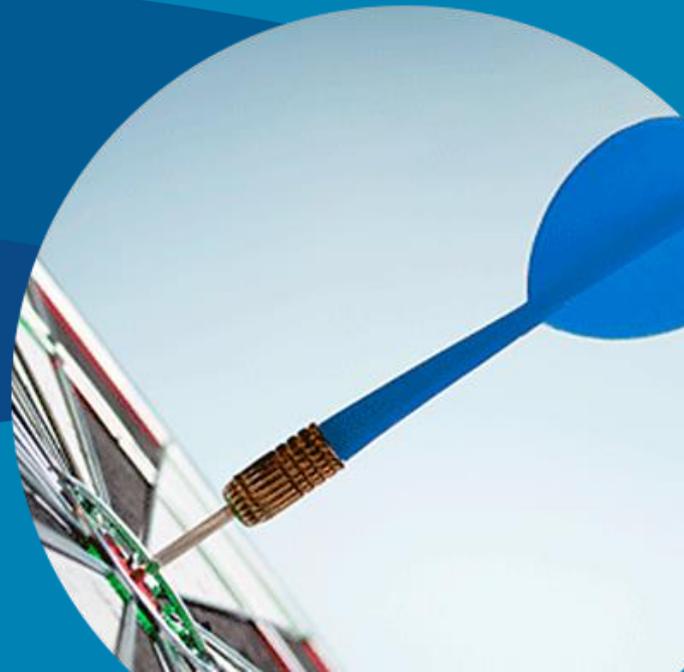


Board Education: Actuarial Standards of Practice (ASOP) Update

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March 28 - 29, 2019



Agenda

- What are the ASOPs?
- Which ones are relevant to Pension work?
- New Disclosure Requirements from ASOP 51
- Major Studies for 2019:
 - Experience Study
 - Asset Liability Study
 - Asset Allocation Study

Opinions

- Most of the slides and discussion will provide straight language from the ASOPs
- However, some of the slides and discussion will provide opinions, views, or interpretations of the ASOPs and our approaches
- It should be noted that the opinions in this material are the authors' and may not be the same as GRS as a company or as the actuarial community
- When we use GRS, it represents GRS the company
- When we use GRS:TMRS or “our”, it means the specific team that works on TMRS (the authors)

Actuarial Standards Board

- “The Actuarial Standards Board (ASB) sets standards for appropriate actuarial practice in the United States through the development and promulgation of Actuarial Standards of Practice (ASOPs).”
- “These ASOPs describe the procedures an actuary should follow when performing actuarial services and identify what the actuary should disclose when communicating the results of those services.”
- “Standards of practice serve to assure the public that actuaries are professionally accountable. At the same time, standards provide practicing actuaries with a basis for assuring that their work will conform to appropriate practices.”

<http://www.actuarialstandardsboard.org/about-asb/>

Relevant ASOPs

- ASOP No. 4 – Measuring Pension Obligations and Determining Pension Plan Costs or Contributions
- ASOP No. 23 - Data Quality
- ASOP No. 25 - Credibility
- ASOP No. 27 - Economic Assumptions
- ASOP No. 35 - Demographic Assumptions
- ASOP No. 41 - Actuarial Communications
- ASOP No. 44 - Asset Valuation Methods
- ASOP No. 51 – Disclosure of Risk

New Exposure Draft for ASOP 4:

Measuring Pension Obligations and Determining Pension Plan Costs or Contributions

- Strong position against Negative Amortization
- Required Disclosure of an Actuarially Determined Contribution that either:
 - Currently has positive amortization, or
 - Will soon be in a position of positive amortization and describes how long it will take to achieve positive amortization
- Disclosure of Investment Risk Defeasement Measure (IRDM)

New Exposure Draft for ASOP 4:

IRDM

- If the actuary is performing a funding valuation, the actuary should calculate and disclose an obligation measure to reflect the cost of effectively defeasing the investment risk of the plan. The actuary should calculate the investment risk defeasement measure using the following:
 - a. **benefits accrued** as of the measurement date;
 - b. the **unit credit** actuarial cost method;
 - c. discount rates consistent with market yields for a hypothetical bond portfolio whose cash flows reasonably match the pattern of benefits expected to be paid in the future. For this purpose, the actuary should use either of the following:
 - 1. **U.S. Treasury yields**; or
 - 2. rates at which the pension obligation can be effectively settled. The actuary may use yields of fixed-income debt securities that receive one of the two highest ratings given by a recognized ratings agency; and
 - d. assumptions other than discount rates used in the funding valuation or other reasonable assumptions based on estimates inherent in market data, in accordance with ASOP Nos. 27 and 35.

DISCLOSURE ONLY

Reasonable Assumptions

ASOP 27

- An assumption is reasonable if
 - It is appropriate for the purpose of the measurement
 - It reflects the actuary's professional judgement
 - It takes into account historical and current economic data that is relevant as of the measurement date
 - It reflects the actuary's estimate of future experience
 - It has no significant bias (i.e., it is not significantly optimistic or pessimistic)
 - Although some allowance for adverse experience may be appropriate
- From ASOP 4: Actuary should select assumptions such that the combined effect of the assumptions selected by the actuary has no significant bias (i.e., it is not significantly optimistic or pessimistic) except when provisions for adverse deviation are included

Investment Return Assumption

ASOP 27

- “The investment return assumption reflects the **anticipated returns on the plan’s current and, if appropriate for the measurement, future assets**. This assumption is typically constructed by considering various factors including, but not limited to, the time value of money; inflation and inflation risk; illiquidity; credit risk; macroeconomic conditions; and growth in earnings, dividends, and rents.”
- “In developing a reasonable assumption for these factors and in combining the factors to develop the investment return assumption, the actuary may consider a broad range of data and other inputs, including the **judgment of investment professionals**.”

GRS Preferred Approach

- From internal guidance from our Chief Actuary:
 - “A reasonable range for the assumed rate of return is between the median and mean return
 - Although the mean is acceptable, our recommendations should encourage use of the median“
- Your GRS Client Service Team agrees with this position
- Actuarial community has pushed heavily towards the median (50th percentile)
- Investment professionals usually only disclose the median
- GRS:TMRS’ general approach:
 - “Emphasis should be given to the nominal, median expectations being provided by the client’s investment advisor and/or investment staff”
 - Our recent recommendations have consistently been towards the median provided by the client’s investment consultant, although there might be an allowance for timeframe
- We will then use our broader survey of 10-12 other investment groups to verify that the result is within a defensible range
- We will also take into account other influences, such as potential variability of the liability stream and the funding policy

ASOP No. 35 – Demographic Assumptions

- “The actuary should reflect the effect of mortality improvement both before and after the **measurement date**”
- “Note that the existence of uncertainty about the occurrence or magnitude of future mortality improvement does not by itself mean that an assumption of zero future improvement is a reasonable assumption”
- Proposed changes in exposure draft:
 - Additional guidance regarding the selection of the mortality assumption
 - Section 3.5.3 of ASOP No. 35
 - Should consider the use of recently published and generally available mortality tables
 - Section 4.1.2 of ASOP No. 35
 - If the mortality assumption is based on mortality tables that substantially predate more recently published relevant and generally available pension mortality tables and the actuary determines that the assumption is reasonable, the actuary should disclose the justification for the use of such tables

PUB-2010

Public Retirement Plans Mortality Report

- Finalized in February of 2019
- Based on a very large pool of public sector retirement system data with midpoint of 2010
- Separate tables for Teachers, Public Safety, and General Employees
- Found gender, occupation, and benefit amount (or salary) to be most statistically significant predictors of differences across groups
- Found public sector pension data had longer life expectancies than previous estimates and published tables
- Also issued an above-median and below-median versions of the tables, to provide practitioners a range
- Found public safety experience almost equivalent to general employee data, but much smaller range of variance
- No real guidance on when next versions of tables will be published
- GRS' position is that for all small to medium sized systems, these new tables, or versions of them, should become the default choice in the next experience study

GRS:TMRS views for large Systems

- Smaller, more frequent adjustments are preferable to infrequent, large increases in unfunded liabilities
 - Experience Study every 4 years vs new, national tables every 10-15 years
- Being dependent on national mortality tables puts the System at risk of large, unpredictable changes to the mortality assumptions based on data that may or may not be reflective of the System experience
- More recent mortality experience is available and is a credible data source for Systems of size
 - For example, for TMRS, we will have a five year data history with midpoint 2016
 - As of the 2023 experience study, we will have a midpoint of 2020, vs the Pub10 data will still be 2010
- Mortality experience for a specific System is dependent on the mix of occupation, disability provisions, access to post-retirement healthcare, size of pension benefits (including social security and post retirement cost of living increases), retirement eligibility conditions and geography. No other data set will uniquely match all of these differentiators as well as the specific data for the System
- Future improvements in longevity are unknown and most attempts to predict the patterns, even over short time frames, have been inconsistent at best and utilize data that is not necessarily reflective of the specific System's experience
 - Select portion of MP scales are all constructed based on Social Security Data
- Although the amount of improvement and how long that improvement will continue is unknown, an assumption that projects no improvement, or substantially underestimates likely future improvement, will make it difficult to appropriately fund the System over the appropriate timeframes

GRS:TMRS' strategy

- Based on these understandings, our approach to longevity assumptions is to:
 - Create a base mortality table based on the data of the specific retirement system at the time of each experience study.
 - As most of our clients have moved to having experience studies every three to four years, this is creating a pattern of more frequent, smaller adjustments.
 - Utilize a generational approach to mortality improvements, which means continuous improvements in longevity are built into the assumption.
 - A 65 year old in 2030 will have a slightly longer life expectancy than a 65 year old in 2020. Each cohort of retirees will have a slightly longer life expectancy, and thus the probability of having a significant increase in the unfunded liability is minimized.
 - To project improvement, we utilize a middle of the range assumption of 1% improvement per year across almost all ages. This is consistent with the long term values in the most widely used MP projection scales.
 - The strategy is centered around leaving this projection scale unchanged throughout time.
- Thus, our strategy is to use the actual data of the actual System, frequently updated for new experience, but always projected using the same projection scale. This strategy narrows the number of variables over the short term, while still reacting to experience as necessary. It minimizes risk of material, unexpected increases in the unfunded liability of the System.
- This strategy does not intentionally set longevity higher or lower than standard, published tables. The actual assumption will be based on the experience of the group: for example Hawaii uses an assumption with life expectancies 3-4 years longer than the most conservative published tables.

ASOP 27 and 35: Phase-In of Assumptions

- Additional guidance included regarding phase-in of changes in assumptions
 - Clarification of existing guidance
 - Section 3.6.3 of ASOP No. 27
 - Section 3.4 of ASOP No. 35
 - Basically, if you are phasing in an assumption change, the assumptions used at each measurement date have to be reasonable

ASOP 27 and 35: Disclosure of Rationale

- Clarification of guidance regarding the disclosure requirement for the rationale of assumptions
 - Section 4.1.2 of ASOP No. 27
 - Section 4.1.2 of ASOP No. 35
 - Disclosure should be the information and analysis used to support the actuary's determination that the assumption is reasonable

ASOP No. 44 - Asset Valuation Methods

- “the actuary should select an asset valuation method that is designed to produce actuarial values of assets that bear a reasonable relationship to the corresponding market values. The qualities of such an asset valuation method include the following:”
 1. “The asset valuation method is likely to produce actuarial values of assets that are **sometimes greater than and sometimes less than** the corresponding market values”
 2. “The asset valuation method is likely to produce actuarial values of assets that, in the actuary’s professional judgment, satisfy **both** of the following:”
 1. “The asset values fall within a reasonable range around the corresponding market values. “
 2. “Any differences between the actuarial value of assets and the market value are **recognized within a reasonable period of time.**”
 - “In lieu of satisfying both (1) and (2) above, an asset valuation method **could** satisfy section 3.3(b) if in the **actuary’s professional judgment**, the asset valuation method **either** (i) produces values within a sufficiently narrow range around market value or (ii) recognizes differences from market value in a sufficiently short period...”
- TMRS currently uses 10 year smoothing as long as the smoothed value is within 15% of the market, and three year smoothing outside of the 15%
 - Called a “soft corridor”

New ASOP 51: Assessing and Disclosing Pension Risk

- Effective for December 31, 2018 TMRS valuations
- New disclosure requirements and potentially more quantitative analysis
- Standard does not provide guidance on the management or reduction of risk
- We don't anticipate significant change to our reports or communications as we have historically incorporated the discussion of risks

New ASOP 51:

Assessing and Disclosing Pension Risk

- Defines Risk: The potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience
- “The actuary should identify risks that, in the actuary’s professional judgment, may reasonably be anticipated to significantly affect the plan’s future financial condition”

New ASOP 51: Assessing and Disclosing Pension Risk

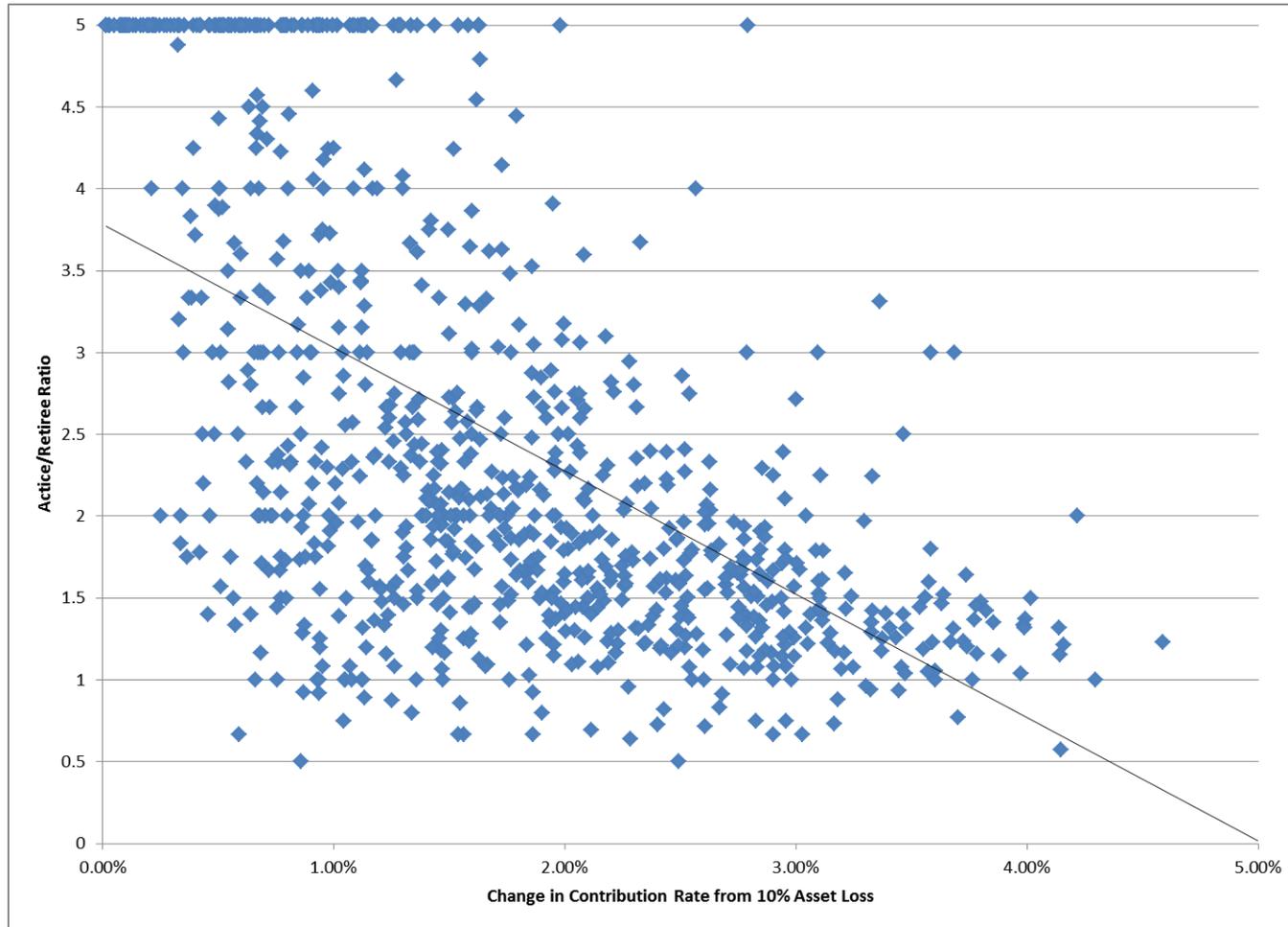
- Assess risks – does not have to be numerical
- Methods for assessment of risk
 - Scenario testing
 - Sensitivity testing
 - Stochastic modeling
 - Stress testing
 - Comparison to minimal-risk investments
- Additional assessment of risk – the actuary can recommend that the intended user have a more complete study performed

New ASOP 51: Assessing and Disclosing Pension Risk

- Plan maturity measures – the actuary should calculate and disclose plan maturity measures, in the actuary’s professional judgment, are significant to understanding the risks associated with the plan
 - Ratio of market value of assets to payroll
 - Ratio of cash flow measure to market value of assets
 - Ratio of benefit payments to contributions
 - Ratio of retired liability to total liability
 - Duration of the actuarial accrued liability

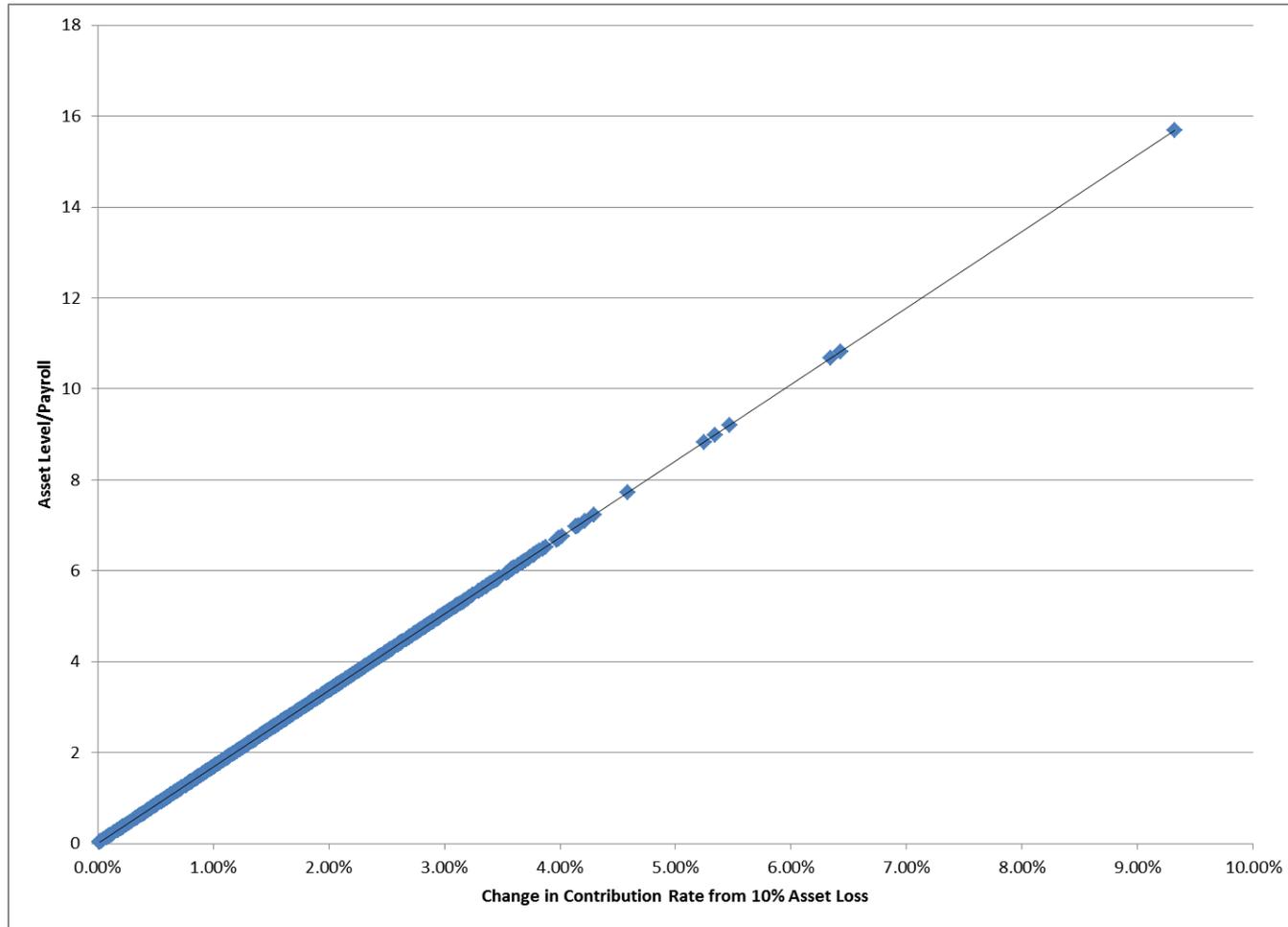
Plan Maturity Examples:

Active to Retiree Ratio vs Potential Contribution Rate Volatility



Plan Maturity Examples:

Assets to Payroll Ratio vs Potential Contribution Rate Volatility



New ASOP 51: Plan Maturity Measures

- There will be a new section in our Report that provides a handful of plan maturity measures for each unit
 - We are going to focus on direct, explicit metrics that will be more consistent with the concerns of the stakeholders
- There will be more discussion of risk in the narrative of our Report
- Otherwise, we are already meeting the requirements of the ASOP

Purpose of the 2019 Experience Study

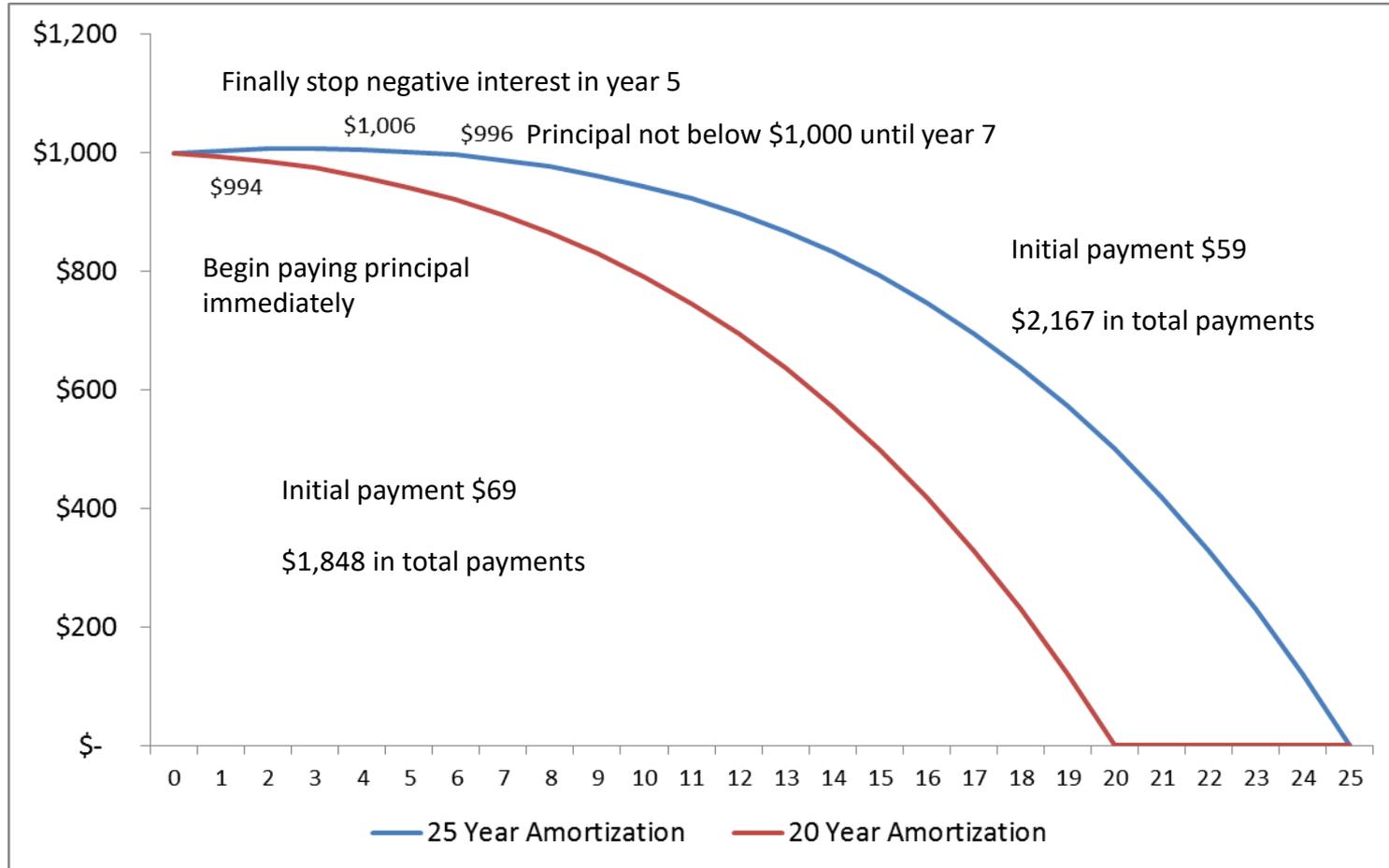
- Assumptions are not static; they should occasionally change to reflect
 - New information and changing knowledge
 - Mortality improvement
 - Changing patterns of retirements, terminations, etc.
 - Implementation of improved technology and processes
- Our analysis will address the following questions for each assumption
 - What was TMRS' actual experience?
 - How does that compare with current assumptions?
 - Is a change warranted?

Current Thoughts

- Most of the assumptions have been tracking close to actual experience
- Mortality will need to be updated for data through 2018
 - Male experience is tracking very close to current assumption
 - Female experience is outpacing current assumption
 - 25.7 actual vs 25.1 expected at age 60 for 2013 - 2017
 - New projection scales (used to project life expectancy improvement into the future) have been published which anticipate slower improvement going forward
- Capital Market Expectations remain low and peer systems continue to decrease investment return and payroll growth assumptions
- Best practices for funding polices and amortization periods continue to evolve
 - Current Amortization Period is 25 Years and Asset Smoothing Period is 10 Years, combined have a total of 35 years from a significant event until fully amortized
 - One of these two needs to decrease by 5 years

20 Year vs 25 Year Amortization Period

\$1,000 loss at time 0



Schedule

- **May:** Delivery of the December 31, 2018 Actuarial Valuation Report (2020 contribution rates)
- **June/August:** Preliminary Experience Study results, setup demographic assumptions for use in ALM
- **September:** Asset/Liability Study results
- **October:** Final decision on new assumptions and asset allocations

Summary

- 2019 is going to be a busy year
- Practically every actuarial and financial policy is up for examination
- Very unlikely that there is a need for a large, immediate change
- However, also unlikely to have no changes
- Currently, looking to focus on policies, strategies, and methods to continue to improve the sustainability of the System and remain in Industry Best Practices