Teachers' Retirement System of the State of Illinois

Actuarial Valuation and Review of Pension Benefits as of June 30, 2016

January 5, 2017

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Board of Trustees
Teachers' Retirement System of the State of Illinois
2815 West Washington Street
Springfield, Illinois 62702

Ladies and Gentlemen:

This report presents the results of the annual valuation of the assets and liabilities of the Teachers' Retirement System of the State of Illinois (TRS or System) as of June 30, 2016, prepared in accordance with the funding policy specified under the Illinois Pension Code (40 ILCS 5/16). This valuation takes into account all of the pension benefits to which members are entitled.

Actuarial Assumptions and Methods

The valuation was based on the actuarial assumptions adopted by the Board of Trustees, reflecting the three-year demographic experience review covering the period July 1, 2011, through June 30, 2014, and the economic experience review presented at the August 2016 Board meeting. In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the System and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience of the System. The methods are mandated by the Illinois Pension Code and are inadequate to appropriately fund TRS.

Assets and Membership Data

TRS reported to the actuary the individual data for members of the System as of the prior valuation date. Valuation results are projected, based upon the actuarial assumptions, to account for the one-year difference between the census data and the valuation date. The amount of assets in the trust fund taken into account in the valuation was based on statements prepared by TRS.

Funding Adequacy

The member and employer contribution rates are determined in accordance with the funding policy specified under the Illinois Pension Code (40 ILCS 5/16). The member contribution rate is 9.0%, which is comprised of 7.5% toward the cost of the retirement annuity, 0.5% toward the cost of the automatic annual increase in the retirement annuity and 1.0% for survivor benefits. The employer contributions are determined such that, together with the member contributions, the plan is projected to achieve 90% funding by 2045. The 2045 funding objective of 90% was set in 1994 as a 50-year objective. TRS members have always contributed their share. The State funding has been inadequate, resulting in TRS being among the worst funded public employee retirement systems in the United States. We strongly recommend an actuarial funding method that targets 100% funding where payments at least cover interest on the unfunded actuarial accrued liability and a portion of the principal balance. The funding policy adopted by the Board, referred to as Actuarial Math 2.0, meets this standard.

The valuation indicates that for the fiscal year ending June 30, 2016, the actuarial experience of TRS was unfavorable, generating a net actuarial loss of $1,431 million (1.2% of the actuarial accrued liability). This loss is the net result of a $467 million loss due to unfavorable investment return experience and a $964 million loss due to net unfavorable demographic experience in fiscal 2016.

Actuarial Certification

In preparing the results presented in this report, we have relied upon information TRS provided to us regarding the benefit provisions, System members, benefit payments and unaudited plan assets. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented also comply with the Illinois Pension Code and, where applicable, the Internal Revenue Code, and the Statements of the Governmental Accounting Standards Board. The undersigned are independent actuaries. Both are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and both are experienced in performing valuations for large public retirement systems. They both meet the Qualification Standards of the American Academy of Actuaries.

Respectfully submitted,

Segal Consulting, a Member of the Segal Group

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OVERVIEW OF TRS

The Teachers' Retirement System of the State of Illinois (TRS) was established by the State of Illinois on July 1, 1939, to provide retirement, disability, and death benefits to teachers employed by Illinois public elementary and secondary schools outside the City of Chicago. TRS is the administrator of a cost-sharing, multiple-employer defined benefit public employee retirement system. Membership is mandatory for all full-time, part-time, and substitute pubic school personnel employed outside of Chicago in positions requiring certification. Persons employed at certain state agencies are also members. TRS is governed by the Illinois Pension Code (40 ILCS 5/16).

Members of TRS are employed by school districts, special districts, and certain state agencies. As of June 30, 2016, there were 992 employers, comprised of 850 local school districts, 126 special districts, and 16 state agencies. The membership totaled over 408,000 members as of June 30, 2015. Of the 408,000 members, 115,000 are retirees and survivors to whom TRS paid over $5.8 billion during the fiscal year ending June 30, 2016. As of June 30, 2016, the assets of TRS amounted to $45.3 billion on a market value basis.

The amount of the benefit paid to a member upon retirement, termination, disability, or death is defined by the Illinois Pension Code (40 ILCS 5/16). The contributions to fund these benefits are determined through an annual valuation based upon the funding provisions in the Illinois Pension Code.

PURPOSE OF THE ANNUAL ACTUARIAL VALUATION

An actuarial valuation is performed annually as of June 30. The purposes of the annual actuarial valuation are to:

- Calculate the annual contribution as required by the Illinois Pension Code. This contribution is not adequate to fund TRS.
- Calculate an actuarially determined contribution based upon the funding policy adopted by the Board. This contribution, if paid, would be expected to adequately fund TRS.
- Determine the funding progress under the Illinois Pension Code's inadequate funding standard.
- Determine the annual gain and loss amounts by source.
- Satisfy regulatory and accounting requirements.

SIGNIFICANT RESULTS OF THE ACTUARIAL VALUATION

1. The contribution made during fiscal 2016 by the State, as required by the Illinois Pension Code, was insufficient to reduce the unfunded actuarial accrued liability.
2. The following assumption changes were approved by the Board on August 26, 2016, and are reflected in this valuation:
   a. The inflation assumption was lowered from 3.00% to 2.50%;
   b. The investment return assumption was lowered from 7.50% to 7.00%;
   c. The individual salary increase assumption was lowered by 0.50%; and
   d. The Tier II COLA and pay cap increase assumptions were lowered from 1.40% to 1.25%.
3. The Early Retirement Option (ERO) was discontinued effective July 1, 2016, and is not expected to be reestablished. Last year's valuation assumed that ERO would continue indefinitely; therefore, the elimination of ERO caused the actuarial accrued liability to decrease by about $480 million. However, this reduction in the actuarial accrued liability has minimal effect on State contributions because the future member and School District contributions that would have paid for the cost of ERO have also been discontinued.
4. The total projected employer contribution for 2018, including State, Federal, and School Districts, is $4.72 billion. Of this amount, $1.05 billion, or about 22%, is for the employer portion of the normal cost and 78% is for unfunded actuarial accrued liability. The required State contribution for 2018 is $4.56 billion, an increase from $3.99 billion for 2017.
5. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of June 30, 2016, was 39.8%, compared to 42.0% as of June 30, 2015. Prior to reflecting the assumption changes, the funded ratio as of June 30, 2016, was 41.8%. This ratio is a measure of funded status, and its history is a measure of funding progress.
6. For the year ended June 30, 2016, Segal has estimated that the asset return on a market value basis was -0.10%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 6.46%. This represents an experience loss when compared to the assumed rate of 7.50% (the interest rate assumption for the year ended June 30, 2016.) As of June 30, 2016, the actuarial value of assets ($47.2 billion) represented 104.4% of the market value ($45.3 billion).
7. The investment loss on the actuarial value of assets for the year ended June 30, 2016, was $467 million. The demographic and liability experience resulted in a $964 million loss (0.8% of actuarial accrued liability), primarily due to the change in software/actuary. The 0.8% increase in the actuarial accrued liability due to the change in software/actuary is within the normal range for a plan the size of TRS.

8. As page 22 of this report indicates, the total investment loss not yet recognized as of June 30, 2016, is $2.0 billion. These unrecognized losses will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent they are not offset by recognition of gains derived from future experience. This means that earning the assumed rate of investment return of 7.00% per year (net of investment expenses) on a market value basis will result in investment losses on the actuarial value of assets in the next few years.

9. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 104.4% of the market value of assets as of June 30, 2016. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding market value. The actuarial asset method complies with this guideline.

10. The System's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the market value of assets was -2.5% as of June 30, 2016, compared to -2.6% as of June 30, 2015. Negative cash flow drains the assets of the System without investment income and may cause suboptimal investment strategies.

11. This actuarial valuation report as of June 30, 2016, is based on financial data as of that date. Changes in the value of assets subsequent to that date are not reflected.

12. When measuring net pension liability for GASB purposes, the Entry Age cost method is used to determine the total pension liability (TPL) of the System. The Projected Unit Credit cost method is used to determine the contribution required by the Illinois Pension Code. The Entry Age cost method is used to determine the Actuarially Determined Contribution ("Actuarial Math 2.0"), based upon the funding policy adopted by the Board. This means that the TPL measure for financial reporting shown in this report will differ from the actuarial accrued liability (AAL) measure for funding, under the Illinois Pension Code. We note that the same is true for the normal cost component of the annual plan cost for funding and financial reporting.

13. The GASB blended discount rate calculation results in a lower discount rate (6.83%) than is used for funding purposes (7.00%). As a result, the TPL measure for financial reporting shown in this report will differ from the AAL measure for funding, under Actuarial Math 2.0.

14. The net pension liability (NPL) is equal to the difference between the TPL and the Plan's fiduciary net position. The NPL increased from $65.5 billion as of June 30, 2015, to $78.9 billion as of June 30, 2016.

Summary of Key Valuation Results

	June 30, 2016		June 30, 2015
Present Value of Future Benefits:	**Before Assumption Changes**	**After Assumption Changes**	
1. Active members	$54,378,617,760	$56,981,455,487	$54,450,277,586
2. Retired members and beneficiaries receiving benefits	74,191,996,125	77,688,074,878	70,545,782,134
3. Inactive members with deferred benefits	3,080,010,933	3,260,634,369	2,687,999,663
4. Total: (1) + (2) + (3)	$131,650,624,818	$137,930,164,734	$127,684,059,383
Actuarial Accrued Liability:			
1. Active members	$35,703,041,249	$37,681,181,058	$34,888,043,374
2. Retired members and beneficiaries receiving benefits	74,191,996,125	77,688,074,878	70,545,782,134
3. Inactive members with deferred benefits	3,080,010,933	3,260,634,369	2,687,999,663
4. Total: (1) + (2) + (3)	$112,975,048,307	$118,629,890,305	$108,121,825,171
Funded Status:			
1. Actuarial accrued liability	$112,975,048,307	$118,629,890,305	$108,121,825,171
2. Actuarial value of assets (AVA)	47,222,097,809	47,222,097,809	45,435,192,645
3. Unfunded actuarial accrued liability (AVA basis): (1) – (2)	$65,752,950,498	$71,407,792,496	$62,686,632,526
4. Funded ratio (AVA basis): (2) / (1)	41.8%	39.8%	42.0%
5. Market value of assets (MVA)	$45,250,956,731	$45,250,956,731	$46,406,915,593
6. Unfunded actuarial accrued liability (MVA basis): (1) – (5)	67,724,091,576	73,378,933,574	61,714,909,578
7. Funded ratio (MVA basis): (5) / (1)	40.1%	38.1%	42.9%
Summary of State Contributions for Fiscal Year:		**2018**	**2017**
1. Based on Statutory Funding Plan		$4,564,952,674	$3,986,583,351
2. Based on Actuarial Math 2.0		6,876,283,032	6,070,973,314
3. Difference between Actuarial Math 2.0 and Statutory Funding: (2) – (1)		$2,311,330,358	$2,084,389,963
4. Normal cost rate based on Statutory Funding Plan *			
(a) Total (including administrative expenses)		19.10%	18.08%
(b) Member rate		9.00%	9.81%
(c) Employer: (4a) – (4b)		10.10%	8.27%

**With the sunset of the Early Retirement Option, the FY2017 normal cost rate used to bill for optional service and excess sick leave has been reduced to 17.68%. Effective with the 2016 valuation, the member rate is equal to the statutory 9% rate and the member cost for optional service was removed.*

Summary of Key Valuation Results (continued)

	June 30, 2016	June 30, 2015
Summary of State Contributions for Fiscal Year (continued):	**2018**	**2017**
5. Total normal cost based on Statutory Funding Plan		
(a) Total	$1,967,800,321	$1,882,004,794
(b) Administrative expenses	26,549,011	23,594,987
(c) Expected member contributions	939,719,161	1,034,264,612
(d) Total employer normal cost: (5a) + (5b) – (5c)	$1,054,630,171	$871,335,169
GASB information:		
1. Long-term expected rate of return	7.00%	7.50%
2. Municipal bond index	2.85%	3.73%
3. Single equivalent discount rate	6.83%	7.47%
4. Total pension liability	$124,187,003,384	$111,916,989,345
5. Plan fiduciary net position	45,250,956,731	46,406,915,593
6. Net pension liability: (4) – (5)	$78,936,046,653	$65,510,073,752
7. Plan fiduciary net position as a percentage of total pension liability: (5) / (4)	36.4%	41.5%
Demographic data used for valuation as of June 30*:	**2015**	**2014**
1. Number of active member		
(a) Full-time and regular part-time	133,478	132,916
(b) Substitute, part-time, and hourly paid	26,206	26,920
(c) Total	159,684	159,836
2. Number of inactive member		
(a) Eligible for deferred annuities	18,362	17,575
(b) Eligible for refunds or single sum benefits only	115,360	113,012
3. Number of annuitants	115,273	112,682
4. Total membership	408,679	403,105
5. Annual salaries		
(a) Full-time and regular part-time	$9,286,852,068	$9,115,480,030
(b) Substitute, part-time, and hourly paid	148,554,785	143,897,458
(c) Total	$9,435,406,853	$9,259,377,488
6. Annual annuities	$5,728,198,886	$5,505,783,524

** Member data used in the valuation is as of the prior valuation date.*

SIGNIFICANT ISSUES FACING TRS

Funding Policy

A funding policy outlines the parameters for calculating an actuarially determined contribution rate and ensures the systematic funding of future benefit payments. An actuarially determined contribution is comprised of the Normal Cost and an amortization of the Unfunded Actuarial Accrued Liability. These amounts are determined by the three funding policy components:

- *Actuarial Cost Method*: The Actuarial Cost Method allocates the total present value of future benefits to each year (Normal Cost) including all past years (Actuarial Accrued Liability or AAL)
- *Asset Smoothing Method*: The techniques that spread the recognition of investment gains or losses over a period of time for the purposes of determining the Actuarial Value of Assets used in the actuarial valuation
- *Amortization Policy*: The method on how, in terms of duration and pattern, to fund the Unfunded Actuarial Accrued Liability

Historical Underfunding by the State

The Illinois Pension Code sets the parameters for funding TRS. The employer contributions are determined such that, together with the member contributions, the System is projected to achieve 90% funding by 2045. The 2045 funding objective of 90% was set in 1994 as a 50-year objective. TRS members have always contributed their share. The State funding has been inadequate, resulting in TRS being among the worst funded public employee retirement systems in the United States.

The State has historically underfunded TRS by the use of funding policies that do not provide for adequate funding of TRS and include:

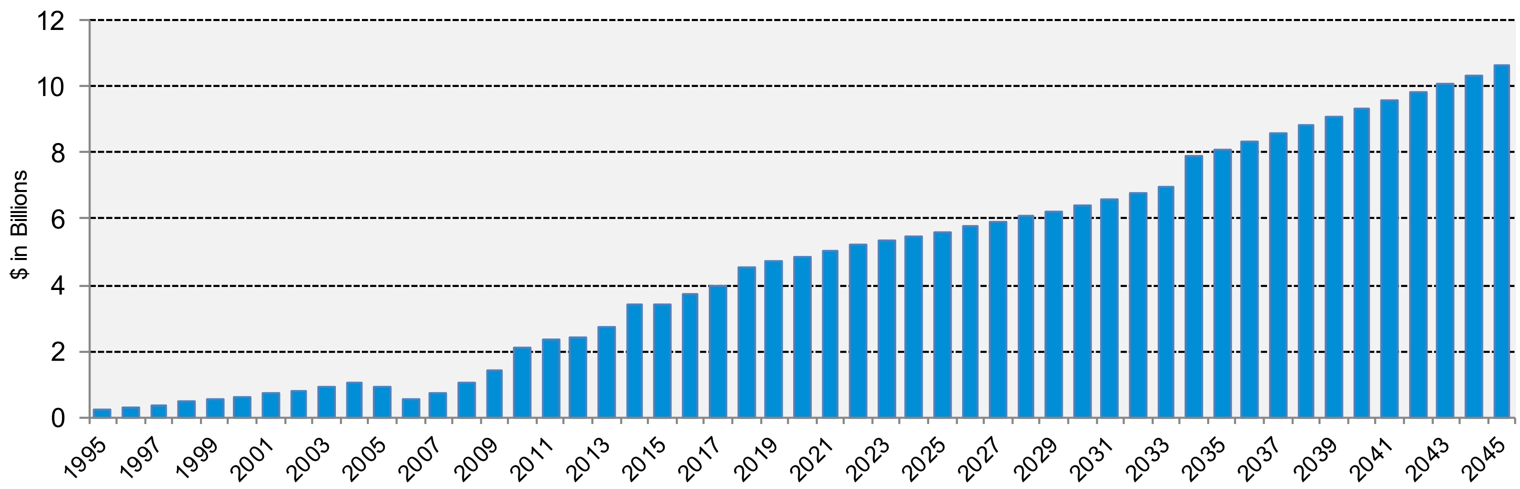
- Establishing a 50-year period in 1994, over which to amortize the Unfunded Actuarial Accrued Liability
- Back loading the 50-year period by requiring a 15-year period to ramp up to full contributions as determined under the Illinois funding policy
- Setting a funding target of 90% of the actuarial accrued liability (as opposed to 100%)
- Requiring the use of the projected unit cost method, which further back loads the contributions to TRS as compared to the entry age cost method, which is a level cost funding method

- Imposing a maximum contribution based upon Pension Obligation Bond (POB) debt payments despite the fact that not all of the POB proceeds were contributed to TRS
- Reducing contributions for fiscal years ended June 30, 2006 and 2007
- Modifying the asset valuation method to reduce contributions for the fiscal year ended June 30, 2011; further reducing FY 2011 contributions by requiring TRS to recertify the 2009 valuation to assume that Tier II had been in effect in 2009
- Requiring that the Tier II benefit provisions be fully reflected in the determination of the contribution before the reduction in benefit payments occurs, resulting in reduced contributions

The graph below shows a history and projection of the State required contributions under the Illinois Pension Code. The graph illustrates the effect of inadequate State contributions on projected future contributions.

CHART A

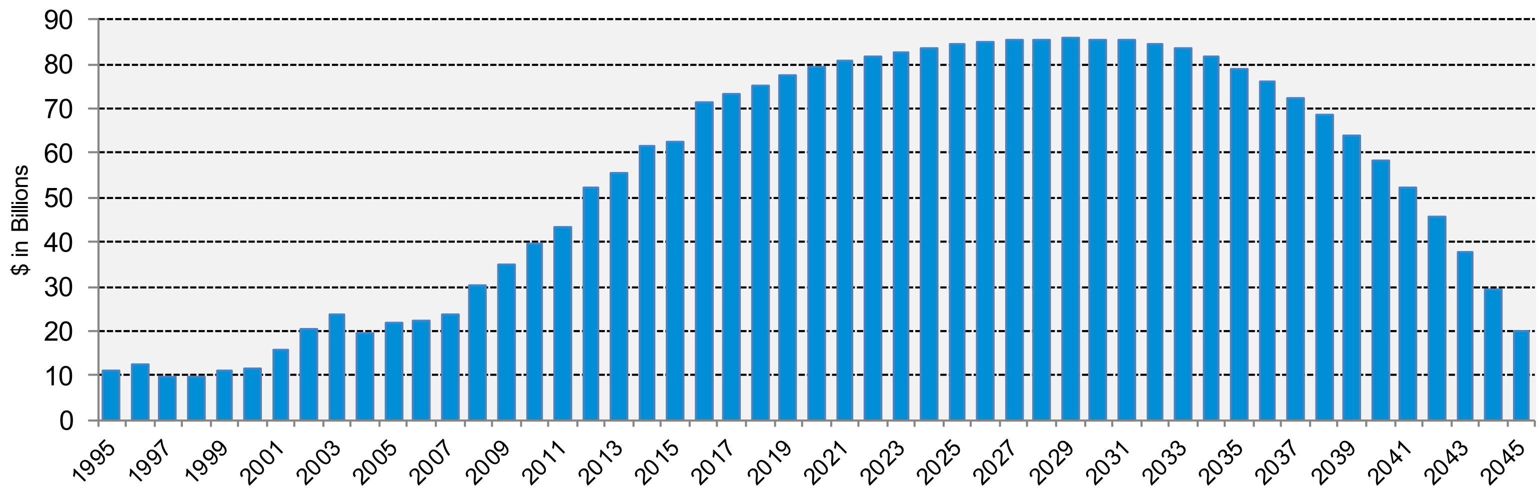
State Required Contribution for Fiscal Year Ending June 30



The insufficiency of the State contributions is the primary reason for the historical and projected increases in UAAL as shown in the graph below.

CHART B

Unfunded Actuarial Accrued Liability as of Fiscal Year Ending June 30



Funding Policy Certified by the Board

Because State contributions under the Illinois Pension Code are inadequate, the Board of Trustees adopted a funding policy ("Actuarial Math 2.0"), comprised of the following components:

- *Actuarial Cost Method*: The entry age method, which allocates costs evenly as a level percentage of salary
- *Asset Smoothing Method*: The actuarial value of assets is based on the market value of assets with a five-year phase-in of actuarial investment returns in excess of (or less than) expected investment income
- *Amortization Policy*: The amortization policy is a layered amortization approach. Effective with the June 30, 2015, actuarial valuation, the UAAL is amortized over a closed 20-year period. Sources of UAAL that emerge in subsequent valuations are amortized over 20-year closed periods. The amortization payment increases at the rate of future State revenue growth (assumed to be 2.0%). The minimum contribution is the normal cost.

The Board of Trustees prepares an annual certification, which includes State contributions under the Illinois Pension Code and Actuarial Math 2.0. Unlike the current funding policy, Actuarial Math 2.0 will bring TRS to full funding by decreasing the UAAL every year. We strongly recommend an actuarial funding method that targets 100% funding where payments at least cover interest on the unfunded actuarial accrued liability and a portion of the principal balance. The funding policy adopted by the Board, referred to as Actuarial Math 2.0, meets this standard.

Implications of Tier II

Lower Benefit Structure/Same Contribution Rate as Tier I

- Tier II members are those who first established membership with TRS or a reciprocal system after December 31, 2010. While Tier II member contributions are the same as Tier I member contributions, the value of Tier II benefits is lower than Tier I benefits. This is because Tier II members have to work longer to be eligible for retirement, the final average salary period is longer, salaries are capped, and the cost-of-living adjustments (COLAs) are smaller.

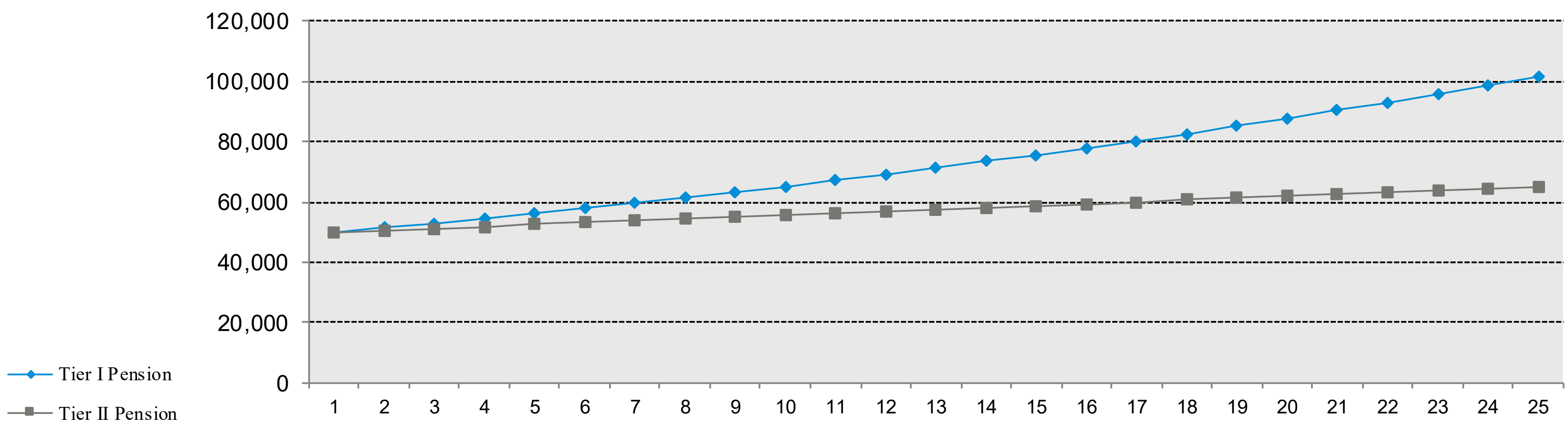
- The Tier II wage cap, which applies to benefits and contributions, was established in 2011 at $106,800. The wage cap increases each fiscal year by the lesser of 3% or one-half of the CPI-U as of the preceding September. For 2016, the limit is $111,572. Based upon the current actuarial assumptions, it is projected that the wage cap will affect the majority of full career Tier II members' final average salary.

Cost-of-living Adjustment

- The Tier II cost-of-living adjustment (COLA) is calculated using the lesser of 3% or one-half of CPI-U as of the preceding September, of the originally granted retirement annuity as compared to the Tier I COLA, which is a 3% compound COLA. The Tier II COLA will not keep pace with inflation, eroding the purchasing power of Tier II pensions during retirement. Chart C below shows the comparison of a $50,000 pension under the Tier I and Tier II COLA provisions. The projection is based upon the valuation inflation assumption of 2.50%.

CHART C

Illustration of Tier I and Tier II COLA Based on Initial Annual Benefit of $50,000



Total Normal Cost Rate Compared to Member Contribution Rate

- The following chart compares the Tier I and Tier II member contribution rates to the normal cost rates for the fiscal year 2018. The normal cost rate is the cost of benefits that accrue during the year expressed as a percentage of payroll. The total normal cost for Tier I is more than three times the normal cost rate for Tier II, reflecting the differences in the benefits. The Tier II total normal cost rate is less than the member contribution rate. As a result, based upon the actuarial assumptions, Tier II members are funding their entire pension benefit plus paying a portion of the UAAL.

CHART D

Allocation of Member Contribution Rate

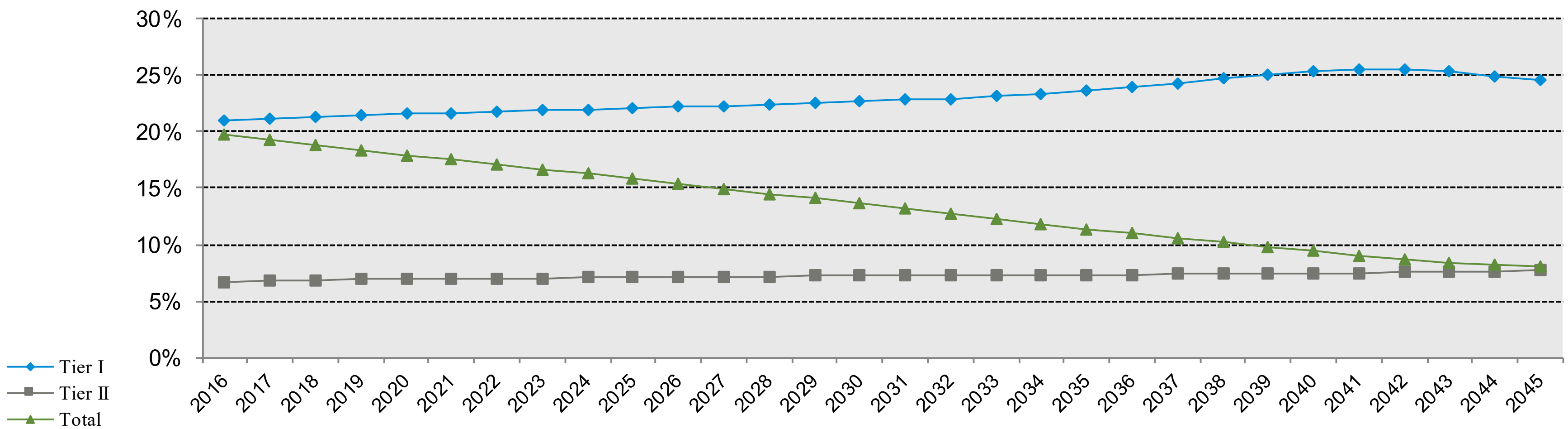
	For Fiscal Year 2018		
	Tier I	**Tier II**	**Total**
1. Total normal cost rate, including administrative expenses	21.57%	7.11%	19.10%
2. Less: member contribution rate	(9.00)	(9.00)	(9.00)
3. Employer normal cost rate	12.57%	(1.89%)	10.10%
4. Allocation of member contribution rate			
a. Normal cost rate	9.00%	7.11%	9.00%
b. Unfunded actuarial accrued liability	0.00	1.89	0.00
c. Total	9.00%	9.00%	9.00%

Projection of Total Normal Cost Rate by Tier

- The following graph shows a projection of the total normal cost rates for Tier I, Tier II, and in total. The chart shows that the total normal cost rate will decline over time as the Tier I members terminate and retire and are replaced by Tier II members. The funding policy under the Illinois Pension Code, which targets a 90% funded ratio by 2045, requires the Tier II benefit provisions to be fully reflected in the determination of the contribution before the reduction in benefit payments occurs, resulting in a deferral of contributions to later years. In other words, the contributions, as determined by the Illinois Pension Code, are based on a projection of normal cost and actuarial accrued liability for hypothetical members with lower benefits who will be hired after the valuation date and through 2045.

CHART E

Projection of Total Normal Cost Rate for Fiscal Year Ending June 30

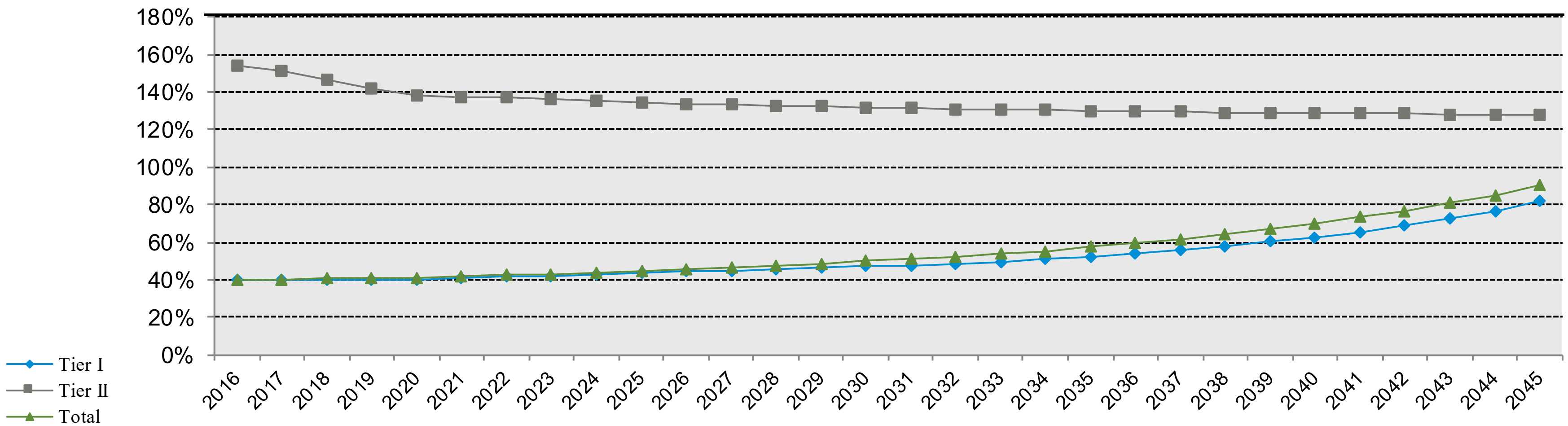


Tier II Contribution Toward Unfunded Actuarial Accrued Liability

As described above, Tier II members are assisting the State by funding a portion of the UAAL along with the full normal cost of their benefits. Tier I and Tier II liabilities and assets are not allocated separately for purposes of determining the funded ratio and contribution requirements. However, if the assets and liabilities were allocated separately, a projection of the funded ratio for each tier would show that the Tier II funded ratio is 154% as of June 30, 2016, decreasing slightly over time to a funded ratio of 128% as of June 30, 2045. In contrast, the Tier I funded ratio is 40% as of June 30, 2016, increasing to 82% as of June 30, 2045. For the total System, the funded ratio is 40% as of June 30, 2016, increasing to 90% as of June 30, 2045. Tier II member contributions have the effect of increasing the total funded ratio to 90% as of 2045. The graph below illustrates this.

CHART F

Projection of Funded Ratio for Fiscal Year Ending June 30



SENSITIVITY PROJECTIONS

The following charts show projections of valuation results under alternative investment return scenarios. Charts G and H show projections of the funded status and State contributions for the next five years. The projections are based on the current actuarial assumptions and assume that all actuarial assumptions are realized, with the exception of the investment return for the year ending June 30, 2017:

- Scenario 1 assumes a 0% investment return for the year ending June 30, 2017
- Scenario 2 assumes a 14% investment return for the year ending June 30, 2017

Because investment gains and losses are recognized in the actuarial value of assets over a five-year period, the effect on the funded status and State contribution in the first year is small. However, by the fifth year, the investment returns are fully reflected in the valuation. The charts show that investment gains and losses will have a significant effect on the valuation results.

CHART G

Projection of Funded Ratio for Fiscal Year Ending June 30

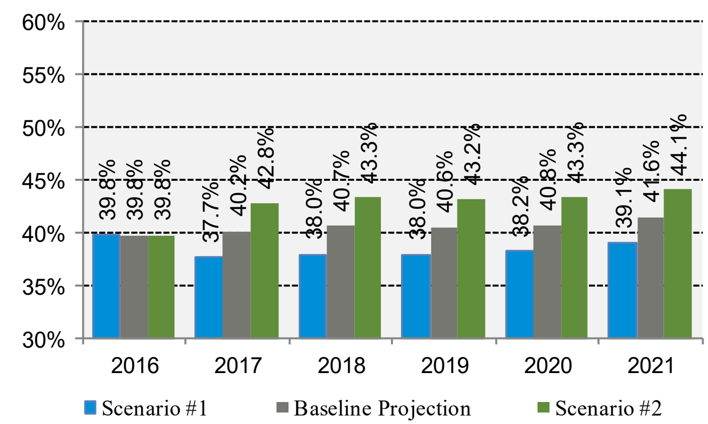


CHART H

Projection of State Contribution for Fiscal Year Ending June 30

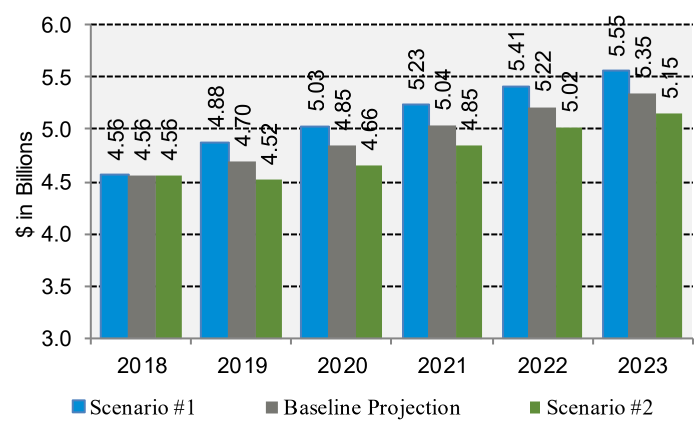
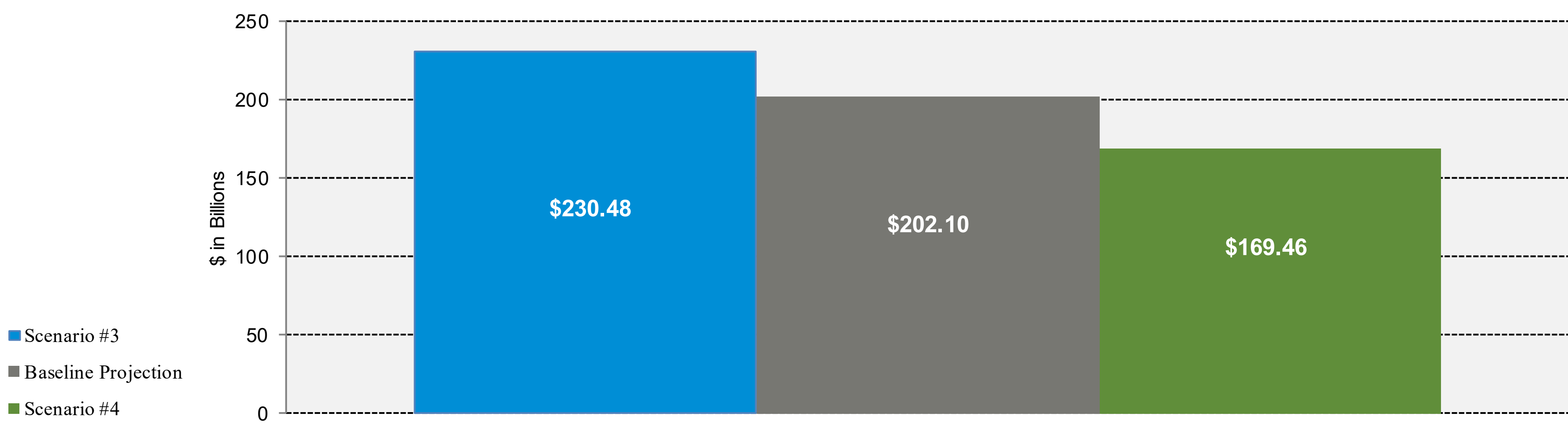


Chart I shows the total State contributions for the fiscal years June 30, 2018, through June 30, 2045, based on the current actuarial assumptions and assume that all actuarial assumptions are realized with the exception of the investment returns as follows:

- Scenario 3 assumes investment returns of 6.00% for each year beginning with the year ending June 30, 2017, through June 30, 2045
- Scenario 4 assumes investment returns of 8.00% for each year beginning with the year ending June 30, 2017, through June 30, 2045

CHART I

Total State Contribution from Year Ending June 30, 2018, Through June 30, 2045



IMPORTANT INFORMATION ABOUT ACTUARIAL VALUATIONS

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual benefits and expenses paid and the actual investment experience of the System will determine the actual long-term cost of the plan.

In order to prepare a valuation, Segal Consulting ("Segal") relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for the System is based on data provided to the actuary by TRS. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the market value of assets as of the valuation date, as provided by TRS, and uses an "actuarial value of assets" that differs from market value to gradually reflect year-to-year changes in the market value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the System's assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the TRS Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the System's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the System will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- If the TRS Board is aware of any event or trend that was not considered in the valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the System's provisions, but they may be subject to alternative interpretations. TRS should look to their other advisors for expertise in these areas.
- The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

As Segal has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.

A. MEMBER DATA

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active members, retirees, and beneficiaries.

This section presents a summary of significant statistical data on these participant groups.

Data used for the valuation is as of the prior valuation date. Any changes in liabilities due to demographic experience during the most recent plan year are captured in the subsequent valuation.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A, B, C and D.

A historical perspective of how the population has changed over past valuations can be seen in this chart.

CHART 1

Member Population: 2006 – 2015*

June 30	Full-Time and Regular Part-Time Active Members	Substitutes, Part-Time and Hourly Paid	Inactive Members Eligible for Deferred Annuities	Inactive Members Eligible for Refunds	Annuitants and Survivor Annuitants	Ratio of Full-Time Actives to Annuitants
2006	130,867	28,355	15,156	84,153	89,269	1.47
2007	132,287	28,514	15,712	89,222	91,497	1.45
2008	136,328	29,146	16,039	92,377	94,419	1.44
2009	138,180	30,993	16,370	95,488	97,796	1.41
2010	137,711	32,479	16,266	99,029	101,352	1.36
2011	133,752	32,120	16,811	104,970	105,499	1.27
2012	132,956	29,073	16,995	108,531	106,102	1.25
2013	132,886	28,104	17,250	110,403	109,448	1.21
2014	132,916	26,920	17,575	113,012	112,682	1.18
2015	133,478	26,206	18,362	115,360	115,273	1.16

**Member data used in the valuation is as of the prior valuation date.*

Active Members

Plan costs are affected by the age, years of service, and compensation of active members. As of June 30, 2015 (the date as of which census is collected for the June 30, 2016, valuation), there were 133,478 full-time and regular part-time active members with an average age of 41.7 and 12.6 average years of service. The 132,916 full-time and regular part-time active members in the prior valuation had an average age of 41.2 and 12.6 average years of service. In addition, as of June 30, 2015, there are 26,206 active members who are substitutes, part-time, and hourly paid on either a flexible or limited work schedule.

Inactive Members

As of June 30, 2015 (the date at which census is collected for the June 30, 2016 valuation), there were 18,328 participants and 34 survivors with a vested right to a deferred benefit. Inactive members may also be eligible for a refund of their retirement benefit contributions or a single sum benefit.

In addition, there were 115,360 participants entitled to a return of their employee contributions.

These charts show a distribution of active participants based on years of service

CHART 2

Distribution of Full-Time and Regular Part-Time Active Participants by Age as of June 30, 2015*

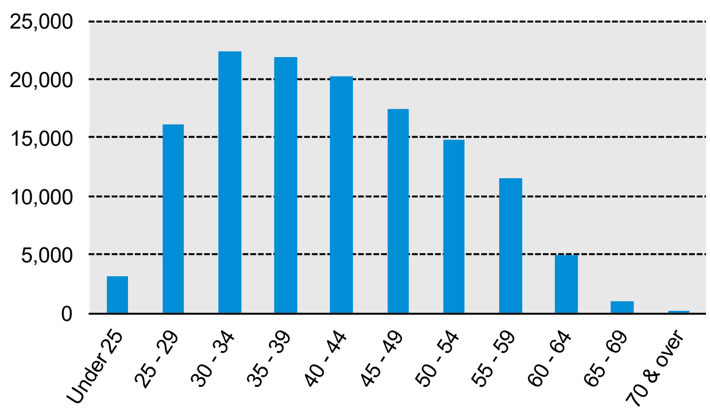
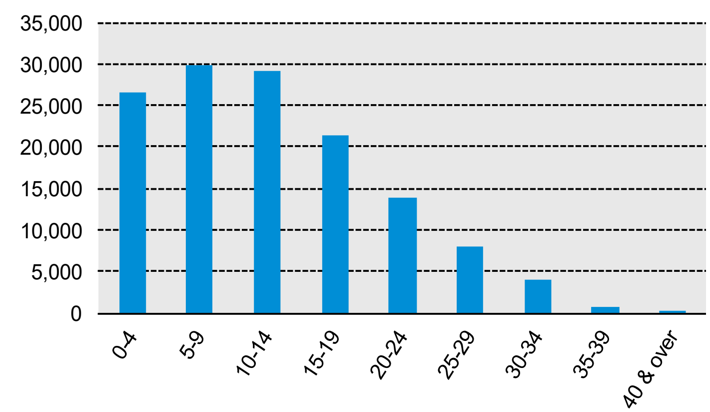


CHART 3

Distribution of Full-Time and Regular Part-Time Active Participants by Years of Service as of June 30, 2015*



* *Member data used for the valuation is as of the prior valuation date.*

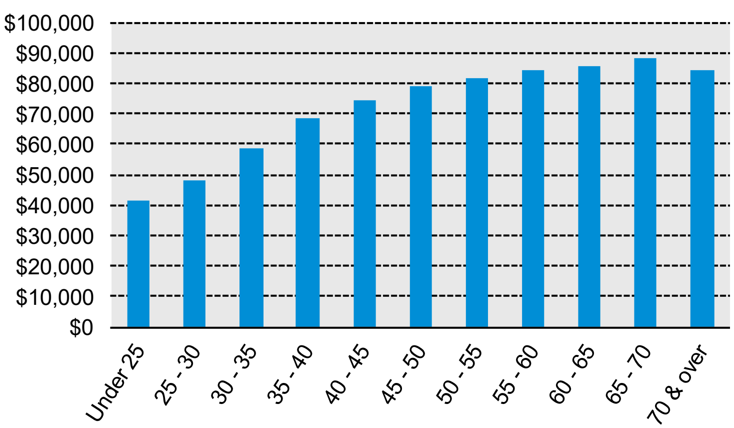
These charts show a distribution of active members by age and by average compensation.

Distribution of Full-Time and Regular Part-Time Active Members by Age and Average Compensation

As of June 30, 2015 (the date as of which census is collected for the June 30, 2016 valuation), there were 133,478 full-time and regular part-time active members with an average compensation of $69,576. The 132,916 active members used in the prior valuation had an average compensation of $68,581.

CHART 4

Distribution of Full-Time and Regular Part-Time Active Members by Age and Average Compensation as of June 30, 2015*



* *Member data used for the valuation is as of the prior valuation date.*

Annuitants and Survivor Annuitants

As of June 30, 2015, (the date as of which census is collected for the June 30, 2016 valuation), 104,883 annuitants and 10,390 survivor annuitants were receiving total annual benefits of $5,728,198,886. For comparison, in the data used for the previous valuation, there were 102,588 annuitants and 10,094 survivor annuitants were receiving total annual benefits of $5,505,783,524.

These charts show the distribution of the current annuitants and survivor annuitants based on their age and annual benefit, by type of pension.

CHART 5

Distribution of Annuitants and Survivor Annuitants by Annual Benefit as of June 30, 2015*

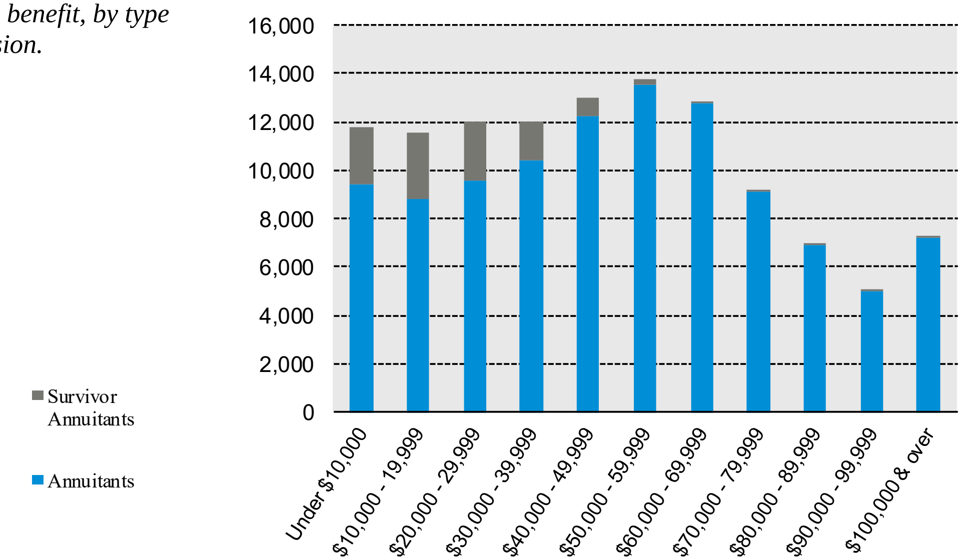
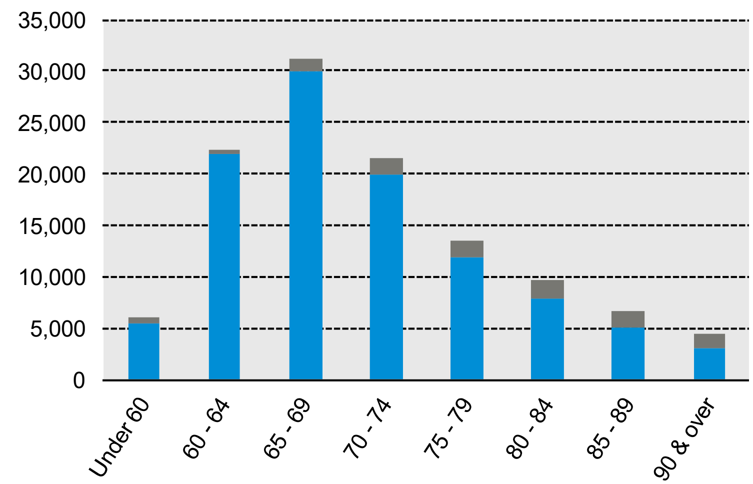


CHART 6

Distribution of Annuitants and Survivor Annuitants by Age as of June 30, 2015*



** Member data used for the valuation is as of the prior valuation date.*

B. FINANCIAL INFORMATION

Two actuarial values of assets are used for determining the statutory contribution under the Illinois Pension Code, one that includes the Pension Obligation Bond (POB) and one that excludes the POB. The recommended contribution under the Board's funding policy (Actuarial Math 2.0) includes the POB. The actuarial value of assets under both methods gradually adjusts to market value. Under this asset valuation method, the full value of market fluctuations is recognized over a five-year period as opposed to in a single year. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative.

Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

To determine the employer contributions, the actuarial value of assets are projected one year from the valuation date to the beginning of the contribution fiscal year.

This chart shows the determination of the actuarial value of assets with POB as of the valuation date.

CHART 7

Determination of Actuarial Value of Assets and Projected Actuarial Value of Assets with POB for June 30, 2016 and June 30, 2015 Actuarial Valuations

				2016		2015
1.	Market value of assets with POB available for benefits			$45,250,956,731		$46,406,915,593
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized		% Not Recognized	
	(a) Year ended June 30, 2016	($3,482,927,259)	80%	($2,786,341,807)		
	(b) Year ended June 30, 2015	(1,621,728,539)	60%	(973,037,123)	80%	($1,297,382,831)
	(c) Year ended June 30, 2014	3,625,986,948	40%	1,450,394,779	60%	2,175,592,169
	(d) Year ended June 30, 2013	1,689,215,365	20%	337,843,073	40%	675,686,146
	(e) Year ended June 30, 2012	(2,910,862,678)		0	20%	(582,172,536)
	(f) Total unrecognized return			($1,971,141,078)		$971,722,948
3.	Actuarial value of assets with POB (Current Assets): (1) – (2f)			$47,222,097,809		$45,435,192,645
4.	Actuarial value as a percent of market value: (3) ÷ (1)			104.4%		97.9%
5.	Projected actuarial value of assets					
	(a) Assumed contributions			$5,160,573,611		$4,988,427,944
	(b) Assumed distributions			6,264,433,393		5,892,627,459
	(c) Expected return at 7.00% for fiscal 2017 (7.50% for fiscal 2016)			3,266,911,754		3,373,731,967
	(d) Projected actuarial value of assets			$49,385,149,781		$47,904,725,097

* *Recognition at 20% per year over 5 years*

***Total return minus expected return on market value*

For determining the actuarial value of assets without the POB, the market value of assets is estimated by adjusting for the POB. The market value of assets without the POB as of the valuation date is equal to the market value of assets without the POB as of the prior valuation date, increased by contributions excluding the POB debt service, decreased by disbursements, and credited with interest based upon the investment return of the market value of assets with the POB.

This chart shows the determination of the actuarial value of assets without POB as of the valuation date.

CHART 8

Determination of Actuarial Value of Assets and Projected Actuarial Value of Assets without POB for June 30, 2016 and June 30, 2015 Actuarial Valuations

				2016		2015
1.	Estimated market value of assets without POB available for benefits			$40,445,032,097		$41,256,196,208
2.	Calculation of unrecognized return*	Original Amount**	% Not Recognized		% Not Recognized	
	(a) Year ended June 30, 2016	($3,104,582,596)	80%	($2,483,666,077)		
	(b) Year ended June 30, 2015	(1,438,100,040)	60%	(862,860,024)	80%	($1,150,480,031)
	(c) Year ended June 30, 2014	3,197,370,397	40%	1,278,948,159	60%	1,918,422,238
	(d) Year ended June 30, 2013	1,480,225,815	20%	296,045,163	40%	592,090,326
	(e) Year ended June 30, 2012	(2,535,234,834)		0	20%	(507,046,967)
	(f) Total unrecognized return			($1,771,532,779)		$852,985,566
3.	Actuarial value of assets without POB (Current Assets): (1) – (2f)			$42,216,564,876		$40,403,210,642
4.	Actuarial value as a percent of market value: (3) ÷ (1)			104.4%		97.9%
5.	Projected actuarial value of assets					
	(a) Assumed contributions			$5,512,798,176		$5,328,431,839
	(b) Assumed distributions			6,264,433,393		5,892,627,459
	(c) Expected return at 7.00% for fiscal 2017 (7.50% for fiscal 2016)			2,928,852,309		3,009,083,463
	(d) Projected actuarial value of assets			$44,393,781,968		$42,848,098,485

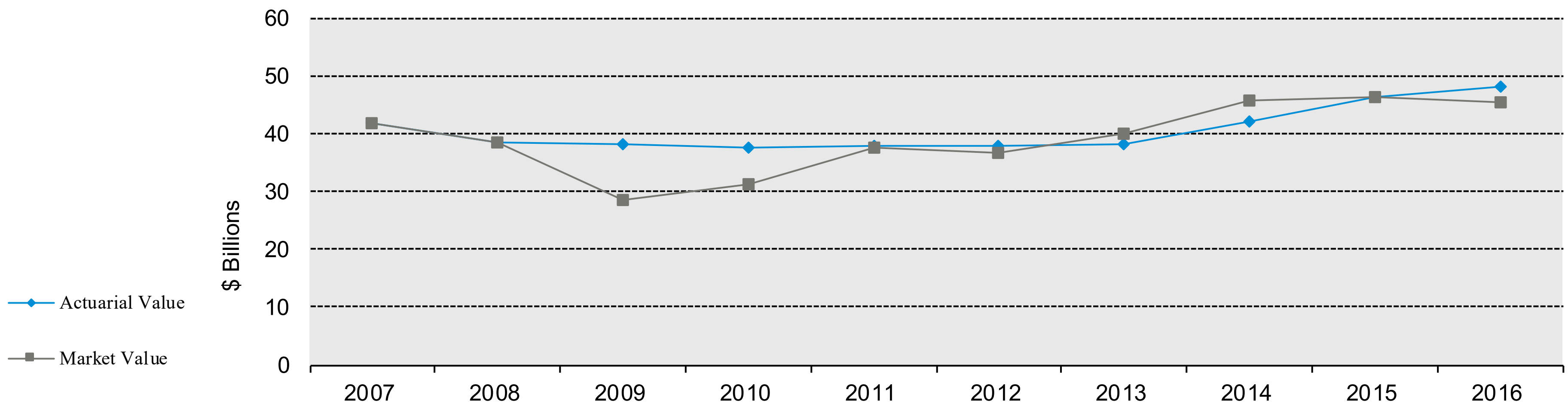
* *Recognition at 20% per year over 5 years*
***Total return minus expected return on market value*

Both the actuarial value and market value of assets are a representation of the TRS financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the market value of assets. The actuarial asset value is significant because TRS liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 9

Actuarial Value of Assets vs. Market Value of Assets as of June 30, 2007 – 2016 (with POB)



C. ACTUARIAL EXPERIENCE

To calculate the actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. Overall favorable experience relative to the assumptions (an actuarial gain) causes a decrease in the contribution requirement. On the other hand, overall less favorable experince relative to the assumptions (an actuarial loss) causes an increase in the contribution requirement.

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single years' experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss is $1,431,238,735; $467,184,012 from investment losses and $964,054,723 in losses from all other sources. The net experience variation from individual sources other than investments was approximately 0.8% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 10

Actuarial Experience for Year Ended June 30, 2016

1.	Net loss from investments*	($467,184,012)
2.	Net loss from other experience**	(964,054,723)
3.	Net experience loss: (1) + (2)	($1,431,238,735)

* *Details in Chart 11*

** *Details in Chart 14*

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the TRS investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.00%. The assumed rate of return for the year ended June 30, 2016 was 7.50%. The actual rate of return on an actuarial basis for the year ended June 30, 2016, was 6.46%.

Since the actual return for the year was less than the assumed return, TRS experienced an actuarial loss during the year ended June 30, 2016, with regard to its investments.

This chart shows the portion of the gain due to investment experience.

CHART 11

Investment Experience for the Year Ended June 30, 2016

	Market Value With POB	Market Value Without POB	Actuarial Value With POB
1. Value of assets as of June 30, 2015	$46,406,915,593	$41,256,196,208	$45,435,192,645
2. Contributions during fiscal year ended June 30, 2016	4,842,319,410	5,182,323,305*	4,842,319,410
3. Benefits and expenses during fiscal year ended June 30, 2016	5,954,175,094	5,954,175,094	5,954,175,094
4. Value of assets as of June 30, 2016	45,250,956,731	40,445,032,097	47,222,097,809
5. Total investment income: (4) – (1) – (2) + (3)	(44,103,178)	(39,312,322)	2,898,760,848
6. Average value of assets: (1) + ((2) - (3)) ÷ 2	45,850,987,751	40,870,270,314	44,879,264,803
7. Actual rate of return: (5) ÷ (6)	(0.10%)	(0.10%)	6.46%
8. Assumed rate of return	7.50%	7.50%	7.50%
9. Expected return: (6) x (8)	$3,438,824,081	$3,065,270,274	$3,365,944,860
10. Actuarial loss: (5) – (9)	($3,482,927,259)	($3,104,582,596)	($467,184,012)

* Includes POB debt service

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last twenty years, including five-year, ten-year, fifteen-year, and twenty-year averages. Note that the actuarial value of assets was equal to the market value of assets prior to June 30, 2009. Effective June 30, 2009, the actuarial value of assets was changed to a method under which market fluctuations in excess of or below the assumed investment return are recognized over a five-year period. The returns were determined by the actuary and may be different from the returns reported in the Comprehensive Annual Financial Report.

CHART 12
Investment Return

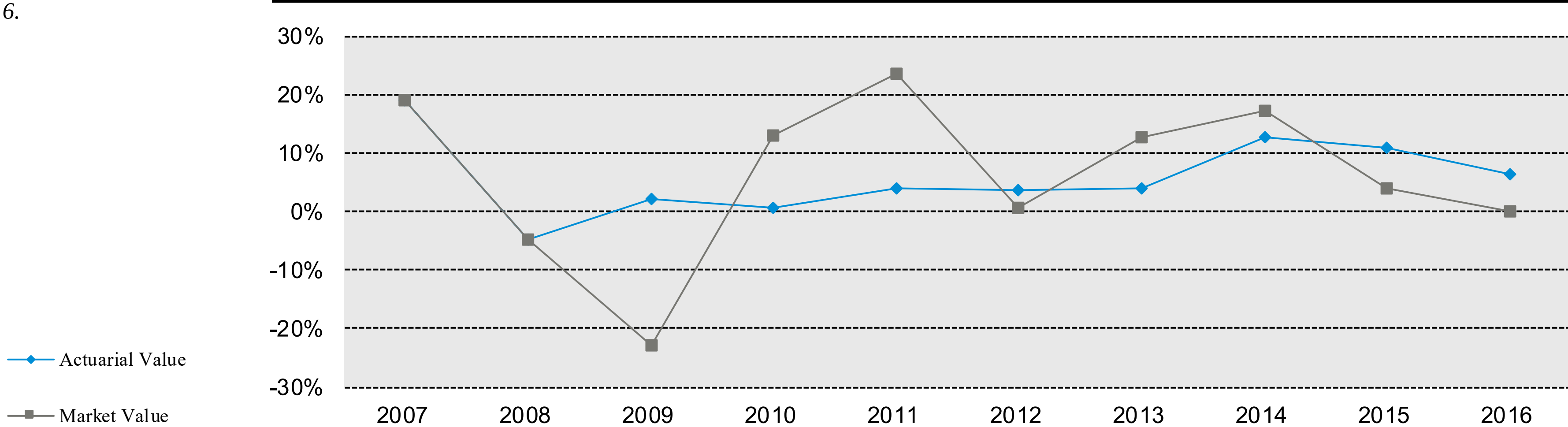
Year Ended June 30	Market Value	Actuarial Value
1997	17.93%	17.93%
1998	16.72	16.72
1999	10.44	10.44
2000	10.53	10.53
2001	(4.16)	(4.16)
2002	(3.12)	(3.12)
2003	4.78	4.78
2004	16.46	16.46
2005	10.69	10.69
2006	11.98	11.98
2007	19.07	19.07
2008	(4.89)	(4.89)
2009	(22.89)	2.22
2010	12.97	0.71
2011	23.50	3.84
2012	0.61	3.64
2013	12.70	3.83
2014	17.19	12.75
2015	3.91	10.76
2016	(0.10)	6.46
Average Returns		
Last 5 years:	6.6%	7.4%
Last 10 years:	5.3%	5.6%
Last 15 years:	6.2%	6.4%
Last 20 years:	7.1%	7.3%

The actuarial asset valuation method gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs. Chart 13 illustrates the effect that the asset returns on a market value basis are more volatile than asset returns on an actuarial basis.

This chart illustrates how this leveling effect has actually worked over the years 2009 – 2016.

CHART 13

Market Value and Actuarial Rates of Return for Years Ended June 30, 2007 - 2016



Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include, but are not limited to:

- salary increases different than assumed,
- retirement experience (earlier or later than expected),
- disability experience different than assumed, and
- the extent of turnover among the participants,
- mortality (more or fewer deaths than expected) and,
- new entrants

The loss from this other experience for the year ended June 30, 2016, amounted to $964,054,723, which is approximately 0.8% of the actuarial accrual liability. A five-year history of the demographic gain/(loss) experience is shown in the chart below.

This chart shows a five-year history of the elements of experience gain/(loss).

CHART 14

Experience Due to Changes in Demographics for Years Ended June 30, 2012 to June 30, 2016

	Year Ended June 30				
	2016	**2015**	**2014**	**2013**	**2012***
1. Salary increases	$65,504,184	$468,541,235	$474,190,195	$412,776,000	$1,211,157,000
2. Retirement experience	(237,492,448)	(302,761,415)	(119,675,346)	(65,579,020)	N/A
3. Disability experience	16,091,632	13,393,193	3,237,170	6,120,537	N/A
4. Termination experience	(15,147,793)	(56,862,195)	4,442,984	(22,925,587)	(29,810,000)
5. Mortality experience	(49,779,799)	45,647,175	74,308,199	(7,355,374)	(52,681,000)
6. Rehires	(23,266,945)	(13,630,966)	(37,754,909)	-	N/A
7. New entrants	17,516,646	(5,168,927)	315,731	(12,677,870)	(14,505,000)
8. Other	(737,480,200)**	(21,988,860)	2,815,856	(279,656,717)	(521,890,000)
9. Total	($964,054,723)	$127,169,240	$401,879,880	$30,701,969	$592,271,000

**Gain (loss) not available for items noted as N/A.*

***Primarily due to a change in software/actuary, which is within a normal range for this change for a plan the size of TRS.*

D. DEVELOPMENT OF EMPLOYER CONTRIBUTIONS

Statutory Funding under Illinois Pension Code

The amount of the employer contribution as determined by the Illinois Pension Code is the amount, which, as a level percentage of member payroll, will result in the System being 90% funded by June 30, 2045. The employer contributions include contributions from the State, Federal and School Districts. Federal contributions are based on the assumption that 2.00% of total payroll is attributable to Federal Funds payroll. The School Districts contributions are expected to equal 0.58% of total payroll under Sec. 16-158(e) and approximately 0.04% of total payroll under Sec. 16-158(f). The actuarial cost method is the projected unit credit method.

Recommended Funding under Actuarial Math 2.0

The Actuarially Determined Contribution under the Board's funding policy, called Actuarial Math 2.0, is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. The amortization of the unfunded accrued liability is a closed 20-year period effective June 30, 2015, and will decline by one year in each subsequent valuation. Sources of unfunded actuarial accrued liability that emerge in subsequent valuations are amortized over 20-year closed periods. Contributions toward the unfunded actuarial accrued liability increase by 2% each year, the estimate of increase in future State revenue growth. The actuarial cost method is the entry age method. The minimum contribution is the normal cost.

Chart 15 shows the development of employer contributions under Statutory Funding and Actuarial Math 2.0.

This chart shows a comparison of the employer contributions based on the Statutory Funding Plan to the actuarially determined contribution (Actuarial Math 2.0)

CHART 15

Employer Contributions

	Fiscal Year Ending June 30	
	2018	**2017**
Based on Statutory Funding Plan		
1. Benefit Trust Reserve:		
a. Employer's cost as percentage of membership payroll	45.19%	39.12%
b. Total employer contribution (1a) * membership payroll	$4,717,960,367	$4,124,118,869
c. School Districts contribution (0.58% of total payroll)	(60,559,679)	(61,138,899)
d. Federal Funds cost as a percentage of Federal payroll	44.61%	38.54%
e. Federal Funds contribution (1d) * Federal payroll	(93,148,014)	(77,196,619)
f. State Contribution: (1b) + (1c) + (1e)	$4,564,252,674	$3,985,783,351
2. Guaranteed Minimum Annuity Reserve	700,000	800,000
3. Total State Contribution: (1f) + (2)	$4,564,952,674	$3,986,583,351
Based on Actuarial Math 2.0 (Actuarially Determined Contribution)		
4. Benefit Trust Reserve		
a. Normal cost plus amortization of UAAL	$7,076,460,732	$6,248,879,280
b. School Districts contribution (0.58% of payroll)	(60,559,679)	(61,138,899)
c. Federal Funds contribution	(140,318,021)	(117,567,067)
d. State Contribution: (4a) + (4b) + (4c)	$6,875,583,032	$6,070,173,314
5. Guaranteed Minimum Annuity Reserve	700,000	800,000
6. Total State Contribution: (4d) + (5)	$6,876,283,032	$6,070,973,314
Difference between Actuarial Math 2.0 and Statutory Funding		
7. Shortfall/(Excess): (6) – (3)	$2,311,330,358	$2,084,389,963
Expected membership payroll		
8. State payroll	$10,232,497,531	$10,340,906,848
9. Federal payroll	208,826,480	200,282,599
10. Total membership payroll	$10,441,324,011	$10,541,189,447

EXHIBIT A

Summary of Membership Data

Category	Valuation as of June 30 * 2016	2015	Change From Prior Year
Active members:			
1. Number			
a. Full-time and regular part-time			
Tier I	117,545	121,476	-3.24%
Tier II	15,933	11,440	39.27%
Total	133,478	132,916	0.42%
b. Substitutes, part-time, and hourly paid			
Tier I	15,953	17,224	-7.38%
Tier II	10,253	9,696	5.74%
Total	26,206	26,920	-2.65%
c. Total number of active members			
Tier I	133,498	138,700	-3.75%
Tier II	26,186	21,136	23.89%
Total	159,684	159,836	-0.10%
2. Annual salaries			
a. Full-time and regular part-time			
Tier I	$8,556,153,120	$8,610,773,109	-0.63%
Tier II	730,698,948	504,706,921	44.78%
Total	$9,286,852,068	$9,115,480,030	1.88%
b. Substitutes, part-time, and hourly paid			
Tier I	$93,375,300	$94,972,940	-1.68%
Tier II	55,179,485	48,924,518	12.78%
Total	$148,554,785	$143,897,458	3.24%
c. Total annual salaries			
Tier I	$8,649,528,420	$8,705,746,049	-0.65%
Tier II	785,878,433	553,631,439	41.95%
Total	$9,435,406,853	$9,259,377,488	1.90%

**Member data used in the valuation is as of the prior valuation date.*

EXHIBIT A (*continued*)
Summary of Membership Data

Category	Valuation as of June 30* 2016	Valuation as of June 30* 2015	Change From Prior Year
Active members (continued):			
3. Average age			
a. Full-time and regular part-time	41.7	41.2	N/A
b. Substitutes, part-time, and hourly paid	44.2	42.7	N/A
c. Total	42.1	41.4	N/A
4. Average service			
a. Full-time and regular part-time	12.6	12.6	N/A
b. Substitutes, part-time, and hourly paid	2.4	2.3	N/A
c. Total	11.0	10.8	N/A
Inactive members:			
Eligible for deferred annuities	18,362	17,575	4.48%
Eligible for refunds or single sum benefits	115,360	113,012	2.08%
Total	133,722	130,587	2.40%
Service retirees:			
1. Number			
a. Regular	68,912	66,067	4.31%
b. ERI	9,623	9,884	-2.64%
c. ERO	25,253	25,540	-1.12%
d. Total	103,788	101,491	2.26%
2. Annual annuities			
a. Regular	$3,303,159,295	$3,104,104,842	6.41%
b. ERI	541,033,711	547,922,192	-1.26%
c. ERO	1,624,256,799	1,609,849,806	0.89%
d. Total	$5,468,449,806	$5,261,876,840	3.93%
3. Average age	71.0	70.1	N/A
4. Average monthly benefit	$4,391	$4,320	1.64%

**Member data used in the valuation is as of the prior valuation date.*

EXHIBIT A (*continued*)
Summary of Membership Data

Category	Valuation as of June 30* 2016	Valuation as of June 30* 2015	Change From Prior Year
Disability annuitants:			
1. Number			
a. Retirement Allowance	766	778	-1.54%
b. Occupational	4	4	0.00%
c. Temporary	325	315	3.17%
d. Total	1,095	1,097	-0.18%
2. Annual annuities			
a. Retirement Allowance	$20,135,885	$20,702,978	-2.74%
b. Occupational	181,372	187,457	-3.25%
c. Temporary	9,298,439	7,705,713	20.67%
d. Total	$29,615,696	$28,596,148	3.57%
3. Average age	59.2	59.1	N/A
4. Average monthly benefit	$2,254	$2,172	3.78%
Survivor annuitants:			
1. Number			
a. Children	76	71	7.04%
b. Survivors	10,109	9,826	2.88%
c. Reversionary	205	197	4.06%
d. Total	10,390	10,094	2.93%
2. Annual annuities			
a. Children	$830,687	$790,550	5.08%
b. Survivors	221,787,418	207,472,165	6.90%
c. Reversionary	7,515,279	7,047,821	6.63%
d. Total	$230,133,385	$215,310,536	6.88%
3. Average age	77.7	77.0	N/A
4. Average monthly benefit	$1,846	$1,778	3.82%
Total number of participants	408,645	403,105	1.37%

**Member data used in the valuation is as of the prior valuation date.*

EXHIBIT B

Active Membership Data as of June 30, 2015 used in June 30, 2016 Actuarial Valuation – Number and Average Annual Salary

		Full-Time and Regular Part-Time								
		Years of Service								
Age	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & over
Under 25	3,142	3,142	- -	- -	- -	- -	- -	- -	- -	- -
	$41,224	$41,224	- -	- -	- -	- -	- -	- -	- -	- -
25 - 29	16,189	11,845	4,344	- -	- -	- -	- -	- -	- -	- -
	$47,964	$45,901	$53,590	- -	- -	- -	- -	- -	- -	- -
30 - 34	22,402	4,630	12,686	5,086	- -	- -	- -	- -	- -	- -
	$58,848	$49,580	$58,823	$67,349	- -	- -	- -	- -	- -	- -
35 - 39	21,822	2,328	4,837	10,973	3,684	- -	- -	- -	- -	- -
	$68,099	$51,284	$61,064	$70,975	$79,392	- -	- -	- -	- -	- -
40 - 44	20,166	1,931	2,890	4,768	8,125	2,452	- -	- -	- -	- -
	$74,434	$50,252	$60,842	$72,078	$82,191	$88,372	- -	- -	- -	- -
45 - 49	17,484	1,264	2,112	3,065	3,731	5,729	1,583	- -	- -	- -
	$79,208	$51,150	$60,540	$71,892	$81,717	$90,507	$93,879	- -	- -	- -
50 - 54	14,780	798	1,549	2,417	2,394	2,541	3,658	1,423	- -	- -
	$81,821	$51,508	$60,532	$69,944	$78,416	$90,035	$94,739	$100,020	- -	- -
55 - 59	11,471	417	883	1,854	2,129	1,978	1,823	2,084	303	- -
	$83,956	$53,814	$61,662	$70,513	$78,735	$87,723	$94,486	$101,454	$101,047	- -
60 - 64	4,899	154	364	836	1,118	956	705	425	290	51
	$85,606	$54,244	$64,862	$73,703	$79,884	$90,850	$95,800	$104,983	$109,794	$110,684
65 & over	1,123	43	92	172	236	227	157	93	49	54
	$87,990	$53,751	$69,889	$80,399	$84,416	$89,798	$95,402	$99,253	$116,410	$111,559
Total	133,478	26,552	29,757	29,171	21,417	13,883	7,926	4,025	642	105
	$69,576	$47,381	$59,022	$70,638	$80,766	$89,659	$94,617	$101,269	$106,171	$111,134

EXHIBIT C

10-Year History of Active Membership Data

Full-Time and Regular Part-Time

Census Date June 30	Number	Percentage Change in Membership	Total Salaries	Average Annual Salary	Percentage Change in Average Salary
2006	130,867	3.2%	$7,845,223,000	$59,948	2.1%
2007	132,287	1.1%	8,163,840,000	61,713	2.9%
2008	136,328	3.1%	8,723,099,000	63,986	3.7%
2009	138,180	1.4%	9,147,433,000	66,199	3.5%
2010	137,711	(0.3%)	9,412,873,000	68,352	3.3%
2011	133,752	(2.9%)	9,358,470,000	69,969	2.4%
2012	132,956	(0.6%)	8,874,281,176	66,476	(4.6%)
2013	132,886	(0.1%)	8,984,821,118	67,613	1.3%
2014	132,916	0.0%	9,115,480,030	68,581	1.4%
2015	133,478	0.4%	9,286,852,068	69,576	1.5%

Substitutes, Part-Time and Hourly-Paid

Census Date June 30	Number	Percentage Change in Membership	Total Salaries	Average Annual Salary	Percentage Change in Average Salary
2006	28,355	(2.7%)	$135,650,000	$4,784	3.2%
2007	28,514	0.6%	139,440,000	4,890	2.2%
2008	29,146	2.2%	149,452,000	5,128	4.9%
2009	30,993	6.3%	154,121,000	4,973	(3.0%)
2010	32,479	4.8%	161,461,000	4,971	0.0%
2011	32,120	(1.1%)	153,261,000	4,772	(4.0%)
2012	29,073	(9.5%)	154,240,000	5,305	11.2%
2013	28,104	(3.3%)	143,217,984	5,096	(3.9%)
2014	26,920	(4.2%)	143,897,458	5,345	4.9%
2015	26,206	(2.7%)	148,630,024	5,672	6.1%

EXHIBIT D

10-Year History of Annuitant and Survivor Annuitant Membership

Valuation as of June 30	Number	Percentage Change in Number of Recipients	Annual Allowances	Percentage Change in Allowances	Average Annual Annuity
2006	89,269	4.8%	$3,342,349,000	10.8%	$37,441
2007	91,497	2.5%	3,549,173,000	6.2%	38,790
2008	94,419	3.2%	3,812,546,000	7.4%	40,379
2009	97,796	3.6%	4,107,592,000	7.7%	42,002
2010	101,352	3.6%	4,418,017,000	7.6%	43,591
2011	105,499	4.1%	4,780,743,000	8.2%	45,316
2012	106,102	0.6%	4,811,370,000	0.6%	45,347
2013	109,448	3.2%	5,204,460,272	8.2%	47,552
2014	112,682	3.0%	5,505,783,524	5.8%	48,861
2015	115,273	2.3%	5,728,198,887	4.0%	49,692

EXHIBIT E

Benefit Stream for Guaranteed Minimum Annuity Reserve

Fiscal Year	Benefits Stream for Guaranteed Minimum Annuity Reserve	Fiscal Year	Benefits Stream for Guaranteed Minimum Annuity Reserve
2017	$627,745	2040	$18,682
2018	558,924	2041	15,425
2019	492,763	2042	12,661
2020	431,390	2043	10,304
2021	376,071	2044	8,333
2022	326,706	2045	6,670
2023	283,095	2046	5,297
2024	244,722	2047	4,162
2025	211,222	2048	3,233
2026	182,034	2049	2,480
2027	156,700	2050	1,876
2028	134,762	2051	1,399
2029	115,741	2052	1,028
2030	99,312	2053	743
2031	85,093	2054	529
2032	72,798	2055	359
2033	62,157	2056	246
2034	52,943	2057	165
2035	44,963	2058	110
2036	38,055	2059	61
2037	32,081	2060	37
2038	26,925	2061	22
2039	22,488	2062	12

EXHIBIT F

Reconciliation of Member Data

	Active Members	Inactive Member Eligible for Allowance	Inactive Member Eligible for Refund	Service Retirees	Disabled Retirees	Beneficiaries	Deferred Beneficiaries	Total
A. Number as of June 30, 2014	159,836	17,575	113,012	101,491	1,097	10,094	29	403,134*
B. New members	10,443	N/A	N/A	N/A	N/A	N/A	N/A	10,443
C. Participant movement								
1. Retirements	(3,662)	(571)	(205)	4,438	0	15	(15)	0
2. Disabilities	(132)	(3)	0	0	135	0	0	0
3. Conversion from disability to service pension	N/A	N/A	N/A	50	(50)	N/A	N/A	0
4. Died with beneficiary	(39)	0	0	(742)	(18)	815	10	26**
5. Died without beneficiary	(153)	(17)	(89)	(1,474)	(26)	(616)	0	(2,375)
6. Terminations – with vested rights	(2,619)	2,619	0	0	0	0	0	0
7. Terminations – without vested rights	(7,757)	0	7,757	0	0	0	0	0
8. Refunds	(819)	(289)	(1,601)	N/A	N/A	N/A	0	(2,709)
9. Rehired as active	4,591	(1,021)	(3,529)	(6)	(35)	0	0	0
10. Temporary annuity expired	N/A	N/A	NA	N/A	N/A	(4)	N/A	(4)
D. Data adjustment	(5)	35	15	31	(8)	86	10	164
E. Number as of June 30, 2015	159,684	18,328	115,360	103,788	1,095	10,390	34	408,679

* *The 29 deferred beneficiaries were not included in last year's member counts.*
** *Includes multiple beneficiaries*

EXHIBIT G

Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended June 30, 2016		Year Ended June 30, 2015	
Net assets at market value at the beginning of the year		$46,406,915,593		$45,824,382,514
Contribution income:				
Members	$951,809,398		$935,451,049	
State of Illinois	3,742,469,245		3,377,664,945	
Employers:				
Early retirement	13,554,467		13,930,699	
Federal funds	74,497,870		69,764,609	
2.2 Benefit formula	55,785,482		56,610,761	
Excess salary/sick leave	4,202,948		5,285,516	
Total contribution income		$4,842,319,410		$4,458,707,579
Investment income:				
Net appreciation (depreciation)	($843,377,824)		$753,800,289	
Interest	240,569,604		241,478,494	
Alternative	808,469,675		756,671,998	
Dividends	435,697,251		472,773,697	
Other	47,074,975		227,659,217	
Securities lending	17,651,392		10,166,086	
Less direct investment expense	(749,609,143)		(696,589,128)	
Less securities lending management fees	(1,089,734)		(941,907)	
Securities lending borrower rebates	510,626		5,530,787	
Net investment income		(44,103,178)		1,770,549,533
Total income available for benefits		$4,798,216,232		$6,229,257,112
Less benefit payments and administrative expenses:				
Retirement benefits	($5,575,129,529)		($5,281,221,313)	
Survivor benefits	(242,578,458)		(224,779,380)	
Disability benefits	(30,472,221)		(30,398,754)	
Refund of contributions	(83,026,969)		(88,637,726)	
Administrative expenses	(22,967,917)		(21,686,860)	
Net benefit payments and administrative expenses		($5,954,175,094)		($5,646,724,033)
Net assets at market value at the end of the year		$45,250,956,731		$46,406,915,593

EXHIBIT H

Summary Statement of System Assets

	Year Ended June 30, 2016		Year Ended June 30, 2015	
Cash equivalents		$40,637,848		$45,709,535
Accounts receivable and prepaid expenses:				
Member contributions	$53,246,316		$52,436,438	
Employer contributions	14,904,808		13,620,835	
State of Illinois	473,533,699		344,042,033	
Investment income	110,892,567		113,824,855	
Investments sold	4,622,648,071		5,219,465,652	
Prepaid expenses	4,338,705		4,020,623	
Total accounts receivable and prepaid expenses		$5,279,564,166		$5,747,410,436
Investments at market value:				
Fixed income	$9,887,153,436		$8,697,165,058	
Equities	16,083,525,866		18,475,666,319	
Real estate	6,943,206,220		6,255,857,685	
Short term investments	1,127,440,142		848,587,909	
Private equity	5,465,171,512		5,281,073,621	
Real return	2,889,159,873		2,994,366,309	
Absolute return	3,196,766,195		3,471,868,205	
Foreign currency	103,219,472		74,142,815	
Derivatives	(62,716,360)		936,964	
Total investments		$45,632,926,356		$46,099,664,885
Invested securities lending collateral		3,134,036,175		2,943,517,231
Capital assets, net of accumulated depreciation		3,605,993		3,947,730
Total assets		$54,090,770,538		$54,840,249,817
Less accounts payable:				
Benefits and refunds payable	($5,958,467)		($6,928,533)	
Administrative and investment expenses payable	(53,025,784)		(55,505,862)	
Pending investment purchases	(5,646,802,204)		(5,427,366,418)	
Securities lending collateral	(3,134,027,352)		(2,943,533,411)	
Total accounts payable		($8,839,813,807)		($8,433,334,224)
Net assets at market value		$45,250,956,731		$46,406,915,593

EXHIBIT I

History of System Revenue and Expenses

Year Ending June 30	Market Value of Assets Beginning of Year	Member Contributions	Employer Contributions	Net Investment Return	Admin Expenses	Benefit Payments	Market Value of Assets End of Year	Investment Return*
2007	$36,584,889,427	$826,249,007	$853,585,668	$6,831,324,436	$15,246,203	$3,171,484,584	$41,909,317,751	19.2%
2008	41,909,317,751	865,400,168	1,171,788,454	(2,014,902,366)	16,613,364	3,484,267,356	38,430,723,287	(5.0%)
2009	38,430,723,287	876,182,122	1,603,920,569	(8,654,702,712)	17,387,936	3,707,423,088	28,531,312,242**	(22.7%)
2010	28,531,312,242	899,401,027	2,252,149,605	3,679,642,960	16,950,679	3,988,188,142	31,323,784,214	12.9%
2011	31,323,784,214	909,577,109	2,326,028,622	7,234,539,490	17,792,071	4,304,870,170	37,471,267,194	23.6%
2012	37,471,267,194	917,661,328	2,561,259,102	224,106,719	19,011,899	4,638,457,105	36,516,825,339	0.8%
2013	36,516,825,339	921,422,657	2,860,491,456	4,561,768,383	20,257,553	4,981,481,783	39,858,768,499	12.7%
2014	39,858,768,499	928,745,853	3,596,717,490	6,782,031,720	21,218,069	5,320,662,979	45,824,382,514	17.2%
2015	45,824,382,514	935,451,049	3,523,256,530	1,770,549,533	21,686,860	5,625,037,173	46,406,915,593	3.9%
2016	46,406,915,593	951,809,398	3,890,510,012	(44,103,178)	22,967,917	5,931,207,177	45,250,956,731	(0.1%)

* Calculated by the actuary and may not match the investment return reported in the Comprehensive Annual Financial Report.

**Subsequent to the valuation, the market value as of June 30, 2009 was determined to be $28,497,729,443.

EXHIBIT J

Development of Unfunded Actuarial Accrued Liability

	Year Ending June 30			
	2016		2015	
1. Unfunded actuarial accrued liability at beginning of year		$62,686,632,526		$61,589,612,006
2. Total normal cost at beginning of year		1,820,919,242		1,925,420,029
3. Total member and employer contributions		4,842,319,410		4,458,707,579
4. Interest on:				
(a) Unfunded actuarial accrued liability and normal cost	$4,838,066,383		$4,690,118,847	
(b) Total contributions	181,586,978		164,178,832	
(c) Total interest: (4a) – (4b)		4,656,479,405		4,525,940,015
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)		$64,321,711,763*		$63,582,264,471
6. Changes due to (gain)/loss from:				
(a) Investments	467,184,012		(1,354,881,665)	
(b) Demographics	964,054,723		(127,169,240)	
(c) Total changes due to (gain)/loss: (6a) + (6b)		1,431,238,735		(1,482,050,905)
7. Change due to plan amendments		0		0
8. Change in actuarial assumptions		5,654,841,998**		586,418,960
9. Unfunded actuarial accrued liability at end of year: (5) + (6c) + (7) + (8)		$71,407,792,496		$62,686,632,526

* The unfunded actuarial accrued liability increased $1,635,079,237 during the year ended June 30, 2016 due to total contributions being less than total normal cost plus interest on the unfunded actuarial accrued liability.

** The elimination of ERO decreased the actuarial accrued liability by $482,220,490. All other assumption changes increased the actuarial accrued liability by $6,137,062,488.

EXHIBIT I

Derivation of Employer Contributions under Illinois Pension Code

	June 30, 2018	As Percentage of Payroll (State, Federal, Total)	
1. Assumed Payroll:			
a. Total payroll	$10,441,324,011		
b. Less Federal Funds payroll	(208,826,480)		
c. State payroll	$10,232,497,531		
2. Employer contribution that would have been required without funds provided by Sec. 7.2(d) of General Obligation Bond Act			
a. Employer's cost	$5,081,762,020	48.67%	Total
b. Less School Districts' contribution under Sec. 16-158(e)	(60,559,679)	(0.58%)	Total
c. State and Federal Funds contribution	$5,021,202,341	48.09%	Total
d. Less State debt service for TRS portion of all funds provided under Sec 7.2 of General Obligation Bond Act	(363,801,653)	(3.48%)	Total
e. Maximum State and Federal Funds contribution under PA 94-0004	$4,657,400,688	44.61%	Total
3. Employer contribution recognizing all system assets, before limiting State and Federal Funds contribution			
a. Employer's cost	$4,781,210,729	45.79%	Total
b. Less School Districts' contribution under Sec. 16-158(e)	(60,559,679)	(0.58%)	Total
c. State and Federal Funds contribution	$4,720,651,050	45.21%	Total
4. State and Federal Funds contribution under PA 94-0004			
a. Lesser of amounts under (2) and (3)	$4,657,400,688	44.61%	Total
5. Employer contribution under PA 94-0004			
a. State portion of (4) based on State payroll	$4,564,252,674	44.61%	State
b. Plus Federal portion of (4) based on Federal payroll	93,148,014	44.61%	Federal
c. State and Federal Funds contribution	$4,657,400,688	44.61%	Total
d. Plus School Districts' contribution under Sec. 16-158(e)	60,559,679	0.58%	Total
e. Employer contribution	$4,717,960,367	45.19%	Total

Notes about employer contribution under PA 94-0004:

1) **Assumed Payrolls**
The TRS staff estimated Federal Funds payroll for the fiscal year ending June 30, 2018 would be 2.00% of payroll.

2) **Determination of Maximum State and Federal Funds Contribution under Public Act 94-0004**
Under Section 7.2(d) of the General Obligation Bond Act (GOBA), TRS received $4.33 billion on July 2, 2003. Commencing with fiscal year 2005, the maximum State contribution under the Act equals the State contribution that would have been required had the $4.33 billion contribution not been made, reduced, but not below zero, by the State's debt service on the TRS portion of the full $10 billion of Pension Obligation Bonds issued under Section 7.2 of the GOBA. Commencing with fiscal year 2006, the Federal Funds contribute at the same rate as the State, and therefore a Combined State and Federal Funds contribution must be determined.

3) **Employer Contribution Recognizing $4.33 Billion Received July 2, 2003**
A gross employer contribution is determined that recognizes all System assets, and that meets the cost of maintaining and administering the System on a 90% funded basis by June 30, 2045, with a level percentage of payroll contribution after a 15-year phase-in beginning in fiscal year 1996.

4) **State and Federal Funds Contribution under Public Act 94-0004**
The State and Federal Funds contribution is the lesser of the maximum contribution determined under (2) or the contribution determined under (3).

5) **Employer Contribution under Public Act 94-0004**
The contribution determined under (4) is allocated to the State and to the Federal Funds in proportion to their respective payrolls (shown in (1)). The required employer contribution equals the sum of these contributions and the expected 0.58% of payroll School Districts' contributions for the 2.2% formula made under provisions of Sec. 16-158(e).

6) **State Contribution Amount for FY 2006 and FY 2007 under Public Act 94-0004**
PA 94-0004 specified actual contribution amounts for fiscal years 2006 and 2007 made by the State to the Benefit Trust Reserve.

Notes about employer contribution under PA 94-0004 (continued):

Additional information:

The following contributions made to the Benefit Trust Reserve are not shown on Exhibit I:

a) **From Members:**

   i) Sec. 16-128 payments for the purchase of optional service credit

   ii) Sec. 16-152 career contributions of 9.0% of salary

b) **From School Districts:**

   i) Sec. 16-128(d-10) payments for excessive sick leave service credit

   ii) Sec. 16-158(f) lump sum payments at retirement for the cost of pension benefits arising from salary increases over 6% used in the final average salary calculation

Although these types of contributions are not shown in the exhibits, they are all, with the exception of Sec. 16-128(d-10) payments and Sec. 16-128 member payments for the purchase of optional service credit, taken into account in the actuarial projection of the assets and funded status of the system. The actuarial projection is performed after the above contributions have been taken into account.

Payments under Sec. 16-158(f) have been included since the recertified June 30, 2004, valuation. There are no current assumptions for excessive sick leave service credit, and therefore the actuarial projections do not currently include projected payments under Sec. 16-128(d-10).

EXHIBIT II

Development of State and Federal Funds Statutory Contributions under Illinois Pension Code

			Fiscal Year Ending June 30, 2018
1.	Present value as of June 30, 2017 of future obligations to fund:		
	a.	90% of June 30, 2045 Actuarial Accrued Liability	$26,819,217,442
	b.	Benefit disbursements and administrative expenses through June 30, 2045	117,637,515,099
	c.	Total	$144,456,732,541
2.	Projected actuarial value of assets as of June 30, 2017		
	a.	With POB proceeds	49,385,149,781
	b.	Without POB proceeds	44,393,781,968
3.	Present value as of June 30, 2017 of future member contributions through June 30, 2045		15,606,267,932
4.	Present value as of June 30, 2017 of future School district contributions through June 30, 2045		
	a.	6% FAS cap increases under §16-158(f)	$61,958,191
	b.	2.2% formula under §16-158(e)	1,005,737,267
	c.	Total	$1,067,695,458
5.	Present value as of June 30, 2017 of future State and Federal Funds contributions through June 30, 2045		
	a.	Including POB proceeds: (1c) – (2a) – (3) – (4c)	78,397,619,370
	b.	Excluding POB proceeds: (1c) – (2b) – (3) – (4c)	83,388,987,183
6.	Present value as of June 30, 2017 of future covered payroll through June 30, 2045		173,402,977,020
7.	Determination of preliminary contribution rates for State and Federal Funds for year ended June 30, 2018		
	a.	Including POB proceeds: (5a) / (6)	45.21%
	b.	Excluding POB proceeds: (5b) / (6)	48.09%

EXHIBIT II (*continued*)

Development of State and Federal Funds Statutory Contributions under Illinois Pension Code

	Fiscal Year Ending June 30, 2018
8. Determination of contribution for State and Federal Funds for year ended June 30, 2018:	
a. Projected payroll:	
i) State	$10,232,497,531
ii) Federal Funds	208,826,480
iii) Total	$10,441,324,011
b. State and Federal Funds contribution before maximum: (7a) x (8a)(iii)	4,720,651,050
c. State and Federal Funds contribution maximum:	
i) Gross maximum: (7b) x (8a)(iii)	$5,021,202,341
ii) State's debt service	363,801,653
iii) Net maximum: (i) – (ii)	$4,657,400,688
d. State and Federal Funds contribution after maximum:	
i) Total dollar contribution: minimum of (8b) and (8c)(iii)	$4,657,400,688
ii) Total contribution as percentage of payroll: (i) / (8a)(iii)	44.61%
iii) State contribution: (8a)(i) x (8d)(ii)	$4,564,252,674
iv) Federal Funds contribution: (8a)(ii) x (8d)(ii)	$93,148,014

EXHIBIT III

Development of State and Federal Funds Contributions Based on Actuarial Math 2.0

			Fiscal Year Ending June 30, 2018
1.	Projected employer Normal Cost as of June 30, 2018:		
	a.	Total	$1,855,230,642
	b.	Administrative expenses	26,549,011
	c.	Member contributions	939,719,161
	d.	Employer Normal Cost (a) + (b) – (c)	$942,060,492
2.	Projected Unfunded Actuarial Accrued Liability as of June 30, 2017		
	a.	Actuarial Accrued Liability	$125,489,540,404
	b.	Actuarial Value of Assets	49,385,149,781
	c.	Unfunded Actuarial Accrued Liability	$76,104,390,623
3.	Payment toward projected Unfunded Actuarial Accrued Liability as of June 30, 2018 (see Exhibit IV)		6,138,695,864
4.	Total employer contribution for year ending June 30, 2018: (1d) + (3)		$7,080,756,356
5.	Projected School district contributions for year ended June 30, 2018		
	a.	6% FAS cap increases under §16-158(f)	$4,295,624
	b.	2.2% formula under §16-158(e)	60,559,679
	c.	Total	$64,855,303
6.	State and Federal contribution for year ending June 30, 2018: (4) – (5c)		7,015,901,053
7.	Federal Funds portion of total payroll		2.00%
8.	Federal Funds contribution for year ending June 30, 2018: (6) x (7)		$140,318,021
9.	State contribution for year ending June 30, 2018: (6) – (8)		$6,875,583,032

EXHIBIT IV

Components of Unfunded Liability Bases and Amortization Payment under Actuarial Math 2.0

	Original Amount	Balance as of June 30, 2018	Remaining Amortization Period	2018 Amortization
June 30, 2015 valuation base:				
Projected UAAL as of June 30, 2017	$68,126,860,208	$67,478,501,516	19	$5,461,835,333
June 30, 2016 valuation base:				
Projected (gain)/loss as of June 30, 2018	$8,625,889,107	8,625,889,107	20	676,860,531
Total		$76,104,390,623		$6,138,695,864

EXHIBIT V
10-Year History of Unfunded Actuarial Liability and Funded Ratio ($ in thousands)

		Assets		Unfunded Liability Using Assets Based on		Funded Ratio Using Assets Based on	
As of June 30	Actuarial Accrued Liability	Actuarial Value of Assets	Market Value of Assets	Actuarial Value of Assets	Market Value of Assets	Actuarial Value of Assets	Market Value of Assets
2007	$65,648,395	$41,909,318	$41,909,318	$23,739,077	$23,739,077	63.8%	63.8%
2008	68,632,367	38,430,723	38,430,723	30,201,644	30,201,644	56.0	56.0
2009	73,027,198	38,026,044	28,497,729	35,001,154	44,529,469	52.1	39.0
2010	77,293,198	37,439,092	31,323,784	39,854,106	45,969,414	48.4	40.5
2011	81,299,745	37,769,753	37,471,267	43,529,992	43,828,478	46.5	46.1
2012	90,024,945	37,945,397	36,516,825	52,079,548	53,508,120	42.1	40.6
2013	93,886,989	38,155,191	39,858,768	55,731,797	54,028,220	40.6	42.5
2014	103,740,377	42,150,765	45,824,383	61,589,612	57,915,994	40.6	44.2
2015	108,121,825	45,435,193	46,406,916	62,686,632	61,714,909	42.0	42.9
2016	118,629,890	47,222,098	45,250,957	71,407,792	73,378,934	39.8	38.1

EXHIBIT VI
Funded Ratio

A critical piece of information regarding the System's financial status is the funded ratio. This ratio compares the actuarial value and market value of assets to the actuarial accrued liabilities of the System as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

The chart below depicts a history of the funded ratios for this System.

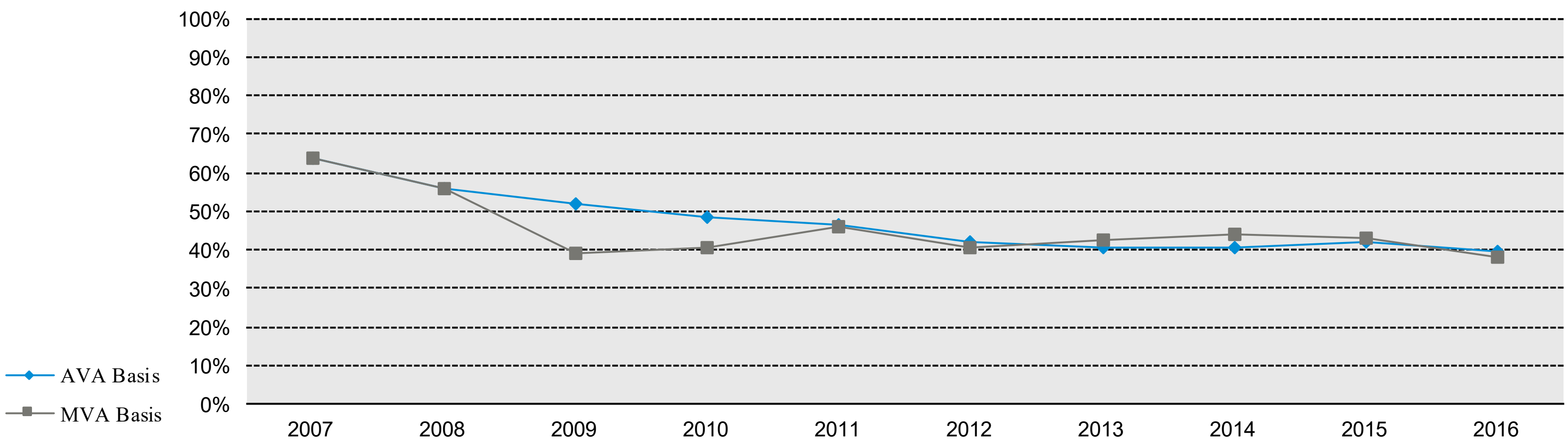


EXHIBIT VII
Department of Insurance Information

	June 30, 2016	June 30, 2015
Actuarial Accrued Liabilities:		
Service Retirement	$75,251,548,496	$68,251,326,306
Disability Retirement	412,320,378	405,679,765
Survivor	2,024,206,004	1,888,776,063
Subtotal	$77,688,074,878	$70,545,782,134
Inactive	3,260,634,369	2,687,999,663
Active	37,681,181,058	34,888,043,374
Total	$118,629,890,305	$108,121,825,171
Headcounts and Salaries for Active Members:		
Male		
Count	37,415	37,340
Salaries	$2,523,476,544	$2,461,405,691
Female		
Count	122,269	122,496
Salaries	$6,911,930,308	$6,797,971,797
Total		
Count	159,684	159,836
Salaries	$9,435,406,853	$9,259,377,488

EXHIBIT VIII

Roll Forward of Actuarial Accrued Liability and Normal Cost

	Actuarial Accrued Liabilities Developed for June 30, 2016 Valuation	Amount
1.	Actuarial Accrued Liability measured as of June 30, 2015	$114,745,497,166
2.	Normal Cost measured for fiscal year ended June 30, 2016	1,887,394,821
3.	Expected benefit payments for fiscal year ended June 30, 2016	5,958,747,943
4.	Interest on 1., 2. and 3. to June 30, 2016	7,955,746,261
5.	Actuarial Accrued Liability as of June 30, 2016 (1.+2.-3.+4.)	$118,629,890,305
6.	Normal Cost measured for fiscal year ended June 30, 2017	1,894,232,552
7.	Expected benefit payments for fiscal year ended June 30, 2017	6,240,838,406
8.	Interest on 5., 6. and 7. to June 30, 2017	8,218,259,255
9.	Actuarial Accrued Liability as of June 30, 2017 (5.+6.-7.+8.)	$122,501,543,706

Based on member census as of June 30, 2015, assumptions and methods as of June 30, 2016, including the Projected Unit Credit actuarial cost method.

EXHIBIT IX

Development of Annual Required Contribution (ARC) under GASB 25*

GASB 25 ARC ($ in thousands)

	Fiscal Year Ended June 30, 2016
Development of the ARC:	
1. Employer Normal Cost	$931,010
2. Amortization of Unfunded Actuarial Accrued Liability**	3,433,347
3. Annual Required Contribution: (1. + 2.)	$4,364,357

** The GASB 25 ARC is no longer applicable. It is developed at the request of the State.*

*** The UAAL is amortized as a level percentage of pay over 30 years based on the salary increase assumption and new entrant profile found in Section 6.3 of this report.*

The ARC for fiscal year ending June 30, 2016, is based on the valuation date of June 30, 2014, prepared by Buck Consultants.

Actuarial Cost Method	Projected Unit Credit
Amortization Method (for GASB disclosure)	Level Percent Open
Remaining Amortization Period (for GASB disclosure)	30 years
Payroll Growth Assumption (for GASB disclosure)	Projected using the assumed decrements for the members in the system and the valuation new entrant profile
Asset Valuation Method	5-Year Smoothing
Investment Rate of Return	7.50%
Projected Salary Increases	4.75% – 9.90%; composite approximates 5.75%
Includes Inflation at:	3.00%
Post-retirement Increase:	Tier I 3% compounded Tier II 1.4% not compounded (lesser of 3% or 1/2 CPI increase, but not less than zero)

Projections – Overview

Based on the results of the June 30, 2016, actuarial valuation, we have projected valuation results to June 30, 2045 commencing with Fiscal Year 2017.

Our projections of contributions, liabilities, and assets are based on the actuarial assumptions, membership data and benefit provisions that were used for the regular actuarial valuation.

In order to determine projected contributions, liabilities, and assets, certain calculations needed to be made that are not normally required in a regular actuarial valuation. Benefit payout requirements, actuarial liabilities, and payroll were estimated over the period from 2017 through 2045 by projecting the membership of TRS over the period, taking into account the impact of new entrants into the System.

To make the required projections, assumptions needed to be made regarding the age and salary distribution of new entrants as well as the size of the active membership of TRS. The assumptions regarding the profile of new entrants to TRS were based on the recent experience of TRS with regard to new entrants. The size of the active membership of the System was assumed to remain constant over the projection period. The results of our projections are shown on the following pages.

The assets haven been allocated by Tier for illustration purposes. Estimated Tier II assets are based on the June 30, 2013, accumulated member contributions of $70,783,523, rolled forward with expected member contributions, expected benefit payments, and the proportionate share of investment earnings.

TABLE 1

Projections – Projection of Funded Ratio to 2045

Amounts above the line are based on prior valuations and amounts below the line are based on the current valuation.

Year Ended June 30	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Tier I Funded Ratio	Tier II Funded Ratio	Total Funded Ratio
1995	$23,980,566,000	$12,641,865,000	($11,338,701,000)			52.7%
1996	26,141,794,000	13,829,711,000	(12,312,083,000)			52.9%
1997	26,951,585,000	17,393,108,000	(9,558,477,000)			64.5%
1998	29,908,241,000	19,965,887,000	(9,942,354,000)			66.8%
1999	33,205,513,000	22,237,709,000	(10,967,804,000)			67.0%
2000	35,886,404,000	24,481,413,000	(11,404,991,000)			68.2%
2001	39,166,697,000	23,315,646,000	(15,851,051,000)			59.5%
2002	43,047,674,000	22,366,285,000	(20,681,389,000)			52.0%
2003	46,933,432,000	23,124,823,000	(23,808,609,000)			49.3%
2004	50,947,451,000	31,544,729,000	(19,402,722,000)			61.9%
2005	56,075,029,000	34,085,218,000	(21,989,811,000)			60.8%
2006	58,996,913,000	36,584,889,000	(22,412,024,000)			62.0%
2007	65,648,395,000	41,909,318,000	(23,739,077,000)			63.8%
2008	68,632,367,000	38,430,723,000	(30,201,644,000)			56.0%
2009	73,027,198,000	38,026,043,512	(35,001,154,488)			52.1%
2010	77,293,198,000	37,439,091,771	(39,854,106,229)			48.4%
2011	81,299,745,000	37,769,752,971	(43,529,992,029)			46.5%
2012	90,024,945,000	37,945,397,211	(52,079,547,789)			42.1%
2013	93,886,988,785	38,155,191,497	(55,731,797,288)			40.6%
2014	103,740,377,267	42,150,765,261	(61,589,612,006)	40.6%	120.5%	40.6%
2015	108,121,825,171	45,435,192,645	(62,686,632,526)	41.9%	162.8%	42.0%
2016	118,629,890,305	47,222,097,809	(71,407,792,496)	39.6%	153.9%	39.8%
2017	122,501,543,706	49,289,279,209	(73,212,264,498)	40.0%	151.0%	40.2%
2018	126,377,196,019	51,401,733,472	(74,975,462,547)	40.3%	146.8%	40.7%
2019	130,252,728,049	52,851,175,402	(77,401,552,647)	40.2%	141.7%	40.6%
2020	134,124,382,392	54,700,487,786	(79,423,894,606)	40.2%	138.3%	40.8%

TABLE 1 (*continued*)

Projections – Projection of Funded Ratio to 2045

Year Ended June 30	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Tier I Funded Ratio	Tier II Funded Ratio	Total Funded Ratio
2021	$137,981,736,299	$57,370,857,517	($80,610,878,781)	40.9%	137.5%	41.6%
2022	141,825,903,449	60,152,030,727	(81,673,872,722)	41.6%	136.8%	42.4%
2023	145,651,213,856	63,007,865,858	(82,643,347,998)	42.3%	136.0%	43.3%
2024	149,452,013,885	65,932,899,091	(83,519,114,794)	42.9%	135.2%	44.1%
2025	153,217,152,693	68,933,332,794	(84,283,819,899)	43.6%	134.5%	45.0%
2026	156,929,857,432	72,027,138,930	(84,902,718,501)	44.3%	133.9%	45.9%
2027	160,570,698,997	75,218,093,196	(85,352,605,801)	44.9%	133.3%	46.8%
2028	164,126,144,756	78,495,225,906	(85,630,918,850)	45.6%	132.8%	47.8%
2029	167,580,316,144	81,867,995,727	(85,712,320,417)	46.4%	132.2%	48.9%
2030	170,915,944,628	85,331,060,080	(85,584,884,548)	47.1%	131.8%	49.9%
2031	174,112,760,505	88,892,131,785	(85,220,628,720)	47.9%	131.4%	51.1%
2032	177,153,958,748	92,579,455,770	(84,574,502,978)	48.7%	131.0%	52.3%
2033	180,018,412,513	96,417,644,722	(83,600,767,791)	49.6%	130.6%	53.6%
2034	182,692,992,138	101,152,039,234	(81,540,952,904)	51.0%	130.3%	55.4%
2035	185,160,373,890	106,121,145,255	(79,039,228,635)	52.5%	130.0%	57.3%
2036	187,417,908,665	111,359,412,965	(76,058,495,700)	54.1%	129.7%	59.4%
2037	189,473,032,599	116,919,067,581	(72,553,965,018)	55.9%	129.4%	61.7%
2038	191,288,497,841	122,809,851,826	(68,478,646,015)	57.9%	129.2%	64.2%
2039	192,866,144,608	129,080,619,917	(63,785,524,690)	60.2%	129.0%	66.9%
2040	194,198,872,256	135,780,021,895	(58,418,850,361)	62.7%	128.8%	69.9%
2041	195,302,805,400	142,968,813,992	(52,333,991,408)	65.6%	128.6%	73.2%
2042	196,197,683,158	150,715,796,287	(45,481,886,872)	68.8%	128.4%	76.8%
2043	196,927,959,058	159,116,750,752	(37,811,208,306)	72.6%	128.2%	80.8%
2044	197,557,278,874	168,288,176,539	(29,269,102,335)	76.8%	128.0%	85.2%
2045	198,129,602,016	178,316,641,814	(19,812,960,202)	81.7%	127.8%	90.0%

TABLE 2

Projections – Projection of Contributions to Trust to 2045 (Dollars)

Amounts above the line are based on prior valuations and amounts below the line are based on the current valuation.

Year Ended June 30	Contributions	School District						
	Member	§16-158(f) (6% FAS Cap)	§133.2 (ERO)	§16-158(e) (2.2 Formula)	Total	Federal Funds	State	Total
1995	$421,726,521	-	-	-	-	$16,500,000	$262,864,800	$701,091,321
1996	422,238,847	-	-	-	-	17,000,000	324,276,242	763,515,089
1997	420,762,625	-	-	-	-	17,300,000	377,968,984	816,031,609
1998	440,967,595	-	-	-	-	18,000,000	460,439,267	919,406,862
1999	866,369,000	-	-	$16,675,000	$16,675,000	18,500,000	567,067,600	1,468,611,600
2000	619,622,000	-	-	34,145,066	34,145,066	18,200,000	634,038,560	1,306,005,626
2001	643,563,000	-	-	36,375,498	36,375,498	20,000,000	719,356,841	1,419,295,339
2002	681,151,770	-	-	38,664,380	38,664,380	23,000,000	810,618,724	1,553,434,874
2003	732,020,451	-	-	12,808,373	12,808,373	25,000,000	926,049,918	1,695,878,742
2004	768,661,300	-	-	42,604,912	42,604,912	29,400,000	1,027,258,994	1,867,925,206
2005	761,790,009	-	-	44,481,074	44,481,074	37,860,000	902,243,532	1,746,374,615
2006	799,034,336	$14,974,781	-	45,656,648	60,631,429	24,070,387	531,827,700	1,415,563,852
2007	826,249,007	19,353,893	$160,339,640	46,047,720	225,741,253	41,328,022	735,514,500	1,828,832,782
2008	865,400,168	-	83,137,070	48,102,405	131,239,475	47,829,058	1,039,194,988	2,083,663,689
2009	876,182,122	3,000,000	94,319,430	51,141,422	148,460,852	55,707,046	1,449,888,800	2,530,238,820
2010	909,642,774	3,000,000	89,212,140	53,666,271	145,878,411	75,718,545	2,087,668,469	3,218,908,199
2011	948,286,581	5,000,000	86,576,360	56,171,181	147,747,541	75,405,839	2,357,040,597	3,528,480,558
2012	976,364,866	5,000,000	84,768,690	57,976,440	147,745,130	84,654,093	2,405,172,175	3,613,936,264
2013	967,910,390	5,000,000	70,492,910	57,610,031	133,102,941	83,575,603	2,702,277,829	3,886,866,763
2014	1,004,368,089	5,000,000	61,550,660	57,896,194	124,446,854	97,203,752	3,437,478,152	4,663,496,847
2015	1,045,996,125	5,782,580	58,366,010	60,413,797	124,562,387	25,074,310	3,411,877,643	4,607,510,465
2016	1,041,807,455	5,027,434	58,048,699	61,478,785	124,554,918	80,263,377	3,741,802,194	4,988,427,944
2017	1,034,264,612	2,190,130	-	61,138,899	63,329,029	77,196,619	3,985,783,351	5,160,573,611
2018	939,719,161	4,295,624	-	60,559,679	64,855,303	93,148,014	4,564,252,674	5,661,975,152
2019	966,598,268	4,283,381	-	62,291,888	66,575,269	95,929,427	4,700,541,940	5,829,644,904
2020	994,277,610	4,371,308	-	64,075,668	68,446,976	98,932,785	4,847,706,448	6,009,363,818

TABLE 2 (*continued*)

Projections – Projection of Contributions to Trust to 2045 (Dollars)

Year Ended June 30	Contributions							
		School District						
	Member	§16-158(f) (6% FAS Cap)	§133.2 (ERO)	§16-158(e) (2.2 Formula)	Total	Federal Funds	State	Total
2021	$1,022,678,099	$4,574,987	-	$65,905,922	$70,480,908	$102,924,214	$5,043,286,463	$6,239,369,684
2022	1,050,635,543	4,428,627	-	67,707,624	72,136,251	106,473,991	5,217,225,539	6,446,471,323
2023	1,079,373,540	4,535,475	-	69,559,628	74,095,103	109,227,729	5,352,158,724	6,614,855,096
2024	1,109,078,341	4,546,049	-	71,473,938	76,019,986	111,821,006	5,479,229,317	6,776,148,651
2025	1,139,695,290	4,653,453	-	73,447,030	78,100,483	114,566,358	5,613,751,561	6,946,113,692
2026	1,171,256,564	4,887,740	-	75,480,979	80,368,718	117,756,560	5,770,071,439	7,139,453,281
2027	1,203,848,522	5,053,020	-	77,581,349	82,634,369	121,090,101	5,933,414,972	7,340,987,964
2028	1,236,757,948	5,104,218	-	79,702,179	84,806,397	124,192,779	6,085,446,194	7,531,203,318
2029	1,271,082,548	5,250,578	-	81,914,209	87,164,786	127,496,101	6,247,308,958	7,733,052,394
2030	1,306,749,280	5,467,056	-	84,212,731	89,679,787	130,696,147	6,404,111,222	7,931,236,437
2031	1,343,597,513	5,622,320	-	86,587,395	92,209,715	134,086,273	6,570,227,401	8,140,120,902
2032	1,381,655,816	5,741,967	-	89,040,041	94,782,008	137,965,516	6,760,310,286	8,374,713,626
2033	1,420,706,804	5,916,152	-	91,556,661	97,472,812	142,294,917	6,972,450,956	8,632,925,489
2034	1,460,691,570	5,866,623	-	94,133,457	100,000,080	160,800,405	7,879,219,844	9,600,711,898
2035	1,502,026,234	5,890,553	-	96,797,246	102,687,799	165,350,736	8,102,186,087	9,872,250,857
2036	1,544,690,654	5,759,219	-	99,546,731	105,305,950	170,047,454	8,332,325,257	10,152,369,315
2037	1,589,079,254	5,839,355	-	102,407,330	108,246,684	174,933,979	8,571,764,947	10,444,024,864
2038	1,634,480,279	5,930,064	-	105,333,174	111,263,238	179,931,956	8,816,665,829	10,742,341,301
2039	1,680,412,800	5,822,103	-	108,293,269	114,115,372	184,988,443	9,064,433,696	11,043,950,311
2040	1,727,755,394	5,856,050	-	111,344,236	117,200,286	190,200,158	9,319,807,734	11,354,963,571
2041	1,774,844,955	5,537,732	-	114,378,897	119,916,629	195,384,018	9,573,816,872	11,663,962,474
2042	1,822,184,311	5,305,671	-	117,429,656	122,735,327	200,595,376	9,829,173,442	11,974,688,456
2043	1,870,175,415	4,799,813	-	120,522,416	125,322,228	205,878,483	10,088,045,654	12,289,421,779
2044	1,919,142,418	4,155,386	-	123,678,067	127,833,452	211,269,021	10,352,182,034	12,610,426,925
2045	1,967,477,851	3,749,697	-	126,793,017	130,542,714	216,590,033	10,612,911,619	12,927,522,217

TABLE 2 (*continued*)

Projections – Projection of Contributions to Trust to 2045 (Dollars)

Notes

1) The administrative staff of the System estimated the Federal Funds contribution for fiscal years prior to 2006. Commencing with the contribution for fiscal 2006, total payroll for the valuation is split into State and Federal Funds payrolls. Federal Funds payrolls for 2006 - 2017 were estimated to be 4.33%, 5.32%, 4.40%, 3.70%, 3.50%, 3.10%, 3.40%, 3.00%, 2.75%, 3.00%, 2.10%, and 1.90% respectively, of total payrolls for those years. For 2018 the estimate is 2.00% of payroll. All payrolls are assumed to increase at the same rate for years subsequent to 2018.

2) School District contributions under Sec. 16-158(e) for years subsequent to 2005 are expected to equal 0.58% of total payroll. Sec. 16-158(f) contributions for 2008 – 2014 were estimated by the administrative staff of the System. Commencing with the contribution for fiscal 2007, Sec. 16-133.2 contributions are estimated in this schedule and are assumed to be zero starting in fiscal 2017 because ERO was discontinued at the end of fiscal 2016.

3) Employer Rates, Contribution Amounts, and Assumed Payroll shown for fiscal years 1995 - 2018 are based on the June 30, 1993 - June 30, 2016 actuarial valuations and are certified amounts, with the following exceptions. The 2006 amount is the recertified amount and 2007 is the certified amount required by per PA 94-0004. The 2011 amount is the originally certified amount, not the recertified amount per PA 96-1511. The 2015 amount is the certified amount; however, PA 98-0674 subsequently lowered state contributions and increased federal contributions. The 2017 Sec. 133.2 contribution was removed because ERO was discontinued at the end of fiscal 2016. Items subsequent to 2017 are based on the June 30, 2016 valuation.

4) Schedule excludes State ERI contributions of $1,000,000 for 2004, and $1,684,000 for 2005 (under Public Act 92-0056, as amended).

TABLE 3

Projections – Projection of Contributions to Trust to 2045 (Percent of Payroll)

Amounts above the line are based on prior valuations and amounts below the line are based on the current valuation.

		Contributions							
			School District						
Year Ended June 30	Assumed Payroll	Member	§16-158(f) (6% FAS Cap)	§133.2 (ERO)	§16-158(e) (2.2 Formula)	Total	Federal Funds	State	Total
1995	$4,633,650,000	9.10%	0.00%	0.00%	0.00%	0.00%	0.36%	5.67%	15.13%
1996	4,863,544,432	8.68%	0.00%	0.00%	0.00%	0.00%	0.35%	6.67%	15.70%
1997	4,903,151,093	8.58%	0.00%	0.00%	0.00%	0.00%	0.35%	7.71%	16.64%
1998	5,264,732,966	8.38%	0.00%	0.00%	0.00%	0.00%	0.34%	8.75%	17.46%
1999	5,558,349,721	15.59%	0.00%	0.00%	0.30%	0.30%	0.33%	10.20%	26.42%
2000	5,887,080,405	10.53%	0.00%	0.00%	0.58%	0.58%	0.31%	10.77%	22.18%
2001	6,271,637,672	10.26%	0.00%	0.00%	0.58%	0.58%	0.32%	11.47%	22.63%
2002	6,666,272,399	10.22%	0.00%	0.00%	0.58%	0.58%	0.35%	12.16%	23.30%
2003	7,115,762,553	10.29%	0.00%	0.00%	0.18%	0.18%	0.35%	13.01%	23.83%
2004	7,345,674,585	10.46%	0.00%	0.00%	0.58%	0.58%	0.40%	13.98%	25.43%
2005	7,669,150,690	9.93%	0.00%	0.00%	0.58%	0.58%	0.49%	11.76%	22.77%
2006	7,871,835,902	10.15%	0.19%	0.00%	0.58%	0.77%	0.31%	6.76%	17.98%
2007	7,939,262,146	10.41%	0.24%	2.02%	0.58%	2.84%	0.52%	9.26%	23.04%
2008	8,293,518,065	10.43%	0.00%	1.00%	0.58%	1.58%	0.58%	12.53%	25.12%
2009	8,817,486,572	9.94%	0.03%	1.07%	0.58%	1.68%	0.63%	16.44%	28.70%
2010	9,252,805,323	9.83%	0.03%	0.96%	0.58%	1.58%	0.82%	22.56%	34.79%
2011	9,684,686,327	9.79%	0.05%	0.89%	0.58%	1.53%	0.78%	24.34%	36.43%
2012	9,995,937,994	9.77%	0.05%	0.85%	0.58%	1.48%	0.85%	24.06%	36.15%
2013	9,932,764,038	9.74%	0.05%	0.71%	0.58%	1.34%	0.84%	27.21%	39.13%
2014	9,982,102,443	10.06%	0.05%	0.62%	0.58%	1.25%	0.97%	34.44%	46.72%
2015	10,416,171,908	10.04%	0.06%	0.56%	0.58%	1.20%	0.24%	32.76%	44.23%
2016	10,599,790,566	9.83%	0.05%	0.55%	0.58%	1.18%	0.76%	35.30%	47.06%
2017	10,541,189,447	9.81%	0.02%	0.00%	0.58%	0.60%	0.73%	37.81%	48.96%
2018	10,441,324,011	9.00%	0.04%	0.00%	0.58%	0.62%	0.89%	43.71%	54.23%
2019	10,739,980,751	9.00%	0.04%	0.00%	0.58%	0.62%	0.89%	43.77%	54.28%
2020	11,047,528,999	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	43.88%	54.40%

Note:

Effective with the 2016 valuation, the member contribution rate is equal to the statutory 9% rate because of the elimination of ERO and the assumption for the members' cost of optional service.

TABLE 3 (*continued*)

Projections – Projection of Contributions to Trust to 2045 (Percent of Payroll)

Year Ended June 30	Assumed Payroll	Contributions: Member	School District: §16-158(f) (6% FAS Cap)	School District: §133.2 (ERO)	School District: §16-158(e) (2.2 Formula)	School District: Total	Federal Funds	State	Total
2021	$11,363,089,987	9.00%	0.04%	0.00%	0.58%	0.62%	0.91%	44.38%	54.91%
2022	11,673,728,259	9.00%	0.04%	0.00%	0.58%	0.62%	0.91%	44.69%	55.22%
2023	11,993,039,337	9.00%	0.04%	0.00%	0.58%	0.62%	0.91%	44.63%	55.16%
2024	12,323,092,682	9.00%	0.04%	0.00%	0.58%	0.62%	0.91%	44.46%	54.99%
2025	12,663,280,996	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.33%	54.85%
2026	13,013,961,821	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.34%	54.86%
2027	13,376,094,685	9.00%	0.04%	0.00%	0.58%	0.62%	0.91%	44.36%	54.88%
2028	13,741,754,981	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.28%	54.81%
2029	14,123,139,427	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.23%	54.75%
2030	14,519,436,446	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.11%	54.62%
2031	14,928,861,257	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.01%	54.53%
2032	15,351,731,291	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.04%	54.55%
2033	15,785,631,151	9.00%	0.04%	0.00%	0.58%	0.62%	0.90%	44.17%	54.69%
2034	16,229,906,328	9.00%	0.04%	0.00%	0.58%	0.62%	0.99%	48.55%	59.15%
2035	16,689,180,382	9.00%	0.04%	0.00%	0.58%	0.62%	0.99%	48.55%	59.15%
2036	17,163,229,493	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.15%
2037	17,656,436,159	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.15%
2038	18,160,891,986	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.15%
2039	18,671,253,336	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.15%
2040	19,197,282,155	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.15%
2041	19,720,499,505	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.15%
2042	20,246,492,344	9.00%	0.03%	0.00%	0.58%	0.61%	0.99%	48.55%	59.14%
2043	20,779,726,829	9.00%	0.02%	0.00%	0.58%	0.60%	0.99%	48.55%	59.14%
2044	21,323,804,643	9.00%	0.02%	0.00%	0.58%	0.60%	0.99%	48.55%	59.14%
2045	21,860,865,015	9.00%	0.02%	0.00%	0.58%	0.60%	0.99%	48.55%	59.14%

TABLE 4

Projections – Projection of Employer Normal Cost and Amortization Amount to 2045

Amounts above the line are based on prior valuations and amounts below the line are based on the current valuation.

Year Ended June 30	Amortization Year	Employer Rate			Amount of Employer Contribution		
		Total	Normal Cost	Amortization	Total	Normal Cost	Amortization
1995	0	6.03%	8.12%	-2.09%	$279,364,800	$376,122,700	($96,757,900)
1996	1	7.02%	8.23%	-1.21%	341,276,242	400,134,055	(58,857,813)
1997	2	8.06%	8.21%	-0.15%	395,268,984	402,771,457	(7,502,473)
1998	3	9.09%	8.38%	0.71%	478,439,267	441,403,004	37,036,263
1999	4	10.83%	7.84%	2.99%	602,242,600	435,910,961	166,331,639
2000	5	11.66%	8.15%	3.51%	686,383,626	479,928,856	206,454,770
2001	6	12.37%	8.65%	3.72%	775,732,339	542,794,806	232,937,533
2002	7	13.09%	8.84%	4.25%	872,283,104	588,971,933	283,311,171
2003	8	13.55%	8.83%	4.72%	963,858,291	628,536,783	335,321,508
2004	9	14.96%	8.15%	6.81%	1,099,263,906	598,462,925	500,800,981
2005	10	12.84%	8.32%	4.52%	984,584,606	637,971,250	346,613,356
2006	11	7.64%	8.20%	-0.56%	601,554,735	645,705,698	(44,150,963)
2007	12	10.36%	8.20%	2.16%	822,890,242	650,835,074	172,055,168
2008	13	13.69%	8.22%	5.47%	1,135,126,451	681,651,502	453,474,949
2009	14	17.66%	9.27%	8.39%	1,556,737,268	817,320,366	739,416,902
2010	15	23.96%	9.15%	14.81%	2,217,053,286	846,936,893	1,370,116,393
2011	16	25.70%	8.77%	16.93%	2,488,617,617	849,716,122	1,638,901,495
2012	17	25.49%	8.43%	17.06%	2,547,802,708	842,532,254	1,705,270,454
2013	18	28.63%	8.23%	20.40%	2,843,463,463	817,433,027	2,026,030,436
2014	19	35.99%	7.89%	28.10%	3,592,578,098	787,230,469	2,805,347,629
2015	20	33.58%	8.02%	25.56%	3,497,365,750	835,810,326	2,661,555,424
2016	21	36.64%	9.36%	27.27%	3,883,544,356	992,489,371	2,891,054,985
2017	22	39.12%	8.27%	30.86%	4,124,118,869	871,335,169	3,252,783,700
2018	23	45.19%	10.10%	35.08%	4,717,960,367	1,054,630,171	3,663,330,196
2019	24	45.24%	9.65%	35.59%	4,858,763,256	1,035,982,175	3,822,781,081
2020	25	45.36%	9.20%	36.16%	5,010,714,900	1,016,277,740	3,994,437,160

TABLE 4 (*continued*)

Projections – Projection of Employer Normal Cost and Amortization Amount to 2045

Year Ended June 30	Amortization Year	Employer Rate			Amount of Employer Contribution		
		Total	Normal Cost	Amortization	Total	Normal Cost	Amortization
2021	26	45.87%	8.75%	37.12%	$5,212,116,598	$994,145,128	$4,217,971,470
2022	27	46.18%	8.34%	37.85%	5,391,407,153	973,220,011	4,418,187,142
2023	28	46.12%	7.93%	38.19%	5,530,946,081	950,622,372	4,580,323,709
2024	29	45.95%	7.52%	38.44%	5,662,524,261	926,108,132	4,736,416,129
2025	30	45.82%	7.10%	38.72%	5,801,764,949	898,922,573	4,902,842,376
2026	31	45.82%	6.67%	39.15%	5,963,308,977	868,105,685	5,095,203,293
2027	32	45.84%	6.22%	39.62%	6,132,086,422	831,889,392	5,300,197,030
2028	33	45.77%	5.77%	40.00%	6,289,341,152	792,988,022	5,496,353,130
2029	34	45.72%	5.32%	40.40%	6,456,719,268	751,427,368	5,705,291,900
2030	35	45.59%	4.87%	40.72%	6,619,020,101	706,652,391	5,912,367,709
2031	36	45.49%	4.41%	41.08%	6,790,901,070	658,481,782	6,132,419,288
2032	37	45.51%	3.96%	41.56%	6,987,315,843	607,297,542	6,380,018,301
2033	38	45.65%	3.51%	42.14%	7,206,302,534	553,608,878	6,652,693,656
2034	39	50.12%	3.07%	47.05%	8,134,153,706	497,895,362	7,636,258,344
2035	40	50.12%	2.64%	47.48%	8,364,334,070	440,425,433	7,923,908,637
2036	41	50.12%	2.24%	47.88%	8,601,919,442	384,251,081	8,217,668,361
2037	42	50.12%	1.85%	48.27%	8,849,106,256	327,012,587	8,522,093,669
2038	43	50.12%	1.46%	48.66%	9,101,930,958	265,443,141	8,836,487,817
2039	44	50.12%	1.07%	49.05%	9,357,715,408	199,810,602	9,157,904,806
2040	45	50.12%	0.68%	49.44%	9,621,352,128	130,087,467	9,491,264,661
2041	46	50.12%	0.31%	49.81%	9,883,579,787	61,035,466	9,822,544,321
2042	47	50.12%	-0.03%	50.14%	10,147,198,474	(5,364,960)	10,152,563,434
2043	48	50.12%	-0.32%	50.44%	10,414,446,552	(66,104,292)	10,480,550,844
2044	49	50.12%	-0.55%	50.67%	10,687,129,122	(117,239,201)	10,804,368,323
2045	50	50.12%	-0.70%	50.82%	10,956,294,669	(153,867,269)	11,110,161,938

TABLE 4 (*continued*)

Projections – Projection of Employer Normal Cost and Amortization Amount to 2045

Notes

1) Contributions to the Benefit Trust Reserve represent the sum of State and Federal Funds Contributions, as well as School District Contributions for the 2.2% formula (commencing in 1999). Sec. 16-158 requires calculations of State contribution amounts.

2) The following employer contributions to the Benefit Trust Reserve were taken into account when determining the above schedule, but are not included in this schedule:
   a) State ERI contributions of $1,000,000 for fiscal year 2004 and $1,684,000 for fiscal year 2005, which were made under a separate funding plan. (Beginning in fiscal year 2007, the cost of ERI is part of the 50-year funding plan, and included in this schedule);
   b) School District Contributions to the Benefit Trust Reserve under Sec. 16-133.2 and 16-158(f), which are shown in Table 2; and
   c) for FY 1999, additional State funding due to PA 90-0582, and $9,695,600 in additional State Pensions Fund appropriations. No School District contributions are anticipated under Sec. 16-128(d-10).

3) The amortization rate in fiscal years 1995-1997 and 2006 is negative because contributions do not cover normal cost. A negative employer normal cost after 2018 means member contributions are projected to exceed the cost of benefits accruing.

4) Employer Rates, Contribution Amounts, and Assumed Payroll shown for fiscal years 1995 - 2018 are based on the June 30, 1993 - June 30, 2016 actuarial valuations and are certified amounts, with the following exceptions. The 2006 amount is the recertified amount and 2007 is the certified amount required per PA 94-0004. The 2011 amount is the originally certified amount, not the recertified amount per PA 96-1511. The 2015 amount is the certified amount; however, PA 98-0674 subsequently lowered state contributions and increased federal contributions. Items subsequent to 2017 are based on the June 30, 2016 valuation.

Notes (*continued*)

5) Modified ERO retirements are recognized commencing with the June 30, 2005 actuarial liability, while FY 2006 and FY 2007 Pipeline ERO retirements are first recognized in the June 30, 2006 and 2007 accrued liabilities. ERO was discontinued effective June 30, 2016.

6) For calculation purposes, Employer Rates include 15 decimal places. For ease of presentation, only 2 decimal places are shown.

7) Assumptions and methodology:
   - Payroll Growth based on valuation assumptions
   - Valuation Interest Rate = 8.00% prior to 1997, 8.50% for 1997-2011, 8.0% for 2012-2013 and 7.50% for 2013-2015 and 7.00% after 2015
   - Return on Investment Equals Valuation Interest Rate
   - Assets at cost value prior to 1997, market value 1997-2008 and 5-year smoothing actuarial value after 2008

TABLE 5

Projections – Projection of Funded Ratio to 2045 by Tier
Total Tier I and Tier II

Amounts above the line are based on prior valuations and amounts below the line are based on the current valuation.

Year Ended June 30	Contributions	Benefits and Expenses	Market Value Asset Return	Actuarial Value of Assets *	Market Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
1995	$701,091,321	$1,108,283,000		$12,641,865,000	$12,641,865,000	$23,980,566,000	$11,338,701,000	52.7%
1996	763,515,089	1,148,919,000	$1,573,249,911	13,829,711,000	13,829,711,000	26,141,794,000	12,312,083,000	52.9%
1997	816,031,609	1,186,203,042	3,933,568,433	17,393,108,000	17,393,108,000	26,951,585,000	9,558,477,000	64.5%
1998	919,406,862	1,237,762,773	2,891,134,911	19,965,887,000	19,965,887,000	29,908,241,000	9,942,354,000	66.8%
1999	1,468,611,600	1,314,929,000	2,118,139,400	22,237,709,000	22,237,709,000	33,205,513,000	10,967,804,000	67.0%
2000	1,306,005,626	1,437,474,000	2,375,172,374	24,481,413,000	24,481,413,000	35,886,404,000	11,404,991,000	68.2%
2001	1,419,295,339	1,611,050,000	(974,012,339)	23,315,646,000	23,315,646,000	39,166,697,000	15,851,051,000	59.5%
2002	1,553,434,874	1,809,763,000	(693,032,874)	22,366,285,000	22,366,285,000	43,047,674,000	20,681,389,000	52.0%
2003	1,695,878,742	2,051,953,000	1,114,612,258	23,124,823,000	23,124,823,000	46,933,432,000	23,808,609,000	49.3%
2004	1,867,925,206	2,320,690,844	8,872,671,638	31,544,729,000	31,544,729,000	50,947,451,000	19,402,722,000	61.9%
2005	1,746,374,615	2,604,081,011	3,398,195,396	34,085,218,000	34,085,218,000	56,075,029,000	21,989,811,000	60.8%
2006	1,415,563,852	2,948,023,574	4,032,130,722	36,584,889,000	36,584,889,000	58,996,913,000	22,412,024,000	62.0%
2007	1,828,832,782	3,184,574,659	6,680,170,877	41,909,318,000	41,909,318,000	65,648,395,000	23,739,077,000	63.8%
2008	2,083,663,689	3,498,960,895	(2,063,297,794)	38,430,723,000	38,430,723,000	68,632,367,000	30,201,644,000	56.0%
2009	2,530,238,820	3,723,108,308	(8,706,541,270)	38,026,043,512	28,531,312,242	73,027,198,000	35,001,154,488	52.1%
2010	3,218,908,199	4,003,538,821	3,577,102,594	37,439,091,771	31,323,784,214	77,293,198,000	39,854,106,229	48.4%
2011	3,528,480,558	4,329,807,307	6,948,809,729	37,769,752,971	37,471,267,194	81,299,745,000	43,529,992,029	46.5%
2012	3,613,936,264	4,641,424,675	73,046,556	37,945,397,211	36,516,825,339	90,024,945,000	52,079,547,789	42.1%
2013	3,886,866,763	4,969,794,354	4,424,870,751	38,155,191,497	39,858,768,499	93,886,988,785	55,731,797,288	40.6%
2014	4,524,563,343	5,340,981,048	6,782,031,720	42,150,765,261	45,824,382,514	103,740,377,267	61,589,612,006	40.6%
2015	4,457,907,579	5,645,924,033	1,770,549,533	45,435,192,645	46,406,915,593	108,121,825,171	62,686,632,526	42.0%
2016	4,842,319,410	5,954,175,094	(44,103,178)	47,222,097,809	45,250,956,731	118,629,890,305	71,407,792,496	39.8%
2017	5,160,573,611	6,264,433,393	3,128,931,879	49,289,279,209	47,276,028,827	122,501,543,706	73,212,264,498	40.2%
2018	5,661,975,152	6,532,636,006	3,278,848,888	51,401,733,472	49,684,216,861	126,377,196,019	74,975,462,547	40.7%
2019	5,829,644,904	6,803,096,200	3,443,824,385	52,851,175,402	52,154,589,950	130,252,728,049	77,401,552,647	40.6%
2020	6,009,363,818	7,076,922,717	3,613,456,735	54,700,487,786	54,700,487,786	134,124,382,392	79,423,894,606	40.8%

Notes:

The projection of assets is based upon the assumption that the Employer maintains the funding policy under Public Act 94-0004 that begins with fiscal year 2006.

Projected amounts may not add to the dollar due to rounding.

* For 2001 to 2008, assets are at fair market value; for 2009 and after, assets are 5-year smoothed value.

TABLE 5 (*continued*)

Projections – Projection of Funded Ratio to 2045 by Tier
Total Tier I and Tier II (*continued*)

Year Ended June 30	Contributions	Benefits and Expenses	Market Value Asset Return	Actuarial Value of Assets *	Market Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
2021	$6,239,369,684	$7,358,852,209	$3,789,852,257	$57,370,857,517	$57,370,857,517	$137,981,736,299	$80,610,878,781	41.6%
2022	6,446,471,323	7,639,502,064	3,974,203,950	60,152,030,727	60,152,030,727	141,825,903,449	81,673,872,722	42.4%
2023	6,614,855,096	7,923,847,385	4,164,827,421	63,007,865,858	63,007,865,858	145,651,213,856	82,643,347,998	43.3%
2024	6,776,148,651	8,211,431,141	4,360,315,723	65,932,899,091	65,932,899,091	149,452,013,885	83,519,114,794	44.1%
2025	6,946,113,692	8,506,373,821	4,560,693,832	68,933,332,794	68,933,332,794	153,217,152,693	84,283,819,899	45.0%
2026	7,139,453,281	8,812,426,381	4,766,779,237	72,027,138,930	72,027,138,930	156,929,857,432	84,902,718,501	45.9%
2027	7,340,987,964	9,129,341,065	4,979,307,367	75,218,093,196	75,218,093,196	160,570,698,997	85,352,605,801	46.8%
2028	7,531,203,318	9,452,105,554	5,198,034,945	78,495,225,906	78,495,225,906	164,126,144,756	85,630,918,850	47.8%
2029	7,733,052,394	9,783,193,450	5,422,910,876	81,867,995,727	81,867,995,727	167,580,316,144	85,712,320,417	48.9%
2030	7,931,236,437	10,122,246,435	5,654,074,351	85,331,060,080	85,331,060,080	170,915,944,628	85,584,884,548	49.9%
2031	8,140,120,902	10,470,654,719	5,891,605,522	88,892,131,785	88,892,131,785	174,112,760,505	85,220,628,720	51.1%
2032	8,374,713,626	10,824,109,993	6,136,720,352	92,579,455,770	92,579,455,770	177,153,958,748	84,574,502,978	52.3%
2033	8,632,925,489	11,185,942,834	6,391,206,297	96,417,644,722	96,417,644,722	180,018,412,513	83,600,767,791	53.6%
2034	9,600,711,898	11,547,417,811	6,681,100,424	101,152,039,234	101,152,039,234	182,692,992,138	81,540,952,904	55.4%
2035	9,872,250,857	11,912,382,959	7,009,238,123	106,121,145,255	106,121,145,255	185,160,373,890	79,039,228,635	57.3%
2036	10,152,369,315	12,268,516,617	7,354,415,012	111,359,412,965	111,359,412,965	187,417,908,665	76,058,495,700	59.4%
2037	10,444,024,864	12,603,932,393	7,719,562,144	116,919,067,581	116,919,067,581	189,473,032,599	72,553,965,018	61.7%
2038	10,742,341,301	12,958,332,108	8,106,775,052	122,809,851,826	122,809,851,826	191,288,497,841	68,478,646,015	64.2%
2039	11,043,950,311	13,291,217,497	8,518,035,276	129,080,619,917	129,080,619,917	192,866,144,608	63,785,524,690	66.9%
2040	11,354,963,571	13,612,201,655	8,956,640,061	135,780,021,895	135,780,021,895	194,198,872,256	58,418,850,361	69.9%
2041	11,663,962,474	13,901,459,513	9,426,289,136	142,968,813,992	142,968,813,992	195,302,805,400	52,333,991,408	73.2%
2042	11,974,688,456	14,159,069,794	9,931,363,633	150,715,796,287	150,715,796,287	196,197,683,158	45,481,886,872	76.8%
2043	12,289,421,779	14,365,896,440	10,477,429,127	159,116,750,752	159,116,750,752	196,927,959,058	37,811,208,306	80.8%
2044	12,610,426,925	14,510,665,346	11,071,664,208	168,288,176,539	168,288,176,539	197,557,278,874	29,269,102,335	85.2%
2045	12,927,522,217	14,619,992,828	11,720,935,886	178,316,641,814	178,316,641,814	198,129,602,016	19,812,960,202	90.0%

Notes:

The projection of assets is based upon the assumption that the Employer maintains the funding policy under Public Act 94-0004 that begins with fiscal year 2006.

Projected amounts may not add to the dollar due to rounding.

* For 2001 to 2008, assets are at fair market value; for 2009 and after, assets are 5-year smoothed value.

TABLE 5 (*continued*)

Projections – Projection of Funded Ratio to 2045 by Tier
Tier I

Year Ended June 30	Contributions	Benefits and Expenses	Market Value Asset Return	Actuarial Value of Assets	Market Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
2014				$42,060,460,784	$45,726,207,620	$103,665,420,423	$61,604,959,639	40.6%
2015	$4,357,376,533	$5,636,978,805	$1,759,751,948	45,238,833,875	46,206,357,296	108,001,248,291	62,762,414,416	41.9%
2016	4,761,135,081	5,938,766,822	(43,878,630)	46,944,396,204	44,984,846,925	118,449,453,398	71,505,057,193	39.6%
2017	5,042,189,379	6,242,932,536	3,106,913,274	48,887,871,691	46,891,017,042	122,235,654,258	73,347,782,567	40.0%
2018	5,501,168,839	6,505,311,632	3,247,226,195	50,832,600,270	49,134,100,444	125,989,611,659	75,157,011,388	40.3%
2019	5,626,095,991	6,767,060,510	3,399,453,273	52,078,997,241	51,392,589,199	129,707,656,185	77,628,658,945	40.2%
2020	5,762,690,043	7,030,239,649	3,553,117,008	53,678,156,601	53,678,156,601	133,385,141,176	79,706,984,574	40.2%
2021	5,949,119,877	7,296,399,370	3,710,316,180	56,041,193,287	56,041,193,287	137,015,011,491	80,973,818,203	40.9%
2022	6,112,652,110	7,567,873,016	3,871,950,798	58,457,923,180	58,457,923,180	140,587,207,494	82,129,284,314	41.6%
2023	6,235,981,824	7,844,118,139	4,035,769,852	60,885,556,716	60,885,556,716	144,090,368,241	83,204,811,525	42.3%
2024	6,350,040,940	8,122,761,477	4,199,943,751	63,312,779,930	63,312,779,930	147,514,216,821	84,201,436,891	42.9%
2025	6,470,383,374	8,407,854,027	4,364,083,122	65,739,392,400	65,739,392,400	150,842,520,616	85,103,128,217	43.6%
2026	6,611,554,428	8,701,462,342	4,528,610,691	68,178,095,177	68,178,095,177	154,054,728,985	85,876,633,808	44.3%
2027	6,757,620,260	9,007,890,826	4,693,707,193	70,621,531,803	70,621,531,803	157,122,276,734	86,500,744,930	44.9%
2028	6,889,398,665	9,319,776,887	4,858,443,988	73,049,597,570	73,049,597,570	160,024,020,557	86,974,422,988	45.6%
2029	7,030,171,780	9,639,049,717	5,022,161,102	75,462,880,735	75,462,880,735	162,737,038,595	87,274,157,860	46.4%
2030	7,164,665,887	9,964,940,553	5,184,392,038	77,846,998,106	77,846,998,106	165,237,288,928	87,390,290,821	47.1%
2031	7,307,013,400	10,299,349,450	5,344,558,106	80,199,220,163	80,199,220,163	167,495,895,563	87,296,675,401	47.9%
2032	7,472,219,345	10,637,176,057	5,503,171,926	82,537,435,377	82,537,435,377	169,487,810,182	86,950,374,805	48.7%
2033	7,658,275,074	10,981,996,620	5,661,290,222	84,875,004,053	84,875,004,053	171,182,713,319	86,307,709,267	49.6%
2034	8,551,079,647	11,324,901,850	5,844,166,507	87,945,348,357	87,945,348,357	172,557,753,115	84,612,404,758	51.0%
2035	8,745,392,557	11,668,675,287	6,053,859,489	91,075,925,116	91,075,925,116	173,587,152,281	82,511,227,165	52.5%
2036	8,946,414,194	12,002,384,478	6,268,355,798	94,288,310,630	94,288,310,630	174,256,881,757	79,968,571,127	54.1%
2037	9,157,712,122	12,310,212,573	6,489,844,228	97,625,654,407	97,625,654,407	174,567,862,886	76,942,208,480	55.9%
2038	9,374,129,478	12,633,578,242	6,719,715,102	101,085,920,745	101,085,920,745	174,473,742,172	73,387,821,427	57.9%
2039	9,592,182,934	12,932,547,329	6,959,101,698	104,704,658,048	104,704,658,048	173,965,408,013	69,260,749,965	60.2%
2040	9,818,492,405	13,215,778,117	7,210,421,063	108,517,793,400	108,517,793,400	173,025,920,686	64,508,127,286	62.7%
2041	10,043,795,924	13,464,864,406	7,476,508,141	112,573,233,059	112,573,233,059	171,658,879,431	59,085,646,372	65.6%
2042	10,272,890,824	13,673,726,382	7,761,097,070	116,933,494,571	116,933,494,571	169,878,933,410	52,945,438,839	68.8%
2043	10,508,662,175	13,825,736,399	8,069,247,022	121,685,667,370	121,685,667,370	167,723,318,857	46,037,651,488	72.6%
2044	10,753,659,813	13,911,012,811	8,407,489,361	126,935,803,732	126,935,803,732	165,246,573,326	38,310,769,594	76.8%
2045	11,000,460,904	13,952,039,049	8,782,201,026	132,766,426,614	132,766,426,614	162,488,975,626	29,722,549,012	81.7%

Notes:

The projection of assets is based upon the assumption that the Employer maintains the funding policy under Public Act 94-0004 that begins with fiscal year 2006.

Projected amounts may not add to the dollar due to rounding.

TABLE 5 (*continued*)

Projections – Projection of Funded Ratio to 2045 by Tier
Tier II

Year Ended June 30	Contributions	Benefits and Expenses	Market Value Asset Return	Actuarial Value of Assets	Market Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
2014				$90,304,477	$98,174,894	$74,956,844	($15,347,633)	120.5%
2015	$100,531,046	$8,945,228	$10,797,585	196,358,770	200,558,297	120,576,880	(75,781,890)	162.8%
2016	81,184,329	15,408,272	(224,548)	277,701,605	266,109,806	180,436,907	(97,264,697)	153.9%
2017	118,384,232	21,500,857	22,018,605	401,407,518	385,011,785	265,889,449	(135,518,069)	151.0%
2018	160,806,313	27,324,374	31,622,693	569,133,202	550,116,417	387,584,360	(181,548,842)	146.8%
2019	203,548,913	36,035,690	44,371,112	772,178,161	762,000,751	545,071,864	(227,106,298)	141.7%
2020	246,673,774	46,683,069	60,339,727	1,022,331,185	1,022,331,185	739,241,216	(283,089,968)	138.3%
2021	290,249,807	62,452,839	79,536,077	1,329,664,230	1,329,664,230	966,724,808	(362,939,422)	137.5%
2022	333,819,213	71,629,049	102,253,152	1,694,107,547	1,694,107,547	1,238,695,955	(455,411,592)	136.8%
2023	378,873,273	79,729,246	129,057,569	2,122,309,143	2,122,309,143	1,560,845,615	(561,463,528)	136.0%
2024	426,107,711	88,669,665	160,371,972	2,620,119,161	2,620,119,161	1,937,797,064	(682,322,097)	135.2%
2025	475,730,318	98,519,794	196,610,710	3,193,940,394	3,193,940,394	2,374,632,077	(819,308,318)	134.5%
2026	527,898,852	110,964,039	238,168,546	3,849,043,753	3,849,043,753	2,875,128,447	(973,915,307)	133.9%
2027	583,367,704	121,450,239	285,600,174	4,596,561,392	4,596,561,392	3,448,422,263	(1,148,139,130)	133.3%
2028	641,804,654	132,328,666	339,590,957	5,445,628,336	5,445,628,336	4,102,124,199	(1,343,504,137)	132.8%
2029	702,880,614	144,143,733	400,749,774	6,405,114,992	6,405,114,992	4,843,277,549	(1,561,837,443)	132.2%
2030	766,570,550	157,305,881	469,682,313	7,484,061,974	7,484,061,974	5,678,655,700	(1,805,406,273)	131.8%
2031	833,107,502	171,305,270	547,047,416	8,692,911,622	8,692,911,622	6,616,864,941	(2,076,046,681)	131.4%
2032	902,494,281	186,933,936	633,548,426	10,042,020,393	10,042,020,393	7,666,148,566	(2,375,871,827)	131.0%
2033	974,650,416	203,946,214	729,916,075	11,542,640,670	11,542,640,670	8,835,699,194	(2,706,941,476)	130.6%
2034	1,049,632,251	222,515,961	836,933,917	13,206,690,877	13,206,690,877	10,135,239,023	(3,071,451,854)	130.3%
2035	1,126,858,300	243,707,672	955,378,633	15,045,220,139	15,045,220,139	11,573,221,609	(3,471,998,530)	130.0%
2036	1,205,955,121	266,132,138	1,086,059,214	17,071,102,335	17,071,102,335	13,161,026,908	(3,910,075,427)	129.7%
2037	1,286,312,743	293,719,820	1,229,717,916	19,293,413,174	19,293,413,174	14,905,169,712	(4,388,243,462)	129.4%
2038	1,368,211,822	324,753,866	1,387,059,951	21,723,931,081	21,723,931,081	16,814,755,669	(4,909,175,412)	129.2%
2039	1,451,767,377	358,670,167	1,558,933,578	24,375,961,869	24,375,961,869	18,900,736,594	(5,475,225,275)	129.0%
2040	1,536,471,166	396,423,538	1,746,218,998	27,262,228,495	27,262,228,495	21,172,951,570	(6,089,276,925)	128.8%
2041	1,620,166,550	436,595,107	1,949,780,995	30,395,580,933	30,395,580,933	23,643,925,969	(6,751,654,964)	128.6%
2042	1,701,797,632	485,343,412	2,170,266,563	33,782,301,715	33,782,301,715	26,318,749,748	(7,463,551,967)	128.4%
2043	1,780,759,604	540,160,042	2,408,182,105	37,431,083,383	37,431,083,383	29,204,640,201	(8,226,443,182)	128.2%
2044	1,856,767,112	599,652,535	2,664,174,847	41,352,372,806	41,352,372,806	32,310,705,548	(9,041,667,259)	128.0%
2045	1,927,061,313	667,953,780	2,938,734,860	45,550,215,200	45,550,215,200	35,640,626,390	(9,909,588,810)	127.8%

Notes:

The projection of assets is based upon the assumption that the Employer maintains the funding policy under Public Act 94-0004 that begins with fiscal year 2006.

Projected amounts may not add to the dollar due to rounding.

TABLE 6

Projections – Projection of Actuarial Accrued Liability to 2045 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Inactive	Total Actuarial Accrued Liability
2016	$37,500,744,151	$180,436,907	-	$80,948,709,247	$118,629,890,305
2017	41,750,267,157	229,919,426	$35,970,022	80,485,387,100	122,501,543,706
2018	46,103,062,519	281,374,138	106,210,222	79,886,549,139	126,377,196,019
2019	50,561,676,325	336,763,151	208,308,713	79,145,979,860	130,252,728,049
2020	55,126,974,355	399,182,212	340,059,004	78,258,166,821	134,124,382,392
2021	59,796,195,398	467,556,882	499,167,926	77,218,816,092	137,981,736,299
2022	64,561,983,607	540,875,951	697,820,003	76,025,223,887	141,825,903,449
2023	69,415,431,196	621,914,678	938,930,937	74,674,937,045	145,651,213,856
2024	74,344,327,998	711,745,850	1,226,051,214	73,169,888,823	149,452,013,885
2025	79,333,408,684	811,589,026	1,563,043,050	71,509,111,933	153,217,152,693
2026	84,360,616,221	920,825,661	1,954,302,786	69,694,112,764	156,929,857,432
2027	89,394,822,255	1,039,649,158	2,408,773,105	67,727,454,479	160,570,698,997
2028	94,409,231,984	1,168,998,703	2,933,125,496	65,614,788,573	164,126,144,756
2029	99,376,553,610	1,309,522,569	3,533,754,980	63,360,484,985	167,580,316,144
2030	104,265,455,549	1,461,987,482	4,216,668,219	60,971,833,379	170,915,944,628
2031	109,037,714,178	1,627,181,087	4,989,683,855	58,458,181,385	174,112,760,505
2032	113,655,828,312	1,805,660,875	5,860,487,691	55,831,981,870	177,153,958,748
2033	118,078,607,151	1,998,062,774	6,837,636,420	53,104,106,168	180,018,412,513
2034	122,266,158,142	2,205,035,554	7,930,203,469	50,291,594,973	182,692,992,138
2035	126,177,833,905	2,427,231,829	9,145,989,780	47,409,318,376	185,160,373,890
2036	129,780,130,182	2,665,371,978	10,495,654,931	44,476,751,575	187,417,908,665
2037	133,037,576,453	2,920,037,277	11,985,132,435	41,530,286,434	189,473,032,599
2038	135,901,270,539	3,191,618,397	13,623,137,272	38,572,471,633	191,288,497,841
2039	138,339,796,858	3,480,692,240	15,420,044,355	35,625,611,155	192,866,144,608
2040	140,317,513,904	3,787,793,588	17,385,157,982	32,708,406,782	194,198,872,256
2041	141,814,551,452	4,113,145,626	19,530,780,343	29,844,327,979	195,302,805,400
2042	142,826,167,130	4,457,383,517	21,861,366,231	27,052,766,280	196,197,683,158
2043	143,370,170,604	4,819,804,532	24,384,835,669	24,353,148,254	196,927,959,058
2044	143,484,992,899	5,199,584,688	27,111,120,860	21,761,580,427	197,557,278,874
2045	143,196,826,835	5,592,641,346	30,047,985,044	19,292,148,791	198,129,602,016

TABLE 7

Projections – Projection of Total Normal Cost to 2045 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Total Normal Cost
2016	$1,897,381,323	$56,072,316	-	$1,953,453,640
2017	1,871,625,949	54,097,863	$34,806,879	1,960,530,691
2018	1,845,282,189	52,784,738	69,733,394	1,967,800,321
2019	1,818,859,760	52,323,816	104,088,465	1,975,272,041
2020	1,791,794,409	53,046,230	137,624,311	1,982,464,951
2021	1,763,627,352	54,307,310	169,995,792	1,987,930,454
2022	1,734,286,067	55,645,499	204,241,361	1,994,172,926
2023	1,702,657,456	57,078,740	239,765,180	1,999,501,377
2024	1,668,197,776	58,645,571	277,009,369	2,003,852,715
2025	1,629,905,046	60,359,717	316,154,350	2,006,419,113
2026	1,586,774,070	62,140,505	357,357,253	2,006,271,827
2027	1,536,772,172	64,069,008	400,885,522	2,001,726,702
2028	1,481,652,379	66,231,402	446,921,218	1,994,804,999
2029	1,423,016,977	68,479,156	495,103,071	1,986,599,204
2030	1,360,566,308	70,887,157	545,029,836	1,976,483,301
2031	1,293,165,668	73,436,403	597,517,814	1,964,119,885
2032	1,221,365,813	76,033,531	652,519,379	1,949,918,722
2033	1,145,348,257	78,708,514	710,121,005	1,934,177,775
2034	1,065,473,048	81,405,879	770,440,446	1,917,319,372
2035	983,216,265	84,198,128	832,601,926	1,900,016,319
2036	900,732,277	87,085,989	897,482,763	1,885,301,028
2037	817,568,997	89,983,963	963,644,105	1,871,197,064
2038	729,429,731	92,806,993	1,031,509,246	1,853,745,970
2039	635,513,775	95,548,789	1,101,685,699	1,832,748,263
2040	537,494,983	98,212,622	1,173,322,592	1,809,030,196
2041	437,946,246	100,744,465	1,247,046,668	1,785,737,379
2042	341,181,473	103,139,517	1,321,017,884	1,765,338,874
2043	251,381,847	105,152,962	1,394,699,988	1,751,234,797
2044	172,851,287	106,478,721	1,468,353,465	1,747,683,472
2045	110,581,302	106,813,200	1,540,630,760	1,758,025,262

Note:
The normal cost in this table does not include administrative expenses.

TABLE 8

Projections – Projection of Benefit Payments to 2045 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Inactives	Total Benefit Payments	Administrative Expenses	Total Benefits and Expenses
2016	$142,322,781	$13,511,679	-	$5,802,913,483	$5,958,747,943	$22,967,917	$5,981,715,860
2017	299,948,533	18,430,265	$13,431	5,922,446,177	6,240,838,406	23,594,987	6,264,433,393
2018	461,262,198	18,559,785	4,221,478	6,022,043,534	6,506,086,995	26,549,011	6,532,636,006
2019	627,021,899	17,778,162	12,506,850	6,118,480,887	6,775,787,798	27,308,401	6,803,096,200
2020	798,459,714	15,453,549	24,260,475	6,210,658,579	7,048,832,317	28,090,400	7,076,922,717
2021	978,680,276	15,180,555	39,072,126	6,297,026,479	7,329,959,436	28,892,772	7,358,852,209
2022	1,171,863,663	16,364,389	45,833,576	6,375,757,808	7,609,819,436	29,682,628	7,639,502,064
2023	1,377,900,008	15,296,163	53,729,129	6,446,427,550	7,893,352,850	30,494,536	7,923,847,386
2024	1,598,834,438	13,846,966	62,784,274	6,504,631,705	8,180,097,383	31,333,758	8,211,431,141
2025	1,835,792,156	11,961,256	73,118,172	6,553,303,486	8,474,175,070	32,198,750	8,506,373,821
2026	2,093,298,712	11,416,881	84,632,923	6,589,987,443	8,779,335,959	33,090,421	8,812,426,381
2027	2,376,596,536	11,468,494	93,500,400	6,613,764,423	9,095,329,853	34,011,212	9,129,341,065
2028	2,681,144,342	11,494,693	102,701,664	6,621,823,883	9,417,164,582	34,940,971	9,452,105,554
2029	3,007,210,567	11,691,710	112,594,191	6,615,786,269	9,747,282,737	35,910,712	9,783,193,450
2030	3,356,553,247	12,063,744	123,584,933	6,593,126,139	10,085,328,063	36,918,371	10,122,246,435
2031	3,732,578,905	12,623,457	135,144,802	6,552,348,145	10,432,695,309	37,959,410	10,470,654,719
2032	4,132,554,490	13,553,238	147,883,367	6,491,084,262	10,785,075,357	39,034,636	10,824,109,993
2033	4,557,689,838	14,844,943	161,565,380	6,411,704,767	11,145,804,928	40,137,907	11,185,942,835
2034	5,004,304,393	16,473,767	176,387,911	6,308,984,180	11,506,150,251	41,267,559	11,547,417,811
2035	5,471,903,799	18,552,291	193,319,302	6,186,172,216	11,869,947,608	42,435,349	11,912,382,958
2036	5,952,989,293	21,059,908	211,001,503	6,039,825,205	12,224,875,909	43,640,707	12,268,516,617
2037	6,446,743,091	24,094,336	233,284,487	5,854,915,703	12,559,037,617	44,894,777	12,603,932,394
2038	6,959,451,886	27,794,090	258,304,961	5,666,603,721	12,912,154,658	46,177,450	12,958,332,108
2039	7,470,113,235	31,999,375	285,655,360	5,455,974,389	13,243,742,359	47,475,139	13,291,217,498
2040	7,982,357,368	36,793,169	316,221,879	5,228,016,574	13,563,388,990	48,812,665	13,612,201,655
2041	8,481,105,747	42,458,740	348,363,310	4,979,388,674	13,851,316,471	50,143,042	13,901,459,513
2042	8,954,707,182	48,608,337	388,655,771	4,715,618,027	14,107,589,317	51,480,477	14,159,069,794
2043	9,385,227,931	56,333,035	433,516,863	4,437,982,286	14,313,060,115	52,836,325	14,365,896,440
2044	9,758,247,484	65,396,726	481,798,296	4,151,003,097	14,456,445,603	54,219,744	14,510,665,347
2045	10,093,175,202	78,588,899	534,921,411	3,857,721,995	14,564,407,507	55,585,320	14,619,992,827

TABLE 9

Projections – Projection of Payroll to 2045 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Total Payroll
2016	$9,038,627,760	$842,836,891	-	$9,881,464,651
2017	8,836,646,169	812,278,441	$503,101,911	10,152,026,521
2018	8,654,587,205	781,348,115	1,005,388,691	10,441,324,011
2019	8,478,326,166	762,150,555	1,499,504,030	10,739,980,751
2020	8,306,709,283	754,824,737	1,985,994,979	11,047,528,999
2021	8,138,092,130	761,040,603	2,463,957,254	11,363,089,987
2022	7,964,625,889	772,154,343	2,936,948,027	11,673,728,259
2023	7,783,336,307	782,712,675	3,426,990,355	11,993,039,337
2024	7,588,562,558	793,095,597	3,941,434,527	12,323,092,682
2025	7,377,388,579	803,542,443	4,482,349,974	12,663,280,996
2026	7,148,419,019	813,856,345	5,051,686,457	13,013,961,821
2027	6,894,231,311	823,429,052	5,658,434,322	13,376,094,685
2028	6,610,592,164	833,148,111	6,298,014,706	13,741,754,981
2029	6,313,354,829	842,860,731	6,966,923,867	14,123,139,427
2030	6,001,985,889	851,563,993	7,665,886,564	14,519,436,446
2031	5,672,111,235	859,314,768	8,397,435,254	14,928,861,257
2032	5,324,017,054	865,766,514	9,161,947,723	15,351,731,291
2033	4,956,182,089	870,607,179	9,958,841,883	15,785,631,151
2034	4,567,325,761	873,984,596	10,788,595,971	16,229,906,328
2035	4,168,532,601	876,004,916	11,644,642,865	16,689,180,382
2036	3,763,728,150	877,197,430	12,522,303,913	17,163,229,493
2037	3,364,072,351	877,625,817	13,414,737,991	17,656,436,159
2038	2,958,538,404	876,701,379	14,325,652,203	18,160,891,986
2039	2,540,504,699	874,227,329	15,256,521,308	18,671,253,336
2040	2,125,380,311	870,218,586	16,201,683,258	19,197,282,155
2041	1,718,648,951	863,904,947	17,137,945,607	19,720,499,505
2042	1,337,629,767	854,977,224	18,053,885,353	20,246,492,344
2043	993,509,003	843,585,514	18,942,632,312	20,779,726,829
2044	693,058,957	827,820,709	19,802,924,977	21,323,804,643
2045	449,072,648	807,280,937	20,604,511,430	21,860,865,015

TABLE 10

Projections – Projection of Member Count to 2045 by Member Group

Year Ended June 30	Tier I Number Active	Tier I Number Retired and Inactive	Tier I Sub-Total	Tier II Number Active	Tier II Number Retired and Inactive	Tier II Sub-Total	Total Number Active	Total Number Retired and Inactive	Grand Total
2016	124,378	242,464	366,842	35,306	6	35,312	159,684	242,470	402,154
2017	116,431	240,312	356,743	43,253	15	43,268	159,684	240,327	400,011
2018	109,306	237,938	347,244	50,378	30	50,408	159,684	237,968	397,652
2019	102,848	235,339	338,187	56,836	57	56,893	159,684	235,396	395,080
2020	96,979	232,466	329,445	62,705	94	62,799	159,684	232,560	392,244
2021	91,564	229,520	321,084	68,120	142	68,262	159,684	229,662	389,346
2022	86,553	226,078	312,631	73,131	209	73,340	159,684	226,287	385,971
2023	81,694	222,391	304,085	77,990	387	78,377	159,684	222,778	382,462
2024	76,958	218,481	295,439	82,726	662	83,388	159,684	219,143	378,827
2025	72,321	214,358	286,679	87,363	1,040	88,403	159,684	215,398	375,082
2026	67,699	210,099	277,798	91,985	1,646	93,631	159,684	211,745	371,429
2027	63,086	205,708	268,794	96,598	2,373	98,971	159,684	208,081	367,765
2028	58,582	201,079	259,661	101,102	3,233	104,335	159,684	204,312	363,996
2029	54,177	196,219	250,396	105,507	4,220	109,727	159,684	200,439	360,123
2030	49,825	191,176	241,001	109,859	5,358	115,217	159,684	196,534	356,218
2031	45,529	185,945	231,474	114,155	6,613	120,768	159,684	192,558	352,242
2032	41,288	180,533	221,821	118,396	7,985	126,381	159,684	188,518	348,202
2033	37,094	174,954	212,048	122,590	9,457	132,047	159,684	184,411	344,095
2034	33,009	169,152	202,161	126,675	11,030	137,705	159,684	180,182	339,866
2035	29,060	163,105	192,165	130,624	12,731	143,355	159,684	175,836	335,520
2036	25,332	156,737	182,069	134,352	14,507	148,859	159,684	171,244	330,928
2037	21,751	155,899	177,650	137,933	16,434	154,367	159,684	172,333	332,017
2038	18,271	154,880	173,151	141,413	18,471	159,884	159,684	173,351	333,035
2039	14,969	153,615	168,584	144,715	20,605	165,320	159,684	174,220	333,904
2040	11,878	152,086	163,964	147,806	22,849	170,655	159,684	174,935	334,619
2041	9,091	150,218	159,309	150,593	25,178	175,771	159,684	175,396	335,080
2042	6,651	147,985	154,636	153,033	27,667	180,700	159,684	175,652	335,336
2043	4,580	145,381	149,961	155,104	30,285	185,389	159,684	175,666	335,350
2044	2,938	142,368	145,306	156,746	33,024	189,770	159,684	175,392	335,076
2045	1,797	138,885	140,682	157,887	35,929	193,816	159,684	174,814	334,498

TABLE 11

Projections – Projection of Employer Normal Cost to 2045 by Member Group

Year Ended June 30	Payroll			Employer Normal Cost ($)				Employer Normal Cost (% of Pay)			
	Tier I	Tier II	Total	Tier I	Tier II	Administrative Expenses	Total	Tier I (% of pay)	Tier II (% of pay)	Admin. Expenses (% of pay)	Total (% of pay)
2018	$8,654,587,205	$1,786,736,806	$10,441,324,011	$1,066,369,341	($38,288,180)	$26,549,011	$1,054,630,171	12.32%	-2.14%	0.25%	10.10%
2019	8,478,326,166	2,261,654,585	10,739,980,751	1,055,810,405	(47,136,631)	27,308,401	1,035,982,175	12.45%	-2.08%	0.25%	9.65%
2020	8,306,709,283	2,740,819,716	11,047,528,999	1,044,190,574	(56,003,233)	28,090,400	1,016,277,740	12.57%	-2.04%	0.25%	9.20%
2021	8,138,092,130	3,224,997,857	11,363,089,987	1,031,199,061	(65,946,705)	28,892,772	994,145,128	12.67%	-2.04%	0.25%	8.75%
2022	7,964,625,889	3,709,102,370	11,673,728,259	1,017,469,737	(73,932,354)	29,682,628	973,220,011	12.77%	-1.99%	0.25%	8.34%
2023	7,783,336,307	4,209,703,030	11,993,039,337	1,002,157,189	(82,029,353)	30,494,536	950,622,372	12.88%	-1.95%	0.25%	7.93%
2024	7,588,562,558	4,734,530,124	12,323,092,682	985,227,146	(90,452,772)	31,333,758	926,108,132	12.98%	-1.91%	0.25%	7.52%
2025	7,377,388,579	5,285,892,417	12,663,280,996	965,940,074	(99,216,251)	32,198,750	898,922,573	13.09%	-1.88%	0.25%	7.10%
2026	7,148,419,019	5,865,542,802	13,013,961,821	943,416,358	(108,401,095)	33,090,421	868,105,685	13.20%	-1.85%	0.25%	6.67%
2027	6,894,231,311	6,481,863,374	13,376,094,685	916,291,354	(118,413,174)	34,011,212	831,889,392	13.29%	-1.83%	0.25%	6.22%
2028	6,610,592,164	7,131,162,817	13,741,754,981	886,699,084	(128,652,033)	34,940,971	792,988,022	13.41%	-1.80%	0.25%	5.77%
2029	6,313,354,829	7,809,784,598	14,123,139,427	854,815,042	(139,298,387)	35,910,712	751,427,368	13.54%	-1.78%	0.25%	5.32%
2030	6,001,985,889	8,517,450,557	14,519,436,446	820,387,578	(150,653,557)	36,918,371	706,652,391	13.67%	-1.77%	0.25%	4.87%
2031	5,672,111,235	9,256,750,022	14,928,861,257	782,675,657	(162,153,285)	37,959,410	658,481,782	13.80%	-1.75%	0.25%	4.41%
2032	5,324,017,054	10,027,714,237	15,351,731,291	742,204,278	(173,941,371)	39,034,636	607,297,542	13.94%	-1.73%	0.25%	3.96%
2033	4,956,182,089	10,829,449,062	15,785,631,151	699,291,869	(185,820,897)	40,137,907	553,608,878	14.11%	-1.72%	0.25%	3.51%
2034	4,567,325,761	11,662,580,567	16,229,906,328	654,413,729	(197,785,927)	41,267,559	497,895,362	14.33%	-1.70%	0.25%	3.07%
2035	4,168,532,601	12,520,647,781	16,689,180,382	608,048,331	(210,058,247)	42,435,349	440,425,433	14.59%	-1.68%	0.25%	2.64%
2036	3,763,728,150	13,399,501,343	17,163,229,493	561,996,743	(221,386,369)	43,640,707	384,251,081	14.93%	-1.65%	0.25%	2.24%
2037	3,364,072,351	14,292,363,808	17,656,436,159	514,802,485	(232,684,675)	44,894,777	327,012,587	15.30%	-1.63%	0.25%	1.85%
2038	2,958,538,404	15,202,353,582	18,160,891,986	463,161,275	(243,895,583)	46,177,450	265,443,141	15.66%	-1.60%	0.25%	1.46%
2039	2,540,504,699	16,130,748,637	18,671,253,336	406,868,352	(254,532,889)	47,475,139	199,810,602	16.02%	-1.58%	0.25%	1.07%
2040	2,125,380,311	17,071,901,844	19,197,282,155	346,210,755	(264,935,953)	48,812,665	130,087,467	16.29%	-1.55%	0.25%	0.68%
2041	1,718,648,951	18,001,850,554	19,720,499,505	283,267,841	(272,375,417)	50,143,042	61,035,466	16.48%	-1.51%	0.25%	0.31%
2042	1,337,629,767	18,908,862,577	20,246,492,344	220,794,794	(277,640,231)	51,480,477	(5,364,960)	16.51%	-1.47%	0.25%	-0.03%
2043	993,509,003	19,786,217,826	20,779,726,829	161,966,037	(280,906,654)	52,836,325	(66,104,292)	16.30%	-1.42%	0.25%	-0.32%
2044	693,058,957	20,630,745,686	21,323,804,643	110,475,980	(281,934,926)	54,219,744	(117,239,201)	15.94%	-1.37%	0.25%	-0.55%
2045	449,072,648	21,411,792,367	21,860,865,015	70,164,764	(279,617,354)	55,585,320	(153,867,269)	15.62%	-1.31%	0.25%	-0.70%

TABLE 12

Projections – Projection of State Normal Cost to 2045 by Member Group

Year Ended June 30	Payroll			State Share of Employer Normal Cost ($) [1]			State Share of Employer Normal Cost (% of Pay)		
	Tier I	Tier II	Total	Tier I	Tier II	Total	Tier I (% of pay)	Tier II (% of pay)	Total (% of pay)
2018	$8,654,587,205	$1,786,736,806	$10,441,324,011	$1,016,172,735	($48,651,254)	$967,521,481	11.74%	-2.72%	9.27%
2019	8,478,326,166	2,261,654,585	10,739,980,751	1,006,636,113	(60,254,228)	946,381,885	11.87%	-2.66%	8.81%
2020	8,306,709,283	2,740,819,716	11,047,528,999	996,011,660	(71,899,988)	924,111,672	11.99%	-2.62%	8.36%
2021	8,138,092,130	3,224,997,857	11,363,089,987	983,998,126	(84,651,693)	899,346,434	12.09%	-2.62%	7.91%
2022	7,964,625,889	3,709,102,370	11,673,728,259	971,274,907	(95,445,148)	875,829,759	12.19%	-2.57%	7.50%
2023	7,783,336,307	4,209,703,030	11,993,039,337	957,013,838	(106,445,630)	850,568,208	12.30%	-2.53%	7.09%
2024	7,588,562,558	4,734,530,124	12,323,092,682	941,213,483	(117,913,047)	823,300,436	12.40%	-2.49%	6.68%
2025	7,377,388,579	5,285,892,417	12,663,280,996	923,151,220	(129,874,427)	793,276,793	12.51%	-2.46%	6.26%
2026	7,148,419,019	5,865,542,802	13,013,961,821	901,955,527	(142,421,243)	759,534,285	12.62%	-2.43%	5.84%
2027	6,894,231,311	6,481,863,374	13,376,094,685	876,304,812	(156,007,981)	720,296,831	12.71%	-2.41%	5.38%
2028	6,610,592,164	7,131,162,817	13,741,754,981	848,357,649	(170,012,778)	678,344,872	12.83%	-2.38%	4.94%
2029	6,313,354,829	7,809,784,598	14,123,139,427	818,197,584	(184,595,137)	633,602,447	12.96%	-2.36%	4.49%
2030	6,001,985,889	8,517,450,557	14,519,436,446	785,576,059	(200,054,770)	585,521,289	13.09%	-2.35%	4.03%
2031	5,672,111,235	9,256,750,022	14,928,861,257	749,777,412	(215,842,435)	533,934,977	13.22%	-2.33%	3.58%
2032	5,324,017,054	10,027,714,237	15,351,731,291	711,324,979	(232,102,114)	479,222,865	13.36%	-2.31%	3.12%
2033	4,956,182,089	10,829,449,062	15,785,631,151	670,546,012	(248,631,702)	421,914,311	13.53%	-2.30%	2.67%
2034	4,567,325,761	11,662,580,567	16,229,906,328	627,923,240	(265,428,894)	362,494,346	13.75%	-2.28%	2.23%
2035	4,168,532,601	12,520,647,781	16,689,180,382	583,870,842	(282,678,004)	301,192,838	14.01%	-2.26%	1.80%
2036	3,763,728,150	13,399,501,343	17,163,229,493	540,167,120	(299,103,477)	241,063,643	14.35%	-2.23%	1.40%
2037	3,364,072,351	14,292,363,808	17,656,436,159	495,290,866	(315,580,385)	179,710,480	14.72%	-2.21%	1.02%
2038	2,958,538,404	15,202,353,582	18,160,891,986	446,001,752	(332,069,234)	113,932,518	15.08%	-2.18%	0.63%
2039	2,540,504,699	16,130,748,637	18,671,253,336	392,133,425	(348,091,231)	44,042,194	15.44%	-2.16%	0.24%
2040	2,125,380,311	17,071,901,844	19,197,282,155	333,883,549	(363,952,983)	(30,069,434)	15.71%	-2.13%	-0.16%
2041	1,718,648,951	18,001,850,554	19,720,499,505	273,299,677	(376,786,150)	(103,486,473)	15.90%	-2.09%	-0.52%
2042	1,337,629,767	18,908,862,577	20,246,492,344	213,036,541	(387,311,634)	(174,275,093)	15.93%	-2.05%	-0.86%
2043	993,509,003	19,786,217,826	20,779,726,829	156,203,685	(395,666,718)	(239,463,033)	15.72%	-2.00%	-1.15%
2044	693,058,957	20,630,745,686	21,323,804,643	106,456,239	(401,593,251)	(295,137,013)	15.36%	-1.95%	-1.38%
2045	449,072,648	21,411,792,367	21,860,865,015	67,560,143	(403,805,749)	(336,245,607)	15.04%	-1.89%	-1.54%

[1] Excludes 0.58% of membership payroll for School District Contributions

TABLE 13

Projections – Projection of Debt Service to 2033

Fiscal Year	Debt Service
2016	$340,003,895
2017	352,224,565
2018	363,801,653
2019	374,735,158
2020	399,198,690
2021	422,197,518
2022	443,731,640
2023	463,801,058
2024	497,200,770
2025	528,003,960
2026	541,748,515
2027	553,983,980
2028	579,505,355
2029	602,763,095
2030	638,552,200
2031	671,323,125
2032	686,280,870
2033	684,179,980

EXHIBIT 1

GASB 25 Schedule of Employer Contributions ($ in thousands)

Fiscal Year ended June 30	Actuarially Determined Contribution*	Percentage Contributed
2007	$2,052,396	39.8%
2008	1,949,463	60.0%
2009	2,109,480	75.9%
2010	2,481,914	90.6%
2011	2,743,221	84.7%
2012	3,429,945	74.6%
2013	3,582,033	79.8%
2014	4,091,978	87.8%
2015	4,119,526	85.5%
2016	4,582,530	84.9%

**Prior to 2017, the ADC is the same as the GASB ARC determined under GASB 25. Beginning with fiscal 2017, the ADC will be based on the Board's funding policy.*

The information presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (e.g., the contribution determined by the valuation completed as of June 30, 2014, was contributed in the fiscal year ending June 30, 2016).

EXHIBIT 1 (*continued*)

GASB 25 Schedule of Employer Contributions ($ in thousands)

Fiscal Year	Actuarially Determined Contributions	State Contributions	Federal and Employer Contributions	Total	Contribution Deficiency	Covered Payroll	Contributions as a Percentage of Covered Employee Payroll
2007	$2,052,396	$735,515	$81,155	$816,670	$1,235,726	$8,149,849	10.0%
2008	1,949,463	1,039,195	130,578	1,169,773	779,690	8,521,717	13.7%
2009	2,109,480	1,449,889	151,716	1,601,605	507,875	8,945,021	17.9%
2010	2,481,914	2,079,129	170,653	2,249,782	232,132	9,251,139	24.3%
2011	2,743,221	2,169,518	154,150	2,323,668	419,553	9,205,603	25.2%
2012	3,429,945	2,405,172	153,409	2,558,581	871,364	9,321,098	27.4%
2013	3,582,033	2,702,278	155,787	2,858,065	723,968	9,394,741	30.4%
2014	4,091,978	3,437,478	157,228	3,594,706	497,272	9,512,810	37.8%
2015	4,119,526	3,376,878	144,780	3,521,658	597,868	9,641,148	36.5%
2016	4,582,530	3,741,802	147,408	3,889,210	693,320	9,811,614	39.6%

EXHIBIT 2

GASB 25 Schedule of Funding Progress ($ in thousands)

(1) Valuation Date	(2) Actuarial Value of Assets (AVA)	(3) Actuarial Accrued Liability (AAL)	(4) Unfunded Actuarial Accrued Liability (UAAL) (3) – (2)	(5) Funded Ratio (2) / (3)	(6) Covered Payroll	(7) UAAL as a % of Payroll (4) / (6)
6/30/2007	$41,909,318	$65,648,395	$23,739,077	63.8%	$ 8,149,849	291.3%
6/30/2008	38,430,723	68,632,367	30,201,644	56.0%	8,521,717	354.4%
6/30/2009	38,026,044	73,027,198	35,001,154	52.1%	8,945,021	391.3%
6/30/2010	37,439,092	77,293,198	39,854,106	48.4%	9,251,139	430.8%
6/30/2011	37,769,753	81,299,745	43,529,992	46.5%	9,205,603	472.9%
6/30/2012	37,945,397	90,024,945	52,079,548	42.1%	9,321,098	558.7%
6/30/2013	38,155,191	93,886,989	55,731,798	40.6%	9,394,741	593.2%
6/30/2014	42,150,765	103,740,377	61,589,612	40.6%	9,512,810	647.4%
6/30/2015	45,435,193	108,121,825	62,686,632	42.0%	9,641,171	650.2%
6/30/2016	47,222,098	118,629,890	71,407,792	39.8%	9,811,614	727.8%

EXHIBIT 3
GASB 25 Solvency Test ($ in thousands)

	Actuarial Accrued Liability for:				Portion of Actuarial Accrued Liability Covered by Valuation Assets		
Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member (Employer Financed Portion)	Valuation Assets	(1)	(2)	(3)
2007	$6,500,318	$39,785,368	$19,362,709	$ 41,909,318	100%	89%	0%
2008	6,931,518	41,849,964	19,850,885	38,430,723	100%	75%	0%
2009	7,320,600	44,495,917	21,210,681	38,026,044	100%	69%	0%
2010	7,715,984	47,475,906	22,101,308	37,439,092	100%	63%	0%
2011	8,048,689	50,567,880	22,683,176	37,769,753	100%	59%	0%
2012	8,270,073	58,734,636	23,020,236	37,945,397	100%	51%	0%
2013	8,569,939	61,254,334	24,062,715	38,155,191	100%	48%	0%
2014	8,890,558	65,614,627	29,235,192	42,150,765	100%	51%	0%
2015	9,281,893	70,545,782	28,294,150	45,435,193	100%	51%	0%
2016	9,629,934	77,688,075	31,311,881	47,222,098	100%	48%	0%

EXHIBIT 4
GASB 67 Net Pension Liability

	June 30, 2016	June 30, 2015
The components of the net pension liability:		
Total pension liability	$124,187,003,384	$111,916,989,345
Plan fiduciary net position	(45,250,956,731)	(46,406,915,593)
Net pension liability	$78,936,046,653	$65,510,073,752
Plan fiduciary net position as a percentage of the total pension liability	36.4%	41.5%

Plan provisions. The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of June 30, 2016.

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of June 30, 2016, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.50%
Salary increases	9.25% at one year of service to 3.25% at 20 and more years of service
Investment rate of return	7.00%
Cost-of-living adjustments	Tier I: 3% compounded Tier II: 1.25% not compounded

The assumed mortality rates are based on the Society of Actuaries RP-2014 White Collar mortality tables, with adjustments for TRS experience, with generational improvement based on Scale MP-2014.

The actuarial assumptions used were based on the results of an experience study dated August 2015 and an analysis of economic assumptions in August 2016.

Discount rate: The discount rate used to measure the total pension liability was 6.83% as of June 30, 2016. The projection of cash flows used to determine the discount rate assumes that member and employer contributions will be made at rates equal to those based on this June 30, 2016, Actuarial Valuation Report. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected member and employer contributions for future plan members are included, to the extent that they exceed the service costs of future plan members.

Based on those assumptions, the pension plan's fiduciary net position was not projected to be available to make all projected future benefit payments for current plan members as of June 30, 2016. The projected benefit payments through June 30, 2079 were discounted at the expected long-term discount rate. Starting July 1, 2079, the projected benefit payments were discounted at the municipal bond index. Therefore, the single equivalent, blended discount rate of 6.83% was calculated using the long-term expected rate of return and the municipal bond index.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability as of June 30, 2016, calculated using the discount rate of 6.83%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (5.83%) or 1-percentage-point higher (7.83%) than the current rate:

	1% Decrease (5.83%)	Current Discount Rate (6.83%)	1% Increase (7.83%)
Net pension liability as of June 30, 2016	$96,541,989,944	$78,936,046,653	$64,556,661,223

EXHIBIT 5

GASB 67 Schedules of Changes in Net Pension Liability

	2016	2015
Total pension liability		
Service cost	$1,681,242,232	$1,948,079,771
Interest	8,264,257,311	7,864,916,421
Change of benefit terms	0	0
Differences between expected and actual experience	701,827,169	(90,079,446)
Changes of assumptions	7,553,894,504	1,136,454,886
Benefit payments, including refunds of employee contributions	(5,931,207,177)	(5,625,037,173)
Net change in total pension liability	$12,270,014,039	$5,234,334,459
Total pension liability – beginning	111,916,989,345	106,682,654,886
Total pension liability – ending (a)	$124,187,003,384	$111,916,989,345
Plan fiduciary net position		
Contributions – employer	$148,040,767	$145,591,585
Contributions – nonmember contributing entity	3,742,469,245	3,377,664,945
Contributions – member	951,809,398	935,451,049
Net investment income	(44,103,178)	1,770,549,533
Benefit payments, including refunds of employee contributions	(5,931,207,177)	(5,625,037,173)
Administrative expense	(22,967,917)	(21,686,860)
Net change in plan fiduciary net position	($1,155,958,862)	$582,533,079
Plan fiduciary net position – beginning	46,406,915,593	45,824,382,514
Plan fiduciary net position – ending (b)	$45,250,956,731	$46,406,915,593
Net pension liability – ending (a) – (b)	$78,936,046,653	$65,510,073,752
Plan fiduciary net position as a percentage of the total pension liability	36.4%	41.5%
Actual covered employee payroll	$9,811,614,284	$9,641,170,627
Plan net pension liability as percentage of covered employee payroll	804.5%	679.5%

Changes in the collective net pension liability from the beginning of the year to the end of the year arise from the net difference between changes in the total pension liability and plan fiduciary net position that occurred during the year. Changes in net pension liability will be recognized immediately as pension expense, or reported as deferred outflows of resources related to pensions or deferred inflows of resources related to pensions, depending on the nature of the change.

Differences between actual and expected investment-related experience are recognized over a closed five-year period. Differences between actual and expected non-investment-related experience and changes of assumptions are recognized over the average of the expected remaining service lives of all members who are provided with pensions through the pension plan (active employees and inactive employees). The amounts below that are not included in pension expense for the current year are included in deferred outflows of resources or deferred inflows of resources related to pensions.

EXHIBIT 6

GASB 68 Reconciliation of Collective Net Pension Liability

	Increase/(Decrease) For Fiscal Year Ending June 30, 2016		
	Total Pension Liability (a)	**Plan Fiduciary Net Position (b)**	**Net Pension Liability (a) – (b)**
Balances at beginning of year	$111,916,989,345	$46,406,915,593	$65,510,073,752
Changes for the year			
Service cost	1,681,242,232		1,681,242,232
Interest	8,264,257,311		8,264,257,311
Differences between expected and actual experience	701,827,169		701,827,169
Contributions – employer		148,040,767	(148,040,767)
Contributions – nonmember contributing entity		3,742,469,245	(3,742,469,245)
Contributions – member		951,809,398	(951,809,398)
Net investment income		(44,103,178)	44,103,178
Benefit payments, including refunds of employee contributions	(5,931,207,177)	(5,931,207,177)	0
Administrative expense		(22,967,917)	22,967,917
Change of assumptions	7,553,894,504	0	7,553,894,504
Net changes	12,270,014,039	(1,155,958,862)	13,425,972,901
Balances at end of year	$124,187,003,384	$45,250,956,731	$78,936,046,653

EXHIBIT 7

GASB 68 Collective Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

	Year Established	Original Balance	Original Amortization Period	Amortization Amount	Outstanding Balance at June 30, 2016
Outflows					
Demographic	2014	$39,950,212	5.12	$7,802,776	$16,541,884
Investment	2015	1,621,728,539	5.00	324,345,708	973,037,123
Assumption	2015	1,136,454,886	4.93	230,518,233	675,418,420
Demographic	2016	701,827,169	5.21*	134,707,710	567,119,459
Investment	2016	3,482,927,259	5.00	696,585,452	2,786,341,807
Assumption	2016	7,553,894,504	5.21*	1,449,883,782	6,104,010,722
Total outflows				**$2,843,843,661**	**$11,122,469,415**
Inflows					
Investment	2014	$3,823,239,747	5.00	$764,647,950	$1,529,295,897
Demographic	2015	90,079,446	4.93	18,271,693	53,536,060
Total inflows				**$782,919,643**	**$1,582,831,957**

* Equal to the total expected remaining service lives of 2,129,412 years, divided by total employees that are provided with pensions through the plan of 408,569 (as shown in the table below), rounded to two decimal places.

	Expected Remaining Service	Counts	Average of the Expected Remaining Service
Actives Members	2,129,412	159,684	13.34
Inactive Members	-	133,722	-
Retirees and Beneficiaries	-	115,197	-
Total Employees	2,129,412	408,603	5.21

EXHIBIT 7 (continued)

GASB 68 Collective Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

At June 30, 2016, deferred outflows of resources and deferred inflows of resources related to pensions are:

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	$583,661,343	$53,536,060
Changes of assumptions	6,779,429,142	-
Net differences between projected and actual earnings on pension plan investments	2,230,083,033	-
Total	$9,593,173,518	$53,536,060

Deferred outflows of resources and deferred inflows of resources related to pensions will be recognized as follows:

Year ended June 30:	
2017	$2,060,924,018
2018	2,060,924,021
2019	2,803,848,263
2020	2,281,176,943
2021	332,764,213
Thereafter	-

EXHIBIT 8
GASB 68 Collective Pension Expense

	Fiscal Year Ending June 30, 2016	Fiscal Year Ending June 30, 2015
Components of pension expense		
Service cost	$1,681,242,232	$1,948,079,771
Interest on the total pension liability	8,264,257,311	7,864,916,421
Projected earnings on plan investments	(3,438,824,081)	(3,392,278,072)
Contributions – member	(951,809,398)	(935,451,049)
Administrative expense	22,967,917	21,686,860
Current year recognition of:		
Changes of assumptions	1,680,402,015	230,518,233
Difference between expected and actual experience	124,238,793	(10,468,917)
Difference between projected and actual earnings on pension plan investments	256,283,210	(440,302,242)
Change of benefit terms	-	-
Total pension expense	$7,638,757,999	$5,286,701,005

EXHIBIT 9
GASB 67 Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2017	$45,250,956,731	$5,039,991,386	$6,240,838,406	$23,594,987	$3,124,711,501	$47,151,226,224
2018	47,151,226,224	5,625,755,689	6,464,244,028	25,499,145	3,270,346,274	49,557,585,015
2019	49,557,585,015	5,757,323,528	6,730,344,764	25,313,229	3,434,089,245	51,993,339,795
2020	51,993,339,795	5,901,249,990	6,997,854,804	25,235,352	3,600,269,380	54,471,769,009
2021	54,471,769,009	6,096,549,759	7,266,779,401	25,246,605	3,771,182,162	57,047,474,923
2022	57,047,474,923	6,269,135,799	7,539,665,199	25,311,547	3,947,968,812	59,699,602,789
2023	59,699,602,789	6,402,110,910	7,817,654,395	25,470,174	4,128,536,717	62,387,125,846
2024	62,387,125,846	6,526,420,774	8,098,630,608	25,667,908	4,311,173,088	65,100,421,193
2025	65,100,421,193	6,657,480,739	8,385,604,049	25,883,751	4,495,639,236	67,842,053,367
2026	67,842,053,367	6,809,820,005	8,680,803,725	26,114,879	4,682,545,285	70,627,500,053
2027	70,627,500,053	6,968,284,386	8,989,021,580	26,359,665	4,872,276,614	73,452,679,808
2028	73,452,679,808	7,112,920,492	9,304,221,986	26,587,662	5,064,061,466	76,298,852,118
2029	76,298,852,118	7,265,750,895	9,625,491,921	26,814,088	5,257,390,219	79,169,687,223
2030	79,169,687,223	7,412,953,588	9,954,395,643	27,041,815	5,451,981,170	82,053,184,523
2031	82,053,184,523	7,568,402,309	10,291,385,560	27,265,114	5,647,464,224	84,950,400,382
2032	84,950,400,382	7,746,876,818	10,632,799,164	27,476,687	5,844,559,061	87,881,560,411
2033	87,881,560,411	7,946,298,103	10,980,143,721	27,672,827	6,044,556,083	90,864,598,050
2034	90,864,598,050	8,852,511,116	11,327,313,195	27,850,162	6,272,929,035	94,634,874,843
2035	94,634,874,843	9,059,556,769	11,675,881,516	28,015,039	6,531,889,347	98,522,424,404
2036	98,522,424,404	9,272,060,911	12,014,558,884	28,169,472	6,799,596,348	102,551,353,307
2037	102,551,353,307	9,493,893,675	12,331,065,941	28,317,374	7,078,302,594	106,764,166,260
2038	106,764,166,260	9,721,512,749	12,662,321,410	28,454,546	7,369,567,426	111,164,470,479
2039	111,164,470,479	9,950,605,927	12,972,225,748	28,559,627	7,674,756,653	115,789,047,684
2040	115,789,047,684	10,186,424,615	13,267,677,796	28,644,493	7,996,386,919	120,675,536,929
2041	120,675,536,929	10,417,916,991	13,531,693,367	28,688,350	8,337,301,320	125,870,373,522
2042	125,870,373,522	10,649,620,744	13,763,721,185	28,700,201	8,700,928,124	131,428,501,004
2043	131,428,501,004	10,885,014,794	13,946,848,202	28,696,905	9,091,826,509	137,429,797,199
2044	137,429,797,199	11,126,763,508	14,064,573,174	28,680,939	9,516,258,633	143,979,565,227
2045	143,979,565,227	11,365,748,162	14,133,370,513	28,633,339	9,980,700,617	151,164,010,155
2046	151,164,010,155	1,484,923,458	14,142,643,792	28,554,413	10,137,461,095	148,615,196,503
2047	148,615,196,503	1,452,852,582	14,122,439,721	28,466,106	9,958,631,892	145,875,775,150
2048	145,875,775,150	1,431,507,056	14,059,650,147	28,362,789	9,768,326,555	142,987,595,825
2049	142,987,595,825	1,413,634,589	13,971,828,101	28,244,627	9,568,606,373	139,969,764,059
2050	139,969,764,059	1,398,126,798	13,871,929,107	28,111,809	9,360,316,490	136,828,166,432
2051	136,828,166,432	1,383,788,941	13,776,915,594	27,964,547	9,143,233,458	133,550,308,690
2052	133,550,308,690	1,369,747,961	13,734,756,697	27,803,074	8,914,773,195	130,072,270,075
2053	130,072,270,075	1,355,397,087	13,665,272,767	27,627,645	8,673,246,289	126,408,013,039

EXHIBIT 9 (continued)

GASB 67 Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2054	$126,408,013,039	$1,340,505,555	$13,577,419,033	$27,438,539	$8,419,308,592	$122,562,969,614
2055	122,562,969,614	1,325,619,488	13,473,872,182	27,236,050	8,153,265,767	118,540,746,637
2056	118,540,746,637	1,311,268,233	13,353,338,302	27,020,495	7,875,434,095	114,347,090,168
2057	114,347,090,168	1,297,792,030	13,272,713,774	26,792,209	7,584,236,323	109,929,612,539
2058	109,929,612,539	1,285,013,510	13,147,502,952	26,551,544	7,278,956,443	105,319,527,996
2059	105,319,527,996	1,272,858,872	12,990,769,064	26,298,869	6,961,319,643	100,536,638,578
2060	100,536,638,578	1,261,836,008	12,810,954,322	26,034,570	6,632,434,349	95,593,920,043
2061	95,593,920,043	1,252,023,662	12,600,432,689	25,759,047	6,293,478,520	90,513,230,489
2062	90,513,230,489	1,243,320,337	12,370,957,886	25,472,713	5,945,567,275	85,305,687,502
2063	85,305,687,502	1,235,464,390	12,116,443,749	25,175,996	5,589,682,688	79,989,214,834
2064	79,989,214,834	1,227,987,801	11,828,905,247	24,869,333	5,227,342,501	74,590,770,556
2065	74,590,770,556	1,220,751,462	11,516,711,228	24,553,176	4,860,135,986	69,130,393,600
2066	69,130,393,600	1,213,653,217	11,173,771,569	24,227,982	4,489,675,430	63,635,722,696
2067	63,635,722,696	1,206,607,456	10,803,539,269	23,894,220	4,117,771,678	58,132,668,341
2068	58,132,668,341	1,199,601,575	10,405,987,823	23,552,443	3,746,238,930	52,648,968,581
2069	52,648,968,581	1,192,831,365	9,981,747,970	23,214,964	3,377,003,196	47,213,840,208
2070	47,213,840,208	1,186,295,040	9,532,252,534	22,881,739	3,012,059,441	41,857,060,416
2071	41,857,060,416	1,179,990,863	9,059,559,855	22,552,722	2,653,419,969	36,608,358,671
2072	36,608,358,671	1,173,917,143	8,552,369,759	22,227,871	2,303,561,290	31,511,239,474
2073	31,511,239,474	1,168,072,236	8,016,647,046	21,907,141	1,965,319,895	26,606,077,418
2074	26,606,077,418	1,162,454,541	7,470,771,048	21,590,490	1,640,878,674	21,917,049,095
2075	21,917,049,095	1,157,062,504	6,921,461,253	21,277,875	1,331,694,755	17,463,067,226
2076	17,463,067,226	1,151,894,617	6,371,104,809	20,969,252	1,039,008,425	13,261,896,207
2077	13,261,896,207	1,146,949,415	5,809,948,082	20,664,579	764,404,521	9,342,637,483
2078	9,342,637,483	1,142,225,477	5,263,395,269	20,363,815	509,030,948	5,710,134,824
2079	5,710,134,824	1,137,721,426	4,742,469,006	20,066,918	272,840,930	2,358,161,255
2080	2,358,161,255	1,133,435,930	4,237,839,701	19,773,846	55,725,071	0
2081	0	1,129,367,697	3,754,738,915	19,484,559	0	0
2082	0	1,125,515,480	3,295,229,200	19,199,015	0	0
2083	0	1,121,878,074	2,862,924,580	18,917,174	0	0
2084	0	1,118,454,316	2,460,923,528	18,638,997	0	0
2085	0	1,115,243,085	2,091,711,060	18,364,442	0	0
2086	0	1,112,243,300	1,757,000,806	18,093,471	0	0
2087	0	1,109,453,924	1,457,656,243	17,826,045	0	0
2088	0	1,106,873,958	1,193,740,679	17,562,125	0	0
2089	0	1,104,502,445	964,477,600	17,301,671	0	0
2090	0	1,102,338,468	768,400,952	17,044,647	0	0
2091	0	1,100,381,151	603,352,804	16,791,013	0	0

EXHIBIT 9 (continued)

GASB 67 Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2092	$0	$1,098,629,657	$466,645,688	$16,540,733	$0	$0
2093	0	1,097,083,189	355,296,903	16,293,768	0	0
2094	0	1,095,740,988	266,150,108	16,050,083	0	0
2095	0	1,094,602,336	196,058,804	15,809,639	0	0
2096	0	1,093,666,553	141,960,283	15,572,401	0	0
2097	0	1,092,932,998	100,969,870	15,338,333	0	0
2098	0	1,092,401,067	70,495,995	15,107,399	0	0
2099	0	1,092,070,197	48,294,370	14,879,563	0	0
2100	0	1,091,939,862	32,442,561	14,654,789	0	0
2101	0	1,092,009,571	21,346,329	14,433,044	0	0
2102	0	1,092,278,876	13,738,621	14,214,293	0	0
2103	0	1,092,747,363	8,648,378	13,998,501	0	0
2104	0	1,093,414,655	5,314,234	13,785,634	0	0
2105	0	1,094,280,415	3,183,266	13,575,658	0	0
2106	0	1,095,344,341	1,858,114	13,368,540	0	0
2107	0	1,096,606,168	1,053,149	13,164,248	0	0
2108	0	1,098,065,668	583,938	12,962,747	0	0
2109	0	1,099,722,652	318,855	12,764,006	0	0
2110	0	1,101,576,963	173,384	12,567,992	0	0
2111	0	1,103,628,485	95,801	12,374,673	0	0
2112	0	1,105,877,135	55,260	12,184,017	0	0
2113	0	1,108,322,868	33,207	11,995,994	0	0
2114	0	1,110,965,675	20,772	11,810,572	0	0
2115	0	1,113,805,583	12,892	11,627,720	0	0
2116	0	1,116,842,654	7,719	11,447,407	0	0
2117	0	1,120,076,988	4,982	11,269,604	0	0
2118	0	1,123,508,718	3,064	11,094,280	0	0
2119	0	1,127,138,016	1,779	10,921,405	0	0
2120	0	1,130,965,087	994	10,750,951	0	0
2121	0	1,134,990,173	523	10,582,888	0	0
2122	0	1,139,213,551	260	10,417,187	0	0
2123	0	1,143,635,536	123	10,253,820	0	0
2124	0	1,148,256,475	55	10,092,757	0	0
2125	0	1,153,076,753	25	9,933,972	0	0
2126	0	1,158,096,790	11	9,777,436	0	0
2127	0	1,163,317,041	5	9,623,121	0	0
2128	0	1,168,737,997	2	9,471,002	0	0

EXHIBIT 9 (continued)
GASB 67 Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit Payments	"Unfunded" Portion of Benefit Payments	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.85%	Present Value of Benefit Payments at 6.83%
2017	$45,250,956,731	$6,240,838,406	$6,240,838,406	$0	$6,033,246,210	$0	$6,038,094,253
2018	47,151,226,224	6,464,244,028	6,464,244,028	0	5,840,393,061	0	5,854,483,603
2019	49,557,585,015	6,730,344,764	6,730,344,764	0	5,683,002,766	0	5,705,872,508
2020	51,993,339,795	6,997,854,804	6,997,854,804	0	5,522,321,734	0	5,553,459,127
2021	54,471,769,009	7,266,779,401	7,266,779,401	0	5,359,385,253	0	5,398,269,097
2022	57,047,474,923	7,539,665,199	7,539,665,199	0	5,196,863,191	0	5,242,983,795
2023	59,699,602,789	7,817,654,395	7,817,654,395	0	5,035,955,829	0	5,088,816,867
2024	62,387,125,846	8,098,630,608	8,098,630,608	0	4,875,658,260	0	4,934,757,845
2025	65,100,421,193	8,385,604,049	8,385,604,049	0	4,718,155,409	0	4,783,023,432
2026	67,842,053,367	8,680,803,725	8,680,803,725	0	4,564,719,010	0	4,634,917,348
2027	70,627,500,053	8,989,021,580	8,989,021,580	0	4,417,563,056	0	4,492,709,945
2028	73,452,679,808	9,304,221,986	9,304,221,986	0	4,273,331,854	0	4,353,012,579
2029	76,298,852,118	9,625,491,921	9,625,491,921	0	4,131,670,818	0	4,215,476,700
2030	79,169,687,223	9,954,395,643	9,954,395,643	0	3,993,318,032	0	4,080,868,102
2031	82,053,184,523	10,291,385,560	10,291,385,560	0	3,858,416,202	0	3,949,348,057
2032	84,950,400,382	10,632,799,164	10,632,799,164	0	3,725,624,293	0	3,819,557,677
2033	87,881,560,411	10,980,143,721	10,980,143,721	0	3,595,635,776	0	3,692,218,441
2034	90,864,598,050	11,327,313,195	11,327,313,195	0	3,466,656,407	0	3,565,497,792
2035	94,634,874,843	11,675,881,516	11,675,881,516	0	3,339,564,164	0	3,440,304,180
2036	98,522,424,404	12,014,558,884	12,014,558,884	0	3,211,620,086	0	3,313,819,849
2037	102,551,353,307	12,331,065,941	12,331,065,941	0	3,080,584,867	0	3,183,725,278
2038	106,764,166,260	12,662,321,410	12,662,321,410	0	2,956,392,643	0	3,060,287,295
2039	111,164,470,479	12,972,225,748	12,972,225,748	0	2,830,606,502	0	2,934,791,582
2040	115,789,047,684	13,267,677,796	13,267,677,796	0	2,705,678,188	0	2,809,775,258
2041	120,675,536,929	13,531,693,367	13,531,693,367	0	2,578,989,623	0	2,682,518,442
2042	125,870,373,522	13,763,721,185	13,763,721,185	0	2,451,599,564	0	2,554,114,341
2043	131,428,501,004	13,946,848,202	13,946,848,202	0	2,321,699,273	0	2,422,671,018
2044	137,429,797,199	14,064,573,174	14,064,573,174	0	2,188,127,733	0	2,286,961,363
2045	143,979,565,227	14,133,370,513	14,133,370,513	0	2,054,982,275	0	2,151,255,114
2046	151,164,010,155	14,142,643,792	14,142,643,792	0	1,921,804,302	0	2,015,072,495
2047	148,615,196,503	14,122,439,721	14,122,439,721	0	1,793,512,923	0	1,883,578,405
2048	145,875,775,150	14,059,650,147	14,059,650,147	0	1,668,727,861	0	1,755,344,601
2049	142,987,595,825	13,971,828,101	13,971,828,101	0	1,549,817,138	0	1,632,882,777
2050	139,969,764,059	13,871,929,107	13,871,929,107	0	1,438,070,933	0	1,517,583,290
2051	136,828,166,432	13,776,915,594	13,776,915,594	0	1,334,786,076	0	1,410,852,375
2052	133,550,308,690	13,734,756,697	13,734,756,697	0	1,243,646,244	0	1,316,632,124
2053	130,072,270,075	13,665,272,767	13,665,272,767	0	1,156,406,221	0	1,226,240,575

EXHIBIT 9 (continued)

GASB 67 Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit Payments	"Unfunded" Portion of Benefit Payments	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.85%	Present Value of Benefit Payments at 6.83%
2054	$126,408,013,039	$13,577,419,033	$13,577,419,033	$0	$1,073,805,338	$0	$1,140,482,169
2055	122,562,969,614	13,473,872,182	13,473,872,182	0	995,902,866	0	1,059,443,015
2056	118,540,746,637	13,353,338,302	13,353,338,302	0	922,424,083	0	982,853,824
2057	114,347,090,168	13,272,713,774	13,272,713,774	0	856,873,541	0	914,476,837
2058	109,929,612,539	13,147,502,952	13,147,502,952	0	793,261,731	0	847,949,831
2059	105,319,527,996	12,990,769,064	12,990,769,064	0	732,528,137	0	784,288,134
2060	100,536,638,578	12,810,954,322	12,810,954,322	0	675,129,606	0	723,995,998
2061	95,593,920,043	12,600,432,689	12,600,432,689	0	620,593,685	0	666,582,706
2062	90,513,230,489	12,370,957,886	12,370,957,886	0	569,431,442	0	612,612,442
2063	85,305,687,502	12,116,443,749	12,116,443,749	0	521,230,125	0	561,657,491
2064	79,989,214,834	11,828,905,247	11,828,905,247	0	475,570,725	0	513,280,587
2065	74,590,770,556	11,516,711,228	11,516,711,228	0	432,728,261	0	467,791,864
2066	69,130,393,600	11,173,771,569	11,173,771,569	0	392,376,323	0	424,852,204
2067	63,635,722,696	10,803,539,269	10,803,539,269	0	354,556,361	0	384,519,211
2068	58,132,668,341	10,405,987,823	10,405,987,823	0	319,167,574	0	346,696,296
2069	52,648,968,581	9,981,747,970	9,981,747,970	0	286,126,625	0	311,305,210
2070	47,213,840,208	9,532,252,534	9,532,252,534	0	255,366,211	0	278,284,636
2071	41,857,060,416	9,059,559,855	9,059,559,855	0	226,825,154	0	247,579,505
2072	36,608,358,671	8,552,369,759	8,552,369,759	0	200,118,301	0	218,780,173
2073	31,511,239,474	8,016,647,046	8,016,647,046	0	175,311,063	0	191,967,697
2074	26,606,077,418	7,470,771,048	7,470,771,048	0	152,685,646	0	167,461,401
2075	21,917,049,095	6,921,461,253	6,921,461,253	0	132,204,670	0	145,231,555
2076	17,463,067,226	6,371,104,809	6,371,104,809	0	113,731,293	0	125,138,759
2077	13,261,896,207	5,809,948,082	5,809,948,082	0	96,928,993	0	106,822,625
2078	9,342,637,483	5,263,395,269	5,263,395,269	0	82,066,074	0	90,588,044
2079	5,710,134,824	4,742,469,006	4,742,469,006	0	69,106,420	0	76,405,267
2080	2,358,161,255	4,237,839,701	0	4,237,839,701	0	711,494,795	63,911,237
2081	0	3,754,738,915	0	3,754,738,915	0	612,918,387	53,006,160
2082	0	3,295,229,200	0	3,295,229,200	0	523,003,069	43,545,785
2083	0	2,862,924,580	0	2,862,924,580	0	441,798,484	35,414,760
2084	0	2,460,923,528	0	2,460,923,528	0	369,239,485	28,496,165
2085	0	2,091,711,060	0	2,091,711,060	0	305,145,813	22,672,734
2086	0	1,757,000,806	0	1,757,000,806	0	249,214,546	17,827,402
2087	0	1,457,656,243	0	1,457,656,243	0	201,026,007	13,844,750
2088	0	1,193,740,679	0	1,193,740,679	0	160,067,377	10,613,384
2089	0	964,477,600	0	964,477,600	0	125,742,093	8,026,939
2090	0	768,400,952	0	768,400,952	0	97,402,956	5,986,315
2091	0	603,352,804	0	603,352,804	0	74,362,038	4,400,043

EXHIBIT 9 (continued)
GASB 67 Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit Payments	"Unfunded" Portion of Benefit Payments	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.85%	Present Value of Benefit Payments at 6.83%
2092	$0	$466,645,688	$0	$466,645,688	$0	$55,919,452	$3,185,567
2093	0	355,296,903	0	355,296,903	0	41,396,419	2,270,413
2094	0	266,150,108	0	266,150,108	0	30,150,443	1,592,040
2095	0	196,058,804	0	196,058,804	0	21,594,796	1,097,811
2096	0	141,960,283	0	141,960,283	0	15,202,861	744,084
2097	0	100,969,870	0	100,969,870	0	10,513,467	495,405
2098	0	70,495,995	0	70,495,995	0	7,136,977	323,778
2099	0	48,294,370	0	48,294,370	0	4,753,813	207,632
2100	0	32,442,561	0	32,442,561	0	3,104,963	130,565
2101	0	21,346,329	0	21,346,329	0	1,986,370	80,417
2102	0	13,738,621	0	13,738,621	0	1,243,013	48,449
2103	0	8,648,378	0	8,648,378	0	760,787	28,549
2104	0	5,314,234	0	5,314,234	0	454,532	16,421
2105	0	3,183,266	0	3,183,266	0	264,724	9,208
2106	0	1,858,114	0	1,858,114	0	150,241	5,031
2107	0	1,053,149	0	1,053,149	0	82,794	2,669
2108	0	583,938	0	583,938	0	44,635	1,385
2109	0	318,855	0	318,855	0	23,697	708
2110	0	173,384	0	173,384	0	12,529	360
2111	0	95,801	0	95,801	0	6,731	186
2112	0	55,260	0	55,260	0	3,775	101
2113	0	33,207	0	33,207	0	2,206	57
2114	0	20,772	0	20,772	0	1,341	33
2115	0	12,892	0	12,892	0	809	19
2116	0	7,719	0	7,719	0	471	11
2117	0	4,982	0	4,982	0	296	7
2118	0	3,064	0	3,064	0	177	4
2119	0	1,779	0	1,779	0	100	2
2120	0	994	0	994	0	54	1
2121	0	523	0	523	0	28	1
2122	0	260	0	260	0	13	0
2123	0	123	0	123	0	6	0
2124	0	55	0	55	0	3	0
2125	0	25	0	25	0	1	0
2126	0	11	0	11	0	1	0
2127	0	5	0	5	0	0	0
2128	0	2	0	2	0	0	0
Total					$137,644,584,026	$4,066,227,574	$141,710,811,600

Summary of Assumptions and Methods

Rationale for Assumptions: The information and analysis used in supporting each assumption that has a significant effect on this valuation is shown in the demographic experience review dated August 13, 2015 and the economic experience review presented at the August 2016 Board meeting.

All assumptions were adopted by the Board effective June 30, 2015, unless otherwise noted.

Interest Rate: 7.00% per annum, compounded annually and net of investment expenses. The interest rate assumption is composed of an inflation assumption of 2.50% and real return of 4.50%. (Adopted effective June 30, 2016.)

Mortality Rates:

Healthy Post-Retirement: RP-2014 White Collar Annuitant Tables projected generationally with scale MP-2014, with female rates multiplied by 76% for ages 50 to 77 and 106% for ages 78 to 114 and male rates multiplied by 115% for ages 78 to 114.

Disabled Post-Retirement: RP-2014 Disabled Retiree Tables projected generationally with scale MP-2014.

Beneficiary Post-Retirement: RP-2014 White Collar Annuitant Tables projected generationally with scale MP-2014, with female and male rates multiplied by 112% for ages 50 to 114.

Pre-Retirement: RP-2014 White Collar Employee Tables projected generationally with scale MP-2014.

Salary Increase Rates:

The components include 2.50% inflation, 0.75% real wage growth and 0.25% for employment type and status changes. (Adopted effective June 30, 2016.) Salary increase rates are shown below.

Service	Rate
1	9.25%
2	7.25%
3	6.75%
4	6.45%
5	6.25%
10	5.25%
15	4.25%
20 and above	3.25%

For a member who works 34 years, the assumed average salary increase over their career is 4.44% per year.

Retirement Rates:

The following rates of retirement are assumed for members hired before January 1, 2011:

	Service				
Age	**5 – 18**	**19 – 30**	**31**	**32 - 33**	**34+**
54	0%	6%	8%	38%	60%
55	0%	10%	8%	38%	60%
56	0%	7%	8%	38%	45%
57	0%	7%	12%	40%	45%
58	0%	7%	12%	40%	40%
59	0%	25%	38%	60%	40%
60	14%	30%	48%	60%	40%
61	14%	27%	33%	45%	40%
62	14%	27%	50%	45%	40%
63	14%	27%	38%	50%	40%
64	24%	37%	50%	60%	40%
65	26%	37%	50%	50%	40%
66	26%	37%	50%	50%	40%
67	26%	37%	50%	50%	40%
68	26%	33%	50%	50%	40%
69	26%	33%	50%	50%	40%
70	100%	100%	100%	100%	100%

The following rates of retirement are assumed for members hired on or after January 1, 2011:

	Service				
Age	9 – 18	19 – 30	31	32 - 33	34+
61 and younger	0%	0%	0%	0%	0%
62	13%	15%	20%	25%	25%
63	8%	10%	15%	20%	20%
64	8%	10%	15%	20%	20%
65	8%	10%	15%	20%	20%
66	20%	10%	15%	20%	20%
67	20%	40%	70%	70%	70%
68	20%	40%	40%	40%	40%
69	20%	40%	40%	40%	40%
70	100%	100%	100%	100%	100%

Disability Rates:

Shown below for selected ages.

Age	Male	Female
25	0.029%	0.030%
30	0.023%	0.061%
35	0.030%	0.069%
40	0.051%	0.112%
45	0.068%	0.140%
50	0.117%	0.192%
55	0.138%	0.240%
60	0.179%	0.227%
65	0.536%	0.410%

Termination Rates:

Termination rates based on service, for causes other than death, disability, or retirement.

	Under 5 Years of Service		5 or More Years of Service	
Age	Male	Female	Male	Female
25	9.5%	8.4%	6.0%	6.5%
30	8.8%	11.3%	2.8%	5.0%
35	10.2%	11.6%	2.1%	3.5%
40	12.3%	10.8%	1.7%	2.2%
45	12.6%	10.3%	1.5%	1.9%
50	16.7%	11.8%	1.9%	1.7%
55	20.7%	17.0%	5.0%	3.8%
60	16.4%	16.9%	4.6%	4.0%
65	30.2%	35.0%	4.6%	4.0%

Percent Married:

For valuation purposes, 85% of members are assumed to be married. Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.

Severance Pay:

20% of retirees are assumed to receive severance pay and the average severance payment will be 2.5% of other pensionable earnings in the last year of employment.

Optional Service Purchases:

The liability for retirement benefits for active members who have not previously purchased optional service is increased to cover the employer cost of out-of-system service purchased in the last two years prior to retirement. The amount purchased varies by the amount of regular service at retirement. Representative amounts purchased at retirement, and other assumptions used, are as follows:

Service	Maximum Service Purchased
10 years	0.204 years
20 years	0.537 years
25 years	1.029 years
30 years	1.424 years
34 or more	None

a. Actual optional service credit for each current member is provided by TRS;

b. No additional service purchases will be assumed for members who currently have optional service credit;

c. Members will not purchase service if it does not improve their pension benefit; and

d. When optional service is purchased within the last two years prior to retirement, 25% of the cost is covered by member payments and the remaining cost is the responsibility of the employer.

Sick Leave Service Credit: The assumed unused and uncompensated sick leave service credit at retirement varies by the amount of regular service at retirement. Representative assumed amounts of unused and uncompensated sick leave service are as follows:

Service	Sick Leave Service Credit
20 years	0.938 years
25 years	1.115 years
30 years	1.276 years
34 years	1.450 years
35 or more	None

2.2 Upgrade Assumption: For those active members who have already made a payment to upgrade past service prior to June 30, 1998, their benefits are based on their upgrading at the valuation date. For all other active members, they are assumed to upgrade at retirement.

Tier II Pay Cap Increase: 1.25% per annum (Adopted effective June 30, 2016.)

Tier II COLA Increase: 1.25% per annum (Adopted effective June 30, 2016.)

Census and Assets: The current actuarial valuation was based on the latest membership data available, which was submitted by the System for active, inactive and retired members as of the prior valuation date. The valuation assumptions were used to project results to account for the one-year difference in the census date and the valuation date. Any change in liability due to changes in census between the collection date of the census information and the valuation date is captured in the next actuarial valuation.

Administrative Expenses: $23,594,987 of administrative expenses is expected to be paid for the year beginning July 1, 2016. $26,549,011 of administrative expenses is expected to be paid for the year beginning July 1, 2017 and each year thereafter, increased by the rate at which payroll is expected to increase.

Asset Valuation Method:

The actuarial value of assets for funding and GASB 25 (adopted June 30, 2009) is based on the market value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the actuarial value of assets (adjusted for receipts and disbursements during the year). The actual investment return for this purpose is determined net of all investment and administrative expenses. For GASB 67 and 68, the fair market value of assets is used.

Actuarial Cost Method:

Projected Unit Credit (adopted June 30, 1989) is used for funding and GASB 25 purposes. Under this method, the projected benefits of each individual included in the valuation are allocated by a consistent formula to valuation years. The actuarial present value of benefits allocated to a valuation year is called the normal cost. The actuarial present value of benefits allocated to all periods prior to a valuation year is called the accrued liability.

Entry Age is used for GASB 67 and 68 purposes and to determine the Actuarially Determined Contribution ("Actuarial Math 2.0"), based upon the funding policy adopted by the Board. Under this method, a normal cost is calculated for each employee that is the level annual contribution as a percent of pay required to be made from the employee's date of hire for as long as he/she remains active so that sufficient assets will be accumulated to provide his/her benefit. The accrued liability is the difference between the present value of all future benefits and the present value of all future normal costs.

Amortization Period and Method:

For funding purposes under the Illinois Pension Code, the unfunded liability is not explicitly amortized. The employer contribution is the amount which, as a level percentage of member payroll, will result in the System being 90% funded by June 30, 2045. For Actuarial Math 2.0, the amortization of the unfunded accrued liability is a closed 20-year period effective June 30, 2015, and declines by one year in each subsequent valuation. Sources of unfunded actuarial accrued liability that emerge in subsequent valuations are amortized over 20-year closed periods. Contributions toward the unfunded actuarial accrued liability increase by 2% each year, the estimate of increase in future State revenue growth.

Summary of Plan Provisions

Membership:

Employers of the System include:

- The Illinois public common school districts outside of Chicago,
- Certain state agencies employing certified teachers, and
- The State Board of Education, Illinois School Board Association, statewide and national teacher organizations, educational cooperatives and the retirement system.

Employees covered under the System include:

- Any educational, administrative, professional or other staff employed in the public common schools outside the City of Chicago in a position requiring certification under the teacher certification law, including substitute teachers, part-time teachers, and hourly paid teachers who are on a flexible work schedule;
- Any position requiring teacher certification in certain state agencies;
- Any regional superintendent of schools, assistant regional superintendent of schools, State Superintendent of Education; any person employed by the State Board of Education as an executive; any executive of the boards engaged in the service of public common school education in school districts covered under this system of which the State Superintendent of Education is an ex-officio member;
- Any employee of a school board association who is certificated under the teacher certification law;
- Any person employed by the retirement system who was an employee of and a member in the system on August 17, 2001 or becomes an employee of the system on or after August 17, 2001;
- Any educational, administrative, professional or other staff employed by and under the supervision and control of a regional superintendent of schools, provided such employment position requires the person to be certificated under the teacher certification law;

- Any educational, administrative, professional or other staff in a certificated position employed by a program serving two or more school districts in accordance with a joint agreement authorized by the School Code or by federal legislation;
- Any officer or employee of a statewide teacher organization or officer of a national teacher organization who is certified under the teacher certification law, provided the member had previously established creditable service under TRS and files an irrevocable election for TRS membership before January 5, 2012, and does not receive credit under any other article of the pension code; and
- Any educational, administrative, professional, or other staff employed in a charter school that is certificated under the teacher certification law.

Employment on a full-time basis covers only teachers whose normal employment schedule consist of working at least four clock hours daily, five days per week. Employment on a part-time basis covers teachers who are employed less than four clock hours daily or less than five days per week. A substitute teacher is employed on temporary basis to replace another teacher.

Creditable service rendered as an employee for a regular school year in any district, in accordance with the provisions of the Pension Code, is equal to one year of service, and time less than a legal year is counted as such portion of a year as the number of days taught bears to 170 days. Additionally, members may purchase various types of optional service credit.

"Tier II" means a member, or a benefit provision, that applies to a member who first contributed to TRS on or after January 1, 2011, and has no preexisting creditable service with a reciprocal pension system prior to January 1, 2011. "Tier I" means all other members and applicable benefit provisions.

For determining both member benefits and contribution amounts, salary for Tier II is capped at a limit that is tied to the Consumer Price Index. The initial limit was $106,800 as of January 1, 2011. The limit increases in each subsequent year by an amount equal to the then current limit times the lesser of 3% or one-half the percentage increase in CPI-U as of the preceding September.

"Final average salary" means for Tier I the average salary for the highest four consecutive years within the last 10 years of creditable service, as determined under the rules of the Board. For Tier II, final average salary is for the highest eight consecutive years within the last 10 years.

Normal Retirement

Eligibility

Tier I: Age 60 with 10 years of service, or age 62 with 5 years of service

Tier II: Age 67 with 10 years of service

Amount

Tier I: For members who first became a teacher before July 1, 2005, the annual benefit amount is the greatest of (i), (ii) and (iii) below. For members who first became a teacher on or after July 1, 2005, the annual benefit amount is the greater of (i) and (ii) below.

Tier II: The annual benefit is the amount under (i) below.

(i) For service earned before July 1, 1998, 1.67% of final average salary for each of the first 10 years of creditable service, plus 1.90% of final average salary for each year in excess of 10 but not exceeding 20, plus 2.10% of final average salary for each year in excess of 20 but not exceeding 30, and 2.30% of final average salary for each year in excess of 30. For all other service, 2.2% of final average salary.*

(ii) 1½% of final average salary for each year of creditable service, plus $7.50 per year for each of the first 20 years of creditable service.

(iii) An actuarially equivalent life annuity, resulting from the member's contributions and State-matching contributions (1.4 times member contributions) plus compound interest on both.

Maximum amount under (i) and (ii) above is 75% of final average salary.

* *Service earned before July 1, 1998 can be upgraded to 2.2% through additional member contributions of 1% of the member's highest salary within the last four years for each year of prior service. Maximum payment is 20% of salary, but all years are upgraded. The number of years to be upgraded is reduced by one for each three full years worked under the 2.2% formula. The 2.2% formula upgrade cost is reduced on a sliding scale for members who have more than 34 years of service credit.*

Early Retirement

Eligibility	*Tier I:* Age 55 with 20 years of service *Tier II:* Age 62 with 10 years of service
Amount	*Tier I:* Equal to the amount computed under normal retirement, reduced by 6% for each year the member is under age 60. There is no reduction for a member who retires prior to age 60 with 35 years of credited service. *Tier II:* Equal to the amount computed under normal retirement, reduced by 6% for each year the member is under age 67.
Rule of 85 for State Employees:	A Tier I employee of a state agency retiring on or after January 1, 2001 is entitled to a nondiscounted annuity if his or her attained age at retirement and total creditable service equal at least 85, provided he or she has (i) earned during the period immediately preceding the last day of service at least one year of contributing creditable service as a state employee and (ii) has earned at least 5 years of contributing creditable service as a state employee.

Single Sum Benefit

Eligibility	Age 65 with fewer than 5 years of creditable service after July 1, 1947
Amount	Lump sum payment actuarially equivalent to a life annuity consisting of 1.67% of final average salary for each year of service.

Temporary Disability Benefit

Eligibility	3 years of credited service
Amount	Equal to 40% of the member's most recent annual contract salary at time of disablement. The benefit is payable beginning with the 31st day after disablement and ending at the earlier of (1) cessation of disability, (2) when the member requests termination of the benefit, (3) when the period for which payments have been made equals one-fourth the period of creditable service, or (4) the member is gainfully employed or able to be gainfully employed.

Disability Retirement Benefit

Eligibility	Termination of temporary disability benefit, provided member remains disabled
Amount	The greater of: (a) 35% of the member's most recent annual contract salary, or (b) the benefit payable for normal retirement, but reduced by 1/2% for each month by which the member is less than age 60, or age 55 if the member has 20 years of service. Other formulas may be applicable if disability retirement occurred prior to July 1, 1971.

Occupational Disability

Eligibility	Totally and immediately incapacitated for the performance of duty
Amount	Equal to 60% of salary, if disability is duty-connected or occupational adjudicated by the Illinois Industrial Commission as compensable under either the Workers' Compensation or Occupational Diseases Act. Any amounts payable under these Acts shall be applied as an offset to any occupational disability benefits payable by the Teachers' Retirement System. In general, benefits are payable throughout the period of disability.

Deferred Vested Benefits

Eligibility	*Tier I:* 5 years of service *Tier II:* 10 years of service
Amount	*Tier I:* Equal to the amount computed under normal retirement deferred to age 62, if the member has less than 10 years of service. With 10 or more years of service, the annuity is payable at age 60. *Tier II:* Equal to the amount computed under normal retirement, payable at age 67, or in a reduced amount as early as age 62. The reduction is 6% for each year the member is under age 67.

Reversionary Retirement Annuity: Any member entitled to a retirement annuity for age may elect to receive a reduced annuity with the remainder determined on an actuarial basis to become, upon the member's death, an annuity for life to any designated person dependent upon the member at the time of the member's retirement, provided such payment shall not be less than $10 nor more than the amount of reduced age retirement monthly annuity to which the member is entitled.

Refund of Contributions: A member who ceases to be a member for any reason other than death or retirement, shall be entitled to a refund of all retirement contributions and payments made into the System by the member which have not previously been refunded, without interest thereon.

Death Benefit: Refund of the deceased member's accumulated contributions are paid to survivors or to the member's estate. Additional lump sum death benefits are also payable:

	Types of Beneficiaries	
Time of Death	**Dependents**	**Non-dependents**
While employed	Lump sum up to last salary **or** $1,000 and a monthly benefit generally not less than $400* or $600 with minor children**	Lump sum up to last salary
Inactive within 12 months of last day of credit	Lump sum up to last salary **or** $1,000 and a monthly benefit generally not less than $400* or $600 with minor children**	Lump sum up to last salary
Inactive with 20 or more years of service	Lump sum of $3,000 or 1/6 of last salary*** **or** $1,000 and a monthly benefit generally ½ for Tier I and 2/3 for Tier II of member's earned benefit at time of death	Lump sum of $3,000 or 1/6 of last salary***
Annuitant	Lump sum of $3,000 or 1/6 of last salary*** **or** $1,000 and a monthly benefit generally ½ for Tier I and 2/3 for Tier II of annuitant's earned benefit at time of death	Lump sum of $3,000 or 1/6 of last salary***

* *Certain circumstances might provide a monthly annuity less than $400 per month for an active member.*

** *TRS will pay 50 percent of the member's earned retirement annuity at death if it is greater than the above amounts.*

*** *Certain lump sums may be greater if the annuitant or inactive member has been in retirement or out of service for less than five years.*

Automatic Postretirement Benefit Cost-of-Living Adjustment

Eligibility	Member contributed for at least an equivalent period of one full year of creditable service after July 1, 1969
Amount	For Tier I, initial increase of 1½% of base annuity for periods prior to January 1, 1972, 2% for periods from and after January 1, 1972 and prior to January 1, 1978, and 3% for periods thereafter (such periods to exclude any period of retirement that precedes attainment of age 55). Initial increase payable effective with the later of: January 1 following first anniversary of retirement; or January 1 following attainment of age 61. Following the initial increase, automatic annual increases payable on each January 1 thereafter. Prior to January 1, 1990, annual increases were determined as a percentage of the original retirement annuity. Effective on and after January 1, 1990, automatic annual increases granted to eligible annuitants equal 3% of the total annuity being received, including previous increases granted. For Tier II retirement and deferred vested benefits, the annual increase is equal to the original granted annuity benefit times the lesser of 3% or one-half the increase in the CPI-U as of the preceding September. The initial increase is effective January 1 after the later of attaining age 67 or the first anniversary of the annuity starting date. For Tier I and Tier II disability benefits, the initial increase is generally 7% effective January 1 following the fourth anniversary of the initial payment and 3% annually thereafter of the then current benefit amount. For Tier I and Tier II survivor benefits, the initial increase is effective January 1 following the first anniversary of the initial survivor payment, or after the survivor benefit has been granted benefits for survivors of annuitants, and annually thereafter. The Tier I increase is 3% of the then current benefit. The increase for Tier II is the lesser of 3% or one-half the percentage increase in CPI-U as of the preceding September of the original benefit amount.

Member Contributions:

Beginning July 1, 1998, contributions for creditable service are made at the rate of 8% (exclusive of the 1% Survivor Benefit Contribution) of salary which is comprised of a rate of 7½% of salary towards the cost of the retirement annuity plus ½% of salary toward the cost of the automatic annual increase in retirement annuity.

Beginning July 24, 1959, each member contributes an additional 1% of salary toward Survivor's Benefits. These contributions are subject to refund if there is no dependent beneficiary at retirement, provided the member elects such refund.

Beginning July 1, 1995, each member not employed by a State agency contributes to the Teachers' Health Insurance Security Fund, administered by the Department of Central Management Services. These contributions are not refundable and do not become part of the System's assets.

Additional contributions as are necessary to receive credit for service during which contributions were not made, such as military service or service outside the System.

New Benefit Increases:

The term "new benefit increase" means an increase in the amount of any benefit provided by the statute, or the expansion of the eligibility requirements for any benefit provided by the statute, resulting from an amendment that takes place on or after June 1, 2005.

Every new benefit increase must have an identified funding source whose adequacy is verified and periodically confirmed by the Commission on Government Forecasting and Accountability (CGFA).

Every new benefit increase will automatically expire at the earlier of (i) five years after its effective date; (ii) at an earlier time specified in the amendment creating the benefit; or (iii) at the end of the fiscal year in which CGFA certifies that the identified funding source is inadequate; except that any new benefit increase will continue to apply to persons who applied for and qualified for the increase while it was in effect, and except that any new benefit increase may be extended or recreated by the General Assembly (subject to the adequacy of the funding source).

Sick Leave Service Accruals:	Any unused and uncompensated accumulated sick leave is counted as creditable service provided that each former employer certifies to the System the number of unused and uncompensated accumulated sick leave days upon termination of the member. The service granted is the ratio of the number of unused and uncompensated accumulated sick leave days to 170 days, subject to a maximum of two years of service credit. The period of sick leave shall not be considered in determining the effective date of retirement.
Guaranteed Minimum Benefit:	For members who make a small qualifying contribution, a minimum benefit of $25 per month per year of service, up to a maximum of $750 per month with 30 years of service, is paid. An alternate minimum retirement annuity of $200 per month, applicable to members with at least 10 years of service, is described under 40 ILCS 5/16-136.3. The minimum benefit is payable to the extent that funds are available under the Minimum Retirement Annuity Reserve established under 40 ILCS 5/16-186.3. The Minimum Retirement Annuity Reserve is credited with qualifying contributions made by annuitants, amounts contributed by the state that are sufficient to assure payment, and interest. The reserve is charged with the minimum benefit payments. The portion of the retiree's benefit that is below the minimum is paid from the Benefit Trust Reserve. Only the difference between that amount and the minimum is paid from the Minimum Retirement Annuity Reserve.

Definitions of Terms

The following list defines certain technical terms for the convenience of the reader:

Actuarial Accrued Liability For Actives: The equivalent of the accumulated normal costs allocated to the years before the valuation date.

Actuarial Accrued Liability For Pensioners: The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.

Actuarial Cost Method: A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the Actuarially Determined Contribution.

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

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

Actuarial Math: The term given to a funding policy which is designed to systematically fully fund a public employee retirement system over a reasonable amount of time.

Actuarial Math 2.0: The term given to the Board's funding policy. The contribution determined under Actuarial Math 2.0 is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. The amortization of the unfunded accrued liability is a closed 20-year period effective June 30, 2015, and will decline by one year in each subsequent valuation. Sources of unfunded actuarial accrued liability that emerge in subsequent valuations are amortized over 20-year closed periods. Contributions toward the unfunded actuarial accrued liability increase by 2% each year, the estimate of increase in future State revenue growth. The actuarial cost method is the entry age method. The minimum contribution is the normal cost.

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

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

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

Actuarial Valuation:	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
Actuarial Value of Assets:	The value of the System's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
Actuarially Determined:	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
Actuarially Determined Contribution (ADC):	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Board's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
Amortization Method:	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active participants will increase.
Amortization Payment:	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions: The estimates on which the cost of the System is calculated including:

(a) Investment return — the rate of investment yield that the System will earn over the long-term future;

(b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;

(c) Retirement rates — the rate or probability of retirement at a given age;

(d) Turnover rates - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;

(e) Salary increase rates - the rates of salary increase due to inflation and productivity growth.

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

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

Defined Benefit Plan: A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.

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

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

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

Funded Ratio:	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA, as another measure of the Plan's health.
GASB 25 and GASB 27:	Governmental Accounting Standards Board Statements No. 25 and No. 27. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 25 sets the rules for the systems themselves.
GASB 67 and GASB 68:	Governmental Accounting Standards Board Statements No. 67 and No. 68 are the successor statements to GASB Statements No. 25 and No. 27.
Investment Return:	The rate of earnings of the System from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the System. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount, or in relation to covered payroll, if the actuarial assumptions are realized.

Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarially accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability (UAAL):	The excess of the actuarial accrued liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

History of Legislative Changes

The actuarial cost method utilized is the projected unit credit cost method, which became effective with the June 30, 1989 valuation. Administrative expenses have been a component of the normal cost rate since the June 30, 1994 valuation. The financing objective under Article 16 of the Illinois Pension Code is to meet the cost of maintaining and administering the system on a 90% funded basis by June 30, 2045. Following is a brief summary of the changes in funding requirements.

- Public Act 88-0593, enacted in 1994, established a fifty-year funding plan for fiscal years 1996 through 2045. It required a fifteen–year ramp period of gradually increasing State contributions followed by a 35- year period of State contributions at a level percent of pay.

- Public Act 90-0448, enacted in 1997, required the System's assets to be valued at fair market value instead of book value.

- Public Act 90-0582, enacted in 1998, changed the defined benefit formula and added minimum state contribution rates in fiscal year 1999 that remained in effect through fiscal year 2004.

- Public Act 93-0002, enacted in 2003, provided pension obligation bond proceeds and placed upper limits on State contributions beginning with the State contribution due for fiscal year 2005.

- Public Act 94-0004, enacted in 2005, removed the money purchase formula for new hires, added new employer contributions for excess salary increases and sick leave, specified the level of state contributions for fiscal years 2006 and 2007, and required a return to the statutory funding plan in fiscal year 2008.

- Public Act 94-1057, enacted in 2006, contained exemptions from some of the new employer contribution requirements enacted in 2005.

- Public Act 96-0043, enacted in 2009, required the use of a smoothed actuarial value of assets beginning with the June 30, 2009 valuation.

- Public Act 96-0889, enacted in 2010, established Tier II provisions.

- Public Act 96-1511, enacted in 2011, required the state retirement systems to recertify their fiscal year 2011 state funding requirements and assume the Tier II benefits of Public Act 96-0889 were in effect on June 30, 2009.

- Public Act 97-0694, enacted in 2012, required the auditor general to hire an actuary to serve as the State Actuary.

- Public Act 98-0042, enacted in 2013, provided that the Early Retirement Option terminate on June 30, 2016.

- Public Act 98-0674, enacted in 2014 as part of the budget implementation bill, requires the state and federal contribution rates to TRS to be the same.

- Public Act 99-0232, enacted in 2015, requires the actuaries of the state-funded retirement systems to conduct experience analyses every three years instead of every five years.

A more complete history of legislative changes can be found at the following link: **http://trs.illinois.gov/pubs/history.pdf**

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