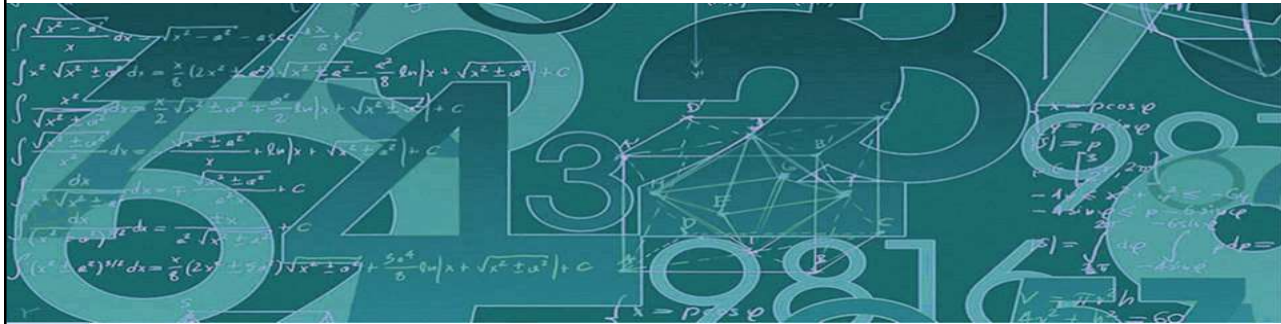


State Actuary's Recommendation on Long-Term Economic Assumptions

Presentation to: Select Committee on Pension Policy

Matthew M. Smith, State Actuary, FCA, EA, MAAA



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September 21, 2021

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Today's Presentation

- Highlights of the *Economic Experience Study*
- Full report available on OSA's [website](#)
- Published jointly with the *Report on Financial Condition*

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A Review of Roles

- Per [RCW 41.45.030\(1\)](#), in odd numbered years, the state actuary makes recommendations on the long-term economic assumptions
- Per [41.45.030\(2\)](#), by October 31 of odd numbered years, the PFC may adopt changes to the economic assumptions
 - Subject to revision by the Legislature
- Per [RCW 41.04.281\(4\)](#), the SCPP may make a recommendation to the PFC for the council's consideration
- Today's presentation is intended to assist the SCPP in making a recommendation to the PFC
- I intend to share considerations you may find helpful in your role

What Are the Assumptions in This Study?

Assumption	Use of Assumption
Inflation	Model post-retirement COLAs based on changes in Consumer Price Index (CPI) for Seattle, Tacoma, Bellevue (STB) Building block for other assumptions
General Salary Growth	Project salaries to determine future retirement benefits and contribution rates as a percentage of payroll
Investment Return	Determine today's value of future benefit payments and salaries
Membership Growth for Plan 1 Funding	Determine amortization payments for Plan 1 UAAL Plan 1 UAAL amortized over a rolling 10-year period as a percentage of system payrolls

What's the Purpose of These Assumptions?

- Used to measure pension obligations and determine contribution rates
 - Assumptions for an actuarial funding valuation
- No prescribed assumptions for financial reporting
 - Accounting valuations based on OSA's best estimate rate of investment return

How Long Are the “Long-Term” Assumptions?

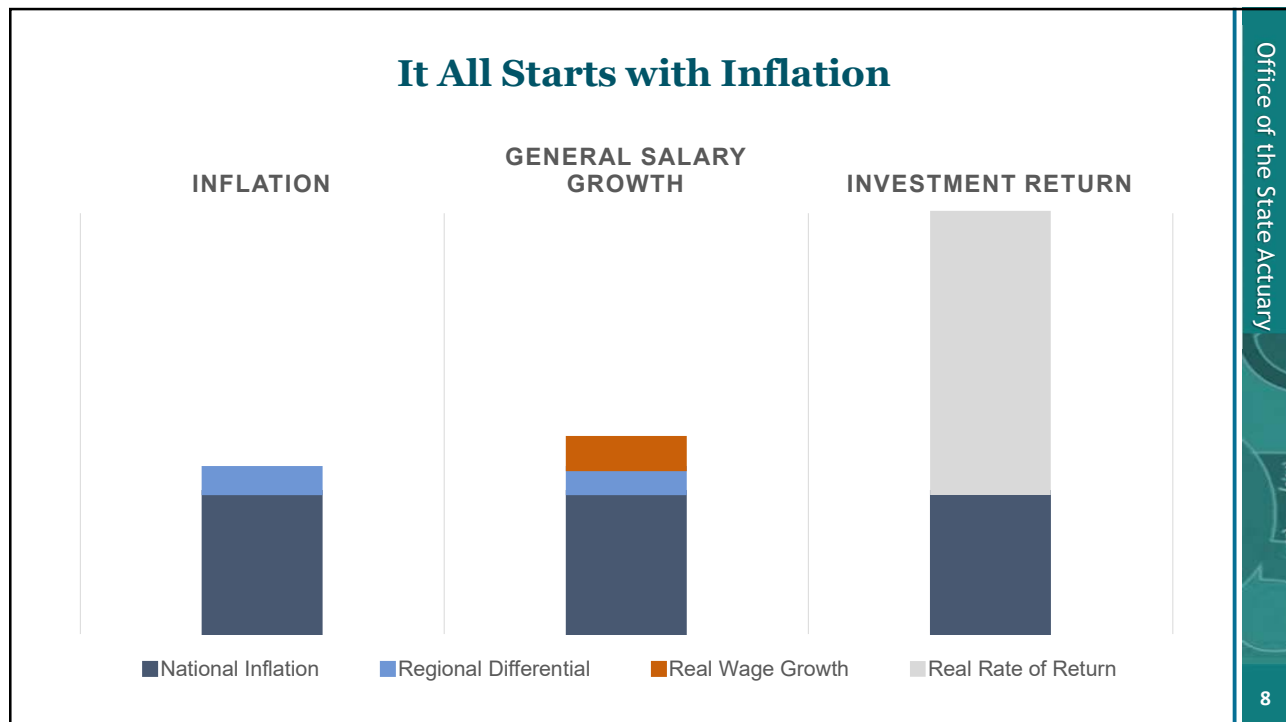
- Recommendations for each assumption are set with consideration for the relevant time horizon for an actuarial valuation
- Referred to as “duration”
 - Represents the weighted average length of plan liabilities and salaries; weighted by their present value

Current Duration Measurements

Duration by Open and Closed Plans (As of 2019 Actuarial Valuation Report)	
Duration of Liabilities	
Open Plans	20.7
Closed Plans	8.1
Duration of Salaries	
Open Plans	8.2

How Do You Select Long-Term Economic Assumptions?

- Actuaries follow the guidance from applicable Actuarial Standards of Practice or ASOPs
- ASOP Number 27 provides guidance on the selection of economic assumptions and identifies the following summarized process
 - Identify components, if any, of the assumption
 - Evaluate relevant data
 - Consider factors specific to the measurement
 - Consider other general factors; and
 - Select a reasonable assumption
- Involves a fair amount of professional judgment
 - Education and experience



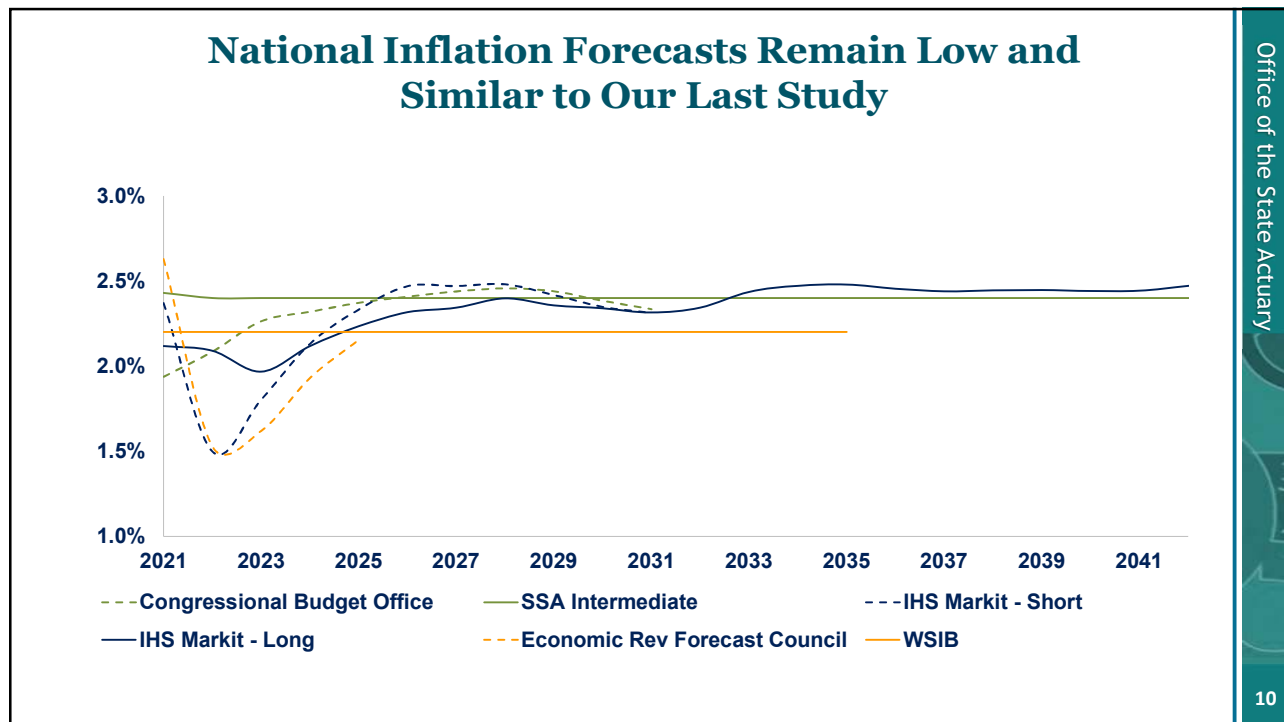
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What Is Relevant Data for Setting These Assumptions?

- While we review historical data, we mostly rely on relevant forecasts
- These assumptions are intended to estimate the future, not replicate the past
- The conditions of the past may not be present today

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We Continue to Expect STB Inflation to Outpace National Inflation

	Average Inflation		
	STB CPI-W	National CPI-W	Difference
Last 30 years	2.72%	2.26%	0.46%
Last 25 years	2.52%	2.11%	0.42%
Last 20 years	2.36%	2.03%	0.34%
Last 15 years	2.39%	1.87%	0.52%
Last 10 years	2.27%	1.66%	0.62%
Last 5 years	2.60%	1.70%	0.90%

■ Consistent with our prior study, we continue to assume a 0.40% regional price inflation differential

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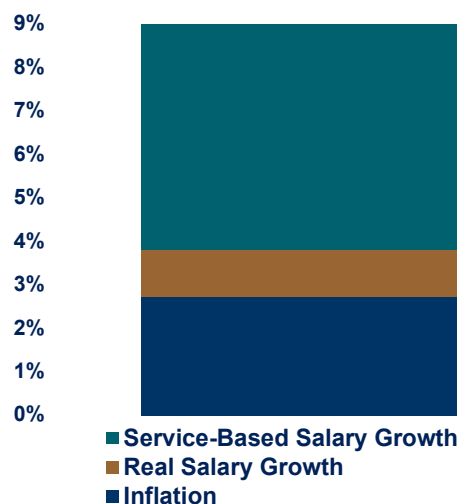
What about the Higher Levels of Inflation We're Experiencing Today?

- Inflation in 2021 has been significantly higher than recent years, but we believe it will be transitory
- Consistent with current Federal Reserve position
 - Acknowledge that inflation is higher than 2% target now
 - "Time will tell whether we have reached 2% inflation on a sustainable basis" - Chair Powell
 - "Today we see little evidence of wage increases that might threaten excessive inflation" - Chair Powell
- Latest commentary on inflation from Washington ERFC
 - The increase in inflation this year (2021) is expected to be temporary
 - Much of the recent increase in prices is due to the recovery of prices of services driven down during the pandemic
 - Constraints on supply chains have also impacted prices

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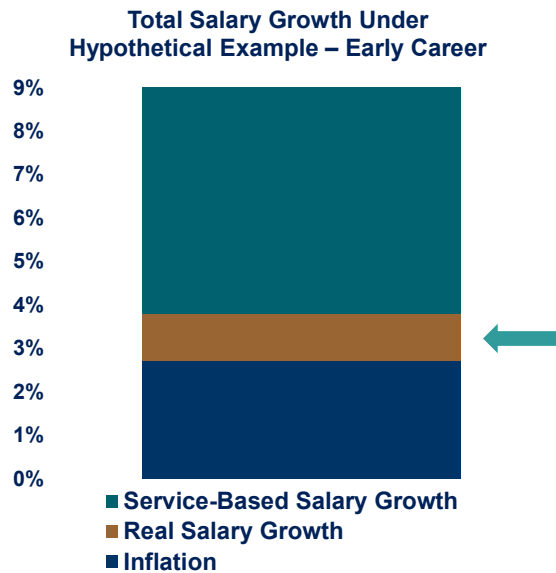
OSA Models Total Salary Growth with Economic and Demographic Assumptions

Total Salary Growth Under
Hypothetical Example – Early Career



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Focusing on Economic Assumption Today



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We've Observed a Longer-Term Downward Trend in Historical General Salary Growth, Inflation, and Real Wage Growth

Estimated General Salary Growth			
Employees in Open DRS Administered Plans			
Geometric Averages	Observed Growth of Average Salary (a + b)	Observed Inflation (a)	Estimated Real Wage Growth (b)
Last 10 years (2010-2019)	2.73%	2.17%	0.56%
Last 20 years (2000-2019)	3.38%	2.46%	0.92%
Last 30 years (1990-2019)	3.60%	2.90%	0.69%

- Observed Growth of Average Salary = Observed Inflation + Estimated Real Wage Growth
- Estimated because we assume a stable population and cannot specifically identify and back-out service-based salary increases

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Decrease in Forecasted National Real Wage Growth since Our Last Study

Projected 10-Year Average Annual Real Wage Growth		
	2019*	2021
CBO	0.90%	0.80%
SSA	1.71%	1.49%

Note: National forecasts include additional sources of employee compensation beyond employee wages.

**Numbers re-stated for this report to display the 10-year average instead of range.*

- National forecasts rely on a broader definition of wages which can include benefits
- We rely on the change in these projections, not the projection values themselves to set our retirement system assumptions

What about the Potential for Short-Term Above-Expected Wage Increases?

- A possible outcome
- Our General Salary Growth assumption represents average annual growth over the measurement period
 - Not intended to forecast a single year's wage growth
- As we have done in the past, if we observe actual salary growth well below or well above our longer-term expectations, we will update our assumptions in a future actuarial valuation
 - For example, an adjustment to a single year of projected salary growth based on known/adopted salary increases
 - An assumption change to reflect known but not yet reflected salary data after the measurement date of the valuation

What Are Some of the Key Considerations When Selecting a Return Assumption?

- Capital market assumptions or CMAs
- Asset allocation
- Simulated future returns, net of expenses
- Sensitivity analysis
- Consistency of WSIB CMAs and return simulations with use for setting assumptions for a pension funding valuation

What Are Capital Market Assumptions?

- According to WSIB, CMAs are the cornerstone in the development of a strategic asset allocation strategy
- Represent the projected behavioral characteristics of asset classes in terms of
 - Risk (volatility)
 - Reward (return)
 - Relationship (correlation)
- WSIB CMAs developed for a 15-year time horizon
- Not developed for the purpose of setting actuarial assumptions, but can inform the selection of actuarial assumptions

WSIB CMAs Have Changed since Our Last Study

WSIB Portfolio Statistics & Capital Market Assumptions						
Asset Class	Expected 1-Year Return			Standard Deviation		
	2021	2019	Difference	2021	2019	Difference
Global Equity	8.1%	8.5%	(0.4%)	19.0%	18.5%	0.5%
Tangible Assets	6.9%	7.3%	(0.4%)	12.0%	13.0%	(1.0%)
Fixed Income	3.7%	4.4%	(0.7%)	6.0%	6.0%	0.0%
Private Equity	11.1%	11.5%	(0.4%)	25.0%	25.0%	0.0%
Real Estate	7.6%	8.0%	(0.4%)	13.0%	14.0%	(1.0%)
Cash	1.7%	2.6%	(0.9%)	1.5%	1.5%	0.0%

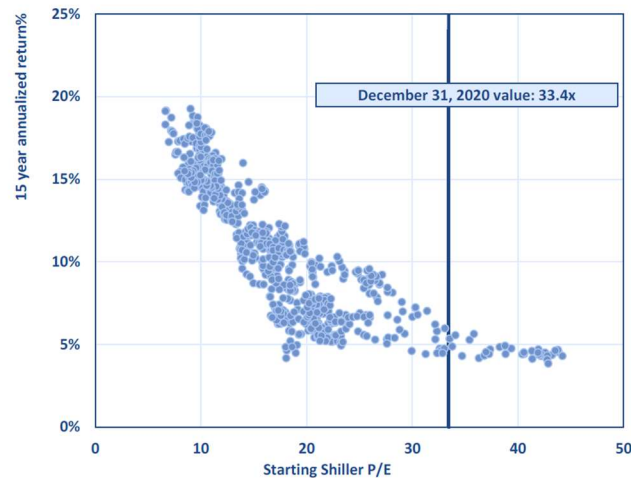
- 1-year expected returns decreased across all asset classes
- Mixed changes to expected standard deviation (or volatility)

Why Could We Expect Lower Future Returns?

- In general, financial assets represent future cash flow
 - Equities generally represent future earnings and dividends (where applicable)
 - Fixed income generally represents future coupon payments and the ultimate repayment of principal
 - Real estate can represent future lease payments
- Markets put a price on expected future cash flow and perceived level of risk
 - Those prices vary by the asset classes listed above
- A discount rate that equates the current price with the expected future cash flow is the expected return
- Lower/higher prices come from higher/lower discount rates
- Lower/higher prices imply higher/lower future returns

An Example of Why We Could Expect Lower Future U.S. Equity Returns

Starting Shiller P/E and Subsequent 15-Year U.S. Equity Return



Source: Robert Shiller

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CTF Asset Allocation Unchanged since Our Last Study

WSIB Target Asset Allocation			
	2021	2019	Difference
Global Equity	32%	32%	0%
Tangible Assets	7%	7%	0%
Fixed Income	20%	20%	0%
Private Equity	23%	23%	0%
Real Estate	18%	18%	0%
Cash	0%	0%	0%
Total	100%	100%	

- A future change in the CTF asset allocation could lead to a different recommended return assumption in the future

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WSIB Simulated Returns for the CTF Have Decreased since Our Last Study

Simulated Future Investment Returns*			
	2021	2019	Difference
75th Percentile	8.8%	9.3%	(0.5%)
60th Percentile	7.6%	8.1%	(0.5%)
55th Percentile	7.2%	7.7%	(0.5%)
Median Return	6.9%	7.4%	(0.5%)
45th Percentile	6.5%	7.0%	(0.5%)
40th Percentile	6.1%	6.6%	(0.5%)
25th Percentile	4.9%	5.4%	(0.5%)

*Simulated returns over 25-year period.

- 50 basis point decreases to the median return (and at most percentiles)
- Half the simulated returns fall below (or above) “Median Return”
- We focus on the median when setting this assumption
- Corresponds to a similar decrease in assumed returns by asset class

Simulated Returns Vary with Use of Different CMAs

25-Year Estimated Median Return Sensitivity					
	Private Equity Expected Return			Global Equity Expected Return	
	Base	(1%)	1%	(1%)	1%
Median Return	6.9%	6.7%	7.1%	6.6%	7.2%

- Modeled a decrease or increase in the expected 1-year return of private equities and global equities by 1%
- These two asset classes comprise 55% of the asset allocation of the CTF
- Median returns over 25 years fall below the current prescribed assumption of 7.5% with a 1% increase in 1-year returns for either asset class

Other Considerations before Recommending a Return Assumption

- Consistency of WSIB CMAs and return simulations with use for setting assumptions for a pension funding valuation
 - OSA assumes higher national inflation than WSIB CMAs
 - Time horizons vary between CMAs and retirement system plan durations
- Differences can lead to adjusted return expectations for pension funding

Membership Growth for Plan 1 Funding

- No change to prior recommendation other than rounding 0.95% recommendation to 1.00%
- We rounded the prior assumption/recommendation to reflect a lower level of precision in our future growth expectation
- No expected contribution rate or budget impact from this single assumption change

Summary of Long-Term Economic Assumptions

Assumption	Current	Recommended
Inflation	2.75%	2.75%
General Salary Growth	3.50%	3.25%
Annual Investment Return	7.50%	7.00%
Growth in System Membership	0.95% (PERS) 1.25% (TRS)	1.00% (PERS) 1.00% (TRS)

Note: Excludes LEOFF 2. The LEOFF 2 Board adopts assumptions for LEOFF 2.

- We developed these assumptions as a consistent set of economic assumptions and recommend reviewing them as a set of assumptions
- Adopting recommendation will improve long-term system health measures, but weaken short-term affordability
- Under current law, any adopted assumption changes would impact contribution rates and budgets starting in 2023-25

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Short-Term GF-S Budget Impact–Preliminary

Preliminary Employer Pension Contributions			
(Dollars in Millions)	GF-State		
	Normal Cost	Plan 1 Unfunded Liability	Total
	2023-2025		
Baseline Projection*	\$1,913	\$1,288	\$3,201
FY 2021 Return (a)	(\$116)	(\$480)	(\$596)
New Assumptions (b)	\$527	\$464	\$991
Total Change (a + b)	\$411	(\$16)	\$395
New Projection	\$2,324	\$1,272	\$3,596
(Dollars in Millions)	2025-2027		
	Normal Cost	Plan 1 Unfunded Liability	Total
	2025-2027		
Baseline Projection*	\$1,957	\$875	\$2,832
FY 2021 Return (a)	(\$358)	(\$875)	(\$1,233)
New Assumptions (b)	\$428	\$181	\$608
Total Change (a + b)	\$70	(\$694)	(\$625)
New Projection	\$2,026	\$181	\$2,207

Note: Preliminary analysis subject to change. Actual results may also vary from these preliminary projected values.

**Baseline projection reflects actual investment returns through June 30, 2020.*

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Short-Term Total Employer Budget Impact—Preliminary

Preliminary Employer Pension Contributions			
(Dollars in Millions)	Total Employer		
	Normal Cost	Plan 1 Unfunded Liability	Total
2023-2025			
Baseline Projection*	\$3,792	\$2,335	\$6,128
FY 2021 Return (a)	(\$285)	(\$552)	(\$837)
New Assumptions (b)	\$1,109	\$522	\$1,631
Total Change (a + b)	\$824	(\$30)	\$795
New Projection	\$4,616	\$2,306	\$6,922
2025-2027			
Baseline Projection*	\$3,822	\$1,917	\$5,739
FY 2021 Return (a)	(\$635)	(\$1,917)	(\$2,553)
New Assumptions (b)	\$687	\$648	\$1,336
Total Change (a + b)	\$52	(\$1,269)	(\$1,217)
New Projection	\$3,874	\$648	\$4,522

Note: Preliminary analysis subject to change. Actual results may also vary from these preliminary projected values.

*Baseline projection reflects actual investment returns through June 30, 2020.

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How to Manage Budget Impacts of Any Assumption Changes

- If adopting the recommendation is deemed unaffordable for a single biennium, consider phasing in the budget impact over multiple biennia
- We do not recommend the adoption of an “assumption phase-in”
 - For example, an assumed return of 7.40% for 2023-25, 7.30% for 2025-27, etc.
- Budget impact from the last significant update to mortality assumptions was phased in over three biennia
- Opportunity under phase-in design to align cost/timing of assumption change with cost/timing of expected savings from FY 2021 investment returns
 - Monitor and assess emerging experience

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How Could a Budget Phase-in Work?

- Start by measuring pension obligations, funded status, and contribution rates using the recommended assumptions
 - Measurements without a phase-in; determines the basis of your required costs
- Next determine the period over which you want to fully phase-in the costs
- In consultation with OSA, adopt contribution rates each biennium that move you from contribution rates determined under current assumptions to contribution rates determined under the new assumptions
 - Contribution rates at the end of the phase-in period would equal the rates without a phase-in
 - Contribution rates at the end of the phase-in would be higher than they would without a phase-in policy due to lost investment earnings on the lower than otherwise required contributions

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Concluding Remarks

- Budget impacts from adopting a lower return assumption represent short-term contribution increases required to offset lower expected long-term investment returns
- Longer-term pension costs will depend on actual experience
- Based on the *2019 Actuarial Valuation Report*, all the current economic assumptions are reasonable

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Next Steps for the SCPP

- SCPP may make a recommendation to the PFC for the council's consideration
- That recommendation could be made at today's meeting or at your October meeting
- It's possible the PFC may act before you make a recommendation at your October meeting
- Options for SCPP recommendation to PFC
 1. No change to current assumptions
 2. Adopt the state actuary's recommended assumptions
 3. Adopt a different set of economic assumptions
 4. Options 2 or 3 with a phase-in of the budget impacts
- If the SCPP recommends a phase-in, the details of the phase-in can be determined later

Questions?



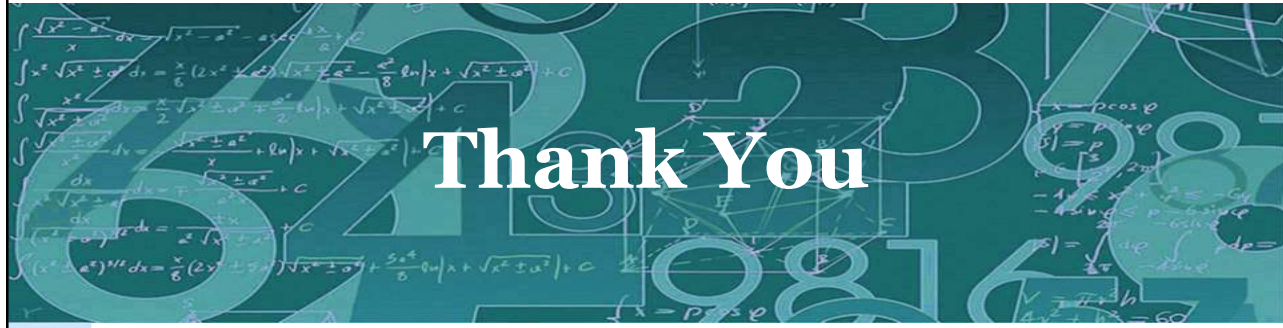
Questions? Please Contact: The Office of the State Actuary

leg.wa.gov/OSA; state.actuary@leg.wa.gov

360-786-6140, PO Box 40914, Olympia, WA 98504

Matthew M. Smith

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Thank You

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Appendix

- Preliminary 2023-25 Contribution Rate Impacts, No Phase-in
- Other States' Economic Assumptions
- Historical Economic Assumptions for Washington State Pension Systems



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Preliminary 2023-25 Employer Contribution Rate Impact, No Phase-in

Change in Employer Projected Contribution Rates—Preliminary							
	PERS 1 UAAL	TRS 1 UAAL	PERS 2/3 NC ¹	TRS 2/3 NC	SERS 2/3 NC	PSERS 2 NC	WSPRS 1/2 NC
2021-23 Biennium							
Adopted Rates	3.71%	6.19%	6.36%	8.05%	7.76%	6.50%	17.66%
2023-25 Biennium							
Baseline Projection²	3.71%	6.19%	5.49%	7.61%	6.96%	6.23%	20.71%
FY 2021 Return (a)	0.0%	0.0% ³	(0.7%)	(0.4%)	(0.5%)	(0.2%)	(3.1%)
New Assumptions (b)	0.0%	0.0%	2.2%	2.4%	2.0%	1.2%	10.3%
Total Change (a + b)	0.0%	0.0%	1.6%	2.0%	1.5%	1.1%	7.3%
New Projected Rate	3.71%	6.19%	7.07%	9.58%	8.43%	7.28%	27.98%

Totals may not agree due to rounding.

¹NC = Normal Cost.

²Baseline projection reflects actual investment returns through June 30, 2020.

³UAAL contribution rate required for first fiscal year in biennium only. No rate required in second fiscal year.

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Preliminary 2023-25 Plan 2 Member Contribution Rate Impact, No Phase-in

Change in Plan 2 Member Projected Contribution Rates—Preliminary ¹					
	PERS	TRS	SERS	PSERS	WSPRS
2021-23 Biennium					
Adopted Rates	6.36%	8.05%	7.76%	6.50%	8.61%
2023-25 Biennium					
Baseline Projection²	5.49%	7.61%	6.96%	6.23%	8.61%
FY 2021 Return (a)	(0.7%)	(0.4%)	(0.5%)	(0.2%)	0.0%
New Assumptions (b)	2.2%	1.4%	2.0%	1.2%	0.0%
Total Change (a + b)	1.6%	1.0%	1.5%	1.1%	0.0%
New Projected Rate	7.07%	8.64%	8.43%	7.28%	8.61%

Totals may not agree due to rounding.

¹Includes WSPRS Plan 1.

²Baseline projection reflects actual investment returns through June 30, 2020.

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Other States' Economic Assumptions

Economic Assumptions for Selected Plans Outside Washington ¹				
Plan Name	Investment Return	General Salary Growth	Real Wage Growth ²	Inflation
WA 2021 Economic Experience Study Recommendation	7.00%	3.25%	0.50%	2.75%
WA Currently Prescribed Economic Assumptions	7.50%	3.50%	0.75%	2.75%
Alaska PERS	7.38%	2.75%	0.25%	2.50%
Alaska Teachers	7.38%	2.75%	0.25%	2.50%
California PERS	6.80%	2.75%	0.25%	2.50%
California Teachers	7.00%	3.50%	0.75%	2.75%
Colorado PERA	7.25%	3.00%	0.70%	2.30%
Florida Retirement System	7.00%	3.25%	0.85%	2.40%
Idaho PERS	6.30%	3.75%	0.75%	2.30%
Iowa PERS	7.00%	3.25%	0.65%	2.60%
Missouri State Employees	6.95%	2.50%	0.25%	2.25%
Ohio PERS	7.20%	3.25%	0.75%	2.50%
Oregon PERS	6.90%	3.50%	1.00%	2.50%
Wisconsin Retirement System	5.40%	3.00%	0.50%	2.50%
Selected Public Plans Outside WA – Average	6.88%	3.10%	0.58%	2.47%
Selected Public Plans Outside WA – Minimum	5.40%	2.50%	0.25%	2.25%
Selected Public Plans Outside WA – Maximum	7.38%	3.75%	1.00%	2.75%

Note: We updated the Investment Return assumptions, in red, for California PERS, Idaho PERS, and Oregon PERS based on more recent information than what was used in our 2021 Report on Financial Condition and Economic Experience Study.

¹Data gathered from NASRA, the Public Plans Database maintained by the Center for Retirement Research, and individual system Annual Comprehensive Financial Reports or Actuarial Valuations as of June 30, 2021. Where more recent updates were available (e.g., via press release issued after the last report), that information was used. For systems having multiple benefit tiers with different assumptions, the largest was used.

²For comparison to our economic assumptions, we assumed Real Wage Growth was the difference between General Salary Growth and Inflation.

Other States' Economic Assumptions – Select, Well Funded Peer Systems

Economic Assumptions for Selected Plans Outside Washington ¹				
Plan Name	Investment Return	General Salary Growth	Real Wage Growth ²	Inflation
WA 2021 Economic Experience Study Recommendation	7.00%	3.25%	0.50%	2.75%
WA Currently Prescribed Economic Assumptions	7.50%	3.50%	0.75%	2.75%
Idaho PERS	6.30%	3.75%	0.75%	2.30%
Nebraska NPERS	7.30% ³	3.15% ³	0.50%	2.65% ³
New York NYSLRS-ERS	5.90%	4.40%	1.70%	2.70%
South Dakota SDRS	6.50%	5.25%	3.00%	2.25%
Tennessee	7.25%	3.00%	0.50%	2.50%
Wisconsin Retirement System	5.40%	3.00%	0.50%	2.50%
Selected Public Plans Outside WA – Average	6.44%	3.76%	1.16%	2.48%
Selected Public Plans Outside WA – Minimum	5.40%	3.00%	0.50%	2.25%
Selected Public Plans Outside WA – Maximum	7.30%	5.25%	3.00%	2.70%

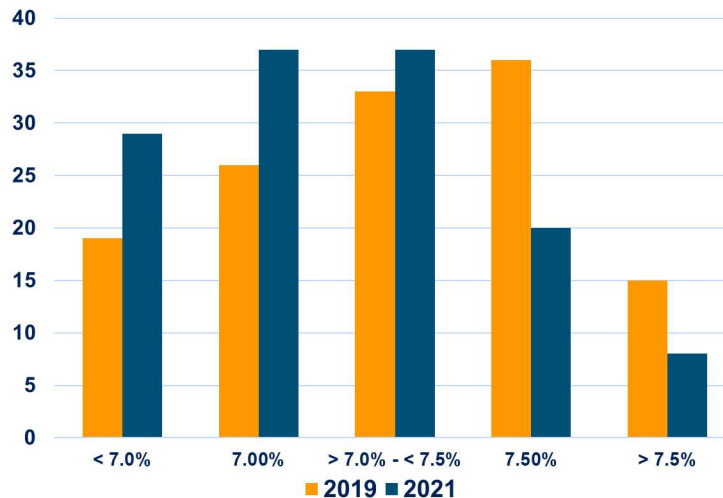
Note: Selected systems had a funded status of at least 90% in the most recent PEW State Pension Funding Gap report.

¹Data gathered from NASRA, the Public Plans Database maintained by the Center for Retirement Research, and individual system Annual Comprehensive Financial Reports or Actuarial Valuations as of June 30, 2021. Where more recent updates were available (e.g., via press release issued after the last report), that information was used. For systems having multiple benefit tiers with different assumptions, the largest was used.

²For comparison to our economic assumptions, we assumed Real Wage Growth was the difference between General Salary Growth and Inflation.

³Investment Return grading down to 7.0% by 2024. General Salary Growth grading down to 2.85% by 2024. Inflation grading down to 2.35% by 2024.

Distribution of Return Assumptions in Other States



Median return
declined from
7.25% to 7.0%

Source: NASRA Public Fund Survey. Does not reflect updates noted on slide 40.

Historical Economic Assumptions for Washington State Pension Systems

Historical Economic Assumptions for Washington State Pension Systems					
Valuation Years	Investment Return	General Salary Growth	Inflation	Real Wage Growth	Membership Growth for Plan 1 Funding
1989 - 1994	7.50%	5.50%	5.00%	0.50%	0.75% TRS 1.25% PERS
1995 - 1997	7.50%	5.00%	4.25%	0.75%	0.90% TRS 1.25% All Others
1998 - 1999	7.50%	4.00%	3.50%	0.50%	0.90% TRS 1.25% All Others
2000 - 2008	8.00%	4.50%	3.50%	1.00%	0.90% TRS 1.25% All Others
2009 - 2010	8.00%	4.50% LEOFF 2 4.00% Other Plans	3.50%	1.00% LEOFF 2 0.50% Other Plans	0.90% TRS 1.25% All Others
2011 - 2012	7.5% LEOFF 2 7.9% Other Plans	3.75%	3.00%	0.75%	0.80% TRS 0.95% PERS
2013 - 2014	7.5% LEOFF 2 7.8% Other Plans	3.75%	3.00%	0.75%	0.80% TRS 0.95% PERS
2015	7.5% LEOFF 2 7.7% Other Plans	3.75%	3.00%	0.75%	0.80% TRS 0.95% PERS
2016	7.5% LEOFF 2 7.7% Other Plans	3.75%	3.00%	0.75%	1.25% TRS 0.95% PERS
2017 - 2018	7.4% LEOFF 2 7.5% Other Plans	3.50%	2.75%	0.75%	1.25% TRS 0.95% PERS
2019 - 2020	7.4% LEOFF 2 7.5% Other Plans	3.50%	2.75%	0.75%	1.25% TRS 0.95% PERS