What is your actuary thinking?

Hot Topics in Assumptions and Methods

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FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

Agenda

- New Public Pension Mortality Tables
- Actuarial Standards of Practice Updates
- Amortization Issues
- Key Takeaways

New Public Table Mortality Tables

New Public Pension Mortality Tables

Breaking News!!!

New Public Pension Mortality Tables

Breaking News!!!

- It's the moment we have all been waiting for…
- In January 2019, the Society of Actuaries released its new public pension mortality tables!

- The new tables are referred to as Pub-2010

New Public Pension Mortality Tables

Data Collected

- Prior mortality tables had excluded public plan data
- 78 public pension plans submitted data
- Mortality experience collected from calendar years 2008 to 2013
- Data included 46 million life-years of exposure and around 580,000 deaths

New Public Pension Mortality Tables

Tables Produced

- 94 individual tables were created
  - Three separate job categories – Teachers, Public Safety, General Employees
  - Amount-weighted versus headcount weighted
  - Income level – Above/below median
  - Subgroups – Employees, retirees, contingent survivors, disabled retirees, juveniles

New Public Pension Mortality Tables

Tables Produced

- The full set of all public plan mortality tables produced in the study is denoted Pub-2010
  - Individual table names indicate job classification
    - PubT-2010 for Teachers
    - PubS-2010 for Public Safety
    - PubG-2010 for General Employees
  - Headcount-weighted tables are indicated with an ".H"
  - Tables based on above and below median amount (salary or pension amount) are indicated with an "A" or "B"
  - For example:
    - PubG-2010 : Amount-weighted General Employees
    - PubT.H.-2010(B): Headcount weighted below-median Teachers

New Public Pension Mortality Tables

Impact

- The report compares various annuity calculations under the new tables to mortality tables currently being used
  - Amount-weighted tables on following pages are from the report
- Deferred to age 62 annuities
  - Discount rate of 7% before age 62 and 5% after age 62
    - Approximates a 2% COLA
  - Scale MP-2017 fully generational projections for all tables other than RP-2000 (Scale BB)
  - Does not necessarily translate to liability increases if currently using RP-2014 tables

NEW PUBLIC PENSION MORTALITY TABLES

IMPACT

- Annuity Comparisons – Teachers

		Monthly Deferred-to-62 Annuity Due Values Generational @ July 1, 2018				*Percentage Change of Moving to PubT-2010 (with MP-2017) from:*		
	Base Rate →	RP-2000	RP-2006	RP-2006 WC	**PubT-2010**	RP-2000	RP-2006	RP-2006 WC
	Proj. Scale →	BB	MP-2017	MP-2017	**MP-2017**	BB	MP-2017	MP-2017
Females	Age 25	1.1735	1.1671	1.1960	**1.2406**	*5.7%*	*6.3%*	*3.7%*
	Age 35	2.2720	2.2594	2.3191	**2.4113**	*6.1%*	*6.7%*	*4.0%*
	Age 45	4.4101	4.3812	4.5028	**4.6932**	*6.4%*	*7.1%*	*4.2%*
	Age 55	8.6263	8.5443	8.7849	**9.1655**	*6.3%*	*7.3%*	*4.3%*
	Age 65	13.0772	12.9595	13.3331	**13.9245**	*6.5%*	*7.4%*	*4.4%*
	Age 75	9.8517	9.6858	10.0300	**10.5286**	*6.9%*	*8.7%*	*5.0%*
	Age 85	6.3586	6.0423	6.2543	**6.6215**	*4.1%*	*9.6%*	*5.9%*
Males	Age 25	1.1220	1.0994	1.1543	**1.1867**	*5.8%*	*7.9%*	*2.8%*
	Age 35	2.1668	2.1251	2.2369	**2.3018**	*6.2%*	*8.3%*	*2.9%*
	Age 45	4.1995	4.1143	4.3391	**4.4721**	*6.5%*	*8.7%*	*3.1%*
	Age 55	8.2051	8.0345	8.4670	**8.7317**	*6.4%*	*8.7%*	*3.1%*
	Age 65	12.3695	12.2340	12.8373	**13.2171**	*6.9%*	*8.0%*	*3.0%*
	Age 75	8.9093	8.9690	9.4431	**9.7232**	*9.1%*	*8.4%*	*3.0%*
	Age 85	5.3409	5.4378	5.6904	**5.8822**	*10.1%*	*8.2%*	*3.4%*

NEW PUBLIC PENSION MORTALITY TABLES

IMPACT

- Annuity Comparisons – Public Safety

		Monthly Deferred-to-62 Annuity Due Values Generational @ July 1, 2018				*Percentage Change of Moving to PubS-2010 (with MP-2017) from:*		
	Base Rate →	RP-2000	RP-2006	RP-2006 WC	**PubS-2010**	RP-2000	RP-2006	RP-2006 WC
	Proj. Scale →	BB	MP-2017	MP-2017	**MP-2017**	BB	MP-2017	MP-2017
Females	Age 25	1.1735	1.1671	1.1960	**1.1820**	*0.7%*	*1.3%*	*-1.2%*
	Age 35	2.2720	2.2594	2.3191	**2.2919**	*0.9%*	*1.4%*	*-1.2%*
	Age 45	4.4101	4.3812	4.5028	**4.4517**	*0.9%*	*1.6%*	*-1.1%*
	Age 55	8.6263	8.5443	8.7849	**8.6740**	*0.6%*	*1.5%*	*-1.3%*
	Age 65	13.0772	12.9595	13.3331	**13.0713**	*0.0%*	*0.9%*	*-2.0%*
	Age 75	9.8517	9.6858	10.0300	**9.7245**	*-1.3%*	*0.4%*	*-3.0%*
	Age 85	6.3586	6.0423	6.2543	**6.1480**	*-3.3%*	*1.8%*	*-1.7%*
Males	Age 25	1.1220	1.0994	1.1543	**1.1330**	*1.0%*	*3.1%*	*-1.8%*
	Age 35	2.1668	2.1251	2.2369	**2.1949**	*1.3%*	*3.3%*	*-1.9%*
	Age 45	4.1995	4.1143	4.3391	**4.2582**	*1.4%*	*3.5%*	*-1.9%*
	Age 55	8.2051	8.0345	8.4670	**8.2939**	*1.1%*	*3.2%*	*-2.0%*
	Age 65	12.3695	12.2340	12.8373	**12.4434**	*0.6%*	*1.7%*	*-3.1%*
	Age 75	8.9093	8.9690	9.4431	**8.9533**	*0.5%*	*-0.2%*	*-5.2%*
	Age 85	5.3409	5.4378	5.6904	**5.3471**	*0.1%*	*-1.7%*	*-6.0%*

NEW PUBLIC PENSION MORTALITY TABLES

IMPACT

- Annuity Comparisons – General

		Monthly Deferred-to-62 Annuity Due Values Generational @ July 1, 2018				*Percentage Change of Moving to PubG-2010 (with MP-2017) from:*		
	Base Rate →	RP-2000	RP-2006	RP-2006 WC	**PubG-2010**	RP-2000	RP-2006	RP-2006 WC
	Proj. Scale →	BB	MP-2017	MP-2017	**MP-2017**	BB	MP-2017	MP-2017
Females	Age 25	1.1735	1.1671	1.1960	**1.2085**	*3.0%*	*3.5%*	*1.0%*
	Age 35	2.2720	2.2594	2.3191	**2.3444**	*3.2%*	*3.8%*	*1.1%*
	Age 45	4.4101	4.3812	4.5028	**4.5554**	*3.3%*	*4.0%*	*1.2%*
	Age 55	8.6263	8.5443	8.7849	**8.8853**	*3.0%*	*4.0%*	*1.1%*
	Age 65	13.0772	12.9595	13.3331	**13.4541**	*2.9%*	*3.8%*	*0.9%*
	Age 75	9.8517	9.6858	10.0300	**10.0760**	*2.3%*	*4.0%*	*0.5%*
	Age 85	6.3586	6.0423	6.2543	**6.2831**	*-1.2%*	*4.0%*	*0.5%*
Males	Age 25	1.1220	1.0994	1.1543	**1.1344**	*1.1%*	*3.2%*	*-1.7%*
	Age 35	2.1668	2.1251	2.2369	**2.1955**	*1.3%*	*3.3%*	*-1.9%*
	Age 45	4.1995	4.1143	4.3391	**4.2605**	*1.5%*	*3.6%*	*-1.8%*
	Age 55	8.2051	8.0345	8.4670	**8.3168**	*1.4%*	*3.5%*	*-1.8%*
	Age 65	12.3695	12.2340	12.8373	**12.5732**	*1.6%*	*2.8%*	*-2.1%*
	Age 75	8.9093	8.9690	9.4431	**9.1604**	*2.8%*	*2.1%*	*-3.0%*
	Age 85	5.3409	5.4378	5.6904	**5.5437**	*3.8%*	*1.9%*	*-2.6%*

NEW PUBLIC PENSION MORTALITY TABLES

IMPACT

- Example of Impact on Representative Article 4 Fund
  - PubS-2010 mortality projected with MP-2017
  - RP-2000 BC mortality projected with Scale BB
  - Assuming same 7.00% interest rate as the sample annuity factors

	RP-2000 BC	PubS-2010	Increase for PubS-2010
Accrued Liability			
Projected to Valuation Date	33,211,880	34,313,166	3.3%
Projected 5 Years Past Valuation Date	33,567,981	34,513,978	2.8%
Generational Projection	34,646,816	35,382,672	2.1%
Normal Cost			
Projected to Valuation Date	675,588	698,052	3.3%
Projected 5 Years Past Valuation Date	680,842	701,034	3.0%
Generational Projection	707,916	722,685	2.1%

New Public Pension Mortality Tables
Other Considerations

- Actuarial Standards of Practice (ASOP) Considerations
  - Mortality tables should be projected with appropriate mortality improvement scale
    - MP-2018 is most recent but each update since MP-2014 has lowered improvement expectations
  - All relevant population characteristics should be considered (job category, income level, etc.)
  - Different tables for different participant subgroups

New Public Pension Mortality Tables

Predictions

- Most public plans will migrate towards one of these new tables
- Most plans will see increases in liabilities and contribution requirements
  - Teachers plans will likely see largest increases
  - Public safety plans will be surprised…but will also see increases
  - General employees plans also will see higher costs

Actuarial Standards of Practice Updates

Actuarial Standards of Practice Updates
ASOP 51

- ASOP 51 – Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions
  - Adopted by the Actuarial Standards Board in September 2017
  - Effective on November 1, 2018
  - Applies to funding and pricing valuations

Actuarial Standards of Practice Updates
ASOP 51

- Analysis of Issues and Recommended Practices
  - Identify the risks to be assessed
    - Investment risk
    - Asset/liability mismatch risk
    - Interest rate risk
    - Longevity and other demographic risks
    - Contribution risk
  - Assess the risk
    - Numerical calculations are not required

Actuarial Standards of Practice Updates
ASOP 51

- Analysis of Issues and Recommended Practices (cont.)
  - Methods for assessment of risk
    - Scenario tests
    - Sensitivity test
    - Stochastic modeling
    - Stress tests
    - Comparison to an actuarial present value based on minimal-risk investments
  - Assumptions for assessment of risk
    - The actuary should recommend a more detailed assessment if it would be significantly beneficial for the intended user to understand the risks

Actuarial Standards of Practice Updates
ASOP 51

- Analysis of Issues and Recommended Practices (cont.)
  - Plan maturity measures
    - Ratio of market value of assets to active payroll
    - Ratio of retiree accrued liability to total accrued liability
    - Ratio of cash flows to market value of assets
    - Ratio of benefit payments to contributions
    - Duration of the accrued liability

Actuarial Standards of Practice Updates
ASOP 51

- Analysis of Issues and Recommended Practices (cont.)
  - Historical information
    - Funded status
    - Gains and losses
    - Actuarially determined contribution
    - Normal cost
  - Reliance on a separate report
    - Risk assessed by another party like an investment advisor

Actuarial Standards of Practice Updates
ASOP 4

- Proposed Revisions to ASOP 4 – Measuring Pension Obligations and Determining Pension Plan Costs or Contributions
  - Exposure draft issued in March 2018
  - Comment period ended on July 31, 2018

ACTUARIAL STANDARDS OF PRACTICE UPDATES
ASOP 4

- Exposure Draft Adds "Investment Risk Defeasement Measure" section
  - More commonly know as a Market Value of Liability requirement
  - If performing a funding valuation, the actuary should disclose the cost of effectively defeasing the investment risk of the plan
  - Calculation based on U.S. Treasury yields or rates at which the pension obligation can effectively be settled
  - Unlike all other ASOPs, this addition prescribes an actuarial assumption
  - A disclosure item so it would not change the contribution requirements to the plan

ACTUARIAL STANDARDS OF PRACTICE UPDATES
ASOP 4

- Exposure Draft Adds "Investment Risk Defeasement Measure" section (cont.)
  - It would create confusion since the actuary would be providing results based on a separate measure
  - Is not required in the risk ASOP (ASOP 51)
- Adds requirement for actuary to disclose a reasonable actuarially determined contribution
  - Calculated based on an amortization method with no negative amortization or one that is paid off in a reasonable time period
  - Not based on market value of liabilities

Amortization Issues

Amortization Issues

Amortization Defined

- The actuarial cost method determines the actuarial accrued liability.
- In the actuarial valuation, the accrued liability is compared to the actuarial value of assets.
- If the accrued liability is larger, unfunded liabilities exist and need to be paid down, similar to a mortgage.
- Currently, the amortization period in Illinois Pension Code ends in 2040 (target is 90% of accrued liability).

Amortization Issues

Amortization Method Selection

- Many considerations when selecting an amortization method:
  - Length of the amortization period?
  - Open (rolling) or closed amortization?
  - Level dollar or level percentage of payroll basis?
    - If level percentage basis, what is the payroll growth assumption?
  - Single base or layered approach?

Amortization Issues

Amortization Method Selection

- Length of amortization period?
  - Typically, funds rely on the Illinois Pension Code.
  - Currently, the amortization period is through the year 2040.
    - This is an arbitrary date arrived at through the political process.
  - Amortization periods that end at an arbitrary date can be dangerous.
    - The plan is going to be around for a lot longer than this “end date.”
    - This date is often pushed back without any consideration of the effect on the plan or the municipality.
- Increasing contributions and volatility as you approach the end of the amortization period will be difficult for the municipality to manage.

Amortization Issues

Amortization Method Selection

- Open (rolling) or closed amortization?
  - An amortization with a finite period is called a closed amortization.
    - 2040 is a closed amortization.
    - Or is it?!?! The date will be moved at some point in the future.
  - An open amortization is one that always uses the same number of years.
    - For example, IMRF is going to an open 15 year amortization.
    - Opponents do not like it because it does not get you to 100% by any specific date.

Amortization Issues

Amortization Method Selection

- Level dollar or level percentage of payroll basis?
  - The level dollar approach produces an amortization payment that is always the same amount.
    - Becomes a smaller percentage of payroll over time.
  - The level percentage of payroll produces a payment stream that is designed to increase based on the expected growth in payroll.
    - Payments start out smaller and increase over time.
    - The actuary uses a payroll growth assumption to determine the payment pattern; the higher the assumption, the more the payment will increase over time.
    - The current payment is less than the level dollar approach since future payments get larger each year.
    - The level dollar method is the same as the level percentage approach with a 0% payroll growth assumption.

Amortization Issues

Amortization Method Selection

- Level dollar or level percentage of payroll basis?
  - The higher the payroll growth assumption, the more likely that negative amortization will exist.
    - Negative amortization occurs when the annual amortization payment is less than the interest accruing on the unfunded liability.
    - This often leads to an increase in the unfunded liability for the first several years of the amortization schedule before any of this past service debt is paid down.
  - A funding policy based on perpetual negative amortization is a recipe for disaster

AMORTIZATION ISSUES

AMORTIZATION METHOD SELECTION

- Single base or layered approach?
  - Most plans in Illinois reamortize the unfunded liability over a fixed number of years each valuation
  - Many municipalities outside of Illinois set up a new layer each year for any changes in the unfunded liability
    - The example below illustrates a plan that began a layered approach as of 5/1/2016 and amortizes assumption changes over 20 years and gain/loss over 10 years.

Base	Date Established	Years Remaining	5/1/2018 Amount	Amortization Amount
Initial Unfunded	5/1/2016	18	12,568,745	946,703
Assumption Change	5/1/2017	19	1,023,541	74,277
Actuarial Loss (Gain)	5/1/2017	9	(523,657)	(67,436)
Assumption Change	5/1/2018	20	(625,985)	(43,883)
Actuarial Loss (Gain)	5/1/2018	10	1,563,254	184,456
			14,005,898	1,094,117

Amortization Issues

Payroll Growth Assumption and Negative Amortization

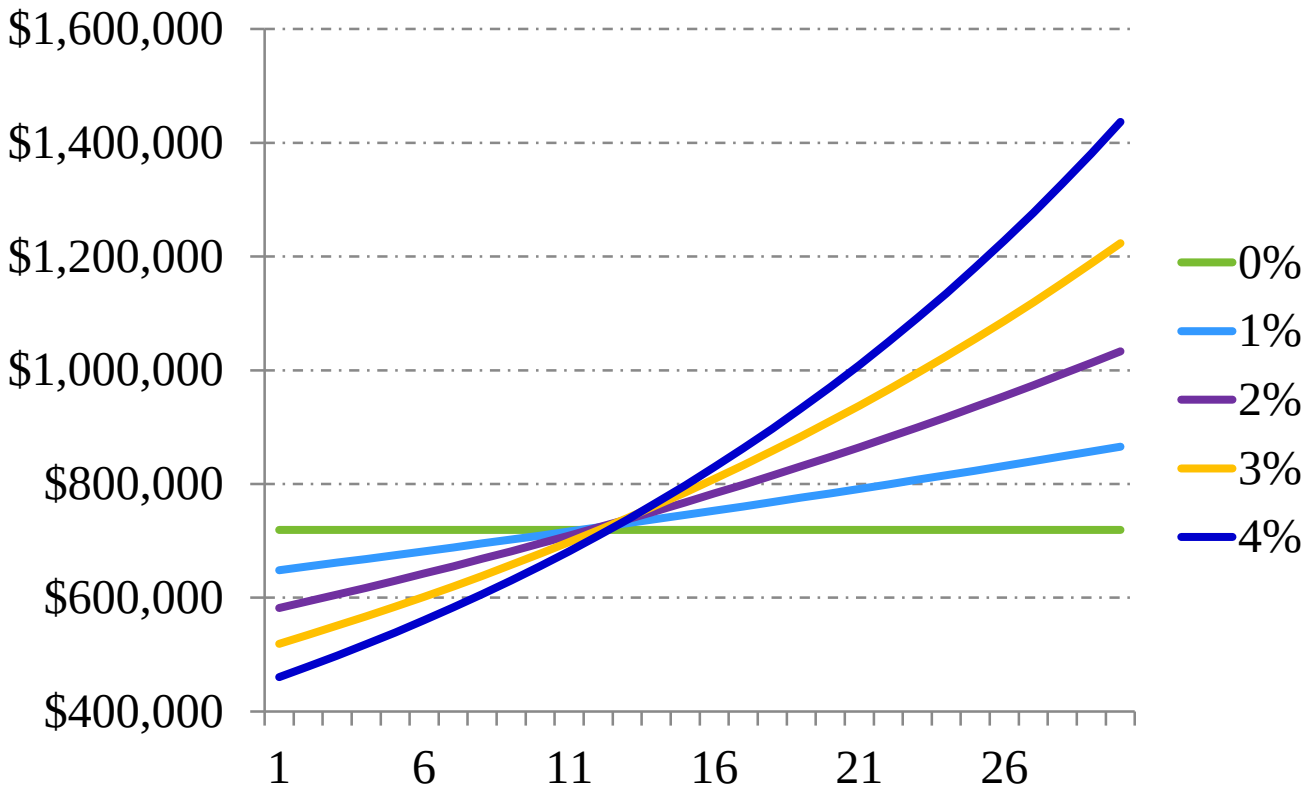
- The payroll growth assumption determines how unfunded liabilities are paid off.
- Example – 30-Year Amortization
  - Unfunded Actuarial Liability = $10,000,000
  - Interest Rate = 6.50%

Payroll Growth Rate	UAL Payment (1st year)
0% (Level $)	$719,037
1%	$648,601
2%	$581,886
3%	$519,150
4%	$460,600

Amortization Issues

Payroll Growth Assumption and Negative Amortization

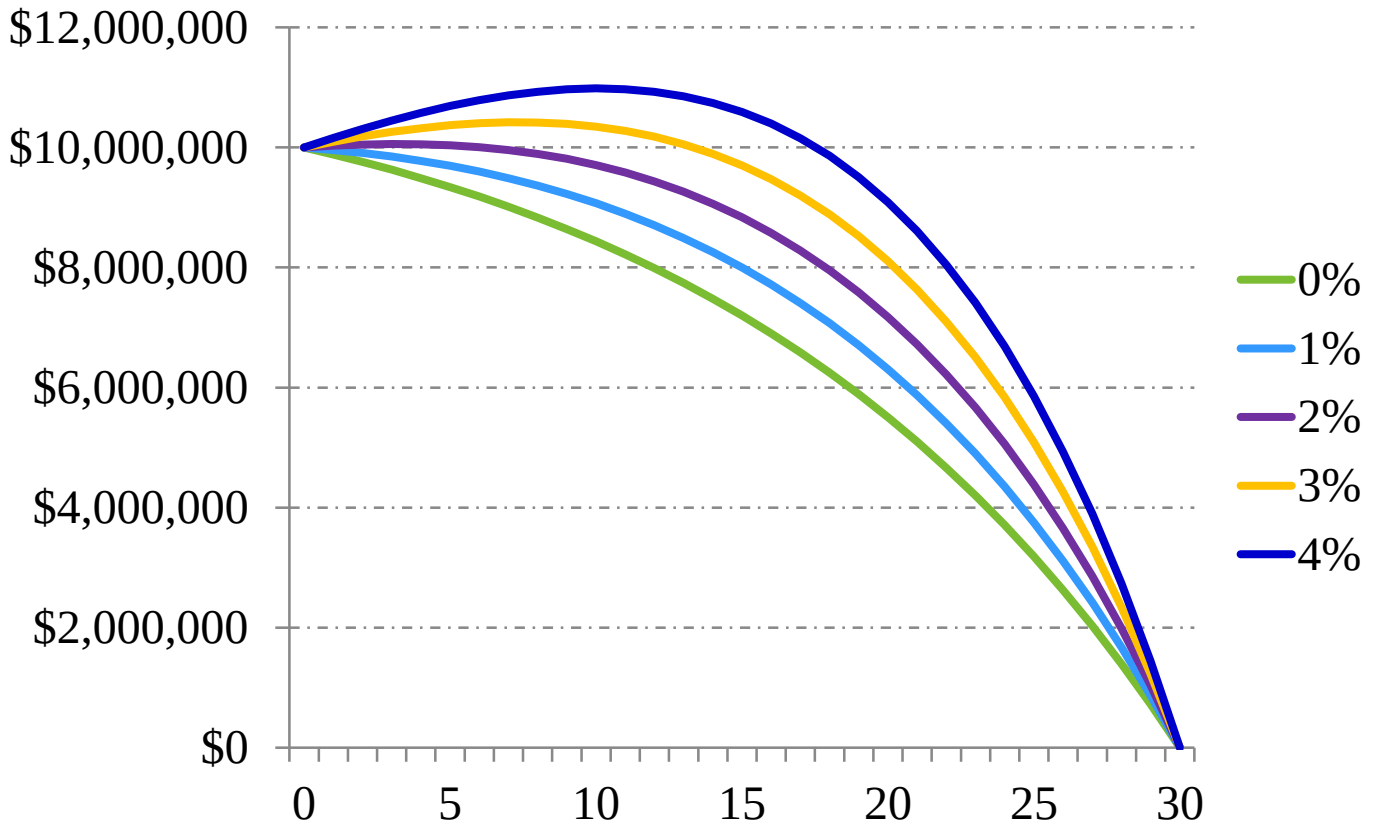
- How do the amortization payments change over the 30-year period with various payroll growth assumptions?



Amortization Issues

Payroll Growth Assumption and Negative Amortization

- What happens to the unfunded liabilities under various payroll growth assumptions?



Amortization Issues

Considerations

- Each municipality should select its own amortization approach rather than relying on pension legislation from Springfield.
- Need to consider how all of the factors work together and select those that will help you succeed.
  - Cannot cherry pick the “cheapest” approach from each category.
- Once you have made a selection, stick with it and do not change the rules along the way.
  - Changing the rules will set you up for failure.

Key Takeaways

KEY TAKEAWAYS

- The new mortality tables will likely affect my Fund in the near future
  - Determine the magnitude of the change in liabilities
- There are changes to the Actuarial Standards of Practice that may confuse the readers of our valuation report
  - What steps do we need to take to minimize confusion?
- Is our amortization method causing our unfunded liability to grow uncontrollably?

Questions?

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