

# Teachers' Retirement System of the State of Illinois

## Summary Review of June 30, 2020 Actuarial Valuation Results

**October 30, 2020**

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

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

**David Nickerson, ASA, MAAA, EA  
Associate Actuarial Consultant**

This document has been prepared by Segal for the benefit of the Board of Trustees of the Teachers' Retirement System of the State of Illinois and is not complete without the presentation provided at the October 30, 2020 meeting. The actuarial valuation report has information on the plan provisions, data, methods and assumptions used in the valuation. Use of the information in this presentation is subject to the caveats described in that document. The measurements in this presentation may not be appropriate for purposes other than those described in the actuarial valuation report. The actuarial calculations were completed under the supervision of Matt Strom, FSA, MAAA, EA and Tanya Dybal, FSA, MAAA, EA.



# | Agenda

**Overview of the Valuation Process**

**Summary of Valuation Highlights**

**Membership and Demographics**

**Valuation Results**

**Sensitivity Projections**

**Other Topics**

# Purposes of the Actuarial Valuation

- Report the System's actuarial assets
- Calculate the System's liabilities
- Determine the funding progress
- Calculate the Actuarially Determined Contribution
  - Board-Adopted Actuarial Funding Policy
- Determine the contribution under the Statutory Funding Plan
- Explore reasons why the current valuation differs from prior valuations
- Provide information for annual financial statements

# The Valuation Process

## Input

Member Data  
Asset Information  
Benefit Provisions  
Actuarial Assumptions  
Funding Methodology



## Results

Actuarial Value of Assets  
Normal Cost and Actuarial Liability  
Unfunded Liability and Funded Ratio  
Statutory Contribution  
Actuarially Determined Employer Contribution  
Accounting Results

# Actuarial Assumptions

Two types:

## Demographic

- Retirement
- Disability
- Withdrawal
- Mortality

## Economic

- Inflation – 2.50%
- Interest rate – 7.00%
- Salary increases – 9.50% for members with one year of service to 4.00% for members with 20 or more 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. Adjustments to inflation (2.50% down to 2.25%) and investment return (7.00% down to 6.75%) were recommended in June 2020 for use with this valuation, but were not adopted. The next full experience study is scheduled to be completed during 2021 with any assumption changes to be implemented in the June 30, 2021 actuarial valuation.

# 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.

# Summary of Valuation Highlights

- **State Contribution**

- Required State contribution for fiscal 2022 is \$5.69 billion, an 11% increase from the fiscal 2021 contribution of \$5.14 billion
- The fiscal 2022 State contribution under the Board-Adopted Actuarial Funding Policy is \$8.85 billion
  - Statutory contribution is approximately 65% of the Board funding policy amount
  - The \$3.16 billion contribution shortfall increases future contribution requirements

- **Asset Return**

- Fair value of assets returned 0.5% for year ending 6/30/20 (Segal calculation)
  - Gradual recognition of deferred gains and losses resulted in a 5.2% return on actuarial assets, compared to 7.0% expected
  - Loss on actuarial value of assets is \$973 million

- **Demographic Experience**

- Demographic and liability experience resulted in a loss of \$47 million, or 0.03% of actuarial accrued liability

- **Funded Percentage**

- Funded ratio based on the actuarial value of assets decreased from 40.6% in 2019 to 40.5% in 2020



# Summary of Valuation Highlights (continued)

- **Unfunded Actuarial Accrued Liability (UAAL)**

- The actuarial accrued liability increased from \$131.5 billion (as of June 30, 2019) to \$135.6 billion (as of June 30, 2020)
- The UAAL increased from \$78.1 billion to \$80.7 billion
  - \$2.6 billion increase results from net experience loss (\$1.0 billion) and inadequate State contributions (\$1.6 billion)

- **Changes Since Last Year's Valuation**

- There were no plan provision or assumption changes implemented in the June 30, 2020 actuarial valuation
- We will continue to monitor buyout program experience to determine whether changes in next year's valuation are appropriate

# Membership

## Active membership statistics

	June 30, 2020	June 30, 2019	Change
Number			
Tier I	116,261	119,572	-2.8%
Tier II	<u>46,814</u>	<u>41,180</u>	+13.7%
Total	163,075	160,752	+1.4%
Average Salary*	\$74,550	\$73,106	+2.0%
Median Salary*	68,187	66,795	+2.1%
Average Age	42.8 years	42.6 years	
Average Total Service	11.4 years	11.3 years	

\* Full-time / regular part-time employees only

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

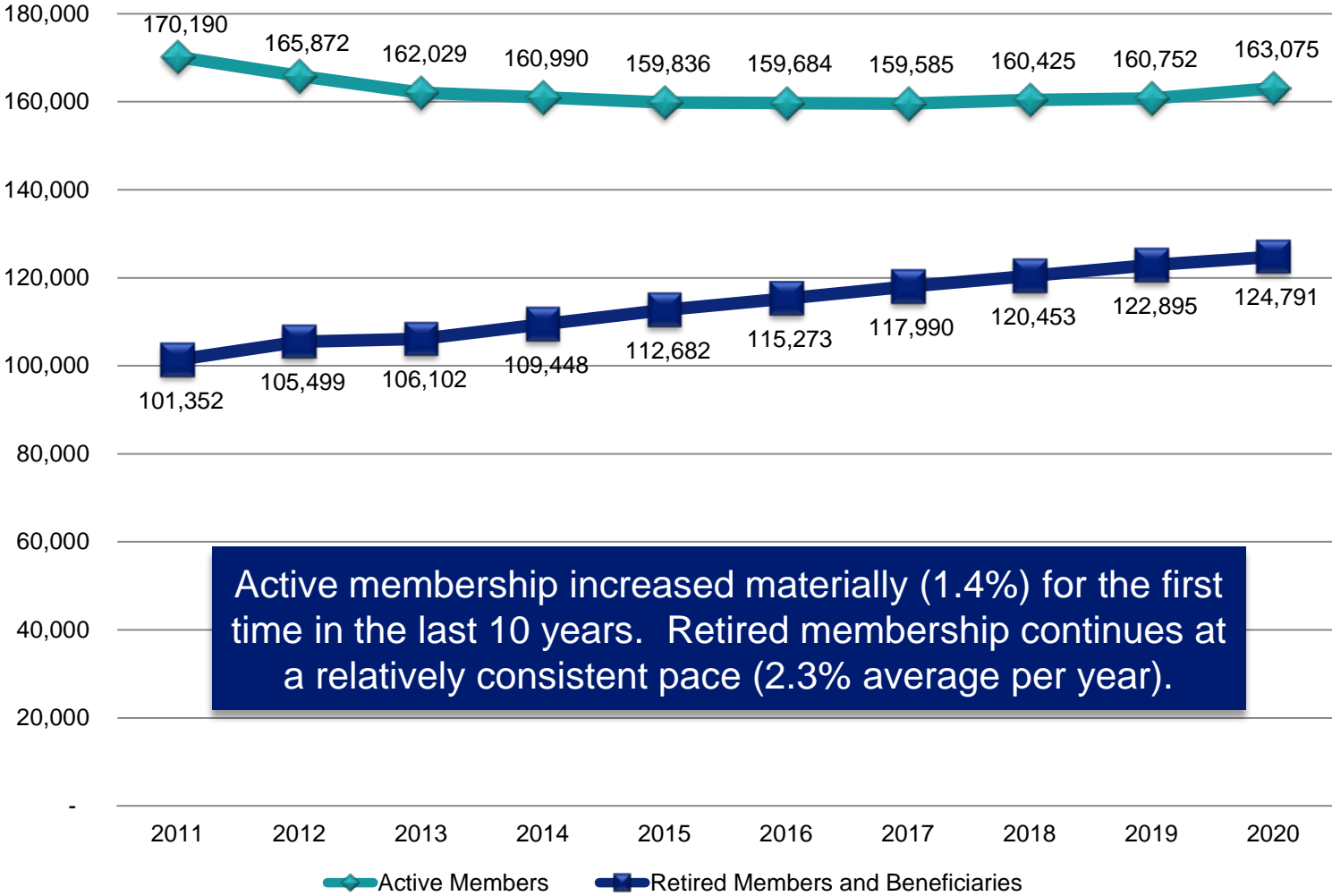
# Membership

## Retiree and beneficiary statistics

	June 30, 2020	June 30, 2019	Change
Number	124,791	122,895	+1.5%
Annual Annuities	\$6.927 billion	\$6.640 billion	+4.3%
Average Age	72.8 years	72.4 years	
Average Monthly Benefit	\$4,626	\$4,502	+2.8%

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

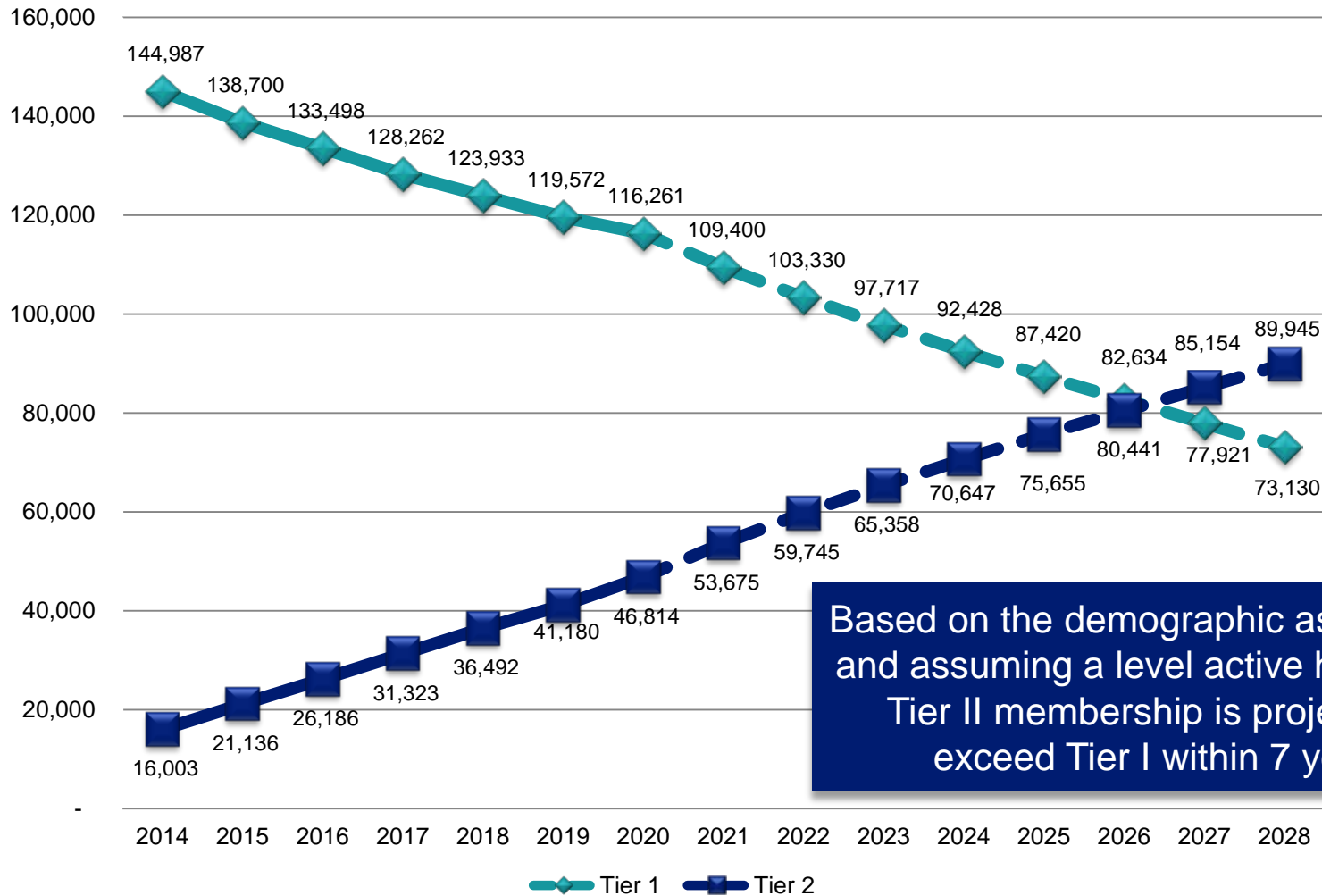
# Active and Retired Membership



Active membership increased materially (1.4%) for the first time in the last 10 years. Retired membership continues at a relatively consistent pace (2.3% average per year).

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

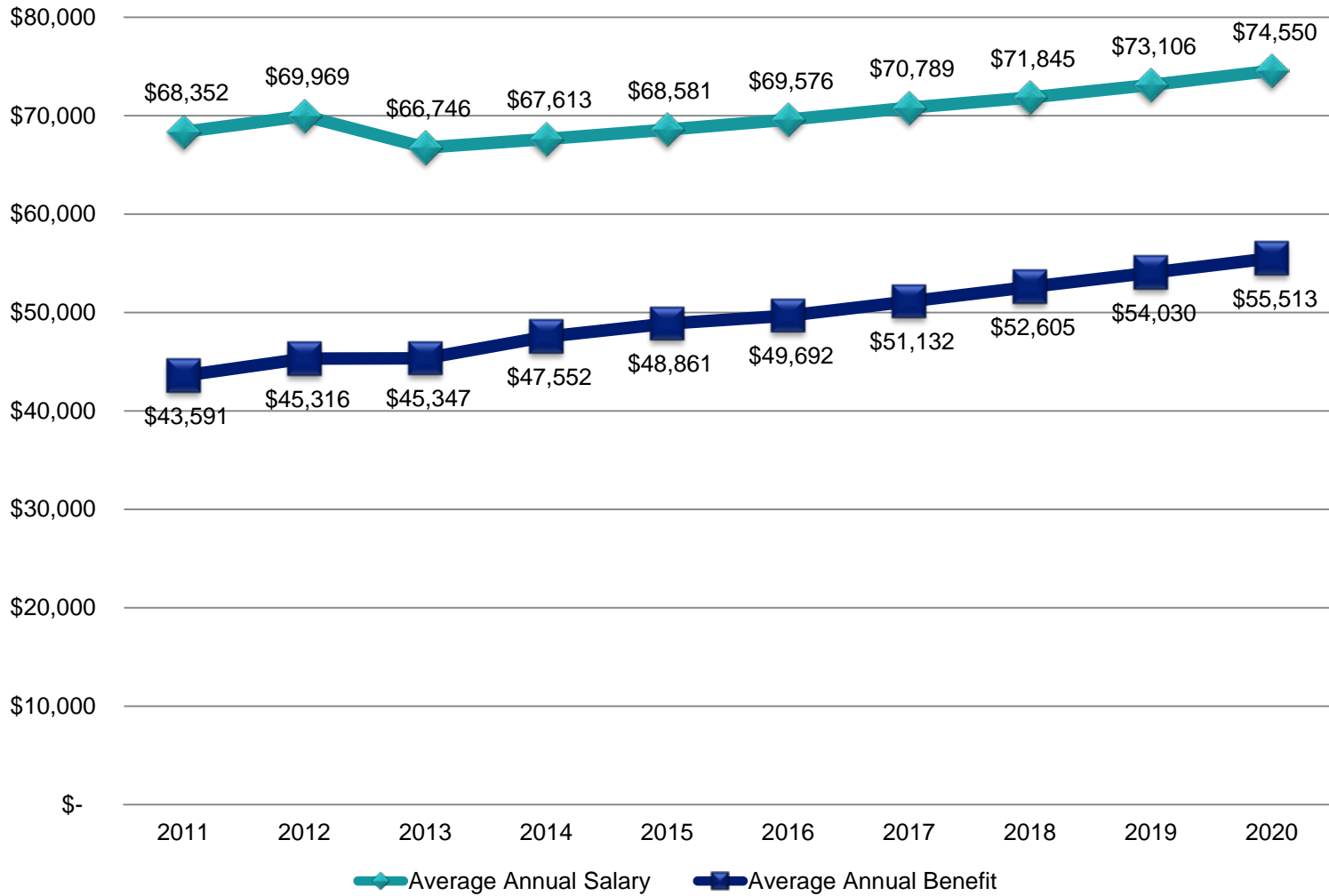


Based on the demographic assumptions and assuming a level active headcount, Tier II membership is projected to exceed Tier I within 7 years.

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 current level

# Average Salary and Average Benefit



The average annual benefit for all benefit recipients has increased by 2.7% per year. Starting in 2013, salaries were revised to reflect the reported rate of pensionable salary.

# Assets

- The fair value of assets decreased from \$53.3 billion (as of June 30, 2019) to \$52.3 billion (as of June 30, 2020)
  - Segal determined the investment return was +0.5%, net of investment expenses
- The actuarial value of assets – which smoothes unexpected investment gains and losses over five years – increased from \$53.4 billion (as of June 30, 2019) to \$54.9 billion (as of June 30, 2020)
  - Return of +5.2%, net of investment expenses
  - Actuarial value is 104.9% of fair value
  - There is a total of \$2.6 billion of deferred investment losses that will be recognized in future years
- Average annual returns are:

	Fair Value	Actuarial Value
5-year average	5.1%	6.6%
10-year average	8.2%	6.8%
15-year average	6.1%	6.3%
20-year average	5.7%	5.9%

The actual average actuarial asset returns over various historical periods have been less than the current 7.00% assumption.

# Assets

## Fair Value of Assets (in millions)

	June 30, 2020	June 30, 2019
Beginning of Year	\$53,262	\$51,970
Contributions		
• State	\$4,814	\$4,466
• Employers	93	89
• Members	<u>994</u>	<u>964</u>
• Total	\$5,901	\$5,519
Benefits Paid	(7,100)	(6,819)
Administrative Expenses	(23)	(24)
Investment Income (net)	<u>276</u>	<u>2,616</u>
End of Year	\$52,316	\$53,262
Rate of Return	+0.52%	+5.10%



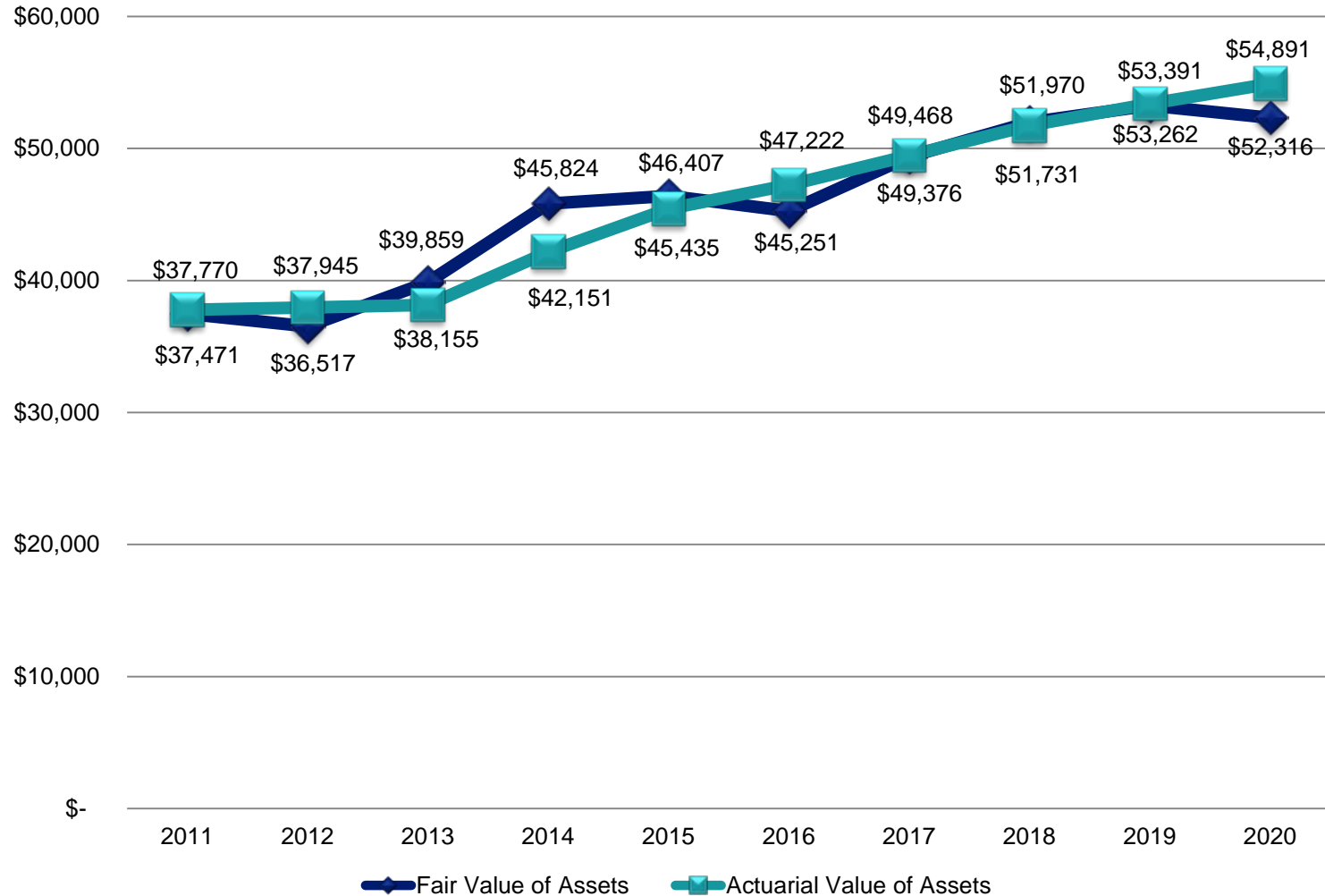
# Assets

## Actuarial Value of Pension Assets (in millions)

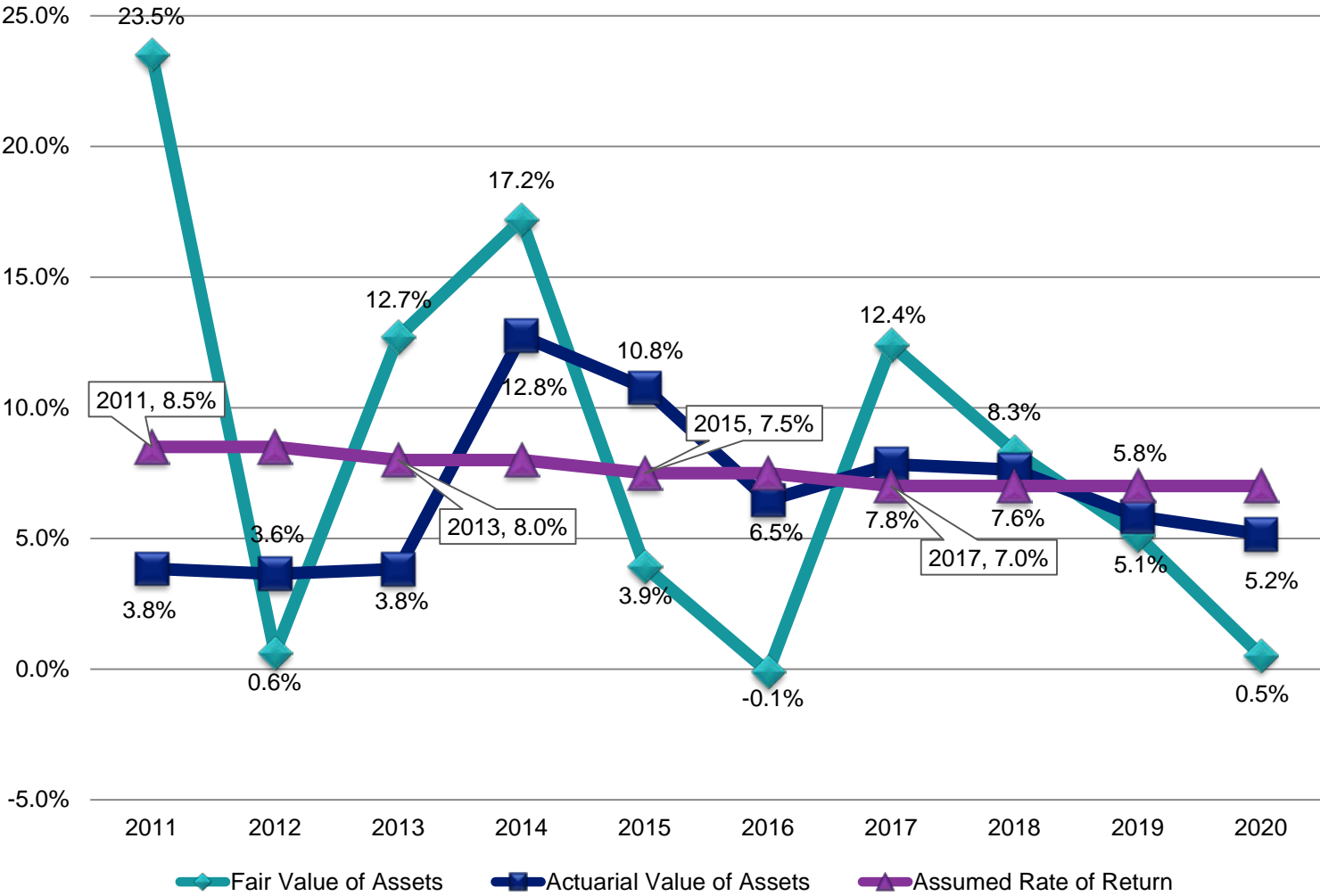
Fair Value of Pension Assets as of June 30, 2020			\$52,316
Gain or (Loss) on Assets	Original Amount	% Deferred	Deferred Amount
Year ended June 30, 2020	(\$3,410)	80%	(\$2,728)
Year ended June 30, 2019	(\$974)	60%	(585)
Year ended June 30, 2018	644	40%	258
Year ended June 30, 2017	2,402	20%	480
Year ended June 30, 2016	(3,483)	0%	<u>0</u>
Total			(\$2,575)
Actuarial Value as of June 30, 2020			\$54,891
Actuarial Value as a Percent of Fair Value			104.9%
Rate of Return			5.16%

# Fair and Actuarial Values of Assets

\$ Millions

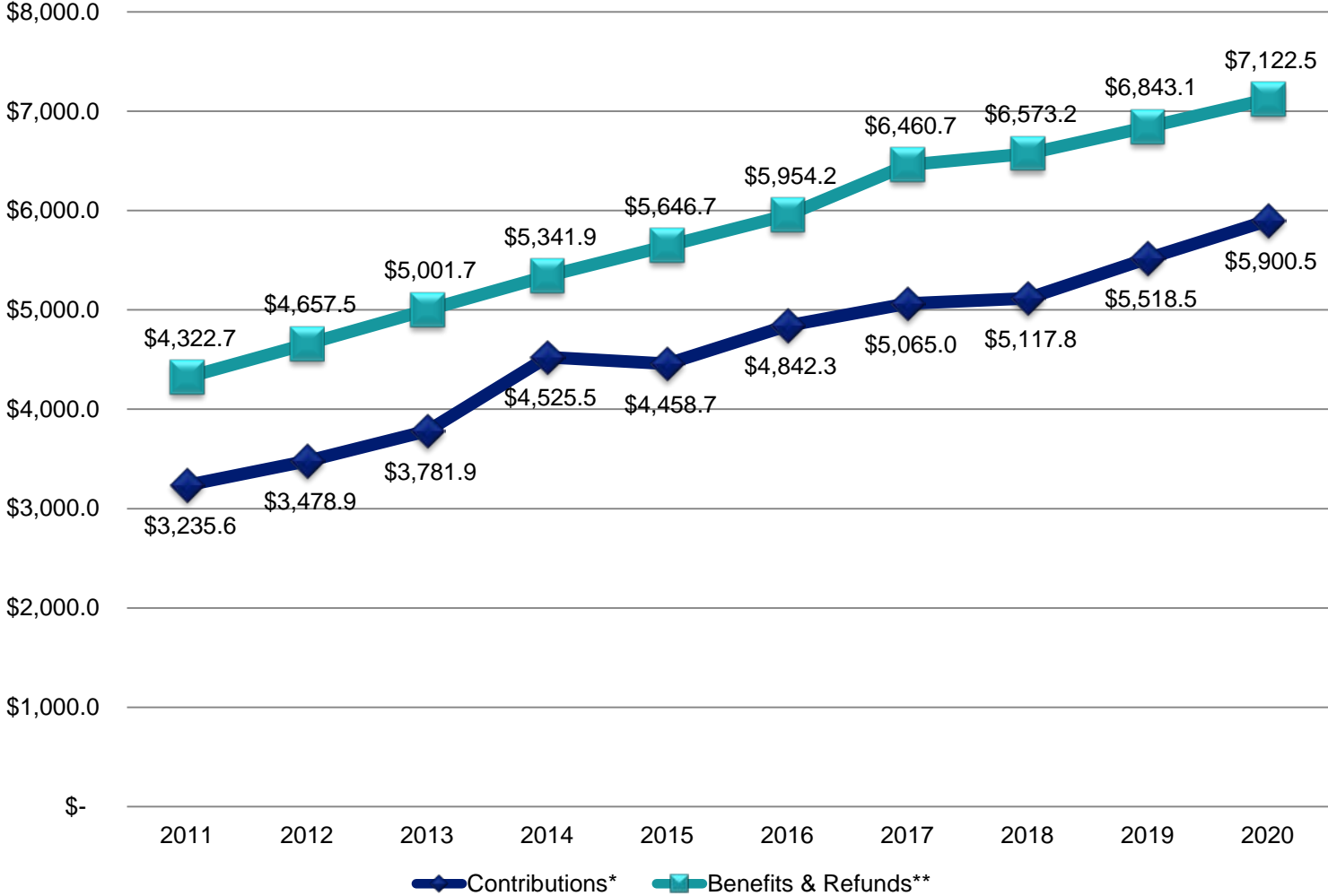


# Asset Returns



# Contributions vs Disbursements

\$ Millions



\* Includes member, employer and state contributions

\*\* Includes benefit payments, refunds and administrative expenses

# Valuation Results

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

	June 30, 2020	June 30, 2019
Actuarial Accrued Liability:		
• Active Members	\$43,919	\$42,130
• Retirees and Beneficiaries	88,186	85,789
• Inactive Members with Deferred Benefits	<u>3,494</u>	<u>3,538</u>
Total	\$135,599	\$131,457
Actuarial Assets	<u>54,891</u>	<u>53,391</u>
Unfunded Accrued Liability	\$80,708	\$78,066
Funded Ratio	40.5%	40.6%

# Valuation Results

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

	FY 2022	FY 2021
Based on Statutory Funding Plan	\$5,694	\$5,141
Based on Board-Adopted Actuarial Funding Policy	8,850	8,344
Difference Between Statutory Amount and Board-Adopted Actuarial Funding Policy	\$3,156	\$3,203
Statutory Amount as a Percentage of Board-Adopted Actuarial Funding Policy	64%	62%

# Valuation Results

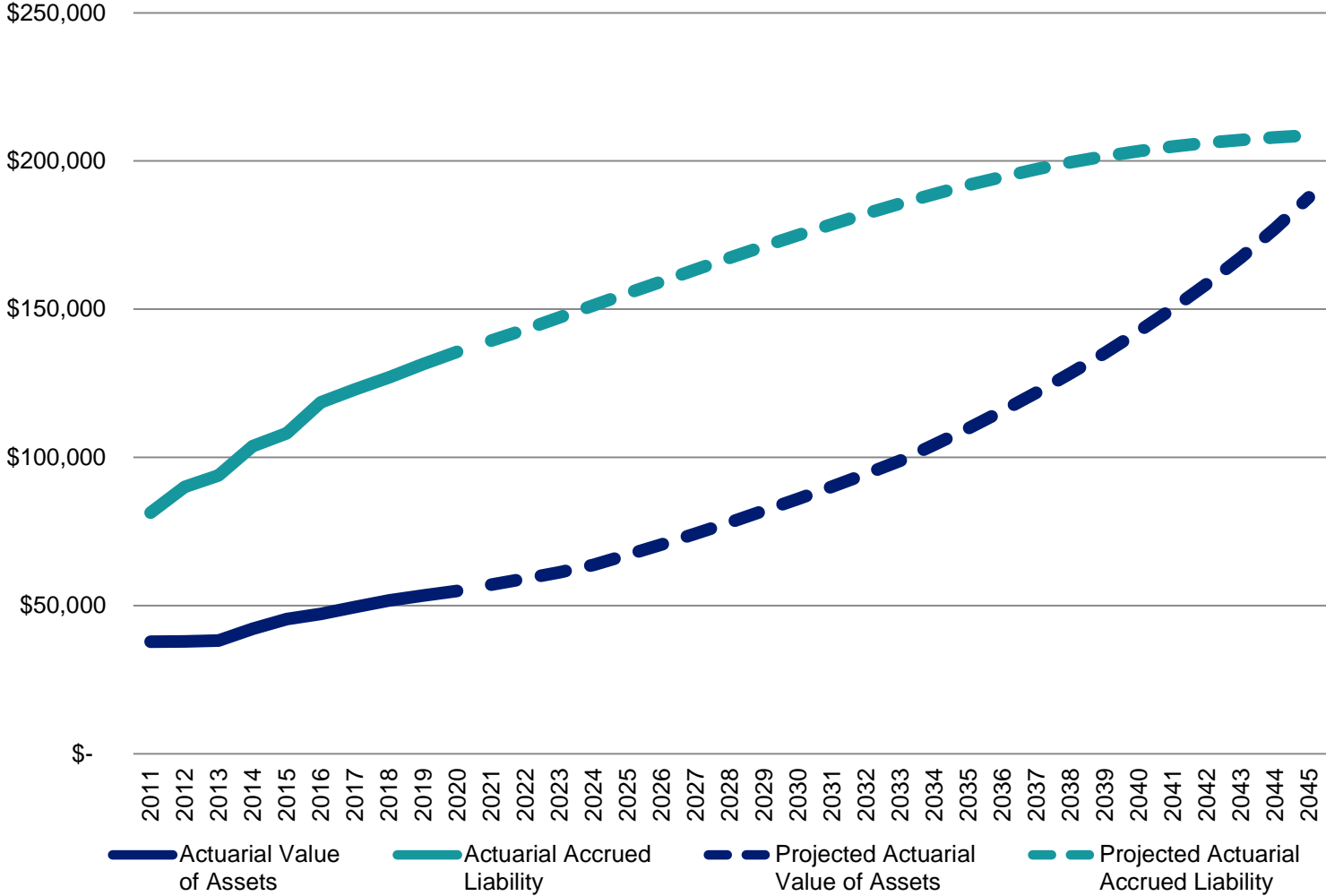
## Reconciliation of State Statutory Funding Plan Contribution from Fiscal Year 2021 to 2022 (in millions)

	Statutory Funding Contribution
FY 2021 State Contribution	\$5,141
Expected Increase	261
Investment Loss	44
All Other Net Actuarial Losses*	<u>248</u>
FY 2022 State Contribution	\$5,694

\*Reflects changes to new entrant profile, which increased FY 2022 State Contribution by approximately \$174 million

# Assets and Liabilities

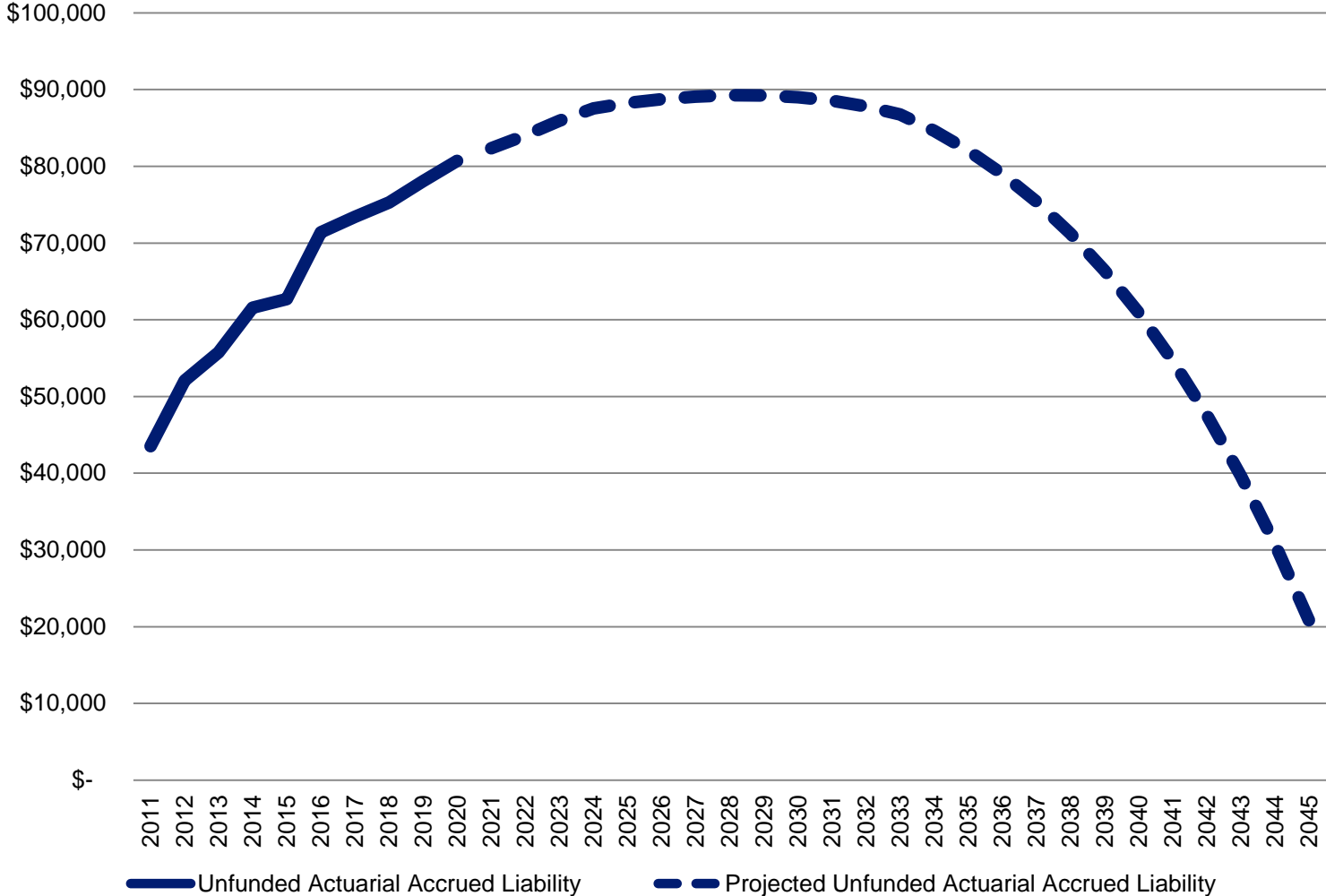
\$ Millions



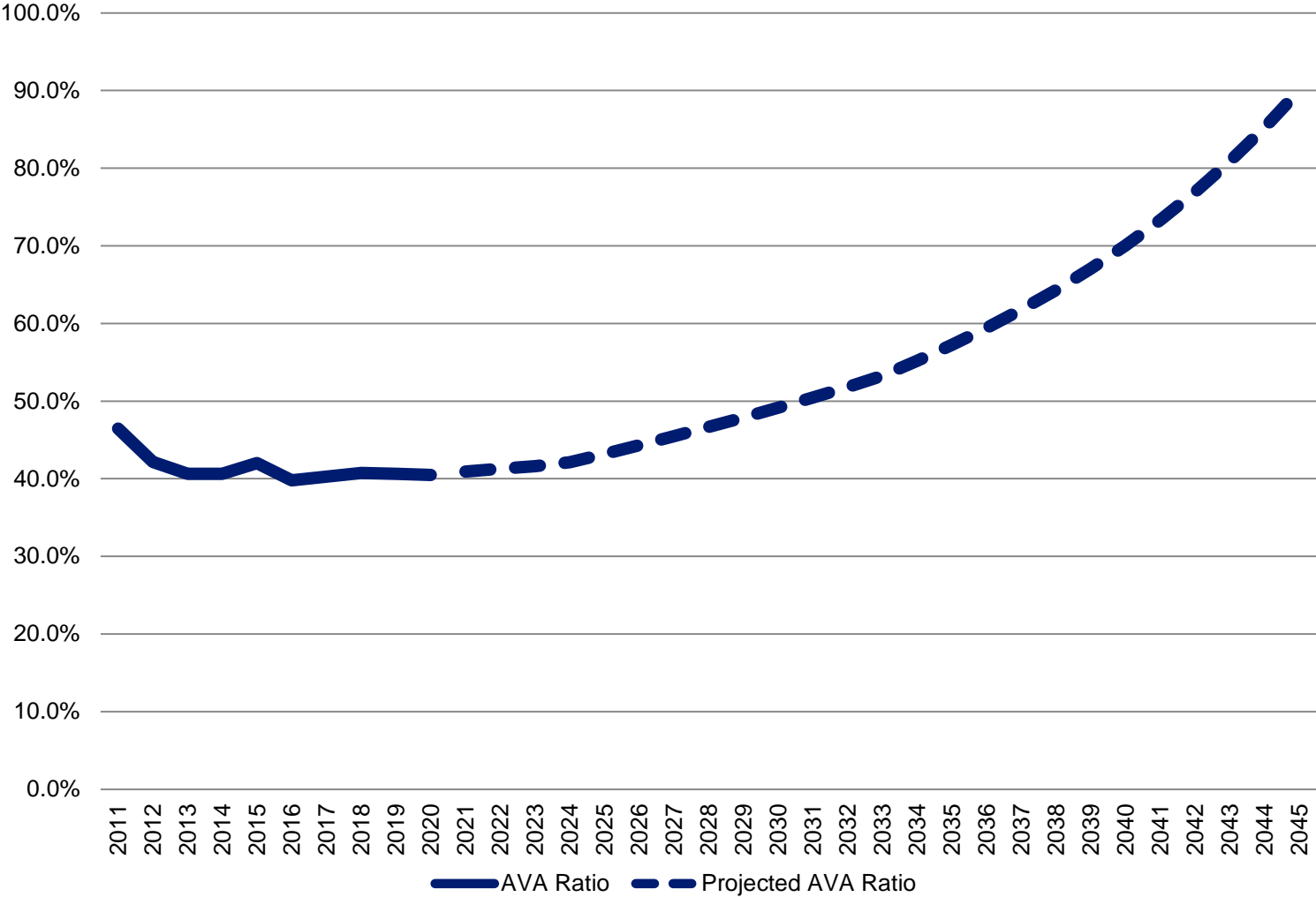


# Unfunded Actuarial Accrued Liability

\$ Millions

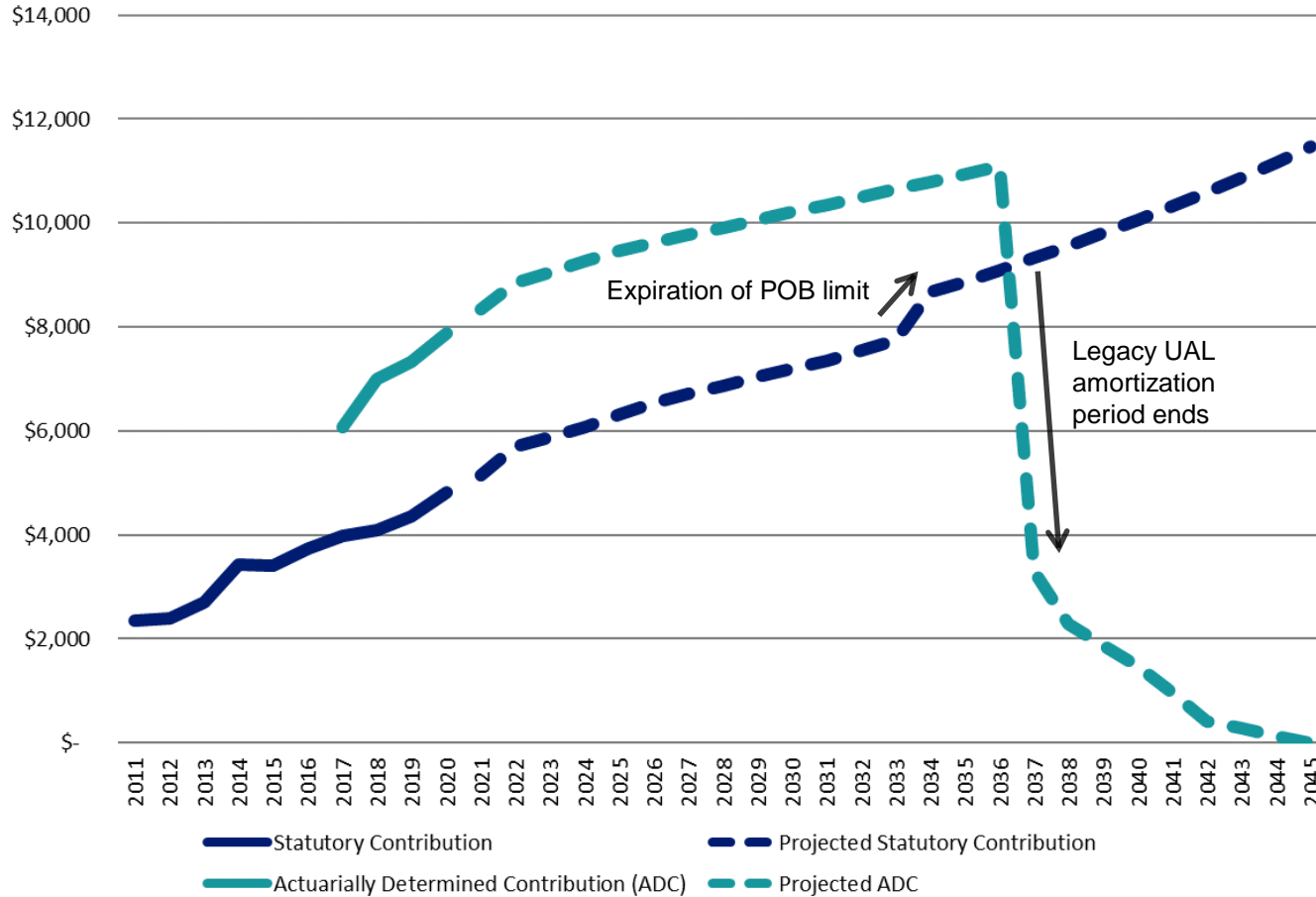


# Funded Ratio



# State Contributions

\$ Millions



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

- The cumulative Statutory contribution from FY 2022 through FY 2045 is \$201 billion
- The cumulative ADC contribution from FY 2022 through FY 2045 is \$161 billion

# Summary of GASB Accounting Results

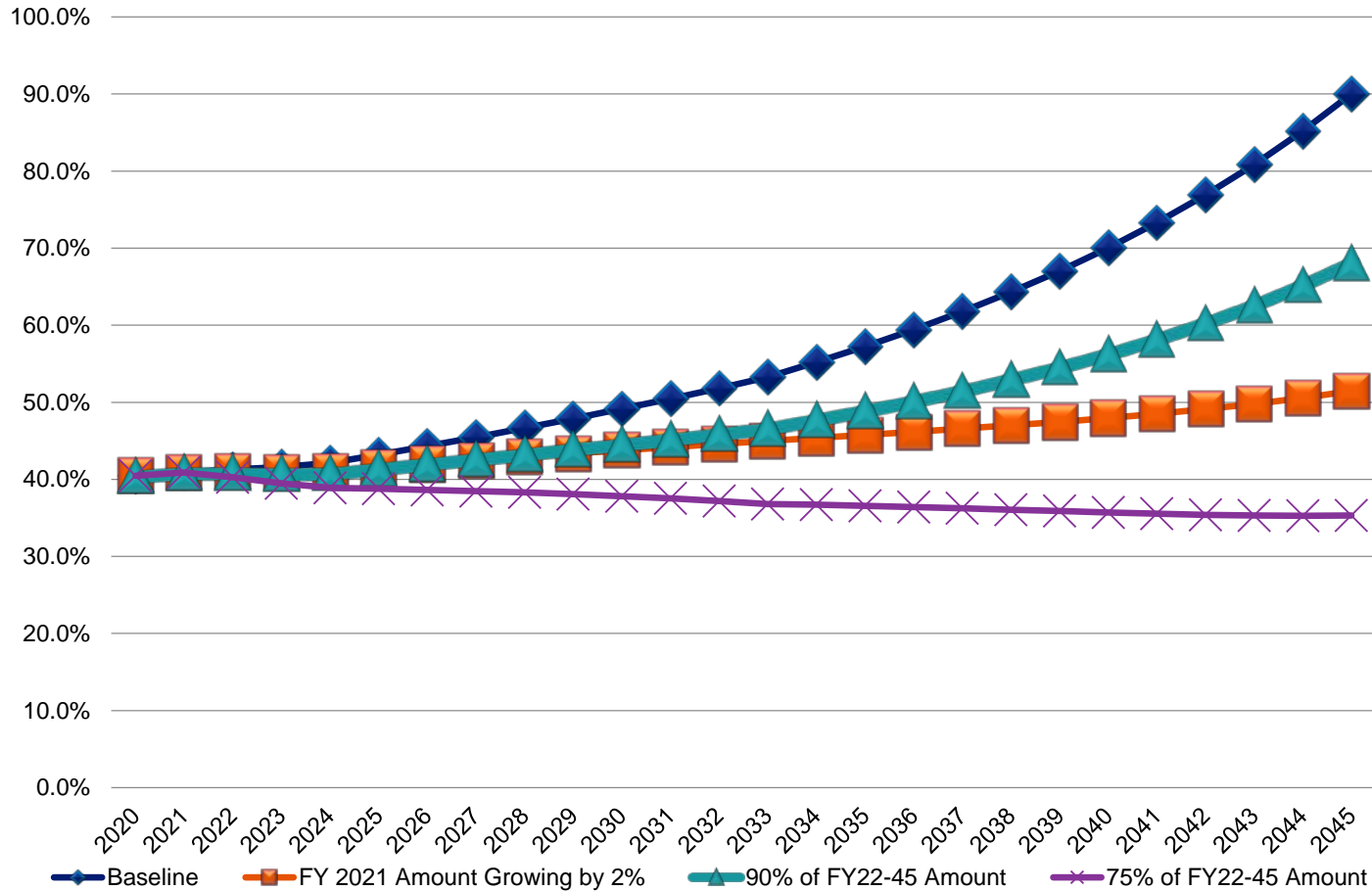
## GASB Information (\$ in millions)

	June 30, 2020	June 30, 2019
Long-Term Expected Rate of Return	7.00%	7.00%
Municipal Bond Index	2.21%	3.50%
Single Equivalent Discount Rate	7.00%	7.00%
Total Pension Liability	\$138,532	\$134,371
Plan Fiduciary Net Position	<u>52,316</u>	<u>53,262</u>
Net Pension Liability	\$86,216	\$81,109
Plan Fiduciary Net Position as a Percentage of Total Pension Liability	37.8%	39.6%
Total Pension Expense	\$8,897	\$8,519

# Sensitivity Projections

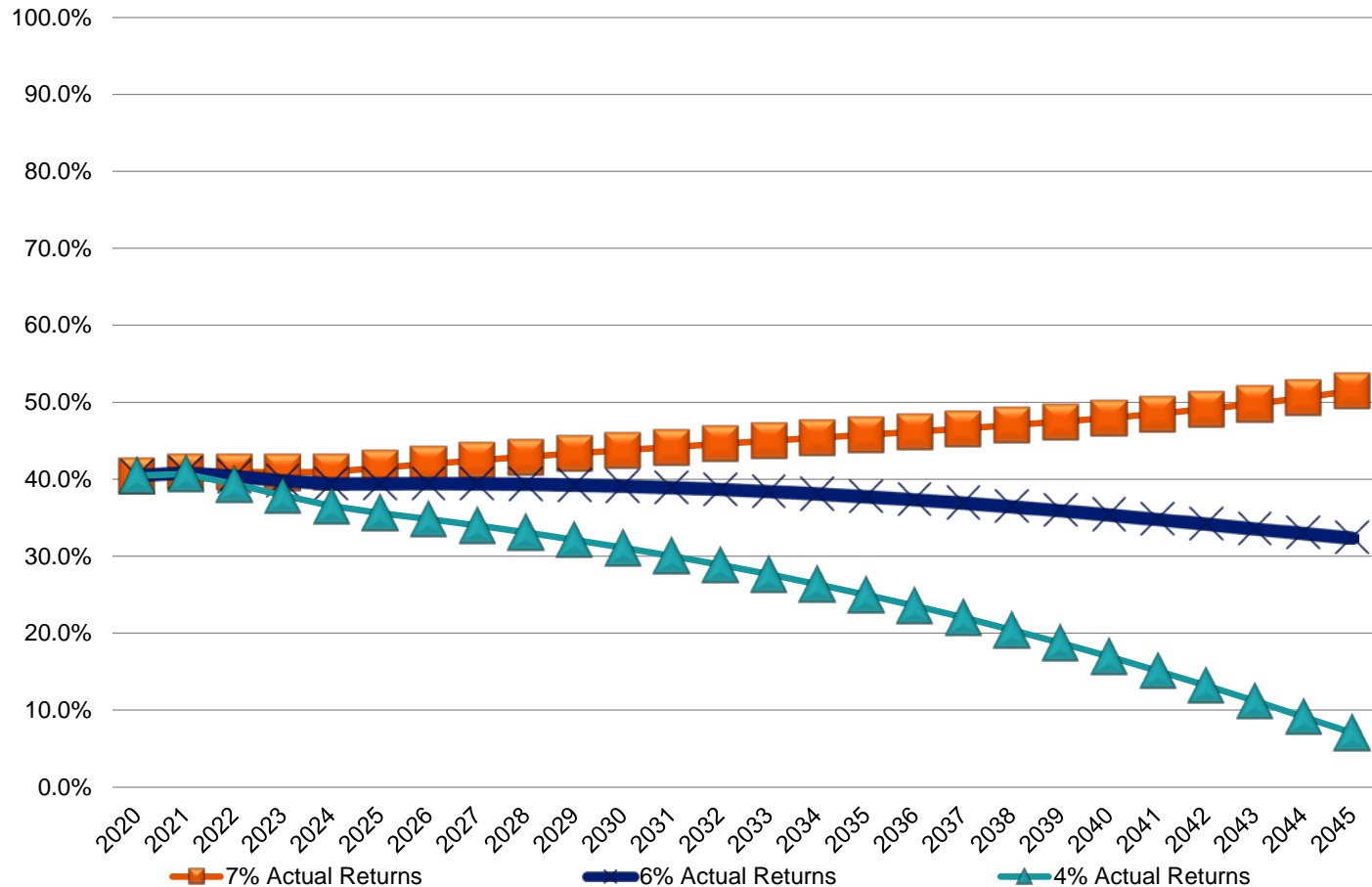
- The projected Statutory State contributions are determined based on an underlying assumption that the State will contribute the required amounts for all future years
  - The required contribution amounts are projected to increase by 3.4% per year, on average
  - The estimated increase in future State revenue growth, used in determining the Actuarially Determined Contribution, is 2.00% per year
  - Baseline projections of State contributions are also based on the assumption that investment returns will be 7.00% per year
- To test the sensitivity of this assumption, we created projections based on the following contribution scenarios:
  - The FY 2021 amount is contributed, and future contributions increase by 2%
  - 90% of the FY 2022-2045 amounts are contributed
  - 75% of the FY 2022-2045 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 2021 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 2021 State contribution is made, and future contributions increase by 2%, TRS is projected to remain solvent, but the funded ratio is projected to be 51% in 2045
- If 90% of the FY 2022-2045 State contributions are made, the funded ratio is projected to be 68% in 2045
- If 75% of the FY 2022-2045 State contributions are made, the funded ratio is projected to be 35% in 2045

# Sensitivity Projection #2



- If the FY 2021 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 33% in 2045
- If the FY 2021 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 7% 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.



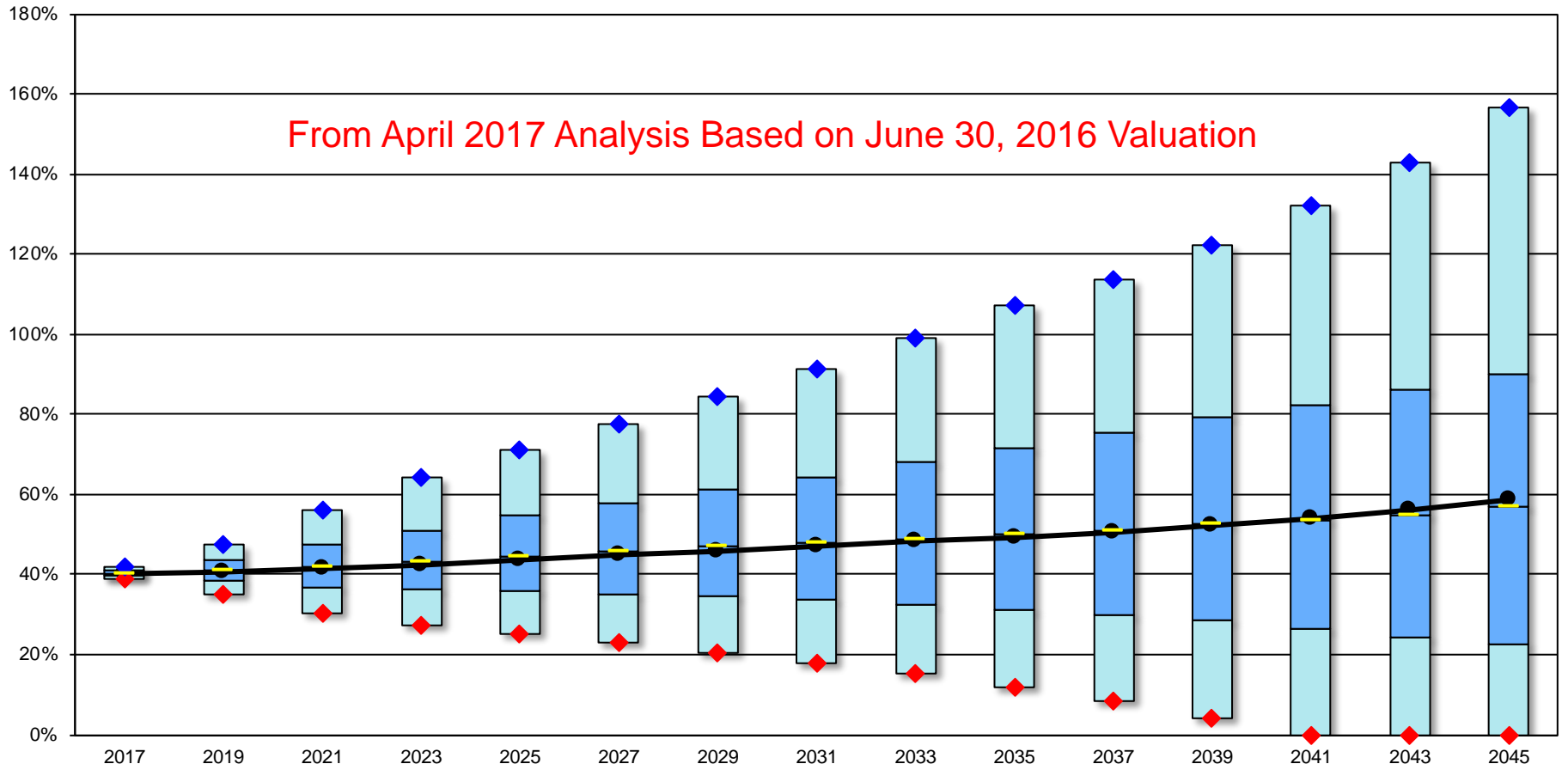
# Stochastic Modeling

- **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, 2020 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)

Projected Funded Percentage as of July 1



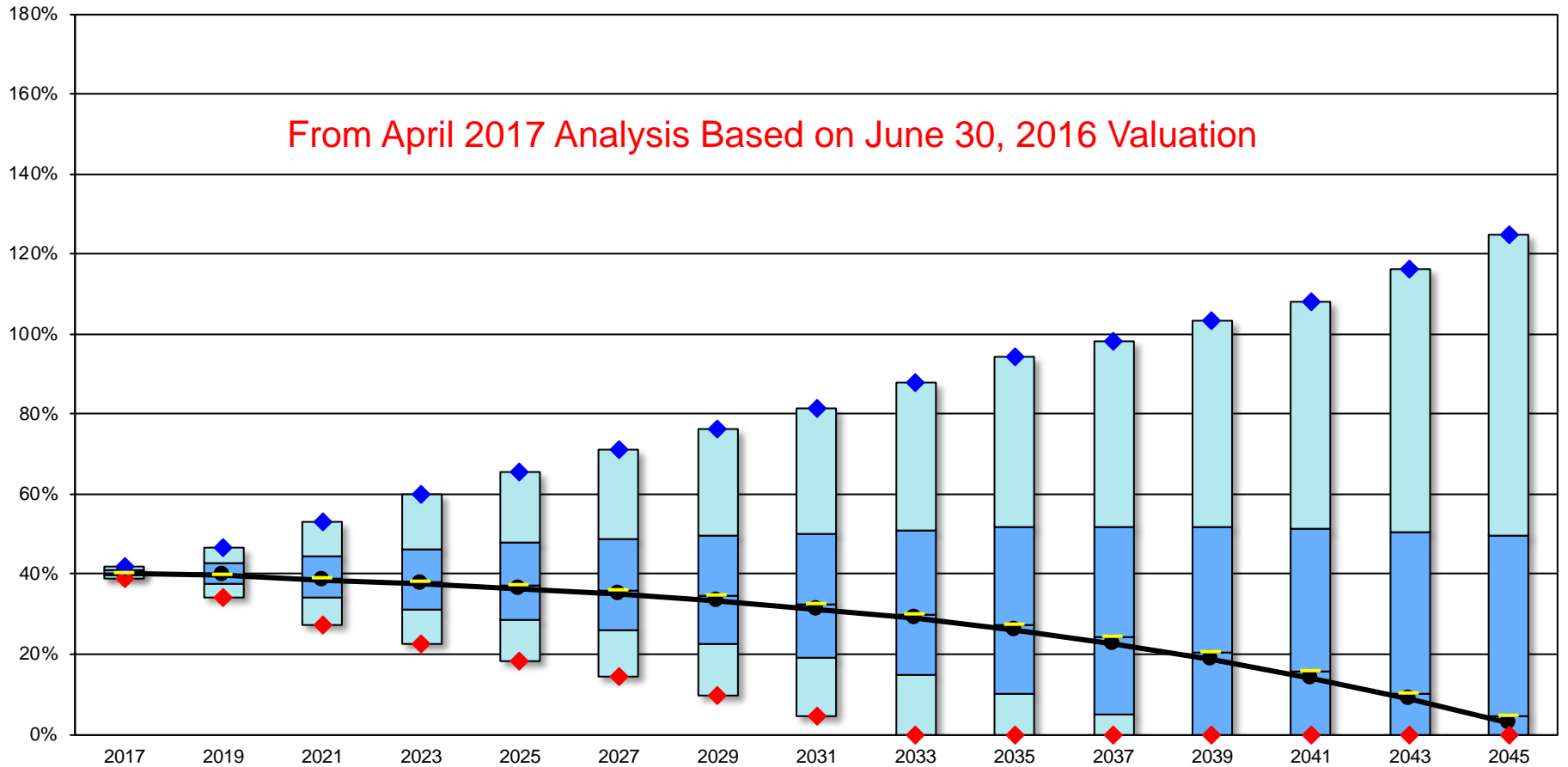
From April 2017 Analysis Based on June 30, 2016 Valuation

	2017	2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039	2041	2043	2045
◆ 95th	41.7%	47.6%	55.8%	64.0%	70.9%	77.4%	84.5%	91.4%	99.2%	107.0%	113.8%	122.2%	132.0%	142.6%	156.4%
— 75th	40.9%	43.5%	47.4%	51.1%	54.7%	57.9%	61.0%	64.1%	67.9%	71.6%	75.2%	79.1%	82.1%	86.0%	90.0%
— 50th	40.3%	40.9%	41.9%	43.2%	44.5%	45.8%	47.0%	47.8%	48.7%	50.0%	51.1%	52.5%	53.6%	54.6%	56.8%
— 25th	39.7%	38.3%	36.9%	36.3%	35.8%	35.2%	34.5%	33.8%	32.6%	31.3%	29.9%	28.7%	26.6%	24.3%	22.6%
◆ 5th	38.9%	35.0%	30.3%	27.3%	25.1%	23.0%	20.3%	17.9%	15.1%	11.7%	8.2%	4.0%	0.0%	0.0%	0.0%
●	40.2%	40.5%	41.3%	42.5%	43.7%	44.8%	45.9%	47.0%	48.1%	49.3%	50.6%	52.0%	53.8%	55.9%	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



	2017	2019	2021	2023	2025	2027	2029	2031	2033	2035	2037	2039	2041	2043	2045
◆ 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%	108.0%	116.4%	124.8%
— 75th	40.9%	42.5%	44.5%	46.2%	47.8%	48.8%	49.8%	50.2%	50.8%	51.8%	51.9%	51.8%	51.2%	50.3%	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%
— 25th	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%
◆ 5th	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%
●	40.2%	39.6%	38.4%	37.5%	36.3%	35.0%	33.3%	31.2%	28.8%	25.9%	22.6%	18.6%	14.0%	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 2022 contribution increasing 2% per year
- State pays 100% of required contributions, capped at 75% of FY 2022 contribution increasing 2% per year

# Appendix

- FY 2022 State Contribution Certification Exhibit A
- FY 2022 THIS Fund Certification Exhibit B

## Exhibit A

Summary of State Contributions under Illinois Pension Code and Board-Adopted Actuarial Funding Policy	Fiscal Year 2022
<b>1. Based on Statutory Funding Plan</b>	
Total State Contribution for fiscal year 2022:	
a. Benefit Trust Reserve*:	
i. 50.29% of membership payroll	\$ 5,768,670,673
ii. Minus School Districts Contributions:	
(0.58% of membership payroll)	(66,528,518)
(6% FAS cap increases)	(4,063,578)
(10.31% of membership payroll above the Governor's salary)	(3,619,569)
iii. Minus Federal Funds Contribution	
(10.31% of membership payroll from federal funds)	(23,652,035)
iv. Minus phase-in of the effect of assumption changes	<u>22,900,000</u>
v. State Contribution	\$ 5,693,706,973
b. Guaranteed Minimum Annuity Reserve	<u>400,000</u>
c. Total State Contribution (current law)	\$ 5,694,106,973
<b>2. Based on Board-Adopted Actuarial Funding Policy**</b>	
a. Benefit Trust Reserve*:	
i. Normal cost plus amortization	\$ 8,947,919,008
ii. Minus School Districts Contributions:	
(0.58% of membership payroll)	(66,528,518)
(6% FAS cap increases)	(4,063,578)
(10.31% of membership payroll above the Governor's salary)	(3,619,569)
iii. Minus Federal Funds Contribution	
(10.31% of membership payroll from federal funds)	<u>(23,652,035)</u>
iv. State Contribution	\$ 8,850,055,308
b. Guaranteed Minimum Annuity Reserve	<u>400,000</u>
c. Total State Contribution	\$ 8,850,455,308
<b>3. Total Normal Cost and Employer Normal Cost Rate for Fiscal Year 2022</b>	
a. Total Normal Cost Rate (including administrative expenses)	19.31%
b. Member Rate	<u>-9.00%</u>
c. Employer Normal Cost Rate	10.31%
<b>4. Federal Contribution Rate (Employer Normal Cost Rate, per PA 100-0340)</b>	10.31%

\* Expected fiscal year 2022 membership payroll is \$11,470,434,147

\*\* 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:

- 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

## Exhibit B

Teacher Health Insurance Security Fund Contribution Amount to be Certified by the Board for Fiscal Year 2022	Fiscal Year 2022
<b>Expected State Contribution for Fiscal Year 2022 to THIS Fund:</b>	
1. Fiscal Year 2022 membership payroll:	
a. Total	\$ 11,470,434,147
b. Minus members who do not contribute to THIS Fund	(58,898,948)
c. Members who do contribute to THIS Fund	\$ 11,411,535,199
2. Member contribution rate (actual, per CMS)	1.30%
3. Matching State contribution: 1.c. x 2.	\$ 148,349,958
4. Adjustment to THIS Fund for overestimating Fiscal Year 2020 member THIS Fund contributions	(4,980,897)
5. Total THIS Fund State contribution*	\$ 143,369,061

\* 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 2022 payroll from the June 30, 2020 valuation