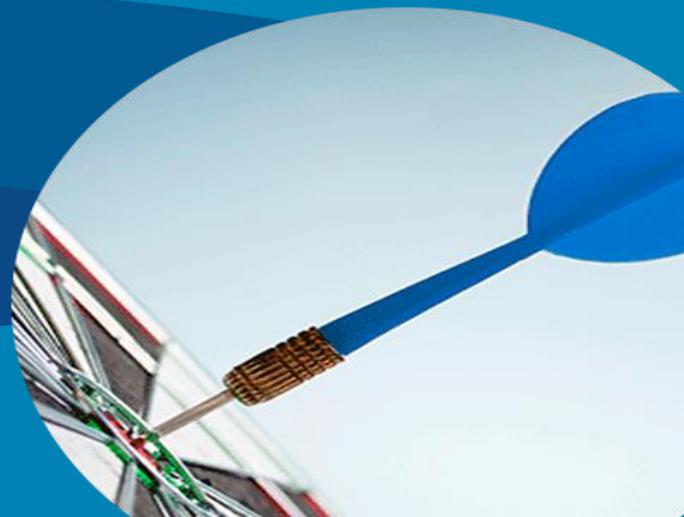


Kentucky Retirement Systems

2018 Actuarial Valuation Results
November 8, 2018

Janie Shaw, ASA, MAAA
Danny White, FSA, EA, MAAA



Agenda

- Summary of Valuation Results
 - Comments on valuation results
 - Demographic experience
 - Contribution rates and funded status
- Projection Information for Pension and Insurance
 - Unfunded liability and funded ratio
 - Contribution dollars and rate of pay
- Closing Comments on 2018 Valuation Results
- Experience Study Process and Timeline

Comment on KERS Non-Haz Retirement Fund

- Imperative to maintain or increase contribution effort for the KERS Non-Hazardous Retirement Fund
 - Current assets cover two years of benefit payments
 - June 30, 2018 assets were \$2,004 million (excluding the 401(h) assets)
 - Benefit payments for the 2018 fiscal year were \$981 million
- Expected FY 2019 employer and member contributions are \$1,031 million

Comments on Valuation Results

- There were no assumption changes since the prior valuation
- Legislation and benefit changes
 - HB 185: Provided increased benefits for members who die in the line of duty
 - HB 265: Maintain FY 2019 contribution rate at 49.47% for Regional Mental Health/Mental Retardation Boards, Local and District Health Departments, State Universities, Community Colleges and any other agency in KERS
 - 114 entities representing approximately 25% of covered payroll
 - HB 362: Phase-in the contribution rates for CERS
 - SB 151: Not reflected in the 2018 actuarial valuation (currently in appeals in the State Supreme Court)

Comments on Valuation Results (continued)

- Investment return was 7.4% to 9.3% (return varies by fund)
 - \$410 million more in plan assets than expected (\$279 million for pension and \$131 million for insurance funds)
 - Recognized in the contribution rates over the next five-years
- Change in active membership and covered payroll
 - Active membership declined in all five systems
 - Covered payroll decreased in both KERS Systems, and the CERS Haz
 - Small change in covered payroll for CERS Non-Haz and SPRS

Comments on Valuation Results (continued)

- Retirement fund liability experience
 - \$196 million loss for all retirement funds combined
 - 0.4% to 0.6% of liability loss for KERS and CERS funds, and a 2.0% of liability loss for SPRS
- Insurance fund liability experience
 - Lower than expected health insurance premiums for 2019 resulting in liability gains and slightly lower than forecasted contribution rates
 - \$989 million liability gain (9% to 11% of liability gain)
 - \$940 million of which is due to the premium experience

Employer Contribution Rates Comparison

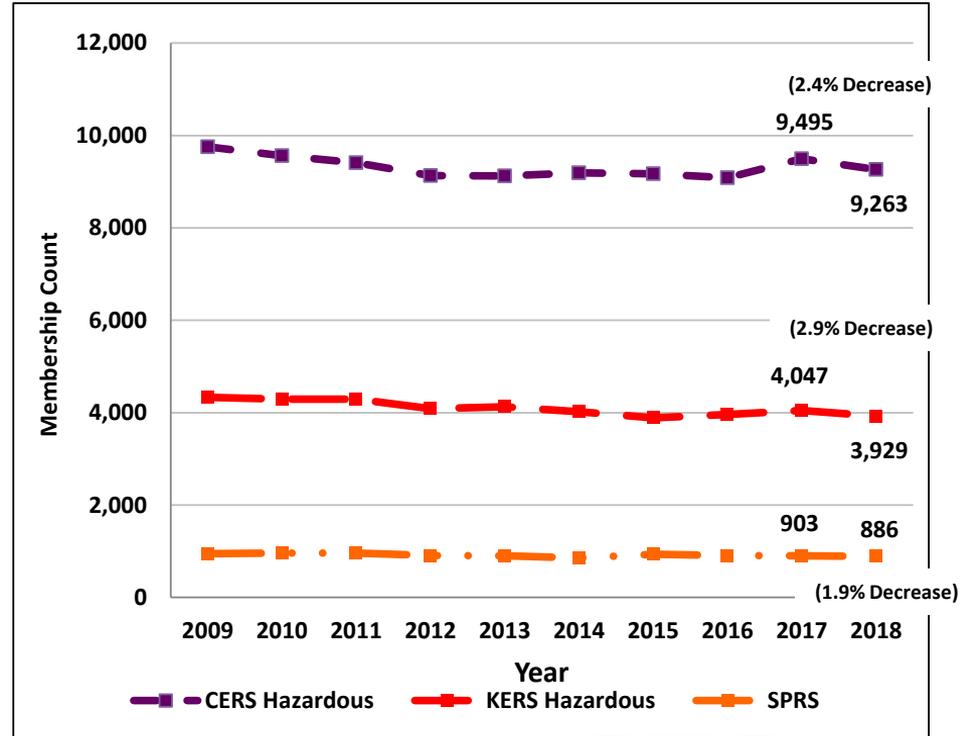
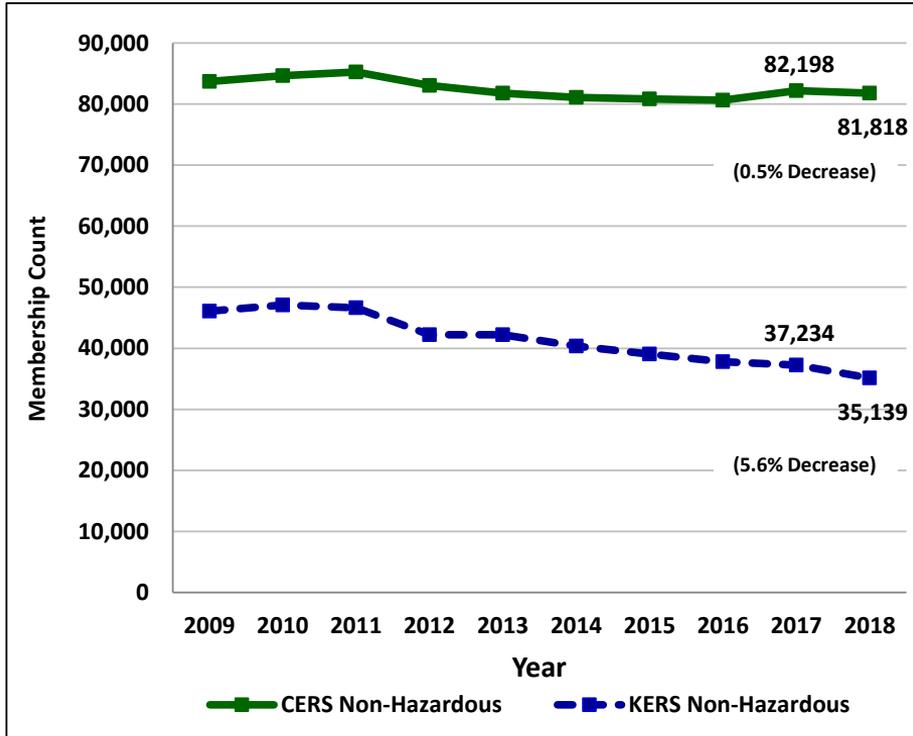
Item	2017 Valuation			2018 Valuation ¹			Current Rate
	Pension	Insurance	Combined	Pension	Insurance	Combined	FY 2019
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
KERS Non-Hazardous	71.03%	12.40%	83.43%	74.54%	10.65%	85.19%	83.43%
KERS Hazardous	34.39%	2.46%	36.85%	34.42%	0.00%	34.42%	36.85%
CERS Non-Hazardous	21.84%	6.21%	28.05%	22.52%	4.76%	27.28%	21.48%
CERS Hazardous	35.69%	12.17%	47.86%	36.98%	9.52%	46.50%	35.34%
SPRS	119.05%	27.23%	146.28%	120.54%	19.50%	140.04%	146.28%

¹ Without regard to the contribution rate phase-in for CERS.

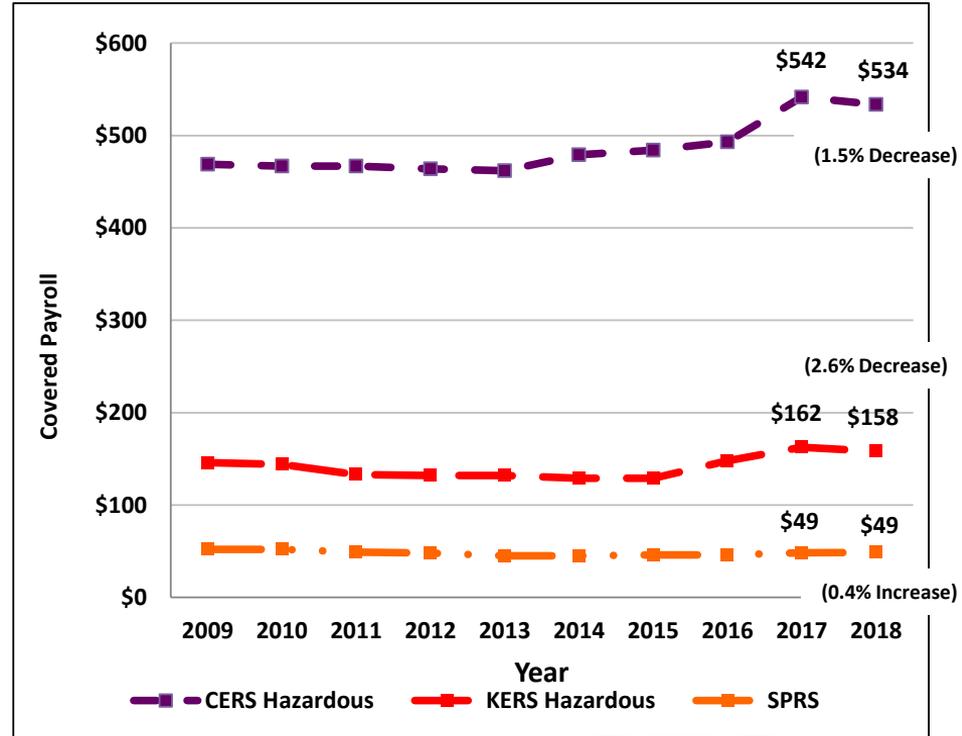
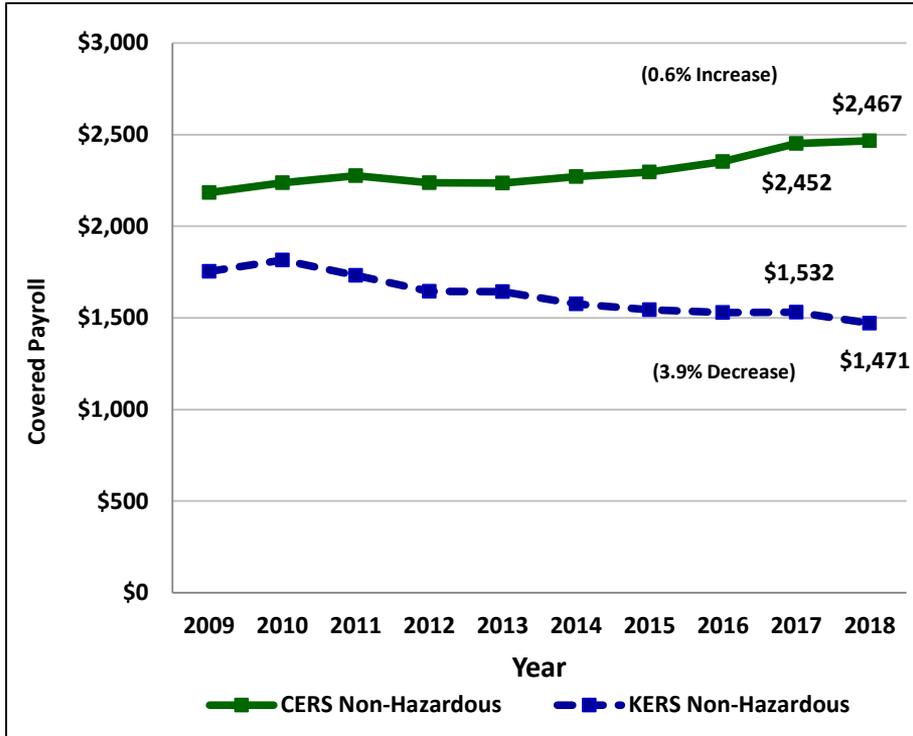
Unfunded Actuarial Accrued Liability – Actuarial Value of Asset Basis (\$ in Billions)

Item	2017 Valuation			2018 Valuation			Change In UAAL
	Pension	Insurance	Combined	Pension	Insurance	Combined	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
KERS Non-Hazardous	\$13.47	\$1.86	\$15.33	\$13.66	\$1.55	\$15.21	(\$0.12)
KERS Hazardous	0.51	(0.07)	0.44	0.51	(0.12)	0.39	(\$0.05)
CERS Non-Hazardous	6.04	1.13	7.17	6.24	0.72	6.96	(\$0.21)
CERS Hazardous	2.41	0.59	3.00	2.47	0.48	2.95	(\$0.05)
SPRS	0.71	0.10	0.81	0.72	0.07	0.79	(\$0.02)
Total	\$23.14	\$3.61	\$26.75	\$23.60	\$2.70	\$26.30	(\$0.45)

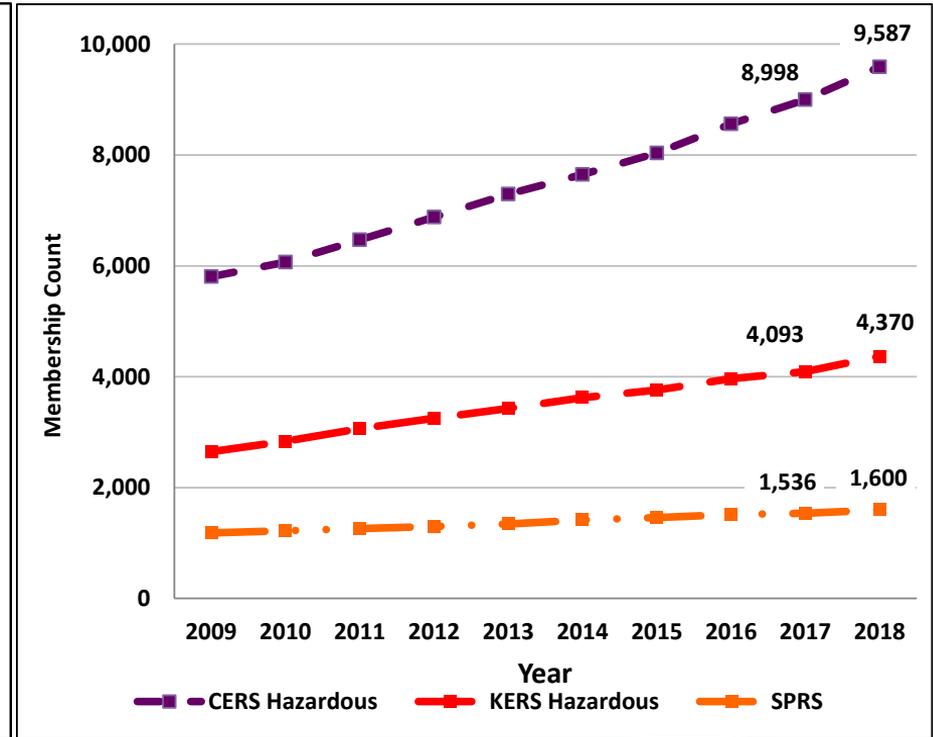
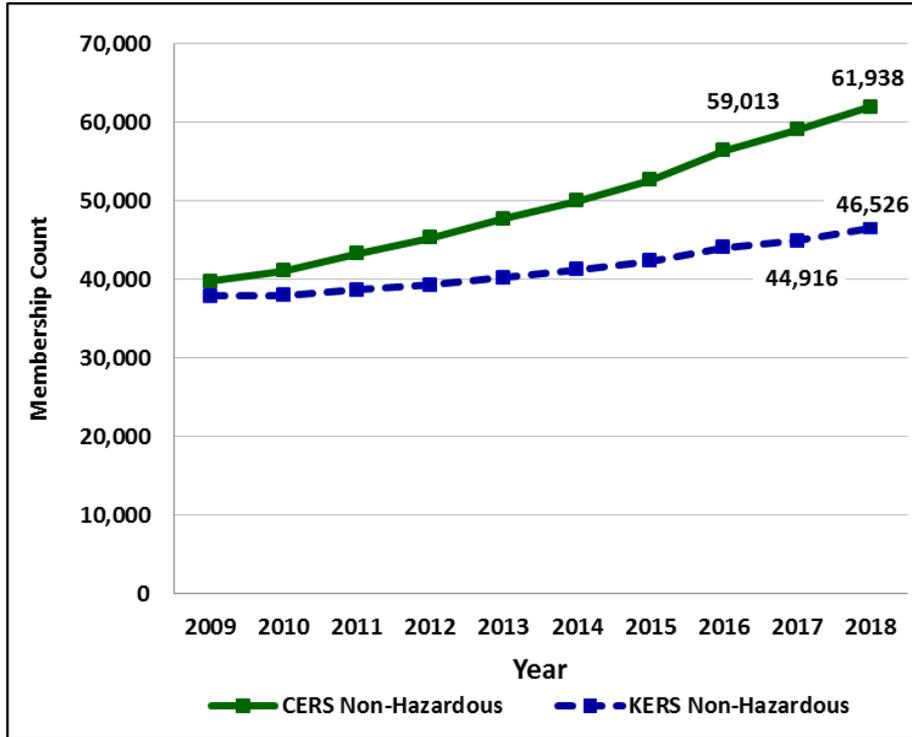
Active Membership Count



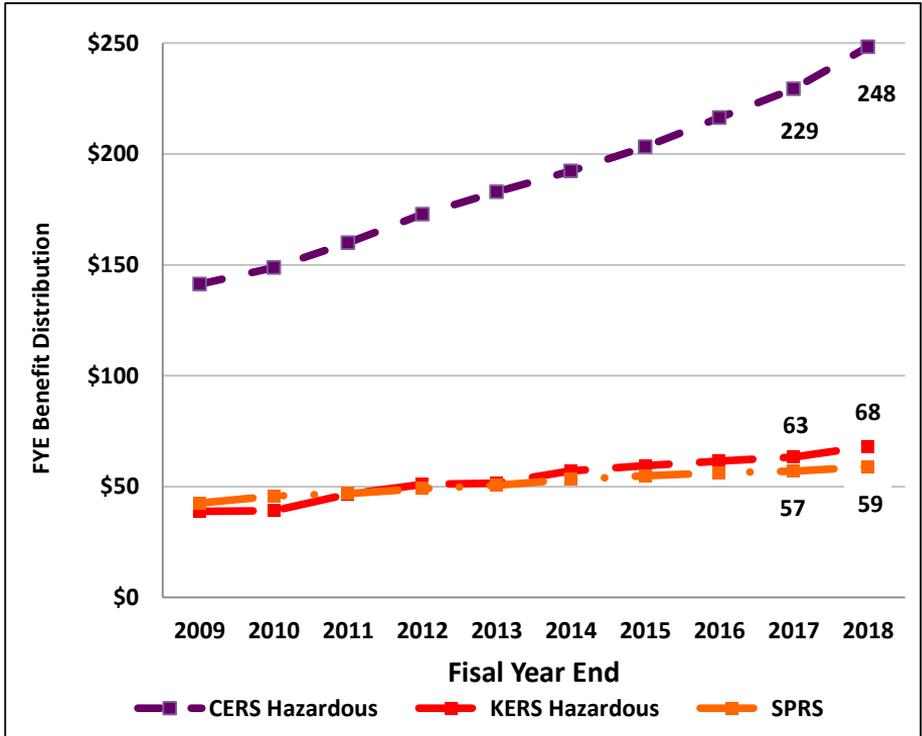
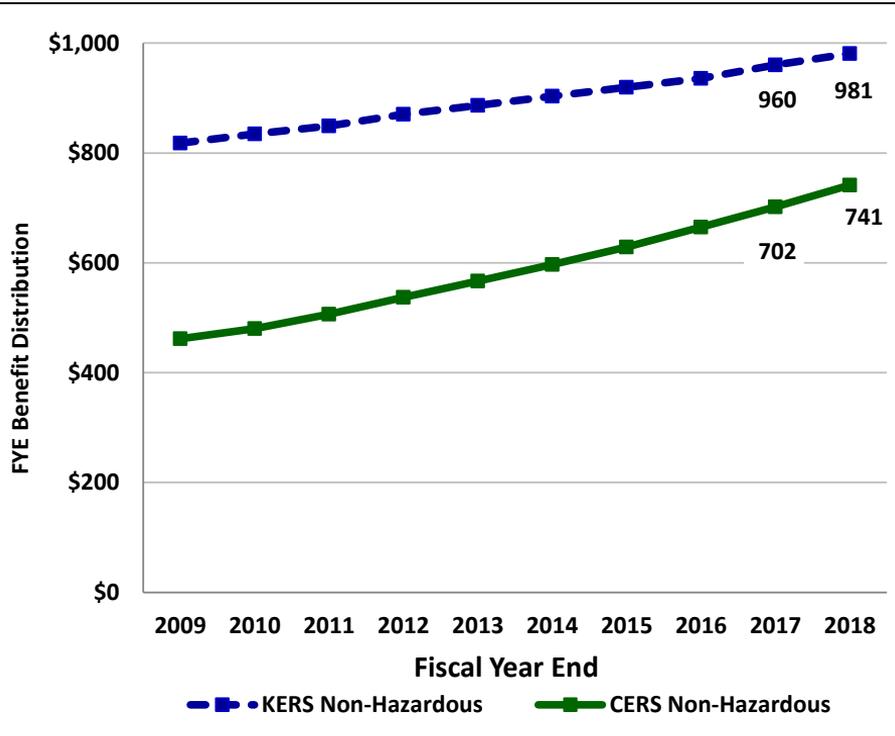
Covered Payroll (\$ in Millions)



Retired Membership Count



Benefit Distributions (\$ in Millions)



Funding Results – KERS (\$ in millions)

Item	NonHazardous System				Hazardous System			
	Pension		Insurance		Pension		Insurance	
	2018	2017	2018	2017	2018	2017	2018	2017
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Normal Cost Rate	12.25%	12.45%	2.83%	3.06%	16.62%	17.10%	5.73%	6.40%
Member Rate	<u>(5.00%)</u>	<u>(5.00%)</u>	<u>(0.40%)</u>	<u>(0.35%)</u>	<u>(8.00%)</u>	<u>(8.00%)</u>	<u>(0.58%)</u>	<u>(0.52%)</u>
Employer Normal Cost Rate	7.25%	7.45%	2.43%	2.71%	8.62%	9.10%	5.15%	5.88%
Administrative Expenses	0.73%	0.72%	0.05%	0.06%	0.62%	0.57%	0.07%	0.06%
Amortization Cost	<u>66.56%</u>	<u>62.86%</u>	<u>8.17%</u>	<u>9.63%</u>	<u>25.18%</u>	<u>24.72%</u>	<u>(6.09%)</u>	<u>(3.48%)</u>
Total Employer Contribution Rate	74.54%	71.03%	10.65%	12.40%	34.42%	34.39%	0.00%	2.46%
Actuarial Accrued Liability	\$15,675	\$15,592	\$2,436	\$2,683	\$1,152	\$1,121	\$393	\$419
Actuarial Value of Assets	<u>2,019</u>	<u>2,124</u>	<u>887</u>	<u>824</u>	<u>639</u>	<u>607</u>	<u>511</u>	<u>493</u>
Unfunded Actuarial Accrued Liability	\$13,656	\$13,468	\$1,548	\$1,859	\$513	\$514	(\$118)	(\$74)
Funded Ratio	12.9%	13.6%	36.4%	30.7%	55.5%	54.1%	130.0%	117.6%

Funding Results – CERS (\$ in millions)

Item	NonHazardous System				Hazardous System			
	Pension		Insurance		Pension		Insurance	
	2018	2017	2018	2017	2018	2017	2018	2017
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Total Normal Cost Rate	10.01%	10.05%	3.32%	3.57%	14.07%	14.52%	4.74%	5.38%
Member Rate	<u>(5.00%)</u>	<u>(5.00%)</u>	<u>(0.46%)</u>	<u>(0.41%)</u>	<u>(8.00%)</u>	<u>(8.00%)</u>	<u>(0.41%)</u>	<u>(0.35%)</u>
Employer Normal Cost Rate	5.01%	5.05%	2.86%	3.16%	6.07%	6.52%	4.33%	5.03%
Administrative Expenses	0.79%	0.80%	0.03%	0.03%	0.28%	0.26%	0.07%	0.07%
Amortization Cost	<u>16.72%</u>	<u>15.99%</u>	<u>1.87%</u>	<u>3.02%</u>	<u>30.63%</u>	<u>28.91%</u>	<u>5.12%</u>	<u>7.07%</u>
Total Employer Contribution Rate	22.52%	21.84%	4.76%	6.21%	36.98%	35.69%	9.52%	12.17%
Actuarial Accrued Liability	\$13,191	\$12,804	\$3,093	\$3,355	\$4,793	\$4,649	\$1,684	\$1,788
Actuarial Value of Assets	<u>6,950</u>	<u>6,765</u>	<u>2,371</u>	<u>2,227</u>	<u>2,322</u>	<u>2,238</u>	<u>1,256</u>	<u>1,197</u>
Unfunded Actuarial Accrued Liability	\$6,241	\$6,039	\$721	\$1,128	\$2,471	\$2,411	\$428	\$592
Funded Ratio	52.7%	52.8%	76.7%	66.4%	48.4%	48.1%	74.6%	66.9%

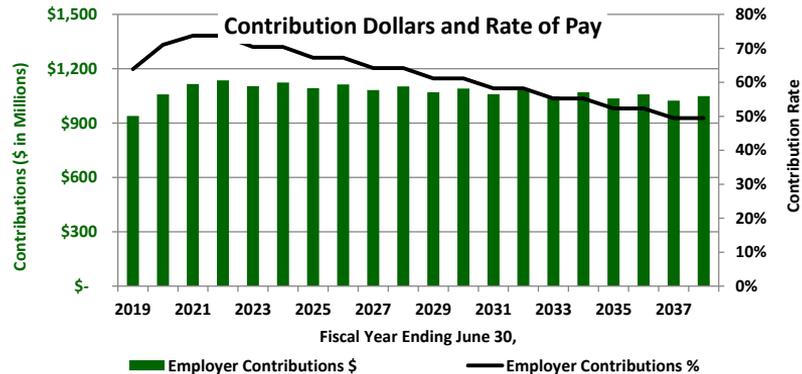
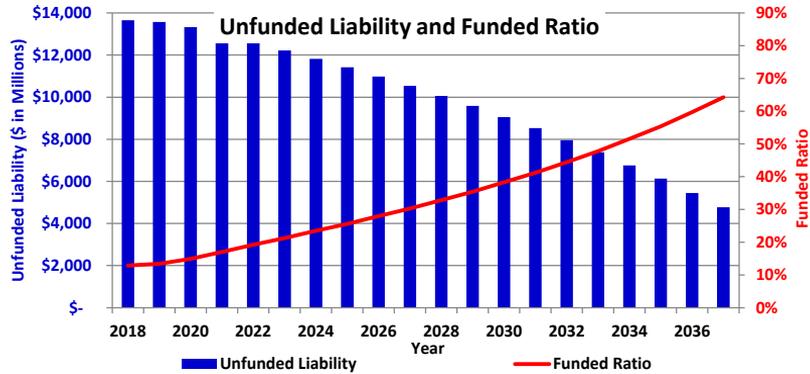
Funding Results – SPRS (\$ in millions)

Item	Pension		Insurance	
	2018	2017	2018	2017
(1)	(2)	(3)	(4)	(5)
Total Normal Cost Rate	23.41%	23.84%	8.29%	11.48%
Member Rate	<u>(8.00%)</u>	<u>(8.00%)</u>	<u>(0.35%)</u>	<u>(0.30%)</u>
Employer Normal Cost Rate	15.41%	15.84%	7.94%	11.18%
Administrative Expenses	0.40%	0.37%	0.13%	0.14%
Amortization Cost	<u>104.73%</u>	<u>102.84%</u>	<u>11.43%</u>	<u>15.91%</u>
Total Employer Contribution Rate	120.54%	119.05%	19.50%	27.23%
Actuarial Accrued Liability	\$989	\$967	262	277
Actuarial Value of Assets	<u>268</u>	<u>261</u>	<u>188</u>	<u>180</u>
Unfunded Actuarial Accrued Liability	\$721	\$706	\$74	\$96
Funded Ratio	27.1%	27.0%	71.6%	65.2%

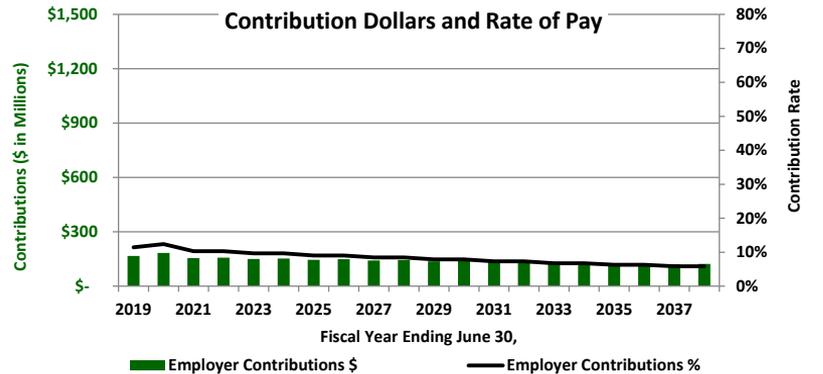
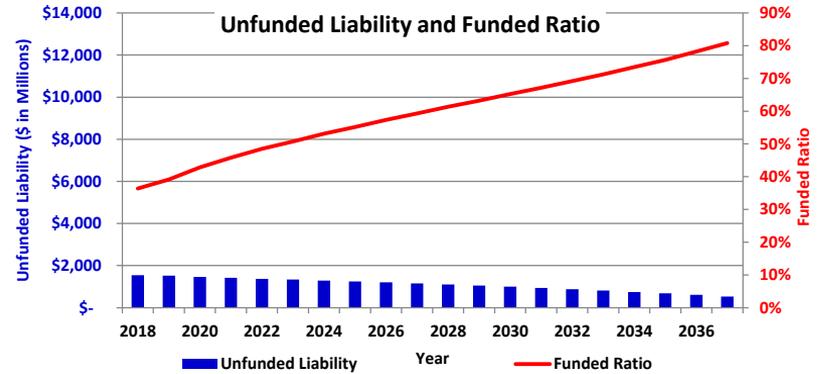
Projection Information Pension and Insurance

KERS Non-Hazardous

Pension

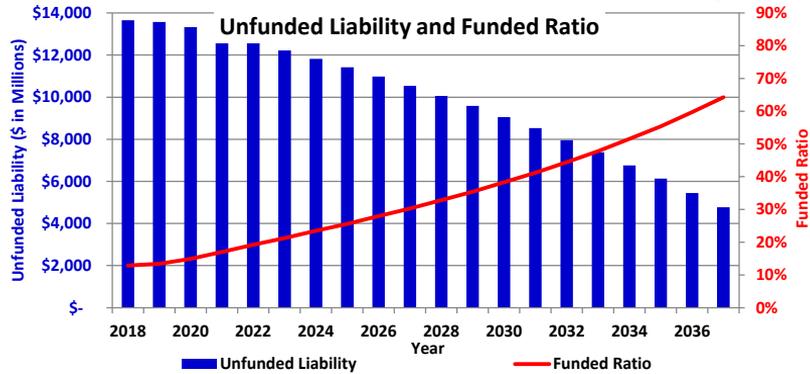


Insurance

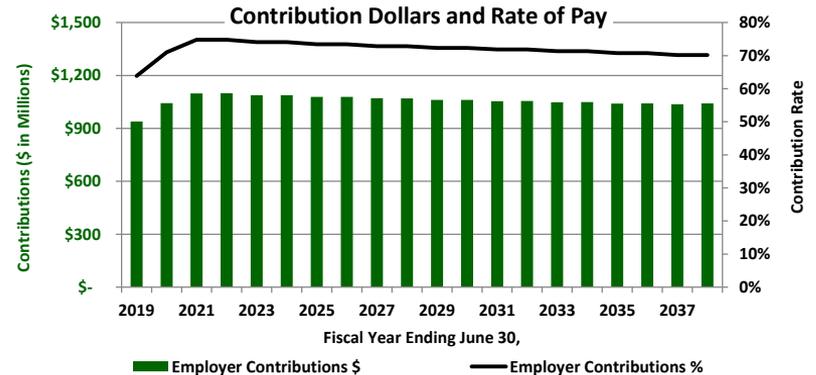
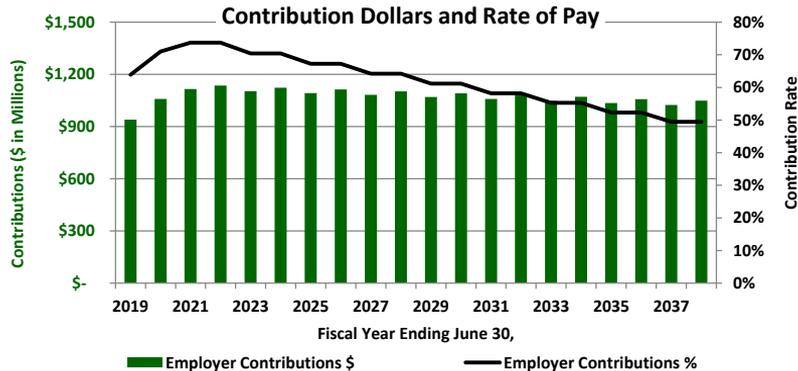
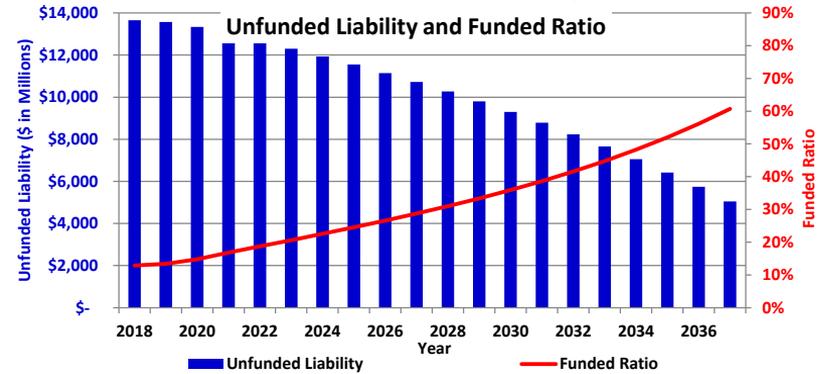


KERS Non-Hazardous – Alternative Scenario

Constant Future Membership

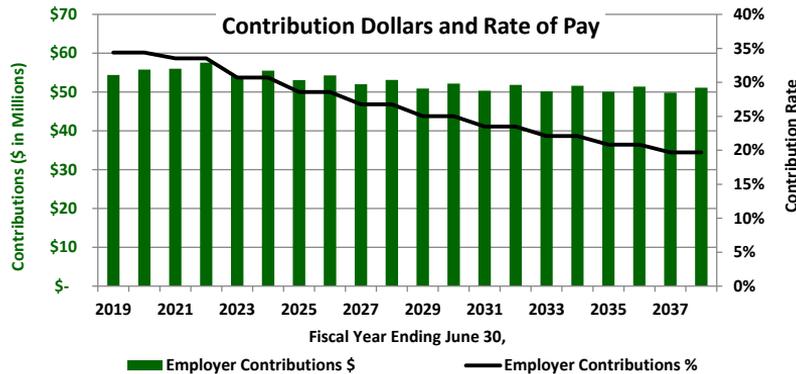
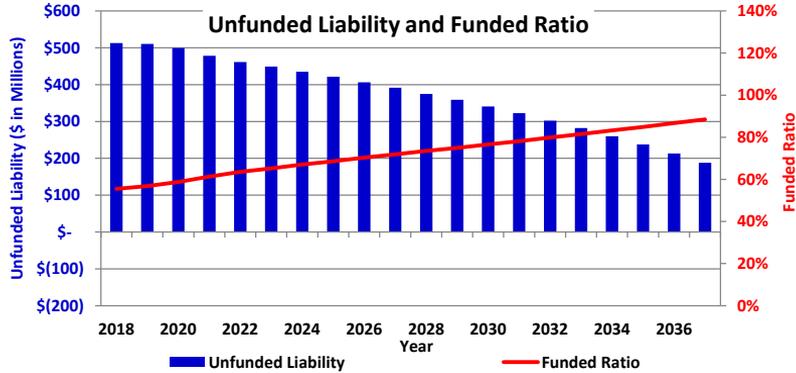


2% Annual Membership Decline

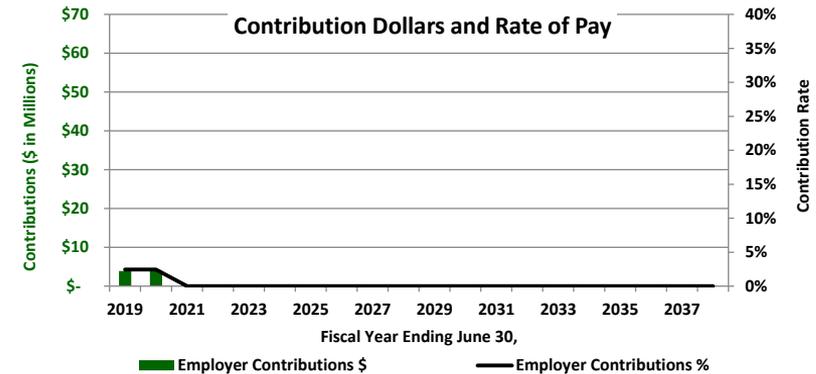
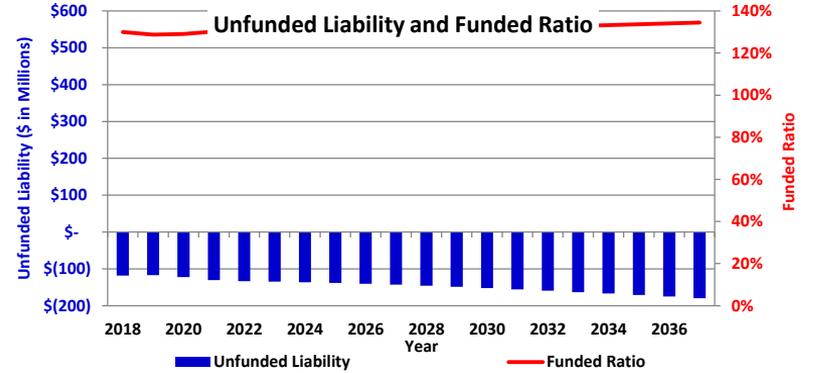


KERS Hazardous

Pension

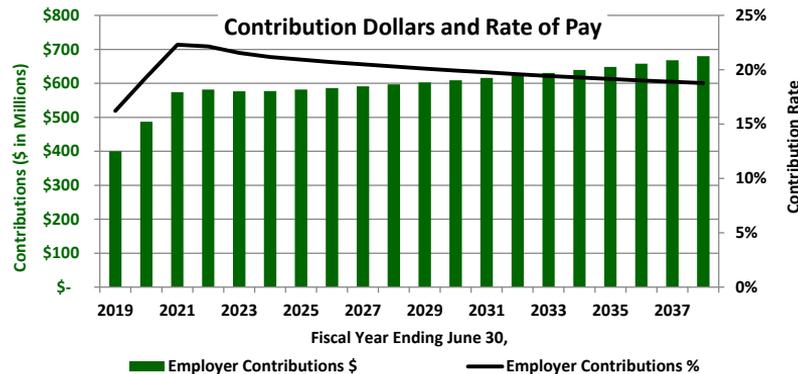
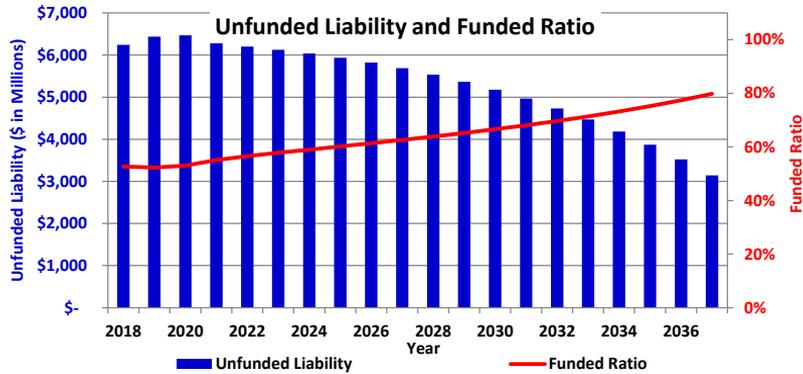


Insurance

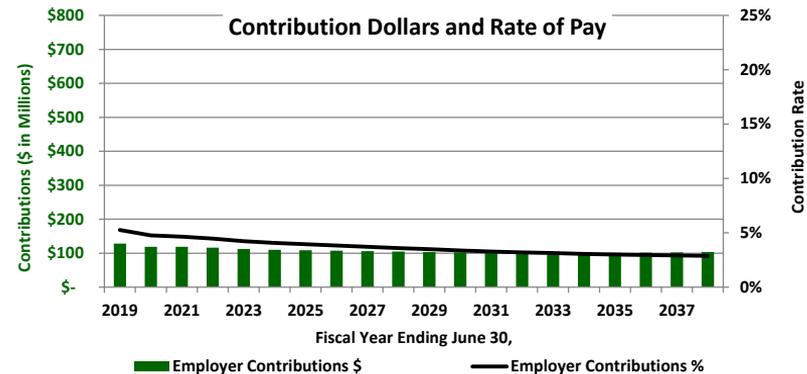
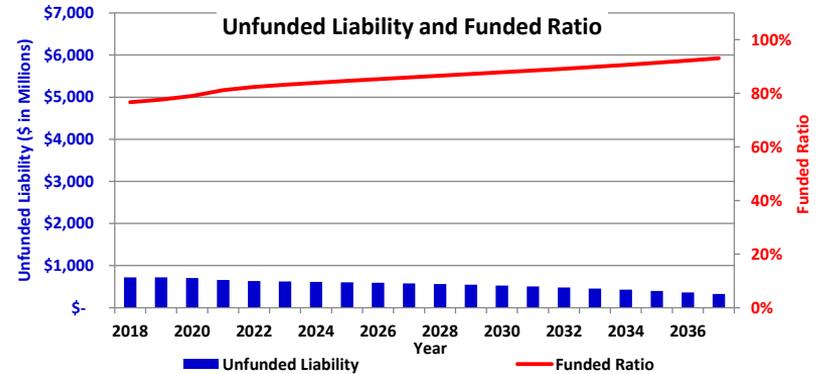


CERS Non-Hazardous

Pension

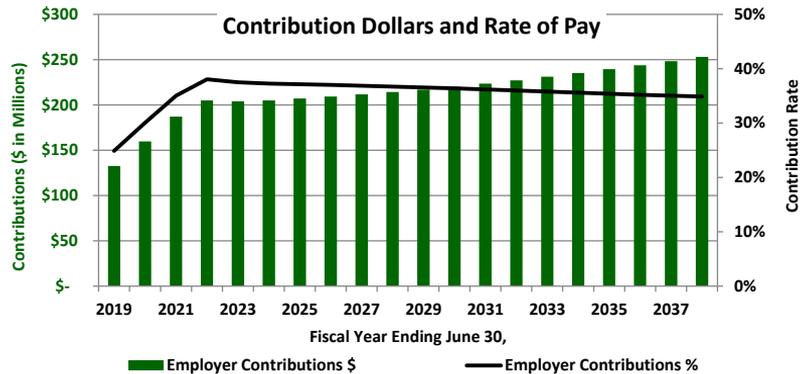
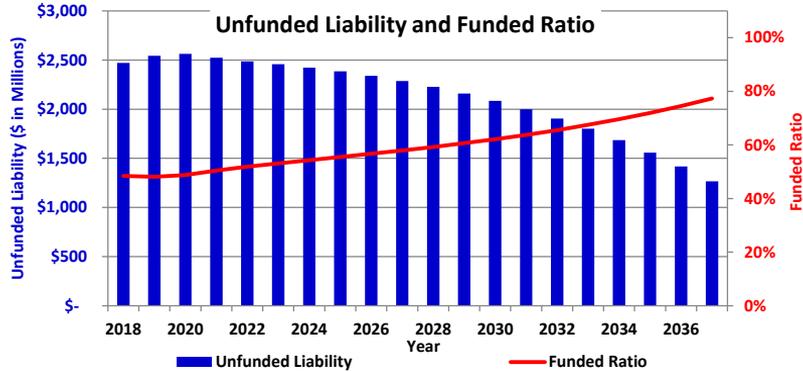


Insurance

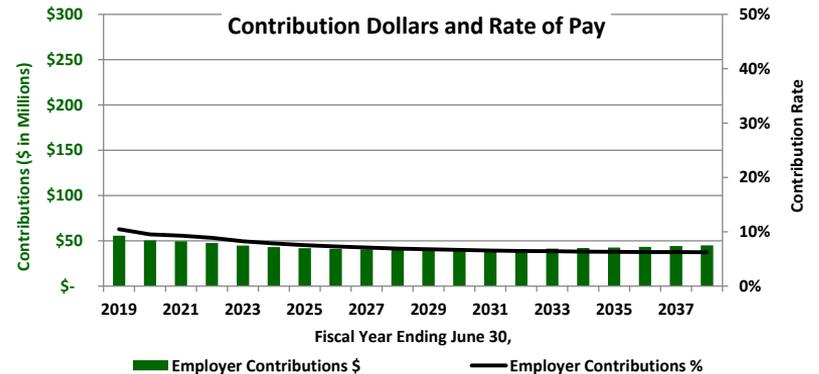
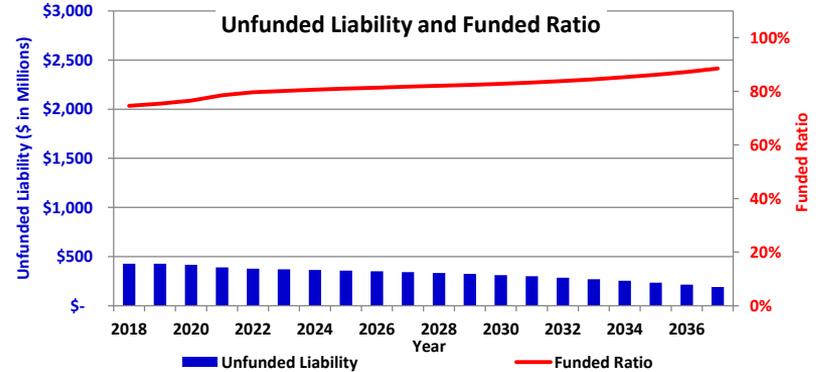


CERS Hazardous

Pension

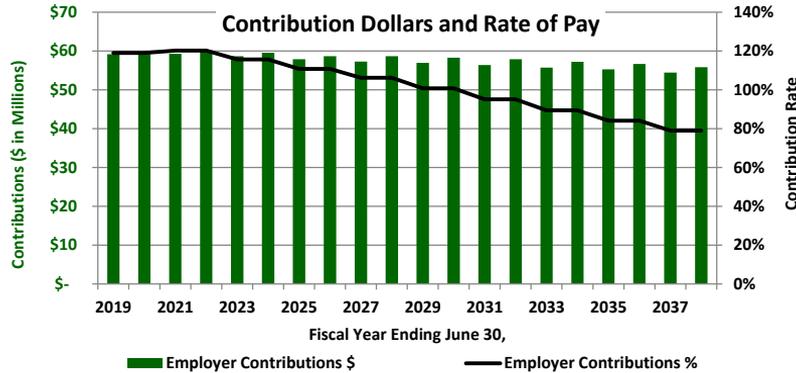
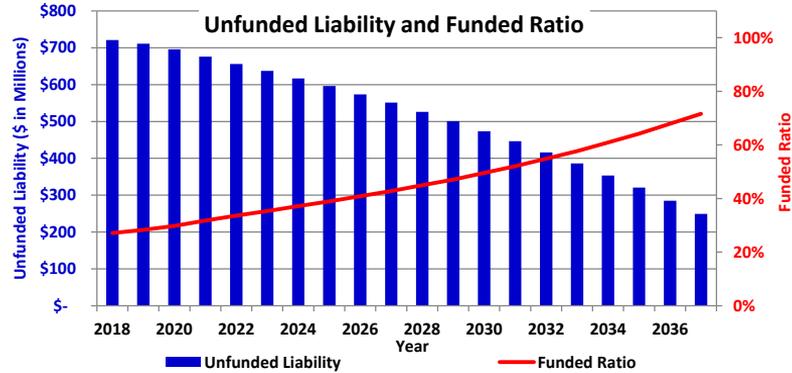


Insurance

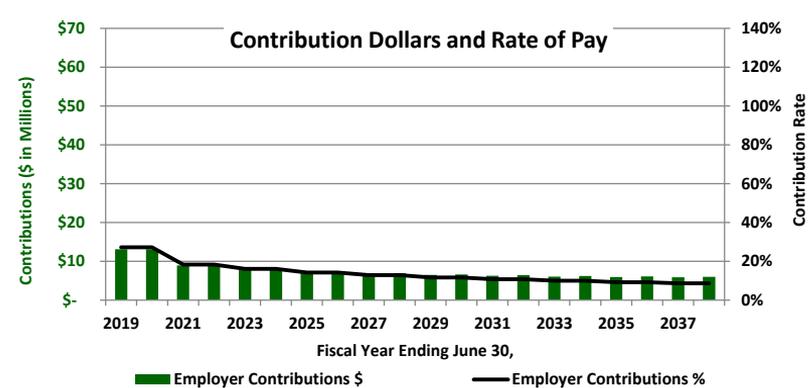
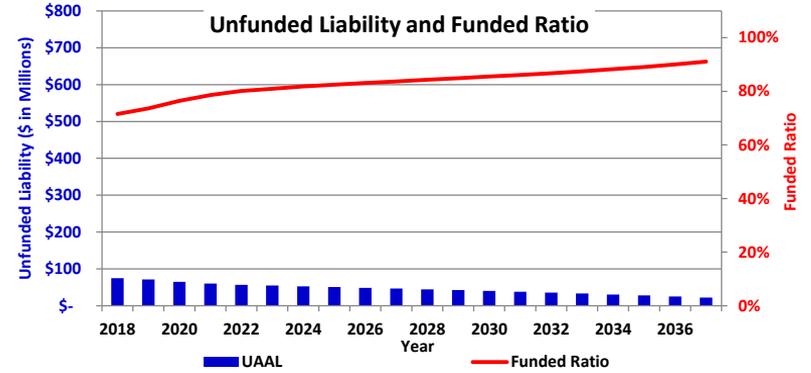


SPRS

Pension



Insurance



Closing Comments on 2018 Valuation Results

- It is imperative the State and participating employers in the Systems contribute the actuarial determined contribution in each future year to improve the System's financial security
- We recommend KRS investigate into a method to allocate the amortization cost to participating employers that is not associated with covered payroll
 - Needed most for the KERS Non-Hazardous System
 - Legislative action will be required.

Experience Study Process and Timing

Experience Study Process

- Compare actual experience to current actuarial assumptions and recommend changes to assumptions to better align with future expectations
- Review past experience over a given timeframe
 - Review will include experience of all five systems
 - Identify how many members retired, terminated, became disabled, or died, including their age/service
 - Identify salary increases received by active members
 - Greater emphasis on forward-looking expectations for economic assumptions

Experience Study Process (continued)

- Assumptions are not static; they should occasionally change to reflect
 - New information
 - Mortality improvement
 - Changing patterns of retirements, terminations, etc.
 - Changing knowledge
- Recent experience provides strong guidance for some assumptions (for example, mortality) and weak guidance for others (for example, the investment return rate)

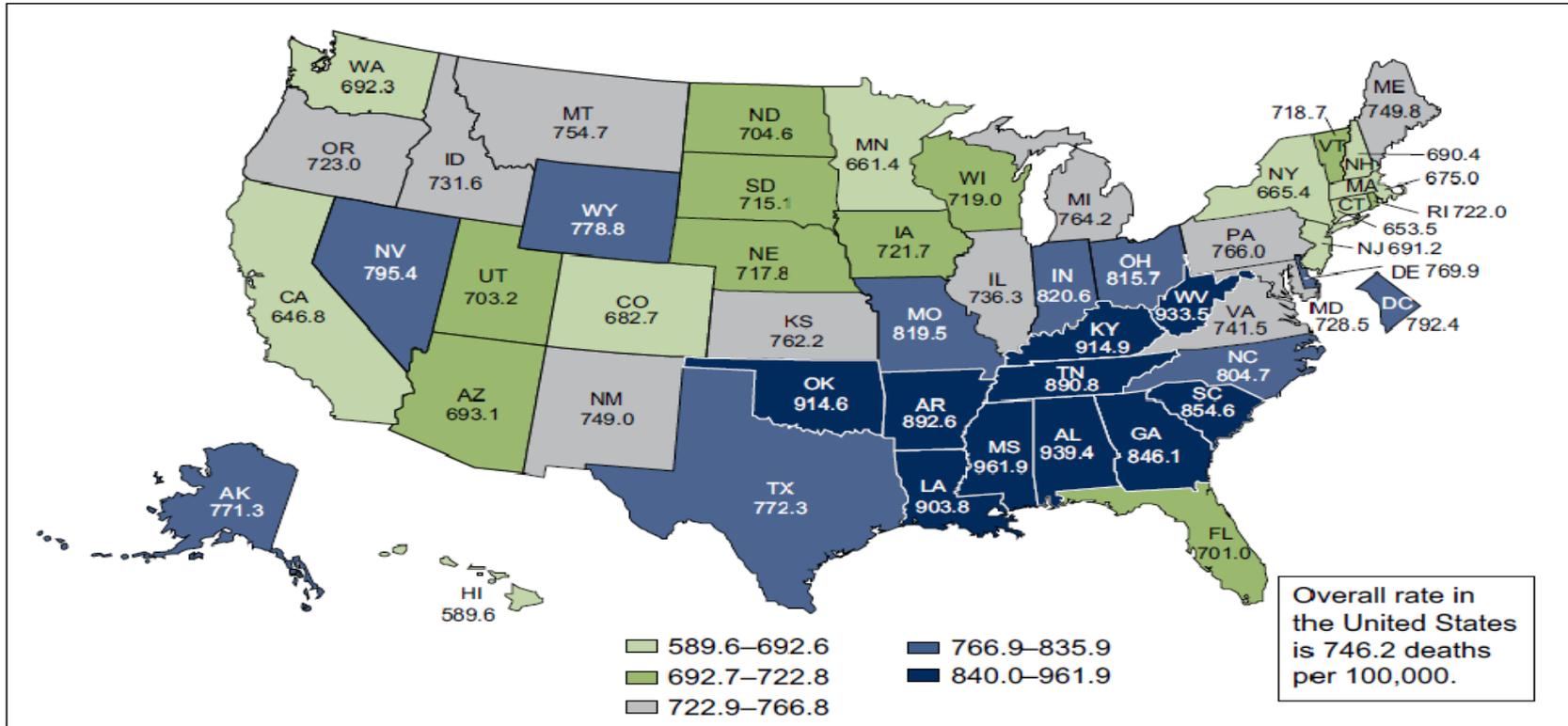
Mortality Assumption

- An actuary makes two considerations in recommending a mortality assumption:
 - Identify the current life expectancy (data dependent)
 - Make an assumption about the rate of improvement in life expectancy (anticipated trends)
- Actuarial standards of practice require actuaries to include a margin for future improvement in life expectancy

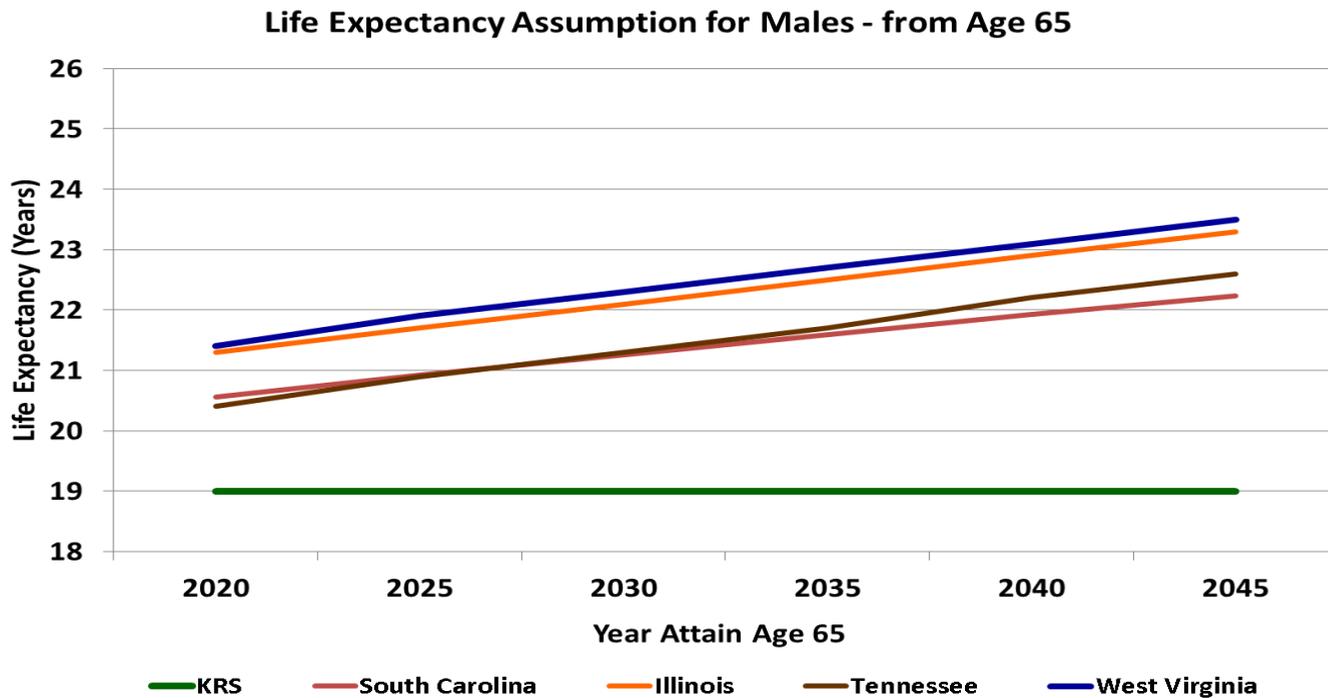
Mortality Review Process

- Review KRS mortality experience to identify the current life expectancy (data dependent)
 - The number of observed deaths will dictate the credibility actual experience
 - Industry standards generally considers 1,000 observed deaths in a 5-year period to be fully credible
- Review the change in the life expectancy since the last experience study (anticipated trends)
 - Identify the appropriate assumption for future improvement in mortality
 - Use a published improvement assumption

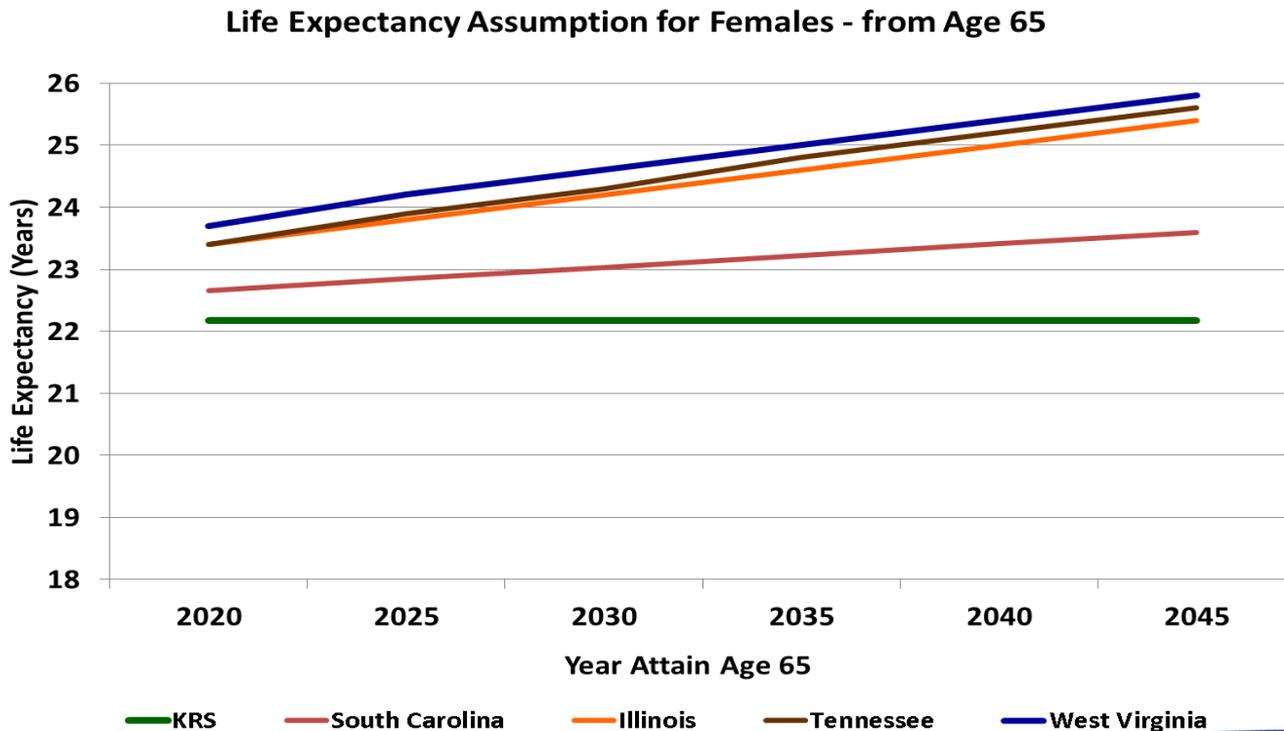
Mortality Rates by Geographic Location



Life Expectancy Assumption Comparison - Males



Life Expectancy Assumption Comparison - Females



KRS Experience Study Timing

- GRS will provide the Board a report with the analysis and recommendations in February or March 2019
 - Board has the authority to adopt, reject, or modify the recommended assumptions
- The Board adopted assumptions will be first used to perform the June 30, 2019 actuarial valuation
 - Determines the contribution requirements for the 2020/2021 fiscal year

Disclaimers

- This presentation is intended to be used in conjunction with the actuarial valuations as of June 30, 2018. This presentation should not be relied on for any purpose other than the purpose described in the valuation report.
- Readers are cautioned to examine original source materials and to consult with subject matter experts before making decisions related to the subject matter of this presentation.
- This presentation shall not be construed to provide tax advice, legal advice or investment advice.