



TEACHERS' AND STATE EMPLOYEES' RETIREMENT SYSTEM & LOCAL GOVERNMENTAL EMPLOYEES' RETIREMENT SYSTEM

BOARD OF TRUSTEES MEETING – December 2020

Rate of Return Assumption

Patrick Kinlaw, FSA, Director of Policy, Planning, and Compliance



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Agenda

- Background on Rate of Return Assumption
 - How assumption is used
 - Actuaries' professional guidance for setting assumption
 - Recent history
- Review of Current Information
 - Most recent asset allocation study
 - Survey information
 - Historical performance
 - Trends among other public plan sponsors
- Conclusion
 - Staff recommendation
 - Anticipated impacts





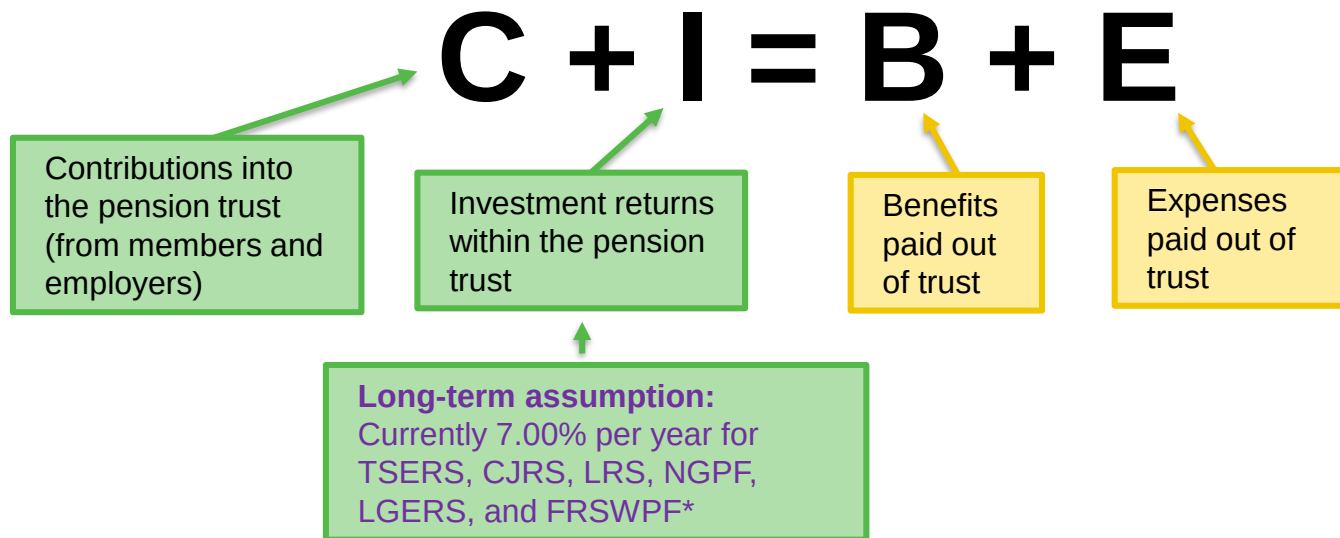
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Background on the Rate of Return Assumption

Long-Term Pension Funding Equation



- Higher levels of actual investment returns over time will reduce the required contributions.
- Lower levels of actual investment returns over time will increase the required contributions.
- Since we do not know the actual rate of future investment returns, it is necessary to make an assumption.
- The assumption is used for determining required contributions as well as accounting / financial reporting.

* A different assumption, currently 3.75% per year, is used for the Registers of Deeds' Supplemental Pension Fund, Disability Income Plan of NC, and Death Benefit Plans. This presentation addresses the systems that use the 7.00% assumption.



Importance of Investment Return Assumption

“A shortfall in long-term expected investment earnings must be made up by higher contributions or reduced benefits....

An investment return assumption that is set too low will overstate liabilities and costs, causing current taxpayers to be overcharged and future taxpayers to be undercharged. A rate set too high will understate liabilities, undercharging current taxpayers, at the expense of future taxpayers. An assumption that is significantly wrong in either direction will cause a misallocation of resources and unfairly distribute costs among generations of taxpayers....

The investment return assumption is the single-most consequential of all actuarial assumptions in terms of its effect on a pension plan’s finances.”

NASRA Issue Brief: Public Pension Plan Investment Return Assumptions, Feb. 2020



Actuaries' Professional Guidance for Setting Assumption

- Actuaries practicing in the U.S. follow Actuarial Standards of Practice (ASOPs).
- ASOP No. 27 provides principles for setting economic assumptions (see Appendix).
- While historical performance data is informative, assumption is for future returns.
- Generally a long-term assumption (20+ years) because obligations are long-term, but differences in short-, intermediate-, and long-term expectations should be considered.
- Actuary should select an assumption that is “**reasonable**,” meaning: Appropriate, reflects actuary’s professional judgment, accounts for relevant data, reflects actuary’s estimate of future experience, and is not significantly biased. Actuary may view a range of assumptions as reasonable.
- Same assumption will be used for purposes beyond funding. GASB statements require conformity to ASOPs in assumptions. Plan administration will also use this assumption.
- For assumption set by another party, if actuary believes it significantly conflicts with reasonableness, or cannot evaluate reasonableness, actuary’s report must disclose.
- Current ASOP No. 27 was effective Sept. 2013. A new version has been adopted that will be effective Aug. 2021. Since the Boards’ decision may apply for as many as five years, both the current and future ASOP No. 27 may be relevant.



Recent History of TSERS/LGERS Investment Return Assumption

- Reviewed at least once every five years as part of the quinquennial experience study.
- 1998: Boards reduced assumption from 7.50% to 7.25%.
- Remained at 7.25% through several experience studies.
- In 2015 experience study, Systems' actuaries noted that over time horizons of 20+ years, there was at least a 60% probability of achieving at least 7.25% compound annual return, based on standard models not customized to the Investment Management Division's (IMD's) capital market views. Boards kept assumption at 7.25% but adopted ECRSPs to ensure adequate funding until the next experience study.
- 2017: Boards reduced assumption from 7.25% to 7.20%, based on data including IMD's 2016 asset allocation study.
- 2018: Boards reduced assumption from 7.20% to 7.00%, with the effect on employer contribution rates phased in over three years, i.e., until the next experience study.
- 2021: Boards will consider consulting actuary's recommendation to reduce assumption from 7.00% to 6.50%, along with 0.50% annual reduction in assumed long-term inflation





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Review of Current Information

2016 IMD Asset Allocation Study

- The ideal reference point is a **forward-looking** and **organization-specific** asset allocation study, based on the Systems' capital market assumptions for various invested asset classes
- The last time this was performed for the Systems was IMD's 2016 study
 - Based on market conditions and asset allocation as of year-end 2015
 - Incorporated Employer Contribution Rate Stabilization Policies (ECRSPs) adopted in 2016
- Expected range of annualized passive compound returns, net of expenses, is summarized below
- 7.00% assumption (adopted 2018) is between the median 20-year and 30-year expected returns based on this study from 2016

Horizon	5 th Percentile	25 th Percentile	50 th Percentile	75 th Percentile	95 th Percentile
10 Years	0.2%	4.0%	5.9%	8.0%	11.5%
20 Years	2.2%	4.8%	6.7%	8.5%	11.8%
30 Years	3.1%	5.3%	7.1%	8.7%	12.0%

Source: North Carolina Department of State Treasurer and Buck Consulting



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Adjustment for Changes in Expectations, 2016-2020

- In the absence of a more recent Systems-specific study, it is possible to make inferences based on changes in investment experts' expectations between 2016 and 2020
- According to Horizon Actuarial Services' Survey of Capital Market Assumptions (2020 Edition), **average return expectations have declined for public equities, and have declined very significantly for fixed income, during the 2016-2020 timeframe**
 - Based on 29 investment advisors who provided short-term expectations to Horizon each year 2016-2020, and nine (9) who provided long-term expectations each year
- For private equity, expectations have not changed very much
- For real estate and hedge funds, 10-year return expectations have declined, but 20-year expectations have not changed very much
- Applying these changes to the Systems' target allocations would imply a **reduction** in annual return expectations of **0.45% (over 10 years) and 0.56% (over 20 years)**
 - Horizon Survey summarizes responses only for 10- and 20-year periods
- Applied to target allocations of major U.S. public systems **excluding** NC would imply a **reduction of 0.40% (over 10 years) and 0.44% (over 20 years)**
- Similar estimates would result from using FY 2019 actual allocations instead of targets



Adjustment for Changes in Expectations, 2016-2020

NC Retirement Systems



Asset Class	Target Allocation	Change in Avg. Return Expectation*	
		10 Years	20 Years
Public Equity	42.0%	(0.4%)	(0.4%)
Fixed Income	35.0%	(0.7%)	(1.1%)
Private Equity	6.0%	+0.1%	+0.1%
Real Estate	8.0%	(0.4%)	(0.1%)
Multi-Strategy	2.0%	(0.5%)	(0.1%)
All Other	7.0%	0.0%	0.0%
Total	100.0%		
Weighted Average		(0.45%)	(0.56%)

Major U.S. Public Plans Excluding NC Retirement Systems



Asset Class	Target Allocation	Change in Avg. Return Expectation*	
		10 Years	20 Years
Public Equity	46.3%	Same As Shown for NC Retirement Systems	
Fixed Income	22.2%		
Private Equity	9.9%		
Real Estate	9.5%		
Multi-Strategy	6.8%		
All Other	5.3%		
Total	100.0%		
Weighted Average		(0.40%)	(0.44%)

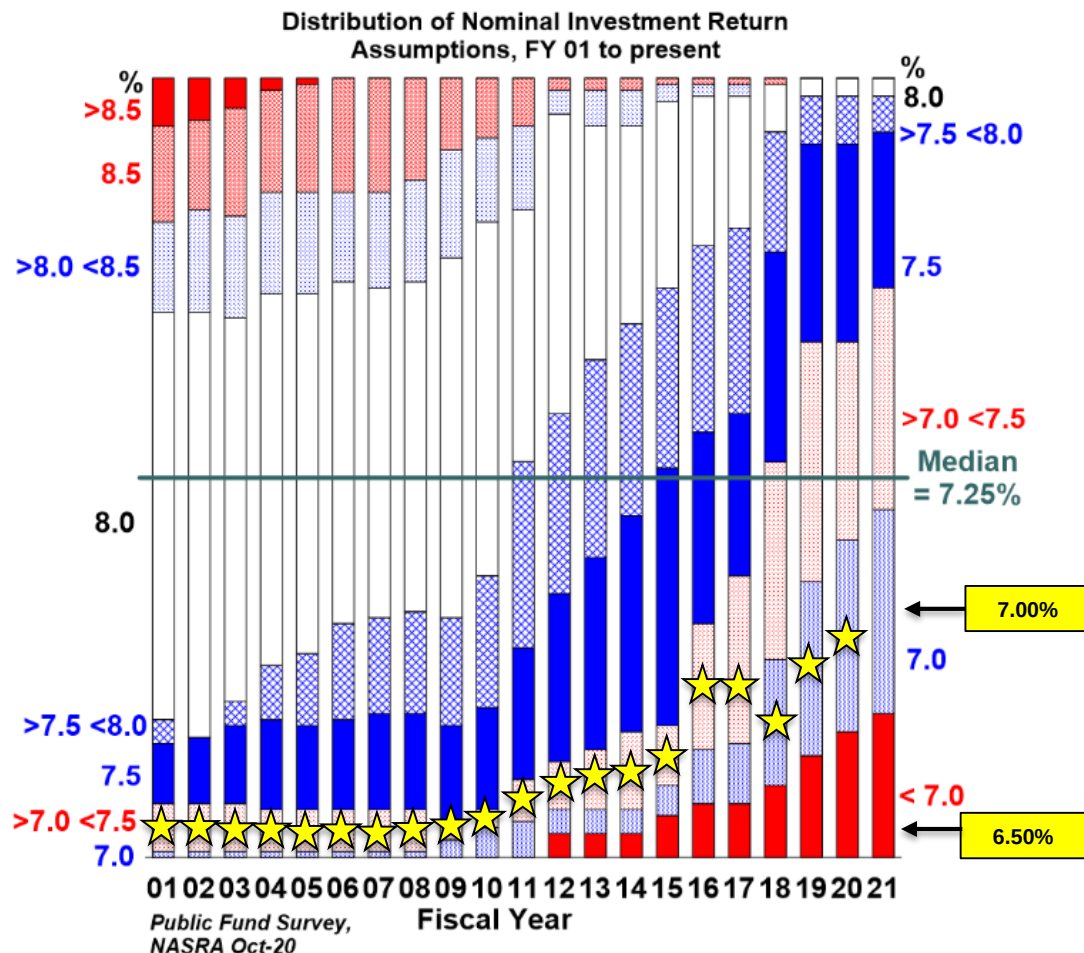
Target allocations for NCRS: "Performance Review," 11/18/2020 Investment Advisory Committee, p. 9. "Fixed Income" includes Investment-Grade Fixed Income/Cash and Opportunistic Fixed Income. "Real Estate" includes Core and Non-Core Real Estate. "All Other" includes Inflation-Sensitive and Pension Cash.

Target allocations for Major U.S. Public Plans Excluding NCRS: Public Plans Database (publicplansdata.org), all systems excluding NC TSERS and LGERS that reported nonzero asset values and target allocations for FY 2019, weighted by asset value at end of FY 2019. "Multi-Strategy" includes Hedge Funds. "All Other" includes Commodities, Miscellaneous, Cash, and Other.

* Change in Avg. Return Expectations: Horizon Actuarial Services, "Survey of Capital Market Assumptions, 2020 Edition," p. 6. Change in Large-Cap U.S. equities is used for Public Equity category. Change in US Bonds (Core) is used for Fixed Income category.



NASRA Public Fund Survey



- Data for 130 state-sponsored retirement systems as of Oct. 2020
- Lower on page represents a lower assumed return relative to others; higher on page is a higher assumption relative to others
- Assumptions may differ from state to state for many structural reasons (e.g. asset allocation, time horizon, treatment of expenses)
- Yellow stars are historical NC assumption, treating half the “>7.0%<7.5%” states as above 7.25% and half below
- **Since financial crisis, median assumption down from 8.00% to 7.25% (likely soon 7.00%)**
- **NC assumption has decreased from 7.25% to 7.00%, and is now closer to median**



Survey Information for Assumed Returns $\leq 7\%$ Per Year

58 of the 130 respondents in NASRA's Oct. 2020 survey use 7% or less:

- **34 use 7%**
 - CalPERS, CalSTRS, Chicago Teachers, City of Austin, CO Affiliated Local, CO P&F, Contra Costa Co., DE, FL, HI, Houston Firefighters, ID, IL SERS, IL Teachers, IA, Los Angeles Co., MO DOT/Highway Patrol, NM Teachers, NYC Employees, NYC Teachers, NC LGERS, NC TSERS, ND, OK Teachers, Orange Co., PA State, RI State, RI Municipal, Richmond, San Diego Co., TX Employees, TX LEO Supplemental, WI, WY
- **16 use at least 6.75% but less than 7%**
 - CT SERS, CT Teachers, IL Universities, IN PERF, IN Teachers, ME Local, ME State & Teacher, MI PSERS, MO State Employees, NH, NY State & Local EEs, NY State & Local P&F, TX Municipal, Univ. of CA, UT Noncontributory, VA
- **8 use less than 6.75%**
 - DC P&F (6.50%), DC Teachers (6.50%), KY County (6.25%), KY ERS (5.25%), LA Parochial (6.50%), MI SERS (6.70%), OK PERS (6.50%), SD Retirement (6.50%)



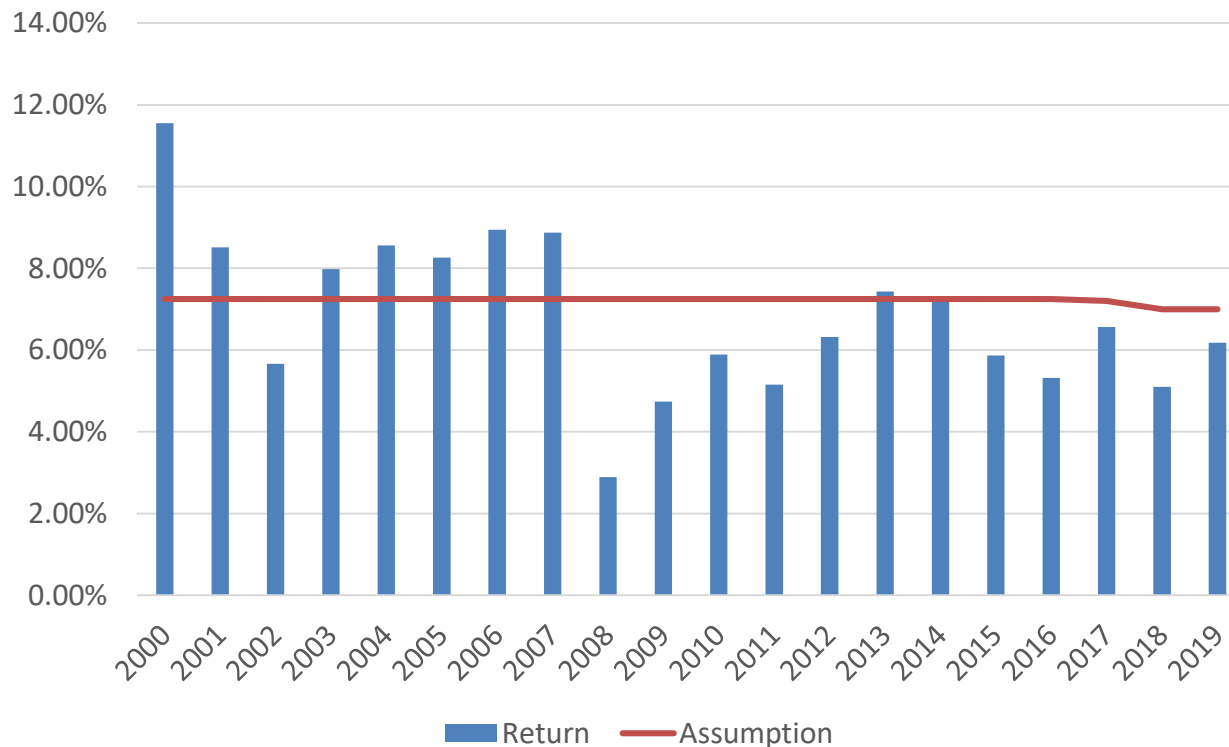
Asset Allocation and Risk Relative to Other Systems

- Target asset allocation
 - The Systems' target allocation is more toward fixed income than the weighted average of other major U.S. public pension plans; it is less toward public equity, private equity, hedge funds, and real estate
- Current asset allocation
 - The Systems' current allocation is more toward fixed income and cash, and less toward public equity, than the target allocation
- Risk measure
 - Compared to the BNY Mellon Universe of US Public Funds of more than \$20 billion, the Systems' risk percentile (1st = highest risk, 100th = lowest risk) has been 94th percentile based on actual volatility of returns over the past 20 years
- **These metrics indicate that the Systems have taken, or expect to take, less investment risk than the average major U.S. public pension plan**
- **Less risk translates to less long-term expected return**



Historical TSERS/LGERS Investment Returns

Returns on Actuarial Value of Assets, by Calendar Year



20-year average return over 2000-2019: 6.83%

Source: 2019 TSERS valuation report (pub. Oct. 2020).
Actuarial value generally recognizes gains and losses
(relative to expected rate) over five years.



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Net NCRS Market Value Returns for Periods Ending 12/31/2019:

Time Period	Annualized Return
10 Years	7.6%
15 Years	6.3%
20 Years	5.8%

Source: "Performance Review," 2/19/2020
Investment Advisory Committee, Page 11.
Includes all NC Retirement Systems.

Recent Trends in Setting Investment Return Assumption

- Importance of time horizon
 - Per ASOPs and GASB literature, it is reasonable for the assumption to be long-term
 - Recently, the near-term returns predicted by many investment experts have fallen short of longer-term predictions by a large margin
 - The average respondent to Horizon's 2020 survey (p. 7) believed a typical multiemployer plan (~33% fixed income) had a 53% chance of achieving 6.50% over 20 years, but only a 42% chance over 10 years
 - In the face of lower near-term expectations, setting a median long-term assumption may lead to year-over-year increases in unfunded liabilities
- “Smoothing” the impact of assumption changes on contribution rates
 - The assumption should be a reasonable current estimate
 - Immediate change can cause jumps in contribution rates that are difficult to absorb
 - In 2018 change from 7.20% to 7.00%, Boards approved “direct rate smoothing” of impact on contribution rates over period until the next experience study
 - For 2018, smoothing period was 3 years (2018 until 2020 experience study)
 - For current decision, it would be 5 years (2021 until 2025 experience study)
 - There has been acceptance of direct rate smoothing in the actuarial community, under certain conditions (see Appendix)





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Conclusion

Staff Recommendation

- Recommendation applies only to TSERS, CJRS, LRS, and NGPF (for TSERS Board) and LGERS and FRSWPF (for LGERS Board)
- **Change investment return assumption from 7.00% to 6.50% per year**
 - Effective date: Actuarial valuations as of December 31, 2020
 - Funded percentage: Change to use 6.50% effective December 31, 2020
 - Contribution rates: Apply direct rate smoothing to all changes adopted from the experience study (including investment return assumption), phasing in the impact to the employer contribution rate over five years; will first affect contribution rates for the fiscal year ending June 30, 2023, fully recognized for the fiscal year ending June 30, 2027
 - Direct rate smoothing like the methodology applied to the reduction from 7.20% to 7.00% adopted in 2018, except that the smoothing period is five years rather than three years
 - The preliminary actuarially determined employer contribution (ADEC) in each year, after smoothing, will be subject to adjustment under any ECRSP or similar policy
 - See appendix for numerical example of direct rate smoothing
 - Financial reporting: Change to measuring obligations using 6.50% for FY ending June 30, 2021
 - Plan administration: Use actuarial factors at 6.50% for service purchases, optional annuity calculations, and related purposes, effective January 1, 2022
- Boards will re-evaluate as part of experience study to be conducted in 2025



Anticipated Effects of Recommendation

1. Obligations and funded status measured as of 12/31/2020 and later
 - Cavanaugh Macdonald has estimated the impact in their experience study
 - Change is due to more accurate measurement of existing benefits based on the Board's outlook
2. Employer contribution rates for fiscal years ending 2023-2027
 - Cavanaugh Macdonald has estimated the impact in their experience study
 - Change will be recognized gradually in the ADEC over five years
 - If ECRSPs are extended/amended, **actual impact on employer contribution rates may be somewhat less (or even zero) during FY 2023-2027**, if rate under ECRSP exceeds ADEC
3. Plan administration effects beginning 1/1/2022
 - Will increase cost of “full actuarial cost” service purchases, all else being equal
 - Will not affect Maximum Allowance (retirement benefit payable over member's lifetime)
 - Will slightly reduce allowances under Options 2, 3, and 6 (options with survivorship benefits); will slightly increase allowances under Option 4 (Social Security leveling option)
 - Return assumption is also used for other purposes, such as fund transfer amounts



Summary of Staff Recommendation and Rationale

1. Reduce assumption to 6.50% effective for 12/31/2020 valuations of applicable systems
 - 6.50% assumption is consistent with most recent asset allocation study as adjusted for changes in investment experts' expectations
 - Current assumption of 7.00% is above the 20-year median expected return, but below the 30-year return, from the 2016 IMD asset allocation study
 - A reduction of 0.50% appears to be supported by changes in investment experts' expectations since 2016
 - Although historical returns are not a primary rationale, the average market return over the past 20 years has been less than 6.50%, including periods of higher interest rates
 - Based on recent NASRA survey of state-sponsored systems, 6.50% assumption would be consistent with taking less investment risk relative to peers
2. Implement direct rate smoothing of the change over five years; continue to plan for direct rate smoothing of any future changes (aligned with experience studies) over five years
 - Reduces near-term contribution rate impact for employers
 - For all other purposes, including financial reporting, allows obligation to be measured immediately using Boards' best estimate of return





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Questions



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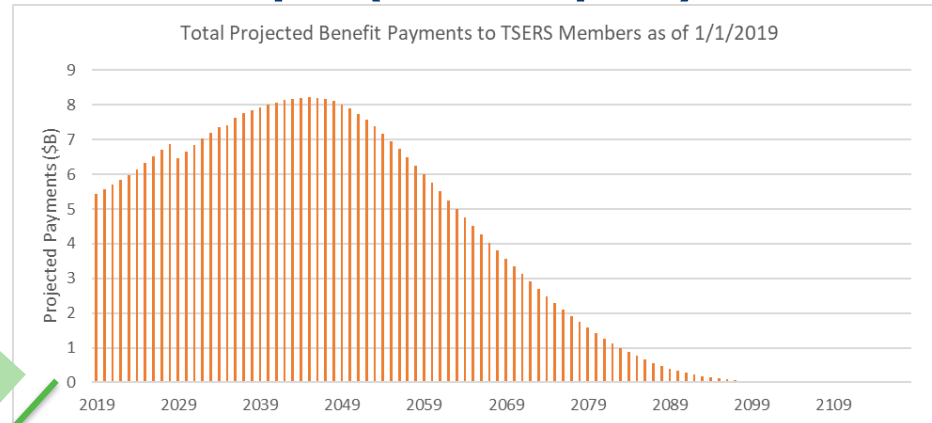


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Appendix

How Actuaries Use the Assumed Rate of Return: TSERS 12/31/2018 Valuation as Example (See Step #2)

- 1 Actuary estimates the benefit amounts payable to each member in each year in the future, based on many assumptions: Pay increases, likelihood of leaving or retiring, life expectancy, and more. (In NC's valuations, this projection includes only members as of the valuation date, not future members.)



- 2 Actuary determines "present value of all future benefits."

**\$95.6 Billion
Present Value**

Discounted at
7.00% per year

- 3 Actuary applies "cost method" to assign the value of benefits to past/future periods.

Past (Accrued)	\$82.1B
Future – Member-Paid	\$7.2B
<u>Future – Employer-Paid</u>	<u>\$6.3B</u>
Total	\$95.6B

- 4 Actuary uses this information, together with plan assets and other information, to develop the actuarially determined employer contribution (ADEC).



ASOP Guidance for Setting Assumption: Factors to Consider

- ASOP No. 27 describes factors to consider when setting economic assumptions such as the future rate of investment return. The following summary is consistent with both the currently applicable ASOP No. 27 (effective Sept. 2013) and the approved future version (to be effective Aug. 2021).

Type of Factor	Examples (for Setting Rate of Return)
Context	Purpose of valuation; time horizon
Components	Inflation; credit risk; equity premiums
Data	Current fixed income yields; forecast returns by asset class; historical performance
Measurement-Specific	Investment policy; investment expenses; volatility
Other Factors	Changes in circumstances; analysis / surveys from other professionals



Actuarial Community's Comments on Direct Rate Smoothing

- “Actuarial Funding Policies and Practices for Public Pension Plans,” Conference of Consulting Actuaries Public Plans Community, Oct. 2014
 - Direct rate smoothing may be part of an actuarial funding policy, as a form of smoothing **in addition to** asset smoothing and amortization of unfunded liabilities
 - “Acceptable practice” for systems with regular experience reviews to phase in the cost impact of an assumption change over the time until the next scheduled review (not longer than five years)
 - If smoothing is applied to cost increases, it should also be applied to cost decreases
 - **Not recommended** to phase in assumption changes over a period longer than five years, or to phase in the cost impact of actual plan experience or plan changes
- “Report of the Blue Ribbon Panel on Public Pension Plan Funding,” independent panel commissioned by Society of Actuaries, Feb. 2014
 - “The Panel encourages the consideration of direct rate smoothing and other asset and liability cash flow modeling techniques. Such approaches can provide greater transparency into the current financial position of the trust, the level of risk in funding assumptions, and enhanced flexibility to sponsors in the development of sustainable funding programs.”
 - Potential acceptance of smoothing in situations that the later CCA report would not recommend, such as smoothing cost impact of actual plan experience, or smoothing over long periods of time, with caveat that direct rate smoothing requires high levels of funding discipline and transparency



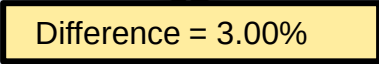
Actuarial Community's Comments on Direct Rate Smoothing (Cont.)

- “Report of the Pension Task Force of the Actuarial Standards Board,” Feb. 2016
 - Recommends that ASOPs No. 27 and 35 be clarified to state “that phase-in of assumptions is only allowed if the assumption actually used is itself reasonable.... This is the PTF’s understanding of the original intent of these standards. Anecdotal evidence indicates that some practitioners may be phasing in assumption changes over a period of years and PTF believes that [further] guidance is needed in this situation.”
- “Objectives and Principles for Funding Public Sector Pension Plans,” American Academy of Actuaries, Feb. 2014, and “Core Elements of a Funding Policy,” Government Finance Officers Association, Mar. 2013, did not address direct rate smoothing specifically
- “Proposed Rev. ASOP No. 4 (2nd Exposure Draft),” Actuarial Standards Board, Dec. 2019
 - This version of ASOP No. 4 has not yet been adopted
 - Would add Section 3.16, “Output Smoothing Method” (OSM), which would include the type of direct rate smoothing contemplated by the Systems
 - Any OSM should result in a reasonable relationship between (a) the smoothed contribution and (b) the ADEC without the OSM
 - Method should **not** produce a value of (a) that falls **below** a reasonable range around (b)
 - Any shortfall of (a) relative to (b) should be recognized within a reasonable period of time
 - A description of the OSM must be disclosed in the actuary’s report



Hypothetical Example of Direct Rate Smoothing

This is a hypothetical example, not a projection for TSERS or LGERS. It assumes the experience study would increase the ADEC (before smoothing or ECRSPs) by 3.00% of pay (=15.00%-12.00% below).

Date of Valuation	Contrib. Year	ADEC Prior to Smoothing / ECRSP Before Exper. Study	ADEC Prior to Smoothing / ECRSP After Exper. Study	ADEC Prior to ECRSP	Comment
12/31/2020	FY 2023	12.00%	15.00%	12.60%	Impact of change is 3.00% of pay. One-fifth (3.00% / 5 = 0.60%) is recognized in this valuation and 2.40% remains to be recognized. 15.00% - 2.40% = 12.60%.
					
12/31/2021	FY 2024	Not used	Assume 14.00%	12.20%	ADEC reduced by 1.80% as 3/5 remains to be recognized. 14.00% - 1.80% = 12.20%.
12/31/2022	FY 2025	Not used	Assume 13.00%	11.80%	ADEC reduced by 1.20% as 2/5 remains to be recognized. 13.00% - 1.20% = 11.80%.
12/31/2023	FY 2026	Not used	Assume 14.00%	13.40%	ADEC reduced by 0.60% as 1/5 remains to be recognized. 14.00% - 0.60% = 13.40%.
12/31/2024	FY 2027	Not used	Assume 13.00%	13.00%	The change made in the 12/31/2020 valuation is fully recognized.

- The “ADEC Prior to ECRSP” column would be subject to further adjustment based on any ECRSP or SCRSP.
- Boards could adopt new assumptions for the 12/31/2025 valuation and apply direct rate smoothing over the following five-year period if desired.

