

State Actuary's Recommendations On Long-Term Economic Assumptions

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Presentation to Pension Funding Council

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

September 15, 2015

Today's Presentation

- Highlights of two reports
 - Financial Condition
 - Economic Experience Study
- Full reports included in meeting materials

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Three Key Measures To Assess Plan's Financial Condition

- Funding level
- Adequacy and affordability of contributions
- Underlying financial risks of the plan

- One measure alone will not provide the complete story
- Maintaining plan health requires striking the right balance of these measures for all stakeholders

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Summary Of Financial Condition

- Funded status declined since last report
 - Most plans on target for full funding
 - Plan in place to get PERS and TRS Plans 1 back on track
 - GASB reporting changes lowered funded status in open plans
- Contributions required under funding policy currently being made
- Affordability measures have experienced volatility
- Financial risk of the systems has improved
 - Changes to benefit provisions for new hires
 - Court ruling regarding Gain Sharing and UCOLA
 - Adoption of updated assumptions

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Funded Status Declined From Last Report

- Phase-in of lower investment return assumption from 7.9 to 7.8 percent
 - Today's value of future benefits increases when the discount rate decreases
- Recognizing longer life spans (mortality improvements)
 - When members live longer they receive more benefits and the cost (liabilities) of the plan increases

| Funded Status as of June 30 | | | |
|-----------------------------|------|------|------|
| Plan | 2012 | 2013 | 2014 |
| PERS 1 | 69% | 63% | 61% |
| PERS 2/3 | 111% | 102% | 101% |
| TRS 1 | 79% | 71% | 69% |
| TRS 2/3 | 114% | 105% | 104% |
| SERS 2/3 | 110% | 102% | 101% |
| PSERS 2 | 134% | 124% | 124% |
| LEOFF 1 | 135% | 125% | 127% |
| WSPRS 1/2 | 114% | 105% | 103% |

Note: Shown under Projected Unit Credit (PUC) cost method.

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Funded Status Also Declined Under Different Cost Method

- GASB requires Entry Age Normal (EAN) Actuarial Cost Method to report funded status in state and local government's financial reports
- GASB requirements do not change contribution rate calculations for funding purposes
- Beginning with the 2014 Actuarial Valuation, we will report the funded status under EAN

| Funded Status as of June 30, 2014, Under Different Cost Methods | | |
|--|-----------------------|------------------|
| Plan | Projected Unit Credit | Entry Age Normal |
| PERS 1 | 61% | 61% |
| PERS 2/3 | 101% | 90% |
| TRS 1 | 69% | 69% |
| TRS 2/3 | 104% | 94% |
| SERS 2/3 | 101% | 91% |
| PSERS 2 | 124% | 96% |
| LEOFF 1 | 127% | 127% |
| WSPRS 1/2 | 103% | 100% |

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Financial Condition Based On Funded Status

- Washington's combined plans rank seventh in the nation based on national report by the Pew Charitable Trusts
- All open plans and LEOFF 1 at least 90 percent funded and considered on target for full funding
- PERS and TRS Plans 1 less than 70 percent funded but Legislature requires additional employer contributions to get them back on track
 - Legacy costs (Unfunded Actuarial Accrued Liability) amortized over rolling ten year period
 - Minimum rates in place to ensure full funding
 - Under current projections and assumptions, full funding is expected in 2027 (PERS 1) and 2025 (TRS 1)
 - Full funding will occur sooner/later under optimistic/pessimistic outlooks

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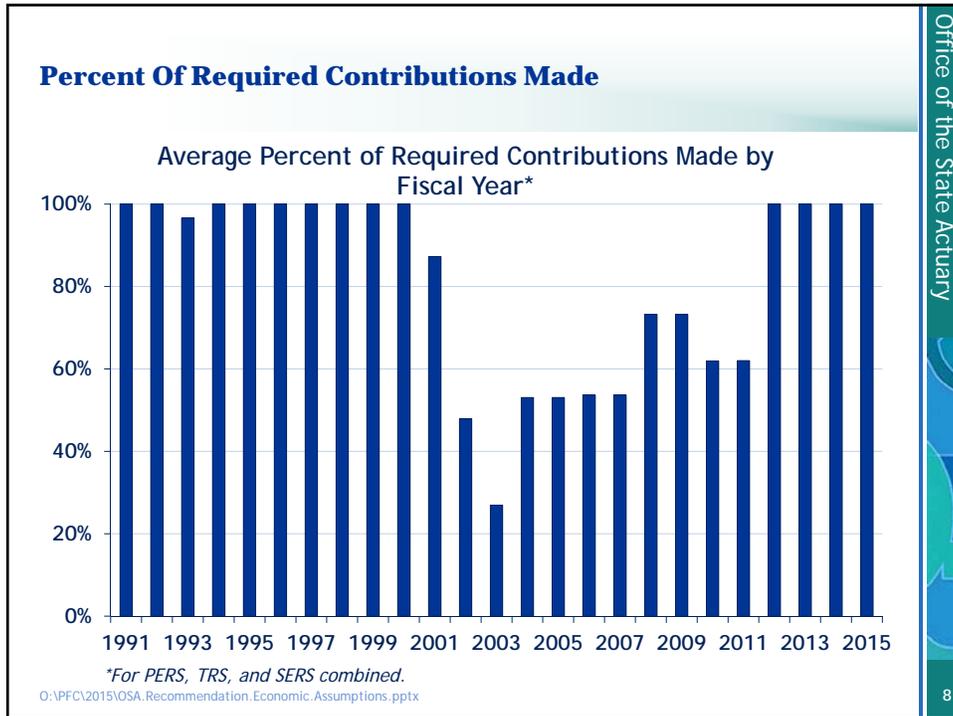
Adequate Funding Improves Plan Health

- Contributions are adequate if they provide full funding based on the funding policy and reasonable set of assumptions
 - Recent history shows adequate contributions have been made
 - Future increases are expected to reach full funding for most plans
 - PERS and TRS Plans 1 also require additional funding to amortize the past legacy costs (UAAL)
- Adopting set of reasonable assumptions improves adequacy
 - When assumptions closely model actual experience the contributions calculated under the funding policy will closely model actual plan costs

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- ### Affordability Is The Ability To Provide Adequate Funding
- If contributions are deemed unaffordable, full funding and plan health are at risk of declining
 - Affordability is subjective
 - Can measure/assess affordability by the growth in contributions over time
 - As a percent of pay
 - As a percent of General Fund-State (GF-S) budget
 - Affordability improves if contribution rates are stable and predictable
 - Asset smoothing method helps reduce volatility
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Contribution Rates As A Percent Of Pay

| | | Contribution Rates | | |
|--------------------|---------------------|--------------------|--------------------|-----------------------------------|
| System | | Actual 2013-15 | Adopted 2015-17 | Projected ¹ 2017-19 |
| PERS | Member ² | 4.92% | 6.12% | 7.23% |
| | Employer | 9.03% | 11.00% | 12.29% |
| TRS | Member ² | 4.96% | 5.95% | 7.00% |
| | Employer | 10.21% | 12.95% | 14.69% |
| SERS | Member ² | 4.64% | 5.63% | 6.94% |
| | Employer | 9.64% | 11.40% | 12.52% |
| PSERS | Member | 6.36% | 6.59% | 6.80% |
| | Employer | 10.36% | 11.36% | 11.75% |
| LEOFF ³ | Member | 8.41% | 8.41% | 8.85% |
| | Employer | 8.41% | 8.41% | 8.85% |
| WSPRS | Member | 6.59% | 6.69% | 7.19% |
| | Employer | 7.91% | 8.01% | 12.45% |

¹Rates shown for 2017-19 are expected projections based on the 2013 Actuarial Valuation.

²Plan 1 members' contribution rate is statutorily set at 6.0%. Members in Plan 3 do not make contributions to their defined benefit.

³No member or employer contributions are required for LEOFF Plan 1 when the plan is fully funded.

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Estimated Pension Contributions As A Percent Of GF-S Budget

| Estimated Pension Contributions as a Percent of GF-S Budget | | | | | | |
|---|---------|---------|----------|----------|----------|----------|
| (Dollars in Millions) | 1989 | 1994 | 2000 | 2005 | 2010 | 2014 |
| Est GF-S Contributions* | \$200 | \$323 | \$265 | \$81 | \$384 | \$597 |
| GF-S Budget** | \$5,686 | \$8,013 | \$11,068 | \$13,036 | \$13,571 | \$16,383 |
| Percent of GF-S Budget | 3.5% | 4.0% | 2.4% | 0.6% | 2.8% | 3.6% |

*Actual total employer contributions were found in the 2005, 2009, and 2014 OFM CAFRs. The estimated GF-S contributions is the product of actual employer contributions and assumed GF-S fund splits (found on OSA's website).

**1989 and 1994 GF-S budget found in June 2008 ERFC Annual Forecast. All other GF-S budgets were found in June 2015 ERFC Annual Forecast.

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Financial Risk Has Improved

- Recent changes to benefit provisions for new hires
 - Early retirement benefits less generous
 - Reduces contribution requirements
 - Improves affordability and sustainability of plans
- Litigation risks for gain-sharing and Plan 1 UCOLA removed after court ruling in favor of the state
- Adoption of updated assumptions
 - Longer life spans
 - Lower investment return assumption
 - Short term costs with long term savings

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Concluding Remarks On Financial Condition

- Contribution rates expected to increase in the short term to meet full funding goal
- Full funding and maintenance of affordable/sustainable plan designs will help systems manage financial risks and improve health
- Adopting reasonable assumptions improves adequacy
 - Require continual monitoring and adjustments as needed
- Questions on Report on Financial Condition?

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Summary Of Report On Long-Term Economic Assumptions

- All current assumptions reasonable
- Two assumption changes recommended
 - Lower long-term rate of return
 - Higher TRS system growth rate
- Adopting recommendation will improve system health and lessen some financial risks, but increase short-term budget impacts
- Continued phase-in of change in assumed rate of return recommended
- Supporting data and analysis in full report

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Lower Long-Term Rate Of Return, Higher TRS Growth Rate Recommended

| Assumption | Current | Recommended |
|-----------------------------|---------------------------|---------------------------|
| Inflation | 3.00% | 3.00% |
| General Salary Growth | 3.75% | 3.75% |
| Annual Investment Return | 7.80% | 7.50% |
| Growth in System Membership | 0.80% (TRS), 0.95% (PERS) | 1.25% (TRS), 0.95% (PERS) |

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

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Inflation

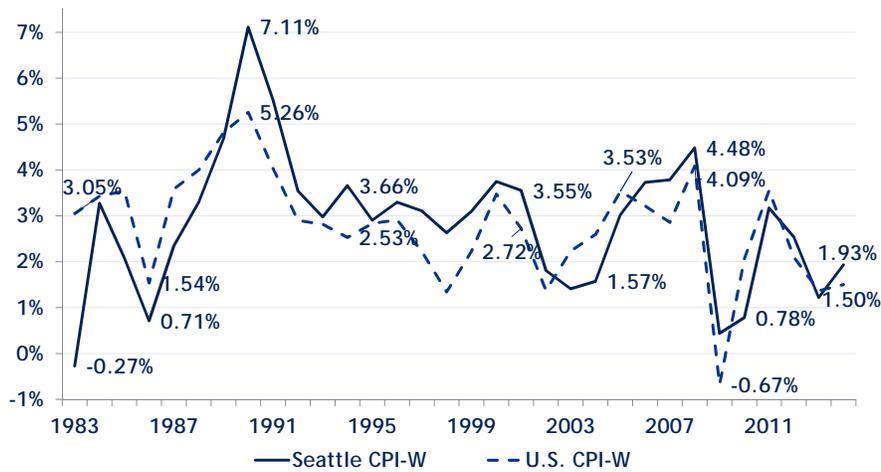
- Assumption used to model post-retirement COLAs based on changes in Consumer Price Index (CPI) for Seattle, Tacoma, Bremerton
- Also used as a “building block” for general salary growth and nominal rate of return assumption
- Components of total inflation assumption
 - US inflation
 - Adjustment for regional inflation
- Recommending no change in the total inflation assumption from the current assumption

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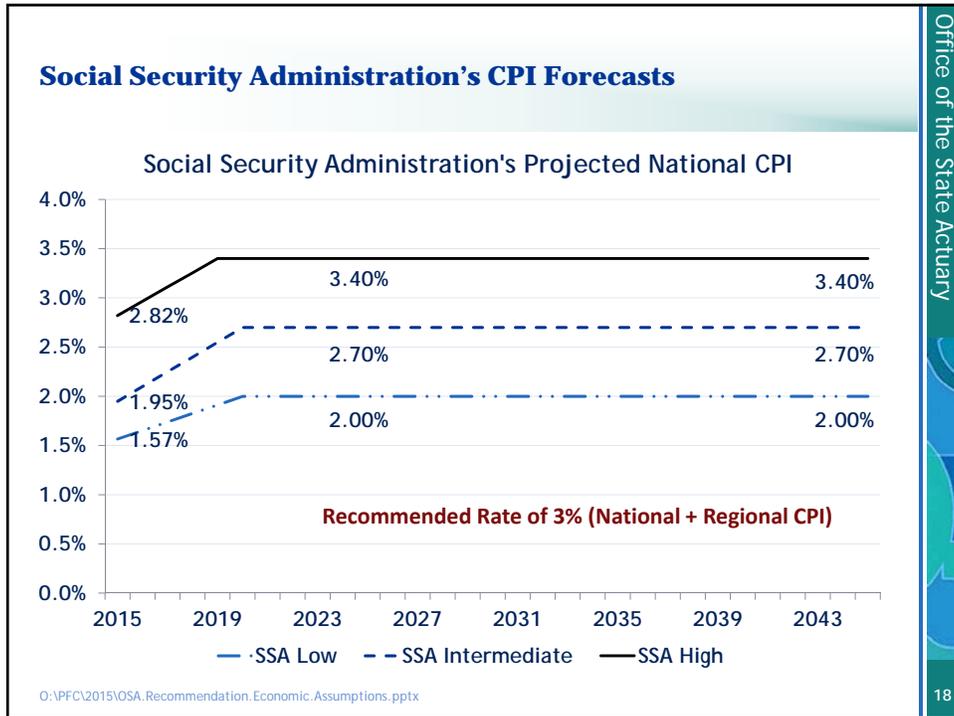
Historical Inflation Data

Annual Percent Change By Year (1983-2014)



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- ### General Salary Growth
- Assumption used to project salaries to determine future retirement benefits and contribution rates as a percentage of payroll
 - Components of general salary growth assumption
 - Inflation
 - "Productivity growth" (salary growth above inflation)
 - Economic growth factors only
 - Service-based salary increases included in plan-specific demographic assumptions
 - Consistent with last study, adjusted experience study data to remove short-term salary practices in response to Great Recession
 - Recommending no change in the general salary increase assumption from the current assumption
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General Salary Growth Experience

| General Salary Growth Experience 1984 - 2009 | | | | |
|---|-----------------------|--------------------------|--------------------------------|----------------------------|
| | Observed Inflation | Observed Productivity | Total General Salary Growth | Recommended Assumption* |
| PERS | 3.14% | 0.90% | 4.03% | 3.75% |
| TRS | 3.14% | 0.97% | 4.10% | 3.75% |
| SERS | 3.14% | 0.57% | 3.71% | 3.75% |
| WSPRS | 3.14% | 0.97% | 4.10% | 3.75% |

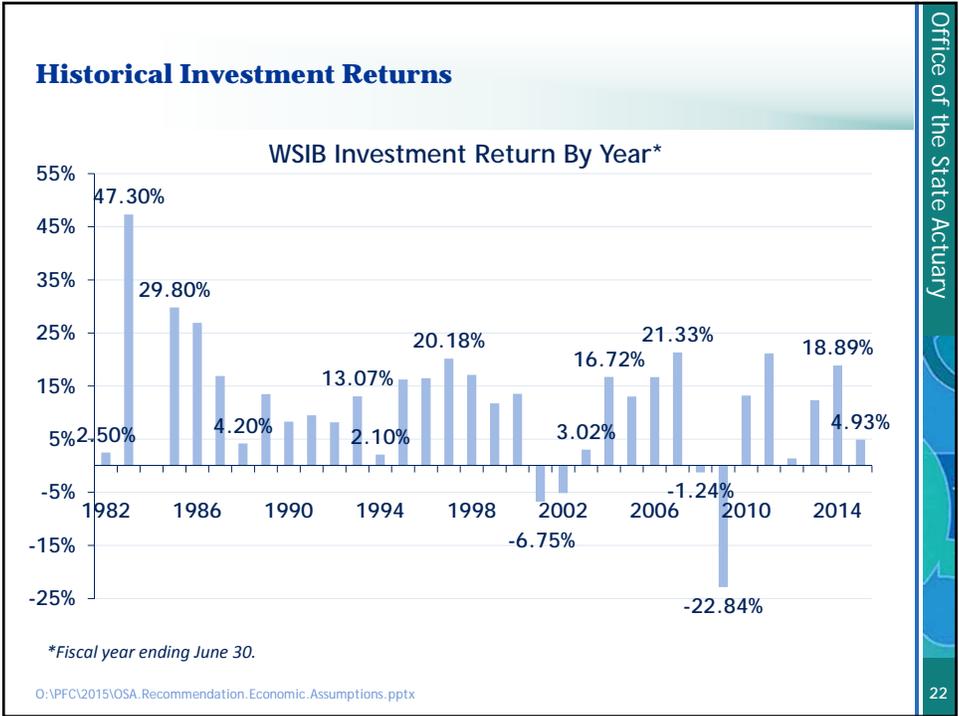
*Note: Insufficient data to study PSERS. Totals may not agree due to rounding.
3% assumed inflation + 0.75% assumed productivity.

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Annual Investment Return

- Assumption used to determine today's value of future benefit payments and salaries
- Key assumption for determining contribution requirements
- Components of annual investment return assumption
 - Inflation
 - "Real rate of return" (return above inflation)
- Recommending a decrease in annual investment return assumption consistent with WSIB's capital market assumptions

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Simulated Future Investment Returns

| 50-Year Simulated Future Investment Returns* | | | | | |
|--|-------|-------|-------|-------|---------|
| | 2015 | 2013 | 2011 | 2009 | Average |
| 75th Percentile | 8.86% | 8.62% | 8.95% | 8.87% | 8.83% |
| 60th Percentile | 8.18% | 7.86% | 8.04% | 8.05% | 8.03% |
| 55th Percentile | 7.94% | 7.63% | 7.76% | 7.80% | 7.78% |
| Expected Return | 7.74% | 7.40% | 7.49% | 7.57% | 7.55% |
| 45th Percentile | 7.54% | 7.17% | 7.22% | 7.31% | 7.31% |
| 40th Percentile | 7.31% | 6.93% | 6.94% | 7.07% | 7.06% |
| 25th Percentile | 6.56% | 6.13% | 6.03% | 6.25% | 6.24% |

*Based on WSIB's capital market assumptions.

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Growth In System Membership

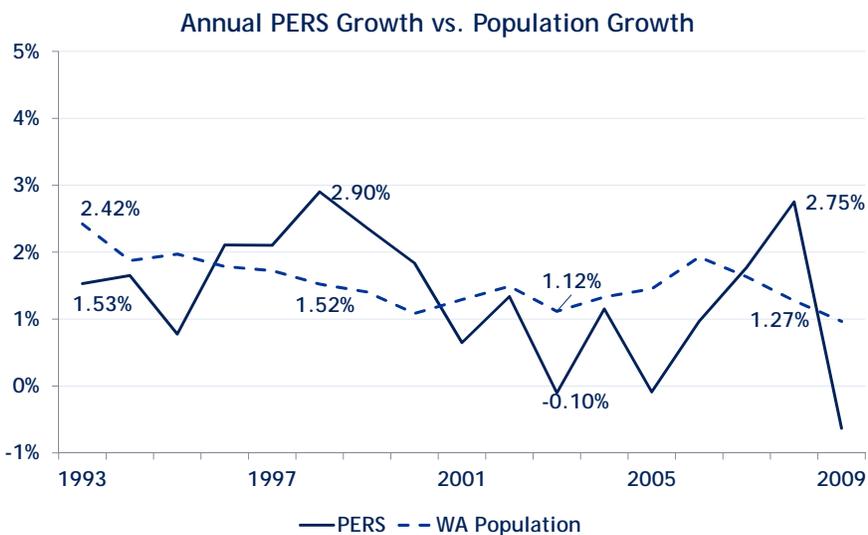
- Assumption used to determine amortization payments for Plan 1 UAAL
 - Plan 1 UAAL amortized over a rolling ten-year period as a percentage of system payrolls
- Short-term forces materially impact this ten-year assumption
- OFM expects both general state population and school age population (ages 5-17) growth to moderately increase over the next ten years
 - Retirement system growth correlated with state population growth
- Expect increase in TRS system growth rate due to increased state funding for basic education
 - SHB 2776, 2010 Session
 - McCleary
- Recommending increase in TRS system growth rate; no change for PERS

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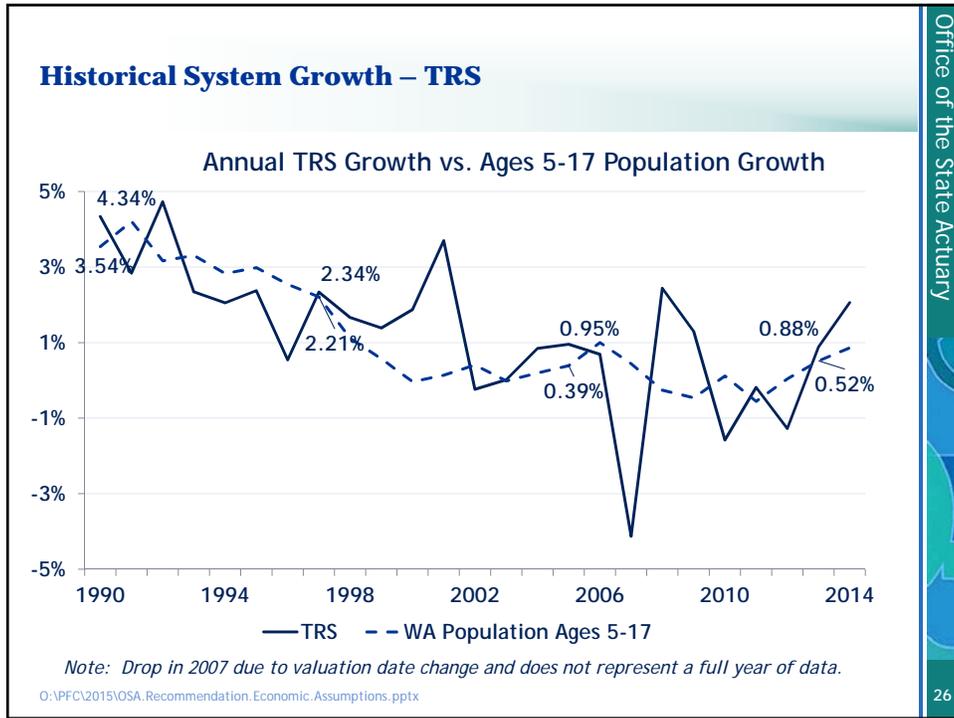
Historical System Growth – PERS



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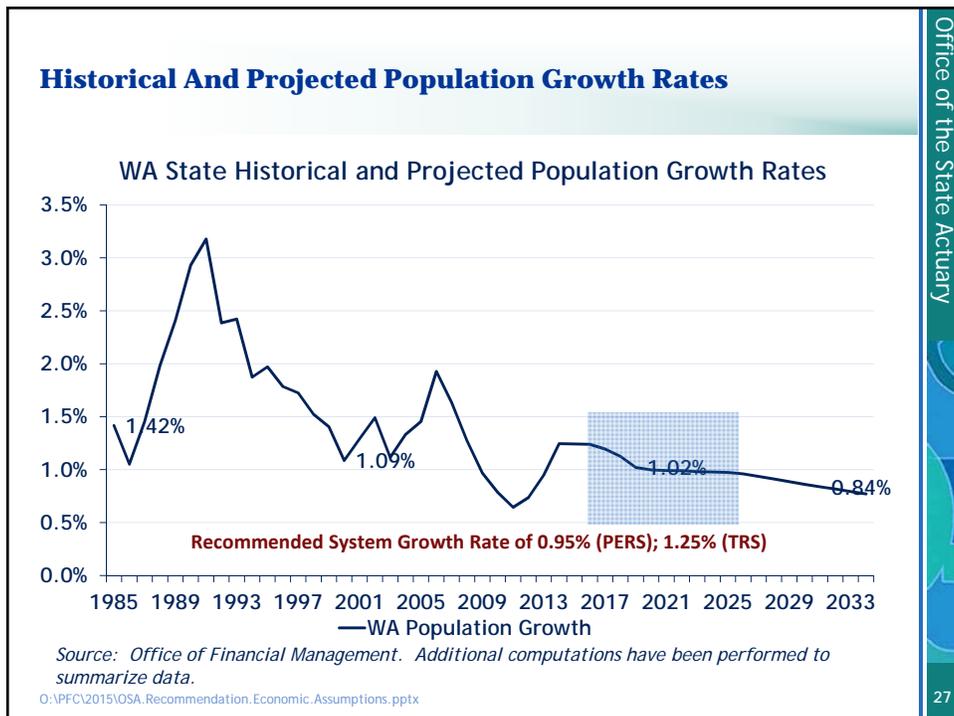
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Concluding Remarks On Economic Assumptions

- All current assumptions reasonable, but not representative of my best estimate
- Lower rate of return and higher TRS system growth rate recommended
- No other changes recommended
- Adopting the recommended rate of return assumption without phase-in will improve system health and lessen some financial risks, but increase short-term budget impacts
- Continued phase-in of assumed rate of return assumption recommended

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2017-19 Budget Impact – Adopting Both Assumption Changes No Phase-In

| Increase in Contributions from Adopting Full Recommendation* | | | | | | |
|--|----------------|----------------|---------------|--------------|--------------|----------------|
| (Dollars in Millions) | PERS | TRS | SERS | PSERS | WSPRS | Total |
| 2017-2019 | | | | | | |
| General Fund | \$34.6 | \$77.7 | \$14.6 | \$1.8 | \$0.5 | \$129.2 |
| Non-General Fund | \$52.0 | \$0.0 | \$0.0 | \$0.2 | \$6.9 | \$59.2 |
| Total State | \$86.6 | \$77.7 | \$14.6 | \$2.0 | \$7.5 | \$188.3 |
| Local Government | \$98.4 | \$31.7 | \$18.1 | \$2.2 | \$0.0 | \$150.5 |
| Total Employer | \$185.0 | \$109.5 | \$32.7 | \$4.2 | \$7.5 | \$338.8 |
| Total Employee | \$115.8 | \$20.4 | \$11.4 | \$3.1 | \$0.2 | \$150.9 |

Totals may not agree due to rounding.

*In current law, we assume 7.70% rate of return for the 2017-19 Biennium. This table displays the cost in the 2017-19 Biennium from lowering the assumed rate of return from 7.7% to 7.5% as well as increasing the TRS growth in system membership assumption from 0.80% to 1.25%. Short-term costs would continue beyond 2017-19 and ultimately become a long-term savings. We estimated the 2017-19 impact by applying the change in contribution rates from the 2013 AVR to projected payroll. Actual impacts may vary from this estimate.

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Recommended Investment Return Phase-In

| Investment Return Phase-In | | |
|----------------------------|-------------|-------------|
| Biennium | Current Law | Recommended |
| 2015-17 | 7.80% | 7.80% |
| 2017-19 | 7.70% | 7.70% |
| 2019-21 | 7.70% | 7.60% |
| 2021-23 | 7.70% | 7.50% |

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Estimated 2019-21 Budget Impact – Phase-In 7.7 Percent to 7.6 Percent

| Estimated Increase in Contributions from Adopting Phase-In* | | | | | | |
|---|---------------|---------------|---------------|--------------|--------------|----------------|
| (Dollars in Millions) | PERS | TRS | SERS | PSERS | WSPRS | Total |
| 2019-2021 | | | | | | |
| General Fund | \$17.2 | \$46.7 | \$7.1 | \$0.9 | \$0.3 | \$72.2 |
| Non-General Fund | \$25.9 | \$0.0 | \$0.0 | \$0.1 | \$3.4 | \$29.4 |
| Total State | \$43.1 | \$46.7 | \$7.1 | \$1.1 | \$3.6 | \$101.6 |
| Local Government | \$49.0 | \$19.1 | \$8.8 | \$1.2 | \$0.0 | \$78.1 |
| Total Employer | \$92.2 | \$65.8 | \$15.9 | \$2.2 | \$3.6 | \$179.7 |
| Total Employee | \$56.0 | \$11.8 | \$5.6 | \$1.6 | \$0.2 | \$75.2 |

Totals may not agree due to rounding.

*In current law, we assume 7.70% rate of return for the 2019-21 Biennium. This table displays the cost in the 2019-21 Biennium from lowering the assumed rate of return from 7.7% to 7.6%. Short-term costs would continue beyond 2019-21 and ultimately become a long-term savings. We estimated the 2019-21 impact by applying the change in contribution rates from the 2013 AVR to projected payroll. Actual impacts may vary from this estimate.

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**Estimated 2021-23 Budget Impact – Phase-In
7.6 Percent to 7.5 Percent**

| Additional Increase in Contributions from Adopting Phase-In* | | | | | | |
|--|---------------|---------------|---------------|--------------|--------------|----------------|
| (Dollars in Millions) | PERS | TRS | SERS | PSERS | WSPRS | Total |
| 2021-2023 | | | | | | |
| General Fund | \$17.6 | \$50.3 | \$7.1 | \$1.0 | \$0.3 | \$76.3 |
| Non-General Fund | \$26.5 | \$0.0 | \$0.0 | \$0.1 | \$3.3 | \$30.0 |
| Total State | \$44.2 | \$50.3 | \$7.1 | \$1.2 | \$3.6 | \$106.3 |
| Local Government | \$50.2 | \$20.6 | \$8.8 | \$1.3 | \$0.0 | \$80.9 |
| Total Employer | \$94.4 | \$70.9 | \$15.9 | \$2.4 | \$3.6 | \$187.2 |
| Total Employee | \$55.7 | \$14.0 | \$5.7 | \$1.8 | \$0.2 | \$77.4 |

Totals may not agree due to rounding.

*In current law, we assume 7.70% rate of return for the 2021-23 Biennium. This table displays the additional costs for the 2021-23 Biennium from lowering the assumed rate of return from 7.6% to 7.5%, but excludes the 2021-23 cost of lowering the rate of return from 7.7% to 7.6%. Short-term costs would continue beyond 2021-23 and ultimately become a long-term savings. We estimated the 2021-23 impact by applying the change in contribution rates from the 2013 AVR to projected payroll. Actual impacts may vary from this estimate.

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Estimated 2017-19 Budget Impact – Higher TRS Growth Rate

| Decrease in Contributions from Adopting TRS Growth Rate | | | | | | |
|---|--------------|-----------------|--------------|--------------|--------------|-----------------|
| (Dollars in Millions) | PERS | TRS | SERS | PSERS | WSPRS | Total |
| 2017-19 | | | | | | |
| General Fund | \$0.0 | (\$10.8) | \$0.0 | \$0.0 | \$0.0 | (\$10.8) |
| Non-General Fund | \$0.0 | \$0.0 | \$0.0 | \$0.0 | \$0.0 | \$0.0 |
| Total State | \$0.0 | (\$10.8) | \$0.0 | \$0.0 | \$0.0 | (\$10.8) |
| Local Government | \$0.0 | (\$4.4) | \$0.0 | \$0.0 | \$0.0 | (\$4.4) |
| Total Employer | \$0.0 | (\$15.2) | \$0.0 | \$0.0 | \$0.0 | (\$15.2) |
| Total Employee | \$0.0 | \$0.0 | \$0.0 | \$0.0 | \$0.0 | \$0.0 |

Totals may not agree due to rounding.

*We currently assume a TRS growth in system membership of 0.80%. This table displays the savings in the 2017-19 Biennium from increasing the assumption for TRS from 0.80% to 1.25%. We estimated the 2017-19 impact by applying the change in contribution rates from the 2013 AVR to projected payroll. Actual impacts may vary from this estimate.

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Recap

- Report on Financial Condition
 - Funded status declined but most plans on track
 - Current contribution rates are adequate for full funding
 - Risk measures have improved
 - Reasonable assumptions key to improve/maintain plan health
- Economic Experience Study
 - All current assumptions reasonable
 - Lower long-term rate of return and higher TRS system growth rate recommended
 - Adopting recommendation will improve system health and lessen some financial risks, but increase short-term budget impacts
 - Continued phase-in of change in assumed rate of return recommended
- Full reports included in meeting materials

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Estimated 2017-19 Contribution Rate Impact Adopting Both Assumption Changes; No Phase-In

| Increase in Contribution Rates from Adopting Full Recommendation* (Effective 7/1/2017) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| 2017-2019 State Budget | PERS | TRS | SERS | PSERS | WSPRS |
| Employee (Plan 2) | 0.86% | 0.90% | 0.88% | 0.50% | 0.00% |
| Employer | | | | | |
| Current Annual Cost | 0.86% | 0.90% | 0.88% | 0.50% | 4.49% |
| Plan 1 Past Cost | 0.17% | 0.19% | 0.17% | 0.17% | N/A |
| Total Employer | 1.03% | 1.09% | 1.05% | 0.68% | 4.49% |

**In current law, we assume 7.70% rate of return for the 2017-19 Biennium. This table displays the rate impacts in the 2017-19 Biennium from lowering the assumed rate of return from 7.7% to 7.5% as well as increasing the TRS growth in system membership assumption from 0.80% to 1.25%. Short-term impacts would continue beyond 2017-19 and ultimately become a long-term savings. We estimated the 2017-19 impact with the change in contribution rates from the 2013 AVR. Actual impacts may vary from this estimate.*

Estimated 2019-21 Contribution Rate Impact - Phase-In 7.7 Percent to 7.6 Percent

| Increase in Contribution Rates from Adopting Phase-In* (Effective 7/1/2019) | | | | | |
|--|--------------|--------------|--------------|--------------|--------------|
| 2019-2021 State Budget | PERS | TRS | SERS | PSERS | WSPRS |
| Employee (Plan 2) | 0.43% | 0.45% | 0.44% | 0.25% | 0.00% |
| Employer | | | | | |
| Current Annual Cost | 0.43% | 0.45% | 0.44% | 0.25% | 2.23% |
| Plan 1 Past Cost | 0.09% | 0.16% | 0.09% | 0.09% | N/A |
| Total Employer | 0.51% | 0.61% | 0.52% | 0.33% | 2.23% |

**In current law, we assume 7.70% rate of return for the 2019-21 Biennium. This table displays the rate impact in the 2019-21 Biennium from lowering the assumed rate of return from 7.7% to 7.6%. Short term rate impacts would continue beyond 2019-21 and ultimately become a long-term savings. We estimated the 2019-21 impact with the impact from the 2013 AVR. Actual impacts may vary from this estimate.*

Estimated 2021-23 Contribution Rate Impact - Phase-In 7.6 Percent to 7.5 Percent

| Additional Increase in Contribution Rates from Adopting Phase-In* (Effective 7/1/2021) | | | | | |
|---|--------------|--------------|--------------|--------------|--------------|
| 2021-2023 State Budget | PERS | TRS | SERS | PSERS | WSPRS |
| Employee (Plan 2) | 0.43% | 0.46% | 0.44% | 0.26% | 0.00% |
| Employer | | | | | |
| Current Annual Cost | 0.43% | 0.46% | 0.44% | 0.26% | 2.26% |
| Plan 1 Past Cost | 0.09% | 0.16% | 0.09% | 0.09% | N/A |
| Total Employer | 0.52% | 0.62% | 0.53% | 0.34% | 2.26% |

**In current law, we assume 7.70% rate of return for the 2021-23 Biennium. This table displays the additional rate impact for the 2021-23 Biennium from lowering the assumed rate of return from 7.6% to 7.5%, but excludes the 2021-23 impacts of lowering the rate of return from 7.7% to 7.6%. Short-term impacts would continue beyond 2021-23 and ultimately become a long-term savings. We estimated the 2021-23 impact with the change in contribution rates from the 2013 AVR. Actual impacts may vary from this estimate.*

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Estimated 2017-19 Contribution Rate Impact Higher TRS Growth Rate

| Decrease in Contribution Rates from Adopting Higher TRS Growth Rate* (Effective 7/1/2017) | | | | | |
|--|--------------|----------------|--------------|--------------|--------------|
| 2017-2019 State Budget | PERS | TRS | SERS | PSERS | WSPRS |
| Employee (Plan 2) | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Employer | | | | | |
| Current Annual Cost | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Plan 1 Past Cost | 0.00% | (0.13%) | 0.00% | 0.00% | 0.00% |
| Total Employer | 0.00% | (0.13%) | 0.00% | 0.00% | 0.00% |

**We currently assume a TRS growth in system membership of 0.80%. This table displays the savings in the 2017-19 Biennium from increasing the assumption for TRS from 0.80% to 1.25%. We estimated the 2017-19 impact by applying the change in contribution rates from the 2013 AVR to projected payroll. Actual impacts may vary from this estimate.*

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Other States' Economic Assumptions

| Economic Assumptions for Selected Plans Outside Washington | | | | |
|--|-------------------|-----------------------|---------------|-----------|
| Plan Name | Investment Return | General Salary Growth | Productivity* | Inflation |
| Alaska Public Employees Retirement System | 8.00% | 3.62% | 0.50% | 3.12% |
| Alaska Teachers Retirement System | 8.00% | 3.62% | 0.50% | 3.12% |
| California Public Employees Retirement System | 7.50% | 3.00% | 0.25% | 2.75% |
| California State Teachers Retirement System | 7.50% | 3.75% | 0.75% | 3.00% |
| Public Employees Retirement Association of Colorado (State & School Divisions) | 7.50% | 3.90% | 1.10% | 2.80% |
| Florida Retirement System | 7.65% | 3.25% | 0.65% | 2.60% |
| Iowa Public Employees Retirement System | 7.50% | 4.00% | 1.00% | 3.00% |
| Public Employees Retirement System of Idaho | 7.00% | 3.75% | 0.51% | 3.24% |
| Missouri State Employees Retirement System | 8.00% | 3.00% | 0.50% | 2.50% |
| Ohio Public Employees Retirement System | 8.00% | 3.75% | 0.75% | 3.00% |
| Oregon Public Employees Retirement System | 7.75% | 3.75% | 1.00% | 2.75% |
| Wisconsin Retirement System | 7.20% | 3.20% | N/A | 2.0%-2.7% |
| 2015 Economic Experience Study Recommendation | 7.50% | 3.75% | 0.75% | 3.00% |
| Selected Public Plans Outside WA - Average | 7.63% | 3.55% | 0.68% | 2.90% |
| Selected Public Plans Outside WA - Minimum | 7.00% | 3.00% | 0.25% | 2.50% |
| Selected Public Plans Outside WA - Maximum | 8.00% | 4.00% | 1.10% | 3.24% |

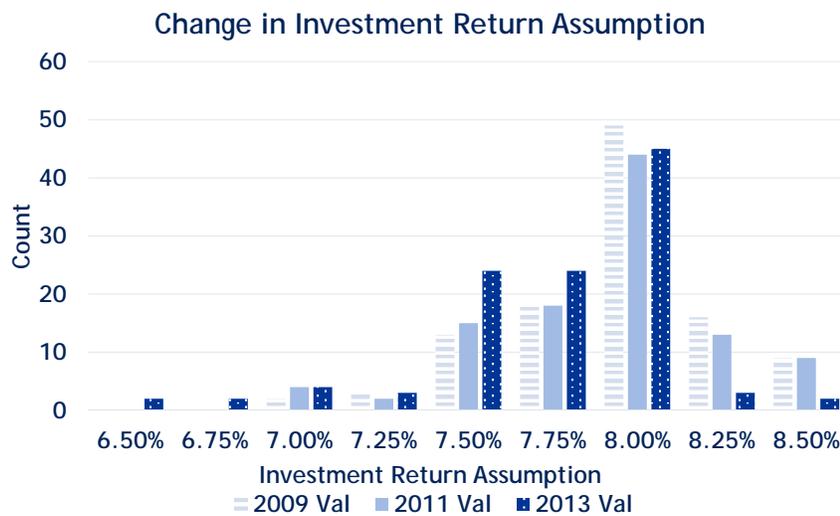
Assumptions are developed according to individual plan needs for use in a variety of actuarial models. Additional assumptions may be used, in combination with the reported general salary growth assumption, to model total salary growth. Investment return assumptions are heavily dependent on the plan's asset allocation.

Data gathered from Public Plans Database, Center for Retirement Research, and individual state system Comprehensive Annual Financial Reports or Actuarial Valuations.

**For comparison to our economic assumptions. We assumed productivity was the difference between General Salary Growth and Inflation.*

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Other States' Economic Assumptions



Source: NASRA Public Fund Survey.

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