

# Results of Actuarial Valuation and Demographic Experience Study

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

The collage features various mathematical elements:

- Integration formulas:  $\int \frac{\sqrt{x^2 - a^2}}{x} dx = \sqrt{x^2 - a^2} - a \operatorname{csc}^{-1} \frac{x}{a} + C$ ,  $\int \frac{x^2}{\sqrt{x^2 \pm a^2}} dx = \frac{x}{2} \sqrt{x^2 \pm a^2} \mp \frac{a^2}{2} \ln|x + \sqrt{x^2 \pm a^2}| + C$ ,  $\int \frac{dx}{\sqrt{x^2 \pm a^2}} = \frac{\sqrt{x^2 \pm a^2}}{x} + \ln|x + \sqrt{x^2 \pm a^2}| + C$ ,  $\int \frac{dx}{x^2 \sqrt{x^2 \pm a^2}} = \frac{-1}{a^2 x} \sqrt{x^2 \pm a^2} + C$ ,  $\int \frac{dx}{(x^2 + a^2)^{3/2}} = \frac{x}{a^2 \sqrt{x^2 + a^2}} + C$ ,  $\int (x^2 \pm a^2)^{3/2} dx = \frac{x}{8} (2x^2 \pm 5a^2) \sqrt{x^2 \pm a^2} + \frac{3a^4}{8} \ln|x + \sqrt{x^2 \pm a^2}| + C$
- Geometric diagrams: A 3D cube with vertices labeled A through I, and a 2D diagram showing a circle with radius  $p$  and a point  $(x, y)$  on the circle, with  $x = p \cos \varphi$  and  $y = p \sin \varphi$ .
- Algebraic equations:  $x = p \cos \varphi$ ,  $y = p \sin \varphi$ ,  $|z| = p$ ,  $-1 \leq x^2 + y^2 \leq -6y$ ,  $-4 \sin \varphi \leq p - 6 \sin \varphi$ ,  $2r = -6 \sin \varphi$ ,  $|z| = \sqrt{p^2 - 4 \sin^2 \varphi}$ ,  $\frac{d\rho}{d\varphi} = \frac{3}{\sqrt{3}}$ ,  $\sqrt{r^2 + h^2} = 60$
- Large numbers: 1, 2, 3, 4, 5, 6, 7, 8, 9, 0.



## Today's Presentation

- Recap of results from latest experience study and actuarial valuation
  - Full presentation provided in June
- Budget impact of assumption changes and updated contribution rates
- Managing budget and rate impacts



## Results Are Final

- Concurrent actuarial audit now complete
- No changes to preliminary results
- Final reports available this fall and will reflect PFC action



# Summary Of Updates To Current Assumptions From Experience Study

## ■ Mortality

- Changes to reflect lower mortality rates since last study
- Updates to projected increases in life spans
- Increases short-term costs
- Most significant assumption change in this experience study

## ■ Retirement

- Changes to reflect later retirement; except in WSPRS
- Decreases short-term costs

## ■ Termination

- Changes to reflect fewer early career terminations; except TRS
- Changes to reflect more late career terminations (20+ YOS)
- Decreases short-term costs (due to TRS changes)

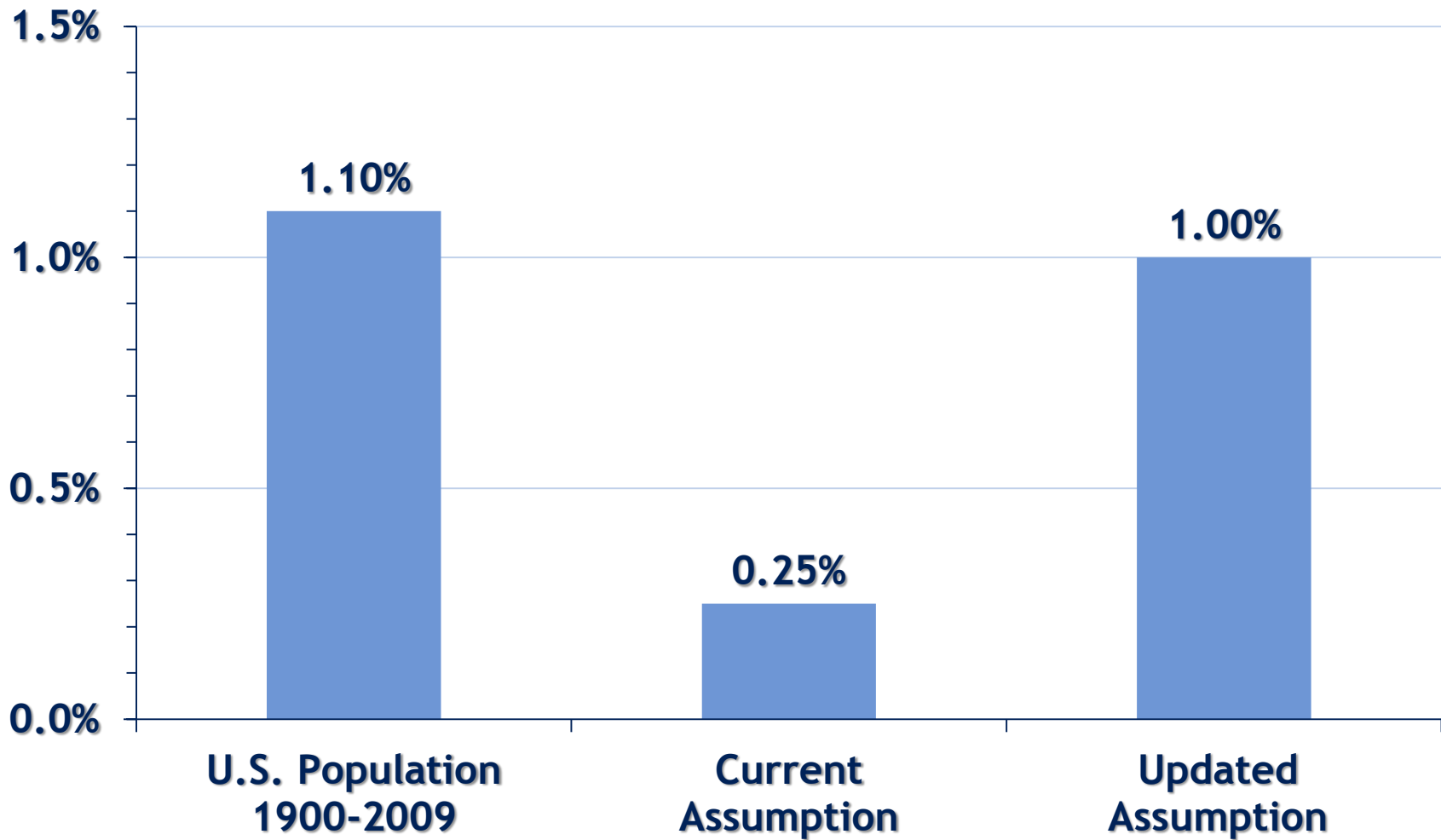
## Summary Of Updates To Current Assumptions From Experience Study *(Continued)*

- Disability
  - Minor adjustments made to most plans
- Salary increases
  - Changes to “service based” salary increase assumptions
  - Lowered early career increases and increased/extended salary scale
  - Increases short-term costs
- Miscellaneous assumptions
  - Increases short-term costs
- Supporting data provided in Attachments A-G from June meeting



# Current Assumption Less Than One Quarter Of Observed Long-Term Improvement in U.S.

## Long-Term Mortality Improvement Rates

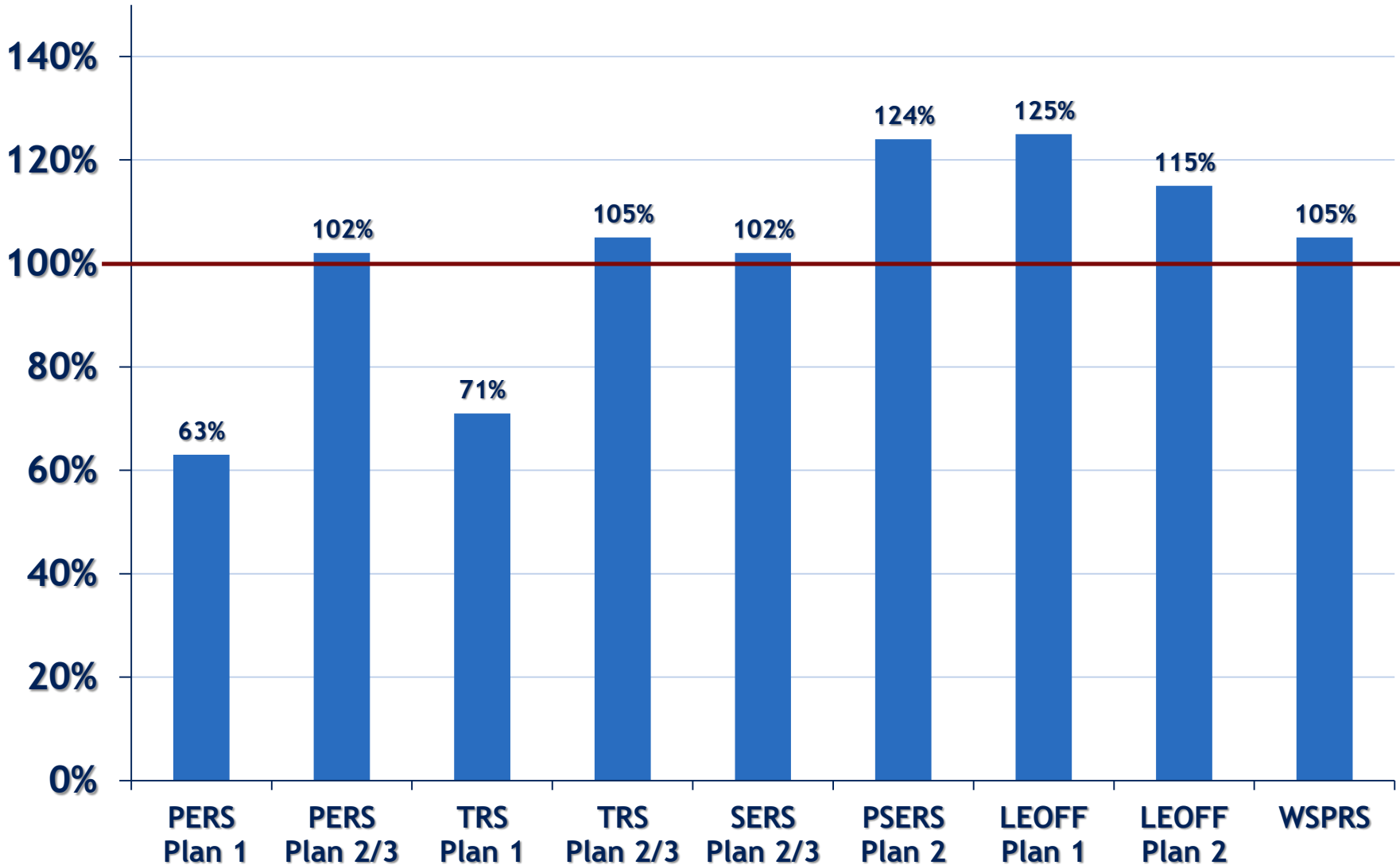


## Funded Status – All Plans Combined

Funded Status at June 30		
	2013	2012
(Dollars in Millions)	After ExpStudy 7.8% ExpROR	Before ExpStudy 7.9% ExpROR
<b>All Systems</b>		
a. Accrued Liability	\$69,828	\$62,578
b. Market Value of Assets	62,213	56,753
c. Deferred Gains/(Losses)	(3,245)	(6,369)
d. Actuarial Value of Assets (b-c)	65,458	63,122
e. Unfunded Liability (a-d)	\$4,370	(\$544)
f. Funded Ratio (d/a)	94%	101%

*Note: Totals may not agree due to rounding.*

# Funded Status Above 100 Percent For All Open Plans





## 2015-17 And 2017-19 Budget Impacts

Increase Above 2013-15 Current Law Budget*				
	Before ExpStudy 7.9% ExpROR	7.8% ExpROR Only	ExpStudy Changes Only	After ExpStudy 7.8% ExpROR
(Dollars in millions)	A	B	C	A+B+C
<b>2015-2017</b>				
General Fund	\$125	\$50	\$307	\$482
Non-General Fund	\$26	\$29	\$141	\$196
<b>Total State</b>	<b>\$150</b>	<b>\$79</b>	<b>\$449</b>	<b>\$678</b>
Local Government	\$108	\$71	\$377	\$556
<b>Total Employer</b>	<b>\$258</b>	<b>\$150</b>	<b>\$826</b>	<b>\$1,233</b>
<b>Total Employee</b>	<b>\$4</b>	<b>\$75</b>	<b>\$328</b>	<b>\$408</b>
<b>2017-2019</b>				
General Fund	\$138	\$54	\$337	\$529
Non-General Fund	\$28	\$31	\$152	\$211
<b>Total State</b>	<b>\$165</b>	<b>\$85</b>	<b>\$489</b>	<b>\$740</b>
Local Government	\$118	\$77	\$410	\$604
<b>Total Employer</b>	<b>\$283</b>	<b>\$163</b>	<b>\$899</b>	<b>\$1,344</b>
<b>Total Employee</b>	<b>\$5</b>	<b>\$83</b>	<b>\$362</b>	<b>\$449</b>

\*Excludes LEOFF 2. Budget impacts reflect difference between current contribution rates and the rates from the preliminary 2013 AVR only.

Totals may not agree due to rounding.

## 2015-17 Employer Contribution Rates\*

Total Employer Contribution Rates				
	Current	Before ExpStudy 7.9% ExpROR	Before ExpStudy 7.8% ExpROR	After ExpStudy 7.8% ExpROR
PERS	9.03%	9.47%	9.95%	12.29%
TRS	10.21%	11.60%	11.92%	14.47%
SERS 2/3	9.64%	10.26%	10.75%	12.88%
PSERS 2	10.36%	10.40%	10.72%	12.07%
LEOFF 1	0.00%	0.00%	0.00%	0.00%
WSPRS 1/2	7.91%	7.68%	7.84%	8.79%

\*Excludes current administrative expense rate of 0.18%.

## 2015-17 Member Contribution Rates

Member Contribution Rates				
	Current	Before ExpStudy 7.9% ExpROR	Before ExpStudy 7.8% ExpROR	After ExpStudy 7.8% ExpROR
PERS 2	4.92%	4.95%	5.33%	7.00%
TRS 2	4.96%	4.93%	5.25%	6.79%
SERS 2	4.64%	4.85%	5.24%	6.70%
PSERS 2	6.36%	5.99%	6.21%	6.89%
LEOFF 1	0.00%	0.00%	0.00%	0.00%
WSPRS 1/2*	6.59%	6.36%	6.52%	7.19%

\*WSPRS maximum employee rate is 7.19%

## Managing Budget And Rate Impacts

- PFC and Legislature may consider short-term funding policy changes to manage the short-term impacts of assumption changes
- Balancing act
  - Pay now or pay more later
  - Finding the sweet spot; affordable now and later
- Options to manage budget and rate impacts
  - Recognize full cost and rate increases from assumption changes now; or
  - Spread cost of assumption changes over more than one biennium

