The logo for the SRPS Actuarial Section is centered on the page. It features the letters "SRPS" in a large, bold, serif font. Below "SRPS" is the text "Actuarial Section" in a smaller, elegant, cursive script. The entire logo is set against a light gray square background that has a subtle, stylized pattern of vertical bars and horizontal lines, resembling a grid or architectural structure.

SRPS  
*Actuarial Section*



December 4, 2019

Board of Trustees  
Maryland State Retirement and Pension System  
120 East Baltimore Street  
Baltimore, MD 21202

Dear Members of the Board:

The results of the **June 30, 2019 annual actuarial valuation** of the Maryland State Retirement and Pension System ("MSRPS") are presented in this Section.

The purposes of the annual actuarial valuation are as follows:

- Measure the financial position of MSRPS with regard to funding,
- Provide the Board with State and Participating Governmental Unit ("PGU") contribution rates for certification,
- Determine actuarial and statutory contribution rates with reinvested savings,
- Discuss some of the risks associated with achieving the funding objectives of MSRPS, and
- Analyze the aggregate experience of the State Systems over the past year.

Information required by Statements No. 67 and No. 68 of the Governmental Accounting Standards Board ("GASB") for fiscal year 2019 is provided in a separate report.

The following schedules in the Actuarial Section, Financial Section, Statistical Section, and Plan Summary Section of the CAFR were prepared by Gabriel, Roeder, Smith & Company based upon certain information presented in the previously mentioned funding and financial reporting valuation reports:

**Actuarial Section**

Summary of Valuation Results  
Actuary's Comments  
Other Observations  
Prior Year Asset Experience  
Trends  
Summary of Assumptions  
Schedules of Active Membership by Plan  
Summary of Unfunded Liabilities/Solvency Test  
Summary of Retirees and Beneficiaries  
Summary of Principal Results

**Financial Section**

Summary of Membership by System  
Schedules of Funding Progress  
Net Pension Liability/(Asset)  
Key Methods and Assumptions Used in Valuation of Total Pension Liability  
Sensitivity of Net Pension Liability/(Asset) to Changes in the Discount Rate  
Schedules of Changes in Net Pension Liability/(Asset)  
Schedule of Contributions from Employers and Other Contributing Entities

**Statistical Section**

- Schedule of Benefit Expense by Type
- Average Benefit Payments
- History of Employer Contributions by Plan
- History of Active Membership by Plan
- History of Retirees and Beneficiaries by Plan
- Principal Participating Employees

**Plan Summary Section**

- Membership Schedules

The individual member data required for the valuations was furnished by the Maryland State Retirement Agency (“MSRA”), together with pertinent data on financial operations (unaudited). The cooperation and collaboration of MSRA staff in furnishing these materials is acknowledged with appreciation. We checked for internal and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the MSRA.

Actuarial valuations are based upon assumptions regarding future activity in specific risk areas including the rates of investment return and payroll growth, eligibility for the various classes of benefits, and longevity among retired lives. The Board adopts these assumptions after considering the advice of the actuary and other professionals. The assumptions and methods used for funding and financial reporting purposes are in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. They are also in conformity with the Board’s funding policy.

Each actuarial valuation takes into account all prior differences between actual and assumed experience in each risk area and adjusts the contribution rates as needed. GRS performed an experience study of MSRPS for the period 2014-2018 after completion of the June 30, 2018 valuations. Assumptions from the experience study including investment return, inflation, COLA increases, mortality rates, retirement rates, withdrawal rates, disability rates, and rates of salary increase were adopted by the Board for first use in the June 30, 2019 valuation. It is our opinion that the actuarial assumptions used for the valuation are reasonable.

Based upon the results of a projection performed in accordance with GASB Statement No. 67 parameters, the Single Discount rate for purpose of discounting pension liabilities for pension financial reporting purpose is 7.40%.

The computed contribution rates may be considered as a minimum contribution rate that complies with the funding policy stated in the Statutes and anticipate reinvested savings. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

The benefit provisions valued in the actuarial valuation as of June 30, 2019 are the same as the provisions from the last actuarial valuation as of June 30, 2018. Portions of the savings from the 2011 pension reforms passed by the General Assembly are to be reinvested as additional contributions into the Systems. Legislation enacted in 2015 reduced the amount of reinvested savings to \$75 million per year beginning in fiscal year 2016 until the combined funded ratio of the Systems reaches 85% at which point the additional contributions cease.



This valuation assumes the continuing ability of the participating employers to make the contributions necessary to fund this system. A determination regarding whether or not each participating employer is actually able to do so is outside our scope of expertise. Consequently, we did not perform such an analysis.

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. The actuary did not perform an analysis of the potential range of such future measurements in this actuarial valuation report.

This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. We certify that, to the best of our knowledge, this report is complete and accurate and has been prepared in accordance with Maryland's Annotated Code and generally recognized and accepted actuarial principles and practices which are consistent with the Code of Professional Conduct and applicable Actuarial Standards of Practice as promulgated by the Actuarial Standards Board. In particular, the assumptions and methods used for funding purposes meet the parameters set by the applicable Actuarial Standards of Practice.

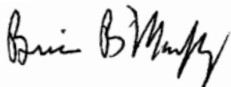
This report should not be relied on for any purpose other than the purposes previously described. Determinations of the financial results associated with benefits described in this report in a manner other than the intended purpose may produce significantly different results.

The signing actuaries are independent of the plan sponsor.

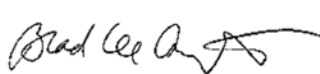
This is one of multiple documents comprising the actuarial report. Other documents comprising the actuarial report include the PowerPoint presentation presented to the Board in November 2019 and separately to the Joint Committee on Pensions in November 2019. Not all of these documents have been issued as of this date.

Brian B. Murphy, Brad L. Armstrong, and Jeffrey T. Tebeau are Members of the American Academy of Actuaries (MAAA), and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Respectfully submitted,



Brian B. Murphy, FSA, MAAA  
Consulting Actuary



Brad L. Armstrong, ASA, MAAA  
Consulting Actuary



Jeffrey T. Tebeau, ASA, EA, MAAA  
Consulting Actuary

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## INTRODUCTION

The funding valuation report presents the results of the June 30, 2019 annual actuarial valuation of the Maryland State Retirement and Pension System (MSRPS). The purposes of the annual funding valuations are as follows:

- Measure the financial position of MSRPS with regard to funding,
- Provide the Board with State and Participating Governmental Unit (“PGU”) contribution rates for certification,
- Determine actuarial and statutory contribution rates with reinvested savings,
- Discuss some of the risks associated with achieving the funding objectives of MSRPS, and
- Analyze the aggregate experience of the State Systems over the past year.

A summary of the primary funding valuation results as of June 30, 2019 is presented on the following page.

The Governmental Accounting Standards Board (GASB) No. 67 and No. 68 valuation report presents the results of the June 30, 2019 annual accounting valuation of the Maryland State Retirement and Pension System (MSRPS). The purpose of the annual accounting valuations is as follows:

- Provide actuarial reporting and disclosure information for the MSRPS and State’s financial report.

The accounting valuation results for the year ended June 30, 2019 are presented in a separate report.

## ACTUARIAL ASSUMPTIONS

The assumptions used for the actuarial valuation were recommended by the System’s independent actuary, based upon periodic analyses of the System’s experience, and adopted by the Board of Trustees. The most recent analysis of the System’s experience was performed in 2019 and the June 30, 2019 valuation reflects the adoption of the assumptions recommended from that analysis. Differences between assumed and actual experience (i.e., actuarial gains and losses) are part of the unfunded actuarial liability. The following significant assumptions were used in the actuarial valuation as of June 30, 2019:

- A rate of return on investments of 7.40% compounded annually (effective June 30, 2019);
- projected salary increases of 3.10% compounded annually, attributable to wage inflation (effective June 30, 2019);
- additional projected salary increases ranging from 0.00% to 8.50% per year attributable to seniority and merit (effective June 30, 2019);
- post-retirement benefit increases ranging from 2.19% to 3.10% per year depending on the system for service earned prior to July 1, 2011, and 1.42% to 3.10% per year depending on the system for service earned on or after July 1, 2011 (effective June 30, 2019);
- rates of mortality, termination of service, disablement and retirement based on actual experience during the period from June 30, 2014 through June 30, 2018 (effective June 30, 2019); and
- an increase in the aggregate active member payroll of 3.10% annually (effective June 30, 2019).

**SUMMARY OF VALUATION RESULTS**  
**JUNE 30, 2019**  
**(\$ IN MILLIONS)**  
**(STATE AND MUNICIPAL)**

	2019						2018		% Change
	TCS	ECS	State			Total	Total		
			Police	Judges	LEOPS				
<b>A. Demographic Information</b>									
1. Active Number Counts	107,782	81,217	1,364	315	2,683	97	193,458	192,431	0.5%
2. Active Payroll	\$ 7,153	\$ 4,410	\$ 107	\$ 49	\$ 181	\$ 6	\$ 11,905	\$ 11,566	2.9%
3. Retired Number Counts	79,151	80,712	2,505	431	2,053	40	164,892	160,374	2.8%
4. Annual Benefits for Retired Members <sup>2</sup>	\$ 2,287	\$ 1,455	\$ 129	\$ 35	\$ 75	\$ 1	\$ 3,982	\$ 3,791	5.0%
5. Deferred / Inactive Number Counts	24,474	25,361	89	8	311	3	50,246	52,301	-3.9%
6. Total Number Counts	211,407	187,290	3,958	754	5,047	140	408,596	405,106	0.9%
<b>B. Assets</b>									
1. Market Value (MV)	\$ 32,803	\$ 18,070	\$ 1,510	\$ 490	\$ 1,045	\$ 26	\$ 53,943	\$ 51,827	4.1%
<sup>3</sup> 2. Rate of Return on MV							6.42 %	8.05 %	
3. Actuarial Value (AV)	\$ 33,060	\$ 18,207	\$ 1,522	\$ 494	\$ 1,052	\$ 26	\$ 54,362	\$ 52,587	3.4%
4. Rate of Return on AV							5.67 %	6.83 %	
5. Ratio of AV to MV							100.8%	101.5%	
<b>C. Actuarial Results</b>									
1. Normal Cost as a % of Payroll	11.33%	10.11%	32.99%	37.39%	23.47%	12.46%	11.37%	11.40%	
2. Actuarial Accrued Liability (AAL)									
a. Active	\$ 17,469	\$ 9,169	\$ 507	\$ 170	\$ 545	\$ 12	\$ 27,872	\$ 27,234	2.3%
b. Retired	24,800	16,393	1,780	387	1,044	15	44,420	43,237	2.7%
c. Deferred/Inactive	1,104	1,080	13	3	34	0	2,235	2,105	6.2%
d. Total	\$ 43,372	\$ 26,641	\$ 2,301	\$ 560	\$ 1,623	\$ 28	\$ 74,526	\$ 72,575	2.7%
3. Unfunded AAL (UAAL)	\$ 10,312	\$ 8,434	\$ 779	\$ 66	\$ 571	\$ 2	\$ 20,164	\$ 19,988	0.9%
4. Funded Ratio	76.22 %	68.34 %	66.16 %	88.17 %	64.83 %	92.49 %	72.94 %	72.46 %	
<b>D. Contribution Rates<sup>4</sup></b>									
	STATE PORTION ONLY								
	FY 2021						FY 2020	FY 2019	
	TCS	ECS	State		Total	Total	Total		
			Police	Judges	LEOPS				
1. Pension Contributions									
a. Employer Normal Cost	4.33%	3.74%	24.99%	30.66%	16.65%	4.61%	4.65%	4.66%	
b. Member Contribution Rate	7.00%	6.74%	8.00%	6.73%	7.00%	6.93%	6.93%	6.93%	
c. UAAL Contribution Rate	<u>10.63%</u>	<u>16.97%</u>	<u>53.10%</u>	<u>9.61%</u>	<u>26.31%</u>	<u>13.14%</u>	<u>13.17%</u>	<u>12.76%</u>	
d. Total	21.96%	27.45%	86.09%	47.00%	49.96%	24.68%	24.75%	24.35%	
2. Total Actuarial Employer Rate (1.a + 1.c)	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%	17.82%	17.42%	
3. Total Employer Budgeted Rate									
a. Employer Budgeted Rate	14.96%	20.71%	78.09%	40.27%	42.96%	17.75%	17.82%	17.42%	
b. Reinvested Savings Rate	<u>0.69%</u>	<u>0.65%</u>	<u>0.94%</u>	<u>0.00%</u>	<u>0.97%</u>	<u>0.71%</u>	<u>0.72%</u>	<u>0.73%</u>	
c. Total Employer Budgeted Rate	15.65%	21.36%	79.03%	40.27%	43.93%	18.46%	18.54%	18.15%	

<sup>1</sup>Includes CORS Municipal only. State CORS included in ECS.

<sup>2</sup>Retiree benefit amounts include the cost-of-living-adjustment granted July 1, 2019 and July 1, 2018, respectively.

<sup>3</sup>Actuarial estimation method used is expected to produce results that differ modestly from figures reported by State Street.

<sup>4</sup>Contribution rates shown in the "Total" column are for informational purposes only and are not used for funding purposes. Totals may not add due to rounding.

**ACTUARY'S COMMENTS**

For the year ended June 30, 2019, the System's assets earned 6.42% based on our estimate and 6.46% as reported by State Street (using a slightly different computation method) on a market value basis and 5.67% on a smoothed or actuarial value basis. The smoothed rate of return is less than the 7.45% assumed rate of investment return. Recognized asset losses from fiscal years 2015, 2016, and 2019 offset recognized asset gains from fiscal years 2017 and 2018 in the actuarial value of assets as of June 30, 2019. This resulted in a loss under the asset smoothing method.

**UAAL and Actuarial Gain/(Loss)  
(\$ in Millions)**

	Municipal	State	Total SRPS
Unfunded Actuarial Accrued Liability (UAAL) as of June 30, 2018	\$ 950	\$ 19,038	\$19,988
Expected UAAL as of June 30, 2019 before changes	947	18,973	19,920
Changes in methods and assumptions	75	(754)	(679)
Expected UAAL as of June 30, 2019 after changes	1,022	18,219	19,241
Actual UAAL as of June 30, 2019	1,111	19,053	20,164
Net actuarial gain/(loss)	(89)	(834)	(923)
Actuarial gain/(loss) by source			
Actuarial investment experience	(80)	(847)	(927)
Actuarial accrued liability experience	(9)	13	4
<i>Totals may not add due to rounding</i>			

Changes in assumptions included adopting the assumptions pursuant to the 2014-2018 Experience Study.

In relative terms, the overall System funded ratio of actuarial value of assets to liabilities increased from 72.46% in 2018 to **72.94%** this year. If market value of assets were the basis for the measurements, the funded ratio would have increased from 70.00% to 72.38% funded.

The market value of assets exceeds the retiree liabilities by about 21% in total (or 2.8% if accumulated member contributions of about \$8.3 billion are netted out), an increase from 20% last year. This is referred to as a short condition test and is demonstrated in the chart at the bottom of this page. It is looking at the current retiree liabilities as the benefits that will be paid the soonest since these benefits are already in pay status. Active liabilities and deferred vested liabilities do not have associated immediate cash flow requirements. Although the market value of assets exceeds the current retiree liabilities in total, this is not true for one of the smaller systems. For State Police, the market value of assets is less than the retiree liabilities.

<b>Summary of Contribution Rates by State System (\$ in Millions)</b>							
	TCS	ECS	State Police	Judges	LEOPS	CORS	Total
Fair Value of Assets (FVA)	\$32,803	\$18,070	\$ 1,510	\$ 490	\$ 1,045	\$ 26	\$53,943
Retiree Liability	24,800	16,393	1,780	387	1,044	15	44,420
FVA as % of Retiree Liability	132%	110%	85%	127%	100%	165%	121%

In the 2013 legislative session, the Legislature changed the method used to fund the State Systems of the MSRPS. The unfunded liability for each State System is being amortized over a single closed 25-year period beginning July 1, 2014 and ending June 30, 2039 (19 years remaining as of the June 30, 2019 valuation, which determines the fiscal year 2021 contribution). In addition, the corridor method used by the Teachers' Combined System and the State portion of the

Employees' Combined System, which was established in 2001, was being phased-out over a 10-year period. In 2015, the Legislature removed the corridor funding method effective with the June 30, 2015 valuation.

The Teachers' Combined System (TCS) remained out of the corridor since the June 30, 2005 valuation and the State portion of the Employees Combined System (ECS) remained out of the corridor since the June 30, 2004 valuation resulting in contribution rates for TCS and ECS that were less than actuarial rates. With the elimination of the corridor effective with the June 30, 2015 valuation report, TCS and ECS began to contribute based on the actuarially determined rate beginning in fiscal year 2017.

Beginning in fiscal year 2012, employers pay a per-member fee to cover the Retirement Agency's operating expenses (i.e., administrative expenses). The State pays the fee for libraries.

In 2011, the General Assembly enacted pension reforms which were effective July 1, 2011, and affected both current actives and new hires. The member contribution rate was increased for members of the Teachers' Pension System and Employees' Pension System from 5% to 7%. The member contribution rate was increased from 4% to 7% for LEOPS. In addition, the benefit attributable to service on or after July 1, 2011 is subject to cost-of-living adjustments (COLAs) that are based on the increase in the Consumer Price Index and capped at 2.5% or 1.0%. The cap is 2.5% if market value investment return from the preceding calendar year was higher or lower than the investment return assumption used in the valuation (currently 7.45%), and 1.0% otherwise. There were also that affected only those members hired on or after July 1, 2011.

In addition to the benefit provision changes, a portion of the savings from the pension reforms is to be reinvested in certain State Systems (TCS, ECS, State Police, and LEOPS). Reinvested savings of \$191 million was contributed in fiscal year 2013. Legislation enacted in 2014 changed the amount of reinvested savings from \$300 million each year beginning in fiscal year 2014 to \$100 million each year for fiscal years 2014 and 2015, \$150 million for fiscal year 2016, \$200 million for fiscal year 2017, \$250 million for fiscal year 2018, \$300 million each year beginning in fiscal year 2019 and thereafter. The \$300 million would then continue until the later of the combined funded ratio of the Systems reaching 85%, and the corridor funding method being fully phased-out. Legislation enacted in 2015 further reduced the amount of reinvested savings to \$75 million per year beginning in fiscal year 2016 until the combined funded ratio of the Systems reaches 85% at which point the reinvestment ceases. The allocation of reinvested savings by System is in proportion to the savings from the pension reforms as measured in the actuarial valuation as of June 30, 2011.

The actuarially determined rates are equal to the employer normal cost plus the Unfunded Actuarial Accrued Liability contribution rate. The unfunded actuarial contribution rate is equal to the payment resulting from amortizing the remaining unfunded liability as a level percentage of pay over a single 25-year closed period beginning July 1, 2014 and ending June 30, 2039 (19 years remaining as of the June 30, 2019 valuation).

The fiscal year 2021 budgeted rates for TCS, ECS, State Police, and LEOPS are equal to the actuarially determined rate. The budgeted rates with reinvested savings are based on a projection of payroll. It is our understanding that the Retirement Agency will monitor contributions to ensure that the System receives the proper amount of reinvested dollar savings during fiscal year 2021. The fiscal year 2021 budgeted rate for Judges is equal to the actuarially determined contribution rate.

Beginning in fiscal year 2013, local employers contributed toward the normal cost for the Teachers Combined System. The required portion of normal cost contribution amounts for local employers for fiscal years 2013 through 2016 was defined by the Maryland statutes. Beginning in fiscal year 2017, local employers contribute the full normal cost contribution on behalf of their employees.

The schedules required under Government Accounting Standards Board (GASB) Statement No. 67 (beginning with fiscal year 2014) and No. 68 (beginning with fiscal year 2015) are provided in a separate report.

## **OTHER OBSERVATIONS**

### **General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected System Contributions and Funded Status**

Given the System's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the System earning 7.40% on the actuarial value of assets), it is expected that:



1. The employer normal cost as a percentage of pay will decrease to the level of the Reformed Benefit Plan's (i.e., plans for members hired after July 1, 2011) normal cost as time passes and the active population is comprised entirely of Reformed Plan members,
2. The unfunded actuarial accrued liabilities will be fully amortized after 19 years (June 30, 2039), and
3. The funded status of the plan will increase gradually towards a 100% funded ratio.

**Limitations of Funded Status Measurements**

Unless otherwise indicated, a funded status measurement presented in this report is based upon the Actuarial Accrued Liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligations, for example: transferring the liability to an unrelated third party in a free market type transaction.
2. The measurement is dependent upon the actuarial cost method which, in combination with the System's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions. A funded status measurement in this report of 100% is not synonymous with no required future contributions. If the funded status were 100%, the System would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
3. The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

**PRIOR YEAR ASSET EXPERIENCE**

**Assets (State and Municipal)**

Plan assets for this System are measured on both a market value and an actuarial or smoothed value basis. The actuarial smoothing method, described again on page Appendix A-17, annually recognizes 20% of the difference between (a) the expected investment return if the market value of assets had earned the assumed rate of 7.45% during FY 2019, and (b) the actual investment return. Bear in mind that the expected return for this purpose is based on the assumed return from the prior year's actuarial valuation. In addition, there is a market value collar that constrains the actuarial value to be within 20% of the market value of assets. In periods of high returns, this method defers the amount of asset gains above the assumed return (7.45%). Conversely, in periods of returns below the assumed rate, recognition of the losses is deferred. This method limits the effect of temporary asset value fluctuations on contribution rates. The System does not immediately feel the full impact of lower (or higher) costs when asset values fluctuate dramatically.

For the year ended June 30, 2019, the System's assets earned **6.42%** based on our estimate and **6.46%** as reported by State Street (using a slightly different computation method) on a market value basis and **5.67%** on an actuarial value basis. The System experienced an investment loss of **\$530** million on a market value basis and a loss of **\$927** million on an actuarial basis. More detail can be found in Section III. Reconciliations of market value and actuarial value of assets are presented below:

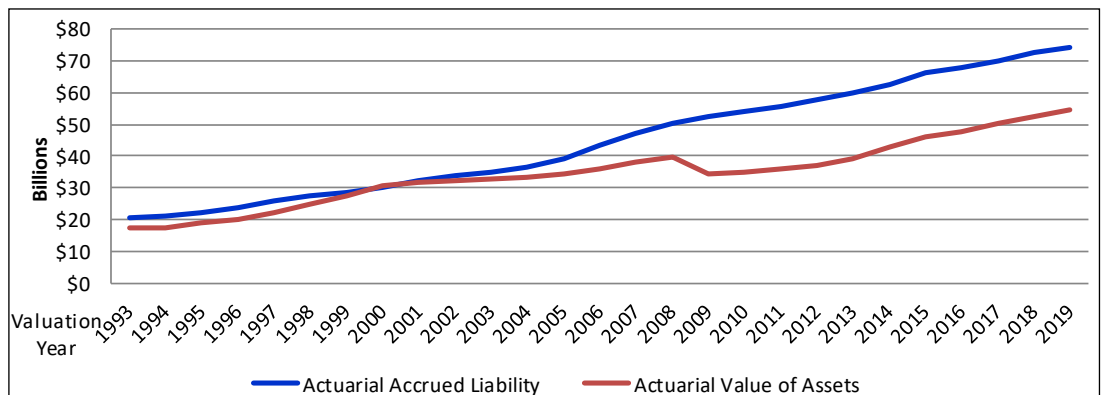
**(STATE AND MUNICIPAL)  
TRENDS (STATE AND MUNICIPAL)**

Item (In Millions)	Market Value	Actuarial Value
June 30, 2018 Value	\$ 51,827	\$ 52,586
June 30, 2018 Municipal Withdrawals / New Entrants	-	-
Employer Contributions	2,054	2,054
Member Contributions	807	807
Benefit Payments and Other Disbursements	(4,033)	(4,033)
Expected Investment Earnings (7.45% in FY2019)	3,818	3,875
Expected Value June 30, 2019	<u>\$ 54,473</u>	<u>\$ 55,289</u>
<b>Investment Gain/(Loss)</b>	<b>(530)</b>	<b>(927)</b>
June 30, 2019 Value	\$ 53,943	\$ 54,362
<i>Figures may not add correctly due to rounding</i>		

One of the best ways to measure or evaluate the financial condition of a pension plan is to examine the historical trends that are evolving. Below are three charts which illustrate trend information from 1993 through the end of 2019, on the System's assets and liabilities, annual cash flows in and out of the fund, and the State contribution rate. Our comments on each follow.

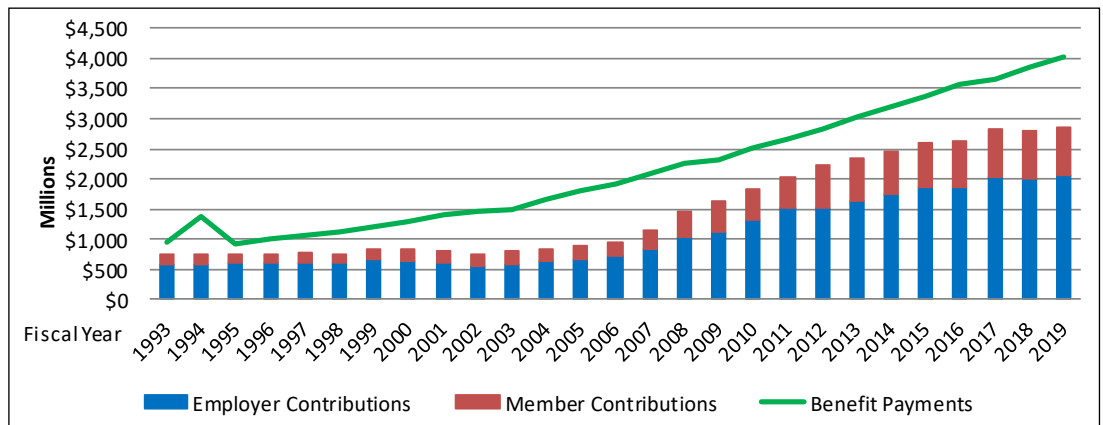
**Chart A:**  
Assets/Liabilities

**Chart A: Assets/Liabilities**



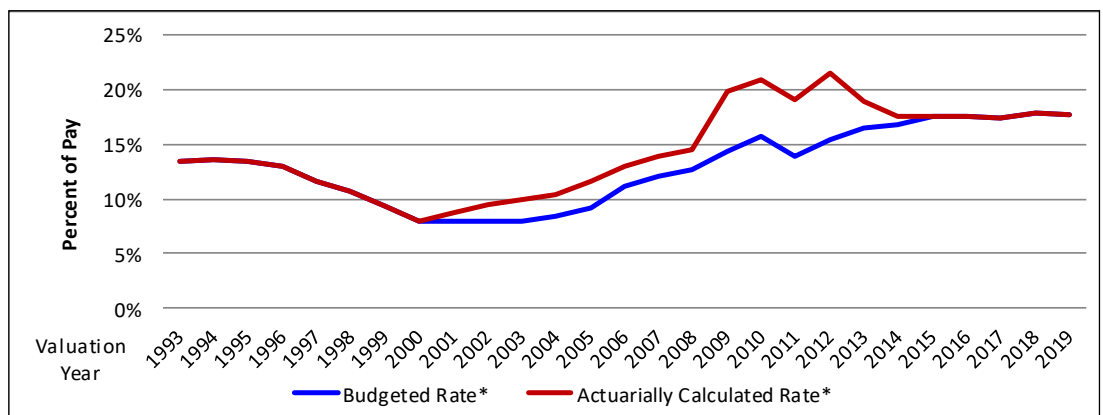
**Chart B:**  
Benefits vs Contributions

**Chart B: Benefits vs. Contributions**



**Chart C:**  
State Contribution Rate

**Chart C: State Contributions Rate**



\* Excludes reinvested savings in valuation years 2010. 2010 rates are prior to the 2011 GA Reforms.

**Chart A** displays a comparison of the actuarial value of assets and the Actuarial Accrued Liability (AAL). The difference between the actuarial value of assets and the AAL is the Unfunded Actuarial Accrued Liability. The Unfunded Actuarial Accrued Liability is about \$20 billion as of June 30, 2019, and increased by about \$176 million since the last valuation as of June 30, 2018. As of June 30, 2019, the actuarial value of assets under the five-year asset smoothing method is 101% of the market value of assets, compared with 101% as of June 30, 2018.

**Chart B** presents non-investment cash flow trend information that can have investment implications. With the aging and retirements of the baby boom generation, MSRPS has seen increases in payments to retirees. This is expected for mature retirement systems such as MSRPS. Benefit payments, which are the total amount below the green line, exceeds the total contributions, which is the total amount below the top of the red bar. The amount needed to pay the excess of benefit payments over total contributions comes from either investment return or liquidation of current assets. If the difference between the total benefit payments and total contributions increases, a larger portion of investment return will be needed to pay benefits and may require a change in asset allocation. The corridor method increased the extent of negative cash flows. The corridor funding method was eliminated first

effective with the June 30, 2015 valuation. The budgeted rates have been equal to the actuarial rates since fiscal year 2017.

Finally, **Chart C** looks at the composite actuarially determined and budgeted State contribution rates. The budgeted contribution rates by System determine the fiscal year State appropriation. It shows the impact of the 1990s sustained investment gains and a continuous lowering of the rate until 2000. Effective with the 2001 valuation, the State appropriations were performed under a corridor funding method for the two largest plans, TCS and ECS. The appropriation remained essentially level for a few years before increasing with the 2004 valuation. Legislation enacted in 2015 removed the corridor funding method for TCS and ECS beginning with the valuation as of June 30, 2015. The budgeted rate is now equal to the actuarial rate for TCS and ECS.

**Chart C** further illustrates that the corridor method consistently acted to reduce the State's contributions calculated in valuations between 2001 and 2015.

SUMMARY OF UNFUNDED ACTUARIAL  
(STATE AND

Valuation Date June 30,	Actuarial Liabilities For			Total Liabilities	Actuarial Value of Assets
	Active Member Contributions	Retirees, Term Vested and Inactives	Active Members Employer Fin. Portion		
2010	\$ 3,389,265,622	\$ 9,900,015,751	\$ 20,795,799,745	\$ 54,085,081,118	\$ 34,688,345,696
2011	3,732,934,034	31,901,090,890	20,283,517,888	55,917,542,812	36,177,655,993
2012	4,274,269,025	34,208,190,190	19,386,686,257	57,869,145,472	37,248,400,780
2013	4,818,674,217	36,001,888,558	19,239,528,603	60,060,091,378	39,350,969,353
2014	5,369,806,786	37,679,277,545	19,561,109,243	62,610,193,574	42,996,956,526
2015	5,908,597,531	40,321,760,550	20,051,422,798	66,281,780,879	46,170,624,066
2016	6,437,712,138	41,640,894,712	19,703,317,255	67,781,924,105	47,803,679,296
2017	7,023,662,251	43,117,075,812	19,845,837,454	69,986,575,517	50,250,464,717
2018	7,557,858,673	45,341,184,229	19,675,645,860	72,574,688,762	52,586,527,740
2019	8,142,516,497	46,654,221,664	19,729,262,120	74,526,000,281	54,361,969,141

SUMMARY OF RETIREES AND BENEFICIARIES ADDED TO AND REMOVED FROM ROLLS  
(STATE AND MUNICIPAL)

Fiscal Year Ended	Added to Rols		Removed from Rols		Rols-End of Year		% Increase in Annual Allowances	Average Annual Allowance
	Number	Annual Allowance	Number	Annual Allowances	Number	Annual Allowances		
2010	6,908	\$ 147,419,991	2,668	\$ 50,510,952	120,247	\$ 2,434,890,574	4.14%	\$ 20,249
2011	8,639	226,843,465	1,715	55,062,716	127,171	2,606,671,323	7.05%	20,497
2012	7,936	264,562,994	2,614	58,769,603	132,493	2,812,464,714	7.89%	21,227
2013	7,874	238,239,133	2,442	62,081,371	137,925	2,988,622,476	6.26%	21,668
2014	7,698	217,542,920	2,736	58,512,733	142,887	3,147,652,663	5.32%	22,029
2015	8,459	239,724,802	3,496	64,129,306	147,850	3,323,248,158	5.58%	22,477
2016	8,243	201,205,015	3,527	75,486,723	152,566	3,448,966,450	3.87%	22,606
2017	7,384	211,608,686	3,584	73,321,980	156,366	3,587,253,156	4.01%	22,941
2018	8,105	268,295,042	4,097	64,344,782	160,374	3,791,203,416	5.69%	23,640
2019	7,484	260,126,211	2,966	69,487,028	164,892	3,981,842,599	5.03%	24,148

Notes: Members added to rolls were estimated based on a retirement date/change date after June 30, 2018.  
Annual allowances added to rolls include COLA increases for continuing members.  
COLA increases were estimated based on the benefits for the continuing members.

LIABILITIES / SOLVENCY TEST  
MUNICIPAL)

Ratio of Assets to Actuarial Liabilities			Funded Ratio (Assets/Liab. Coverage)	Unfunded Actuarial Accrued Liability (UAAL)	Covered Payroll	UAAL as % of Covered Payroll
Active Member Contributions	Retirees Term Vested and Inactives	Active Members Employer Fin. Portion				
100.00%	100.00%	6.73%	64.14%	\$ 19,396,735,421	\$ 10,657,943,561	182%
100.00%	100.00%	2.68%	64.70%	19,739,886,819	10,478,799,565	188%
100.00%	96.39%	0.00%	64.37%	20,620,744,692	10,336,536,835	199%
100.00%	95.92%	0.00%	65.52%	20,709,122,025	10,477,544,241	198%
100.00%	99.86%	0.00%	68.67%	19,613,237,049	10,803,632,045	182%
100.00%	99.85%	0.00%	69.66%	20,111,156,814	11,063,961,664	182%
100.00%	99.34%	0.00%	70.53%	19,978,224,809	11,155,923,517	179%
100.00%	100.00%	0.55%	71.80%	19,736,110,801	11,418,973,317	173%
100.00%	99.31%	0.00%	72.46%	19,988,161,021	11,566,219,797	173%
100.00%	99.07%	0.00%	72.94%	20,164,031,140	11,905,463,225	169%

MARYLAND STATE RETIREMENT  
ACCOUNTING STATEMENT  
AS OF  
(STATE AND

	<b>Teachers' Combined System</b>	<b>Employees' Combined System</b>
1. Actuarial Accrued Liability:		
a. Employee Contributions	\$ 5,121,059,848	\$ 2,772,423,411
b. Retirees, Term. Vesteds & Inactives	25,903,857,488	17,472,809,063
c. Active Members	12,347,519,908	6,396,134,731
2. Total Actuarial Accrued Liability (1(a) + 1(b) + 1(c))	\$43,372,437,244	\$26,641,367,205
3. Actuarial Value of Assets	<u>33,060,345,745</u>	<u>18,207,410,442</u>
4. Unfunded Actuarial Accrued Liability: (2-3)	<u>\$10,312,091,499</u>	<u>\$ 8,433,956,763</u>
5. Funded Ratio	76.22%	68.34%
6. Annual Payroll	\$ 7,153,063,434	\$ 4,409,940,761
7. UAAL as % of Payroll	144%	191%

AND PENSION SYSTEM  
INFORMATION  
JUNE 30, 2019  
MUNICIPAL)

State Police	Judges	LEOPS	CORS	Total MSRPS
\$ 99,223,797	\$ 32,510,410	\$ 114,687,528	\$ 2,611,503	\$ 8,142,516,497
1,793,517,164	390,544,130	1,077,859,224	15,634,595	46,654,221,664
408,191,769	137,255,891	430,586,275	9,573,546	19,729,262,120
\$2,300,932,730	\$560,310,431	\$1,623,133,027	\$ 27,819,644	\$74,526,000,281
<u>1,522,238,564</u>	<u>494,038,020</u>	<u>1,052,204,643</u>	<u>25,731,728</u>	<u>54,361,969,141</u>
<u>\$ 778,694,166</u>	<u>\$ 66,272,411</u>	<u>\$ 570,928,384</u>	<u>\$ 2,087,916</u>	<u>\$20,164,031,140</u>
66.16%	88.17%	64.83%	92.49%	72.94%
\$ 106,977,874	\$ 48,934,800	\$ 180,963,077	\$ 5,583,279	\$11,905,463,225
728%	135%	315%	37%	169%

REPORT OF THE ACTUARY ON THE VALUATION OF THE  
TEACHERS' COMBINED SYSTEM OF THE STATE OF MARYLAND  
*Summary of Principal Plan Results*

	<b>Actuarial Valuation Performed</b>		<b>% Change</b>
	<b>June 30, 2019</b> <b>(for FY2020)</b>	<b>June 30, 2018</b> <b>(for FY2019)</b>	
<b>A. Demographic Information</b>			
Active Number Count	107,782	106,846	0.9%
Retired Member and Beneficiary Count	79,151	77,201	2.5%
Vested Former Member Count	24,474	25,188	-2.8%
Total Number Count	211,407	209,235	1.0%
Active Payroll	\$ 7,153,063,434	\$ 6,941,096,601	3.1%
Annual Benefits for Retired Members	\$ 2,287,252,060	\$ 2,189,605,461	4.5%
<b>B. Actuarial Results</b>			
Actuarial Accrued Liability	\$ 43,372,437,244	\$ 42,739,561,732	1.5%
Actuarial Value of Assets	33,060,345,745	31,945,910,198	3.5%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 10,312,091,499	\$ 10,793,651,534	-4.5%
Funded Ratio	76.22%	74.75%	
<b>C. Contribution Rates (State Portion Only)</b>			
Employer Normal Cost Rate	4.33%	4.38%	
UAAL Amortization Rate	10.63%	11.21%	
Total Actuarial Employer Contribution Rate	14.96%	15.59%	



REPORT OF THE ACTUARY ON THE VALUATION OF THE  
EMPLOYEES' COMBINED SYSTEM OF THE STATE OF MARYLAND  
(STATE AND MUNICIPAL)

**Summary of Principal Plan Results**

	<u>Actuarial Valuation Performed</u>		% Change
	June 30, 2019 (for FY2020)	June 30, 2018 (for FY2019)	
<b>A. Demographic Information</b>			
Active Number Count	81,217	81,208	-1.1%
Retired Member and Beneficiary Count	80,712	78,287	3.1%
Vested Former Member Count	<u>25,361</u>	<u>26,698</u>	-3.7%
Total Number Count	187,290	186,193	0.2%
Active Payroll	\$ 4,409,940,761	\$ 4,301,247,490	-0.4%
Annual Benefits for Retired Members	\$ 1,454,885,857	\$ 1,373,595,058	7.2%
<b>B. Actuarial Results</b>			
Actuarial Accrued Liability	\$ 26,641,367,205	\$ 25,462,496,831	3.6%
Actuarial Value of Assets	<u>18,207,410,422</u>	<u>17,679,879,601</u>	4.4%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 8,433,956,763	\$ 7,782,617,230	1.9%
Funded Ratio	68.34%	69.43%	
<b>C. Contribution Rates (State Portion Only)</b>			
Employer Normal Cost Rate	3.74%	3.85%	
UAAL Amortization Rate	<u>16.97%</u>	<u>15.71%</u>	
Total Actuarial Employer Contribution Rate	20.71%	19.56%	

REPORT OF THE ACTUARY ON THE VALUATION OF THE  
STATE POLICE RETIREMENT SYSTEM OF THE STATE OF MARYLAND

*Summary of Principal Plan Results*

	<b>June 30, 2019</b> <b>(for FY2020)</b>	<b>June 30, 2018</b> <b>(for FY2019)</b>	<b>% Change</b>
<b>A. Demographic Information</b>			
Active Number Count	1,364	1,347	1.3%
Retired Member and Beneficiary Count	2,505	2,477	1.1%
Vested Former Member Count	<u>89</u>	<u>99</u>	-10.1%
Total Number Count	3,958	3,923	0.9%
Active Payroll	\$ 106,977,874	\$ 100,324,842	6.6%
Annual Benefits for Retired Members	\$ 128,577,798	\$ 123,862,208	3.8%
<b>B. Actuarial Results</b>			
Actuarial Accrued Liability	\$ 2,300,932,760	\$ 2,250,698,919	2.2%
Actuarial Value of Assets	<u>\$ 1,522,238,564</u>	<u>1,468,640,940</u>	3.6%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 778,694,166	\$ 782,057,979	-0.4%
Funded Ratio	66.16%	65.25%	
<b>C. Contribution Rates (State Portion Only)</b>			
Employer Normal Cost Rate	24.99%	24.04%	
UAAL Amortization Rate	<u>53.10%</u>	<u>55.54%</u>	
Total Actuarial Employer Contribution Rate	78.09%	79.58%	

REPORT OF THE ACTUARY ON THE VALUATION OF THE  
PENSION PLAN OF JUDGES AND THEIR SURVIVING SPOUSES

**Summary of Principal Plan Results**

	<b>June 30, 2019</b> <b>(for FY2020)</b>	<b>June 30, 2018</b> <b>(for FY2019)</b>	<b>% Change</b>
<b>A. Demographic Information</b>			
Active Number Count	315	316	-0.3%
Retired Member and Beneficiary Count	431	421	2.4%
Vested Former Member Count	<u>8</u>	<u>9</u>	-11.1%
Total Number Count	754	746	1.1%
Active Payroll	\$ 48,934,800	\$ 47,498,152	3.0%
Annual Benefits for Retired Members	\$ 35,371,231	\$ 33,319,561	6.2%
<b>B. Actuarial Results</b>			
Actuarial Accrued Liability	\$ 560,310,431	\$ 556,746,430	0.6%
Actuarial Value of Assets	<u>494,038,020</u>	<u>477,005,959</u>	3.6%
Unfunded Actuarial Accrued Liability (UAAL)	\$66,272,411	\$ 79,740,471	-16.9%
Funded Ratio	88.17%	85.68%	
<b>C. Contribution Rates (State Portion Only)</b>			
Employer Normal Cost Rate	30.66%	32.49%	
UAAL Amortization Rate	<u>9.61%</u>	<u>11.95%</u>	
Total Actuarial Employer Contribution Rate	40.27%	44.44%	

REPORT OF THE ACTUARY ON THE VALUATION OF THE  
LAW ENFORCEMENT OFFICERS' PENSION SYSTEM OF THE STATE OF MARYLAND  
(STATE AND MUNICIPAL)

**Summary of Principal Plan Results**

	<b>June 30, 2019</b>	<b>June 30, 2018</b>	
	<b>(for FY2020)</b>	<b>(for FY2019)</b>	<b>% Change</b>
<b>A. Demographic Information</b>			
Active Number Count	2,683	2,617	2.5%
Retired Member and Beneficiary Count	2,053	1,954	5.1%
Vested Former Member Count	311	305	2.0%
Total Number Count	<u>5,047</u>	<u>4,876</u>	3.5%
Active Payroll	\$ 180,963,077	\$ 170,555,081	6.1%
Annual Benefits for Retired Members	\$ 74,686,123	\$ 69,878,318	6.9%
<b>B. Actuarial Results</b>			
Actuarial Accrued Liability	\$ 1,623,133,027	\$ 1,539,168,329	5.5%
Actuarial Value of Assets	1,052,204,634	990,564,212	6.2%
Unfunded Actuarial Accrued Liability (UAAL)	<u>\$ 570,928,384</u>	<u>\$ 548,604,117</u>	4.1%
Funded Ratio	64.83%	64.36%	
<b>C. Contribution Rates (State Portion Only)</b>			
Employer Normal Cost Rate	16.65%	15.07%	
UAAL Amortization Rate	26.31%	26.30%	
Total Actuarial Employer Contribution Rate	<u>42.96%</u>	<u>41.37%</u>	

REPORT OF THE ACTUARY ON THE VALUATION OF THE  
CORRECTIONAL OFFICERS' RETIREMENT SYSTEM OF THE STATE OF MARYLAND  
(MUNICIPAL)

*Summary of Principal Plan Results*

	<b>June 30, 2019</b> <b>(for FY2020)</b>	<b>June 30, 2018</b> <b>(for FY2019)</b>	<b>% Change</b>
<b>A. Demographic Information</b>			
Active Number Count	97	97	0.0%
Retired Member and Beneficiary Count	40	34	17.6%
Vested Former Member Count	<u>3</u>	<u>2</u>	100.0%
Total Number Count	140	133	5.3%
Active Payroll	\$ 5,583,279	\$ 5,497,631	1.6%
Annual Benefits for Retired Members	\$ 1,069,529	\$ 942,809	13.4%
<b>B. Actuarial Results</b>			
Actuarial Accrued Liability	\$ 27,819,644	\$ 26,016,521	6.9%
Actuarial Value of Assets	<u>25,731,728</u>	<u>24,526,829</u>	4.9%
Unfunded Actuarial Accrued Liability (UAAL)	\$ 2,087,916	\$ 1,489,692	40.2%
Funded Ratio	92.49%	94.27%	

## SCHEDULE OF ACTIVE MEMBERSHIP VALUATION DATA BY PLAN

**Teachers' Retirement**

<b>Valuation Date As of June 30,</b>	<b>Number</b>	<b>Annual Payroll</b>	<b>Annual Average Pay</b>	<b>% Increase Avg. Pay</b>
2010	3,111	\$ 269,775,400	\$ 86,717	0.68 %
2011	2,589	225,118,122	86,952	0.27
2012	2,040	178,541,246	87,520	-0.65
2013	1,630	145,207,003	89,084	1.79
2014	1,276	116,356,416	91,188	2.36
2015	986	91,396,562	92,694	1.65
2016	724	68,494,031	94,605	2.06
2017	537	51,836,368	96,530	2.03
2018	418	41,497,070	99,275	2.84
2019	334	33,972,615	101,714	2.46

**Teachers' Pension**

<b>Valuation Date As of June 30,</b>	<b>Number</b>	<b>Annual Payroll</b>	<b>Annual Average Pay</b>	<b>% Increase Avg. Pay</b>
2010	103,162	\$ 5,984,872,410	\$ 58,014	1.03 %
2011	102,939	5,971,858,330	58,014	0.00
2012	101,654	5,902,062,066	58,060	0.08
2013	102,398	6,039,968,791	58,985	1.59
2014	103,194	6,193,896,978	60,022	1.76
2015	104,540	6,379,309,714	61,023	1.67
2016	104,823	6,542,543,808	62,415	2.28
2017	105,765	6,729,001,984	63,622	1.93
2018	106,428	6,899,599,531	64,829	1.90
2019	107,448	7,119,090,819	66,256	2.20

**Employees' Retirement**

(State and Municipal)

<b>Valuation Date As of June 30,</b>	<b>Number</b>	<b>Annual Payroll</b>	<b>Annual Average Pay</b>	<b>% Increase Avg. Pay</b>
2010	9,665	\$ 463,375,639	\$ 47,944	-1.29 %
2011	9,189	432,469,190	47,064	-1.84
2012	9,113	421,320,077	46,233	-1.77
2013	8,976	417,020,134	46,459	0.49
2014	8,741	423,960,682	48,503	4.40
2015	8,566	429,223,262	50,108	3.31
2016	7,923	395,490,050	49,917	-0.38
2017	7,632	389,389,294	51,021	2.21
2018	7,725	397,640,605	51,475	0.89
2019	8,119	419,453,514	51,663	0.37

SCHEDULE OF ACTIVE MEMBERSHIP VALUATION DATA BY PLAN  
(continued)

**Employees' Pension**  
(State and Municipal)

Valuation Date As of June 30,	Number	Annual Payroll	Annual Average Pay	% Increase Avg. Pay
2010	77,660	\$ 3,674,098,155	\$ 47,310	-0.22 %
2011	76,264	3,595,340,448	47,143	-0.35
2012	76,061	3,577,154,799	47,030	-0.24
2013	75,701	3,613,240,787	47,730	1.49
2014	76,084	3,791,019,971	49,827	4.39
2015	75,228	3,871,524,469	51,464	3.29
2016	74,702	3,849,843,225	51,536	0.14
2017	74,455	3,929,663,604	52,779	2.41
2018	73,483	3,903,606,885	53,123	0.65
2019	73,098	3,990,487,247	54,591	2.77

**Judges' Retirement**

Valuation Date As of June 30,	Number	Annual Payroll	Annual Average Pay	% Increase Avg. Pay
2010	294	\$ 39,960,883	\$ 135,921	0.25 %
2011	286	38,810,261	135,700	-0.16
2012	294	39,955,368	135,903	0.15
2013	288	40,000,518	138,891	2.20
2014	301	42,313,395	140,576	1.21
2015	307	44,612,624	145,318	3.37
2016	298	44,711,221	150,038	3.25
2017	312	46,875,642	150,242	0.14
2018	316	47,498,152	150,311	0.05
2019	315	48,934,800	155,349	3.35

**State Police Retirement**

Valuation Date As of June 30,	Number	Annual Payroll	Annual Average Pay	% Increase Avg. Pay
2010	1,354	\$ 81,705,369	\$ 59,946	0.71 %
2011	1,295	75,551,283	58,341	-3.32
2012	1,332	77,689,914	58,326	-0.03
2013	1,320	79,848,029	60,491	3.71
2014	1,351	85,660,006	63,405	4.82
2015	1,394	91,049,875	65,316	3.01
2016	1,402	93,490,648	66,684	2.09
2017	1,371	100,384,047	73,220	9.80
2018	1,347	100,324,842	74,480	1.72
2019	1,364	106,977,874	78,430	5.30

## SCHEDULE OF ACTIVE MEMBERSHIP VALUATION DATA BY PLAN

*(continued)***Law Enforcement Officers' Pension**

(STATE AND MUNICIPAL)

<b>Valuation Date As of June 30,</b>	<b>Number</b>	<b>Annual Payroll</b>	<b>Annual Average Pay</b>	<b>% Increase Avg. Pay</b>
2010	2,474	\$ 140,199,243	\$ 56,669	-1.08 %
2011	2,411	135,176,780	56,067	-1.06
2012	2,410	135,185,336	56,094	0.05
2013	2,407	137,612,972	57,172	1.92
2014	2,484	145,672,538	58,644	2.58
2015	2,488	151,955,067	61,075	4.15
2016	2,529	156,396,298	61,841	1.25
2017	2,574	166,560,857	64,709	4.64
2018	2,617	170,555,081	65,172	0.72
2019	2,683	180,963,077	67,448	3.49

**Correctional Officers' Retirement System**

(MUNICIPAL)

<b>Valuation Date As of June 30,</b>	<b>Number</b>	<b>Annual Payroll</b>	<b>Annual Average Pay</b>	<b>% Increase Avg. Pay</b>
2010	66	\$ 3,956,462	\$ 59,946	0.71 %
2011	86	4,475,151	52,037	-13.19
2012	90	4,628,029	51,423	-1.18
2013	90	4,646,007	51,622	0.39
2014	91	4,752,059	52,220	1.16
2015	91	4,890,091	53,737	2.90
2016	93	4,954,236	53,271	-0.87
2017	96	5,261,521	54,808	2.88
2018	97	5,497,631	56,677	3.41
2019	97	5,583,279	57,560	1.56