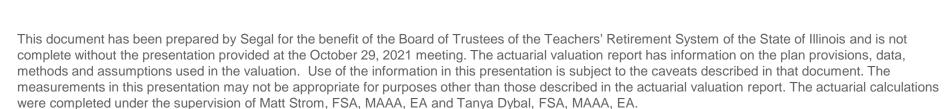
Teachers' Retirement System of the State of Illinois

Summary Review of June 30, 2021 Actuarial Valuation Results

October 29, 2021

Kim Nicholl, FSA, MAAA, FCA, EA Senior Vice President and Actuary

Matt Strom, FSA, MAAA, EA Senior Vice President and Actuary





# Agenda

Overview of the Valuation Process
Summary of Valuation Highlights
Membership and Demographics
Valuation Results
Sensitivity Projections
Other Topics

### The Valuation Process

#### **Input**

Member Data

Asset Information

**Benefit Provisions** 

**Actuarial Assumptions** 

**Funding Methodology** 

### Results

**Actuarial Value of Assets** 

Normal Cost and Actuarial Liability

Analysis of Gains and Losses

**Unfunded Liability and Funded Ratio** 

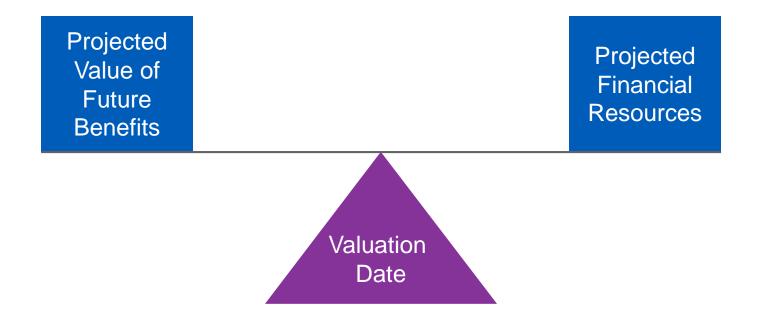
**Statutory Contribution** 

Actuarially Determined Contribution (Board-adopted Funding Policy)

**Accounting Results** 



### **Actuarial Balance**



Over the life of a pension system,

Benefits + Expenses = Contributions + Investment Return

Or: Contributions = Benefits + Expenses - Investment Return



# **Actuarial Assumptions**

#### Two types:

#### **Demographic**

- Retirement
- Disability
- Withdrawal
- Mortality

#### **Economic**

- Inflation 2.25%
- Interest rate 7.00%
- Salary increases 8.50% for new members to 3.50% for members with 20+ years of service
- Payroll growth based on open group projection with a level active population and new entrants similar to newly hired employees

Economic assumptions are reviewed annually and demographic assumptions are reviewed every three years, most recently with the actuarial experience review for the period July 1, 2017 to June 30, 2020. Detailed information regarding the assumption changes adopted by the Board in August 2021 can be found in our experience study report dated September 30, 2021.

### **Actuarial Methods**

# Asset Valuation Method (Actuarial Assets)

- Investment gains and losses recognized over a number of years
  - TRS uses a five-year smoothing period

#### **Cost Method**

- Allocation of liability to past and future service
- Projected unit credit required for Statutory Contribution
- Current year's cost based on value of benefit earned that year, using projected salary
- Results in back-loading of normal cost
- Entry age normal used for Board-Adopted Actuarial Funding Policy
- Allocates cost of member's benefit over expected career as a level % of salary
- Most common cost method among public sector retirement systems
- Required by GASB

#### **Amortization Method**

#### Statutory Contribution

- No explicit method to amortize the UAAL; the total contribution less the normal cost is the payment toward the UAAL
- Board-Adopted
   Actuarial Funding
   Policy
  - Layered amortization with new UAAL amortized over 20 years
  - Amortization payments increase at the rate of future State revenue growth, assumed to be 2%



# Actuarially Determined vs. Statutory Contribution

# Actuarially Determined Contribution (Board-Adopted Actuarial Funding Policy)

- Equal to the normal cost plus amortization of the unfunded actuarial accrued liability (UAAL)
- Benefits:
  - Entry age normal cost method
  - 100% funding target
  - Reflects appropriate tier of benefits of those in TRS, not those to be hired

# Statutory Contribution under Illinois Funding Policy

- Equal to amount determined as a level percentage of payroll necessary to achieve a projected funded percentage of 90% by 2045
- Shortcomings:
  - Projected unit credit cost method
  - 90% funding target
  - Reflects effect of Tier II provisions for members who have not yet been hired

The Actuarially Determined Contribution is compared to the Statutory Contribution as measure of the inadequacy of the Statutory Contribution.

# Changes Since Last Year's Valuation

#### Assumption Changes

- -The following assumption changes were approved by the Board on August 12, 2021, and are reflected in the June 30, 2021 actuarial valuation:
  - The inflation assumption was lowered from 2.50% to 2.25%. The Tier 2 salary cap increase, Tier 2 COLA, and new entrant pay increase assumptions were modified to reflect change in assumed inflation.
  - The rates of individual salary increase were increased based on plan experience
  - The assumed percent of retirees receiving severance and the average severance payment was decreased from 20% to 18% and 10% to 8%, respectively
  - The retirement, termination, and disability rates were adjusted based on plan experience. Service groupings for Tier 1 retirement rates were combined where similar experience was found
  - The healthy, disabled, and beneficiary post-retirement mortality assumptions were updated to use the newly published PubT-2010 tables with adjusted rate multipliers at various ages for males and females to better reflect recent plan experience
  - The mortality improvement scale was updated from Scale MP-2017 to Scale MP-2020
  - The sick leave service credit, optional service purchase, and future service accrual rates were adjusted based on plan experience
  - The AAI and IV buyout election percentages were adjusted based on plan experience
- -The impact of these assumption changes decreased the actuarial accrued liability as of June 30, 2021 by \$517 million and increased the FY 2023 State Contribution by \$57 million\*



<sup>\*</sup> Primarily due to lowering the new entrant pay increase assumption

# Summary of Valuation Highlights

#### State Contribution

- Required State contribution for fiscal 2023 is \$5.89 billion, a 4% increase from the fiscal 2022 contribution of \$5.69 billion
- -The fiscal 2023 State contribution under the Board-Adopted Actuarial Funding Policy is \$9.10 billion
  - Statutory contribution is approximately 65% of the Board funding policy amount
  - The \$3.21 billion contribution shortfall increases future contribution requirements

#### Asset Return

- -Fair value of assets returned 25.2% for year ending 6/30/21 (Segal calculation)
  - Gradual recognition of deferred gains and losses resulted in a 9.7% return on actuarial assets, compared to 7.0% expected
  - Gain on actuarial value of assets is \$1.44 billion

#### Demographic Experience

 Demographic and liability experience resulted in a gain of \$234 million, or 0.2% of actuarial accrued liability

#### Funded Percentage

-Funded ratio based on the actuarial value of assets increased from 40.5% in 2020 to 42.5% in 2021



# Summary of Valuation Highlights (continued)

#### Unfunded Actuarial Accrued Liability (UAAL)

- -The actuarial accrued liability increased from \$135.6 billion (as of June 30, 2020) to \$138.9 billion (as of June 30, 2021)
- -The actuarial value of assets increased from \$54.9 billion (as of June 30, 2020) to \$59.0 billion (as of June 30, 2021)
- -The UAAL decreased from \$80.7 billion to \$79.9 billion
  - \$0.7 billion decrease results from net experience gain (\$1.7 billion), gain from assumption changes (\$0.5 billion), and loss from inadequate State contributions (\$1.5 billion)

#### Buyout Experience

- –As of September 30, 2021 there have been \$534 million of buyout payments paid since the commencement of the AAI and IV buyout programs
- Approximately \$415 million and \$405 million of liability has been settled as a result of the AAI and IV buyout experience, respectively
- The required State contribution for fiscal 2023 is approximately \$90 million lower due as a result of the buyout programs
- We will continue to monitor buyout program experience to determine whether changes to the election percentage assumption in next year's valuation are appropriate

# Membership

### **Active membership statistics**

	June 30, 2021	June 30, 2020	Change
Headcount			
Tier I	112,214	116,261	-3.5%
Tier II	<u>50,735</u>	<u>46,814</u>	+8.4%
Total	162,949	163,075	-0.1%
Average Salary*	\$76,061	\$74,550	+2.0%
Median Salary*	69,604	68,187	+2.1%
Average Age	43.0 years	42.8 years	
Average Total Service	11.6 years	11.4 years	

<sup>\*</sup> Full-time / regular part-time employees only

# Membership

### **Retiree and beneficiary statistics**

	June 30, 2021	June 30, 2020	Change
Headcount	126,594	124,791	+1.4%
Annual Annuities	\$7.206 billion	\$6.927 billion	+4.0%
Average Age	73.1 years	72.8 years	
Average Monthly Benefit	\$4,743	\$4,626	+2.5%

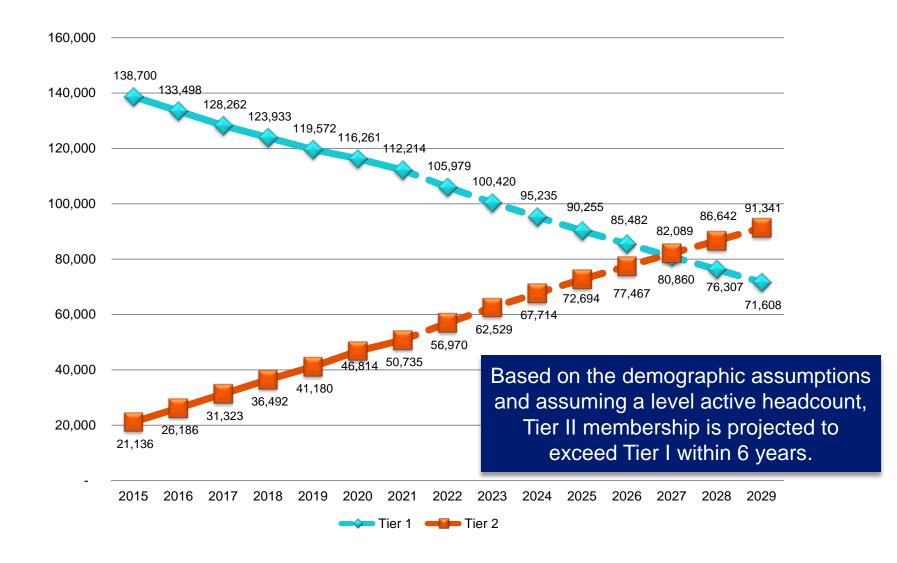
# Active and Retired Membership



Active member and annuitant data used in the valuation is as of the prior valuation date. Prior to 2013, annuitant data used in the valuation was as of the valuation date.



# Projection of Active Membership by Tier

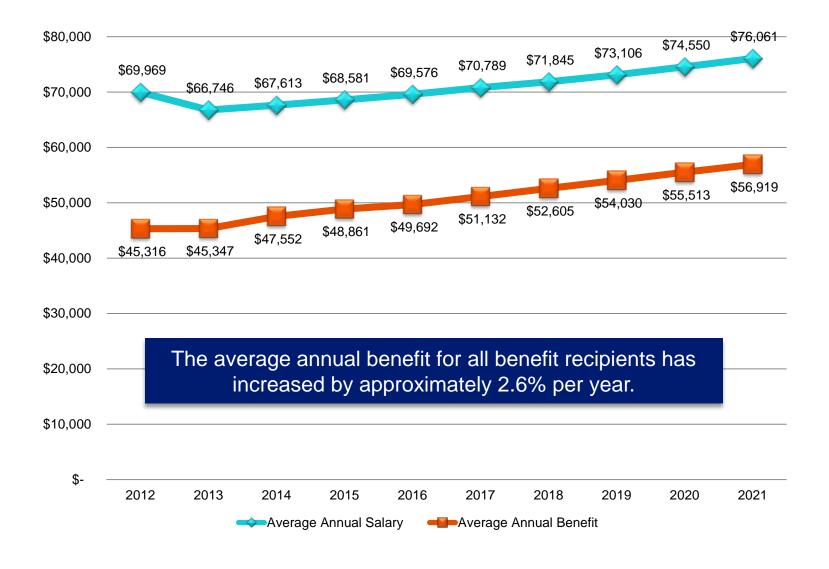


Active member data used in the valuation is as of the prior valuation date.

Dashed lines represent a projection of membership, assuming total active count remains at the current level



# Average Salary and Average Benefit



Starting in 2013, salaries were revised to reflect the reported rate of pensionable salary.

### **Assets**

- The fair value of assets increased from \$52.3 billion (as of June 30, 2020) to \$64.2 billion (as of June 30, 2021)
  - Segal determined the investment return was +25.2%, net of investment expenses
- The actuarial value of assets which smoothes unexpected investment gains and losses over five years – increased from \$54.9 billion (as of June 30, 2020) to \$59.0 billion (as of June 30, 2021)
  - Return of +9.7%, net of investment expenses
  - Actuarial value is 91.9% of fair value
  - There is a total of \$5.2 billion of deferred investment gains that will be recognized in future years
- Average annual returns are:

	Fair Value	Actuarial Value
5-year average	10.0%	7.2%
10-year average	8.3%	7.3%
15-year average	6.9%	6.2%
20-year average	7.1%	6.6%

The actual average actuarial asset returns over the short term (5- and 10-year periods) have been greater than the current 7.00% assumption, but less over long term

## Assets

### **Fair Value of Assets (in millions)**

	June 30, 2021	June 30, 2020
Beginning of Year	\$52,316	\$53,262
Contributions		
State	\$5,141	\$4,814
<ul> <li>Employers</li> </ul>	97	93
<ul> <li>Members</li> </ul>	1,024	994
• Total	\$6,262	\$5,901
Benefits Paid	(7,388)	(7,100)
Administrative Expenses	(24)	(23)
Investment Income (net)	13,047	<u>276</u>
End of Year	\$64,213	\$52,316
Rate of Return	+25.2%	+0.52%

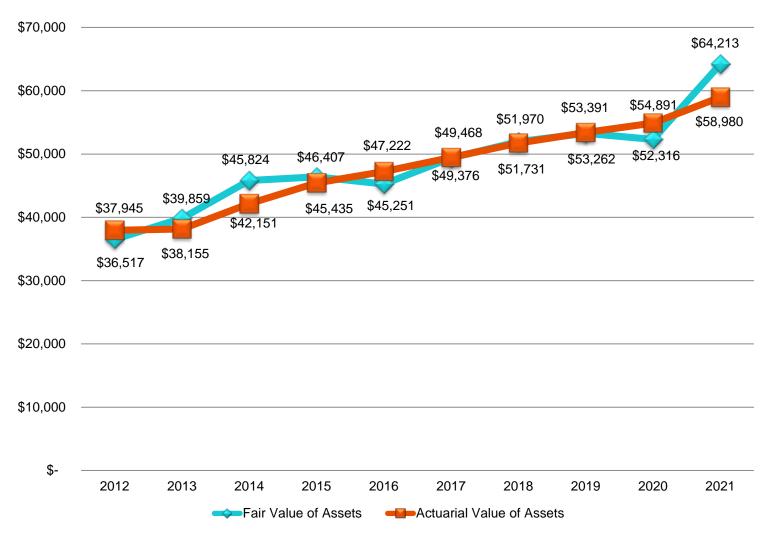
## Assets

### **Actuarial Value of Pension Assets (in millions)**

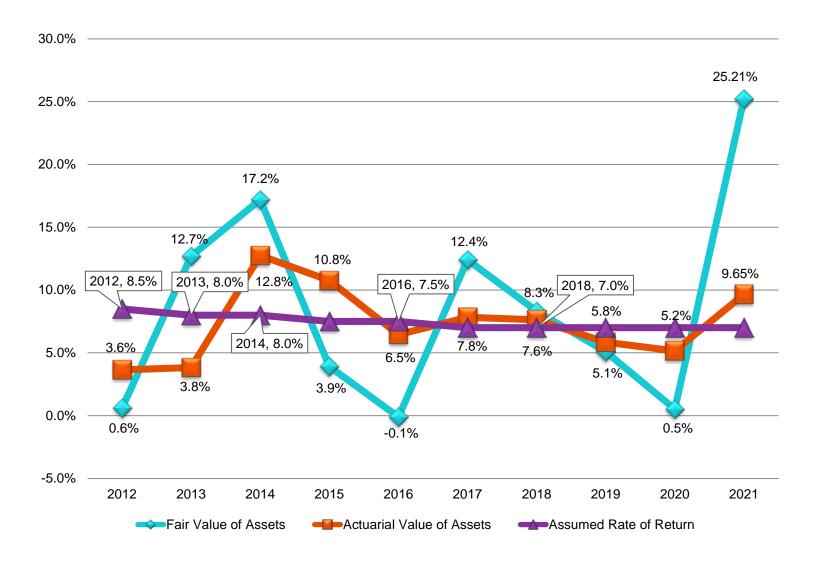
Fair Value of Pension Assets as of June 30, 2021			\$64,213
Gain or (Loss) on Assets	Original Amount	% Deferred	Deferred Amount
Year ended June 30, 2021	\$9,424	80%	\$7,540
Year ended June 30, 2020	(3,410)	60%	(2,046)
Year ended June 30, 2019	(974)	40%	(390)
Year ended June 30, 2018	644	20%	129
Year ended June 30, 2017	2,402	0%	0
Total			\$5,233
Actuarial Value as of June 30, 2021			\$58,980
Actuarial Value as a Percent of Fair Value			91.9%
Rate of Return			9.65%

## Fair and Actuarial Values of Assets

#### \$ Millions

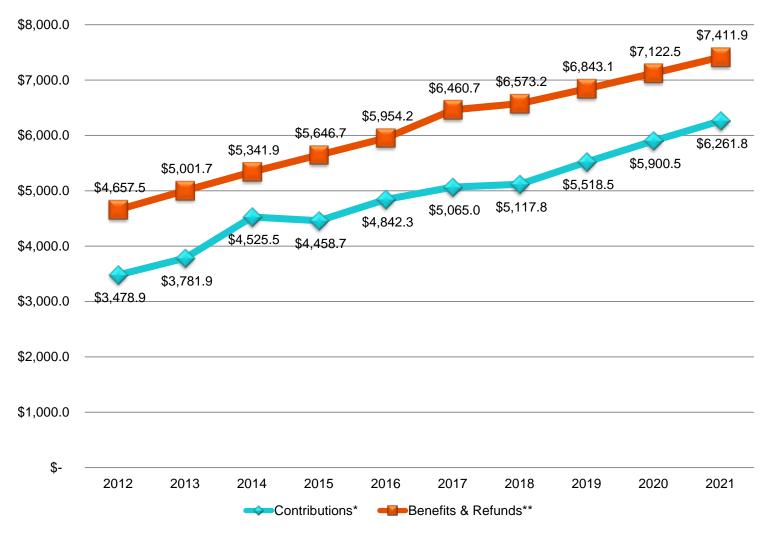


## **Asset Returns**



## Contributions vs Disbursements

#### \$ Millions

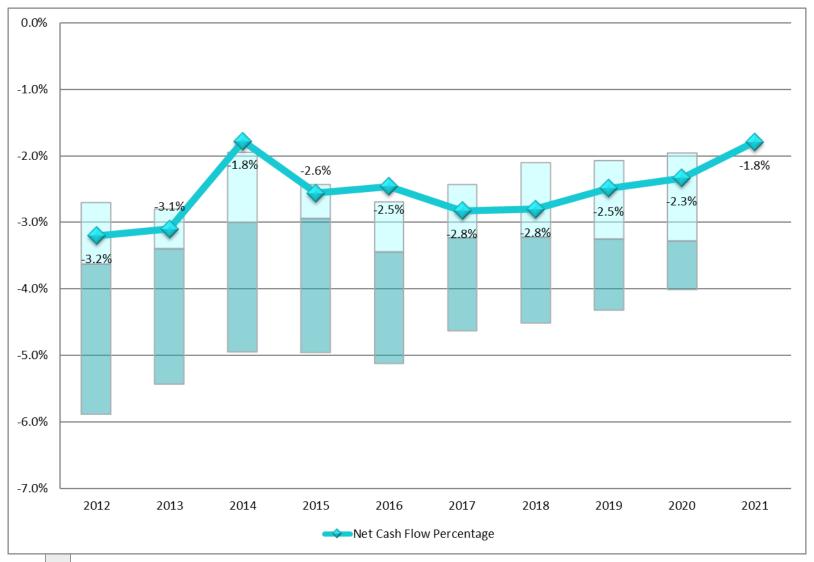


<sup>\*</sup> Includes member, employer and state contributions



<sup>\*\*</sup> Includes benefit payments, refunds and administrative expenses

## Net Cash Flow as a % of Market Value



For context, historical data is compared to 38 systems in the Public Plans Data\* that primarily cover teachers. The top marker represents the 2<sup>nd</sup> quartile (50<sup>th</sup> to 75<sup>th</sup> percentile) and the lower marker represents the 3<sup>rd</sup> quartile (25<sup>th</sup> to 75<sup>th</sup> percentile), where the middle line indicates the median.



# Valuation Results

### Comparison of current year to prior year (in millions)

	June 30, 2021	June 30, 2020
Actuarial Accrued Liability:		
Active Members	\$46,208	\$43,919
<ul> <li>Retirees and Beneficiaries</li> </ul>	88,789	88,186
<ul> <li>Inactive Members with Deferred Benefits</li> </ul>	3,917	3,494
Total	\$138,914	\$135,599
Actuarial Assets	58,980	54,891
Unfunded Accrued Liability	\$79,964	\$80,708
Funded Ratio	42.5%	40.5%

# Valuation Results

### **Summary of State Contribution for Fiscal Year (in millions)**

	FY 2023	FY 2022
Based on Statutory Funding Plan	\$5,894	\$5,694
Based on Board-Adopted Actuarial Funding Policy	9,101	8,850
Difference Between Statutory Amount and Board- Adopted Actuarial Funding Policy	\$3,207	\$3,156
Statutory Amount as a Percentage of Board- Adopted Actuarial Funding Policy	65%	64%

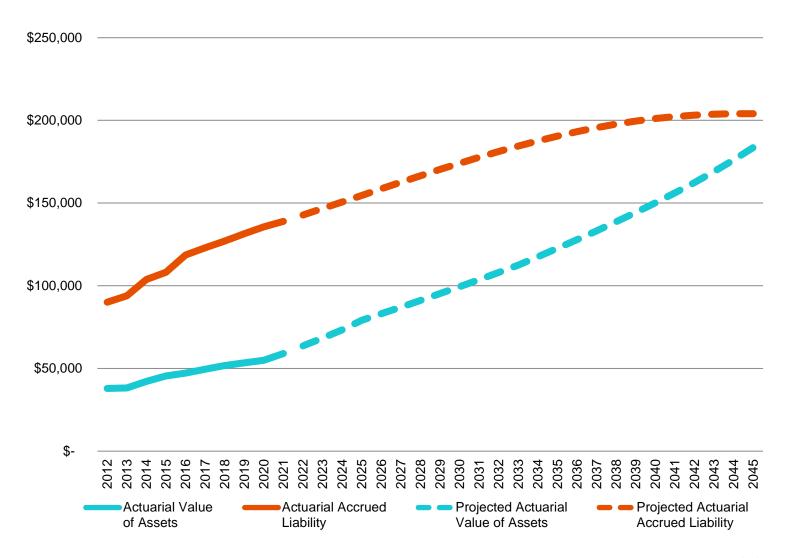
## Valuation Results

# Reconciliation of State Statutory Funding Plan Contribution from Fiscal Year 2022 to 2023 (in millions)

	Statutory Funding Contribution
FY 2022 State Contribution	\$5,694
Expected Increase	181
Investment Gain	(127)
Assumption Changes	57
All Other Net Actuarial Factors	<u>89</u>
FY 2023 State Contribution	\$5,894

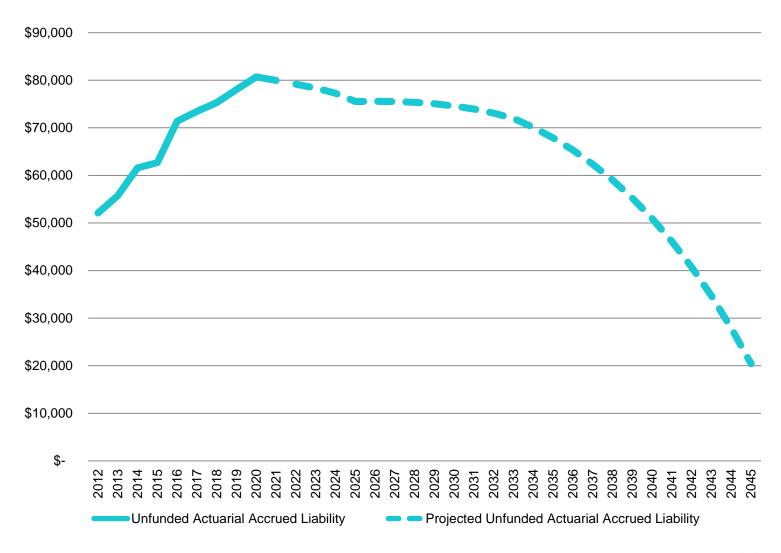
## Assets and Liabilities

#### \$ Millions

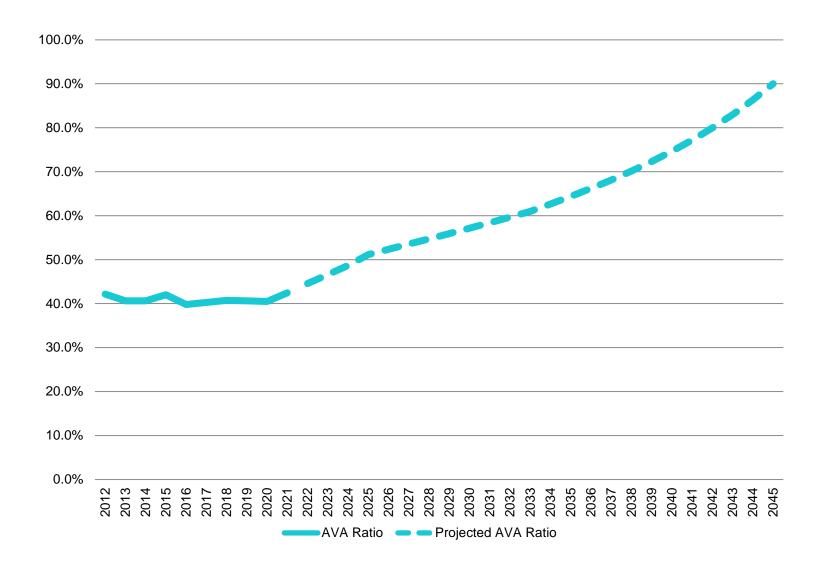


# Unfunded Actuarial Accrued Liability

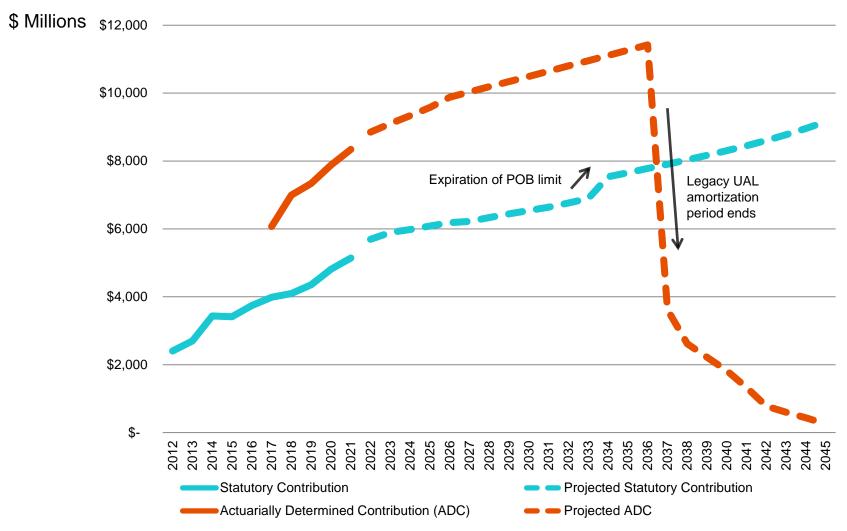
#### \$ Millions



### **Funded Ratio**



### State Contributions



Note: The Board-Adopted Actuarial Funding Policy is the ADC

- The cumulative Statutory contribution from FY 2023 through FY 2045 is \$169 billion
- The cumulative ADC contribution from FY 2023 through FY 2045 is \$159 billion



# Summary of GASB Accounting Results

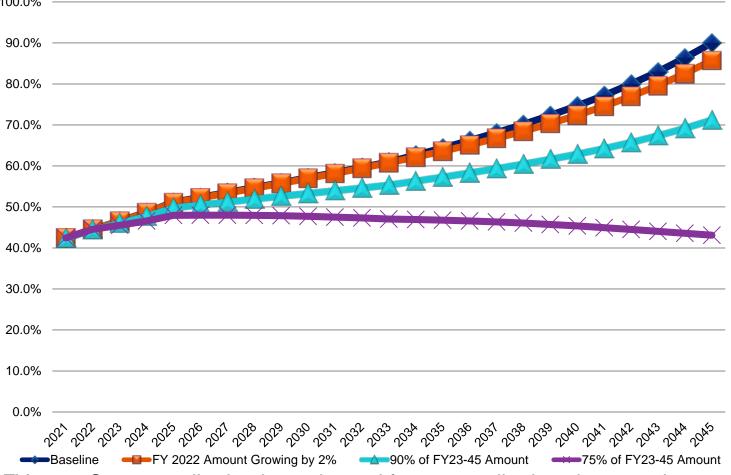
### **GASB Information (\$ in millions)**

	June 30, 2021	June 30, 2020
Long-Term Expected Rate of Return	7.00%	7.00%
Municipal Bond Index	2.16%	2.21%
Single Equivalent Discount Rate	7.00%	7.00%
Total Pension Liability	\$142,224	\$138,532
Plan Fiduciary Net Position	64,213	<u>52,316</u>
Net Pension Liability	\$78,011	\$86,216
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	45.1%	37.8%
Total Pension Expense	\$5,328	\$8,897

# Sensitivity Projections

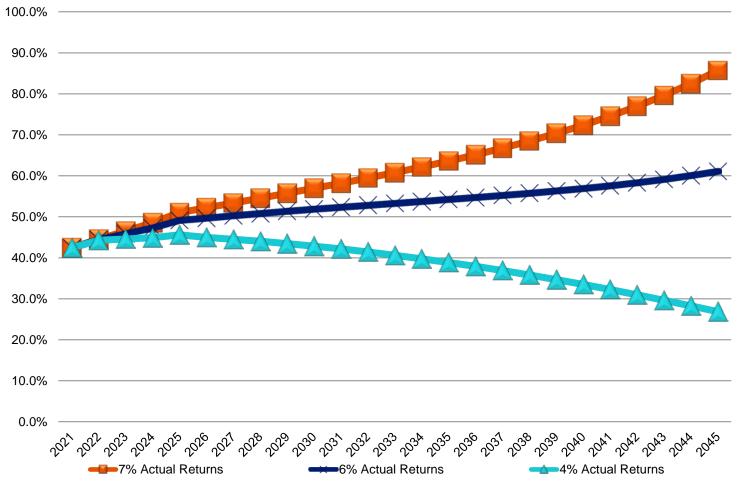
- The projected Statutory State contributions are determined based on an underlying assumption that the State will contribute the required amounts for all future years
  - The required contribution amounts are projected to increase by 2.1% per year, on average
  - -The estimated increase in future State revenue growth, used in determining the Actuarially Determined Contribution, is 2.00% per year
  - -Baseline projections of State contributions are also based on future investment returns of 7.00% per year
- To test the sensitivity of this assumption, we created projections based on the following contribution scenarios:
  - -The FY 2022 amount is contributed, and future contributions increase by 2%
  - -90% of the FY 2023-2045 amounts are contributed
  - -75% of the FY 2023-2045 amounts are contributed
- We have also tested the sensitivity of the 7% return assumption by creating projections based on the State contribution scenario of the FY 2022 amount increasing by 2% using the following actual investment returns in each future year:
  - -Actual returns of 6% per year
  - –Actual returns of 4% per year

# Sensitivity Projection #1



- If the FY 2022 State contribution is made, and future contributions increase by 2%, TRS is projected to remain solvent, but the funded ratio is projected to be 86% in 2045
- > If 90% of the FY 2023-2045 State contributions are made, the funded ratio is projected to be 71% in 2045
- If 75% of the FY 2023-2045 State contributions are made, the funded ratio is projected to be 43% in 2045 ★ Segal 32

# Sensitivity Projection #2



- ➤ If the FY 2022 State contribution is made, future contributions increase by 2%, and actual investment returns are 6% rather than 7%, the funded ratio is projected to be 61% in 2045
- ➤ If the FY 2022 State contribution is made, future contributions increase by 2%, and actual investment returns are 4% rather than 7%, the funded ratio is projected to be 27% in 2045

### ASOP 51 - Assessment and Disclosure of Risk

- Additional information is required to be provided to intended users of the risks of future experience differing from the assumptions
  - Intended users of these measurements may not understand the effect of future experience differing from the assumptions
- Steps that actuary takes:
  - -Identify the risks
  - Assess each of the risks
  - -Assessment need not be based on numerical calculations
  - Assessment should account for applicable plan circumstances funding policy, investment policy, funded status, demographics, etc.
  - Recommend a more detailed assessment if actuary believes it would be beneficial to intended users

Segal recommends that a more detailed assessment of risk be performed.

# Stochastic Modeling

#### Given a certain set of assumptions:

- –What is the range of possible results?
- -What is the probability of achieving certain metrics (e.g., funded percentage)?
- -What are the chances of a declining funded percentage over time?
- -Alternatively, what is the likelihood of long-term "success?"

#### What are metrics for success?

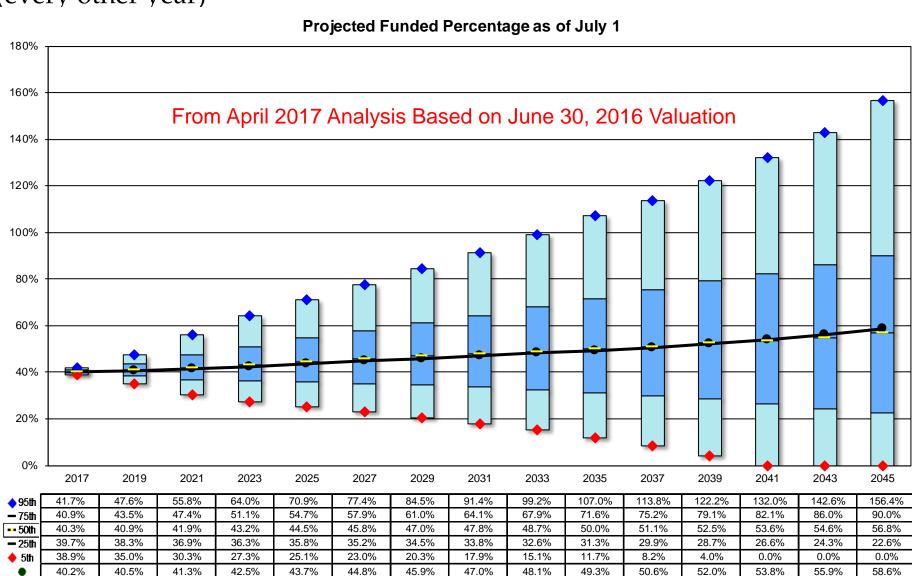
- –Probability that State contributions will decrease as a percentage of State budget?
- –Probability of avoiding insolvency?
- -Other?

#### More than one metric can be modeled

 Stochastically model investment returns and overlay the results on various State contribution scenarios

Segal performed a stochastic modeling study for TRS based on the June 30, 2016 actuarial valuation. We recommend that the Board consider updating the stochastic modeling based on the June 30, 2021 actuarial valuation and recent capital market expectations to analyze plan risks.

State Pays 100% of Contributions, But No More than 100% of FY 2018 Contribution Increasing 2% Per Year - Projection of Funded Ratio to 2045 (every other year)



45.9%

58.6%

Baseline deterministic projection using current 7.00% investment return assumption

State Pays 100% of Contributions, But No More than 75% of FY 2018 Contribution Increasing 2% Per Year - Projection of Funded Ratio to 2045 (every other year)

#### Projected Funded Percentage as of July 1 180% 160% From April 2017 Analysis Based on June 30, 2016 Valuation 140% 120% 100% 80% 60% 40% 20% 0% 2017 2019 2021 2023 2025 2027 2029 2031 2033 2035 2037 2039 2041 2043 2045 108.0% 95th 41.7% 46.7% 53.2% 60.0% 65.5% 71.2% 76.2% 81.4% 87.7% 94.2% 98.2% 103.3% 116.4% 124.8% 40.9% 42.5% 44.5% 47.8% 50.2% 50.8% 51.8% 51.8% 51.2% 50.3% **-** 75th 46.2% 48.8% 49.8% 51.9% 49.6% - 50th 40.3% 39.9% 39.0% 38.2% 37.3% 36.1% 34.6% 32.5% 30.1% 27.3% 24.2% 20.3% 15.5% 10.2% 4.6% 39.7% 37.4% 34.0% 31.3% 28.7% 25.8% 22.6% 19.0% 15.0% 10.2% 4.9% 0.0% 0.0% 0.0% 0.0% 25th 38.9% 34.0% 27.4% 22.6% 18.4% 14.2% 9.5% 4.6% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0% 0.0%

36.3%

35.0%

33.3%

31.2%

28.8%

25.9%

22.6%

18.6%

14.0%

37.5%

40.2%

39.6%

38.4%

8.7%

2.7%

Baseline deterministic projection using current 7.00% investment return assumption

# Summary of Results – State Contribution Limited to FY2018 Contribution Increasing 2% Per Year

From April 2017 Analysis Based on June 30, 2016 Valuation

Probability of various events based on stochastic projections:

Benchmark	State Pays 100% of Contributions, but No More than 100% of FY2018 Contribution Increasing 2% Per Year	State Pays 100% of Contributions, but No More than 75% of FY2018 Contribution Increasing 2% Per Year
At least 90% funded in 2045	25%	12%
At least 120% funded in 2045	11%	6%
Less than 50% funded in 2045	45%	75%
At least 50% funded in 2031	46%	25%
Less than 25% funded any time	29%	63%
Asset depletion any time	11%	47%

If the State caps contributions at 75% of the FY2018 contribution amount, increasing 2% per year, then TRS is at severe risk of asset depletion.

# Possible State Contribution Scenarios for Future Analysis

- State pays 100% of all required contributions that vary based on investment returns
- State pays 75% of all required contributions that vary based on investment returns
- State pays 100% of required contributions, but capped at 100% of FY 2023 contribution increasing 2% per year
- State pays 100% of required contributions, capped at 75% of FY 2023 contribution increasing 2% per year

# Appendix

- FY 2023 State Contribution Certification Exhibit A
- FY 2023 THIS Fund Certification Exhibit B

#### **Exhibit A**

Summary of State Contributions under Illinois Pension Code and Board-Adopted Actuarial Funding Policy	Fiscal Year 2023
1. Based on Statutory Funding Plan	
Total State Contribution for fiscal year 2023:	
a. Benefit Trust Reserve*:	
i. 53.15% of membership payroll	\$ 6,209,687,457
ii. Minus School Districts Contributions:	
(0.58% of membership payroll)	(67,758,874)
(6% FAS cap increases)	(4,106,777)
(10.49% of membership payroll above the Governor's salary)	(3,939,577)
iii. Minus Federal Funds Contribution	
(10.49% of membership payroll from federal funds)	(24,510,020)
iv. Minus phase-in of the effect of assumption changes	(215,640,000)
v. State Contribution	\$ 5,893,732,209
b. Guaranteed Minimum Annuity Reserve	300,000
c. Total State Contribution (current law)	\$ 5,894,032,209
2. Based on Board-Adopted Actuarial Funding Policy**  a. Benefit Trust Reserve*:  i. Normal cost plus amortization  ii. Minus School Districts Contributions  (0.58% of membership payroll)  (6% FAS cap increases)  (10.49% of membership payroll above the Governor's salary)  iii. Minus Federal Funds Contribution  (10.49% of membership payroll from federal funds)  iv. State Contribution  b. Guaranteed Minimum Annuity Reserve	\$ 9,201,648,472 (67,758,874) (4,106,777) (3,939,577) (24,510,020) \$ 9,101,333,224 300,000
c. Total State Contribution	\$ 9,101,633,224
3. Total Normal Cost and Employer Normal Cost Rate for Fiscal Year 2023  a. Total Normal Cost Rate (including administrative expenses)  b. Member Rate  a. Employer Normal Cost Rate	19.49% -9.00%
c. Employer Normal Cost Rate	10.49%
4. Federal Contribution Rate (Employer Normal Cost Rate, per PA 100-0340)	10.49%

Expected fiscal year 2023 membership payroll is \$11,682,564,466

- 20-year closed amortization of Unfunded Actuarial Accrued Liability (UAAL) beginning with Fiscal Year 2017
- Use layered amortization, with new UAAL after Fiscal Year 2017 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



<sup>\*\*</sup> Board-Adopted Actuarial Funding Policy is based on the entry age normal actuarial cost method, current asset valuation method and an amortization policy as follows:

#### **Exhibit B**

	Teacher Health Insurance Security Fund Contribution Amount to be Certified by the Board for Fiscal Year 2023	Fi	iscal Year 2023
Ex	pected State Contribution for Fiscal Year 2023 to THIS Fund:		
1.	Fiscal Year 2023 membership payroll:		
	a. Total	\$	11,682,564,466
	b. Minus members who do not contribute to THIS Fund		(61,480,634)
	c. Members who do contribute to THIS Fund	\$	11,621,083,832
2.	Member contribution rate (actual, per CMS)		0.90%
3.	Matching State contribution: 1.c. x 2.	\$	104,589,754
4.	Adjustment to THIS Fund for underestimating Fiscal Year 2021 member THIS Fund contributions		1,739,104
5.	Total THIS Fund State contribution*	\$	106,328,858

<sup>\*</sup> This certification does not include other State contributions to THIS Fund, which are not part of the statutory certification requirement.

- Illinois Statute requires the TRS Board to certify the THIS Fund State contribution amount by November 15 each year
- State contribution amount is based on the projected fiscal 2023 payroll from the June 30, 2021 valuation