State Actuary's Recommendation on Long-Term Economic Assumptions

Presentation to: LEOFF 2 Retirement Board

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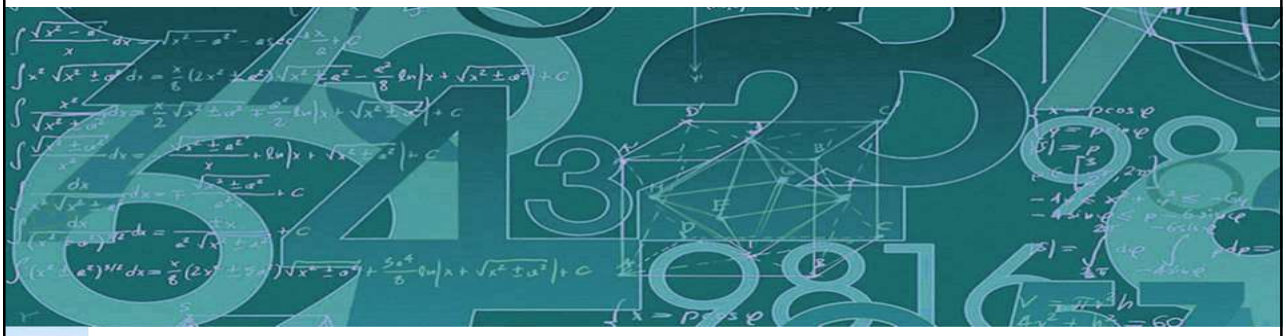

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Today's Presentation

- 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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1

1

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
- LEOFF 2 Board can adopt changes at any time
- Today's presentation is intended to assist you in determining whether to adopt changes to the plan's economic assumptions
- I intend to share considerations you may find helpful in your role

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2

2

What Are the Assumptions in This Study for LEOFF 2?

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

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3

3

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

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4

4

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

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5

5

Current Duration Measurements

Duration by Open and Closed Plans *(As of 2019 Actuarial Valuation Report)*	
Duration of Liabilities	
Open Plans	20.7
LEOFF 2 Only	22.0
Closed Plans	8.1
Duration of Salaries	
Open Plans	8.2
LEOFF 2 Only	8.8

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6

6

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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7

7

It All Starts with Inflation

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8

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
- Consistent with purpose/use of these assumptions, we put more weight on long-term than short-term forecasts

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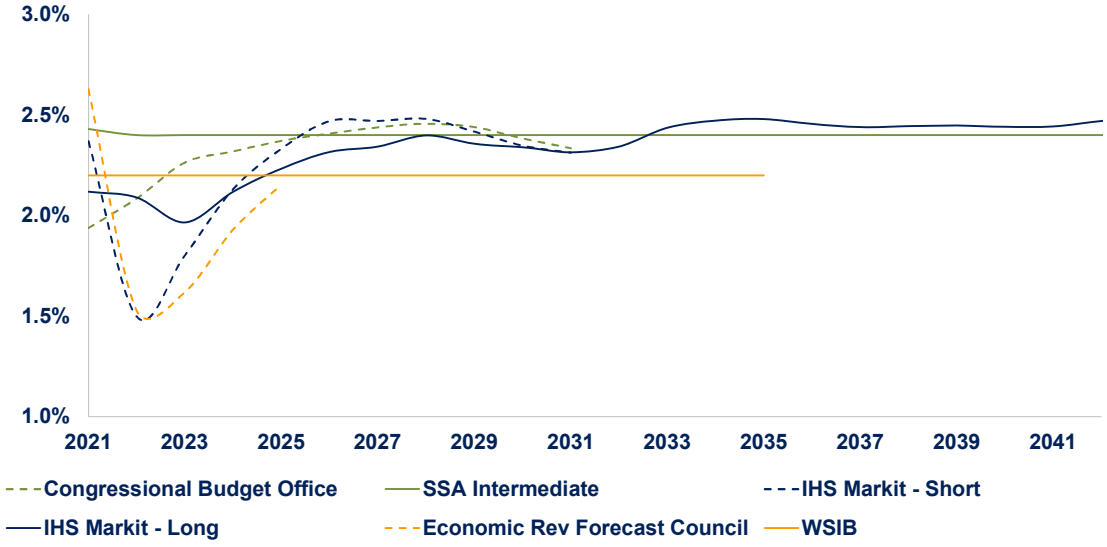
9

9

National Inflation Forecasts Remain Low and Similar to Our Last Study



10

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

11

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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12

12

OSA Models Total Salary Growth with Economic and Demographic Assumptions

- Economic assumption
  - Inflation
  - Real Wage Growth (economic growth above inflation)
- Demographic assumption
  - Service-Based Salary increases
  - For example, merit, longevity or "step increases"
  - Studied every 5-6 years as part of the *Demographic Experience Study*
- We combine all sources, economic and demographic, to model total expected salary growth
- Focusing on the economic assumption today
  - Once you set your Inflation assumption, you're left with the Real Wage Growth assumption to set your General Salary Growth assumption

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13

13

An Example of Current Total Salary Growth Assumptions

2019 Total Expected Salary Growth—Current Assumptions									
(Dollars in Millions)	PERS 1	PERS 2/3	PSERS	TRS 1	TRS 2/3	SERS 2/3	LEOFF 1	LEOFF 2	WSPRS 1/2
Total Salary	108.8	11,611.3	559.8	37.1	7,138.8	2,595.2	2.2	2,234.7	114.9
Expected Growth	3.87%	5.27%	5.74%	3.74%	5.50%	5.82%	3.52%	5.55%	5.30%

- 2.75% assumed inflation and 0.75% assumed real wage growth under current assumptions
- For LEOFF 2, that leaves about 2%, on average, for service-based salary increases in 2019

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14

14

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
- We do not rely on LEOFF 2 data only for this assumption; overstates observed real wage growth under this method

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15

15

Decrease in Forecasted National Real Wage Growth since Our Last Study

- We review national forecasts from the CBO and SSA to determine if forecasted productivity or real wage growth has changed since our last study
- However, we do not rely on these specific forecasts (point estimates) when recommending a General Salary Growth assumption
  - National forecasts rely on a broader definition of wages which can include benefits
  - CBO and SSA forecasts for real wage growth include all sources of increase above inflation (including demographic sources)
  - In contrast, OSA models inflation, real wage growth, and service-based salary increases
- CBO and SSA average annual real wage growth forecasts for the next 10 years, declined by 11-13% from our last study

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16

16

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

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17

17

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

18

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

19

WSIB CMAs Have Changed since Our Last Study

WSIB Portfolio Statistics & Capital Market Assumptions						
	Expected 1-Year Return			Standard Deviation		
Asset Class	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)

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20

20

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

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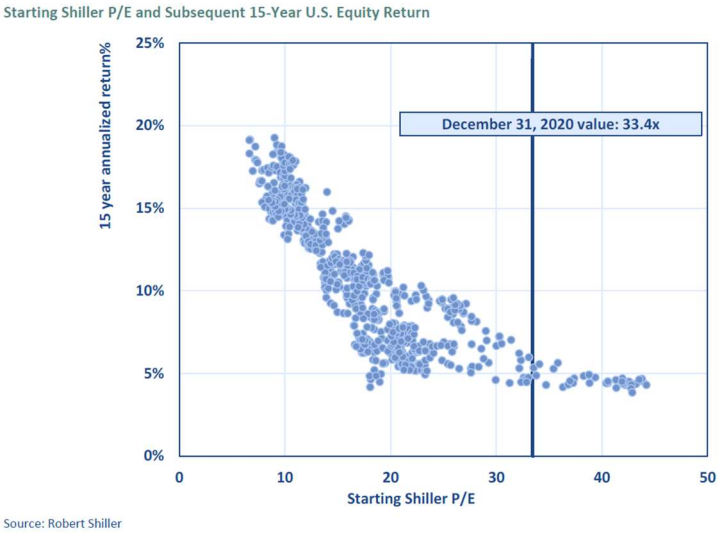
21

21

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



22

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

23

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

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24

24

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 LEOFF 2 assumption of 7.4% with a 1% increase in 1-year returns for either asset class

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25

25

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

26

Summary of Long-Term Economic Assumptions

Assumption	Current	Recommended
Inflation	2.75%	2.75%
General Salary Growth	3.50%	3.25%
Annual Investment Return	7.40%	7.00%

- We developed these assumptions as a consistent set of economic assumptions and recommend reviewing them as a set of assumptions
  - Changing the Inflation assumption, for example, without changing the Salary Growth or nominal Investment Return assumptions could lead to an inconsistent set of assumptions
- Adopting recommendation will decrease the plan's funded status in the short-term and increase minimum contribution rates

27

Funded Status Impact — Preliminary

Change in Funded Ratio (FR)–Preliminary	As of June 30, 2019	As of June 30, 2021	As of June 30, 2023	As of June 30, 2025
Baseline Projection	**111%**	**113%**	**113%**	**113%**
FY 2021 Return (a)	0%	3%	10%	17%
New Assumptions (b)	(6%)	(6%)	(7%)	(7%)
Total Change (a + b)	**(6%)**	**(3%)**	**4%**	**9%**
New Projected FR	**105%**	**110%**	**117%**	**123%**

Note: Preliminary values subject to change. Actual results may also vary from these preliminary values. Baseline Projection under current assumptions and returns through June 30, 2020.

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28

28

Change In Minimum Contribution Rates — Preliminary

Change in Total Employer Projected Contribution Rates—Preliminary	2021-23 Biennium	2023-25 Biennium	2025-27 Biennium
Baseline Projection	**8.53%**	**8.53%**	**7.74%***
90% Minimum rate		7.71%	7.74%
100% Minimum rate		8.57%	8.60%
New Projected Rate	**8.53%**	**8.53%**	**8.30%***
90% Minimum rate		8.27%	8.30%
100% Minimum rate		9.18%	9.23%

Note: Rates through 2023-25 adopted by the Board and assumed to remain unchanged. Preliminary values subject to change. Actual results may also vary from these preliminary values. Baseline Projection under current assumptions. New Projected Rate under recommended assumptions.

**Represents a minimum contribution rate at 90% of the Entry Age Normal Cost rate.*

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29

29

Concluding Remarks

- Funded status impacts from adopting a lower return assumption represent short-term impacts required to offset lower expected long-term investment returns
- Long-term funded status impact will depend on actual experience
- Expected funded status through June 30, 2025, remains at least 105% under recommended assumptions
  - Actual funded status may vary
- Based on the *2019 Actuarial Valuation Report*, all the current economic assumptions are reasonable
- Other State's Economic Assumptions and Historical Washington State Assumptions in the Appendix

30

Questions?

31

Questions? Please Contact: The Office of the State Actuary
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Matthew M. Smith

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Thank You

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32

Appendix

- Other States' Economic Assumptions
- Historical Economic Assumptions for Washington State Pension Systems

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33

33

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.

[1] Data 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.

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

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34

34

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%**	**2.50%**

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

[1] Data 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.

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

[3] Investment 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.

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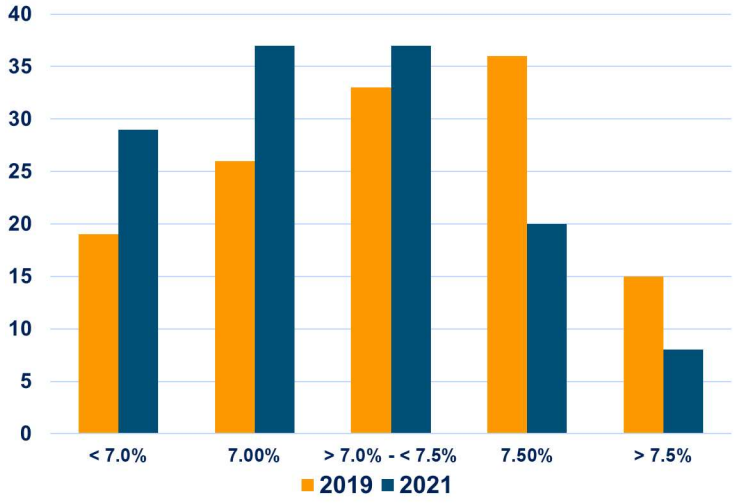
35

35

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 34.

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36

36

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

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37

37