

Summary of 2016 actuarial experience study

South Carolina Retirement System (SCRS)

Assumption changes

	Previous assumption as used in July 1, 2015, valuation	Recommended assumption for use in July 1, 2016, valuation
Inflation	2.75%	2.25%
Investment return	7.50%	7.25%
Salary increases	3.50%	3.00%
Payroll growth rate	3.50%	3.00%
Mortality	Variation of RP 2000 mortality tables with scale AA improvement assumption	System specific mortality table developed using our data with AA improvement assumption
Retirement		Increase assumed rates of retirement for members who retire with reduced benefits
Termination/withdrawal		Decrease assumed rate of member terminations
Refund of member contributions		Increase and make explicit the assumed number of members who elect a refund
Disability		No change
Asset valuation method	Recognize 20% of difference between market value and actuarial value of assets	Each year's gain/loss is recognized over a closed 5-year period at 20% per year

Note: The fiscal impact of assumption changes, if approved, would first be incorporated into the July 1, 2016, actuarial valuation which sets the contribution rates for the fiscal year beginning July 1, 2018.

Fiscal impact of assumption changes

	Impact on employer contribution rate	Impact on UAAL (\$ millions)	Impact on funded ratio
Inflation	No direct impact	No direct impact	No direct impact
Investment return	0.56%	\$1,270	-1.8%
Salary increases	-0.33%	-\$403	0.6%
Payroll growth rate	0.30%	\$0	0.0%
Mortality	0.31%	\$760	-1.0%
Retirement	0.05%	\$88	-0.1%
Termination/withdrawal	0.14%	\$96	-0.2%
Refund of member contributions	0.14%	-\$171	0.3%
Disability	0.02%	-\$1	0.0%
Asset valuation method	No direct impact	No direct impact	No direct impact
Total impact	1.19%	\$1,639	-2.2%
July 1, 2015, valuation (current assumptions)	11.09%	\$16,753	62.0%
Results of recommended assumptions	12.28%	\$18,392	59.8%

SCRS projected rates

Based on July 1, 2015, valuation and 2016 experience study

Note: The fiscal impact of assumption changes, if approved, would first be incorporated into the July 1, 2016 actuarial valuation, which sets the contribution rates for the fiscal year beginning July 1, 2018

Current assumptions
(assumes 7.5% each future year)

July 1,	Employer contribution rate	Member contribution rate	Total employer contributions (\$ millions)	Unfunded liability (\$ millions)	Funded ratio	Funding period
2015	11.06%	8.16%	\$1,047	\$16,753	62%	30
2016	11.06%	8.16%	\$1,071	\$17,486	61%	30
2017	11.09%	8.19%	\$1,104	\$18,321	61%	30
2018	11.09%	8.19%	\$1,145	\$19,242	60%	30
2019	11.19%	8.29%	\$1,189	\$20,247	59%	30
2020	11.30%	8.40%	\$1,240	\$20,536	59%	29
2021	11.41%	8.51%	\$1,295	\$20,780	60%	28
2022	11.54%	8.64%	\$1,335	\$20,969	60%	27
Future numbers at selected intervals						
2025	11.54%	8.64%	\$1,462	\$21,338	63%	24
2030	11.54%	8.64%	\$1,697	\$21,080	67%	18
2035	11.54%	8.64%	\$1,980	\$19,153	73%	13
2040	11.54%	8.64%	\$2,326	\$14,555	81%	7
2045	11.54%	8.64%	\$2,752	\$5,743	93%	2

Recommended assumptions
(assumes 7.25% each future year)

July 1,	Employer contribution rate	Member contribution rate	Total employer contributions (\$ millions)	Unfunded liability (\$ millions)	Funded ratio	Funding period
2015	11.06%	8.16%	\$1,047	\$16,753	62%	30
2016	11.06%	8.16%	\$1,061	\$19,112	59%	30
2017	11.09%	8.19%	\$1,089	\$20,086	58%	30
2018	12.43%	9.53%	\$1,259	\$21,083	57%	30
2019	12.56%	9.66%	\$1,304	\$21,821	57%	29
2020	12.63%	9.73%	\$1,350	\$22,528	56%	29
2021	12.68%	9.78%	\$1,394	\$22,713	57%	28
2022	12.68%	9.78%	\$1,433	\$22,853	58%	27
Future numbers at selected intervals						
2025	12.68%	9.78%	\$1,554	\$23,045	60%	23
2030	12.68%	9.78%	\$1,772	\$22,381	65%	18
2035	12.68%	9.78%	\$2,028	\$19,916	71%	12
2040	12.68%	9.78%	\$2,336	\$14,666	80%	7
2045	12.68%	9.78%	\$2,706	\$5,156	94%	2

Recommended assumptions
(assumes -6% return for FY16 and 7.25% each future year)

July 1,	Employer contribution rate	Member contribution rate	Total employer contributions (\$ millions)	Unfunded liability (\$ millions)	Funded ratio	Funding period
2015	11.06%	8.16%	\$1,047	\$16,753	62%	30
2016	11.06%	8.16%	\$1,061	\$19,763	58%	30
2017	11.09%	8.19%	\$1,089	\$21,626	55%	30
2018	12.62%	9.72%	\$1,279	\$23,527	52%	30
2019	13.02%	10.12%	\$1,355	\$25,150	50%	30
2020	13.34%	10.44%	\$1,430	\$26,700	48%	30
2021	13.63%	10.73%	\$1,505	\$27,032	49%	29
2022	13.84%	10.94%	\$1,573	\$27,273	50%	27
Future numbers at selected intervals						
2025	13.84%	10.94%	\$1,706	\$27,614	52%	24
2030	13.84%	10.94%	\$1,948	\$27,112	58%	19
2035	13.84%	10.94%	\$2,231	\$24,633	65%	13
2040	13.84%	10.94%	\$2,572	\$19,076	75%	8
2045	13.84%	10.94%	\$2,980	\$8,783	89%	2

Summary of 2016 actuarial experience study

Police Officers Retirement System (PORS)

Assumption changes

	Previous assumption as used in July 1, 2015, valuation	Recommended assumption for use in July 1, 2016, valuation
Inflation	2.75%	2.25%
Investment return	7.50%	7.25%
Salary increases	3.50%	3.00%
Payroll growth rate	3.50%	3.00%
Mortality	Variation of RP 2000 mortality tables with scale AA improvement assumption	System specific mortality table developed using our data with AA improvement assumption
Retirement		Modification to retirement rates at certain services and ages, but no significant overall change
Termination/withdrawal		No change
Refund of member contributions		No change
Disability		Increase in the rate of disability retirements
Asset valuation method	Recognize 20% of difference between market value and actuarial value of assets	Each year's gain/loss is recognized over a closed 5-year period at 20% per year

Note: The fiscal impact of assumption changes, if approved, would first be incorporated into the July 1, 2016, actuarial valuation which sets the contribution rates for the fiscal year beginning July 1, 2018.

Fiscal impact of assumption changes

	Impact on employer contribution rate	Impact on UAAL (\$ millions)	Impact on funded ratio
Inflation	No direct impact	No direct impact	No direct impact
Investment return	0.77%	\$193	-2.0%
Salary increases	-0.34%	-\$72	0.8%
Payroll growth rate	0.26%	\$0	0.0%
Mortality	0.43%	\$133	-1.4%
Retirement	-0.07%	-\$18	0.2%
Termination/withdrawal	0.00%	\$0	0.0%
Refund of member contributions	0.13%	-\$18	0.1%
Disability	0.08%	\$3	-0.1%
Asset valuation method	No direct impact	No direct impact	No direct impact
Total impact	1.26%	\$221	-2.4%
July 1, 2015, valuation (current assumptions)	13.53%	\$1,895	69.2%
Results of recommended assumptions	14.79%	\$2,116	66.8%

Actual employer rate currently in effect is 13.74% with a 27-year funding period.

PORS projected rates

Based on July 1, 2015, valuation and 2016 experience study

Note: The fiscal impact of assumption changes, if approved, would first be incorporated into the July 1, 2016 actuarial valuation, which sets the contribution rates for the fiscal year beginning July 1, 2018

Current assumptions
(assumes 7.5% each future year)

July 1,	Employer contribution rate	Member contribution rate	Total employer contributions (\$ millions)	Unfunded liability (\$ millions)	Funded ratio	Funding period
2015	13.74%	8.74%	\$169	\$1,895	69%	27
2016	13.74%	8.74%	\$172	\$1,988	69%	28
2017	13.74%	8.74%	\$177	\$2,092	69%	28
2018	13.74%	8.74%	\$182	\$2,206	68%	29
2019	13.74%	8.74%	\$188	\$2,332	68%	30
2020	13.74%	8.74%	\$193	\$2,364	69%	28
2021	13.74%	8.74%	\$199	\$2,394	69%	27
2022	13.74%	8.74%	\$206	\$2,422	70%	26
Future numbers at selected intervals						
2025	13.74%	8.74%	\$226	\$2,476	73%	22
2030	13.74%	8.74%	\$265	\$2,443	77%	16
2035	13.74%	8.74%	\$312	\$2,176	82%	10
2040	13.74%	8.74%	\$369	\$1,535	89%	5
2045	13.00%	8.00%	\$416	\$404	98%	0

Recommended assumptions
(assumes 7.25% each future year)

July 1,	Employer contribution rate	Member contribution rate	Total employer contributions (\$ millions)	Unfunded liability (\$ millions)	Funded ratio	Funding period
2015	13.74%	8.74%	\$169	\$1,895	69%	27
2016	13.74%	8.74%	\$171	\$2,199	67%	30
2017	13.74%	8.74%	\$176	\$2,326	66%	30
2018	14.86%	9.86%	\$195	\$2,455	66%	30
2019	14.95%	9.95%	\$201	\$2,554	66%	30
2020	14.95%	9.95%	\$207	\$2,649	66%	30
2021	14.95%	9.95%	\$212	\$2,676	67%	28
2022	14.95%	9.95%	\$218	\$2,701	68%	27
Future numbers at selected intervals						
2025	14.95%	9.95%	\$238	\$2,746	70%	23
2030	14.95%	9.95%	\$274	\$2,691	75%	17
2035	14.95%	9.95%	\$316	\$2,396	81%	11
2040	14.95%	9.95%	\$368	\$1,732	88%	6
2045	13.00%	8.00%	\$372	\$617	96%	1

Recommended assumptions
(assumes -6% return for FY16 and 7.25% each future year)

July 1,	Employer contribution rate	Member contribution rate	Total employer contributions (\$ millions)	Unfunded liability (\$ millions)	Funded ratio	Funding period
2015	13.74%	8.74%	\$169	\$1,895	69%	27
2016	13.74%	8.74%	\$171	\$2,303	65%	30
2017	13.74%	8.74%	\$176	\$2,573	63%	30
2018	15.10%	10.10%	\$198	\$2,846	60%	30
2019	15.54%	10.54%	\$209	\$3,086	59%	30
2020	15.83%	10.83%	\$219	\$3,315	57%	30
2021	16.12%	11.12%	\$229	\$3,365	58%	29
2022	16.38%	11.38%	\$239	\$3,405	59%	27
Future numbers at selected intervals						
2025	16.38%	11.38%	\$260	\$3,472	63%	24
2030	16.38%	11.38%	\$300	\$3,433	68%	18
2035	16.38%	11.38%	\$347	\$3,118	75%	12
2040	16.38%	11.38%	\$403	\$2,374	83%	7
2045	16.38%	11.38%	\$469	\$969	94%	3