TFFR Experience Study Results for the Period Ending June 30, 2024 and Assumption Recommendations

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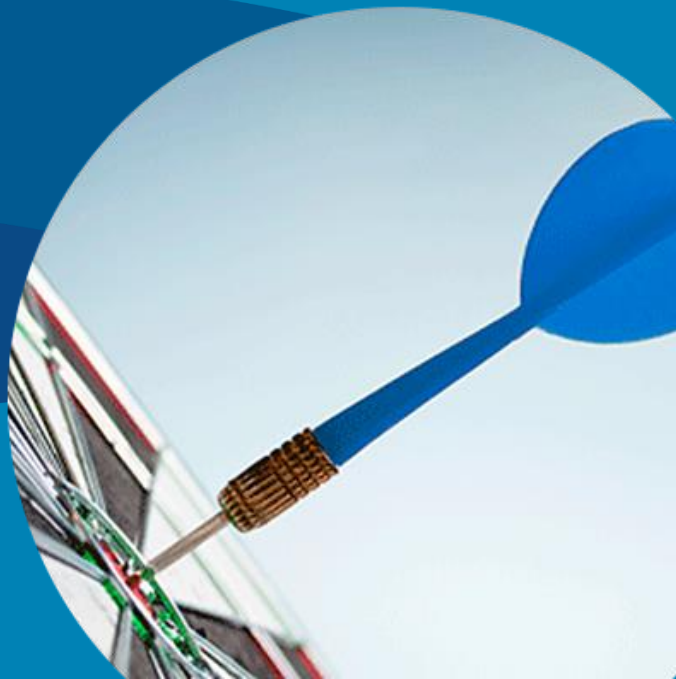


Today

- Review of Educational Intro: Experience Study Process
- Demographic Assumptions
- Economic Assumptions
- Methods
- Impact to June 30, 2024 Valuation Results

EDUCATIONAL INTRO: EXPERIENCE STUDY PROCESS

Purpose of Experience Study

- Assumptions should occasionally change to reflect
  - New information and changing knowledge
  - Changing patterns of retirements, terminations, mortality, etc.
- Experience study is a regularly scheduled review of the assumptions and methods
  - Generally recommend every 3-5 years
  - Five years since last study
- General process for setting assumptions and methods
  - Actuary makes recommendations
  - Board considers actuary's recommendation and makes the final decision for the system

How assumptions factor in…

- Over time, the true cost of benefits will be borne out in actual experience
  - Ultimate benefits paid are NOT affected by actuarial assumptions or methods
  - Determined by actual participant behavior (termination, retirement), plan provisions, and actual investment returns
- Assumptions help us develop a reasonable starting point for decision making today

Selection of Assumptions

What Are They?

Economic

- Investment Return
- Payroll Growth Rate
- Promotional/Step Pay Increases
- Population Growth Rate (Usually, a constant population size is assumed)

Demographic

- Retirement Rates
- Disability
- Turnover
- Mortality

Who Selects Them?

Economic

- Board
- Other Advisors

Demographic

- Board (usually based on experience study)

Experience Study Process

- Compare actual experience to current actuarial assumptions and recommend changes to assumptions if necessary to better align with future expectations
- Reviewed past experience over a given timeframe
  - Identified how many members retired, terminated, became disabled, or died, including their age/service
  - Identified salary increases received by active members
  - Greater emphasis on forward-looking expectations for economic assumptions

Actuarial Standards of Practice

- Guidelines for the assumption setting process are set by the Actuarial Standards of Practice
  - ASOP #4 Measuring Pension Obligations
  - ASOP #25 Credibility
  - ASOP #27 Selection of Assumptions for Measuring Pension Obligations
  - ASOP #44 Selection and Use of Asset Valuation Methods

Actual to Expected Ratio

- For an experience study, we determine actual the number of deaths, retirements, etc. that occurred. Then we determine the number expected
- We then calculate the A/E ratio, where "A" is the actual number and "E" is the expected number
- If the current assumptions were “perfect”, the A/E ratio would be 100%
- When there is a variation from this figure, it suggests that a new assumption may be needed
- We not only look at the assumptions as a whole, but we also review how well they fit the actual results by gender, by age, and by service

DEMOGRAPHIC ASSUMPTIONS

Retirement Experience

- Key finding was on early retirement
  - Expectation from audit that early retirement rates were too high for Tier 1NGF and Tier 2
  - Played out in observed experience

Early Retirement Experience – Tier 1 Non-Grandfathered & Tier 2

Age	Retirements	Exposure	Crude Rates	Sample Rates*		Expected Retirements		Ratio of Actuals/Expecteds	
				Old	New	Old	New	Old	New
55	0	1268	0	0.02000	0.01000	25	13	0%	0%
56	0	858	0	0.02000	0.01000	17	9	0%	0%
57	4	702	0.00534	0.03000	0.01000	21	7	18%	54%
58	0	607	0.00000	0.03500	0.01000	21	6	0%	0%
59	0	525	0.00000	0.04000	0.01000	21	5	0%	0%
60	10	411	0.02345	0.05000	0.03000	21	12	46%	80%
61	2	306	0.00647	0.09000	0.03000	28	9	7%	22%
62	17	293	0.05823	0.10000	0.03000	29	9	59%	190%
63	10	211	0.04589	0.11000	0.03000	23	6	42%	161%
64	4	155	0.02534	0.12000	0.03000	19	5	21%	79%
Totals	46	5337	0.00863			225	81	20%	57%

- Proposed separate, substantially lower rates for this group

Mortality Experience

- Continue to use standard, unadjusted base tables for active and disabled
- Retiree mortality
  - Actual to expected based on current assumption
    - **Female 108%**
    - **Male 113%**
    - More deaths than expected
    - But COVID
    - Similar to what we are seeing in other plans with similarly timed studies
  - **Leave base tables unchanged**
- Update to ultimate rates of most recent mortality projection table

Termination Experience

- More terminations than expected
- Slightly reduce rates
  - Leave bit of conservatism for credibility/covid experience
- Actual to expected:
  - Female: 129% -> 110%
  - Male: 127% -> 107%

Other

- Little to no change on other demographic assumptions
- Minimal impact

ECONOMIC ASSUMPTIONS

Inflation

- The assumed core inflation rate is not used directly in the actuarial valuation, but it impacts the development of:
  - Investment return assumption
  - Salary increase assumptions
  - Overall payroll growth rate
  - COLA assumption
- Current inflation assumption in 2.30% per year
- **Forward-looking, long-term assumption**

Forward-looking Inflation Metrics

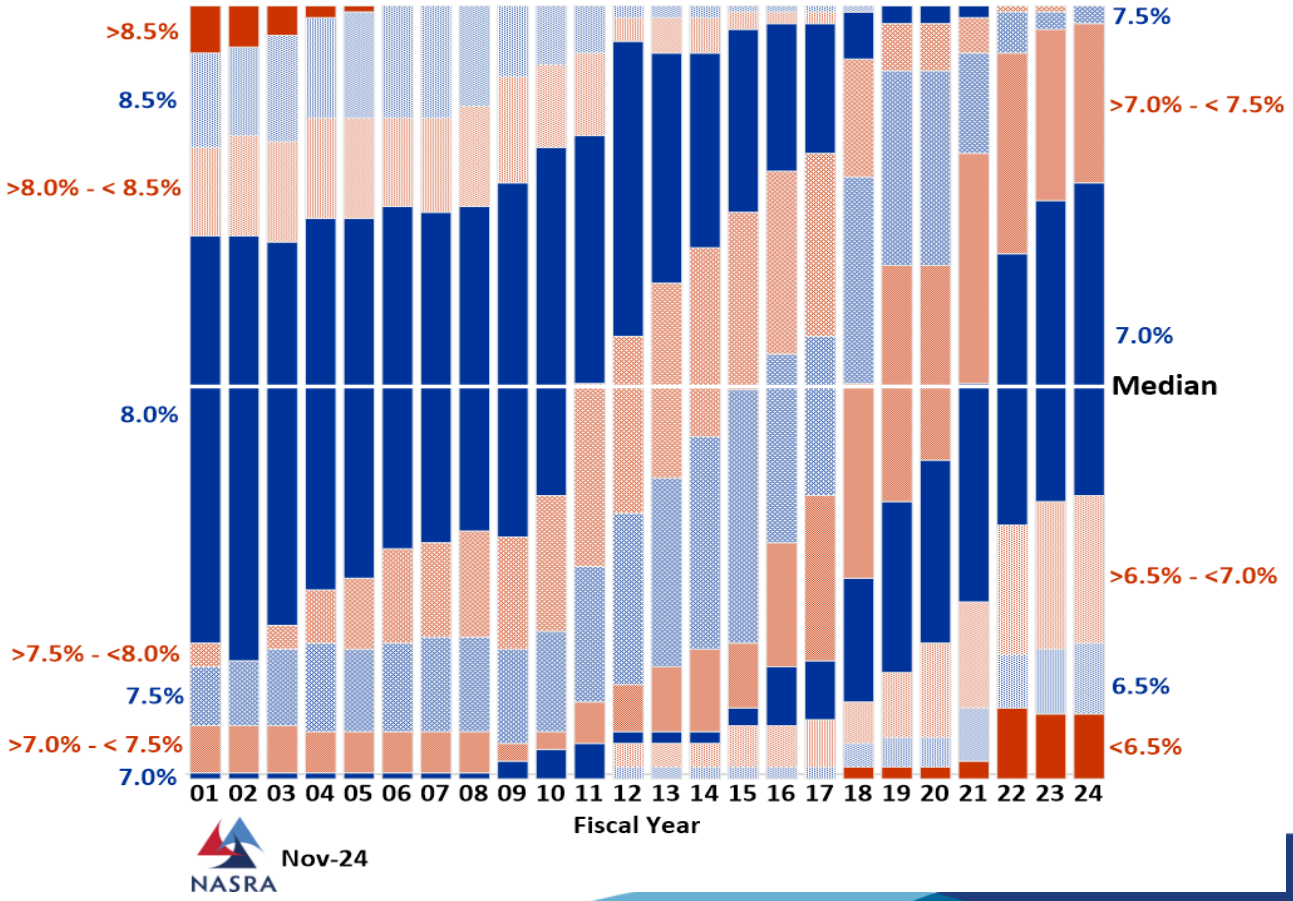
- 10-year metrics
  - NEPC December 31, 2024 10-year 2.60%
  - Average of survey of 12 investment consultants 2.39%
  - Range of survey 2.13% - 2.70%
- 20 and 30-year metrics
  - 20-year treasury bonds 2.50%
  - 30-year treasury bonds 2.35%
  - Social Security intermediate long-term 2.40%
  - Cleveland Federal Reserve 2.52%
  - St. Louis Federal Reserve 2.52%
- **Recommendation: Increase inflation assumption to 2.40%**

Investment Return Assumption

- The assumption selected should be reasonable
  - Not necessarily a single “correct” answer
- Assumption is selected using a process that considers:
  - TFFR target asset allocation
  - Capital market expectations
    - Utilize a building block approach that reflects expected inflation, real rates of return, and plan related expenses
    - Take into account the volatility of the expected returns produced by the investment portfolio
- Other factors to consider
  - Historical investment performance
  - Comparison with peers

Investment Return Assumption - National Trends

- Median and mode is 7.00%



GRS Survey of Investment Consultants

- We analyzed the current asset allocation
- Projected real returns were developed using TFFR Investment Policy Statement and 2024 capital market return assumptions
  - 2024 GRS Survey of 12 investment consulting firms
    - Generally 10-20 year time horizons
  - Includes TFFR Investment Consultant, NEPC

Expectations Based on Survey

- With inflation of 2.40%
  - Average arithmetic return
    - 7.50%
  - Average of Median Geometric Returns is
    - 6.83% (7-10 year expectations)
    - 7.03% (20-30 year expectations)
  - Horizon survey (2.47% inflation)
    - 7.07%

Investment Return Recommendation

- Reduce nominal return from 7.25% to 7.15%
  - Reduces real return from 4.95% to 4.75% (0.10% from increased inflation, 0.10% from real return)
- Reflects tempered reduced expectations
  - Tempering for:
    - Currently doing asset allocation study
    - Current market volatility

Salary Increases

- Used for projecting individual member's pay and benefits
- Current assumption consists of three components
  - Price inflation (2.30%)
  - Productivity (1.50%)
    - Combined with price inflation equals 3.80% wage inflation
  - Service-related increases for first 29 years
    - Meant to reflect additional increases above wage inflation received by early to mid career members

Salary Increases

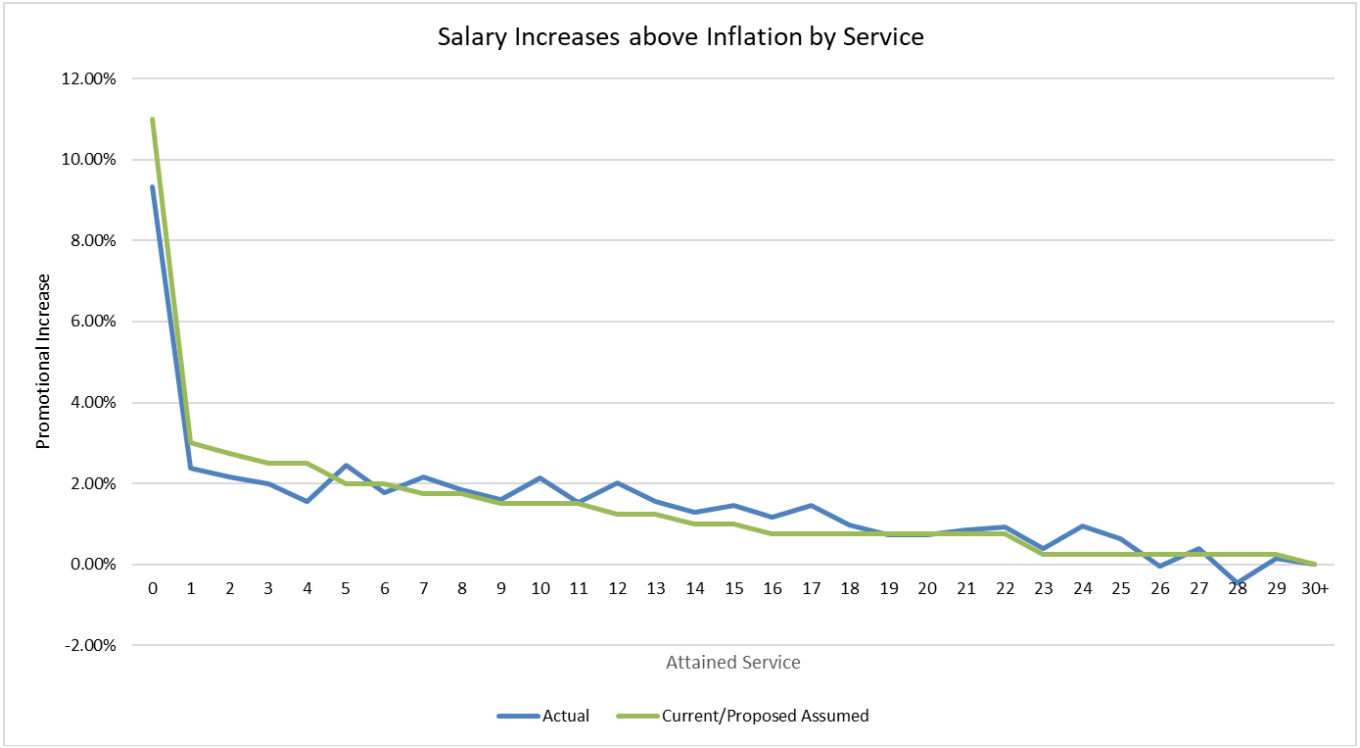
- Price Inflation
  - 2.3% -> 2.4%
- Productivity
  - Current assumption: 1.4%
  - National economy

Excess Wage Inflation Over Price Inflation Over Most Recent	
10 years	1.1%
15 years	0.8%
20 years	0.8%
25 years	1.0%

  - TFFR long-service
    - Negative 1.4% (anomalous)
- Recommend 1.0% consistent with national economy numbers
- Base wage inflation 3.4% (2.4%+1.0%)

Salary Increases

- Merit/service-based increases continue to be a great fit
- No change



Total Payroll Growth

- Used in projections and amortization of the unfunded liability
- The higher the assumption, the more reliance on future payroll in meeting funding objectives
- Current 3.25%
- Should be no higher than 3.4% wage inflation assumption
- Leave at 3.25%

METHODS

No Changes to Methods

- Asset Smoothing
- Amortization
  - Currently volatility could lead to funding policy recommendation changes, but none at this time

IMPACT TO JUNE 30, 2024 VALUATION RESULTS

Impact to June 30, 2024 Valuation Results

- Aggregate impact is modest

	Current Assumption	Proposed Mortality Assumptions	Proposed Mortality and Retirement Assumptions	Proposed Mortality, Retirement, Termination and Disability Assumptions	Proposed Demographic Assumptions and Economic Assumptions
1. Statutory Contributions (% of payroll):					
a. Member Contribution Rate	11.75%	11.75%	11.75%	11.75%	11.75%
b. Employer Contribution Rate	12.75%	12.75%	12.75%	12.75%	12.75%
c. Actuarially Determined Employer Contribution Rate	12.46%	12.63%	12.92%	12.79%	12.52%
d. Margin Available [Contribution Shortfall/(Surplus)]	(0.29)%	(0.12)%	0.17%	0.04%	(0.23)%
2. Funded Status					
a. Actuarial Accrued Liability	$ 4,758,417,607	$ 4,774,714,476	$ 4,788,402,562	$ 4,790,969,147	$ 4,803,268,427
b. Actuarial Value of Assets (AVA)	3,408,483,045	3,408,483,045	3,408,483,045	3,408,483,045	3,408,483,045
c. Unfunded Liability (AVA-basis)	1,349,934,562	1,366,231,431	1,379,919,517	1,382,486,102	1,394,785,382
d. Funded Ratio (AVA-basis)	71.6%	71.4%	71.2%	71.1%	71.0%

Impact to Plan Policy Score

- Fair Value Funded Ratio after changes is 69.8%
  - lose point on current funded ratio since cutoff is 70%
- Other metrics slightly improved, but not enough to gain points

Valuation Year	Score	Notable Events	Geometric Mean Used in Simulation
2019	6	First Score	7.47%
2019	7	Post-experience study changes	7.47%
2020	6	Market return FY 2020 = 3%	7.25%
2021	9	Market return FY 2021 = 26%	6.77%
2022	7	Market return FY 2022 = -6%	6.86%
2023	9	Market return FY 2023 = 7%	7.39%
2024	10	Market return FY 2024 = 8%	7.07%
2024	9	Post-experience study changes	7.07%

WRAP UP

Next steps

1. Today: Motion from Board to adopt valuation assumptions
2. Later this summer/fall: Evaluate discount rate post-asset allocation
   - Change unlikely, but should make sure
3. Recommend and adopt actuarial equivalence assumptions, set effective date

Conclusions

- Proposed assumptions will provide a better fit going forward
- Recommend Board adopts this assumption set for first use in the June 30, 2025 valuation

- Thank you!