

# Teachers' Retirement System of the State of Illinois

Actuarial Valuation Report  
June 30, 2015 Actuarial Valuation  
of Pension Benefits

January 7, 2016





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January 7, 2016

Board of Trustees  
Teachers' Retirement System of the State of Illinois  
Springfield, IL

### **Certification of Actuarial Valuation**

#### **Ladies and Gentlemen:**

This report summarizes the actuarial valuation results of Teachers' Retirement System of the State of Illinois (TRS) as of June 30, 2015 performed by Buck Consultants, LLC.

The purpose of the valuation is to determine the funding progress of TRS, to determine the required State and Federal contribution amounts or rates for the fiscal year ending June 30, 2017, to determine certain accounting information under Governmental Accounting Standards Board (GASB) Statement Nos. 25 and 67, and certain other supplemental information as requested by TRS. Use of this report for any other purposes or by anyone other than the Board members and staff of the System may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the letter for that purpose. No one may make any representations or warranties based on any statements or conclusions contained in this report without Buck Consultants' written consent.

The actuarial valuation is based on unaudited financial and member data provided by the staff of the TRS and summarized in this report. The benefits considered were provided by staff and summarized in this report. The actuary did not verify the data submitted, but did perform tests for consistency and reasonableness.

All costs, liabilities and other factors under TRS were determined in accordance with generally accepted actuarial principles and procedures. An actuarial cost method is used to measure the actuarial liabilities which we believe is reasonable. Buck Consultants, LLC is solely responsible for the actuarial data and actuarial results presented in this report. This report fully and fairly discloses the actuarial position of the Plan.

TRS is funded by Employer and Member Contributions in accordance with the funding policy specified under the Illinois Pension Code (40 ILCS 5/16). The funding objective under the Illinois Pension Code is to achieve 90% funding by 2045. The 2045 objective was set in 1994 as a 50 year objective. While TRS members have always contributed their share, the State funding has been inadequate. This inadequate funding has resulted in TRS being among the worst funded public employee retirements systems (PERS) in the United States.

In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the Plan and reasonable long-term expectations, and represent our best estimate of the anticipated long-term experience under the Plan. The methods mandated by the Illinois Pension Code are inadequate to appropriately fund TRS. A summary of the actuarial assumptions and methods used in this actuarial valuation are shown in Section 6.



Please note, GASB amended the reporting requirements of Statement Nos. 25 and 27 with Statement Nos. 67 and 68 for fiscal years beginning after June 15, 2013 and June 15, 2014, respectively. This report includes certain computations and financial statement disclosure information for TRS with respect to the plan reflecting the new accounting standards. Employer disclosure information under Statement No. 68 will be provided in a separate report. This report still provides the Annual Required Contribution (ARC) under Statement No. 25, as requested by the System.

The assumptions and methods used to determine the GASB information for TRS as outlined in this report and all supporting schedules meet the parameters and requirements for disclosure. Based on member data and asset information provided by the staff of the Retirement System, we have prepared the Schedule of Funding Progress and Schedule of Employer Contributions that are included in the Financial Section of the Comprehensive Annual Financial Report.

Future actuarial measurements may differ significantly from the current measurement presented in this report due to such factors as: plan experience different from that anticipated by the economic and demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law. An analysis of the potential range of such future measurements has not been performed as it is beyond the scope of this valuation.

Qualified actuaries completed the valuation in accordance with accepted actuarial procedures as prescribed by the Actuarial Standards Board. The qualified actuaries are members of the American Academy of Actuaries and are experienced in performing actuarial valuations of public employee retirement systems. To the best of our knowledge, this report is complete and accurate and has been prepared in accordance with generally accepted actuarial principals and practice. The undersigned with actuarial designations is qualified to render the opinions contained in this report.

In our opinion the calculations also comply with Illinois law and where applicable, federal laws such as the Internal Revenue Code, and the Statements of the Governmental Accounting Standards Board. We certify that the information presented herein is accurate and fairly portrays the actuarial position of the Plan as of June 30, 2015.

Respectfully submitted,

BUCK CONSULTANTS, LLC

A handwritten signature in blue ink, appearing to be "LL" or similar initials.

Larry Langer, FCA, ASA, EA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink, reading "Paul R. Wilkinson".

Paul Wilkinson, ASA, EA, MAAA  
Director and Consulting Actuary

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cc: Emily Urbaniak  
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# Executive Summary

## Overview

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 (PERS). Membership is mandatory for all full-time, part-time, and substitute public 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, 2015 there were 1,006 employers, comprised of 855 local school districts, 134 special districts and 17 state agencies. The membership totaled over 403,000 members as of June 30, 2014. Of these 403,000 members, 113,000 are retirees to which TRS paid over \$5.5 billion during the year ending June 30, 2015. As of June 30, 2015, the assets of TRS amounted to \$46.4 billion.

Under TRS, 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 amount of contributions needed to fund these benefits cannot be known with certainty. In Illinois, like other states, these contributions should be paid during a teacher's career so that upon retirement, termination, disability or death, there are funds available to pay these benefits. These amounts are determined through an actuarial valuation based on funding provisions of the Illinois Pension Code. This actuarial valuation report is our annual analysis of the financial health of TRS. This report, prepared as of June 30, 2015, presents the results of the seventy-seventh actuarial valuation of TRS.

## Purpose of the Annual Actuarial Valuation

An actuarial valuation is performed on TRS annually as of June 30. Typically, the actuary determines the amount of contributions to be made to a PERS during each member's career that, when combined with investment return, will be sufficient to pay for retirement benefits when the member retires. Under the Illinois Pension Code, the actuary is required to calculate an annual contribution which funds below the level of this standard.

In addition, the annual actuarial valuation is performed to:

- Determine the funding progress of TRS under the Illinois Pension Code's inadequate funding standard,
- Determine the amount of contributions under more standard public sector actuarial practices,
- Explore why the results of the current valuation differ from the results of the previous year valuation, and
- Satisfy regulatory and accounting requirements.

A glossary of actuarial terms and a summary of the valuation process are provided in sections 6.5 and 6.6.

## Key Observations

The actuarial valuation is done each year to replace the estimates the actuary assumed for the prior valuation with the actual events that happened. This past year, as expected, some of the assumptions used in the prior valuation were not realized. Key results of the June 30, 2015 valuation, as compared to the June 30, 2014 valuation, are:

- The contribution made by the State of Illinois to TRS under the Illinois Pension Code was insufficient to keep the unfunded actuarial accrued liability from growing; while this was expected in our projections, it is worthwhile to note that this practice continues.
- Market value returns of 3.91% compared to 7.50% assumed
- Payroll increased 1.5%, which was less than the assumed increase
- No changes in benefit provisions, actuarial assumptions, or funding methodology from the prior year's valuation except as noted below:
  - At the August 13, 2015 Board meeting, the Board of Trustees adopted the following recommendations by Buck Consultants based on the three-year experience study:
    - increase the rates of termination for members with less than 5 years of service and lower rates of termination for members with more than 5 years of service
    - increase rates of disability for males and decrease rates for females
    - increase rates of retirement
    - decrease rates of ERO elections
    - update pre-retirement base mortality rates to RP-2014 White Collar
    - update post-retirement base mortality rates to RP-2014 White Collar for service retirements, RP-2014 for beneficiaries and unadjusted disability mortality table for disability retirements
    - update mortality projection scale to MP-2014
    - decrease optional service and unused sick leave
    - decrease severance pay
    - reduce salary increase rates at all ages and base rates on service
    - decrease Tier II pay cap assumptions

When compared to the June 30, 2014 valuation results, the above resulted in:

- A lower funded ratio as of June 30, 2015 based on actuarial value of assets:
  - 42.7% was projected in the June 30, 2014 valuation
  - 42.0% is the actual amount determined in this actuarial valuation
- A higher state contribution under the Illinois Pension Code for fiscal year ending June 30, 2017
  - 34.50% of payroll (\$3.80 billion) was projected in the June 30, 2014 valuation
  - 37.81% of payroll (\$3.99 billion) is the actual amount determined in this actuarial valuation
- Lower projected benefit amounts being accrued by active members

Note that the funded ratios have no bearing on the funded position with respect to the settlement of the plan.

The funded ratio for TRS is among the worst in the United States. This is due to:

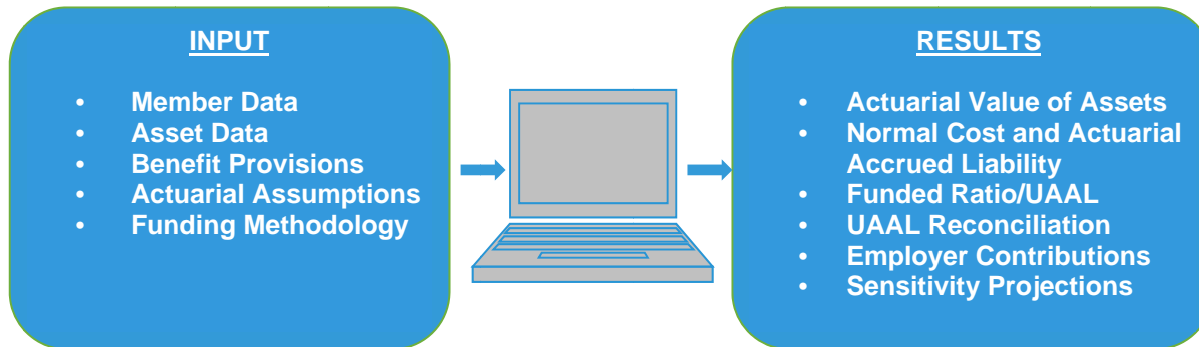
- A lack of commitment from policy makers to keep the Retirement System well-funded
- A history of appropriating and contributing amounts far below that which a prudent actuary would recommend
- A funding policy that systematically underfunds TRS
- Changes in benefits that were unfunded and granted when the funded ratio of TRS is quite low

Funding reform needs to occur for TRS or the benefits of its membership could be compromised.

We have recommended Actuarial Math 2.0 to fully fund the Retirement System at a lower long-term cost than under Illinois Pension Code funding.

## The Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process.



A more detailed description of the valuation process is provided in Section 6.6.

### Valuation Input: Member Data

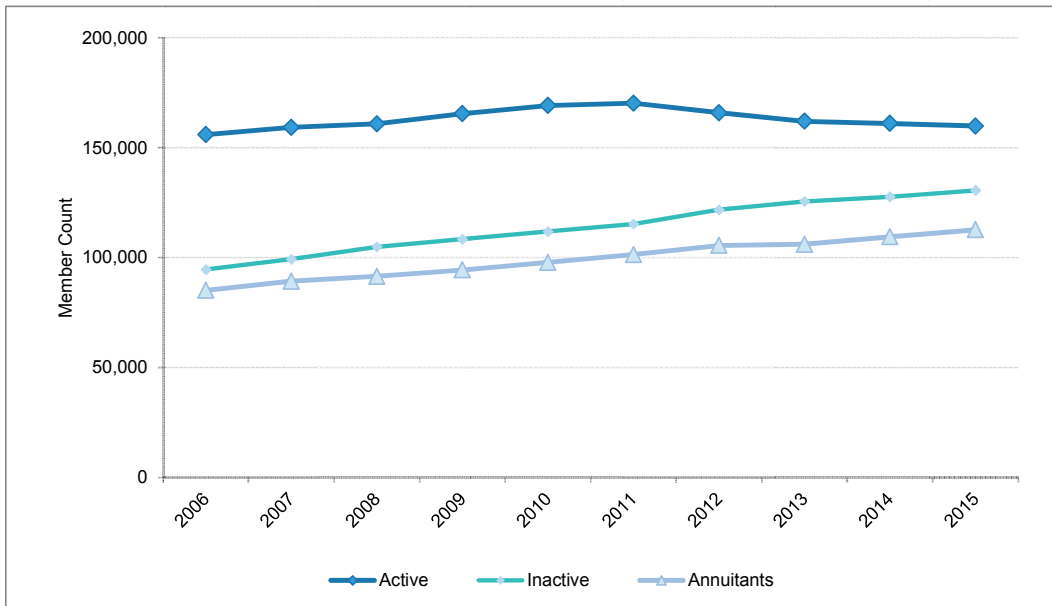
As with any estimate, the actuary collects information that we know now. Under the actuarial valuation process, current information about TRS members is collected annually by TRS Staff at the direction of the actuary. Membership data will assist the actuary in estimating benefits in the future. Information about benefit provisions and assets held in the trust as of the valuation date is also collected.

TRS Staff provided membership data as of one year before the valuation date for each member of TRS. The membership data will assist the actuary in estimating benefits that could be paid in the future. The member information the actuary collects includes data elements such as current service, salary and benefit group identifier for members that have not separated service, and actual benefit amounts and form of payment for members that have separated service. Data elements such as gender and date of birth are used to determine when a benefit might be paid and for how long.

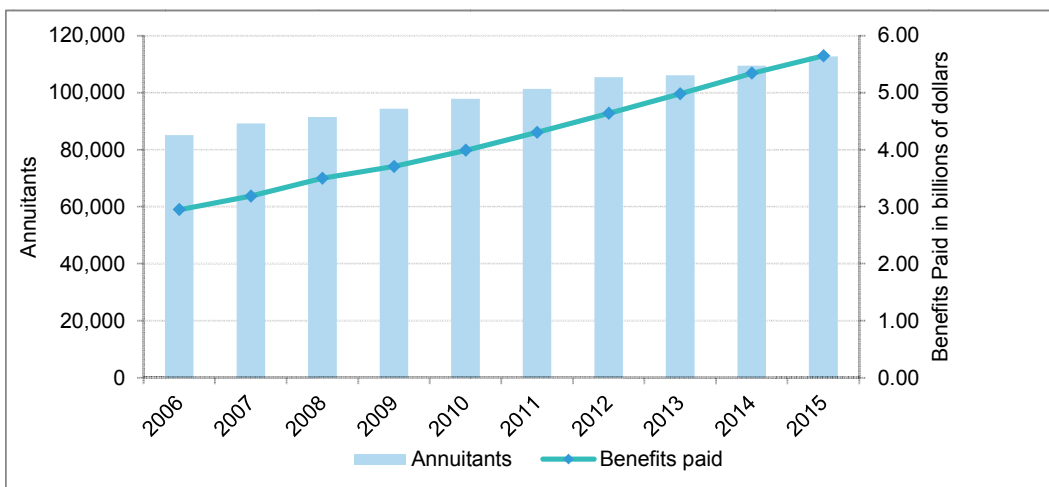


## Valuation Input: Member Data (continued)

The graph below provides a history of the number of members over the past ten years. The number of actives has stayed relatively level over time, with a slight peak four years ago. The number of annuitants has steadily increased over the period in line with the expectations.



The graph below provides a history of the number of annuitants as well as the benefits paid over the same period. The fact that they have increased dramatically was expected.



A detailed summary of the membership data used in this valuation is provided in Section 5 of this report.

## Valuation Input: Member Data (continued)

The table below provides a summary of the membership data used in this valuation compared to the prior valuation. Because the census information is collected as of one year before the valuation date, the June 30, 2015 valuation counts are the number of members as of June 30, 2014; similarly, the June 30, 2014 valuation counts are the number of members as of June 30, 2013.

Data Item	Valuation June 30, 2015	Valuation June 30, 2014	Percentage Change
<b>Active membership:</b>			
• Full-time and regular part-time:			
➤ Number	132,916	132,886	0.0
➤ Annual Salaries	\$ 9,115,480,030	\$ 8,984,852,207	1.5
➤ Average Salaries	\$ 68,581	\$ 67,613	1.4
• Substitute, part-time, hourly paid (limited schedule)			
➤ Number	26,920	28,104	(4.2)
➤ Annual Salaries	\$ 143,897,458	\$ 143,205,393	0.5
➤ Average Salaries	\$ 5,345	\$ 5,096	4.9
• Total Number	159,836	160,990	(0.7)
<b>Inactive Membership:</b>			
• Eligible for deferred annuities	17,575	17,250	1.9
• Eligible for refunds or single sum benefits only	113,012	110,403	2.4
<b>Annuitants (retirees, disabilitants and survivors):</b>			
• Number	112,682	109,448	3.0
• Annual annuities	\$ 5,505,783,524	\$ 5,204,460,272	5.8
• Average annual annuities	\$ 48,861	\$ 47,552	2.8

Note that the 2014 salaries were revised to reflect the reported rate of pensionable salary.

Annual annuities are based on the monthly amounts reported as of June 30, 2014 (2013) multiplied by 12.

Salary amounts increased less than expected, which resulted in lower liability amounts. The amount of new retirement benefits paid during the year ended June 30, 2014 resulted in an unexpected increase in liabilities. Deaths resulted in less liability than expected.

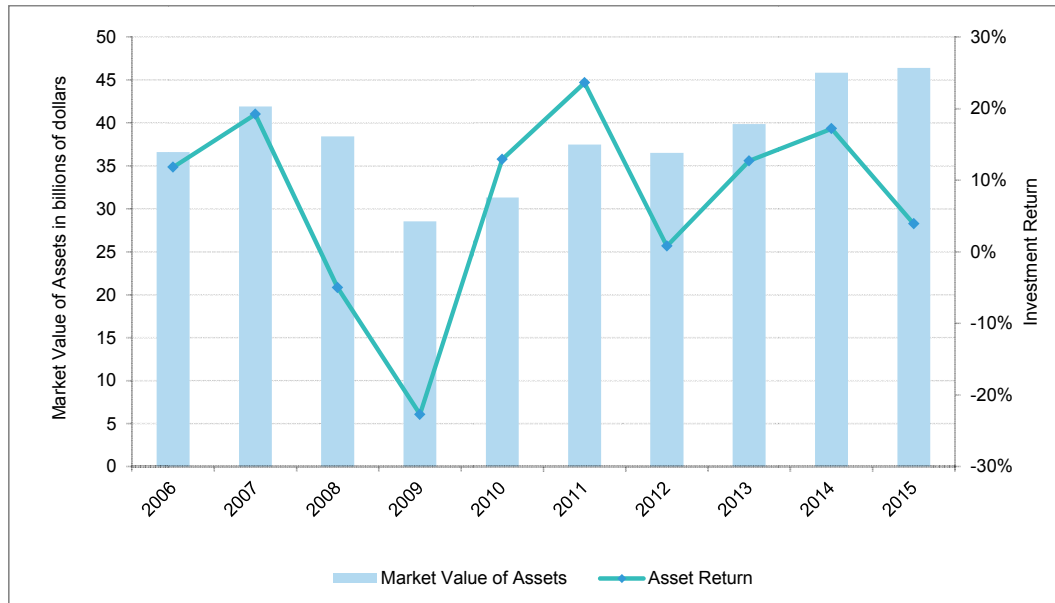
## Valuation Input: Asset Data

TRS assets are held in trust and are invested for exclusive benefit of plan members. The market value of assets increased to \$46.4 billion during the year ended June 30, 2015. Last year's valuation anticipated the assets would grow to \$48.3 billion. Returns for year ended June 30, 2015 were 3.9% which was lower than the 7.50% return assumed for year ended June 30, 2015 in last year's actuarial valuation. The \$1.8 billion in returns TRS generated at a 3.9% return is less than the \$3.4 billion expected based on the 7.50% assumed rate. It is worth noting that had TRS been fully funded on June 30, 2014, meaning assets equaled the actuarial accrued liability, the expected return based on 7.50% would have been \$7.8 billion. TRS will not invest itself out of its current financial shortfall. More funding is necessary.

## Valuation Input: Asset Data (continued)

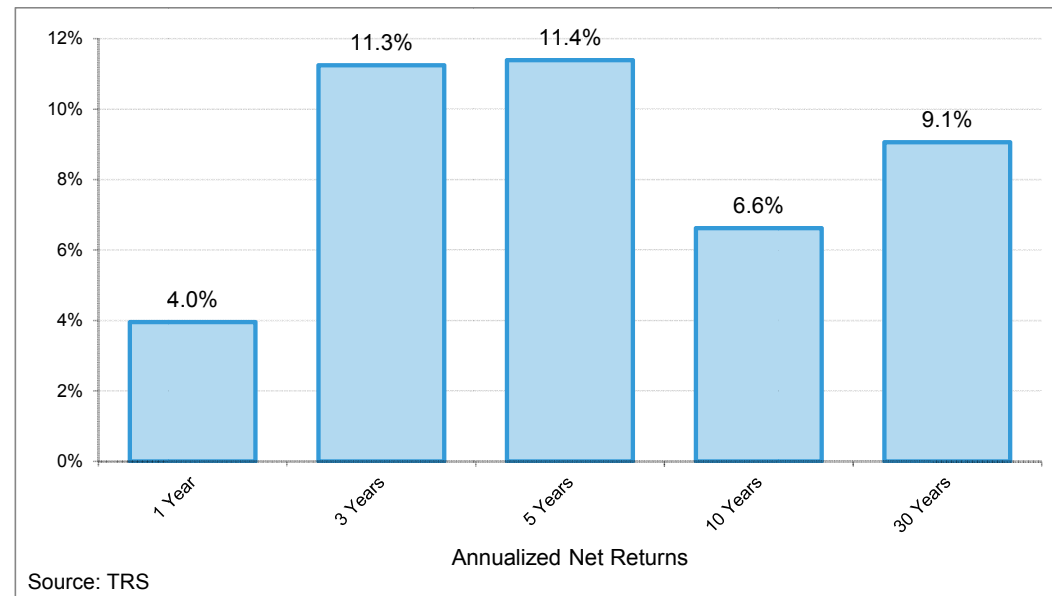
### Market Value of Assets and Asset Returns

The graph below provides a history of the Retirement System's market value of assets and asset returns over the past ten years.



### Annualized Net Returns

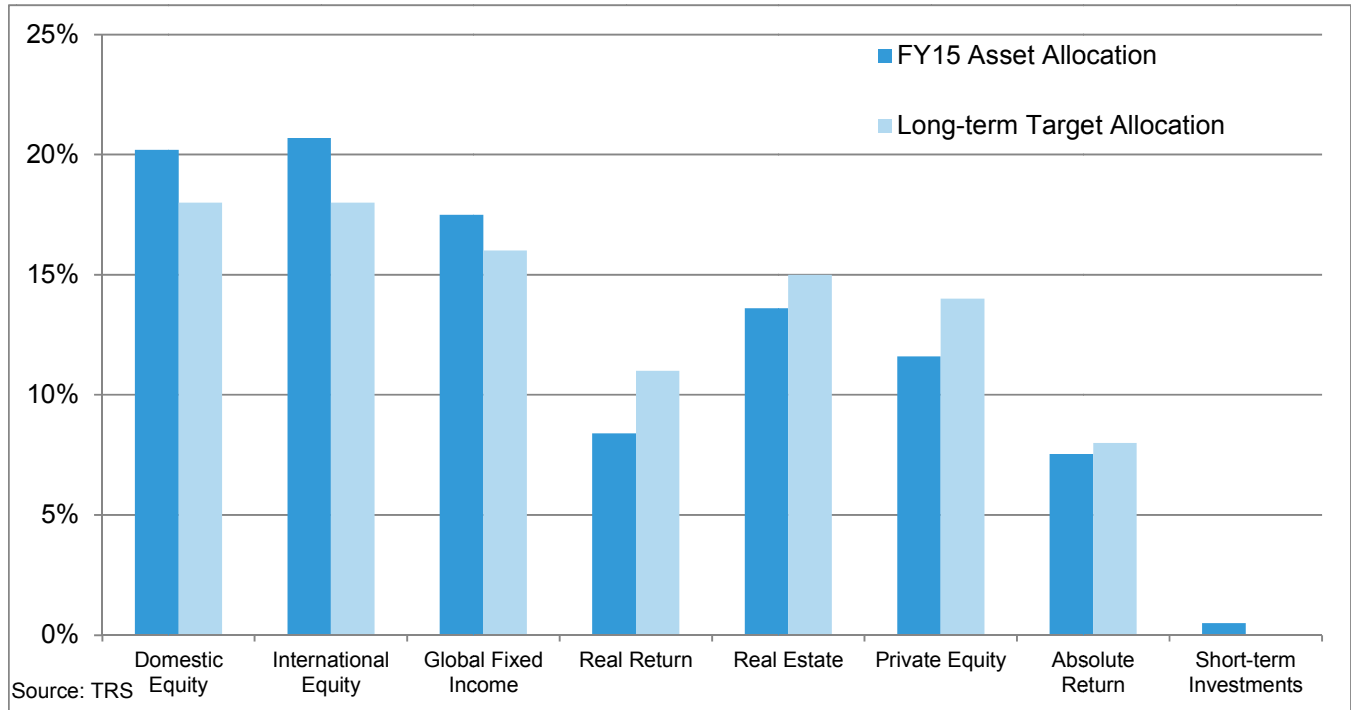
As seen below, annualized net returns have generally been higher than the assumed rate of return of 7.50%.



## Valuation Input: Asset Data (continued)

### Allocation of Investments

Asset allocation is the primary driver of returns over the long term. The allocation of assets as of June 30, 2015 and the long-term target allocation are as follows:



Based on historical market returns, the current asset allocation, the current investment policy, and the expectation of future asset returns, the 7.50% investment return assumption used in this valuation is reasonable and appropriate. The return assumption was last reviewed at the August 13, 2015 Board of Trustees meeting. The investment return assumption will be reviewed before the June 30, 2016 annual actuarial valuation.

More details regarding the market value of assets are provided in Section 2 of this report.

## Valuation Input: Benefit Provisions

Benefit provisions are described in Article 16 of the Illinois Pension Code. There were no changes in benefit provisions from the prior year's valuation.

Public Act 96-0889 added a new section to the Pension Code that applied different benefits to anyone who first contributed to TRS on or after Jan. 1, 2011 and does not have any previous service credit with a pension system that has reciprocal rights with TRS. These members are referred to as "Tier II" members. The benefits Tier II members receive are generally lower than that of Tier I members, whose benefits were not changed under Public Act 96-0889. Highlights of the differences in benefit provisions are summarized below.

Tier I	Tier II
<b>Benefit Formula</b>	
2.2% multiplied by final average salary multiplied by years of creditable service	
<b>Retirement Eligibility</b>	
<ul style="list-style-type: none"> <li>◦ Age 55 with 35 years of service if member has elected the 2.2% formula</li> <li>◦ Age 55 with 20 years of service for a benefit that is reduced by 6% for every year the member is under 60</li> <li>◦ Age 60 with 10 years of service</li> <li>◦ Age 62 with 5 years of service</li> </ul>	<ul style="list-style-type: none"> <li>◦ Age 67 with 10 years of service</li> <li>◦ Age 62 with 10 years of service for a benefit that is reduced by 6% for every year the member is under 67</li> </ul>
<b>Benefit Caps</b>	
<ul style="list-style-type: none"> <li>◦ Maximum benefit is 75% of final average salary</li> </ul>	<ul style="list-style-type: none"> <li>◦ Maximum benefit is 75% of final average salary</li> <li>◦ In determining final average salary, no member's salary can exceed the Tier II wage cap.</li> </ul>
<b>Final Average Salary</b>	
Based on highest average salary during 4 out of the last 10 years of service	Based on highest average salary during 8 out of the last 10 years of service
<b>Cost-of-living adjustments</b>	
3 percent, compounded annually	Lesser of 3 percent or one-half of the Consumer Price Index, with the adjustment applied to the original benefit, i.e. not compounded
<b>Member Contribution Rate</b>	
9.4% of pay	

A detailed summary of the benefit provisions is provided in Section 6.1 of this report.

Despite having the same benefit formula and member contribution rate, the value of the Tier II benefit is lower than that of Tier I due to the difference in retirement eligibility, caps on average salary, and cost-of living adjustments. Later in this executive summary we will discuss the subsidy that Tier II members provide to the State due to the member contribution they make being more valuable than the benefit they receive. Here we will focus on the lower value of their benefit.

The delay in retirement eligibility under PA 96-0889 represents a reduction in the amount of benefit paid to Tier II members. The amount of reduction varies based on the age at hire of each individual. Projected improvements in life expectancy likely will partially offset these delays.

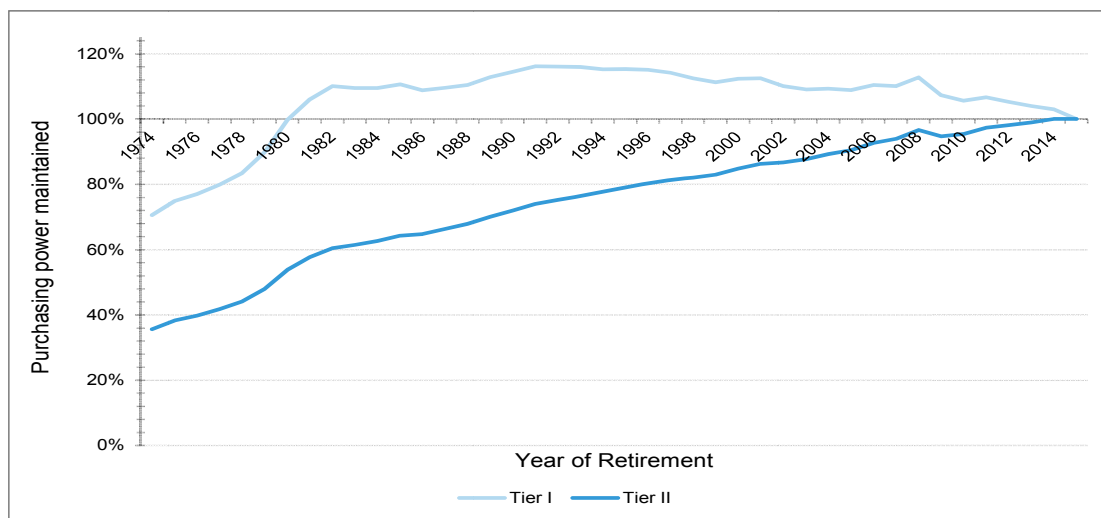
## Valuation Input: Benefit Provisions (continued)

The increase in averaging period used for final average salary will generally decrease the benefits of Tier II members by five to ten percent, depending on the individual.

The Tier II wage cap is a limit on the salary amount for benefit and contribution purposes for Tier II members. Since the maximum benefit is 75 percent of final average *capped* salary, a member could receive much less than 75 percent of their actual final average *uncapped* pensionable salary after a full career. The original limit for 2011 was \$106,800. Each subsequent year the cap increases by the lesser of 3% or one-half the percentage increase in the CPI-U as of the preceding September. For 2015 the limit is \$111,572. In the future, we project that virtually all Tier II members that put in a full career will not receive a benefit of 75% of their final average *uncapped* pensionable salary.

Cost-of-living adjustments are critical to ensuring that members' pensions keep pace with inflation. To the extent that pensions do not increase after retirement, inflation erodes the purchasing power for the beneficiary. The graph below illustrates the effectiveness of the Tier I and Tier II cost-of-living adjustments in keeping pace with inflation. A value above 100% for a retiree indicates that the member's pension has stayed ahead of inflation; a value below 100% indicates that the member's pension stayed behind inflation. For example, the pension as of June 30, 2015 for a Tier I member retired in 2004 is about 9 percent higher than if the member had received increases equal to the Consumer Price Index; the pension as of June 30, 2015 for a Tier I member retired in 1978 is about 17% lower. For illustration purposes, the graph assumes the current Tier I and Tier II COLAs have been in effect for all years, even though the current Tier I COLA started 1990 and the Tier II COLA started 2011.

Overall, the 3% Tier I COLA has, or hypothetically would have, done a reasonable job of keeping pace with inflation for retirees over the past 35 years. Given that the Tier II cost-of-living adjustment is half of the Consumer Price Index, not to exceed 3%, it should not be surprising that the pension of retirees would not have kept pace with inflation. This is exacerbated by the fact that Tier II COLAs are not compounded but simple. Theoretically, a full third of the lost purchasing power is due to the simple cost-of-living adjustment under Tier II.

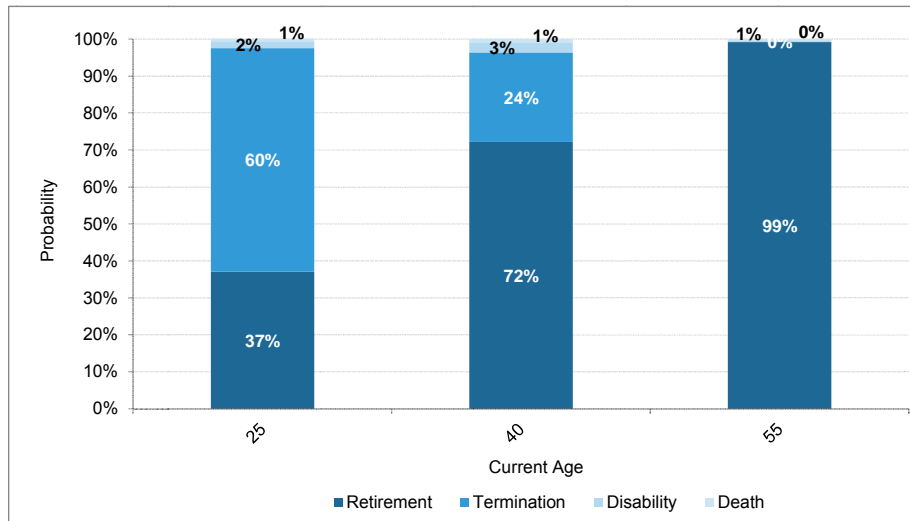


The net effect of these changes is a benefit that does not reward a full career. Later we will see that the 9.40% contribution made by Tier II members is greater than the value of the pension they receive.

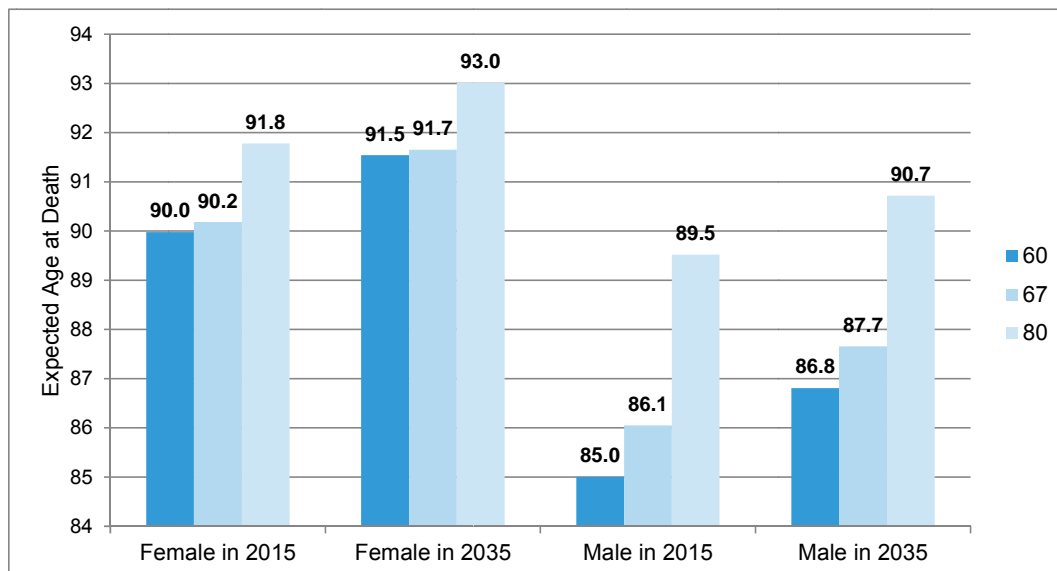
## Valuation Input: Actuarial Assumptions

Actuarial assumptions bridge the gap between the information that we know with certainty as of the valuation date – age, gender, service, pay or benefits of the members – and what may happen in the future.

Demographic assumptions describe future events that relate to people such as retirement rates, termination rates, disability rates, and mortality rates. The rates are developed to model what we expect to occur within TRS. The probability of members retiring, terminating, becoming disabled or dying during their career at illustrative rates is below. Not surprising, as a member ages they are more likely to retire, but also become disabled or die.



Mortality is a large driver of costs. The longer a member is expected to live, the larger the expected costs. Below are the expected age at death based on the assumptions used for this valuation. Note that we show expected age at death in 2015 and 2035 as illustrative values. The valuation uses what is known as generational mortality. Each future generation is expected to live longer than the prior. Finally, females continue to live longer than males, although the gap is shrinking.



## Valuation Input: Actuarial Assumptions (continued)

Economic assumptions describe future events that relate to the Retirement System's assets such as the interest rate, salary increases, the real return, and payroll growth. The investment return assumption is 7.50% annually. Salary increases vary by age and service (revised as of June 30, 2015). Members with one year of service are expected to receive a pay increase of 9.75%; members with 20 years of service and beyond are expected to receive a pay increase of 3.75%.

The actuarial assumptions of TRS are reviewed in a process known as an Experience Review. Based on this review, the actuary will make recommendations on the demographic and economic assumptions. The latest assumptions were adopted for use with the June 30, 2015 actuarial valuation, based on the experience study prepared as of June 30, 2014 and adopted by the Board of Trustees at their August 2015 Board meeting. The next experience study will be prepared after a three year period as of June 30, 2017 and presented to the Board in mid-2018. Assumptions and methods based on the next experience study, as adopted by the Board, will be used with the June 30, 2018 valuation. Reviewing assumptions every three years is a best practice.

In August 2015, Buck Consultants prepared a review of the economic and demographic assumptions. At the August 13, 2015 Board meeting, based on that review, the Board of Trustees adopted the following changes recommended by Buck Consultants for the June 30, 2015 valuation:

- increase the rates of termination for members with less than 5 years of service and lower rates of termination for members with more than 5 years of service
- increase rates of disability for males and decrease rates for females
- increase rates of retirement
- decrease rates of ERO elections
- update pre-retirement base mortality rates to RP-2014 White Collar
- update post-retirement base mortality rates to RP-2014 White Collar for service retirements, RP-2014 for beneficiaries and unadjusted disability mortality table for disability retirements
- update mortality projection scale to MP-2014
- decrease optional service and unused sick leave
- decrease severance pay
- reduce salary increase rates at all ages and base rates on service
- decrease tier II pay cap assumptions

These changes increased the Actuarial Accrued Liability as of June 30, 2015 by \$586 million.

A detailed summary of the actuarial assumptions is provided in Section 6.3 of this report.



## Valuation Input: Funding Methodology

The Funding Methodology is the funding policy for a PERS. There are three broad goals when formulating a funding policy for a PERS.

- *Sufficiency* - the funding target should be the value of benefits allocated to the benefits accrued to date.
- *Intergenerational equity* – taxpayers should pay for workers’ pensions while those workers are providing their services – fund for benefits over the worker’s career.
- *Stability of contributions* – while stable contributions are easier to budget for, stability should not be achieved at the expense of the first two considerations.

Actuarial Methods describe the funding policy for the PERS. Actuarial Methods generally are comprised of the three components below:

- *Actuarial Cost Methods* allocate costs to the actuarial accrued liability (i.e. the amount of money that should be in the PERS fund) for past service and normal cost (i.e. the cost of benefits accruing during the year) for current service to allow for systematic payment of the costs over a member’s career
- *Amortization Payment for UAAL Methods* determine the payment schedule for unfunded actuarial accrued liability (UAAL)
- *Asset Valuation Methods* smooth or average the market value returns over time to alleviate contribution volatility that results from market returns that differ from the investment return assumption used in the actuarial valuation

We have broadly referred to funding of a PERS outlined above as “Actuarial Math.” We have shown two versions of Actuarial Math in the past few years:

- Contribution based on 30-year open level percent of pay amortization of UAAL (formerly called minimum generally accepted actuarial standards) – since the inception of GASB 25 and 27 in the mid-1990s, the minimum annual required contribution (ARC) contained in those standards has served as the de facto minimum funding standard for a PERS. The basis for this version of Actuarial Math is the projected unit credit cost method, with a 30-year open level percent of pay amortization.
- Based on keeping the UAAL from growing – recognizing that the contribution based on 30-year level percent of pay amortization is not sufficient to reduce the UAAL from year to year, we have shown this amount. This policy is an improvement over the above.

Based on our recommendation, the following Actuarial Math 2.0 has been adopted by the Board as the next generation of actuarial math, replacing the two versions that have been certified by the Board in the past:

- Replace the projected unit credit cost method with the entry age normal cost method
- Keep the current asset valuation method (including no corridor)
- Update amortization policy as follows:
  - 20 year closed amortization of UAAL
  - Use layered amortization, with new UAAL being amortized over 20 years regardless of source
  - Amortization payment increase at the rate of future State revenue growth (assumed to be 2.0%)
  - Minimum total contribution is no less than the normal cost in any given year

## Valuation Input: Funding Methodology (continued)

The funding of TRS by the State of Illinois does not follow even the minimum Actuarial Math. The State has systematically underfunded TRS using Illinois Math, which has systematically underfunded TRS by:

- Initially selecting a 50 year period over which to pay down unfunded actuarial accrued liability
- Back loading the 50 year plan by using a 15 year period to ramp up contributions to the ultimate level
- Establishing 90% of the actuarial accrued liability as the funding target
- Using the projected unit credit cost method which understates the funding target compared to the more common entry age normal cost method
- Imposing a maximum contribution based on POB debt payments; while contributions are potentially reduced by the full value of the debt payments, not all of the POB proceeds were directly deposited
- Reducing contributions for fiscal year ended June 30, 2006 and 2007
- Reducing contributions in fiscal year ended June 30, 2011 by introducing an actuarial value of assets
- Reducing contributions to fully reflect the impact of Tier II provisions before the reduction in benefit accruals occurred

The de facto funding policy under GASB 25 and 27 was effectively eliminated with the introduction of GASB 67 and 68 three years ago. In the interim, public sector actuaries have reviewed funding of public sector pensions. While the framework remains the same, the parameters have been refined.

- Actuarial Cost Method based on the entry age normal cost method, which has a higher target than the projected unit credit method under Illinois Math
- Asset Valuation Method which smoothes returns over a five year period without a corridor, similar to that prescribed under the Illinois Pension Code
- Amortization Method which at a minimum pays down the unfunded liability each year. A closed level percent of pay amortization of 15 to 20 years or closed level dollar amortization of no more than 25 years achieves this.

When compared to other public sector retirement systems in the United States, the funding policy for TRS has resulted in TRS being regarded by its peers as among the worst funded in the United States.

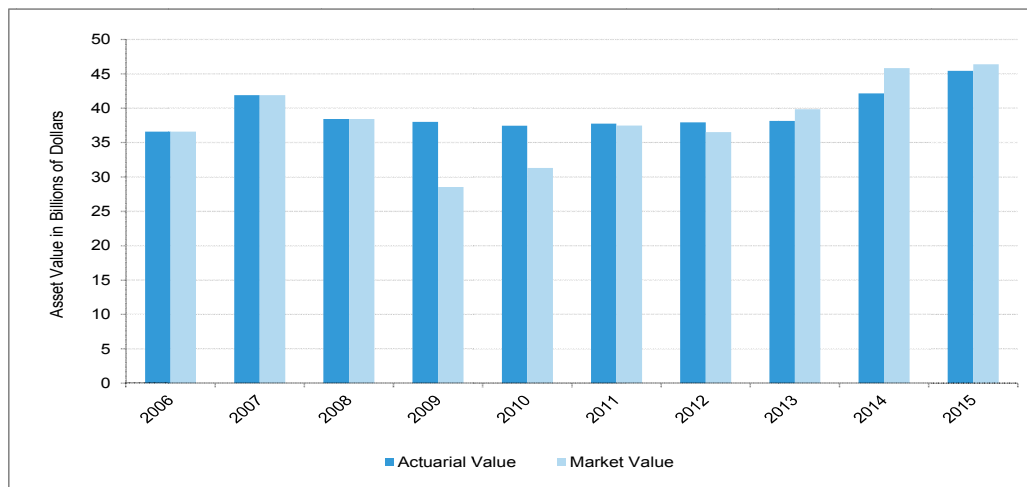
A detailed summary of the actuarial methods is provided in Section 6.2.

## Valuation Output: Actuarial Value of Assets

The Illinois Pension Code specifies the method for determining the Actuarial Value of Assets for funding purposes. Effective with the 2009 valuation, the method was changed from the market value of assets to a market-related value that recognizes investment gains and losses over five years. The Actuarial Value of Assets is \$45.4 billion as of June 30, 2015 and \$42.2 billion as of June 30, 2014.

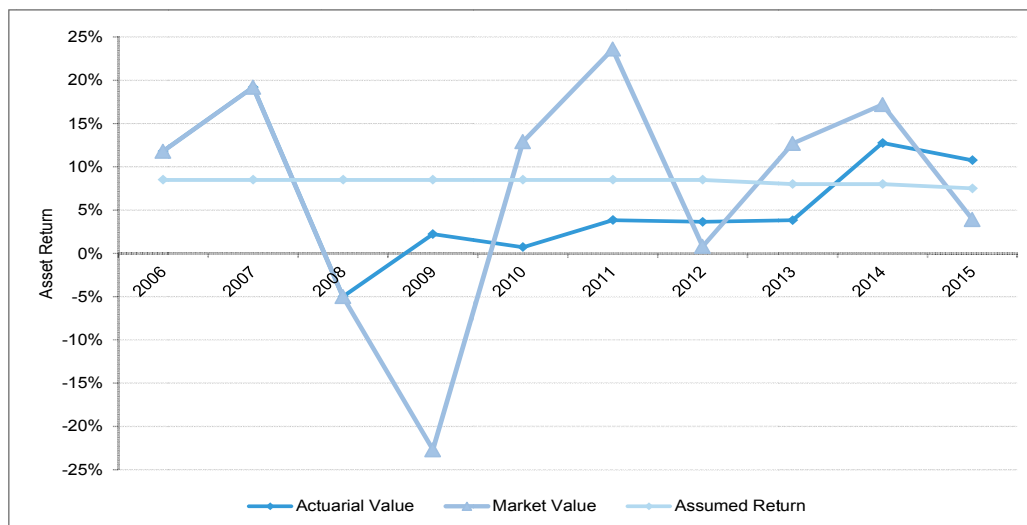
### Actuarial Value and Market Value of Assets

The graph below provides a history of the market value and actuarial value of assets over the past ten years. The point of using an actuarial value of assets is to develop contributions that are more stable than if the contributions were based solely on market.



### Asset Returns

The graph below provides history of the market value and actuarial value of asset returns over the past ten years.



The more stable returns under the actuarial value results in more stable contributions than if the market value of assets were used to determine the employer contributions.

A detailed summary of the Actuarial Value of Assets is provided in Section 2 of this report.

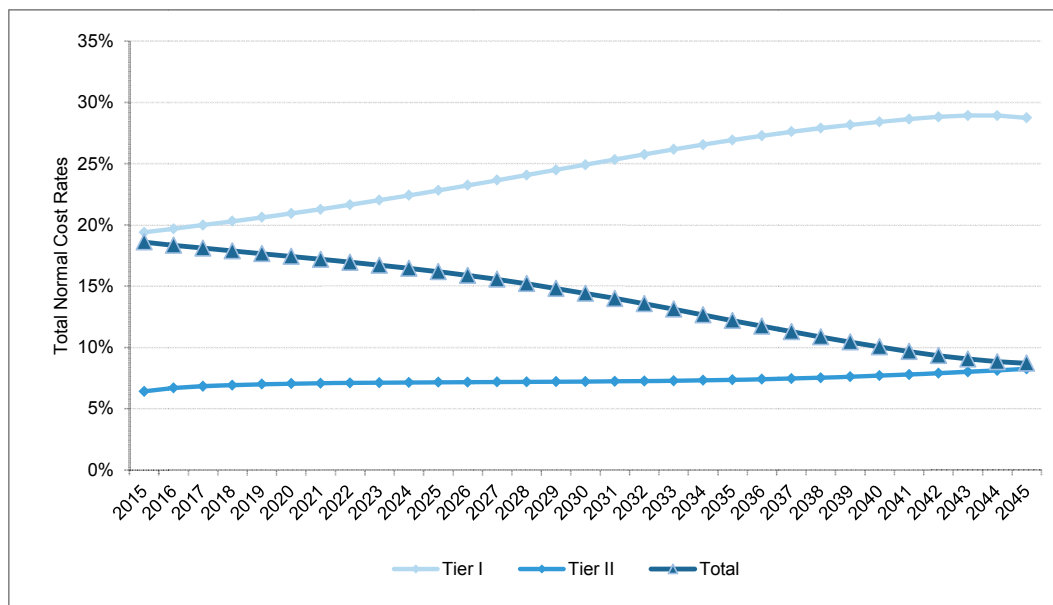
## Valuation Output: Actuarial Accrued Liability

Using the provided membership data, benefit provisions, and actuarial assumptions, the Retirement System's future benefit payments are estimated. These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is an estimate of the current value of the benefits promised to all members as of a valuation date.

Once the PVFB is developed, an actuarial cost method is used to allocate the PVFB. Under the actuarial cost method, the PVFB is allocated to past, current and future service, respectively known as the actuarial accrued liability (AAL), total normal cost (TNC) and present value of future total normal costs (PVFTNC). The AAL is also referred to as the amount of money a PERS should ideally have in the trust. The TNC is also referred to as the cost of benefits accruing during the year.

### Total Normal Cost

The total normal cost is the cost of benefits accruing during the year. It is often given as a percent of payroll. Below we project the total normal cost by Tier.



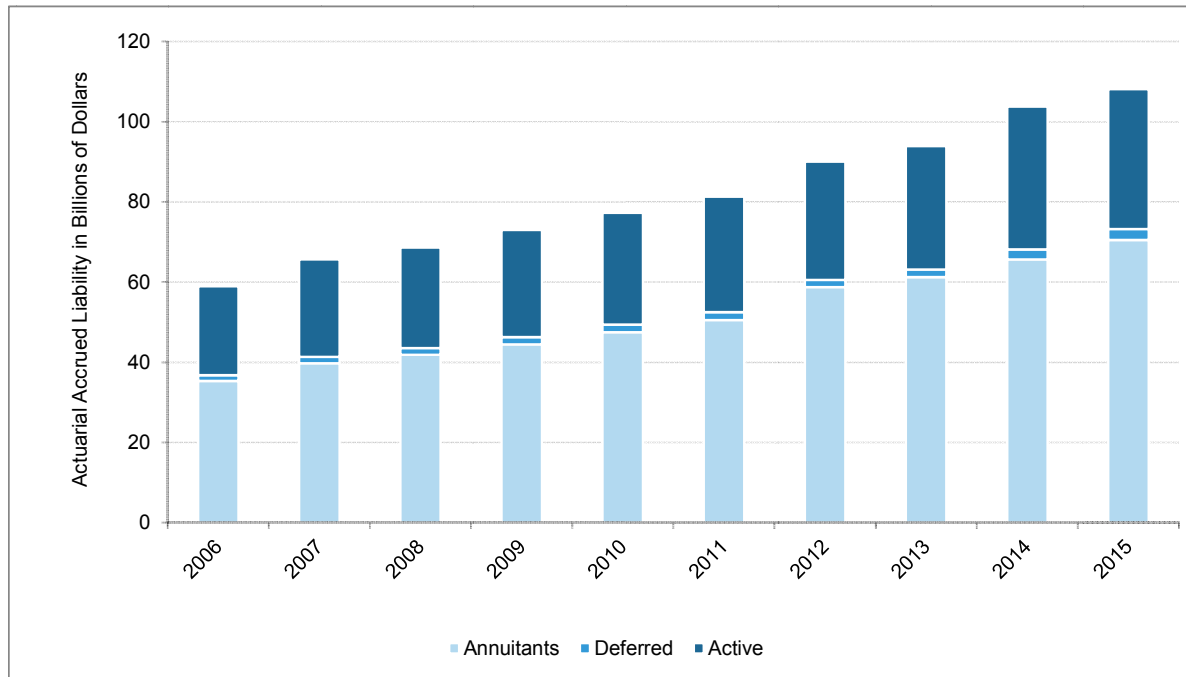
Some observations:

- The total normal cost rate for Tier I is over double that of Tier II;
- The Tier II total normal cost increases over time as mortality improvements are reflected;
- The Tier II total normal cost is less than the Tier II member contribution rate; that is, Tier II members pay for their own pensions and subsidize the State by paying down the UAAL;
- Note that the rates above are based on the projected unit credit cost method. Use of the more common entry age normal cost would result in lower total normal costs, and higher actuarial accrued liabilities.

## Valuation Output: Actuarial Accrued Liability (continued)

### Actuarial Accrued Liability

The graph below provides a history of the actuarial accrued liability over the past ten years.



The AAL increased from 2014 to 2015 by \$4.4 billion from \$103.7 billion to \$108.1 billion. We expected the AAL to grow to \$107.8 billion. The additional \$0.3 billion was primarily due to the changes in assumptions adopted by the Board at the recommendation of Buck Consultants.

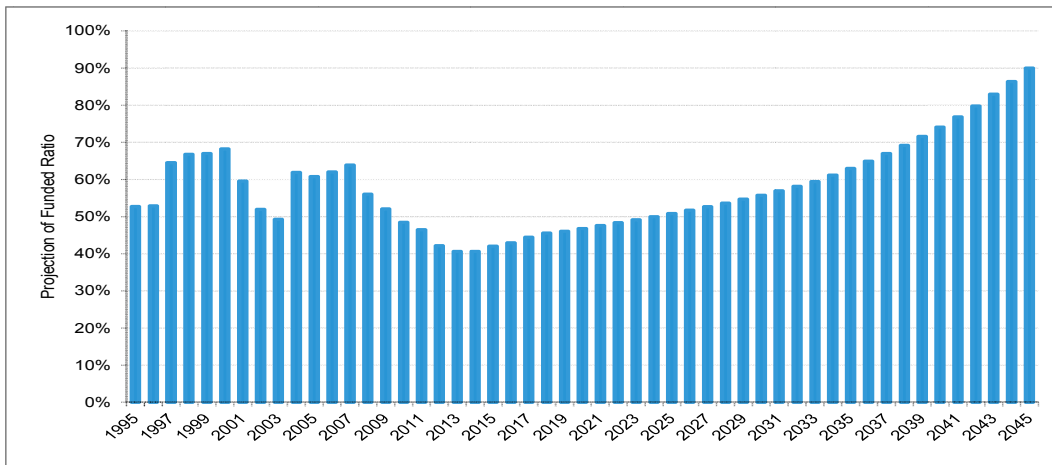
A detailed summary of the actuarial accrued liability is provided in Section 1 of this report.

## Valuation Output: Funded Ratio

The funded ratio is a measure of the progress that has been made in funding the plan as of the valuation date. It is the ratio of how much money the Retirement System actually has in the fund to the amount the Retirement System should have in the fund. The funded ratio from 2014 to 2015 increased from 40.6% to 42.0%.

### Funded Ratios

The graph below provides a history and a projection of the funded ratio for TRS over the 50 year funding period under Illinois Math. The funded ratio is the actuarial value of assets divided by the actuarial accrued liability, or it is the ratio of how much money TRS has in the fund to how much it should have in the fund.



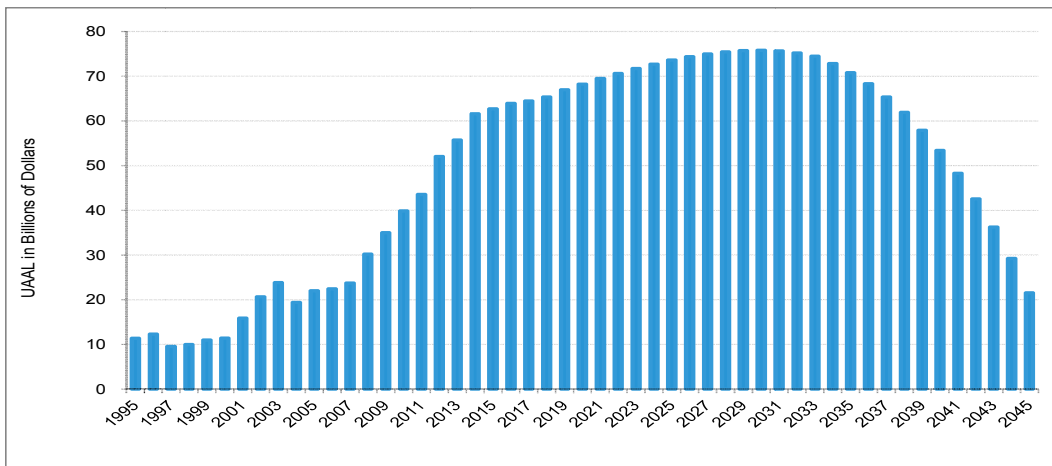
The funded ratio should trend to 100% over a reasonably short period of time – say 15 to 25 years. The 90% target and the 50 year period used by Illinois Math, while an improvement over funding before 1995, are inadequate. We recommend Illinois Math be replaced with Actuarial Math.

## Valuation Output: Unfunded Actuarial Accrued Liability (UAAL)

The unfunded actuarial accrued liability is the difference between the actuarial accrued liability (AAL) and actuarial value of assets (AVA). The UAAL is sometimes referred to as “unfunded accrued liability.” The UAAL increased from 2014 to 2015 by \$1.1 billion from \$61.6 billion to \$62.7 billion.

### Unfunded Actuarial Accrued Liability (UAAL)

The graph below provides a projection of the unfunded actuarial accrued liability.



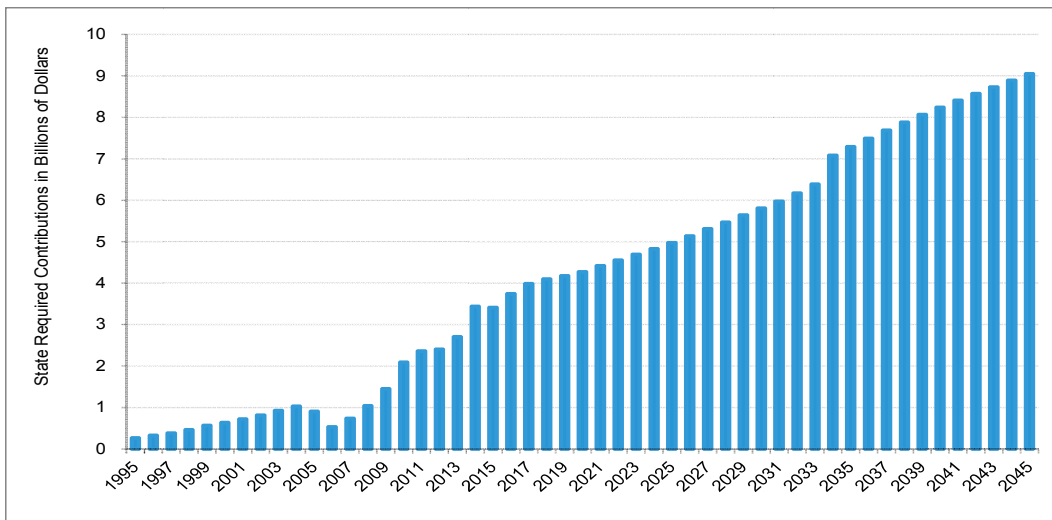
The UAAL before the current valuation date has generally increased. While System experience has resulted in some of the increases and decreases in unfunded liability, the State contributions mandated under the Illinois Pension Code were designed to allow the UAAL to grow for more than three decades when the 50 year plan was put in place in 1995. The first year the UAAL begins to decrease is for the year ending June 30, 2031.

## Valuation Output: Employer Contributions

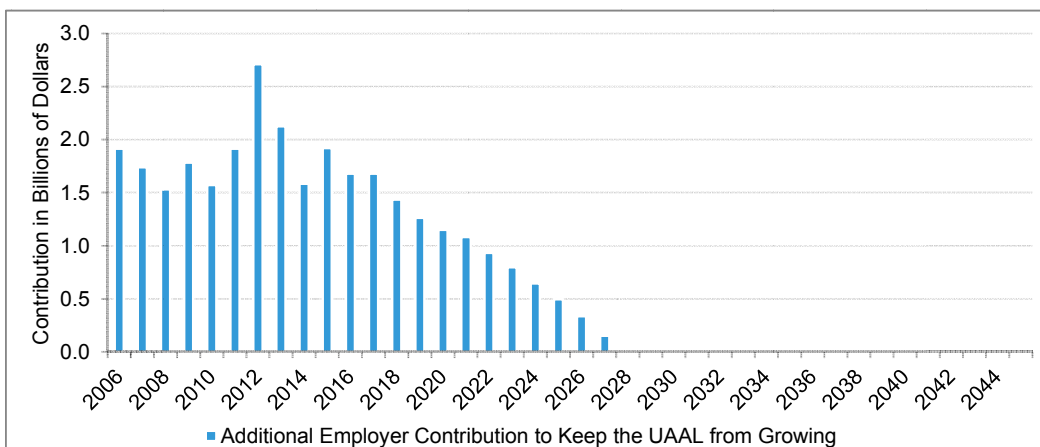
### Employer Required Contribution Rates

The total projected employer contribution for 2017, including State, Federal and School Districts, is \$4.12 billion. Of this amount, \$0.87 billion, or about 21%, is for the employer portion of normal cost and 79% is for the unfunded accrued liability. The required State contribution for 2017 is \$3.99 billion, an increase from \$3.74 billion for 2016.

The graph below provides a projection of the State required contributions as provided under the Illinois Pension Code. In the first several years of the 50 year plan, the State contributions were lower as the contribution ramped-up from 1995 through 2010. In the future, the increases will continue as payroll increases. A larger increase of almost 10% occurs in 2034 as the constraint of the POB maximum is lifted. The insufficiency of the contributions shown here is a primary driver of the increasing unfunded liability on the previous page.



The employer contributions to TRS, including the projected contributions for 2017, have consistently been less than that needed to keep the unfunded actuarial accrued liability from growing. To keep the unfunded from growing, the contribution must cover the employer portion of the normal cost plus at least the interest on the unfunded. The graph here illustrates a recent history and a projection of additional employer contributions, in excess of the amount required under the Illinois Pension Code, needed to keep the unfunded from growing.

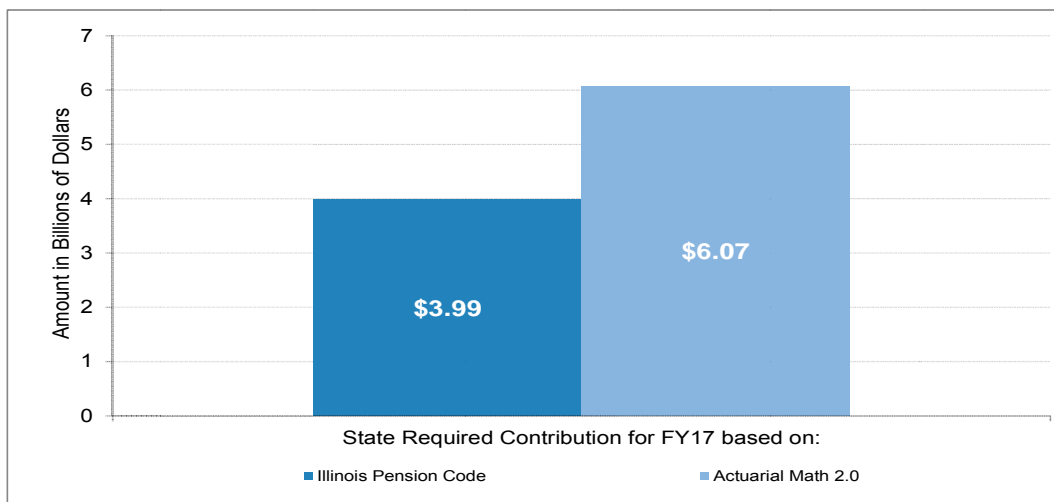




## Valuation Output: Employer Contributions (continued)

Recognizing that the State contributions under the Illinois Pension Code are inadequate, the Board of trustees prepares a certification which includes State contributions under the Illinois Pension Code and Actuarial Math 2.0. We have recommended Actuarial Math 2.0 to fix deficiencies in the current funding policy. Specifically, Actuarial Math 2.0 will bring TRS to full funding by decreasing the UAAL every year with contributions that are projected to grow at 2%, our estimated rate of state revenue growth. The UAAL contribution growth of 2% and payment period of 20 years are projected to promote intergenerational equity by not requiring contributions of future generations for past underfunding.

The following graph and table show the State contribution for the fiscal year ending June 30, 2017 under the Illinois Pension Code and Actuarial Math 2.0. More detail on the development of these amounts is in Section 1.2.



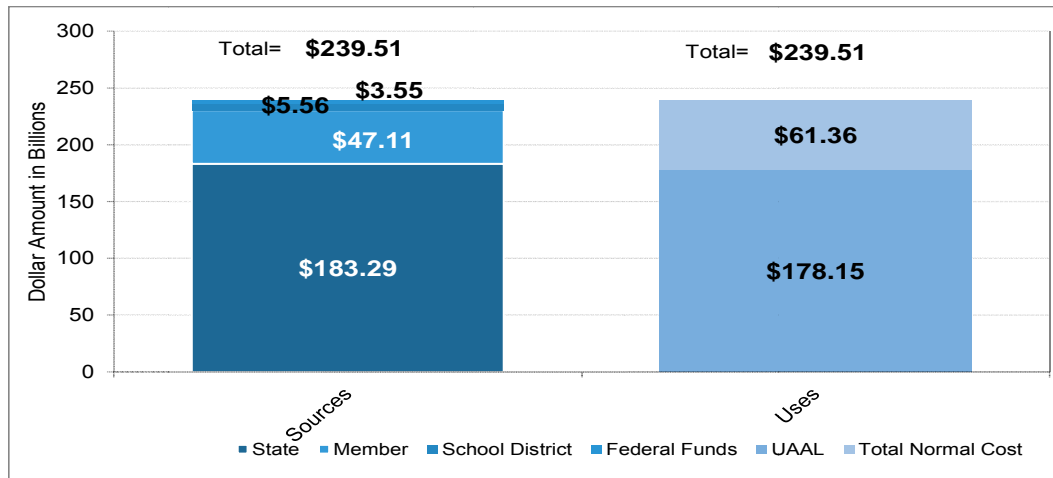
Summary of State Contributions under Illinois Pension Code and Actuarial Math 2.0	Fiscal Year 2017
<b>1. Based on Statutory Funding Plan</b>	
Total State Contribution for fiscal year 2017:	
a. Benefit Trust Reserve*:	
i. 39.12% of membership payroll	\$ 4,124,118,869
ii. minus School Districts Contribution (0.58% of membership payroll)	(61,138,899)
iii. minus Federal Funds Contribution	(77,196,619)
State Contribution	\$ 3,985,783,351
b. Guaranteed Minimum Annuity Reserve	800,000
c. Total State Contribution (current law)	\$ 3,986,583,351
<b>2. Based on Actuarial Math 2.0</b>	
Total State Contribution for fiscal year 2017:	
a. Benefit Trust Reserve*:	
i. normal cost plus amortization	\$ 6,248,879,280
ii. minus School Districts Contribution (0.58% of membership payroll)	(61,138,899)
iii. minus Federal Funds Contribution	(117,567,067)
State Contribution	\$ 6,070,173,314
b. Guaranteed Minimum Annuity Reserve	800,000
c. Total State Contribution	\$ 6,070,973,314

\* The School Districts and Federal Funds contributions are projected amounts used to develop the certified State contribution amounts.

## Valuation Output: Employer Contributions (continued)

### Sources and Uses of Funds

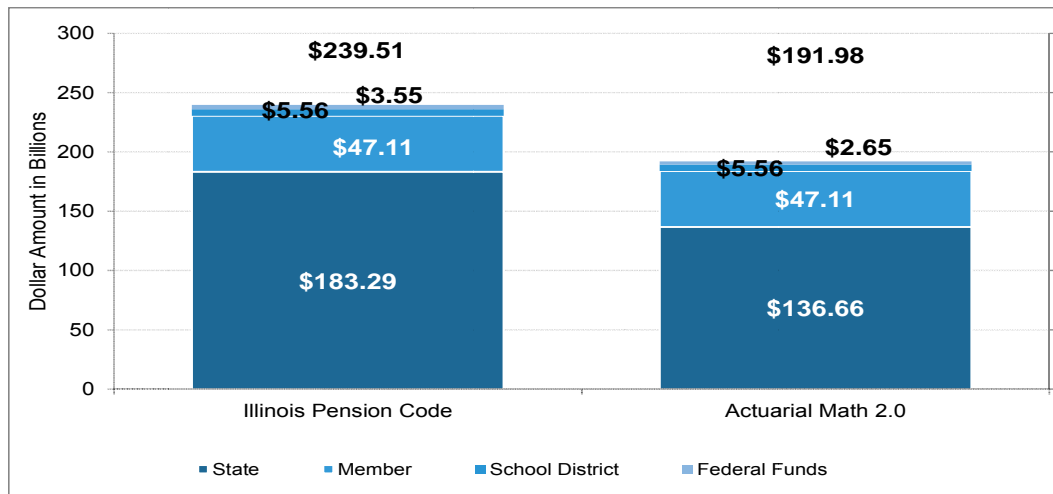
This graph provides a comparison of the Sources and Uses of the \$239.51 billion in contributions projected to be made from year ended June 30, 2017 through the end of the 50-year funding period of June 30, 2045 under the Illinois Pension Code.



Much of the contributions projected for 2017 to 2045 are used to pay down the UAAL. Over 75% of the projected total contributions are being provided by the state and over 19% is being provided by teachers. In aggregate, teachers pay for the cost of benefits accruing, and the State pays for the pension debt that has accrued as a result of following inadequate funding policies since the inception of TRS.

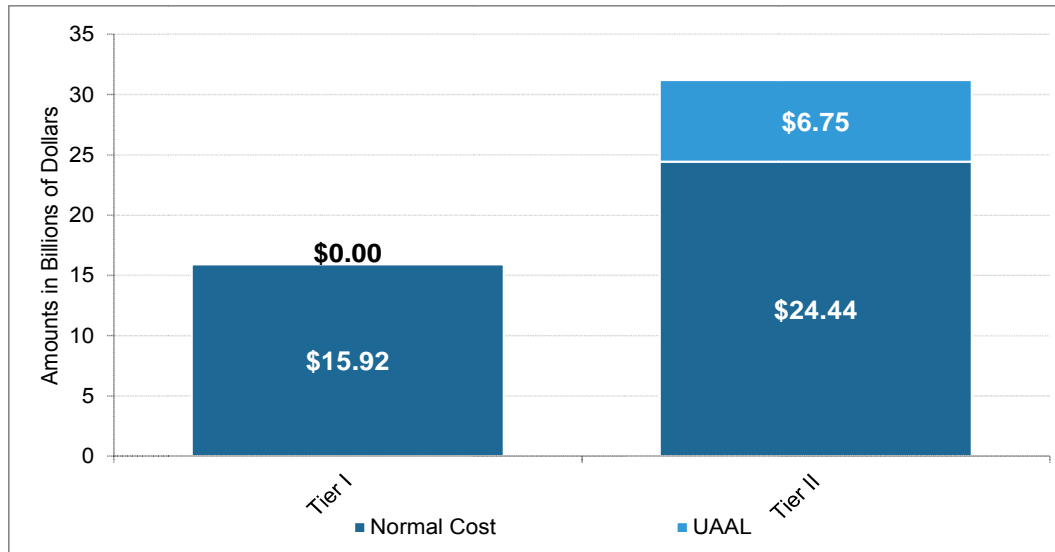
Under Actuarial Math 2.0, the State contributes more towards the UAAL earlier, reducing associated future interest costs and accumulating \$37 billion more in assets by 2045 than under Illinois Pension Code funding. Under Illinois Pension Code funding, interest costs are substantially greater and TRS ends up only 90% funded by 2045.

As shown in the following Sources chart, the projected total contributions for 2017 through 2045 are \$191.98 billion under Actuarial Math 2.0 compared to \$239.51 billion under the Illinois Pension Code. This illustrates the concept of pay me now under Actuarial Math 2.0 or pay me later, with interest, under the Illinois Pension Code.



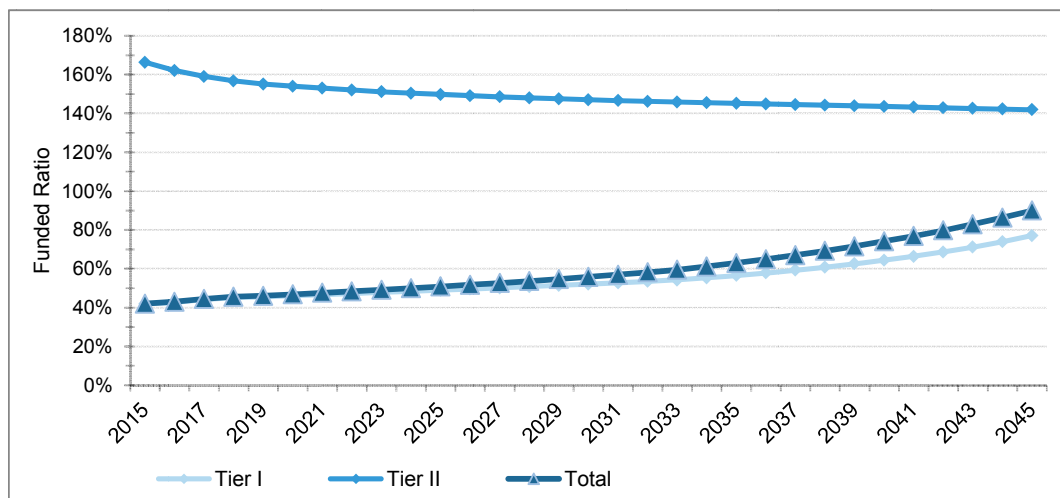
## Valuation Output: Employer Contributions (continued)

The chart below provides a summary of projected funding by TRS members and the use of those funds between normal cost and UAAL from the year ending June 30, 2017 through June 30, 2045.



As seen above, Tier II members are assisting the State by paying for part of the UAAL in addition to paying for all of their benefit. If the more commonly used entry age method is used, the amount allocated to normal cost would be lower, with more being allocated to the UAAL.

While Tier I and Tier II assets are comingled within TRS to determine the funding requirements and funded ratio, the chart below projects the funded ratio based on allocating Tier II member contributions with projected investment returns to the Tier II assets and the remaining contributions – Tier I member, all State, all School District and all Federal Funds – with projected investment returns to the Tier I assets.



Tier II member contributions are more than sufficient to fund Tier II benefits, and the excess is used to increase the overall funded ratio of TRS. These Tier II excess contributions increase the June 30, 2045 TRS funded ratio from 80% to the 90% target under the Illinois Pension Code.

A detailed summary of the employer required contributions rates is provided in Section 1 of this report.

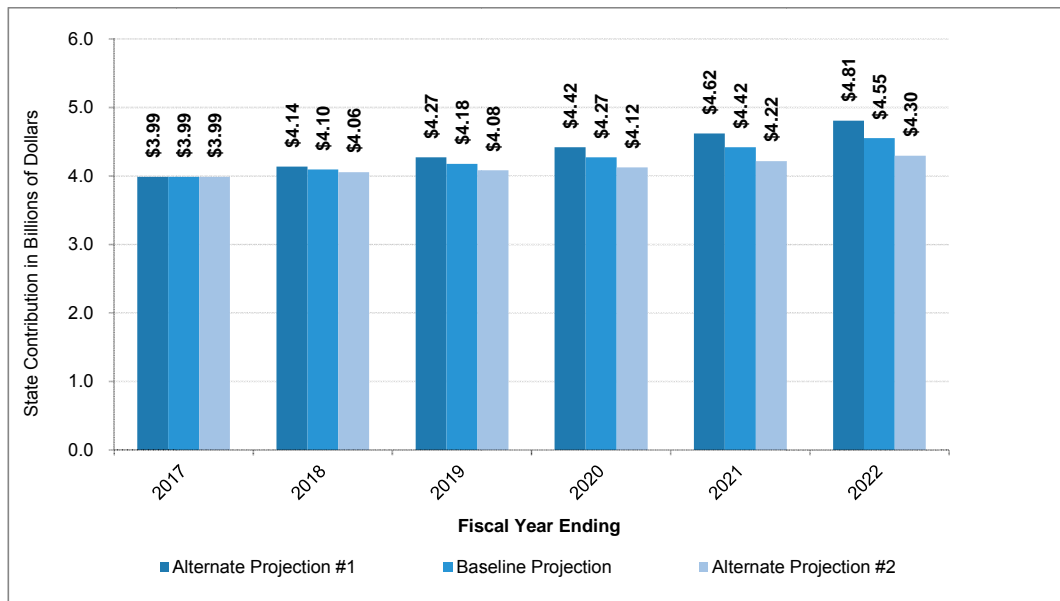
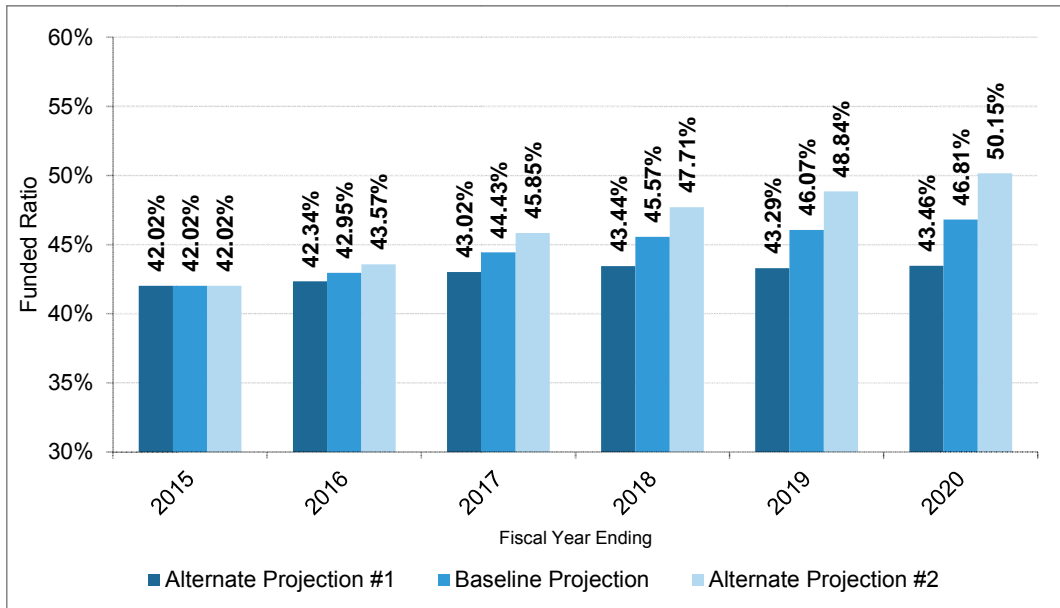
## Valuation Output: Sensitivity Projections

Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. We provide such projections in this valuation report. The projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future.

In addition, we have provided alternate deterministic projections. Each is based on the same assumptions as the baseline deterministic projection except:

- Alternate Projection #1 assumes a 0% asset return for year the ending June 30, 2016
- Alternate Projection #2 assumes a 15% asset return for the year ending June 30, 2016.

The following graphs provide a projection of the funded ratio and State contribution. The impact of investment returns on the valuation results can be significant. The impact in the first year is rather modest because only 20% of the alternate returns are reflected in the actuarial value of assets each valuation. By the fifth year, the returns are fully reflected in the valuation.

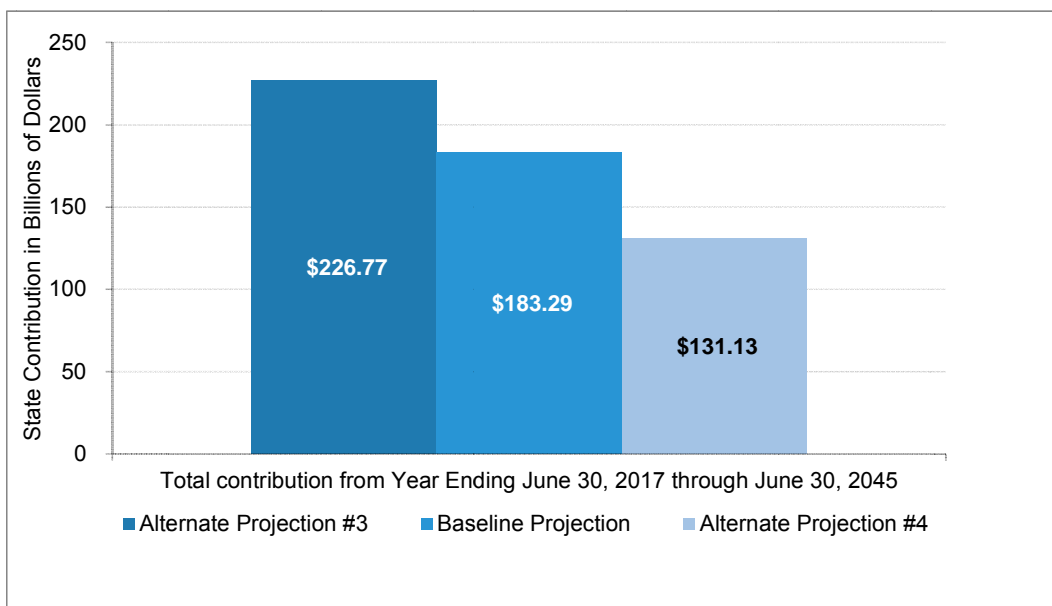


## Valuation Output: Sensitivity Projections (continued)

We have provided additional alternate deterministic projections. Each is based on the same assumptions as the baseline deterministic projection except:

- Alternate Projection #3 assumes a 6.50% asset return annually beginning year ending June 30, 2016 and all future years
- Alternate Projection #4 assumes an 8.50% asset return annually beginning year ending June 30, 2016 and all future years.

This graph provides the total state required contributions from the year ending June 30, 2017 through June 30, 2045.



The total impact on contributions over the funding period is significant.

A detailed summary of the deterministic projections is provided in Section 4 of this report.

## Valuation Output: Accounting Information

The Governmental Account Standards Board (GASB) issues statements which establish financial reporting standards for defined benefit pension plans and accounting for pension expenditures and expenses for governmental employers. The required financial reporting information for TRS can be found in Section 3 of this report.

Please note that GASB Statement No. 25 (Financial Reporting for Defined Benefit Pension Plans) is applicable for fiscal years ending prior to 2014 and has been replaced by GASB Statement No. 67 (Financial Reporting for Pension Plans) for fiscal years ending 2014 and later. Similarly, GASB Statement No. 27 (Accounting for Pensions by State and Local Governmental Employers) is applicable for fiscal years ending prior to 2015 and has been replaced by GASB Statement No. 68 (Accounting and Financial Reporting for Pensions) for fiscal years ending 2015 and later.

The actuarial valuations under Statement No. 25 and Statement No. 67 use different cost methods and assumptions. Statement No. 25 uses the system's cost method and assumptions used for the funding valuation. For TRS, the cost method for the funding valuation is the projected unit cost method and actuarial value of assets. Statement No. 67 uses the entry age normal cost method and assets at fair value. The assumptions are the same for both statements, except the interest rate used for Statement No. 67 is referred to as the discount rate and it may be a blended rate reflecting the interest rate and a municipal bond rate. For June 30, 2015, the discount rate for TRS is a blended rate equal to 7.47%. Similar to the funding valuation, Statement No. 67 requires the calculation of the funded status by comparing the assets, referred to as Fiduciary Net Position (FNP), to the actuarial accrued liability, referred to as Total Pension Liability (TPL). The difference between the TPL and FNP is the Net Pension Liability (NPL). As of June 30, 2015, TRS has TPL of \$111.9 billion and FNP of \$46.4 billion, for NPL of \$65.5 billion.

The valuation has been prepared in accordance with the parameters of Statement Nos. 25 and 67 of the GASB and all applicable Actuarial Standards of Practice. Employer disclosure information under Statement No. 68 is provided in a separate report.

## Funded Status and Funding Policy

TRS assets as of June 30, 2015 are \$46.4 billion. The actuarial value of assets is \$45.4 billion. Based on the results of this actuarial valuation, the actual amount of assets that Buck Consultants has determined should be in the TRS trust is \$108.1 billion. The funded ratio is 42.0% and the unfunded actuarial accrued liability is \$62.7 billion. The funded status of TRS is universally regarded by its peers as among of the worst in the country. This low funded status is the direct result of a consistent underfunding by the State of Illinois government. Indeed, since inception, the contributions received from the State of Illinois have been insufficient to even pay the interest payment on the unfunded actuarial accrued liability, let alone pay it down. The contributions made by the State are governed by the Illinois Pension Code. The Illinois General Assembly has the authority to amend the Illinois Pension Code such that, with the Governor's approval, it would fund according to current actuarial practice. The term given to the funding provisions the Illinois General Assembly follows is "Illinois Math." In contrast, the term we give for the prudent funding of TRS that we encourage stakeholders to adopt is "Actuarial Math." We will develop these concepts more, later in this report.

In 2012, the TRS Board of Trustees approved a resolution that not only recognized the threat to its members caused by the systematic underfunding under Illinois Math, but set forth a five-point foundation for any change to the pension code designed to secure the future. The five cornerstones of future security for TRS pensions are:

1. Require the use of standard actuarial practices and formulas instead of alternate calculations and practices required by state law that artificially lower state funding levels.
2. Require a legal guarantee that ensures state government fully funds TRS and the other public pension funds in the future.
3. Amend state law to fix a serious financial inequity in the benefits and funding for Tier II pensions that significantly penalizes those members over time and masks the true underfunded status of Tier I benefits.
4. Ensure that any changes in the pension code made by the General Assembly are uncomplicated and easy to administer fairly to all our members.
5. Require that any changes to the pension code adhere to Article 13, Section 5 of the Illinois Constitution – the pension protection clause.

## Key Takeaways

Key takeaways of this valuation are:

- The annual cost of benefits earned by active teachers in TRS is \$1.9 billion, 18.08% of pay in FY 2017. This is the total normal cost.
- Teachers contribute about half of this through member contributions.
- Of the total employer contribution of \$4.1 billion for FY 2017 (\$4.0 billion of which is for the State), \$3.2 billion is for UAAL, and the other \$0.9 billion is for the employers' share of the normal cost and expenses.
- Because the employer contribution for UAAL will be less than the \$4.8 billion interest payment, the UAAL is projected to grow. The UAAL is expected to grow until 2030.
- New hires after January 1, 2011 will fully fund the cost of their benefit accruals, and excess contributions reduce the State's contributions toward the UAAL.
- Current funding problems are due to historic noncompliance with generally accepted actuarial principles for determining State contributions.
- The funded ratio for TRS is among the worst in the United States. This is due to:
  - A lack of commitment from policy makers to keep TRS well-funded
  - A history of appropriating and contributing amounts far below that which a prudent actuary would recommend
  - A funding policy that systematically underfunds TRS
  - Changes in benefits that were unfunded and granted when the funded ratio of TRS was quite low
- By funding based on Illinois Math instead of Actuarial Math, the State has put the retirement security for the 403,000 current and former educators in the State of Illinois at risk. Meaningful funding reform should be implemented now.

A quote from the 1954 valuation report:

"Although State contributions to the fund were increased substantially over the previous year, the rate of State contributions continues to be inadequate. A general revision of the contribution policy of the State is very desirable."



# Section 1: Actuarial Funding Results

## 1.1 Summary of Funding Results

The actuarial accrued liability and normal cost are projected to the valuation date based on census information and a measurement date as of one year prior to the valuation date. See Section 1.9 for the development of the current valuation accrued liability and normal cost.

Summary of Funding Valuation Results with Last Year's Results for Comparison	June 30, 2015 Valuation	June 30, 2014 Valuation
<b>Results as of Valuation Date</b>	<b>June 30, 2015</b>	<b>June 30, 2014</b>
<b>Funded Status</b>		
1. Actuarial Accrued Liability	\$ 108,121,825,171	\$ 103,740,377,267
2. Actuarial Value of Assets (AVA)	<u>45,435,192,645</u>	<u>42,150,765,261</u>
3. Unfunded Actuarial Accrued Liability (AVA basis) (1. - 2.)	\$ 62,686,632,526	\$ 61,589,612,006
4. Funded Ratio (AVA basis): (2. / 1.)	42.0%	40.6%
5. Market Value of Assets (MVA)	46,406,915,593	45,824,382,514
6. Unfunded Actuarial Accrued Liability (MVA basis) (1. - 5.)	\$ 61,714,909,578	\$ 57,915,994,753
7. Funded Ratio (MVA basis): (5. / 1.)	42.9%	44.2%
<b>Actuarial Accrued Liability</b>		
1. Active Members	\$ 34,888,043,374	\$ 35,622,053,592
2. Retired Members and Beneficiaries Receiving Benefits	70,545,782,134	65,614,627,003
3. Inactive Members with Deferred Benefits	<u>2,687,999,663</u>	<u>2,503,696,672</u>
4. Total Actuarial Accrued Liability (1. + 2. + 3.)	\$ 108,121,825,171	\$ 103,740,377,267
<b>Present Value of Future Benefits</b>		
1. Active Members	\$ 54,450,277,586	\$ 57,951,385,818
2. Retired Members and Beneficiaries Receiving Benefits	70,545,782,134	65,614,627,003
3. Inactive Members with Deferred Benefits	<u>2,687,999,663</u>	<u>2,503,696,672</u>
4. Present Value of Future Benefits (1. + 2. + 3.)	\$ 127,684,059,383	\$ 126,069,709,493
<b>Results as of Fiscal Year Ending</b>	<b>June 30, 2017</b>	<b>June 30, 2016</b>
<b>Certified State Contribution under Illinois Pension Code</b> (includes amount to Guaranteed Minimum Annuity Reserve)	\$ 3,986,583,351	\$ 3,742,702,194
<b>Normal Cost</b>		
1. Total Normal Cost	\$ 1,882,004,794	\$ 2,010,002,760
2. Administrative Expenses	23,594,987	24,294,066
3. Expected Member Contribution	<u>1,034,264,612</u>	<u>1,041,807,455</u>
4. Total Employer Normal Cost (1. + 2. - 3.)	\$ 871,335,169	\$ 992,489,371

## 1.2 Derivation of Employer Contributions

Summary of State Contributions under Illinois Pension Code and Actuarial Math 2.0	Fiscal Year 2017
<b>1. Based on Statutory Funding Plan</b>	
Total State Contribution for fiscal year 2017:	
a. Benefit Trust Reserve*:	
i. 39.12% of membership payroll	\$ 4,124,118,869
ii. minus School Districts Contribution (0.58% of membership payroll)	(61,138,899)
iii. minus Federal Funds Contribution	<u>(77,196,619)</u>
State Contribution	\$ 3,985,783,351
b. Guaranteed Minimum Annuity Reserve	<u>800,000</u>
c. Total State Contribution (current law)	\$ 3,986,583,351
<b>2. Based on Actuarial Math 2.0</b>	
Total State Contribution for fiscal year 2017:	
a. Benefit Trust Reserve*:	
i. normal cost plus amortization	\$ 6,248,879,280
ii. minus School Districts Contribution (0.58% of membership payroll)	(61,138,899)
iii. minus Federal Funds Contribution	<u>(117,567,067)</u>
State Contribution	\$ 6,070,173,314
b. Guaranteed Minimum Annuity Reserve	<u>800,000</u>
c. Total State Contribution	\$ 6,070,973,314
<b>3. Total Normal Cost and Employer Normal Cost Rate for fiscal year 2017</b>	
a. Total Normal Cost Rate (including administrative expenses)	18.08 %
b. Member Rate**	<u>(9.81)</u>
c. Employer Normal Cost Rate	8.27 %

\* Expected fiscal year 2017 membership payroll is \$10,541,189,447

\*\* The member contribution rate above is the projected rate for all member contributions, not just the base 9.40% contribution. Additional member contributions are assumed for optional service and Early Retirement Option.

## 1.2 Derivation of Employer Contributions (continued)

Employer Contribution under Illinois Pension Code	Year Ending June 30, 2017	As Percentage of Payroll (State, Federal, Total)	
1. Assumed Payroll			
a. Total Payroll	\$ 10,541,189,447		
b. Less Federal Funds Payroll	<u>(200,282,599)</u>		
c. State Payroll	\$ 10,340,906,848		
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	\$ 4,476,343,434	42.47 %	Total
b. Less School Districts under Sec. 16-158(e)	<u>(61,138,899)</u>	<u>(0.58)</u>	Total
c. State and Federal Funds Contribution	\$ 4,415,204,535	41.89 %	Total
d. Less State Debt Service for TRS portion of all funds provided under sec. 7.2 of General Obligation Bond Act	<u>(352,224,565)</u>	<u>(3.34)</u>	Total
e. Maximum State and Federal Funds Contribution under PA 94-0004	\$ 4,062,979,970	38.54 %	Total
3. Employer contribution recognizing all system assets, before limiting State and Federal Funds contribution			
a. Employer's Cost	\$ 4,170,765,027	39.57 %	Total
b. Less School Districts under Sec. 16-158(e)	<u>(61,138,899)</u>	<u>(0.58)</u>	Total
c. State and Federal Funds Contribution	\$ 4,109,626,128	38.99 %	Total
4. State and Federal Funds Contribution under PA 94-0004 Lesser of amounts under (2) and (3)	\$ 4,062,979,970	38.54 %	Total
5. Employer contribution under PA 94-0004			
a. State Portion of (4), based on State Payroll	\$ 3,985,783,351	38.54 %	State
b. Plus Federal Portion of (4), based on Federal Payroll	<u>77,196,619</u>	<u>38.54</u>	Federal
c. State and Federal Funds Contribution	\$ 4,062,979,970	38.54 %	Total
d. Plus School Districts under Sec. 16-158(e)	<u>61,138,899</u>	<u>0.58</u>	Total
e. Employer's Cost	\$ 4,124,118,869	39.12 %	Total

## 1.2 Derivation of Employer Contributions (continued)

### Notes about employer contribution under PA 94-0004

**(1) Assumed Payrolls**

The administrative staff of the System estimated Federal Funds payroll for the fiscal year ending June 30, 2017 would be 1.90% of total 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 the fiscal year 2005, the maximum State contribution under the Act equals the State contribution that would have been required if this \$4.33 billion contribution had 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 the fiscal year 2006 the Federal Funds contribute at the same rate as the State, and so a Combined State and Federal Funds contributions 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 level percentage of payroll contributions 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 under PA 94-0004 equals the sum of these contributions, plus the expected 0.58% of payroll School District contributions for the 2.2% formula made under the provisions of Sec. 16-158(e).

**(6) State Contribution Amount for FY 2006 and FY 2007 under PA 94-0004**

PA 94-0004 specified actual contribution amounts for fiscal years 2006 and 2007 made by the State to the Benefit Trust Reserve.

### Additional Information:

The following contributions made to the Benefit Trust Reserve are not shown above:

(a) From Members:

1. Sec. 16-128 payments for the purchase of optional service credit.
2. Sec. 16-133.2 ERO lump sum payments upon retirement with ERO benefits
3. Sec. 16-152 career contributions of 9.0% of salary, plus – commencing July 1, 2005 – an additional 0.4% toward the ERO program.

(b) From School Districts:

1. Sec. 16-128(d-10) payments for excessive sick leave service credit
2. Sec. 16-133.2 ERO lump sum payments when members retire with ERO benefits
3. 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 – taken into account in the actuarial projection of the assets and funded status of the system, and the calculation is performed only *after* the above contributions have been taken into account.

An assumption for optional service purchases has been included in the projections since the June 30, 1994 valuation, and payments under Sec. 16-158(f) have been included since the recertified June 30, 2004 valuation. The career ERO contributions and lump sum payments toward ERO benefits were first recognized in the June 30, 2005 actuarial valuation. Finally, there are no current assumptions for excessive sick leave service credit, and so the actuarial projections do not currently include projected payments under Sec. 16-128(d-10).

Note that TRS has directed the actuary to assume that ERO is permanent even though it is scheduled to sunset June 30, 2016.

## 1.2 Derivation of Employer Contributions (continued)

Development of State and Federal Funds Statutory Contributions under §16-158 of the Illinois Pension Code	Year Ending June 30, 2017
1. Present value as of June 30, 2016 of future obligations to fund:	
a. 90% of June 30, 2045 Actuarial Accrued Liability	\$ 23,798,695,595
b. Benefit disbursements and administrative expenses from July 1, 2016 through June 30, 2045	111,360,293,322
c. Total present value of future obligations: a.+b.	\$ 135,158,988,917
2. Projected Actuarial Value of Assets as of June 30, 2016:	
a. With POB proceeds	47,904,725,097
b. Without POB proceeds	42,848,098,485
3. Present value as of June 30, 2016 of future member contributions from July 1, 2016 through June 30, 2045	17,157,965,200
4. Present value as of June 30, 2016 of future School District contributions from July 1, 2016 through June 30, 2045 for:	
a. FAS cap Increases under §16-158(f)	\$ 33,165,197
b. Modified Early Retirement Option under §16-133.2	1,046,472,313
c. 2.2% formula under §16-158(e)	1,011,709,514
d. Total present value of future School District contributions: a.+ b.+ c.	\$ 2,091,347,024
5. Present value as of June 30, 2016 of future State and Federal Funds contributions from July 1, 2016 through June 30, 2045 under §16-158:	
a. Based on including POB proceeds: 1.c.-2.a.-3.-4.d.	68,004,951,597
b. Based on not including POB proceeds: 1.c.-2.b.-3.-4.d.	73,061,578,209
6. Present value as of June 30, 2016 of future covered payroll from July 1, 2016 through June 30, 2045	174,432,674,865
7. Determination of preliminary contribution rates for State and Federal Funds for year ending June 30, 2017:	
a. Preliminary rate based on including POB proceeds: 5.a.+6.	38.99%
b. Preliminary rate based on not including POB proceeds: 5.b.+6.	41.89%
8. Determination of contribution for State and Federal Funds for year ending June 30, 2017:	
a. Projected payroll for year ending June 30, 2017:	
i. State projected payroll	\$ 10,340,906,848
ii. Federal Funds projected payroll	200,282,599
iii. Total projected payroll: i.+ ii.	\$ 10,541,189,447
b. State and Federal Funds contribution for year ending June 30, 2017 before maximum: 7.a.x 8.a.iii.	4,109,626,128
c. State and Federal Funds contribution maximum for year ending June 30, 2017:	
i. Gross Maximum State and Federal Funds contribution: 7.b.x 8.a.iii.	\$ 4,415,204,535
ii. State's Debt service	352,224,565
iii. Net Maximum State and Federal Funds contribution: i.- ii.	\$ 4,062,979,970
d. State and Federal Funds contribution after applying maximum for year ending June 30, 2017:	
i. Total contribution as dollar amount: minimum of 8.b and 8.c.iii	\$ 4,062,979,970
ii. Total contribution as rate of payroll: i.+ 8.a.iii	38.54%
iii. State contribution: 8.a.i. x 8.d.ii	\$ 3,985,783,351
iv. Federal Funds contribution: 8.a.ii. x 8.d.ii	77,196,619

## 1.2 Derivation of Employer Contributions (continued)

Development of State and Federal Funds Contributions based on Actuarial Math 2.0	Year Ending June 30, 2017
1. Projected employer Normal Cost for year ending June 30, 2017:	
a. Projected total Normal Cost	\$ 1,765,907,552
b. Projected administrative expenses	23,594,987
c. Projected member contributions	1,034,264,612
d. Projected employer Normal Cost: a.+b.-c.	755,237,928
2. Projected Unfunded Actuarial Accrued Liability as of June 30, 2016:	
a. Projected Actuarial Accrued Liability	\$ 115,972,045,663
b. Projected Actuarial Value of Assets	47,904,725,097
c. Projected Unfunded Actuarial Accrued Liability: a.-b.	68,067,320,567
3. Projected Unfunded Actuarial Accrued Liability payment for year ending June 30, 2017:	
a. Unfunded Actuarial Accrued Liability amortization factor (20-year amortization)	12.2649184068
b. Unfunded Actuarial Accrued Liability payment: 2.c.÷ a.	5,549,757,309
4. Total employer contribution for year ending June 30, 2017: 1.d.+3.b.	\$ 6,304,995,237
5. Projected School District contributions for year ending June 30, 2017:	
a. FAS cap Increases under §16-158(f)	\$ 2,190,130
b. Modified Early Retirement Option under §16-133.2	53,925,827
c. 2.2% formula under §16-158(e)	61,138,899
d. Total School District contributions for year ending June 30, 2017: a.+b.+c.	\$ 117,254,856
6. State and Federal contribution for year ending June 30, 2017: 4.- 5.d.	6,187,740,381
7. Portion of total payroll that is Federal Funds for year ending June 30, 2017	1.90%
8. Federal Funds contribution for year ending June 30, 2017: 6.x 7.	\$ 117,567,067
9. State contribution for year ending June 30, 2017: 6.- 8.	\$ 6,070,173,314

Actuarial Math 2.0 has been adopted by the Board as the next generation of actuarial math:

Replace the projected unit credit cost method with the entry age normal cost method

Keep the current asset valuation method (including no corridor)

Update amortization policy as follows:

20 year closed amortization of UAAL

Use layered amortization, with new UAAL being amortized over 20 years regardless of source

Amortization payment increase at the rate of future State revenue growth (assumed to be 2.0%)

Minimum total contribution is no less than the normal cost in any given year

### 1.3 Actuarial (Gain)/Loss

Development of Actuarial (Gain) / Loss	Amount
1. Expected Actuarial Accrued Liability	
a. Actuarial Accrued Liability at June 30, 2014	\$ 103,740,377,267
b. Normal Cost at June 30, 2014	1,925,420,029
c. Interest at 7.50% on a. + b. to June 30, 2015	7,851,426,242
d. Benefit Payments and Administrative Expenses for June 30, 2014, with Interest at 7.50% to June 30, 2015	5,854,648,087
e. Expected Actuarial Accrued Liability before Changes	107,662,575,451
f. Change in Actuarial Accrued Liability at June 30, 2015, due to Change in Actuarial Assumptions	586,418,960
g. Change in Actuarial Accrued Liability at June 30, 2015, due to Change in Plan Provisions	0
h. Expected Actuarial Accrued Liability at June 30, 2015: (e. + f. + g.)	108,248,994,411
2. Actuarial Accrued Liability at June 30, 2015	108,121,825,171
3. Expected Actuarial Value of Assets	
a. Actuarial Value of Assets at June 30, 2014	42,150,765,261
b. Interest at 7.50% on a. to June 30, 2015	3,161,307,395
c. Contributions Made for June 30, 2014	4,458,707,579
d. Interest at 7.50% on c. to June 30, 2015	164,178,832
e. Benefit Payments and Administrative Expenses for June 30, 2014, with Interest at 7.50% to June 30, 2015	5,854,648,087
f. Change in Actuarial Value of Assets at June 30, 2015 due to Change in Method	0
g. Expected Actuarial Value of Assets at June 30, 2015: (a.+b.+c.+d.-e+f)	44,080,310,980
4. Actuarial Value of Assets as of June 30, 2015	45,435,192,645
5. Liability (Gain) / Loss: (2. – 1.h.)	(127,169,240)
6. Actuarial Asset (Gain) / Loss: (3.g. - 4.)	(1,354,881,665)
7. Total Actuarial (Gain) / Loss: (5. + 6.)	(1,482,050,905)

## 1.4 Reconciliation of Unfunded Accrued Liability

Reconciliation of Unfunded Actuarial Accrued Liability	Year Ended June 30		
	2015	2014	2013
<b>Unfunded Actuarial Accrued Liability at beginning of year</b>	<b>\$ 61,589,612,006</b>	<b>\$ 55,731,797,288</b>	<b>\$ 52,079,548,158</b>
<b>Additions (deductions)</b>			
- Employer cost in excess of contributions	\$ 1,992,652,465	\$ 1,648,042,240	\$ 2,125,731,840
- Change in actuarial assumptions and methods	586,418,960	6,403,256,969	-
<b>Net additions (deductions)</b>	<b>\$ 2,579,071,425</b>	<b>\$ 8,051,299,209</b>	<b>\$ 2,125,731,840</b>
<b>Actuarial losses (gains) compared to assumptions</b>			
- Salary increases for continuing active members	\$ (468,541,235)	\$ (474,190,195)	\$ (412,776,000)
- Asset loss (gain) on actuarial value of assets <sup>1</sup>	(1,354,881,665)	(1,791,604,611)	1,557,219,259
- New entrant loss (gain)	5,168,927	(315,731)	12,677,870
- Mortality other than expected	(45,647,175)	(74,308,199)	7,355,374
- Retirements other than expected	302,761,415	119,675,346	65,579,020
- Disabilities other than expected	(13,393,193)	(3,237,170)	(6,120,537)
- Terminations other than expected	56,862,195	(4,442,984)	22,925,587
- Rehires	13,630,966	37,754,909	-
- Repayments of refunded member contributions <sup>2</sup>	-	-	25,733,387
- Delayed reporting of retirements (effect on assets)	-	-	2,302,527
- Other <sup>3</sup>	21,988,860	(2,815,856)	251,620,803
<b>Net actuarial loss (gain)</b>	<b>\$ (1,482,050,905)</b>	<b>\$ (2,193,484,491)</b>	<b>\$ 1,526,517,290</b>
<b>Unfunded Actuarial Accrued Liability at end of year</b>	<b>\$ 62,686,632,526</b>	<b>\$ 61,589,612,006</b>	<b>\$ 55,731,797,288</b>

<sup>1</sup> Assets are expected to earn 7.5%. This item is the difference between the expected and the actual return on an actuarial basis. For example, in fiscal year 2015, the expected actuarial return of \$3.117 billion was less than the \$4.472 billion actual return on the actuarial value of assets, resulting in an actuarial gain which reduced the unfunded actuarial accrued liability by \$1.355 billion.

<sup>2</sup> This includes the employer-paid portion of the benefit that was restored when members repaid previously refunded contributions.

<sup>3</sup> Other includes items such as:

- (a) Retroactive benefit payments for individuals who delayed applying for retirement.
- (b) Differences between actual cost of benefits earned during the year and projected cost.
- (c) Retirements with reciprocal service credits.
- (d) Delayed reporting of retirements (effect on AAL).



## 1.5 Employer Cost in Excess of Contributions

Employer Cost in Excess of Contributions	Year Ended June 30	
	2015	2014
1. Employer cost		
a. Employer normal cost	\$ 988,370,864	\$ 890,299,621
b. Interest on Unfunded Actuarial Accrued Liability at mid-year	<u>4,455,172,247</u>	<u>4,290,235,756</u>
c. Total employer cost	\$ 5,443,543,111	\$ 5,180,535,377
2. Employer contributions toward normal cost and interest on Unfunded Actuarial Accrued Liability		
a. State (excluding Minimum Benefit)	\$ 3,376,878,000	\$ 3,437,478,000
b. School Districts for 2.2% and Salary Increase Cap and Modified ERO	75,015,805	82,743,883
c. Federal Funds	<u>69,764,609</u>	<u>74,484,109</u>
d. Total employer credits	\$ 3,521,658,414	\$ 3,594,705,992
3. Employer cost in excess of contributions		
a. Cost minus contribution: (1.c.-2.d.)	\$ 1,921,884,697	\$ 1,585,829,385
b. Interest on a. to year-end	<u>70,767,768</u>	<u>62,212,855</u>
c. Total excess with interest	\$ 1,992,652,465	\$ 1,648,042,240

Employer cost in excess of contributions is used in Section 1.4, the reconciliation of UAAL, to measure the increase in UAAL due to the excess. Employer normal cost (1.a.) for 2015 is the total normal cost based on the June 30, 2014 valuation minus 2015 member contributions.

## 1.6 10 Year History of Unfunded Actuarial Accrued Liability and Funded Ratio

### Based on Actuarial Value of Assets

Year Ended June 30	Actuarial Accrued Liability	Actuarial Value of Assets*	Unfunded Actuarial Accrued Liability	Percentage Change in Unfunded	Funded Ratio
2006	\$ 58,996,912,735	\$ 36,584,889,427	\$ 22,412,023,308	1.92%	62.0%
2007	65,648,394,666	41,909,317,753	23,739,076,913	5.92	63.8
2008	68,632,366,686	38,430,723,287	30,201,643,399	27.22	56.0
2009	73,027,198,172	38,026,043,512	35,001,154,660	15.89	52.1
2010	77,293,197,626	37,439,091,771	39,854,105,855	13.87	48.4
2011	81,299,745,296	37,769,752,972	43,529,992,324	9.22	46.5
2012	90,024,945,369	37,945,397,211	52,079,548,158	19.64	42.1
2013	93,886,988,785	38,155,191,497	55,731,797,288	7.01	40.6
2014	103,740,377,267	42,150,765,261	61,589,612,006	10.51	40.6
2015	108,121,825,171	45,435,192,645	62,686,632,526	1.78	42.0
Average Annual Change				11.11%	

\* For 2001 to 2008: Assets are at fair market value.  
For 2009 and After: Assets are 5-year smoothed value.

### Based on Market Value of Assets

Year Ended June 30	Actuarial Accrued Liability	Market Value of Assets	Unfunded Actuarial Accrued Liability	Percentage Change in Unfunded	Funded Ratio
2006	\$ 58,996,912,735	\$ 36,584,889,427	\$ 22,412,023,308	1.92%	62.0%
2007	65,648,394,666	41,909,317,753	23,739,076,913	5.92	63.8
2008	68,632,366,686	38,430,723,287	30,201,643,399	27.22	56.0
2009	73,027,198,172	38,026,043,512	35,001,154,660	15.89	52.1
2010	77,293,197,626	31,323,784,214	45,969,413,412	31.34	40.5
2011	81,299,745,296	37,471,267,194	43,828,478,102	(4.66)	46.1
2012	90,024,945,369	36,516,825,339	53,508,120,030	22.09	40.6
2013	93,886,988,785	39,858,768,499	54,028,220,286	0.97	42.5
2014	103,740,377,267	45,824,382,514	57,915,994,753	7.20	44.2
2015	108,121,825,171	46,406,915,593	61,714,909,578	6.56	42.9
Average Annual Change				11.25%	

## 1.7 10 Year History of Solvency Test

Solvency Test							
Year Ended June 30	Actuarial Accrued Liability for:			Actuarial Value of Assets	Portion of Actuarial Accrued Liabilities Covered by Assets		
	(1)	(2)	(3)		(1)	(2)	(3)
	Active and Inactive Members Accumulated Contributions	Members Currently Receiving Benefits	Active and Inactive Members Employer Portion				
2006	\$6,303,750,000	\$35,315,528,699	\$17,377,634,036	\$36,584,889,427	100.0%	85.7%	0.0%
2007	6,500,318,000	39,785,368,134	19,362,708,532	41,909,317,753	100.0%	89.0%	0.0%
2008	6,931,518,000	41,849,963,527	19,850,885,159	38,430,723,287	100.0%	75.3%	0.0%
2009	7,320,600,000	44,495,917,095	21,210,681,077	38,026,043,512	100.0%	69.0%	0.0%
2010	7,715,984,000	47,475,905,587	22,101,308,039	37,439,091,771	100.0%	62.6%	0.0%
2011	8,048,689,000	50,567,880,069	22,683,176,227	37,769,752,972	100.0%	58.8%	0.0%
2012	8,270,073,000	58,734,635,863	23,020,236,506	37,945,397,211	100.0%	50.5%	0.0%
2013	8,569,939,000	61,254,334,295	24,062,715,490	38,155,191,497	100.0%	48.3%	0.0%
2014	8,890,558,488	65,614,627,003	29,235,191,776	42,150,765,261	100.0%	50.7%	0.0%
2015	9,281,893,307	70,545,782,134	28,294,149,730	45,435,192,645	100.0%	51.3%	0.0%

(1) members' contributions on deposits in the system.

(2) basic retirement benefit values attributable to present retired members and beneficiaries.

(3) basic retirement benefit values attributable to active and vested terminated members for service already rendered.

## 1.8 Department of Insurance Information

Actuarial Accrued Liabilities	June 30, 2015	June 30, 2014
Service Retirement	\$ 68,251,326,306	\$ 63,467,624,896
Disability Retirement	405,679,765	392,403,043
Survivor	<u>1,888,776,063</u>	<u>1,754,599,064</u>
	\$ 70,545,782,134	\$ 65,614,627,003
Inactive	2,687,999,663	2,503,696,672
Active	<u>34,888,043,374</u>	<u>35,622,053,592</u>
Total	\$ 108,121,825,171	\$ 103,740,377,267

Headcounts and Salaries for Active Members	June 30, 2015	June 30, 2014
Male		
Count	37,340	37,527
Salaries	\$ 2,461,405,691	\$ 2,410,720,090
Female		
Count	122,496	123,463
Salaries	\$ 6,797,971,797	\$ 6,717,337,510
Total		
Count	159,836	160,990
Salaries	\$ 9,259,377,488	\$ 9,128,057,600

Note that the 2014 salaries were revised to reflect the reported rate of pensionable salary.

## 1.9 Actuarial Liabilities and Normal Cost

Actuarial Accrued Liability Developed for June 30, 2015 Valuation	Amount
1. Actuarial Accrued Liability measured as of June 30, 2014	\$ 104,214,590,925
2. Normal Cost measured for fiscal year ended June 30, 2015	1,820,919,242
3. Expected benefit payments for fiscal year ended June 30, 2015	5,588,495,217
4. Interest on 1., 2. and 3. to June 30, 2015	7,674,810,221
5. Actuarial Accrued Liability as of June 30, 2015 (1.+2.-3.+4.)	\$ 108,121,825,171
6. Normal Cost measured for fiscal year ended June 30, 2016	1,848,030,735
7. Expected benefit payments for fiscal year ended June 30, 2016	5,869,742,709
8. Interest on 5., 6. and 7. to June 30, 2016	7,958,322,689
9. Actuarial Accrued Liability as of June 30, 2016 (5.+6.-7.+8.)	\$ 112,058,435,886
Based on member census as of June 30, 2014, assumptions and methods as of June 30, 2015.	

## Section 2: Plan Assets

### 2.1 Summary of Market Value of Assets

MARKET VALUE OF ASSETS				
Asset Category	June 30, 2015 Amount	%	June 30, 2014 Amount	%
<b>1. Cash</b>	\$ 45,709,535	0.08%	\$ 60,859,067	0.11%
<b>2. Receivables and Prepaid Expenses</b>				
a. Member Contributions	\$ 52,436,438	0.10%	\$ 57,529,290	0.11%
b. Employer Contributions	13,620,835	0.02%	14,367,466	0.03%
c. State of Illinois	344,042,033	0.63%	372,984,303	0.68%
d. Investment Income	113,824,855	0.21%	106,358,243	0.20%
e. Pending Investment Sales	5,219,465,652	9.51%	4,876,016,116	9.08%
f. Prepaid Expenses	4,020,623	0.01%	2,958,078	0.01%
g. Total Receivables and Prepaid Expenses	\$ 5,747,410,436	10.48%	\$ 5,430,213,496	10.11%
<b>3. Investments at Market Value</b>				
a. Fixed Income	\$ 8,697,165,058	15.86%	\$ 8,413,584,938	15.66%
b. Equities	18,475,666,319	33.68%	19,151,133,896	35.63%
c. Real Estate	6,255,857,685	11.41%	5,638,680,343	10.49%
d. Short Term Investments	848,587,909	1.55%	1,432,002,394	2.67%
e. Private Equity Investments	5,281,073,621	9.63%	5,038,446,122	9.38%
f. Real Return	2,994,366,309	5.46%	3,055,818,516	5.69%
g. Absolute Return	3,471,868,205	6.33%	2,618,256,628	4.87%
h. Foreign Currency	74,142,815	0.14%	84,850,132	0.16%
i. Derivatives	936,964	0.00%	2,805,648	0.01%
j. Total Investments	\$ 46,099,664,885	84.06%	\$ 45,435,578,617	84.56%
<b>4. Invested Securities Lending Collateral</b>				
a. Short-Term Investments	\$ 2,763,060,869	5.04%	\$ 2,718,126,389	5.06%
b. Fixed Income	125,008,362	0.23%	12,965,947	0.02%
c. Securities Lending Collateral with the State Treasurer	55,448,000	0.10%	67,457,000	0.13%
d. Total Invested Securities Lending Collateral	\$ 2,943,517,231	5.37%	\$ 2,798,549,336	5.21%
<b>5. Capital assets, net of accumulated depreciation</b>	\$ 3,947,730	0.01%	\$ 4,114,038	0.01%
<b>6. Total Assets (1.+2.g.+3.j.+4.d.+ 5.)</b>	\$ 54,840,249,817	100.00%	\$ 53,729,314,554	100.00%
<b>7. Liabilities</b>				
a. Benefit and Refunds Payable	\$ 6,928,533		\$ 8,324,286	
b. Administrative and Investment Expenses Payable	55,505,862		45,714,593	
c. Pending Investment Purchases	5,427,366,418		5,052,429,964	
d. Securities Lending Collateral	2,943,533,411		2,798,463,197	
e. Total Liabilities	\$ 8,433,334,224		\$ 7,904,932,040	
<b>8. Net Assets for Pension Benefits (6. - 7.e.)</b>	\$ 46,406,915,593		\$ 45,824,382,514	

## 2.2 Changes in Market Value of Assets

CHANGE IN MARKET VALUE OF ASSETS		
Transactions	Year Ended June 30, 2015	Year Ended June 30, 2014
<b>Additions</b>		
<b>1. Contributions</b>		
a. Members	\$ 935,451,049	\$ 928,745,853
b. State of Illinois	3,377,664,945	3,438,382,892
c. Employers		
i. Early Retirement	13,930,699	23,392,170
ii. Federal Funds	69,764,609	74,484,109
iii. 2.2 Benefit Formula	56,610,761	55,181,100
iv. Excess Salary/Sick Leave	5,285,516	5,277,219
d. Total Contributions	\$ 4,458,707,579	\$ 4,525,463,343
<b>2. Investment Income</b>		
<b>From Investment Activities</b>		
a. Net Appreciation (Depreciation)	\$ 753,800,289	\$ 5,804,678,228
b. Interest	241,478,494	236,947,917
c. Real Estate Operating Income	295,551,944	311,383,726
d. Dividends	472,773,697	515,858,875
e. Private Equity Income	93,663,968	117,978,674
f. Other Investment Income	227,659,217	81,912,282
g. Investment Activity Income	\$ 2,084,927,609	\$ 7,068,759,702
h. Less Investment Expense	(329,133,042)	(300,257,270)
i. Net Investment Activity Income	\$ 1,755,794,567	\$ 6,768,502,432
<b>From Securities Lending Activities</b>		
j. Securities Lending Income	\$ 10,166,086	\$ 7,541,948
k. Securities Lending Management Fees	(941,907)	(863,807)
l. Securities Lending Borrower Rebates	5,530,787	6,851,147
m. Net Securities Lending Activity Income	\$ 14,754,966	\$ 13,529,288
n. Total Investment Income	\$ 1,770,549,533	\$ 6,782,031,720
<b>3. Total Additions (1.d. + 2.n.)</b>	\$ 6,229,257,112	\$ 11,307,495,063
<b>Deductions</b>		
<b>4. Benefits and Expenses</b>		
a. Retirement Benefits	\$ 5,281,221,313	\$ 4,986,155,845
b. Survivor Benefits	224,779,380	208,424,078
c. Disability Benefits	30,398,754	30,626,905
d. Refunds	88,637,726	95,456,151
e. Administrative Expenses	21,686,860	21,218,069
f. Total Deductions	\$ 5,646,724,033	\$ 5,341,881,048
<b>5. Net Increase (Decrease)</b>	\$ 582,533,079	\$ 5,965,614,015
<b>6. Net Assets Held in Trust for Pension Benefits</b>		
a. Beginning of Year	\$ 45,824,382,514	\$ 39,858,768,499
b. End of Year	\$ 46,406,915,593	\$ 45,824,382,514

## 2.3 Actuarial Value of Assets

<b>DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS (with POB)</b>				
<b>as of June 30, 2015</b>				
1. Market Value of Assets as of June 30, 2014				\$ 45,824,382,514
2. Contributions				4,458,707,579
3. Distributions				5,646,724,033
4. Expected return at 7.50% on				
a. Item 1				3,436,828,689
b. Item 2.				167,201,534
c. Item 3.				211,752,151
d. Total (a. + b. - c.)				3,392,278,072
5. Actual return on Market Value for fiscal year				1,770,549,533
6. Gain / (Loss) to be spread for fiscal year (5. - 4.d.)				(1,621,728,539)
7. Total Market Value of Assets as of June 30, 2015 (1. + 2. -3. + 5.)				\$ 46,406,915,593
8. Return to be spread:				
	<b>Fiscal Year</b>	<b>Gain /</b>	<b>Unrecognized</b>	<b>Unrecognized</b>
	<b>Ending</b>	<b>(Loss)</b>	<b>Percent</b>	<b>Amount</b>
	2015	\$ (1,621,728,539)	80%	\$ (1,297,382,831)
	2014	3,625,986,948	60%	2,175,592,169
	2013	1,689,215,365	40%	675,686,146
	2012	(2,910,862,678)	20%	<u>(582,172,536)</u>
				\$ 971,722,948
9. Actuarial Value of Assets at June 30, 2015 (7. – 8.)				<b>\$ 45,435,192,645</b>
10. Recognized rate of return for the year on Actuarial Value of Assets				<b>10.76%</b>
11. Rate of return for the year on Market Value of Assets				<b>3.91%</b>



## 2.3 Actuarial Value of Assets (continued)

<b>DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS (without POB)</b>				
<b>as of June 30, 2015</b>				
1. Market Value of Assets as of June 30, 2014				\$ 40,531,741,961
2. Contributions				4,801,108,264
3. Distributions				5,646,724,033
4. Expected return at 7.50% on				
a. Item 1				3,039,880,647
b. Item 2.				180,041,560
c. Item 3.				211,752,151
d. Total (a. + b. - c.)				3,008,170,056
5. Actual return on Market Value for fiscal year				1,570,070,016
6. Gain / (Loss) to be spread for fiscal year (5. - 4.d.)				(1,438,100,040)
7. Total Market Value of Assets as of June 30, 2015 (1. + 2. -3. + 5.)				\$ 41,256,196,208
8. Return to be spread:				
	<b>Fiscal Year</b>	<b>Gain /</b>	<b>Unrecognized</b>	<b>Unrecognized</b>
	<b>Ending</b>	<b>(Loss)</b>	<b>Percent</b>	<b>Amount</b>
	2015	\$ (1,438,100,040)	80%	\$ (1,150,480,031)
	2014	3,197,370,397	60%	1,918,422,238
	2013	1,480,225,815	40%	592,090,326
	2012	(2,535,234,834)	20%	<u>(507,046,967)</u>
				\$ 852,985,566
9. Actuarial Value of Assets at June 30, 2015 (7. – 8.)				<b>\$ 40,403,210,642</b>
10. Recognized rate of return for the year on Actuarial Value of Assets				<b>10.71%</b>
11. Rate of return for the year on Market Value of Assets				<b>3.91%</b>

The Market Value of Assets is not the actual value, but is imputed assuming no POB. The Market Value of Assets at the beginning of the year is from the prior year's calculation. Contributions represent the actual amounts minus debt service for 2015 of \$342,400,685. The actual return on the Market Value of Assets is derived by applying the unrounded rate of return for 2015 to the beginning Market Value of Assets and the contributions and disbursements shown above.

## 2.4 10 Year History of System Revenue and Expenses

10-YEAR HISTORY OF SYSTEM REVENUE AND EXPENSES							
Year Ended June 30	Beginning of Year Market Value of Assets	Contributions		Market Value Income	Benefits and Expenses	End of Year Market Value of Assets	Investment Return
		Member	Employer				
2006	\$ 34,085,218,477	\$ 799,034,336	\$ 657,847,863	\$ 3,993,289,880	\$ 2,950,501,129	\$ 36,584,889,427	11.8%
2007	36,584,889,427	826,249,007	853,585,668	6,831,324,439	3,186,730,789	41,909,317,752	19.2%
2008	41,909,317,752	865,400,168	1,171,788,454	(2,014,413,780)	3,501,369,307	38,430,723,287	-5.0%
2009	38,430,723,287	876,182,122	1,603,920,569	(8,654,702,712)	3,724,811,024	28,531,312,242 *	-22.7%
2010	28,531,312,242	899,401,027	1,006,282,216	3,679,642,960	2,792,854,230	31,323,784,215	12.9%
2011	31,323,784,215	909,577,109	2,326,028,622	7,234,539,490	4,322,662,242	37,471,267,194	23.6%
2012	37,471,267,194	917,661,328	2,561,259,102	224,106,719	4,657,469,004	36,516,825,339	0.8%
2013	36,516,825,339	921,422,657	2,860,491,456	4,561,768,383	5,001,739,336	39,858,768,499	12.7%
2014	39,858,768,499	928,745,853	3,596,717,490	6,782,031,720	5,341,881,048	45,824,382,514	17.2%
2015	45,824,382,514	935,451,049	3,523,256,530	1,770,549,533	5,646,724,033	46,406,915,593	3.9%

Notes: Market Value Income represents the net appreciation/(depreciation) in the market value of assets after adjusting for contributions received and benefits and expenses paid.

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

## 2.5 Development of Projected Actuarial Values of Assets with POB

For determining the certified employer contributions in Section 1.2, the Actuarial Value of Assets is projected one year from the valuation date to the beginning of the contribution fiscal year. The projection assumes no investment gains or losses on the Actuarial Value of Assets, meaning the return is the expected amount based on the assumed interest rate and current Actuarial Value of Assets, as illustrated below.

<b>Projected Actuarial Value of Assets (with POB) as of June 30, 2016 for Section 1.2 - Derivation of Employer Contributions</b>	
1. Actuarial Value of Assets as of June 30, 2015	\$ 45,435,192,645
2. Assumed contributions	4,988,427,944
3. Assumed distributions	5,892,627,459
4. Expected return at 7.50% on 1., 2., and 3.	3,373,731,967
5. Projected Actuarial Value of Assets as of June 30, 2016 (1.+ 2. -3.+ 4.)	<b>\$ 47,904,725,097</b>

For projecting future years' valuation results in Section 4, the Market Value of Assets is projected from the current valuation date. The Actuarial Value of Assets is derived from the projected Market Value of Assets, reflecting gains and losses for the years prior to the projected valuation date. The following illustrates a projection of the assets for a valuation date one year after the current valuation date. Future years are similarly projected.

<b>Projected Actuarial Value of Assets (with POB) as of June 30, 2016 for Section 4 - Valuation Projections</b>																									
1. Market Value of Assets as of June 30, 2015	\$ 46,406,915,593																								
2. Assumed contributions	4,988,427,944																								
3. Assumed distributions	5,892,627,459																								
4. Expected return at 7.50% on 1., 2., and 3.	3,446,611,188																								
5. Assumed actual return on Market Value for fiscal year (4.)	3,446,611,188																								
6. Gain / (Loss) to be spread for fiscal year (5. - 4.)	0																								
7. Assumed Market Value of Assets as of June 30, 2016 (1.+ 2. -3.+ 5.)	\$ 48,949,327,266																								
8. Return to be spread:																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Fiscal Year Ending</th> <th style="text-align: center;">Gain / (Loss)</th> <th style="text-align: center;">Unrecognized Percent</th> <th style="text-align: center;">Unrecognized Amount</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">2016</td> <td style="text-align: center;">\$ -</td> <td style="text-align: center;">80%</td> <td style="text-align: center;">\$ -</td> </tr> <tr> <td style="text-align: center;">2015</td> <td style="text-align: center;">(1,621,728,539)</td> <td style="text-align: center;">60%</td> <td style="text-align: center;">(973,037,123)</td> </tr> <tr> <td style="text-align: center;">2014</td> <td style="text-align: center;">3,625,986,948</td> <td style="text-align: center;">40%</td> <td style="text-align: center;">1,450,394,779</td> </tr> <tr> <td style="text-align: center;">2013</td> <td style="text-align: center;">1,689,215,365</td> <td style="text-align: center;">20%</td> <td style="text-align: center;"><u>337,843,073</u></td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;">\$ 815,200,729</td> </tr> </tbody> </table>	Fiscal Year Ending	Gain / (Loss)	Unrecognized Percent	Unrecognized Amount	2016	\$ -	80%	\$ -	2015	(1,621,728,539)	60%	(973,037,123)	2014	3,625,986,948	40%	1,450,394,779	2013	1,689,215,365	20%	<u>337,843,073</u>				\$ 815,200,729
Fiscal Year Ending	Gain / (Loss)	Unrecognized Percent	Unrecognized Amount																						
2016	\$ -	80%	\$ -																						
2015	(1,621,728,539)	60%	(973,037,123)																						
2014	3,625,986,948	40%	1,450,394,779																						
2013	1,689,215,365	20%	<u>337,843,073</u>																						
			\$ 815,200,729																						
9. Projected Actuarial Value of Assets at June 30, 2016 (7. – 8.)	<b>\$ 48,134,126,537</b>																								
10. Recognized rate of return for the year on Actuarial Value of Assets	<b>8.01%</b>																								
11. Rate of return for the year on Market Value of Assets	<b>7.50%</b>																								

## 2.6 Development of Projected Actuarial Values of Assets without POB

For determining the certified employer contributions in Section 1.2, the Actuarial Value of Assets is projected one year from the valuation date to the beginning of the contribution fiscal year. The projection assumes no investment gains or losses on the Actuarial Value of Assets, meaning the return is the expected amount based on the assumed interest rate and current Actuarial Value of Assets, as illustrated below.

<b>Projected Actuarial Value of Assets (without POB) as of June 30, 2016 for Section 1.2 - Derivation of Employer Contributions</b>	
1. Actuarial Value of Assets as of June 30, 2015	\$ 40,403,210,642
2. Assumed contributions	5,328,431,839
3. Assumed distributions	5,892,627,459
4. Expected return at 7.50% on 1., 2., and 3.	3,009,083,463
5. Projected Actuarial Value of Assets as of June 30, 2016 (1.+ 2. -3.+ 4.)	<b>\$ 42,848,098,485</b>

For projecting future years' valuation results in Section 4, the Market Value of Assets is projected from the current valuation date. The Actuarial Value of Assets is derived from the projected Market Value of Assets, reflecting gains and losses for the years prior to the projected valuation date. The following illustrates a projection of the assets for a valuation date one year after the current valuation date. Future years are similarly projected.

<b>Projected Actuarial Value of Assets (without POB) as of June 30, 2016 for Section 4 - Valuation Projections</b>																									
1. Market Value of Assets as of June 30, 2015	\$ 41,256,196,208																								
2. Assumed contributions	5,328,431,839																								
3. Assumed distributions	5,892,627,459																								
4. Expected return at 7.50% on 1., 2., and 3.	3,073,057,380																								
5. Assumed actual return on Market Value for fiscal year (4.)	3,073,057,380																								
6. Gain / (Loss) to be spread for fiscal year (5. - 4.)	0																								
7. Assumed Market Value of Assets as of June 30, 2016 (1.+ 2. -3.+ 5.)	\$ 43,765,057,968																								
8. Return to be spread:																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Fiscal Year Ending</th> <th style="text-align: right;">Gain / (Loss)</th> <th style="text-align: right;">Unrecognized Percent</th> <th style="text-align: right;">Unrecognized Amount</th> </tr> </thead> <tbody> <tr> <td style="text-align: right;">2016</td> <td style="text-align: right;">\$ -</td> <td style="text-align: right;">80%</td> <td style="text-align: right;">\$ -</td> </tr> <tr> <td style="text-align: right;">2015</td> <td style="text-align: right;">(1,438,100,040)</td> <td style="text-align: right;">60%</td> <td style="text-align: right;">(862,860,024)</td> </tr> <tr> <td style="text-align: right;">2014</td> <td style="text-align: right;">3,197,370,397</td> <td style="text-align: right;">40%</td> <td style="text-align: right;">1,278,948,159</td> </tr> <tr> <td style="text-align: right;">2013</td> <td style="text-align: right;">1,480,225,815</td> <td style="text-align: right;">20%</td> <td style="text-align: right;">296,045,163</td> </tr> <tr> <td></td> <td></td> <td></td> <td style="text-align: right;">\$ 712,133,298</td> </tr> </tbody> </table>	Fiscal Year Ending	Gain / (Loss)	Unrecognized Percent	Unrecognized Amount	2016	\$ -	80%	\$ -	2015	(1,438,100,040)	60%	(862,860,024)	2014	3,197,370,397	40%	1,278,948,159	2013	1,480,225,815	20%	296,045,163				\$ 712,133,298
Fiscal Year Ending	Gain / (Loss)	Unrecognized Percent	Unrecognized Amount																						
2016	\$ -	80%	\$ -																						
2015	(1,438,100,040)	60%	(862,860,024)																						
2014	3,197,370,397	40%	1,278,948,159																						
2013	1,480,225,815	20%	296,045,163																						
			\$ 712,133,298																						
9. Projected Actuarial Value of Assets at June 30, 2016 (7. – 8.)	<b>\$ 43,052,924,670</b>																								
10. Recognized rate of return for the year on Actuarial Value of Assets	<b>8.01%</b>																								
11. Rate of return for the year on Market Value of Assets	<b>7.50%</b>																								

## Section 3: Accounting Information

### 3.1 Schedule of Funding Progress

GASB 25 Schedule of Funding Progress						
Actuarial Valuation Date	Actuarial Value of Assets (a) *	Actuarial Accrued Liability (AAL) -- Projected Unit Credit (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a)/(b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a)/c)
6/30/2006	\$ 36,584,889,427	\$ 58,996,912,735	\$ 22,412,024,000	62.0%	\$ 7,765,752,000	288.6%
6/30/2007**	41,909,317,753	65,648,394,666	23,739,077,000	63.8%	8,149,849,000	291.3%
6/30/2008	38,430,723,287	68,632,366,686	30,201,644,000	56.0%	8,521,717,000	354.4%
6/30/2009	38,026,043,512	73,027,198,172	35,001,154,000	52.1%	8,945,021,000	391.3%
6/30/2010	37,439,091,771	77,293,197,626	39,854,105,855	48.4%	9,251,139,345	430.8%
6/30/2011	37,769,752,972	81,299,745,296	43,529,992,324	46.5%	9,205,602,667	472.9%
6/30/2012**	37,945,397,211	90,024,945,369	52,079,548,158	42.1%	9,321,098,000	558.7%
6/30/2013	38,155,191,497	93,886,988,785	55,731,797,288	40.6%	9,394,741,000	593.2%
6/30/2014***	42,150,765,261	103,740,377,267	61,589,612,006	40.6%	9,512,809,680	647.4%
6/30/2015****	45,435,192,645	108,121,825,171	62,686,632,526	42.0%	9,641,170,627	650.2%

\* For 2005 to 2008: Assets are at fair market value.

For 2009 and later: Assets are 5-year smoothed value.

\*\* Revised economic and noneconomic assumptions due to experience review.

\*\*\* Revised economic assumptions due to change in investment policy.

\*\*\*\* Revised economic and noneconomic assumptions due to experience review.

### 3.2 Schedule of Employer Contributions

GASB 25 Schedule of Employer Contributions (\$ in thousands)		
Total Employer Contributions		
Year Ended June 30	Annual Required Contribution	Percentage Contributed
2006	\$ 1,679,524	35.8%
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%

### 3.3 Development of the Annual Required Contribution (ARC)

GASB 25 ARC (\$ in thousands)			
Development of the ARC		Fiscal Year Ended June 30, 2015	
Item			
1.	Employer Normal Cost	\$	835,811
2.	Amortization of Unfunded AAL *		3,283,715
3.	Annual Required Contribution (ARC) (1. + 2.)	\$	4,119,526

\* The unfunded AAL 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 amounts for fiscal year ending June 30, 2015 are based on the valuation date of June 30, 2013.

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:	8.00%
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)

### 3.4 GASB 67 Net Pension Liability

Net Pension Liability (Asset)	June 30, 2015	June 30, 2014
Total Pension Liability	\$ 111,916,989,345	\$ 106,682,654,886
less Plan Fiduciary Net Position	<u>46,406,915,593</u>	<u>45,824,382,514</u>
Net Pension Liability (Asset)	\$ 65,510,073,752	\$ 60,858,272,372
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability (Asset)	41.47%	42.95%

Schedule of Changes in Net Pension Liability as of June 30, 2015	
<b>Total Pension Liability</b>	
Service Cost	\$ 1,948,079,771
Interest	7,864,916,421
Changes of Benefit Terms	-
Difference between Expected and Actual Experience	(90,079,446)
Change of Assumptions	1,136,454,886
Benefit Payments, including Refund of Member Contributions	<u>(5,625,037,173)</u>
Net Change in Total Pension Liability	5,234,334,459
Total Pension Liability - Beginning of Year	\$ 106,682,654,886
Total Pension Liability - End of Year	\$ 111,916,989,345
<b>Plan Fiduciary Net Position</b>	
Employer Contributions	\$ 3,523,256,530
Member Contributions	935,451,049
Net Investment Income	1,770,549,533
Benefit Payments, including Refund of Member Contributions	(5,625,037,173)
Administrative Expenses	(21,686,860)
Other	<u>0</u>
Net Change in Plan Fiduciary Net Position	582,533,079
Plan Fiduciary Net Position - Beginning of Year	\$ 45,824,382,514
Plan Fiduciary Net Position - End of Year	\$ 46,406,915,593

Sensitivity of the Net Pension Liability to Changes in the Discount Rate			
	1% Decrease	Current	1% Increase
Discount Rate	6.47%	7.47%	8.47%
Net Pension Liability (Asset)	\$ 80,954,388,749	\$ 65,510,073,752	\$ 52,845,317,289

**GASB 67 Assumptions and Methods:**

The assumptions under GASB 67 are the same as under GASB 25 except for the development of the discount rate. The discount rate as of June 30, 2015 is a blend of the assumed long-term rate of return rate of 7.50% and a municipal bond rate of 3.73%, which is the S&P Municipal Bond 20 Year High Grade Rate Index as of June 30, 2015. The blended rate is 7.47%, as developed in Section 3.5 of this report.

The actuarial cost method required under GASB 67 is the entry age normal method. For this system, Total Pension Liability is developed and rolled forward to the fiscal year end based on a valuation date and member census one year prior. For example, TPL is projected to June 30, 2015 based on a valuation date of June 30, 2014. Assets, referred to as Fiduciary Net Position, are measured at fair market value.

### 3.5 Development of GASB 67 Discount Rate

Projection of Fiduciary Net Position (\$ in thousands)							
Year Ended June 30	Beginning Fiduciary Net Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Net Position
2016	46,406,916	\$ 1,018,470	\$ 3,946,620	\$ 5,851,945	\$ 22,885	\$ 3,446,403	\$ 48,943,579
2017	48,943,579	962,917	4,180,235	6,108,572	23,595	3,633,680	51,588,244
2018	51,588,244	947,428	4,296,478	6,372,900	24,331	3,825,870	54,260,789
2019	54,260,789	932,805	4,382,457	6,642,994	25,090	4,018,828	56,926,795
2020	56,926,795	921,076	4,484,571	6,920,404	25,876	4,211,736	59,597,898
2021	59,597,898	909,785	4,638,874	7,201,336	26,694	4,406,865	62,325,392
2022	62,325,392	899,062	4,782,901	7,486,232	27,548	4,605,711	65,099,286
2023	65,099,286	889,907	4,939,870	7,775,012	28,442	4,808,434	67,934,043
2024	67,934,043	878,986	5,087,170	8,070,447	29,370	5,015,042	70,815,424
2025	70,815,424	867,969	5,242,402	8,378,795	30,325	5,224,953	73,741,628
2026	73,741,628	854,844	5,419,316	8,697,104	31,311	5,438,588	76,725,961
2027	76,725,961	845,707	5,606,883	9,028,375	32,325	5,656,643	79,774,494
2028	79,774,494	829,883	5,773,028	9,376,428	33,362	5,877,830	82,845,445
2029	82,845,445	816,630	5,952,561	9,736,869	34,425	6,100,829	85,944,171
2030	85,944,171	802,183	6,126,033	10,101,522	35,523	6,325,482	89,060,824
2031	89,060,824	789,325	6,314,995	10,473,050	36,652	6,551,861	92,207,303
2032	92,207,303	776,987	6,523,630	10,854,114	37,806	6,780,873	95,396,873
2033	95,396,873	761,085	6,748,782	11,247,295	38,974	7,013,151	98,633,622
2034	98,633,622	744,424	7,465,393	11,645,712	40,139	7,267,170	102,424,758
2035	102,424,758	726,767	7,675,902	12,049,945	41,293	7,543,534	106,279,723
2036	106,279,723	707,483	7,881,991	12,449,857	42,441	7,824,624	110,201,523
2037	110,201,523	691,407	8,088,549	12,842,951	43,571	8,111,118	114,206,075
2038	114,206,075	673,077	8,285,756	13,235,128	44,658	8,403,420	118,288,542
2039	118,288,542	651,741	8,465,416	13,619,048	45,693	8,701,107	122,442,065
2040	122,442,065	629,593	8,636,972	14,003,300	46,685	9,003,776	126,662,421
2041	126,662,421	605,068	8,792,377	14,358,532	47,638	9,311,854	130,965,550
2042	130,965,550	580,806	8,937,907	14,680,017	48,560	9,627,046	135,382,732
2043	135,382,732	559,638	9,080,980	14,951,914	49,470	9,952,677	139,974,643
2044	139,974,643	539,115	9,218,691	15,150,259	50,373	10,293,993	144,825,810
2045	144,825,810	528,522	9,367,754	15,296,349	51,270	10,657,510	150,031,977
2046	150,031,977	525,652	1,235,255	15,370,321	52,161	10,740,090	147,110,492
2047	147,110,492	528,025	1,248,249	15,388,972	53,043	10,520,823	143,965,574
2048	143,965,574	533,723	1,268,820	15,358,941	53,917	10,287,030	140,642,289
2049	140,642,289	541,536	1,293,962	15,296,397	54,785	10,041,334	137,167,939
2050	137,167,939	549,790	1,322,509	15,214,764	55,646	9,785,165	133,554,993
2051	133,554,993	558,315	1,358,652	15,137,531	56,500	9,518,734	129,796,663
2052	129,796,663	566,628	1,392,556	15,061,297	57,350	9,241,270	125,878,470
2053	125,878,470	574,900	1,425,050	14,970,706	58,207	8,952,298	121,801,805
2054	121,801,805	583,714	1,456,020	14,860,441	59,075	8,652,144	117,574,167
2055	117,574,167	592,962	1,486,649	14,733,443	59,951	8,341,295	113,201,679
2056	113,201,679	602,535	1,522,633	14,598,868	60,831	8,020,082	108,687,230
2057	108,687,230	612,093	1,553,538	14,453,341	61,725	7,688,439	104,026,234
2058	104,026,234	621,875	1,582,965	14,289,709	62,634	7,346,435	99,225,166
2059	99,225,166	632,389	1,611,124	14,102,988	63,558	6,994,773	94,296,906
2060	94,296,906	643,191	1,638,330	13,891,296	64,499	6,634,483	89,257,115
2061	89,257,115	654,144	1,663,886	13,654,293	65,453	6,266,718	84,122,117
2062	84,122,117	665,024	1,685,583	13,390,802	66,426	5,892,660	78,908,156
2063	78,908,156	675,958	1,704,743	13,099,261	67,417	5,513,638	73,635,817
2064	73,635,817	686,994	1,721,080	12,779,356	68,424	5,131,197	68,327,308
2065	68,327,308	697,793	1,734,767	12,429,813	69,449	4,747,046	63,007,652



### 3.5 Development of GASB 67 Discount Rate (continued)

Projection of Fiduciary Net Position (\$ in thousands)								
Year Ended June 30	Beginning Fiduciary Net Position	Member Contributions	Employer Contributions	Benefit Payments	Administrative Expenses	Investment Earnings	Ending Fiduciary Net Position	
2066	\$ 63,007,652	\$ 708,488	\$ 1,745,696	\$ 12,049,852	\$ 70,492	\$ 4,363,094	\$	\$ 57,704,586
2067	57,704,586	719,115	1,753,738	11,639,170	71,552	3,981,423		52,448,140
2068	52,448,140	729,708	1,758,901	11,198,048	72,631	3,604,283		47,270,353
2069	47,270,353	740,271	1,761,444	10,727,472	73,729	3,234,045		42,204,912
2070	42,204,912	750,890	1,761,234	10,229,057	74,846	2,873,177		37,286,310
2071	37,286,310	761,561	1,758,451	9,705,061	75,982	2,524,184		32,549,463
2072	32,549,463	772,354	1,753,349	9,158,401	77,138	2,189,592		28,029,219
2073	28,029,219	783,318	1,746,133	8,592,565	78,313	1,871,886		23,759,678
2074	23,759,678	794,468	1,737,290	8,011,584	79,509	1,573,502		19,773,845
2075	19,773,845	805,905	1,727,088	7,420,024	80,725	1,296,747		16,102,836
2076	16,102,836	817,607	1,715,876	6,822,879	81,962	1,043,786		12,775,264
2077	12,775,264	829,645	1,704,319	6,225,478	83,221	816,594		9,817,123
2078	9,817,123	842,095	1,692,661	5,633,437	84,501	616,915		7,250,856
2079	7,250,856	854,970	1,681,566	5,052,492	85,803	446,247		5,095,344
2080	5,095,344	868,341	1,671,540	4,488,390	87,127	305,815		3,365,523
2081	3,365,523	881,169	1,633,874	3,907,999	88,475	196,861		2,080,953
2082	2,080,953	894,101	1,603,855	3,399,163	89,846	118,908		1,208,808
2083	1,208,808	907,128	1,577,539	2,922,190	91,240	70,832		750,877
2084	750,877	920,244	1,555,330	2,480,928	92,659	52,640		705,504
2085	705,504	933,446	1,537,543	2,078,360	94,103	64,108		1,068,138
2086	1,068,138	946,727	1,524,401	1,716,518	95,573	104,825		1,832,000
2087	1,832,000	960,084	1,516,020	1,396,385	97,068	174,249		2,988,900
2088	2,988,900	973,513	1,512,405	1,117,846	98,589	271,774		4,530,157
2089	4,530,157	987,007	1,513,466	879,737	100,137	396,784		6,447,540
2090	6,447,540	1,000,559	1,519,011	679,940	101,713	548,737		8,734,194
2091	8,734,194	1,014,159	1,528,778	515,548	103,318	727,217		11,385,482
2092	11,385,482	1,027,797	1,542,437	383,052	104,950	931,994		14,399,708
2093	14,399,708	1,041,480	1,559,611	278,553	106,613	1,163,077		17,778,710
2094	17,778,710	1,055,197	1,579,926	197,997	108,305	1,420,734		21,528,265
2095	21,528,265	1,068,938	1,603,008	137,385	110,028	1,705,540		25,658,338
2096	25,658,338	1,082,692	1,628,510	92,928	111,783	2,018,368		30,183,197
2097	30,183,197	1,096,450	1,656,112	61,187	113,570	2,360,406		35,121,408
2098	35,121,408	1,110,218	1,685,530	39,158	115,391	2,733,150		40,495,757
2099	40,495,757	1,123,976	1,716,552	24,324	117,246	3,138,393		46,333,108
2100	46,333,108	1,137,713	1,749,008	14,649	119,135	3,578,217		52,664,262
2101	52,664,262	1,151,419	1,782,771	8,544	121,061	4,054,991		59,523,838
2102	59,523,838	1,165,082	1,817,752	4,823	123,023	4,571,350		66,950,176
2103	66,950,176	1,178,695	1,853,900	2,635	125,024	5,130,198		74,985,310
2104	74,985,310	1,192,239	1,891,197	1,394	127,063	5,734,710		83,674,999
2105	83,674,999	1,205,702	1,929,641	715	129,142	6,388,330		93,068,815
2106	93,068,815	1,219,071	1,969,242	356	131,262	7,094,787		103,220,297
2107	103,220,297	1,232,336	2,010,022	172	133,423	7,858,102		114,187,162
2108	114,187,162	1,245,486	2,052,009	80	135,628	8,682,604		126,031,553
2109	126,031,553	1,258,507	2,095,239	36	137,877	9,572,959		138,820,345
2110	138,820,345	1,271,386	2,139,745	16	140,170	10,534,187		152,625,477
2111	152,625,477	1,284,117	2,185,561	7	142,510	11,571,681		167,524,319
2112	167,524,319	1,296,687	2,232,728	3	144,897	12,691,243		183,600,077
2113	183,600,077							

Projection is on a closed group basis except Member Contributions includes new member contributions in excess of their service cost. Employer Contributions includes amounts for Administrative Expenses.

### 3.5 Development of GASB 67 Discount Rate (continued)

Present Values of Projected Benefits (\$ in thousands)								
Year Ended June 30	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments			
					Funded Payments at 7.50%	Unfunded Payments at 3.73%	Using Single Discount Rate of 7.47%	
2016	\$ 46,406,916	\$ 5,851,945	\$ 5,851,945	\$ 0	\$ 5,644,117	\$ 0	\$ 5,644,905	
2017	48,943,579	6,108,572	6,108,572	0	5,480,586	0	5,482,881	
2018	51,588,244	6,372,900	6,372,900	0	5,318,828	0	5,322,541	
2019	54,260,789	6,642,994	6,642,994	0	5,157,441	0	5,162,481	
2020	56,926,795	6,920,404	6,920,404	0	4,997,967	0	5,004,248	
2021	59,597,898	7,201,336	7,201,336	0	4,838,007	0	4,845,440	
2022	62,325,392	7,486,232	7,486,232	0	4,678,518	0	4,687,013	
2023	65,099,286	7,775,012	7,775,012	0	4,519,991	0	4,529,463	
2024	67,934,043	8,070,447	8,070,447	0	4,364,411	0	4,374,778	
2025	70,815,424	8,378,795	8,378,795	0	4,215,035	0	4,226,226	
2026	73,741,628	8,697,104	8,697,104	0	4,069,919	0	4,081,864	
2027	76,725,961	9,028,375	9,028,375	0	3,930,178	0	3,942,813	
2028	79,774,494	9,376,428	9,376,428	0	3,796,922	0	3,810,192	
2029	82,845,445	9,736,869	9,736,869	0	3,667,795	0	3,681,641	
2030	85,944,171	10,101,522	10,101,522	0	3,539,681	0	3,554,035	
2031	89,060,824	10,473,050	10,473,050	0	3,413,831	0	3,428,632	
2032	92,207,303	10,854,114	10,854,114	0	3,291,203	0	3,306,395	
2033	95,396,873	11,247,295	11,247,295	0	3,172,488	0	3,188,021	
2034	98,633,622	11,645,712	11,645,712	0	3,055,691	0	3,071,510	
2035	102,424,758	12,049,945	12,049,945	0	2,941,169	0	2,957,221	
2036	106,279,723	12,449,857	12,449,857	0	2,826,772	0	2,842,993	
2037	110,201,523	12,842,951	12,842,951	0	2,712,582	0	2,728,909	
2038	114,206,075	13,235,128	13,235,128	0	2,600,385	0	2,616,767	
2039	118,288,542	13,619,048	13,619,048	0	2,489,131	0	2,505,512	
2040	122,442,065	14,003,300	14,003,300	0	2,380,801	0	2,397,137	
2041	126,662,421	14,358,532	14,358,532	0	2,270,880	0	2,287,100	
2042	130,965,550	14,680,017	14,680,017	0	2,159,744	0	2,175,777	
2043	135,382,732	14,951,914	14,951,914	0	2,046,275	0	2,062,042	
2044	139,974,643	15,150,259	15,150,259	0	1,928,763	0	1,944,167	
2045	144,825,810	15,296,349	15,296,349	0	1,811,499	0	1,826,476	
2046	150,031,977	15,370,321	15,370,321	0	1,693,264	0	1,707,740	
2047	147,110,492	15,388,972	15,388,972	0	1,577,041	0	1,590,967	
2048	143,965,574	15,358,941	15,358,941	0	1,464,152	0	1,477,494	
2049	140,642,289	15,296,397	15,296,397	0	1,356,456	0	1,369,198	
2050	137,167,939	15,214,764	15,214,764	0	1,255,085	0	1,267,229	
2051	133,554,993	15,137,531	15,137,531	0	1,161,595	0	1,173,161	
2052	129,796,663	15,061,297	15,061,297	0	1,075,111	0	1,086,120	
2053	125,878,470	14,970,706	14,970,706	0	994,088	0	1,004,547	
2054	121,801,805	14,860,441	14,860,441	0	917,922	0	927,839	
2055	117,574,167	14,733,443	14,733,443	0	846,584	0	855,969	
2056	113,201,679	14,598,868	14,598,868	0	780,327	0	789,197	
2057	108,687,230	14,453,341	14,453,341	0	718,649	0	727,022	
2058	104,026,234	14,289,709	14,289,709	0	660,942	0	668,829	
2059	99,225,166	14,102,988	14,102,988	0	606,796	0	614,208	
2060	94,296,906	13,891,296	13,891,296	0	555,989	0	562,938	
2061	89,257,115	13,654,293	13,654,293	0	508,375	0	514,872	
2062	84,122,117	13,390,802	13,390,802	0	463,781	0	469,839	
2063	78,908,156	13,099,261	13,099,261	0	422,031	0	427,664	
2064	73,635,817	12,779,356	12,779,356	0	383,000	0	388,220	
2065	68,327,308	12,429,813	12,429,813	0	346,534	0	351,355	

### 3.5 Development of GASB 67 Discount Rate (continued)

Present Values of Projected Benefits (\$ in thousands)							
Year Ended June 30	Beginning Fiduciary Position	Benefit Payments	Funded Benefit Payments	Unfunded Benefit Payments	Present Value of Benefit Payments		
					Funded Payments at 7.50%	Unfunded Payments at 3.73%	Using Single Discount Rate of 7.47%
2066	\$ 63,007,652	\$ 12,049,852	\$ 12,049,852	\$ 0	\$ 312,503	\$ 0	\$ 316,939
2067	57,704,586	11,639,170	11,639,170	0	280,793	0	284,858
2068	52,448,140	11,198,048	11,198,048	0	251,303	0	255,013
2069	47,270,353	10,727,472	10,727,472	0	223,947	0	227,316
2070	42,204,912	10,229,057	10,229,057	0	198,643	0	201,688
2071	37,286,310	9,705,061	9,705,061	0	175,319	0	178,056
2072	32,549,463	9,158,401	9,158,401	0	153,901	0	156,347
2073	28,029,219	8,592,565	8,592,565	0	134,319	0	136,492
2074	23,759,678	8,011,584	8,011,584	0	116,499	0	118,417
2075	19,773,845	7,420,024	7,420,024	0	100,369	0	102,050
2076	16,102,836	6,822,879	6,822,879	0	85,853	0	87,315
2077	12,775,264	6,225,478	6,225,478	0	72,871	0	74,132
2078	9,817,123	5,633,437	5,633,437	0	61,340	0	62,420
2079	7,250,856	5,052,492	5,052,492	0	51,176	0	52,091
2080	5,095,344	4,488,390	4,488,390	0	42,291	0	43,059
2081	3,365,523	3,907,999	3,365,523	542,476	29,498	49,277	34,885
2082	2,080,953	3,399,163	2,080,953	1,318,210	16,967	115,437	28,234
2083	1,208,808	2,922,190	1,208,808	1,713,382	9,168	144,647	22,585
2084	750,877	2,480,928	750,877	1,730,051	5,298	140,802	17,842
2085	705,504	2,078,360	705,504	1,372,856	4,630	107,714	13,908
2086	1,068,138	1,716,518	1,068,138	648,380	6,521	49,042	10,688
2087	1,832,000	1,396,385	1,396,385	0	7,930	0	8,090
2088	2,988,900	1,117,846	1,117,846	0	5,906	0	6,026
2089	4,530,157	879,737	879,737	0	4,323	0	4,413
2090	6,447,540	679,940	679,940	0	3,108	0	3,174
2091	8,734,194	515,548	515,548	0	2,192	0	2,239
2092	11,385,482	383,052	383,052	0	1,515	0	1,548
2093	14,399,708	278,553	278,553	0	1,025	0	1,047
2094	17,778,710	197,997	197,997	0	678	0	693
2095	21,528,265	137,385	137,385	0	437	0	447
2096	25,658,338	92,928	92,928	0	275	0	282
2097	30,183,197	61,187	61,187	0	169	0	172
2098	35,121,408	39,158	39,158	0	100	0	103
2099	40,495,757	24,324	24,324	0	58	0	59
2100	46,333,108	14,649	14,649	0	32	0	33
2101	52,664,262	8,544	8,544	0	18	0	18
2102	59,523,838	4,823	4,823	0	9	0	9
2103	66,950,176	2,635	2,635	0	5	0	5
2104	74,985,310	1,394	1,394	0	2	0	2
2105	83,674,999	715	715	0	1	0	1
2106	93,068,815	356	356	0	1	0	1
2107	103,220,297	172	172	0	0	0	0
2108	114,187,162	80	80	0	0	0	0
2109	126,031,553	36	36	0	0	0	0
2110	138,820,345	16	16	0	0	0	0
2111	152,625,477	7	7	0	0	0	0
2112	167,524,319	3	3	0	0	0	0

## Section 4: Plan Projections

### 4.1 Projection Assumptions

Projections of contribution requirements and funded status into the future can be helpful planning tools for stakeholders. This section provides such projections. The projections of the actuarial valuation are known as deterministic projections. Deterministic projections are based on one scenario in the future. The baseline deterministic projection is based on the June 30, 2015 valuation results and assumptions.

Key Projection Assumptions:

- Valuation interest rate of 7.50% for all years
- 7.50% investment return on market value of assets
- Actuarial assumptions and methods as described in Section 6.3. All future demographic experience is assumed to be exactly realized
- The projected annual contributions under the Illinois Pension Code are contributed each year
- 0% increase in the total active member population as of the June 30, 2014 measurement date
- Future pay increases based on long-term salary increase assumptions

The assets have been split by Tier for illustration purposes. Estimated Tier II assets are based on the June 30, 2013 accumulated member contributions of \$70,783,523.

## 4.2 Projection of Funded Ratio to 2046

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)			42.2%
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%
<b>2015</b>	<b>108,121,825,171</b>	<b>45,435,192,645</b>	<b>(62,686,632,526)</b>	<b>41.9%</b>	<b>162.8%</b>	<b>42.0%</b>
2016	112,058,435,886	48,134,126,537	(63,924,309,349)	42.7%	159.4%	43.0%
2017	116,053,616,787	51,567,802,440	(64,485,814,348)	44.1%	158.8%	44.4%
2018	120,100,676,345	54,735,345,549	(65,365,330,796)	45.2%	157.7%	45.6%
2019	124,194,249,014	57,214,525,393	(66,979,723,621)	45.5%	155.1%	46.1%
2020	128,327,555,116	60,066,283,470	(68,261,271,647)	46.1%	154.0%	46.8%
2021	132,508,598,117	63,029,620,576	(69,478,977,540)	46.7%	153.0%	47.6%
2022	136,736,024,191	66,099,088,156	(70,636,936,036)	47.2%	152.0%	48.3%
2023	141,008,774,390	69,294,190,657	(71,714,583,733)	47.8%	151.2%	49.1%
2024	145,320,457,719	72,605,822,090	(72,714,635,629)	48.4%	150.4%	50.0%
2025	149,677,284,035	76,059,474,467	(73,617,809,568)	49.0%	149.8%	50.8%
2026	154,056,253,121	79,665,448,511	(74,390,804,610)	49.5%	149.2%	51.7%
2027	158,440,018,119	83,434,456,976	(75,005,561,144)	50.2%	148.6%	52.7%
2028	162,803,675,579	87,334,072,085	(75,469,603,494)	50.8%	148.0%	53.6%
2029	167,124,584,818	91,377,951,289	(75,746,633,529)	51.4%	147.5%	54.7%
2030	171,391,412,589	95,566,056,512	(75,825,356,077)	52.0%	147.0%	55.8%
2031	175,586,374,001	99,918,474,716	(75,667,899,285)	52.7%	146.6%	56.9%
2032	179,687,663,760	104,458,291,630	(75,229,372,131)	53.4%	146.2%	58.1%
2033	183,666,803,900	109,200,228,838	(74,466,575,062)	54.2%	145.9%	59.5%
2034	187,497,800,859	114,660,769,337	(72,837,031,522)	55.3%	145.5%	61.2%
2035	191,156,690,746	120,360,420,453	(70,796,270,293)	56.6%	145.2%	63.0%
2036	194,623,457,938	126,306,780,704	(68,316,677,234)	57.9%	144.9%	64.9%
2037	197,884,293,121	132,524,259,478	(65,360,033,644)	59.3%	144.5%	67.0%
2038	200,918,062,481	139,017,099,117	(61,900,963,364)	60.8%	144.2%	69.2%
2039	203,706,309,041	145,787,188,402	(57,919,120,639)	62.5%	143.9%	71.6%
2040	206,226,299,958	152,842,233,326	(53,384,066,632)	64.3%	143.6%	74.1%
2041	208,475,955,874	160,199,203,166	(48,276,752,708)	66.4%	143.2%	76.8%
2042	210,467,058,870	167,896,630,898	(42,570,427,972)	68.6%	142.9%	79.8%
2043	212,235,363,381	176,002,938,804	(36,232,424,577)	71.1%	142.5%	82.9%
2044	213,845,855,654	184,608,472,986	(29,237,382,667)	73.9%	142.2%	86.3%
2045	215,355,569,498	193,820,012,548	(21,535,556,950)	77.1%	141.9%	90.0%
2046	216,823,856,225	195,141,470,603	(21,682,385,623)	75.6%	141.5%	90.0%

### 4.3 Projection of Contributions to Trust to 2046 (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							
	Member	School District			Total	Federal Funds	State	Total
		§ 16-158(f) (FAS Cap)	§ 16-133.2 (ERO)	§ 16-158(e) (2.2 Formula)				
1995	\$421,726,521	\$0	\$0	\$0	\$0	\$16,500,000	\$262,864,800	\$701,091,321
1996	422,238,847	0	0	0	0	17,000,000	324,276,242	763,515,089
1997	420,762,625	0	0	0	0	17,300,000	377,968,984	816,031,609
1998	440,967,595	0	0	0	0	18,000,000	460,439,267	919,406,862
1999	866,369,000	0	0	16,675,000	16,675,000	18,500,000	567,067,600	1,468,611,600
2000	619,622,000	0	0	34,145,066	34,145,066	18,200,000	634,038,560	1,306,005,626
2001	643,563,000	0	0	36,375,498	36,375,498	20,000,000	719,356,841	1,419,295,339
2002	681,151,770	0	0	38,664,380	38,664,380	23,000,000	810,618,724	1,553,434,874
2003	732,020,451	0	0	12,808,373	12,808,373	25,000,000	926,049,918	1,695,878,742
2004	768,661,300	0	0	42,604,912	42,604,912	29,400,000	1,027,258,994	1,867,925,206
2005	761,790,009	0	0	44,481,074	44,481,074	37,860,000	902,243,532	1,746,374,615
2006	799,034,336	14,974,781	See note (2)	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	0	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
<b>2017</b>	<b>1,034,264,612</b>	<b>2,190,130</b>	<b>53,925,827</b>	<b>61,138,899</b>	<b>117,254,856</b>	<b>77,196,619</b>	<b>3,985,783,351</b>	<b>5,214,499,438</b>
2018	1,066,489,332	2,207,860	55,657,202	63,045,943	120,911,005	79,335,781	4,096,231,629	5,362,967,747
2019	1,099,146,823	2,177,626	56,330,600	65,013,032	123,521,258	80,919,772	4,178,015,610	5,481,603,463
2020	1,134,218,026	2,175,073	60,242,193	67,050,483	129,467,749	82,746,969	4,272,356,651	5,618,789,395
2021	1,170,404,375	2,188,900	63,326,820	69,169,951	134,685,671	85,579,573	4,418,608,460	5,809,278,079
2022	1,208,818,403	2,200,165	69,035,224	71,383,162	142,618,551	88,165,359	4,552,116,716	5,991,719,029
2023	1,250,530,126	2,291,092	78,690,958	73,699,545	154,681,595	90,918,587	4,694,270,211	6,190,400,519
2024	1,292,407,626	2,366,577	85,804,151	76,102,026	164,272,754	93,535,049	4,829,362,257	6,379,577,685
2025	1,336,530,670	2,534,818	92,866,856	78,577,806	173,979,480	96,300,033	4,972,122,789	6,578,932,972
2026	1,380,875,640	2,694,955	98,940,940	81,131,400	182,767,295	99,494,431	5,137,054,580	6,800,191,946
2027	1,427,845,283	2,911,031	108,658,360	83,760,377	195,329,768	102,819,510	5,308,733,652	7,034,728,213
2028	1,470,898,113	2,920,691	106,372,886	86,445,762	195,739,339	105,968,488	5,471,320,339	7,243,926,279
2029	1,518,444,190	3,023,688	110,033,378	89,201,549	202,258,615	109,255,744	5,641,046,570	7,471,005,120
2030	1,566,715,171	3,046,758	113,749,154	92,047,274	208,843,186	112,426,608	5,804,763,309	7,692,748,275
2031	1,617,852,607	3,095,102	124,256,068	94,971,307	222,322,477	115,760,785	5,976,912,093	7,932,847,961
2032	1,670,834,501	3,106,350	131,789,601	97,962,768	232,858,719	119,524,656	6,171,246,741	8,194,464,618
2033	1,721,766,284	3,066,340	136,340,269	100,988,746	240,395,355	123,659,350	6,384,727,510	8,470,548,499
2034	1,772,690,585	3,042,768	136,504,347	104,006,802	243,553,917	137,214,939	7,084,623,947	9,238,083,387
2035	1,822,858,882	3,059,631	136,311,987	106,997,941	246,369,559	141,161,113	7,288,371,142	9,498,760,696
2036	1,870,536,647	3,023,008	132,858,964	109,973,388	245,855,360	145,086,585	7,491,049,470	9,752,528,062
2037	1,920,355,744	3,255,369	132,965,749	112,901,114	249,122,232	148,949,100	7,690,477,211	10,008,904,287
2038	1,966,464,035	3,873,958	131,222,269	115,716,886	250,813,113	152,663,913	7,882,278,908	10,252,219,969
2039	2,008,134,830	4,466,179	121,322,949	118,399,703	244,188,831	156,203,322	8,065,024,162	10,473,551,145
2040	2,047,898,072	4,991,402	111,299,715	120,970,167	237,261,284	159,594,506	8,240,116,312	10,684,870,174
2041	2,083,296,929	5,082,388	92,651,799	123,439,945	221,174,132	162,852,854	8,408,349,999	10,875,673,916
2042	2,116,099,181	4,771,373	70,213,803	125,829,040	200,814,216	166,004,759	8,571,087,797	11,054,005,954
2043	2,148,483,173	4,359,859	47,730,065	128,185,337	180,275,261	169,113,393	8,731,591,507	11,229,463,334
2044	2,177,272,990	3,681,801	21,316,439	130,525,083	155,523,323	172,200,192	8,890,967,820	11,395,964,325
2045	2,211,903,050	3,207,243	7,146,066	132,849,274	143,202,583	175,266,470	9,049,284,561	11,579,656,663
2046	2,249,083,514	2,786,466	1,678,997	135,157,792	139,623,255	20,817,011	1,074,815,125	3,484,338,905

### 4.3 Projection of Contributions to Trust to 2046 (Dollars) (continued)

**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 - 2016 were estimated to be 4.33%, 5.32%, 4.40%, 3.70%, 3.50%, 3.10%, 3.40%, 3.00%, 2.75%, 3.00%, and 2.10%, respectively, of total payrolls for those years. For 2017 the estimate is 1.90% of payroll. All payrolls are assumed to increase at the same rate for years subsequent to 2017.

(2) School District contributions under 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.

(3) Employer Rates, Contribution Amounts, and Assumed Payroll shown for fiscal years 1995 - 2017 are based on the June 30, 1993 - June 30, 2015 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. Items subsequent to 2016 are based on the June 30, 2015 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).



#### 4.4 Projection of Contributions to Trust to 2046 (Percent of Payroll)

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

Year Ended June 30	Assumed Payroll	Contributions							
		Member	School District			Total	Federal Funds	State	Total
			§ 16-158(f) (FAS Cap)	§ 16-133.2 (ERO)	§ 16-158(e) (2.2 Formula)				
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%
<b>2017</b>	<b>10,541,189,447</b>	<b>9.81%</b>	<b>0.02%</b>	<b>0.51%</b>	<b>0.58%</b>	<b>1.11%</b>	<b>0.73%</b>	<b>37.81%</b>	<b>49.47%</b>
2018	10,869,990,256	9.81%	0.02%	0.51%	0.58%	1.11%	0.73%	37.68%	49.34%
2019	11,209,143,522	9.81%	0.02%	0.50%	0.58%	1.10%	0.72%	37.27%	48.90%
2020	11,560,428,161	9.81%	0.02%	0.52%	0.58%	1.12%	0.72%	36.96%	48.60%
2021	11,925,853,639	9.81%	0.02%	0.53%	0.58%	1.13%	0.72%	37.05%	48.71%
2022	12,307,441,804	9.82%	0.02%	0.56%	0.58%	1.16%	0.72%	36.99%	48.68%
2023	12,706,818,037	9.84%	0.02%	0.62%	0.58%	1.22%	0.72%	36.94%	48.72%
2024	13,121,038,883	9.85%	0.02%	0.65%	0.58%	1.25%	0.71%	36.81%	48.62%
2025	13,547,897,545	9.87%	0.02%	0.69%	0.58%	1.28%	0.71%	36.70%	48.56%
2026	13,988,172,439	9.87%	0.02%	0.71%	0.58%	1.31%	0.71%	36.72%	48.61%
2027	14,441,444,362	9.89%	0.02%	0.75%	0.58%	1.35%	0.71%	36.76%	48.71%
2028	14,904,441,715	9.87%	0.02%	0.71%	0.58%	1.31%	0.71%	36.71%	48.60%
2029	15,379,577,472	9.87%	0.02%	0.72%	0.58%	1.32%	0.71%	36.68%	48.58%
2030	15,870,219,695	9.87%	0.02%	0.72%	0.58%	1.32%	0.71%	36.58%	48.47%
2031	16,374,363,214	9.88%	0.02%	0.76%	0.58%	1.36%	0.71%	36.50%	48.45%
2032	16,890,132,394	9.89%	0.02%	0.78%	0.58%	1.38%	0.71%	36.54%	48.52%
2033	17,411,852,675	9.89%	0.02%	0.78%	0.58%	1.38%	0.71%	36.67%	48.65%
2034	17,932,207,183	9.89%	0.02%	0.76%	0.58%	1.36%	0.77%	39.51%	51.52%
2035	18,447,920,784	9.88%	0.02%	0.74%	0.58%	1.34%	0.77%	39.51%	51.49%
2036	18,960,928,926	9.87%	0.02%	0.70%	0.58%	1.30%	0.77%	39.51%	51.43%
2037	19,465,709,361	9.87%	0.02%	0.68%	0.58%	1.28%	0.77%	39.51%	51.42%
2038	19,951,187,178	9.86%	0.02%	0.66%	0.58%	1.26%	0.77%	39.51%	51.39%
2039	20,413,741,830	9.84%	0.02%	0.59%	0.58%	1.20%	0.77%	39.51%	51.31%
2040	20,856,925,368	9.82%	0.02%	0.53%	0.58%	1.14%	0.77%	39.51%	51.23%
2041	21,282,749,147	9.79%	0.02%	0.44%	0.58%	1.04%	0.77%	39.51%	51.10%
2042	21,694,662,035	9.75%	0.02%	0.32%	0.58%	0.93%	0.77%	39.51%	50.95%
2043	22,100,920,121	9.72%	0.02%	0.22%	0.58%	0.82%	0.77%	39.51%	50.81%
2044	22,504,324,607	9.67%	0.02%	0.09%	0.58%	0.69%	0.77%	39.51%	50.64%
2045	22,905,047,159	9.66%	0.01%	0.03%	0.58%	0.63%	0.77%	39.51%	50.56%
2046	23,303,067,623	9.65%	0.01%	0.01%	0.58%	0.60%	0.09%	4.61%	14.95%

**Notes:**

Refer to the notes in Section 4.3.



## 4.5 Projection of Employer Normal Cost and Amortization Cost to 2046

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

Year Ended June 30	Amort. Year	Employer Rate			Amount of Employer Contribution		
		Total	Normal Cost	Amort.	Total	Normal Cost	Amort.
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	(58,857,812)
1997	2	8.06%	8.21%	-0.15%	395,268,984	402,771,457	(7,502,473)
1998	3	9.09%	8.38%	0.70%	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%	3.71%	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%	4.71%	963,858,291	628,536,783	335,321,507
2004	9	14.96%	8.15%	6.82%	1,099,263,906	598,462,925	500,800,982
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%	2.17%	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%	16.92%	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%	25.55%	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
<b>2017</b>	<b>22</b>	<b>39.12%</b>	<b>8.27%</b>	<b>30.86%</b>	<b>4,124,118,869</b>	<b>871,335,169</b>	<b>3,252,783,700</b>
2018	23	38.99%	8.04%	30.95%	4,238,613,353	874,473,598	3,364,139,755
2019	24	38.58%	7.83%	30.75%	4,323,948,414	877,224,235	3,446,724,179
2020	25	38.25%	7.59%	30.66%	4,422,154,103	877,890,650	3,544,263,453
2021	26	38.35%	7.36%	30.99%	4,573,357,984	878,016,375	3,695,341,609
2022	27	38.28%	7.12%	31.16%	4,711,665,237	876,428,512	3,835,236,726
2023	28	38.24%	6.86%	31.37%	4,858,888,343	872,282,436	3,986,605,907
2024	29	38.10%	6.61%	31.49%	4,998,999,332	866,888,726	4,132,110,606
2025	30	37.99%	6.32%	31.67%	5,147,000,628	856,451,716	4,290,548,912
2026	31	38.02%	6.02%	31.99%	5,317,680,411	842,602,402	4,475,078,009
2027	32	38.05%	5.69%	32.36%	5,495,313,539	821,770,822	4,673,542,717
2028	33	38.00%	5.36%	32.64%	5,663,734,589	798,209,144	4,865,525,445
2029	34	37.97%	4.97%	33.00%	5,839,503,863	763,943,843	5,075,560,020
2030	35	37.86%	4.58%	33.29%	6,009,237,192	726,250,003	5,282,987,189
2031	36	37.79%	4.16%	33.62%	6,187,644,184	681,878,730	5,505,765,455
2032	37	37.83%	3.74%	34.09%	6,388,734,165	630,984,718	5,757,749,447
2033	38	37.96%	3.30%	34.66%	6,609,375,606	575,288,260	6,034,087,346
2034	39	40.85%	2.85%	38.00%	7,325,845,687	511,622,519	6,814,223,169
2035	40	40.85%	2.40%	38.45%	7,536,530,196	443,575,460	7,092,954,736
2036	41	40.85%	1.97%	38.88%	7,746,109,443	374,219,530	7,371,889,914
2037	42	40.85%	1.54%	39.31%	7,952,327,424	300,216,607	7,652,110,818
2038	43	40.85%	1.14%	39.72%	8,150,659,707	226,890,581	7,923,769,126
2039	44	40.85%	0.75%	40.10%	8,339,627,187	152,727,181	8,186,900,006
2040	45	40.85%	0.38%	40.47%	8,520,680,984	78,911,326	8,441,769,658
2041	46	40.85%	0.05%	40.80%	8,694,642,799	10,575,615	8,684,067,183
2042	47	40.85%	-0.24%	41.09%	8,862,921,596	(52,050,999)	8,914,972,595
2043	48	40.85%	-0.48%	41.33%	9,028,890,237	(105,319,110)	9,134,209,347
2044	49	40.85%	-0.63%	41.49%	9,193,693,096	(142,729,149)	9,336,422,245
2045	50	40.85%	-0.74%	41.59%	9,357,400,304	(169,238,596)	9,526,638,900
2046	51	5.28%	-0.77%	6.05%	1,230,789,928	(180,010,246)	1,410,800,174

## 4.5 Projection of Employer Normal Cost and Amortization Cost to 2046 (continued)

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 Section 4.3; 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) Amortization rate in fiscal years 1995-1997 and 2006 is negative on account of the fact that contributions do not cover normal cost. A negative employer normal cost after 2017 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 - 2017 are based on the June 30, 1993 - June 30, 2015 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. Items subsequent to 2016 are based on the June 30, 2015 valuation.
- (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.
- (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 7.5% after 2013
  - 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

## 4.6 Projection of Funded Ratio to 2046 by Tier

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

### Total Tier I and Tier II

Year Ended June 30	Contributions	Benefits and Expenses	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	1,828,832,762	3,184,574,659	6,680,170,878	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%
<b>2015</b>	<b>4,457,907,579</b>	<b>5,645,924,033</b>	<b>1,770,549,533</b>	<b>45,435,192,645</b>	<b>46,406,915,593</b>	<b>108,121,825,171</b>	<b>62,686,632,526</b>	<b>42.0%</b>
2016	4,988,427,944	5,892,627,459	3,446,611,188	48,134,126,537	48,949,327,266	112,058,435,886	63,924,309,349	43.0%
2017	5,214,499,438	6,155,432,832	3,635,914,543	51,567,802,440	51,644,308,415	116,053,616,787	64,485,814,348	44.4%
2018	5,362,967,747	6,429,600,716	3,833,324,395	54,735,345,549	54,410,999,841	120,100,676,345	65,365,330,796	45.6%
2019	5,481,603,463	6,712,735,449	4,034,657,539	57,214,525,393	57,214,525,393	124,194,249,014	66,979,723,621	46.1%
2020	5,618,789,395	7,006,096,699	4,239,065,381	60,066,283,470	60,066,283,470	128,327,555,116	68,261,271,647	46.8%
2021	5,809,278,079	7,295,190,516	4,449,249,544	63,029,620,576	63,029,620,576	132,508,598,117	69,478,977,540	47.6%
2022	5,991,719,029	7,589,554,176	4,667,302,725	66,099,088,156	66,099,088,156	136,736,024,191	70,636,936,036	48.3%
2023	6,190,400,519	7,889,030,986	4,893,732,969	69,294,190,657	69,294,190,657	141,008,774,390	71,714,583,733	49.1%
2024	6,379,577,685	8,196,862,376	5,128,916,123	72,605,822,090	72,605,822,090	145,320,457,719	72,714,635,629	50.0%
2025	6,578,932,972	8,498,725,049	5,373,444,454	76,059,474,467	76,059,474,467	149,677,284,035	73,617,809,568	50.8%
2026	6,800,191,946	8,822,829,576	5,628,611,674	79,665,448,511	79,665,448,511	154,056,253,121	74,390,804,610	51.7%
2027	7,034,728,213	9,160,897,055	5,895,177,307	83,434,456,976	83,434,456,976	158,440,018,119	75,005,561,144	52.7%
2028	7,243,926,279	9,516,667,642	6,172,356,472	87,334,072,085	87,334,072,085	162,803,675,579	75,469,603,494	53.6%
2029	7,471,005,120	9,886,596,640	6,459,470,724	91,377,951,289	91,377,951,289	167,124,584,818	75,746,633,529	54.7%
2030	7,692,748,275	10,261,655,382	6,757,012,330	95,566,056,512	95,566,056,512	171,391,412,589	75,825,356,077	55.8%
2031	7,932,847,961	10,646,135,705	7,065,705,948	99,918,474,716	99,918,474,716	175,586,374,001	75,667,899,285	56.9%
2032	8,194,464,618	11,041,759,741	7,387,112,037	104,458,291,630	104,458,291,630	179,687,663,760	75,229,372,131	58.1%
2033	8,470,548,499	11,451,208,416	7,722,597,125	109,200,228,838	109,200,228,838	183,666,803,900	74,466,575,062	59.5%
2034	9,238,083,387	11,868,904,268	8,091,361,380	114,660,769,337	114,660,769,337	187,497,800,859	72,837,031,522	61.2%
2035	9,498,760,696	12,293,851,380	8,494,741,800	120,360,420,453	120,360,420,453	191,156,690,746	70,796,270,293	63.0%
2036	9,752,528,062	12,721,849,781	8,915,681,970	126,306,780,704	126,306,780,704	194,623,457,938	68,316,677,234	64.9%
2037	10,008,904,287	13,146,764,315	9,355,338,802	132,524,259,478	132,524,259,478	197,884,293,121	65,360,033,644	67.0%
2038	10,252,219,969	13,574,128,230	9,814,747,901	139,017,099,117	139,017,099,117	200,918,062,481	61,900,963,364	69.2%
2039	10,473,551,145	13,997,592,735	10,294,130,874	145,787,188,402	145,787,188,402	203,706,309,041	57,919,120,639	71.6%
2040	10,684,870,174	14,423,659,770	10,793,834,520	152,842,233,326	152,842,233,326	206,226,299,958	53,384,066,632	74.1%
2041	10,875,673,916	14,833,454,792	11,314,750,717	160,199,203,166	160,199,203,166	208,475,955,874	48,276,752,708	76.8%
2042	11,054,005,954	15,215,463,791	11,858,885,569	167,896,630,898	167,896,630,898	210,467,058,870	42,570,427,972	79.8%
2043	11,229,463,334	15,553,260,356	12,430,104,929	176,002,938,804	176,002,938,804	212,235,363,381	36,232,424,577	82.9%
2044	11,395,964,325	15,824,577,557	13,034,147,414	184,608,472,986	184,608,472,986	213,845,855,654	29,237,382,667	86.3%
2045	11,579,656,663	16,046,255,132	13,678,138,031	193,820,012,548	193,820,012,548	215,355,569,498	21,535,556,950	90.0%
2046	3,484,338,905	16,221,729,639	14,058,848,789	195,141,470,603	195,141,470,603	216,823,856,225	21,682,385,623	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.

## 4.6 Projection of Funded Ratio to 2046 by Tier (Continued)

### Tier I

Year Ended June 30	Contributions	Benefits and Expenses	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	4,866,818,773	5,876,897,778	3,427,601,188	47,814,098,748	48,623,879,479	111,857,648,130	64,043,549,382	42.7%
2017	5,049,272,501	6,130,989,963	3,606,224,543	51,072,615,245	51,148,386,560	115,741,776,761	64,669,161,517	44.1%
2018	5,153,419,085	6,396,183,398	3,789,524,395	54,015,225,126	53,695,146,642	119,644,024,791	65,628,799,665	45.1%
2019	5,226,560,049	6,669,252,979	3,973,037,539	56,225,491,250	56,225,491,250	123,556,580,655	67,331,089,406	45.5%
2020	5,316,909,957	6,950,360,369	4,155,655,381	58,747,696,218	58,747,696,218	127,471,246,052	68,723,549,834	46.1%
2021	5,458,654,903	7,231,214,260	4,339,609,544	61,314,746,405	61,314,746,405	131,387,598,435	70,072,852,030	46.7%
2022	5,589,907,783	7,518,803,479	4,526,272,725	63,912,123,434	63,912,123,434	135,297,537,602	71,385,414,168	47.2%
2023	5,734,852,856	7,811,770,258	4,715,522,969	66,550,729,001	66,550,729,001	139,193,776,076	72,643,047,075	47.8%
2024	5,867,400,020	8,111,392,792	4,907,156,123	69,213,892,352	69,213,892,352	143,064,967,452	73,851,075,099	48.4%
2025	6,006,879,200	8,400,760,257	5,101,274,454	71,921,285,749	71,921,285,749	146,914,329,267	74,993,043,517	49.0%
2026	6,164,905,928	8,719,478,941	5,298,301,674	74,665,014,411	74,665,014,411	150,703,838,696	76,038,824,285	49.5%
2027	6,332,632,438	9,051,010,478	5,497,937,307	77,444,573,678	77,444,573,678	154,408,319,454	76,963,745,777	50.2%
2028	6,470,991,010	9,399,313,513	5,698,526,472	80,214,777,647	80,214,777,647	157,993,670,637	77,778,892,990	50.8%
2029	6,623,600,814	9,759,829,498	5,898,500,724	82,977,049,687	82,977,049,687	161,429,360,888	78,452,311,201	51.4%
2030	6,767,959,409	10,124,463,844	6,097,412,330	85,717,957,581	85,717,957,581	164,693,988,865	78,976,031,284	52.0%
2031	6,927,826,579	10,495,926,672	6,295,045,948	88,444,903,437	88,444,903,437	167,760,882,718	79,315,979,281	52.7%
2032	7,106,346,131	10,876,629,544	6,491,982,037	91,166,602,061	91,166,602,061	170,597,862,091	79,431,260,030	53.4%
2033	7,296,368,857	11,269,113,862	6,688,517,125	93,882,374,181	93,882,374,181	173,165,026,636	79,282,652,455	54.2%
2034	7,975,639,872	11,666,547,639	6,902,771,380	97,094,237,794	97,094,237,794	175,426,167,151	78,331,929,357	55.3%
2035	8,146,919,809	12,069,445,103	7,134,971,800	100,306,684,299	100,306,684,299	177,343,907,529	77,037,223,229	56.6%
2036	8,310,779,495	12,467,750,493	7,367,111,970	103,516,825,271	103,516,825,271	178,891,076,186	75,374,250,915	57.9%
2037	8,477,901,718	12,858,850,081	7,599,478,802	106,735,355,709	106,735,355,709	180,043,233,446	73,307,877,737	59.3%
2038	8,633,342,650	13,248,454,503	7,832,087,901	109,952,331,758	109,952,331,758	180,766,804,944	70,814,473,186	60.8%
2039	8,767,754,320	13,629,324,063	8,064,120,874	113,154,882,889	113,154,882,889	181,031,035,370	67,876,152,480	62.5%
2040	8,893,517,260	14,009,963,598	8,294,744,520	116,333,181,072	116,333,181,072	180,797,324,647	64,464,143,575	64.3%
2041	9,001,231,076	14,360,601,370	8,524,010,717	119,497,821,494	119,497,821,494	180,059,471,209	60,561,649,715	66.4%
2042	9,099,781,744	14,677,200,180	8,753,185,569	122,673,588,627	122,673,588,627	178,818,314,472	56,144,725,845	68.6%
2043	9,199,848,226	14,942,967,315	8,985,154,929	125,915,624,466	125,915,624,466	177,098,365,287	51,182,740,820	71.1%
2044	9,296,335,840	15,134,088,042	9,224,757,414	129,302,629,679	129,302,629,679	174,955,393,884	45,652,764,205	73.9%
2045	9,416,493,328	15,269,593,583	9,478,208,031	132,927,737,454	132,927,737,454	172,433,798,782	39,506,061,328	77.1%
2046	1,264,978,069	15,330,759,565	9,442,108,789	128,304,064,747	128,304,064,747	169,604,202,949	41,300,138,202	75.6%

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.

## 4.6 Projection of Funded Ratio to 2046 by Tier (Continued)

### Tier II

Year Ended June 30	Contributions	Benefits and Expenses	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	121,609,171	15,729,681	19,010,000	320,027,789	325,447,787	200,787,756	(119,240,033)	159.4%
2017	165,226,936	24,442,869	29,690,000	495,187,195	495,921,855	311,840,026	(183,347,169)	158.8%
2018	209,548,663	33,417,318	43,800,000	720,120,423	715,853,199	456,651,554	(263,468,869)	157.7%
2019	255,043,414	43,482,470	61,620,000	989,034,144	989,034,144	637,668,359	(351,365,785)	155.1%
2020	301,879,438	55,736,330	83,410,000	1,318,587,252	1,318,587,252	856,309,064	(462,278,188)	154.0%
2021	350,623,176	63,976,256	109,640,000	1,714,874,172	1,714,874,172	1,120,999,682	(593,874,490)	153.0%
2022	401,811,246	70,750,697	141,030,000	2,186,964,721	2,186,964,721	1,438,486,589	(748,478,132)	152.0%
2023	455,547,663	77,260,728	178,210,000	2,743,461,656	2,743,461,656	1,814,998,314	(928,463,342)	151.2%
2024	512,177,665	85,469,584	221,760,000	3,391,929,737	3,391,929,737	2,255,490,267	(1,136,439,470)	150.4%
2025	572,053,772	97,964,792	272,170,000	4,138,188,718	4,138,188,718	2,762,954,768	(1,375,233,950)	149.8%
2026	635,286,017	103,350,635	330,310,000	5,000,434,100	5,000,434,100	3,352,414,425	(1,648,019,675)	149.2%
2027	702,095,775	109,886,577	397,240,000	5,989,883,298	5,989,883,298	4,031,698,665	(1,958,184,633)	148.6%
2028	772,935,269	117,354,129	473,830,000	7,119,294,438	7,119,294,438	4,810,004,942	(2,309,289,496)	148.0%
2029	847,404,306	126,767,142	560,970,000	8,400,901,602	8,400,901,602	5,695,223,930	(2,705,677,672)	147.5%
2030	924,788,867	137,191,538	659,600,000	9,848,098,930	9,848,098,930	6,697,423,724	(3,150,675,206)	147.0%
2031	1,005,021,382	150,209,033	770,660,000	11,473,571,279	11,473,571,279	7,825,491,283	(3,648,079,996)	146.6%
2032	1,088,118,486	165,130,197	895,130,000	13,291,689,569	13,291,689,569	9,089,801,669	(4,201,887,900)	146.2%
2033	1,174,179,642	182,094,554	1,034,080,000	15,317,854,657	15,317,854,657	10,501,777,264	(4,816,077,393)	145.9%
2034	1,262,443,516	202,356,629	1,188,590,000	17,566,531,543	17,566,531,543	12,071,633,708	(5,494,897,835)	145.5%
2035	1,351,840,887	224,406,277	1,359,770,000	20,053,736,154	20,053,736,154	13,812,783,217	(6,240,952,937)	145.2%
2036	1,441,748,568	254,099,288	1,548,570,000	22,789,955,433	22,789,955,433	15,732,381,752	(7,057,573,681)	144.9%
2037	1,531,002,569	287,914,234	1,755,860,000	25,788,903,768	25,788,903,768	17,841,059,675	(7,947,844,093)	144.5%
2038	1,618,877,319	325,673,727	1,982,660,000	29,064,767,360	29,064,767,360	20,151,257,537	(8,913,509,823)	144.2%
2039	1,705,796,825	368,268,672	2,230,010,000	32,632,305,512	32,632,305,512	22,675,273,671	(9,957,031,841)	143.9%
2040	1,791,352,914	413,696,172	2,499,090,000	36,509,052,254	36,509,052,254	25,428,975,311	(11,080,076,943)	143.6%
2041	1,874,442,840	472,853,422	2,790,740,000	40,701,381,672	40,701,381,672	28,416,484,665	(12,284,897,007)	143.2%
2042	1,954,224,209	538,263,611	3,105,700,000	45,223,042,270	45,223,042,270	31,648,744,398	(13,574,297,872)	142.9%
2043	2,029,615,108	610,293,041	3,444,950,000	50,087,314,337	50,087,314,337	35,136,998,094	(14,950,316,243)	142.5%
2044	2,099,628,485	690,489,515	3,809,390,000	55,305,843,308	55,305,843,308	38,890,461,770	(16,415,381,538)	142.2%
2045	2,163,163,335	776,661,549	4,199,930,000	60,892,275,094	60,892,275,094	42,921,770,716	(17,970,504,378)	141.9%
2046	2,219,360,836	890,970,074	4,616,740,000	66,837,405,856	66,837,405,856	47,219,653,276	(19,617,752,580)	141.5%

#### 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.

#### 4.7 Projection of Actuarial Accrued Liability to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Inactive	Total Actuarial Accrued Liability
2015	\$34,767,466,494	\$120,576,880	\$0	\$73,233,781,797	\$108,121,825,171
2016	38,893,778,058	151,240,822	49,546,934	72,963,870,071	112,058,435,885
2017	43,162,221,887	179,366,517	132,473,509	72,579,554,874	116,053,616,787
2018	47,571,594,101	208,506,615	248,144,939	72,072,430,689	120,100,676,344
2019	52,118,253,251	241,649,100	396,019,259	71,438,327,404	124,194,249,014
2020	56,797,632,173	280,679,840	575,629,224	70,673,613,881	128,327,555,118
2021	61,610,474,525	322,660,967	798,338,715	69,777,123,913	132,508,598,120
2022	66,550,205,021	370,879,826	1,067,606,763	68,747,332,585	136,736,024,195
2023	71,612,561,160	427,613,502	1,387,384,812	67,581,214,921	141,008,774,395
2024	76,785,245,479	493,781,331	1,761,708,936	66,279,721,978	145,320,457,724
2025	82,051,204,706	566,590,462	2,196,364,306	64,863,124,568	149,677,284,042
2026	87,390,343,284	646,408,943	2,706,005,482	63,313,495,420	154,056,253,129
2027	92,774,298,178	733,650,437	3,298,048,228	61,634,021,284	158,440,018,127
2028	98,163,553,000	829,008,398	3,980,996,544	59,830,117,646	162,803,675,588
2029	103,522,580,894	932,952,768	4,762,271,162	57,906,780,004	167,124,584,828
2030	108,821,598,225	1,046,096,872	5,651,326,852	55,872,390,649	171,391,412,598
2031	114,025,152,403	1,169,128,571	6,656,362,712	53,735,730,326	175,586,374,012
2032	119,089,104,060	1,302,498,616	7,787,303,053	51,508,758,043	179,687,663,772
2033	123,961,717,052	1,446,638,863	9,055,138,401	49,203,309,596	183,666,803,912
2034	128,589,778,235	1,602,052,037	10,469,581,671	46,836,388,928	187,497,800,871
2035	132,919,824,364	1,769,219,679	12,043,563,538	44,424,083,179	191,156,690,760
2036	136,906,408,879	1,948,776,387	13,783,605,365	41,984,667,321	194,623,457,952
2037	140,506,297,871	2,141,242,641	15,699,817,034	39,536,935,591	197,884,293,137
2038	143,664,885,387	2,346,962,938	17,804,294,599	37,101,919,573	200,918,062,497
2039	146,329,935,431	2,566,441,063	20,108,832,608	34,701,099,955	203,706,309,057
2040	148,444,137,186	2,800,075,791	22,628,899,520	32,353,187,480	206,226,299,977
2041	149,977,761,011	3,047,769,000	25,368,715,665	30,081,710,217	208,475,955,893
2042	150,911,695,245	3,310,095,452	28,338,648,946	27,906,619,249	210,467,058,892
2043	151,251,865,544	3,586,499,677	31,550,498,417	25,846,499,766	212,235,363,404
2044	151,037,036,473	3,876,347,078	35,014,114,692	23,918,357,435	213,845,855,678
2045	150,298,060,181	4,176,240,749	38,745,529,967	22,135,738,628	215,355,569,525
2046	149,089,550,365	4,483,571,264	42,736,082,012	20,514,652,613	216,823,856,254

#### 4.8 Projection of Total Normal Cost to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Total Normal Cost
2015	\$1,768,923,921	\$51,995,321	\$0	\$1,820,919,242
2016	1,763,705,766	34,520,611	49,804,358	1,848,030,735
2017	1,765,038,370	32,934,411	84,032,013	1,882,004,794
2018	1,766,179,927	31,576,466	118,875,576	1,916,631,969
2019	1,766,335,406	30,934,870	154,010,673	1,951,280,949
2020	1,765,854,416	31,121,939	189,255,911	1,986,232,266
2021	1,764,528,502	31,857,050	225,340,833	2,021,726,385
2022	1,761,972,366	32,809,754	262,916,297	2,057,698,417
2023	1,758,193,504	34,048,785	302,127,828	2,094,370,117
2024	1,751,091,287	35,587,573	343,247,871	2,129,926,731
2025	1,738,617,588	37,367,705	386,672,009	2,162,657,302
2026	1,720,394,612	39,228,308	432,544,543	2,192,167,463
2027	1,695,015,776	41,150,342	481,124,821	2,217,290,939
2028	1,659,664,980	43,225,086	532,855,671	2,235,745,737
2029	1,615,683,924	45,360,946	586,918,117	2,247,962,987
2030	1,565,977,586	47,592,730	643,871,578	2,257,441,894
2031	1,509,727,649	49,894,693	703,457,259	2,263,079,601
2032	1,445,968,553	52,232,778	765,811,675	2,264,013,006
2033	1,372,139,743	54,579,631	831,361,159	2,258,080,533
2034	1,287,867,697	56,912,924	899,393,729	2,244,174,350
2035	1,195,166,786	59,234,035	970,740,416	2,225,141,237
2036	1,096,514,480	61,583,837	1,044,216,456	2,202,314,773
2037	993,906,793	63,914,115	1,119,180,159	2,177,001,067
2038	886,041,354	66,178,808	1,196,476,496	2,148,696,658
2039	770,830,792	68,403,366	1,275,934,529	2,115,168,687
2040	651,434,054	70,535,635	1,358,154,382	2,080,124,071
2041	532,092,739	72,512,457	1,441,628,874	2,046,234,070
2042	415,996,730	74,309,560	1,525,181,408	2,015,487,698
2043	309,089,988	75,775,896	1,608,828,342	1,993,694,226
2044	215,909,169	76,750,264	1,691,511,606	1,984,171,039
2045	140,492,839	76,866,141	1,774,035,710	1,991,394,690
2046	86,183,716	76,004,290	1,854,724,585	2,016,912,591

See Sections 4.12 and 4.13 for projection of Employer and State Normal Cost by Member Group



#### 4.9 Projection of Benefit Payments to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Inactive	Total Benefit Payments	Admin. Expenses	Total Benefits and Expenses
2015	\$134,926,137	\$10,436,090	\$0	\$5,443,132,990	\$5,588,495,217	\$21,686,860	\$5,610,182,077
2016	299,848,824	13,681,404	2,048,277	5,554,164,203	5,869,742,708	22,884,750	5,892,627,458
2017	462,474,058	16,758,379	7,684,490	5,644,920,917	6,131,837,844	23,594,987	6,155,432,831
2018	636,343,230	16,455,878	16,961,440	5,735,509,206	6,405,269,754	24,330,962	6,429,600,716
2019	822,923,750	14,063,074	29,419,396	5,821,239,120	6,687,645,340	25,090,109	6,712,735,449
2020	1,023,194,244	10,970,559	44,765,771	5,901,289,714	6,980,220,288	25,876,411	7,006,096,699
2021	1,231,497,236	11,683,422	52,292,834	5,973,022,659	7,268,496,151	26,694,365	7,295,190,516
2022	1,454,555,588	9,658,635	61,092,062	6,036,699,394	7,562,005,679	27,548,497	7,589,554,176
2023	1,689,672,288	6,176,314	71,084,414	6,093,655,526	7,860,588,542	28,442,445	7,889,030,987
2024	1,942,183,111	2,723,171	82,746,413	6,139,840,060	8,167,492,755	29,369,621	8,196,862,376
2025	2,213,734,874	2,885,265	95,079,527	6,156,700,298	8,468,399,964	30,325,085	8,498,725,049
2026	2,505,649,335	3,253,179	100,097,456	6,182,519,027	8,791,518,997	31,310,579	8,822,829,576
2027	2,823,035,874	3,790,513	106,096,064	6,195,649,438	9,128,571,889	32,325,165	9,160,897,054
2028	3,171,778,273	4,348,770	113,005,359	6,194,173,720	9,483,306,122	33,361,521	9,516,667,643
2029	3,546,516,292	5,101,919	121,665,223	6,178,888,160	9,852,171,594	34,425,046	9,886,596,640
2030	3,942,051,066	5,980,541	131,210,997	6,146,889,498	10,226,132,102	35,523,280	10,261,655,382
2031	4,360,875,301	6,931,384	143,277,649	6,098,399,636	10,609,483,970	36,651,735	10,646,135,705
2032	4,807,833,395	8,198,655	156,931,542	6,030,989,935	11,003,953,527	37,806,213	11,041,759,740
2033	5,284,496,188	9,805,799	172,288,755	5,945,643,662	11,412,234,404	38,974,011	11,451,208,415
2034	5,788,173,814	11,693,396	190,663,233	5,838,235,073	11,828,765,516	40,138,753	11,868,904,269
2035	6,317,274,968	13,919,588	210,486,689	5,710,877,030	12,252,558,275	41,293,106	12,293,851,381
2036	6,862,685,383	16,412,530	237,686,758	5,562,623,707	12,679,408,378	42,441,403	12,721,849,781
2037	7,420,983,106	19,279,874	268,634,360	5,394,295,691	13,103,193,031	43,571,284	13,146,764,315
2038	7,998,701,425	22,682,809	302,990,918	5,205,095,120	13,529,470,272	44,657,959	13,574,128,231
2039	8,587,521,260	26,518,157	341,750,515	4,996,109,480	13,951,899,412	45,693,323	13,997,592,735
2040	9,191,716,852	30,871,396	382,824,776	4,771,561,419	14,376,974,443	46,685,328	14,423,659,771
2041	9,784,802,583	36,187,132	436,666,290	4,528,160,312	14,785,816,317	47,638,475	14,833,454,792
2042	10,357,585,012	41,785,438	496,478,173	4,271,054,683	15,166,903,306	48,560,485	15,215,463,791
2043	10,890,494,175	48,646,193	561,646,848	4,003,003,303	15,503,790,519	49,469,837	15,553,260,356
2044	11,356,843,132	56,644,312	633,845,203	3,726,872,109	15,774,204,756	50,372,802	15,824,577,558
2045	11,771,099,131	68,029,861	708,631,688	3,447,224,688	15,994,985,368	51,269,763	16,046,255,131
2046	12,115,932,467	81,679,029	809,291,045	3,162,666,422	16,169,568,963	52,160,677	16,221,729,640



#### 4.10 Projection of Payroll to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Total Payroll
2015	\$9,121,945,996	\$590,004,629	\$220,417,471	\$9,932,368,096
2016	8,963,688,539	571,663,067	688,535,593	10,223,887,199
2017	8,828,993,215	551,589,351	1,160,606,881	10,541,189,447
2018	8,698,501,525	533,535,560	1,637,953,171	10,869,990,256
2019	8,566,206,585	523,432,451	2,119,504,486	11,209,143,522
2020	8,432,143,826	523,798,557	2,604,485,778	11,560,428,161
2021	8,292,452,851	530,070,697	3,103,330,091	11,925,853,639
2022	8,143,594,691	536,810,449	3,627,036,664	12,307,441,804
2023	7,986,116,867	544,075,707	4,176,625,463	12,706,818,037
2024	7,813,498,311	551,957,855	4,755,582,717	13,121,038,883
2025	7,619,879,181	559,990,564	5,368,027,800	13,547,897,545
2026	7,404,897,647	567,712,932	6,015,561,860	13,988,172,439
2027	7,165,840,474	575,155,074	6,700,448,814	14,441,444,362
2028	6,894,749,811	582,660,079	7,427,031,825	14,904,441,715
2029	6,598,185,700	590,159,351	8,191,232,421	15,379,577,472
2030	6,286,915,378	597,375,784	8,985,928,533	15,870,219,695
2031	5,959,633,869	604,256,089	9,810,473,256	16,374,363,214
2032	5,614,293,156	610,613,300	10,665,225,938	16,890,132,394
2033	5,244,187,991	616,255,650	11,551,409,034	17,411,852,675
2034	4,849,890,960	621,330,521	12,460,985,702	17,932,207,183
2035	4,439,206,926	626,011,664	13,382,702,194	18,447,920,784
2036	4,020,529,262	630,423,497	14,309,976,167	18,960,928,926
2037	3,600,397,765	634,389,485	15,230,922,111	19,465,709,361
2038	3,175,256,416	637,178,189	16,138,752,573	19,951,187,178
2039	2,737,090,796	637,602,149	17,039,048,885	20,413,741,830
2040	2,293,682,739	634,176,363	17,929,066,266	20,856,925,368
2041	1,858,471,012	625,616,821	18,798,661,314	21,282,749,147
2042	1,443,633,960	613,513,072	19,637,515,003	21,694,662,035
2043	1,068,639,209	599,518,911	20,432,762,001	22,100,920,121
2044	746,516,471	582,618,507	21,175,189,629	22,504,324,607
2045	488,846,792	561,590,030	21,854,610,337	22,905,047,159
2046	304,509,739	536,167,555	22,462,390,329	23,303,067,623

#### 4.11 Projection of Member Count to 2046 by Member Group

Year Ended June 30	Tier I			Tier II			Total		
	Number Active	Number Retired and Inactive	Sub-Total	Number Active	Number Retired and Inactive	Sub-Total	Number Active	Number Retired and Inactive	Grand Total
2015	138,700	230,712	369,412	21,136	0	21,136	159,836	230,712	390,548
2016	128,738	222,640	351,378	31,097	68	31,165	159,835	222,708	382,543
2017	120,289	213,395	333,684	39,547	126	39,673	159,836	213,521	373,357
2018	112,744	204,004	316,748	47,091	188	47,279	159,835	204,192	364,027
2019	105,891	194,496	300,387	53,946	258	54,204	159,837	194,754	354,591
2020	99,604	184,838	284,442	60,233	345	60,578	159,837	185,183	345,020
2021	93,801	174,926	268,727	66,035	439	66,474	159,836	175,365	335,201
2022	88,359	164,828	253,187	71,478	542	72,020	159,837	165,370	325,207
2023	83,225	154,473	237,698	76,609	698	77,307	159,834	155,171	315,005
2024	78,365	156,390	234,755	81,468	932	82,400	159,833	157,322	317,155
2025	73,666	158,109	231,775	86,169	1,252	87,421	159,835	159,361	319,196
2026	69,122	159,601	228,723	90,715	1,562	92,277	159,837	161,163	321,000
2027	64,681	160,888	225,569	95,156	2,058	97,214	159,837	162,946	322,783
2028	60,319	161,974	222,293	99,517	2,710	102,227	159,836	164,684	324,520
2029	55,943	162,946	218,889	103,892	3,500	107,392	159,835	166,446	326,281
2030	51,722	163,622	215,344	108,117	4,457	112,574	159,839	168,079	327,918
2031	47,596	164,037	211,633	112,241	5,542	117,783	159,837	169,579	329,416
2032	43,592	164,176	207,768	116,244	6,764	123,008	159,836	170,940	330,776
2033	39,661	164,072	203,733	120,174	8,105	128,279	159,835	172,177	332,012
2034	35,773	163,754	199,527	124,063	9,558	133,621	159,836	173,312	333,148
2035	31,962	163,185	195,147	127,875	11,147	139,022	159,837	174,332	334,169
2036	28,279	162,311	190,590	131,558	12,831	144,389	159,837	175,142	334,979
2037	24,761	161,105	185,866	135,076	14,665	149,741	159,837	175,770	335,607
2038	21,442	159,539	180,981	138,395	16,609	155,004	159,837	176,148	335,985
2039	18,231	157,723	175,954	141,606	18,657	160,263	159,837	176,380	336,217
2040	15,110	155,687	170,797	144,727	20,820	165,547	159,837	176,507	336,344
2041	12,178	153,358	165,536	147,658	23,070	170,728	159,836	176,428	336,264
2042	9,464	150,730	160,194	150,372	25,490	175,862	159,836	176,220	336,056
2043	7,045	147,761	154,806	152,789	28,017	180,806	159,834	175,778	335,612
2044	5,016	144,384	149,400	154,822	30,654	185,476	159,838	175,038	334,876
2045	3,354	140,647	144,001	156,482	33,434	189,916	159,836	174,081	333,917
2046	2,145	136,495	138,640	157,692	36,320	194,012	159,837	172,815	332,652



## 4.12 Projection of Employer Normal Cost to 2046 by Member Group

Year Ended June 30	Payroll			Employer Normal Cost (in \$)				Employer Normal Cost (in %)			
	Tier I	Tier II	Total	Tier I	Tier II	Administrative expenses	Total	Tier I (expressed as % of Tier I payroll)	Tier II (expressed as % of Tier II payroll)	Admin Expenses (expressed as % of Total Payroll)	Total (expressed as % of Total Payroll)
2017	8,828,993,215	1,712,196,232	10,541,189,447	896,000,695	(48,260,513)	23,594,987	871,335,169	10.15%	-2.82%	0.22%	8.27%
2018	8,698,501,525	2,171,488,731	10,869,990,256	909,239,257	(59,096,621)	24,330,962	874,473,598	10.45%	-2.72%	0.22%	8.04%
2019	8,566,206,585	2,642,936,937	11,209,143,522	922,231,998	(70,097,872)	25,090,109	877,224,235	10.77%	-2.65%	0.22%	7.83%
2020	8,432,143,826	3,128,284,335	11,560,428,161	933,515,828	(81,501,589)	25,876,411	877,890,650	11.07%	-2.61%	0.22%	7.59%
2021	8,292,452,851	3,633,400,788	11,925,853,639	944,747,302	(93,425,293)	26,694,365	878,016,374	11.39%	-2.57%	0.22%	7.36%
2022	8,143,594,691	4,163,847,113	12,307,441,804	954,965,210	(106,085,196)	27,548,497	876,428,511	11.73%	-2.55%	0.22%	7.12%
2023	7,986,116,867	4,720,701,170	12,706,818,037	963,211,040	(119,371,050)	28,442,445	872,282,435	12.06%	-2.53%	0.22%	6.86%
2024	7,813,498,311	5,307,540,572	13,121,038,883	970,861,326	(133,342,221)	29,369,621	866,888,726	12.43%	-2.51%	0.22%	6.61%
2025	7,619,879,181	5,928,018,364	13,547,897,545	974,140,690	(148,014,059)	30,325,085	856,451,716	12.78%	-2.50%	0.22%	6.32%
2026	7,404,897,647	6,583,274,792	13,988,172,439	974,804,989	(163,513,166)	31,310,579	842,602,402	13.16%	-2.48%	0.22%	6.02%
2027	7,165,840,474	7,275,603,888	14,441,444,362	969,266,269	(179,820,612)	32,325,165	821,770,822	13.53%	-2.47%	0.22%	5.69%
2028	6,894,749,811	8,009,691,904	14,904,441,715	961,702,136	(196,854,512)	33,361,521	798,209,145	13.95%	-2.46%	0.22%	5.36%
2029	6,598,185,700	8,781,391,772	15,379,577,472	944,644,040	(215,125,243)	34,425,046	763,943,843	14.32%	-2.45%	0.22%	4.97%
2030	6,286,915,378	9,583,304,317	15,870,219,695	924,051,281	(233,324,559)	35,523,280	726,250,002	14.70%	-2.43%	0.22%	4.58%
2031	5,959,633,869	10,414,729,345	16,374,363,214	896,896,424	(251,669,429)	36,651,735	681,878,730	15.05%	-2.42%	0.22%	4.16%
2032	5,614,293,156	11,275,839,238	16,890,132,394	863,252,539	(270,074,034)	37,806,213	630,984,718	15.38%	-2.40%	0.22%	3.74%
2033	5,244,187,991	12,167,664,684	17,411,852,675	824,553,101	(288,238,852)	38,974,011	575,288,260	15.72%	-2.37%	0.22%	3.30%
2034	4,849,890,960	13,082,316,223	17,932,207,183	777,620,628	(306,136,862)	40,138,753	511,622,519	16.03%	-2.34%	0.22%	2.85%
2035	4,439,206,926	14,008,713,858	18,447,920,784	724,148,791	(321,866,436)	41,293,106	443,575,461	16.31%	-2.30%	0.22%	2.40%
2036	4,020,529,262	14,940,399,664	18,960,928,926	667,726,401	(335,948,274)	42,441,403	374,219,530	16.61%	-2.25%	0.22%	1.97%
2037	3,600,397,765	15,865,311,596	19,465,709,361	604,553,618	(347,908,295)	43,571,284	300,216,607	16.79%	-2.19%	0.22%	1.54%
2038	3,175,256,416	16,775,930,762	19,951,187,178	538,454,638	(356,222,015)	44,657,959	226,890,582	16.96%	-2.12%	0.22%	1.14%
2039	2,737,090,796	17,676,651,034	20,413,741,830	468,492,787	(361,458,929)	45,693,323	152,727,181	17.12%	-2.04%	0.22%	0.75%
2040	2,293,682,739	18,563,242,629	20,856,925,368	394,888,895	(362,662,897)	46,685,328	78,911,326	17.22%	-1.95%	0.22%	0.38%
2041	1,858,471,012	19,424,278,135	21,282,749,147	323,238,649	(360,301,509)	47,638,475	10,575,615	17.39%	-1.85%	0.22%	0.05%
2042	1,443,633,960	20,251,028,075	21,694,662,035	254,121,758	(354,733,241)	48,560,485	(52,050,998)	17.60%	-1.75%	0.22%	-0.24%
2043	1,068,639,209	21,032,280,912	22,100,920,121	190,221,923	(345,010,870)	49,469,837	(105,319,110)	17.80%	-1.64%	0.22%	-0.48%
2044	746,516,471	21,757,808,136	22,504,324,607	138,264,664	(331,366,615)	50,372,802	(142,729,149)	18.52%	-1.52%	0.22%	-0.63%
2045	488,846,792	22,416,200,367	22,905,047,159	91,753,125	(312,261,485)	51,269,763	(169,238,597)	18.77%	-1.39%	0.22%	-0.74%
2046	304,509,739	22,998,557,884	23,303,067,623	56,461,037	(288,631,961)	52,160,677	(180,010,247)	18.54%	-1.26%	0.22%	-0.77%

### 4.13 Projection of State Normal Cost to 2046 by Member Group

Year Ended June 30	Payroll			State Share of Employer Normal Cost (in \$) <sup>1</sup>			State Share of Employer Normal Cost (in %)		
	Tier I	Tier II	Total	Tier I	Tier II	Total	Tier I (expressed as % of Tier I payroll)	Tier II (expressed as % of Tier II payroll)	Total (expressed as % of Total Payroll)
2017	8,828,993,215	1,712,196,232	10,541,189,447	844,792,534	(58,191,251)	786,601,283	9.57%	-3.40%	7.46%
2018	8,698,501,525	2,171,488,731	10,869,990,256	858,787,948	(71,691,256)	787,096,692	9.87%	-3.30%	7.24%
2019	8,566,206,585	2,642,936,937	11,209,143,522	872,548,000	(85,426,906)	787,121,094	10.19%	-3.23%	7.02%
2020	8,432,143,826	3,128,284,335	11,560,428,161	884,609,394	(99,645,638)	784,963,756	10.49%	-3.19%	6.79%
2021	8,292,452,851	3,633,400,788	11,925,853,639	896,651,075	(114,499,018)	782,152,057	10.81%	-3.15%	6.56%
2022	8,143,594,691	4,163,847,113	12,307,441,804	907,732,361	(130,235,509)	777,496,852	11.15%	-3.13%	6.32%
2023	7,986,116,867	4,720,701,170	12,706,818,037	916,891,562	(146,751,117)	770,140,445	11.48%	-3.11%	6.06%
2024	7,813,498,311	5,307,540,572	13,121,038,883	925,543,036	(164,125,956)	761,417,080	11.85%	-3.09%	5.80%
2025	7,619,879,181	5,928,018,364	13,547,897,545	929,945,391	(182,396,566)	747,548,825	12.20%	-3.08%	5.52%
2026	7,404,897,647	6,583,274,792	13,988,172,439	931,856,583	(201,696,160)	730,160,423	12.58%	-3.06%	5.22%
2027	7,165,840,474	7,275,603,888	14,441,444,362	927,704,394	(222,019,115)	705,685,279	12.95%	-3.05%	4.89%
2028	6,894,749,811	8,009,691,904	14,904,441,715	921,712,587	(243,310,725)	678,401,862	13.37%	-3.04%	4.55%
2029	6,598,185,700	8,781,391,772	15,379,577,472	906,374,563	(266,057,315)	640,317,248	13.74%	-3.03%	4.16%
2030	6,286,915,378	9,583,304,317	15,870,219,695	887,587,172	(288,907,724)	598,679,448	14.12%	-3.01%	3.77%
2031	5,959,633,869	10,414,729,345	16,374,363,214	862,330,548	(312,074,859)	550,255,689	14.47%	-3.00%	3.36%
2032	5,614,293,156	11,275,839,238	16,890,132,394	830,689,639	(335,473,902)	495,215,737	14.80%	-2.98%	2.93%
2033	5,244,187,991	12,167,664,684	17,411,852,675	794,136,811	(358,811,307)	435,325,504	15.14%	-2.95%	2.50%
2034	4,849,890,960	13,082,316,223	17,932,207,183	749,491,260	(382,014,296)	367,476,964	15.45%	-2.92%	2.05%
2035	4,439,206,926	14,008,713,858	18,447,920,784	698,401,391	(403,116,976)	295,284,415	15.73%	-2.88%	1.60%
2036	4,020,529,262	14,940,399,664	18,960,928,926	644,407,331	(422,602,592)	221,804,739	16.03%	-2.83%	1.17%
2037	3,600,397,765	15,865,311,596	19,465,709,361	583,671,311	(439,927,102)	143,744,209	16.21%	-2.77%	0.74%
2038	3,175,256,416	16,775,930,762	19,951,187,178	520,038,151	(453,522,413)	66,515,738	16.38%	-2.70%	0.33%
2039	2,737,090,796	17,676,651,034	20,413,741,830	452,617,660	(463,983,505)	(11,365,845)	16.54%	-2.62%	-0.06%
2040	2,293,682,739	18,563,242,629	20,856,925,368	381,585,535	(470,329,704)	(88,744,169)	16.64%	-2.53%	-0.43%
2041	1,858,471,012	19,424,278,135	21,282,749,147	312,459,517	(472,962,322)	(160,502,805)	16.81%	-2.43%	-0.75%
2042	1,443,633,960	20,251,028,075	21,694,662,035	245,748,681	(472,189,204)	(226,440,523)	17.02%	-2.33%	-1.04%
2043	1,068,639,209	21,032,280,912	22,100,920,121	184,023,816	(466,998,099)	(282,974,283)	17.22%	-2.22%	-1.28%
2044	746,516,471	21,757,808,136	22,504,324,607	133,934,868	(457,561,902)	(323,627,034)	17.94%	-2.10%	-1.44%
2045	488,846,792	22,416,200,367	22,905,047,159	88,917,814	(442,275,447)	(353,357,633)	18.19%	-1.97%	-1.54%
2046	304,509,739	22,998,557,884	23,303,067,623	54,694,881	(422,023,597)	(367,328,716)	17.96%	-1.84%	-1.58%

<sup>1</sup> excludes 0.58% of membership payroll for School District Contributions

#### 4.14 Projection of Debt Service to 2033

Fiscal Year	Debt Service
2015	\$ 342,400,685
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

## Section 5: Member Data

### 5.1 Summary of Members Included

Group	Number	Annual Salaries
Active members:		
Reported full-time and regular part-time		
Tier I	121,476	\$8,610,773,109
Tier II	11,440	504,706,921
Total	132,916	\$9,115,480,030
Reported substitutes and hourly paid		
Tier I	17,224	\$94,972,940
Tier II	9,696	48,924,518
Total	26,920	\$143,897,458
Total active members		
Tier I	138,700	\$8,705,746,049
Tier II	21,136	553,631,439
Total	159,836	\$9,259,377,488
Inactives:	130,587	N/A

Salaries reflect the reported rate of pensionable salary.

**ANNUITANTS, DISABILITY BENEFIT RECIPIENTS,  
AND SURVIVOR ANNUITANTS OF THE SYSTEM  
AS OF JUNE 30, 2014  
USED IN JUNE 30, 2015 VALUATION  
(Excluding Guaranteed Minimum Annuities)**

Class	Number	Annual Annuities at June 30
Retired on account of service:		
Regular	66,067	\$ 3,104,104,842
ERI	9,884	547,922,192
ERO	25,540	1,609,849,806
Total	101,491	\$ 5,261,876,840
Disability benefit recipients:		
Retirement allowance	778	\$ 20,702,978
Occupational	4	187,457
Temporary	315	7,705,713
Total	1,097	\$ 28,596,148
Survivor benefit recipients:		
Children	71	\$ 790,550
Survivor annuitants	9,826	207,472,165
Reversionary annuitants	197	7,047,821
Total	10,094	\$ 215,310,536
Grand Total	112,682	\$ 5,505,783,524

## 5.2 Reconciliation of Member Counts

Item	Active Members	Inactive Members
Number as of June 30, 2013 used as proxy for June 30, 2014 Valuation	160,990	127,653
New Participants	10,280	
Terminations	(10,849)	10,849
Retirements	(3,914)	(933)
Disabilities	(121)	
Return to Work	4,292	(4,246)
Deceased	(4)	(13)
Refund	(33)	(2,785)
Lump Sum	(806)	0
Data Corrections	1	<u>62</u>
Number as of June 30, 2014 used as proxy for June 30, 2015 Valuation	159,836	130,587

Item	Retirees & Beneficiaries
Number as of June 30, 2013 used as proxy for June 30, 2014 Valuation	109,448
New Retirees & Beneficiaries	4,864
Disabilities	121
Return to Work	(46)
Deceased w/o surv	(1,748)
Expiration or Transfer	0
Suspended	0
Data Corrections	<u>43</u>
Number as of June 30, 2014 used as proxy for June 30, 2015 Valuation	112,682

\* The Member counts shown represent the data one year prior to the Valuation. For example, the Active Membership data used for the June 30, 2015 valuation is the snapshot as of June 30, 2014

### 5.3 Age and Service Distribution of Active Members

Based on attained age, rounded years of service and reported rate of pensionable salary as of 6/30/2014

#### Full-Time and Regular Part-Time

Age	Years of Service									Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
<b>Under 25</b>	2,255 \$39,422	1 \$37,085									2,256 \$39,421
<b>25-29</b>	11,505 \$44,825	4,011 \$53,208									15,516 \$46,992
<b>30-34</b>	4,833 \$48,208	14,199 \$57,904	3,690 \$66,446								22,722 \$57,229
<b>35-39</b>	2,233 \$50,263	5,613 \$60,451	11,173 \$70,208	2,498 \$78,732							21,517 \$66,583
<b>40-44</b>	1,568 \$51,241	3,264 \$60,295	5,070 \$71,782	7,871 \$80,877	1,887 \$87,040						19,660 \$73,342
<b>45-49</b>	1,205 \$50,792	2,409 \$59,869	3,014 \$71,545	3,592 \$81,443	5,468 \$89,089	1,082 \$91,205					16,770 \$77,486
<b>50-54</b>	797 \$52,125	1,811 \$60,377	2,495 \$69,636	2,311 \$77,687	2,604 \$87,770	3,804 \$93,718	1,000 \$97,436				14,822 \$80,060
<b>55-59</b>	400 \$53,895	1,097 \$60,918	2,033 \$70,638	2,073 \$78,027	2,126 \$85,554	1,906 \$93,206	2,344 \$99,430	284 \$98,542			12,263 \$82,715
<b>60-64</b>	179 \$54,925	479 \$65,203	987 \$71,929	1,295 \$78,810	1,264 \$88,863	862 \$93,132	549 \$101,283	346 \$107,328	60 \$98,349		6,021 \$83,933
<b>Over 64</b>	46 \$ 54,222	131 \$ 66,669	216 \$ 78,316	278 \$ 81,115	278 \$ 88,839	194 \$ 91,517	101 \$ 97,094	56 \$ 112,062	69 \$ 108,520		1,369 \$ 85,256
<b>Total</b>	25,021 \$46,634	33,015 \$58,522	28,678 \$70,244	19,918 \$79,912	13,627 \$87,976	7,848 \$93,129	3,994 \$99,127	686 \$104,077	129 \$103,789		132,916 \$68,581

Average Age                   41.18  
Average Service               12.55



## 5.4 10 Year History of Active Membership Data

### Full-Time and Regular Part-Time

Census Date June 30	Number of Active Members	Percentage Change in Membership	Average Annual Salary	Percentage Change in Salary
2005	126,798	(0.48)%	\$58,715	3.24%
2006	130,867	3.21	59,948	2.10
2007	132,287	1.09	61,713	2.94
2008	136,328	3.05	63,986	3.68
2009	138,180	1.36	66,199	3.46
2010	137,711	(0.34)	68,352	3.25
2011	133,752	(2.87)	69,969	2.37
2012	132,956	(0.60)	66,746	(4.61)
2013	132,886	(0.05)	67,613	1.30
2014	132,916	(0.03)	68,581	1.43

### Substitutes, Part-Time and Hourly-Paid

Census Date June 30	Number of Active Members	Percentage Change in Membership	Average Annual Salary	Percentage Change in Salary
2005	29,148	-3.60%	\$4,636	7.96%
2006	28,355	(2.72)	4,784	3.19
2007	28,514	0.56	4,890	2.22
2008	29,146	2.22	5,128	4.87
2009	30,993	6.34	4,973	(3.02)
2010	32,479	4.79	4,971	(0.04)
2011	32,120	(1.11)	4,772	(4.00)
2012	29,073	(9.49)	5,305	11.17
2013	28,104	(3.33)	5,096	(3.94)
2014	26,920	(7.41)	5,345	4.89

Note that the 2013 salaries were revised to reflect the reported rate of pensionable salary.

## 5.5 10 Year History of Annuitant and Survivor Annuitant Membership

Census Date June 30	Number on Roll	Percentage Change in Membership
2006	85,153	3.23%
2007	89,269	4.83
2008	91,497	2.50
2009	94,419	3.19
2010	97,796	3.58
2011	101,352	3.64
2012	105,499	4.09
2012	106,102	0.57
2013	109,448	3.15
2014	112,682	2.95

## 5.6 Benefit Stream for Guaranteed Minimum Annuity Reserve

Benefit Payment Stream	
Fiscal Year	Guaranteed Minimum
2016	\$ 692,597
2017	603,876
2018	525,892
2019	457,373
2020	397,211
2021	344,447
2022	298,245
2023	257,872
2024	222,659
2025	192,007
2026	165,375
2027	142,266
2028	122,245
2029	104,923
2030	89,946
2031	76,999
2032	65,807
2033	56,130
2034	47,760
2035	40,518
2036	34,254
2037	28,842
2038	24,174
2039	20,161

Benefit Payment Stream	
Fiscal Year	Guaranteed Minimum
2040	\$ 16,722
2041	13,789
2042	11,298
2043	9,192
2044	7,422
2045	5,942
2046	4,712
2047	3,697
2048	2,867
2049	2,194
2050	1,655
2051	1,229
2052	897
2053	643
2054	451
2055	310
2056	208
2057	137
2058	87
2059	54
2060	33
2061	19
2062	11
2063	-

Notes:

(1) Above benefit payment amounts were projected based on the mortality assumptions for the general pensioner population.

(2) As separate mortality studies have not been performed for this special group, the fiscal 2017 State Contribution shown on the Summary of Principal Results has been adjusted to ensure payment of all required benefit amounts, as required by Statute.

## 5.7 Members in Active Service Distributed by Age

Based on attained age and reported rate of pensionable salary as of 6/30/2014

### Full-Time and Regular Part-Time

Age	Men		Women		Totals	
	Number	Salary	Number	Salary	Number	Salary
21	1	\$ 59,451	3	\$ 103,590	4	\$ 163,041
22	21	827,437	171	6,390,817	192	7,218,254
23	176	6,830,221	912	35,818,803	1,088	42,649,024
24	388	16,312,728	1,604	64,998,662	1,992	81,311,390
25	491	21,845,705	2,028	85,801,626	2,519	107,647,331
26	622	28,520,082	2,378	106,699,527	3,000	135,219,609
27	706	34,363,608	2,528	118,590,990	3,234	152,954,598
28	790	40,719,938	2,959	145,668,763	3,749	186,388,702
29	937	51,310,740	3,259	168,442,065	4,196	219,752,805
30	989	56,525,459	3,358	178,628,534	4,347	235,153,993
31	1,101	66,767,930	3,571	195,832,429	4,672	262,600,360
32	1,132	70,646,595	3,609	204,817,617	4,741	275,464,212
33	1,098	72,517,856	3,422	200,916,462	4,520	273,434,318
34	1,163	80,266,953	3,510	211,079,146	4,673	291,346,099
35	1,096	76,991,774	3,333	205,001,354	4,429	281,993,128
36	1,117	82,704,780	3,234	204,720,482	4,351	287,425,262
37	1,184	90,551,501	3,172	205,263,779	4,356	295,815,280
38	1,086	85,519,030	2,896	191,117,579	3,982	276,636,609
39	1,065	85,312,239	3,030	202,565,705	4,095	287,877,944
40	1,069	88,430,322	2,771	189,004,174	3,840	277,434,495
41	1,030	87,823,891	2,772	189,156,539	3,802	276,980,430
42	1,015	87,427,620	2,805	195,964,424	3,820	283,392,044
43	1,064	92,562,374	3,016	212,261,638	4,080	304,824,011
44	1,026	91,145,370	2,941	208,458,944	3,967	299,604,315
45	969	90,513,324	2,726	194,282,650	3,695	284,795,975
46	876	78,416,087	2,482	180,583,441	3,358	258,999,528
47	820	75,475,150	2,446	178,699,555	3,266	254,174,704
48	785	72,373,291	2,261	167,311,810	3,046	239,685,101
49	731	67,273,081	2,203	163,843,838	2,934	231,116,919
50	684	63,179,995	2,316	172,213,971	3,000	235,393,966
51	692	64,780,749	2,240	169,741,463	2,932	234,522,212
52	672	64,552,289	2,390	180,264,070	3,062	244,816,359
53	663	63,717,686	2,302	177,669,796	2,965	241,387,481
54	574	55,525,383	2,291	177,588,936	2,865	233,114,319
55	530	51,506,746	2,116	165,986,529	2,646	217,493,275
56	484	46,338,296	2,066	163,886,053	2,550	210,224,349
57	423	41,035,608	1,971	157,564,205	2,394	198,599,812
58	381	36,354,954	1,765	143,156,015	2,146	179,510,970
59	372	34,706,692	1,683	138,715,576	2,055	173,422,268
60	262	22,909,631	1,209	98,842,846	1,471	121,752,477

## 5.7 Members in Active Service Distributed by Age (continued)

### Full-Time and Regular Part-Time

Age	Men		Women		Totals	
	Number	Salary	Number	Salary	Number	Salary
61	215	\$ 19,582,881	986	\$ 80,824,994	1,201	\$ 100,407,875
62	190	17,200,284	878	73,032,719	1,068	90,233,003
63	150	12,941,053	729	61,594,002	879	74,535,055
64	128	11,626,653	488	41,319,774	616	52,946,427
65	74	6,601,468	327	27,273,324	401	33,874,792
66	55	5,578,447	200	16,972,645	255	22,551,092
67	43	3,442,193	152	12,917,346	195	16,359,540
68	30	2,591,457	73	6,178,349	103	8,769,806
69	13	1,232,960	33	2,621,467	46	3,854,427
70	10	863,490	26	2,071,134	36	2,934,624
71	14	1,283,608	22	1,904,531	36	3,188,139
72	1	36,155	17	1,270,765	18	1,306,920
73			7	655,247	7	655,247
74	1	123,847	3	212,595	4	336,442
75	2	125,335	4	432,883	6	558,218
76	1	81,527	1	45,116	2	126,643
77	1	78,244	2	113,713	3	191,957
78			1	100,690	1	100,690
79			1	61,689	1	61,689
80						
81			1	78,825	1	78,825
82						
<b>Total</b>	31,213	\$2,428,032,167	101,703	\$ 6,687,447,863	132,916	\$9,115,480,030

Amounts may not add due to rounding.

In addition, there are the following active members:

#### **SUBSTITUTES, PART-TIME, AND HOURLY-PAID TEACHERS WHO ARE ON A FLEXIBLE OR LIMITED WORK SCHEDULE**

Number	26,920
Annual Salaries	\$ 143,897,458
Average Age	42.68
Average Service	2.29

## 5.8 Members in Active Service Distributed by Service

Based on rounded years of service and reported rate of pensionable salary as of 6/30/2014

### Full-Time and Regular Part-Time

Service	Men		Women		Totals	
	Number	Salary	Number	Salary	Number	Salary
0	296	\$ 11,167,977	938	\$ 33,771,318	1,234	\$ 44,939,295
1	1,427	66,307,536	5,175	221,790,970	6,602	288,098,506
2	1,529	77,140,430	4,873	223,362,109	6,402	300,502,539
3	1,380	71,495,813	4,558	215,111,421	5,938	286,607,234
4	1,077	59,832,970	3,768	186,836,228	4,845	246,669,198
5	1,212	68,628,933	4,301	223,140,769	5,513	291,769,703
6	1,325	80,439,893	5,124	279,811,997	6,449	360,251,890
7	1,664	106,515,406	5,444	307,203,704	7,108	413,719,110
8	1,483	101,034,898	5,374	316,484,163	6,857	417,519,062
9	1,599	112,882,001	5,489	335,962,487	7,088	448,844,488
10	1,363	100,247,857	4,759	300,202,706	6,122	400,450,563
11	1,255	99,203,214	4,360	285,353,156	5,615	384,556,369
12	1,348	106,512,346	4,358	295,117,524	5,706	401,629,870
13	1,308	108,147,329	4,395	305,521,541	5,703	413,668,870
14	1,318	111,642,420	4,214	302,503,915	5,532	414,146,335
15	1,271	110,041,518	3,802	278,268,515	5,073	388,310,033
16	1,089	97,833,211	3,355	250,247,410	4,444	348,080,622
17	963	88,391,868	2,856	218,744,816	3,819	307,136,684
18	890	82,596,441	2,446	191,225,392	3,336	273,821,833
19	832	79,153,208	2,414	195,188,763	3,246	274,341,971
20	1,083	107,913,842	2,789	227,332,141	3,872	335,245,983
21	743	73,713,087	2,092	171,266,473	2,835	244,979,561
22	567	58,455,427	1,851	156,486,421	2,418	214,941,849
23	596	61,877,880	1,763	149,344,271	2,359	211,222,150
24	501	51,714,810	1,642	140,740,583	2,143	192,455,393
25	439	45,566,132	1,330	115,571,722	1,769	161,137,854
26	347	36,238,481	1,297	115,430,249	1,644	151,668,730
27	379	40,427,864	1,172	104,889,274	1,551	145,317,138
28	351	38,602,004	1,094	97,666,438	1,445	136,268,442
29	337	35,558,560	1,102	100,922,637	1,439	136,481,197
30	337	36,453,636	871	81,169,414	1,208	117,623,050
31	243	26,817,152	704	65,873,260	947	92,690,412
32	206	23,967,252	600	58,366,989	806	82,334,241
33	143	15,914,315	504	49,045,046	647	64,959,361
34	75	8,578,238	311	29,726,602	386	38,304,839
35	64	6,837,485	186	18,030,161	250	24,867,646
36	38	4,673,665	109	10,842,059	147	15,515,724
37	47	5,494,260	90	9,091,987	137	14,586,246
38	30	3,322,831	64	6,709,712	94	10,032,543
39	22	2,690,156	36	3,704,546	58	6,394,701

## 5.8 Members in Active Service Distributed by Service (continued)

### Full-Time and Regular Part-Time

Service	Men		Women		Totals	
	Number	Salary	Number	Salary	Number	Salary
40	11	\$ 1,147,495	32	\$ 3,146,774	43	\$ 4,294,269
41	6	644,106	14	1,550,999	20	2,195,106
42	5	490,434	11	1,007,772	16	1,498,206
43	6	656,582	14	1,386,554	20	2,043,136
44	3	529,004	9	1,039,967	12	1,568,971
45	3	309,892	6	553,200	9	863,092
46	1	119,996			1	119,996
47						
48			1	119,904	1	119,904
49	1	102,312	1	104,128	2	206,440
50			1	97,253	1	97,253
51			2	202,908	2	202,908
52						
53						
54						
55						
56			1	100,690	1	100,690
57						
58						
59						
60			1	78,825	1	78,825
<b>Total</b>	31,213	\$2,428,032,167	101,703	\$6,687,447,863	132,916	\$9,115,480,030

Amounts may not add due to rounding.

In addition, there are the following active members:

**SUBSTITUTES, PART-TIME, AND HOURLY-PAID  
TEACHERS WHO ARE ON A FLEXIBLE OR  
LIMITED WORK SCHEDULE**

Number	26,920
Annual Salaries	\$ 143,897,458
Average Age	42.68
Average Service	2.29

## 5.9 Retired Annuitants Distributed by Age

Annual annuities are based on the monthly amounts reported as of June 30, 2014 multiplied by 12

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
51	1	\$ 36,156			1	\$ 36,156
52			1	\$ 10,469	1	10,469
53			1	7,786	1	7,786
54	11	550,025	45	2,176,477	56	2,726,502
55	93	6,805,216	227	11,807,826	320	18,613,042
56	185	12,834,373	520	29,546,178	705	42,380,551
57	279	19,233,179	788	43,890,830	1,067	63,124,009
58	408	29,260,350	1,106	64,486,790	1,514	93,747,140
59	499	35,055,841	1,518	83,678,945	2,017	118,734,786
60	707	45,795,371	2,214	113,963,566	2,921	159,758,937
61	882	60,920,334	3,048	157,833,036	3,930	218,753,370
62	1,118	75,309,455	3,838	200,971,466	4,956	276,280,921
63	1,330	93,482,765	4,222	221,379,127	5,552	314,861,892
64	1,538	106,021,321	4,244	214,406,817	5,782	320,428,138
65	1,579	110,424,968	4,268	213,044,987	5,847	323,469,955
66	1,888	133,084,341	4,421	221,538,065	6,309	354,622,406
67	1,876	131,327,134	4,274	218,621,817	6,150	349,948,951
68	1,815	125,673,410	3,332	164,355,771	5,147	290,029,181
69	1,556	105,826,495	2,943	142,651,912	4,499	248,478,407
70	1,463	95,761,194	2,804	130,163,715	4,267	225,924,909
71	1,514	97,814,558	2,771	126,229,319	4,285	224,043,877
72	1,284	80,791,391	2,451	112,585,840	3,735	193,377,231
73	1,106	68,936,119	2,039	91,075,835	3,145	160,011,954
74	972	61,412,472	1,803	77,520,768	2,775	138,933,240
75	971	60,384,061	1,643	72,228,364	2,614	132,612,425
76	872	54,267,610	1,532	64,770,564	2,404	119,038,174
77	795	48,204,617	1,367	55,620,389	2,162	103,825,006
78	790	44,948,731	1,247	52,200,474	2,037	97,149,205
79	769	45,293,640	1,180	46,813,301	1,949	92,106,941
80	640	37,272,907	1,033	40,002,988	1,673	77,275,895
81	592	32,684,673	957	34,970,936	1,549	67,655,609
82	602	32,592,095	909	34,867,147	1,511	67,459,242
83	552	26,656,480	870	30,395,234	1,422	57,051,714
84	467	24,734,616	842	28,422,946	1,309	53,157,562
85	420	21,307,670	784	24,855,048	1,204	46,162,717
86	372	17,915,488	766	24,043,058	1,138	41,958,546
87	337	15,807,889	687	20,180,200	1,024	35,988,089
88	253	11,791,065	502	14,516,599	755	26,307,664
89	248	11,750,506	481	13,815,362	729	25,565,868
90	154	6,769,474	429	11,820,453	583	18,589,927



## 5.9 Retired Annuitants Distributed by Age (continued)

Annual annuities are based on the monthly amounts reported as of June 30, 2014 multiplied by 12

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
91	142	\$ 5,988,327	411	\$ 10,276,506	553	\$ 16,264,833
92	89	3,156,383	328	7,664,614	417	10,820,997
93	54	1,928,132	318	8,082,096	372	10,010,228
94	44	1,392,513	245	5,482,648	289	6,875,161
95	28	844,354	206	4,557,530	234	5,401,884
96	31	815,145	160	3,290,453	191	4,105,597
97	17	607,953	104	2,419,951	121	3,027,904
98	8	276,287	72	1,363,848	80	1,640,135
99	5	180,900	56	1,007,585	61	1,188,485
100	8	251,775	120	2,081,445	128	2,333,220
<b>Total</b>	31,364	\$2,004,179,757	70,127	\$3,257,697,082	101,491	\$5,261,876,840

Amounts may not add due to rounding.

Average Age                    70.13

## 5.10 Survivor Annuitants Distributed by Age

Annual annuities are based on the monthly amounts reported as of June 30, 2014 multiplied by 12

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
19	21	\$ 166,526	12	\$ 139,705	33	\$ 306,231
20	22	199,041	11	214,312	33	413,353
21	2	11,530	3	59,436	5	70,966
24			1	9,335	1	9,335
25			2	40,033	2	40,033
26			1	25,755	1	25,755
27	2	83,645			2	83,645
28	1	5,236			1	5,236
30	1	14,099			1	14,099
32	1	7,308			1	7,308
33			2	15,294	2	15,294
34	3	21,703	1	7,308	4	29,011
35	1	7,308	3	27,479	4	34,787
36			1	11,110	1	11,110
37	1	9,821	3	30,141	4	39,962
38	1	2,584	3	23,804	4	26,388
39	2	16,657	2	16,741	4	33,399
40	4	36,331	3	24,957	7	61,288
41	3	28,252	3	28,059	6	56,311
42	5	73,582	1	9,258	6	82,840
43	5	72,398	1	9,258	6	81,655
44	1	9,258	2	39,817	3	49,074
45	7	145,560	7	202,417	14	347,976
46	4	66,299	2	37,928	6	104,227
47	4	37,678	4	65,138	8	102,816
48	5	58,335	3	50,842	8	109,177
49	2	15,206	7	90,370	9	105,576
50	4	42,155	10	203,673	14	245,829
51	6	100,746	11	267,941	17	368,687
52	14	212,299	12	251,102	26	463,401
53	19	302,884	16	356,041	35	658,924
54	10	212,025	23	560,488	33	772,513
55	20	371,944	19	419,428	39	791,372
56	30	480,461	16	280,458	46	760,919
57	33	577,203	27	658,345	60	1,235,547
58	17	274,932	36	772,726	53	1,047,658
59	23	452,161	41	913,601	64	1,365,762
60	37	860,299	42	1,110,424	79	1,970,723

## 5.10 Survivor Annuitants Distributed by Age (continued)

Annual annuities are based on the monthly amounts reported as of June 30, 2014 multiplied by 12

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
61	41	\$ 826,706	68	\$ 1,972,650	109	\$ 2,799,356
62	56	1,372,960	80	2,163,290	136	3,536,250
63	67	1,292,624	79	2,323,737	146	3,616,360
64	56	1,262,903	108	3,056,028	164	4,318,931
65	79	1,644,208	123	3,590,459	202	5,234,667
66	119	2,704,403	139	3,937,689	258	6,642,092
67	87	1,853,643	132	3,903,492	219	5,757,135
68	85	1,904,451	143	3,965,649	228	5,870,100
69	80	1,604,086	166	4,558,038	246	6,162,124
70	82	1,780,435	173	4,868,174	255	6,648,609
71	124	2,555,029	206	5,506,452	330	8,061,481
72	113	2,383,750	199	5,448,940	312	7,832,690
73	95	1,990,493	196	5,359,576	291	7,350,069
74	87	1,749,804	192	5,347,379	279	7,097,183
75	107	2,147,437	221	5,876,212	328	8,023,649
76	91	1,749,040	250	6,429,345	341	8,178,385
77	101	1,733,912	231	5,686,073	332	7,419,985
78	102	1,830,471	223	5,477,711	325	7,308,183
79	91	1,710,252	228	5,415,311	319	7,125,563
80	97	1,889,254	241	5,793,835	338	7,683,089
81	114	2,055,718	238	5,408,685	352	7,464,403
82	120	1,883,412	275	6,117,003	395	8,000,415
83	124	2,199,622	272	5,907,498	396	8,107,120
84	111	1,670,031	277	5,942,755	388	7,612,786
85	93	1,526,739	262	5,598,836	355	7,125,575
86	112	1,645,263	217	4,509,182	329	6,154,445
87	98	1,433,279	212	4,345,328	310	5,778,607
88	86	1,245,261	199	3,516,102	285	4,761,363
89	79	1,028,463	174	3,296,704	253	4,325,167
90	82	1,034,102	154	2,691,147	236	3,725,249
91	80	1,012,926	129	2,200,984	209	3,213,910
92	56	692,453	118	1,902,784	174	2,595,236
93	53	519,527	96	1,563,161	149	2,082,687
94	48	479,061	84	1,261,803	132	1,740,864
95	18	190,280	74	1,019,720	92	1,210,000
96	28	275,252	49	578,895	77	854,147
97	18	144,416	35	511,746	53	656,161
98	14	115,580	27	363,626	41	479,206
99	10	92,424	25	363,172	35	455,596
100	7	43,913	26	309,595	33	353,508
<b>Total</b>	3,422	\$ 60,249,050	6,672	\$ 155,061,486	10,094	\$ 215,310,536

Amounts may not add due to rounding.

Average Age 77.02

## 5.11 Disability Annuitants Distributed by Age

Annual annuities are based on the monthly amounts reported as of June 30, 2014 multiplied by 12

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
27			1	\$ 21,176	1	\$ 21,176
29	1	\$ 14,687	1	18,924	2	33,611
30			2	39,588	2	39,588
31			5	89,958	5	89,958
32			4	71,110	4	71,110
33			2	39,194	2	39,194
34			4	71,460	4	71,460
35			6	119,995	6	119,995
36			5	100,649	5	100,649
37			6	125,675	6	125,675
38			3	57,376	3	57,376
39			5	89,534	5	89,534
40	1	23,865	4	81,218	5	105,083
41	2	66,246	13	283,979	15	350,224
42	3	55,786	5	124,601	8	180,387
43	2	40,874	15	305,944	17	346,818
44			13	303,917	13	303,917
45	4	97,665	28	586,605	32	684,270
46	2	44,489	20	430,300	22	474,788
47	3	90,691	15	335,580	18	426,270
48	4	76,370	11	246,060	15	322,430
49	4	113,717	16	343,221	20	456,938
50	6	162,707	15	368,609	21	531,316
51	6	124,930	18	452,955	24	577,885
52	7	177,396	26	691,998	33	869,395
53	9	236,196	21	517,807	30	754,003
54	10	266,217	29	651,888	39	918,105
55	1	15,889	38	1,036,575	39	1,052,464
56	7	171,043	30	865,308	37	1,036,350
57	7	338,012	44	1,385,676	51	1,723,689
58	11	357,151	36	1,163,871	47	1,521,022
59	5	177,460	27	759,282	32	936,741
60	9	195,290	47	1,375,209	56	1,570,500
61	3	70,448	35	1,023,342	38	1,093,790
62	8	229,991	37	999,405	45	1,229,396
63	7	232,109	45	1,207,852	52	1,439,961
64	10	271,109	27	742,915	37	1,014,024
65	8	215,327	28	867,478	36	1,082,805
66	2	38,186	21	587,604	23	625,790
67	9	278,194	26	712,138	35	990,332

## 5.11 Disability Annuitants Distributed by Age (continued)

Annual annuities are based on the monthly amounts reported as of June 30, 2014 multiplied by 12

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
68	5	\$ 252,513	20	\$ 617,692	25	\$ 870,206
69	2	44,492	13	337,100	15	381,592
70	8	222,651	15	312,815	23	535,466
71	3	80,711	10	252,153	13	332,864
72	4	156,148	16	395,799	20	551,947
73	2	32,102	7	206,279	9	238,381
74	1	15,806	5	95,010	6	110,816
75	1	7,697	10	251,444	11	259,141
76			4	82,253	4	82,253
77	3	78,501	6	95,482	9	173,984
78	2	110,490	8	158,151	10	268,641
79	1	67,620	11	254,396	12	322,016
80	2	64,292	7	168,608	9	232,900
81			5	114,964	5	114,964
82	1	10,016	4	69,071	5	79,087
83	1	19,908	5	83,201	6	103,109
84	1	22,122	5	79,384	6	101,507
85	2	23,959	1	11,465	3	35,425
86	2	41,580	2	43,811	4	85,390
87			1	8,700	1	8,700
88			2	24,924	2	24,924
89	1	17,989	1	15,762	2	33,751
90			5	86,449	5	86,449
91			1	12,124	1	12,124
92			3	39,617	3	39,617
94			1	9,171	1	9,171
97			1	11,801	1	11,801
98			1	11,904	1	11,904
<b>Total</b>	193	\$ 5,450,643	904	\$ 23,145,505	1,097	\$ 28,596,148

Amounts may not add due to rounding.

Average Age                    59.06

## 5.12 Guaranteed Minimum Annuity Reserve of Retired Annuitants

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
61			1	\$ 1,344	1	\$ 1,344
62			1	266	1	266
63			2	161	2	161
64			2	1,846	2	1,846
65			4	1,025	4	1,025
66			9	5,553	9	5,553
67	1	\$ 167	3	1,602	4	1,769
68			5	2,325	5	2,325
69	2	253	6	5,535	8	5,788
70			8	1,409	8	1,409
71	3	181	9	5,523	12	5,704
72	3	650	13	4,469	16	5,118
73			6	8,508	6	8,508
74			10	4,524	10	4,524
75	1	838	14	8,104	15	8,942
76	2	976	35	17,038	37	18,014
77	2	860	27	14,104	29	14,964
78	2	3,060	18	12,445	20	15,505
79	1	347	32	16,950	33	17,298
80	2	375	14	9,023	16	9,398
81	2	602	20	13,183	22	13,785
82	1	293	24	18,197	25	18,490
83	6	2,980	32	23,236	38	26,216
84	5	4,546	42	28,389	47	32,935
85	6	4,623	46	29,147	52	33,770
86	7	1,145	48	36,095	55	37,240
87	8	7,403	48	44,680	56	52,084
88	6	2,738	36	27,715	42	30,453
89	4	5,840	40	36,160	44	42,000
90	5	3,351	46	40,315	51	43,666
91	4	3,815	43	48,696	47	52,510
92	4	3,920	41	41,276	45	45,195
93	3	2,654	39	47,124	42	49,777
94	2	3,831	35	40,481	37	44,312
95	5	3,299	38	46,262	43	49,561
96	3	5,728	17	23,430	20	29,158
97	2	2,522	16	23,829	18	26,351
98	1	747	17	20,841	18	21,588
99	1	1,546	13	14,716	14	16,262
100			9	14,818	9	14,818

### 5.12 Guaranteed Minimum Annuity Reserve of Retired Annuitants (continued)

Age	Males		Females		Totals	
	Number	Annuities	Number	Annuities	Number	Annuities
101	1	\$ 994	6	\$ 9,164	7	\$ 10,158
102			3	5,887	3	5,887
103			4	5,839	4	5,839
104			2	5,951	2	5,951
105			1	2,485	1	2,485
106						
107			1	2,558	1	2,558
<b>Total</b>	95	\$ 70,284	886	\$ 772,227	981	\$ 842,511

Amounts may not add due to rounding.

# Section 6 – Basis of the Actuarial Valuation

## 6.1 Summary of Benefit and Contribution Provisions

### MEMBERSHIP

Employers of the System include:

- (a) the Illinois public common school districts outside of Chicago,
- (b) certain state agencies employing certificated teachers, and
- (c) 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.



## 6.1 Summary of Benefit and Contribution Provisions (continued)

Employment on a full-time basis covers only teachers whose normal employment schedule consists 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 a 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 is \$106,800 as of January 1, 2011. Each subsequent year the limit will increase 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 4 consecutive years within the last 10 years of creditable service as determined under the rules of the Board. For Tier II, the average is for the highest 8 consecutive years within the last 10 years.

### BENEFITS

#### Normal Retirement

Eligibility	For Tier I, age 60 with 10 years of service, or age 62 with 5 years of service. For Tier II, age 67 with 10 years of service.
Amount	For a Tier I person who first became a teacher before July 1, 2005, the annual benefit amount is the greatest of (i), (ii) and (iii) below. For a Tier I person who first became a teacher on or after July 1, 2005, the annual benefit amount is the greater of (i) and (ii) below. For 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.\*

\* Service earned before July 1, 1998 can be upgraded to 2.2% through additional member contributions or 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.

- (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.

## 6.1 Summary of Benefit and Contribution Provisions (continued)

- (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 - 75% of final average salary.

### Early Retirement

**Eligibility** For Tier I, age 55 with 20 years of service. For Tier II, age 62 with 10 years of service.

**Amount** For 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. For Tier II, the reduction is 6% for each year the member is under age 67.

### Early Retirement Option

A member retiring after June 1, 1980 and within six months of the last day of teaching for which retirement contributions were required, may elect to make a one time employee contribution to avoid the early retirement reduction described in the foregoing paragraph. Such employee and employer contributions will be a multiple of the member's last full time annual salary rate as a teacher, the full time equivalent if less than full time, or the highest year's salary used for determining final average salary.

The member lump sum ERO contribution rate for members is 14.4%, and the employer lump sum ERO contribution rate for such persons is 29.3%. The multiple of salary to be contributed by the member equals the member rate times the lesser of the following two periods: (a) the number of years (including fractional years) that the member is less than age 60; or (b) the number of years (including fractional years) that the member's creditable service is less than 35 years.

The multiple of salary to be contributed by the member's employer equals the employer rate times the number of years (including fractional years) that the member is less than age 60.

### 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.

## 6.1 Summary of Benefit and Contribution Provisions (continued)

### 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 Annuity

Eligibility	Termination of temporary disability benefit, provided member remains disabled.
Amount	The larger of (a) 35% of the member's most recent annual contract salary or (b) the benefit payable as for normal retirement, but reduced by ½% 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	For Tier I, 5 years of service. For Tier II, 10 years of service.
Amount	For Tier I, equal to the amount computed under normal retirement deferred to age 62 if member has less than 10 years of service. With 10 or more years of service the annuity is payable at age 60. For 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.

## 6.1 Summary of Benefit and Contribution Provisions (continued)

Refund of Contributions	<p>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 fund by him which have not previously been refunded, without interest thereon.</p> <p>A member who retires on ERO shall not receive a refund of the 0.4% career ERO contributions; otherwise, the 0.4% career ERO contributions are refunded, without interest, to the member, or the member's beneficiary or Estate (if applicable) if any of the following occur: (1) the ERO program is discontinued under Section 16-176; or (2) the member either retires without ERO, terminates employment and withdraws the member account balance, or dies before retirement.</p>
Death Benefit	<p>Refunds 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.</p>

Survivor Benefit	Types of Beneficiaries	
<u>Time of Death</u>	<u>Dependents</u>	<u>Non-dependents</u>
While employed	Lump sum up to last salary <b>or</b> \$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 <b>or</b> \$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*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 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*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 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.

## 6.1 Summary of Benefit and Contribution Provisions (continued)

### 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 Jan. 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 Jan. 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 Jan. 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, 2005, each member contributes an additional 0.4% of pay "career ERO contribution," bringing the total contribution to 9.4%. This contribution requirement shall cease if the Early Retirement Option program ends.

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.

## 6.1 Summary of Benefit and Contribution Provisions (continued)

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 an expansion of the eligibility requirements for any benefit provided by the statute, resulting from an amendment that takes effect 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 2 years of service credit. The period of sick leave shall not be considered in determining the effective date of retirement.

## 6.2 Summary of Actuarial Methods

The methods below used for the funding valuation are prescribed by the Illinois Pension Code. They do not necessarily represent the recommendations of the actuary.

**VALUATION COST METHOD:** The projected unit credit cost method, effective June 30, 1989, applies for funding and GASB 25. The entry age normal cost method applies for GASB 67. Gains and losses are reflected in the unfunded actuarial accrued liability (net pension liability for GASB 67).

**ASSET VALUATION METHOD:** For the funding valuation, beginning with the June 30, 2009 valuation, the method for determining the actuarial value of assets was changed from the market value to a smoothed value. The smoothed value recognizes the actuarial investment gains or losses for each fiscal year in equal amounts over the ensuing five-year period. The same method is used for GASB 25. For GASB 67, the fair market value is used.

**AMORTIZATION OF UNFUNDED ACCRUED LIABILITY:** 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.

**LIABILITY ADJUSTMENT:** 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. In projecting results to account for the one-year difference in the census date and the valuation date, we made use of the valuation assumptions. To the extent that changes have occurred in the census from the date the census information is determined and the valuation date, we will work with TRS staff to determine if additional adjustments need to be made. Otherwise, any change in liability due to changes in census between the collection date of the census information and the valuation date will be captured in the next actuarial valuation.

### 6.3 Summary of Actuarial Assumptions

Assumptions adopted by the TRS Board effective June 30, 2015, except as otherwise noted.

INTEREST RATE: 7.50% per annum, compounded annually. The interest rate assumption includes the following components: inflation 3.00%, and real rate of return 4.50%. (Adopted effective June 30, 2014.)

SEPARATIONS FROM ACTIVE SERVICE (OTHER THAN DEATH AND SERVICE RETIREMENT):  
Representative values of the assumed rates of separation are shown in the following tables:

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

Incidence of Disability		
Age	Male	Female
25	.029%	.030%
30	.023%	.061%
35	.030%	.069%
40	.051%	.112%
45	.068%	.140%
50	.117%	.192%
55	.138%	.240%
60	.179%	.227%
65	.536%	.410%



### 6.3 Summary of Actuarial Assumptions (continued)

SERVICE RETIREMENT FROM ACTIVE SERVICE AND UTILIZATION OF ERO FOR MEMBERS HIRED BEFORE JANUARY 1, 2011: The assumed rates of retirement and utilization of ERO are shown in the following tables:

Incidence of Regular Service Retirement Among Eligible Active Members					
Age *	Service*				
	5 – 18	19 – 30	31	32 – 33	34+
54		6%	8%	38%	60%
55		10%	8%	38%	60%
56		7%	8%	38%	45%
57		7%	12%	40%	45%
58		7%	12%	40%	40%
59		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%

Utilization of ERO among All Active Service Retirees**						
Service *	Age*					
	54	55	56	57	58	59
19 – 30	0%	50%	58%	49%	58%	51%
31	0%	65%	66%	44%	50%	64%
32	0%	82%	52%	52%	38%	52%
33	0%	10%	11%	12%	6%	8%

\* Rounded to nearest year on June 30 prior to retirement

\*\* ERO Utilization Rates are applied only to members who have less than 35 years of total service at the assumed retirement date (including assumed sick leave and optional service purchased at retirement). Based on the sick leave and optional service assumptions, the majority of members with 33 years of service at the beginning of the year of retirement will not be assumed to retire on ERO because they will be assumed to have at least 35 years of service at retirement.

In addition, ERO Utilization Rates are not applied to members whose pension under the ERO program would be less than their money purchase benefit.

ERO is assumed to be extended beyond June 30, 2016. The current assumed lump sum contribution rates for ERO are 10.8% for the member and 22.0% for the employer.

### 6.3 Summary of Actuarial Assumptions (continued)

SERVICE RETIREMENT FROM ACTIVE SERVICE FOR MEMBERS HIRED ON OR AFTER JANUARY 1, 2011: The assumed rates of retirement for members hired January 1, 2011 and later are shown in the following tables:

Incidence of Regular Service Retirement Rates Among Eligible Active Members					
Age*	Service*				
	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%

\* Rounded to nearest year on June 30 prior to retirement

MORTALITY: The assumed mortality rates are based on the Society of Actuaries RP-2014 mortality tables, with adjustments as appropriate for TRS experience. The rates are used on a fully generational basis using projection table MP-2014. Sample rates and a description of the tables follows. Note that the sample rates shown are as of the base year 2014.

Pre-Commencement Member Mortality Rates		
Age	Male	Female
25	0.0339%	0.0146%
30	0.0317%	0.0184%
35	0.0367%	0.2410%
40	0.0440%	0.0334%
45	0.0682%	0.0554%
50	0.1182%	0.0930%
55	0.1955%	0.1412%
60	0.3288%	0.2060%
65	0.5805%	0.3119%

### 6.3 Summary of Actuarial Assumptions (continued)

Post-Commencement Mortality Rates						
Age	Healthy Male	Healthy Female	Disabled Male	Disabled Female	Beneficiary Male	Beneficiary Female
50	0.2764%	0.1578%	2.0395%	1.1907%	0.4552%	0.3100%
55	0.3908%	0.2064%	2.3369%	1.4479%	0.6423%	0.4057%
60	0.5225%	0.2957%	2.6604%	1.6999%	0.8704%	0.5814%
65	0.7580%	0.4977%	3.1685%	2.0860%	1.2335%	0.9014%
70	1.2402%	0.8021%	4.0346%	2.8203%	1.8781%	1.4412%
75	2.1279%	1.3359%	5.4287%	4.1045%	3.0045%	2.3451%
80	4.2903%	3.2244%	7.6616%	6.1036%	5.0089%	3.9025%
85	7.8655%	5.7890%	11.3303%	9.0420%	8.6797%	6.7764%
90	14.5119%	10.6219%	17.3005%	13.2652%	15.2217%	11.9981%

Pre-Commencement Member: the RP-2014 White Collar table.

Post-Commencement Healthy used for non-disability retirements: the RP-2014 White Collar table with female rates multiplied by 76% for ages 50-77 and 106% for ages 78 to 114 and male rates multiplied by 115% for ages 78 to 114.

Post-Commencement Disability: the RP-2014 Disabled table.

Post-Commencement Surviving Beneficiaries: the RP-2014 table with female and male rates multiplied by 112% for ages 50 to 114.

MARITAL DATA: It is assumed that 85% of members are married and that the female spouse is three years younger than the male spouse. (Adopted effective June 30, 1993.)

GROWTH IN ACTIVE MEMBERSHIP: For purposes of the projection required by State funding law, it is assumed that the active membership of the System will remain constant in number, with no change in the size of either the full-time/part-time group or the hourly/substitute group. (Adopted effective June 30, 1994.)

SALARY INCREASES (includes 3.00% inflation and 0.75% real wage growth; additional 0.25% per annum increase used to cover employment type and status changes was combined with the rest of the assumption.):

Service	Annual Salary Increase
1	9.75%
2	7.75%
3	7.25%
4	6.95%
5	6.75%
10	5.75%
15	4.75%
20 and above	3.75%

### 6.3 Summary of Actuarial Assumptions (continued)

**SEVERANCE PAY:** The percent of retirees from active service assumed to receive severance payments, and the amount of such severance payments, should be based on the assumption of 20% of retirees will 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:

Regular Service at Retirement	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; and
- b. No additional service purchases will be assumed for members who currently have optional service credit; and
- 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.

The liability covered by future member payments is not included in the liability on the valuation date, but is brought into projected liabilities as those payments are brought into the assets.

### 6.3 Summary of Actuarial Assumptions (continued)

**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:

Regular Service at Retirement	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

**ADMINISTRATIVE EXPENSES:** The administrative staff of the System estimates the expected administrative expenses for the fiscal year following the valuation. Total payroll for the same year is projected based on valuation assumptions and the expected administrative expenses are then expressed as a percent of total payroll. Administrative expenses in future years are then assumed to remain constant as a percent of total payroll. The rate changes annually. This year's rate can be found on exhibit 1.1. (Adopted effective June 30, 1994.)

**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. (Adopted effective June 30, 1999.)

**TIER II PAY CAP INCREASE:** 1.40% per annum

**TIER II COLA INCREASE:** 1.40% per annum

The current assumptions for inflation, the Tier II pay cap increase rate and the Tier II COLA increase rate, are based on stochastic projections that developed the rate of return. Buck applied the specifics of the pay cap and COLA increase to the projection of inflation from the model and elected amounts in the middle range for each assumption and then rounded the number to the nearest tenth of a percent.

**FUTURE PAYROLL ASSUMPTION:** Future payroll is projected using the assumed decrements for the members in the system and the new entrant profile as described below.

**415 AND 401(a)(17) LIMITS:** Benefits are limited by these Internal Revenue Code limits and are assumed to increase 3.00% annually.

**NEW HIRES AFTER VALUATION:** to be based on the census information provided for the year preceding the valuation.

### 6.3 Summary of Actuarial Assumptions (continued)

#### NEW MEMBER PROFILE

Distribution of New Entrants is as follows (based on 6/30/2014 new hire statistics):

Age Group	Full Time/Part Time			Hourly/Substitute		
	Males	Females	Total	Males	Females	Total
20 – 24	5.1%	26.2%	31.3%	6.6%	18.7%	25.3%
25 – 29	6.8%	26.0%	32.8%	7.5%	14.5%	22.0%
30 – 34	3.7%	10.5%	14.2%	3.2%	6.8%	10.0%
35 – 39	1.9%	5.4%	7.3%	2.1%	6.9%	9.0%
40 – 44	1.3%	4.6%	5.9%	2.2%	9.6%	11.8%
45 – 49	1.0%	3.1%	4.1%	1.4%	5.8%	7.2%
50 – 54	0.7%	1.9%	2.6%	1.5%	4.1%	5.6%
55 – 59	0.3%	0.9%	1.2%	1.1%	3.0%	4.1%
60 – 64	0.2%	0.4%	0.6%	1.2%	1.8%	3.0%
65 – 69	0.0%	0.0%	0.0%	0.7%	0.7%	1.4%
70	<u>0.0%</u>	<u>0.0%</u>	<u>0.0%</u>	<u>0.3%</u>	<u>0.3%</u>	<u>0.6%</u>
Total	21.0%	79.0%	100.0%	27.8%	72.2%	100.0%

Service Credit Earned in Each Future Year (based on 6/30/2014 new hire statistics):

Age Group	Full Time/Part Time			Hourly/Substitute		
	Males	Females	Total	Males	Females	Total
20 – 24	0.951	0.969	0.966	0.271	0.259	0.262
25 – 29	0.963	0.964	0.964	0.258	0.246	0.250
30 – 34	0.951	0.957	0.955	0.248	0.246	0.247
35 – 39	0.957	0.958	0.958	0.243	0.240	0.241
40 – 44	0.951	0.950	0.950	0.248	0.240	0.241
45 – 49	0.970	0.962	0.964	0.265	0.244	0.248
50 – 54	0.970	0.955	0.959	0.260	0.244	0.248
55 – 59	0.803	0.926	0.895	0.250	0.241	0.243
60 – 64	0.970	0.956	0.961	0.260	0.236	0.246
65 – 69	0.000	0.000	0.000	0.238	0.234	0.236
70	0.000	0.000	0.000	0.243	0.218	0.231
Average	0.955	0.963	0.961	0.258	0.247	0.250

### 6.3 Summary of Actuarial Assumptions (continued)

NEW MEMBER PROFILE (continued)

Projected Annual Rate of Pay at 6/30/2014\* (for one year of service credit)

Age Group	Full Time/Part Time			Hourly/Substitute		
	Males	Females	Total	Males	Females	Total
20 – 24	\$ 43,350	\$ 43,421	\$ 43,410	\$ 24,796	\$ 26,527	\$ 26,075
25 – 29	\$ 46,270	\$ 47,274	\$ 47,066	\$ 22,480	\$ 24,734	\$ 23,965
30 – 34	\$ 56,622	\$ 49,576	\$ 51,412	\$ 22,709	\$ 23,194	\$ 23,039
35 – 39	\$ 60,163	\$ 53,193	\$ 55,007	\$ 22,672	\$ 20,750	\$ 21,199
40 – 44	\$ 63,824	\$ 54,772	\$ 56,766	\$ 20,273	\$ 18,660	\$ 18,961
45 – 49	\$ 63,810	\$ 58,709	\$ 59,953	\$ 20,114	\$ 18,287	\$ 18,642
50 – 54	\$ 65,192	\$ 56,033	\$ 58,499	\$ 18,179	\$ 17,765	\$ 17,876
55 – 59	\$ 77,805	\$ 56,904	\$ 61,129	\$ 16,712	\$ 17,689	\$ 17,427
60 – 64	\$ 56,006	\$ 63,947	\$ 61,300	\$ 17,711	\$ 17,880	\$ 17,813
65 – 69	\$ -	\$ -	\$ -	\$ 16,846	\$ 18,975	\$ 17,910
70	\$ -	\$ -	\$ -	\$ 19,011	\$ 15,685	\$ 17,348
Total	\$ 51,738	\$ 47,997	\$ 48,782	\$ 21,931	\$ 22,394	\$ 22,266

\* The rate of pay profile will increase by the inflation and real wage growth assumptions.

## 6.4 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, provides that the Early Retirement Option terminates on July 1, 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>



## 6.5 Glossary of Actuarial Terms

Note that the first definitions given are the “official” definitions of the term. For some terms there is a second definition, in italics.

**Actuarial Accrued Liability (AAL).** The portion of the Present Value of Future Benefits (PVFB) allocated to past service. Also difference between (i) the actuarial present value of future benefits, and (ii) the present value of future normal cost. Sometimes referred to as “accrued liability” or “past service liability.” *The amount of money that should be in the Fund. The funding target.*

**Actuarial Assumptions.** Estimates of future plan experience with respect to rates of mortality, disability, retirement, investment income and salary increases. Demographic (“people”) assumptions (rates of mortality, separation, and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic (“money”) assumptions (salary increases and investment income) consist of an underlying rate appropriate in an inflation-free environment plus a provision for a long-term average rate of inflation. *Estimates of future events used to project what we know now- current member data, assets, and benefit provisions – into an estimate of future benefits.*

**Actuarial Cost Method.** A mathematical budgeting procedure for allocating the dollar amount of the Present Value of Projected Benefits (PVFB) between the normal costs to be paid in the future and the actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

**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. Refer to the executive summary for more details.

**Actuarial Methods.** The collective term for the Actuarial Cost Method, the Amortization Payment for UAAL Method, and the Asset Valuation Method used to develop the contribution requirements for the Retirement System. *The Funding Policy.*

**Actuarial Equivalent.** Benefits whose actuarial present values are equal.

**Actuarial Present Value.** The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

**Actuarial Value of Assets (AVA).** The value of assets used to determine the contribution requirement and funded ratio. The AVA can be thought of as the average value of assets over a period of years. This smoothed value of assets is used to limit contribution volatility. Also known as the funding value of assets. *Smoothed value of assets.*

## 6.5 Glossary of Actuarial Terms (continued)

**Amortization Payment for UAAL.** Payment of the unfunded actuarial accrued liability by means of periodic contributions of interest and principal, as opposed to a lump sum payment. The components of the amortization payment for UAAL includes:

- Amortization Period Length – Generally amortization periods up to 30 years are allowed, although more recent white papers regarding public sector actuarial practice favor reducing the period to 15 to 20 years. Similar to a mortgage, the shorter the amortization period, the higher the payment and the faster the UAAL is paid off.
- Amortization payment increases – Future payments can be level dollar, like a mortgage, or as a level percent of pay. Most PERS amortize UAAL as a level percent of pay which when combined with the employer normal cost that is developed as a level percent of pay can result in contributions that are easier to budget.
- Amortization schedule can be closed or open. A closed amortization schedule is similar to a mortgage – at the end of the amortization period the UAAL is designed to be paid off. An open amortization period is similar to refinancing the UAAL year after year.
- Amortization schedule UAAL can be amortized over a single amortization period, or it can be amortized over a schedule, also known as layered amortization.

*The amortization payment for UAAL can be thought of as the UAAL mortgage payment.*

**Asset Valuation Method.** The components of how the actuarial value of assets is to be developed. Typical components are the averaging period and the corridor. The averaging period tends to be 3 to 5 years but can be longer. The corridor limits the actuarial value of assets to within a percent, say 20%, of the actual market value. Corridors are more common with longer averaging periods; white papers on the subject suggest that no corridor is needed for averaging periods of five years or less because the period is short enough to recognize asset gains and losses over a sufficiently small period and because corridors provide for excessive contribution volatility.

**Experience Gain Loss.** A measure of the difference between actual experience and experience anticipated by a set of actuarial assumptions during the period between two actuarial valuation dates, in accordance with the actuarial cost method being used. *The experience Gain (Loss) represents how much the actuary missed the mark in a given year.*

**Fiduciary Net Position (FNP).** Used for GASB 67, it represents the assets, measured at fair value, held in trust to provide benefits.

**Funded Ratio.** The percent of the actuarial accrued liabilities covered by the actuarial value of assets. Also known as the funded status. *The ratio of how much money you actually have in the fund to the amount you should have in the fund.*

**Illinois Math.** The term given to the various schemes in the Illinois Pension Code designed to systematically underfund public employee retirement systems in the state of Illinois. Refer to the executive summary for more details.

**Net Pension Liability (NPL).** Used for GASB 67, it is the difference between the total pension liability (TPL) and fiduciary net position (FNP). It is similar to the UAAL. It represents the liability of employers and nonemployer contributing entities to plan members for benefits provided through a defined benefit pension plan.

## 6.5 Glossary of Actuarial Terms (continued)

**Normal Cost.** The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as “current service cost.” An amortization payment toward the unfunded actuarial accrued liability is paid in addition to the normal cost to arrive at the total contribution in a given year. *The cost of benefits accruing during the year.*

**PERS.** A generic term given to a Public Employees Retirement System

**Present Value of Future Normal Cost (PVFNC).** The portion of the Present Value of Projected Benefits (PVFB) allocated to future service. *The value in today’s dollars of the amount of contribution to be made in the future for benefits accruing for members in the Retirement System as of the valuation date. Note that in practice, this number is rarely discussed.*

**Present Value of Future Benefits (PVFB).** The projected future benefit payments of the plan are discounted into today’s dollars using an assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is the discounted value of the projected benefits promised to all members as of a valuation date, including future pay and service for members which has not yet been earned. *If the Retirement System held assets equal to the PVFB and all the assumptions were realized, there would be sufficient funds to pay off all the benefits to be paid in the future for members in the Retirement System as of the valuation date.*

**Reserve Account.** An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

**Service Cost.** Used for GASB 67, it is the annual cost assigned, using the cost method (entry age normal) and assumptions under GASB 67, to current and subsequent plan years. It is similar to normal cost.

**Total Pension Liability (TPL).** Used for GASB 67, it is the portion of the Present Value of Future Benefits (PVFB) allocated to past service using the cost method (entry age normal) and assumptions under GASB 67. It is similar to the actuarial accrued liability.

**Unfunded Actuarial Accrued Liability (UAAL).** The difference between the actuarial accrued liability (AAL) and actuarial value of assets (AVA). The UAAL is sometimes referred to as “unfunded accrued liability.” *Funding shortfall, pension debt or prefunded amount if negative.*

**Valuation Date.** The date that the actuarial valuation calculations are performed as of. *Also known as the “snapshot date”.*

## 6.6 The Actuarial Valuation Process

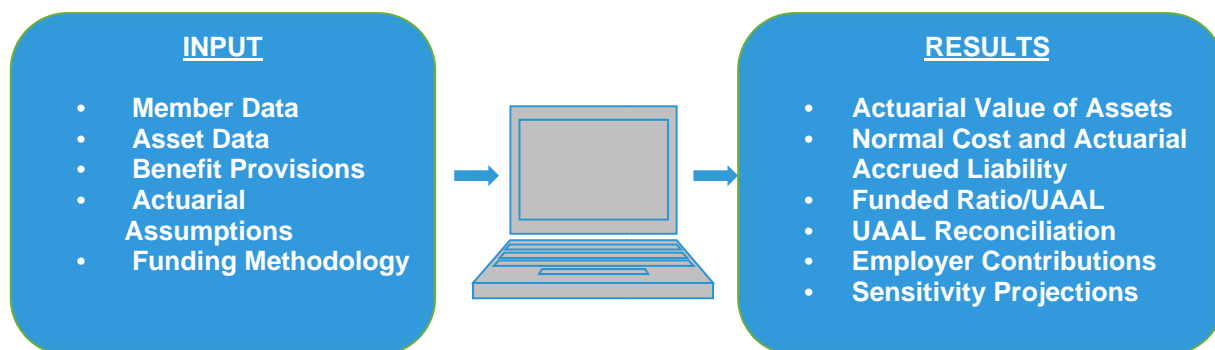
### Purpose of an Actuarial Valuation

The Teachers' Retirement System of the State of Illinois is a defined benefit (DB) retirement system. Under a DB Retirement System, the amount of benefits payable to a member upon retirement, termination, death or disability is defined in various contracts and legal instruments and is based, in part, on the member's years of credited service and final compensation. The amount of contribution needed to fund these benefits cannot be known with certainty. A primary responsibility of the Board of Trustees of a Retirement System is to establish and monitor a funding policy for the contributions made to the Retirement System.

While somewhat uncommon, in some jurisdictions, contributions are made by the plan sponsor as benefits come due. This is known as pay-as-you-go financing. More commonly, contributions for benefits are made in advance during the course of active employment of the members. This is known as actuarial pre-funding. The Illinois Pension Code (40 ILCS 5/16), for example, provides for State contributions designed to fund for 90% of a teacher's pension based on the results of the annual actuarial valuation. The more common (and recommended) practice is to fund for 100% of a member's pension.

### The Actuarial Valuation Process

The following diagram summarizes the inputs and results of the actuarial valuation process. A narrative of the process follows the diagram. The reader may find it worthwhile to refer to the diagram from time to time.



Under the actuarial valuation process, current information about Retirement System members is collected annually by staff at the direction of the actuary, namely member data, asset data and information on benefit provisions. Member data is collected for each member of the Retirement System. The member data will assist the actuary in estimating benefits that could be paid in the future. The member information the actuary collects to estimate the amount of benefit includes elements such as current service, salary and benefit group identifier for members that have not separated service; for those that have, the actual benefit amounts are collected. The actuary collects information such as gender and date of birth to determine when a benefit might be paid and for how long. The actuary collects summary information about assets as of the valuation date and information on cash flows for the year ending on the valuation date. Information about benefit provisions as of the valuation date is also collected. To bridge the gap between the information collected and potential benefits to be paid in the future, the actuary must make assumptions about future activities. These assumptions are recommended by the actuary to the Board based on the results of an experience review. An experience review is a review of the Retirement System over a period of time, typically three to five years, where the actuary analyzes the demographic and economic assumptions of the Retirement System. Based on this review, the actuary will make recommendations on the demographic assumptions, such as when members will be projected to retire, terminate, become disabled and/or die in the future, as well as the economic assumptions, such as what rate of return is

## 6.6 The Actuarial Valuation Process (continued)

projected to be earned by the fund based on the Retirement System investment policy and what level of future salary increases is expected for members. To maintain the assumptions, the Board should adopt a prudent policy of having an experience review being performed at least every three to five years. (The next experience review for TRS will be based on the three-year period ending on June 30, 2018 as required by Public Act 99-0232 (HB422) and will be presented during 2018.) Using these assumptions, the actuary is able to use the member data, asset data and benefit provision information collected to project the benefits that will be paid from the Retirement System to current members. These projected future benefit payments are based not only on service and pay through the valuation date but includes future pay and service, which has not yet been earned by the members but is expected to be earned.

These projected future benefit payments are discounted into today's dollars using the assumed rate of investment return assumption to determine the Present Value of Future Benefits (PVFB) of the Retirement System. The PVFB is an estimate of the value of the projected future benefit payments promised to all members as of a valuation date. If the Retirement System held assets equal to the PVFB and all the assumptions were realized, there would be sufficient funds to pay off all the benefits to be paid in the future for members in the Retirement System as of the valuation date.

The PVFB is a large sum of money, typically much larger than the amount of Retirement System assets held in the trust. The next step is for the actuary to apply the Funding Policy as adopted by the Board to determine the employer contributions to be made to the Retirement System so that the gap between the PVFB and assets is systematically paid off over time. The Funding Policy is adopted by the Board based on discussions with the actuary. When the Board develops a funding policy, a balance between contributions which are responsive to the needs of the Retirement System yet stable should be struck. There are many different funding policies for the Board to consider, and the actuary is responsible for discussing the various features of the funding policies under consideration. Funding Policies are generally reviewed during an experience review, but it is not uncommon to review a funding policy in between, particularly during period where large increases or decreases in contributions are expected. The Funding Policy is composed of three components: the actuarial cost method, the asset valuation method, and the amortization method.

Once the PVFB is developed, an actuarial cost method is used to allocate the PVFB. Under the actuarial cost method, the PVFB is allocated to past, current and future service, respectively known as the actuarial accrued liability (AAL), normal cost (NC) and present value of future normal costs (PVFNC). The actuary computes the liability components (PVFB, NC, AAL, and PVFNC) for each member in the Retirement System at the valuation date. These liability components are then totaled for the Retirement System. There are many actuarial cost methods. Different actuarial methods will produce different contribution patterns, but do not change the ultimate cost of the benefits. The entry age normal cost method is the most prevalent method used for public sector plans in the United States, because the expected normal cost is calculated in such a way that it will tend to stay level as a percent of pay over a member's career. Most public employee retirement systems use the entry age normal cost method.

The actuarial accrued liability (AAL) is also referred to as the amount of money the Retirement System should ideally have in the trust. The unfunded actuarial accrued liability (UAAL) is the portion of actuarial accrued liability that is not covered by the assets of the Retirement System. The UAAL can be a negative number, which means that the Retirement System has more assets than actuarial accrued liability. We refer to this condition as overfunded liability in this summary. Having UAAL does not indicate that the Retirement System is in failing actuarial health. UAAL is a common occurrence. Currently, many Retirement Systems in the United States have UAAL as a result of the Great Recession of 2008. Another related statistic of the Retirement System is the funded ratio. The funded ratio is the percent of the actuarial accrued liabilities covered by the actuarial value of assets. The assets used for these purposes are an actuarial value of assets (AVA), not market. The actuarial value of assets is based on the asset valuation method as recommended by the actuary and adopted by the Board or as required by statute. An actuarial value of assets is a smoothed, or averaged, value of assets, which

## 6.6 The Actuarial Valuation Process (continued)

is used to limit employer contribution volatility. Typically, assets are smoothed, or averaged, over a period of 3 to 5 years, although longer periods are becoming more common. By averaging returns, the UAAL is not as volatile, which we will see later results in contributions that are not as volatile as well.

While having UAAL is common, it is acceptable only if it is systematically being paid off. The method by which the UAAL is paid off is known as the amortization method. The concept is similar to that of a mortgage payment. The Board adopts the amortization method used to pay off the UAAL over a period of time or it may be specified by statute. The amortization method is composed of the amortization period, the amount of payment increase, whether the period is open or closed and by the amount of amortization schedules. The amortization period is the amount of time over which the UAAL will be paid off. This is generally a period of thirty years or less, but actuaries are beginning to recommend shorter periods of around 15 to 20 years. The payments can be developed to stay constant from year to year like a mortgage, but often they are developed to increase each year at the same level payroll increases. Amortization type can be closed or open. Under a closed period, the UAAL is expected to be paid off over the amortization period. This is similar to a typical mortgage. Under an open period, the amortization period remains unchanged year after year. The concept is similar to re-mortgaging annually. In many instances, an amortization schedule is developed, whereby the UAAL is amortized over a closed period from the point the UAAL is incurred. Finally, some amortization methods are defined by a schedule of payments, where a new schedule of payments is added with each valuation. This is referred to as amortization layers. Regardless of the amortization type or period, the funding policy should generate a contribution that pays off the UAAL, which results in the funded ratio trending to 100% over time. Caution should be used when an open method is used, because typically an open amortization policy does not result in the UAAL being paid off.

To satisfy the requirements of the Illinois Pension Code, the actuary calculates a projection of actuarial accrued liabilities and benefit payments through the year 2045. The contribution is developed as a level percent of pay to fund 90% of the 2045 actuarial accrued liability. The contribution is typically further reduced to coordinate with the pension obligation bonds debt service through the year 2033. The contribution requirements under the Illinois Pension Code are inadequate and have resulted in TRS being among the worst funded public employee retirement systems. The recommended practice is to develop the total annual contribution to the Retirement System as the normal cost plus a contribution towards UAAL. Said another way, this contribution is sufficient to pay for the cost of benefits accruing during the year (normal cost) plus the mortgage payment (UAAL payment). The total contribution is reduced by the amount of member contributions, if any, to arrive at the employer contribution.

An actuarial valuation report is produced annually, which contains the contribution for the fiscal year as well as the funded ratio of the Retirement System. The primary purpose of performing an actuarial valuation annually is to replace the estimated activities from the previous valuation, which were based on assumptions, with the actual experience of the Retirement System for the prior year. The experience gain (loss) is the difference between the expected and the actual UAAL of the Retirement System. An experience loss can be thought of as the amount of additional UAAL over and above the amount that was expected from the prior year due to deviation of actual experience from the assumption. Similarly, an experience gain can be thought of as having less UAAL than that which was expected from the prior year assumptions. As an example, if the Retirement System achieves an asset return of 15% when the assumption was a 7.50% return, an actuarial gain is said to have happened, which typically results in lower contributions and higher funded ratio, all else being equal. Alternatively, a return of 2% under the same circumstances would result in an actuarial loss, requiring an increase in contributions and a funded ratio that is lower than anticipated. Experience gains and losses are common within the valuation process. Typically gains and losses offset each other over time. To the extent that does not occur, the reasons for the gains and losses should be understood, and appropriate recommendations should be made by the actuary after an experience review to adjust the assumptions.

The actuarial valuation report will contain histories of key statistics from prior actuarial valuation reports. In particular, a history of the funded ratio of the Retirement System is an important exhibit. Trustees should



## 6.6 The Actuarial Valuation Process (continued)

understand the reason for the trend of the funded ratio of the Retirement System over time. The actuary will discuss the reasons for changes in the funded ratio of the Retirement System with each valuation report. To the extent that there are unexplained changes in funded ratio corrective action should be explored and the actuary will make recommendations as to whether there should be changes in the assumptions, funding policy, or some other portion of the actuarial valuation process.

In addition to historical information, projections of contributions and funded ratio based on current assumptions can sometimes be found in an actuarial valuation report. Projections of contributions can allow the employer to plan their budget accordingly. Surprises in Retirement System contributions to be paid by the employer serve no one. A one-year projection based on "bad" asset returns can provide ample time for the employer to plan, or allow for a discussion of changing the funding policy to occur. Contribution surprises are a primary contributor to employers considering pension reductions. It is important to keep the employer apprised of future contribution requirements. A projection of funded ratio can serve the Trustees by illustrating the trend of the funded ratio over time. The funded ratio, under a prudent funding policy, should trend to 100% over a period of less than 30 years. It is worthwhile to note that while 30 years has served as an industry standard for the longest period over which 100% funding should be achieved, that period is coming under scrutiny by the actuarial community and has been shortened to 15 to 20 years. If a projection of funded ratio does not trend to 100% over time, consideration should be given to fixing the funding policy to achieve this goal. For TRS, projections are performed to determine the contribution requirements under the Illinois Pension Code. The projection shows the funded ratio trend to 90% over a period longer than old industry standard of 30 years, and certainly much longer than the new standard of 15 to 20 years.

The actuarial report will contain schedules of information about the census, plan and asset information submitted by Retirement System staff upon which the actuarial valuation is based. It is important that the Board of Trustees and staff review that information and determine if the information is consistent with their understanding of the Retirement System. If the Board of Trustees or staff is not comfortable that the information provided is correct, the actuary should be notified to determine if the actuarial valuation report should be corrected.

Finally, the valuation report and/or presentation should contain sufficient information in an understandable fashion to allow the Board to take action and adopt the contribution rate for the upcoming year. It should also allow stakeholders to understand key observations over the past year that resulted in contributions increasing (or decreasing) and where contributions are headed. The actuary is always open to making the results understandable. Buck works with the TRS staff to make your reports and presentations understandable and actionable. If something doesn't make sense – speak up!!