The elements of success

hooker & holcombe

Burlington Employees' Retirement System
Public Sector Actuarial Science 101

Steve Lemanski, FSA, FCA, MAAA

Consulting Actuary

April 17, 2018

Discussion Topics

hooker & holcombe

- Purpose of the Valuation
- Funding
- Actuarial Assumptions
- Traditional Valuation vs. Open-Group Forecast
- Financial Reporting

Purpose of the Valuation

hooker & holcombe

The ultimate cost of a pension plan is based primarily on the level of benefits promised by the plan. The pension fund's investment earnings serve to reduce the cost of plan benefits and expenses. Thus,

City's Ultimate cost = Benefits Paid + Expenses Incurred – Investment Return – Employee Contributions

- The Actuarial Valuation utilizes an actuarial cost method to assign a portion of this "ultimate cost" to the budget year. The valuation does not determine the ultimate cost of the plan but is a tool used to determine the appropriate level of City contributions.
- Actuarially Determined Employer Contribution (ADEC) developed from the valuation is comprised of two components: amortization of unfunded liability (23 *years, on average, for 2016 valuation)* & normal cost (assignment of benefits "earned" for the budget year).

Funding

hooker & holcombe

- Public sector plans are not subject to Internal Revenue Code minimum required/maximum deductible contribution rules
- Historically, linked to the "parameters" under GASB 25/27 financial reporting standards
- GASB 67/68 replaced GASB 25/27 in 2014, but most plans continue to apply the GASB 25/27 parameters
- **ADEC:** Actuarially Determined Employer Contribution
- ADEC usually is Normal Cost + Past Service Payment

Funding - Liabilities

hooker & holcombe

- Most common actuarial cost method used is **Entry Age Normal (EAN)** *
- EAN: 72%; Projected Unit Credit: 13%; Aggregate: 8%; Other: 7%
- BERS valuation uses EAN, which also is the prescribed method under GASB 67/68 for financial reporting

** Source: Actuarial Inputs and the Valuation of Public Pension Liabilities and Contribution Requirements: A Simulation Approach (Gang Chen and David S.T. Matkin, May 2017)*

Funding - Assets

hooker & holcombe

- Most public sector funds smooth investment gains/losses to reduce ADEC volatility
- Typically, 5-year smoothing (20%/year recognition)
- The two most common methods are to: (1) smooth actual vs. expected return on MVA, or (2) smooth expected AVA vs. actual MVA
- BERS valuation uses 10-year smoothing, and method (1) above
- In 2016 BERS valuation, AVA is $175.7 million, vs. MVA of $156.8 million ($18.9 million in unrecognized losses)

Development of Actuarial Value of Assets

hooker & holcombe

Relationship of Actuarial Value to Market Value	
1. Market value 7/1/2016	$156,789,373
2. Gain / (loss) not recognized in actuarial value 7/1/2016	(18,956,586)
3. Preliminary actuarial value 7/1/2016: (1) - (2)	175,745,959
4. Preliminary actuarial value as a percentage of market value: (3) ÷ (1)	112.1%
5. Gain / (loss) recognized for corridor minimum / maximum	N/A
6. Actuarial value 7/1/2016 after corridor minimum / maximum: (3) + (5)	175,745,959
7. Actuarial value as a percentage of market value: (6) ÷ (1)	112.1%

Development of Market Value Gain / Loss for 2015-2016 Plan Year	
1. Market value 7/1/2015	$161,715,857
2. City contributions	9,149,159
3. Employee contributions	2,304,971
4. Benefit payments	14,292,083
5. Administrative expenses	0
6. Expected return at 8.00%	12,823,750
7. Expected value 7/1/2016: (1) + (2) + (3) - (4) - (5) + (6)	171,701,654
8. Market value 7/1/2016	156,789,373
9. Market value gain / (loss) for 2015-2016 plan year: (8) - (7)	(14,912,281)

Recognition of Gain / Loss in Actuarial Value

Year	(a) Gain / (loss)	(b) Total recognized as of 7/1/2015	(c) Recognized in current year: 10% of (a)	(d) Total recognized as of 7/1/2016: (b) + (c)	(e) Not recognized as of 7/1/2016: (a) - (d)
2012-2013	($498,233)	($99,646)	($99,647)	($199,293)	($298,940)
2013-2014	8,081,381	1,616,276	808,138	2,424,414	5,656,967
2014-2015	(13,616,950)	(1,361,695)	(1,361,695)	(2,723,390)	(10,893,560)
2015-2016	(14,912,281)	0	(1,491,228)	(1,491,228)	(13,421,053)
Total			(2,144,432)		(18,956,586)

Funding – Amortization Policy

hooker & holcombe

- Definition: *the length of time and the structure selected for increasing or decreasing contributions to systematically eliminate any unfunded actuarial liability or surplus **
- Similar to paying off a home mortgage

** Source: Spotlight on The Annual Required Contribution Experience of State Retirement Plans, FY 01 to FY 13 (Keith Brainard and Alex Brown, National Association of State Retirement Administrators, March 2015)*

Funding – Amortization Policy

hooker & holcombe

- Amortization period – generally not greater than 30 years
- Median amortization period is about 20 years for public sector pension plans
- Closed or Open amortization
- Method : Level Dollar or Level Percentage of Payroll
- Single amortization base or Layering/Separate bases
- Negative amortization – can occur if amortization period is long, and using level percentage of payroll amortization

Funding – Amortization Policy (BERS)

hooker & holcombe

- Amortization period – 30 years
- Closed amortization
- Method: Level Dollar
- Layering/Separate bases
- For 2016 valuation – average amortization period is 23 years

BERS 2016 Valuation - Executive Summary

hooker & holcombe

	July 1, 2016			July 1, 2015		
	Class A	Class B	Total	Class A	Class B	Total
Number of members						
Active employees	174	680	854	174	668	842
Terminated vested members	15	361	376	16	367	383
Retired, disabled and beneficiaries	177	483	660	170	444	614
Total	366	1,524	1,890	360	1,479	1,839
Covered employee payroll	11,016,208	37,091,509	48,107,717	10,395,873	34,369,246	44,765,119
Average plan salary	63,312	54,546	56,332	59,746	51,451	53,165
Actuarial accrued liability	110,320,376	135,622,903	245,943,279	104,173,828	125,706,463	229,880,291
Plan assets						
Market value of assets	67,913,439	88,875,934	156,789,373	70,746,308	90,969,549	161,715,857
Actuarial value of assets	76,124,499	99,621,460	175,745,959	73,971,751	95,117,004	169,088,755
Unfunded accrued liability	34,195,877	36,001,443	70,197,320	30,202,077	30,589,459	60,791,536
Funded ratio	69.0%	73.5%	71.5%	71.0%	75.7%	73.6%
Actuarially determined employer contribution (ADEC)						
Fiscal year ending	2018	2018	2018	2017	2017	2017
ADEC	4,355,137	5,621,518	9,976,655	3,942,012	5,436,533	9,378,545

BERS – ADEC Calculation for Fiscal 2018

hooker & holcombe

	Class A	Class B	Total
City's normal cost	$1,072,004	$2,089,872	$3,161,876
Actuarial accrued liability	110,320,376	135,622,903	245,943,279
Actuarial value of assets	76,124,499	99,621,460	175,745,959
Unfunded accrued liability	34,195,877	36,001,443	70,197,320
Amortization of unfunded accrued liability	3,283,133	3,531,646	6,814,779
Actuarially determined employer contribution	4,355,137	5,621,518	9,976,655
Estimated valuation year payroll for actives not yet at 100% assumed retirement age	11,412,022	40,383,678	51,795,700
City's normal cost as a percentage of payroll	9.4%	5.2%	6.1%
Contribution as a percentage of payroll	38.2%	13.9%	19.3%

Actuarial Assumptions - Overview

hooker & holcombe

- Most larger public retirement systems review actuarial assumptions on a regular basis through formal Experience Studies
- Many economic and demographic factors are taken into consideration
- The plan's actuary plays a significant role in the selection of actuarial assumptions
- Actuarial Standards of Practice ("ASOPs") provide professional guidance to actuaries during the assumption setting process

BERS most recent Experience Study was as of June 30, 2012

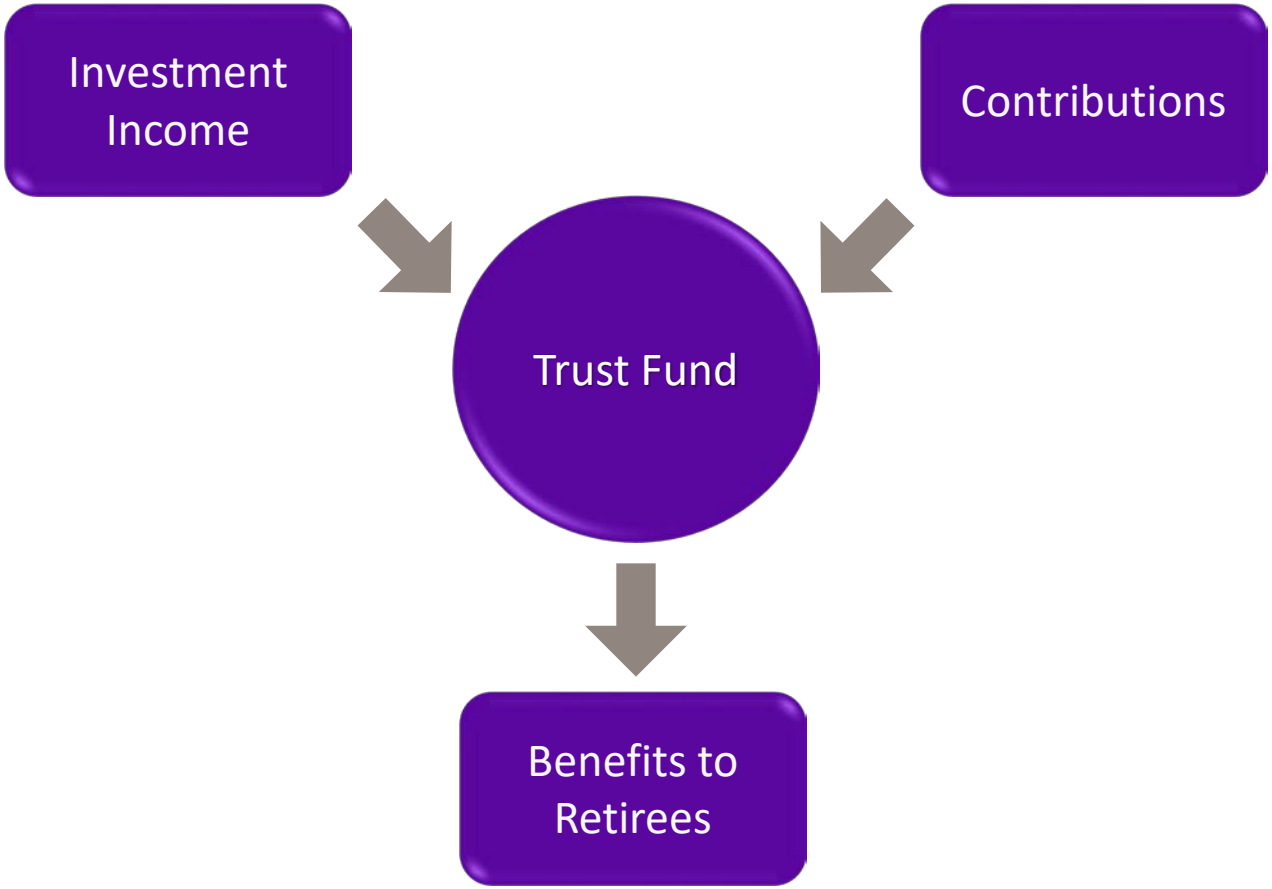
GFOA "BEST PRACTICE"

Perform an Experience Study at least once every 5 years

Why is the investment return assumption important?

hooker & holcombe

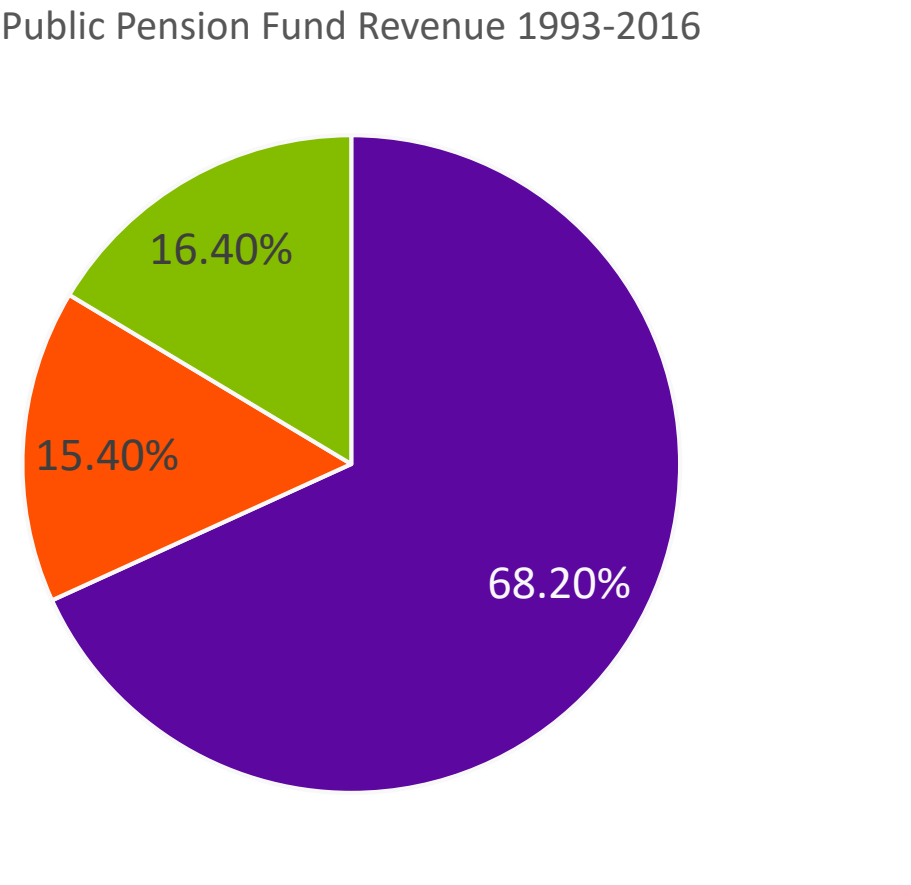
- **Investment income and contribution provide the foundation for funding future benefits for plan members**



Why is the investment return assumption important?

hooker & holcombe

- **Investment earnings account for the majority of revenues for most public pension plans**



Source: US Census 2016 State & Local Public-Employee Retirement Systems Data

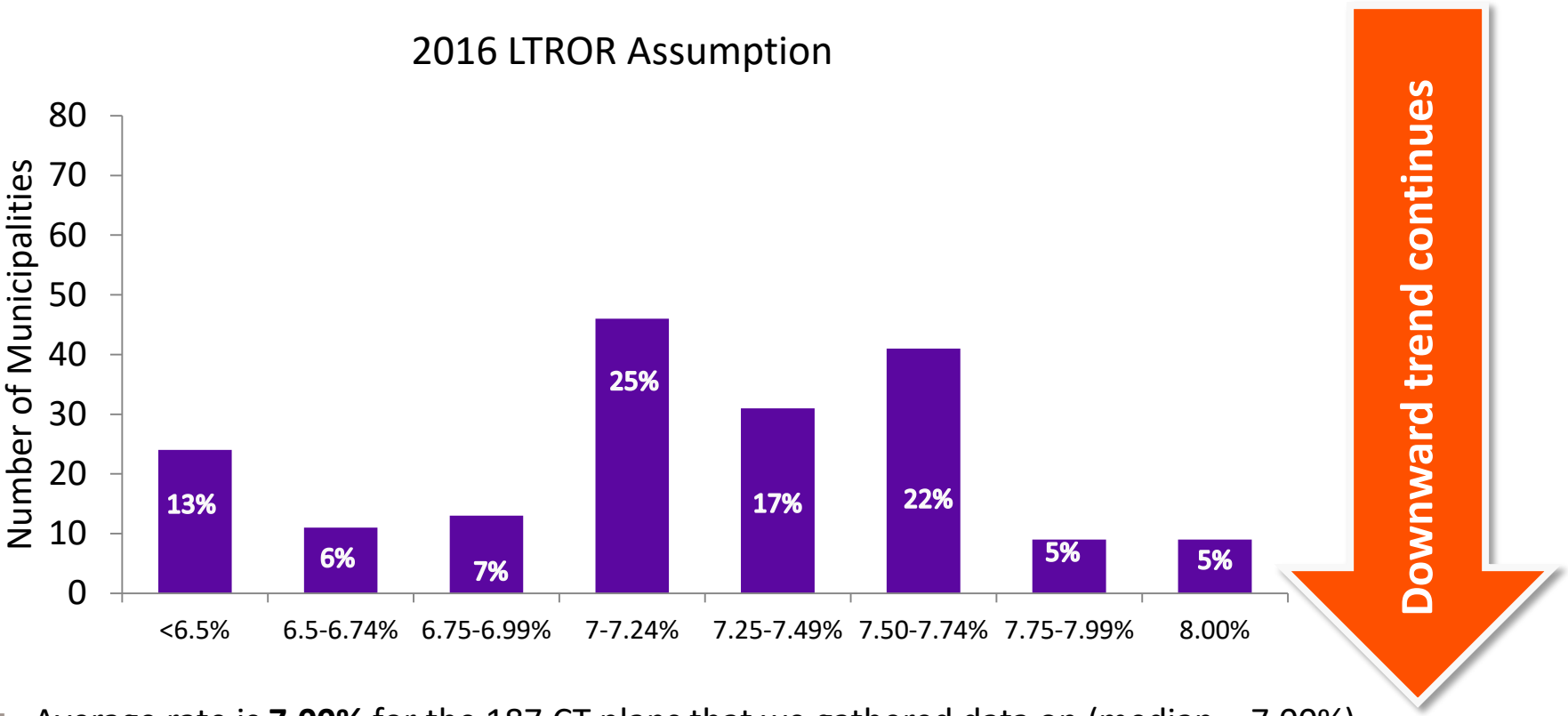
Actuarial Standard of Practice (ASOP) 27

hooker & holcombe

- Actuaries should consider a number of factors in setting the **investment return** assumption:
  - forecasts of inflation and of total returns for each asset class
  - current yields to maturity of fixed income securities such as government securities and corporate bonds
  - historical investment data
  - historical plan performance
- Actuaries may also consider historical statistical data showing standard deviations, correlations, and other statistical measures related to historical returns for each asset class and for inflation

Long-Term rates from 2016 CAFRs

hooker & holcombe



- Average rate is **7.00%** for the 187 CT plans that we gathered data on (median = 7.00%)
- Down about 0.5% from 5 years ago from 7.49% (average)
- No one assumption dominates (unlike the 8.00% assumption that was pervasive 10+ years ago – partly due to phasing-in of lower rates)

Alpha

hooker & holcombe

- **Alpha:** excess returns generated by active management
- Historically, alpha was expected to add 25-50 bps to returns
- Under ASOP 27, actuary may only include a margin for alpha if you can prove it exists
- Research supporting the ability of any particular active manager to consistently generate alpha is thin
- Actuaries in many cases have been lowering or eliminating the margin for alpha

Putting It All Together

hooker & holcombe

- Downward trend in prospects for future investment returns
  - 100-150+ bps reduction in past decade
- No more alpha?
  - 25-50 bps reduction in expected returns
- End result: plan sponsors increasingly reviewing and lowering the investment return assumption

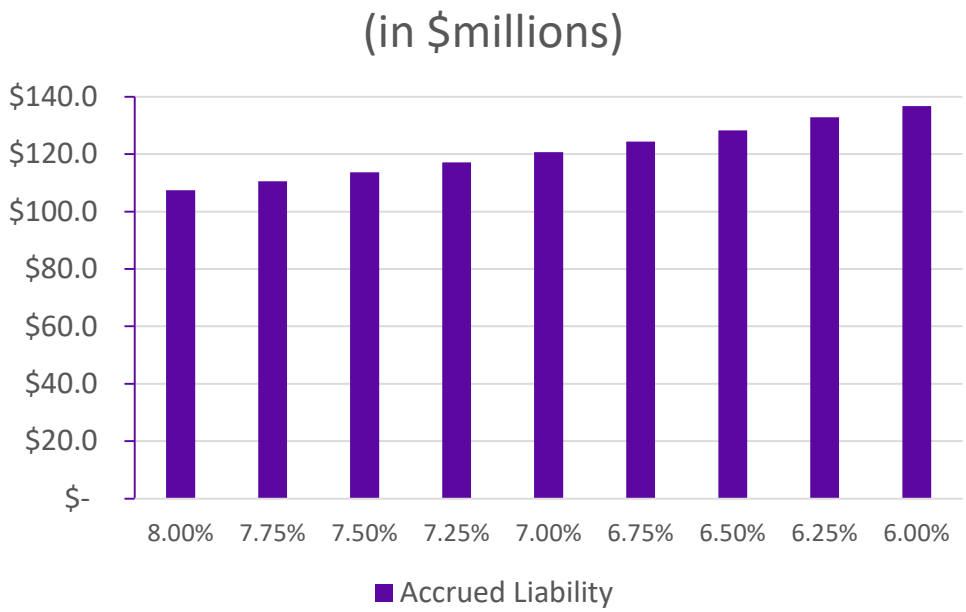
BERS assumption:

8.00%

Impact of Lowering the Investment Return Assumption

hooker & holcombe

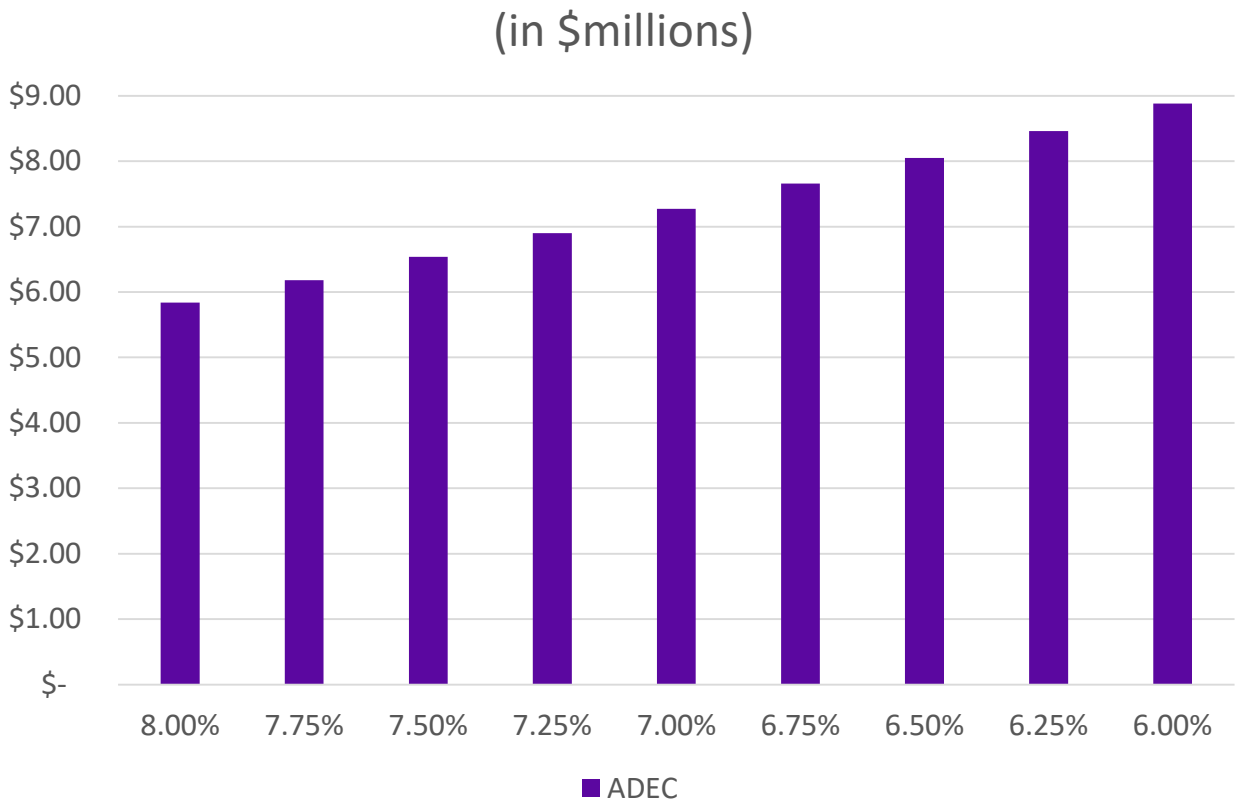
- **Short term**
  - Higher liabilities
  - Lower funding ratios
  - Larger contributions



- **Long term**
  - More likely that investment returns will meet or exceed assumption
  - Less likely that actuarial losses will accumulate
  - Greater stability of contribution levels
  - Decreased pressure on future taxpayers
  - Credit positive

Impact of Lowering the Investment Return Assumption

hooker & holcombe



Impact on Hypothetical Plan

hooker & holcombe

($ millions)

Interest Rate	Accrued Liability	ADEC
8.00%	$107.4	$5.84
7.75%	110.5	6.18
7.50%	113.7	6.54
7.25%	117.1	6.90
7.00%	120.7	7.27
6.75%	124.4	7.66
6.50%	128.3	8.05
6.25%	132.5	8.46
6.00%	136.8	8.88

Why is the mortality assumption important ?

hooker & holcombe

- Pension benefits are generally payable for the lifetime of the member
- Mortality is the primary factor in determining how long the plan expects to pay benefits to a member
- Understating expected longevity will understate the current cost of pension liabilities and place additional burden on future taxpayers to fund pension obligations

How is the mortality assumption developed ?

hooker & holcombe

- Mortality assumption takes into consideration various demographic factors:
  - Gender
  - Status (e.g., active, retired, disabled)
  - Type of occupation (e.g. white vs. blue-collar; uniformed vs. non)
  - Plan experience
- The plan's actuary follows guidance under ASOP 35

BERS assumption:

105% of RP-2000 Combined Mortality Table, projected with Scale BB

More recent mortality studies

hooker & holcombe

- Society of Actuaries (SOA) published a major study in 2014
- **RP-2014 Mortality Table, with MP-2014 projection scale**
- Projection scale is now being updated annually – the most recent scale is **MP-2017**
- Neither the RP-2000 table nor the RP-2014 table explicitly incorporates public sector mortality experience
- SOA currently studying public sector mortality – exposure draft expected by end of 2018
- Public safety vs. Teachers vs. General employees

Traditional Valuation vs. Open-Group Forecast

hooker & holcombe

- **Traditional actuarial valuation reflects a "snapshot" of the current membership, plan provisions, and plan assets as of the valuation date**

  - Future hires – including any new "tiers" of lower benefits – are not reflected in the current valuation
  - As a result, it generally takes many years for significant reductions in the ADEC to be realized

Traditional Valuation vs. Open-Group Forecast

hooker & holcombe

- **Open Group forecast projects traditional valuation results many years into the future (75+ years), taking into account lower tiers of benefit for future new hires**
  - The projected future "traditional valuation" ADECs are translated into an equivalent long-term percentage of payroll contribution pattern
  - The resulting pattern of "open group" ADECs generally reflects lower employer contributions in earlier years, and higher contributions in the future
  - The open-group forecast technique **does not** change the plan sponsor's long-term costs

Financial Reporting

hooker & holcombe

CAFR: Comprehensive Annual Financial Report

- CAFR is "a set of U.S. government financial statements comprising the financial report of a state, municipal or other governmental entity that complies with the accounting requirements promulgated by the Government Accounting Standards Board" *
- Pension is just one item of many covered in the CAFR
- Different set of rules vs. funding

* Source: Accounting for Governmental and Nonprofit Entities (15th Ed.) (Earl Wilson, 2010)

Financial Reporting

hooker & holcombe

- **GASB 67/68** – current financial reporting standards for pension plans
- Balance sheet entry = Net Pension Liability (NPL)
- NPL = Total Pension Liability – Plan Fiduciary Net Position
- **NPL** is the unfunded actuarial liability determined on an EAN basis, and using Market Value of Assets
- Also calculate an annual "pension expense" amount that is recorded in the financials

** Source: Accounting for Governmental and Nonprofit Entities (15th Ed.) (Earl Wilson, 2010)*

Financial Reporting

hooker & holcombe

- Additional disclosure items
  - Money-weighted rate of return (10 years)
  - ADEC vs. Actual Employer Contribution (10 years)
  - NPL, including annual reconciliation (10 years)
  - +/- 1% discount rate sensitivity : NPL
  - Target asset allocation and Expected Return basis
- Generally more rapid recognition of gains/losses, plan amendments, assumption changes
- Pension expense much more volatile than ADEC
- May need “depletion date projection” if not contributing ADEC

hooker & holcombe

Questions