

Retirement System for Judges and Solicitors of the State of South Carolina (JSRS)

Actuarial Valuation Report
as of July 1, 2019



December 4, 2019

Public Employee Benefit Authority
South Carolina Retirement Systems
P.O. Box 11960
Columbia, SC 29211-1960

Subject: Actuarial Valuation as of July 1, 2019

Dear Members of the Board:

This report describes the current actuarial condition of the Retirement System for Judges and Solicitors of the State of South Carolina (JSRS), determines the calculated employer contribution requirement, and analyzes changes in the System's financial condition. In addition, the report provides various summaries of the data. A separate report is issued with regard to valuation results determined in accordance with Governmental Accounting Standards Board (GASB) Statements No. 67 and 68. Results of this report should not be used for any other purpose without consultation with the undersigned. Valuations are prepared annually as of July 1, the first day of the plan year for JSRS. This report was prepared at the request of the Board of Directors of the South Carolina Public Employee Benefit Authority (Board) and is intended for use by the Public Employee Benefit Authority (PEBA) staff and those designated or approved by the Board.

Under South Carolina State statutes, the Board must certify the employer contribution annually. This amount is determined actuarially, based on the Board's funding policy. Normally, a Board adopted contribution rate determined by an actuarial valuation becomes effective twelve months after the valuation date. However, the contribution rate documented in this report to be certified by the Board became effective on July 1, 2019. If new legislation is enacted between the valuation date and the date the contribution rate becomes effective, the Board may adjust the calculated amount before certifying them, in order to reflect this new legislation. Such adjustments are based on information supplied by the actuary.

FINANCING OBJECTIVES AND FUNDING POLICY

The Board's current funding policy is to establish a minimum contribution rate which results in the unfunded actuarial accrued liability being funded over a period that is the same as the maximum funding period established for the South Carolina Retirement System in accordance with Section 9-1-1085 of the South Carolina Code. Under this Statute reference, the maximum amortization period is 28 years as of July 1, 2019 and will decrease by one year in each of the next eight years until reaching a maximum 20-year funding period on July 1, 2027. According to the Board's JSRS contribution rate policy, the calculated contribution rate is a minimum and the Board certified rate may not be less than the rate established for the prior fiscal year as long as the System's funded ratio is less than 85%.

For purposes of calculating the funding period for the System's unfunded liability, payroll based contributions and non-payroll based appropriations will be considered.

Effective July 1, 2019, the State increased the contribution rate from 52.49% of pay to 62.94% of pay and has committed \$2.9 million in non-payroll based appropriations each future year until the System becomes fully funded. This total contribution effort beginning July 1, 2019 satisfies the 28-year funding period requirement.

PROGRESS TOWARD REALIZATION OF FINANCING OBJECTIVES

The funded ratio (the ratio of the actuarial value of assets to the actuarial accrued liability) is a standard measure of a plan's funded status. In the absence of benefit improvements, it should increase over time, until it reaches at least 100%. The System's funded ratio, based on the actuarial valuation of assets, decreased from 55.6% at July 1, 2018 to 41.8% at July 1, 2019. The single largest source of this decrease is due to a 35.8% salary increase provided to the active members and a corresponding 35.8% increase in the monthly retirement benefit provided to payees currently receiving a retirement benefit from the System.

Plan assets earned a 5.84% return on a time weighted-basis (net of fees) as reported in the financial statement of the South Carolina Retirement Systems for the year ending June 30, 2019. If the market value of assets had been used in the calculation instead of actuarial (smoothed) value of assets, the funded ratio for the System as of July 1, 2019 would have been 41.5% compared to 41.8%.

Based on the State's increased contribution effort beginning July 1, 2019, we expect the funded ratio of the System to gradually improve (absent experience that is unfavorable compared to that assumed).

ASSUMPTIONS AND METHODS

South Carolina State Code also requires that an experience analysis that reviews the economic and demographic assumptions be performed at least every five years. The last experience study was conducted for the five-year period ending June 30, 2015. There were no assumption changes since the prior actuarial valuation. The investment return assumption is a prescribed assumption in Section 9-16-335 in South Carolina State Code.

It is our opinion that the current assumptions are internally consistent and reasonably reflect the anticipated future experience of the System. The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rate, and funding periods. The actuarial calculations are intended to provide information for rational decision making.

BENEFIT PROVISIONS

The benefit provisions reflected in this valuation are those that were in effect on July 1, 2019. There were no legislative changes enacted since the previous valuation that had a measureable effect on the current valuation.

DATA

Census data for retired, active and inactive members was supplied as of July 1, 2019, by the PEBA staff. The staff also supplied asset information as of July 1, 2019. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data. GRS is not responsible for the accuracy or completeness of the information provided to us by PEBA.

CERTIFICATION

We certify that the information presented herein is accurate and fairly portrays the actuarial position of JSRS as of July 1, 2019.

All of our work conforms with generally accepted actuarial principles and practices and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of South Carolina Code of Laws and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board.

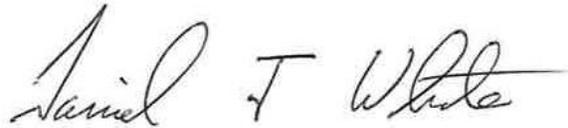
The undersigned are independent actuaries and consultants. Mr. Newton and Mr. White are Enrolled Actuaries and Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries. Both are experienced in performing valuations for large public retirement systems.

Sincerely,

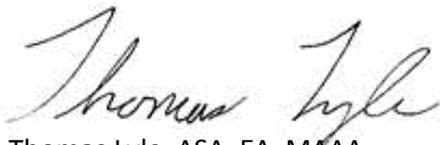
Gabriel, Roeder, Smith & Co.



Joseph P. Newton, FSA, MAAA, EA
Senior Consultant



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Thomas Lyle, ASA, EA, MAAA
Actuary

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SECTION A

EXECUTIVE SUMMARY

Executive Summary

(Dollar amounts expressed in thousands)

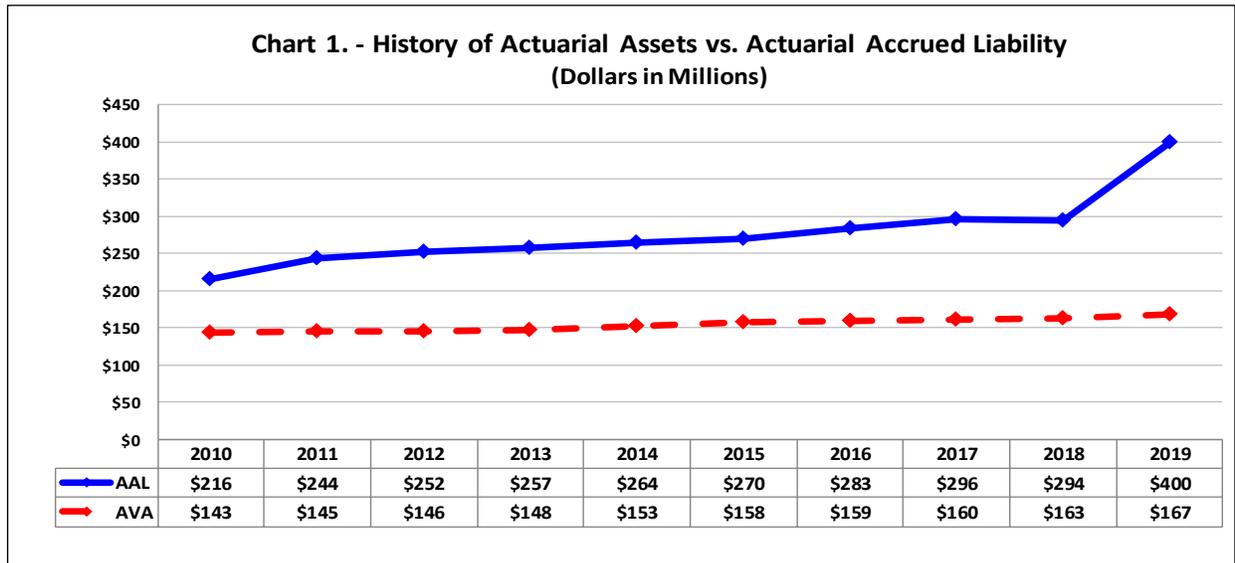
Valuation Date:	July 1, 2019	July 1, 2018
Membership <ul style="list-style-type: none"> • Number of <ul style="list-style-type: none"> - Active members¹ 160 - Retirees and beneficiaries 197 - Inactive members 6 - Total 363 • Projected payroll of active members \$30,346 		160 193 4 357 \$22,347
Contribution Rates <ul style="list-style-type: none"> • Employer contribution rate 62.94%² • Member 10.00% 		52.49% 10.00%
Assets <ul style="list-style-type: none"> • Market value \$165,843 • Actuarial value 167,119 • Return on market value 5.8% • Return on actuarial value 4.4% • Ratio of actuarial to market value of assets 100.8% • External cash flow % -2.0% 		\$160,036 163,358 7.7% 4.4% 102.1% -2.4%
Actuarial Information <ul style="list-style-type: none"> • Normal cost % 29.51% • Actuarial accrued liability (AAL) \$399,746 • Unfunded actuarial accrued liability (UAAL) 232,627 • Funded ratio 41.8% • Funding period (years) 20 		29.86% \$293,815 130,457 55.6% 28
Reconciliation of UAAL <ul style="list-style-type: none"> • Beginning of Year UAAL \$130,457 - Interest on UAAL 9,458 - Amortization payment (9,032) - Assumption/method changes 0 - Asset experience 4,584 - Benefit adjustment 64,361 - Salary experience 25,686 - Other liability experience 7,113 - Legislative Changes 0 • End of Year UAAL \$232,627 		\$135,441 9,819 (8,524) 0 4,468 (5,434) (2,402) (2,911) 0 \$130,457

¹ Active member counts include 21 and 20 retired-in-place members as of July 1, 2019 and July 1, 2018, respectively and also includes unfilled positions.

² The 62.94% contribution rate is for the fiscal year beginning July 1, 2019 and established by the Board to conform to the funding in the State budget for the 2020 fiscal year. The contribution rate includes the cost of incidental death benefits.

Executive Summary (Continued)

The unfunded actuarial accrued liability increased by \$102.1 million since the prior year's valuation to \$232.6 million. The largest source of this increase is due to the 35.8% increase in salary for active members (which also results in a larger than expected benefit increase for annuitants). Below is a chart with the historical actuarial value of assets and actuarial accrued liability for JSRS.



As of the valuation date, the System has \$1.3 million in deferred investment losses. Absent future favorable investment experience to offset the existing deferred investment loss amount, the existing deferred losses will be fully reflected in the actuarial value of assets over the next two years. Due to the material increase in actuarial accrued liability, the State increased their employer contribution rate from 52.49% of pay to 62.49% of pay and has committed an additional \$2.9 million in non-payroll based appropriations each future year until the System is fully funded. As a result of these changes, the calculated funding period based on the July 1, 2019 actuarial valuation is 20 years.

Note, due to the benefit provision that provides that benefits paid to retired members and surviving spouses are increased by an amount equal to the percentage increase in the current salary paid to the position from which the member retired, the System will experience significant actuarial gains or losses when the actual salary increase provided to covered positions is materially different than assumed. Due to the combination of this benefit feature and the current financial condition of the System, it is imperative that the State makes these planned contributions each future year. Also, the current contribution effort may need to be increased in a future year depending on emerging economic and demographic experience.

SECTION B

DISCUSSION

Discussion

The results of the July 1, 2019 actuarial valuation of the Retirement System for Judges and Solicitors are presented in this report. The purposes of the valuation report are to depict the current financial condition of the System, determine the amortization period resulting from the current contribution rates, and analyze changes in the System's financial condition. In addition, the report provides various summaries of the members participating in the plan.

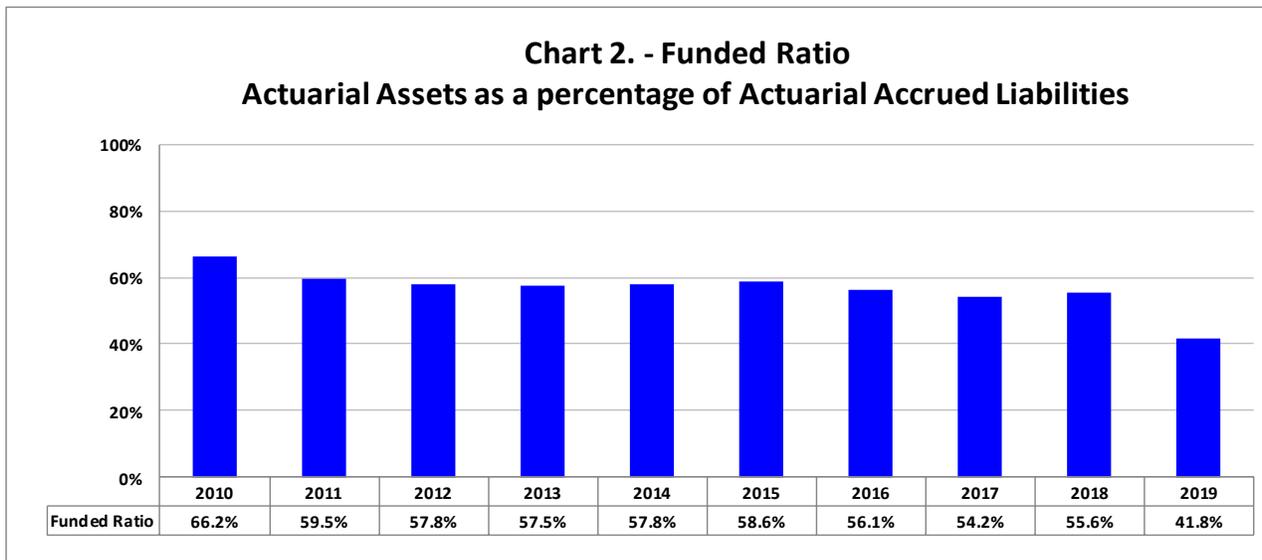
This section discusses the determination of the current funding requirements and the System's funded status, as well as changes in the financial condition of the retirement system.

All of the actuarial and financial tables referenced by the other sections of this report appear in Section C. Section D provides member data and statistical information. Section E is new this year and provides an assessment and disclosure of risk as required by Actuarial Standards of Practice No. 51. Appendices A and B provide summaries of the principle actuarial assumptions and methods and plan provisions. Finally, Appendix C provides a glossary of technical terms that are used throughout this report.

Funding Progress

The funded ratio decreased from 55.6% to 41.8% since the prior valuation. The decrease in the funded ratio is primarily due to the 35.8% salary increase for active members earning benefits in the System. Due to a benefit provision that provides payees a benefit in relation to the current salary the member retired from, retirees also received a 35.8% increase in their monthly retirement benefit.

As shown in the table below, the funding ratio (on a smoothed asset basis) materially decreased from 2018 to 2019. Table 10, Schedule of Funding Progress, in the following section of the report provides additional detail regarding the funding progress of the Retirement System.



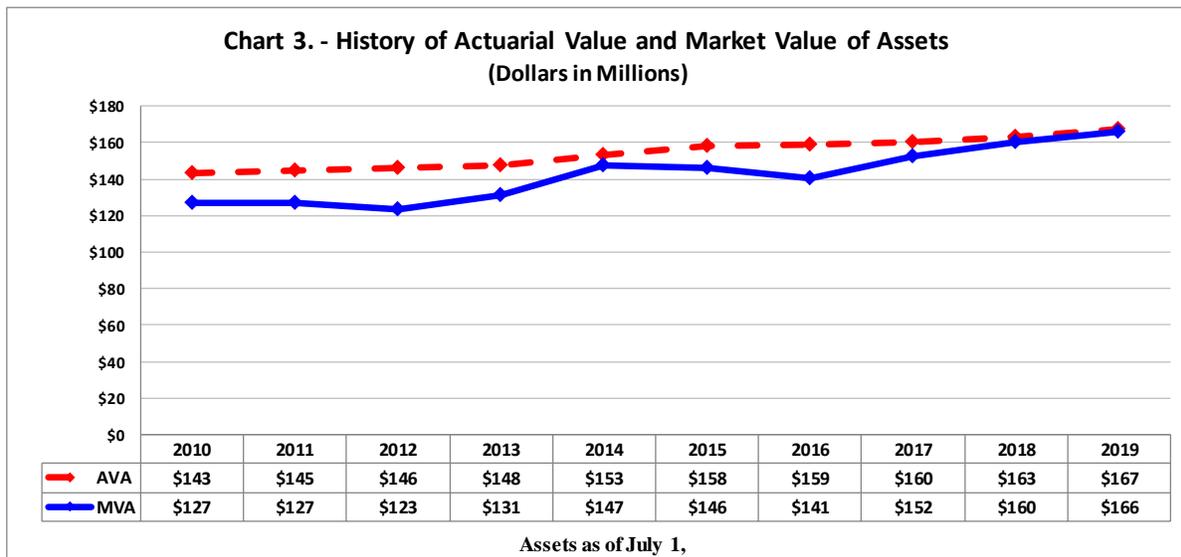
As a result of the increase in the contribution effort beginning July 1, 2019, we expect the funded ratio to begin gradually improving (absent assumption changes or experience that is unfavorable compared to that assumed). Also, we expect the dollar amount of the unfunded actuarial accrued liability to begin decreasing (i.e. positive amortization of the unfunded actuarial accrued liability).

Asset Gains/(Losses)

The actuarial value of assets (“AVA”) is based on a smoothed market value of assets, using a systematic approach to phase-in the difference between the actual and expected investment return on the market value of assets (adjusted for receipts and disbursements during the year). This is appropriate because it dampens the short-term volatility inherent in investment markets. The returns are computed net of investment expenses. The actuarial value of assets increased from \$163.4 million to \$167.1 million since the prior valuation. Table 8 in the following section of the report provides the development of the actuarial value of assets.

The rate of return on the mean market value of assets for fiscal year 2019 was 5.8%. Because of the recognition of prior investment experience in prior years, the actuarial (smoothed) asset value returned was 4.4%. This difference in the estimated return on market value and actuarial value illustrates the smoothing effect of the asset valuation method.

Now that the market and actuarial value of assets have converged, the funded ratio on an actuarial value of asset basis is anticipated to begin to improve assuming all assumptions are met.



Tables 6 and 7 in the following section of this report provide asset information that was included in the annual financial statements of the System. Also, Table 9 shows the estimated yield on a market value basis and on the actuarial asset valuation method.

Actuarial Gains/(Losses) and the Contribution Requirement

The annual actuarial valuation is a snapshot analysis of the benefit liabilities, assets and funded position of the System as of the first day of the plan year. In any one fiscal year, the experience can be better or worse from that which is assumed or expected. The actuarial assumptions do not necessarily attempt to model what the experience will be for any one given fiscal year, but instead try to model the overall experience over many years. The demographic experience for the last year is briefly summarized in the chart below.

The unfunded actuarial accrued liability (UAAL) has increased from \$130.5 million in 2018 to \$232.6 million in 2019. The table below shows the source of the gains and losses and the impact of those gains and losses on the UAAL.

Reconciliation of UAAL	
(Dollars in thousands)	
• Beginning of Year UAAL	\$130,457
- Interest on UAAL	9,458
- Amortization payment	(9,032)
- Assumption/method changes	0
- Asset Experience	4,584
- Benefit adjustment	64,361
- Salary Experience	25,686
- Other Liability Experience	7,113
- Legislative Changes	0
• End of Year UAAL	<u>\$232,627</u>

The following table provides a reconciliation of the change in the funding period from July 1, 2018 to July 1, 2019.

Change in Funding Period (Years)	
Reconciliation from July 1, 2018 to July 1, 2019	
• Prior Year	28.3
- Expected Experience	(1.0)
- Assumption Change	0.0
- Asset Experience	2.1
- Effect of increase in salary for active members and monthly benefits to current retirees, and increased employer contribution effort ¹	(12.2)
- Other liability experience	3.3
- Legislative Changes	0.0
- Total Change	<u>(7.8)</u>
• Current Year Valuation	20.5

¹ The change in the funding period due to the increase in the salary and benefits for members in JSRS cannot be separately quantified as plan assets would have been exhausted in a future date if there was not an increase in employer contribution effort.

As noted earlier, the increase in the contribution effort beginning July 1, 2019 is expected to result in a gradual improvement in the funded ratio and a decrease in the dollar amount of the unfunded actuarial accrued liability.

Actuarial Assumptions and Methods

In determining costs and liabilities, actuaries use assumptions about the future, such as rates of salary increase, probabilities of retirement, termination, death and disability, and an annual investment return assumption. South Carolina State Code also requires that an experience analysis that reviews the economic and demographic assumptions be performed at least every five years and the last experience study was conducted for the five-year period ending June 30, 2015.

The investment return assumption is a prescribed assumption in Section 9-16-335 in South Carolina State Code. There were no assumption changes since the prior actuarial valuation.

Appendix A includes a summary of the actuarial assumptions and methods used in this valuation. It is our opinion that the assumptions are internally consistent, reasonable, and reflect anticipated future experience of the System. The next experience study will be conducted no later than June 30, 2020.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. This report does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

An actuarial valuation assumes that all assumptions will be met in future years, including a 7.25% return on the actuarial value of assets determined as of the actuarial valuation date. Establishing the contribution rates, funding period, and other financial metrics on an actuarial value of asset basis is consistent with applicable actuarial standards of practice, industry prevalence, and applicable provisions in South Carolina State Code.

Emerging experience due to liabilities or investments that is different than assumed (including the recognition of previously deferred investment losses) may result in a change in the required contribution rate and or funding period that is different than expected based on the prior actuarial valuation. Also, separate projections provided outside of this report that may illustrate the financial effect of future gains or losses on an actuarial basis in subsequent years may be useful for business making decisions, but such projections should not be misunderstood as documentation of satisfaction of the maximum amortization period that is specified in the Board's funding policy or relevant State Code.

Benefit Provisions

Appendix B of this report includes a summary of the benefit provisions for JSRS. There were no legislative changes enacted since the previous valuation that had a measurable effect on the current valuation.

Below is a summary of the retirement provisions for members in the Retirement System.

Summary of Retirement Provisions

- A retirement benefit equal to 71.3% of the current active salary of the position from which the member retired plus an additional 2.67% of compensation for each year of service beyond 25 years for judges and 24 years for solicitors and public defenders (subject to a maximum retirement allowance that does not exceed 90% of salary).
- The normal form of payment for a married member is a 33 1/3 joint and survivor annuity.
- Active members contribute 10% of compensation.
- Members are eligible for retirement after they have (i) attained age 70 with 15 years of service, or (ii) attained age 65 with 20 years of service or (iii) completed 25 years of creditable service for judges and 24 years for solicitors and public defenders regardless of age.
- Members who have accrued a retirement allowance that is 90% of salary may elect to “retire in place” and begin to receive their accrued retirement benefits while remaining employed. Members who have retired in place but have not attained age 60 will have their retirement benefit paid into a deferred retirement option program (DROP) and receive the balance of their DROP account upon attaining age 60.
- The mandatory retirement age is 72.

SECTION C

ACTUARIAL TABLES

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Summary of Cost Items
(Dollar amounts expressed in thousands)

	July 1, 2019 (1)	July 1, 2018 (2)
1. Projected payroll of active members ¹	\$ 30,346	\$ 22,347
2. Present value of future pay	\$ 194,700	\$ 148,730
3. Normal cost rate		
a. Total normal cost rate	29.51%	29.86%
b. Less: member contribution rate	<u>-10.00%</u>	<u>-10.00%</u>
c. Employer normal cost rate	19.51%	19.86%
4. Actuarial accrued liability for active members		
a. Present value of future benefits	\$ 183,374	\$ 136,177
b. Less: present value of future normal costs	<u>(54,506)</u>	<u>(42,456)</u>
c. Actuarial accrued liability	\$ 128,868	\$ 93,721
5. Total actuarial accrued liability for:		
a. Retirees and beneficiaries	\$ 268,747	\$ 198,893
b. Inactive members	2,131	1,201
c. Active members (Item 4c)	<u>128,868</u>	<u>93,721</u>
d. Total	\$ 399,746	\$ 293,815
6. Actuarial value of assets	\$ 167,119	\$ 163,358
7. Unfunded actuarial accrued liability (UAAL) (Item 5d - Item 6)	\$ 232,627	\$ 130,457
8. Applicable required contribution rate		
a. Employer normal cost rate	19.51%	19.86%
b. Employer contribution rate available to amortize the UAAL	<u>43.43%</u>	<u>32.63%</u>
c. Total employer contribution rate ²	62.94%	52.49%
9. Funding period based on the current employer contribution rate (years)	20	28

¹ The projected payroll is based on all filled and unfilled positions.

² The 62.94% contribution rate is for the fiscal year beginning July 1, 2019 and certified by the Board to conform with the funding in the State Budget. The contribution rate includes the cost of incidental death benefits.

Actuarial Present Value of Future Benefits
(Dollar amounts expressed in thousands)

	July 1, 2019	July 1, 2018
	(1)	(2)
1. Active members		
a. Service retirement	\$ 170,221	\$ 126,068
b. Survivor benefits	2,408	1,895
c. Disability benefits	10,745	8,214
d. Total	\$ 183,374	\$ 136,177
2. Retired members		
a. Service retirement	\$ 247,019	\$ 181,928
b. Disability retirement	0	0
c. Beneficiaries	21,728	16,965
d. Total	\$ 268,747	\$ 198,893
3. Inactive members		
a. Vested terminations	\$ 2,005	\$ 1,079
b. Nonvested terminations	126	122
c. Total	\$ 2,131	\$ 1,201
4. Total actuarial present value of future benefits	\$ 454,252	\$ 336,271

Analysis of Normal Cost

	July 1, 2019 (1)	July 1, 2018 (2)
1. Total normal cost rate		
a. Service retirement	24.76%	25.09%
b. Survivor benefits	0.67%	0.68%
c. Disability benefits	3.96%	3.97%
d. Total	29.39%	29.74%
2. Administrative expense	0.12%	0.12%
3. Less: member contribution rate	10.00%	10.00%
4. Net employer normal cost rate	19.51%	19.86%

Note: The normal cost includes the cost for incidental death benefits.

Results of July 1, 2019 Valuation
(Dollar amounts expressed in thousands)

	July 1, 2019 (1)
1. Actuarial Present Value of Future Benefits	
a. Present retired members and beneficiaries	\$ 268,747
b. Present active and inactive members	185,505
c. Total actuarial present value	\$ 454,252
2. Present Value of Future Normal Contributions	
a. Member	\$ 19,470
b. Employer	35,036
c. Total future normal contributions	\$ 54,506
3. Actuarial Liability	\$ 399,746
4. Current Actuarial Value of Assets	\$ 167,119
5. Unfunded Actuarial Liability	\$ 232,627
6. UAAL Amortization Rates Based on an Employer Contribution Rate of 62.94%	
a. Active members	43.43%
b. DROP and Retired-in-Place Members (including employee contributions)	72.94%
7. Unfunded Actuarial Liability Liquidation Period	20 Years

Note: The employer contribution rate includes the cost for incidental death benefits.

Actuarial Balance Sheet
(Dollar amounts expressed in thousands)

	July 1, 2019	July 1, 2018
	(1)	(2)
1. Assets		
a. Current assets (actuarial value)		
i. Employee annuity savings fund	\$ 30,289	\$ 28,259
ii. Employer annuity accumulation fund	136,830	135,099
iii. Total current assets	\$ 167,119	\$ 163,358
b. Present value of future member contributions	\$ 19,470	\$ 14,873
c. Present value of future employer contributions		
i. Normal contributions	\$ 35,036	\$ 27,583
ii. Accrued liability contributions	232,627	130,457
iii. Total future employer contributions	\$ 267,663	\$ 158,040
d. Total assets	\$ 454,252	\$ 336,271
2. Liabilities		
a. Employee annuity savings fund		
i. Past member contributions	\$ 30,289	\$ 28,259
ii. Present value of future member contributions	19,470	14,873
iii. Total contributions to employee annuity savings fund	\$ 49,759	\$ 43,132
b. Employer annuity accumulation fund		
i. Benefits currently in payment	\$ 268,747	\$ 198,893
ii. Benefits to be provided to other members	135,746	94,246
iii. Total benefits payable from employer annuity accumulation fund	\$ 404,493	\$ 293,139
c. Total liabilities	\$ 454,252	\$ 336,271

System Net Assets
Assets at Market or Fair Value
(Dollar amounts expressed in thousands)

Item (1)	July 1, 2019 (2)	July 1, 2018 (3)
1. Cash and cash equivalents (operating cash)	\$ 16,874	\$ 13,768
2. Receivables	8,253	4,133
3. Investments		
a. Short-term securities	\$ 2,021	\$ 2,944
b. Fixed income (global)	23,181	26,549
c. Global public equity	58,419	54,120
d. Opportunistic	13,676	15,530
e. Alternative investments	50,975	47,700
f. Total investments	<u>\$ 148,272</u>	<u>\$ 146,843</u>
4. Securities lending cash collateral invested	\$ 207	\$ 174
5. Prepaid administrative expenses	20	18
6. Capital assets, net of accumulated depreciation	<u>9</u>	<u>10</u>
7. Total assets	\$ 173,635	\$ 164,946
8. Liabilities		
a. Due to other systems	\$ 0	\$ 0
b. Accounts payable	6,429	4,317
c. Investment fees payable	58	64
d. Obligations under securities lending	207	174
e. Deferred retirement benefits	0	0
f. Due to employee insurance program	0	0
g. Benefit payable	0	0
h. Other liabilities	1,098	355
i. Total liabilities	<u>\$ 7,792</u>	<u>\$ 4,910</u>
9. Total market value of assets available for benefits (Item 7. - Item 8.i.)	\$ 165,843	\$ 160,036
10. Asset allocation (investments) ¹		
a. Net invested cash	11.8%	10.1%
b. Fixed income	14.0%	16.6%
c. Public equity	35.3%	33.8%
d. Global tactical asset allocation	8.2%	9.7%
e. Alternative investments	30.7%	29.8%
f. Total investments	<u>100.0%</u>	<u>100.0%</u>

¹ These asset allocations are calculated based on the dollar amounts shown in items 1. through 9. above and, due to cash flow and rebalancing timing, may be slightly different than the allocation percentages reported by the South Carolina Retirement System Investment Commission.

Reconciliation of System Net Assets
(Dollar amounts expressed in thousands)

	Year Ending	
	July 1, 2019 (1)	July 1, 2018 (2)
1. Value of assets at beginning of year	\$ 160,036	\$ 152,151
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 2,840	\$ 3,016
ii. Employer contributions	11,730	11,043
iii. Total	\$ 14,570	\$ 14,059
b. Income		
i. Interest, dividends, and other income	\$ 3,334	\$ 3,111
ii. Investment expenses	(1,670)	(1,879)
iii. Net	\$ 1,664	\$ 1,232
c. Net realized and unrealized gains (losses)	7,519	10,491
d. Total revenue	\$ 23,753	\$ 25,782
3. Expenditures for the year		
a. Disbursements		
i. Refunds	\$ 0	\$ 0
ii. Regular annuity benefits	17,947	17,655
iii. Other benefit payments	3	156
iv. Transfers to other systems	(96)	0
v. Total	\$ 17,854	\$ 17,811
b. Administrative expenses and depreciation	92	86
c. Total expenditures	\$ 17,946	\$ 17,897
4. Increase in net assets (Item 2. - Item 3.)	\$ 5,807	\$ 7,885
5. Value of assets at end of year (Item 1. + Item 4.)	\$ 165,843	\$ 160,036
6. Net external cash flow		
a. Dollar amount	\$ (3,284)	\$ (3,752)
b. Percentage of market value	-2.0%	-2.4%

Development of Actuarial Value of Assets
(Dollar amounts expressed in thousands)

	Year Ending June 30, 2019
1. Actuarial value of assets at beginning of year	\$ 163,358
2. Market value of assets at beginning of year	\$ 160,036
3. Net new investments	
a. Contributions	\$ 14,570
b. Disbursements	(17,946)
c. Subtotal	(3,376)
4. Market value of assets at end of year	\$ 165,843
5. Net earnings (Item 4. - Item 2. - Item 3.c.)	\$ 9,183
6. Assumed investment return rate for fiscal year	7.25%
7. Expected return (Item 6. x (Item 2. + 1/2 Item 3.c.))	\$ 11,480
8. Excess return (Item 5. - Item 7.)	\$ (2,297)
9. Excess return on assets as of June 30, 2019:	
a.	Fiscal Year <u>Ending June 30,</u> (1)
b.	Excess <u>Return</u> (2)
c.	Percent <u>Deferred</u> (3)
d.	Deferred <u>Amount</u> (4)
e.	2019 \$ (2,297) 80% \$ (1,838)
f.	2018 831 60% 499
g.	2017 6,031 40% 2,412
h.	2016 (11,747) 20% (2,349)
i.	2015 (14,537) 0% 0
j.	Total \$ (1,276)
10. Actuarial value of assets as of June 30, 2019 (Item 4. - Item 9.f.)	\$ 167,119
11. Expected actuarial value as of June 30, 2019	\$ 171,703
12. Asset gain (loss) for year (Item 10. - Item 11.)	\$ (4,584)
13. Asset gain (loss) as % of the actuarial value of assets	-2.7%
14. Ratio of actuarial value to market value	100.8%

Estimation of Yields
(Dollar amounts expressed in thousands)

	Year Ending	
	July 1, 2019 (1)	July 1, 2018 (2)
1. Market value yield		
a. Beginning of year market assets	\$ 160,036	\$ 152,151
b. Contributions to fund during the year	14,570	14,059
c. Disbursements	(17,946)	(17,811)
d. Investment income (net of investment)	9,183	11,637
e. End of year market assets	\$ 165,843	\$ 160,036
f. Estimated dollar weighted market value yield	5.8%	7.7%
2. Actuarial value yield		
a. Beginning of year actuarial assets	\$ 163,358	\$ 160,189
b. Contributions to fund during the year	14,570	14,059
c. Disbursements	(17,946)	(17,811)
d. Investment income (net of investment and administrative expenses)	7,137	6,921
e. End of year actuarial assets	\$ 167,119	\$ 163,358
f. Estimated actuarial value yield	4.4%	4.4%

Schedule of Funding Progress
(Dollar amounts expressed in thousands)

July 1, <u>(1)</u>	Actuarial Value of Assets (AVA) <u>(2)</u>	Actuarial Accrued Liability (AAL) <u>(3)</u>	Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) <u>(4)</u>	Funded Ratio (2)/(3) <u>(5)</u>	Annual Covered Payroll <u>(6)</u>	UAAL as % of Payroll (4)/(6) <u>(7)</u>
2005	118,888	204,847	85,959	58.0%	15,465	555.8%
2006	124,837	211,384	86,547	59.1%	15,929	543.3%
2007	132,990	229,388	96,398	58.0%	16,407	587.5%
2008	138,323	213,406	75,083	64.8%	18,661	402.4%
2009	141,797	214,363	72,566	66.1%	18,661	388.9%
2010	142,871	215,823	72,952	66.2%	18,661	390.9%
2011	144,927	243,514	98,587	59.5%	18,661	528.3%
2012	145,604	251,729	106,125	57.8%	19,221	552.1%
2013	147,648	256,988	109,340	57.5%	20,407	535.8%
2014	152,839	264,293	111,454	57.8%	20,815	535.4%
2015	157,983	269,675	111,692	58.6%	21,267	525.2%
2016	158,837	283,304	124,467	56.1%	21,958	566.8%
2017	160,189	295,630	135,441	54.2%	22,347	606.1%
2018	163,358	293,815	130,457	55.6%	22,347	583.8%
2019	167,119	399,746	232,627	41.8%	30,346	766.6%

Summary of Principle Assumptions and Methods

Below is a summary of the principle economic assumptions, cost method, and the method for financing the unfunded actuarial accrued liability:

Valuation date:	July 1, 2019
Actuarial cost method:	Entry Age Normal
Amortization method:	Level percentage of payroll
Amortization period for contribution rate:	28-year maximum funding period ¹
Asset valuation method:	5-Year Smoothing
Actuarial assumptions:	
Investment rate of return ²	7.25%
Projected salary increases	2.75%
Inflation	2.25%
Cost-of-living adjustments	2.75%
Retiree mortality	The 2016 Public Retirees of South Carolina Mortality Table projected at Scale AA from the year 2016. Male rates are multiplied by 92% and female rates are multiplied by 98%.

¹ In accordance with the Board's funding policy, the minimum employer contribution rate is determined using the same maximum funding period specified in Section 9-1-1085 of the South Carolina Code for the South Carolina Retirement System. For 2019 the funding period determined on an actuarial value of asset basis may not exceed 28 years. The contribution rate is not permitted to decrease until the ratio of the actuarial value of assets and the actuarial accrued liability is at least 85%.

² This is a prescribed assumption in Section 9-16-335 of South Carolina State Code.

Solvency Test
(Dollar amounts expressed in thousands)

July 1,	Actuarial Accrued Liability			Valuation Assets	Portion of Aggregate Accrued Liabilities Covered by Assets		
	Active Member Contributions	Retirants & Beneficiaries	Active & Inactive Members (Employer Financed)		Active	Retirants	ER Financed
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
2005	20,005	110,876	73,966	118,888	100.0%	89.2%	0.0%
2006	21,857	112,823	76,704	124,837	100.0%	91.3%	0.0%
2007	18,999	149,435	60,954	132,990	100.0%	76.3%	0.0%
2008	17,367	141,510	54,529	138,323	100.0%	85.5%	0.0%
2009	18,431	144,464	51,468	141,797	100.0%	85.4%	0.0%
2010	17,816	150,696	47,311	142,871	100.0%	83.0%	0.0%
2011	18,864	169,841	54,809	144,927	100.0%	74.2%	0.0%
2012	20,005	177,483	54,241	145,604	100.0%	70.8%	0.0%
2013	21,369	178,526	57,093	147,648	100.0%	70.7%	0.0%
2014	22,926	184,625	56,742	152,839	100.0%	70.4%	0.0%
2015	24,650	186,481	58,544	157,983	100.0%	71.5%	0.0%
2016	25,082	200,323	57,899	158,837	100.0%	66.8%	0.0%
2017	26,703	203,030	65,897	160,189	100.0%	65.7%	0.0%
2018	28,259	198,893	66,663	163,358	100.0%	67.9%	0.0%
2019	30,289	268,747	100,710	167,119	100.0%	50.9%	0.0%

SECTION D

MEMBERSHIP DATA

Membership Tables

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Summary of Membership Data

	July 1, 2019 (1)	July 1, 2018 (2)
1. Active members		
a. Males	108	107
b. Females	52	52
c. Total members ¹	160	159
d. Total annualized pay ²	\$ 30,345,856	\$ 22,346,577
e. Average pay ²	\$ 189,662	\$ 139,666
f. Average age	57.4	57.1
g. Average credited service	15.4	15.0
h. Member contributions with interest ³	\$ 29,562,494	\$ 27,802,186
i. Average contributions with interest ³	\$ 211,161	\$ 200,016
2. Vested inactive members		
a. Number	2	1
b. Total annual deferred benefits	\$ 210,812	\$ 84,321
c. Average annual deferred benefit	\$ 105,406	\$ 84,321
3. Nonvested inactive members		
a. Number	4	3
b. Member contributions with interest	\$ 125,991	\$ 121,773
c. Average contributions with interest	\$ 31,498	\$ 40,591
4. Service retirees		
a. Number ¹	156	155
b. Total annual benefits	\$ 22,168,549	\$ 16,157,726
c. Average annual benefit	\$ 142,106	\$ 104,243
d. Average age at the valuation date	72.8	72.2
e. Average age at retirement date	60.2	60.2
5. Disabled retirees		
a. Number	0	0
b. Total annual benefits	\$ 0	\$ 0
c. Average annual benefit	\$ 0	\$ 0
d. Average age at the valuation date	N/A	N/A
e. Average age at retirement date	N/A	N/A
6. Beneficiaries		
a. Number	61	58
b. Total annual benefits	\$ 2,242,354	\$ 1,683,805
c. Average annual benefit	\$ 36,760	\$ 29,031
d. Average age at the valuation date	70.4	71.0

¹ Includes members in DROP, Retired in Place and one (1) unfilled position at June 30, 2019 and June 30, 2018.

² Based on filled and unfilled positions.

³ Total and average contributions and interest statistics exclude members in DROP and Retired in Place.

Summary of Historical Active Membership

July 1, (1)	Active Members		Covered Payroll	Average Annual Pay			
	Number of Employers (2)	Number ¹ (3)	Amount in Thousands ¹ (4)	Amount (5)	Percent Increase /(Decrease) (6)	Average Age (7)	Average Service (8)
2005	2	128	15,465	120,820	4.00%	55.0	19.0
2006	2	128	15,929	124,445	3.00%	55.0	20.0
2007	2	128	16,407	128,176	3.00%	55.0	19.0
2008	3	144	18,661	129,590	1.10%	54.0	15.0
2009	3	144	18,661	129,590	0.00%	55.0	15.4
2010	3	144	18,661	129,590	0.00%	54.9	15.0
2011	3	144	18,661	129,590	0.00%	55.1	14.3
2012	3	144	19,221	133,476	3.00%	55.6	15.1
2013	3	153	20,407	133,381	-0.07%	56.0	15.5
2014	3	153	20,815	136,048	2.00%	56.3	15.1
2015	4	157	21,267	133,756	0.28%	56.5	15.1
2016	4	157	21,958	139,861	4.56%	57.2	15.4
2017	4	160	22,347	139,666	-0.14%	57.4	15.4
2018	4	160	22,347	139,666	0.00%	57.1	15.0
2019	4	160	30,346	189,662	35.80%	57.4	15.4

¹ Includes filled and unfilled positions and members in DROP or Retired-in-Place.

Distribution of Active Members by Age and by Years of Service

Attained Age	Years of Credited Service												Total Count & Avg. Comp.	
	0 Count & Avg. Comp.	1 Count & Avg. Comp.	2 Count & Avg. Comp.	3 Count & Avg. Comp.	4 Count & Avg. Comp.	5-9 Count & Avg. Comp.	10-14 Count & Avg. Comp.	15-19 Count & Avg. Comp.	20-24 Count & Avg. Comp.	25-29 Count & Avg. Comp.	30-34 Count & Avg. Comp.	35 & Over Count & Avg. Comp.		
Under 20	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
20-24	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
25-29	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
30-34	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0
35-39	1 \$138,102	1 \$141,354	1 \$137,634	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	3 \$139,030
40-44	4 \$132,986	1 \$137,634	0 \$0	1 \$141,354	2 \$139,494	1 \$141,354	1 \$141,354	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	10 \$137,263
45-49	1 \$138,102	4 \$140,424	1 \$141,354	2 \$137,634	0 \$0	5 \$139,122	2 \$137,634	2 \$141,354	2 \$141,354	0 \$0	0 \$0	0 \$0	0 \$0	19 \$139,617
50-54	0 \$0	1 \$141,354	2 \$141,354	2 \$139,494	0 \$0	6 \$138,874	3 \$138,874	3 \$140,114	4 \$141,354	4 \$141,354	0 \$0	0 \$0	0 \$0	25 \$140,164
55-59	0 \$0	1 \$138,102	1 \$141,354	0 \$0	4 \$139,611	9 \$138,874	3 \$142,594	5 \$142,098	5 \$139,960	6 \$141,354	0 \$0	0 \$0	0 \$0	34 \$140,411
60-64	0 \$0	2 \$137,634	0 \$0	0 \$0	1 \$127,219	7 \$138,165	2 \$139,494	2 \$141,354	6 \$140,734	7 \$140,823	2 \$143,214	0 \$0	0 \$0	29 \$139,584
65 & Over	0 \$0	1 \$137,634	0 \$0	1 \$138,102	1 \$141,354	0 \$0	10 \$139,866	1 \$141,354	4 \$138,564	2 \$141,354	0 \$0	0 \$0	0 \$0	20 \$139,703
Total	6 \$134,691	11 \$139,367	5 \$140,610	6 \$138,952	8 \$138,251	28 \$138,830	21 \$139,937	13 \$141,354	21 \$140,314	19 \$141,158	2 \$143,214	0 \$0	0 \$0	140 \$139,732

Information shown above is for members in JSRS earning retirement benefits. It does not include unfilled positions or members that are retired-in-place. The compensation values above are based on actual pay received in Fiscal Year 2019 and does not reflect the 35.8% salary increase effective July 1, 2019

Distribution of Annuitants by Monthly Benefit

Monthly Benefit Amount	Number of Annuitants	Female	Male	Average Service
(1)	(2)	(3)	(4)	(5)
Under \$500	0	0	0	0.00
\$ 500 - 999	13	7	6	26.90
1,000 - 1,499	2	2	0	9.13
1,500 - 1,999	3	0	3	29.22
2,000 - 2,499	2	2	0	8.75
2,500 - 2,999	3	3	0	23.67
3,000 - 3,499	3	3	0	24.81
3,500 - 3,999	21	21	0	18.96
4,000 - 4,499	6	5	1	26.00
4,500 - 4,999	10	10	0	31.23
5,000 - 5,499	3	2	1	20.50
5,500 - 5,999	2	1	1	22.21
6,000 - 6,499	2	1	1	13.29
6,500 - 6,999	2	0	2	19.63
7,000 - 7,499	2	1	1	15.04
7,500 - 7,999	1	1	0	16.50
8,000 - 8,499	3	1	2	22.53
8,500 - 8,999	2	1	1	19.58
9,000 - 9,499	4	0	4	19.29
9,500 - 9,999	1	0	1	20.08
10,000 - 10,499	4	0	4	21.81
10,500 - 10,999	0	0	0	0.00
11,000 - 11,499	39	5	34	22.02
11,500 & Over	89	6	83	24.91
Total	217	72	145	23.37

Average age at retirement for service retirees as of July 1, 2019 is age 60.2.

Schedule of Retirants Added to and Removed from Rolls
(Dollar amounts except average allowance expressed in thousands)

July 1, (1)	Added to Rolls		Removed from Rolls		Rolls End of the Year		% Increase in Annual Benefit (8)	Average Annual Benefit (9)
	Number (2)	Annual Benefits (3)	Number (4)	Annual Benefits (5)	Number (6)	Annual Benefits (7)		
2005	3	581	1	27	141	9,615	6.1%	68,191
2006	4	464	1	28	144	10,051	4.5%	69,799
2007	32	2,690	1	30	175	12,711	26.5%	72,634
2008	6	545	3	156	178	13,100	3.1%	73,596
2009	10	903	4	259	184	13,744	4.9%	74,696
2010	18	1,210	8	593	194	14,361	4.5%	74,025
2011	9	827	5	196	198	14,992	4.4%	75,717
2012	6	912	4	184	200	15,720	4.9%	78,600
2013	10	279	9	42	201	15,957	1.5%	79,388
2014	7	637	4	192	204	16,402	2.8%	80,402
2015	8	757	6	497	206	16,662	1.6%	80,883
2016	10	1,355	6	300	210	17,717	6.3%	84,367
2017	7	535	4	352	213	17,900	1.0%	84,038
2018	11	734	11	792	213	17,842	-0.3%	83,765
2019	8	6,828	4	259	217	24,411	36.8%	112,493

Beginning July 1, 2007, includes participants who have retired in place.

Annual benefits added to rolls include benefit increases for continuing retirees.

The removed from rolls count does not include members who are replaced by beneficiaries.

SECTION E

ASSESSMENT AND DISCLOSURE OF RISK

Risks Associated with Measuring the Accrued Liability And Actuarially Determined Contribution

(As Required by ASOP No. 51)

The determination of JSRS's accrued liability, actuarially determined contribution, and calculated funding period requires the use of assumptions regarding future economic and demographic experience. The risk measures illustrated in this section are intended to aid stakeholders in understanding the effects when future experience differs from the assumptions used in performing an actuarial valuation. These risk measures may also help with illustrating the potential volatility in the funded status and actuarially determined contributions that result from differences between actual experience and the expected experience based on the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience (economic and demographic) differing from the assumptions, changes in assumptions due to changing conditions, changes in contribution requirements due to modifications to the funding policy, and changes in the liability and cost due to changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risks that may reasonably be anticipated to significantly affect the System's future financial condition include:

- Investment risk – actual investment returns may differ from expected returns;
- Longevity risk – members may live longer or shorter than expected and receive pensions for a time period different than assumed;
- Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liabilities and contributions differing from expected;
- Salary and payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liabilities and contributions differing from expected;
- Asset/Liability mismatch – changes in assets may be inconsistent with changes in liabilities, thereby altering the relative difference between the assets and liabilities, which may alter the funded status and contribution requirements;
- Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions are not made in accordance with the System's funding policy or Statute, other anticipated payments to the plan are not made, or material changes occur in the anticipated number of covered employees, covered payroll, or another relevant contribution base.

On the other hand, effects of certain experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate of return, the funded status of the plan can be expected to decrease (or increase) more than anticipated.

Under South Carolina State statutes, the Board must certify the employer contribution annually. This amount is determined actuarially, based on the Board's funding policy. The Board has also adopted the contribution rate determined by this actuarial valuation to become effective twelve months after the valuation date.

Employer Risk with Contribution Rates

The funding policy is intended to finance the unfunded actuarial accrued liability over a reasonable time period and provide stability in the employer contribution rates so employers are better able to budget their pension cost in future years. The greater the difference between the contribution rate in effect versus the minimum contribution rate specified by the maximum funding period specified by the Board's funding policy, the greater the ability for the System to incur some adverse experience without requiring an increase in the employer contribution rate.

However, providing stability in the contribution rates means that projecting the year the fund actually attains a 100% funded ratio becomes less certain. If actual experience is more favorable than assumed, then the year the fund attains a 100% funded ratio will be earlier than projected, but the projected year the fund attains a 100% funded ratio will be later than projected if actual experience is less favorable than assumed.

Plan Maturity Measures

Risks faced by a pension plan evolve over time. A relatively new plan with virtually no assets and paying few benefits will experience lower investment risk than a mature plan with a significant amount of assets and large number of members receiving benefits. There are a few measures that can assist stakeholders in understanding and comparing the maturity of a plan to other systems, which include:

- Ratio of market value of assets to payroll: The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. If assets are approximately the same as covered payroll, an investment return that is 5% different than assumed would equal 5% of payroll. In another example, if the assets are approximately twice as large as covered payroll, an investment return that is 5% different than assumed would equal 10% of payroll. A ratio that increases over time generally indicates the potential of an increasing volatility in employer contribution rates as a percentage of payroll.
- Ratio of actuarial accrued liability to payroll: The ratio of actuarial accrued liability to payroll can be used as a measure to indicate the potential volatility of contributions due to volatility in the liability experience. For instance, if the actuarial accrued liability is 5 times the size of the covered payroll, then a change in the liability that is 2% different than expected would be a change in magnitude that is 10% of payroll. A ratio that increases over time generally indicates the potential of an increasing volatility in employer contribution rates as a percentage of payroll.

- Ratio of active to retired members: A relatively mature open plan is likely to have close to the same number of actives to retirees resulting in a ratio that is around 1.0. On the other hand, a super-mature plan, or a plan that is closed to new entrants will have more retirees than active members resulting in a ratio below 1.0. As this ratio declines, a larger portion of the total actuarial accrued liability in the System is attributable to retirees. This metric also typically moves in tandem with the liability to payroll metric, which provides an indication of potential contribution volatility.
- Ratio of net cash flow to market value of assets: A negative net cash flow means that benefit payments exceed contributions and the plan is depending on investment earnings and possibly existing funds to make payments to retirees. A certain amount of negative net cash flow is expected to occur when benefits are prefunded and the plan has matured. However, a relatively large negative net cash flow as a percent of assets may be an indication of the need for additional contributions for a plan with a low funded ratio.

The following exhibit provides a summary of these measures for JSRS. We have also included these metrics for the prior four years so stakeholders can identify how these measures are trending.

	July 1,				
	2019	2018	2017	2016	2015
Ratio of the market value of assets to total payroll	5.47	7.16	6.81	6.41	6.88
Ratio of actuarial accrued liability to payroll	13.17	13.15	13.23	12.91	12.68
Ratio of actives to retirees and beneficiaries	0.65	0.65	0.63	0.64	0.67
Ratio of net cash flow to market value of assets	-2.0%	-2.3%	-3.2%	-3.3%	-2.2%

Note: For purposes of this analysis, payroll includes the payroll received by working retirees since the System receives contributions on that payroll.

APPENDIX A

ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Assumptions and Methods

The following presents a summary of the actuarial assumptions and methods used in the valuation of the Retirement System for Judges and Solicitors of South Carolina.

Investment Rate of Return

Assumed annual rate of 7.25% composed of a 2.25% inflation component and a 5.00% real rate of return, net of investment expenses.

This is a prescribed assumption set by another party in Section 9-16-335 of the South Carolina State Code.

Rates of Annual Salary Increase

Rates of salary are assumed to increase at an annual rate of 2.75%.

Active Member Decrement Rates

- a. Assumed rates of service retirement are shown in the following table. In addition to the rates in the table below, all participants are assumed to retire upon reaching the mandatory retirement age of 72.

Service Based Retirement Rates		
Years of Service	Male	Female
15-19	10.00%	10.00%
20-24	40.00%	40.00%
25-31	15.00%	15.00%
32+	100.00%	100.00%

*Retirement rate will be 100% at 31 years of service for solicitors and public defenders.

- b. An abbreviated table with the assumed rates of disability incidence and pre-retirement mortality is shown below. The pre-retirement mortality assumption is based upon the RP-2014 Mortality Table for Employees with applicable multipliers to better reflect anticipated experience and provide margin for future improvement in mortality.

Age	Disability Incidence Rates		Pre-Retirement Mortality	
	Males	Females	Males	Females
25	0.0419%	0.0458%	0.0460%	0.0147%
30	0.0629%	0.0616%	0.0429%	0.0185%
35	0.0838%	0.0616%	0.0497%	0.0243%
40	0.1572%	0.1074%	0.0597%	0.0337%
45	0.2620%	0.2200%	0.0924%	0.0558%
50	0.4192%	0.3520%	0.1602%	0.0937%
55	0.6812%	0.5720%	0.2649%	0.1422%
60	1.0480%	0.8800%	0.4454%	0.2076%
Multiplier	105%	88%	95%	85%

Note: The multiplier has been applied to the decrement in the illustrative table.

- c. There is no active employment withdrawal assumption.

Post Retirement Mortality

- a. Healthy retirees and beneficiaries – The 2016 Public Retirees of South Carolina Mortality Table for Males and the 2016 Public Retirees of South Carolina Mortality Table for Females, both using the AA projection table from the year 2016 with multipliers based on plan experience. The following are sample rates:

Healthy Annuitant Mortality Rates Before Projection		
Age	Males	Females
50	0.1875%	0.1284%
55	0.2949%	0.2177%
60	0.5394%	0.3765%
65	0.9382%	0.5230%
70	1.4461%	0.8511%
75	2.5019%	1.6363%
80	4.6454%	3.2910%
85	8.4266%	6.2277%
90	14.6319%	10.9026%
Multiplier	92%	98%

Note: The multiplier has been applied to the decrement in the illustrative table.

The table on the following page provides the life expectancy for individuals retiring in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years				
Gender	Year of Retirement			
	2020	2025	2030	2035
Male	21.2	21.5	21.9	22.2
Female	23.6	23.8	24.0	24.1

- b. A separate table of mortality rates is used for disabled retirees based on the RP-2014 Disabled Mortality table projected using the AA projection table from the year 2016 and with multipliers based on plan experience. The following are sample rates:

Disabled Annuitant Mortality Rates		
Age	Males	Females
50	2.5494%	1.4884%
55	2.9211%	1.8099%
60	3.3255%	2.1249%
65	3.9606%	2.6075%
70	5.0433%	3.5254%
75	6.7859%	5.1306%
80	9.5770%	7.6295%
85	14.1629%	11.3025%
90	21.6256%	16.5815%
Multiplier	125%	125%

Note: The multiplier has been applied to the decrement in the illustrative table.

Asset Valuation Method

The actuarial value of assets is equal to the market value, adjusted for the five-year phase in of the actual investment return in excess of (or less than) the expected investment return on a market value of asset basis. This five-year phase in begins with the investment experience for the fiscal year ending June 30, 2016. The actual return is calculated net of investment expenses, and the expected investment return is equal to the assumed investment return rate multiplied by the prior year's market value of assets, adjusted for contributions, benefits paid, and refunds.

Actuarial Cost Method

The Entry Age Normal actuarial cost method allocates the System's actuarial present value of future benefits to various periods based upon service. The portion of the present value of future benefits allocated to years of service prior to the valuation date is the actuarial accrued liability, and the portion allocated to years following the valuation date is the present value of future normal costs. The normal cost is determined for each active member as the level percent of payroll necessary to fully fund the expected benefits to be earned over the career of each individual active member. The normal cost is partially funded with active member contributions with the remainder funded by employer contributions.

An unfunded accrued liability exists in the amount equal to the excess of accrued liability over valuation assets. The amortization period of the System is the number of years required to fully amortize the unfunded accrued liability, on an actuarial value of asset basis, with the expected amount of employer contributions in excess of the employers' portion of the normal cost.

The calculation of the amortization period takes into account budgeted non-payroll based contributions. Also, the calculation of the amortization period reflects additional contributions the System receives with respect to members in DROP and who are retired-in-place. These contributions are assumed to grow at the same payroll growth rate as for active employees. It is assumed that amortization payments are made monthly at the end of the month.

Note, the principle financial measurement calculations in this actuarial valuation, which include the unfunded actuarial accrued liability, funded ratio, contributions rates, and funding period, are based on an actuarial value of assets (smoothed value) basis. The actuarial value of assets is a calculated asset value, which may be greater than or less than the market value of assets and is used to dampen some of the volatility in the market value of assets. As a result, many of these measures would be different if they were determined on a market value of asset basis.

Future Cost-of-living Increases

Future benefits are assumed to increase at an annual rate of 2.75%.

Payroll Growth Rate

The total annual payroll of active members (including DROP and retired in place participants) is assumed to increase at an annual rate of 2.75%. This rate represents the underlying expected annual rate of wage inflation and does not anticipate increases in the number of members.

Other Assumptions

1. The normal cost rate is increased by 0.12% to account for administrative expenses that are paid with plan assets.
2. Percent married: 95% of male and female employees are assumed to be married.
2. Age difference: Males are assumed to be four years older than their spouses.
3. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an immediate life annuity.
4. Inactive Population: All non-vested members are assumed to take an immediate refund. Members with a vested benefit are assumed to elect a deferred benefit commencing at their earliest possible commencement age.
5. There will be no recoveries once disabled.
6. Decrement timing: Decrements of all types are assumed to occur mid-year.
7. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
8. Benefit Service: All active members are assumed to accrue one year of service each year.

Participant Data

Participant data was securely supplied in electronic text files. There were separate files for (i) active and inactive members, and (ii) members and beneficiaries receiving benefits.

The data for active members included birth date, gender, service with the current employer and total vesting service, salary, and employee contribution account balances. For retired members and beneficiaries, the data included date of birth, gender, spouse's date of birth (where applicable), amount of monthly benefit, date of retirement, and form of payment code.

Salary supplied for the current year was based on the annualized earnings for the year preceding the valuation date. Assumptions were made to correct for missing or inconsistent data. These had no material impact on the results presented.

APPENDIX B

BENEFIT PROVISIONS

Summary of Benefit Provisions for Retirement System for Judges and Solicitors for the State of South Carolina Retirement System (JSRS)

Effective Date: July 1, 1979.

Administration: The South Carolina Public Employee Benefit Authority, is responsible for the general administrative operations and day to day management of the Plan.

Type of Plan: This is a qualified governmental defined benefit retirement plan and considered to be a single employer plan under GASB Statement No. 67.

Eligibility: This System covers all solicitors, circuit public defenders, judges of a Circuit or Family Court, justices of the Court of Appeals, and Supreme Court judges, unless exempted by statute. Administrative Law Judges who elect to participate in the System are also eligible to earn retirement benefits in the System.

Employee Contributions: Members contribute 10.00% of compensation per year. Contributions are credited with interest at the rate of 4.0% per annum.

Service Retirement:

- a. **Eligibility:** There is a mandatory retirement age of 72. Members may retire if they have met one of the following eligibility conditions:
 - i. Age 65 with 20 years of credited service.
 - ii. Age 70 with 15 years of credited service.
 - iii. Completed 25 years of credited service as a judge or 24 years as a solicitor or public defender.
- b. **Monthly Benefit:** The monthly benefit is equal to one-twelfth (1/12th) of the member's current salary, times 71.3% plus 2.67% of pay for each year of credited service beyond 25 for judges and 24 for solicitors and public defenders. The monthly benefit may not exceed one-twelfth of 90% of the member's current salary.
- c. **Payment Form:** Standard Annuity Payment.

A JSRS member whose annuity as calculated at retirement exceeds the 90 percent maximum annuity will receive an additional lump-sum benefit at retirement. The additional benefit is equal to the member's contributions and interest paid in to the system after the member attained sufficient service credit to be eligible to receive the maximum annuity of 90 percent of the current active salary. The 90 percent maximum annuity amount is generally reached when the following JSRS service credit is obtained: 32 years for justices and judges; and 31 years for solicitors and circuit public defenders.

Disability Retirement:

- a. Eligibility: Member must have five or more years of earned service.
- b. Monthly Benefit: The monthly disability benefit payable is determined the same as a service retirement benefit and payable immediately.
- c. Payment Form: Standard Annuity Payment.
- d. Death while Disabled: A disabled member is treated as a retired member for purposes of determining a death benefit.

Vesting and Refunds:

- a. Eligibility: Judges are vested in the system after attaining ten (10) years of earned service. Solicitors and public defenders are vested in the system after attaining eight (8) years of earned service. Vested members may also elect to receive a refund in lieu of the deferred termination benefit described below.
- b. Amount: The refund benefit is the accumulated value of the member's contributions plus interest credited by the fund. Members do not earn interest on their employee contribution account balance while they are inactive.

Deferred Termination Benefit:

- a. Eligibility: Member must be vested and must elect to leave his/her contributions on deposit. Members who began service before July 1, 2004 are eligible for a monthly benefit beginning at age 55. Members hired after July 1, 2004 are eligible to commence their deferred monthly benefit at age 65.
- b. Monthly Benefit: The member's benefit is determined by multiplying the base benefit by a fraction, in which the numerator is the member's total credited service and twenty-four is the denominator.
- c. Payment Form: Standard Annuity Payment.
- d. Death Benefit: The beneficiary of an inactive member who dies is entitled to receive the amount of the member's accumulated contributions (with interest). A beneficiary of an inactive member who was eligible to commence his retirement annuity at the time of his death may elect a monthly survivor annuity equal to one-third the annuity that would have been payable to the deceased member.

Death while an Active Member:

- a. In General: A refund of the member's accumulated contributions (with interest) is paid to the beneficiary of a deceased member.
- b. Beneficiary Annuity: If the deceased member was married and eligible to commence his retirement annuity at the time of his death, then his beneficiary may elect a monthly survivor annuity equal to one-third the annuity that would have been payable to the deceased member.

Standard Annuity Payment: The monthly retirement benefit will be paid as follows. Other reduced optional forms of payment are also available to a member to elect at retirement.

- a. Unmarried Retiree: A life annuity. Upon the member's death, any remaining member contributions plus interest will be paid to the member's designated beneficiary.
- b. Married Retiree (One-third Joint & Survivor): An unreduced annuity is payable during the member's life, and continues after the member's death at one-third of the rate paid to the member for the life of the surviving spouse, unless a contingent non-spousal beneficiary is named.
- c. Optional Allowance: A reduced lifetime annuity is payable during the member's life, and continues after the member's death at one-third of the rate paid to the member for the life of the non-spousal beneficiary (or in equal shares to multiple beneficiaries).

Incidental Death Benefit:

- a. Active Employees: The beneficiary (or estate) of an active employee who completes at least one full year of membership service, will receive a death benefit equal to the member's annual earnable compensation at the time of death.

The one full year membership requirement is waived for members whose death is a result of an injury arising out of and in the course of performing his duties.

- b. Post-Employment: The beneficiary (or estate) of a retiree, both current and future, will receive a one-time payment upon the retiree's death. The amount of the one-time payment is based on the retiree's credited service.

Years of Service Credit	Death Benefit
10 or more, but less than 20	\$1,000
20 or more, but less than 30	\$2,000
30 or more	\$3,000

Retire in Place: Members who have accrued their maximum monthly benefit (i.e. 90% of salary) may elect to "retire in place". These members will receive their monthly retirement benefit while they remain employed. Members who retire in place under the age of 60 will have his retirement benefit accumulated into a deferred retirement option program (DROP). These members will receive a distribution of their DROP balance upon reaching the age of 60 or retirement (if earlier).

Postretirement Benefit Increases: Benefits paid to retired members or surviving spouses are increased annually by an amount equal to the percentage increase in the current salary paid to the respective position from which the member retired. The cost of living adjustment for non-spousal beneficiaries is based on the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W), and said beneficiaries will receive a 4.00% increase in their benefit in years in which the annual increase in CPI-W exceeds 3.00%.

APPENDIX C

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits, which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or Funding Method: A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ADC.

Actuarial Gain or Actuarial Loss: A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the Fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

- a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)
- b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
- c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations that provide the financial information of the plan, such as the funded ratio, unfunded actuarial accrued liability and the ADC.

Actuarial Value of Assets or Valuation Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Actuarially Determined Contribution (ADC): The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and the Amortization Payment.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: That portion of the pension plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Closed Amortization Period: A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decremments: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: A retirement plan that is not a Defined Contribution Plan. Typically a Defined Benefit Plan is one in which benefits are defined by a formula applied to the member's compensation and/or years of service.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market Funded Ratio, using the Market Value of Assets (MVA), rather than the AVA, although GASB 25 reporting requires the use of the AVA.

Funding Period or Amortization Period: The term "Funding Period" is used two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. This funding period is chosen by the Board of Trustees. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on the statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: Governmental Accounting Standards Board.

GASB 67 and **GASB 68:** Governmental Accounting Standards Board Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting and reporting rules for public retirement systems and the employers that sponsor, participate in, or contribute to them. Statement No. 67 sets the accounting rules for the financial reporting of the retirement systems, while Statement No. 68 sets the rules for the employers that sponsor, participate in, or contribute to public retirement systems.

Normal Cost: That portion of the Actuarial Present Value of pension plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but may not decrease by exactly one year in the subsequent year's actuarial valuation. In some instances, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In other instances, such as the case with the South Carolina Retirement System (SCRS), Police Officers Retirement System (PORS), and the Retirement System for Judges and Solicitors (JSRS) the amortization period denotes the expected number of years until the plan attains a 100% funded ratio (on an actuarial value of asset basis), based on the contribution rate that is in effect. In this instance, the amortization period may "float" from year to year, meaning it could increase, decrease, or remain relatively unchanged from the amortization period in the prior year's valuation.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.