

Economic Experience Study Preview

$$\int x^2 \sqrt{x^2 \pm a^2} dx = \frac{x}{8} (2x^2 \pm a^2) \sqrt{x^2 \pm a^2} - \frac{a^2}{8} \ln|x + \sqrt{x^2 \pm a^2}| + C$$

*Lisa Won, ASA, FCA, MAAA
Deputy State Actuary*

The collage features various mathematical elements:

- Integration formulas: $\int \frac{\sqrt{x^2 - a^2}}{x} dx = \sqrt{x^2 - a^2} - a \sec^{-1} \frac{x}{a} + C$, $\int \frac{x^e}{\sqrt{x^2 \pm a^2}} dx = \frac{x}{2} \sqrt{x^2 \pm a^2} \mp \frac{a^2}{2} \ln|x + \sqrt{x^2 \pm a^2}| + C$, $\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \frac{1}{a} \ln|x + \sqrt{x^2 \pm a^2}| + C$, $\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \frac{1}{a} \ln|x + \sqrt{x^2 \pm a^2}| + C$, $\int \frac{dx}{(x^2 \pm a^2)^{3/2}} = \frac{x}{a^2 \sqrt{x^2 \pm a^2}} + C$, $\int (x^2 \pm a^2)^{3/2} dx = \frac{x}{8} (2x^2 \pm 5a^2) \sqrt{x^2 \pm a^2} + \frac{3a^4}{8} \ln|x + \sqrt{x^2 \pm a^2}| + C$
- Geometric diagrams: A 3D cube with vertices labeled A through H, and a 2D diagram showing a point on a circle with polar coordinates $x = p \cos \varphi$, $y = p \sin \varphi$, and $|z| = p$.
- Algebraic equations: $-1 \leq x^2 + y^2 \leq -6y$, $-4 \sin \varphi \leq p - 6 \sin \varphi \leq 20 - 6 \sin \varphi$, $|s| = \int \frac{dp}{\sqrt{p}}$, $V = \frac{\pi r^2 h}{3}$, $4r^2 + h^2 = 60$.
- Large numbers: 3, 4, 8, 0, 8.



Office of the State Actuary
"Securing tomorrow's pensions today."

July 22, 2015

Today's Presentation

- What is an economic experience study?
- What assumptions are reviewed?
- Why are experience studies done?
- How do we perform the study?
- What's the outcome?
- Next steps
- No action required today - informational only



OSA Performs Economic And Demographic Experience Studies

- Review and update assumptions to ensure they remain reasonable
- Economic Experience Studies are performed every two years
 - Includes some plan-specific data as well as national and regional economic data
- Demographic Experience Studies are performed at least every six years
 - More focus is placed on historical experience at a plan-specific level
 - Covers assumptions such as termination, mortality, retirement, disability, etc.
 - Most recent study was completed in 2014 for the 2007-2012 period

Economic Assumptions

- Include
 - Rate of inflation
 - Rate of general salary increases
 - Rate of investment return
 - Growth in system membership
- Help us estimate
 - Future benefits payable from the plans
 - Today's value of future benefits and salary
 - Funding requirements (contribution rates) needed to secure those benefits



Rate Of Inflation

- Regional CPI (Seattle, Tacoma, Bremerton) is the basis for post-retirement Cost of Living Adjustments (COLAs) in LEOFF 2
- Inflation assumption used in our valuation model to estimate the amount of COLAs provided under the plan
- Includes:
 - National inflation
 - Adjustments for regional inflation

Rate Of General Salary Increases

- Represents a portion of the rate of change in an individual's salary
- Future salary levels impact an individual's benefit and contributions to the plan
- Includes
 - Inflation
 - Productivity growth
- Excludes promotions or merit/step increases that are included in plan-specific demographic assumptions



Rate Of Investment Return

- Reflects anticipated returns on plan's current and future assets
- Assumption used to determine today's value of future benefit payments and salaries
- Key assumption for determining contribution requirements
- Components include
 - National inflation
 - Real rate of return

Growth In System Membership

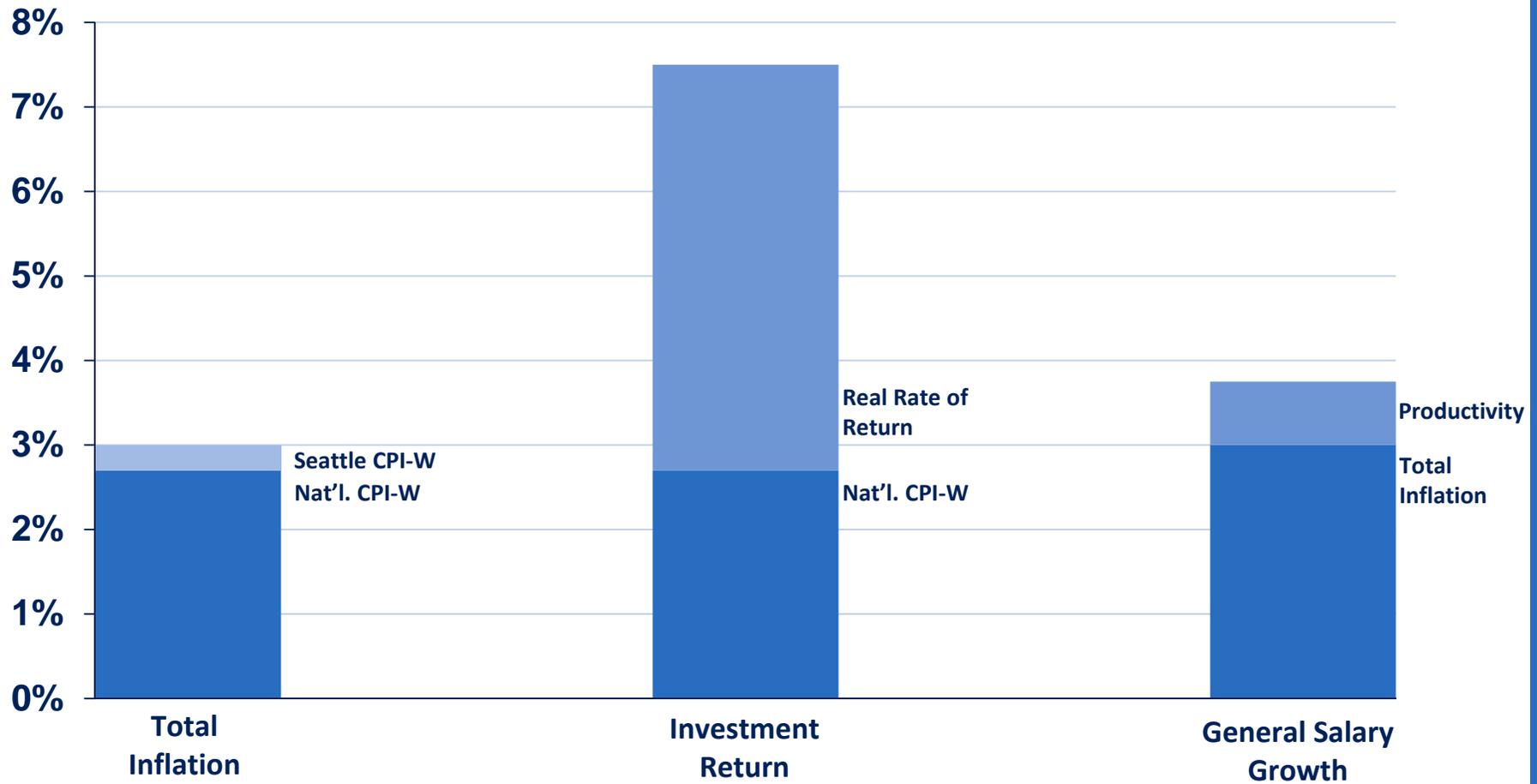
- Represents rate of change in number of active members covered under the plan
- Used in the calculation of amortization payments for the Plans 1 Unfunded Actuarial Accrued Liability (UAAL)
 - Not an assumption impacting LEOFF 2 since no UAAL payments are required for LEOFF 1 while the plan is fully funded



How The Assumptions Interact

- Entire set of economic assumptions should be consistent
- Developed using the building block method
 - One of the recommended approaches under Actuarial Standards of Practice (ASOP) 27
 - Component of inflation is the base for salary growth and investment return assumptions

Building Block Example



Economic Experience Study Performed Every Two Years

- Required in statute 41.45.030 for reporting to the PFC
 - All plans except LEOFF 2
 - LEOFF 2 Board typically follows the PFC timeline
- Actuarial services must satisfy applicable ASOPs
- Things change
 - Policy or benefit structures
 - Economic conditions, future expectations
- Reasonable assumptions contribute to reasonable funding
- Appropriate funding levels help manage risks
 - Pensions are promises to pay lifetime benefits
 - Insufficient accumulation of assets increases risk of additional funding requirements – intergenerational ‘inequity’

Managing Risk

- Assumptions used to project future outcomes
 - Involve uncertainty/risk
- When assumptions are wrong
 - Plan may be underfunded
 - Want to be on the “right side” of risk (reasonable conservatism)
- Risk isn't symmetrical
 - Best estimate assumption may not fall in the mean (50th percentile)
- Balance risk management with other stakeholder needs
 - State and local budgets
 - Member take-home pay
 - Benefit/plan security



Experience Studies Consider Past And Future Experience

- Analyze historical data and experience
 - Plan or system experience
 - National or regional experience
- Review projections for future expectations
 - Collaborate with other state agencies
- Analyze conditions that created certain experience
 - Are they outliers – highly unlikely to occur again?
 - May remove or limit reliance on those data points
 - Are they within range of expected outcomes?
 - Keep the data points and comment on the conditions and likelihood they occur again
 - Did they occur because of policy or plan changes?
 - Data points may require adjustment

Data Sources By Assumption

	Inflation	Investment Return	General Salary Growth	System Growth
DRS			X	X
WSIB	X	X		
OFM				X
Social Security Administration	X			
Congressional Budget Office	X			
Economic and Revenue Forecast Council	X			
Global Insight	X			
Bureau of Economic Analysis	X			

Past And Future Experience Is Blended Together

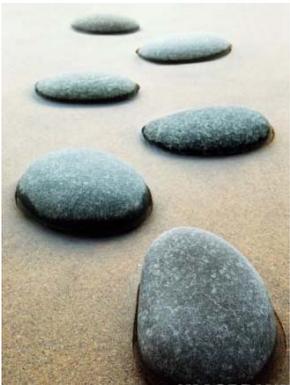
- Develop single point best estimate assumption
- Actuaries follow guidance in ASOPs
 - ASOPs no longer support a 'best estimate range'
- Requires professional judgment
 - Past is not always the best predictor of the future
 - Part of actuary's training and development
- Mix of art and science

Recommended Assumptions Presented For Adoption

- Entire set of economic assumptions should be consistent
- If no changes are recommended
 - Actuary's best estimate matches current assumptions
- If changes are recommended for one or all assumptions
 - Actuary's best estimate is materially different from the current assumptions to support a change
 - Fiscal impact will likely result
 - Important to maintain appropriate funding levels and manage risks
 - Actuary will comment on whether current assumptions remain reasonable
- Adoption of new assumptions incorporated in the next rate-setting valuation

What's Next For The Board?

- OSA finalizes analysis and recommendations
- Recommendations presented to the Board in September
 - Supporting analysis provided with the recommendations
- Board action to adopt any changes, if needed



Questions?

