

Pennsylvania Public School Employees' Retirement System

Actuarial Valuation
June 30, 2016



© 2016 Conduent Business Services, LLC. All rights reserved. Conduent™ and Conduent Design™ are trademarks of Conduent Business Services, LLC in the United States and/or other countries.

Other company trademarks are also acknowledged.

Document Version: R:\TOBIN\2017\April\PSERS04072017DDEQSN_2016 Actuary's Report.docx

April 7, 2017

Board of Trustees
Pennsylvania Public School Employees'
Retirement System
5 North 5th Street
Harrisburg, PA 17101

Ladies and Gentlemen:

This report presents the results of the annual actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) as of June 30, 2016.

The valuation takes into account all of the promised benefits to which members are entitled as of June 30, 2016, including pension and survivor benefits, and as required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code) is the basis for the contribution rate for fiscal year 2017/2018.

As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were selected on the basis of the July 1, 2010 to June 30, 2015 Experience Review and adopted by the Board of Trustees at their June 10, 2016 meeting, which include a 7.25% per annum rate of investment return. As mandated by the Retirement Code, these assumptions will remain in effect for valuation purposes until such time as the Board of Trustees adopts revised assumptions.

The actuarial assumptions and methods for financial reporting meet the parameters set forth in Governmental Accounting Standards Board (GASB) Statement No. 43. The Health Insurance funding provisions of the Retirement Code differ from the GASB 43 disclosure requirements. For funding purposes, the actuarial liability equals the assets in the health insurance account, and a contribution is determined that will assure the solvency of the account through the third fiscal year following the valuation date. For purposes of GASB 43 disclosure, the Health Insurance actuarial liability and normal cost requirements have been determined under the entry age actuarial cost method, with 30-year level dollar amortization of the unfunded liability. (The entry age actuarial cost method meets the GASB 43 parameters for determining actuarial liability and normal cost, and is the cost method specified by the Retirement Code for the PSERS pension plan.)

Reporting requirements of GASB Statements No. 67 and No. 68 took effect for PSERS at the June 30, 2014 and June 30, 2015 reporting dates, respectively. These requirements are addressed in separate reports.

Assets and Membership Data

The Retirement System provided the individual data for members used in the valuation. While we did not verify the data at their source, we did perform tests for internal consistency and reasonableness. The amount of assets in the trust fund taken into account in the valuation was based on statements prepared for us by the Retirement System. The accuracy of the results presented in this report is dependent on the accuracy of the data.

Funding Adequacy

The valuation results indicate that the employer contribution rate for fiscal year 2017/2018 is 32.57%. As of June 30, 2016, the total funded ratio of the plan (for Pensions and Health Insurance combined) is 57.3%, based on the accrued liability and actuarial value of assets calculated under the funding requirements of Section 8328 of the Retirement Code. Where presented, references to “funded ratio” and “unfunded accrued liability” typically are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the plan if the plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

Financial Results and Membership Data

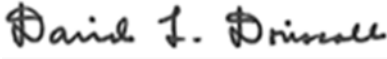


Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are shown in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Comprehensive Annual Financial Report (CAFR), and also prepared the trend data schedules included in the Financial Section of the CAFR.

Future actuarial measurements may differ significantly from current measurements due to plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in plan provisions or applicable law. An analysis of the potential range of future results is beyond the scope of this valuation.

Use of this report for any other purpose or by anyone other than the Board or staff of PSERS may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. No one may make any representations or warranties based on any statements or conclusions contained in this report without Conduent’s prior written consent.

David L. Driscoll is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. Edward Quinn and Salvador Nakar are Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions concerning it.

Respectfully submitted,

David L. Driscoll, FSA, MAAA, EA
Principal, Consulting Actuary

Edward Quinn, MAAA, EA
Director, Retirement Actuary

Salvador Nakar, MAAA, EA
Senior Consultant, Actuary

The Pennsylvania Public School Employees' Retirement System

Table of Contents

Table/Exhibit

Executive Summary	1
Table 1 - Summary of Results of Actuarial Valuation as of June 30, 2016	12
Table 2 - Summary of Sources of Employer Contribution Rate as of June 30, 2016.....	13
Table 3 - Determination of Health Insurance Contribution Rate for Fiscal Year 2017/2018	14
Table 4 - Summary of Market Value of Plan Assets as of June 30, 2016.....	15
Table 5 - Derivation of Actuarial Value of Assets as of June 30, 2016	16
Table 6 - Analysis of Change in Unfunded Accrued Liability as of June 30, 2016.....	17
Table 7 - Schedule of Funding Progress	18
Table 8a - Schedule of Employer Contributions for Pensions	19
Table 8b - Schedule of Employer Contributions for Postemployment Benefits Other than Pensions - GASB Statement No. 43 Disclosure.....	20
Table 9 -Solvency Test — Comparative Summary of Accrued Liability and Actuarial Value of Assets.	21
Table 10 -History and Projection of Contribution Rates and Funded Ratios.....	22
Table 11 -History and Projection of Annuitants, Beneficiaries, Survivor Annuitants and Active Members	23
Table 12 - Description of Actuarial Assumptions and Methods.....	24
Table 13 - Summary of Benefit and Contribution Provisions.....	28
Table 14 - Summary of Membership Data as of June 30, 2016.....	32
Exhibit I - Active Membership Data as of June 30, 2016 - Number and Average Annual Salary	36
Exhibit II - The Number and Average Annual Annuity as of June 30, 2016 – Retired on Account of Superannuation, Early Retirement and Those in Receipt of Withdrawal Annuities	37
Exhibit III - The Number and Average Annual Annuity as of June 30, 2016 – Beneficiaries and Survivor Annuitants.....	38
Exhibit IV - The Number and Average Annual Annuity as of June 30, 2016 - Retired on Account of Disability.....	39
Exhibit V - Annuitant and Beneficiary Membership Data as of June 30, 2016.....	40
Exhibit VI - 10-Year History of Membership Data.....	41
Exhibit VII - Detailed Tabulations of the Data.....	43
Exhibit VIII - Glossary	57

Executive Summary

This report presents the actuarial valuation as of June 30, 2016 for the Pennsylvania Public School Employees' Retirement System.

The principal valuation results include:

- The employer contribution rate for fiscal year 2017/2018, which is 32.57% (31.74% Pension plus 0.83% Premium Assistance).
- The Act 120 minimum employer pension rate is the normal cost rate of 7.70%.
- The total funded ratio of the plan determined as of June 30, 2016 under the funding requirements of Section 8328 of the Retirement Code is 57.3%, which is based on the accrued liability and the actuarial value of assets for Pensions and Health Insurance as of that date.
- The determination and analysis of actuarial experience in the year ending June 30, 2016, which consisted of a net experience loss of \$2.135 billion.
- The valuation results reflect an increase of \$0.5 billion in the System's unfunded accrued liability due to the Act 120 employer pension contribution collar for fiscal year 2015/2016.
- The valuation results also reflect an increase of \$2.521 billion in the System's unfunded accrued liability due to changes in assumptions. The changes of assumptions are outlined in Table 12.
- The next Class T-E and Class T-F shared-risk valuation is to be performed for the six-year period ending June 30, 2017. The Act 120-2010 member shared-risk contribution rates are discussed on page 9.
- Annual disclosures as of June 30, 2016 in accordance with Statement Nos. 25, 27 and 43 of the Governmental Accounting Standards Board (GASB). Although Statement Nos. 25 and 27 of the GASB have been superseded by Statement Nos. 67 and 68, respectively, information that would have been required to be disclosed under Statement Nos. 25 and 27 has been included in this report at the request of PSERS staff for informational purposes only. Disclosures in accordance with Statement Nos. 67 and 68 have been provided in separate reports.

The valuation was completed based upon membership and financial data submitted by the Retirement System. Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are included in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Comprehensive Annual Financial Report (CAFR), and also prepared the trend data schedules included in the Financial Section of the CAFR.

Changes Since Last Year

Legislative and Administrative Changes

The benefit provisions and contribution provisions are summarized in Table 13. There were no legislative or administrative changes since the prior valuation.

Actuarial Assumptions and Methods

The actuarial assumptions and methods are outlined in Table 12. The valuation was completed based upon the following changes in demographic, economic, and optional forms of benefit payment assumptions at retirement adopted by the Board of Trustees at the June 10, 2016 Board meeting.

Demographic Assumptions

1. Update the rates of withdrawal, disability, and retirement from employment among active members to reflect recent experience.
2. Update the rates of mortality among active members, annuitants, beneficiaries and survivors to reflect recent experience as follows:
 - a. Active Members:
 - Male participants: RP-2014 male employee mortality table adjusted backward to 2006 with the MP-2014 mortality improvement scale, projected to 2013 with the Buck Modified 2015 projection scale and adjusted by approximately 81% for credibility.
 - Female participants: RP-2014 female employee mortality table adjusted backward to 2006 with the MP-2014 mortality improvement scale, projected to 2013 with the Buck Modified 2015 projection scale and adjusted by approximately 78% for credibility.
 - These base mortality tables will then be projected on a generational basis using the Buck Modified 2015 projection scale to the valuation date and further projected using the Buck Modified 2015 projection scale.
 - b. Annuitants and Dependent Beneficiaries:
 - Update the male annuitant mortality table to the RP-2014 male mortality table adjusted backward to 2006 with the MP-2014 mortality improvement scale and projected to the valuation date with the Buck Modified 2015 projection scale.
 - Update the female annuitant mortality table to the RP-2014 female mortality table adjusted backward to 2006 with the MP-2014 mortality improvement scale, projected to 2013 with the Buck Modified 2015 projection scale and adjusted by approximately 93% for credibility. This base mortality table will then be projected on a generational basis using the Buck Modified 2015 projection scale to the valuation date.
 - Update the male and female disabled annuitant mortality tables to the RP-2014 disabled mortality tables adjusted backward to 2006 with the MP-2014 mortality improvement scale and projected to the valuation date with the Buck Modified 2015 projection scale.
 - These base mortality tables will then be projected on a generational basis using the Buck Modified 2015 projection scale from the valuation date.

Economic Assumptions

1. Reduce the interest rate from 7.50% to 7.25%.
2. Reduce the rate of inflation from 3.0% to 2.75%.
3. Reduce the average rate of increase in annual salaries among active members from an average of 5.50% to 5.00%.

Optional Forms of Benefit Payment at Retirement

1. Update the assumption that all eligible retirements will elect the Maximum Straight Life Annuity (MSLA) form of annuity payment to the following distribution of optional forms of annuity payment elections:
 - 50% will elect MSLA
 - 20% will elect Option 1
 - 20% will elect Option 2 (assuming males are 3 years older than females)
 - 10% will elect Option 3 (assuming males are 3 years older than females)
 - 0% will elect Option 4 (annuity payment only)
2. Update the assumption that 100% of retiring Class TC and Class TD members will elect to withdraw all accumulated deductions under the Option 4 form of payment to 80%.

Premium Assistance Election Coverage

The proportion of eligible participants who are assumed to elect Premium Assistance coverage was changed from 64% to 63% to reflect a refinement of this estimate per discussions with the Plan Sponsor.

There have been no other changes in the demographic or economic assumptions from those used in the prior valuation. We have reviewed the assumptions and methods used in completing the June 30, 2016 actuarial valuation and believe that they are reasonable and in compliance with the applicable standards.

Contribution Rates

The results of the valuation as of June 30, 2016 determine the employer contribution rate for fiscal year 2017/2018. The calculated employer contribution rate for the 2017/2018 fiscal year is 32.57%, and the Board of Trustees certified this rate at their December 7, 2016 meeting.

The average contribution rate payable by the members is 7.54%. The average member contribution rate of 7.54% is a pay-weighted average of member rates that vary based on date of hire and Class membership. Effective January 1, 2002, the employee contribution rate for members who elected to have prior school service and intervening military service converted to Class T-D service increased by 1.25% to 7.50%. Anyone who enrolled after July 1, 2001 and before July 1, 2011 is a member of Class T-D. Any employee who becomes a member after June 30, 2011 is a Class T-E member or, alternatively, may elect to become a Class T-F member. The base contribution rate for Class T-E members is 7.50% of compensation. The base contribution rate for Class T-F members is 10.30% of compensation. Class T-E and Class T-F members are subject to a "shared-risk" employee contribution rate, as discussed on page 9.

Reasons for Change in the Rate Calculated by the Actuary

The employer contribution rate calculated by the actuary increased from 30.03% for fiscal year 2016/2017 to 32.57% for fiscal year 2017/2018. The reconciliation of the employer contribution rates by source is as follows:

1. Reflects increase from appropriation payroll less than expected and liability losses.

Summary of Principal Results

Summarized below are the principal financial results for the Public School Employees' Retirement System based upon the actuarial valuation as of June 30, 2016. Comparable results from the June 30, 2015 valuation are also shown.

Item	June 30, 2016	June 30, 2015
Demographics		
Active Members		
• Number	257,080	259,868
• Average Annual Pay	\$ 49,989	\$ 48,787
Annuitants		
• Number ¹	224,828	219,775
• Average Annual Benefit Payment	\$ 25,203	\$ 25,119
Contribution Rates (as a Percentage of Payroll)		
	(Fiscal Year 2017/2018)	(Fiscal Year 2016/2017)
Employer Contribution Rate:		
• Total Pension Rate Calculated by Actuaries ³	31.74%	29.20%
• Health Insurance Contribution Rate	<u>0.83</u>	<u>0.83</u>
• Total Contribution Rate	32.57%	30.03%
• Total Contribution Rate Certified by Board	32.57%	30.03%
• Member Average Contribution Rate	<u>7.54</u>	<u>7.52</u>
• Total Rate	40.11%	37.55%
Funded Status²		
• Accrued Liability	\$ 100,114.0 Mil	\$ 94,697.4 Mil
• Actuarial Value of Assets	57,390.1	57,361.6
• Market Value of Assets	49,956.6	51,706.2
• Unfunded Accrued Liability		
• Actuarial Value of Assets	\$ 42,723.9	\$ 37,335.8
• Market Value of Assets	50,157.4	42,991.2
• Funded Ratio		
• Actuarial Value of Assets	57.3%	60.6%

1. Excludes 1,181 and 1,446 beneficiaries as of June 30, 2016 and June 30, 2015, respectively, who are only entitled to a pending lump sum distribution.
2. Minimum Pension Rate for the June 30, 2016 valuation is 7.70% and for the June 30, 2015 valuation is 8.31%.
3. Pensions and Health Insurance combined.

Five-Year History of Principal Financial Results

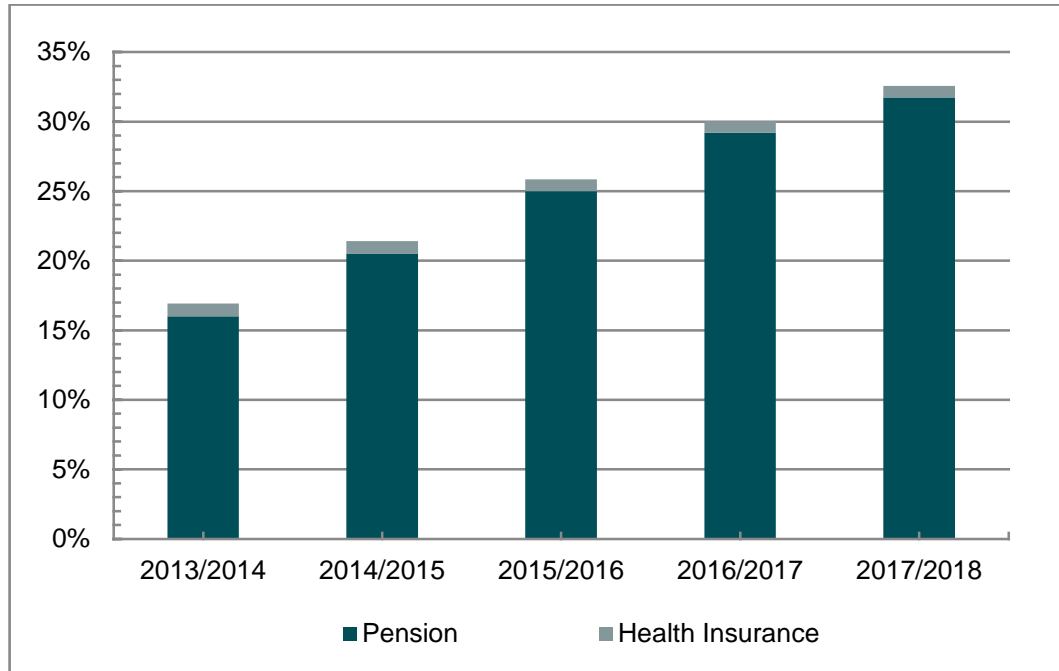
**Five-Year History of Contribution Rates
(As a % of Payroll)**

Fiscal Year	Member Contributions	Employer Contributions				
		Normal Cost	Unfunded Accrued Liability	Health Insurance	Preliminary Employer Contribution	Final Employer Contribution ¹
2017/2018	7.54%	7.70%	24.04%	0.83%	32.57%	32.57%
2016/2017	7.52	8.31	20.89	0.83	30.03	30.03
2015/2016	7.49	8.38	19.44	0.84	28.66	25.84 ²
2014/2015	7.46	8.46	17.51	0.90	26.87	21.40 ²
2013/2014	7.43	8.57	15.25	0.93	24.75	16.93 ²

1. Certified by the Board.
2. Reflects Act 120 Pension Collar.

The following chart shows a five-year history of employer contribution rates:

Five-Year History of Employer Contribution Rates



Funded Ratio

The financing objective of the Retirement System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method; and
- Liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 2010-120, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010 and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability will be funded over 10 years based on level-percent-of-pay amortization.
- As directed by Act 2010-120, the minimum employer pension contribution rate will be the normal cost rate.

The total contribution rate of 32.57% of payroll payable by employers, when taken together with the contributions payable by the members, current assets, and expected future asset returns, is sufficient to achieve the financing objective.

The Retirement System's total funded ratio on this funding basis is measured by comparing the actuarial value of assets (based on a phased-in, 10-year moving average market value) to the accrued liability. The accrued liability for pensions is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active employees. The accrued liability for Health Insurance equals the assets in the Health Insurance account.

On this basis, the Retirement System's total funded ratio (for Pensions and Health Insurance combined) is 57.3% as of June 30, 2016. This funded ratio is based on an actuarial value of assets of \$57.4 billion and an accrued liability of \$100.1 billion. The funded ratio for Pensions alone is 57.3% as of June 30, 2016, based on an actuarial value of assets of \$57.3 billion, and an accrued liability of \$100.0 billion.

Reasons for Change in the Total Funded Ratio

The total funded ratio decreased from 60.6% as of June 30, 2015 to 57.3% as of June 30, 2016. This decrease is primarily due to returns below expected levels on assets measured at actuarial value, a small net actuarial loss due to demographic experience, a fiscal year 2015/2016 employer contribution below its recommended level due to the limits imposed by Act 120, and changes to the demographic and economic assumptions used to value the System's liability. Table 6 provides an analysis of the change in the unfunded accrued liability as of June 30, 2016.

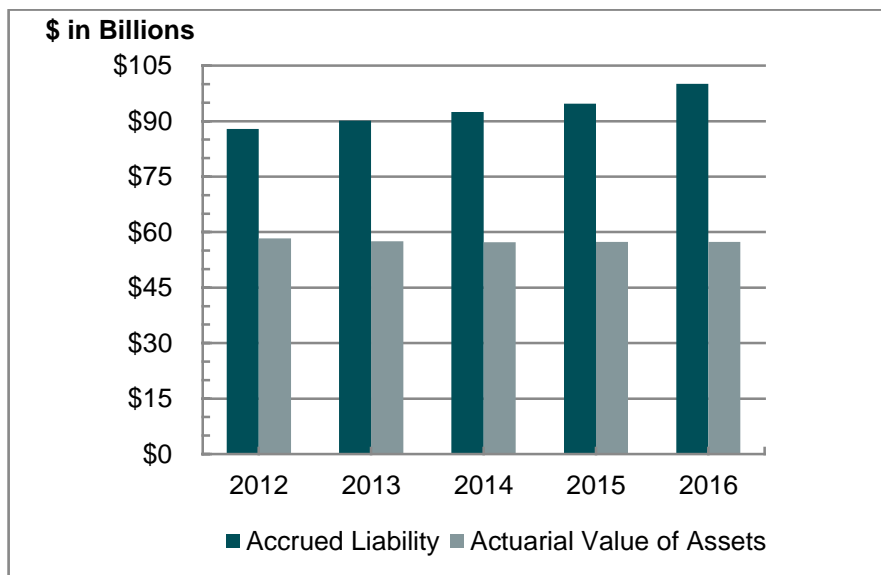
Five-Year History of Total Funded Ratio¹
(\$ Amounts in Millions)

Valuation as of June 30	Accrued Liability	Actuarial Value of Assets	Unfunded Accrued Liability	Funded Ratio
2016	\$ 100,114.0	\$ 57,390.1	\$ 42,723.9	57.3%
2015	94,697.4	57,361.6	37,335.8	60.6
2014	92,465.0	57,343.9	35,121.1	62.0
2013	90,052.2	57,453.6	32,598.6	63.8
2012	87,854.4	58,321.4	29,533.0	66.4

1. For Pensions and Health Insurance (under the funding provisions of the Retirement Code).

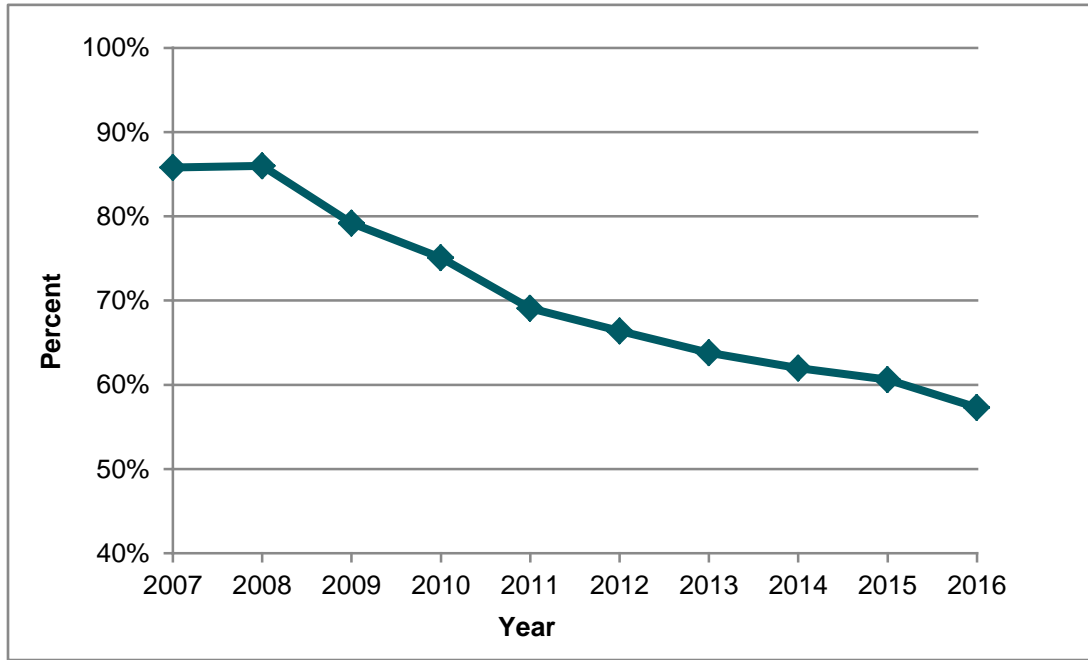
The following chart shows a five-year history of the accrued liability and the actuarial value of assets:

Five-Year History of Accrued Liability and Actuarial Value of Assets



The following chart shows a ten-year history of the total funded ratio based on actuarial value of assets for Pensions and Health Insurance:

Ten-Year History of Total Funded Ratio (2007 – 2016)



Act 120-2010 Class T-E and Class T-F shared risk contributions

Commencing with the annual actuarial valuation for the period ending June 30, 2014, and every three years thereafter, the Board compares the actual investment rate of return, net of fees, to the annual interest rate adopted by the Board for the calculation of the normal contribution rate, based on the market value of assets, for the prior ten-year period. Until the Retirement System has accumulated a ten-year period of investment rate of return experience following June 30, 2011, the look-back period used in this calculation will begin not earlier than June 30, 2011.

If the actual time-weighted investment rate of return, net of fees, is less than the annual interest rate adopted by the Board by an amount of 1% or more, the shared risk contribution rate of Class T-E and T-F members will increase by 0.5%. If the actual time-weighted investment rate of return, net of fees, is equal to or exceeds the annual interest rate adopted by the Board, the shared risk contribution rate of Class T-E and T-F members will decrease by 0.5%. The total member contribution rate for Class T-E members shall not be less than 7.5%, nor more than 9.5%. The total member contribution rate for Class T-F members shall not be less than 10.3%, nor more than 12.3%. If the Retirement System's total funded ratio based on the actuarial value of assets is at least 100% as of the measurement date, the shared risk contribution rate shall be zero. In the event that the annual interest rate adopted by the Board for the calculation of the normal contribution rate is changed during the period used to determine the shared risk contribution rate, the Board, with the advice of the actuary, shall determine the applicable rate during the entire period, expressed as an annual rate. For any fiscal year in which the employer contribution rate is lower than the final contribution rate under section 8328(h), the total member contribution rate for Class T-E and T-F members shall be prospectively reset to the basic contribution rate. There shall be no increase in the member contribution rate if there has not been an equivalent increase to the employer contribution rate over the previous three-year period.

The time-weighted market rates of return net of fees, for the three-year period ending June 30, 2014 were as follows:

Valuation as of June 30	Time-Weighted Rate of Return (Market Value) ¹
2014	14.91%
2013	7.96
2012	3.43
Three-Year Average	8.66%

1. As provided by the Retirement System's investment consultant.

The time-weighted rate of return, net of fees, for the three-year period ending June 30, 2014 was 8.66% as calculated by Aon Hewitt. Since the time-weighted rate of return exceeded 6.50% (the annual interest rate adopted by the Board over the 3-year period less 1.00%), the contribution rates for Class T-E and Class T-F members remained at 7.50% and 10.30%, respectively for the period July 1, 2015 to June 30, 2018.

The next Class T-E and Class T-F "shared-risk" valuation is to be performed for the six-year period ending June 30, 2017.

GASB No. 43 Disclosure

GASB Statement No. 43 established reporting standards for the annual financial reports of postemployment benefit plans other than pension plans, and these reporting requirements apply to the PSERS health insurance premium assistance plan. The Retirement System complied with Statement No. 43 beginning with the June 30, 2006 valuation. The statement requires disclosure of the "schedule of funding progress" and the "schedule of employer contributions" in the Retirement System's financial statements.

The health insurance liability and funding provisions of the Retirement Code differ from the GASB disclosure requirements. As a result, different determinations of actuarial liability and contribution requirements are made for GASB accounting purposes and for State funding purposes. For purposes of funding, the actuarial liability equals the assets in the health insurance account, and the contribution required is the amount necessary to establish reserves sufficient to provide premium assistance payments to all participating eligible annuitants during the fiscal year that immediately follows the year the employer contribution is made. For GASB accounting purposes, the actuarial liability has been determined under the entry age actuarial cost method, and the Annual Required Contribution (ARC) is equal to the entry age normal cost for health insurance plus an amount that will amortize the entry age unfunded actuarial liability for health insurance over a period of 30 years. (The entry age actuarial cost method was selected for this calculation because it meets the GASB parameters for determining actuarial liability and normal cost, and is the cost method specified by the Retirement Code for the PSERS pension plan.)

The GASB 43 schedule of funding progress, presented in Table 7, shows that as of June 30, 2016, the health insurance assets were \$124,563,000, measured on a market value basis, while the GASB 43 health insurance liabilities were \$1,431,487,000, resulting in a funded ratio of 8.7%. Effective for the fiscal year ending June 30, 2017, the Premium Assistance plan will be required to disclose under the requirements of GASB Statement No. 74 instead of GASB Statement No. 43.

The GASB 43 schedule of employer contributions is presented in Table 8b.

Rate of Return

The investment return of the trust fund (i.e., total return including both realized and unrealized gains and losses) for fiscal years 2007/2008 through 2015/2016 is shown in the table below.

The rate of return on market value reflects the investment earnings on the market value of assets from the beginning of the fiscal year to the end of the fiscal year.

Fiscal Year	Rate of Return Based on Market Value ¹
2015/2016	1.3%
2014/2015	3.0
2013/2014	14.9
2012/2013	8.0
2011/2012	3.4
2010/2011	20.4
2009/2010	14.6
2008/2009	-26.5
2007/2008	-2.8

1. Provided by PSERS' investment consultants (Aon Hewitt for fiscal years 2013/2014, 2014/2015, and 2015/2016 and Wilshire Associates for prior years).

Table 1

Summary of Results of Actuarial Valuation as of June 30, 2016
(\$ Amounts in Thousands)

Item	June 30, 2016	June 30, 2015
Member Data		
1. Number of Members		
a) Active Members	257,080	259,868
b) Vesteess ¹	23,437	21,909
c) Annuitants, Beneficiaries and Survivor Annuitants ²	224,828	219,775
d) Total	<u>505,345</u>	<u>501,552</u>
2. Annualized Salaries (\$ Amounts in Thousands) ³	\$ 12,851,289	\$ 12,678,213
3. Annual Annuities (\$ Amounts in Thousands)	\$ 5,666,392	\$ 5,520,620
Valuation Results		
4. Present Value of Future Pension Benefits		
a) Active Members	\$ 61,864,737	\$ 61,134,713
b) Inactive Members and Vesteess	1,829,457	1,613,862
c) Annuitants, Beneficiaries and Survivor Annuitants	55,314,858	52,739,489
d) Total	<u>\$ 119,009,052</u>	<u>\$ 115,488,064</u>
5. Present Value of Future Pension Normal Cost		
a) Active Members	\$ 9,737,924	\$ 10,232,272
b) Employer	9,281,727	10,679,082
c) Total	<u>\$ 19,019,651</u>	<u>\$ 20,911,354</u>
6. Pension Accrued Liability		
a) Active Members (4a) - (5c)	\$ 42,845,086	\$ 40,223,359
b) Inactive Members and Vesteess	1,829,457	1,613,862
c) Annuitants, Beneficiaries and Survivor Annuitants	55,314,858	52,739,489
d) Total	<u>\$ 99,989,401</u>	<u>\$ 94,576,710</u>
7. Health Insurance Assets for Premium Assistance	\$ 124,563	\$ 120,643
8. Total Accrued Liability for Funding (6) + (7)	\$ 100,113,964	\$ 94,697,353
9. Actuarial Value of Assets	\$ 57,390,069	\$ 57,361,589
10. Funded Status (9) / (8)	57.3 %	60.6 %
11. Unfunded Accrued Liability (8) - (9)	\$ 42,723,895	\$ 37,335,764
12. Total Normal Cost Rate	15.24 %	15.83 %
13. Member Contribution Rate	7.54 %	7.52 %
14. Employer Normal Cost Rate (12) - (13)	7.70 %	8.31 %
Employer Annual Funding Requirement		
15. Employer Contribution Rate Calculated by Actuaries	Fiscal 2017/2018	Fiscal 2016/2017
a) Normal Cost	7.70 %	8.31 %
b) Unfunded Accrued Liability	<u>24.04</u>	<u>20.89</u>
c) Preliminary Pension Rate	31.74 %	29.20 %
d) Health Insurance	<u>0.83</u>	<u>0.83</u>
e) Total Rate ⁴ = (15c) + (15d)	32.57 %	30.03 %

1. Excludes 120,083 and 115,277 inactive members and non-members as of June 30, 2016 and June 30, 2015, respectively, who are no longer participating and are valued for their accumulated deductions only.

2. Excludes 1,181 and 1,446 beneficiaries as of June 30, 2016 and June 30, 2015, respectively, who are only entitled to a pending lump sum distribution.

3. The salaries shown represent an annual rate of pay for members who were in active service on the valuation date.

4. Minimum Pension Rate for the June 30, 2016 valuation is 7.70% and for the June 30, 2015 valuation is 8.31%.

Table 2

Summary of Sources of Employer Contribution Rate as of June 30, 2016
(\$ Amounts in Thousands)

Item	Funding Period (Years)	Beginning July 1	Initial Liability	7/1/2016 Outstanding Balance	Annual Payment		
					Amount	Percent ¹	
1. Amortization of:							
a) Act 120 Fresh Start Unfunded Accrued Liability And Asset Method Change	24	2011	\$ 16,729,283	\$ 18,099,923	\$ 1,430,690	10.64%	
b) 2010 Experience	24	2011	3,419,297	3,787,111	299,348	2.23%	
c) 2011 Experience	24	2012	564,642	619,685	47,271	0.35%	
d) 2011 Assumption Changes	24	2012	4,592,397	5,040,081	384,473	2.86%	
e) 2012 Experience	24	2013	2,372,550	2,598,272	191,741	1.43%	
f) 2013 Experience	24	2014	2,707,494	2,952,381	211,225	1.57%	
g) 2014 Experience	24	2015	2,170,432	2,352,007	163,459	1.21%	
h) 2015 Experience	24	2016	1,941,277	2,086,873	141,137	1.05%	
i) 2016 Experience	24	2017	2,666,236	2,666,236	186,696	1.39%	
j) 2016 Assumption Changes	24	2017	2,521,326	<u>2,521,326</u>	<u>176,549</u>	<u>1.31%</u>	
Total				\$ 42,723,895	\$ 3,232,589	24.04%	
2. Employer Normal Cost Rate						<u>7.70%</u>	
3. Preliminary Pension Rate (1) + (2)						31.74%	
4. Act 120 Fiscal Year 2018 Minimum Employer Pension Rate (Employer Normal Cost Rate)						7.70%	
5. Health Insurance Rate						<u>0.83%</u>	
6. Final Total Employer Contribution Rate Calculated by Actuary: Maximum of [(3) and (4)] + (5)						32.57%	

1. Based on estimated employer payroll for fiscal year ending 2018 of \$13,449,000.

Table 3

Determination of Health Insurance Contribution Rate for Fiscal Year 2017/2018
(\$ Amounts in Thousands)

Item			
1. June 30, 2016 Balance in Health Insurance Account			\$ 124,563
2. Estimated Fiscal 2016/2017 Contribution			
(a) Contribution Rate Certified in 2015 Valuation			0.83%
(b) Estimated Fiscal 2016/2017 payroll			\$ 13,237,000
(c) Estimated Contribution = (a) x (b)			\$ 109,867
3. Estimated Number of Annuitants who:		Are Eligible	Elect Coverage
(a) Fiscal 2016/2017		147,000	92,610
(b) Fiscal 2017/2018		149,000	93,870
(c) Fiscal 2018/2019		150,800	95,004
4. Estimated Disbursements:	Administration	Assistance	Total
(a) Fiscal 2016/2017	\$ 2,293	\$ 111,132	\$ 113,425
(b) Fiscal 2017/2018	2,412	112,644	115,056
(c) Fiscal 2018/2019	<u>2,496</u>	<u>114,005</u>	<u>116,501</u>
(d) Total	\$ 7,201	\$ 337,781	\$ 344,982
5. Required Fiscal 2017/2018 Contribution			
(4d) – (1) – (2c)			\$ 110,552
6. Required Health Insurance Contribution Rate			
(a) Estimated 2017/2018 Payroll			\$ 13,449,000
(b) Required Health Insurance Contribution Rate			
(5) / (6a) (rounded up)			0.83%

Notes:

1. Current estimates of fiscal 2016/2017 membership payroll and administrative expenses, and of fiscal 2017/2018 administrative expenses, were provided by PSERS staff.
2. 63% of eligible annuitants are assumed to elect coverage. This decreased from the 64% used in the prior valuation.
3. Premium Assistance payments equal \$100 per month per eligible annuitant who elected coverage.
4. The estimated fiscal 2016/2017 payroll in 2.(b) has been revised from \$13.549 billion to \$13.237 billion.

Table 4

Summary of Market Value of Plan Assets as of June 30, 2016
(\$ Amounts in Thousands)

Market Value	
1. Market Value of Assets as of June 30, 2015	\$ 51,706,164
2. Contributions During Fiscal 2015/2016	4,292,083
3. Disbursements During Fiscal 2015/2016	6,468,598
4. Investment Return During Fiscal 2015/2016	
a) Investment Return (Net of Investment Expenses)	\$ 473,748
b) Administrative Expenses	<u>46,774</u>
c) Investment Return After Expenses (a) - (b)	\$ 426,974
5. Market Value of Assets as of June 30, 2016 (1) + (2) - (3) + (4c)	\$ 49,956,623
6. Rate of Return (per Aon Hewitt)	1.29 %
Asset Allocation by Account	
1. Members' Savings Account	\$ 14,907,731
2. Annuity Reserve Account	55,314,858
3. State Accumulation Account	(20,390,529)
4. Health Insurance Account	<u>124,563</u>
5. Total (1) + (2) + (3) + (4)	\$ 49,956,623

Table 5

Derivation of Actuarial Value of Assets as of June 30, 2016
(\$ Amounts in Thousands)

1. Market Value of Assets as of June 30, 2016						\$ 49,956,623
2. Determination of Deferred Gain (Loss)						
		Return on Assets				
Fiscal						Deferred
<u>Year</u>	<u>Actual</u>	<u>Expected</u>	<u>Difference</u>	<u>% Deferred</u> ³		<u>Amount</u>
2015/2016	\$ 426,974	\$ 4,220,500	\$ (3,793,526)	90.00%		\$ (3,414,173)
2014/2015	1,284,258	4,202,212	(2,917,954)	80.00%		(2,334,364)
2013/2014	7,057,089	4,193,490	2,863,599	70.00%		2,004,519
2012/2013	4,086,520	4,239,172	(152,652)	60.00%		(91,591)
2011/2012	1,057,435	4,303,637	(3,246,202)	50.00%		(1,623,101)
2010/2011	9,207,766	4,609,422	4,598,344	40.00%		1,839,338
2009/2010	6,100,499	4,651,504	1,448,995	30.00%		434,699
2008/2009	(16,237,298)	4,900,688	(21,137,986)	17.78%		(3,757,864)
2007/2008	(1,816,980)	4,728,472	(6,545,452)	7.50%		(490,909)
						<u>\$ (7,433,446)</u>
3. Actuarial Value of Assets ^{1,2} (1) - (2)						\$ 57,390,069

1. The amounts reported include assets for both Pension and Health Insurance.
2. The rate of return on the actuarial value of assets was 3.92%. This investment return is based on the change in the actuarial value of assets from the June 30, 2015 valuation to the June 30, 2016 valuation. The actuarial value of assets developed above is a rolling ten year average. The impact of investment gains and losses is not fully realized in the year the gain or loss arose but is smoothed in over a ten year period.
3. The percentage amounts shown are rounded. The corresponding Deferred Amounts reflect the use of unrounded percentages.

Table 6

Analysis of Change in Unfunded Accrued as of June 30, 2016¹
(\$ Amounts in Thousands)

Item	Amount
1. Unfunded Accrued Liability at June 30, 2015	\$ 37,335,764
2. Interest Credit to June 30, 2016	2,800,182
3. Expected Contributions Toward Unfunded Accrued Liability	<u>2,599,612</u>
4. Expected Unfunded Accrued Liability at June 30, 2016 (1) + (2) - (3)	\$ 37,536,334
5. Actual Unfunded Accrued Liability at June 30, 2016	<u>42,723,895</u>
6. Increase (Decrease) from Expected (5) - (4)	\$ 5,187,561
7. Reasons for Increase (Decrease)	
(a) Experience Losses (Gains)	
(i) Loss from Investment Return on Actuarial Value of Assets	\$ 2,015,505
(ii) Loss from New Entrants and Pickups	283,375
(iii) Gain from Salary Increases Less than Expected	(169,433)
(iv) Gain from Mortality Experience	(15,384)
(v) Loss from Non-Vested Termination Experience	10,058
(vi) Loss from Data/Miscellaneous	<u>10,699</u>
Subtotal	\$ 2,134,820
(b) Change due to Act 120 4.5% Collar on FY 2016 Pension Contribution	531,415
(c) Change due to new assumptions adopted by the Board	<u>2,521,326</u>
(d) Grand Total	\$ 5,187,561

1. The amounts reported include assets and liabilities for Pensions only.

Table 7

Schedule of Funding Progress for Pensions¹
 (\$ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll ³	Unfunded Accrued Liability as a Percentage of Covered Payroll
2016	\$ 57,265,506	\$ 99,989,401	\$ 42,723,895	57.3 %	\$ 12,851,289	332.4 %
2015	57,240,946	94,576,710	37,335,764	60.5	12,678,213	294.5
2014	57,231,799	92,352,983	35,121,184	62.0	12,620,862	278.3
2013	57,353,262	89,951,816	32,598,554	63.8	12,577,105	259.2
2012	58,227,623	87,760,660	29,533,037	66.3	12,714,371	232.3
2011	59,141,130	85,640,383	26,499,253	69.1	12,910,043	205.3

1. The amounts reported above include assets and liabilities for Pensions.

The schedule above is not required by current GASB standards. The information is provided for historical perspective as PSERS has transitioned to GASB Statement No. 67.

Schedule of Funding Progress for Postemployment Benefits Other Than Pensions²
GASB Statement No. 43 Disclosure
 (\$ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll ³	Unfunded Accrued Liability as a Percentage of Covered Payroll
2016	\$ 124,563	\$ 1,431,487	\$ 1,306,924	8.7 %	\$ 12,851,289	10.2 %
2015	120,643	1,368,089	1,247,446	8.8	12,678,213	9.8
2014	112,060	1,374,112	1,262,052	8.2	12,620,862	10.0
2013	100,349	1,385,033	1,284,684	7.2	12,577,105	10.2
2012	93,753	1,364,667	1,270,914	6.9	12,714,371	10.0
2011	111,258	1,339,444	1,228,186	8.3	12,910,043	9.5

2. The amounts reported above include assets and liabilities for Health Insurance Premium Assistance. The health insurance liabilities for GASB 43 disclosure have been calculated under the entry age normal cost method, which provides liabilities that differ from those determined under the funding requirements of the Retirement Code.

3. The salaries shown represent an annual rate of pay for the year ended June 30th for members who were in active service on June 30th.

Table 8a

Schedule of Employer Contributions for Pensions
(\$ Amounts in Thousands)

Fiscal Year Ended June 30	ADC ¹ or ARC ²	Actual Employer Contribution	Percentage Contributed
2016 ¹	\$ 3,720,925	\$ 3,189,510	86 %
2015 ²	3,760,827	2,596,731	69
2014 ²	3,410,373	1,986,384	58
2013 ²	3,110,429	1,434,815	46
2012 ²	2,629,244	1,001,140	38
2011 ²	2,436,602	647,000	27

1. Actuarially Determined Contribution (ADC)
2. GASB Statement No. 25 Annual Required Contribution (ARC)

The ADC or ARC presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (i.e., the ADC for the fiscal year ended June 30, 2016 was determined by the valuation completed as of June 30, 2014 which was based on an 7.50% interest rate).

Additional information as of the latest actuarial valuation as follows:

Valuation Date:	6/30/2016
Actuarial Cost Method:	Entry Age
Amortization Method:	Level Percent of Pay, Closed
Remaining Amortization Period:	24 Years
Asset Valuation Method:	10 Year Smoothed Market

Actuarial Assumptions:

- Investment Rate of Return¹ 7.25%
- Projected Salaried Increases¹ 5.00%

1. Includes Inflation at 2.75%.

The schedule above is not required by current GASB standards. The information is provided for historical perspective as PSERS has transitioned to GASB Statement No. 68.

Table 8b

**Schedule of Employer Contributions for
Postemployment Benefits Other Than Pensions
GASB Statement No. 43 Disclosure
(\$ Amounts in Thousands)**

Fiscal Year Ended June 30	Annual Required Contribution	Actual Employer Contribution	Percentage Contributed
2016	\$ 129,494	\$ 113,307	87 %
2015	128,489	116,808	91
2014	121,260	117,471	97
2013	113,016	107,993	96
2012	102,104	80,936	79
2011	119,320	88,796	74

The Annual Required Contribution (ARC) presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (i.e., the ARC for the fiscal year ended June 30, 2016 was determined by the valuation completed as of June 30, 2014, which was based on an 7.50% interest rate).

Additional information as of the latest actuarial valuation as follows:

Valuation Date:	6/30/2016
Actuarial Cost Method:	Entry Age
Amortization Method:	Level Dollar, Open
Remaining Amortization Period:	30 Years
Asset Valuation Method:	Market

Actuarial Assumptions:

- Investment Rate of Return¹ 7.25%
- Projected Salaried Increases¹ 5.00%

1. Includes Inflation at 2.75%.

Table 9

Solvency Test
Comparative Summary of Accrued Liability and
Actuarial Value of Assets
(\$ Amounts in Thousands)

Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
					(1)	(2)	(3)
2016	\$ 14,907,731	\$ 55,314,858	\$ 29,766,812	\$ 57,265,506	100 %	77 %	0 %
2015	14,079,658	52,739,489	27,757,563	57,240,946	100	82	0
2014	13,554,229	51,425,295	27,373,459	57,231,799	100	85	0
2013	13,089,342	49,979,444	26,883,030	57,353,262	100	89	0
2012	12,535,442	47,511,912	27,713,306	58,227,622	100	96	0
2011	12,242,308	45,648,780	27,749,294	59,141,131	100	100	5

POSTEMPLOYMENT BENEFITS OTHER THAN PENSIONS

Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
					(1)	(2)	(3)
2016	\$ 0	\$ 978,207	\$ 453,280	\$ 124,563	N/A	13 %	0 %
2015	0	957,954	410,135	120,643	N/A	13	0
2014	0	959,079	415,033	112,060	N/A	12	0
2013	0	961,701	423,332	100,349	N/A	10	0
2012	0	934,506	430,161	93,753	N/A	10	0
2011	0	909,076	430,368	111,258	N/A	12	0

Table 10

History and Projection of Contribution Rates and Funded Ratios¹

Fiscal Year Ending June	Budgeted Appropriation Payroll (thousands)	Contribution Rates ²							Funded Ratio
		Employee	Employer Normal Cost	Employer Unfunded Liability	Preliminary Employer Pension	Final Employer Pension ⁶	Employer Health Insurance	Total Employer	
2007 ³	\$ 11,821,951	7.21 %	6.62 %	(0.95) %	5.67 %	5.72 %	0.74 %	6.46 %	85.8 %
2008	12,881,244	7.25	6.68	(0.24)	6.44	6.44	0.69	7.13	86.0
2009	12,500,000	7.29	6.68	(3.37)	3.31	4.00	0.76	4.76	79.2
2010 ⁴	12,899,000	7.32	7.35	(3.72)	3.63	4.00	0.78	4.78	75.1
2011 ^{4,5}	13,510,000	7.34	8.08	(0.50)	7.58	5.00	0.64	5.64	69.1
2012	14,112,000	7.37	8.12	10.15	18.27	8.00	0.65	8.65	66.4
2013 ⁷	14,297,000	7.40	8.66	12.99	21.65	11.50	0.86	12.36	63.8
2014	13,720,000	7.43	8.57	15.25	23.82	16.00	0.93	16.93	62.0
2015	13,482,000	7.46	8.46	17.51	25.97	20.50	0.90	21.40	60.6
2016	13,375,000	7.49	8.38	19.44	27.82	25.00	0.84	25.84	57.3
2017	13,549,000	7.52	8.31	20.89	29.20	29.20	0.83	30.03	55.6
2018^{8,9}	13,449,000	7.54	7.70	24.04	31.74	31.74	0.83	32.57	54.6
2019	13,657,662	7.55	7.52	25.80	33.32	33.32	0.86	34.18	55.5
2020	13,886,043	7.55	7.36	27.32	34.68	34.68	0.85	35.53	56.4
2021	14,136,176	7.55	7.21	27.89	35.10	35.10	0.85	35.95	57.0
2022	14,408,372	7.55	7.06	28.51	35.57	35.57	0.83	36.40	58.0
2023	14,695,797	7.55	6.92	29.36	36.28	36.28	0.83	37.11	59.2
2024	14,983,986	7.55	6.79	30.07	36.86	36.86	0.81	37.67	60.2
2025	15,271,925	7.55	6.64	30.80	37.44	37.44	0.80	38.24	61.5
2026	15,562,653	7.55	6.50	31.68	38.18	38.18	0.79	38.97	63.4

1. The projection of contribution rates is based on the assumption that there are no changes in demographic assumptions, no changes in benefit provisions, and no actuarial gains or losses other than gains or losses on the actuarial value of assets that result from recognizing currently deferred gains or losses on the market value of assets. In addition, a constant active population is assumed with future new members to be Class T-E members with the same demographic characteristics of new members during the period 7/1/2013 to 6/30/2016.
2. In general, the Preliminary Employer Pension Rate equals the sum of the rates for the Employer Normal Cost and the Unfunded Liability; and the Final Employer Pension Rate is the greater of the Preliminary Pension Rate and any Pension Rate Floor or Collar stated in the Retirement Code. The Total Employer Rate is the sum of the Final Employer Pension Rate and the Employer Health Insurance Rate.
3. Revised actuarial assumptions based on a five-year experience review ending June 30, 2005 were used to determine the contributions for the fiscal year ended June 30, 2007. Since the benefit changes under Act 2001-9 had not been in effect throughout the entire period covered by the study the Board decided, at its December 2005 meeting, to delay making any changes to the retirement rate assumptions until further data became available. The 5.72% Final Employer Pension Rate equals the 6.46% Total Employer Rate certified by the Board at that meeting, minus the 0.74% Employer Health Insurance Rate. The 5.67% Preliminary Employer Pension Rate equals the sum of the Employer Normal Cost and Unfunded Liability rates. The Normal Cost and Unfunded Liability rates were calculated by the actuary in January 2006, based on the package of assumptions adopted at the December 2005 meeting.
4. At its January 2009 meeting, the Board voted to reduce the interest rate from 8.50% to 8.25% for the June 30, 2008 valuation and to 8.00% for subsequent valuations.
5. Act 2010-46 recertified the fiscal year ended June 30, 2011 pension rate from 7.58% to 5.00%.
6. The Final Employer Pension rate is limited by the Act 2010-120 pension rate collars for fiscal years 2012 through 2016.
7. Revised actuarial assumptions based on a five-year experience review ended June 30, 2010 were used to determine the contributions for the fiscal year ending June 30, 2013 and thereafter, which include an interest rate of 7.50%.
8. Revised actuarial assumptions based on a five-year experience review ended June 30, 2015 were used to determine the contributions for the fiscal year ending June 30, 2018 and thereafter, which include an interest rate of 7.25%.
9. The employer normal rate in fiscal year ending June 30, 2050 for Class T-E and Class T-F members is projected to be 2.69% based on the assumptions outlined in Table 12 and Note (1) above.

Table 11
History and Projection of Annuitants, Beneficiaries, Survivor Annuitants and Active Members

Valuation as of June 30	New Annuitants During the Year ¹	Annuitant Deaths During the Year	Annuitants at End of Year	Beneficiaries and Survivor Annuitants at End of Year	Total Annuitants, Beneficiaries and Survivor Annuitants	Active Members
2007			159,760	8,266	168,026	264,023
2008			165,091	8,449	173,540	272,690
2009			169,919	8,044	177,963	279,701
2010			176,210	8,724	184,934	282,041
2011			183,665	10,957	194,622	279,152
2012			190,560	11,455	202,015	273,504
2013			197,735	11,469	209,204	267,428
2014			203,756	10,144	213,900	263,312
2015			209,266	10,509	219,775	259,868
2016			214,019	10,809	224,828	257,080
2017	14,283	4,271	224,031	11,423	235,454	257,080
2018	12,601	4,482	232,150	11,971	244,121	257,080
2019	11,860	4,671	239,339	12,445	251,784	257,080
2020	11,128	4,844	245,623	12,856	258,479	257,080
2021	10,589	5,005	251,207	13,215	264,422	257,080
2022	10,160	5,157	256,210	13,530	269,740	257,080
2023	9,769	5,300	260,679	13,803	274,482	257,080
2024	9,474	5,435	264,718	14,039	278,757	257,080
2025	9,264	5,565	268,417	14,238	282,655	257,080
2026	9,151	5,687	271,881	14,401	286,282	257,080

1. The number for the fiscal year of the projection reflects the assumption that all Active members age 74 and above, and that all vested inactive members who have reached superannuation age retire immediately.

Table 12

Description of Actuarial Assumptions and Methods

Assumptions

Interest Rate: 7.25% per annum, compounded annually (adopted as of June 30, 2016). The components are 2.75% for inflation and 4.50% for the real rate of return. Actuarial equivalent benefits are determined based on an interest rate of 4% per year (since 1960).

Separation from Service: Illustrative rates of assumed separation from service are shown in the following table (adopted as of June 30, 2016).

Age	Annual Rate of:						
	Withdrawal less than 5 Years of Service	Withdrawal		Death ¹	Disability	Early Retirement ²	Superannuation Retirement
		Between 5 and 10 Years of Service	10 or More Years of Service				
Males							
25	14.85%	5.70%	2.57%	.041%	.020%		
30	12.74	3.37	2.57	.039	.020		
35	13.39	3.21	1.50	.044	.058		
40	14.49	3.97	1.34	.050	.116		
45	14.42	4.53	1.37	.084	.160		19.16%
50	14.31	4.45	1.92	.138	.284		19.16
55	12.17	4.43	3.38	.233	.442	18.57%	26.59
60	12.43	5.58	5.57	.379	.582	14.42	30.87
65				.700	.087		21.39
69				1.067	.135		19.34
Females							
25	13.41%	7.47%	5.02%	.013%	.018%		
30	13.81	6.05	4.02	.017	.023		
35	14.22	5.53	2.85	.024	.055		
40	11.79	4.87	1.60	.032	.096		
45	11.54	4.51	1.65	.051	.135		15.00%
50	11.66	4.43	2.06	.088	.229		15.00
55	11.75	4.38	3.11	.133	.368	18.59%	10.02
60	12.25	5.97	6.40	.196	.360	17.05	35.77
65				.327	.082		22.23
69				.443	.115		22.79

1. These base mortality tables will then be projected on a generational basis using the Buck Modified 2015 projection scale to the valuation date and thereafter.
2. Early Retirement – Age 55 with 25 years of service, but not eligible for Superannuation retirement.

Death after Retirement:

Male annuitants: RP-2014 male mortality table adjusted backward to 2006 with the MP-2014 improvement scale and projected to the valuation date with the Buck Modified 2015 projection scale.

Female Annuitants: RP-2014 male mortality table adjusted backward to 2006 with the MP-2014 mortality improvement scale, projected to 2013 with the Buck Modified 2015 projection scale adjusted for credibility. This base mortality table will then be projected on a generational basis using the Buck Modified 2015 projection scale to the valuation date.

Disabled annuitants: RP-2014 male and female disabled mortality tables adjusted backward to 2006 with the MP-2014 mortality improvement scale and projected to the valuation date with the Buck Modified 2015 projection scale.

These base mortality tables will then be projected on a generational basis using the Buck Modified 2015 projection scale from the valuation date.

For determination of actuarial equivalence, a unisex table based on the above base tables, with weightings of 25% of male and 75% of female mortality probabilities, is utilized. This table is then projected on a generational basis to 2020 using the Buck Modified 2015 projection scale.

Salary Increase: Effective average of 5.00% per annum, compounded annually (adopted as of June 30, 2016). The components are 2.75% for inflation, and 2.25% for real wage growth and merit or seniority increases. Representative values are as follows:

Age	Annual Rate of Salary Increase
20	10.25%
30	7.75
40	5.75
50	3.75
55	3.25
60	3.25
65	3.25
70	3.25

Payroll Growth: 3.50% per annum.

Miscellaneous:

Annuity Optional Forms Assumption for Retiring Active Members:

- 50% will elect Maximum Straight Life Annuity (MSLA)
- 20% will elect OPTION 1 (Straight life annuity with guaranteed payments equal to present value of MSLA)
- 20% will elect OPTION 2 (100% Joint and Survivor with males 3 years older than females)
- 10% will elect OPTION 3 (50% Joint and Survivor with males 3 years older than females)

- 0% will elect OPTION 4 annuity

Option 4 Lump Sum Elections: 80% of Class T-C and Class T-D members are assumed to elect a refund of contributions and a reduced annuity.

Withdrawal Annuity: 90% of members are assumed to commence payment immediately and 10% are assumed to defer payment to superannuation age.

Health Insurance:

Elections: 63% of eligible retirees are assumed to elect premium assistance.

Administrative Expenses: Assumed equal to 2% of contributions made during the year.

Summary of Changes since the June 30, 2015 Valuation:

As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were selected on the basis of the July 1, 2010 to June 30, 2015 Experience Review and adopted by the Board of Trustees at their June 10, 2016 meeting, which include a 7.25% per annum rate of investment return.

The proportion of eligible participants who are assumed to elect Premium Assistance coverage was changed from 64% to 63% to reflect a refinement of this estimate per discussions with the Plan Sponsor.

Methods

Calculations: The actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system, and on actuarial assumptions that are internally consistent and reasonable based on the actual experience of the System.

Asset Valuation Method: A ten-year moving market average (five-year moving market average prior to June 30, 2010) value of assets that recognizes the 7.25% (7.50% prior to June 30, 2016, 8.25% prior to June 30, 2009, and 8.50% prior to June 30, 2008) actuarial expected investment return immediately and spreads the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets over a period of ten years. The averaging period is being phased-in from fiscal year 2007/2008.

Actuarial Cost Method for Pension Funding: Entry Age Normal Cost Method (modified slightly as of June 30, 2005 to use a pay-weighted average normal contribution rate). The results of each June 30 valuation normally determine the employer contribution rate for the second succeeding fiscal year. Act 120 revised the funding method effective with the June 30, 2010 valuation. Act 120 mandated that the outstanding balance of the unfunded accrued liability as of June 30, 2010, including changes in the unfunded accrued liability due to the funding reforms of Act 120, be amortized over a 24-year period, as a level percent of pay, beginning July 1, 2011. Future valuation gains and losses, and changes in the unfunded accrued liability resulting from changes in actuarial assumptions and methods, are amortized over a 24-year period, as a level percent of pay. Future increases in the unfunded accrued liability due to legislation will be amortized over a 10-year period, as a level percent of pay. Act 120 also modified the employer pension contribution requirements by imposing collars on the rate at which employer contributions may rise from year to year. For the fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014 the pension contribution rate can be no more than 3%, 3.5% and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with the fiscal year in which the actuarially required contribution rate is less than the collared rate, the final contribution rate is the actuarially determined contribution rate, provided that the final contribution rate is not less than the employer normal contribution rate.

Actuarial Cost Method for Health Insurance Funding: The actuarial liability equals the assets in the health insurance account, and the results of the June 30 valuation determine the contribution rate for the second succeeding fiscal year. The rate so determined is the rate necessary to establish reserves sufficient to cover administrative expenses and provide premium assistance payments for all participating eligible annuitants during the third fiscal year that follows the valuation date.

Actuarial Cost Method for GASB 43 Accounting for Health Insurance: The actuarial liability is determined under the entry age actuarial cost method, and the Annual Required Contribution for the second fiscal year that follows the valuation date is equal to the entry age normal cost for health insurance plus an amount that will amortize the entry age unfunded actuarial liability for health insurance over a period of 30 years.

Data

Census and Assets: The valuation was based on members of the Retirement System as of June 30, 2016 and does not take into account future members. All census data was supplied by the Retirement System and was subject to reasonable consistency checks. The actuaries adjust the data to account for service and pay earned by members on or before the valuation that is not reported by the Retirement System until after the actuarial valuation is performed. Asset data was supplied by the Retirement System.

Table 13

Summary of Benefit and Contribution Provisions

Membership

For valuation purposes, all employees are considered to be full coverage. All employees who become members on and after January 1, 1966 are members of the dual coverage group. Dual coverage members contribute to both PSERS and to Social Security.

Benefits

Superannuation Annuity

Eligibility Age 62, or age 60 with 30 years of service, or 35 years of service regardless of age. For Class T-E and Class T-F members, age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service

Amount 2.5% of final average salary times years of school service and intervening military service. 2% of final average salary for non-school service, for members who did not elect Class T-D coverage, and for Class T-E members. Minimum of \$100 per year of service. "Final average salary" means the highest average annual salary for any 3 years of service.

Annual salary is subject to a limit of \$200,000, as adjusted under Section 401(a)(17) of the Internal Revenue Code. As of June 30, 2016, the adjusted limit is \$265,000.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E and Class T-F members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

Early Retirement Annuity

Eligibility Age 55 with 25 years of service.

Amount Accrued benefit as of date of retirement, reduced 1/4% for each month by which commencement of payments precedes Superannuation Age.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E and Class T-F members, the maximum benefit is equal to the lesser of the limit

established by Section 415 of the Internal Revenue Code or 100% of final average salary.

Withdrawal Annuity

Eligibility	5 years of service. For Class T-E and Class T-F members, ten years of service.
Amount	Accrued benefit deferred to superannuation retirement age or an actuarially reduced benefit payable immediately.

Disability Annuity

Eligibility	5 years of service.
Amount	The standard single life annuity if the total number of years of credited service is greater than 16.667, otherwise the standard single life annuity multiplied by the lesser of the following ratios: (Y^*/Y) or $(16.667/Y)$ where Y is the number of years of credited service and Y* is the total years of credited service if the member were to continue as a school employee until superannuation retirement age (or at current age, if later). Minimum of \$100 per year of service.

Return of Contributions

Eligibility	Death or separation from service and member does not qualify for other benefits.
Amount	Refund of accumulated deductions includes interest (less annuity payments received prior to death in the case of a retired member).

Death Benefit

Eligibility	Death of an active member or vestee who was eligible to receive an annuity.
Amount	The present value of the annuity that would have been effective if the member retired on the day before death. Option 1 assumed payable if no other option elected.

Normal and Optional Forms of Benefits

Normal Form (Maximum):	Life annuity with a guaranteed payment equal to member contributions with interest.
Option 1:	Reduced benefit with refund of balance of present value of annuity at retirement over payments received. If balance is less than \$5,000, benefit is paid in lump sum; otherwise, beneficiary may elect annuity and/or lump sum.

- Option 2: Joint and 100% survivorship annuity.
- Option 3: Joint and 50% survivorship annuity.
- Option 4: Benefit of equivalent actuarial value, including lump sum payment of member contributions. Class T-E and Class T-F members cannot elect to receive a lump sum payment of member contributions.

Health Care Premium Assistance

- Eligibility** Retired members who:
- (a) have 24½ or more years of service, or
 - (b) are disability annuitants, or
 - (c) have 15 or more years of service and who both terminated school service and retired after attaining superannuation age and
 - (d) participate in the PSERS health options program or in an employer-sponsored health insurance program.
- Amount** Participating eligible annuitants receive health insurance premium assistance payments from the Health Insurance Account equal to the lesser of \$100 per month or the actual monthly premium. All administrative expenses necessary to operate the health insurance premium assistance program are to be funded by the Health Insurance Account. The Health Insurance Account is credited with contributions of the Commonwealth and the employers.

Contributions

By Members Members who elected coverage under Class T-D and who were most recently enrolled prior to July 22, 1983 contribute at a rate of 6½% of compensation, while members who elected coverage under Class T-D and who were most recently enrolled on or after July 22, 1983 contribute at a rate of 7½% of compensation. Members who did not elect coverage under Class T-D and who were most recently enrolled prior to July 22, 1983 contribute at a rate of 5¼% of compensation, while members who did not elect coverage under Class T-D and who were most recently enrolled on or after July 22, 1983 and prior to July 1, 2001 contribute at a rate of 6¼% of compensation. Anyone who enrolls or re-enrolls on or after July 1, 2001 automatically has coverage under class T-D for subsequent school service and subsequent intervening military service, and must contribute at a rate of 7½% of compensation.

The base contribution rate for Class T-E members is 7½% of compensation. The base contribution rate

for Class T-F members is 10.3% of compensation. Class T-E and Class T-F members are subject to a "shared-risk" employee contribution rate. Members benefit when investments of the fund are doing well and share some of the risk when investments underperform. The member contribution rate will stay within the specified range allotted for Class T-E or Class T-F members, but could increase or decrease every three years starting July 1, 2015 depending on investment performance. The member contribution rate can never go below the base rate of 7.5% for Class T-E members and 10.3% for Class T-F members, nor above 9.5% for Class T-E members and 12.3% for class T-F members. If the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return based on the prior ten-year period, the member contribution rate will decrease by .5%. Likewise, the member contribution rate will increase by .5% if the investment rate of return (less investment fees) during the ten-year period is 1.0% or more below the assumed rate of return. If the Retirement System is fully funded at the time of the comparison, the member contribution rate reverts back to the base rate for the Class. There shall not be an increase in the member contribution rate if there has not been an equivalent increase in the employer contribution rate over the previous three-year period. Until a full ten-year look back period is available, the investment return measurement period will begin on July 1, 2011.

By Commonwealth and
School Districts

Balance of required contribution determined as normal contribution, accrued liability contribution, supplemental annuity contribution, experience adjustment factor and premium assistance contribution, is funded by the Commonwealth and the School District.

Table 14

Summary of Membership Data as of June 30, 2016
(\$ Amounts in Thousands)

Total Active Members*

Item	Male	Female	Total
Number of Members	70,192	186,888	257,080
Total Annual Salaries **	\$ 3,896,970	\$ 8,954,319	\$ 12,851,289
Average Age ***	44.8	45.2	45.1
Average Service ***	11.6	11.1	11.3

* Excludes 143,520 inactive members and vestees.

Class T-C Members*

Item	Male	Female	Total
Number of Members	880	2,802	3,682
Total Annual Salaries **	\$ 54,201	\$ 127,427	\$ 181,628
Average Age ***	49.8	52.3	51.7
Average Service ***	20.0	18.1	18.5

* Excludes 30,562 inactive members and vestees.

Class T-D Members*

Item	Male	Female	Total
Number of Members	52,477	143,000	195,477
Total Annual Salaries **	\$ 3,349,679	\$ 7,669,792	\$ 11,019,471
Average Age ***	46.6	47.3	47.1
Average Service ***	14.6	13.7	13.9

* Excludes 80,540 inactive members and vestees.

** The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2016 for members who were in active service on June 30, 2016.

*** Average completed years of age and service.

Table 14
(Continued)

Summary of Membership Data as of June 30, 2016
(\$ Amounts in Thousands)

Class T-E Members*

Item	Male	Female	Total
Number of Members	14,065	34,563	48,628
Total Annual Salaries **	\$ 382,871	\$ 925,129	\$ 1,308,000
Average Age ***	38.9	37.5	37.9
Average Service ***	1.6	1.7	1.7

* Excludes 31,245 inactive members.

Class T-F Members*

Item	Male	Female	Total
Number of Members	2,770	6,523	9,293
Total Annual Salaries **	\$ 110,219	\$ 231,971	\$ 342,190
Average Age ***	38.6	36.3	37.0
Average Service ***	2.1	2.0	1.9

* Excludes 1,173 inactive members.

** The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2016 for members who were in active service on June 30, 2016.

*** Average completed years of age and service.

**Table 14
(Continued)**

**Summary of Membership Data as of June 30, 2016
(\$ Amounts in Thousands)**

Total Annuitants and Beneficiaries¹

Item	Number	Annual Annuities ²	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	204,843	\$ 5,342,448	\$ 26,081	70.5
Survivors and Beneficiaries	10,809	146,388	\$ 13,543	75.7
Disabled Annuitants	<u>9,176</u>	<u>177,556</u>	\$ 19,350	64.3
Total	224,828	\$ 5,666,392	\$ 25,203	70.5

New Annuitants and Beneficiaries

Who Retired Between July 1, 2015 and June 30, 2016

Item	Number ³	Annual Annuities ²	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	9,794	\$ 239,700	\$ 24,474	60.7
Survivors and Beneficiaries	2,039	14,377	\$ 7,051	58.9
Disabled Annuitants	<u>414</u>	<u>10,136</u>	\$ 24,483	54.7
Total	12,247	\$ 264,214	\$ 21,574	60.2

1. The median annual benefit payable to all annuitants and beneficiaries is \$20,365.
2. The annuities shown in the tables above represent the annual amount payable as of July 1, 2016 for participants who were in payment on June 30, 2016.
3. Excludes 1,432 newly reported annuitants who retired prior to June 30, 2015 and 167 members who retired after June 30, 2015 but died prior to June 30, 2016.

**Table 14
(Continued)**

**Distribution of Annuitants, Beneficiaries, and Survivors by Annual Pension Amount
As of June 30, 2016**

1. All annuitants, beneficiaries, and survivors

Annual Pension Amount	Number	Average Years of Service
Under \$10,000	79,975	13
\$10,000 - \$19,999	31,449	22
\$20,000 - \$29,999	25,762	27
\$30,000 - \$39,999	28,031	30
\$40,000 - \$49,999	26,721	33
\$50,000 - \$59,999	17,628	34
\$60,000 - \$69,999	8,680	35
\$70,000 - \$79,999	3,780	36
\$80,000 - \$89,999	1,428	37
\$90,000 - \$99,999	644	37
\$100,000 or more	730	38
Total	224,828	24

2. Excludes annuitants, beneficiaries, and survivors with no service on file

Annual Pension Amount	Number	Average Years of Service
Under \$10,000	77,210	13
\$10,000 - \$19,999	29,764	23
\$20,000 - \$29,999	24,956	28
\$30,000 - \$39,999	27,647	31
\$40,000 - \$49,999	26,503	33
\$50,000 - \$59,999	17,502	34
\$60,000 - \$69,999	8,634	35
\$70,000 - \$79,999	3,763	36
\$80,000 - \$89,999	1,424	37
\$90,000 - \$99,999	640	37
\$100,000 or more	727	38
Total	218,770	24

Exhibit I

Active Membership Data as of June 30, 2016
 Number and Average Annual Salary

Age	Service									Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
Under 25	6,569 \$24,736	42 \$33,319									6,611 \$24,791
25-29	15,696 \$36,252	4,991 \$51,203	43 \$37,242								20,730 \$39,854
30-34	8,425 \$34,112	15,152 \$55,180	5,963 \$63,233	31 \$49,577							29,571 \$50,795
35-39	6,725 \$27,517	6,869 \$52,654	14,656 \$66,770	3,950 \$74,800	11 \$47,110						32,211 \$56,543
40-44	7,086 \$23,402	5,127 \$43,890	6,834 \$63,119	11,446 \$78,160	2,350 \$83,516	35 \$54,394					32,878 \$58,245
45-49	7,631 \$21,366	6,197 \$36,859	6,262 \$52,991	7,012 \$72,578	7,931 \$84,443	1,997 \$81,196	30 \$54,302				37,060 \$55,740
50-54	6,070 \$20,899	5,928 \$32,416	6,672 \$42,944	5,643 \$55,857	4,002 \$73,566	4,977 \$80,988	1,676 \$78,876	62 \$53,791			35,030 \$50,065
55-59	4,711 \$19,810	4,703 \$30,830	6,462 \$40,649	6,731 \$49,025	4,266 \$60,688	3,135 \$71,651	2,820 \$81,161	722 \$76,525	27 \$51,020		33,577 \$47,652
60-64	2,952 \$17,980	2,784 \$29,650	3,461 \$39,070	4,181 \$48,133	3,214 \$56,420	2,337 \$61,958	906 \$69,521	658 \$81,104	217 \$74,219		20,710 \$44,938
Over 64	2,406 \$13,607	1,640 \$21,659	1,404 \$32,195	1,155 \$40,862	796 \$46,489	614 \$49,667	315 \$53,062	162 \$66,383	210 \$81,451		8,702 \$31,341
Total	68,271 \$26,934	53,433 \$44,231	51,757 \$55,066	40,149 \$64,613	22,570 \$72,581	13,095 \$73,848	5,747 \$76,979	1,604 \$76,500	454 \$76,184		257,080 \$49,989

Exhibit II

The Number of Average Annual Annuity as of June 30, 2016

**Retired on Account of Superannuation, Early Retirement and Those
in Receipt of Withdrawal Annuities**

Age	Years of Service									Total
	0-4 ¹	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 50		4,659	1,449	392	125	28	1			6,654
		\$869	\$2,631	\$6,929	\$13,532	\$21,279	\$8,670			\$1,934
50-54		1,579	1,103	456	238	161	57	18	1	3,613
		\$1,207	\$2,635	\$6,295	\$12,444	\$23,305	\$34,007	\$41,891	\$9,498	\$4,732
55-59		1,630	1,591	959	595	983	1,898	940	10	8,606
		\$1,673	\$3,182	\$7,380	\$14,306	\$32,698	\$47,904	\$55,604	\$46,734	\$23,132
60-64	108	2,219	3,298	2,787	2,810	3,713	7,365	6,623	330	29,253
	\$1,720	\$3,028	\$5,477	\$12,212	\$21,753	\$34,421	\$48,074	\$59,560	\$60,724	\$34,747
65-69	761	3,032	5,892	4,890	5,069	6,415	13,682	12,434	1,329	53,504
	\$1,849	\$3,900	\$5,615	\$12,503	\$21,308	\$31,144	\$43,829	\$56,543	\$68,799	\$33,818
70-74	1,219	2,345	4,374	3,942	3,757	4,475	11,196	7,484	1,039	39,831
	\$1,125	\$3,326	\$4,916	\$10,148	\$17,714	\$27,118	\$36,726	\$51,153	\$64,308	\$28,103
75-79	1,001	1,445	2,875	2,766	2,957	3,425	5,800	4,371	908	25,548
	\$872	\$2,775	\$4,344	\$8,512	\$13,757	\$21,780	\$31,459	\$39,542	\$53,985	\$21,939
80-84	618	1,018	2,229	2,179	2,462	2,673	3,335	2,426	931	17,871
	\$730	\$2,163	\$3,620	\$6,625	\$11,279	\$18,133	\$27,339	\$36,433	\$42,910	\$17,957
85-89	413	654	1,619	1,722	1,982	1,977	1,875	1,419	655	12,316
	\$717	\$1,780	\$3,409	\$6,289	\$11,263	\$17,295	\$24,376	\$32,918	\$41,312	\$15,735
Over 89	317	449	1,173	1,318	1,278	1,187	820	774	331	7,647
	\$1,214	\$1,632	\$3,381	\$6,398	\$10,451	\$15,271	\$20,063	\$25,543	\$35,443	\$12,156
Total	4,437	19,030	25,603	21,411	21,273	25,037	46,029	36,489	5,534	204,843
	\$1,120	\$2,267	\$4,470	\$9,578	\$16,592	\$26,394	\$38,963	\$51,004	\$55,387	\$26,081

1. Includes 76 annuitant records with no service information provided.

Exhibit III

The Number and Average Annual Annuity as of June 30, 2016

Beneficiaries and Survivor Annuitants

Age	Years of Service								Total
	0-9 ¹	10-14	15-19	20-24	25-29	30-34	35-39	40+	
Under 50	195	25	17	19	22	14	10	4	306
	\$12,574	\$4,502	\$3,837	\$4,348	\$7,900	\$13,548	\$15,481	\$18,274	\$7,240
50-54	132	10	13	13	11	7	3	4	193
	\$17,724	\$2,845	\$5,389	\$7,190	\$9,433	\$9,721	\$30,851	\$9,208	\$8,808
55-59	330	22	25	26	20	15	12	12	462
	\$29,960	\$2,740	\$5,499	\$6,426	\$13,273	\$15,619	\$11,785	\$11,799	\$11,293
60-64	614	30	41	41	48	45	34	10	863
	\$26,025	\$5,156	\$8,024	\$7,599	\$13,835	\$14,482	\$19,390	\$14,262	\$16,088
65-69	974	43	34	46	52	120	105	14	1,388
	\$27,321	\$4,058	\$4,986	\$9,345	\$13,906	\$18,179	\$21,000	\$11,877	\$19,386
70-74	893	53	53	59	65	187	143	27	1,480
	\$22,408	\$4,061	\$5,531	\$9,340	\$12,936	\$18,528	\$22,805	\$15,386	\$17,368
75-79	898	82	87	80	79	159	146	54	1,585
	\$16,955	\$3,475	\$5,789	\$7,768	\$13,225	\$16,732	\$20,636	\$20,476	\$14,139
80-84	833	88	94	90	88	182	137	98	1,610
	\$13,907	\$3,006	\$4,510	\$7,217	\$10,275	\$12,928	\$17,766	\$22,239	\$12,242
85-89	751	102	121	122	112	150	172	88	1,618
	\$13,963	\$3,087	\$4,556	\$7,474	\$8,884	\$12,520	\$13,747	\$18,201	\$10,654
Over 89	480	125	89	97	112	129	181	91	1,304
	\$10,726	\$2,613	\$3,981	\$5,625	\$7,834	\$9,587	\$11,643	\$15,526	\$8,742
Total ²	6,100	580	574	593	609	1,008	943	402	10,809
	\$15,077	\$3,339	\$5,048	\$7,359	\$10,825	\$14,800	\$17,426	\$18,098	\$13,543

1. Includes 5,976 beneficiary or survivor annuitant records with no service information provided.

2. In addition, there are 1,181 beneficiaries who are only entitled to a pending lump sum distribution.

Exhibit IV

The Number and Average Annual Annuity as of June 30, 2016

Retired on Account of Disability

Age	Years of Service									Total	
	0-4	5-9 ¹	10-14	15-19	20-24	25-29	30-34	35-39	40+		
Under 50		203	187	107	52	6					555
		\$15,000	\$19,317	\$25,072	\$36,201	\$58,834					\$20,857
50-54		200	198	138	122	98	7	1			764
		\$11,815	\$14,295	\$21,088	\$32,112	\$41,489	\$34,984	\$43,514			\$21,434
55-59		311	333	308	229	166	80	1	1		1,429
		\$10,324	\$13,942	\$19,445	\$28,967	\$40,900	\$45,548		\$39,130		\$21,612
60-64		388	480	389	381	323	134	3			2,098
		\$9,599	\$13,309	\$16,807	\$25,823	\$37,355	\$46,111	\$55,627			\$21,389
65-69		322	351	283	312	397	221	4	5		1,895
		\$7,782	\$10,859	\$15,945	\$23,177	\$33,061	\$45,432	\$26,414	\$27,980		\$21,885
70-74		173	247	202	230	200	75	4			1,131
		\$6,216	\$8,710	\$11,782	\$19,420	\$27,885	\$36,943	\$39,469			\$16,427
75-79		106	160	143	123	69	24	2	1		628
		\$5,297	\$7,794	\$9,618	\$15,582	\$22,316	\$30,253	\$42,997	\$10,189		\$11,882
80-84		65	97	90	67	44	8	1	1		373
		\$4,903	\$6,118	\$8,725	\$12,917	\$20,725	\$23,683	\$43,179	\$10,304		\$9,967
85-89		41	66	37	37	23	1	1	1		207
		\$3,729	\$5,449	\$8,276	\$11,938	\$18,350	\$20,353	\$24,751	\$54,601		\$8,610
Over 89		20	30	17	14	11	4				96
		\$4,231	\$6,208	\$7,958	\$11,389	\$16,874	\$20,413				\$8,676
Total		1,829	2,149	1,714	1,567	1,337	554	17	9		9,176
		\$9,318	\$12,016	\$16,100	\$23,821	\$33,684	\$43,052	\$36,932	\$28,236		\$19,350

1. Includes 6 annuitant records with no service information provided.

Exhibit V

Annuitant and Beneficiary Membership Data as of June 30, 2016

Number and Average Annual Benefit

Excludes Partial Lump Sum Payments

Age Last Birthday	Number	Annual Benefit (Thousands)	Average Annual Benefit
Annuitants (Normal, Early and Withdrawal)			
Under 60	18,873	\$ 229,046	\$ 12,136
60 - 64	29,253	1,016,458	34,747
65 - 69	53,504	1,809,396	33,818
70 - 74	39,831	1,119,385	28,103
75 - 79	25,548	560,509	21,939
Over 79	37,834	607,654	16,061
Total	204,843	\$ 5,342,448	\$ 26,081
Survivors and Beneficiaries			
Under 60	961	\$ 9,134	\$ 9,505
60 - 64	863	13,884	16,088
65 - 69	1,388	26,907	19,385
70 - 74	1,480	25,705	17,368
75 - 79	1,585	22,410	14,139
Over 79	4,532	48,348	10,668
Total	10,809	\$ 146,388	\$ 13,543
Disabled Annuitants			
Under 60	2,748	\$ 58,835	\$ 21,410
60 - 64	2,098	44,875	21,389
65 - 69	1,895	41,472	21,885
70 - 74	1,131	18,579	16,427
75 - 79	628	7,463	11,884
Over 79	676	6,332	9,367
Total	9,176	\$ 177,556	\$ 19,350
Grand Total Average Annual Benefit			
	224,828	\$ 5,666,392	\$ 25,203

Exhibit VI

10-Year History of Membership Data

Active Members

Valuation as of June 30	Number of Active Members	Percentage Change in Membership	Total Annualized Payroll (Thousands) ¹	Percentage Change in Payroll
2016	257,080	(1.07%)	\$ 12,851,289	1.37%
2015	259,868	(1.31%)	12,678,213	0.45%
2014	263,312	(1.54%)	12,620,862	0.35%
2013	267,428	(2.22%)	12,577,105	(1.08%)
2012	273,504	(2.02%)	12,714,371	(1.52%)
2011	279,152	(1.02%)	12,910,043	0.95%
2010	282,041	0.84%	12,788,847	2.11%
2009	279,701	2.57%	12,524,593	5.06%
2008	272,690	3.28%	11,921,469	4.48%
2007	264,023	0.26%	11,410,257	(0.08%)

1. The salaries shown represent an annual rate of pay for the year ending June 30th for members who were in active service on June 30th.

Exhibit VI

(Continued)

10-Year History of Membership Data

The Number and Annual Annuities of Annuitant and Survivor Annuitant Members

Year Ended June 30	Number	Annual Annuities ¹ (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2016	224,828	\$ 5,666.4	\$ 25,203	12,686	\$ 267.1	7,633	\$ 93.5	2.30%	2.64%
2015	219,775	5,520.6	25,119	15,017	297.3	9,142	91.7	2.75%	3.39%
2014	213,900	5,339.5	24,962	15,225	300.5	8,878	84.9	3.06%	3.74%
2013	207,553	5,147.1	24,800	16,404	377.6	10,866	83.7	2.74%	5.63%
2012	202,015	4,872.9	24,121	14,579	332.7	7,186	66.6	3.80%	4.78%
2011	194,622	4,650.8	23,897	16,228	453.7	6,540	76.4	5.24%	7.17%
2010	184,934	4,339.6	23,466	12,649	372.8	5,678	77.6	3.92%	8.59%
2009	177,963	3,996.3	22,456	9,651	314.9	5,228	74.4	2.55%	4.85%
2008	173,540	3,811.5	21,964	10,911	345.3	5,397	73.9	3.28%	8.18%
2007	168,026	3,523.4	20,969	10,612		4,399		3.84%	7.60%

1. The annual annuities added and deleted are for the annuitants and survivor annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

10-Year History of Membership Data

The Number and Annual Annuities of Annuitant Members

Year Ended June 30	Number	Annual Annuities ² (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2016	214,019	\$ 5,520.0	\$ 25,792	11,807	\$ 249.8	7,054	\$ 88.1	2.27%	2.54%
2015	209,266	5,383.3	25,725	12,624	279.2	7,114	86.5	2.70%	3.30%
2014	203,756	5,211.4	25,577	12,915	283.9	6,894	80.0		

2. The annual annuities added and deleted are for the annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

Exhibit VII

Detailed Tabulations of the Data

Table 1

The Number and Annual Salaries of Members in Active Service Distributed by Age as of June 30, 2016

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
17	17	\$ 75,547	6	\$ 26,838	23	\$ 102,385
18	51	281,954	20	136,103	71	418,057
19	98	936,775	80	761,806	178	1,698,581
20	205	2,237,786	173	1,808,571	378	4,046,357
21	245	3,247,578	230	2,568,734	475	5,816,312
22	277	5,230,554	466	9,856,696	743	15,087,250
23	594	13,357,910	1,326	36,996,746	1,920	50,354,656
24	783	21,515,690	2,040	64,853,628	2,823	86,369,318
25	948	28,846,738	2,485	86,582,704	3,433	115,429,442
26	1,057	36,304,078	2,805	104,274,631	3,862	140,578,709
27	1,049	38,543,674	2,997	121,417,354	4,046	159,961,028
28	1,154	46,299,467	3,267	139,586,370	4,421	185,885,837
29	1,337	58,184,712	3,631	166,131,599	4,968	224,316,311
30	1,493	68,059,929	3,942	186,968,356	5,435	255,028,285
31	1,624	79,511,031	4,167	204,470,351	5,791	283,981,382
32	1,578	82,156,325	4,244	215,796,838	5,822	297,953,163
33	1,665	88,167,085	4,436	230,486,764	6,101	318,653,849
34	1,825	101,966,597	4,597	244,482,583	6,422	346,449,180
35	1,885	107,484,847	4,648	250,586,652	6,533	358,071,499
36	1,897	113,911,589	4,648	255,335,398	6,545	369,246,987
37	1,871	113,778,970	4,582	250,571,762	6,453	364,350,732
38	1,801	113,997,991	4,445	244,840,129	6,246	358,838,120
39	1,908	120,125,627	4,526	250,664,533	6,434	370,790,160
40	1,877	121,938,850	4,381	242,437,131	6,258	364,375,981
41	1,814	120,152,259	4,451	247,629,968	6,265	367,782,227
42	1,833	124,837,716	4,547	247,337,582	6,380	372,175,298
43	1,921	131,488,456	4,724	257,208,818	6,645	388,697,274
44	2,075	140,500,942	5,255	281,457,649	7,330	421,958,591
45	2,213	149,466,648	5,805	311,690,176	8,018	461,156,824
46	1,985	135,495,210	5,741	309,166,740	7,726	444,661,950
47	1,965	131,966,000	5,481	281,856,864	7,446	413,822,864
48	1,802	121,589,436	5,159	259,078,861	6,961	380,668,297
49	1,772	113,396,077	5,137	252,003,510	6,909	365,399,587
50	1,816	116,223,721	4,948	235,640,779	6,764	351,864,500
51	1,726	105,769,041	5,287	242,966,702	7,013	348,735,743
52	1,784	111,970,125	5,350	244,263,755	7,134	356,233,880
53	1,728	103,313,513	5,259	242,644,576	6,987	345,958,089
54	1,730	102,079,263	5,402	248,888,738	7,132	350,968,001
55	1,741	101,958,077	5,474	247,017,800	7,215	348,975,877
56	1,638	93,910,377	5,114	226,430,224	6,752	320,340,601

Table 1
(Continued)

**The Number and Annual Salaries off Members in Active Service Distributed
by Age as of June 30, 2016**

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
57	1,644	\$ 89,752,989	5,054	\$ 230,350,977	6,698	\$ 320,103,966
58	1,596	86,145,369	4,984	224,721,591	6,580	310,866,960
59	1,509	84,238,645	4,823	215,473,798	6,332	299,712,443
60	1,369	71,102,416	4,231	191,083,512	5,600	262,185,928
61	1,335	65,383,064	3,864	172,246,173	5,199	237,629,237
62	1,048	49,192,689	2,921	125,644,906	3,969	174,837,595
63	879	42,781,205	2,373	101,671,743	3,252	144,452,948
64	780	33,480,883	1,910	78,087,013	2,690	111,567,896
65	567	23,623,702	1,266	50,334,687	1,833	73,958,389
66	438	17,733,684	912	31,548,538	1,350	49,282,222
67	399	13,061,316	657	21,436,587	1,056	34,497,903
68	347	11,110,103	575	16,952,096	922	28,062,199
69	323	9,871,363	529	15,262,678	852	25,134,041
70	192	5,194,988	244	6,858,946	436	12,053,934
71	182	5,140,047	221	5,146,796	403	10,286,843
72	163	4,042,321	224	4,883,009	387	8,925,330
73	149	3,785,822	171	3,853,906	320	7,639,728
74	116	2,736,880	167	3,295,296	283	6,032,176
75	88	1,863,538	121	2,291,471	209	4,155,009
76	70	1,577,850	78	1,394,920	148	2,972,770
77	48	1,075,256	64	1,207,519	112	2,282,775
78	43	1,138,051	64	1,153,576	107	2,291,627
79	36	667,070	42	631,867	78	1,298,937
80	23	525,212	34	471,921	57	997,133
81	24	452,675	23	377,667	47	830,342
82	15	407,498	24	390,926	39	798,424
83	9	239,447	10	204,164	19	443,611
84	6	149,536	12	142,517	18	292,053
85	8	168,153	11	237,894	19	406,047
86	2	21,858	2	18,510	4	40,368
87	2	28,273	1	18,864	3	47,137
Total	70,192	\$3,896,970,068	186,888	\$8,954,319,087	257,080	\$ 12,851,289,155

Table 2

The Number and Annual Salaries of Members in Active Service Distributed by Years of Credited Service as of June 30, 2016

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
0	4,870	\$ 62,113,434	8,549	\$ 112,944,912	13,419	\$ 175,058,346
1	5,374	134,132,051	14,034	350,078,476	19,408	484,210,527
2	3,816	123,436,417	10,274	303,155,220	14,090	426,591,637
3	3,176	118,044,988	8,590	286,364,452	11,766	404,409,440
4	2,411	96,573,353	7,177	251,979,299	9,588	348,552,652
5	2,266	98,046,759	6,762	249,685,175	9,028	347,731,934
6	2,519	116,575,403	7,589	301,686,837	10,108	418,262,240
7	2,617	129,858,891	8,279	350,515,688	10,896	480,374,579
8	2,825	146,872,893	8,846	397,078,310	11,671	543,951,203
9	2,822	157,330,923	8,908	415,724,076	11,730	573,054,999
10	2,716	156,446,315	8,588	422,502,166	11,304	578,948,481
11	2,745	168,043,574	8,379	429,340,205	11,124	597,383,779
12	2,811	178,315,158	8,029	427,211,090	10,840	605,526,248
13	2,410	158,058,273	6,872	373,282,058	9,282	531,340,331
14	2,318	156,028,604	6,889	380,822,171	9,207	536,850,775
15	2,240	154,523,641	6,638	377,452,596	8,878	531,976,237
16	2,140	153,143,636	6,619	388,428,106	8,759	541,571,742
17	2,508	190,393,256	6,180	380,036,710	8,688	570,429,966
18	2,114	162,011,484	5,088	323,727,628	7,202	485,739,112
19	2,013	162,221,322	4,609	302,220,521	6,622	464,441,843
20	1,633	130,472,124	3,860	259,306,589	5,493	389,778,713
21	1,416	114,245,810	3,518	240,007,429	4,934	354,253,239
22	1,245	99,866,822	3,122	218,456,253	4,367	318,323,075
23	1,485	121,856,931	2,965	208,108,633	4,450	329,965,564
24	970	77,504,839	2,356	168,317,701	3,326	245,822,540
25	835	64,895,214	2,161	151,013,899	2,996	215,909,113
26	906	70,211,699	2,001	141,943,365	2,907	212,155,064
27	863	67,110,763	1,871	134,176,940	2,734	201,287,703
28	711	57,857,786	1,659	120,700,789	2,370	178,558,575
29	660	52,641,788	1,428	106,492,815	2,088	159,134,603
30	586	47,403,357	1,199	90,612,300	1,785	138,015,657
31	462	36,759,320	912	69,283,175	1,374	106,042,495
32	384	30,699,894	717	54,167,601	1,101	84,867,495
33	316	24,346,722	485	37,331,978	801	61,678,700
34	254	18,796,894	432	32,999,545	686	51,796,439
35	195	14,645,873	286	22,031,976	481	36,677,849
36	153	12,092,062	265	19,709,422	418	31,801,484
37	117	9,314,675	209	15,076,752	326	24,391,427
38	71	5,958,906	153	11,526,928	224	17,485,834
39	62	5,257,188	93	7,092,737	155	12,349,925

Table 2
(Continued)

The Number and Annual Salaries of Members in Active Service Distributed by
Years of Credited Service as of June 30, 2016

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
40	54	\$ 4,058,103	76	\$ 5,745,442	130	\$ 9,803,545
41	19	1,606,907	62	4,138,431	81	5,745,338
42	27	2,114,516	44	3,512,658	71	5,627,174
43	18	1,573,260	32	2,705,762	50	4,279,022
44	13	1,120,845	16	1,314,230	29	2,435,075
45	7	613,661	17	1,078,574	24	1,692,235
46	3	230,361	15	834,461	18	1,064,822
47	4	347,149	10	635,009	14	982,158
48	1	106,926	7	480,723	8	587,649
49	2	173,821	4	348,653	6	522,474
50	3	280,452	4	182,120	7	462,572
51	1	143,048	5	354,343	6	497,391
53	2	176,839			2	176,839
54			1	50,217	1	50,217
55	1	112,895	2	209,145	3	322,040
56	1	91,346			1	91,346
57	1	110,897			1	110,897
58			1	42,016	1	42,016
60			1	94,780	1	94,780
Total	70,192	\$3,896,970,068	186,888	\$8,954,319,087	257,080	\$12,851,289,155

Table 3

The Number and Annual Annuities
of Annuitants on the Retired List
as of June 30, 2016

Retired on Account of Superannuation, Early Retirement and
Those in Receipt of Withdrawal Annuities

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
26	5	\$ 2,383	3	\$ 690	8	\$ 3,073
27	9	4,425	2	837	11	5,262
28	8	5,379	13	5,813	21	11,192
29	12	11,223	24	10,352	36	21,575
30	27	15,935	38	20,715	65	36,650
31	37	29,317	57	32,588	94	61,905
32	41	31,263	65	45,668	106	76,931
33	46	32,168	107	74,256	153	106,424
34	89	84,893	111	93,856	200	178,749
35	71	80,255	122	99,893	193	180,148
36	93	113,986	142	174,847	235	288,833
37	95	129,271	185	188,604	280	317,875
38	120	161,485	185	214,203	305	375,688
39	106	181,521	206	282,262	312	463,783
40	115	205,117	233	299,544	348	504,661
41	106	167,608	239	263,593	345	431,201
42	107	177,920	265	388,916	372	566,836
43	123	274,998	274	505,131	397	780,129
44	144	342,876	278	519,816	422	862,692
45	158	386,550	358	730,547	516	1,117,097
46	166	525,536	408	920,055	574	1,445,591
47	169	586,997	371	880,789	540	1,467,786
48	141	515,126	394	1,103,610	535	1,618,736
49	175	672,072	411	1,276,841	586	1,948,913
50	190	882,130	445	1,366,565	635	2,248,695
51	180	820,091	463	1,593,863	643	2,413,954
52	194	1,190,613	538	1,830,538	732	3,021,151
53	225	1,776,035	544	2,409,581	769	4,185,616
54	235	2,171,830	599	3,057,109	834	5,228,939
55	289	3,758,789	722	6,222,966	1,011	9,981,755
56	404	8,226,033	907	13,791,915	1,311	22,017,948
57	469	12,178,534	1,082	19,455,048	1,551	31,633,582
58	633	19,252,969	1,398	33,766,871	2,031	53,019,840
59	783	27,372,034	1,919	55,050,434	2,702	82,422,468
60	930	35,796,594	2,421	76,460,783	3,351	112,257,377
61	1,126	44,342,059	2,934	97,694,149	4,060	142,036,208
62	1,461	55,301,377	4,111	136,615,451	5,572	191,916,828

**Table 3
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List
as of June 30, 2016**

**Retired on Account of Superannuation, Early Retirement and
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
63	1,957	\$ 76,619,478	5,517	\$ 180,985,261	7,474	\$ 257,604,739
64	2,311	90,216,461	6,485	222,426,884	8,796	312,643,345
65	2,826	111,401,372	7,367	246,671,555	10,193	358,072,927
66	2,920	114,903,136	7,298	241,611,980	10,218	356,515,116
67	3,309	129,156,737	7,223	230,671,627	10,532	359,828,364
68	3,549	134,120,997	7,159	222,633,409	10,708	356,754,406
69	4,159	150,726,418	7,694	227,498,590	11,853	378,225,008
70	3,615	125,592,364	6,174	171,910,418	9,789	297,502,782
71	2,946	97,363,274	4,840	130,633,321	7,786	227,996,595
72	2,784	88,533,083	4,626	116,710,127	7,410	205,243,210
73	2,914	90,871,198	4,727	112,020,085	7,641	202,891,283
74	2,832	87,163,054	4,373	98,588,444	7,205	185,751,498
75	2,216	62,698,165	3,887	84,559,692	6,103	147,257,857
76	1,914	53,266,647	3,416	69,145,861	5,330	122,412,508
77	1,766	44,470,946	3,235	61,413,360	5,001	105,884,306
78	1,667	42,061,881	3,090	56,449,327	4,757	98,511,208
79	1,574	39,034,228	2,783	47,409,273	4,357	86,443,501
80	1,473	36,093,519	2,680	44,225,270	4,153	80,318,789
81	1,351	31,103,925	2,497	37,463,336	3,848	68,567,261
82	1,198	27,451,981	2,227	33,304,051	3,425	60,756,032
83	1,145	26,092,694	2,087	29,735,307	3,232	55,828,001
84	1,110	25,366,971	2,103	30,067,411	3,213	55,434,382
85	970	23,114,860	2,082	30,922,535	3,052	54,037,395
86	877	18,525,166	1,854	25,949,007	2,731	44,474,173
87	713	14,364,140	1,677	21,628,547	2,390	35,992,687
88	564	11,570,652	1,630	20,395,133	2,194	31,965,785
89	519	9,821,277	1,430	17,504,195	1,949	27,325,472
90	447	8,337,579	1,246	14,746,104	1,693	23,083,683
91	367	6,772,808	971	10,375,309	1,338	17,148,117
92	278	5,002,258	877	9,581,551	1,155	14,583,809
93	197	3,036,707	655	6,667,832	852	9,704,539
94	140	2,143,758	588	5,764,588	728	7,908,346
95	94	1,644,120	450	4,403,901	544	6,048,021
96	70	1,079,061	353	3,443,732	423	4,522,793
97	31	485,006	232	2,347,459	263	2,832,465
98	30	368,049	203	2,202,991	233	2,571,040
99	14	198,731	147	1,339,963	161	1,538,694
100	14	144,085	88	945,810	102	1,089,895
101	5	87,253	57	669,780	62	757,033
102	3	54,709	35	376,666	38	431,375

**Table 3
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List
as of June 30, 2016**

**Retired on Account of Superannuation, Early Retirement and
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
103	4	\$ 61,938	19	\$ 240,111	23	\$ 302,049
104	2	9,653	10	138,810	12	148,463
105	2	23,056	7	87,137	9	110,193
106	1	32,473	6	65,187	7	97,660
107			2	42,239	2	42,239
108			1	7,433	1	7,433
109			1	25,679	1	25,679
Total	66,160	\$ 2,008,993,260	138,683	\$ 3,333,454,987	204,843	\$ 5,342,448,247

**Table 3
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List
as of June 30, 2016**

**Retired on Account of Superannuation, Early Retirement and
Those in Receipt of Withdrawal Annuities**

<u>OPTION</u>	<u>MALE</u>		<u>FEMALE</u>	
Maximum	30,358	\$ 929,675,324	79,259	\$ 1,887,915,882
1	10,177	237,208,200	30,392	582,371,592
2	15,854	459,726,465	17,074	455,129,791
3	8,276	312,840,718	11,053	370,521,736
4	<u>1,495</u>	<u>69,542,553</u>	<u>905</u>	<u>37,515,986</u>
	66,160	\$ 2,008,993,260	138,683	\$ 3,333,454,987

DEFINITION OF OPTIONS

- Option 1 A life annuity to the member with a guaranteed payment to the beneficiary equal to the present value of the total maximum single life annuity less any amounts paid to the member prior to death.
- Option 2 A joint and one hundred percent (100%) survivor annuity payable during the lifetime of the member with the full amount of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.
- Option 3 A joint and fifty percent (50%) survivor annuity payable during the lifetime of the member with one-half of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.
- Option 4 A life annuity to the member with a special death benefit other than the normal option 1, 2, or 3 death benefit.

Note: The Option 4 totals above only reflect annuity elections that differ from the Maximum annuity or Options 1, 2 or 3. The Option 4 totals do not reflect Option 4 elections to withdraw accumulated deductions.

Table 4

**The Number and Annual Annuities of Beneficiaries and Survivor Annuitants
as of June 30, 2016**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
6	1	\$ 1,534			1	\$ 1,534
9	1	3,741			1	3,741
10			1	\$ 1,534	1	1,534
15	2	4,036			2	4,036
16	1	1,898	1	591	2	2,489
17			2	4,388	2	4,388
18	2	11,957	1	9,605	3	21,562
19	2	3,275			2	3,275
21			2	4,814	2	4,814
22	1	2,775			1	2,775
23			2	9,620	2	9,620
24			2	2,855	2	2,855
25	3	19,923	2	18,704	5	38,627
26	1	110,286	2	6,236	3	116,522
27	5	24,013	3	13,893	8	37,906
28	1	4,049	1	3,484	2	7,533
29	6	71,137	3	25,735	9	96,872
30	1	2,483			1	2,483
31	1	21,281	7	87,104	8	108,385
32	4	22,008	3	20,253	7	42,261
33	2	5,670	2	23,562	4	29,232
34	5	59,285	3	23,371	8	82,656
35	5	29,161	3	10,745	8	39,906
36	6	35,469	2	9,340	8	44,809
37	3	3,031	7	62,203	10	65,234
38	10	88,464	5	22,047	15	110,511
39	6	22,015	4	16,314	10	38,329
40	3	9,392	8	47,282	11	56,674
41	7	102,070	5	34,935	12	137,005
42	7	27,200	8	61,975	15	89,175
43	6	23,376	8	27,804	14	51,180
44	4	32,131	6	46,218	10	78,349
45	1	2,554	15	111,097	16	113,651
46	7	39,932	9	89,375	16	129,307
47	6	26,966	15	162,518	21	189,484
48	12	59,158	17	120,027	29	179,185
49	11	62,807	24	204,830	35	267,637
50	9	64,210	27	220,007	36	284,217

**Table 4
(Continued)**

**The Number and Annual Annuities of Beneficiaries and Survivor Annuitants
as of June 30, 2016**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
51	10	\$ 97,503	22	\$ 250,839	32	\$ 348,342
52	13	62,379	35	302,876	48	365,255
53	11	104,484	25	195,660	36	300,144
54	10	101,552	31	300,474	41	402,026
55	16	137,449	47	510,946	63	648,395
56	18	217,237	54	587,574	72	804,811
57	20	230,757	73	650,844	93	881,601
58	21	228,197	91	1,275,425	112	1,503,622
59	25	187,990	97	1,191,146	122	1,379,136
60	38	395,091	92	1,423,342	130	1,818,433
61	30	448,358	126	1,918,827	156	2,367,185
62	33	517,345	129	2,203,788	162	2,721,133
63	49	672,553	153	2,464,501	202	3,137,054
64	67	1,381,398	146	2,458,692	213	3,840,090
65	71	1,332,380	161	2,949,922	232	4,282,302
66	65	1,106,204	158	3,274,757	223	4,380,961
67	76	1,687,971	199	3,926,823	275	5,614,794
68	84	1,783,621	222	4,170,976	306	5,954,597
69	88	1,851,079	264	4,823,719	352	6,674,798
70	86	1,513,393	214	3,741,141	300	5,254,534
71	61	1,231,156	211	3,817,723	272	5,048,879
72	74	1,524,842	184	3,225,318	258	4,750,160
73	87	1,429,797	230	3,591,038	317	5,020,835
74	88	1,698,872	245	3,931,309	333	5,630,181
75	78	1,362,020	249	3,773,140	327	5,135,160
76	52	880,150	273	3,843,396	325	4,723,546
77	52	765,546	231	3,436,573	283	4,202,119
78	52	849,278	282	3,601,495	334	4,450,773
79	65	684,651	251	3,214,204	316	3,898,855
80	63	917,217	286	3,465,366	349	4,382,583
81	62	629,269	278	3,580,255	340	4,209,524
82	49	687,891	272	3,263,062	321	3,950,953
83	39	448,298	262	3,179,451	301	3,627,749
84	51	527,502	248	3,011,460	299	3,538,962
85	55	616,866	316	3,504,436	371	4,121,302
86	55	610,505	290	3,121,543	345	3,732,048
87	47	495,312	265	3,107,223	312	3,602,535
88	35	368,242	269	2,590,390	304	2,958,632
89	42	436,978	244	2,387,029	286	2,824,007

Table 4
(Continued)

The Number and Annual Annuities of Beneficiaries and Survivor Annuitants
as of June 30, 2016

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
90	40	\$ 352,635	218	\$ 2,039,714	258	\$ 2,392,349
91	39	462,005	183	1,774,136	222	2,236,141
92	40	342,743	171	1,413,108	211	1,755,851
93	30	246,039	125	1,012,208	155	1,258,247
94	16	119,568	99	904,535	115	1,024,103
95	22	203,639	80	751,228	102	954,867
96	8	68,421	69	555,937	77	624,358
97	9	62,949	38	256,393	47	319,342
98	5	35,652	36	293,166	41	328,818
99	2	10,921	25	182,164	27	193,085
100	3	17,693	12	87,296	15	104,989
101	3	19,410	9	69,409	12	88,819
102	1	11,358	7	23,811	8	35,169
103			5	39,597	5	39,597
104			2	16,894	2	16,894
105			2	22,084	2	22,084
106			2	1,693	2	1,693
107			1	1,838	1	1,838
114	1	1,200			1	1,200
115			1	591	1	591
Total	2,299	\$ 33,172,853	8,510	\$ 113,214,951	10,809	\$ 146,387,804

Table 5

**The Number and Annual Annuities of Annuitants on the Retired List
as of June 30, 2016**

Retired on Account of Disability

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
32			1	\$ 27,819	1	\$ 27,819
33			4	83,850	4	83,850
34	5	\$ 69,882	2	46,148	7	116,030
35	2	42,093	3	53,807	5	95,900
36	3	50,309	2	43,861	5	94,170
37	3	46,348	6	121,879	9	168,227
38	2	46,832	10	201,905	12	248,737
39	3	70,910	17	379,620	20	450,530
40	8	150,270	20	354,782	28	505,052
41	2	28,262	17	370,386	19	398,648
42	4	55,389	27	517,493	31	572,882
43	10	205,335	27	462,934	37	668,269
44	8	128,769	28	530,768	36	659,537
45	7	180,394	38	812,965	45	993,359
46	19	463,771	40	923,860	59	1,387,631
47	22	563,996	57	1,024,133	79	1,588,129
48	29	597,887	42	865,862	71	1,463,749
49	25	666,668	62	1,386,344	87	2,053,012
50	32	660,585	57	1,438,402	89	2,098,987
51	33	737,518	85	1,831,677	118	2,569,195
52	50	1,295,727	126	2,524,557	176	3,820,284
53	53	1,178,266	132	2,623,219	185	3,801,485
54	63	1,422,127	133	2,663,513	196	4,085,640
55	51	1,188,837	166	3,381,557	217	4,570,394
56	61	1,680,535	189	3,771,690	250	5,452,225
57	114	2,811,144	197	4,106,046	311	6,917,190
58	99	2,187,210	223	4,832,691	322	7,019,901
59	104	2,464,263	225	4,459,547	329	6,923,810
60	121	2,468,299	264	5,188,133	385	7,656,432
61	126	2,827,510	287	6,116,035	413	8,943,545
62	126	2,849,020	310	6,528,448	436	9,377,468
63	144	3,154,590	306	6,218,747	450	9,373,337
64	124	3,006,757	290	6,517,097	414	9,523,854

**Table 5
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List
as of June 30, 2016**

Retired on Account of Disability

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
65	118	\$ 2,881,903	282	\$ 6,494,898	400	\$ 9,376,801
66	102	2,111,823	265	6,082,735	367	8,194,558
67	144	3,361,997	269	5,742,488	413	9,104,485
68	101	2,278,328	245	5,044,089	346	7,322,417
69	109	2,567,208	260	4,906,482	369	7,473,690
70	95	1,810,028	214	3,728,967	309	5,538,995
71	64	1,363,671	153	2,492,980	217	3,856,651
72	62	1,181,701	123	2,012,382	185	3,194,083
73	71	1,147,191	144	2,014,716	215	3,161,907
74	48	692,984	157	2,134,330	205	2,827,314
75	32	425,116	120	1,405,872	152	1,830,988
76	40	593,970	106	1,150,574	146	1,744,544
77	34	504,115	73	888,499	107	1,392,614
78	39	455,688	83	846,606	122	1,302,294
79	26	287,162	75	905,095	101	1,192,257
80	23	272,070	54	595,313	77	867,383
81	20	240,341	68	560,373	88	800,714
82	18	187,116	64	630,970	82	818,086
83	19	249,997	46	377,848	65	627,845
84	9	78,200	52	525,545	61	603,745
85	14	143,131	39	302,106	53	445,237
86	5	73,523	36	265,593	41	339,116
87	8	115,941	32	250,961	40	366,902
88	8	91,942	39	291,646	47	383,588
89	7	137,494	19	109,831	26	247,325
90	8	79,029	27	248,830	35	327,859
91	3	32,734	12	92,223	15	124,957
92	2	11,890	10	84,102	12	95,992
93			8	76,632	8	76,632
94			9	82,076	9	82,076
95			2	8,294	2	8,294
96	1	4,614	2	8,322	3	12,936
97			2	6,090	2	6,090
98			4	43,925	4	43,925
99			2	20,807	2	20,807
100			2	17,743	2	17,743
101			1	7,505	1	7,505
103			1	8,053	1	8,053
Total	2,683	\$ 56,680,410	6,493	\$ 120,875,276	9,176	\$ 177,555,686

Exhibit VIII

Glossary

Accrued Liability	The difference between (a) the present value of future plan benefits, and (b) the present value of future normal cost. It is the portion of the present value of future plan benefits attributable to service accrued as of the valuation date. Sometimes referred to as “actuarial accrued liability”.
Accrued Service	The service credited under the plan that was rendered before the date of the actuarial valuation.
Actuarial Assumptions	Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
Actuarial Cost Method	A mathematical budgeting procedure for allocating the dollar amount of the “present value of future plan benefits” between the present value of future normal cost and the accrued liability. Sometimes referred to as the “actuarial funding method”.
Actuarial Equivalent	A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.
Actuarial Value of Assets	The value of current plan assets recognized for valuation purposes. Based on a smoothed market value that recognizes investment gains and losses over a period of ten years.
Amortization	Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
Experience Gain (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, in accordance with the actuarial cost method being used.
Normal Cost	The annual cost assumed, under the actuarial funding method, for current and subsequent plan years. Sometimes referred to as “current service cost”.
Present Value	The amount of funds presently required to provide a payment or series of payments in the future. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
Unfunded Accrued Liability	The difference between the actuarial accrued liability and actuarial value of assets.