Teachers' and State Employees' Retirement System of North Carolina

Principal Results of Actuarial Valuation as of December 31, 2023

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October 24, 2024, Board of Trustees Meeting

Gallagher

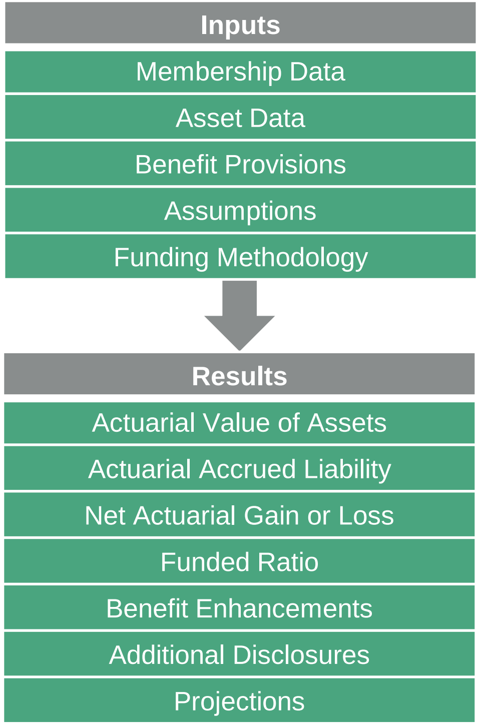
Insurance | Risk Management | Consulting

Purpose of the annual actuarial valuation

- As of the end of each calendar year:
  - An annual actuarial valuation is performed on TSERS
  - The actuary determines the amount of employer contributions to be made to TSERS during each member's career that, when combined with investment return and member contributions, are expected to be sufficient to pay for retirement benefits
- The annual actuarial valuation is performed to:
  - Determine the progress on funding TSERS
  - Explore why the results of the current valuation differ from the results of the valuation of the previous year
  - Satisfy regulatory and accounting requirements

The valuation process

- The diagram to the right summarizes the inputs and results of the actuarial valuation process.
- A detailed summary of the valuation process and a glossary of actuarial terms are provided in the supplementary document, “State of North Carolina Retirement Systems Actuarial Valuation Report Process and Actuarial Terms Glossary” dated October 2024.
- Bars at the top of the page, consistent with the diagram to the right, will appear throughout the presentation to designate where we are in the valuation process. Some of the items on the bars at the top of the page are covered in the appendix to the presentation.



Valuation input

Membership data

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The table below provides a summary of the membership data used in this valuation compared to the prior valuation.

Number as of	12/31/2023	12/31/2022
Active members	299,037	297,802
Members currently receiving Disability Income Plan benefits	4,031	4,491
Terminated vested members and survivors of deceased members entitled to benefits but not yet receiving benefits	64,936	62,192
Terminated non-vested members and survivors of deceased members entitled to a refund of contributions	161,163	152,273
Retired members and survivors of deceased members currently receiving benefits	252,036	246,374
Total	781,203	763,132

The number of active members increased by 0.4% from the previous valuation date.

The number of retired members and survivors of deceased members currently receiving benefits increased by 2.3% from the previous valuation.

The increase in retiree population is consistent with expectations.

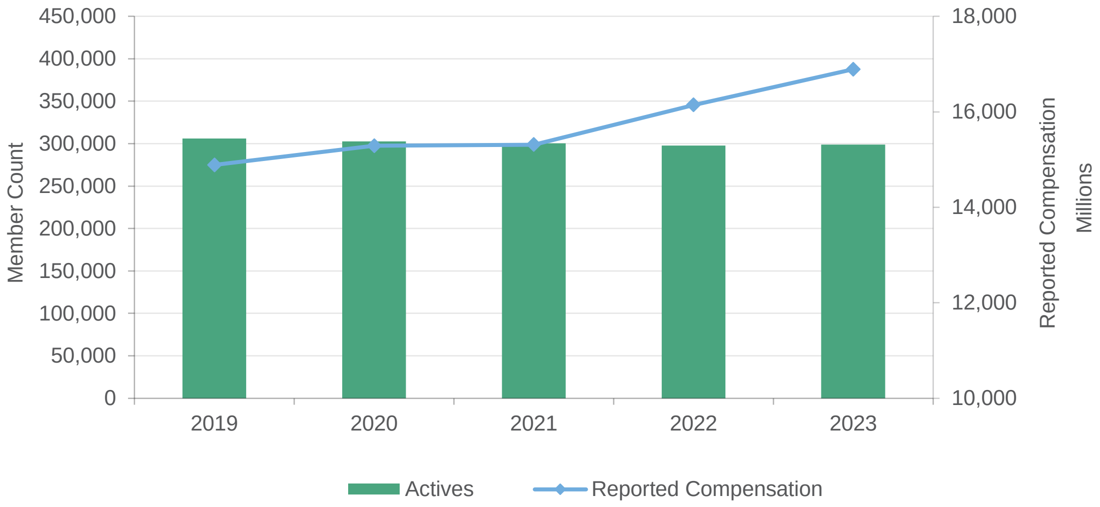
A detailed summary of the membership data used in this valuation is provided in Section 2 and Appendix A.

Valuation input (continued)

Actives

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The graph below provides a history of the number of active members and reported compensation over the past five years.



Reported compensation for active members for the year ending December 31, 2023 was $16.9 billion compared to $16.1 billion in the prior year, an increase of 4.6%.

Covered payroll was expected to increase annually by 3.25%.

Payroll that is increasing faster than we assume results in more benefits accruing than we anticipate, but also more contributions supporting the system. Although the pay increases will ultimately lead to increases in the dollar amounts of contributions, the immediate effect on the December 31, 2023 actuarial valuation is a reduction in the funded ratio and an increase in required employer contribution rates compared to those anticipated in prior projections.

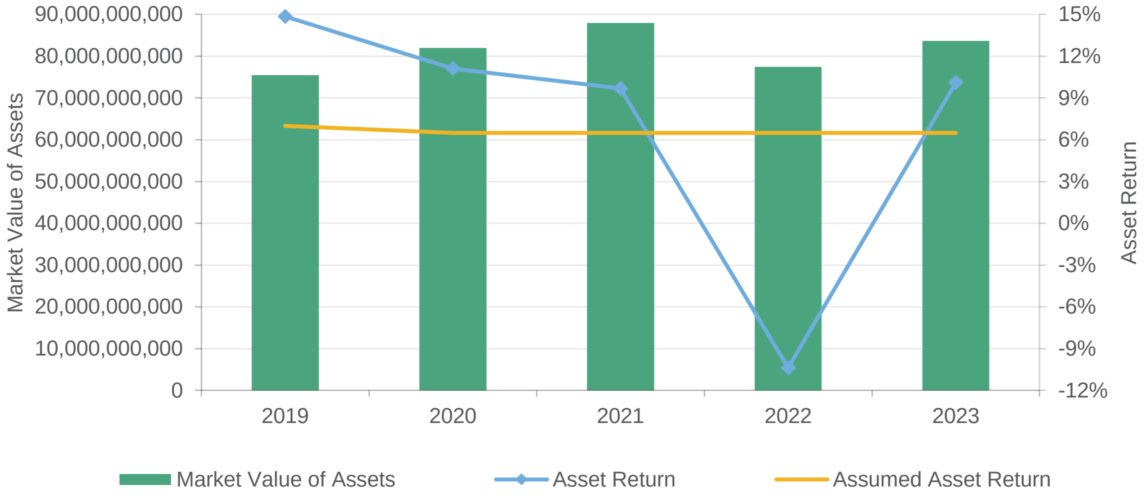
A detailed summary of the membership data used in this valuation is provided in Section 2 and Appendix A.

Valuation input (continued)

Historical market value and returns

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The graph below provides a history of the market value of assets and asset returns over the past five years.



The investment return for the market value of assets for 2023 was 10.11%, which was well above the expected return of 6.50%.

The return on the actuarial value of assets, which is used to determine the contribution rates, was below the 6.50% expected return at 5.63%.

This resulted in an increase in the unfunded actuarial accrued liability (UAAL) of $0.7 billion.

Market value returns have exceeded expectations four times in the last five years.

The annual rates of return on the actuarial value of assets have varied between 4.53% and 9.18% for the past five years.

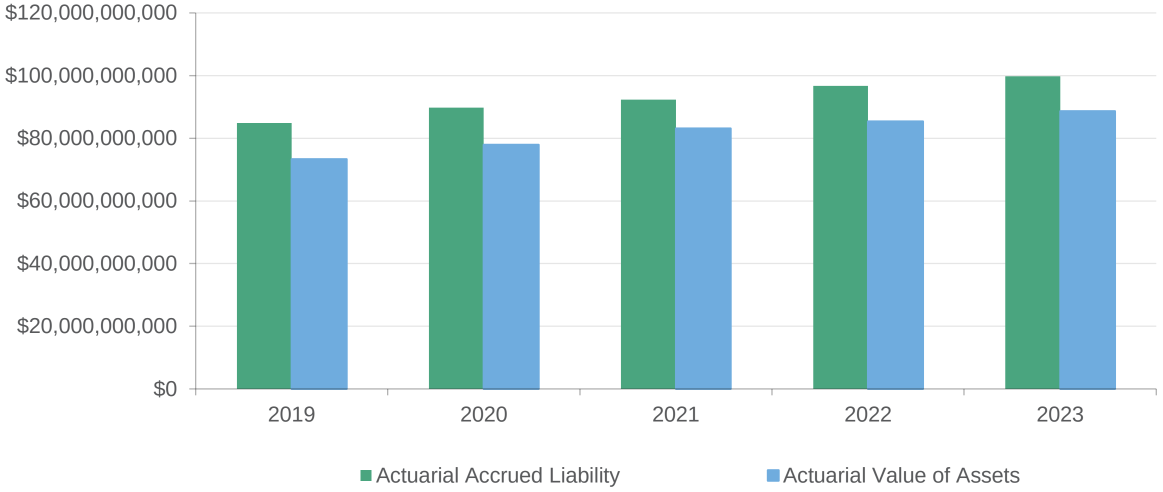
A detailed summary of the market value of assets is provided in Section 3.

Valuation results

Valuation results

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The graph below provides a history of the actuarial accrued liability and actuarial value of assets.



The difference in the actuarial accrued liability and the actuarial value of assets is known as the Unfunded Actuarial Accrued Liability (UAAL).

The UAAL is $11.2 billion as of 12/31/2023 and is to be paid off over a 12-year period.

Detailed summaries of the AVA and AAL are provided in Sections 3 and 4, respectively.

Valuation results (continued)

Net actuarial gain or loss

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The table below provides a reconciliation of the prior year's unfunded actuarial accrued liability to the current year's unfunded actuarial accrued liability.

(in millions)		
Unfunded actuarial accrued liability (UAAL) as of 12/31/2022	$	11,268
Normal cost and administrative expense during 2023		1,986
Reduction due to actual contributions during 2023		(4,183)
Interest on UAAL, normal cost, and contributions		728
Asset (gain) / loss		735
Actuarial accrued liability (gain) / loss		657
Impact of assumption changes		0
Impact of benefit changes		0
Unfunded actuarial accrued liability (UAAL) as of 12/31/2023	$	11,191

During 2023, the UAAL increased due to the asset loss of $735 million.

Additionally, changes in the census data, primarily higher-than-expected salary increases for continuing active members, increased the UAAL by $657 million.

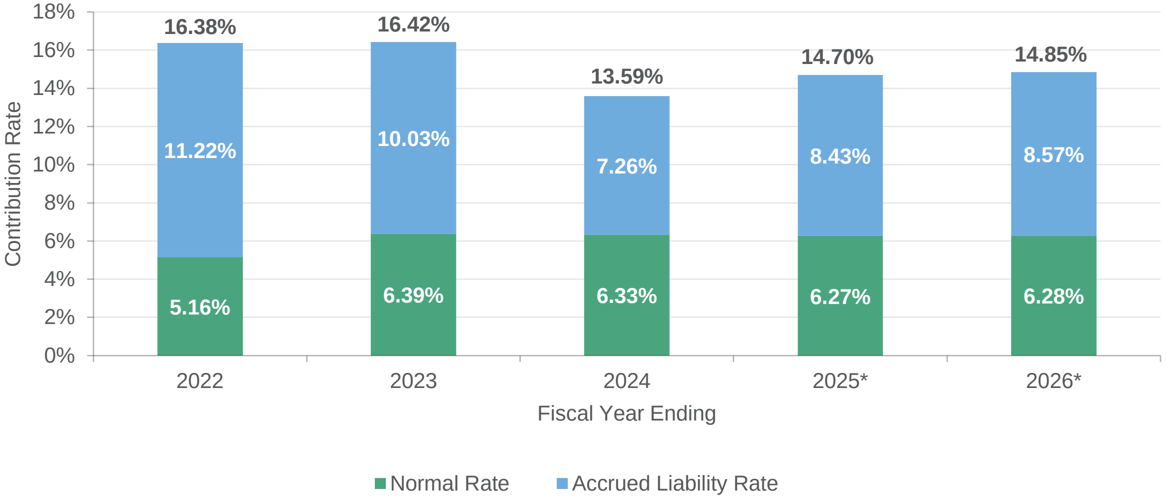
A detailed summary of the net actuarial gain or loss is provided in Section 4.

Valuation results (continued)

Rates prior to application of ECRSP

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The graph below provides a history of actuarially determined employer contribution rates over the past five years before applying funding policy minimums.



* Subject to the impact of future legislative changes effective before or during that fiscal year

The rates are split into the normal rate and the accrued liability rate.

The normal rate is the employer's portion of the cost of benefits accruing after reducing for the 6% of pay member contributions.

The accrued liability rate is the payment toward the unfunded liability.

The actuarially determined employer contribution rate is the amount needed to pay for the cost of the benefits accruing and to pay off the unfunded liability over a 12-year period.

The 12-year period is a short period for Public Sector Retirement Systems in the United States, with the funding period for most of these Systems much longer. The shorter period results in higher contributions and more benefit security.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 5.

Valuation results (continued)

Employer contributions

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The table below provides a reconciliation of the actuarially determined employer contribution rate shown as a percentage of covered payroll before applying the funding policy minimum.

Fiscal year ending June 30, 2025 Preliminary ADEC (based on December 31, 2022 valuation)	14.70%
Impact of Benefit Changes	0.00%
Fiscal year ending June 30, 2025 ADEC Prior to ECRSP	14.70%
Change Due to Anticipated Reduction in UAAL*	(0.78%)
Change Due to Demographic (Gain)/Loss	0.38%
Change Due to Investment (Gain)/Loss	0.51%
Change Due to Contributions Greater than ADEC	(0.56%)
Impact of Assumption Changes	0.00%
Impact of Benefit Changes	0.00%
Impact of Direct Rate Smoothing	0.60%
Reversal of one-time Benefit Costs	0.00%
Fiscal year ending June 30, 2026 Preliminary ADEC (based on December 31, 2023 valuation)	14.85%

The change in rate due to investment loss is based on the actuarial value of assets return of 5.63%, which was less than the 6.50% assumed return.

The change in rate due to demographic loss was largely due to higher-than-expected salary increases for continuing active members.

* Amortization of the UAAL is determined as a level dollar amount with payments expected to remain the same over the amortization period but was calculated as a percentage of valuation payroll in the previous valuation. Payroll is expected to increase annually while the expected amortization payment does not increase. This causes the expected amortization payment to be a lesser percentage of the expected payroll.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 5.

Valuation results (continued)

ECRSP

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The Employer Contribution Rate Stabilization Policy (ECRSP) would result in a recommended contribution rate of 17.14% of payroll for fiscal year ending 2026.

- 15.45% is the actuarially determined employer contribution calculated in this most recent valuation prior to direct-rate smoothing.
- 14.85% is the actuarially determined employer contribution after direct-rate smoothing of the assumption and method changes.
- The minimum is 17.14%; the recommended appropriation from last year of 16.79% plus 0.35%
- The maximum is approximately 52.06%; the estimated actuarially determined employer contribution using a discount rate equal to the long-term treasury bond yield (4.03%).

The ECRSP adopted by the Board of Trustees on April 29, 2021, requires that recommended contributions be 0.35% of payroll greater than the recommended appropriation during the prior year, with the following bounds:

1) Contributions may not be less than the actuarially determined employer contribution (ADEC), and

2) Contributions may not be greater than a contribution determined using the same assumption used to calculate the ADEC based on the long-term treasury bond yield.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 5.

Valuation results (continued)

Potential COLA considerations

Benefit Enhancements	Additional Disclosures	Projections

- Note that the TSERS Board can *recommend* COLAs to the General Assembly; the Board does not have the authority to grant COLAs
- G.S. 135-5(o) has various provisions related to COLAs, including a description of a permanent COLA limited to 4% or inflation (whichever is less) when the cost would not require an increase in the employer contribution rate.
- Type of increase
  – Supplement payable October 2025
  – Permanent effective July 1, 2025
- Immediate or 12-year funding
  – Immediate funding recommended for Supplement
  – 12-year funding could be considered for Permanent
  – The contribution increase is added to the ECRSP rate per policy adopted at April 2021 Board meeting

A detailed summary of the cost of benefit enhancements is provided in Section 5.

Valuation results (continued)

Potential COLAs for fiscal year ending 2026

Benefit Enhancements	Additional Disclosures	Projections

- The December 31, 2023, valuation indicates an actuarial investment loss was incurred during 2023, and there are no investment gains available to support a recommendation of either of the following by the TSERS Board of Trustees.
  - a Cost-of-Living Adjustment (COLA) that would take effect on July 1, 2025; or
  - a one-time supplement to participants in receipt of benefits, payable July 1, 2025.
- If granted by the General Assembly, the cost for a 1.00% COLA increase would be $571.1M, or an increase of 0.40% in the ADEC, payable over 12 years.
- If granted by the General Assembly, the cost of a one-time 1.00% supplement payment would be $57.7M, or an increase of 0.30% in the ADEC, payable over a single year.

Note: Gallagher cannot provide legal advice. Neither this slide, nor any other slide, should be interpreted as legal advice as to the Board's ability to provide a COLA to retirees or recommend a COLA to the legislature

A detailed summary of the cost of benefit enhancements is provided in Section 5.

Valuation results (continued)

Potential COLAs for fiscal year ending 2027

Benefit Enhancements	Additional Disclosures	Projections

- Based on the methods and assumptions used for the projections discussed later in the presentation, the standard conditions for the Board to consider proposing a potential COLA effective July 1, 2026, following the December 31, 2024, valuation would include the following minimal levels of investment return on market values of assets during 2024. Note, however, the ECRSP would require an increase in the employer contribution rate to cover the cost of a COLA.
  - If calendar year 2024 market value returns exceed 16.07% (or about $13.3B for TSERS), the plan is estimated to have an actuarial investment gain (rather than a loss) for 2024 and a COLA effective July 1, 2026, could be considered.
  - If calendar year 2024 market value returns exceed 19.51% (or about $16.2B for TSERS), the plan is estimated to have an actuarial investment gain (rather than a loss) for 2024 and such gain may be enough to consider providing a 1.00% COLA effective July 1, 2026.
    - Estimated actuarial investment gain of $571.1M
    - Estimated cost of 1.00% COLA payable to retirees effective July 1, 2026 of $571.1M.

Note: Gallagher cannot provide legal advice. Neither this slide, nor any other slide, should be interpreted as legal advice as to the Board's ability to provide a COLA to retirees or recommend a COLA to the legislature

A detailed summary of the cost of benefit enhancements is provided in Section 5.

Valuation results (continued)

Projections

Benefit Enhancements	Additional Disclosures	Projections

- Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. This section provides such projections. The projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future. The baseline deterministic projection is based on December 31, 2023 valuation results as assumptions.
- Key Projection Assumptions
  - Valuation interest rate of 6.50%
  - Direct-rate smoothing of the change in the employer contribution rate due to the changes in assumption and methods over a 5-year period beginning July 1, 2022
  - 6.50% investment return on market value of assets
  - Actuarial assumptions and methods as described in Appendix C. All future demographic experience is assumed to be exactly realized.
  - The contribution rate under the Employer Contribution Rate Stabilization Policy (ECRSP) is contributed until fiscal year ending 2027.
  - The actuarially determined employer contribution rate is contributed for fiscal years ending 2028 and beyond.
  - The employer contribution shall not be less than the employee contribution, which is currently 6%.

A detailed summary of the deterministic projections is provided in Section 6.

Valuation results (continued)

Projections

Benefit Enhancements	Additional Disclosures	Projections

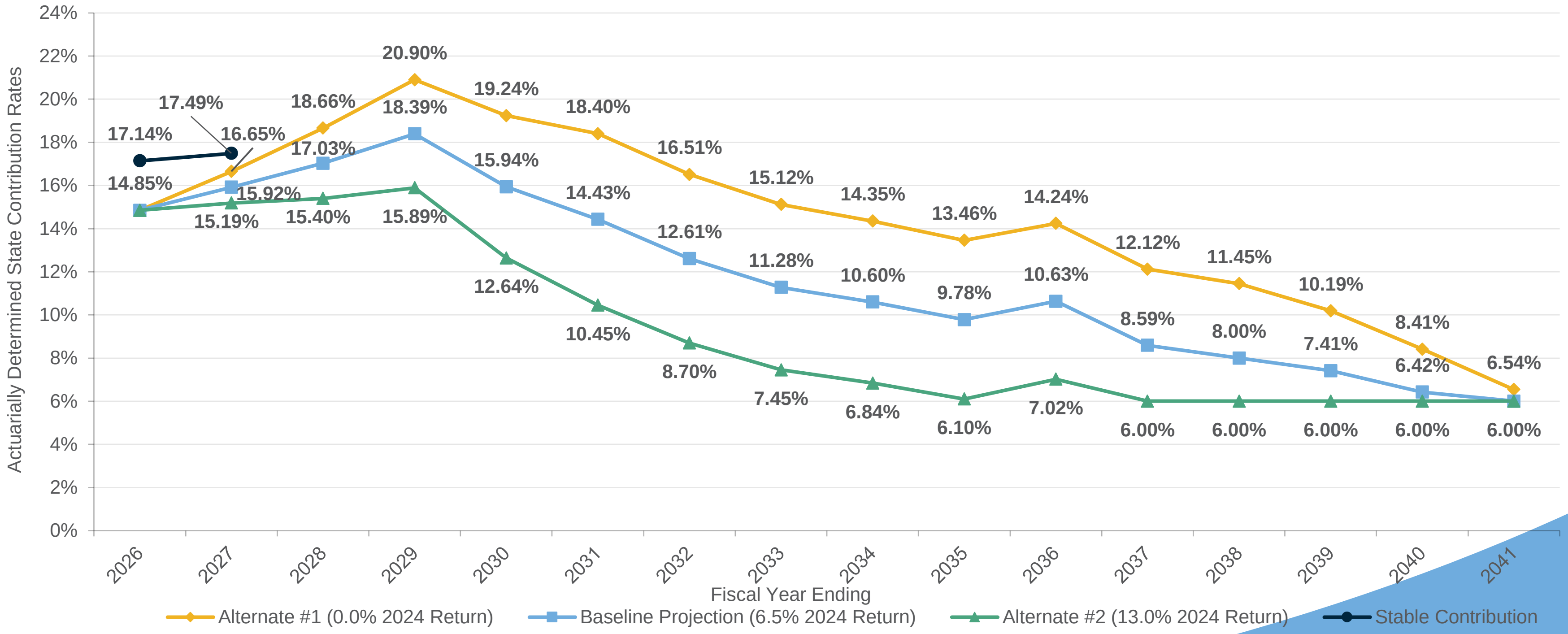
- Key Projection Assumptions (continued)
  - 0% increase in both the active population of TSERS and its subgroups: Teachers, Other Education, General Employees, and Law Enforcement Officers, except that no new hires of UNC Health Care System (UNC HC) will participate in TSERS
  - To replace those assumed to leave active service, the age, gender and salary of future members assumed to be hired into TSERS are based on the demographic information of new TSERS hires over the past three (3) valuations
  - Demographic profiles of new entrants for each subgroup are based on new hires specific to that subgroup over the past three (3) valuations
  - 75% of new entrants are assumed to have rounded service of 0 when first valued, and 25% are assumed to have rounded service of 1 when first valued
  - No cost-of-living adjustments granted
  - Future pay increases based on long-term salary increase assumptions
- The ECRSP contribution rate is the Stable Contribution rate shown in the projections. See Appendix F for more detail on the ECRSP.
- In addition, we have provided two alternate deterministic projections. The first alternate deterministic projection is based on the same assumptions as the baseline deterministic projection except that it assumes a 0.0% asset return for calendar year 2024. The second alternate deterministic projection is based on the same assumptions as the baseline deterministic projection except that it assumes a 13.0% asset return for calendar year 2024.

A detailed summary of the deterministic projections is provided in Section 6.

Valuation results (continued)

Projected contribution rates

Benefit Enhancements | Additional Disclosures | Projections

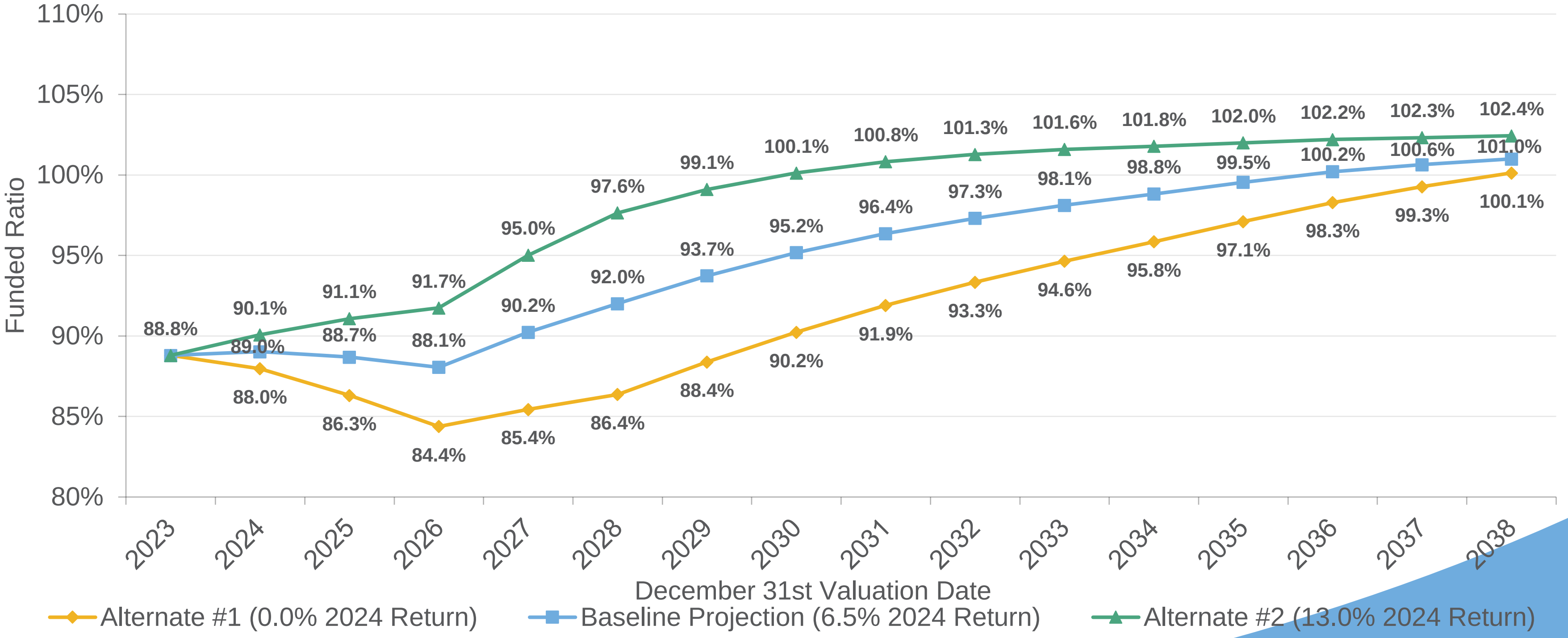


A detailed summary of the deterministic projections is provided in Section 6.

Valuation results (continued)

Projected funded ratio

Benefit Enhancements	Additional Disclosures	Projections



A detailed summary of the deterministic projections is provided in Section 6.

Key takeaways

- Key results of the December 31, 2023 valuation were:
  - Market value returns of 10.11% during calendar year 2023 compared to 6.50% assumed
  - Liabilities $0.7 billion higher than anticipated as of December 31, 2023, primarily from higher-than-expected salary increases for continuing active members
  - Continuation of direct-rate smoothing of the change in the employer contribution rate due to the changes in assumptions and methods over a 5-year period beginning with the December 31, 2020 valuation

Key takeaways (continued)

- When compared to the December 31, 2022 baseline projections, the above resulted in:
  - A similar funded ratio as of December 31, 2023 (88.8% in the valuation is the same as the prior year's baseline projection)
  - A lower actuarially determined employer contribution rate prior to applying the Employer Contribution Rate Stabilization Policy (ECRSP) for fiscal year ending June 30, 2026 (14.85% in the valuation compared to 15.02% in the prior year's baseline projection)
  - Favorable investment gains on the market value of assets during the 2023 plan year have moved the projected date of attaining a 100% funded ratio from December 31, 2037, to December 31, 2036

Key takeaways (continued)

- TSERS is well funded compared to its peers. This is due to:
  - Stakeholders working together to keep TSERS well-funded since inception
  - A history of appropriating and contributing the recommended contribution requirements
  - Assumptions that in aggregate are more conservative than peers
  - A funding policy that aggressively pays down unfunded liability over a 12-year period
  - An ad hoc cost-of-living adjustment, which typically only provides benefit increases when certain financial conditions are met, supports the health of the system
  - Modest changes in benefits when compared to peers
- As has been done for over 80 years, continued focus on these measures will be needed to maintain the sustainability of TSERS well into the future

Certification

Future actuarial measurements may differ significantly from current measurements 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 plan provisions or applicable law. Because of limited scope, Gallagher performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information. Information contained in our report for plan years from December 31, 2017, to December 31, 2020, is based on valuations performed by the prior actuarial firm.

The purpose of this presentation is to provide a summary of the actuarial valuation results to the Board at the October 24, 2024 meeting attended by the actuaries. Use of this report for any other purposes may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of this presentation for that purpose. This presentation should not be provided without a copy of the full valuation report. Because of the risk of misinterpretation of actuarial results, you should ask Gallagher Benefit Services, Inc. (hereinafter “Gallagher”) to review any statement you wish to make on the results contained in this presentation. Gallagher will not accept any liability for any such statement made without prior review.”

This presentation is considered part of the annual actuarial valuation report. Please see below for full description of data, actuarial assumptions and methods, plan provisions, and other applicable disclosures.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. We are Fellows of the Society of Actuaries, Enrolled Actuaries, Members of the American Academy of Actuaries, and Fellows of the Conference of Consulting Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to discuss this report with you at your convenience.

Michael A. Ribble, FSA, EA, MAAA, FCA

Elizabeth A. Wiley, FSA, EA, MAAA, FCA

Appendix I

Supplemental information

Valuation input

Retirees and survivors receiving benefits

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The graph below provides a history of the number of retired members and survivors of deceased members and benefit amounts payable over the past five years.

The number of retired members and survivors of deceased members and the benefits paid to these members has been increasing steadily, as expected based on plan assumptions.

A detailed summary of the membership data used in this valuation is provided in Section 2 and Appendix A.

Valuation input (continued)

Market value

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The table below provides details of the Market Value of Assets for the current and prior year's valuations.

Asset data as of	12/31/2023	12/31/2022
Beginning of year market value of assets	$ 77,445,236,928	$ 87,966,352,518
Employer contributions	3,104,597,510	3,039,949,206
Employee contributions	1,078,160,026	1,042,052,173
Benefit payments other than refunds	(5,584,204,848)	(5,407,203,621)
Refunds	(136,745,938)	(125,034,315)
Administrative expenses	(16,552,601)	(14,583,835)
Investment income	7,752,285,790	(9,056,295,198)
Net increase / (decrease)	6,197,539,939	(10,521,115,590)
End of year market value of assets	$ 83,642,776,867	$ 77,445,236,928
Estimated net investment return	10.11%	-10.38%

TSERS assets are held in trust and are invested for the exclusive benefit of plan members.

Incoming contributions currently cover over 70% of outgoing benefit payments and administrative expenses.

Over the long term, benefit payments and administrative expenses not covered by contributions are expected to be covered with investment income, illustrating the benefits of following actuarial pre-funding since inception.

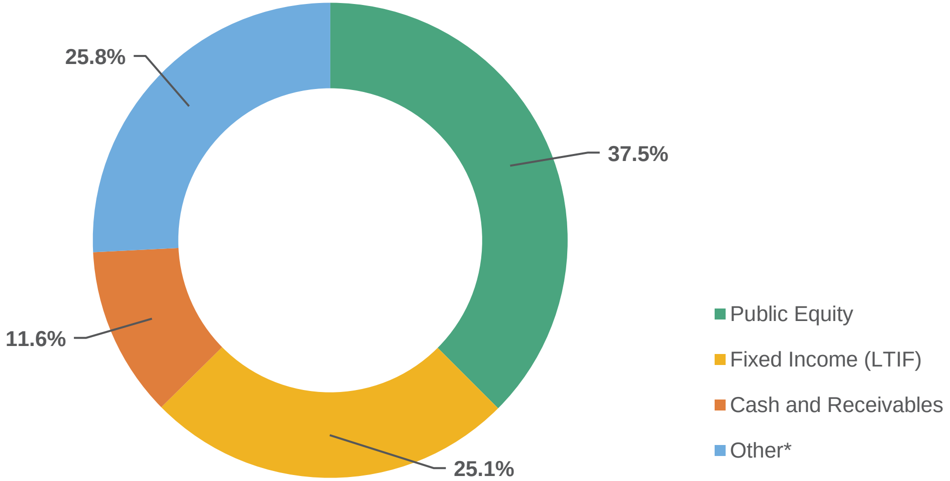
A detailed summary of the market value of assets is provided in Section 3.

Valuation input (continued)

Asset allocation

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The graph below provides the breakdown of the market value of assets on December 31, 2023 by asset category.



Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, as reviewed in the recent experience study, the 6.50% discount rate used in this valuation is reasonable and appropriate.

*Real estate, alternatives, inflation, and credit

A detailed summary of the market value of assets is provided in Section 3.

Valuation input (continued)

Benefit provisions

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

Benefit provisions are described in North Carolina General Statutes, Chapter 135, Article 1.

- There were no significant changes in benefit provisions from the prior year's valuation.

Many Public Sector Retirement Systems in the United States have undergone pension reform where the benefits of members (active or future members) have been reduced.

Because of the well-funded status of TSERS due to the legislature contributing at least the actuarially determined employer contribution on the basis of an actuarially sound funding policy, benefit cuts have not been needed in North Carolina as they have been in most other states.

A detailed summary of the benefit provisions is provided in Appendix B.

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Valuation input (continued)

Actuarial Assumptions

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

Actuarial assumptions bridge the gap between the information that we know with certainty as of the valuation date and what may happen in the future. The assumptions used include the following:

- Demographic
  – Retirement
  – Termination
  – Disability
  – Death
- Economic
  – Interest rate – 6.50% per year
  – Salary increase (individual, varies by service and job type)
  – Inflation – 2.50%
  – Real wage growth – 0.75%

The assumptions used for the December 31, 2023, actuarial valuation are based on the experience study prepared as of December 31, 2019, and adopted by the Board of Trustees on January 28, 2021.

No assumption changes have been made since the prior valuation.

A detailed summary of the actuarial assumptions and methods is provided in Appendix C.

Valuation input (continued)

Actuarial cost method

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The Funding Methodology is the payment plan for TSERS and is composed of the Actuarial Cost Method, the Asset Valuation Method and Amortization Method.

- Actuarial Cost Methods allocate costs to the actuarial accrued liability (i.e., the amount of money that should be in the fund) for past service and normal cost (i.e., the cost of benefits accruing during the year) for current service.
  - The Board of Trustees has adopted Entry Age Normal as its actuarial cost method
  - This method develops normal costs that stay level as a percent of payroll

The following "Objectives and Principles for Funding Public Sector Pension Plans" provides information on funding of Public Plans: https://www.actuary.org/sites/default/files/files/Public-Plans_IB-Funding-Policy_02-18-2014.pdf.

Page 13 of the following : https://www.ccactuaries.org/docs/default-source/papers/CCA-Actuarial-Funding-Policies-for-Public-Plans-2-Final-8-2024.pdf - denotes Entry Age Normal as a model practice for cost methods.

A detailed summary of the actuarial assumptions and methods is provided in Appendix C.

Valuation input (continued)

Asset valuation method

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The Funding Methodology is the payment plan for TSERS and is composed of the Actuarial Cost Method, the Asset Valuation Method and Amortization Method.

- Asset Valuation Methods smooth or average the market value returns over time to alleviate contribution volatility that results from market returns.
  - Asset returns in excess of or less than the expected return on market value of assets reflected over a five-year period
  - Assets corridor: not greater than 120% of market value and not less than 80% of market value

Page 22 of the following

https://www.ccactuaries.org/docs/default-source/papers/CCA-Actuarial-Funding-Policies-for-Public-Plans-2-Final-8-2024.pdf - denotes the policy being used is a model practice.

Almost all Public Sector Retirement Systems in the United States use asset valuation methods to alleviate contribution volatility. The use of a four- or five-year period is most common.

A detailed summary of the actuarial assumptions and methods is provided in Appendix C.

Valuation input (continued)

Amortization method

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

The Funding Methodology is the payment plan for TSERS and is composed of the Actuarial Cost Method, the Asset Valuation Method and Amortization Method.

- Amortization Methods determine the payment schedule for unfunded actuarial accrued liability (i.e., the difference between the actuarial accrued liability and actuarial value of assets)
  - Payment level: the payment is determined as a level dollar amount, like a mortgage payment
  - Payment period: a 12-year closed amortization period was adopted for fiscal year ending 2012. A new amortization base is created each year based on the prior years' experience.
- For fiscal years beginning after January 1, 2017, the sum of the "normal contribution" and the "accrued liability contribution" shall not be less than the employee contribution.

Pages 38-39 of the following -

https://www.ccactuaries.org/docs/default-source/papers/CCA-Actuarial-Funding-Policies-for-Public-Plans-2-Final-8-2024.pdf suggests the Amortization Method is an acceptable practice, with conditions.

When compared to other Public Sector Retirement Systems in the United States, the Amortization Method results in higher pension debt payments. This is because of:

A shorter period of 12 years compared to a national average of 21*

Level dollar payments instead of payments designed to increase, which is more typical in the Public Sector

* NASRA, April 2022, *Overview of Public Pension Plan Amortization Policies*

A detailed summary of the actuarial assumptions and methods is provided in Appendix C.

Valuation results

Actuarial value of assets

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The table below provides the calculation of the Actuarial Value of Assets (AVA) at the valuation date.

Asset data as of		12/31/2023
Beginning of year actuarial value of assets	$	85,406,884,383
Beginning of year market value of assets		77,445,236,928
Total contributions		4,182,757,536
Benefit payments, refunds and administrative expenses		(5,737,503,387)
Net cash flow		(1,554,745,851)
Expected investment return		4,984,206,612
Expected end of year market value of assets		80,874,697,689
End of year market value of assets		83,642,776,867
Excess market value over expected market value of assets		2,768,079,178
80% of 2023 asset gain/(loss)		2,214,463,342
60% of 2022 asset gain/(loss)		(8,836,350,535)
40% of 2021 asset gain/(loss)		1,031,358,476
20% of 2020 asset gain/(loss)		614,234,374
Total deferred asset gain/(loss)		(4,976,294,343)
Preliminary end of year actuarial value of assets		88,619,071,210
Final end of year actuarial value of assets (not less than 80% and not greater than 120% of market value)		88,619,071,210
Estimated net investment return on actuarial value		5.63%

The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution.

The asset valuation recognizes asset returns in excess of or less than the expected return on the market value of assets over a five-year period.

Continued recognition of the 2022 asset loss resulted in a lower-than-expected returns on the actuarial value of assets for calendar year 2023 of 5.63% and a recognized actuarial asset loss of $0.7 billion during 2023.

The assets at actuarial value were $11.2 billion less than the actuarial accrued liability as of December 31, 2023.

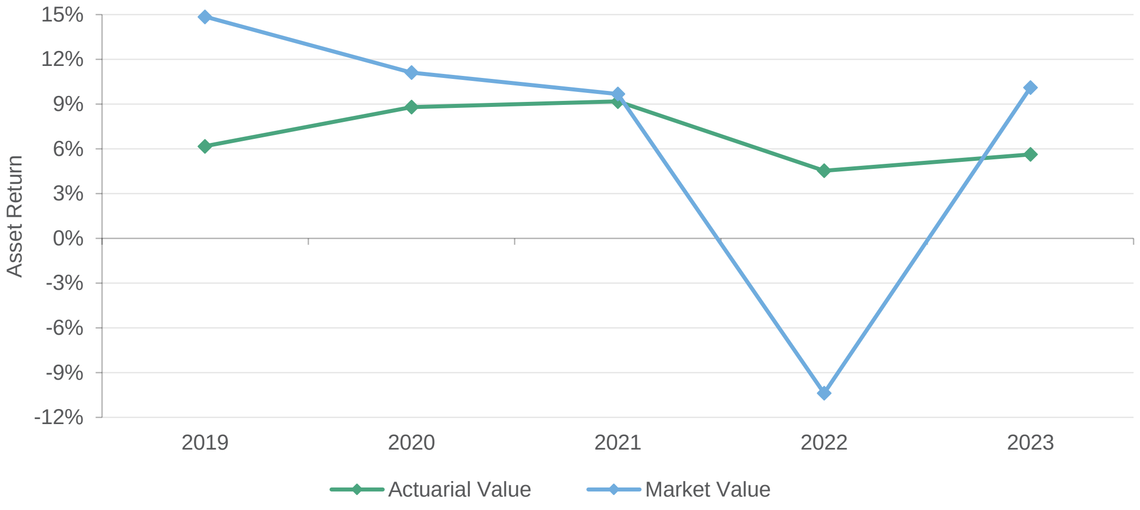
A detailed summary of the Actuarial Value of Assets is provided in Section 3.

Valuation results (continued)

Five-year return history

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The graph below provides a history of the market value and actuarial value of asset returns over the past five years.



The investment return for the market value of assets for calendar year 2023 was 10.11%.

The actuarial value of assets smooths investment gains and losses.

The lower-than-expected market return in 2022, partially offset by higher-than-expected market returns in 2020, 2021, and 2023, resulted in an actuarial value of asset return for calendar year 2023 of 5.63% and a recognized actuarial asset loss of $0.7 billion during 2023.

The assets at actuarial value were $11.2 billion less than the actuarial accrued liability as of December 31, 2023.

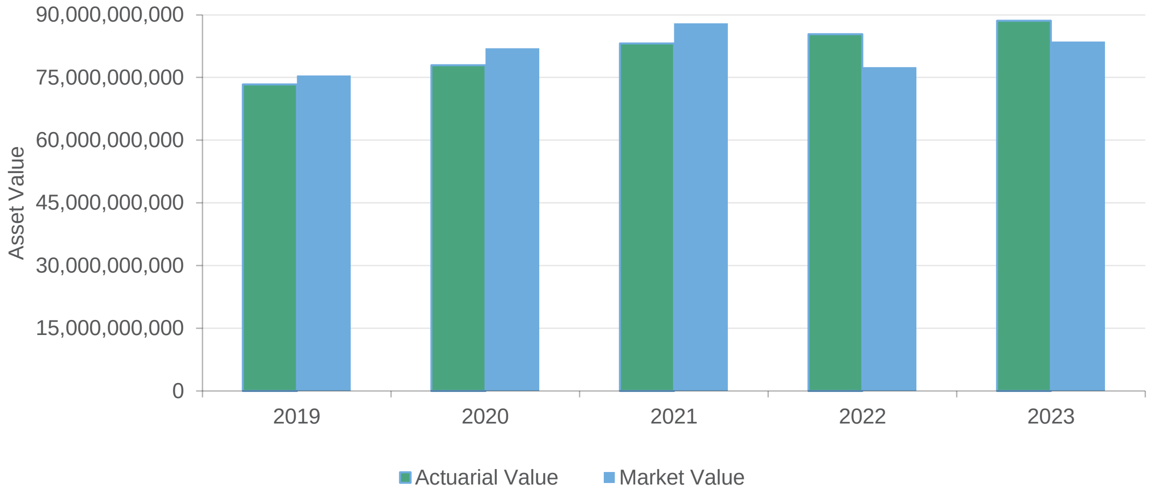
A detailed summary of the actuarial value of assets is provided in Section 3.

Valuation results (continued)

Comparison to market values

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The graph below provides a history of the market value and actuarial value of assets over the past five years.



The market value of assets is lower than the actuarial value of assets, which is used to determine employer contributions.

This indicates that overall, there are unrecognized asset losses to be recognized in future valuations.

In fact, if the investments earn the expected 6.50% per year over the next four years, a loss will be recognized each of the next three years, followed by a gain in the fourth year.

A detailed summary of the Actuarial Value of Assets is provided in Section 3.

Valuation results (continued)

Comparison to market returns

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Calendar Year	Expected Asset Return	Actuarial Value of Asset Return	Market Value of Asset Return	20 Year Average Market Return
2004	7.25%	8.56%	10.73%	NA
2005	7.25%	8.26%	6.97%	NA
2006	7.25%	8.94%	11.41%	NA
2007	7.25%	8.87%	8.38%	NA
2008	7.25%	2.89%	-19.50%	NA
2009	7.25%	4.74%	14.84%	NA
2010	7.25%	5.89%	11.47%	NA
2011	7.25%	5.15%	2.19%	NA
2012	7.25%	6.32%	11.82%	NA
2013	7.25%	7.43%	12.21%	NA
2014	7.25%	7.19%	6.21%	NA
2015	7.25%	5.87%	0.36%	6.86%
2016	7.25%	5.32%	6.22%	6.71%
2017	7.25%	6.56%	13.49%	6.49%
2018	7.20%	5.10%	-1.39%	5.60%
2019	7.00%	6.18%	14.85%	5.82%
2020	7.00%	8.80%	11.12%	6.25%
2021	6.50%	9.18%	9.68%	6.84%
2022	6.50%	4.53%	-10.38%	6.54%
2023	6.50%	5.63%	10.11%	6.16%
20-Yr Average	7.09%	6.56%	6.16%	NA
Range	0.75%	6.29%	34.35%	NA

The average investment return recognized for purposes of determining the annual change in contribution each year is the actuarial value of assets return.

Currently, the average actuarial return over the past 20 years of 6.56% compares with an average market return of 6.16%.

The range of returns is markedly more volatile in the market value of assets at 34.35% versus 6.29% for actuarial value.

Using the actuarial value of assets versus market value results in much lower employer contribution volatility, while ensuring that the actuarial needs of TSERS are met.

A detailed summary of the Actuarial Value of Assets is provided in Section 3.

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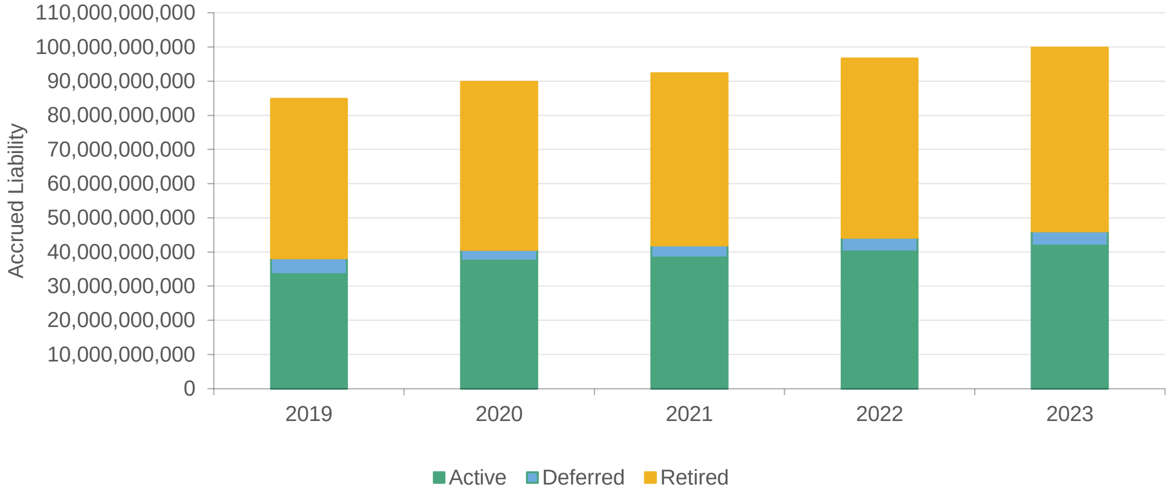
Valuation results (continued)

Actuarial accrued liability

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The graph below provides a history of the actuarial accrued liability (AAL) over the past five years.



The AAL increased from $96.7 billion to $99.8 billion during 2023.

The Retirement System is an open plan, which means that new members enter the plan each year.

In an open plan, liabilities are expected to grow from one year to the next as more benefits accrue and the membership approaches retirement.

The AAL was $0.7 billion higher than expected, resulting primarily from higher-than-expected salary increases for continuing active members.

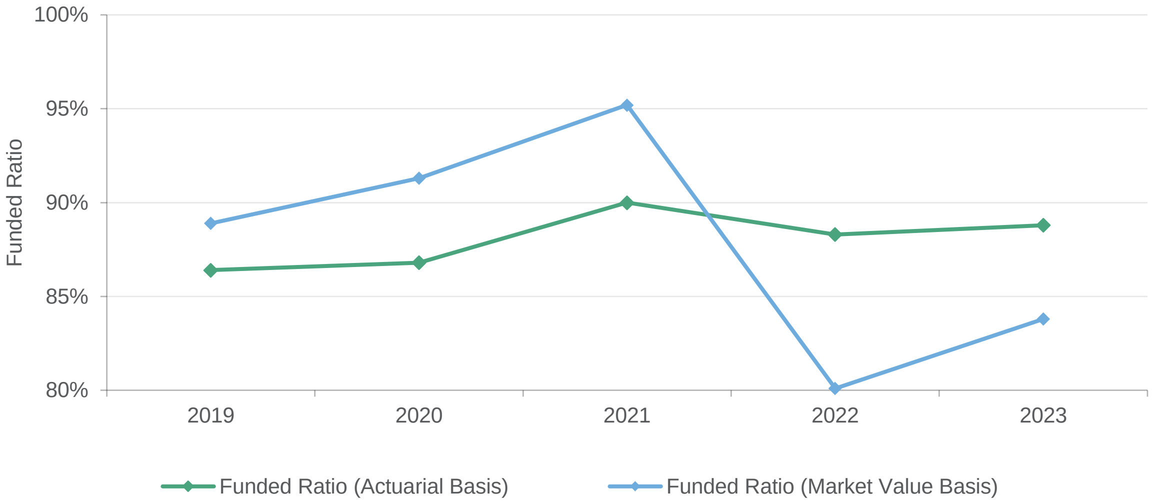
A detailed summary of the Actuarial Accrued Liability is provided in Section 4.

Valuation results (continued)

Funded ratio

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The graph below provides a history of the funded ratio on a market and actuarial basis over the past five years.



The ratio of assets to liabilities shows the health of the plan on an accrued basis.

The actuarial value of assets basis is used for computing contributions to alleviate contribution volatility.

The funded ratio on an actuarial basis increased from 88.3% on December 31, 2022 to 88.8% on December 31, 2023.

A detailed summary of the funded ratio is provided in Section 4.

Valuation results (continued)

History of rates and appropriations

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

The table below provides a history of the actuarially determined employer contribution and the corresponding appropriated rate.

Valuation Date	Fiscal Year Ending	Normal Rate	Accrued Liability Rate	Effect of Direct Rate Smoothing	Legislated Benefit Cost*	ULSR Contribution G.S. 143C-4-10(e)	ADEC Prior to Applicable Funding Policy	ADEC under ECRSP	Appropriated Rate
12/31/2023	06/30/2026	6.28%	9.17%	(0.60%)	N/A	N/A	N/A	N/A	N/A
12/31/2022	06/30/2025	6.27%	9.63%	(1.20%)	N/A	N/A	N/A	N/A	N/A
12/31/2021	06/30/2024	6.33%	7.85%	(1.79%)	1.20%	0.00%	13.59%	17.64%	17.64%
12/31/2020	06/30/2023	6.39%	11.13%	(2.39%)	1.24%	0.05%	16.42%	17.38%	17.38%
12/31/2019	06/30/2022	5.16%	10.58%	0.00%	0.64%	0.00%	16.38%	16.38%	16.38%
12/31/2018	06/30/2021	5.18%	10.19%	(0.59%)	0.00%	0.00%	14.78%	14.78%	14.78%

* The change due to legislation for the contribution for fiscal year ending June 30, 2024 provided for a one-time supplement equal to 4% of the annual retirement allowance payable by November 2023. The change due to legislation for the contribution for fiscal year ending June 30, 2023 provided for a one-time supplement equal to 4% of the annual retirement allowance payable in October 2022. The change due to legislation for the contribution for fiscal year ending June 30, 2022 provided for a one-time supplement equal to 2% of the annual retirement allowance payable in December 2021.

Session Law 2023-134, enacted in 2023, established an employer contribution rate of 16.79% for the fiscal year ending June 30, 2025. However, it remains possible that an adjustment for the second year of the budget biennium will be enacted.

The ADEC for fiscal year ending 2026 is 14.85% of payroll before applying the ECRSP and 17.14% of payroll after applying the ECRSP, without regard to any legislated changes to the rate.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 5.

Valuation results (continued)

Additional disclosures

Benefit Enhancements	Additional Disclosures	Projections

The table below illustrates the sensitivity of certain valuation results to changes in the discount rate on a market value of assets basis. All numbers rounded to billions*

Discount Rate	4.03%	5.27%	6.50%	7.73%	8.97%
Market Value of Assets	$ 83.64	$ 83.64	$ 83.64	$ 83.64	$ 83.64
Actuarial Accrued Liability	135.14	115.23	99.81	87.54	77.80
Unfunded Accrued Liability (UAAL)	$ 51.49	$ 31.59	$ 16.17	$ 3.90	$ (5.85)
Funded Ratio	61.9%	72.6%	83.8%	95.5%	107.5%
20-Year Amortization of UAAL	$ 3.95	$ 2.73	$ 1.56	$ 0.42	N/A
(as % of general state revenue)	8.9%	6.1%	3.5%	0.9%	N/A

* Numbers may not add due to rounding.

Section 6(c) of Session Law 2016-108 requires that the actuarial valuation report provide the valuation results using a 30-year Treasury rate as of December 31 of the year of the valuation as the discount rate.

The 30-year Treasury rate is 4.03% as of December 31, 2023.

The difference between the UAAL measured at 6.50% and 4.03% is $35.3 billion on December 31, 2023.

A detailed summary of the additional disclosures is provided in Appendix D.

Valuation results (continued)

Additional disclosures

Benefit Enhancements	Additional Disclosures	Projections

The table below provides an estimate of future market value of asset returns based on the study commissioned by the DST Investment Management Division and presented by Callan to the Investment Advisory Committee on February 23, 2022.

Horizon	95% Chance (19 out of every 20 scenarios)	75% Chance (3 out of every 4 scenarios)	50% Chance (1 out of every 2 scenarios)	25% Chance (1 out of every 4 scenarios)	5% Chance (1 out of every 20 scenarios)
10 Years (2032)	0.4%	3.6%	5.7%	7.8%	11.1%
30 Years (2052)	3.3%	5.1%	6.3%	7.6%	9.3%

The table below provides an estimate of future market value of asset returns prepared by Gallagher and included in its Stress Testing and Sensitivity Analysis Report, which was presented to the TSERS Board of Trustees on July 25, 2024

Horizon	95% Chance (19 out of every 20 scenarios)	75% Chance (3 out of every 4 scenarios)	50% Chance (1 out of every 2 scenarios)	25% Chance (1 out of every 4 scenarios)	5% Chance (1 out of every 20 scenarios)
10 Years (2033)	2.3%	5.3%	7.1%	8.7%	11.1%
30 Years (2053)	4.0%	5.7%	6.8%	7.8%	9.2%

Callan performed analysis for DST’s Investment Management Division in 2022 and Gallagher analyzed expected future market value of asset returns in its Stress Testing and Sensitivity Analysis Report, which was presented to the TSERS Board of Trustees on July 25, 2024.

In both studies, the lower bound of 4.03% returns is between 75% to 95% likely to be achieved on average over the next 30 years, while the upper bound of 8.97% is more than 5% likely to be achieved on average over the next 30 years. For additional information regarding Gallagher’s underlying Capital Market Assumptions and related assumptions, please refer to the TSERS Stress Testing and Sensitivity Analysis Report dated July 2024.

A detailed summary of the additional disclosures is provided in Appendix D.

Valuation results (continued)

Projections

Benefit Enhancements	Additional Disclosures	Projections

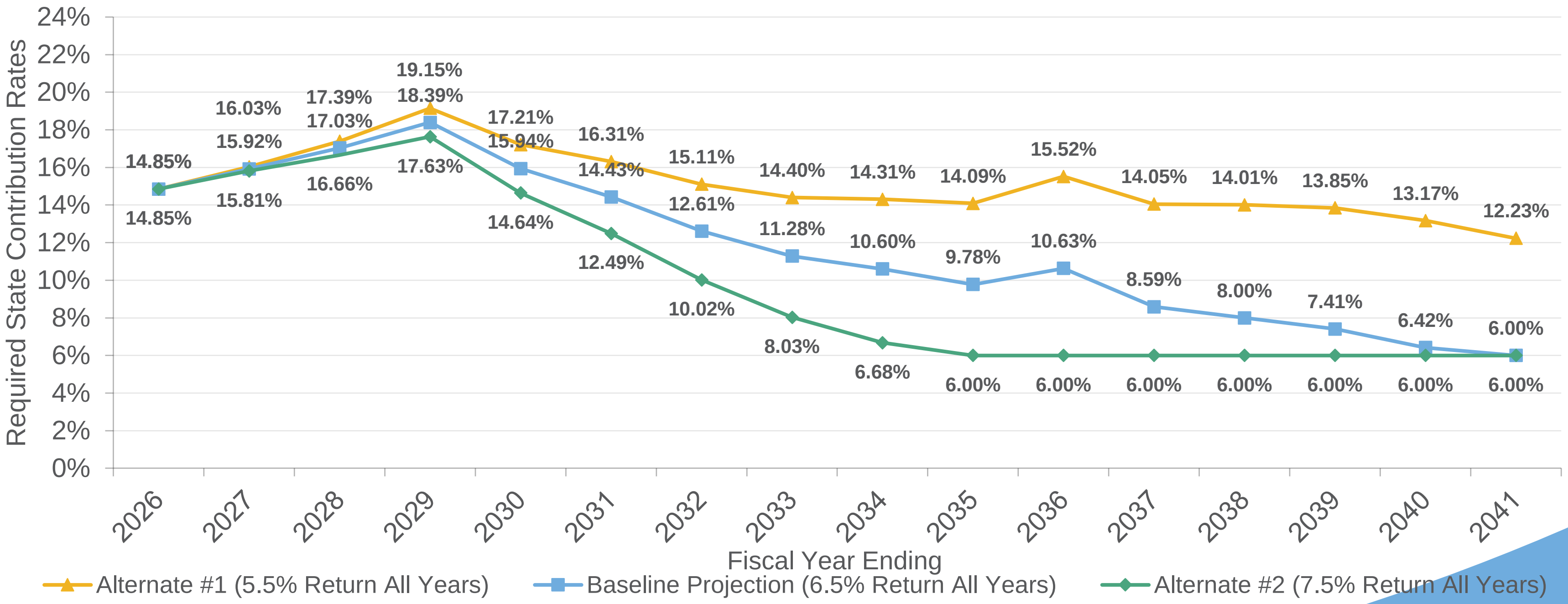
The baseline projection uses the same basis described earlier in this presentation. The alternate deterministic projections are based on the same assumptions as the baseline deterministic projection except that they assume a 5.50%/7.50% actual investment return on market value of assets for all calendar years starting in 2024.

Gallagher

Valuation results (continued)

Projected contribution rates

Benefit Enhancements	Additional Disclosures	Projections

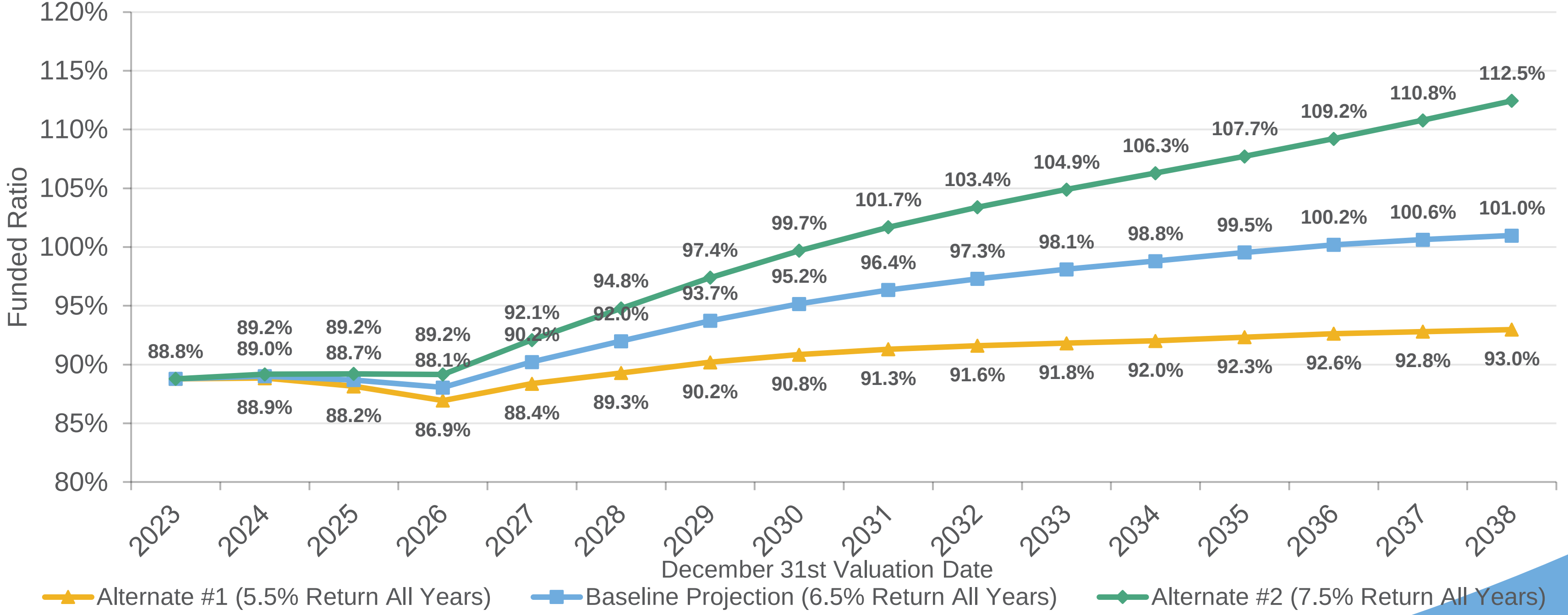


Projected contribution rates Alternate Projection #1 assumes 5.50% asset returns every year starting in 2024 compared to the 6.50% assumption in the Baseline Projection. As a result, the unfunded accrued liability will be higher resulting in higher projected contributions. The converse is true for Alternate Projection #2.

Valuation results (continued)

Projected funded ratio

Benefit Enhancements	Additional Disclosures	Projections



Projected contribution rates Alternate Projection #1 assumes 5.50% asset returns every year starting in 2024 compared to the 6.50% assumption in the Baseline Projection. As a result, the unfunded accrued liability will be higher resulting in a lower projected funded ratio. The converse is true for Alternate Projection #2.

Appendix II

Fiscal Year Ending

Valuation input

Historical market value and returns

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

Market Value of Assets and Asset Return

	Market Value of Assets	Asset Return
2019	$ 75,486,780,473	14.85%
2020	81,969,425,086	11.12%
2021	87,966,352,518	9.68%
2022	77,445,236,928	-10.38%
2023	83,642,776,867	10.11%

Valuation results

Five-year return history

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Asset Returns

	Actuarial Value	Market Value
2019	6.18%	14.85%
2020	8.80%	11.12%
2021	9.18%	9.68%
2022	4.53%	-10.38%
2023	5.63%	10.11%

Valuation results (continued)

Actuarial value of assets / actuarial accrued liability

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Actuarial Accrued Liability and Actuarial Value of Assets

	Actuarial Accrued Liability	Actuarial Value of Assets
2019	$ 84,873,315,272	$ 73,353,759,963
2020	89,809,074,074	77,922,070,039
2021	92,356,225,906	83,139,458,098
2022	96,675,255,859	85,406,884,383
2023	99,809,701,710	88,619,071,210

Valuation results (continued)

Rates prior to application of ECRSP

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Actuarially Determined Employer Contribution Rates

Fiscal Year Ending	Normal Rate	Accrued Liability Rate	Total Rate
2022	5.16%	11.22%	16.38%
2023	6.39%	10.03%	16.42%
2024	6.33%	7.26%	13.59%
2025*	6.27%	8.43%	14.70%
2026*	6.28%	8.57%	14.85%

* Subject to the impact of future legislative changes during that fiscal year

Valuation results (continued)

Projected contribution rates

Benefit Enhancements	Additional Disclosures	Projections

Projected Actuarially Determined Employer Contribution Rates

	Alternate #1 (0.0% 2023 Return)	Baseline Projection	Alternate #2 (13.0% 2023 Return)
2026	14.85%	14.85%	14.85%
2027	16.65%	15.92%	15.19%
2028	18.66%	17.03%	15.40%
2029	20.90%	18.39%	15.89%
2030	19.24%	15.94%	12.64%
2031	18.40%	14.43%	10.45%
2032	16.51%	12.61%	8.70%
2033	15.12%	11.28%	7.45%
2034	14.35%	10.60%	6.84%
2035	13.46%	9.78%	6.10%
2036	14.24%	10.63%	7.02%
2037	12.12%	8.59%	6.00%
2038	11.45%	8.00%	6.00%
2039	10.19%	7.41%	6.00%
2040	8.41%	6.42%	6.00%
2041	6.54%	6.00%	6.00%

Valuation results (continued)

Projected funded ratio

Benefit Enhancements	Additional Disclosures	Projections

Projected Funded Ratio

	Alternate #1 (0.0% 2024 Return)	Baseline Projection	Alternate #2 (13.0% 2024 Return)
2023	88.8%	88.8%	88.8%
2024	88.0%	89.0%	90.1%
2025	86.3%	88.7%	91.1%
2026	84.4%	88.1%	91.7%
2027	85.4%	90.2%	95.0%
2028	86.4%	92.0%	97.6%
2029	88.4%	93.7%	99.1%
2030	90.2%	95.2%	100.1%
2031	91.9%	96.4%	100.8%
2032	93.3%	97.3%	101.3%
2033	94.6%	98.1%	101.6%
2034	95.8%	98.8%	101.8%
2035	97.1%	99.5%	102.0%
2036	98.3%	100.2%	102.2%
2037	99.3%	100.6%	102.3%
2038	100.1%	101.0%	102.4%

Valuation input

Actives

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

Active Members

	Active Member Count	Reported Compensation
2019	305,962	$ 14,886,467,797
2020	302,771	15,287,665,011
2021	300,310	15,312,224,584
2022	297,802	16,141,902,861
2023	299,037	16,889,491,503

Valuation input (continued)

Retirees and survivors receiving benefits

Membership Data	Asset Data	Benefit Provisions	Assumptions	Funding Methodology

Retired Members and Survivors of Deceased Members

	Retired and Survivors of Deceased Member Count	Retirement Allowance
2019	228,291	$ 4,804,178,473
2020	233,751	4,927,686,580
2021	238,652	5,044,817,043
2022	246,374	5,258,568,393
2023	252,036	5,412,198,884

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Valuation results

Comparison to market values

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Actuarial Value and Market Value of Assets

	Actuarial Value of Assets	Market Value of Assets
2019	$ 73,353,759,963	$ 75,486,780,473
2020	77,922,070,039	81,969,425,086
2021	83,139,458,098	87,966,352,518
2022	85,406,884,383	77,445,236,928
2023	88,619,071,210	83,642,776,867

Valuation results (continued)

Actuarial accrued liability

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Actuarial Accrued Liability

	Liability for Active Members	Liability for Deferred Members	Liability for Retired Members	Total Liability
2019	$ 33,527,838,928	$ 4,621,814,392	$ 46,723,661,952	$ 84,873,315,272
2020	37,450,731,186	3,184,248,746	49,174,094,142	89,809,074,074
2021	38,402,155,212	3,505,355,079	50,448,715,615	92,356,225,906
2022	40,197,454,923	3,957,962,360	52,519,838,576	96,675,255,859
2023	41,802,890,911	4,293,041,123	53,713,769,676	99,809,701,710

Valuation results (continued)

Funded ratio

Actuarial Value of Assets	Actuarial Accrued Liability	Net Actuarial Gain or Loss	Funded Ratio	Employer Contributions

Funded Ratios

	Funded Ratio (Actuarial Basis)	Funded Ratio (Market Value Basis)
2019	86.4%	88.9%
2020	86.8%	91.3%
2021	90.0%	95.2%
2022	88.3%	80.1%
2023	88.8%	83.8%

Gallagher

Insurance | Risk Management | Consulting

Teachers' and State Employees' Retirement System of North Carolina

Report on the Eighty-First Actuarial Valuation
Prepared as of December 31, 2023

October 2024

Gallagher

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Gallagher

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October 11, 2024

Board of Trustees
Teachers' and State Employees'
Retirement System of North Carolina
3200 Atlantic Avenue
Raleigh, NC 27604

Members of the Board:

We submit herewith our report on the eighty-first annual valuation of the Teachers' and State Employees' Retirement System of North Carolina (referred to as “TSERS”) prepared as of December 31, 2023. The report has been prepared in accordance with North Carolina General Statute 135-6(o). Information contained in our report for plan years from December 31, 2017, to December 31, 2020, is based upon valuations performed by the prior actuarial firm.

The primary purpose of the valuation report is to determine the required member and employer contribution rates, to describe the current financial condition of TSERS, and to analyze changes in such condition. Use of this report for any other purposes or by anyone other than North Carolina Retirement Systems Division (RSD) or Department of State Treasurer staff 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. The attached pages should not be provided without a copy of this cover letter. Because of the risk of misinterpretation of actuarial results, you should ask Gallagher to review any statement you wish to make on the results contained in this report. Gallagher will not accept any liability for any such statement made without prior review.

The valuation is based upon membership data and financial information as furnished by RSD and the Financial Operations Division and as summarized in this report. Although we reviewed for reasonableness and consistency with the prior valuation, these elements have not been audited by Gallagher and we cannot certify as to the accuracy and completeness of the data supplied. The valuation is also based on benefit and contribution provisions as presented in this report. If you have reason to believe that the plan provisions are incorrectly described that important plan provisions relevant to this valuation are not described, or that conditions have changed since the calculations were made, you should contact the authors of this actuarial report prior to relying on this information.

The valuation is further based on the actuarial valuation assumptions, approved by the Board of Trustees, as presented in this report. We believe that these assumptions are reasonable and comply with the Actuarial Standards of Practice (“ASOPs”) 27 and 35. In our professional judgement, the combined effect of the assumptions is expected to have no significant bias. We have prepared this valuation in accordance with the requirements of this standard and in accordance with all applicable ASOPs.

The assumptions used for the December 31, 2023 actuarial valuation are based on the experience study prepared as of December 31, 2019, and adopted by the Board of Trustees on January 28, 2021. All assumptions are discussed annually with the appropriate parties, and actuarial gain/loss experience is reviewed during each valuation, to see if any changes are needed. The economic assumptions with respect to investment yield, salary increase, and inflation have been based upon a review of the existing portfolio structure as well as recent and anticipated experience. All assumptions represent an estimate of future experience.

ASOPs 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the plan sponsor do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. In the case of the Board's selection of the investment return assumption, the signing actuaries have used economic information and tools provided by Gallagher's Financial Risk Management ("FRM") practice. A spreadsheet tool created by the FRM team converts averages, standard deviations, and correlations from Gallagher's Capital Markets Assumptions ("CMA") that are used for stochastic forecasting into approximate percentile ranges for the arithmetic and geometric average returns. It is intended to suggest possible reasonable ranges for the investment return assumption without attempting to predict or select a specific best estimate rate of return. It takes into account the duration (horizon) of investment and the target allocation of assets in the portfolio to various asset classes. Based on the actuaries' analysis, including consistency with other assumptions used in the valuation, the percentiles generated by the spreadsheet described above and review of actuarial gain/loss experience, the actuaries believe the assumptions, in the actuaries' professional judgment, are reasonable for the purpose of the measurement.

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. In various places in the report the results also show funded ratios and unfunded liabilities based upon varying sets of assumptions as well as market values of assets as that is required for certain disclosure information required per accounting rules or statutes. Where this has been done it has been clearly indicated.

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. In addition to the spreadsheet model discussed above, Gallagher uses third-party software in the performance of annual actuarial valuations and projections. The model is intended to calculate the liabilities associated with the provisions of the Plan using data and assumptions as of the measurement date under the accounting rules specified in this report. The output from the third-party vendor software is used as input to an internally developed model that applies applicable accounting rules to the liabilities derived and other inputs, such as Plan 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 accounting 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. The review is performed by experts within the company who are familiar with applicable accounting rules 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: fund 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 the actuarial valuation. Because of limited scope, Gallagher performed no analysis of the potential range of such future differences, except for some limited analysis in financial projections or required disclosure information.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. We are Fellows of the Society of Actuaries, Enrolled Actuaries, Members of the American Academy of Actuaries, and Fellows of the Conference of Consulting Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. We are available to discuss this report with you at your convenience.

Respectfully submitted,

Buck Global, LLC (Buck),
Gallagher Benefit Services, Inc. (hereinafter "Gallagher")

Michael A. Ribble

Michael A. Ribble, FSA, EA, MAAA, FCA
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Elizabeth A. Wiley

Elizabeth A. Wiley, FSA, EA, MAAA, FCA
Director, Retirement Actuary

Table of Contents

Table of Contents (continued)

Appendices

Executive Summary

Overview

The North Carolina Retirement Systems Division (RSD) was established in 1941 to provide retirement benefits for public servants in the State of North Carolina. Today, under the management of the Department of State Treasurer, RSD administers seven public pension plans (defined benefit plans), three supplemental retirement plans (voluntary defined contributions plans), a health trust fund, a disability income plan, death benefit funds and a number of other benefit programs. As of December 31, 2023, the RSD defined benefit plans cover over one million current and prior public servants of the state of North Carolina. During the fiscal year ending June 30, 2024, RSD paid over $7.8 billion in pensions to more than 360,000 retirees and as of June 30, 2024, RSD's defined benefit plan assets were valued at over $122 billion.

Under the supplemental retirement plans, the amount of contributions in any given year is defined by law. The amount of benefits derived is dependent on the investment returns the individual achieves. Conversely, under the pension plans, the amount of the benefit paid to a member upon retirement, termination, death, or disability is defined by law. The amount of contributions needed to fund these benefits cannot be known with certainty. In North Carolina, like other states, these contributions are paid during a public servant's career so that upon retirement, termination, death, or disability, there are funds available to pay these benefits. These amounts are determined through an actuarial valuation. Actuarial valuations are performed for each of the pension plans administered by RSD and the results are contained in actuarial valuation reports like this.

In 1941, the Teachers' and State Employees' Retirement System (referred to as "TSERS") was established. TSERS provides benefits to all full-time teachers and state employees in all public-school systems, universities, departments, institutions, and agencies of the state. With over $83 billion in assets and over 780,000 members as of December 31, 2023, it is the largest pension plan within the NC Retirement Systems. This actuarial valuation report is our annual analysis of the financial health of TSERS. This report, prepared as of December 31, 2023, presents the results of the eighty-first annual valuation of TSERS.

Purpose

An actuarial valuation is performed on TSERS annually as of the end of the calendar year. The actuary determines the amount of contributions to be made to TSERS during each member's career that, when combined with investment return, will be sufficient to pay for retirement benefits.

In addition, the annual actuarial valuation is performed to:

- Determine the progress on funding TSERS,
- Explore why the results of the current valuation differ from the results of the valuation of the previous year, and
- Satisfy regulatory and accounting requirements.

A detailed summary of the valuation process and a glossary of actuarial terms are provided in the supplementary document, "State of North Carolina Retirement Systems Actuarial Valuation Report Process and Actuarial Terms Glossary" dated October 2024.

Executive Summary (continued)

Actuary's Comments and Other Observations

Membership

As with any estimate, the actuary collects information that we know now. Under the actuarial valuation process, current information about TSERS members is collected annually by the Retirement Systems Division staff at the direction of the actuary. Membership data will assist the actuary in estimating benefits that could be paid in the future. Information about benefit provisions and assets held in the trust as of the valuation date is also collected.

The member information the actuary collects includes data elements such as current service, salary and benefit group identifier for members that have not separated service, and actual benefit amounts and form of payment for members that have separated service. Data elements such as gender and date of birth are used to determine when a benefit might be paid and for how long.

The table below provides a summary of the membership data used in this valuation compared to the prior valuation.

Number as of	12/31/2023	12/31/2022
Active members	299,037	297,802
Members currently receiving Disability Income Plan benefits	4,031	4,491
Terminated vested members and survivors of deceased members entitled to benefits but not yet receiving benefits	64,936	62,192
Terminated non-vested members and survivors of deceased members entitled to a refund of contributions	161,163	152,273
Retired members and survivors of deceased members currently receiving benefits	252,036	246,374
Total	781,203	763,132

The number of active members increased 0.4% from the previous valuation date. The number of retired members and survivors of deceased members currently receiving benefits increased by 2.3% from the previous valuation date. The increase in retiree population is consistent with expectations.

Reported compensation for active members for the year ending December 31, 2023 was $16.9 billion compared to $16.1 billion in the prior year, an increase of 4.6%. Covered payroll was expected to increase annually by 3.25%. Payroll that is increasing faster than we assume results in more benefits accruing that we anticipate, but also more contributions supporting the system. Although the pay increases will ultimately lead to increases in the dollar amounts of contributions, the immediate effect on the December 31, 2023 actuarial valuation is a reduction in the funded ratio and an increase in required employer contribution rates compared to those anticipated in prior projections.

The number of retired members and survivors of deceased members and the benefits paid to these members have been increasing steadily, as expected based on plan assumptions.

A detailed summary of membership data can be found in Section 2 of this report.

Executive Summary (continued)

Assets

TSERS assets are held in trust and are invested for the exclusive benefit of plan members. The Market Value of Assets is $83.6 billion as of December 31, 2023 and was $77.4 billion as of December 31, 2022. The estimated net investment return for the market value of assets for calendar year 2023 was 10.11%.

Market value returns during 2023 were higher than the 6.50% assumed rate of return. All else being equal, this resulted in lower required contributions and a higher funded ratio than anticipated in the December 31, 2022 baseline projections presented in the December 31, 2022 actuarial report.

The actuarial value of assets smooths investment gains and losses. The actuarial value of assets is $88.6 billion as of December 31, 2023 and was $85.4 billion as of December 31, 2022. The market value of assets is lower than the actuarial value of assets, which is used to determine employer contributions. This indicates that overall, there are unrecognized asset losses to be recognized in future valuations.

The lower-than-expected market return in 2022, partially offset by higher-than-expected market returns in 2020, 2021, and 2023, resulted in an actuarial value of asset return for calendar year 2023 of 5.63% and a recognized actuarial asset loss of $0.7 billion during 2023. The assets at actuarial value were $11.2 billion less than the actuarial accrued liability as of December 31, 2023.

Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, as reviewed in the recent experience study, the 6.50% discount rate used in this valuation is reasonable and appropriate.

A detailed summary of asset information can be found in Section 3 of this report.

Benefit Provisions

Benefit provisions are described in North Carolina General Statutes, Chapter 135.

There were no significant changes in benefit provisions from the previous valuation.

Many public sector retirement systems in the United States have undergone pension reform where the benefits of members (active or future members) have been reduced. Because of the well-funded status of TSERS due to the legislature contributing at least the actuarially determined employer contribution on the basis of an actuarially sound funding policy, benefit cuts have not been needed in North Carolina as they have been in most other states. However, if North Carolina’s investment policy shifts substantively, the system should review likely impacts of the shift and consider corresponding changes to actuarial assumptions, funding policy and/or benefit levels.

Cost-of-living increase recommendations to the General Assembly are periodically considered by the Board of Trustees to the extent that certain financial conditions are met. Specifically, benefit allowance increases are generally considered when the trust experiences sufficient investment gains to cover the additional actuarial accrued liabilities created by the cost-of-living adjustment. In addition to employers consistently contributing the actuary’s recommended contribution, this benefit increase policy has helped keep costs manageable when compared to other public sector retirement systems in the United States. Post-retirement increases help to reduce the risk that the benefit will be eroded by inflation.

A detailed summary of the benefit provisions can be found in Appendix B of this report.

Executive Summary (continued)

Actuarial Assumptions

Actuarial assumptions bridge the gap between the information that we know with certainty as of the valuation date (age, gender, service, pay, and benefits of the members) and what may happen in the future. The actuarial assumptions of TSERS are reviewed at least every five years. Based on this review, the actuary will make recommendations on the demographic and economic assumptions.

Demographic assumptions describe future events that relate to people such as retirement rates, termination rates, disability rates, and mortality rates. Economic assumptions describe future events that relate to the assets of TSERS such as the interest rate, salary increases, the real return, and payroll growth.

The assumptions used for the December 31, 2023 actuarial valuation are based on the experience study prepared as of December 31, 2019 and adopted by the Board of Trustees on January 28, 2021. No assumption changes have been made since the prior valuation.

A detailed summary of actuarial assumptions can be found in Appendix C of this report.

Funding Methodology

When compared to other public sector retirement systems in the United States, the funding policy for TSERS is quite aggressive in that the policy pays down the unfunded accrued liability over a much shorter period of time (12 years) compared to the longer funding periods of most public sector retirement systems. As such it is a best practice in the industry.

A detailed summary of actuarial methods can be found in Appendix C of this report. The Employer Contribution Rate Stabilization Policy (ECRSP) can be found in Appendix F.

Liabilities

The Actuarial Accrued Liability (AAL) increased from $96.7 billion to $99.8 billion during 2023. The Retirement System is an open plan, which means that new members enter the plan each year. In an open plan, liabilities are expected to grow from one year to the next as more benefits accrue and the membership approaches retirement. The AAL was $0.7 billion higher than expected, resulting primarily from higher-than-expected salary increases for continuing active members.

A detailed summary of the actuarial accrued liability can be found in Section 4 of this report.

Funded Ratio

The funded ratio is a measure of the progress that has been made in funding the plan as of the valuation date. It is the ratio of how much money TSERS actually has in the fund to the amount TSERS should have in the fund.

The ratio of assets to liabilities shows the health of the plan on an accrued basis. The funded ratio on an actuarial basis increased from 88.3% at December 31, 2022 to 88.8% at December 31, 2023.

Unfunded Accrued Liability

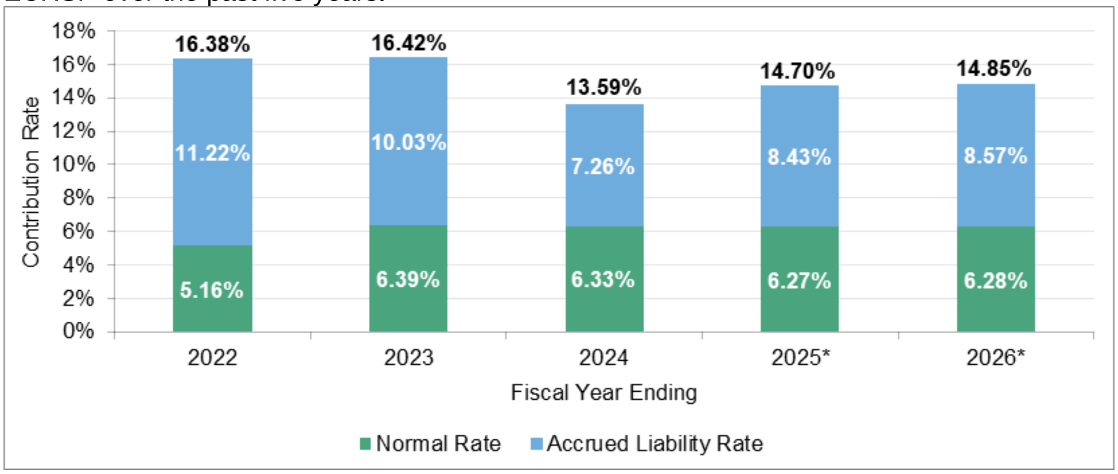
The unfunded accrued liability (UAAL) is the portion of actuarial accrued liability that is not covered by the assets of the Retirement System. The actuarial value of assets basis is used for computing contributions to alleviate contribution volatility. The difference in the actuarial accrued liability and the actuarial value of assets is the amount of unfunded actuarial accrued liability to be paid off over a 12-year period.

The UAAL decreased from $11.3 billion at December 31, 2022 to $11.2 billion at December 31, 2023. A detailed reconciliation of the UAAL can be found in Section 4 of this report.

Executive Summary (continued)

Actuarially Determined Employer Contribution Rates Before Applying Funding Policy Minimums

The graph below provides a history of actuarially determined employer contribution rates prior to application of the ECRSP over the past five years.



* Subject to the impact of future legislative changes effective during that fiscal year

The actuarially determined employer contribution rate prior to application of the ECRSP is the amount needed to pay for the cost of the benefits accruing and to pay off the unfunded actuarial accrued liability over a 12-year period, offset for the 6% of pay contribution the members make. The 12-year period is a relatively short period for public sector retirement systems in the United States, with the funding period for most of these Systems much longer. The shorter period results in higher contributions and more benefit security.

A detailed summary of the actuarially determined employer contribution rates is provided in Section 5 of this report.

Projections

Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. The projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future. The baseline deterministic projection is based on December 31, 2023 valuation results and assumptions.

A detailed summary of the deterministic projections can be found in Section 6 of this report.

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 expected. Actuarial valuations include the risk that actual future measurements will deviate from expected future measurements due to actual experience that is different than the actuarial assumptions.

The primary areas of risk in this actuarial valuation are:

- Investment Risk – the potential that investment returns will be different than expected. Section 6 of this report demonstrates the sensitivity of future projected results to asset returns deviating from expected returns.
- Longevity and Other Demographic Risks – the potential that mortality or other demographic experience will be different than expected.

Executive Summary (continued)

- Interest Rate Risk – To the extent market rates of interest affect the expected return on assets, there is a risk of change to the discount rate which determines the present value of liabilities and actuarial valuation results. Table D-1 of this report demonstrates the sensitivity of valuation results to differing discount rates.
- Contribution Risk – The potential that actual contributions are different than the actuarially determined contributions.

Annual actuarial valuations are performed for RSD which re-measure the assets and liabilities and compute a new actuarially determined contribution. RSD also has experience studies performed every five years to analyze the discrepancies between actuarial assumptions and actual experience and determine if the actuarial assumptions need to be changed. Annual actuarial valuations and periodic experience studies are practical ways to monitor and reassess risk.

Key Takeaways

The actuarial valuation is performed each year to replace the estimates the actuary assumed for the prior valuation with the actual events that happened. This past year, as expected, some of the assumptions used in the prior valuation were not realized. Key results of the December 31, 2023 valuation as compared to the December 31, 2022 valuation were:

- Market value returns of 10.11% during calendar year 2023 compared to 6.50% assumed
- Liabilities $0.7 billion higher than anticipated as of December 31, 2023, primarily from higher-than-expected salary increases for continuing active members
- Continuation of direct-rate smoothing of the change in the employer contribution rate due to the changes in assumptions and methods over a 5-year period beginning with the December 31, 2020 valuation

When compared to the December 31, 2022 projections, the above resulted in:

- A similar funded ratio as of December 31, 2023 (88.8% in the valuation is the same as the prior year's baseline projection)
- A lower actuarially determined employer contribution rate prior to applying the Employer Contribution Rate Stabilization Policy (ECRSP) for fiscal year ending June 30, 2026 (14.85% in the valuation compared to 15.02% in the prior year's baseline projection)

TSERS is well funded compared to its peers. This is due to:

- Stakeholders working together to keep TSERS well-funded since inception
- A history of appropriating and contributing a minimum of the recommended contribution requirements
- Implementation of the ECRSP which provides additional funding of the System
- Assumptions that in aggregate are more conservative than peers
- A funding policy that aggressively pays down the unfunded liability over a 12-year period
- An ad hoc cost-of-living adjustment, which typically only provides benefit increases when certain financial conditions are met, that supports the health of the system
- Modest changes in benefits when compared to peers

As has been done over the past 80 years, continued focus on these measures will be needed to maintain the solid status of TSERS well into the future.

This report, prepared as of December 31, 2023, presents the results of the annual valuation of the system. The principal results of the valuation and a comparison with the preceding year's results are summarized in the following table.

Section 1: Principal Results

This report, prepared as of December 31, 2023, presents the results of the eighty-first annual valuation of the system. The principal results of the valuation and a comparison with the preceding year's results are summarized below.

Table 1: Summary of Principal Results

Valuation results as of	12/31/2023	12/31/2022
Active Members		
Number	299,037	297,802
Reported Compensation	$16,889,491,503	$16,141,902,861
Valuation Compensation*	$18,382,251,586	$17,600,816,901
Retired Members and Survivors of Deceased Members Currently Receiving Benefits		
Number	252,036	246,374
Annual Allowances	$ 5,412,198,884	$ 5,258,568,393
Assets		
Actuarial Value (AVA)	$88,619,071,210	$85,406,884,383
Market Value (MVA)	$83,642,776,867	$77,445,236,928
Actuarial Accrued Liability (AAL)	$99,809,701,710	$96,675,255,859
Unfunded Accrued Liability (AAL-AVA)	$11,190,630,500	$11,268,371,476
Funded Ratio (AVA/AAL)**	88.8%	88.3%
Results for Fiscal Year Ending	**6/30/2026**	**6/30/2025*** **
Actuarially Determined Employer Contribution (ADEC), as a percentage of payroll		
Normal Cost	6.28%	6.27%
Accrued Liability	9.17%	9.63%
Total Preliminary ADEC	15.45%	15.90%
Total Based on Direct Rate Smothing	14.85%	14.70%
Impact of Benefit Changes	Not Final	Not Final
ADEC Prior to Application of Funding Policy	Not Final	Not Final
Board of Trustees Recommended Contribution under the Employer Contribution Rate Stabilization Policy (ECRSP)	17.14%	16.79%
Required Employer Contribution NCGS 135-8(d)	17.14%	16.79%
Appropriations Act for Fiscal Year Ending	**6/30/2026**	**6/30/2025*** **
Employer Contribution Rate as a percentage of payroll		
Normal Cost	6.28%	6.27%
Accrued Liability	N/A	N/A
Total	N/A	N/A

* Reported compensation annualized for new hires and projected for valuation purposes.
** The Funded Ratio on a Market Value of Assets basis is 83.8% at December 31, 2023.
*** Session Law 2023-134, enacted in 2023, established an employer contribution rate of 16.79% for the fiscal year ending June 30, 2025. However, it remains possible that an adjustment for the second year of the budget biennium will be enacted.

Section 2: Membership Data

The Retirement Systems Division provided membership data as of the valuation date for each member of TSERS. The membership data assists the actuary in estimating benefits that could be paid in the future. The tables below provide a summary of the membership data used in this valuation. Detailed tabulations of data are provided in Appendix A.

Table 2: Summary of the Membership Data

Number as of	12/31/2023	12/31/2022
Active members	299,037	297,802
Members currently receiving Disability Income Plan benefits	4,031	4,491
Terminated vested members and survivors of deceased members entitled to benefits but not yet receiving benefits	64,936	62,192
Terminated non-vested members and survivors of deceased members entitled to a refund of contributions	161,163	152,273
Retired members and survivors of deceased members currently receiving benefits	252,036	246,374
Total	781,203	763,132

Table 3: Active Member Data

	Member Count	Average Age	Average Service	Reported Compensation
Teachers, Librarians and Counselors	150,894	44.05	10.68	$ 8,133,118,699
Other Education	47,950	49.34	11.06	2,504,717,398
General Employees	94,830	47.10	10.80	5,874,920,561
Law Enforcement Officers	5,363	39.75	11.14	376,734,845
Total	299,037	45.79	10.79	$ 16,889,491,503

The table above includes members not in receipt of benefits who were active at the end of 2023.

Table 4: Disabled Member Data
(Receiving Benefit from the Disability Income Plan of North Carolina)

	Member Count	Average Age	Average Service	Valuation Compensation
Teachers, Librarians and Counselors	1,421	55.51	14.21	$ 56,260,378
Other Education	603	57.45	13.31	17,212,140
General Employees	1,982	56.39	13.26	78,337,868
Law Enforcement Officers	25	48.76	16.42	1,286,500
Total	4,031	56.19	13.62	$ 153,096,886

The table above includes members not in receipt of benefits who did not have reported compensation in 2023 and who were reported as disabled in the current or prior valuations and not subsequently reported as returned to work.

Section 2: Membership Data (continued)

Table 5: Terminated Vested Member Data

	Member Count	Average Age	Average Service	Annual Deferred Retirement Allowances
Teachers, Librarians and Counselors	31,017	46.14	9.37	$ 245,078,776
Other Education	6,947	50.87	10.22	61,554,154
General Employees	26,236	51.85	9.22	207,425,966
Law Enforcement Officers	736	44.54	10.06	7,217,284
Total	64,936	48.93	9.41	$ 521,276,180

The table above includes vested members not in receipt of benefits who were not active at the end of 2023 and who were not valued as disabled members.

Table 6: Terminated Non-Vested Member Data

	Member Count	Average Age	Average Service	Accumulated Contributions
Teachers, Librarians and Counselors	66,134	41.11	1.86	$ 354,276,640
Other Education	19,126	45.41	1.55	65,497,157
General Employees	74,641	45.88	1.59	406,129,687
Law Enforcement Officers	1,262	39.81	2.15	9,206,076
Total	161,163	43.82	1.70	$ 835,109,560

The table above includes non-vested members not in receipt of benefits who were not active at the end of 2023 and who were not valued as disabled members.

Section 2: Membership Data (continued)

Table 7: Data for Members Currently Receiving Benefits

	Member Count	Average Age	Annual Retirement Allowances
Retired Members (Healthy at Retirement)			
Teachers and Other Education	128,313	71.69	$ 3,060,012,679
General Employees	88,670	72.93	1,717,218,339
Law Enforcement Officers	3,863	65.38	127,877,434
Total	220,846	72.08	$ 4,905,108,452
Retired Members (Disabled at Retirement)*			
Teachers and Other Education	4,848	72.52	$ 92,110,336
General Employees	7,817	72.18	125,089,430
Law Enforcement Officers	156	69.96	3,901,352
Total	12,821	72.28	$ 221,101,118
Survivors of Deceased Members			
Teachers and Other Education	6,286	73.37	$ 118,139,055
General Employees	11,533	73.79	155,403,612
Law Enforcement Officers	550	73.28	12,446,647
Total	18,369	73.63	$ 285,989,314
Grand Total	252,036	72.20	$ 5,412,198,884

* Includes retired members reported as disabled in a prior valuation and not subsequently reported as returned to work.

Section 3: Asset Data

Assets are held in trust and are invested for the exclusive benefit of TSERS members. The tables below provide the details of the Market Value of Assets for the current and prior years' valuations.

Table 8: Market Value of Assets

Asset Data as of	12/31/2023	12/31/2022
Beginning of Year Market Value of Assets	$ 77,445,236,928	$ 87,966,352,518
Employer Contributions	3,104,597,510	3,039,949,206
Employee Contributions	1,078,160,026	1,042,052,173
Benefit Payments Other Than Refunds	(5,584,204,848)	(5,407,203,621)
Refunds	(136,745,938)	(125,034,315)
Administrative Expenses	(16,552,601)	(14,583,835)
Investment Income	7,752,285,790	(9,056,295,198)
Net Increase/(Decrease)	6,197,539,939	(10,521,115,590)
End of Year Market Value of Assets	$ 83,642,776,867	$ 77,445,236,928
Estimated Net Investment Return on Market Value	10.11%	-10.38%

Table 9: Allocation of Investments by Category of the Market Value of Assets

Asset Data as of	12/31/2023	12/31/2022
Allocation by Dollar Amount		
Public Equity	$ 31,390,836,967	$ 25,838,232,669
Fixed Income (LTIF)	20,971,439,248	17,896,725,874
Cash and Receivables	9,705,361,729	12,370,186,485
Other*	21,575,138,923	21,340,091,900
Total Market Value of Assets	$ 83,642,776,867	$ 77,445,236,928
Allocation by Percentage of Asset Value		
Public Equity	37.5%	33.4%
Fixed Income (LTIF)	25.1%	23.1%
Cash and Receivables	11.6%	16.0%
Other*	25.8%	27.5%
Total Market Value of Assets	100.0%	100.0%

* Real Estate, Alternatives, Inflation and Credit

Section 3: Asset Data (continued)

In order to reduce the volatility that investment gains and losses can have on the required contributions and funded status of TSERS, the Board adopted an asset valuation method to determine the Actuarial Value of Assets used for funding purposes. The table below provides the calculation of the Actuarial Value of Assets at the valuation date.

Table 10: Actuarial Value of Assets

Asset Data as of	12/31/2023
Beginning of Year Actuarial Value of Assets	$ 85,406,884,383
Beginning of Year Market Value of Assets	$ 77,445,236,928
Contributions	4,182,757,536
Benefit Payments	(5,737,503,387)
Net Cash Flow	(1,554,745,851)
Expected Investment Return	4,984,206,612
Expected End of Year Market Value of Assets	$ 80,874,697,689
End of Year Market Value of Assets	$ 83,642,776,867
Excess of Market Value over Expected Market Value of Assets	2,768,079,178
80% of 2023 Asset Gain/(Loss)	2,214,463,342
60% of 2022 Asset Gain/(Loss)	(8,836,350,535)
40% of 2021 Asset Gain/(Loss)	1,031,358,476
20% of 2020 Asset Gain/(Loss)	614,234,374
Total Deferred Asset Gain/(Loss)	(4,976,294,343)
Preliminary End of Year Actuarial Value of Assets	$ 88,619,071,210
Final End of Year Actuarial Value of Assets (not less than 80% and not greater than 120% of Market Value)	$ 88,619,071,210
Estimated Net Investment Return on Actuarial Value	5.63%

Commentary The actuarial value of assets smooths investment gains/losses, resulting in less volatility in the employer contribution. The asset valuation recognizes asset returns in excess of or less than the expected return on the market value of assets over a five-year period.

Continued recognition of the 2022 asset loss resulted in a lower-than-expected return on the actuarial value of assets for calendar year 2023 of 5.63% and a recognized actuarial asset loss of $0.7 billion during 2023. The assets at actuarial value were $11.2 billion less than the actuarial accrued liability as of December 31, 2023.

Section 3: Asset Data (continued)

The valuation assumed that the funds will earn a 6.50% asset return in all future years. The table below provides a history of the Actuarial Value and Market Value of Asset returns.

Table 11: Historical Asset Returns

Calendar Year	Expected Asset Return	Actuarial Value of Asset Return	Market Value of Asset Return	20 Year Average Market Return
1996	7.50%	10.18%	9.39%	NA
1997	7.25%	10.18%	18.16%	NA
1998	7.25%	9.92%	16.66%	NA
1999	7.25%	10.60%	10.15%	NA
2000	7.25%	11.55%	2.50%	NA
2001	7.25%	8.51%	-1.87%	NA
2002	7.25%	5.66%	-5.21%	NA
2003	7.25%	7.98%	18.23%	NA
2004	7.25%	8.56%	10.73%	NA
2005	7.25%	8.26%	6.97%	NA
2006	7.25%	8.94%	11.41%	NA
2007	7.25%	8.87%	8.38%	NA
2008	7.25%	2.89%	-19.50%	NA
2009	7.25%	4.74%	14.84%	NA
2010	7.25%	5.89%	11.47%	NA
2011	7.25%	5.15%	2.19%	NA
2012	7.25%	6.32%	11.82%	NA
2013	7.25%	7.43%	12.21%	NA
2014	7.25%	7.19%	6.21%	NA
2015	7.25%	5.87%	0.36%	6.86%
2016	7.25%	5.32%	6.22%	6.71%
2017	7.20%	6.56%	13.49%	6.49%
2018	7.00%	5.10%	-1.39%	5.60%
2019	7.00%	6.18%	14.85%	5.82%
2020	7.00%	8.80%	11.12%	6.25%
2021	6.50%	9.18%	9.68%	6.84%
2022	6.50%	4.53%	-10.38%	6.54%
2023	6.50%	5.63%	10.11%	6.16%
20-Yr Average	7.09%	6.56%	6.16%	NA
20-Yr Range	0.75%	6.29%	34.35%	NA

Commentary: The average investment return recognized for purposes of determining the annual change in contribution each year is the actuarial value of assets return. Currently, the average actuarial return over the past 20 years of 6.56% compares with an average market return of 6.16%. The range of returns on market value of assets is markedly more volatile, 34.35% versus 6.29%. Using the actuarial value of assets instead of market value results in much lower employer contribution volatility, while ensuring that the actuarial needs of TSERS are met.

Section 4: Liability Results

Using the provided membership data, benefit provisions, and actuarial assumptions, the future benefit payments of TSERS are estimated. These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits. The Present Value of Future Benefits is allocated to past, current and future service, respectively known as the actuarial accrued liability, normal cost and present value of future normal costs. The table below provides these liability numbers for the current and prior year's valuations.

Table 12: Liability Summary

Valuation Results as of	12/31/2023	12/31/2022
(a) Present Value of Future Benefits		
(1) Active Members	$ 58,531,986,262	$ 56,280,874,310
(2) Terminated Members	4,293,041,123	3,957,962,360
(3) Members Currently Receiving Benefits	53,713,769,676	52,519,838,576
(4) Total	$ 116,538,797,061	$ 112,758,675,246
(b) Present Value of Future Normal Costs		
(1) Employee Future Normal Costs	$ 8,278,394,694	$ 7,974,210,837
(2) Employer Future Normal Costs	8,450,700,657	8,109,208,550
(3) Total	$ 16,729,095,351	$ 16,083,419,387
(c) Actuarial Accrued Liability: (a4) - (b3)	$ 99,809,701,710	$ 96,675,255,859
(d) Actuarial Value of Assets	$ 88,619,071,210	$ 85,406,884,383
(e) Unfunded Accrued Liability: (c) - (d)	$ 11,190,630,500	$ 11,268,371,476

The table below provides a reconciliation of the prior year's unfunded actuarial accrued liability to the current year's unfunded actuarial accrued liability.

Table 13: Reconciliation of Unfunded Actuarial Accrued Liability

(in millions)	
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2022	$ 11,268
Normal Cost and Administrative Expense during 2023	1,986
Reduction due to Actual Contributions during 2023	(4,183)
Interest on UAAL, Normal Cost, and Contributions	728
Asset (Gain)/Loss	735
Actuarial Accrued Liability (Gain)/Loss	657
Impact of Assumption Changes	-
Impact of Benefit Changes	-
Unfunded Actuarial Accrued Liability (UAAL) as of 12/31/2023	$ 11,191

Commentary: During 2023, the UAAL increased due to the asset loss of $735 million. Additionally, changes in the census data, primarily higher-than-expected salary increases for continuing active members, increased the UAAL by $657 million.

Section 5: Actuarially Determined Employer Contribution

The Actuarially Determined Employer Contribution (ADEC) as a percent of payroll consists of a normal cost rate, an accrued liability rate and an administrative expense rate. The normal cost rate is the employer's portion of the cost of benefits accruing during the year after reducing for the member contribution. The accrued liability rate is the payment toward the unfunded accrued liability in order to pay off the unfunded accrued liability over 12 years. The expense rate is the payment for expected administrative expenses.

The table below provides the calculation of the ADEC for the current and prior years' valuations.

The ADEC is compliant with the definition of a reasonable actuarially determined contribution under ASOP 4. When determining the smoothing period for the actuarial value of assets and the amortization period for the unfunded actuarial accrued liability, the following items were considered: (i) the balance among benefit security, intergenerational equity, and stability of actuarially determined contributions, (ii) the timing and duration of expected benefit payments, and (iii) the nature and frequency of plan amendments. Plan amendments are amortized over periods appropriate for the nature of the change or are funded at the time of the change based on decisions by the plan sponsor.

The Employer Contribution Rate Stabilization Policy (ECRSP) adopted by the Board of Trustees on April 29, 2021 requires that recommended contributions be 0.35% of payroll greater than the appropriated contribution during the prior year, with the following bounds: (1) contributions may not be less than the ADEC calculated below and (2) contributions may not be greater than a contribution determined using the same assumptions used to calculate the ADEC but using a discount rate equal to the long-term Treasury bond yield.

The ECRSP would result in a recommended contribution rate of 17.14% of payroll for fiscal year ending 2026 before recognizing any benefit improvements that may be enacted.

- The minimum (before considering the ADEC) is 17.14%; Board's recommended appropriation for the fiscal year ending 2025 of 16.79%, plus 0.35%.
- 15.45% is the ADEC calculated in this most recent valuation prior to direct rate smoothing and before applying the ECRSP. 14.85% is the ADEC after direct rate smoothing of the assumption and method changes and before applying the ECRSP.
- The maximum ADEC is approximately 52.06%; the estimated ADEC using a discount rate equal to the long-term Treasury bond yield (4.03%).

Table 14: Calculation of the Actuarially Determined Employer Contribution (ADEC) Prior to ECRSP

Valuation Date	12/31/2023	12/31/2022
ADEC for Fiscal Year Ending	6/30/2026	6/30/2025**
Normal Cost Rate Calculation		
(a) Normal Cost Rate	6.18%	6.17%
(b) Expense Rate	0.10%	0.10%
(c) Total Normal Cost Rate	6.28%	6.27%
Accrued Liability Rate Calculation		
(d) Total Annual Amortization Payments*	$ 1,737,619,816	$ 1,747,345,937
(e) Projected Compensation	18,955,278,643	18,152,305,049
(f) Accrued Liability Rate: (d) / (e)	9.17%	9.63%
Total ADEC (c) + (f)	15.45%	15.90%
ADEC with Direct Rate Smoothng	14.85%	14.70%
Impact of Benefit Changes	Not Final	Not Final
Final ADEC Prior to ECRSP	Not Final	Not Final

* See Table 17 for more detail

** Session Law 2023-134, enacted in 2023, established an employer contribution rate of 16.79% for the fiscal year ending June 30, 2025. However, it remains possible that an adjustment for the second year of the budget biennium will be enacted.

Section 5: Actuarially Determined Employer Contribution (continued)

The table below provides a reconciliation of the actuarially determined employer contribution.

Table 15: Reconciliation of the Change in the ADEC Prior to ECRSP

Fiscal year ending June 30, 2025 Preliminary ADEC (based on December 31, 2022 valuation)	14.70%
Impact of Benefit Changes	0.00%
Fiscal year ending June 30, 2025 ADEC Prior to ECRSP	14.70%
Change Due to Anticipated Reduction in UAAL*	(0.78%)
Change Due to Demographic (Gain)/Loss	0.38%
Change Due to Investment (Gain)/Loss	0.51%
Change Due to Contributions Greater than ADEC	(0.56%)
Impact of Assumption Changes	0.00%
Impact of Benefit Changes	0.00%
Impact of Direct Rate Smoothing	0.60%
Reversal of one-time Benefit Costs	0.00%
Fiscal year ending June 30, 2026 Preliminary ADEC (based on December 31, 2023 valuation)	14.85%

* Amortization of the UAAL is determined as a level dollar amount with payments expected to remain the same over the amortization period but was calculated as a percentage of valuation payroll in the previous valuation. Payroll is expected to increase annually while the expected amortization payment does not increase. This causes the expected amortization payment to be a lesser percentage of the expected payroll.

Section 5: Actuarially Determined Employer Contribution (continued)

Amortization methods determine the payment schedule for the unfunded actuarial accrued liability. TSERS adopted a 12-year closed amortization period for fiscal year ending 2012. A new amortization base is created each year based on the prior years' experience. The tables below provide the calculation of the new amortization base and the amortization schedule for the current year's valuation.

Table 16: Calculation of the New Amortization Base

Calculation as of		12/31/2023	12/31/2022
(a)	Unfunded Actuarial Accrued Liability	$ 11,190,630,500	$ 11,268,371,476
(b)	Prior Years' Outstanding Balances	$ 10,327,412,181	$ 7,945,259,358
(c)	New Amortization Base: (a) - (b)	$ 863,218,319	$ 3,323,112,118
(d)	New Amortization Payment	$ 112,679,075	$ 433,778,097

Table 17: Amortization Schedule for Unfunded Accrued Liability

Date Established	Original Balance	12/31/2023 Outstanding Balance	Annual Payment Effective July 1, 2025
December 31, 2010	$ 242,581,914	$ 16,091,893	$ -
December 31, 2011	911,037,989	175,180,587	-
December 31, 2012	78,277,759	24,250,582	10,485,336
December 31, 2013	(114,027,863)	(47,828,739)	(15,228,907)
December 31, 2014	(206,952,282)	(107,978,244)	(27,559,708)
December 31, 2015	2,586,581,023	1,596,237,525	343,435,477
December 31, 2016	1,983,860,720	1,399,714,611	262,453,830
December 31, 2017	2,551,629,668	2,010,065,217	336,317,586
December 31, 2018	1,836,431,391	1,590,066,800	241,617,831
December 31, 2019	865,931,898	811,785,584	113,563,961
December 31, 2020	1,141,156,638	1,144,155,812	148,959,390
December 31, 2021	(1,707,468,366)	(1,823,443,853)	(222,882,152)
December 31, 2022	3,323,112,118	3,539,114,406	433,778,097
December 31, 2023	863,218,319	863,218,319	112,679,075
Total		$ 11,190,630,500	$ 1,737,619,816

Commentary: This is the payment schedule for the unfunded actuarial accrued liability of TSERS.

Section 5: Actuarially Determined Employer Contribution (continued)

The table below provides a history of the actuarially determined employer contribution and the corresponding appropriated rate.

Table 18: History of Actuarially Determined Employer Contributions and Appropriated Rates

Valuation Date	Fiscal Year Ending		Normal Rate	Accrued Liability Rate	Effect of Direct Rate Smoothing	Legislated Benefit Cost*	ULSR Contribution G.S. 143C-4-10(e)	ADEC Prior to Applicable Funding Policy	ADEC under ECRSP	Appropriated Rate
12/31/2023	6/30/2026		6.28%	9.17%	(0.60%)	N/A	N/A	N/A	N/A	N/A
12/31/2022	6/30/2025	**	6.27%	9.63%	(1.20%)	N/A	N/A	N/A	N/A	N/A
12/31/2021	6/30/2024		6.33%	7.85%	(1.79%)	1.20%	0.00%	13.59%	17.64%	17.64%
12/31/2020	6/30/2023		6.39%	11.13%	(2.39%)	1.24%	0.05%	16.42%	17.38%	17.38%
12/31/2019	6/30/2022		5.16%	10.58%	0.00%	0.64%	0.00%	16.38%	16.38%	16.38%
12/31/2018	6/30/2021		5.18%	10.19%	(0.59%)	0.00%	0.00%	14.78%	14.78%	14.78%

* The change due to legislation for the contribution for fiscal year ending June 30, 2024 provided for a one-time supplement equal to 4% of the annual retirement allowance payable by November 2023. The change due to legislation for the contribution for fiscal year ending June 30, 2023 provided for a one-time supplement equal to 4% of the annual retirement allowance payable in October 2022. The change due to legislation for the contribution for fiscal year ending June 30, 2022 provided for a one-time supplement equal to 2% of the annual retirement allowance payable in December 2021.

** Session Law 2023-134, enacted in 2023, established an employer contribution rate of 16.79% for the fiscal year ending June 30, 2025. However, it remains possible that an adjustment for the second year of the budget biennium will be enacted.

Section 5: Actuarially Determined Employer Contribution (continued)

The following table shows estimates of the potential cost of three types of benefit improvements if they were enacted based on the results of the December 31, 2023 or December 31, 2022 valuations. The first benefit improvement is a permanent one-time cost-of-living increase and the second benefit improvement is a one-time supplement payment for retirees during the upcoming year ending December 31, 2024. The third benefit improvement is a 0.01% increase in the defined benefit formula and would include a corresponding increase in retirement allowances.

Table 19: Cost of Benefit Enhancements

Calculation as of	12/31/2023	12/31/2022
Increase in UAAL for a 1.00% COLA	$ 571,111,000	$ 560,833,000
Increase in ADEC for a 1.00% COLA	0.40%	0.41%
Increase in UAAL for a 1.00% Supplement	$ 57,687,000	$ 56,604,000
Increase in ADEC for a 1.00% Supplement	0.30%	0.31%
Increase in UAAL for a 0.01% Increase in the Defined Benefit Formula	$ 548,213,000	$ 534,634,000
Increase in ADEC for a 0.01% Increase in the Defined Benefit Formula	0.45%	0.46%

The 1.00% COLA in the December 31, 2023 column would be effective July 1, 2025 and includes expected costs of COLAs paid for retirements before June 30, 2025. The COLA would be paid in full to retired members and survivors of deceased members on the retirement roll on July 1, 2024 and would be prorated for retired members and survivors of deceased members who commence benefits after July 1, 2024 but before June 30, 2025. We are assuming that the cost of the COLA is amortized over a 12-year period.

The 1.00% Supplement in the December 31, 2023 column is based on an assumed payment date of July 1, 2025 and includes expected costs of supplements paid for retirement before June 30, 2025. The supplement would be equal to 1.00% of the annual allowances of retirees and other beneficiaries who commence retirement on or before July 1, 2025. We are assuming that the cost of the supplement is amortized over a one-year period.

The 0.01% increase in the defined benefit formula would include a corresponding increase in retirement allowances. We are assuming that the cost of the 0.01% benefit increase is amortized over a 12-year period.

Section 6: Projections

Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. This section provides such projections. The projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future. The baseline deterministic projection is based on December 31, 2023 valuation results as assumptions.

Key Projection Assumptions

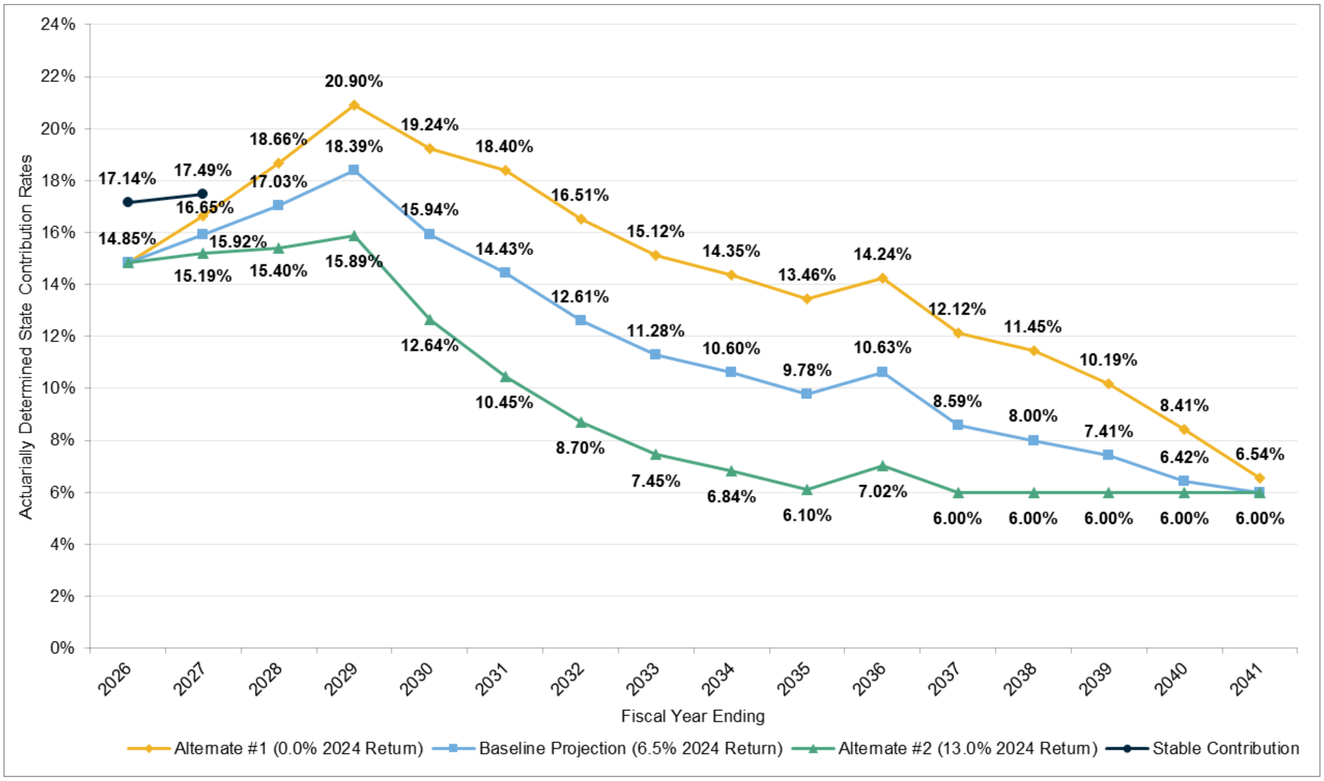
- Valuation interest rate of 6.50%
- Direct-rate smoothing of the change in the employer contribution rate due to the changes in assumption and methods over a 5-year period beginning July 1, 2022
- 6.50% investment return on market value of assets
- Actuarial assumptions and methods as described in Appendix C. All future demographic experience is assumed to be exactly realized
- The contribution rate under the Employer Contribution Rate Stabilization Policy (ECRSP) is contributed until fiscal year ending 2027
- The actuarially determined contribution rate is contributed for fiscal years ending 2028 and beyond
- The employer contribution shall not be less than the employee contribution, which is currently 6%
- 0% increase in both the active population of TSERS and its subgroups: Teachers, Other Education, General Employees, and Law Enforcement Officers, except that no new hires of UNC Health Care System (UNC HC) will participate in TSERS
- To replace those assumed to leave active service, the age, gender and salary of future members assumed to be hired into TSERS are based on the demographic information of new TSERS hires over the past three (3) valuations
- Demographic profiles of new entrants for each subgroup are based on new hires specific to that subgroup over the past three (3) valuations
- 75% of new entrants are assumed to have rounded service of 0 when first valued, and 25% are assumed to have rounded service of 1 when first valued
- No cost-of-living adjustments granted
- Future pay increases based on long-term salary increase assumptions

The ECRSP contribution rate is the Stable Contribution rate shown in the projections. The ECRSP can be found in Appendix F. In addition, we have provided two alternate deterministic projections. The first alternate deterministic projection is based on the same assumptions as the baseline deterministic projection except that it assumes a 0.0% asset return for calendar year 2024. The second alternate deterministic projection is based on the same assumptions as the baseline deterministic projection except that it assumes a 13.0% asset return for calendar year 2024.

Section 6: Projections (continued)

The graph below provides the actuarially determined employer contribution rates projected for 15 years, as well as the board approved stable contribution under the Employer Contribution Rate Stabilization Policy.

Projected Actuarially Determined Employer Contribution Rates

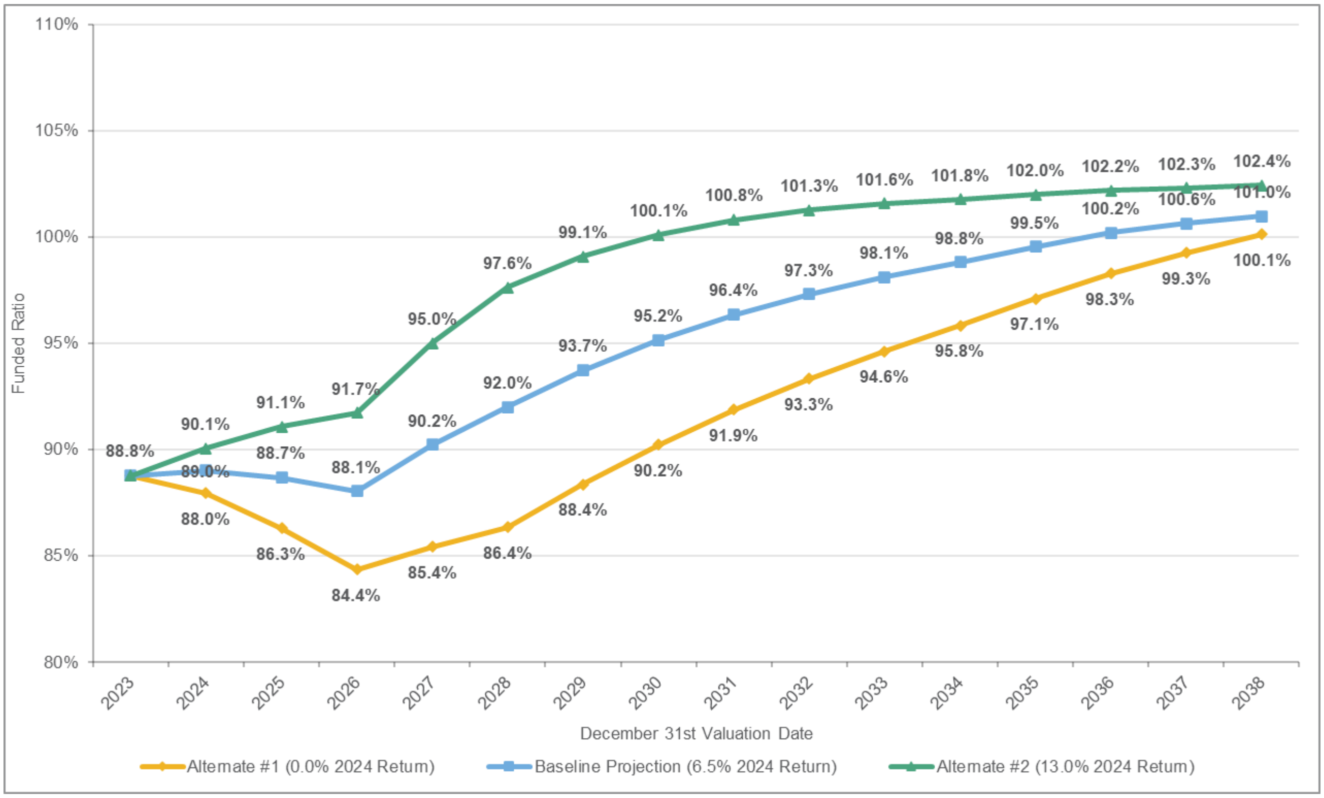


The minimum employer contribution rate is equal to the employee contribution rate of 6.00%.

Section 6: Projections (continued)

The graph below provides the funded ratio projected for 15 years.

Projected Funded Ratio



Absent favorable asset returns and other deviations from expectations resulting in gains to the plan's funded status, funded ratios are expected to decline until 2026, which is the point that the unfavorable asset returns in 2022 are fully recognized in the actuarial value of assets. Subsequently, funded ratios are expected to increase to 100% by the end of the projection under each scenario due to the 12-year amortization policy.

Appendix A: Detailed Tabulations of Member Data

Table A-1: Number and Average Reported Compensation of Active Members Distributed by Age and Service as of December 31, 2023

	Years of Service										
Age	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	Total
Under 25	5,540 $18,660	5,748 $42,378	49 $44,098	0 $0	0 $0	0 $0	0 $0	0 $0	0 $0	0 $0	11,337 $30,795
25 to 29	4,862 $19,884	14,751 $46,391	4,117 $52,032	4 $44,878	0 $0	0 $0	0 $0	0 $0	0 $0	0 $0	23,734 $41,939
30 to 34	3,728 $19,990	10,520 $47,737	11,615 $55,447	3,592 $60,686	15 $51,464	0 $0	0 $0	0 $0	0 $0	0 $0	29,470 $48,846
35 to 39	3,177 $20,147	9,204 $49,358	8,706 $58,277	9,131 $64,873	3,632 $67,961	13 $56,437	0 $0	0 $0	0 $0	0 $0	33,863 $55,092
40 to 44	2,791 $20,752	8,424 $50,370	7,799 $59,713	6,298 $66,224	10,324 $70,556	3,469 $71,580	44 $65,665	0 $0	0 $0	0 $0	39,149 $59,890
45 to 49	2,372 $22,208	7,305 $50,398	7,260 $58,434	5,499 $65,274	7,642 $69,308	8,714 $73,944	2,960 $75,679	12 $60,229	0 $0	0 $0	41,764 $62,320
50 to 54	2,192 $21,772	6,938 $51,321	7,284 $57,560	6,052 $63,335	8,018 $66,709	6,865 $70,950	7,281 $76,985	883 $81,597	8 $70,203	0 $0	45,521 $62,860
55 to 59	1,752 $21,355	5,867 $51,568	5,967 $56,263	5,099 $60,905	7,189 $62,820	5,743 $66,486	4,148 $71,809	1,512 $85,053	211 $80,244	2 $78,550	37,490 $60,369
60 to 64	969 $20,983	3,778 $49,678	4,398 $55,910	3,595 $59,877	4,953 $61,822	3,843 $63,947	2,086 $67,451	819 $78,867	475 $81,725	72 $91,729	24,988 $58,902
65 to 69	389 $19,585	1,326 $49,451	1,613 $57,850	1,303 $63,033	1,533 $65,383	1,028 $66,257	597 $72,102	345 $79,917	177 $84,080	146 $82,131	8,457 $60,833
70 & Up	202 $18,014	640 $43,233	540 $52,679	484 $54,628	561 $59,681	319 $62,589	183 $65,672	113 $76,002	88 $85,096	134 $103,143	3,264 $55,624
Total	27,974 $20,230	74,501 $48,542	59,348 $56,958	41,057 $63,430	43,867 $66,840	29,994 $69,885	17,299 $74,054	3,684 $82,010	959 $82,047	354 $92,017	299,037 $56,480

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-2: Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2023

	Men		Women	
Age	Number	Compensation	Number	Compensation
15			2	$ 46,841
17			1	19,832
18	10	$ 96,093	10	110,022
19	73	1,046,040	60	731,803
20	130	2,617,232	149	2,661,186
21	218	5,439,480	355	7,229,272
22	345	9,788,847	944	21,655,641
23	666	19,167,007	2,284	61,795,477
24	1,015	36,075,749	2,930	100,428,913
25	1,242	48,489,205	3,218	120,048,804
26	1,304	52,536,410	3,270	126,399,412
27	1,328	57,927,396	3,273	133,529,148
28	1,404	62,864,265	3,415	142,312,924
29	1,504	70,452,253	3,445	148,912,774
30	1,540	75,125,424	3,528	155,260,415
31	1,627	81,023,225	3,727	168,820,744
32	1,723	87,384,895	4,145	193,290,548
33	1,824	97,405,837	4,326	207,186,627
34	1,855	101,891,214	4,458	220,062,863
35	1,905	107,652,031	4,609	231,683,118
36	1,892	107,797,866	4,588	234,257,840
37	1,924	114,114,800	4,773	250,781,405
38	1,980	124,055,370	4,849	259,243,925
39	2,068	128,080,929	5,023	275,135,198
40	2,075	130,891,316	5,124	283,906,281
41	2,209	142,634,494	5,367	301,896,637
42	2,264	147,558,205	5,615	321,912,817
43	2,204	145,114,282	5,652	325,038,598
44	2,391	160,733,215	5,732	335,134,064
45	2,258	154,169,505	5,747	341,159,889
46	2,379	162,844,232	5,896	349,657,828
47	2,372	163,233,407	6,123	363,592,905
48	2,308	162,601,836	5,764	345,684,269
49	2,474	171,456,744	6,218	373,039,006
50	2,527	175,352,515	6,182	372,541,892
51	2,563	178,028,044	6,305	376,701,697
52	2,682	188,095,981	6,538	395,828,684
53	2,860	197,211,690	6,852	411,759,676
54	2,594	185,077,035	6,463	385,925,757

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-2: Number and Reported Compensation of Active Members Distributed by Age as of December 31, 2023 (continued)

	Men		Women	
Age	Number	Compensation	Number	Compensation
55	2,498	$ 176,534,845	5,982	$ 354,350,608
56	2,312	160,930,564	5,578	319,176,154
57	2,174	149,647,029	5,388	309,150,326
58	2,215	147,306,966	5,023	283,511,683
59	2,184	145,039,675	4,877	272,888,997
60	2,095	137,565,463	4,730	266,086,098
61	1,936	126,839,137	4,197	231,510,523
62	1,710	110,523,581	3,804	208,581,801
63	1,480	98,658,480	3,102	173,926,501
64	1,223	80,130,843	2,521	143,616,052
65	1,058	72,118,278	2,045	117,324,408
66	873	58,971,700	1,505	84,855,595
67	692	50,090,954	1,091	60,767,513
68	518	32,262,997	811	45,559,817
69	441	30,220,279	576	30,603,544
70	365	25,951,051	502	26,858,762
71	277	17,101,261	373	18,034,040
72	231	15,165,967	247	13,616,946
73	202	11,384,025	246	12,949,093
74	155	9,195,254	162	7,598,447
75	126	8,090,162	122	5,518,514
76	104	6,555,065	92	4,630,814
77	77	4,692,783	71	3,397,204
78	48	2,658,465	49	2,496,184
79	36	2,209,503	31	1,606,018
80	27	1,695,373	29	1,285,868
81	28	1,647,470	23	820,285
82	13	797,604	9	371,708
83	8	422,021	6	287,554
84	9	650,638	7	320,556
85	2	215,067	4	162,649
86	4	104,951	1	37,926
87	4	178,079	2	131,855
88	2	117,530	1	37,994
90	1	60,057	2	107,209
91	1	66,267	1	33,384
92			1	60,688
Total	88,866	$ 5,541,833,453	210,171	$ 11,347,658,050

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-3: Number and Reported Compensation of Active Members Distributed by Service as of December 31, 2023

	Men		Women	
Service	Number	Compensation	Number	Compensation
0	4,733	$ 68,352,805	12,854	$ 186,061,668
1	8,437	350,151,708	20,316	768,166,753
2	6,423	337,913,055	16,478	742,614,744
3	4,134	227,473,476	9,788	480,785,490
4	3,907	227,446,288	9,906	489,937,109
5	4,466	266,892,586	9,858	502,382,581
6	3,951	241,607,127	8,811	465,464,729
7	3,735	237,406,479	8,451	455,854,917
8	3,633	233,744,333	7,622	424,514,028
9	3,335	216,452,130	7,334	417,444,197
10	3,077	204,154,535	6,754	392,282,768
11	3,028	198,756,828	6,828	401,634,584
12	2,663	185,188,461	5,788	354,108,680
13	2,412	170,863,061	5,166	325,519,745
14	2,140	150,969,975	4,458	283,531,310
15	1,768	132,975,505	4,118	260,945,129
16	2,794	196,855,454	6,434	407,421,542
17	2,522	186,922,511	6,279	404,160,654
18	2,544	188,325,410	6,446	412,479,291
19	2,356	172,380,456	5,914	381,780,574
20	2,132	157,858,001	5,353	350,459,937
21	1,865	140,723,330	4,559	304,033,447
22	1,595	123,708,397	4,077	273,043,298
23	1,704	131,070,382	4,378	292,999,134
24	1,600	126,412,447	4,128	275,804,551
25	1,540	125,387,659	3,781	256,528,241
26	1,369	109,826,697	3,254	227,215,676
27	1,182	96,653,802	2,783	198,369,873
28	1,038	87,192,561	2,336	166,242,328
29	702	58,288,017	1,810	130,932,841
30	582	49,801,580	1,190	88,200,153
31	339	31,146,901	776	59,106,144
32	272	24,578,979	514	40,598,545
33	175	16,795,681	325	24,985,787
34	179	17,208,724	304	23,755,308
35	110	9,742,930	233	17,246,271
36	103	8,975,491	189	13,654,711
37	71	6,129,346	141	11,557,457
38	55	5,115,827	97	8,186,226
39	41	3,598,231	76	5,762,377

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-3: Number and Reported Compensation of Active Members Distributed by Service as of December 31, 2023 (continued)

	Men		Women	
Service	Number	Compensation	Number	Compensation
40	37	$ 3,683,654	65	$ 5,368,000
41	31	3,795,988	37	2,588,504
42	13	1,299,931	30	3,603,011
43	19	1,806,137	20	1,614,509
44	8	1,495,129	15	1,006,281
45	18	2,032,553	26	2,139,066
46	7	690,527	20	1,407,413
47	3	198,251	15	1,265,985
48	2	112,698	5	468,152
49	3	252,595	7	726,070
50	4	354,141	4	280,408
51	3	350,799	5	361,519
52	2	172,792	2	165,795
53			4	300,620
54	1	98,961	6	383,011
55	1	175,131		
56	1	155,970	2	126,585
63	1	111,030		
68			1	80,323
Total	88,866	$ 5,541,833,453	210,171	$ 11,347,658,050

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-4: Number and Valuation Compensation of Disabled Members Distributed by Age as of December 31, 2023

	Men		Women	
Age	Number	Compensation	Number	Compensation
22			1	$ 23,469
26			2	18,666
27			2	17,276
28			2	17,276
30			4	117,274
31	1	$ 46,224	4	118,314
32			3	69,848
33	1	8,638		
34	3	133,728	6	163,263
35	3	55,356	5	134,389
36	2	84,833	8	334,584
37	4	143,185	9	298,401
38	3	118,154	4	160,873
39	5	181,726	12	371,555
40	3	57,918	8	299,705
41	9	365,079	22	737,832
42	7	199,226	22	956,746
43	6	171,393	20	854,376
44	10	393,186	24	933,293
45	10	419,448	39	1,452,511
46	15	527,159	51	1,933,903
47	19	730,320	58	2,079,078
48	21	906,638	71	2,880,888
49	34	1,545,501	79	2,958,818
50	32	1,366,513	71	2,655,246
51	40	1,742,275	94	3,688,830
52	37	1,398,907	118	4,616,874
53	40	1,538,684	142	5,203,297
54	45	1,872,029	135	5,250,336
55	49	2,008,759	144	6,524,908
56	57	2,142,684	151	5,661,744
57	57	2,382,022	177	6,761,937
58	78	3,264,399	207	7,480,692
59	91	3,715,295	220	8,291,411
60	76	3,896,768	212	7,354,238
61	77	3,059,256	160	5,810,061
62	74	2,864,418	162	5,274,797
63	77	3,171,471	192	6,542,496
64	75	2,983,550	173	6,110,912
65	49	1,802,412	82	2,873,216

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-4: Number and Valuation Compensation of Disabled Members Distributed by Age as of December 31, 2023 (continued)

	Men		Women	
Age	Number	Compensation	Number	Compensation
66	1	$ 18,900	4	$ 183,691
67	1	61,055	3	117,174
68	1	27,503	3	59,316
69			1	27,390
70	2	101,447		
71	3	59,834	1	15,280
72			3	51,332
74			1	29,584
75	1	13,893		
Total	1,119	$ 45,579,786	2,912	$ 107,517,100

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-5: Number and Deferred Annual Retirement Allowances of Terminated Vested Members Distributed by Age as of December 31, 2023

	Men		Women	
Age	Number	Allowances	Number	Allowances
23	1	$ 3,654		
24	1	4,668	1	$ 2,393
25	3	9,117	5	18,771
26	4	18,330	2	6,858
27	19	82,785	23	94,842
28	27	135,720	81	379,486
29	72	353,048	224	1,051,447
30	101	517,903	412	2,145,389
31	170	933,113	545	2,932,207
32	202	1,159,710	693	3,876,404
33	234	1,491,813	893	5,281,145
34	289	1,831,987	968	5,844,290
35	352	2,366,526	964	6,074,795
36	338	2,351,268	1,103	7,238,365
37	366	2,619,875	1,110	7,471,518
38	413	3,077,535	1,255	8,591,304
39	506	3,733,476	1,283	9,153,731
40	499	4,023,809	1,420	10,148,641
41	534	4,255,386	1,511	11,511,405
42	539	4,365,152	1,590	12,065,202
43	584	5,339,132	1,575	12,889,220
44	535	4,730,874	1,587	12,442,296
45	566	5,291,577	1,548	13,024,592
46	593	5,767,715	1,515	13,121,083
47	607	6,339,288	1,479	12,819,616
48	599	6,151,146	1,453	13,052,074
49	637	6,981,982	1,524	13,407,137
50	599	6,173,551	1,464	13,252,262
51	598	5,924,161	1,469	12,689,544
52	639	6,426,404	1,501	12,640,702
53	678	6,650,881	1,645	13,475,144
54	664	6,555,609	1,668	14,272,859
55	584	5,983,414	1,607	13,434,634
56	549	5,362,074	1,491	11,881,019
57	559	5,260,573	1,408	11,203,202
58	531	5,130,462	1,348	11,454,027
59	583	5,554,971	1,468	11,650,094
60	540	5,308,249	1,352	10,963,657
61	453	4,229,773	1,092	8,120,049
62	363	3,121,907	1,029	7,337,254
63	329	2,875,978	880	6,485,983
64	302	2,858,334	729	4,742,006
65	257	1,977,042	611	4,175,059
66	148	1,151,413	374	2,428,948

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-5: Number and Deferred Annual Retirement Allowances of Terminated Vested Members Distributed by Age as of December 31, 2023 (continued)

	Men		Women	
Age	Number	Allowances	Number	Allowances
67	120	$ 849,068	307	$ 2,025,678
68	100	783,528	220	1,231,050
69	69	426,292	211	1,246,407
70	56	376,566	176	1,026,029
71	46	357,871	112	586,361
72	43	314,841	87	533,551
73	22	191,293	64	568,768
74	14	94,015	38	151,574
75	10	27,048	16	204,234
76	9	62,900	26	160,297
77	12	101,609	15	111,877
78	14	91,672	8	52,870
79	7	49,997	8	47,753
80	7	59,028	1	7,656
81	4	35,363	5	26,000
82	1	2,679	7	24,559
83	2	5,892	7	9,927
84	4	12,233	2	5,045
85	3	8,330	2	2,081
86	3	18,848	3	6,065
87	1	1,157	1	2,902
89	2	2,209	1	2,628
90	1	35,566		
94	1	352		
97	1	2,472		
Total	17,719	$ 158,392,214	47,217	$ 362,883,966

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-6: Number and Accumulated Contributions of Terminated Non-Vested Members Distributed by Age as of December 31, 2023

	Men		Women	
Age	Number	Contributions	Number	Contributions
18			1	$ 42
19	6	$ 2,855	8	3,401
20	28	26,808	65	46,355
21	74	85,251	104	113,970
22	122	182,165	252	288,115
23	234	398,498	495	766,289
24	371	807,694	905	1,789,657
25	558	1,351,251	1,377	3,586,791
26	727	2,076,139	1,817	5,863,497
27	867	2,767,241	2,187	8,267,429
28	1,035	3,848,040	2,473	10,123,052
29	1,144	4,483,707	2,783	11,905,526
30	1,296	5,078,889	2,906	13,252,910
31	1,404	5,395,255	3,078	14,964,594
32	1,445	6,050,660	3,183	15,012,388
33	1,521	6,488,095	3,430	16,895,378
34	1,565	7,032,871	3,516	17,343,125
35	1,526	7,212,476	3,473	17,709,019
36	1,522	7,229,061	3,468	17,639,882
37	1,519	7,344,726	3,279	17,226,952
38	1,438	6,772,525	3,388	18,631,175
39	1,522	7,446,350	3,487	18,673,648
40	1,354	6,924,442	3,500	19,458,030
41	1,509	7,640,095	3,452	18,904,064
42	1,396	7,207,259	3,465	19,349,092
43	1,360	7,288,919	3,371	19,507,359
44	1,376	7,076,358	3,358	19,232,523
45	1,260	6,675,010	3,146	18,411,365
46	1,250	7,182,655	3,029	18,448,143
47	1,232	7,431,710	2,894	16,902,536
48	1,104	6,188,924	2,700	15,684,804
49	1,102	6,178,688	2,778	15,834,485
50	1,127	6,621,978	2,492	14,575,590
51	1,136	6,743,327	2,472	14,206,833
52	1,141	6,311,490	2,480	14,708,748
53	1,225	7,221,410	2,645	15,471,328
54	1,079	6,430,161	2,539	14,721,314
55	1,004	6,132,524	2,141	12,389,764
56	982	5,925,297	1,981	11,356,422
57	906	5,281,579	1,872	10,461,986
58	910	5,241,730	1,774	10,021,499
59	853	5,030,372	1,811	10,039,157
60	762	4,559,722	1,621	9,208,829
61	659	3,735,977	1,401	7,648,650

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-6: Number and Accumulated Contributions of Terminated Non-Vested Members Distributed by Age as of December 31, 2023 (continued)

	Men		Women	
Age	Number	Contributions	Number	Contributions
62	622	$ 3,250,020	1,348	$ 7,268,182
63	640	3,607,713	1,215	6,785,252
64	509	3,021,745	1,071	6,143,643
65	479	2,790,024	876	5,099,530
66	402	2,389,153	710	4,091,598
67	368	2,101,010	657	3,796,888
68	347	2,097,860	558	2,997,070
69	351	1,997,287	567	2,944,873
70	284	1,731,197	456	2,532,931
71	221	1,146,961	394	2,471,938
72	203	1,103,518	302	1,835,790
73	152	829,004	216	1,242,173
74	79	386,345	170	785,591
75	75	309,840	100	481,847
76	54	203,534	59	245,900
77	39	116,406	59	236,183
78	21	78,917	36	174,861
79	30	173,100	22	67,890
80	19	59,194	15	103,084
81	10	60,728	11	87,711
82	12	34,023	11	43,149
83	10	34,841	7	66,544
84	12	31,983	7	11,252
85	11	57,002	8	5,441
86	4	24,147	8	38,446
87	5	34,204	6	17,685
88	3	6,614	3	21,797
89	7	16,306	4	5,704
90	4	3,352	4	547
91	4	24,763	1	252
92	2	933	2	162
93	1	5,242	4	1,856
94	1	209		
95	2	6,395	2	3,238
96	1			
97			2	6,055
98	3	93	2	234
99			3	59
100	1	2,078	2	26
101			1	87
102			2	242
103	1	149	1	345
104			1	250
105			1	57
106	1	1,393	1	14
Total	49,641	$ 248,847,467	111,522	$ 586,262,093

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-7: Number and Annual Retirement Allowances of Retired Members (Healthy at Retirement) and Survivors of Deceased Members Distributed by Age as of December 31, 2023

	Men		Women	
Age	Number	Allowances	Number	Allowances
<20	5	$ 22,209	2	$ 18,993
20			3	37,030
21	6	63,902	2	28,561
22				
23			4	64,689
24	3	17,539	3	30,116
25	8	64,345	3	19,274
26	6	99,359	6	43,345
27	8	43,956	9	136,299
28	8	86,682	7	102,054
29	4	51,893	7	85,782
30	7	92,371	10	360,038
31	6	71,761	15	189,906
32	12	172,815	12	116,543
33	10	109,128	11	132,136
34	15	175,934	19	178,984
35	22	175,824	20	232,541
36	14	236,259	17	194,139
37	16	148,970	25	294,657
38	15	146,891	23	235,141
39	15	182,241	17	204,542
40	27	262,803	20	156,994
41	24	287,206	30	345,823
42	33	298,269	33	399,016
43	29	420,252	32	280,229
44	21	262,868	36	387,072
45	27	236,212	35	453,781
46	23	280,452	39	466,672
47	29	391,652	48	476,164
48	36	681,074	50	654,383
49	58	1,309,488	52	629,174
50	103	2,827,905	88	1,746,926
51	228	7,012,764	295	6,899,125
52	393	12,391,850	526	13,937,527
53	483	16,232,235	832	23,696,417
54	608	20,678,200	1,038	32,273,928
55	630	21,415,681	1,234	37,304,313
56	755	25,483,263	1,306	39,125,637
57	842	28,044,957	1,467	43,536,755
58	890	29,318,275	1,555	46,077,039
59	934	30,331,008	1,831	53,218,393
60	1,150	36,247,878	2,243	62,619,991
61	1,494	44,938,646	3,066	79,239,842
62	1,627	45,744,183	3,672	88,890,228
63	1,917	48,479,382	4,460	94,957,991

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-7: Number and Annual Retirement Allowances of Retired Members (Healthy at Retirement) and Survivors of Deceased Members Distributed by Age as of December 31, 2023 (continued)

	Men		Women	
Age	Number	Allowances	Number	Allowances
64	2,041	$ 49,363,513	5,054	$ 106,013,624
65	2,310	54,252,178	5,555	111,056,582
66	2,541	57,893,186	6,473	132,545,453
67	2,787	61,667,292	7,098	144,635,915
68	2,952	65,383,957	7,271	148,307,041
69	3,088	69,005,524	7,534	152,771,304
70	3,115	69,164,249	7,965	162,591,315
71	3,210	73,323,972	8,134	167,903,535
72	3,293	75,206,204	8,008	165,793,190
73	3,244	73,128,710	7,642	157,657,149
74	3,127	71,757,312	7,317	146,615,950
75	3,171	72,740,924	7,139	141,172,783
76	3,137	72,604,346	6,949	135,214,639
77	3,307	78,656,172	7,302	141,846,152
78	2,255	52,812,871	4,924	93,523,609
79	2,190	50,921,059	4,521	84,628,432
80	1,923	45,303,606	4,446	83,225,830
81	1,912	47,346,032	4,326	80,692,562
82	1,511	36,247,331	3,493	63,533,369
83	1,326	31,985,486	3,046	55,116,158
84	1,156	28,534,191	2,755	49,864,133
85	1,055	26,219,802	2,426	43,298,117
86	889	21,660,240	2,249	38,739,892
87	730	18,725,939	1,865	32,859,217
88	689	17,491,178	1,737	30,674,871
89	537	13,792,853	1,603	27,266,084
90	456	11,193,708	1,217	20,253,180
91	359	8,832,226	1,087	18,305,222
92	312	7,591,901	943	16,709,443
93	223	5,849,813	717	12,673,940
94	193	4,796,861	600	10,391,535
95	130	3,613,898	486	7,891,369
96	82	1,919,286	350	5,915,468
97	66	1,767,371	247	3,744,378
98	52	1,233,688	201	3,130,068
99	25	472,466	119	1,817,496
100+	40	879,216	238	3,363,428
Total	71,975	$ 1,758,877,143	167,240	$ 3,432,220,623

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-8: Number and Annual Retirement Allowances of Retired Members (Healthy at Retirement) and Survivors of Deceased Members Distributed by Annuity Type as of December 31, 2023

	Men		Women	
Annuity Type	Number	Allowances	Number	Allowances
Maximum	24,134	$ 569,874,861	90,196	$ 1,823,529,030
Option 1	283	8,811,809	1,073	20,530,087
Option 2	14,739	362,524,827	11,263	200,112,878
Option 3	3,547	104,808,530	4,542	99,269,825
Option 4	8,675	215,187,499	24,118	537,712,055
Option 5-2	55	1,754,362	28	254,312
Option 5-3	29	1,002,007	31	650,004
Option 6-2	11,511	302,211,824	13,957	306,282,369
Option 6-3	4,088	127,088,545	8,572	223,225,352
Other	4	261,773	1	16,503
Survivors of Deceased Members	4,910	65,351,106	13,459	220,638,208
Total	71,975	$ 1,758,877,143	167,240	$ 3,432,220,623

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-9: Number and Annual Retirement Allowances of Retired Members (Disabled at Retirement) Distributed by Age as of December 31, 2023

	Men		Women	
Age	Number	Allowances	Number	Allowances
50	2	$ 44,095		
51	1	25,253		
52	2	33,085	6	$ 138,975
53	7	161,184	9	221,475
54	12	283,408	27	696,464
55	24	549,810	27	637,261
56	26	582,184	33	817,276
57	33	705,472	36	907,404
58	24	476,971	43	1,000,260
59	41	890,637	56	1,281,613
60	45	1,016,781	87	1,790,888
61	75	1,597,136	153	3,105,532
62	97	1,820,112	182	3,486,489
63	74	1,454,820	239	4,280,708
64	82	1,606,906	187	3,419,850
65	139	2,323,351	289	4,838,677
66	197	3,358,553	396	6,469,105
67	198	3,256,383	386	6,012,580
68	181	2,995,073	452	7,424,417
69	179	2,970,316	428	7,087,912
70	181	3,138,788	481	8,209,053
71	209	3,602,840	490	8,774,354
72	204	3,632,315	518	9,352,231
73	204	3,593,485	563	9,952,634
74	208	3,534,937	478	8,284,220
75	195	3,383,445	448	8,104,499
76	238	4,353,067	455	7,859,467

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-9: Number and Annual Retirement Allowances of Retired Members (Disabled at Retirement) Distributed by Age as of December 31, 2023 (continued)

	Men		Women	
Age	Number	Allowances	Number	Allowances
77	208	$ 3,888,814	458	$ 8,038,789
78	136	2,438,784	320	5,405,934
79	107	1,894,343	303	4,882,135
80	99	1,699,322	280	4,104,326
81	97	1,760,421	261	4,250,970
82	62	1,118,123	191	2,926,016
83	50	703,928	159	2,138,735
84	58	897,888	110	1,591,765
85	33	472,026	127	1,639,191
86	29	500,439	101	1,340,957
87	19	255,090	55	753,628
88	10	186,420	44	580,228
89	8	143,655	19	239,927
90	6	110,726	24	277,410
91	4	168,662	17	170,108
92	8	119,641	10	125,263
93	9	79,009	16	190,348
94			9	122,530
95	1	7,189	7	100,237
96			7	73,852
97			4	77,363
98			5	47,774
99			1	6,606
100			2	28,795
Total	3,822	$ 67,834,887	8,999	$ 153,266,231

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-10: Number and Annual Retirement Allowances of Retired Members (Disabled at Retirement) Distributed by Annuity Type as of December 31, 2023

	Men		Women	
Annuity Type	Number	Allowances	Number	Allowances
Maximum	1,846	$ 34,751,855	6,243	$ 109,073,109
Option 1	34	666,239	125	1,916,693
Option 2	855	12,644,595	840	11,670,904
Option 3	173	3,268,392	294	4,638,959
Option 4	131	2,831,730	393	7,171,602
Option 5-2	1	20,506		
Option 5-3				
Option 6-2	595	9,811,228	710	11,373,692
Option 6-3	187	3,840,342	393	7,400,310
Other			1	20,962
Total	3,822	$ 67,834,887	8,999	$ 153,266,231

Appendix A: Detailed Tabulations of Member Data (continued)

Table A-11: Number and Annual Retirement Allowances of Retired Members and Survivors of Deceased Members Distributed by Amount of Annual Retirement Allowance as of December 31, 2023

Amount of Annual Retirement Allowances	Number of Retired Members and Survivors	Sum of Annual Retirement Allowances
$0 -$ 4,999	31,180	$ 95,227,641
$5,000 - $9,999	41,065	305,715,914
$10,000 - $14,999	35,418	440,960,817
$15,000 - $19,999	28,195	490,428,520
$20,000 - $24,999	24,459	551,005,457
$25,000 - $29,999	23,985	658,993,957
$30,000 - $34,999	22,921	743,025,135
$35,000 - $39,999	16,455	614,218,695
$40,000 -$ 44,999	10,126	428,225,898
$45,000 - $49,999	6,120	289,315,349
$50,000 & over	12,112	795,081,500
Total	252,036	$ 5,412,198,884

Appendix B: Summary of Main Benefit and Contribution Provisions

A summary of the main benefit provisions of the Retirement System and of the sources of revenue from which benefits are paid is presented in the following digest. Items in parentheses in the text are the provisions applicable to law enforcement officers.

Average final compensation

The average annual compensation during the four consecutive years of membership service that afford the highest such average

Membership service

Service represented by regular contributions

Creditable service

Membership service, which may also include certain non-contributory or purchased service

Membership

Membership in TSERS is automatic for eligible employees who are permanent, full-time teachers or employees of a state-supported board of education or community college, a permanent employee of the state (or any of its agencies, departments, bureaus or institutions) and work at least 30 hours per week for nine months per year, a permanent employee of a charter school that participates in TSERS and works at least 30 hours per week for nine months per year, or a community college President hired after June 30, 2018. Faculty members, administrators or other eligible employees at a state institution of higher education as well as community college presidents hired on or before to June 30, 2018 may join the ORP instead of TSERS.

Agricultural Extension Service employees and members of the Federal Employees' Retirement System, new employees of the University of North Carolina Health Care System hired on or after Jan. 1, 2024, and employees of the Medical Faculty Practice Plan or ECU Dental School Clinical hired on or after Jan. 1, 2024 are not eligible for membership in TSERS.

Benefits

Unreduced Retirement Allowance

Condition for Allowance

An unreduced retirement allowance is payable to any member who retires from service:

(a) after age 65 (55) and completion of five years of creditable service.

(b) after age 60 and completion of 25 years of creditable service (not applicable to law enforcement officers); or

(c) after completion of 30 years of creditable service.

Amount of Allowance

1.82% of average final compensation multiplied by the number of years of creditable service.

In no event will a member whose creditable service commenced on or before June 30, 1963 receive a smaller retirement allowance than he would have received under the benefit provisions of the system in effect on that date.

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

Reduced Retirement Allowance

Condition for Allowance

A reduced retirement allowance is payable to any member who retires from service prior to becoming eligible for an unreduced retirement allowance but after age 60 and completion of five years of membership service (age 55 and five years of creditable service).

Amount of Allowance

The member's reduced retirement allowance is equal to 1.82% of average final compensation multiplied by the number of years of creditable service at date of retirement reduced by 1/4 of 1% for each month by which the member’s age at retirement is less than age 65.

In no event will a member whose creditable service commenced on or before June 30, 1963 receive a smaller retirement allowance than he would have received under the benefit provisions of the system in effect on that date.

OR

Condition for Allowance

A reduced retirement allowance is payable to any member who retires from service after age 50 and completion of 20 (15) years of creditable service but prior to becoming eligible for a reduced or unreduced retirement allowance.

Amount of Allowance

The member's reduced retirement allowance is equal to 1.82% of average final compensation multiplied by the number of years of creditable service at date of retirement reduced by the lesser of:

(i) 5/12 (1/3) of 1% for each month by which his or her age is less than 60 (55), plus, if the member is not a law enforcement officer, 1/4 of 1% for each month by which his or her age is less than 65.

(ii) 5% times the difference between 30 years and his or her creditable service at retirement.

OR

Condition for Allowance

A reduced retirement allowance is payable to any law enforcement officer who retires from service at any age with 25 years of service (15 years as an officer), but prior to becoming eligible for a reduced or unreduced retirement allowance.

Amount of Allowance

The member's reduced retirement allowance is equal to 1.82% of average final compensation multiplied by the number of years of creditable service at date of retirement reduced by the lesser of:

(i) 1/3 of 1% for each month by which his or her age is less than 55,

(ii) 5% times the difference between 30 years and creditable service at retirement plus 4% times the difference between age 50 and the member’s age at retirement.

Deferred Retirement Allowance

Any member who separates from service after completing five or more years of membership service prior to becoming eligible for an unreduced or reduced retirement allowance and who leaves his or her total accumulated contributions in the system may receive a deferred retirement allowance, beginning at age 60 (55), computed in the same way as a reduced retirement allowance, or, if the member has 20 (15) or more years of service, at age 50 computed in the same way as a reduced service retirement allowance, on the basis of creditable service and compensation to the date of separation.

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

Return of Contributions

Upon the withdrawal of a member without a retirement allowance and upon his or her request, the member's contributions are returned, together with accumulated regular interest.

Upon the death of a member before retirement, his or her contributions, together with the full accumulated regular interest thereon, are paid to his or her estate or to person(s) designated by the member unless the designated beneficiary, if eligible, elects the survivor's alternate benefit described below.

The current interest rate on member contributions is 4%.

Survivor's Alternate Benefit

Upon the death of a member in service who has met conditions (a) or (b) below, his or her designated beneficiary may elect to receive a benefit equal to that which would have been payable under the provisions of Option 2 had the member retired on the first day of the month following his or her death and elected such option, in lieu of the member's accumulated contributions, provided the member had not instructed the Board of Trustees in writing that he or she did not wish the alternate benefit to apply.

a) age 60 (55) and completion five years of membership (creditable) service; or
b) completion of 20 years of creditable service.

Members receiving a benefit from the Disability Income Plan are eligible for this benefit.

Death After Retirement

Upon the death of a beneficiary who did not retire under an effective election of Option 2, 3, 5 or 6, an amount equal to the excess if any, of the member's accumulated contributions at retirement over the retirement allowance payments received is paid to a designated person or to the beneficiary's estate.

Upon the death of the survivor of a beneficiary who retired under an effective election of Option 2 or Option 3, an Upon the death of the survivor of a beneficiary who retired under an effective election of Option 2, 3, 5 or 6, an amount equal to the excess, if any, of the beneficiary's accumulated contributions at retirement over the total retirement allowance payments received is paid to such other person designated by the beneficiary or to the beneficiary's estate.

Upon the death of a beneficiary, a benefit may be provided by the Retirees' Contributory Death Benefit Plan.

Other Death Benefits

Upon the death of a member in service, other benefits may be provided by the Death Benefit Plan or Separate Insurance Benefit Plan for Law Enforcement Officers.

Optional Arrangements at Retirement

In lieu of the full retirement allowance, any member may elect to receive a reduced retirement allowance equal in value to the full allowance, with the provision that:

Option 1 A member retiring prior to July 1, 1993, may elect that at his or her or her death within 10 years from his or her retirement date, an amount equal to his or her accumulated contributions at retirement, less 1/120 for each month he has received a retirement allowance, is paid to his or her estate, or to a person(s) designated by the member, or

Option 2 At the death of the member his or her allowance shall be continued throughout the life of such other person as the member shall have designated at the time of his or her retirement, or

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

Option 3 At the death of the member one-half of his or her allowance shall be continued throughout the life of such other person as the member shall have designated at the time of his or her retirement.

Option 4 A member may elect to receive a retirement allowance in such an amount that, together with his or her Social Security benefit, he or she will receive approximately the same income per annum before and after the earliest age at which he or she becomes eligible to receive the Social Security benefit.

Option 5 A member retiring prior to July 1, 1993 may elect to receive a reduced retirement allowance under the provisions of Option 2 or Option 3 in conjunction with the provisions of Option 1.

Option 6 A member may elect either Option 2 or Option 3 with the added provision that in the event the designated beneficiary predeceases the member, the retirement allowance payable to the member after the designated beneficiary's death shall be equal to the retirement allowance which would have been payable had the member not elected the option.

Post-Retirement Increases in Allowances

Future increases in allowances may be granted at the discretion of the State.

Service Reciprocity

For the purpose of determining eligibility for a deferred, reduced or unreduced service retirement allowance, the membership and creditable service of a member shall include such prior service earned as a member of the Local Governmental Employees' Retirement System (LGERS), the Consolidated Judicial Retirement System (CJRS), or the Legislative Retirement System (LRS). In addition, if the member's accumulated contributions and reserves are transferred from the prior System to this System, the creditable service earned as a member of the prior System may be included for purposes of determining the amount of benefits payable under this System.

Military Service

For periods of active duty in the United States military may be counted as creditable service if the member was an employee upon entering the military and returned to employment within two years of discharge or for a period of 10 additional years.

Service Purchases

Additional creditable service may include service that the member purchased to restore a period of service for which the member:

1) received a refund of contributions,
2) had a leave of absence for educational purposes, extended illness or parental or maternity reasons,
3) had full-time temporary or part-time local or State government employment,
4) was in a probationary or waiting period with a unit of the LGERS,
5) had a leave of absence under Workers' Compensation,
6) performed service with a unit of local government not covered by LGERS,
7) performed service with the federal government or to another state not covered by any other retirement system,
8) performed service with a public community service entity funded entirely with federal funds,
9) performed service as a member of the General Assembly,
10) performed service as a member of a charter school not participating in the system,
11) was employed by The University of North Carolina and participated in the Optional Retirement Program but not eligible to receive any benefits from that program, or
12) performed service which was omitted by reason of error.

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

Unused Sick Leave

Unused sick leave counts as creditable service at retirement. Sick leave which was converted from unused vacation leave is also creditable. One month of credit is allowed for each 20 days of unused sick leave, plus an additional month for any part of 20 days left over.

Transfer of Defined Contribution Balances (Special Retirement Allowances)

A member may make a one-time election to transfer any portion of their eligible accumulated contributions to this plan on or after retirement. Eligible accumulated contributions are those from the Supplemental Retirement Income Plan or Public Employee Deferred Compensation Plan, not including Roth after-tax contributions. A member who became a member of the Supplemental Retirement Income Plan prior to retirement and who remains a member of the Supplemental Retirement Income Plan may also make a one-time election to transfer eligible balances, not including any Roth after-tax contributions, from any of the following plans to the Supplemental Retirement Income Plan, subject to the applicable requirements of the Supplemental Retirement Income Plan, and then through the Supplemental Retirement Income Plan to this Retirement System:

1) A plan participating in the North Carolina Public School Teachers' and Professional Educators' Investment Plan.
2) A plan described in section 403(b) of the Internal Revenue Code.
3) A plan described in section 457(b) of the Internal Revenue Code that is maintained by a state, political subdivision of a state, or any agency or instrumentality of a state or political subdivision of a state.
4) An individual retirement account or annuity described in Section 408(a) or 408(b) of the Internal Revenue Code that is eligible to be rolled over and would otherwise be includible in gross income.
5) A tax-qualified plan described in section 401(a) or 403(a) of the Internal Revenue Code.

The member may elect to convert the accumulated contributions to a life annuity with or without annual increases equal to the annual increase in the U.S. Consumer Price Index. Any ad-hoc COLA increases granted will not apply to benefits under this section. A member may elect Options 2, 3, or 6 under the Plan and may also elect either a guaranteed number of months of payments or a guarantee of total payments at least equal to the amount of contributions transferred to the Plan. In addition, any transfer may be paid in whole or in part with employer contributions paid directly to the Retirement System at the time of transfer.

Contributions

Member Contributions

Each member contributes 6% of his or her compensation.

Employer Contributions

Employers make annual contributions consisting of a normal contribution and an accrued liability contribution. The normal contribution covers the liability on account of current service and is determined by the actuary after each valuation.

The accrued liability contribution covers the past service liability that exceeds the actuarial value of assets.

The minimum total employer contribution rate is 6.00%.

Changes Since Prior Valuation

This valuation and the projections herein reflect the provisions of S.L. 2023-134, which excludes UNC Health and ECU Health employees hired on or after January 1, 2024 from participation in TSERS. There have been no other significant changes in benefit provisions from the previous valuation.

Appendix C: Actuarial Assumptions and Methods

Assumptions are based on the experience investigation prepared as of December 31, 2019 and adopted by the Board of Trustees on January 28, 2021 for use beginning with the December 31, 2020 annual actuarial valuation.

Interest Rate

6.50% per annum, compounded annually.

Price Inflation

2.50% per annum, compounded annually.

Real Wage Growth

0.75% per annum.

Payroll Growth

3.25% per annum.

Separations From Active Service

Representative values of the assumed rates of separation from active service are as follows:

Rates of Withdrawal

Up to five years of membership								
	General Employees		Teachers, Librarians, and Counselors		Law Enforcement Officers		Other Education	
Service	Male	Female	Male	Female	Male	Female	Male	Female
0	0.0900	0.0900	0.0500	0.0350	0.0350	0.0350	0.0900	0.0700
1	0.1700	0.1750	0.1750	0.1650	0.0925	0.0925	0.1900	0.1750
2	0.1500	0.1575	0.1550	0.1550	0.0925	0.0925	0.1700	0.1550
3	0.1250	0.1400	0.1450	0.1375	0.0950	0.0950	0.1300	0.1250
4	0.1100	0.1150	0.1150	0.1150	0.0800	0.0800	0.1100	0.1075

After five years of membership								
	General Employees		Teachers, Librarians, and Counselors		Law Enforcement Officers		Other Education	
Age	Male	Female	Male	Female	Male	Female	Male	Female
25	0.2500	0.2500	0.3000	0.3500	0.0750	0.0750	0.2500	0.2500
30	0.1250	0.1200	0.0900	0.1000	0.0750	0.0750	0.1000	0.1500
35	0.0750	0.1000	0.0600	0.0575	0.0350	0.0350	0.0550	0.0750
40	0.0500	0.0575	0.0475	0.0400	0.0250	0.0250	0.0500	0.0650
45	0.0400	0.0400	0.0375	0.0350	0.0200	0.0200	0.0500	0.0475
50	0.0400	0.0400	0.0425	0.0400	0.0200	0.0200	0.0500	0.0450
55	0.0400	0.0400	0.0425	0.0400			0.0400	0.0350
60	0.0400	0.0400	0.0425	0.0400			0.0400	0.0350

Appendix C: Actuarial Assumptions and Methods (continued)

Annual Rates of Mortality for Employees

(Base rates using Pub-2010 Amount weighted)

	General Employees		Teachers, Librarians, and Counselors		Law Enforcement Officers		Other Education	
Age	Male	Female	Male	Female	Male	Female	Male	Female
25	0.00028	0.00009	0.00016	0.00009	0.00037	0.00020	0.00028	0.00009
30	0.00036	0.00015	0.00022	0.00014	0.00041	0.00027	0.00036	0.00015
35	0.00047	0.00023	0.00030	0.00020	0.00047	0.00036	0.00047	0.00023
40	0.00066	0.00036	0.00042	0.00031	0.00059	0.00049	0.00066	0.00036
45	0.00098	0.00056	0.00067	0.00048	0.00082	0.00067	0.00098	0.00056
50	0.00149	0.00083	0.00111	0.00073	0.00120	0.00091	0.00149	0.00083
55	0.00219	0.00123	0.00172	0.00107	0.00175	0.00123	0.00219	0.00123
60	0.00319	0.00186	0.00264	0.00161	0.00264	0.00168	0.00319	0.00186
65	0.00468	0.00296	0.00435	0.00270	0.00410	0.00228	0.00468	0.00296
70	0.00703	0.00489	0.00709	0.00485	0.00766	0.00454	0.00703	0.00489
74	0.01001	0.00731	0.00993	0.00809	0.01263	0.00787	0.01001	0.00731

Annual Rates of Disability

Active Members with 5 or more years of service as of January 1, 1988

	General Employees		Teachers, Librarians, and Counselors		Law Enforcement Officers		Other Education	
Age	Male	Female	Male	Female	Male	Female	Male	Female
25	0.00020	0.00024	0.00006	0.00018	0.00330	0.00330	0.00020	0.00024
30	0.00040	0.00040	0.00012	0.00026	0.00430	0.00430	0.00040	0.00040
35	0.00100	0.00100	0.00030	0.00060	0.00600	0.00600	0.00100	0.00100
40	0.00300	0.00180	0.00066	0.00102	0.00790	0.00790	0.00300	0.00180
45	0.00500	0.00320	0.00138	0.00178	0.01100	0.01100	0.00500	0.00320
50	0.00840	0.00500	0.00234	0.00316	0.01760	0.01760	0.00840	0.00500
55	0.01440	0.00880	0.00474	0.00554	0.03070	0.03070	0.01440	0.00880
60	0.02400	0.01380	0.00768	0.01020	0.06010	0.06010	0.02400	0.01380
64	0.03160	0.01780	0.01124	0.01392	0.11210	0.11210	0.03160	0.01780

Appendix C: Actuarial Assumptions and Methods (continued)

Retirements

Representative values of the assumed rates of retirement from active service are as follows:

Annual Rates of Retirement

General Employees

Male				Service			
Age	5	10	15	20	25	30	35
50				0.030	0.040	0.600	0.600
55				0.030	0.040	0.350	0.350
60	0.090	0.070	0.070	0.100	0.225	0.270	0.270
65	0.180	0.250	0.250	0.300	0.400	0.300	0.300
70	0.180	0.250	0.225	0.225	0.250	0.300	0.300
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Female				Service			
Age	5	10	15	20	25	30	35
50				0.035	0.040	0.400	0.400
55				0.040	0.040	0.250	0.250
60	0.070	0.080	0.090	0.095	0.200	0.250	0.250
65	0.200	0.250	0.300	0.300	0.350	0.300	0.300
70	0.150	0.200	0.225	0.250	0.350	0.300	0.300
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Teachers, Librarians, and Counselors

Male				Service			
Age	5	10	15	20	25	30	35
50				0.030	0.030	0.700	0.700
55				0.045	0.030	0.450	0.450
60	0.085	0.080	0.100	0.100	0.300	0.300	0.300
65	0.175	0.225	0.250	0.325	0.400	0.250	0.250
70	0.175	0.225	0.250	0.250	0.250	0.300	0.300
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Female				Service			
Age	5	10	15	20	25	30	35
50				0.050	0.045	0.750	0.750
55				0.050	0.045	0.375	0.375
60	0.080	0.100	0.100	0.130	0.250	0.375	0.375
65	0.250	0.300	0.250	0.350	0.475	0.400	0.400
70	0.225	0.250	0.300	0.300	0.300	0.325	0.325
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Appendix C: Actuarial Assumptions and Methods (continued)

Law Enforcement Officers

	Service						
Age	5	10	15	20	25	30	35
50			0.040	0.050	0.050	0.800	0.800
55	0.200	0.200	0.350	0.350	0.500	0.650	0.650
60	0.100	0.200	0.125	0.250	0.250	0.500	0.500
65	0.150	0.450	0.250	0.250	0.250	0.500	0.500
70	0.250	0.150	0.250	0.250	0.250	0.500	0.500
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Other Education

Male	Service						
Age	5	10	15	20	25	30	35
50				0.035	0.045	0.500	0.500
55				0.040	0.050	0.300	0.300
60	0.080	0.070	0.100	0.090	0.200	0.275	0.275
65	0.100	0.250	0.250	0.300	0.275	0.275	0.275
70	0.100	0.250	0.250	0.225	0.300	0.350	0.350
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Female	Service						
Age	5	10	15	20	25	30	35
50				0.045	0.045	0.500	0.500
55				0.045	0.060	0.300	0.300
60	0.070	0.090	0.100	0.100	0.300	0.300	0.300
65	0.175	0.250	0.250	0.300	0.350	0.350	0.350
70	0.150	0.200	0.225	0.200	0.275	0.350	0.350
75	1.000	1.000	1.000	1.000	1.000	1.000	1.000

Salary Merit Increases

Total assumed salary increases are these merit rates combined with the wage inflation assumption of 3.25% (2.50% price inflation plus 0.75% real wage growth). Representative values of the assumed annual rates of salary merit increases are as follows:

Service	General Employees	Teachers, Librarians and Counselors	Law Enforcement Officers	Other Education
0	3.00%	4.05%	4.80%	4.25%
5	1.80%	2.87%	3.10%	2.65%
10	1.10%	2.04%	2.00%	1.85%
15	0.60%	1.13%	0.80%	1.33%
20	0.50%	0.00%	0.80%	0.83%
25	0.40%	0.00%	0.80%	0.33%
30	0.00%	0.00%	0.40%	0.00%
>=35	0.00%	0.00%	0.00%	0.00%

Appendix C: Actuarial Assumptions and Methods (continued)

Post-Retirement Mortality

Representative values of the assumed post-retirement mortality rates as of 2010 prior to any mortality improvements are as follows:

Annual Rates of Post-Retirement Mortality (members healthy at retirement)

	General Employees		Teachers, Librarians, and Counselors		Law Enforcement Officers		Other Education	
Age	Male	Female	Male	Female	Male	Female	Male	Female
55	0.00455	0.00272	0.00335	0.00266	0.00327	0.00279	0.00455	0.00272
60	0.00649	0.00365	0.00471	0.00344	0.00549	0.00482	0.00649	0.00365
65	0.00963	0.00582	0.00672	0.00456	0.00957	0.00832	0.00963	0.00582
70	0.01610	0.01010	0.01183	0.00789	0.01711	0.01438	0.01610	0.01010
75	0.02818	0.01789	0.02187	0.01499	0.03085	0.02483	0.02818	0.01789
80	0.05037	0.03360	0.04030	0.02895	0.05571	0.04287	0.05037	0.03360

Annual Rates of Post-Retirement Mortality (survivor and members disabled at retirement)

	Contingent Survivors of Deceased members		Members Disabled at Retirement			
	All Survivors		Non - Law Enforcement Officers		Law Enforcement Officers	
Age	Male	Female	Male	Female	Male	Female
55	0.01147	0.00742	0.02355	0.01692	0.01818	0.01587
60	0.01450	0.00975	0.02785	0.01914	0.02280	0.01833
65	0.02086	0.01332	0.03524	0.02178	0.02677	0.02051
70	0.03221	0.01931	0.04599	0.02706	0.03353	0.02450
75	0.04971	0.02946	0.06347	0.03718	0.04344	0.03239
80	0.07802	0.04698	0.09259	0.05517	0.05921	0.04678

Mortality Assumption

All mortality rates use Pub-2010 amount-weighted tables.

Mortality Projection

All mortality rates are projected from 2010 using generational improvement with Scale MP-2019.

Deaths After Retirement (General Employees and Other Education)

Mortality rates are based on the General Mortality Table for Retirees. Rates for male members are multiplied by 105.5% at all ages. Rates for female members are multiplied by 95% for ages under 76, increased by 1% for each age up to age 90 and by 110% for all ages greater than 89. Because the retiree tables have no rates prior to age 50, the General Mortality Table for Employees is used for ages less than 50.

Appendix C: Actuarial Assumptions and Methods (continued)

Deaths After Retirement (Teachers)

Mortality rates are based on the Below-median Teachers Mortality Table for Retirees. Rates for male members are multiplied by 96% for ages under 83, increased by 2% for each age up to 87 and by 106% for all ages greater than 86. Rates for female members are multiplied by 101% for age 81, increased by 1% for each age up to 85, and by 105% for all ages greater than 84. Because the retiree tables have no rates prior to age 55, the Below-median Teachers Mortality Table for Employees is used for ages less than 55.

Deaths After Retirement (Law Enforcement Officers)

Mortality rates are based on the Safety Mortality Table for Retirees. Rates for all members are multiplied by 97% and Set Forward by 1 year. Because the retiree tables have no rates prior to age 45, the Safety Mortality Table for Employees is used for ages less than 45.

Deaths After Retirement (Survivors of Deceased Members)

Mortality rates are based on the Below- median Teachers Mortality Table for Contingent Survivors. Rates for male members are Set Forward 3 years. Rate for female members are Set Forward 1 year. Because the contingent survivor tables have no rates prior to age 45, the Below-median Teachers Mortality Table for Employees is used for ages less than 45.

Deaths After Retirement (Disabled Members at Retirement)

Mortality rates are based on the General Mortality Table for Disabled Retirees. Rates for male members not in Law Enforcement are Set Forward 3 years, while male members in Law Enforcement are Set Back 3 years. Rates for female members not in Law Enforcement are Set Back 1 year, while female members in Law Enforcement are Set Back 3 years.

Deaths Prior to Retirement

Mortality rates for the general and other education groups are based on the General Mortality Table for Employees. Mortality rates for teachers are based on the Teachers Mortality Table for Employees. Mortality rates for law enforcement officers are based on the Safety Mortality Table for Employees.

Timing of Assumptions

All withdrawals, deaths, disabilities, retirements and salary increases are assumed to occur July 1 of each year. The timing of retirement changes from mid-year to beginning of year at and after the 100% retirement age.

Appendix C: Actuarial Assumptions and Methods (continued)

Leave Conversions

Sick leave can be converted to increase creditable service and used to meet the eligibility requirements for retirement. Unused vacation leave can be converted to increase creditable service or compensation but does not add to the eligibility service. The assumed impact of these conversions is shown in the table below.

		General Employees		Teachers, Librarians and Counselors		Law Enforcement Officers		Other Education	
		Male	Female	Male	Female	Male	Female	Male	Female
Increase in AFC (percentage) – Unused Vacation Leave		2.50%	2.50%	2.00%	2.00%	1.75%	1.75%	1.75%	1.75%
Increase in Service (yrs) – Unused Sick Leave	Credited	0.85	0.55	0.90	0.70	1.50	1.50	1.05	0.80
	Eligibility	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

Liability for Inactive Members

For inactive members with five or more years of service without actual deferred benefit amounts, a deferred benefit amount is estimated based on available data and contribution balances projecting backwards assuming 4% salary growth and 4% interest on contribution balances where necessary. For inactive members with less than five years of service the liability is equal to the member's accumulated contributions.

Administrative Expenses

0.10% of payroll added to the normal cost rate.

Marriage Assumption

100% married with male spouses three years older than female spouses.

Missing Gender Code

For members reported on the data without a gender code, we use the prior year's code where available or assign a code based on inspection.

Reported Compensation

Calendar year compensation as furnished by the system's office.

Valuation Compensation

Reported compensation adjusted to reflect the assumed rate of pay as of the valuation date and the probability of decrement during the year.

Compensation for members receiving DIPNC benefits

Compensation earned as of the disability benefit effective date is increased by inflation to the valuation date.

Compensation Limits

No compensation limits are applied.

Appendix C: Actuarial Assumptions and Methods (continued)

Actuarial Cost Method

Entry age normal cost method. Under this method, the actuarial value of projected benefits for each individual participant is allocated as a level percentage of compensation over the working lifetime of the participant between the date of employment and assumed date of exit.

Normal Cost

Normal cost rate reflects the impact of new entrants during the year.

Amortization Period

12-year closed, level-dollar amount. The first amortization base was created for the contribution payable for fiscal year ending 2012.

Asset Valuation Method

Actuarial value, as developed in Table 10. The actuarial value of assets is based upon a smoothed market value method. Under this method, asset returns in excess of or less than the expected return on market value of assets will be reflected in the actuarial value of assets over a five-year period. The Actuarial Value of Assets was reset to the market value of assets at December 31, 2014. The calculation of the Actuarial Value of Assets is based on the following formula:

$MV – 80\% \times G/(L)_1 – 60\% \times G/(L)_2 – 40\% \times G/(L)_3 – 20\% \times G/(L)_4$

MV = the market value of assets as of the valuation date

$G/(L)_i$ = the asset gain or (loss) for the i-th year preceding the valuation date

Direct Rate Smoothing

Assumption changes adopted by the experience study prepared as of December 31, 2019, and adopted by the Board of Trustees on January 28, 2021, increased the actuarially determined contribution requirements of TSERS by 2.99% of payroll, as calculated by the prior actuarial firm. The impact of these assumption changes has been smoothed over a five-year period so that 20% of the impact has been recognized for each valuation starting with the December 31, 2020 valuation, and will be fully recognized in the December 31, 2024 valuation.

The Total Preliminary ADEC shown in Table 1 is the actuarially determined contribution prior to any direct rate smoothing and before reflection of the ECRSP.

Changes in Assumptions and Methods Since Prior Valuation:

None. The assumptions and methods used for the December 31, 2023 actuarial valuation are based on the experience study prepared as of December 31, 2019 and adopted by the Board of Trustees on January 28, 2021.

Appendix D: Additional Disclosures

Table D-1 illustrates the sensitivity of certain valuation results to changes in the discount rate on a market value of assets basis. Table D-2 provides an estimate of future market value of asset returns based on the current portfolio structure and summarized in the “NCRS Investment Policy Statement Review” presentation prepared by the DST Investment Management Division and dated May 25, 2022.

Section 6(c) of Session Law 2016-108 requires that the actuarial valuation report provide the valuation results using a 30-year treasury rate as of December 31 of the year of the valuation as the discount rate. This is 4.03% at December 31, 2023 and has been used as the lower bound of the sensitivity analysis presented. The range between the current discount rate (6.50%) and the 30-year treasury rate (4.03%) was used to establish an upper bound for sensitivity analysis (8.97%). Callan performed analysis for DST’s Investment Management Division in 2022 and Gallagher analyzed expected future market value of asset returns in its Stress Testing and Sensitivity Analysis Report, which was presented to the TSERS Board of Trustees on July 25, 2024. In both studies, the lower bound of 4.03% returns is between 75% to 95% likely to be achieved on average over the next 30 years, while the upper bound of 8.97% is more than 5% likely to be achieved on average over the next 30 years. For additional information regarding Gallagher’s underlying Capital Market Assumptions and related assumptions, please refer to the TSERS Stress Testing and Sensitivity Analysis Report dated July 2024.

TSERS invests in a diversified portfolio with the objective of maximizing investment returns at a reasonable level of risk. However, Actuarial Standard of Practice No. 4 (“ASOP 4”) requires the actuary to disclose a Low-Default-Risk Obligation Measure (“LDROM”) of plan liabilities and provide commentary to help intended users of this report understand the significance of the measure with respect to funded status, contributions, and participant benefit security.

The LDROM is to be based on “discount rates derived from low-default-risk fixed income securities whose cash flows are reasonably consistent with the pattern of benefits expected to be paid in the future.” Note that the actuarial accrued liability shown in Table D-1 using the 30-year treasury rate of 4.03% as of December 31, 2023 represents the LDROM of plan liabilities. Please note that the interest rate used for the LDROM is based on 30-year Treasury rates as of the measurement and will therefore vary for different measurement dates. All other assumptions are the same as those used for funding purposes as shown in this report.

The LDROM shown here represents an estimate of what the TSERS actuarial accrued liability would be if TSERS invested its assets solely in 30-year Treasury bonds. Consequently, the difference between the LDROM and the Actuarial Accrued Liability can be thought of as representing the expected taxpayer savings / (cost) from investing in the plan’s diversified portfolio compared to investing only in 30-year Treasury bonds. It may also be thought of as the cost of reducing investment risk.

Actuaries play a role in helping determine funding methods and policies that can achieve affordable and appropriate contributions and risk management. The funded status based on actuarial accrued liability and the actuarially determined contributions are determined using the expected return on assets, which reflects the actual investment portfolio. Since the assets are not invested in an all-bond portfolio, the LDROM does not indicate TSERS’ funded status or progress, nor does it provide information on necessary plan contributions.

With respect to security of participant benefits, if this plan were to be funded on an LDROM basis, participant benefits currently accrued as of the measurement date may be considered more secure as investment risk may be significantly reduced. However, the assets being invested in a diversified portfolio does not mean the participant benefits are not secure. Security of participant benefits relies on a combination of the assets in the plan, the investment returns generated on those assets, and the promise of future contributions from the plan sponsors.

Appendix D: Additional Disclosures (continued)

Table D-1: Sensitivity of Valuation Results as of December 31, 2023

Discount Rate	4.03%	5.27%	6.50%	7.73%	8.97%
Market Value of Assets	$ 83,642,776,867	$ 83,642,776,867	$ 83,642,776,867	$ 83,642,776,867	$ 83,642,776,867
Actuarial Accrued Liability	$ 135,136,748,382	$ 115,233,267,938	$ 99,809,701,710	$ 87,544,645,690	$ 77,796,253,627
Unfunded Accrued Liability (UAAL)	$ 51,493,971,515	$ 31,590,491,071	$ 16,166,924,843	$ 3,901,868,823	$ (5,846,523,240)
Funded Ratio	61.9%	72.6%	83.8%	95.5%	107.5%
20-Year Amortization of UAL	$ 3,952,182,018	$ 2,729,909,987	$ 1,562,612,346	$ 419,563,818	N/A
(as % of general state revenue)	8.9%	6.1%	3.5%	0.9%	N/A

Other than the discount rate, these results are based on the other economic and demographic assumptions presented in the report. For purposes of simplicity in this disclosure, no adjustments to the valuation assumption for inflation were reflected in the sensitivities above. The statute also requires that the actuarial valuation report show the results using a market value of assets basis. The “funded ratio” and “unfunded accrued liability” in Table D-1 are based upon the market value of assets. In order to alleviate volatility, future employer contributions are determined based on the actuarial value of assets, which smooths market value returns.

None of the liability amounts shown are intended to imply the amount that might represent the cost of any settlement of the plan’s obligations. The various caveats, constraints, and discussions presented earlier in the report apply to these results as well.

Table D-2: Statistical Likelihood of Minimum Future Asset Returns as of 12/31/2023 (Callan)

Horizon	95% Chance (19 out of every 20 scenarios)	75% Chance (3 out of every 4 scenarios)	50% Chance (1 out of every 2 scenarios)	25% Chance (1 out of every 4 scenarios)	5% Chance (1 out of every 20 scenarios)
10 Years (2032)	0.4%	3.6%	5.7%	7.8%	11.1%
30 Years (2052)	3.3%	5.1%	6.3%	7.6%	9.3%

This analysis was commissioned by the Investment Management Division and presented by Callan to the Investment Advisory Committee on February 23, 2022.

Table D-3: Statistical Likelihood of Minimum Future Asset Returns as of 12/31/2023 (Gallagher)

Horizon	95% Chance (19 out of every 20 scenarios)	75% Chance (3 out of every 4 scenarios)	50% Chance (1 out of every 2 scenarios)	25% Chance (1 out of every 4 scenarios)	5% Chance (1 out of every 20 scenarios)
10 Years (2033)	2.3%	5.3%	7.1%	8.7%	11.1%
30 Years (2053)	4.0%	5.7%	6.8%	7.8%	9.2%

This analysis was included in Gallagher’s Stress Testing and Sensitivity Analysis Report, which was presented to the TSERS Board of Trustees on July 25, 2024.

Appendix E: Participating Employers

Employer	Employer Code	Employer	Employer Code
A Childs Garden Charter (AKA Cross Creek Charter)	33501	Carteret Community College	31605
Academy of Moore County	36301	Carteret County Schools	31600
Administrative Office of the Courts	10800	Caswell County Schools	31700
Alamance Community College	30105	Catawba County Schools	31800
Alamance Community School	32915	Catawba Valley Community College	31805
Alamance County Schools	30100	Central Carolina Community College	35305
Alexander County Schools	30200	Central Park Sch for Children	33202
Alleghany County Schools	30300	Central Piedmont Community College	36005
American Renaissance Mid School	34901	Chapel Hill - Carrboro City Schools	36810
Anson County Schools	30400	Charlotte Secondary Charter	36009
Appalachian State University	20100	Charlotte-Mecklenburg County Schools	36000
Arapahoe Charter School	36901	Chatham County Schools	31900
Arts Based Elementary Charter	33402	Cherokee County Schools	32000
Ashe County Schools	30500	Childrens Village Academy	35401
Asheboro City Schools	37610	Clay County Schools	32200
Asheville City Schools	31110	Cleveland Community College	32305
Asheville-Buncombe Technical College	31105	Cleveland County Schools	32300
Aspire Trade High School	36401	Clinton City Schools	38210
Avery County Schools	30600	Clover Garden Charter School	30102
Barber Examiners, State Board Of	18600	Coastal Carolina Community College	36705
Bear Grass Charter School	33206	College of the Albemarle	37005
Beaufort County Community College	30705	Columbus County Schools	32400
Beaufort County Schools	30700	Community Colleges Administration	19005
Bertie County Schools	30800	Community School of Davidson	36003
Bethany Community Middle School	37901	Cornerstone Academy	33027
Bladen Community College	30905	Corvian Community Charter School	36004
Bladen County Schools	30900	Craven Community College	32505
Blue Ridge Community College	34505	Cumberland County Schools	32600
Brevard Academy Charter School	38801	Currituck County Schools	32700
Brunswick Community College	31005	Dare County Schools	32800
Brunswick County Schools	31000	Davidson County Schools	32900
Buncombe County Schools	31100	Davidson-Davie Community College	32905
Burke County Schools	31200	Davie County Schools	33000
Cabarrus County Schools	31300	Department of Administration	10900
Caldwell Community College	31405	Department of Adult Corrections	19120
Caldwell County Schools	31400	Department of Commerce	12510
Camden County Schools	31500	Department of Justice	10400
Cape Fear Community College	36505	Department of Natural and Cultural Resources	10700
Cape Fear Ctr for Inquiry	36501	Department of Public Instruction	22000
Carolina International School	31301	Department of Public Safety	19100

Appendix E: Participating Employers (continued)

Employer	Employer Code	Employer	Employer Code
Dept of Agriculture & Consumer Svcs.	18400	Henderson County Schools	34500
Discovery Charter	32904	Hertford County Schools	34600
Duplin County Schools	33100	Hickory City Schools	31810
Durham Public Schools	33200	Highway - Administrative	51000
Durham Technical Institute	33205	Hoke County Schools	34700
East Carolina University	20300	Hyde County Schools	34800
East Wake First Academy	39208	Information Technology Services	10930
Edenton-Chowan County Schools	32100	Insurance Department	12600
Edgecombe County Schools	33300	Invest Collegiate Charter (Buncombe)	33207
Edgecombe Technical College	33305	Iredell-Statesville Schools	34900
Elizabeth City and Pasquotank County Schools	37000	Isothermal Community College	38105
Elizabeth City State University	20400	Jackson County Schools	35000
Elkin City Schools	38620	James Sprunt Technical College	33105
Endeavor Charter School	39201	Johnston County Schools	35100
Evergreen Community Charter School	31102	Johnston Technical College	35105
F Delany New School for Children	31101	Jones County Schools	35200
Fayetteville State University	20600	Kannapolis City Schools	31320
Fayetteville Technical Community College	32605	Labor Department	12700
Forsyth Technical Communiity College	33405	Lake Norman Charter School	36006
Franklin County Schools	33500	Lee County Board of Education	35300
Gaston College	33605	Lenoir County Community College	35405
Gaston County Schools	33600	Lenoir County Schools	35400
Gates County Schools	33700	Lexington City Schools	32910
General Assembly	12160	Lincoln County Schools	35500
Governor's Office	12100	Lt Governor's Office	12150
Graham County Schools	33800	Macon County Schools	35600
Granville County Public Schools	33900	Madison County Schools	35700
Gray Stone Day School	38402	Martin Community College	35805
Greene County Schools	34000	Martin County Schools	35800
Guilford County Schools	34100	Mayland Technical College	36105
Guilford Technical Community College	34105	Mcdowell County Schools	35900
Halifax Community College	34205	Mcdowell Technical College	35905
Halifax County Schools	34200	Millennium Charter Academy	38602
Haliwa-Saponi Tribal Charter	39301	Mitchell Community College	34905
Harnett County Schools	34300	Mitchell County Schools	36100
Haywood County Schools	34400	Montgomery Community College	36205
Haywood Technical College	34405	Montgomery County Schools	36200
Health and Human Svcs	12220	Moore County Schools	36300
Healthy Start Academy	33203	Mooresville City Schools	34910
Henderson Collegiate Charter School	39401	Mount Airy City Schools	38610

Appendix E: Participating Employers (continued)

Employer	Employer Code	Employer	Employer Code
Mountain Community School	34501	Randolph Community College	37605
Mtn Discovery Charter	38701	Randolph County Schools	37600
N.E. Academy of Aerospace & Adv.Tech	37001	Revenue Department	13500
N.E. Regional School for Biotechnology	33001	Richmond County Schools	37700
Nash Community College	36405	Richmond Technical College	37705
Nash County Public Schools	36400	River Mill Academy Charter	30103
NC A&T University	20700	Roanoke Rapids City Schools	34220
NC Auctioneers Licensing Board	18740	Roanoke-Chowan Community College	34605
NC Brd of Examiners of Practicing Psycologists	18780	Robeson Community College	37805
NC Central University	20800	Robeson County Schools	37800
NC Department of Military & Veterans Affairs	11050	Rockingham Community College	37905
NC Dept of Environmental Quality	11300	Rockingham County Schools	37900
NC Housing Finance Agency	11310	Rowan-Cabarrus Community College	38005
NC School of Science & Mathematics	10950	Rowan-Salisbury School System	38000
NC School of the Arts	20200	Roxboro Community School	37301
NC State University	21300	Rutherford County Schools	38100
Neuse Charter School	35106	Sampson Community College	38205
New Bern Craven County Board of Education	32500	Sampson County Schools	38200
New Hanover County Schools	36500	Sandhills Community College	36305
Newton-Conover City Schools	31820	Scotland County Schools	38300
North Carolina Board of Opticians	18640	Secretary of State	13700
North Carolina Education Lottery	10200	Socrates Academy	36007
Northampton County Schools	36600	South Piedmont Community College	30405
Office of Administrative Hearing	10850	Southeastern Academy Charter School	37801
Office of State Budget & Management	10910	Southeastern Community College	32405
Office of State Controller	10940	Southern Wake Academy	39204
Onslow County Schools	36700	Southwestern Community College	35005
Orange Charter School	36802	Stanly Community College	38405
Orange County Schools	36800	Stanly County Schools	38400
Pamlico Community College	36905	Stars Charter School	36302
Pamlico County Schools	36900	State Auditor	10500
Pender County Schools	37100	State Board of Elections	11900
Perquimans County Schools	37200	State Treasurer	14300
Person County Schools	37300	Stokes County Schools	38500
Piedmont Community College	37305	Success Institute	34903
Pine Lake Prep Charter	36008	Surry Community College	38605
Pinnacle Classical Academy	39703	Surry County Schools	38600
Pitt Community College	37405	Swain County Schools	38700
Pitt County Schools	37400	The Hawbridge School	30104
Polk County Schools	37500	The North Carolina Leadership Academy	36303

Appendix E: Participating Employers (continued)

Employer	Employer Code	Employer	Employer Code
Thomasville City Schools	32920	Wayne Community College	39605
Transylvania County Schools	38800	Wayne County Schools	39600
Tri-County Community College	32005	Weldon City Schools	34230
Two Rivers Comm School	39501	Western Carolina University	21800
Tyrrell County Schools	38900	Western Piedmont Comm College	31205
UNC - Pembroke	21200	Whiteville City Schools	32410
UNC Health Care System	21550	Wildlife Resources Commission	11600
UNC-Chapel Hill Cb1260	21520	Wilkes Community College	39705
UNC-System Office	21525	Wilkes County Schools	39700
Union County Schools	39000	Wilmington Prep Academy	36502
University of North Carolina at Asheville	23000	Wilson Community College	39805
University of North Carolina at Charlotte	23100	Wilson County Schools	39800
University of North Carolina at Greensboro	20900	Winston-Salem State University	21900
University of North Carolina at Wilmington	23200	Winston-Salem-Forsyth County Schools	33400
University of North Carolina Press	21570	Yadkin County Schools	39900
Uwharrie Charter Academy	37601	Yancey County Schools	30000
Vance Charter School	39101	Zeca School of the Arts and Technology	36701
Vance County Schools	39100		
Vance-Granville Community College	39105		
Voyager Academy	33204		
Wake County Public Schools System	39200		
Wake Technical College	39205		
Warren County Schools	39300		
Washington County Schools	39400		
Watauga County Schools	39500		

Appendix F: ECRSP Policy

Teachers’ and State Employees’ Retirement System Board of Trustees

Employer Contribution Rate Stabilization Policy for the Teachers’ and State Employees’ Retirement System

This ECRSP policy was adopted by the TSERS Board of Trustees at its meeting on April 29, 2021.

Policy Purpose

This policy provides for continued operation of an Employer Contribution Rate Stabilization Policy (ECRSP) for the Teachers’ and State Employees’ Retirement System (TSERS). On January 21, 2016, the Board of Trustees (Board) of TSERS approved an ECRSP to be in place for fiscal years ending 2017 through 2022. Having adopted the Experience Study of the 2015- 2019 calendar years on January 28, 2021, which will be effective for plan funding purposes for fiscal years ending 2023 and later, the Board wishes to institute an ECRSP effective for contributions during the five fiscal years ending 2023 through 2027.

Policy Objectives

This policy establishes how the Board will develop an annual appropriation amount to recommend to the General Assembly to fund TSERS and to establish the “required employer contribution rate” pursuant to G.S. 135-8(d)(a3).

Definitions

- Actuarial Measurement
  The result of an analysis by the Board’s consulting actuary, presented in a public report, based on actuarial assumptions and methods adopted by the Board for purposes of funding of TSERS.
- Policy Contribution
  The State appropriation to be recommended by the Board under this policy.
- Underlying Actuarially Determined Employer Contribution (Underlying ADEC)
  The amount developed annually by the Board’s consulting actuary, representing a funding requirement according to the Board’s actuarial assumptions and methods before applying this policy.

Annual Appropriation Recommendation

This policy calls for continuing the approach used for the fiscal years ending 2017 through 2022, whereby the Board recommends an appropriation at least equal to the Underlying ADEC, and also at least equal to the prior year’s recommendation (as adjusted) plus 0.35% of retirement eligible compensation. This may result in an appropriation recommendation exceeding the Underlying ADEC.

Accordingly, for each year that this policy is in effect, the Policy Contribution recommended by the Board will be the greater of (1) the Underlying ADEC for the upcoming fiscal year or (2) 0.35% of eligible compensation greater than the appropriation recommended by the Board for the current fiscal year. However, if the Policy Contribution is determined by part (2) of the definition, it can be no greater than (3) the Underlying ADEC if it were determined using a discount rate equal to the annual yield on 30-year U.S. Treasury securities as of the date of the actuarial valuation used to determine the Underlying ADEC for the upcoming fiscal year.

In developing Parts (1) and (3) of this definition, the Underlying ADEC should be adjusted to include the effect of any benefit change enacted by the General Assembly that was not incorporated in the consulting actuary’s annual valuation report. This adjustment should be equal to the Actuarial Measurement of the effect of the benefit change for purposes of the legislative actuarial note.

Appendix F: ECRSP Policy (continued)

Teachers’ and State Employees’ Retirement System Board of Trustees

Employer Contribution Rate Stabilization Policy for the Teachers’ and State Employees’ Retirement System

In developing Part (2) of this definition, this policy provides the following guidance.

- The appropriation that was recommended for the current fiscal year should be adjusted for the effect of any permanent cost-of-living allowance (COLA) or other permanent benefit change enacted by the General Assembly, taking effect during the current fiscal year, that was not incorporated in the Board’s recommendation for the current fiscal year. This adjustment should be equal to the Actuarial Measurement of the effect of the benefit change on the Underlying ADEC for purposes of the legislative actuarial note.
- The appropriation that was recommended for the current fiscal year should be adjusted for the effect of any one-time supplemental payment (COLA supplements) enacted by the General Assembly, taking effect during the current fiscal year, that was not incorporated in the Board’s recommendation for the current fiscal year, only if the General Assembly made a recurring appropriation associated with the supplemental payment. In that case, the adjustment should be equal to the percentage of eligible compensation equivalent to the recurring appropriation. Otherwise, the appropriation that was recommended for the current fiscal year should not be adjusted for the cost of a one-time supplemental payment.
- The appropriation that was recommended for the current fiscal year should be adjusted for the effect of any benefit change enacted by the General Assembly, taking effect during the upcoming fiscal year, including COLA supplements, that was not incorporated in the Board’s recommendation for the current fiscal year. This adjustment should be equal to the Actuarial Measurement of the effect of the benefit change on the Underlying ADEC for purposes of the legislative actuarial note.
- The appropriation that was recommended for the current fiscal year should be adjusted for the effect of any changes in actuarial assumptions or methods adopted by the Board that were not incorporated in the Board’s recommendation for the current fiscal year. The adjustment should be equal to the Actuarial Measurement of the effect on the Underlying ADEC.
- The appropriation that was recommended for the current fiscal year should exclude any appropriations to the Unfunded Liability Solvency Reserve for distribution to TSERS.

The Policy Contribution will be deemed by the Board to be the annual actuarially determined employer contribution (funding ADEC) and the “required employer contribution rate” for TSERS, pursuant to G.S. 135-8(d)(a3) as in effect at the date of adoption of this policy.

Policy Effective Date

This policy is effective through the fiscal year ending June 30, 2027. The Board may vote to extend it for any period of time.

Gallagher

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