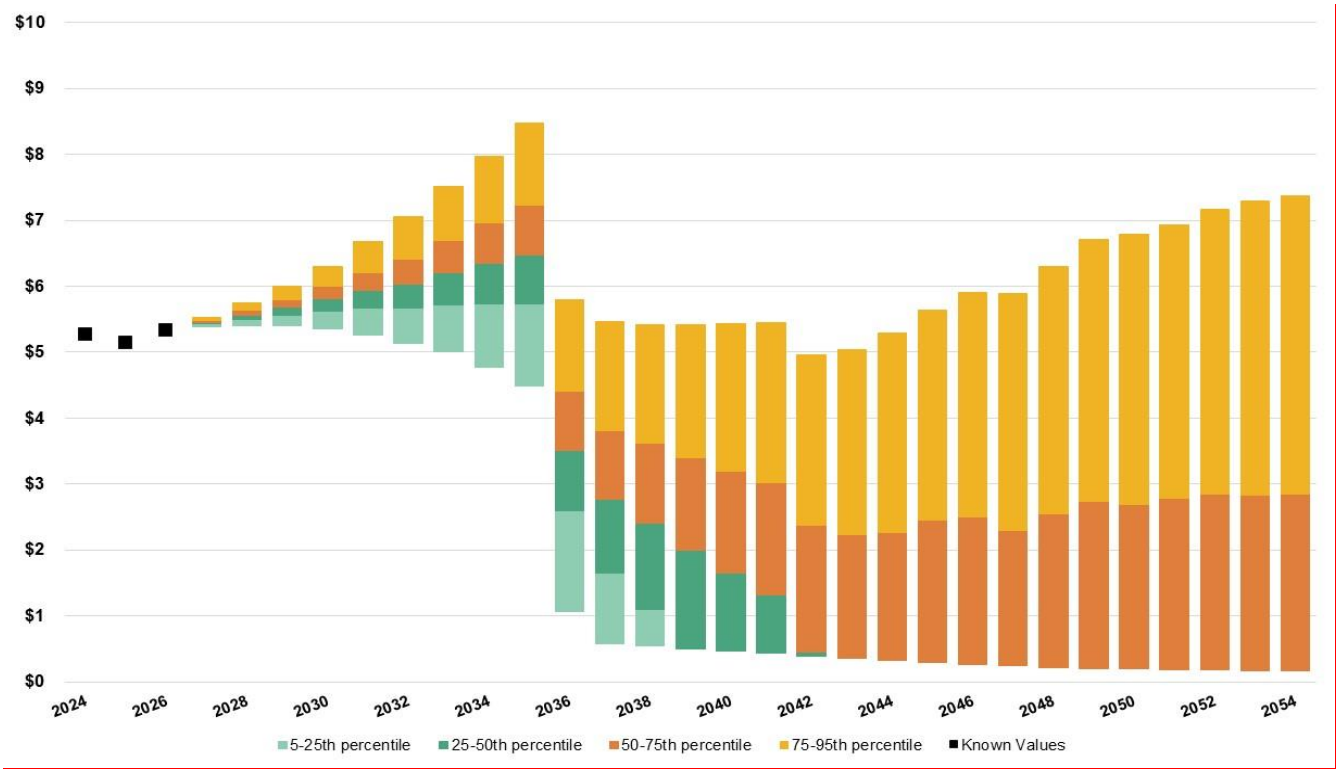
In 30 years at the median, the Retirement System is ~140% funded on a market value of assets basis and ~130% funded on an actuarial value of assets basis (the 50th percentile result represents the median outcome and is where the orange bar meets the dark green bar).

In the more favorable scenarios (75^{th} – 95^{th} percentiles), the funded ratios greatly increase throughout the 30-year projection to over 300% in some cases. In the less favorable scenarios (5^{th} – 25^{th} percentiles), the funded ratios remain around 50% over the long term. The funded ratios at these low percentiles do not drop further because of the additional contributions that are required to make up for the poor Retirement System asset performance.

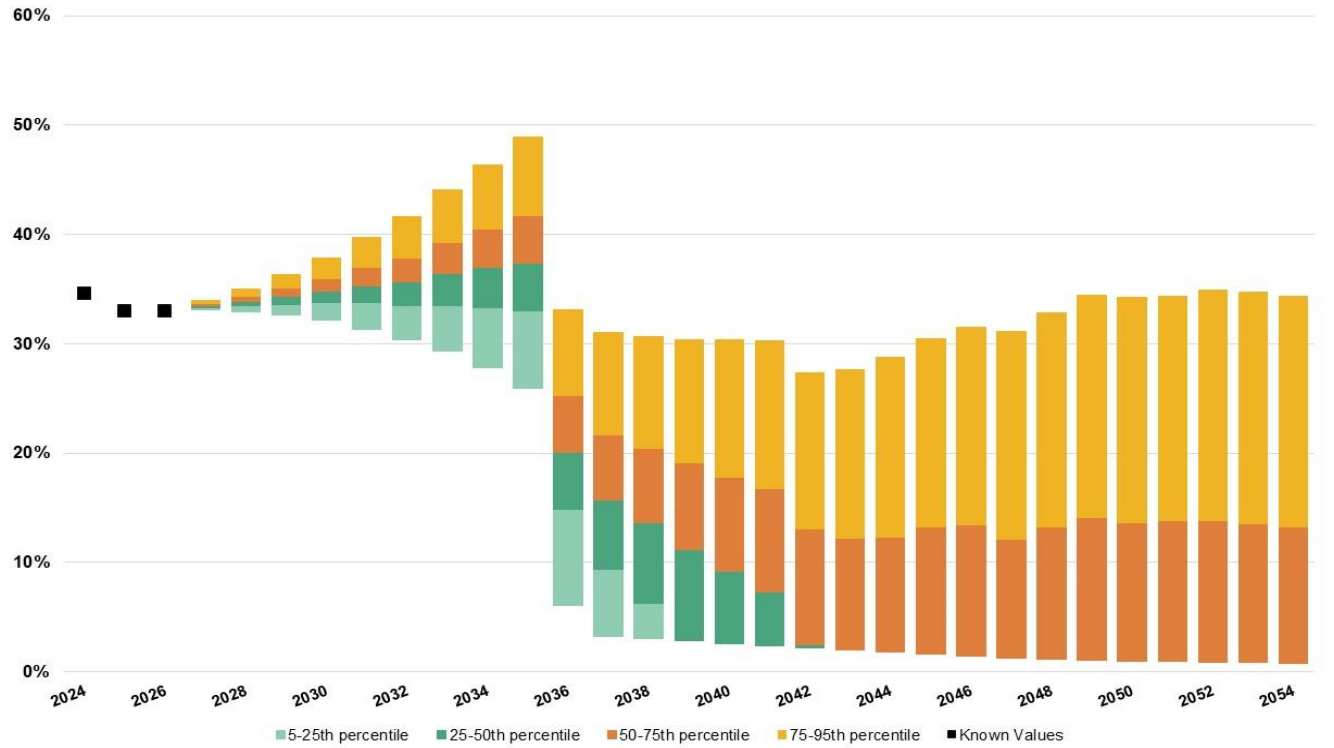
The overall trends are similar between the market value of assets funded ratio and the actuarial value of assets funded ratio, but there is less volatility with the actuarial value of assets due to the smoothing of asset gains and losses.

Section 3: Simulation Analysis (continued)

Employer Contribution Amount ($ Billions)



Employer Contribution (Percentage of Payroll)



Section 3: Simulation Analysis (continued)

At the median, employer contributions are projected to be around $6 billion, or 35% of pay, until 2036. In 2036, the large base from the Act 120 fresh start is expected to be fully amortized, which causes the large drop in contributions. From that point, contributions decrease until 2042, where contributions stay flat at the normal cost rate.

As directed by Act 120-2010, the minimum employer pension contribution rate is the normal cost rate. Beginning in 2042, all results in the 5th through 50th percentiles show the contributions at this normal cost "floor" (no dark green or light green results shown in 2042+).

In the less favorable scenarios, there is the possibility of contributions remaining above $6 billion or 30% of pay even after the Act 120 fresh start is fully amortized. This is represented by the range of the yellow bars.

Summary of Stochastic Results

Portfolio Metrics			Financial Metrics						
			30-Year MVA Funding Ratio		30-Year PV of Employer Contributions* ($ Billions)		30-Year Total Employer Contributions* ($ Billions)		Expected Date of Full Funding
30-Year Geometric Return	Standard Deviation	Sharpe Ratio	Median	5th Percentile (Unfavorable)	Median	95th Percentile (Unfavorable)	Median	95th Percentile (Unfavorable)	
7.6%	9.87%	0.45	140.6%	46.8%	$50.4	$73.2	$85.6	$178.7	6/30/2038

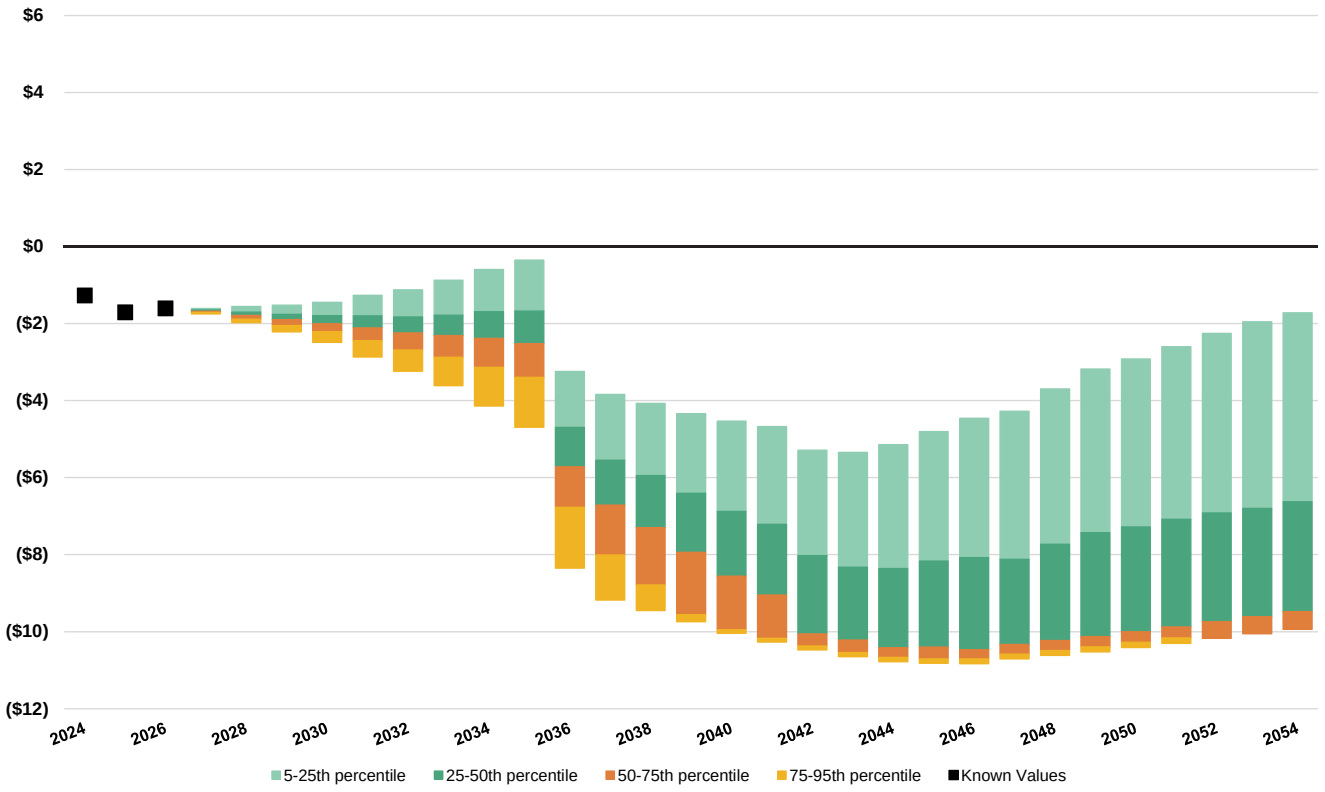
Because the 30-year geometric return is 7.6%, which is greater than the expected return assumption of 7.0%, results of the Retirement System are generally expected to improve at the median over the long-term. Contributions are expected to gradually decrease, particularly after the Act 120 fresh start base is fully amortized and up until the normal cost floor is reached. Funded ratios are expected to gradually increase over the 30-year projection, reaching 140.6% on a market value basis.

While the median result shows positive outcomes, the stochastic modeling shows the likelihoods and results of more optimistic and pessimistic scenarios. At the 5th percentile (unfavorable scenarios), the market value of assets funding ratio drops to 46.8% at the end of the 30-year projection. Cumulative employer contributions total to $178.7 billion in similarly unfavorable scenarios. Actual results over the projection period will, of course, heavily depend on actual contributions levels and investment performance.

Section 4: Liquidity Analysis

The following liquidity analysis is based on the same Stochastic Modeling process described in Section 3.

Net Cash Flow: Contributions less Benefit Payments ($ Billions)



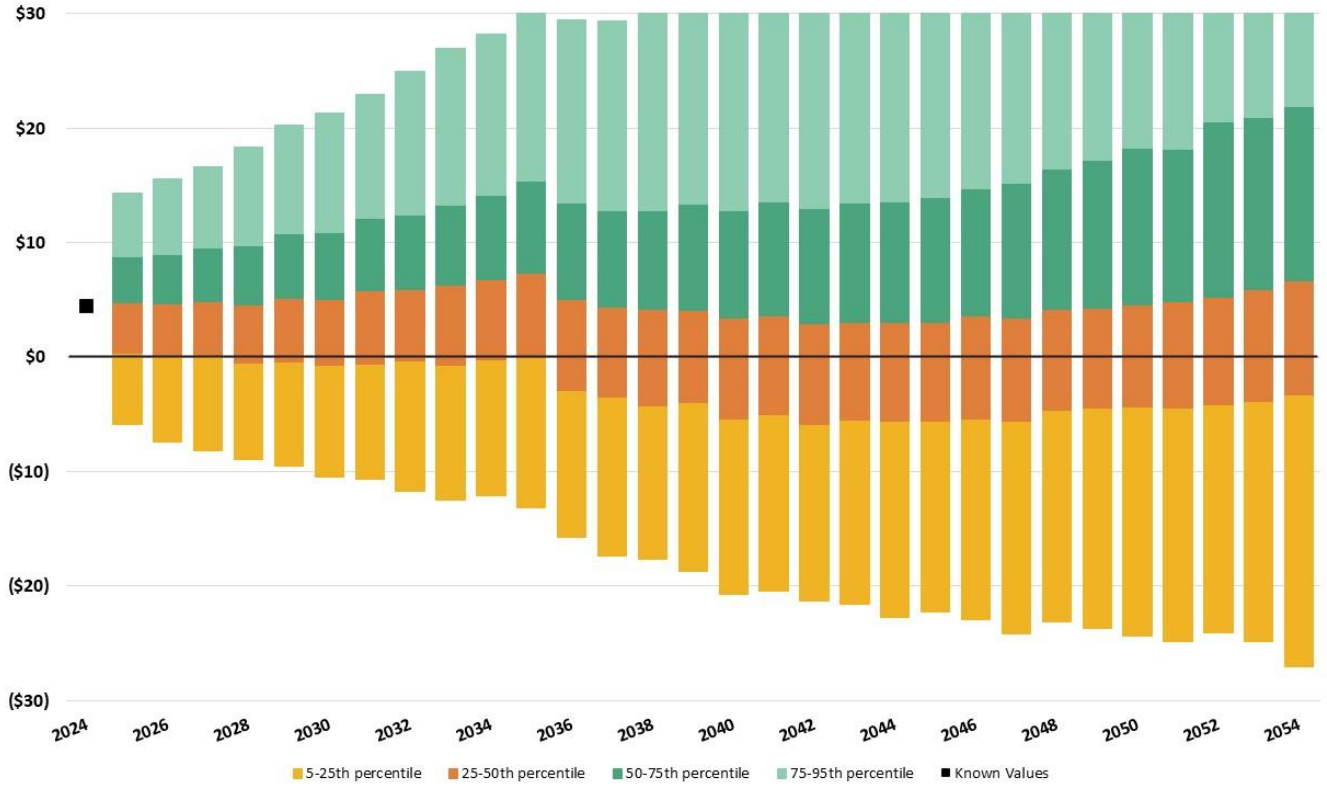
The above chart shows the Retirement System's net cash flow over the 30-year projection, defined as contributions going in minus benefit payments going out. While benefit payments have minimal variability, contribution outcomes vary widely with asset returns as shown in Section 3.

In all shown percentiles (5th through 95th) and projection years, net cash flow is negative, meaning annual contributions alone do not provide enough liquidity to cover plan benefit payments.

Note that in the context of liquidity, the favorable scenarios are shown by the green bars because higher values represent more cash in-flow. However, these same scenarios may consist of poor asset returns and thus higher contribution requirements. It is worth noting that negative cash flow in this specific analysis is not unusual in a mature pension system. The pool of assets dedicated to the Retirement System are set up to generate income and help fill the gap of negative cash flow in this case."

Section 4: Liquidity Analysis (continued)

Net Cash Flow: Contributions less Benefit Payments plus Returns ($ Billions)

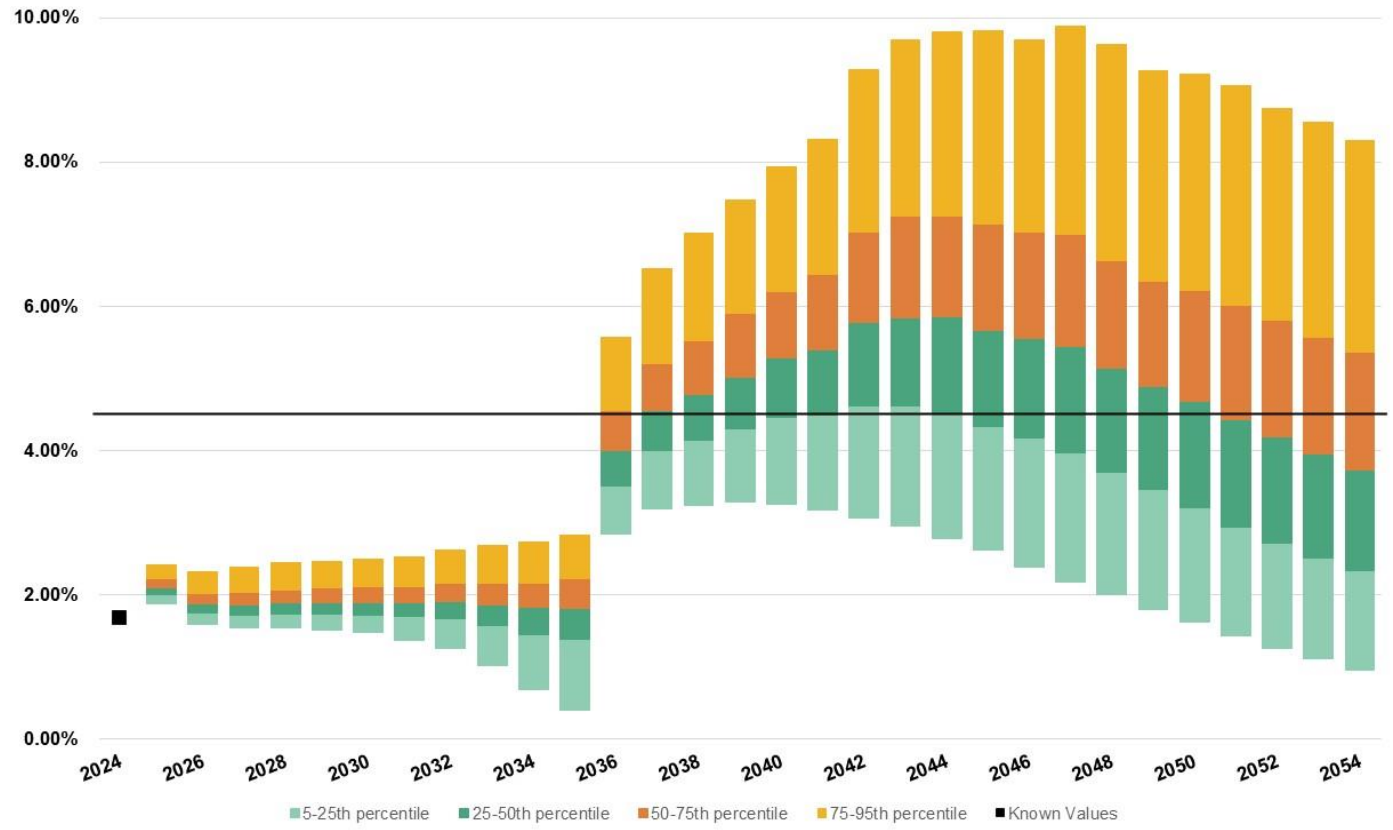


With asset returns brought into the equation, as shown in this chart, the net cash flow is positive at the median throughout the 30-year projection.

Based on the Retirement System's asset allocation, approximately 70% of returns are from investments that could be liquidated relatively quickly if needed to cover immediate benefit payments.

Section 4: Liquidity Analysis (continued)

Net Outflow: Benefit Payments less Contributions / Assets



The chart above shows net outflow, which represents the amount of money leaving the Retirement System each year as a percentage of total assets. A higher net outflow, shown by the orange and yellow bars, indicate larger cash drags on Retirement System assets.

The net outflow variable is shown as a percentage of assets so that it can be analyzed in the context of investment returns. Retirement System assets are expected to return 7% nominal and 4.5% real (assuming 2.5% inflation). If net outflow is below 4.5%, the Retirement System's assets would be expected to earn enough to fund the gap between contributions and benefit payments and maintain purchasing power.

The net outflow is above 4.5% from 2038 – 2050 at the median indicating cash flows are not keeping up with inflation. However, the trend corrects itself in the later years of the projection as benefit payments decrease.

Section 5: Demographic Analysis

In addition to investment and contribution risk, demographic risk can impact future outcomes of the Retirement System.

We have analyzed the following scenarios to demonstrate some of these risks:

- A **Baseline** scenario, where the asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%).
- A **Higher Mortality** scenario, 10% more deaths among current healthy member annuitants than assumed over the first 10-year period, and for the following 20 years is equal to the Retirement System's expected mortality assumption.
- A **Lower Mortality** scenario, 10% fewer deaths among healthy member annuitants than assumed over the first 10-year period, and for the following 20 years is equal to the Retirement System's expected mortality assumption.
- A **Higher Salary** scenario, actual salary increases are 2% higher salary than assumed for the first 10-year period, and for the following 20 years is equal to the Retirement System's expected salary assumption.
- A **Lower Salary** scenario, actual salary increases are 2% lower salary than assumed for the first 10-year period, and for the following 20 years is equal to the Retirement System's expected salary assumption.

Additional detail for these scenarios can be found in Appendix D of this report.

Section 5: Demographic Analysis (continued)

Results

A summary of the cumulative actuarially determined employer contribution (ADEC) amounts, funded ratio on an actuarial value of assets (AVA) basis, and the ADEC rate are shown below at five, ten, and thirty years.

Scenario	5 Years			10 Years			30 Years		
	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate
Baseline	$27.2	74.7%	34.6%	$58.0	88.6%	37.7%	$85.6	99.8%	1.2%
Higher Mortality	27.2	75.0%	34.5%	57.8	89.3%	37.3%	83.4	100.1%	0.8%
Lower Mortality	27.3	74.5%	34.7%	58.2	88.1%	38.0%	87.1	99.7%	1.5%
Higher Salary	27.7	71.9%	33.9%	60.9	82.4%	35.7%	109.9	98.6%	4.5%
Lower Salary	26.8	77.6%	35.2%	55.3	94.9%	40.0%	74.5	114.3%	0.9%

Additional commentary and graphs displaying the ADEC amounts, funded ratio on AVA basis, and ADEC rate over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054 can be found in the remainder of Section 5. Below are key takeaways of Section 5:

- Higher or lower mortality experience among current healthy service-related retirements on the ADEC and funded ratio is relatively small effect to the Retirement System.
- Higher salary increases than assumed generate higher benefits for members.
  - This generates demographic losses to PSERS which delays the Retirement System on approaching 100% funded compared to Baseline.
  - In the near term, ADEC rates on a percentage of payroll basis is lower than Baseline due to the higher payroll, but over time, the losses experienced from higher salary results in higher ADEC rates and higher cumulative ADEC amounts in dollars.
- Lower salary increases than assumed generate lower benefits for members.
  - This generates demographic gains to PSERS which accelerates the Retirement System approaching 100% funded compared to Baseline.
  - In the near term, ADEC rates on a percentage of payroll basis is higher than Baseline due to the lower payroll, but over time, the gains experienced from lower salary results in lower ADEC rates and lower cumulative ADEC amounts in dollars.

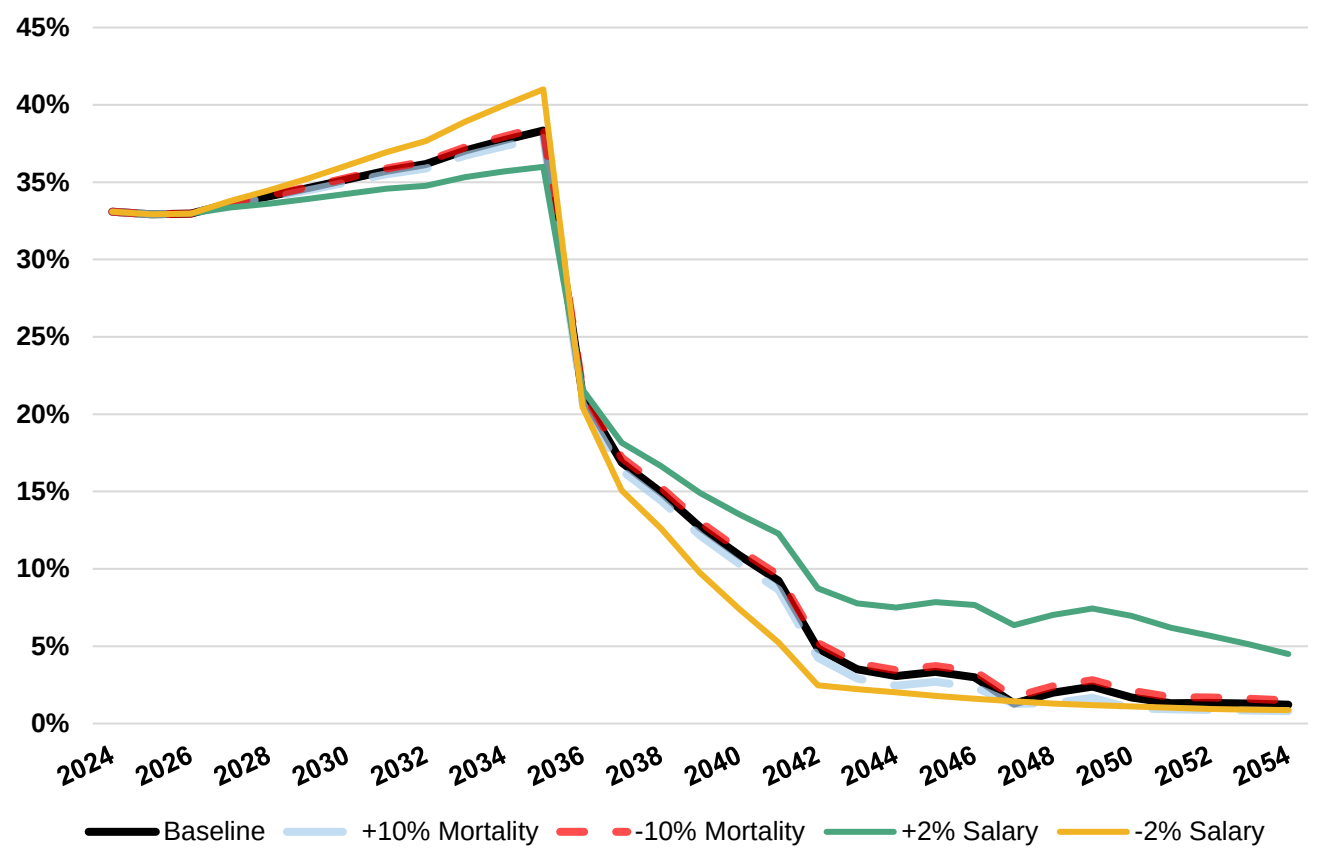
Section 5: Demographic Analysis (continued)

Actuarially Determined Employer Contribution (ADEC)

The Retirement System's ADEC rate is the statutory annual employer contribution as a percentage of covered payroll. A summary of the Retirement System's actuarial cost method and assumptions used to determine the ADEC can be found in Appendix C.

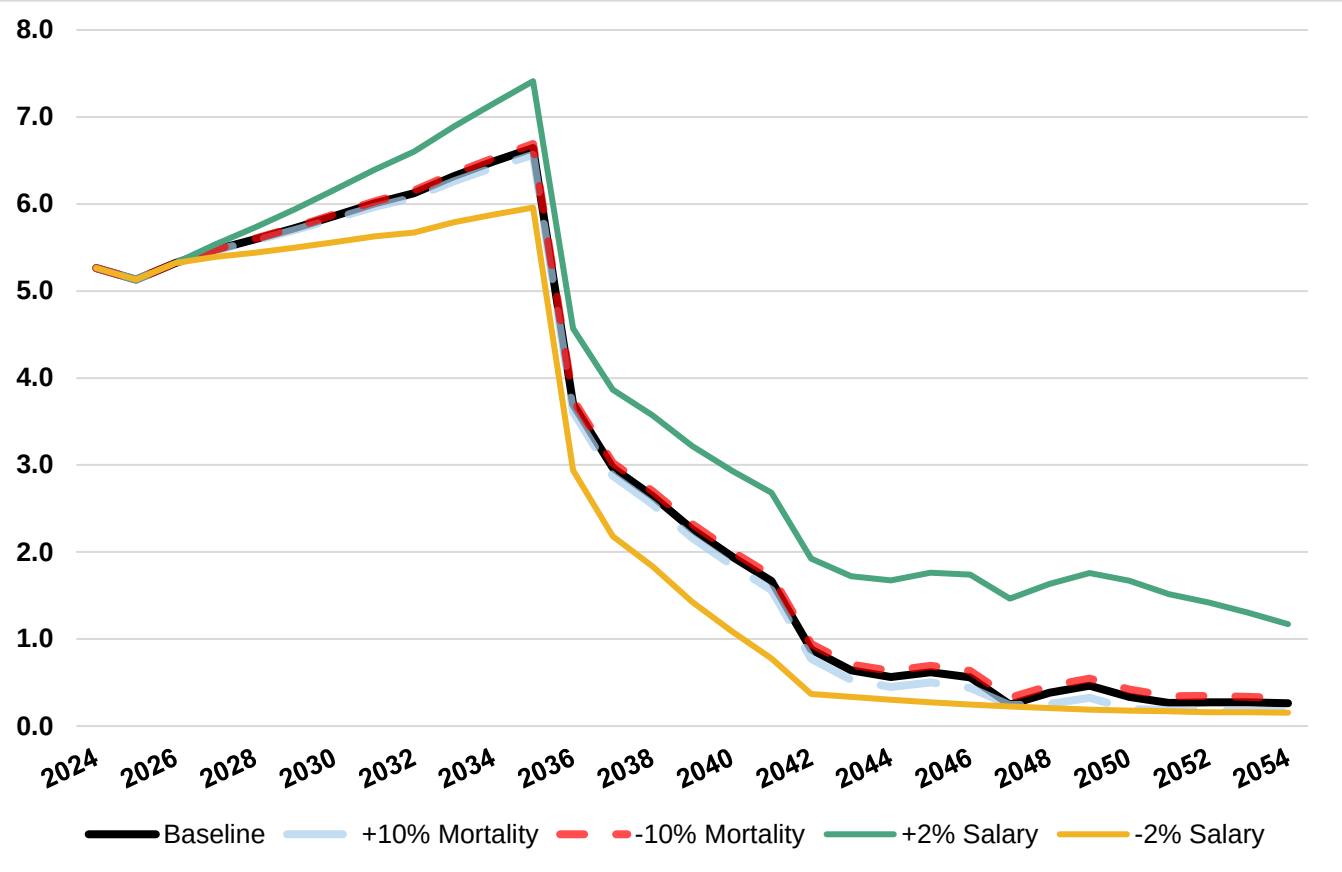
The projected ADEC rates as a percentage of covered payroll and ADEC in dollars for each scenario are shown over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054, in the graphs below.

ADEC Rate % of Covered Payroll



Section 5: Demographic Analysis (continued)

ADEC ($ Billions)



The Act 2010-120 unfunded accrued liability will be fully amortized by June 30, 2035. As a result, the projected ADEC will decrease beginning June 30, 2036 for all scenarios.

The Baseline projected ADEC aligns to the statutory annual employer contribution: employer normal cost, amortization of the June 30, 2024, unfunded accrued liability, and recognition of deferred investment experience in the asset smoothing method. By the end of the projection period, the ADEC begins to approach the Act 2010-120 minimum normal cost contribution rate.

The effect of mortality experience among current healthy service-related retirements on the ADEC is relatively small. In comparison to the Baseline:

- +10% Mortality scenario: actual mortality rates that are higher than the actuarial assumption decreases the annuitant lifetimes, increase the number of deaths, and decrease the value of benefits and ADEC slightly.
- -10% Mortality scenario: actual mortality rates that are less than the actuarial assumption increases the annuitant lifetimes, decrease the number of deaths and increase the value of benefits and ADEC slightly.

Section 5: Demographic Analysis (continued)

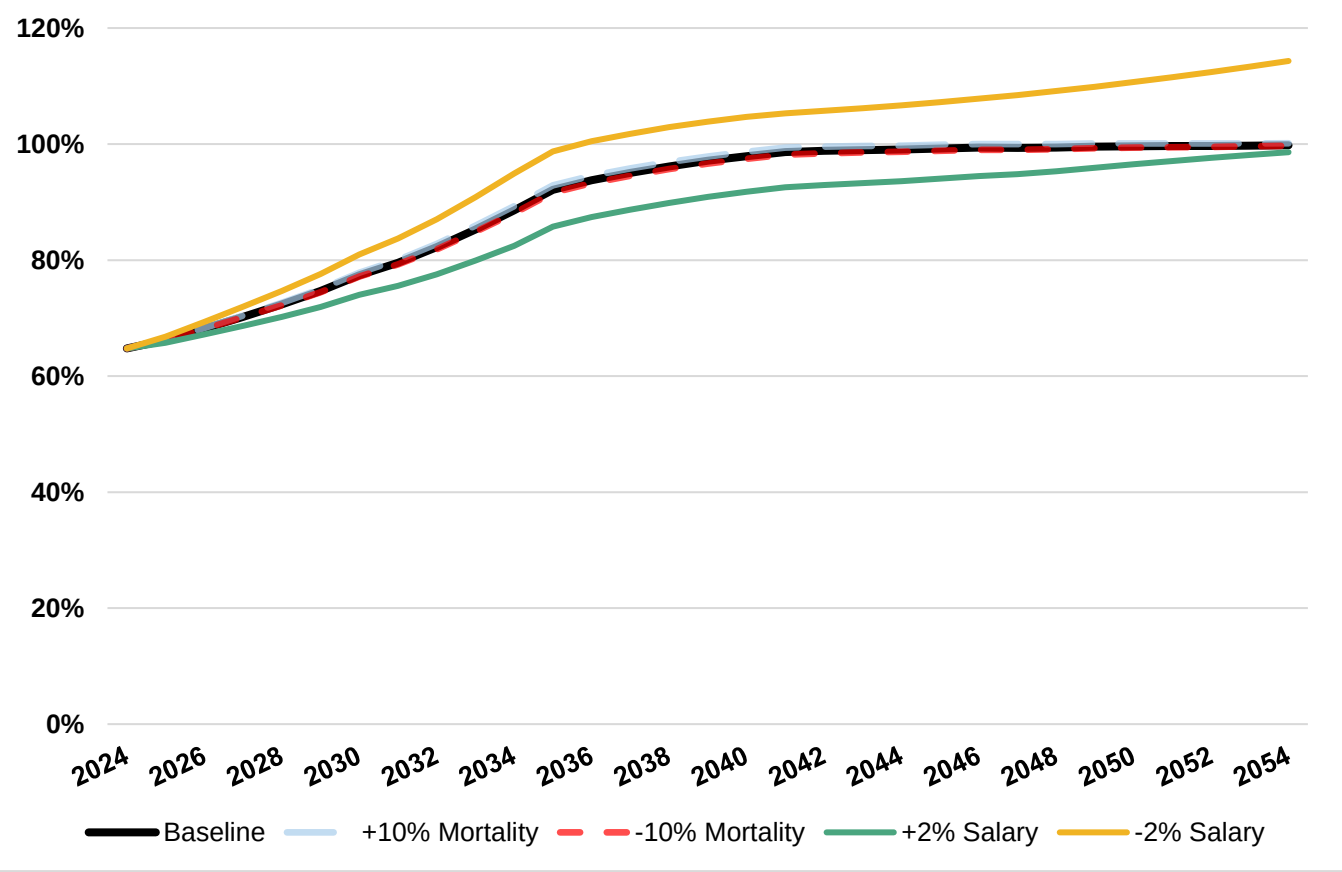
The effect of salary experience among continuing active members has a significant effect on the ADEC rate. In comparison to the Baseline:

- +2% Salary scenario: actual salary increases that are higher than the actuarial assumption increases the active members' projected benefit and increase the ADEC rates in the long term. However, prior to June 30, 2036, the full liquidation of the Act 2010-120 unfunded accrued liability, the ADEC rates are less than Baseline due to the higher payroll. In cumulative ADEC dollars, ADEC total over the course of the projection is greater due to the losses from the higher salary increases than assumed.
- -2% Salary scenario: actual salary increases that are lower than the actuarial assumption decreases the active members' projected benefit and decreases the ADEC rates in the long term. However, prior to June 30, 2036, the full liquidation of the Act 2010-120 unfunded accrued liability, the ADEC rates are more than Baseline due to the lower payroll. In cumulative ADEC dollars, ADEC total over the course of the projection is lower due to the gains from the lower salary increases than assumed.

Funded Ratio: Actuarial Value of Assets (AVA) Basis Summary

The Retirement System's total funded ratio is measured by comparing the actuarial value of assets (based on a 10-year moving average market value) to the accrued liability. The accrued liability is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active members.

The projected funded ratios for each scenario are shown over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054, in the graph below.



Section 5: Demographic Analysis (continued)

The Baseline scenario shows the funded ratio approaching 100% soon after the legacy Act 2010-120 unfunded accrued liability base is fully amortized in fiscal year ending June 30, 2035.

The effect of mortality experience among current healthy service-related retirements on the funded ratio is relatively small. In comparison to the Baseline:

- +10% Mortality scenario: actual mortality rates that are higher than the actuarial assumption decreases the annuitant lifetimes, increase the number of deaths, decrease the value of benefits and increase the funded ratio slightly.
- -10% Mortality scenario: actual mortality rates that are less than the actuarial assumption increases the annuitant lifetimes, decrease the number of deaths, increase the value of benefits and decrease the funded ratio slightly.

The effect of salary experience among continuing active members has a significant effect on the funded ratio. In comparison to the Baseline:

- +2% Salary scenario: actual salary growth rates that are higher than the actuarial assumption increases the active members' projected benefit and decreases the funded ratio.
- -2% Salary scenario: actual salary growth rates that are less than the actuarial assumption decreases the active members' projected benefit and increases the funded ratio.

Section 6: Additional Stress Test Scenarios

We have modeled the following scenarios to provide additional analysis on investment and contribution risk:

- A **Baseline** scenario, where the asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%).
- A **Excess Contribution** scenario, asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%). Contributions in year 1 are $500M plus the actuarially determined contribution, and for the remainder of the projection are equal to the actuarially determined contributions.
- A **One-Time Large Investment Loss** scenario, asset return in year 1 is -20% and for the remainder of the projection is equal to the Retirement System's expected return assumption (7.00%).
- A **Ongoing Low Return & Low Contributions** scenario, asset return for the next 20 years is 2.00% lower (5.00%) than the Retirement System's expected return assumption, and for the following 10 years is equal to the Retirement System's expected return assumption (7%). Contributions for the next 20 years are 80% of the actuarially determined contributions, and for the following 10 years are equal to the full actuarially determined contributions.
- A **One-Time Large Investment Loss & Low Contribution** scenario, asset return in year 1 is -20.00% and for the remainder of the projection is equal to the Retirement System's expected return assumption (7.00%). Contributions in year 1 are 80% of the actuarially determined contributions and for the remainder of the projection are equal to the full actuarially determined contributions.

Additional detail for these scenarios can be found in Appendix D of this report.

Section 6: Additional Stress Test Scenarios (continued)

Results

A summary of the cumulative actuarially determined employer contribution (ADEC) amounts, funded ratio on an actuarial value of assets (AVA) basis, and the ADEC rate are shown below at five, ten, and thirty years.

Scenario	5 Years			10 Years			30 Years		
	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate	Cumulative ADEC Amounts ($ Billions)	Funded Ratio (AVA)	ADEC Rate
Baseline	$27.2	74.7%	34.6%	$58.0	88.6%	37.7%	$85.6	99.8%	1.2%
Excess Contribution	27.1	75.1%	34.4%	57.7	88.9%	37.5%	84.5	99.8%	1.2%
One-time Large Investment Loss	28.2	65.6%	37.4%	64.3	70.2%	46.3%	143.0	95.8%	11.8%
Low Return & Low Contribution	27.8	68.0%	36.5%	62.7	71.2%	44.9%	179.0	68.1%	31.3%
One-time Large Investment Loss & Low Contribution	28.5	64.8%	37.9%	64.9	69.6%	46.8%	145.1	95.8%	11.6%

Additional commentary and graphs displaying the ADEC amounts, funded ratio on AVA basis, and ADEC rate over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054 can be found in the remainder of Section 6. Below are key takeaways of Section 6:

- Future asset returns are uncertain and any deviation from the expected return assumption of 7.00% will have an impact on ADEC and funded ratio for PSERS.
- A one-time large investment loss of -20% will increase ADEC and delay the Retirement System approaching 100% funded in comparison to the Baseline.
- A one-time excess contribution or low contribution has minimal impact to the Retirement System. However, in the Low Return and Low Contribution scenario, it shows the importance of contributing the full ADEC. Contributing the ADEC is an essential step to bringing PSERS back to fully funded status even when adverse asset returns occur.
- The effect of investment performance on the funded ratio is delayed due to the 10-year asset smoothing method.
- The combination of lower-than-expected returns and not contributing the full ADEC increases the future ADEC and the funded ratio remains suppressed at 68% in 30 years.

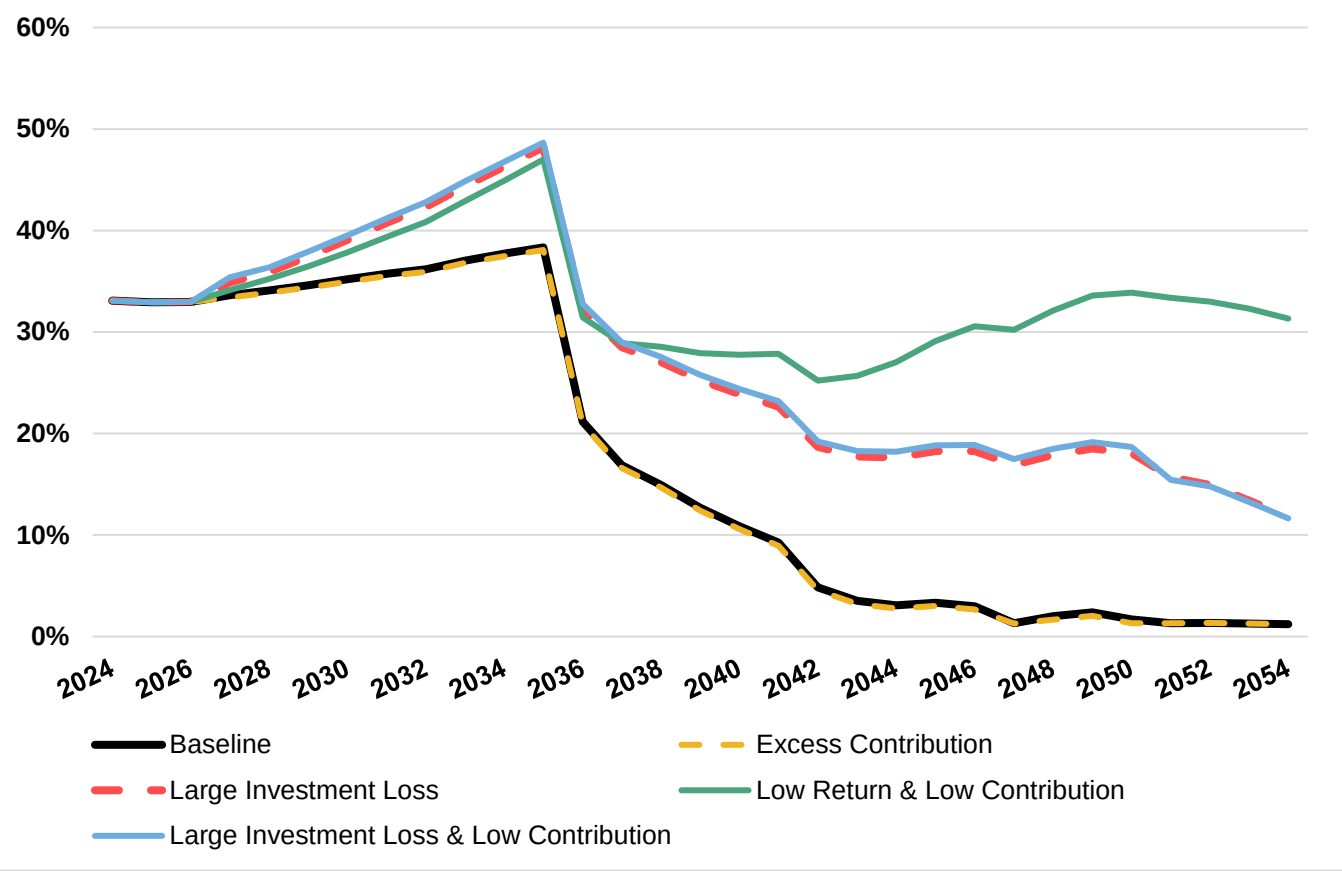
Section 6: Additional Stress Test Scenarios (continued)

Actuarially Determined Employer Contribution (ADEC)

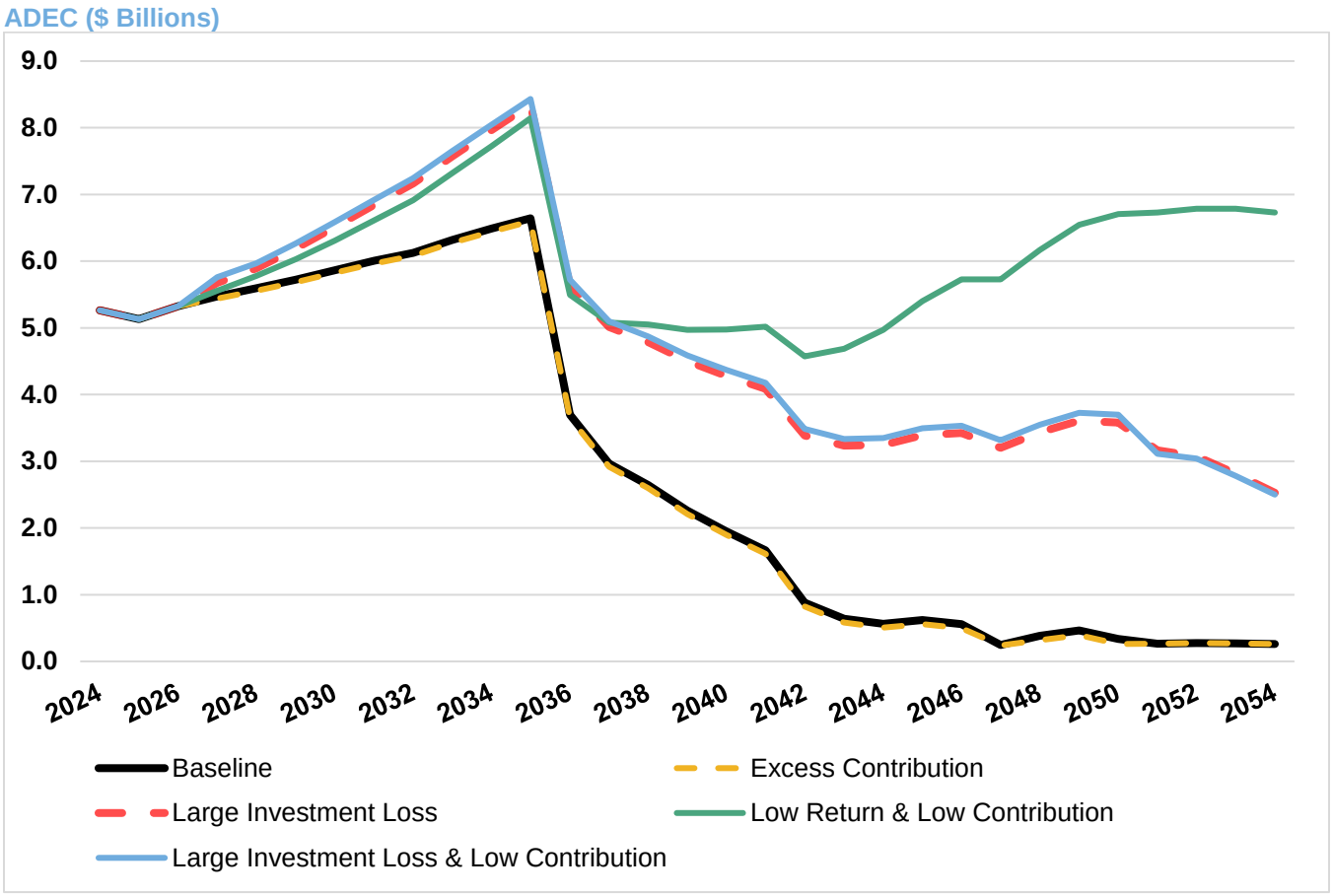
The Retirement System's ADEC rate is the statutory annual employer contribution as a percentage of covered payroll. A summary of the Retirement System's actuarial cost method and assumptions used to determine the ADEC can be found in Appendix C.

The projected ADEC rates as a percentage of covered payroll and ADEC in dollars for each scenario are shown over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054, in the graphs below.

ADEC Rate % of Covered Payroll



Section 6: Additional Stress Test Scenarios (continued)



The Act 2010-120 unfunded accrued liability will be fully amortized by June 30, 2035. As a result, the projected ADEC will decrease beginning June 30, 2036 for all scenarios.

The effect of investment performance on the ADEC is delayed due to the 10-year asset smoothing method, which is intended to dampen market volatility. One-tenth of each year's difference of actual asset returns from their expected level is recognized each year; the first amount is recognized in the valuation immediately succeeding the experience and the final amount recognized nine years later.

The Baseline projected ADEC aligns to the statutory annual employer contribution: employer normal cost, amortization of the June 30, 2024, unfunded accrued liability, and recognition of deferred investment experience in the asset smoothing method. By the end of the projection period, the ADEC begins to approach the Act 2010-120 minimum normal cost contribution rate. In comparison to the Baseline:

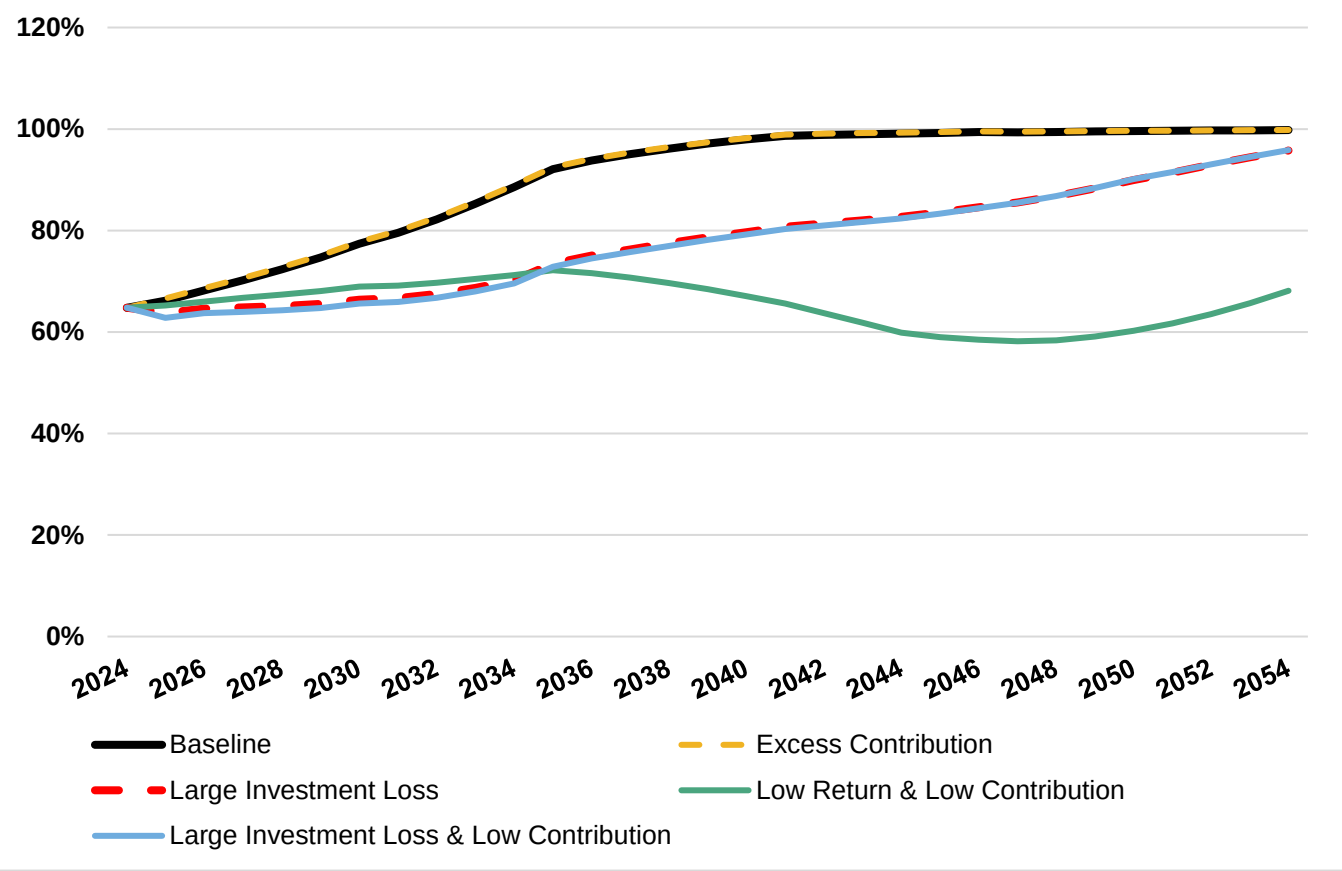
- Excess Contribution scenario: a one-time $500 million cash infusion as of June 30, 2025, will slightly decrease the Baseline ADEC for 24 years since the additional contribution will be subject to a 24-year amortization.
- Large Investment Loss scenario: the assumed -20% asset return in fiscal year ending June 30, 2025, is dampened by asset smoothing and gradually increases the ADEC. Due to the asset smoothing method, the investment loss will be fully recognized by the June 30, 2034 valuation but will continue to affect the ADEC until the shortfall is fully amortized.
- Large Investment Loss & Low Contribution scenario: has similar results as the Large Investment Loss scenario. However, the deferral of current obligations for future payment will increase the ADEC slightly more compared to the Large Investment Loss scenario due to the one-time low contribution.
- Low Return & Low Contribution scenario: unfavorable asset performance will increase the ADEC. Due to the asset smoothing method, investment losses which occurred through June 30, 2044, continue to affect the ADEC through June 30, 2054. The deferral of resulting obligations for future payment will further increase the ADEC over time.

Section 6: Additional Stress Test Scenarios (continued)

Funded Ratio: Actuarial Value of Assets (AVA) Basis Projection

The Retirement System's total funded ratio is measured by comparing the actuarial value of assets (based on a 10-year moving average market value) to the accrued liability. The accrued liability is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active members.

The projected funded ratios for each scenario are shown over a 30-year period, from fiscal year ending June 30, 2025, through June 30, 2054, in the graph below.



Section 6: Additional Stress Test Scenarios (continued)

The Baseline scenario shows the funded ratio approaching 100% soon after the legacy Act 2010-120 unfunded accrued liability base is fully amortized in fiscal year ending June 30, 2035.

In comparison to the Baseline:

- Excess Contribution scenario: a one-time $500 million cash infusion as of June 30, 2025, will immediately improve the funded ratio. However, there will be no prolonged significant impact on the funded ratio due to the slight decrease in ADEC for the next 24 years.
- One-time Large Investment Loss scenario: the assumed -20% asset return in fiscal year ending June 30, 2025, is dampened by asset smoothing and decreases the funded ratio. Due to the asset smoothing method, the investment loss will be fully recognized by the June 30, 2034 valuation but will continue to affect the funded ratio until the shortfall is fully amortized.
- One-time Large Investment Loss & Low Contribution scenario: has similar results as the Large Investment Loss scenario. When compared to the Large Investment Loss scenario, the deferral of current obligations for future payment will decrease the funded ratio even further in the year in which ADEC is not contributed. This will continue until the amortization of the deferred obligations are paid.
- Low Return & Low Contribution scenario: unfavorable asset performance will decrease the funded ratio. Due to the asset smoothing method, investment losses which occurred through June 30, 2044, continue to affect the funded ratio through June 30, 2054. The deferral of resulting obligations for future payment will further decrease the funded ratio.

Appendix A: Stress Testing Requirements

Stress Test of the System

A. **General rule:** The board shall conduct an annual stress test of the system and submit the results of the stress test to the Governor, the General Assembly and the Independent Fiscal Office no later than January 1 of each year (or such later date if approved by the legislature).The stress test shall include a scenario analysis, simulation analysis and sensitivity analysis. The board shall disclose in the report of the stress test results which “industry standards” were used and whether any changes to “industry standards” have been made.

B. **Report by Independent Fiscal Office:** No later than March 1 of each year, the Independent Fiscal Office shall produce a report summarizing the results of the stress test, including a calculation of the ratio of projected employer pension contributions to projected State revenues under a scenario analysis.

C. **Definitions:** As used in this section, the following words and phrases shall have the meanings given to them in this subsection unless the context clearly indicates otherwise:

"Scenario analysis." Projections of assets, liabilities, unfunded actuarial accrued liabilities, the change in unfunded actuarial accrued liabilities, employer contributions, benefit payments, service costs, payroll and calculations of the ratios of assets to liabilities, employer contributions to payroll and operating cash flow to assets in sufficient number as determined prudent by the board as informed by “recognized industry standards.”

“Sensitivity analysis." The following:

1. Estimates of the total normal cost and employer normal cost for new employees, calculated using various investment return assumptions in sufficient number as determined prudent by the board as informed by “recognized industry standards”

2. Estimates of the unfunded actuarial accrued liability and unfunded liability, calculated using various annual assumed rates of return in sufficient number as determined prudent by the board as informed by “recognized industry standards”

"Simulation analysis." Projections of the range of required employer contributions for each of the next 20 years, based on analysis that simulates the volatility of annual investment returns above and below the assumed rate of return, applying methodology determined prudent by the board as informed by “recognized industry standards”

(Nov. 25, 2020, P.L.1237, No.128, eff. 60 days)

2020 Amendment. Act 128 added section 8510. Section 7(1) of Act 128 provided that the addition of section 8510 shall apply to fiscal years beginning after June 30, 2022.

Appendix B: Summary of Benefit and Contribution Provisions

Membership
For valuation purposes, all employees are considered to be full coverage members. All employees who become members on and after January 1, 1966 are members of the dual coverage group. Dual coverage members contribute to both PSERS and to Social Security.

Benefits

Superannuation Annuity

Eligibility

Age 62, or age 60 with 30 years of service, or 35 years of service regardless of age. For Class T-E and Class T-F members, age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service. For Class T-G members, age 67 with a minimum of three years of service, or any combination of age and service that totals 97 with at least 35 years of credited service. For Class T-H members, age 67 with a minimum of three years of service credit.

Amount

Class	Accrual	Final Average Salary
T-C	2.00%	For any 3 years of service
T-D	2.50%	For any 3 years of service
T-E	2.00%	For any 3 years of service
T-F	2.50%	For any 3 years of service
T-G	1.25%	For any 5 years of service
T-H	1.00%	For any 5 years of service

Based on the above table, Accrual Rate times the Final Average Salary times years of school service and intervening military service. Minimum of $100 per year of service. The "final average salary" means the highest average annual salary.

Annual salary is subject to a limit of $200,000, as adjusted under Section 401(a)(17) of the Internal Revenue Code. As of June 30, 2024, the adjusted limit is $345,000.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E, Class T-F, Class T-G and Class T-H members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

Appendix B: Summary of Benefit and Contribution Provisions (continued)

Early Retirement Annuity

Eligibility	Age 55 with 25 years of service. For Class T-G members, age 57 with 25 years of service.
Amount	Accrued benefit as of date of retirement, reduced 1/4% for each month by which commencement of payments precedes Superannuation Age. For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code. For Class T-E, Class T-F, Class T-G and Class T-H members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

Withdrawal Annuity

Eligibility	5 years of service. For Class T-E, Class T-F, Class T-G and Class T-H members, ten years of service.
Amount	Accrued benefit deferred to superannuation retirement age or an actuarially reduced benefit payable immediately. For Class T-C, Class T-D, Class T-E and Class T-F members, PSERS early retirement factors are based on the statutory interest rate of 4%. For Class T-G and T-H members with less than 25 years of service, PSERS early retirement factors from age 62 to superannuation are based on the statutory interest rate of 4.00%. From commencement age to age 62, PSERS early retirement factors are based on the assumed long-term return on Retirement System assets as adopted by the Board.

Disability Annuity

Eligibility	5 years of service.
Amount	The standard single life annuity if the total number of years of credited service is greater than 16.667, otherwise the standard single life annuity multiplied by the lesser of the following ratios: (Y*/Y) or (16.667/Y) where Y is the number of years of credited service and Y* is the total years of credited service if the member were to continue as a school employee until superannuation retirement age (or at current age, if later). For Class T-G and Class T-H members, the standard single life annuity for this provision is based on a 2.00% accrual rate. Minimum of $100 per year of service.

Return of Contributions

Eligibility	Death or separation from service and member does not qualify for other benefits.
Amount	Refund of accumulated deductions includes interest (less annuity payments received prior to death in the case of a retired member).

Appendix B: Summary of Benefit and Contribution Provisions (continued)

Death Benefit

Eligibility	Death of an active member or vestee who was eligible to receive an annuity.
Amount	The present value of the annuity that would have been effective if the member retired on the day before death. Option 1 assumed payable if no other option elected.

Normal and Optional Forms of Benefits

Normal Form (Maximum):	Life annuity with a guaranteed payment equal to member contributions with interest.
Option 1:	Reduced benefit with refund of balance of present value of annuity at retirement over payments received. If balance is less than $5,000, benefit is paid in lump sum; otherwise, beneficiary may elect annuity and/or lump sum.
Option 2:	Joint and 100% survivorship annuity.
Option 3:	Joint and 50% survivorship annuity.
Option 4:	Benefit of equivalent actuarial value, including lump sum payment of member contributions.

Contributions

By Members

Regular member contribution:

Class	Enrollment	Contribution Rate
Members who did not elect Class T-D	Prior to July 22, 1983	5.25%
Members who did not elect Class T-D	After July 21, 1983 but prior to July 1, 2001	6.25%
T-D	Prior to July 22, 1983	6.50%
T-D	After to July 21, 1983	7.50%
T-E		7.50%
T-F		10.30%
T-G		5.50%
T-H		4.50%

Appendix B: Summary of Benefit and Contribution Provisions (continued)

Shared-Risk contribution:

Class T-E, Class T-F, Class T-G and Class T-H members are subject to a shared-risk employee contribution rate. Members benefit when investments of the Retirement System are doing well and share some of the risk when investments underperform. The member contribution rate will stay within the specified range allotted for Class T-E, Class T-F, Class T-G or Class T-H members but could increase or decrease every three years starting July 1, 2015, depending on investment performance.

1. If the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return by more than 1.00% based on the prior ten-year period:

Class	Decrease in Contribution Rate	Minimum Contribution Rate
T-E	0.50%	5.50%
T-F	0.50%	8.30%
T-G	0.75%	2.50%
T-H	0.75%	1.50%

Provided the total member contribution rate is less than the member's basic contribution rate, if the investment rate of return (less investment fees) is less than the assumed rate of return by less than 1.00% based on the prior ten-year period:

Class	Increase in Contribution Rate
T-E	0.50%
T-F	0.50%
T-G	0.75%
T-H	0.75%

Appendix B: Summary of Benefit and Contribution Provisions (continued)

2. If the investment rate of return (less investment fees) is less than assumed rate of return by more than 1.00% based on the prior ten-year period:

Class	Increase in Contribution Rate	Maximum Contribution Rate
T-E	0.50%	9.50%
T-F	0.50%	12.30%
T-G	0.75%	8.50%
T-H	0.75%	7.50%

Provided the total member contribution rate is greater than the member's basic contribution rate, if the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return by less than 1.0% based on the prior ten-year period:

Class	Decrease in Contribution Rate
T-E	0.50%
T-F	0.50%
T-G	0.75%
T-H	0.75%

If the Retirement System is fully funded at the time of the comparison, the increase in member contribution rate shall not be greater than zero. There shall be no increase in the member contribution rate if there has not been an equivalent increase in the employer contribution rate over the previous three-year period. For any fiscal year in which the employer contribution rate is lower than the final contribution rate under section 8328(h), the total member contribution rate shall be prospectively reset to the basic contribution rate provided the total member contribution rate is at or above the basic contribution rate. Shared-risk member contributions shall not be made in any fiscal year in which the Commonwealth fails to make the annually required contribution to the Retirement System as provided under section 8328.

Until a full ten-year look back period is available, the investment return measurement period will begin on July 1, 2011.

By Commonwealth and School Employers

Balance of required contribution determined as normal contribution, accrued liability contribution, supplemental annuity contribution, experience adjustment factor, premium assistance contribution and the DC Plan contribution, is funded by the Commonwealth and the School Employers.

Appendix B: Summary of Benefit and Contribution Provisions (continued)

Defined Contribution (DC) Plan

Eligibility	All employees who become members on or after July 1, 2019 also become participants of the DC Plan.
Eligibility Point	A participant earns one eligibility point for each fiscal year (12-month period beginning July 1) in which school service is rendered and the participant makes a DC participant contribution to the PSERS DC Plan.
Participant and Employer Contribution Rate:	

Class	Participant	Employer
T-G	2.75%	2.25%
T-H	3.00%	2.00%
DC	7.50%	2.00%

Vesting	Participant contribution: 100% vested Employer contribution: 100% vested after accumulating three eligibility points
Benefit	Based on the amount of contributions in the account and any investment performance less expenses.
Death Benefit	Beneficiary will be entitled to receive a distribution of the participant's vested balance in the DC Plan account.

Appendix C: Actuarial Assumptions and Methods

Projection Assumptions

Except as noted herein, the projections provided were prepared using the same data, actuarial methods, and assumptions that were used for the June 30, 2024 actuarial valuation. The following projection assumptions were used for future valuations:

- The active workforce size is assumed to remain constant; and
- Future new employees have similar characteristics (age/gender/salary) to new employees for the period July 1, 2021 through June 30, 2024. Among new school employees hired on or after July 1, 2024, 98% will become Class T-G members, 1% will elect Class T-H membership, and 1% will elect Class DC participation.

The projections reflect the Act 5 risk-sharing provisions for TE/TF/TG/TH members. Note that the Retirement System assets and projected unfunded accrued liability amortization schedules reflect the under/over contribution from the basic member rate resulting from the assumed asset returns, however, the corresponding Retirement System accrued liabilities do not reflect the decrease/increase in the affected members' contribution rates. Stress-testing for future alternative Retirement System returns that are different from the assumed 7.00% per annum may also affect the projected Retirement System liabilities due to the shared-risk member contributions impact on return of contributions for non-vested members, Option 4 lump sum withdrawals, etc. The expected impact of this is minimal.

The Health Insurance Premium assistance and Defined Contribution Plan assets and liabilities have been excluded from this analysis.

Appendix C: Actuarial Assumptions and Methods (continued)

June 30, 2024 Valuation Assumptions

Interest Rate: 7.00% per annum, compounded annually. The components are 2.50% for inflation and 4.50% for the real rate of return. Actuarial equivalent benefits are determined based on an interest rate of 4.00% per year (since 1960) except, in accordance with Act 5-2017, an interest rate of 7.00% per year is used for Class T-E, Class T-F, Class T-G, and Class T-H members' Option 4 partial withdrawal of accumulated member contributions and certain Class T-G and Class T-H early retirement factors.

Separation from Service: Illustrative rates of assumed separation from service are shown in the following table.

	Class T-C and Class T-D Annual Rate of:						
	Withdrawal						
Age	Less Than Five Years of Service	Five Years but Less Than 10 Years of Service	10 or More Years of Service	Death[1]	Disability	Early Retirement[2]	Superannuation Retirement
MALES							
25	21.83%	9.22%	4.55%	.022%	.01%		
30	14.93	3.84	4.55	.029	.01		
35	15.17	3.77	1.68	.038	.04		
40	16.04	4.44	1.42	.053	.06		
45	15.12	5.17	1.41	.082	.11		19.00%
50	15.81	4.96	1.89	.129	.23		19.00
55	15.54	4.96	3.63	.194	.37	14.50%	25.00
60	13.85	6.37	5.49	.289	.37	14.50	29.00
65				.447	.11		23.00
70				.699	.08		20.00
75				1.076	.08		25.00
79				1.701	.08		25.00
FEMALES							
25	18.33%	7.47%	3.90%	.008%	.01%		
30	15.16	5.92	3.90	.013	.02		
35	14.66	5.68	2.83	.019	.03		
40	12.86	5.16	1.67	.030	.06		
45	12.82	5.25	1.60	.046	.11		16.00%
50	13.02	5.23	2.08	.069	.18		16.00
55	13.43	5.31	3.66	.102	.29	14.50%	16.00
60	13.81	7.53	5.94	.154	.24	15.00	31.00
65				.251	.07		28.00
70				.431	.09		23.00
75				.766	.09		25.00
79				1.239	.09		25.00

1. These base mortality tables will then be projected on a generational basis using the Buck Modified scale MP-2020. Refer to the pre-retirement mortality description below.
2. Early Retirement – Age 55 with 25 years of service, but not eligible for Superannuation retirement.

Appendix C: Actuarial Assumptions and Methods (continued)

Age	Class T-E, Class T-F, Class T-G and Class T-H Annual Rate of:					
	Withdrawal					
	Less Than 10 Years of Service	10 or More Years of Service	Death[1]	Disability	Early Retirement[2]	Superannuation Retirement
MALES						
25	17.02%	4.55%	.022%	.01%		
30	11.25	4.55	.029	.01		
35	12.09	1.68	.038	.04		
40	13.14	1.42	.053	.06		
45	13.87	1.41	.082	.11		
50	13.67	1.89	.129	.23		
55	11.91	3.63	.194	.37	14.50%	16.30%
60	11.19	5.49	.289	.37	14.50	16.30
65	11.19		.447	.11		16.30
70	11.19		.699	.08		16.30
75	11.19		1.076	.08		16.30
79	11.19		1.701	.08		16.30
FEMALES						
25	14.54%	3.90%	.008%	.01%		
30	11.68	3.90	.013	.02		
35	12.39	2.83	.019	.03		
40	11.53	1.67	.030	.06		
45	10.99	1.60	.046	.11		
50	10.72	2.08	.069	.18		
55	10.75	3.66	.102	.29	14.50%	19.50%
60	11.62	5.94	.154	.24	15.00	19.50
65	11.62		.251	.07		19.50
70	11.62		.431	.09		19.50
75	11.62		.766	.09		19.50
79	11.62		1.239	.09		19.50

1. These base mortality tables will then be projected on a generational basis using the Buck Modified scale MP-2020. Refer to the pre-retirement mortality description below.
2. Early Retirement – prior to eligibility for Superannuation retirement.

Death before Retirement:

Male participants: 50% PubT-2010 Employee (Total Teacher dataset) and 50% PubG-2010 Employee (Total General Employees dataset) Amount Weighted Male Tables, with a 99.0% adjustment, generationally projected with Buck Modified scale MP-2020.

Female participants: 50% PubT-2010 Employee (Total Teacher dataset) and 50% PubG-2010 Employee (Total General Employees dataset) Amount Weighted Female Tables, with an 88.6% adjustment, generationally projected with Buck Modified scale MP-2020.

Appendix C: Actuarial Assumptions and Methods (continued)

Death after Retirement:

Male annuitants: 50% PubT-2010 Retiree (Total Teacher dataset) and 50% PubG-2010 Retiree (Total General Employees dataset) Amount Weighted Male Tables, with a 99.7% adjustment, generationally projected with Buck Modified scale MP-2020.

Female annuitants: 50% PubT-2010 Retiree (Total Teacher dataset) and 50% PubG-2010 Retiree (Total General Employees dataset) Amount Weighted Female Tables, with a 95.4% adjustment, generationally projected with Buck Modified scale MP-2020.

Male disabled annuitants: Pub-2010 Disability Mortality Non-Safety Amount Weighted Male Table, with a 105.4% adjustment, generationally projected with Buck Modified scale MP-2020.

Female disabled annuitants: Pub-2010 Disability Mortality Non-Safety Amount Weighted Female Table, with a 95.0% adjustment, generationally projected with Buck Modified scale MP-2020.

Male contingent annuitants: Pub-2010 Contingent Survivor Amount Weighted Male Table, with a 106.0% adjustment, generationally projected with Buck Modified scale MP-2020.

Female contingent annuitants: Pub-2010 Contingent Annuitant Amount Weighted Female Table, with a 116.2% adjustment, generationally projected with Buck Modified scale MP-2020.

For determination of actuarial equivalence, a unisex table based on 25% males and 75% females blend of the Board approved base mortality tables to be used for actuarial valuations beginning June 30, 2021, generationally projected to 2025 with the Buck Modified MP-2020 improvement scale.

Salary Increase: Effective average of 4.50% per annum, compounded annually. The components are 2.50% for inflation, and 2.00% for real wage growth and merit or seniority increases. Representative values are as follows:

Age	Annual Rate of Salary Increase
20	9.65%
30	7.15
40	5.15
50	3.15
55	2.75
60	2.75
65	2.75
Over 65	2.75

Payroll Growth: A 3.25% per annum payroll growth assumption is used to liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 2010-120 and Act 2017-5, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010, and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability due to benefit enhancements will be funded over 10 years based on level-percent-of-pay amortization.

Appendix C: Actuarial Assumptions and Methods (continued)

MISCELLANEOUS:

Option 4 - Refund of Contributions Elections: 75% of Class T-C and Class T-D and 50% of Class T-E, Class T-F, Class T-G, and Class T-H members are assumed to elect a refund of contributions and a reduced annuity.

Withdrawal Annuity: 50% of members are assumed to commence payment immediately and 50% are assumed to defer payment to superannuation age.

Optional Forms of Annuity Payment at Retirement: Anticipated active member elections of optional forms of payment at retirement as follows:

- 45% will elect Maximum Straight Life Annuity (MSLA)
- 25% will elect OPTION 1 (Straight life annuity with guaranteed payments equal to present value of MSLA)
- 20% will elect OPTION 2 (100% Joint and Survivor with males 3 years older than females)
- 10% will elect OPTION 3 (50% Joint and Survivor with males 3 years older than females)
- 0% will elect OPTION 4 annuity

Optional Forms of Payment Factors: Actuarial equivalent benefits are determined based on a statutorily specified interest rate of 4.00% per year or 7.00% per annum, as applicable. The mortality basis is a blend of 25% males and 75% females blend of the Board approved base mortality tables to be used for actuarial valuations beginning June 30, 2021, generationally projected to 2025 with the Buck Modified MP-2020 improvement scale.

Methods

Calculations: The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the Retirement System, and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the Retirement System.

Asset Valuation Method: A ten-year moving market average value of assets that recognizes the 7.00% (7.25% prior to June 30, 2021 and 7.50% prior to June 30, 2016) actuarial expected investment return immediately and spreads the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets over a period of ten years. The actuarial value of assets can be no less than 70% and no more than 130% of the market value of assets.

Appendix C: Actuarial Assumptions and Methods (continued)

Actuarial Cost Method for Pension Funding: Entry Age Normal Cost Method (modified slightly as of June 30, 2005 to use a pay-weighted average normal contribution rate). The gross normal cost rate is determined as of the valuation date. It is the ratio of the gross normal cost amount to the anticipated total salary during the first year, which is adjusted to the beginning of the year by one-half of the effective average salary increase assumption of 4.50% per annum. This method produces a gross normal cost rate that is consistent with the Retirement System's past annual valuations.

The results of each June 30 valuation determine the employer contribution rate for the second succeeding fiscal year. Act 120 revised the funding method effective with the June 30, 2010 valuation. Act 120 mandated that the outstanding balance of the unfunded accrued liability as of June 30, 2010, including changes in the unfunded accrued liability due to the funding reforms of Act 120, be amortized over a 24-year period, as a level percent of pay, beginning July 1, 2011. Future valuation gains and losses, and changes in the unfunded accrued liability resulting from changes in actuarial assumptions and methods, are amortized over a 24-year period, as a level percent of pay. As provided by Act 5-2017, future increases in the unfunded accrued liability due to benefit enhancement legislation will be amortized over 10-year periods, as a level percent of pay. Act 120 also modified the employer pension contribution requirements by imposing collars on the rate for fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014; the pension contribution rate was limited to 3.0%, 3.5% and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with the fiscal year ending June 30, 2017, the actuarially required contribution rate was less than the collared rate and the final contribution rate was the actuarially determined contribution rate. However, as provided by Act 120, the final contribution rate cannot be less than the employer normal contribution rate.

In accordance with Act 5-2017, member shared-risk contributions cannot be used to offset the employer normal contribution rate. Instead, any increase or decrease in the unfunded accrued liability due to member shared-risk contributions shall be recognized as part of the Retirement System's actuarial experience and amortized as a level percentage of compensation over a period of 24 years beginning with the July 1 second succeeding the actuarial valuation in which the shared-risk contribution was recognized.

In the actuary's professional judgment, the Retirement System's funding policy meets the Actuarial Standard of Practice No. 4 standards for a reasonable Actuarially Determined Contribution.

Employer DC contributions: An average DC contribution rate is determined based on the anticipated employer contributions for DC participants and Retirement System appropriation payroll for the second succeeding fiscal year after the June 30 valuation date. It is assumed that among new employees hired on or after July 1, 2024 that 98% will become Class T-G members, 1% will become Class T-H members and 1% will become Class DC participants. The actual rate will vary by employer based on Class T-G, Class T-H, and Class DC membership/participation.

Data

Census and Assets: The pension valuation was based on members of the Retirement System as of June 30, 2024 and does not take into account future members. All census data was supplied by the Retirement System and was subject to reasonable consistency checks. The actuaries adjust the data to account for service and pay earned by members on or before the valuation that is not reported by the Retirement System until after the actuarial valuation is performed. Asset data was supplied by the Retirement System.

Appendix D: Stress Testing Tables

Baseline: Asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%).

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	121.6	2.0	80.1	80.5	41.1	($0.9)	66.2%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	7.00%	124.0	2.1	84.0	84.6	39.4	(1.7)	68.2%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	126.4	2.0	88.2	88.8	37.6	(1.8)	70.2%	16.3	5.5	33.6%	33.6%	8.3	1.7
2028	7.00%	128.7	2.0	92.6	93.1	35.6	(2.0)	72.4%	16.4	5.6	34.1%	34.1%	8.5	1.7
2029	7.00%	130.8	2.0	97.1	97.7	33.1	(2.5)	74.7%	16.5	5.7	34.6%	34.6%	8.7	1.8
2030	7.00%	132.9	2.0	101.9	102.9	30.0	(3.1)	77.4%	16.7	5.9	35.2%	35.2%	9.0	1.9
2031	7.00%	134.9	1.9	107.0	107.3	27.6	(2.4)	79.5%	16.8	6.0	35.7%	35.7%	9.2	2.0
2032	7.00%	136.7	1.9	112.3	112.4	24.3	(3.3)	82.2%	16.9	6.1	36.2%	36.2%	9.4	2.1
2033	7.00%	138.4	1.9	117.9	118.0	20.4	(3.9)	85.3%	17.1	6.3	37.0%	37.0%	9.7	2.2
2034	7.00%	140.0	1.8	123.8	124.0	16.0	(4.4)	88.6%	17.2	6.5	37.7%	37.7%	9.9	2.2
2035	7.00%	141.4	1.8	130.1	130.2	11.2	(4.8)	92.1%	17.3	6.6	38.3%	38.3%	10.1	2.3
2036	7.00%	142.5	1.8	133.5	133.6	8.9	(2.3)	93.8%	17.5	3.7	21.2%	21.2%	10.4	5.5
2037	7.00%	143.4	1.7	136.2	136.3	7.1	(1.8)	95.0%	17.6	3.0	16.9%	16.9%	10.6	6.5
2038	7.00%	144.1	1.7	138.5	138.5	5.6	(1.5)	96.2%	17.7	2.6	14.9%	14.9%	10.8	7.0
2039	7.00%	144.5	1.6	140.3	140.3	4.2	(1.4)	97.1%	17.8	2.3	12.7%	12.7%	11.0	7.6
2040	7.00%	144.7	1.6	141.6	141.7	3.0	(1.2)	97.9%	17.9	1.9	10.9%	10.9%	11.3	8.2
2041	7.00%	144.6	1.6	142.6	142.6	2.0	(1.0)	98.6%	18.0	1.7	9.2%	9.2%	11.4	8.6
2042	7.00%	144.4	1.5	142.7	142.7	1.7	(0.3)	98.9%	18.1	0.9	4.8%	4.8%	11.6	9.6
2043	7.00%	143.9	1.5	142.4	142.4	1.5	(0.2)	99.0%	18.3	0.6	3.5%	3.5%	11.7	9.9
2044	7.00%	143.3	1.4	141.9	141.9	1.4	(0.1)	99.1%	18.4	0.6	3.1%	3.1%	11.8	10.1
2045	7.00%	142.6	1.4	141.5	141.5	1.1	(0.3)	99.2%	18.6	0.6	3.3%	3.3%	11.8	10.0
2046	7.00%	141.9	1.4	141.0	141.0	0.9	(0.2)	99.4%	18.7	0.6	3.0%	3.0%	11.7	10.1
2047	7.00%	141.3	1.3	140.3	140.3	1.0	0.1	99.3%	18.9	0.2	1.3%	1.3%	11.6	10.2
2048	7.00%	140.7	1.3	139.9	139.9	0.8	(0.2)	99.4%	19.2	0.4	2.0%	2.0%	11.4	9.9
2049	7.00%	140.2	1.3	139.6	139.6	0.6	(0.2)	99.5%	19.5	0.5	2.4%	2.4%	11.3	9.7
2050	7.00%	139.8	1.3	139.3	139.3	0.5	(0.1)	99.6%	19.8	0.3	1.7%	1.7%	11.2	9.7
2051	7.00%	139.6	1.3	139.1	139.1	0.5	0.0	99.6%	20.2	0.3	1.3%	1.3%	11.1	9.7
2052	7.00%	139.4	1.3	139.0	139.0	0.4	(0.1)	99.7%	20.6	0.3	1.3%	1.3%	10.9	9.5
2053	7.00%	139.4	1.3	139.0	139.0	0.4	0.0	99.7%	21.0	0.3	1.3%	1.3%	10.8	9.4
2054	7.00%	139.5	1.4	139.2	139.2	0.3	(0.1)	99.8%	21.5	0.3	1.2%	1.2%	10.7	9.2

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Excess Return: Asset return for the next 20 years is 2.00% higher (9.00%) than the Retirement System's expected return assumption, and for the following 10 years is equal to the Retirement System's expected return assumption (7.00%).

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	9.00%	121.6	2.0	81.6	80.7	40.9	($1.1)	66.3%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	9.00%	124.0	2.1	87.3	85.1	38.9	(2.0)	68.6%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	9.00%	126.4	2.0	93.4	89.8	36.6	(2.3)	71.0%	16.3	5.5	33.5%	33.5%	8.3	1.7
2028	9.00%	128.7	2.0	99.9	94.8	33.9	(2.7)	73.7%	16.4	5.6	33.9%	33.9%	8.5	1.8
2029	9.00%	130.8	2.0	106.8	100.4	30.4	(3.5)	76.7%	16.5	5.7	34.2%	34.2%	8.7	1.9
2030	9.00%	132.9	2.0	114.2	106.8	26.1	(4.3)	80.4%	16.7	5.7	34.5%	34.5%	9.0	2.0
2031	9.00%	134.9	1.9	122.1	112.7	22.2	(3.9)	83.6%	16.8	5.8	34.6%	34.6%	9.2	2.2
2032	9.00%	136.7	1.9	130.5	119.6	17.1	(5.1)	87.5%	16.9	5.8	34.5%	34.5%	9.4	2.4
2033	9.00%	138.4	1.9	139.4	127.4	11.0	(6.1)	92.0%	17.1	5.9	34.8%	34.8%	9.7	2.6
2034	9.00%	140.0	1.8	148.9	135.8	4.2	(6.8)	97.0%	17.2	6.0	34.8%	34.8%	9.9	2.7
2035	9.00%	141.4	1.8	158.9	144.7	-3.3	(7.5)	102.3%	17.3	6.0	34.5%	34.5%	10.1	3.0
2036	9.00%	142.5	1.8	166.4	150.9	-8.4	(5.1)	105.9%	17.5	2.8	16.3%	16.3%	10.4	6.4
2037	9.00%	143.4	1.7	173.2	156.6	-13.2	(4.8)	109.2%	17.6	1.9	10.9%	10.9%	10.6	7.5
2038	9.00%	144.1	1.7	179.7	162.1	-18.0	(4.8)	112.5%	17.7	1.4	7.7%	7.7%	10.8	8.3
2039	9.00%	144.5	1.6	186.0	167.3	-22.8	(4.8)	115.8%	17.8	0.7	4.2%	4.2%	11.0	9.1
2040	9.00%	144.7	1.6	192.3	172.6	-27.9	(5.1)	119.3%	17.9	0.5	2.6%	2.6%	11.3	9.7
2041	9.00%	144.6	1.6	198.8	178.2	-33.6	(5.7)	123.2%	18.0	0.4	2.4%	2.4%	11.4	9.9
2042	9.00%	144.4	1.5	205.8	184.2	-39.8	(6.2)	127.6%	18.1	0.4	2.2%	2.2%	11.6	10.1
2043	9.00%	143.9	1.5	213.2	190.7	-46.8	(7.0)	132.6%	18.3	0.4	1.9%	2.0%	11.7	10.2
2044	9.00%	143.3	1.4	221.1	197.8	-54.5	(7.7)	138.0%	18.4	0.3	1.8%	1.8%	11.8	10.3
2045	7.00%	142.6	1.4	225.4	205.0	-62.4	(7.9)	143.8%	18.6	0.3	1.6%	1.6%	11.8	10.4
2046	7.00%	141.9	1.4	230.0	212.5	-70.6	(8.2)	149.7%	18.7	0.3	1.4%	1.4%	11.7	10.4
2047	7.00%	141.3	1.3	235.0	220.3	-79.0	(8.4)	155.9%	18.9	0.2	1.3%	1.3%	11.6	10.2
2048	7.00%	140.7	1.3	240.5	228.4	-87.7	(8.7)	162.3%	19.2	0.2	1.2%	1.2%	11.4	10.1
2049	7.00%	140.2	1.3	246.4	236.8	-96.6	(8.9)	168.9%	19.5	0.2	1.1%	1.1%	11.3	10.0
2050	7.00%	139.8	1.3	252.9	245.5	-105.7	(9.1)	175.5%	19.8	0.2	1.0%	1.0%	11.2	9.9
2051	7.00%	139.6	1.3	260.0	254.4	-114.8	(9.1)	182.3%	20.2	0.2	0.9%	0.9%	11.1	9.7
2052	7.00%	139.4	1.3	267.6	263.6	-124.2	(9.4)	189.1%	20.6	0.2	0.9%	0.9%	10.9	9.6
2053	7.00%	139.4	1.3	276.0	273.0	-133.6	(9.4)	195.9%	21.0	0.2	0.8%	0.8%	10.8	9.5
2054	7.00%	139.5	1.4	285.0	282.6	-143.1	(9.5)	202.6%	21.5	0.2	0.8%	0.8%	10.7	9.3

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Low Return: Asset return for the next 20 years is 2.00% lower (5.00%) than the Retirement System's expected return assumption, and for the following 10 years is equal to the Retirement System's expected return assumption (7.00%).

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	5.00%	121.6	2.0	78.6	80.4	41.2	($0.8)	66.1%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	5.00%	124.0	2.1	80.9	84.1	39.9	(1.3)	67.8%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	5.00%	126.4	2.0	83.2	87.8	38.6	(1.3)	69.4%	16.3	5.5	33.7%	33.7%	8.3	1.7
2028	5.00%	128.7	2.0	85.6	91.4	37.3	(1.3)	71.0%	16.4	5.6	34.3%	34.3%	8.5	1.7
2029	5.00%	130.8	2.0	88.1	95.0	35.8	(1.5)	72.6%	16.5	5.8	35.0%	35.0%	8.7	1.8
2030	5.00%	132.9	2.0	90.6	99.0	33.9	(1.9)	74.5%	16.7	6.0	35.9%	35.9%	9.0	1.8
2031	5.00%	134.9	1.9	93.3	102.0	32.9	(1.0)	75.6%	16.8	6.2	36.8%	36.8%	9.2	1.8
2032	5.00%	136.7	1.9	96.0	105.5	31.2	(1.7)	77.1%	16.9	6.4	37.8%	37.8%	9.4	1.9
2033	5.00%	138.4	1.9	99.0	109.2	29.2	(2.0)	78.9%	17.1	6.7	39.2%	39.2%	9.7	1.8
2034	5.00%	140.0	1.8	102.2	112.9	27.1	(2.1)	80.7%	17.2	7.0	40.6%	40.6%	9.9	1.7
2035	5.00%	141.4	1.8	105.7	116.9	24.5	(2.6)	82.7%	17.3	7.3	42.0%	42.0%	10.1	1.7
2036	5.00%	142.5	1.8	106.2	117.9	24.6	0.1	82.7%	17.5	4.5	25.7%	25.7%	10.4	4.7
2037	5.00%	143.4	1.7	106.0	118.1	25.3	0.7	82.3%	17.6	3.9	22.4%	22.4%	10.6	5.5
2038	5.00%	144.1	1.7	105.4	117.8	26.3	1.0	81.8%	17.7	3.8	21.5%	21.5%	10.8	5.9
2039	5.00%	144.5	1.6	104.4	117.0	27.5	1.2	81.0%	17.8	3.6	20.4%	20.4%	11.0	6.3
2040	5.00%	144.7	1.6	102.9	115.7	29.0	1.5	80.0%	17.9	3.5	19.7%	19.7%	11.3	6.6
2041	5.00%	144.6	1.6	101.1	114.1	30.5	1.5	78.9%	18.0	3.5	19.2%	19.2%	11.4	6.8
2042	5.00%	144.4	1.5	98.6	111.5	32.9	2.4	77.3%	18.1	2.9	16.1%	16.1%	11.6	7.5
2043	5.00%	143.9	1.5	95.8	108.7	35.2	2.3	75.5%	18.3	2.9	16.0%	16.0%	11.7	7.7
2044	5.00%	143.3	1.4	93.0	105.8	37.5	2.3	73.8%	18.4	3.1	16.9%	16.9%	11.8	7.6
2045	7.00%	142.6	1.4	92.1	103.2	39.4	1.9	72.3%	18.6	3.4	18.5%	18.5%	11.8	7.2
2046	7.00%	141.9	1.4	91.6	101.0	40.9	1.5	71.2%	18.7	3.7	19.5%	19.5%	11.7	7.0
2047	7.00%	141.3	1.3	91.2	99.0	42.3	1.4	70.1%	18.9	3.6	19.1%	19.1%	11.6	6.8
2048	7.00%	140.7	1.3	91.4	97.7	43.0	0.7	69.4%	19.2	4.0	20.9%	20.9%	11.4	6.3
2049	7.00%	140.2	1.3	92.1	97.1	43.1	0.1	69.2%	19.5	4.3	22.2%	22.2%	11.3	5.9
2050	7.00%	139.8	1.3	93.2	97.0	42.8	(0.3)	69.4%	19.8	4.4	22.4%	22.4%	11.2	5.6
2051	7.00%	139.6	1.3	94.6	97.5	42.1	(0.7)	69.8%	20.2	4.6	22.6%	22.6%	11.1	5.4
2052	7.00%	139.4	1.3	96.4	98.5	40.9	(1.2)	70.7%	20.6	4.7	23.0%	23.0%	10.9	5.1
2053	7.00%	139.4	1.3	98.7	100.2	39.2	(1.7)	71.9%	21.0	4.8	23.1%	23.1%	10.8	4.8
2054	7.00%	139.5	1.4	101.3	102.5	37.0	(2.2)	73.5%	21.5	4.9	22.8%	22.8%	10.7	4.6

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Low Contribution: Asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%). Contributions for the next 20 years are 80% of the actuarially determined employer contributions (ADEC), and for the following 10 years are equal to the full actuarially determined employer contributions.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	121.6	2.0	79.0	79.5	42.1	$0.1	65.3%	15.6	4.1	26.3%	32.9%	8.0	2.7
2026	7.00%	124.0	2.1	81.8	82.3	41.7	(0.4)	66.4%	16.2	4.3	26.4%	33.0%	8.1	2.7
2027	7.00%	126.4	2.0	84.7	85.3	41.1	(0.6)	67.5%	16.3	4.4	27.3%	34.1%	8.3	2.7
2028	7.00%	128.7	2.0	87.8	88.4	40.3	(0.8)	68.7%	16.4	4.6	28.0%	35.0%	8.5	2.7
2029	7.00%	130.8	2.0	91.1	91.6	39.2	(1.1)	70.0%	16.5	4.8	28.8%	36.1%	8.7	2.8
2030	7.00%	132.9	2.0	94.5	95.5	37.4	(1.8)	71.8%	16.7	5.0	29.7%	37.2%	9.0	2.8
2031	7.00%	134.9	1.9	98.2	98.5	36.4	(1.0)	73.0%	16.8	5.1	30.6%	38.3%	9.2	2.9
2032	7.00%	136.7	1.9	102.0	102.1	34.6	(1.8)	74.7%	16.9	5.3	31.4%	39.3%	9.4	2.9
2033	7.00%	138.4	1.9	106.1	106.3	32.1	(2.5)	76.8%	17.1	5.6	32.6%	40.8%	9.7	2.9
2034	7.00%	140.0	1.8	110.5	110.6	29.4	(2.7)	79.0%	17.2	5.8	33.7%	42.1%	9.9	2.9
2035	7.00%	141.4	1.8	115.2	115.3	26.1	(3.3)	81.6%	17.3	6.0	34.7%	43.4%	10.1	3.0
2036	7.00%	142.5	1.8	117.6	117.7	24.8	(1.3)	82.6%	17.5	3.8	21.5%	26.9%	10.4	5.4
2037	7.00%	143.4	1.7	119.5	119.6	23.8	(1.0)	83.4%	17.6	3.3	18.7%	23.4%	10.6	6.1
2038	7.00%	144.1	1.7	121.1	121.2	22.9	(0.9)	84.1%	17.7	3.1	17.6%	22.0%	10.8	6.5
2039	7.00%	144.5	1.6	122.4	122.4	22.1	(0.8)	84.7%	17.8	2.9	16.2%	20.2%	11.0	7.0
2040	7.00%	144.7	1.6	123.3	123.3	21.4	(0.7)	85.2%	17.9	2.7	15.1%	18.9%	11.3	7.4
2041	7.00%	144.6	1.6	123.9	123.9	20.7	(0.7)	85.7%	18.0	2.6	14.2%	17.8%	11.4	7.8
2042	7.00%	144.4	1.5	123.8	123.8	20.6	(0.1)	85.8%	18.1	2.0	11.1%	13.8%	11.6	8.5
2043	7.00%	143.9	1.5	123.5	123.5	20.4	(0.2)	85.8%	18.3	1.9	10.4%	13.0%	11.7	8.7
2044	7.00%	143.3	1.4	123.1	123.1	20.2	(0.2)	85.9%	18.4	1.9	10.4%	12.9%	11.8	8.8
2045	7.00%	142.6	1.4	123.3	123.3	19.3	(0.9)	86.5%	18.6	2.5	13.6%	13.6%	11.8	8.1
2046	7.00%	141.9	1.4	123.6	123.6	18.3	(1.0)	87.1%	18.7	2.6	13.7%	13.7%	11.7	8.1
2047	7.00%	141.3	1.3	123.8	123.8	17.5	(0.8)	87.7%	18.9	2.3	12.2%	12.2%	11.6	8.2
2048	7.00%	140.7	1.3	124.4	124.4	16.3	(1.2)	88.4%	19.2	2.5	13.0%	13.0%	11.4	7.8
2049	7.00%	140.2	1.3	125.3	125.3	14.9	(1.4)	89.4%	19.5	2.6	13.6%	13.6%	11.3	7.6
2050	7.00%	139.8	1.3	126.4	126.4	13.4	(1.5)	90.4%	19.8	2.6	13.1%	13.1%	11.2	7.5
2051	7.00%	139.6	1.3	127.4	127.4	12.2	(1.2)	91.3%	20.2	2.4	12.0%	12.0%	11.1	7.5
2052	7.00%	139.4	1.3	128.7	128.7	10.7	(1.5)	92.3%	20.6	2.3	11.3%	11.3%	10.9	7.5
2053	7.00%	139.4	1.3	130.0	130.0	9.4	(1.3)	93.3%	21.0	2.2	10.6%	10.6%	10.8	7.4
2054	7.00%	139.5	1.4	131.4	131.4	8.1	(1.3)	94.2%	21.5	2.1	9.7%	9.7%	10.7	7.4

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Higher Mortality: 10% more deaths among healthy member annuitants than assumed over the first 10-year period, and for the following 20 years is equal to the Retirement System's expected mortality assumption.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	121.5	2.0	80.1	80.5	41.0	($1.0)	66.3%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	7.00%	123.8	2.1	84.0	84.6	39.2	(1.8)	68.3%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	126.1	2.0	88.2	88.8	37.3	(1.9)	70.4%	16.3	5.5	33.6%	33.6%	8.3	1.6
2028	7.00%	128.3	2.0	92.6	93.2	35.1	(2.2)	72.6%	16.4	5.6	34.0%	34.0%	8.5	1.7
2029	7.00%	130.4	2.0	97.2	97.8	32.6	(2.5)	75.0%	16.5	5.7	34.5%	34.5%	8.7	1.8
2030	7.00%	132.4	2.0	102.1	103.0	29.4	(3.2)	77.8%	16.7	5.8	35.0%	35.0%	8.9	1.9
2031	7.00%	134.2	1.9	107.2	107.5	26.7	(2.7)	80.0%	16.8	6.0	35.5%	35.5%	9.1	2.0
2032	7.00%	136.0	1.9	112.5	112.6	23.4	(3.3)	82.8%	16.9	6.1	35.9%	35.9%	9.3	2.1
2033	7.00%	137.6	1.9	118.1	118.3	19.3	(4.1)	85.9%	17.1	6.3	36.7%	36.7%	9.6	2.1
2034	7.00%	139.1	1.8	124.1	124.3	14.8	(4.5)	89.3%	17.2	6.4	37.3%	37.3%	9.8	2.2
2035	7.00%	140.6	1.8	130.5	130.6	10.0	(4.8)	92.9%	17.3	6.6	37.9%	37.9%	10.0	2.3
2036	7.00%	141.7	1.8	133.9	134.0	7.7	(2.3)	94.6%	17.5	3.6	20.7%	20.7%	10.3	5.5
2037	7.00%	142.7	1.7	136.6	136.7	6.0	(1.7)	95.8%	17.6	2.9	16.4%	16.4%	10.5	6.5
2038	7.00%	143.4	1.7	139.0	139.0	4.4	(1.6)	96.9%	17.7	2.6	14.4%	14.4%	10.7	7.0
2039	7.00%	143.9	1.6	140.8	140.8	3.1	(1.3)	97.9%	17.8	2.2	12.1%	12.1%	10.9	7.6
2040	7.00%	144.1	1.6	142.2	142.2	1.9	(1.2)	98.7%	17.9	1.8	10.3%	10.3%	11.2	8.2
2041	7.00%	144.1	1.6	143.2	143.2	0.9	(1.0)	99.4%	18.0	1.6	8.7%	8.7%	11.4	8.7
2042	7.00%	143.9	1.5	143.2	143.3	0.6	(0.3)	99.6%	18.1	0.8	4.3%	4.3%	11.5	9.6
2043	7.00%	143.4	1.5	143.0	143.0	0.4	(0.2)	99.7%	18.3	0.5	2.9%	2.9%	11.6	10.0
2044	7.00%	142.9	1.4	142.5	142.5	0.4	0.0	99.7%	18.4	0.5	2.4%	2.4%	11.7	10.1
2045	7.00%	142.2	1.4	142.0	142.0	0.2	(0.2)	99.9%	18.6	0.5	2.7%	2.7%	11.7	10.1
2046	7.00%	141.5	1.4	141.5	141.5	0.0	(0.2)	100.0%	18.7	0.4	2.3%	2.3%	11.7	10.1
2047	7.00%	140.9	1.3	140.9	140.9	0.0	0.0	100.0%	18.9	0.2	1.3%	1.3%	11.5	10.2
2048	7.00%	140.4	1.3	140.4	140.4	0.0	0.0	100.0%	19.2	0.3	1.3%	1.3%	11.4	10.0
2049	7.00%	139.9	1.3	140.1	140.1	-0.2	(0.2)	100.1%	19.5	0.3	1.7%	1.7%	11.3	9.8
2050	7.00%	139.6	1.3	139.7	139.7	-0.1	0.1	100.1%	19.8	0.2	1.0%	1.0%	11.1	9.8
2051	7.00%	139.3	1.3	139.4	139.4	-0.1	0.0	100.1%	20.2	0.2	0.9%	0.9%	11.0	9.7
2052	7.00%	139.2	1.3	139.3	139.3	-0.1	0.0	100.1%	20.6	0.2	0.9%	0.9%	10.9	9.6
2053	7.00%	139.1	1.3	139.3	139.3	-0.2	(0.1)	100.1%	21.0	0.2	0.8%	0.8%	10.8	9.4
2054	7.00%	139.3	1.4	139.4	139.4	-0.1	0.1	100.1%	21.5	0.2	0.8%	0.8%	10.7	9.3

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Lower Mortality: 10% fewer deaths among healthy member annuitants than assumed over the first 10-year period, and for the following 20 years is equal to the Retirement System's expected mortality assumption.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	121.5	2.0	80.1	80.5	41.0	($1.0)	66.3%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	7.00%	123.8	2.1	84.0	84.6	39.2	(1.8)	68.3%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	126.1	2.0	88.2	88.8	37.3	(1.9)	70.4%	16.3	5.5	33.6%	33.6%	8.3	1.6
2028	7.00%	128.3	2.0	92.6	93.2	35.1	(2.2)	72.6%	16.4	5.6	34.0%	34.0%	8.5	1.7
2029	7.00%	130.4	2.0	97.2	97.8	32.6	(2.5)	75.0%	16.5	5.7	34.5%	34.5%	8.7	1.8
2030	7.00%	132.4	2.0	102.1	103.0	29.4	(3.2)	77.8%	16.7	5.8	35.0%	35.0%	8.9	1.9
2031	7.00%	134.2	1.9	107.2	107.5	26.7	(2.7)	80.0%	16.8	6.0	35.5%	35.5%	9.1	2.0
2032	7.00%	136.0	1.9	112.5	112.6	23.4	(3.3)	82.8%	16.9	6.1	35.9%	35.9%	9.3	2.1
2033	7.00%	137.6	1.9	118.1	118.3	19.3	(4.1)	85.9%	17.1	6.3	36.7%	36.7%	9.6	2.1
2034	7.00%	139.1	1.8	124.1	124.3	14.8	(4.5)	89.3%	17.2	6.4	37.3%	37.3%	9.8	2.2
2035	7.00%	140.6	1.8	130.5	130.6	10.0	(4.8)	92.9%	17.3	6.6	37.9%	37.9%	10.0	2.3
2036	7.00%	141.7	1.8	133.9	134.0	7.7	(2.3)	94.6%	17.5	3.6	20.7%	20.7%	10.3	5.5
2037	7.00%	142.7	1.7	136.6	136.7	6.0	(1.7)	95.8%	17.6	2.9	16.4%	16.4%	10.5	6.5
2038	7.00%	143.4	1.7	139.0	139.0	4.4	(1.6)	96.9%	17.7	2.6	14.4%	14.4%	10.7	7.0
2039	7.00%	143.9	1.6	140.8	140.8	3.1	(1.3)	97.9%	17.8	2.2	12.1%	12.1%	10.9	7.6
2040	7.00%	144.1	1.6	142.2	142.2	1.9	(1.2)	98.7%	17.9	1.8	10.3%	10.3%	11.2	8.2
2041	7.00%	144.1	1.6	143.2	143.2	0.9	(1.0)	99.4%	18.0	1.6	8.7%	8.7%	11.4	8.7
2042	7.00%	143.9	1.5	143.2	143.3	0.6	(0.3)	99.6%	18.1	0.8	4.3%	4.3%	11.5	9.6
2043	7.00%	143.4	1.5	143.0	143.0	0.4	(0.2)	99.7%	18.3	0.5	2.9%	2.9%	11.6	10.0
2044	7.00%	142.9	1.4	142.5	142.5	0.4	0.0	99.7%	18.4	0.5	2.4%	2.4%	11.7	10.1
2045	7.00%	142.2	1.4	142.0	142.0	0.2	(0.2)	99.9%	18.6	0.5	2.7%	2.7%	11.7	10.1
2046	7.00%	141.5	1.4	141.5	141.5	0.0	(0.2)	100.0%	18.7	0.4	2.3%	2.3%	11.7	10.1
2047	7.00%	140.9	1.3	140.9	140.9	0.0	0.0	100.0%	18.9	0.2	1.3%	1.3%	11.5	10.2
2048	7.00%	140.4	1.3	140.4	140.4	0.0	0.0	100.0%	19.2	0.3	1.3%	1.3%	11.4	10.0
2049	7.00%	139.9	1.3	140.1	140.1	-0.2	(0.2)	100.1%	19.5	0.3	1.7%	1.7%	11.3	9.8
2050	7.00%	139.6	1.3	139.7	139.7	-0.1	0.1	100.1%	19.8	0.2	1.0%	1.0%	11.1	9.8
2051	7.00%	139.3	1.3	139.4	139.4	-0.1	0.0	100.1%	20.2	0.2	0.9%	0.9%	11.0	9.7
2052	7.00%	139.2	1.3	139.3	139.3	-0.1	0.0	100.1%	20.6	0.2	0.9%	0.9%	10.9	9.6
2053	7.00%	139.1	1.3	139.3	139.3	-0.2	(0.1)	100.1%	21.0	0.2	0.8%	0.8%	10.8	9.4
2054	7.00%	139.3	1.4	139.4	139.4	-0.1	0.1	100.1%	21.5	0.2	0.8%	0.8%	10.7	9.3

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Higher Salary: Actual salary increases are 2% higher salary than assumed for the first 10-year period, and for the following 20 years is equal to the Retirement System's expected salary assumption.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	122.5	2.0	80.1	80.5	42.0	$0.0	65.7%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	7.00%	125.9	2.1	84.0	84.6	41.3	(0.7)	67.2%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	129.4	2.1	88.3	88.8	40.6	(0.7)	68.6%	16.6	5.5	33.4%	33.4%	8.3	1.6
2028	7.00%	133.0	2.1	92.8	93.4	39.6	(1.0)	70.2%	17.0	5.7	33.6%	33.6%	8.5	1.6
2029	7.00%	136.6	2.1	97.7	98.2	38.4	(1.2)	71.9%	17.5	5.9	33.9%	33.9%	8.8	1.6
2030	7.00%	140.2	2.1	102.9	103.8	36.4	(2.0)	74.0%	18.0	6.2	34.3%	34.3%	9.0	1.6
2031	7.00%	143.8	2.1	108.4	108.7	35.1	(1.3)	75.6%	18.5	6.4	34.6%	34.6%	9.3	1.6
2032	7.00%	147.4	2.1	114.2	114.4	33.0	(2.1)	77.6%	19.0	6.6	34.8%	34.8%	9.6	1.7
2033	7.00%	151.0	2.1	120.5	120.7	30.3	(2.7)	79.9%	19.5	6.9	35.3%	35.3%	9.9	1.7
2034	7.00%	154.5	2.1	127.2	127.4	27.1	(3.2)	82.4%	20.0	7.2	35.7%	35.7%	10.2	1.7
2035	7.00%	156.8	2.1	134.4	134.5	22.3	(4.8)	85.8%	20.6	7.4	36.0%	36.0%	10.5	1.7
2036	7.00%	158.8	2.0	138.7	138.8	20.0	(2.3)	87.4%	21.2	4.6	21.6%	21.6%	10.8	4.9
2037	7.00%	160.5	2.0	142.3	142.4	18.1	(1.9)	88.7%	21.3	3.9	18.1%	18.1%	11.2	5.9
2038	7.00%	162.0	2.0	145.5	145.6	16.4	(1.7)	89.9%	21.4	3.6	16.6%	16.6%	11.5	6.5
2039	7.00%	163.2	1.9	148.2	148.3	14.9	(1.5)	90.9%	21.6	3.2	14.9%	14.9%	11.9	7.2
2040	7.00%	164.0	1.9	150.4	150.5	13.5	(1.4)	91.8%	21.7	2.9	13.5%	13.5%	12.2	7.9
2041	7.00%	164.5	1.8	152.2	152.3	12.2	(1.3)	92.6%	21.8	2.7	12.3%	12.3%	12.5	8.4
2042	7.00%	164.8	1.8	153.1	153.2	11.6	(0.6)	93.0%	22.0	1.9	8.7%	8.7%	12.7	9.4
2043	7.00%	164.7	1.7	153.7	153.7	11.0	(0.6)	93.3%	22.1	1.7	7.8%	7.8%	13.0	9.9
2044	7.00%	164.5	1.7	154.0	154.0	10.5	(0.5)	93.6%	22.3	1.7	7.5%	7.5%	13.1	10.1
2045	7.00%	164.1	1.7	154.3	154.3	9.8	(0.7)	94.0%	22.5	1.8	7.8%	7.8%	13.2	10.1
2046	7.00%	163.7	1.6	154.6	154.6	9.1	(0.7)	94.5%	22.7	1.7	7.7%	7.7%	13.2	10.2
2047	7.00%	163.3	1.6	154.8	154.8	8.5	(0.6)	94.8%	23.0	1.5	6.4%	6.4%	13.1	10.3
2048	7.00%	162.9	1.6	155.2	155.2	7.7	(0.8)	95.3%	23.3	1.6	7.0%	7.0%	13.1	10.1
2049	7.00%	162.6	1.6	155.9	155.9	6.7	(1.0)	95.9%	23.6	1.8	7.4%	7.4%	13.0	9.9
2050	7.00%	162.3	1.6	156.6	156.6	5.7	(1.0)	96.5%	24.0	1.7	7.0%	7.0%	12.9	9.9
2051	7.00%	162.1	1.6	157.3	157.3	4.8	(0.9)	97.1%	24.5	1.5	6.2%	6.2%	12.8	9.9
2052	7.00%	162.0	1.6	158.1	158.1	3.9	(0.9)	97.6%	24.9	1.4	5.7%	5.7%	12.7	9.9
2053	7.00%	162.0	1.6	159.0	159.0	3.0	(0.9)	98.1%	25.5	1.3	5.1%	5.1%	12.6	9.9
2054	7.00%	162.2	1.6	159.9	159.9	2.3	(0.7)	98.6%	26.0	1.2	4.5%	4.5%	12.5	9.9

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Lower Salary: Actual salary increases are 2% lower salary than assumed for the first 10-year period, and for the following 20 years is equal to the Retirement System's expected salary assumption.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	120.6	2.0	80.1	80.5	40.1	($1.9)	66.8%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	7.00%	122.0	2.1	84.0	84.6	37.4	(2.7)	69.3%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	123.2	2.0	88.1	88.7	34.5	(2.9)	72.0%	16.0	5.4	33.8%	33.8%	8.3	1.8
2028	7.00%	124.3	1.9	92.3	92.8	31.5	(3.0)	74.7%	15.8	5.4	34.5%	34.5%	8.5	1.9
2029	7.00%	125.2	1.9	96.6	97.1	28.1	(3.4)	77.6%	15.6	5.5	35.2%	35.2%	8.7	2.1
2030	7.00%	125.9	1.8	101.0	101.9	24.0	(4.1)	80.9%	15.4	5.6	36.1%	36.1%	8.9	2.3
2031	7.00%	126.5	1.8	105.6	105.9	20.6	(3.4)	83.7%	15.2	5.6	36.9%	36.9%	9.1	2.4
2032	7.00%	126.9	1.7	110.3	110.5	16.4	(4.2)	87.0%	15.1	5.7	37.7%	37.7%	9.3	2.6
2033	7.00%	127.1	1.7	115.3	115.5	11.6	(4.8)	90.8%	14.9	5.8	38.9%	38.9%	9.5	2.7
2034	7.00%	127.1	1.6	120.6	120.7	6.4	(5.2)	94.9%	14.7	5.9	40.0%	40.0%	9.6	2.7
2035	7.00%	127.7	1.6	126.1	126.2	1.5	(4.9)	98.8%	14.5	6.0	41.0%	41.0%	9.8	2.9
2036	7.00%	128.1	1.5	128.6	128.7	-0.6	(2.1)	100.5%	14.4	2.9	20.5%	20.5%	9.9	6.0
2037	7.00%	128.3	1.5	130.5	130.5	-2.2	(1.6)	101.8%	14.5	2.2	15.1%	15.1%	10.1	6.9
2038	7.00%	128.2	1.5	132.0	132.0	-3.8	(1.6)	102.9%	14.6	1.8	12.6%	12.6%	10.2	7.4
2039	7.00%	128.0	1.4	133.0	133.0	-5.0	(1.2)	103.9%	14.6	1.4	9.7%	9.7%	10.3	8.0
2040	7.00%	127.6	1.4	133.5	133.6	-6.0	(1.0)	104.7%	14.7	1.1	7.4%	7.4%	10.5	8.5
2041	7.00%	127.0	1.3	133.7	133.8	-6.8	(0.8)	105.3%	14.8	0.8	5.2%	5.2%	10.6	8.8
2042	7.00%	126.3	1.3	133.5	133.5	-7.2	(0.4)	105.7%	14.9	0.4	2.5%	2.5%	10.6	9.3
2043	7.00%	125.4	1.3	133.1	133.2	-7.8	(0.6)	106.2%	15.0	0.3	2.2%	2.2%	10.6	9.4
2044	7.00%	124.4	1.2	132.7	132.7	-8.3	(0.5)	106.7%	15.1	0.3	2.0%	2.0%	10.6	9.4
2045	7.00%	123.4	1.2	132.4	132.4	-9.0	(0.7)	107.2%	15.3	0.3	1.8%	1.8%	10.5	9.4
2046	7.00%	122.5	1.2	132.0	132.0	-9.5	(0.5)	107.8%	15.4	0.2	1.6%	1.6%	10.4	9.3
2047	7.00%	121.6	1.1	131.9	131.9	-10.3	(0.8)	108.5%	15.6	0.2	1.4%	1.4%	10.2	9.1
2048	7.00%	120.8	1.1	131.9	131.9	-11.1	(0.8)	109.2%	15.8	0.2	1.3%	1.3%	10.1	8.9
2049	7.00%	120.1	1.1	132.0	132.0	-11.9	(0.8)	109.9%	16.0	0.2	1.2%	1.2%	9.9	8.8
2050	7.00%	119.5	1.1	132.3	132.3	-12.8	(0.9)	110.7%	16.3	0.2	1.1%	1.1%	9.7	8.6
2051	7.00%	119.1	1.1	132.8	132.8	-13.7	(0.9)	111.5%	16.6	0.2	1.0%	1.0%	9.6	8.5
2052	7.00%	118.7	1.1	133.5	133.5	-14.8	(1.1)	112.4%	16.9	0.2	0.9%	1.0%	9.4	8.3
2053	7.00%	118.5	1.1	134.4	134.4	-15.9	(1.1)	113.3%	17.3	0.2	0.9%	0.9%	9.3	8.2
2054	7.00%	118.5	1.1	135.5	135.5	-17.0	(1.1)	114.3%	17.6	0.2	0.9%	0.9%	9.2	8.0

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Excess Contribution: Asset return for the next 30 years is equal to the Retirement System's expected return assumption (7.00%). Contributions in year 1 are $500M plus the actuarially determined contribution, and for the remainder of the projection are equal to the actuarially determined contributions.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	7.00%	121.6	2.0	80.6	81.0	40.6	($1.4)	66.6%	15.6	5.6	36.1%	32.9%	8.0	1.2
2026	7.00%	124.0	2.1	84.6	85.1	38.9	(1.7)	68.6%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	126.4	2.0	88.7	89.3	37.1	(1.8)	70.7%	16.3	5.4	33.4%	33.4%	8.3	1.7
2028	7.00%	128.7	2.0	93.1	93.6	35.1	(2.0)	72.8%	16.4	5.6	33.9%	33.9%	8.5	1.8
2029	7.00%	130.8	2.0	97.7	98.2	32.6	(2.5)	75.1%	16.5	5.7	34.4%	34.4%	8.7	1.9
2030	7.00%	132.9	2.0	102.5	103.4	29.5	(3.1)	77.8%	16.7	5.8	35.0%	35.0%	9.0	2.0
2031	7.00%	134.9	1.9	107.5	107.8	27.1	(2.4)	79.9%	16.8	6.0	35.5%	35.5%	9.2	2.1
2032	7.00%	136.7	1.9	112.8	112.9	23.8	(3.3)	82.6%	16.9	6.1	35.9%	35.9%	9.4	2.2
2033	7.00%	138.4	1.9	118.4	118.6	19.8	(4.0)	85.7%	17.1	6.3	36.8%	36.8%	9.7	2.2
2034	7.00%	140.0	1.8	124.4	124.5	15.5	(4.3)	88.9%	17.2	6.4	37.5%	37.5%	9.9	2.3
2035	7.00%	141.4	1.8	130.6	130.7	10.7	(4.8)	92.5%	17.3	6.6	38.1%	38.1%	10.1	2.4
2036	7.00%	142.5	1.8	134.0	134.1	8.4	(2.3)	94.1%	17.5	3.7	20.9%	20.9%	10.4	5.5
2037	7.00%	143.4	1.7	136.7	136.7	6.7	(1.7)	95.4%	17.6	2.9	16.6%	16.6%	10.6	6.5
2038	7.00%	144.1	1.7	138.9	139.0	5.1	(1.6)	96.5%	17.7	2.6	14.7%	14.7%	10.8	7.1
2039	7.00%	144.5	1.6	140.7	140.8	3.7	(1.4)	97.4%	17.8	2.2	12.4%	12.4%	11.0	7.7
2040	7.00%	144.7	1.6	142.1	142.1	2.6	(1.1)	98.2%	17.9	1.9	10.6%	10.6%	11.3	8.2
2041	7.00%	144.6	1.6	143.0	143.0	1.6	(1.0)	98.9%	18.0	1.6	8.9%	8.9%	11.4	8.7
2042	7.00%	144.4	1.5	143.1	143.1	1.3	(0.3)	99.1%	18.1	0.8	4.5%	4.5%	11.6	9.6
2043	7.00%	143.9	1.5	142.7	142.7	1.2	(0.1)	99.2%	18.3	0.6	3.2%	3.2%	11.7	10.0
2044	7.00%	143.3	1.4	142.2	142.2	1.1	(0.1)	99.3%	18.4	0.5	2.8%	2.8%	11.8	10.2
2045	7.00%	142.6	1.4	141.7	141.8	0.8	(0.3)	99.4%	18.6	0.6	3.0%	3.0%	11.8	10.1
2046	7.00%	141.9	1.4	141.2	141.2	0.7	(0.1)	99.5%	18.7	0.5	2.7%	2.7%	11.7	10.1
2047	7.00%	141.3	1.3	140.5	140.5	0.8	0.1	99.5%	18.9	0.2	1.3%	1.3%	11.6	10.2
2048	7.00%	140.7	1.3	140.0	140.0	0.7	(0.1)	99.5%	19.2	0.3	1.7%	1.7%	11.4	10.0
2049	7.00%	140.2	1.3	139.7	139.7	0.5	(0.2)	99.6%	19.5	0.4	2.0%	2.0%	11.3	9.8
2050	7.00%	139.8	1.3	139.3	139.3	0.5	0.0	99.6%	19.8	0.3	1.3%	1.3%	11.2	9.8
2051	7.00%	139.6	1.3	139.1	139.1	0.5	0.0	99.7%	20.2	0.3	1.3%	1.3%	11.1	9.7
2052	7.00%	139.4	1.3	139.0	139.0	0.4	(0.1)	99.7%	20.6	0.3	1.3%	1.3%	10.9	9.5
2053	7.00%	139.4	1.3	139.0	139.0	0.4	0.0	99.8%	21.0	0.3	1.3%	1.3%	10.8	9.4
2054	7.00%	139.5	1.4	139.2	139.2	0.3	(0.1)	99.8%	21.5	0.3	1.2%	1.2%	10.7	9.2

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

One-Time Large Investment Loss: Asset return in year 1 is -20% and for the remainder of the projection is equal to the Retirement System's expected return assumption (7.00%).

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	-20.00%	121.6	2.0	59.7	77.6	44.0	$2.0	63.8%	15.6	5.1	32.9%	32.9%	8.0	1.7
2026	7.00%	124.0	2.1	62.2	80.2	43.8	(0.2)	64.6%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	126.4	2.0	65.0	82.0	44.4	0.6	64.9%	16.3	5.7	34.9%	34.9%	8.3	1.5
2028	7.00%	128.7	2.0	68.1	83.8	44.9	0.5	65.1%	16.4	5.9	35.9%	35.9%	8.5	1.4
2029	7.00%	130.8	2.0	71.5	85.8	45.0	0.1	65.6%	16.5	6.2	37.4%	37.4%	8.7	1.4
2030	7.00%	132.9	2.0	75.3	88.2	44.7	(0.3)	66.4%	16.7	6.5	39.1%	39.1%	9.0	1.3
2031	7.00%	134.9	1.9	79.4	89.9	45.0	0.3	66.7%	16.8	6.8	40.7%	40.7%	9.2	1.2
2032	7.00%	136.7	1.9	84.0	92.3	44.4	(0.6)	67.5%	16.9	7.2	42.3%	42.3%	9.4	1.1
2033	7.00%	138.4	1.9	89.1	95.1	43.3	(1.1)	68.7%	17.1	7.6	44.4%	44.4%	9.7	0.9
2034	7.00%	140.0	1.8	94.7	98.3	41.7	(1.6)	70.2%	17.2	8.0	46.3%	46.3%	9.9	0.8
2035	7.00%	141.4	1.8	100.9	103.9	37.5	(4.2)	73.5%	17.3	8.4	48.2%	48.2%	10.1	0.6
2036	7.00%	142.5	1.8	104.6	107.0	35.5	(2.0)	75.1%	17.5	5.6	32.3%	32.3%	10.4	3.6
2037	7.00%	143.4	1.7	107.5	109.4	34.0	(1.5)	76.3%	17.6	5.0	28.5%	28.5%	10.6	4.4
2038	7.00%	144.1	1.7	110.2	111.7	32.4	(1.6)	77.5%	17.7	4.8	27.0%	27.0%	10.8	4.9
2039	7.00%	144.5	1.6	112.5	113.6	30.9	(1.5)	78.6%	17.8	4.5	25.3%	25.3%	11.0	5.4
2040	7.00%	144.7	1.6	114.4	115.3	29.4	(1.5)	79.7%	17.9	4.3	23.9%	23.9%	11.3	5.9
2041	7.00%	144.6	1.6	116.1	116.7	27.9	(1.5)	80.7%	18.0	4.1	22.7%	22.7%	11.4	6.2
2042	7.00%	144.4	1.5	117.0	117.5	26.9	(1.0)	81.4%	18.1	3.4	18.7%	18.7%	11.6	7.1
2043	7.00%	143.9	1.5	117.6	118.0	25.9	(1.0)	82.0%	18.3	3.2	17.7%	17.7%	11.7	7.3
2044	7.00%	143.3	1.4	118.2	118.5	24.8	(1.1)	82.7%	18.4	3.2	17.6%	17.6%	11.8	7.4
2045	7.00%	142.6	1.4	118.9	119.2	23.4	(1.4)	83.6%	18.6	3.4	18.3%	18.3%	11.8	7.3
2046	7.00%	141.9	1.4	119.8	120.0	21.9	(1.5)	84.6%	18.7	3.4	18.3%	18.3%	11.7	7.2
2047	7.00%	141.3	1.3	120.7	120.9	20.4	(1.5)	85.6%	18.9	3.2	16.9%	16.9%	11.6	7.3
2048	7.00%	140.7	1.3	122.0	122.1	18.6	(1.8)	86.8%	19.2	3.4	17.9%	17.9%	11.4	6.9
2049	7.00%	140.2	1.3	123.8	123.8	16.4	(2.2)	88.3%	19.5	3.6	18.5%	18.5%	11.3	6.6
2050	7.00%	139.8	1.3	125.7	125.8	14.0	(2.4)	90.0%	19.8	3.6	18.1%	18.1%	11.2	6.5
2051	7.00%	139.6	1.3	127.5	127.6	12.0	(2.0)	91.4%	20.2	3.2	15.7%	15.7%	11.1	6.8
2052	7.00%	139.4	1.3	129.5	129.6	9.8	(2.2)	93.0%	20.6	3.1	14.9%	14.9%	10.9	6.7
2053	7.00%	139.4	1.3	131.5	131.6	7.8	(2.0)	94.4%	21.0	2.8	13.4%	13.4%	10.8	6.8
2054	7.00%	139.5	1.4	133.5	133.6	5.9	(1.9)	95.8%	21.5	2.5	11.8%	11.8%	10.7	7.0

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

Ongoing Low Return & Low Contributions: Asset return for the next 20 years is 2.00% lower (5.00%) than the Retirement System's expected return assumption, and for the following 10 years is equal to the Retirement System's expected return assumption (7.00%). Contributions for the next 20 years are 80% of the actuarially determined contributions, and for the following 10 years are equal to the full actuarially determined contributions.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	5.00%	121.6	2.0	77.5	79.3	42.3	$0.3	65.2%	15.6	4.1	26.3%	32.9%	8.0	2.7
2026	5.00%	124.0	2.1	78.7	81.9	42.1	(0.2)	66.0%	16.2	4.3	26.4%	33.0%	8.1	2.7
2027	5.00%	126.4	2.0	79.8	84.3	42.1	0.0	66.7%	16.3	4.4	27.3%	34.1%	8.3	2.7
2028	5.00%	128.7	2.0	81.0	86.7	42.0	(0.1)	67.4%	16.4	4.6	28.2%	35.2%	8.5	2.7
2029	5.00%	130.8	2.0	82.3	89.0	41.8	(0.2)	68.0%	16.5	4.8	29.2%	36.5%	8.7	2.7
2030	5.00%	132.9	2.0	83.6	91.7	41.2	(0.6)	69.0%	16.7	5.0	30.3%	37.9%	9.0	2.7
2031	5.00%	134.9	1.9	85.0	93.3	41.6	0.4	69.2%	16.8	5.3	31.5%	39.4%	9.2	2.7
2032	5.00%	136.7	1.9	86.4	95.3	41.4	(0.2)	69.7%	16.9	5.5	32.7%	40.8%	9.4	2.7
2033	5.00%	138.4	1.9	88.1	97.5	40.9	(0.5)	70.4%	17.1	5.9	34.3%	42.9%	9.7	2.6
2034	5.00%	140.0	1.8	89.9	99.7	40.3	(0.6)	71.2%	17.2	6.2	35.9%	44.9%	9.9	2.5
2035	5.00%	141.4	1.8	91.8	102.0	39.4	(0.9)	72.2%	17.3	6.5	37.6%	47.0%	10.1	2.5
2036	5.00%	142.5	1.8	91.5	102.0	40.5	1.1	71.6%	17.5	4.4	25.2%	31.5%	10.4	4.8
2037	5.00%	143.4	1.7	90.6	101.4	42.0	1.5	70.7%	17.6	4.1	23.1%	28.9%	10.6	5.4
2038	5.00%	144.1	1.7	89.4	100.3	43.8	1.8	69.6%	17.7	4.0	22.8%	28.5%	10.8	5.6
2039	5.00%	144.5	1.6	87.8	98.9	45.6	1.8	68.4%	17.8	4.0	22.3%	27.9%	11.0	5.9
2040	5.00%	144.7	1.6	85.9	97.0	47.7	2.1	67.1%	17.9	4.0	22.2%	27.8%	11.3	6.2
2041	5.00%	144.6	1.6	83.7	94.9	49.7	2.0	65.6%	18.0	4.0	22.3%	27.8%	11.4	6.3
2042	5.00%	144.4	1.5	80.9	92.0	52.4	2.7	63.7%	18.1	3.7	20.2%	25.2%	11.6	6.8
2043	5.00%	143.9	1.5	78.0	88.9	55.0	2.6	61.8%	18.3	3.8	20.5%	25.7%	11.7	6.8
2044	5.00%	143.3	1.4	75.1	85.8	57.5	2.5	59.9%	18.4	4.0	21.6%	27.0%	11.8	6.7
2045	7.00%	142.6	1.4	74.9	84.1	58.5	1.0	59.0%	18.6	5.4	29.1%	29.1%	11.8	5.3
2046	7.00%	141.9	1.4	75.2	83.0	58.9	0.4	58.5%	18.7	5.7	30.6%	30.6%	11.7	4.9
2047	7.00%	141.3	1.3	75.7	82.2	59.1	0.2	58.2%	18.9	5.7	30.2%	30.2%	11.6	4.7
2048	7.00%	140.7	1.3	76.8	82.1	58.6	(0.5)	58.3%	19.2	6.2	32.1%	32.1%	11.4	4.2
2049	7.00%	140.2	1.3	78.7	82.9	57.3	(1.3)	59.1%	19.5	6.5	33.6%	33.6%	11.3	3.7
2050	7.00%	139.8	1.3	81.0	84.2	55.6	(1.7)	60.2%	19.8	6.7	33.9%	33.9%	11.2	3.4
2051	7.00%	139.6	1.3	83.7	86.1	53.5	(2.1)	61.7%	20.2	6.7	33.4%	33.4%	11.1	3.2
2052	7.00%	139.4	1.3	86.8	88.5	50.9	(2.6)	63.5%	20.6	6.8	33.0%	33.0%	10.9	3.0
2053	7.00%	139.4	1.3	90.2	91.5	47.9	(3.0)	65.7%	21.0	6.8	32.3%	32.3%	10.8	2.9
2054	7.00%	139.5	1.4	94.0	95.0	44.5	(3.4)	68.1%	21.5	6.7	31.3%	31.3%	10.7	2.8

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix D: Stress Testing Tables (continued)

One-Time Large Investment Loss & Low Contribution: Asset return in year 1 is -20.00% and for the remainder of the projection is equal to the Retirement System's expected return assumption (7.00%). Contributions in year 1 are 80% of the actuarially determined contributions and for the remainder of the projection are equal to the full actuarially determined contributions.

Fiscal Year Ending	Asset Return	Actuarial Liability	Gross Normal Cost	Market Value of Assets	Actuarial Value of Assets	Unfunded AAL (AVA)	Change in Unfunded AAL (AVA)	Funded Ratio (AVA)	Payroll	Actual ER Contributions	ER Contributions (% of Payroll)*	ADEC Rate	Benefit Payments	Net Outflow (BP - Total Contributions)
2024	8.14%	$119.2	$2.0	$76.5	$77.2	$42.0		64.8%	$15.3	$5.3	34.5%	33.1%	$7.7	$1.3
2025	-20.00%	121.6	2.0	58.8	76.4	45.2	$3.2	62.8%	15.6	4.1	26.3%	32.9%	8.0	2.7
2026	7.00%	124.0	2.1	61.2	79.0	45.0	(0.2)	63.7%	16.2	5.3	33.0%	33.0%	8.1	1.6
2027	7.00%	126.4	2.0	64.1	80.9	45.5	0.5	64.0%	16.3	5.8	35.4%	35.4%	8.3	1.4
2028	7.00%	128.7	2.0	67.2	82.7	46.0	0.5	64.3%	16.4	6.0	36.4%	36.4%	8.5	1.4
2029	7.00%	130.8	2.0	70.6	84.7	46.1	0.1	64.8%	16.5	6.3	37.9%	37.9%	8.7	1.3
2030	7.00%	132.9	2.0	74.4	87.2	45.7	(0.4)	65.6%	16.7	6.6	39.5%	39.5%	9.0	1.2
2031	7.00%	134.9	1.9	78.5	88.9	46.0	0.3	65.9%	16.8	6.9	41.2%	41.2%	9.2	1.1
2032	7.00%	136.7	1.9	83.1	91.3	45.4	(0.6)	66.8%	16.9	7.2	42.8%	42.8%	9.4	1.0
2033	7.00%	138.4	1.9	88.2	94.2	44.2	(1.2)	68.0%	17.1	7.7	44.9%	44.9%	9.7	0.8
2034	7.00%	140.0	1.8	93.9	97.4	42.6	(1.6)	69.6%	17.2	8.0	46.8%	46.8%	9.9	0.7
2035	7.00%	141.4	1.8	100.1	103.0	38.4	(4.2)	72.9%	17.3	8.4	48.7%	48.7%	10.1	0.5
2036	7.00%	142.5	1.8	103.8	106.1	36.4	(2.0)	74.5%	17.5	5.7	32.8%	32.8%	10.4	3.5
2037	7.00%	143.4	1.7	106.7	108.6	34.8	(1.6)	75.7%	17.6	5.1	29.0%	29.0%	10.6	4.3
2038	7.00%	144.1	1.7	109.4	110.9	33.2	(1.6)	77.0%	17.7	4.9	27.5%	27.5%	10.8	4.8
2039	7.00%	144.5	1.6	111.8	112.9	31.6	(1.6)	78.1%	17.8	4.6	25.8%	25.8%	11.0	5.3
2040	7.00%	144.7	1.6	113.8	114.6	30.1	(1.5)	79.2%	17.9	4.4	24.4%	24.4%	11.3	5.8
2041	7.00%	144.6	1.6	115.5	116.1	28.5	(1.6)	80.3%	18.0	4.2	23.2%	23.2%	11.4	6.1
2042	7.00%	144.4	1.5	116.5	116.9	27.5	(1.0)	81.0%	18.1	3.5	19.2%	19.2%	11.6	7.0
2043	7.00%	143.9	1.5	117.1	117.5	26.4	(1.1)	81.7%	18.3	3.3	18.3%	18.3%	11.7	7.2
2044	7.00%	143.3	1.4	117.8	118.1	25.2	(1.2)	82.4%	18.4	3.3	18.2%	18.2%	11.8	7.3
2045	7.00%	142.6	1.4	118.6	118.8	23.8	(1.4)	83.3%	18.6	3.5	18.9%	18.9%	11.8	7.2
2046	7.00%	141.9	1.4	119.6	119.8	22.1	(1.7)	84.4%	18.7	3.5	18.9%	18.9%	11.7	7.1
2047	7.00%	141.3	1.3	120.6	120.7	20.6	(1.5)	85.4%	18.9	3.3	17.5%	17.5%	11.6	7.1
2048	7.00%	140.7	1.3	122.0	122.1	18.6	(2.0)	86.8%	19.2	3.5	18.5%	18.5%	11.4	6.8
2049	7.00%	140.2	1.3	123.9	123.9	16.3	(2.3)	88.4%	19.5	3.7	19.1%	19.1%	11.3	6.5
2050	7.00%	139.8	1.3	126.0	126.0	13.8	(2.5)	90.1%	19.8	3.7	18.7%	18.7%	11.2	6.4
2051	7.00%	139.6	1.3	127.7	127.8	11.8	(2.0)	91.6%	20.2	3.1	15.4%	15.4%	11.1	6.8
2052	7.00%	139.4	1.3	129.7	129.7	9.7	(2.1)	93.1%	20.6	3.0	14.8%	14.8%	10.9	6.7
2053	7.00%	139.4	1.3	131.7	131.7	7.7	(2.0)	94.5%	21.0	2.8	13.3%	13.3%	10.8	6.9
2054	7.00%	139.5	1.4	133.7	133.7	5.8	(1.9)	95.8%	21.5	2.5	11.6%	11.6%	10.7	7.0

*Fiscal Year Ending 2024 employer contribution rate shown is based on actual contributions divided by original payroll used to calculate the ADEC rate.

Appendix E: Stochastic Analysis Support

Portfolio Analysis

Current Long-Term Policy

Asset Class/Metric	Asset Allocation Plan
US Large Cap Equity	18.0%
Global Equity ex US	12.0%
Private Equity	12.0%
Total Equity	**42.0%**
Aggregate Bonds	6.0%
Emerging Market Debt	1.0%
Long Government	8.0%
US High Yield	3.5%
TIPS	9.0%
Private Debt	6.0%
Total Fixed Income	**33.5%**
Infrastructure	10.0%
Commodities	5.0%
Direct Real Estate	7.0%
REITs	2.5%
Total Real Assets	**24.5%**
Total Plan	**100.0%**
30-Year Geometric Return	**7.6%**
Standard Deviation	**9.9%**
Sharpe Ratio	**0.45**

Return, standard deviation, and Sharpe Ratio statistics are calculated using Gallagher's October 2024 Capital Market Assumptions.

Asset allocation is based on the allocation plan as of June 30, 2024, shown in the PSERS Financial Statements.

Appendix E: Stochastic Analysis Support (continued)

Gallagher October 2024 Capital Market Assumptions
Summary of Expected Returns and Standard Deviations

	1st Year	10th Year			10 Years	20th Year			20 Years	30th Year			30 Years
Asset Class	**Arithmetic Mean**	**Arithmetic Mean**	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**	**Arithmetic Mean**	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**	**Arithmetic Mean**	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**
Global Equity	9.1%	7.5%	7.7%	6.5%	16.4%	9.2%	8.5%	7.2%	16.9%	8.5%	8.7%	7.4%	17.0%
US All Cap Equity	9.1%	7.2%	7.3%	6.1%	16.3%	9.6%	8.4%	7.1%	16.8%	9.2%	8.8%	7.5%	16.9%
US Large Cap Equity	8.9%	7.1%	7.1%	6.0%	16.2%	9.7%	8.4%	7.1%	16.9%	9.3%	8.8%	7.5%	16.9%
US Mid Cap Equity	10.6%	8.8%	8.9%	7.6%	17.5%	9.7%	9.0%	7.6%	17.8%	9.2%	9.1%	7.7%	17.8%
US Small Cap Equity	11.5%	9.5%	9.7%	8.1%	19.5%	10.0%	9.7%	7.9%	19.7%	9.1%	9.7%	7.9%	19.6%
Low Volatility Equity	7.1%	6.0%	6.2%	5.8%	9.2%	7.3%	6.7%	6.3%	9.4%	7.0%	6.9%	6.5%	9.4%
Global Equity ex US	9.9%	8.6%	8.9%	7.2%	20.1%	9.2%	9.1%	7.2%	20.7%	8.0%	9.2%	7.3%	20.7%
MSCI EAFE Equity	9.2%	8.4%	8.9%	7.1%	20.2%	8.6%	8.9%	7.0%	20.8%	7.5%	9.0%	7.0%	20.8%
MSCI Emerging Markets Equity	13.4%	10.7%	10.5%	7.4%	28.0%	12.4%	11.3%	7.8%	28.6%	10.9%	11.6%	8.0%	28.6%
Private Equity	15.2%	12.0%	12.1%	9.1%	27.3%	12.0%	11.9%	8.6%	27.7%	11.7%	12.0%	8.6%	27.7%
Direct Real Estate	4.5%	7.1%	6.6%	6.3%	9.1%	6.4%	6.7%	6.3%	9.2%	6.8%	6.7%	6.4%	9.3%
REITs	6.3%	7.5%	7.0%	5.4%	19.7%	8.1%	7.6%	5.9%	20.0%	7.8%	7.7%	6.0%	20.0%
Infrastructure	8.1%	8.2%	8.4%	7.7%	12.9%	8.7%	8.3%	7.6%	12.9%	8.3%	8.3%	7.6%	12.9%
Hedge Funds	6.5%	5.4%	5.7%	5.3%	9.3%	5.6%	5.6%	5.2%	9.5%	5.6%	5.6%	5.2%	9.4%
Commodities	11.1%	5.4%	6.3%	4.4%	26.4%	6.1%	6.2%	4.0%	26.8%	5.3%	6.1%	3.7%	27.4%
Aggregate Bonds	3.5%	4.6%	4.2%	4.1%	4.5%	4.9%	4.4%	4.3%	4.6%	4.6%	4.5%	4.5%	4.5%
Global Aggregate Bonds	2.7%	4.0%	3.6%	3.5%	5.6%	4.2%	3.8%	3.6%	5.6%	4.0%	3.9%	3.8%	5.7%
Short Government	3.9%	3.9%	3.9%	3.8%	2.4%	4.0%	3.9%	3.9%	2.5%	3.9%	3.9%	3.9%	2.6%
Short Corporate	4.2%	4.6%	4.4%	4.3%	2.5%	4.7%	4.5%	4.4%	2.6%	4.6%	4.5%	4.5%	2.7%
Short Credit	4.2%	4.5%	4.3%	4.3%	2.5%	4.7%	4.4%	4.4%	2.6%	4.5%	4.5%	4.4%	2.6%
Short Government/Credit	3.9%	4.1%	4.0%	3.9%	2.4%	4.2%	4.0%	4.0%	2.5%	4.1%	4.1%	4.0%	2.6%
Intermediate Government	3.4%	4.3%	4.0%	4.0%	3.7%	4.4%	4.2%	4.1%	3.8%	4.2%	4.2%	4.2%	3.8%
Intermediate Corporate	3.4%	5.2%	4.7%	4.6%	4.4%	5.4%	4.9%	4.8%	4.5%	5.1%	5.1%	5.0%	4.6%

Appendix E: Stochastic Analysis Support (continued)

Gallagher October 2024 Capital Market Assumptions
Summary of Expected Returns and Standard Deviations – Continued

	1st Year	10th Year			10 Years	20th Year			20 Years	30th Year			30 Years
Asset Class	**Arithmetic Mean**	**Arithmetic Mean**	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**	**Arithmetic Mean**	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**	**Arithmetic Mean**	**Arithmetic Mean**	**Geometric Mean**	**Standard Deviation**
Intermediate Credit	3.4%	5.1%	4.6%	4.5%	4.3%	5.3%	4.8%	4.8%	4.4%	5.0%	5.0%	4.9%	4.4%
Intermediate Government/Credit	3.4%	4.6%	4.2%	4.2%	3.8%	4.7%	4.4%	4.3%	3.9%	4.5%	4.5%	4.4%	4.0%
Core Government	2.9%	4.8%	4.3%	4.1%	5.6%	4.9%	4.5%	4.3%	5.7%	4.5%	4.6%	4.4%	5.8%
Core Corporate	2.6%	5.7%	4.9%	4.7%	6.1%	6.0%	5.3%	5.1%	6.3%	5.5%	5.5%	5.3%	6.4%
Core Credit	2.7%	5.6%	4.8%	4.6%	6.1%	5.8%	5.2%	5.0%	6.2%	5.4%	5.4%	5.2%	6.3%
Core Government/Credit	2.8%	5.1%	4.5%	4.3%	5.7%	5.3%	4.7%	4.6%	5.8%	4.8%	4.9%	4.7%	5.8%
Long Government	4.7%	5.2%	4.3%	3.8%	10.7%	5.5%	4.7%	4.1%	10.9%	4.4%	4.9%	4.3%	11.0%
Long Corporate	3.3%	6.2%	5.0%	4.5%	10.0%	6.7%	5.5%	5.0%	10.3%	5.7%	5.8%	5.3%	10.4%
Long Credit	3.4%	6.1%	4.9%	4.5%	9.8%	6.6%	5.5%	5.0%	10.0%	5.6%	5.7%	5.2%	10.1%
Long Government/Credit	3.9%	5.6%	4.6%	4.2%	9.4%	6.0%	5.1%	4.6%	9.7%	5.0%	5.3%	4.8%	9.7%
STRIPS	6.2%	6.3%	4.8%	3.6%	16.6%	7.0%	5.4%	4.0%	17.4%	4.9%	5.8%	4.4%	17.5%
TIPS	5.5%	4.6%	4.6%	4.3%	7.5%	5.1%	4.7%	4.5%	7.6%	4.7%	4.8%	4.5%	7.6%
Mortgage-Backed Securities	3.5%	4.6%	4.1%	4.0%	3.9%	4.9%	4.3%	4.3%	4.0%	4.5%	4.5%	4.4%	3.9%
US High Yield	4.4%	9.7%	8.1%	7.4%	12.7%	10.1%	8.9%	8.1%	13.3%	9.4%	9.2%	8.3%	13.3%
Emerging Market Debt	7.9%	6.8%	7.0%	6.5%	10.4%	6.9%	7.0%	6.5%	10.3%	7.0%	7.1%	6.6%	10.4%
Global ex-US Debt	2.2%	3.6%	3.2%	2.9%	8.4%	3.7%	3.3%	3.0%	8.4%	3.6%	3.5%	3.2%	8.4%
Private Debt	9.4%	8.4%	8.5%	8.2%	8.4%	8.3%	8.6%	8.3%	8.4%	8.1%	8.5%	8.2%	8.4%
Cash	4.0%	3.0%	3.2%	3.2%	1.6%	3.2%	3.2%	3.2%	1.7%	3.2%	3.2%	3.2%	1.7%
Inflation	2.4%	2.3%	2.4%	2.4%	2.9%	2.3%	2.4%	2.4%	3.1%	2.3%	2.4%	2.3%	3.2%
Inflation – Wages	3.6%	3.5%	3.5%	3.5%	0.8%	3.5%	3.5%	3.5%	0.8%	3.5%	3.5%	3.5%	0.8%
Medical Trend – Professional	4.1%	4.2%	4.2%	4.1%	1.3%	4.4%	4.2%	4.2%	1.3%	4.4%	4.3%	4.3%	1.3%
Medical Trend – Hospital	5.9%	5.8%	5.7%	5.7%	1.8%	6.0%	5.8%	5.8%	1.9%	5.9%	5.8%	5.8%	1.9%

Appendix E: Stochastic Analysis Support (continued)

Gallagher October 2024 Capital Market Assumptions
Summary of 30-Year Correlations

	Global Equity	US All Cap Equity	US Large Cap Equity	US Mid Cap Equity	US Small Cap Equity	Low Volatility Equity	Global Equity ex US	MSCI EAFE Equity	MSCI Emerging Markets Equity	Private Equity	Direct Real Estate	REITs	Infrastructure	Hedge Funds	Commodities	Aggregate Bonds	Global Aggregate Bonds	Short Government	Short Corporate	Short Credit	Short Government/Credit	Intermediate Government	Intermediate Corporate	Intermediate Credit	Intermediate Government/Credit	Core Government	Core Corporate	Core Credit	Core Government/Credit	Long Government	Long Corporate	Long Credit	Long Government/Credit	STRIPS	TIPS	Mortgage-Backed Securities	US High Yield	Emerging Market Debt	Global ex-US Debt	Private Debt	Cash	Inflation	Inflation - Wages	Medical Trend - Professional	Medical Trend - Hospital
Global Equity	1.0																																											
US All Cap Equity	0.9	1.0																																										
US Large Cap Equity	0.9	1.0	1.0																																									
US Mid Cap Equity	0.9	0.9	0.9	1.0																																							
US Small Cap Equity	0.8	0.9	0.8	0.9	1.0																																						
Low Volatility Equity	0.7	0.7	0.7	0.6	0.6	1.0																																					
Global Equity ex US	0.9	0.7	0.7	0.7	0.7	0.5	1.0																																				
MSCI EAFE Equity	0.8	0.6	0.6	0.6	0.6	0.4	0.9	1.0																																			
MSCI Emerging Markets Equity	0.8	0.8	0.8	0.7	0.7	0.5	0.8	0.6	1.0																																		
Private Equity	0.9	0.9	0.9	0.8	0.8	0.7	0.7	0.6	0.7	1.0																																	
Direct Real Estate	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.2	0.2	1.0																																
REITs	0.5	0.5	0.5	0.5	0.5	0.4	0.4	0.3	0.4	0.5	0.1	1.0																															
Infrastructure	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.0																														
Hedge Funds	0.6	0.6	0.6	0.5	0.5	0.4	0.4	0.4	0.5	0.6	0.1	0.3	0.0	1.0																													
Commodities	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	1.0																												
Aggregate Bonds	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.4	1.0																											
Global Aggregate Bonds	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.1	0.1	0.0	0.1	0.2	0.5	1.0																										
Short Government	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.1	0.1	0.0	0.0	0.0	0.4	0.9	0.5	1.0																									
Short Corporate	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.4	0.9	0.5	1.0	1.0																								
Short Credit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.1	0.4	0.9	0.5	1.0	1.0	1.0																							
Short Government/Credit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.4	0.9	0.5	1.0	1.0	1.0	1.0																						

*Correlations are rounded to the nearest tenth; a correlation shown of 1.0 does not always imply perfect correlation

Appendix E: Stochastic Analysis Support (continued)

Gallagher October 2024 Capital Market Assumptions
Summary of 30-Year Correlations - Continued

	Global Equity	US All Cap Equity	US Large Cap Equity	US Mid Cap Equity	US Small Cap Equity	Low Volatility Equity	Global Equity ex US	MSCI EAFE Equity	MSCI Emerging Markets Equity	Private Equity	Direct Real Estate	REITs	Infrastructure	Hedge Funds	Commodities	Aggregate Bonds	Global Aggregate Bonds	Short Government	Short Corporate	Short Credit	Short Government/Credit	Intermediate Government	Intermediate Corporate	Intermediate Credit	Intermediate Government/Credit	Core Government	Core Corporate	Core Credit	Core Government/Credit	Long Government	Long Corporate	Long Credit	Long Government/Credit	STRIPS	TIPS	Mortgage-Backed Securities	US High Yield	Emerging Market Debt	Global ex-US Debt	Private Debt	Cash	Inflation	Inflation - Wages	Medical Trend - Professional	Medical Trend - Hospital
Intermediate Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	1.0	0.5	1.0	0.9	0.9	1.0	1.0																						
Intermediate Corporate	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.4	1.0	0.5	0.9	0.9	0.9	0.9	0.9	1.0																					
Intermediate Credit	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.4	1.0	0.5	0.9	0.9	0.9	0.9	0.9	1.0	1.0																				
Intermediate Government/Credit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.4	1.0	0.5	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0																			
Core Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	1.0	0.5	0.9	0.9	0.9	0.9	1.0	0.9	0.9	1.0	1.0																		
Core Corporate	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.4	0.9	0.5	0.8	0.9	0.9	0.8	0.9	1.0	1.0	0.9	0.9	1.0																	
Core Credit	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.2	0.1	0.1	0.0	0.1	0.4	1.0	0.5	0.8	0.9	0.9	0.8	0.9	1.0	1.0	0.9	0.9	1.0	1.0																
Core Government/Credit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.4	1.0	0.5	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0															
Long Government	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.9	0.5	0.8	0.7	0.7	0.8	0.9	0.8	0.9	0.9	0.9	0.9	0.9	1.0															
Long Corporate	0.2	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.0	0.2	0.4	0.9	0.5	0.7	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.8	1.0	1.0	0.9	0.9	1.0													
Long Credit	0.2	0.2	0.2	0.3	0.2	0.2	0.2	0.1	0.2	0.2	0.1	0.1	0.0	0.1	0.4	0.9	0.5	0.7	0.8	0.8	0.7	0.8	0.9	0.9	0.9	0.9	1.0	1.0	0.9	0.9	1.0	1.0											
Long Government/Credit	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.4	1.0	0.5	0.8	0.8	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.9	1.0	1.0	1.0	1.0	1.0	1.0										
STRIPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.3	0.9	0.5	0.7	0.7	0.7	0.7	0.8	0.8	0.8	0.8	0.9	0.8	0.8	0.9	1.0	0.9	0.9	1.0	1.0									
TIPS	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.9	0.7	0.3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.6	1.0								
Mortgage-Backed Securities	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.4	0.9	0.5	0.9	0.8	0.8	0.9	0.9	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.9	0.8	0.8	0.9	0.9	0.6	1.0							
US High Yield	0.7	0.7	0.7	0.7	0.6	0.5	0.5	0.4	0.5	0.6	0.2	0.4	0.0	0.4	0.3	0.6	0.3	0.4	0.6	0.6	0.5	0.5	0.7	0.7	0.6	0.5	0.8	0.7	0.6	0.5	0.8	0.8	0.6	0.5	0.3	0.5	1.0						
Emerging Market Debt	0.3	0.2	0.2	0.2	0.2	0.2	0.4	0.3	0.5	0.2	0.0	0.1	0.0	0.2	0.0	0.0	0.4	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	0.1	0.1	0.0	0.0	0.0	0.0	0.2	1.0					
Global ex-US Debt	0.2	0.1	0.1	0.1	0.1	0.1	0.2	0.1	0.2	0.1	0.0	0.1	0.0	0.1	0.1	0.2	0.9	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.2	0.2	0.5	1.0				
Private Debt	0.4	0.4	0.4	0.3	0.3	0.3	0.3	0.2	0.3	0.4	0.1	0.2	0.0	0.2	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	-0.1	-0.1	-0.1	0.0	0.0	-0.1	-0.1	-0.1	-0.1	0.2	0.1	0.0	1.0			
Cash	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.1	0.2	0.4	0.2	0.6	0.6	0.6	0.6	0.4	0.4	0.4	0.4	0.3	0.2	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.2	0.4	0.2	0.0	0.1	0.0	1.0		
Inflation	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	0.7	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	-0.1	0.0	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.4	0.0	0.0	0.0	0.0	0.0	0.1	1.0		
Inflation – Wages	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5	0.1	0.1	0.3	0.3	0.3	0.3	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.3	0.2	0.1	0.0	0.0	0.0	0.5	0.7	1.0	
Medical Trend – Professional	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.2	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.0	0.5	0.1	0.4	1.0
Medical Trend – Hospital	0.1	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.2	0.1	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.0	0.3	0.2	0.1	0.0	0.0	0.0	0.5	0.6	0.8	0.6	1.0

*Correlations are rounded to the nearest tenth; a correlation shown of 1.0 does not always imply perfect correlation

Appendix E: Stochastic Analysis Support (continued)

Simulation Analysis Results: Market Value of Assets and Actuarial Liability Funded Ratio

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	64.2%	74.8%	81.4%	88.1%	94.8%	101.2%	108.2%	116.4%	124.2%	132.5%	142.6%	154.3%	163.8%	171.7%	182.3%	194.2%
75th Percentile	64.2%	70.2%	74.2%	78.0%	81.8%	86.3%	90.2%	94.5%	99.0%	104.2%	109.4%	115.0%	119.1%	124.0%	127.5%	132.0%
50th Percentile	64.2%	66.9%	69.2%	71.4%	73.5%	76.0%	78.3%	81.2%	84.3%	87.2%	90.7%	94.9%	96.8%	99.1%	101.1%	103.1%
25th Percentile	64.2%	63.3%	64.0%	64.9%	65.4%	66.3%	67.7%	69.4%	71.1%	72.7%	74.8%	77.5%	78.9%	79.4%	79.7%	80.2%
5th Percentile	64.2%	58.2%	55.8%	54.7%	53.9%	53.2%	52.6%	52.6%	53.2%	53.7%	55.0%	55.8%	56.0%	54.7%	53.6%	53.4%

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	208.3%	221.6%	235.9%	250.6%	270.0%	289.7%	317.6%	341.4%	363.0%	389.7%	420.2%	451.1%	483.8%	521.2%	548.4%
75th Percentile	136.7%	141.4%	147.2%	152.0%	157.7%	165.6%	172.0%	179.9%	188.7%	196.6%	206.1%	217.0%	228.1%	239.9%	251.8%
50th Percentile	104.6%	106.7%	108.3%	110.3%	112.0%	113.8%	116.2%	116.9%	119.6%	123.8%	126.9%	129.3%	132.8%	137.4%	140.6%
25th Percentile	80.8%	80.8%	80.2%	79.9%	80.1%	80.1%	80.1%	79.8%	80.5%	81.6%	81.3%	82.6%	83.0%	84.1%	84.8%
5th Percentile	52.4%	51.9%	50.8%	49.0%	47.8%	47.3%	47.0%	46.7%	46.2%	45.5%	45.8%	45.8%	45.8%	46.4%	46.8%

Appendix E: Stochastic Analysis Support (continued)

Simulation Analysis Results: Actuarial Value of Assets and Actuarial Liability Funded Ratio

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	64.8%	67.2%	70.4%	74.0%	78.1%	82.8%	88.0%	93.4%	99.8%	107.0%	114.8%	123.7%	130.6%	138.3%	146.9%	155.9%
75th Percentile	64.8%	66.7%	69.3%	72.1%	75.1%	78.4%	82.3%	85.8%	90.0%	94.5%	99.5%	104.8%	108.2%	111.4%	114.4%	117.9%
50th Percentile	64.8%	66.4%	68.5%	70.8%	73.0%	75.5%	78.3%	80.7%	83.6%	86.9%	90.3%	94.1%	95.9%	97.3%	98.7%	100.2%
25th Percentile	64.8%	66.0%	67.7%	69.4%	70.9%	72.4%	74.3%	75.6%	77.3%	79.4%	81.5%	83.9%	84.4%	84.3%	84.7%	85.0%
5th Percentile	64.8%	65.5%	66.4%	67.0%	67.4%	67.3%	67.3%	66.8%	67.2%	66.9%	68.1%	68.3%	67.7%	66.5%	65.2%	64.0%

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	167.3%	178.8%	192.1%	207.9%	224.6%	241.1%	263.4%	285.2%	311.2%	333.8%	362.7%	394.8%	428.7%	462.0%	497.7%
75th Percentile	122.0%	126.1%	131.1%	136.4%	142.6%	148.2%	155.1%	162.5%	170.7%	179.0%	188.1%	197.2%	207.3%	218.8%	231.3%
50th Percentile	101.4%	102.8%	103.7%	105.1%	106.9%	108.8%	110.9%	112.5%	114.4%	117.0%	119.0%	121.6%	125.0%	128.1%	131.5%
25th Percentile	84.8%	84.6%	84.1%	83.6%	83.3%	82.8%	82.6%	81.9%	81.9%	82.2%	82.5%	83.0%	83.4%	84.3%	85.6%
5th Percentile	62.6%	61.5%	59.7%	57.9%	56.0%	54.9%	53.4%	53.0%	52.5%	52.4%	51.9%	51.7%	51.9%	51.8%	52.6%

Appendix E: Stochastic Analysis Support (continued)

Simulation Analysis Results: Employer Contribution Amount

($ Billions)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	$5.3	$5.1	$5.3	$5.5	$5.7	$6.0	$6.3	$6.7	$7.1	$7.5	$8.0	$8.5	$5.8	$5.5	$5.4	$5.4
75th Percentile	5.3	5.1	5.3	5.5	5.6	5.8	6.0	6.2	6.4	6.7	7.0	7.2	4.4	3.8	3.6	3.4
50th Percentile	5.3	5.1	5.3	5.5	5.6	5.7	5.8	5.9	6.0	6.2	6.4	6.5	3.5	2.8	2.4	2.0
25th Percentile	5.3	5.1	5.3	5.4	5.5	5.6	5.6	5.7	5.7	5.7	5.7	5.7	2.6	1.6	1.1	0.5
5th Percentile	5.3	5.1	5.3	5.4	5.4	5.4	5.4	5.3	5.1	5.0	4.8	4.5	1.1	0.6	0.5	0.5

($ Billions)	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	$5.4	$5.5	$5.0	$5.0	$5.3	$5.6	$5.9	$5.9	$6.3	$6.7	$6.8	$6.9	$7.2	$7.3	$7.4
75th Percentile	3.2	3.0	2.4	2.2	2.3	2.5	2.5	2.3	2.5	2.7	2.7	2.8	2.9	2.8	2.8
50th Percentile	1.6	1.3	0.5	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
25th Percentile	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
5th Percentile	0.5	0.4	0.4	0.4	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2

Appendix E: Stochastic Analysis Support (continued)

Simulation Analysis Results: Employer Contribution (Percentage of Payroll)

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	34.5%	32.9%	33.0%	34.0%	35.0%	36.3%	37.8%	39.7%	41.6%	44.0%	46.3%	48.9%	33.2%	31.0%	30.6%	30.4%
75th Percentile	34.5%	32.9%	33.0%	33.7%	34.3%	35.1%	36.0%	37.0%	37.9%	39.2%	40.5%	41.7%	25.3%	21.7%	20.4%	19.1%
50th Percentile	34.5%	32.9%	33.0%	33.5%	33.9%	34.3%	34.8%	35.3%	35.7%	36.4%	37.0%	37.4%	20.1%	15.7%	13.6%	11.2%
25th Percentile	34.5%	32.9%	33.0%	33.3%	33.5%	33.6%	33.8%	33.7%	33.4%	33.5%	33.3%	33.0%	14.8%	9.4%	6.2%	2.8%
5th Percentile	34.5%	32.9%	33.0%	33.1%	33.0%	32.6%	32.1%	31.3%	30.3%	29.4%	27.8%	25.9%	6.1%	3.3%	3.0%	2.8%

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	30.4%	30.3%	27.4%	27.6%	28.8%	30.4%	31.5%	31.1%	32.8%	34.4%	34.3%	34.4%	34.9%	34.7%	34.3%
75th Percentile	17.8%	16.8%	13.1%	12.2%	12.3%	13.2%	13.4%	12.1%	13.2%	14.1%	13.6%	13.8%	13.9%	13.5%	13.3%
50th Percentile	9.2%	7.3%	2.5%	2.0%	1.8%	1.6%	1.4%	1.3%	1.2%	1.1%	1.0%	0.9%	0.9%	0.8%	0.8%
25th Percentile	2.6%	2.4%	2.2%	2.0%	1.8%	1.6%	1.4%	1.3%	1.2%	1.1%	1.0%	0.9%	0.9%	0.8%	0.8%
5th Percentile	2.6%	2.4%	2.2%	2.0%	1.8%	1.6%	1.4%	1.3%	1.2%	1.1%	1.0%	0.9%	0.9%	0.8%	0.8%

Appendix E: Stochastic Analysis Support (continued)

Liquidity Analysis Results: Net Cash Flow: Contributions less Benefit Payments

($ Billions)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	($1.3)	($1.7)	($1.6)	($1.6)	($1.6)	($1.5)	($1.4)	($1.3)	($1.1)	($0.9)	($0.6)	($0.3)	($3.2)	($3.8)	($4.1)	($4.3)
75th Percentile	(1.3)	(1.7)	(1.6)	(1.6)	(1.7)	(1.8)	(1.8)	(1.8)	(1.8)	(1.8)	(1.7)	(1.7)	(4.7)	(5.6)	(5.9)	(6.4)
50th Percentile	(1.3)	(1.7)	(1.6)	(1.7)	(1.8)	(1.9)	(2.0)	(2.1)	(2.2)	(2.3)	(2.4)	(2.5)	(5.7)	(6.7)	(7.3)	(7.9)
25th Percentile	(1.3)	(1.7)	(1.6)	(1.7)	(1.9)	(2.0)	(2.2)	(2.4)	(2.7)	(2.9)	(3.1)	(3.4)	(6.8)	(8.0)	(8.8)	(9.6)
5th Percentile	(1.3)	(1.7)	(1.6)	(1.7)	(2.0)	(2.2)	(2.5)	(2.9)	(3.2)	(3.6)	(4.1)	(4.7)	(8.3)	(9.2)	(9.5)	(9.7)

($ Billions)	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	($4.5)	($4.7)	($5.3)	($5.3)	($5.1)	($4.8)	($4.5)	($4.3)	($3.7)	($3.2)	($2.9)	($2.6)	($2.3)	($2.0)	($1.7)
75th Percentile	(6.9)	(7.2)	(8.0)	(8.3)	(8.4)	(8.2)	(8.1)	(8.1)	(7.7)	(7.4)	(7.3)	(7.1)	(6.9)	(6.8)	(6.6)
50th Percentile	(8.6)	(9.0)	(10.1)	(10.2)	(10.4)	(10.4)	(10.5)	(10.3)	(10.2)	(10.1)	(10.0)	(9.9)	(9.7)	(9.6)	(9.5)
25th Percentile	(10.0)	(10.2)	(10.4)	(10.5)	(10.7)	(10.7)	(10.7)	(10.6)	(10.5)	(10.4)	(10.3)	(10.2)	(10.2)	(10.1)	(9.9)
5th Percentile	(10.0)	(10.3)	(10.5)	(10.6)	(10.8)	(10.8)	(10.8)	(10.7)	(10.6)	(10.5)	(10.4)	(10.3)	(10.2)	(10.1)	(9.9)

Appendix E: Stochastic Analysis Support (continued)

Liquidity Analysis Results: Net Cash Flow: Contributions less Benefit Payments plus Returns

($ Billions)	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	$4.4	$14.3	$15.6	$16.6	$18.3	$20.3	$21.3	$23.0	$25.0	$27.0	$28.3	$30.6	$29.4	$29.4	$30.7	$31.5
75th Percentile	4.4	8.8	8.9	9.5	9.7	10.8	10.8	12.2	12.4	13.3	14.2	15.4	13.4	12.8	12.8	13.4
50th Percentile	4.4	4.8	4.6	4.9	4.5	5.1	5.1	5.8	5.9	6.2	6.8	7.4	5.0	4.4	4.1	4.1
25th Percentile	4.4	0.3	0.2	(0.1)	(0.6)	(0.5)	(0.8)	(0.7)	(0.4)	(0.9)	(0.3)	(0.2)	(3.0)	(3.6)	(4.3)	(4.0)
5th Percentile	4.4	(5.9)	(7.4)	(8.2)	(8.9)	(9.5)	(10.4)	(10.7)	(11.7)	(12.5)	(12.2)	(13.2)	(15.8)	(17.3)	(17.7)	(18.7)

($ Billions)	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	$34.4	$35.9	$37.7	$39.6	$41.9	$43.5	$47.8	$48.8	$50.9	$56.4	$60.1	$64.1	$68.2	$70.8	$79.1
75th Percentile	12.8	13.6	13.0	13.5	13.5	13.9	14.7	15.1	16.4	17.2	18.2	18.2	20.5	20.9	21.9
50th Percentile	3.4	3.6	2.9	3.0	3.0	3.1	3.6	3.4	4.2	4.3	4.6	4.9	5.2	5.9	6.6
25th Percentile	(5.5)	(5.2)	(6.0)	(5.5)	(5.7)	(5.7)	(5.5)	(5.7)	(4.7)	(4.5)	(4.4)	(4.5)	(4.2)	(3.9)	(3.3)
5th Percentile	(20.7)	(20.5)	(21.3)	(21.6)	(22.7)	(22.3)	(23.0)	(24.2)	(23.1)	(23.7)	(24.3)	(24.9)	(24.1)	(24.8)	(27.0)

Appendix E: Stochastic Analysis Support (continued)

Liquidity Analysis Results: Net Outflow: Benefit Payments less Contributions / Assets

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	1.7%	2.4%	2.3%	2.4%	2.4%	2.5%	2.5%	2.5%	2.6%	2.7%	2.7%	2.8%	5.6%	6.5%	7.0%	7.5%
75th Percentile	1.7%	2.2%	2.0%	2.0%	2.1%	2.1%	2.1%	2.1%	2.2%	2.1%	2.2%	2.2%	4.6%	5.2%	5.5%	5.9%
50th Percentile	1.7%	2.1%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.9%	1.8%	1.8%	4.0%	4.6%	4.8%	5.0%
25th Percentile	1.7%	2.0%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.7%	1.6%	1.5%	1.4%	3.5%	4.0%	4.1%	4.3%
5th Percentile	1.7%	1.9%	1.6%	1.5%	1.5%	1.5%	1.5%	1.4%	1.2%	1.0%	0.7%	0.4%	2.8%	3.2%	3.2%	3.3%

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	7.9%	8.3%	9.3%	9.7%	9.8%	9.8%	9.7%	9.9%	9.6%	9.3%	9.2%	9.1%	8.7%	8.6%	8.3%
75th Percentile	6.2%	6.4%	7.0%	7.2%	7.3%	7.1%	7.0%	7.0%	6.6%	6.4%	6.2%	6.0%	5.8%	5.6%	5.4%
50th Percentile	5.3%	5.4%	5.8%	5.8%	5.8%	5.7%	5.6%	5.4%	5.1%	4.9%	4.7%	4.4%	4.2%	4.0%	3.7%
25th Percentile	4.5%	4.5%	4.6%	4.6%	4.5%	4.3%	4.2%	4.0%	3.7%	3.5%	3.2%	2.9%	2.7%	2.5%	2.3%
5th Percentile	3.3%	3.2%	3.1%	2.9%	2.8%	2.6%	2.4%	2.2%	2.0%	1.8%	1.6%	1.4%	1.3%	1.1%	1.0%

Appendix E: Stochastic Analysis Support (continued)

Simulation Analysis Results: Annualized Return

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	8.1%	21.1%	21.5%	21.8%	22.5%	23.6%	23.4%	23.9%	23.7%	24.0%	24.1%	24.4%	24.6%	24.4%	24.4%	24.2%
75th Percentile	8.1%	13.8%	13.1%	13.1%	12.9%	13.5%	13.2%	13.9%	13.6%	13.5%	13.6%	14.0%	14.2%	14.2%	14.2%	14.5%
50th Percentile	8.1%	8.6%	7.9%	7.6%	7.1%	7.6%	7.2%	7.8%	7.7%	7.6%	7.7%	7.9%	8.4%	8.1%	8.2%	8.5%
25th Percentile	8.1%	2.7%	2.2%	1.9%	1.3%	1.5%	1.2%	1.3%	1.6%	1.2%	1.6%	1.7%	1.8%	2.0%	1.9%	2.4%
5th Percentile	8.1%	-5.5%	-7.3%	-8.1%	-8.1%	-8.5%	-8.6%	-8.6%	-8.7%	-9.0%	-8.5%	-8.6%	-7.7%	-7.6%	-7.7%	-7.9%

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	24.2%	24.6%	24.4%	24.3%	24.7%	24.1%	24.5%	24.6%	24.9%	24.3%	24.9%	25.0%	24.7%	23.8%	24.7%
75th Percentile	14.2%	14.4%	14.2%	14.3%	14.4%	14.2%	14.5%	14.3%	14.5%	14.3%	14.3%	14.1%	14.2%	14.2%	14.3%
50th Percentile	8.1%	8.3%	8.1%	8.4%	8.3%	8.3%	8.5%	8.1%	8.4%	8.3%	8.1%	8.1%	8.2%	8.3%	8.2%
25th Percentile	1.7%	2.0%	1.8%	2.3%	2.1%	1.9%	2.1%	1.9%	2.2%	2.1%	2.2%	1.9%	2.1%	2.0%	2.1%
5th Percentile	-8.3%	-8.0%	-8.4%	-8.0%	-8.3%	-8.1%	-8.4%	-8.4%	-8.2%	-8.4%	-8.4%	-8.3%	-7.7%	-7.6%	-8.1%

Appendix E: Stochastic Analysis Support (continued)

Simulation Analysis Results: Annualized Compound Return

	2024	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038	2039
95th Percentile	8.1%	21.1%	17.0%	15.4%	14.4%	13.6%	13.1%	12.8%	12.5%	12.3%	12.1%	12.1%	12.0%	11.8%	11.7%	11.7%
75th Percentile	8.1%	13.8%	11.8%	10.9%	10.4%	10.1%	9.8%	9.6%	9.5%	9.4%	9.3%	9.2%	9.1%	9.2%	9.1%	9.1%
50th Percentile	8.1%	8.6%	8.0%	7.7%	7.5%	7.5%	7.4%	7.4%	7.3%	7.3%	7.3%	7.3%	7.3%	7.4%	7.4%	7.4%
25th Percentile	8.1%	2.7%	4.0%	4.4%	4.5%	4.7%	4.9%	5.0%	5.1%	5.2%	5.3%	5.3%	5.5%	5.6%	5.7%	5.7%
5th Percentile	8.1%	-5.5%	-2.8%	-1.2%	-0.3%	0.3%	0.7%	1.0%	1.4%	1.7%	2.0%	2.1%	2.4%	2.6%	2.8%	2.9%

	2040	2041	2042	2043	2044	2045	2046	2047	2048	2049	2050	2051	2052	2053	2054
95th Percentile	11.7%	11.6%	11.5%	11.4%	11.4%	11.3%	11.3%	11.2%	11.1%	11.1%	11.0%	11.0%	11.0%	10.9%	10.8%
75th Percentile	9.1%	9.1%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	9.0%	8.9%	8.9%	8.9%	8.9%	8.9%	8.9%
50th Percentile	7.4%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.5%	7.6%	7.6%
25th Percentile	5.8%	5.8%	5.9%	5.9%	6.0%	6.0%	6.1%	6.1%	6.1%	6.2%	6.2%	6.2%	6.2%	6.3%	6.3%
5th Percentile	3.0%	3.2%	3.3%	3.4%	3.5%	3.7%	3.8%	3.9%	4.0%	4.1%	4.2%	4.2%	4.3%	4.3%	4.4%

Appendix F: Additional Information

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