



June 30, 2021
Actuarial Valuation Report

for the

New York City
Teachers' Retirement System

prepared by the

New York City
Office of the Actuary

CONTRIBUTIONS REQUIRED FOR FISCAL YEAR 2023



OFFICE OF THE ACTUARY

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MAREK TYSZKIEWICZ
CHIEF ACTUARY

October 19, 2023

Board of Trustees
New York City Teachers' Retirement System
55 Water Street, 16th Floor
New York, NY 10041

Re: June 30, 2021 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2021 actuarial valuation of the benefits under both the New York City Teachers' Retirement System (TRS) Qualified Pension Plan and Group Life Insurance Plan (collectively, the Plan). This valuation, known as the June 30, 2021 valuation, forms the basis for determining the statutorily required contribution (Statutory Contribution) of \$3,086,081,819 for Fiscal Year 2023 (i.e., for the period beginning July 1, 2022 and ending June 30, 2023). It is not intended, nor necessarily suitable, for other purposes. Calculations made for other purposes may differ significantly from those shown herein.

Results of the June 30, 2020 actuarial valuation are shown in this Report for comparative purposes. Other historical information that the Actuary believes useful is also included.

The June 30, 2021 and June 30, 2020 actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employers' payroll facilities. Financial information was provided by TRS and the Office of the Comptroller as of June 30, 2021 and June 30, 2020.

Consistent with Actuarial Standards of Practice, the Office of the Actuary has reviewed census data and financial information for consistency and reasonability but has not audited it. The accuracy of the results and calculations presented in this Report are dependent on the accuracy of this census data and financial information. To the extent any such data or information provided is materially inaccurate or incomplete, the results contained herein will require revision.

A summary of the benefits available under the terms of the Plan is shown in SECTION VIII – SUMMARY OF PLAN PROVISIONS. This valuation reflects the enactment of Chapter 56 of the Laws of 2022 which reduces the Tier 6 vesting requirement from ten years to five years. All other benefits under the Plan are unchanged from the prior valuation. Continued compliance has been presumed for the Older Workers Benefit Protection Act (OWBPA).

A summary of the actuarial assumptions and methods used in the valuation of the Plan is shown in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS. The actuarial assumptions and methods are unchanged from the prior valuation.

This Report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary publishes the Fiscal Year 2023 GASB67 and GASB68 results under separate cover. Reports published by the Office of the Actuary are available on the website www.nyc.gov/actuary.

Note that this valuation does not reflect unknown potential future claims from *Gulino vs. Department of Education*, 96 Civ. 8414(KMW). Also, pension payments that exceed the Internal Revenue Code Section 415 Limit which have been or are expected to be made from the Excess Benefit Plan are excluded from this valuation.

The undersigned actuaries are Associates of the Society of Actuaries and Members of the American Academy of Actuaries. In addition, Dolores Capone is also an Enrolled Actuary under the Employee Retirement Income Security Act of 1974. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of our knowledge, the results contained herein have been prepared in accordance with generally accepted actuarial principles and procedures and with the Actuarial Standards of Practice issued by the Actuarial Standards Board.

Best Regards,



Marek Tyszkiewicz, ASA, MAAA
Chief Actuary



Dolores Capone, ASA, EA, MAAA
Assistant Deputy Chief Actuary

MT/eh

cc: Valerie Budzik, Esq. - New York City Teachers' Retirement System
Thad McTigue - New York City Teachers' Retirement System
Patricia Reilly - New York City Teachers' Retirement System

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SECTION I – EXECUTIVE SUMMARY

This Report presents the results of the June 30, 2021 actuarial valuation of the New York City Teachers' Retirement System (TRS) and Group Life Insurance Plan (collectively, the Plan).

The purposes of the valuation are:

- To determine the actuarially required contribution (Actuarial Contribution) for Fiscal Year 2023 (i.e., July 1, 2022 to June 30, 2023),
- To measure the funding progress of the Plan,
- To disclose the census data and financial information used in the valuation, and
- To disclose the actuarial assumptions and actuarial methods used to determine the Actuarial Contribution.

The statutorily required contribution (Statutory Contribution) is also shown and compared to the Actuarial Contribution in historical years.

This Report does not provide financial and accounting information required by current GASB standards. That information is provided in a separate report.

Future measurements of this information may differ from current measurements for many reasons including, but not limited to, experience differing from economic or demographic assumptions, changes in actuarial assumptions and methods, and changes in applicable statute and plan provisions. These and additional risks may be present for the Plan. A further discussion is presented in SECTION VII – RISK AND UNCERTAINTY for consideration.

Table I-1
Executive Summary

Presented in **Table I-1** are the principal results of the June 30, 2021 actuarial valuation and, for comparative purposes, the June 30, 2020 actuarial valuation.

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM		
SUMMARY OF VALUATION RESULTS		
Valuation Date	June 30, 2021	June 30, 2020
Fiscal Year	2023	2022
Funded Status		
1. Accrued Liability	\$ 79,153,121,519	\$ 75,452,987,066
2. Actuarial Value of Assets (AVA) ¹	66,328,295,214	62,456,795,810
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 12,824,826,305	\$ 12,996,191,256
4. Market Value of Assets (MVA)	78,347,298,000	59,318,950,000
5. Unfunded Accrued Liability (MVA Basis) (1. - 4.)	\$ 805,823,519	\$ 16,134,037,066
6. Funded Ratio (MVA Basis) (4. / 1.)	99.0%	78.6%
Contribution		
1. Normal Cost	\$ 1,436,496,889	\$ 1,411,270,725
2. Unfunded Accrued Liability	1,620,032,951	1,860,069,384
3. Administrative Expenses	56,351,979	58,457,448
4. ASAF Credit	(26,800,000)	(26,000,000)
5. Actuarial Contribution (1. + 2. + 3. + 4.)	\$ 3,086,081,819	\$ 3,303,797,557
6. Statutory Contribution	\$ 3,086,081,819	\$ 3,303,797,557
Participant Data		
1. Active Members		
a. Number	123,211	124,276
b. Annual Salary ²	\$ 11,469,452,986	\$ 11,203,878,026
c. Average Salary	\$ 93,088	\$ 90,153
2. Terminated Nonvested Members / Actives Off Payroll	4,574	5,604
3. Deferred Vested Members	15,128	15,502
4. Retirees and Beneficiaries		
a. Number	89,997	89,536
b. Total Annual Benefits	\$ 4,691,132,464	\$ 4,437,206,309
c. Average Benefit	\$ 52,125	\$ 49,558

¹ AVA as of June 30, 2020 includes receivable contributions of \$3,105,099,273; AVA as of June 30, 2021 does not include receivable contributions.

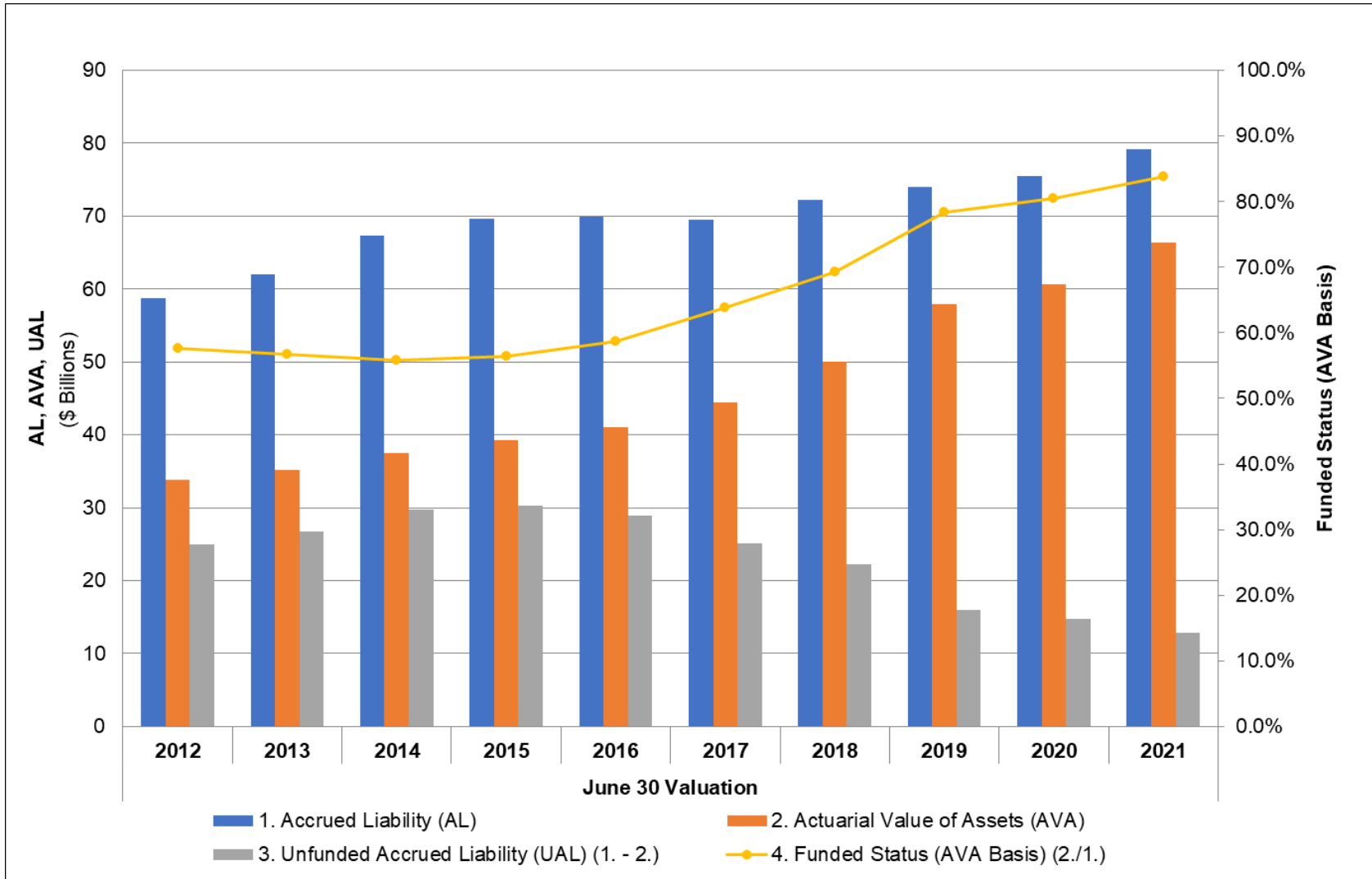
² Includes the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any, that are not yet reflected in the census data.

**Table I-2
Actuarial Liabilities**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM		
ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	June 30, 2021	June 30, 2020
Fiscal Year	2023	2022
Accrued Liability		
1. Active Members	\$ 31,394,224,447	\$ 29,779,050,120
2. Terminated Nonvested Members	56,077,750	53,475,028
3. Deferred Vested Members	1,521,504,637	1,482,176,823
4. Retirees and Beneficiaries	<u>46,175,314,685</u>	<u>44,132,285,095</u>
5. Accrued Liability (1. to 4.)	\$ 79,147,121,519	\$ 75,446,987,066
6. WTC Reserve ¹	<u>6,000,000</u>	<u>6,000,000</u>
7. Total Accrued Liability (AL) (5. + 6.)	\$ 79,153,121,519	\$ 75,452,987,066
Present Value of Benefits		
1. Active Members	\$ 50,208,678,604	\$ 48,421,107,086
2. Terminated Nonvested Members	56,077,750	53,475,028
3. Deferred Vested Members	1,521,504,637	1,482,176,823
4. Retirees and Beneficiaries	<u>46,175,342,609</u>	<u>44,132,285,095</u>
5. Present Value of Benefits (1. to 4.)	\$ 97,961,603,600	\$ 94,089,044,032
6. WTC Reserve ¹	<u>6,000,000</u>	<u>6,000,000</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 97,967,603,600	\$ 94,095,044,032

¹ Reserve for adverse WTC experience.

Graph I-3
Historical Funded Status



SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS

Information on the Market Value of Assets (MVA) of the Plan is provided by the Office of the Comptroller. An asset smoothing method is used to determine the Actuarial Value of Assets (AVA) of the Plan.

The Actuary reset the AVA to the MVA as of June 30, 2011 and as of June 30, 2019. Beginning with the June 30, 2020 actuarial valuation, the asset smoothing method recognizes investment returns greater or less than expected over a period of five years, phasing these gains and losses into the AVA at a rate of 20% per year.

The expected investment return is derived using the Actuarial Interest Rate of 7%, beginning-of-fiscal-year MVA, and net cash flows which are assumed to occur midyear.

The AVA is further constrained to be within a corridor of 80% to 120% of the MVA.

Table II-1
Statement of Plan Net Assets

(\$ Thousands)		
	June 30, 2021	June 30, 2020
ASSETS		
Cash	\$ 74,742	\$ 48,488
Receivables		
Investment Securities Sold	3,560,628	1,889,299
Member Loans	310,380	323,805
Accrued Interest and Dividends	304,145	289,845
Pooled NYC Pension Fund Assets (Fixed-Return Fund)		
Short-Term Investments		
Commercial Paper	867,918	381,195
Short-term Investment Fund	1,028,743	747,639
U.S. Treasury Bills & Agencies	1,090,552	2,149,709
Discount Notes	0	0
Debt Securities		
U.S. Government	14,889,426	9,911,190
Corporate & Other	16,435,107	14,707,801
Equity Securities	30,992,669	25,363,162
Alternative Investments	14,076,877	10,765,147
Collective Trust Funds		
Fixed Income	0	0
International Equity	19,960,860	14,990,424
Mortgage Debt Security	0	0
Treasury Inflation Protected Securities	3,594,216	3,126,355
Collateral from securities lending (Fixed Return Fund)	911,346	1,355,516
Diversified Equity Fund		
Short-Term Investments	110,049	119,761
Equity Securities	6,901,203	5,366,777
Debt Securities	174,484	129,398
Bond Fund		
Short-Term Investments	231	1,086
Equity Securities	55,650	57,937
Debt Securities	0	0
International Equity Fund		
Short-Term Investments	114	104
International Equity	10,881	9,422
Inflation Protection Fund		
Short-Term Investments	0	0
Equity Securities	0	0
Socially Responsive Equity Fund		
Short-Term Investments	149	315
Equity Securities	16,272	12,691
International equity	0	0
U.S. Equity Index Fund		
Equity securities	4,797	2,568
International Equity Index Fund		
Equity securities	117	59
Collateral from securities lending (Variable Return Fund)	331,005	35,724
Other Assets	46,194	63,899
TOTAL ASSETS	\$ 115,748,755	\$ 91,849,316
LIABILITIES		
Accounts Payable	\$ 349,820	\$ 299,648
Payable for Investment Securities Purchased	5,723,528	3,096,888
Accrued Benefits Payable	49,585	88,957
Due to TDA Program's Fixed Return Fund	30,036,173	27,653,633
Security Lending	1,242,351	1,391,240
TOTAL LIABILITIES	\$ 37,401,457	\$ 32,530,366
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	\$ 78,347,298	\$ 59,318,950

Table II-2
Statement of Changes in Plan Net Assets

(\$ Thousands)		
	June 30, 2021	June 30, 2020
ADDITIONS		
Contributions		
Member Contributions	\$ 247,751	\$ 226,920
Employer Contributions	3,131,607	3,590,822
Other Employer Contributions ¹	61,663	61,748
Total Contributions	\$ 3,441,021	\$ 3,879,490
Investment Income		
Interest Income	\$ 1,197,604	\$ 1,094,140
Dividend Income	1,075,166	1,125,180
Net Appreciation in Fair Value of Investments	20,489,535	1,972,228
Total Investment Income	\$ 22,762,305	\$ 4,191,548
Less:		
Investment Expenses	\$ 415,229	\$ 296,818
Net (Decrease) in Fair Variable Expense Provision	(9,516)	(5,947)
Net Investment Income	\$ 22,356,592	\$ 3,900,677
Securities Lending Transactions		
Securities Lending Income	\$ 7,252	\$ 11,885
Securities Lending Fees	(856)	(1,375)
Net Securities Lending Income (Loss)	\$ 6,396	\$ 10,510
Other		
Net Receipts from (to) Other Retirement Systems	\$ (5,550)	\$ (2,798)
TOTAL ADDITIONS	\$ 25,798,459	\$ 7,787,879
DEDUCTIONS		
Benefit Payments and Withdrawals	\$ 4,699,448	\$ 4,591,086
Administrative Expenses	68,100	64,532
Other		
Interest from (to) TDA Program's Fixed Return Fund	1,998,388	1,846,173
TDA Rebalance	4,175	(42,651)
TOTAL DEDUCTIONS	\$ 6,770,111	\$ 6,459,140
NET INCREASE (DECREASE) IN PLAN NET ASSETS	\$ 19,028,348	\$ 1,328,739
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	\$ 59,318,950	\$ 57,990,211
End of Year	\$ 78,347,298	\$ 59,318,950

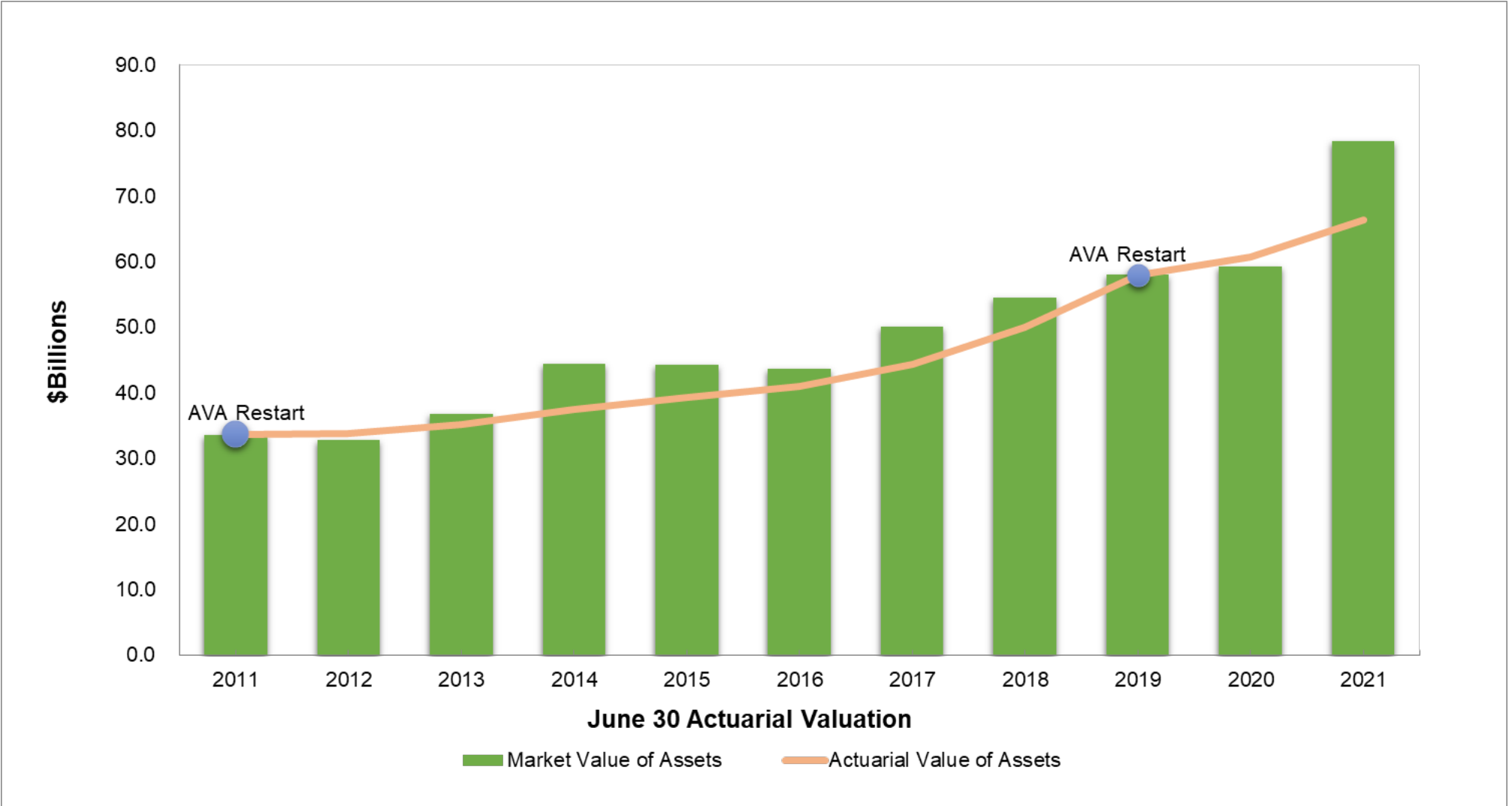
¹ Includes amounts for employer's portion of Additional Member Contributions and supplemental contributions for the ASAF and ASF Funds.

Table II-3
Development of Actuarial Value of Assets

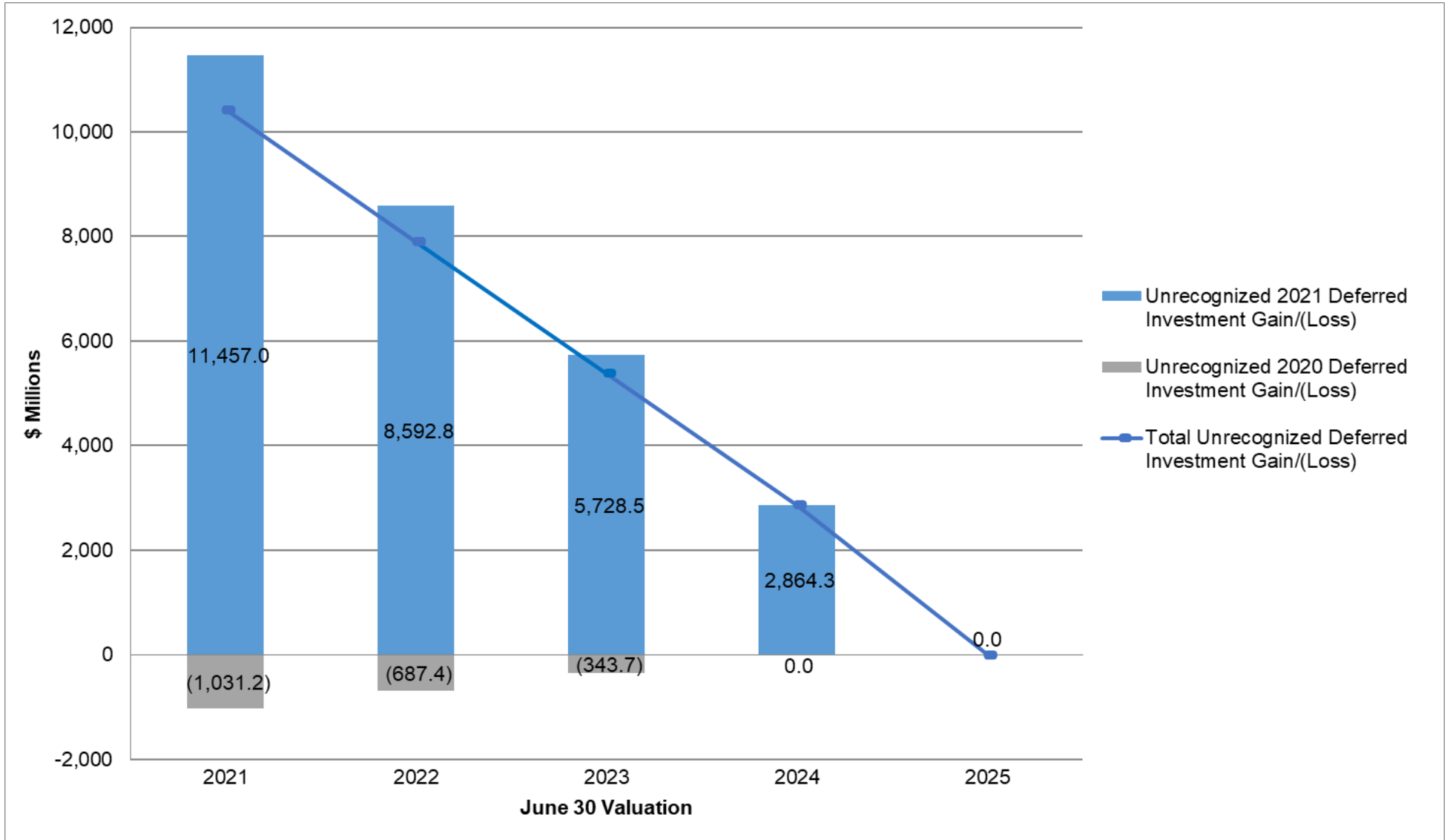
(\$ Thousands)		
Valuation Date	June 30, 2021	June 30, 2020
1. Market Value of Fixed Fund Assets		
a. Beginning of Year (BOY)	\$ 53,732,776	\$ 51,949,650
b. End of Year (EOY)	\$ 71,185,752	\$ 53,732,776
2. Contributions		
a. Employee	\$ 247,535	\$ 226,673
b. Employer	3,131,607	3,590,822
c. Other	61,651	61,734
d. Total Contributions	\$ 3,440,793	\$ 3,879,229
3. Net Investment Income		
a. Investment Income	\$ 18,465,548	\$ 2,201,484
b. Investment Expenses	(403,943)	(288,080)
c. Total Net Investment Income	\$ 18,061,605	\$ 1,913,404
4. Benefit Payments and Other Cash Flow	\$ (4,049,422)	\$ (4,009,507)
5. Net Cash Flow (2.d. + 4.)	\$ (608,629)	\$ (130,278)
6. Expected Investment Return	\$ 3,740,352	\$ 3,631,993
7. Unexpected Investment Return (UIR) (3.c. - 6.)	\$ 14,321,253	\$ (1,718,589)
8. Preliminary Fixed Fund AVA		
a. Preliminary Fixed Fund AVA @ BOY	\$ 55,107,647	\$ 51,949,650
b. Net Cash Flow (5.)	\$ (608,629)	\$ (130,278)
c. Expected Investment Return (6.)	\$ 3,740,352	\$ 3,631,993
d. Phase in of UIR		
20% of UIR for prior year (20% of 7.)	\$ 2,864,251	\$ (343,718)
20% of UIR for second prior year	\$ (343,718)	N/A
20% of UIR for third prior year	N/A	N/A
20% of UIR for fourth prior year	N/A	N/A
20% of UIR for fifth prior year	N/A	N/A
Total	\$ 2,520,533	\$ (343,718)
e. Lower Corridor Bound (80% of 1.b.)	\$ 56,948,602	\$ 42,986,221
f. Upper Corridor Bound (120% of 1.b.)	\$ 85,422,902	\$ 64,479,331
g. Preliminary Fixed AVA (a. through d., bounded by e. and f.)	\$ 60,759,903	\$ 55,107,647
9. Market Value of Variable Fund Assets	\$ 7,161,546	\$ 5,586,174
10. Amounts due (To)/From TDA ¹	\$ (1,593,154)	\$ 1,762,975
11. AVA (8.g. + 9. + 10.)	\$ 66,328,295	\$ 62,456,796

¹ Amount shown as of June 30, 2020 includes adjustments of \$3,105,099,273 for receivable contributions.

Graph II-4
Historical Market and Actuarial Value of Assets



**Graph II-5
Future Recognition of Unexpected Investment Return**



SECTION III – CONTRIBUTION DEVELOPMENT AND HISTORY

**Table III-1
Statutory Contributions**

Table III-1 shows the components of the Fiscal Year 2023 and the Fiscal Year 2022 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	June 30, 2021	June 30, 2020
Fiscal Year	2023	2022
Normal Cost	\$ 1,436,496,889	\$ 1,411,270,725
Unfunded Accrued Liability Amortization ¹	\$ 1,620,032,951	\$ 1,860,069,384
Administrative Expenses	56,351,979	58,457,448
ASAF Credit ²	<u>(26,800,000)</u>	<u>(26,000,000)</u>
Total Contribution to the New York City Teachers' Retirement System	\$ 3,086,081,819	\$ 3,303,797,557

¹ See Table III-2 for additional details.

² Estimated contribution made by the Department of Education to the Annuity Savings Accumulation Fund (ASAF) of certain eligible members for Fiscal Year 2023.

Table III-2
Schedule of Unfunded Accrued Liability Bases

The Initial Unfunded Accrued Liability (UAL) established with the 6/30/2010 valuation is being amortized as a level percent of pay (with payments increasing by 3% per year) over a 22-year period.

Increments to the UAL established after June 30, 2010 are amortized as level dollars over the following periods:

- Benefit Changes: Over the remaining working lifetimes of those impacted unless the amortization period is determined by statute.
- Assumption and Method Changes: Over a 20-year period.
- Actuarial Gains and Losses: Over a 15-year period.

Under the One-Year Lag Methodology (OYLM), the number of payments is one fewer than the number of years in the amortization period (e.g., 14 payments over a 15-year amortization period).

Table III-2
Schedule of Unfunded Accrued Liability Bases (cont'd)

Table III-2 shows the Schedule of UAL Bases as of June 30, 2021.

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM SCHEDULE OF UNFUNDED ACCRUED LIABILITY BASES					
Amortization Base	Date Established	Original \$ Amount	Amortization Years	Payments Remaining	Amortization \$ Payment
Initial UAL	6/30/10	20,524,022,955	22	11	2,134,505,707
(Gain)/Loss	6/30/11	1,329,890,090	15	5	157,298,501
(Gain)/Loss	6/30/12	778,617,335	15	6	92,094,332
(Gain)/Loss	6/30/13	2,065,937,513	15	7	244,357,693
(Gain)/Loss	6/30/14	992,709,734	15	8	117,417,036
Assumption Change ¹	6/30/14	2,239,586,352	20	13	224,142,498
(Gain)/Loss	6/30/15	734,444,345	15	9	86,869,581
(Gain)/Loss	6/30/16	(848,431,601)	15	10	(100,351,916)
(Gain)/Loss	6/30/17	(2,235,025,973)	15	11	(264,357,362)
ASAF Method Change	6/30/17	116,239,745	20	16	11,633,517
Assumption Change ²	6/30/17	(1,078,725,991)	20	16	(107,961,163)
Method Change ²	6/30/17	9,078,212	20	16	908,566
(Gain)/Loss	6/30/18	(622,129,323)	15	12	(73,585,040)
Method Change ³	6/30/18	(1,403,608,000)	20	17	(140,476,031)
(Gain)/Loss	6/30/19	(1,755,622,201)	15	13	(207,653,807)
Assumption Change ⁴	6/30/19	(383,977,377)	20	18	(38,429,261)
Method Change ⁴	6/30/19	(3,158,833,000)	20	18	(316,142,629)
(Gain)/Loss	6/30/20	(53,115,849)	15	14	(6,282,507)
Method Change ⁵	6/30/20	976,069,325	20	19	97,687,066
Plan Change ⁶	6/30/20	55,042,203	8	7	10,564,676
(Gain)/Loss	6/30/21	(2,563,963,216)	15	14	(303,263,841)
Method Change ⁷	6/30/21	(54,358)	2	1	(60,164)
Plan Change ⁸	6/30/21	11,165,833	20	19	1,117,499
TOTAL					1,620,032,951

¹ Change in post-retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

² 2019 A&M.

³ Change in method of characterizing interest credited on TDA Fixed Fund account balances.

⁴ Revised 2021 A&M.

⁵ TDA guaranteed interest credits included as an adjustment to the Actuarial Value of Assets.

⁶ Older Workers Benefit Protection Act (OWBPA).

⁷ Change in payment process for benefits in excess of 415 limits.

⁸ Chapter 56 of the Laws of 2022

Graph III-3
Remaining UAL Amortizations as of June 30, 2021

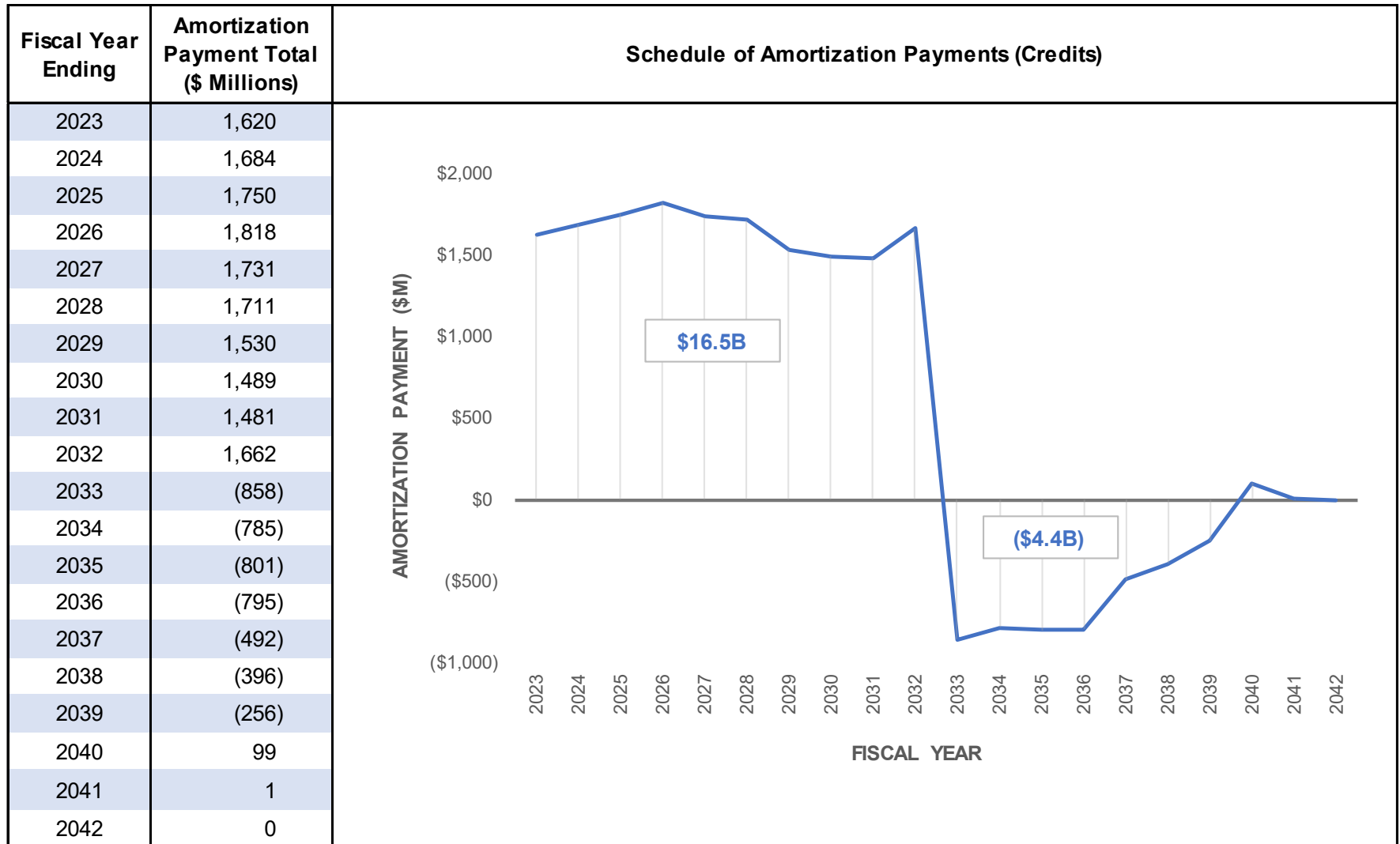


Table III-4
Reconciliation of Outstanding UAL Bases

Cost Component	Date Established	Original Amount	Amort Years	Outstanding Balance 6/30/2021	FY 2022 Payment on 12/31/2021	Outstanding Balance 6/30/2022	FY 2023 Payment on 12/31/2022	Additional Payments
Initial UAL	06/30/10	\$ 20,524,022,955	22	\$ 18,347,444,946	\$ 2,072,335,634	\$ 17,488,125,447	\$ 2,134,505,707	9
(Gain)/Loss	06/30/11	1,329,890,090	15	667,146,548	157,298,501	551,135,970	157,298,501	3
(Gain)/Loss	06/30/12	778,617,335	15	454,075,430	92,094,332	390,597,591	92,094,332	4
(Gain)/Loss	06/30/13	2,065,937,513	15	1,362,226,768	244,357,693	1,204,817,081	244,357,693	5
(Gain)/Loss	06/30/14	992,709,734	15	725,256,761	117,417,036	654,567,606	117,417,036	6
Assumption Change	06/30/14	2,239,586,352	20	1,937,761,464	224,142,498	1,841,549,967	224,142,498	11
(Gain)/Loss	06/30/15	734,444,345	15	585,449,605	86,869,581	536,572,482	86,869,581	7
(Gain)/Loss	06/30/16	(848,431,601)	15	(729,081,684)	(100,351,916)	(676,312,572)	(100,351,916)	8
(Gain)/Loss	06/30/17	(2,235,025,973)	15	(2,050,537,852)	(264,357,362)	(1,920,622,119)	(264,357,362)	9
ASAF Method Change	06/30/17	116,239,745	20	113,679,116	11,633,517	109,602,850	11,633,517	14
Assumption Change	06/30/17	(1,078,725,991)	20	(1,054,962,907)	(107,961,163)	(1,017,134,414)	(107,961,163)	14
Method Change	06/30/17	9,078,212	20	8,878,227	908,566	8,559,875	908,566	14
(Gain)/Loss	06/30/18	(622,129,323)	15	(604,573,085)	(73,585,040)	(570,776,247)	(73,585,040)	10
Method Change	06/30/18	(1,403,608,000)	20	(1,418,689,414)	(140,476,031)	(1,372,688,136)	(140,476,031)	15
(Gain)/Loss	06/30/19	(1,755,622,201)	15	(1,795,213,088)	(207,653,807)	(1,706,079,238)	(207,653,807)	11
Assumption Change	06/30/19	(383,977,377)	20	(399,864,162)	(38,429,261)	(388,103,119)	(38,429,261)	16
Method Change	06/30/19	(3,158,833,000)	20	(3,289,527,423)	(316,142,629)	(3,192,773,861)	(316,142,629)	16
(Gain)/Loss	06/30/20	(53,115,849)	15	(56,833,959)	(6,282,507)	(54,313,660)	(6,282,507)	12
Method Change	06/30/20	976,069,325	20	1,044,394,179	97,687,066	1,016,453,485	97,687,066	17
Plan Change	06/30/20	55,042,203	8	58,895,157	10,564,676	52,089,633	10,564,676	5
Admin Expenses	06/30/20	52,815,839	2	56,512,948	58,457,448	0	0	0
Normal Cost	07/01/20	1,275,071,875	2	1,364,326,906	1,411,270,725	0	0	0
(Gain)/Loss	06/30/21	(2,563,963,216)	15	(2,563,963,216)	0	(2,743,440,646)	(303,263,841)	13
Method Change	06/30/21	(54,358)	2	(54,358)	0	(58,163)	(60,164)	0
Plan Change	06/30/21	11,165,833	20	11,165,833	0	11,947,442	1,117,499	18
Admin Expenses	06/30/21	50,913,565	2	50,913,565	0	54,477,514	56,351,979	0
Normal Cost	07/01/21	1,297,863,513	2	0	0	1,388,713,959	1,436,496,889	0
ASAF Credit	12/31/21	0	0	0	(26,000,000)	0	0	0
ASAF Credit	12/31/22	0	0	0	0	0	(26,800,000)	0
TOTAL				\$ 12,824,826,305	\$ 3,303,797,557	\$ 11,666,908,727	\$ 3,086,081,819	

Payment for amortization bases, normal costs and administrative expenses are deferred 1.5 years to the middle of the fiscal year under the One-Year Lag Methodology. The number of amortization payments is one less than the number of years amortized. Required contributions are the sum of all cost components after interest adjustments due to the lag. Payments by the Department of Education to the Annuity Savings Accumulation Fund (ASAF) offset required contributions.

Table III-4
Reconciliation of Outstanding UAL Bases (cont'd)

Total of Cost Components Summarized by Type	Outstanding Balance 6/30/2021	FY 2022 Payment on 12/31/2021	Outstanding Balance 6/30/2022	FY 2023 Payment on 12/31/2022
Initial UAL	\$ 18,347,444,946	\$ 2,072,335,634	\$ 17,488,125,447	\$ 2,134,505,707
Method Changes	(3,541,319,673)	(346,389,511)	(3,430,903,950)	(346,449,675)
Assumption Changes	482,934,395	77,752,074	436,312,434	77,752,074
Plan Changes	70,060,990	10,564,676	64,037,075	11,682,175
(Gain)/Loss	(4,006,047,772)	45,806,511	(4,333,853,752)	(257,457,330)
Normal Cost	1,364,326,906	1,411,270,725	1,388,713,959	1,436,496,889
Admin Expenses	107,426,513	58,457,448	54,477,514	56,351,979
ASAF Credit	0	(26,000,000)	0	(26,800,000)
TOTAL	\$ 12,824,826,305	\$ 3,303,797,557	\$ 11,666,908,727	\$ 3,086,081,819

	6/30/2021
(A) Actuarial Accrued Liability	\$ 79,153,121,519
(B) Actuarial Value of Assets	66,328,295,214
(C) Unfunded Accrued Liabilities (A) - (B)	\$ 12,824,826,305

	FY 2023
Normal Cost	\$ 1,436,496,889
UAL Payment	1,620,032,951
Admin Expenses	56,351,979
ASAF Credit	(26,800,000)
Total	\$ 3,086,081,819

Table III-5
Actuarial and Statutory Contribution History

Table III-5 compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2014 through 2023.

(\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution Certified	Statutory Contribution Contributed	Percentage of Actuarial Contribution Contributed
2014	2,998,694	2,998,694	100.0%
2015	3,270,007	3,270,007	100.0%
2016	3,702,569	3,702,569	100.0%
2017	3,888,399	3,888,399	100.0%
2018	3,889,710	3,889,710	100.0%
2019	3,696,686	3,696,686	100.0%
2020	3,590,801	3,590,801	100.0%
2021	3,131,607	3,131,607	100.0%
2022	3,303,798	3,303,798	100.0%
2023	3,086,082	3,086,082	100.0%

Table III-6
City Rates: Contributions as a Percentage of Salary

Table III-6 shows the City Rates defined to be the contributions as a percentage of salary for the Fiscal Years 2014 through 2023.

CITY RATES (\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution¹	Salary² at Beginning of Fiscal Year	City Rate
2014	2,998,694	7,964,149	37.7%
2015	3,270,007	8,074,522	40.5%
2016	3,702,569	8,256,100	44.8%
2017	3,888,399	8,818,537	44.1%
2018	3,889,710	9,200,180	42.3%
2019	3,722,186	9,874,119	37.7%
2020 ³	3,616,322	10,439,259	34.6%
2021	3,157,307	10,950,176	28.8%
2022	3,329,798	11,266,796	29.6%
2023	3,112,882	11,527,491	27.0%

¹ Starting in Fiscal Year 2019, reflects the estimate of the contribution made by the Department of Education to the Annuity Savings Fund (ASAF).

² Includes the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

³ Actuarial Contribution is amount before offsetting for ASAF and Pre-Payment Credits.

SECTION IV – RESULTS BY CONTRIBUTING ENTITY

**Table IV-1
Employer Contributions by Obligor**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM												
EMPLOYER CONTRIBUTION BY OBLIGOR												
As of June 30, 2021 Fiscal Year 2023												
Charter School	Future Leaders	Harriet Tubman	Imagine Me Leadership	KIPP Academy	KIPP NYC	Opportunity	Renaissance	South Bronx Early College Academy	University Prep Charter HS	Voice	Wildcat	Charter School Subtotal
1. Normal Cost	\$ 331,852	\$ 444,933	\$ 99,801	\$ 578,980	\$ 662,064	\$ 696,608	\$ 739,812	\$ 255,301	\$ 719,093	\$ 714,368	\$ 325,841	\$ 5,568,653
2. Amortization of Unfunded Accrued Liability	26,543	(26,835)	547	(539,031)	(71,531)	(68,384)	463,509	(81,957)	2,735	(33,164)	20,193	(307,375)
3. Administrative Expenses	15,604	19,199	4,438	34,920	19,974	29,247	26,382	13,898	35,045	34,135	11,608	244,450
4. Actuarial Contribution (1. + 2. + 3.)	\$ 373,999	\$ 437,297	\$ 104,786	\$ 74,869	\$ 610,507	\$ 657,471	\$ 1,229,703	\$ 187,242	\$ 756,873	\$ 715,339	\$ 357,642	\$ 5,505,728
5. Statutory Contribution	\$ 373,999	\$ 437,297	\$ 104,786	\$ 74,869	\$ 610,507	\$ 657,471	\$ 1,229,703	\$ 187,242	\$ 756,873	\$ 715,339	\$ 357,642	\$ 5,505,728
CUNY	Senior Colleges	Community Colleges / Others	CUNY Subtotal									
1. Normal Cost	\$ 41,602,321	\$ 25,874,229	\$ 67,476,550									
2. Amortization of Unfunded Accrued Liability	53,585,754	18,132,373	71,718,127									
3. Administrative Expenses	1,451,943	879,030	2,330,973									
4. Actuarial Contribution (1. + 2. + 3.)	\$ 96,640,018	\$ 44,885,632	\$ 141,525,650									
5. Statutory Contribution	\$ 96,640,018	\$ 44,885,632	\$ 141,525,650									
Obligor	Charter School	CUNY	UFT	Department of Education	Total							
1. Normal Cost	\$ 5,568,653	\$ 67,476,550	\$ 804,739	\$ 1,362,646,947	\$ 1,436,496,889							
2. Amortization of Unfunded Accrued Liability	(307,375)	71,718,127	546,979	1,548,075,220	1,620,032,951							
3. Administrative Expenses	244,450	2,330,973	25,625	53,750,931	56,351,979							
4. ASAF Credit	0	0	0	(26,800,000)	(26,800,000)							
5. Actuarial Contribution (1. + 2. + 3. + 4.)	\$ 5,505,728	\$ 141,525,650	\$ 1,377,343	\$ 2,937,673,098	\$ 3,086,081,819							
6. Statutory Contribution	\$ 5,505,728	\$ 141,525,650	\$ 1,377,343	\$ 2,937,673,098	\$ 3,086,081,819							

**Table IV-2
Accrued Liabilities by Obligor**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM												
SUMMARY OF LIABILITY BY STATUS AND OBLIGOR												
As of June 30, 2021 Fiscal Year 2023												
Charter School	Future Leaders	Harriet Tubman	Imagine Me Leadership	KIPP Academy	KIPP NYC	Opportunity	Renaissance	South Bronx Early College Academy	University Prep Charter HS	Voice	Wildcat	Charter School Subtotal
Accrued Liability												
1. Active Members	\$ 4,244,614	\$ 5,846,260	\$ 679,051	\$ 6,988,331	\$12,606,251	\$ 8,753,243	\$16,929,872	\$ 1,452,042	\$ 9,958,438	\$ 5,407,212	\$ 6,515,581	\$ 79,380,895
2. Terminated Nonvested Members	14,767	186,455	9,382	105,127	19,680	75,423	107,017	41,681	33,314	23,195	53,402	669,443
3. Deferred Vested Members	629,331	1,831,966	54,713	3,237,973	1,948,766	2,254,844	1,632,381	378,797	539,922	692,118	548,605	13,749,416
4. Retirees and Beneficiaries	1,710,021	1,050,684	0	568,953	0	1,795,503	6,938,166	0	589,454	0	3,732,700	16,385,481
5. Accrued Liability SubTotal (1. to 4.)	\$ 6,598,733	\$ 8,915,365	\$ 743,146	\$10,900,384	\$14,574,697	\$12,879,013	\$25,607,436	\$ 1,872,520	\$11,121,128	\$ 6,122,525	\$10,850,288	\$110,185,235
6. WTC Reserve	0	0	0	0	0	0	0	0	0	0	0	0
7. Total Accrued Liability (AL) (5. + 6.)	\$ 6,598,733	\$ 8,915,365	\$ 743,146	\$10,900,384	\$14,574,697	\$12,879,013	\$25,607,436	\$ 1,872,520	\$11,121,128	\$ 6,122,525	\$10,850,288	\$110,185,235
Present Value of Benefits												
1. Active Members	\$ 11,491,016	\$ 13,082,412	\$ 2,391,519	\$22,668,892	\$19,822,548	\$19,875,931	\$25,041,467	\$ 7,396,513	\$24,141,556	\$21,287,000	\$10,096,771	\$177,295,625
2. Terminated Nonvested Members	14,767	186,455	9,382	105,127	19,680	75,423	107,017	41,681	33,314	23,195	53,402	669,443
3. Deferred Vested Members	629,331	1,831,966	54,713	3,237,973	1,948,766	2,254,844	1,632,381	378,797	539,922	692,118	548,605	13,749,416
4. Retirees and Beneficiaries	1,710,021	1,050,684	0	568,953	0	1,795,503	6,938,166	0	589,454	0	3,732,700	16,385,481
5. Present Value of Benefits (1. to 4.)	\$ 13,845,135	\$ 16,151,517	\$ 2,455,614	\$26,580,945	\$21,790,994	\$24,001,701	\$33,719,031	\$ 7,816,991	\$25,304,246	\$22,002,313	\$14,431,478	\$208,099,965
6. WTC Reserve	0	0	0	0	0	0	0	0	0	0	0	0
7. Total Present Value of Benefits (5. + 6.)	\$ 13,845,135	\$ 16,151,517	\$ 2,455,614	\$26,580,945	\$21,790,994	\$24,001,701	\$33,719,031	\$ 7,816,991	\$25,304,246	\$22,002,313	\$14,431,478	\$208,099,965
CUNY	Senior Colleges	Community Colleges / Others	CUNY Subtotal									
Accrued Liability												
1. Active Members	\$ 590,465,860	\$316,082,838	\$ 906,548,698									
2. Terminated Nonvested Members	4,391,001	4,388,818	8,779,819									
3. Deferred Vested Members	42,657,653	24,514,223	67,171,876									
4. Retirees and Beneficiaries	1,035,176,549	357,889,371	1,393,065,920									
5. Accrued Liability SubTotal (1. to 4.)	\$1,672,691,063	\$702,875,250	\$2,375,566,313									
6. WTC Reserve	81,001	43,036	124,037									
7. Total Accrued Liability (AL) (5. + 6.)	\$1,672,772,064	\$702,918,286	\$2,375,690,350									
Present Value of Benefits												
1. Active Members	\$1,040,828,041	\$603,850,028	\$1,644,678,069									
2. Terminated Nonvested Members	4,391,001	4,388,818	8,779,819									
3. Deferred Vested Members	42,657,653	24,514,223	67,171,876									
4. Retirees and Beneficiaries	1,035,176,549	357,889,371	1,393,065,920									
5. Present Value of Benefits (1. to 4.)	\$2,123,053,244	\$990,642,440	\$3,113,695,684									
6. WTC Reserve	81,001	43,036	124,037									
7. Total Present Value of Benefits (5. + 6.)	\$2,123,134,245	\$990,685,476	\$3,113,819,721									

Table IV-2
Accrued Liabilities by Obligor (cont'd)

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM					
SUMMARY OF LIABILITY BY STATUS AND OBLIGOR					
As of June 30, 2021 Fiscal Year 2023					
Obligor	Charter School	CUNY	UFT	Department of Education	Total
Accrued Liability					
1. Active Members	\$ 79,380,895	\$ 906,548,698	\$ 17,599,153	\$ 30,390,695,701	\$ 31,394,224,447
2. Terminated Nonvested Members	669,443	8,779,819	0	46,628,488	56,077,750
3. Deferred Vested Members	13,749,416	67,171,876	0	1,440,583,345	1,521,504,637
4. Retirees and Beneficiaries	<u>16,385,481</u>	<u>1,393,065,920</u>	<u>0</u>	<u>44,765,863,284</u>	<u>46,175,314,685</u>
5. Accrued Liability SubTotal (1. to 4.)	\$ 110,185,235	\$ 2,375,566,313	\$ 17,599,153	\$ 76,643,770,818	\$ 79,147,121,519
6. WTC Reserve	<u>0</u>	<u>124,037</u>	<u>1,028</u>	<u>5,874,935</u>	<u>6,000,000</u>
7. Total Accrued Liability (AL) (5. + 6.)	\$ 110,185,235	\$ 2,375,690,350	\$ 17,600,181	\$ 76,649,645,753	\$ 79,153,121,519
Present Value of Benefits					
1. Active Members	\$ 177,295,625	\$ 1,644,678,069	\$ 25,539,708	\$ 48,361,165,202	\$ 50,208,678,604
2. Terminated Nonvested Members	669,443	8,779,819	0	46,628,488	56,077,750
3. Deferred Vested Members	13,749,416	67,171,876	0	1,440,583,345	1,521,504,637
4. Retirees and Beneficiaries	<u>16,385,481</u>	<u>1,393,065,920</u>	<u>0</u>	<u>44,765,891,208</u>	<u>46,175,342,609</u>
5. Present Value of Benefits SubTotal (1. to 4.)	\$ 208,099,965	\$ 3,113,695,684	\$ 25,539,708	\$ 94,614,268,243	\$ 97,961,603,600
6. WTC Reserve	<u>0</u>	<u>124,037</u>	<u>1,028</u>	<u>5,874,935</u>	<u>6,000,000</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 208,099,965	\$ 3,113,819,721	\$ 25,540,736	\$ 94,620,143,178	\$ 97,967,603,600

**Table IV-3
Participant Data by Obligor**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM												
PARTICIPANT DATA BY OBLIGOR												
As of June 30, 2021 Fiscal Year 2023												
Charter School	Future Leaders	Harriet Tubman	Imagine Me Leadership	KIPP Academy	KIPP NYC	Opportunity	Renaissance	South Bronx Early College Academy	University Prep Charter HS	Voice	Wildcat	Charter School Subtotal
1. Active Members												
a. Number	34	56	12	78	32	63	52	36	78	79	21	541
b. Annual Salary ¹	\$ 3,175,901	\$ 3,907,487	\$ 903,464	\$ 7,107,489	\$ 4,065,236	\$ 5,952,553	\$ 5,369,594	\$ 2,828,691	\$ 7,132,895	\$ 6,947,616	\$ 2,362,552	\$ 49,753,478
c. Average Salary	\$ 93,409	\$ 69,777	\$ 75,289	\$ 91,122	\$ 127,039	\$ 94,485	\$ 103,261	\$ 78,575	\$ 91,447	\$ 87,945	\$ 112,502	\$ 91,966
2. Terminated Nonvested Members	3	15	2	8	2	6	3	8	4	3	2	56
3. Deferred Vested Members	7	13	1	38	39	18	7	4	7	10	4	148
4. Retirees and Beneficiaries												
a. Number	2	3	0	1	0	3	11	0	1	0	9	30
b. Total Annual Benefits	\$ 161,624	\$ 93,935	\$ 0	\$ 61,065	\$ 0	\$ 157,189	\$ 612,993	\$ 0	\$ 48,580	\$ 0	\$ 321,726	\$ 1,457,112
c. Average Annual Benefit	\$ 80,812	\$ 31,312	\$ 0	\$ 61,065	\$ 0	\$ 52,396	\$ 55,727	\$ 0	\$ 48,580	\$ 0	\$ 35,747	\$ 48,570

CUNY	Senior Colleges	Community Colleges / Others	CUNY Subtotal
1. Active Members			
a. Number	4,155	2,318	6,473
b. Annual Salary ¹	\$ 295,517,307	\$ 178,911,108	\$ 474,428,415
c. Average Salary	\$ 71,123	\$ 77,183	\$ 73,293
2. Terminated Nonvested Members	880	682	1,562
3. Deferred Vested Members	326	292	618
4. Retirees and Beneficiaries			
a. Number	2,026	799	2,825
b. Total Annual Benefits	\$ 129,739,704	\$ 39,722,788	\$ 169,462,492
c. Average Annual Benefit	\$ 64,037	\$ 49,716	\$ 59,987

Obligor	Charter School	CUNY	UFT	Department of Education	Total
1. Active Members					
a. Number	541	6,473	54	116,143	123,211
b. Annual Salary ¹	\$ 49,753,478	\$ 474,428,415	\$ 5,215,439	\$ 10,940,055,654	\$ 11,469,452,986
c. Average Salary	\$ 91,966	\$ 73,293	\$ 96,582	\$ 94,195	\$ 93,088
2. Terminated Nonvested Members	56	1,562	0	2,956	4,574
3. Deferred Vested Members	148	618	0	14,362	15,128
4. Retirees and Beneficiaries					
a. Number	30	2,825	0	87,142	89,997
b. Total Annual Benefits	\$ 1,457,112	\$ 169,462,492	\$ 0	\$ 4,520,212,860	\$ 4,691,132,464
c. Average Annual Benefit	\$ 48,570	\$ 59,987	\$ 0	\$ 51,872	\$ 52,125

¹ Salaries shown reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

SECTION V – (GAIN)/LOSS ANALYSIS

Table V-1
Development of Experience (Gain)/Loss

EXPERIENCE (GAIN) / LOSS as of June 30, 2021			
(\$ Thousands)			
	Fixed	Variable	Total
1. Expected Accrued Liability (AL)			
a. AL at June 30, 2020	\$ 69,978,396	\$ 5,474,591	\$ 75,452,987
b. Total Normal Cost and Administrative Expenses at June 30, 2020	1,596,711	191	1,596,902
c. Interest on 1.a. and 1.b. to June 30, 2021	5,010,257	2,348,374	7,358,631
d. Fiscal Year 2021 Benefit Payments with Interest to June 30, 2021	<u>(4,183,617)</u>	<u>(781,002)</u>	<u>(4,964,619)</u>
e. Expected AL at June 30, 2021	\$ 72,401,747	\$ 7,042,154	\$ 79,443,901
2. Actual AL at June 30, 2021	\$ 72,112,955	\$ 7,030,926	\$ 79,143,881
3. Expected Actuarial Asset Value (AVA)			
a. AVA at June 30, 2020	\$ 53,765,523	\$ 5,586,174	\$ 59,351,697
b. Interest on 3.a. to June 30, 2021	3,763,587	2,356,102	6,119,689
c. Total Contributions Paid in Fiscal Year 2021	3,440,793	228	3,441,021
d. Interest on 3.c. to June 30, 2021	118,391	44	118,435
e. Fiscal Year 2021 Benefit Payments with Interest to June 30, 2021	<u>(4,183,617)</u>	<u>(781,002)</u>	<u>(4,964,619)</u>
f. Expected AVA at June 30, 2021	\$ 56,904,677	\$ 7,161,546	\$ 64,066,223
4. Actual AVA at June 30, 2021	\$ 59,168,620	\$ 7,161,546	\$ 66,330,166
5. Liability (Gain) / Loss (2. - 1.e.)	\$ (288,792)	\$ (11,228)	\$ (300,020)
6. Asset (Gain) / Loss (3.f. - 4.)	\$ (2,263,943)	0	\$ (2,263,943)
7. Total Actuarial (Gain) / Loss (5. + 6.)	\$ (2,552,735)	\$ (11,228)	\$ (2,563,963)

SECTION VI – SCHEDULE OF FUNDING PROGRESS

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB25, which has been superseded by GASB67, and is provided for historical context. These liability and asset measures are used to develop the Actuarial Contribution and are not suitable for other purposes including, but not limited to, settlement of plan obligations. For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

**Table VI-1
Schedule of Funding Progress**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM (\$ Thousands)						
June 30 Valuation Date	(1) Actuarial Value of Assets (AVA)	(2) Accrued Liability (AL)	(3) Unfunded AL (UAL) (2)-(1)	(4) Funded Ratio (1) / (2)	(5) Covered Payroll ¹	(6) UAL as a % of Covered Payroll (3) / (5)
2012	33,871,180	58,783,399	24,912,219	57.6%	8,013,395	310.9%
2013	35,186,072	61,988,933	26,802,861	56.8%	8,128,378	329.7%
2014	37,521,424	67,309,977	29,788,553	55.7%	8,274,686	360.0%
2015	39,290,072	69,625,608	30,335,536	56.4%	8,844,651	343.0%
2016	41,015,087	69,964,412	28,949,325	58.6%	9,224,268	313.8%
2017	44,381,706	69,552,380	25,170,674	63.8%	9,848,899	255.6%
2018	50,012,149	72,205,318	22,193,169	69.3%	10,404,404	213.3%
2019	57,990,211	73,938,547	15,948,336	78.4%	10,903,755	146.3%
2020	60,693,821	75,452,987	14,759,166	80.4%	11,203,878	131.7%
2021	66,328,295	79,153,122	12,824,827	83.8%	11,469,453	111.8%

¹ Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

SECTION VII – RISK AND UNCERTAINTY

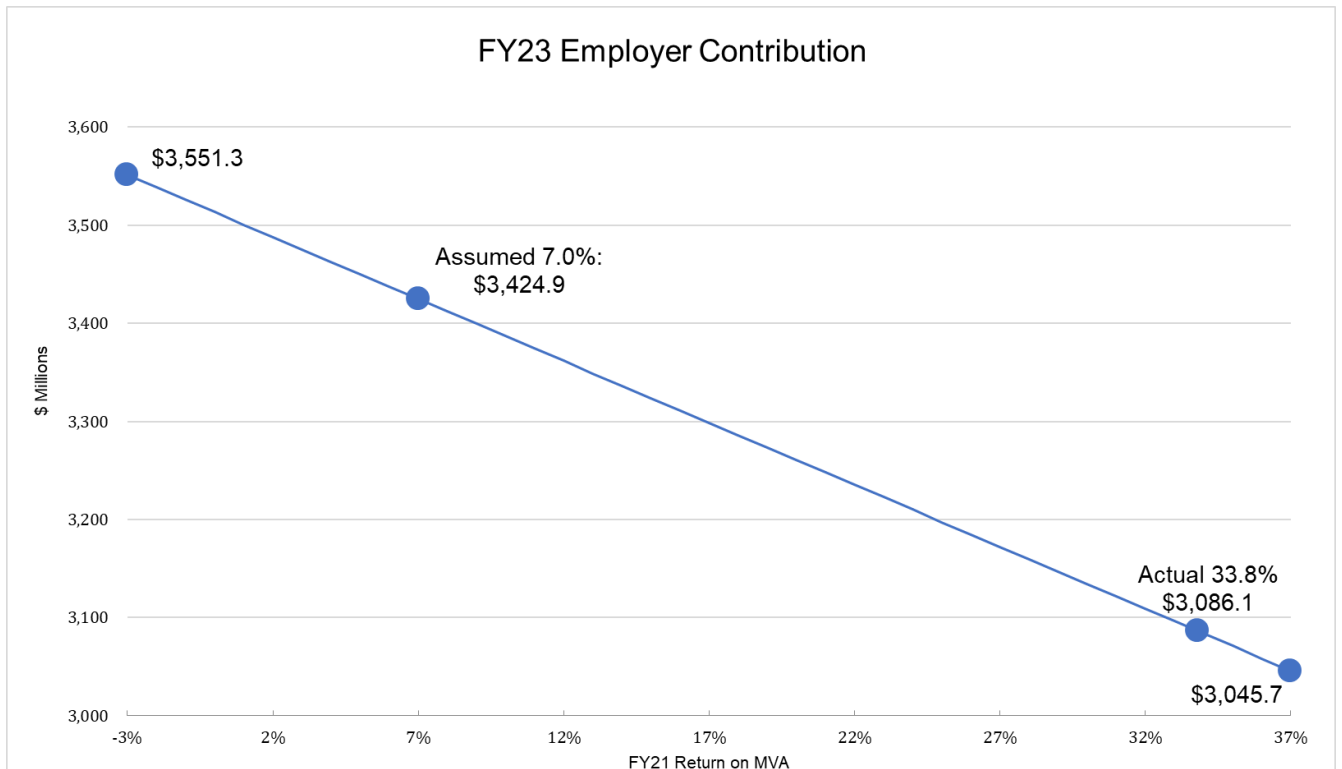
The funded status of TRS depends highly on the realization of the actuarial assumptions used, certain demographic characteristics of the Plan, and other factors. Risks faced by the Plan are described in this Section and have been separated into high, medium, and other risk categories.

High Risk Types

Investment Risk: The Risk of Not Realizing Expected Returns

The most substantial risk for most pension systems, TRS included, is the risk of investment returns being less than assumed. For TRS this assumed investment return is 7%.

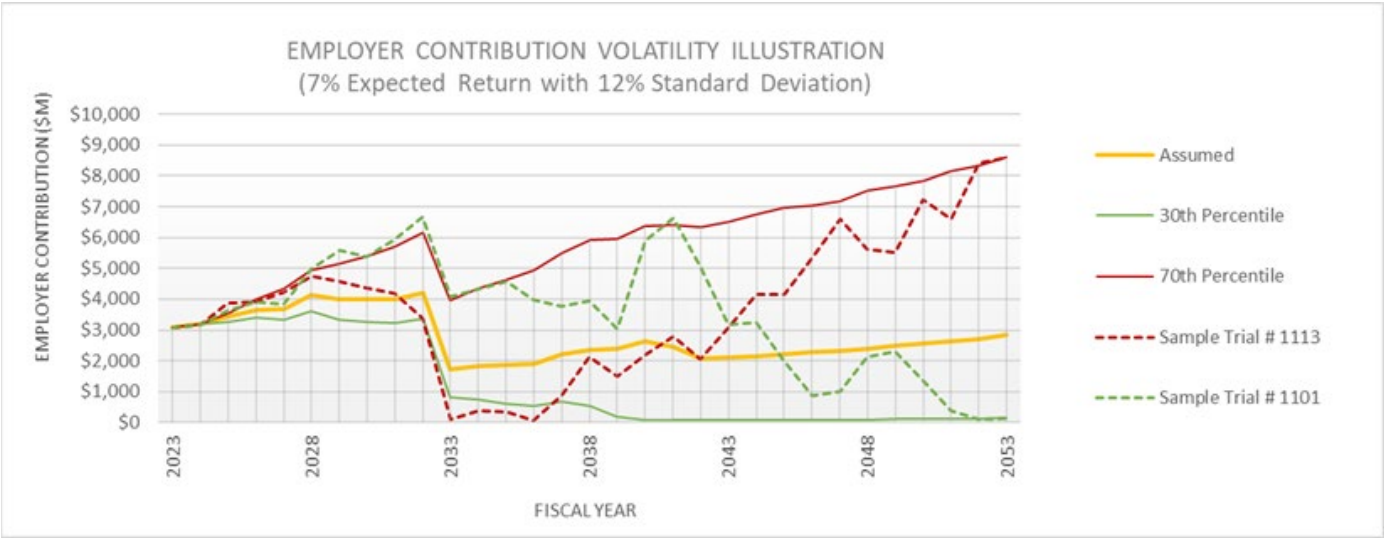
The graph below illustrates the potential FY23 employer contributions for a range of investment return outcomes if returns had differed from the assumed rate of return (i.e., from -3% to 37%). In addition, the actual investment return and employer contribution are shown.



Investment Risk: The Risk of Volatile Realized Returns

Even when long-term investment returns meet actuarial assumptions, investment volatility can contribute substantially to contribution and funded status volatility. The following charts illustrate the impact of investment return volatility on employer contributions and funded ratios based on 5,000 30-year investment return trials. Each stochastic investment return within each 30-year trial was generated from a normal distribution with an expected return of 7% and a standard deviation of 12%. Note that individual asset classes within the portfolio were NOT separately modeled and no attempt was made to rebalance the asset classes during the 30-year trials. The actual investment return for the next valuation year was known prior to the publication of this report and was also incorporated into this projection.

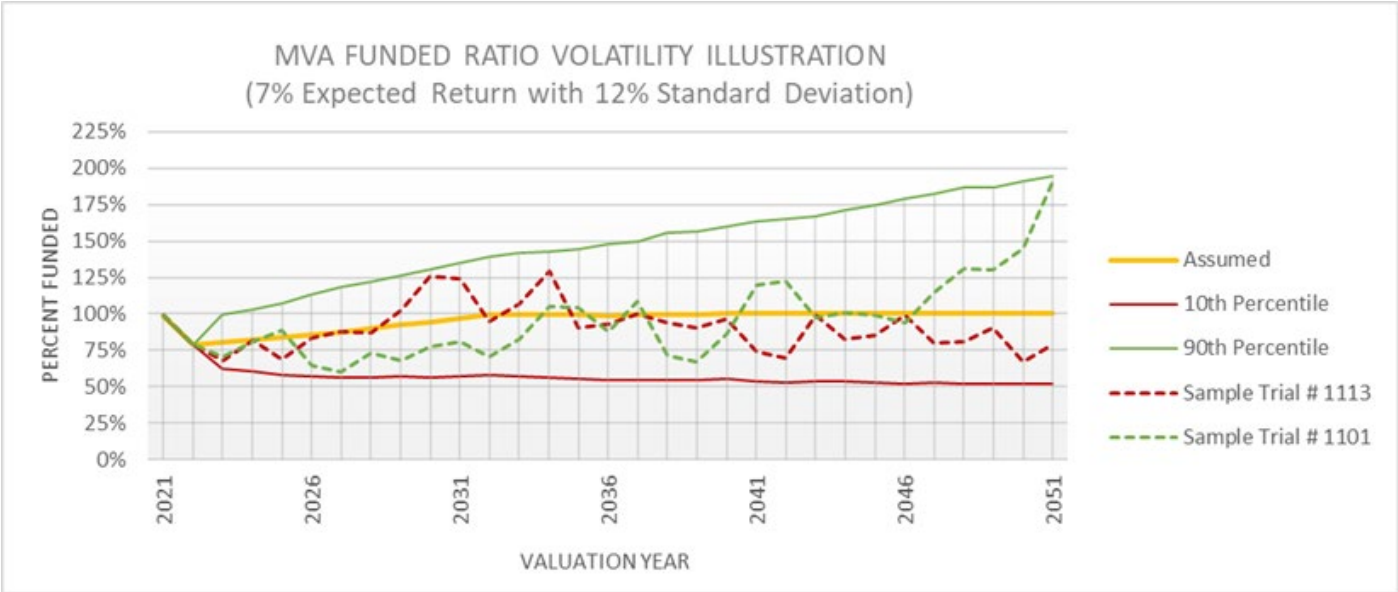
The yellow line in the charts show the results if investment returns were exactly 7% as expected. The two solid lines show results for the indicated percentile range and together frame a range of results based on all 5,000 trials. The two dashed lines illustrate sample results from among the 5,000 trials.



Please note how in the two sample trials above (the dotted lines), the actual employer contribution fluctuates above and below the assumed contribution rate due to investment return volatility.

The impact on the funded status for these two trials can also be seen below, where for example, the green dotted line exceeds 175% funding at the end of the 30-year period (below) with a corresponding employer contribution approaching \$0 (above). The converse is shown in the red dotted line where at the end of the 30-year period, the employer contribution rate approaches \$8B (above) with a corresponding funded ratio of 75% (below).

On average, the 5,000 trials result in the yellow assumed line with a funded status of 100% achieved around the fiscal year ending in 2032.

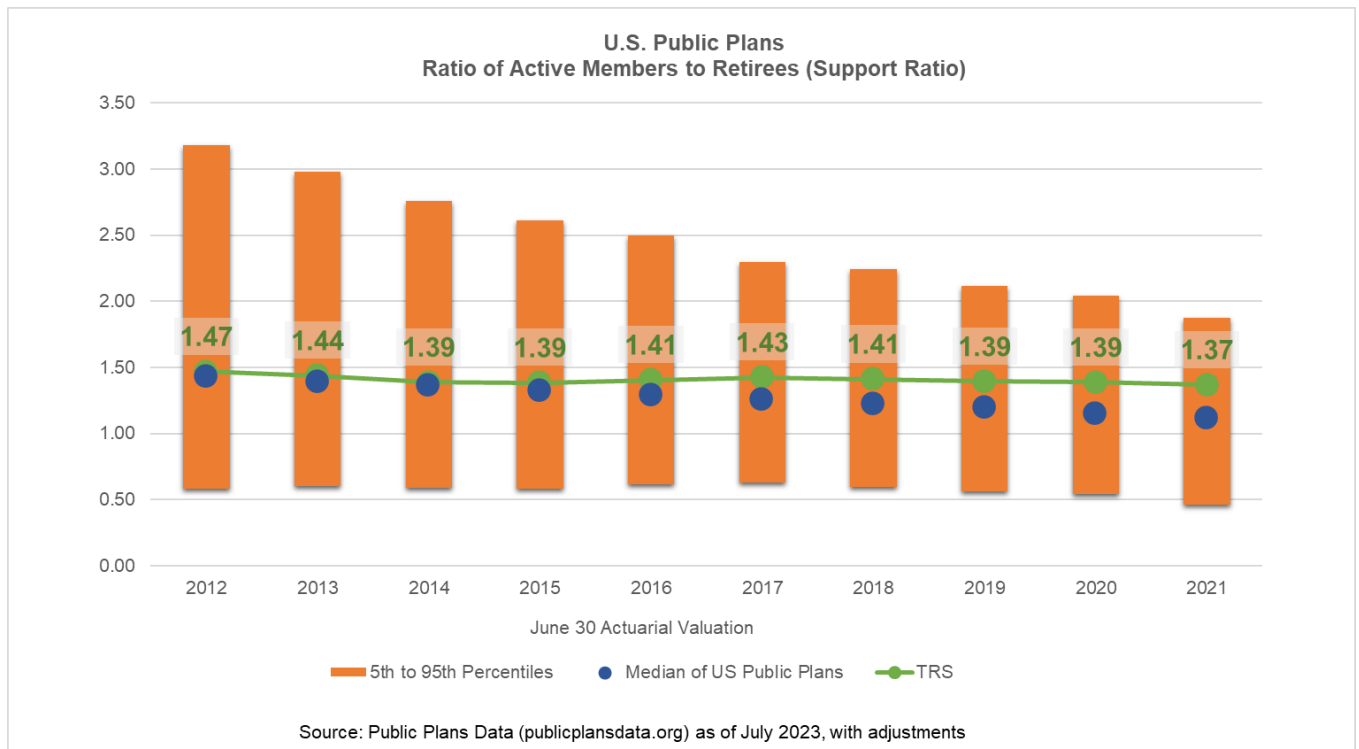


Maturity Risk: The Risk of Demographic Imbalance

In this subsection, the maturity of the Plan is examined with several metrics.

Ratio of Active Members to Retirees (Support Ratio)

A plan's Support Ratio (i.e., the ratio of active members to retirees) is an indicator of the Plan's maturity level. In a plan's early years, the ratio is very high as the plan contains mostly active members. As it matures, more active members transition to retirement, leading to a decrease in the Support Ratio over time that can result in a ratio near or below one. For TRS, this ratio has remained relatively stable in recent years, meaning that about the same number of active workers exist to support pensioner payments.

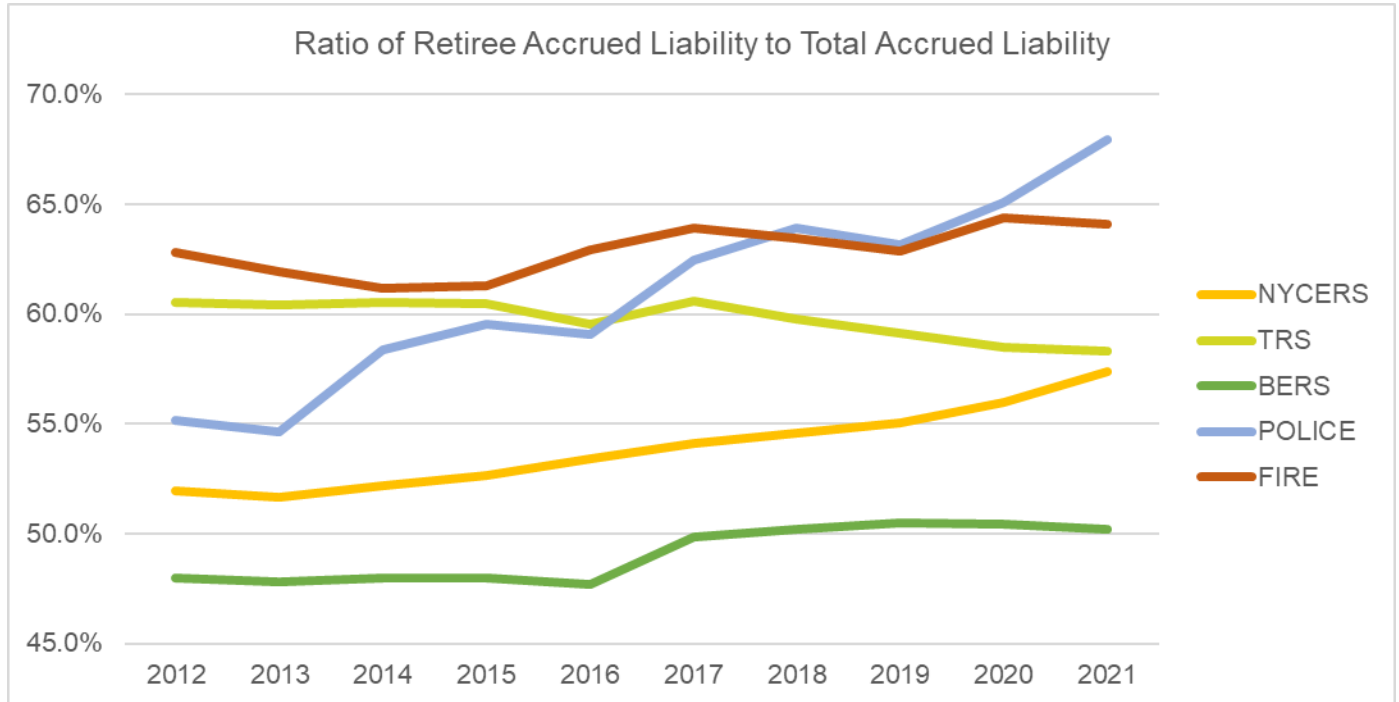


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst U.S. public pensions has declined from 1.43 in the 2012 valuation year to 1.12 in the 2021 valuation year. Over that same period, the Plan's Support Ratio declined from 1.47 to 1.37, meaning fewer active workers exist to support guaranteed pensioner payments.

Because the Plan's Support Ratio is above the median in recent years, TRS's contributions for active members form a larger proportion of the total actuarial contribution than other pension funds in the U.S. with average maturity.

Ratio of Retiree Accrued Liability to Total Accrued Liability

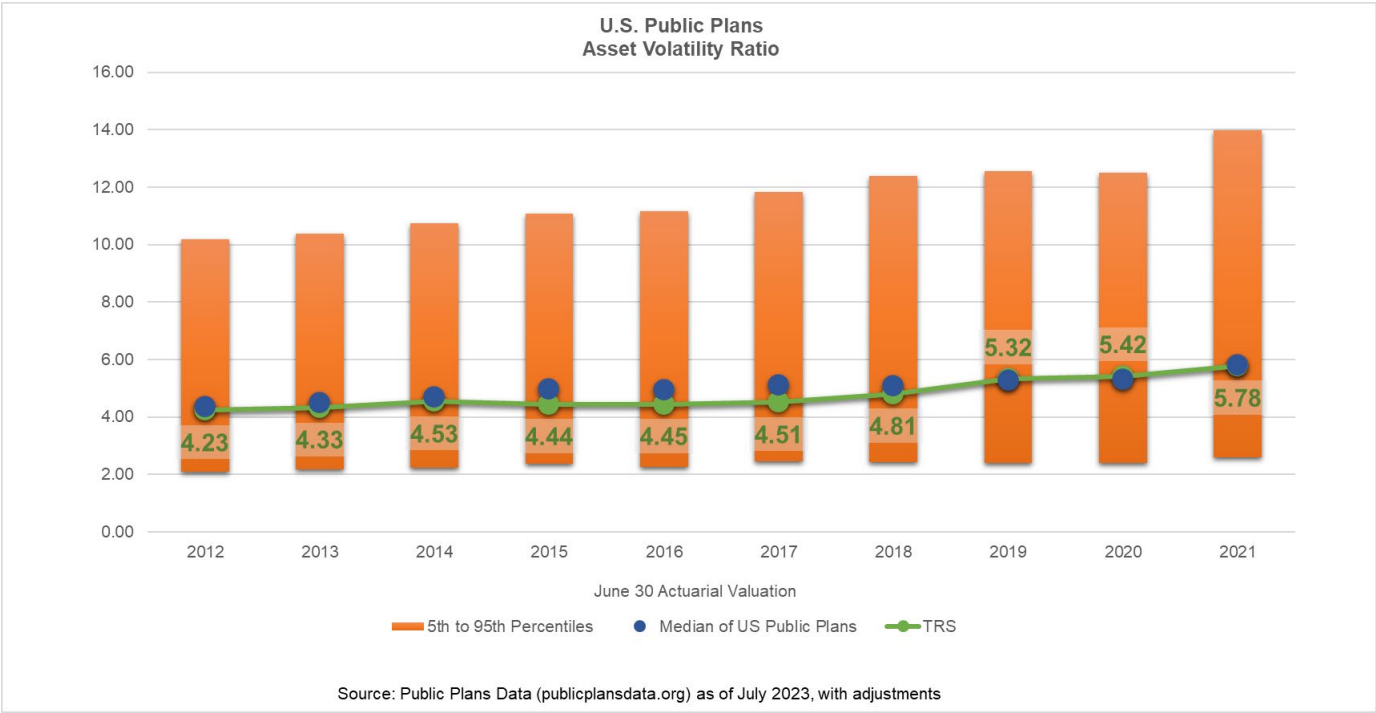
We can also consider the ratio of the Plan's retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for TRS; the other New York City Retirement Systems¹ (NYCRS) are included for comparison. The ratio for TRS has been between 58-61% for the past few years, indicating that TRS is becoming a mature retirement system.



Asset Volatility Ratio

Another way to look at plan maturity is the Asset Volatility Ratio (AVR), or ratio of assets to payroll. This ratio tends to rise as plans mature because assets generally need to accumulate to provide for benefit payments. The chart below compares the AVR (on an AVA basis) for TRS to the population of public pension systems.

¹ New York City Employees' Retirement System (NYCERS); Board of Education Retirement System (BERS); Police Pension Fund (POLICE); Fire Pension Fund (FIRE)



As a plan approaches maturity, AVRs tend to increase, and the plan’s actuarially-determined contribution becomes more sensitive to investment losses. For example, the same percentage of investment losses in more mature plans with a larger asset base can increase contributions as a percentage of payroll more than in less mature plans, leading to additional volatility. Therefore, mature plans may wish to consider more conservative investment strategies. Typical AVRs for a mature retirement system are between five and six. As shown in the tables above, for TRS, these ratios are close to the average.

Medium Risk Types

Interest Rate Risk: The Risk of Reduction in the Long-Term Rate of Return

The Accrued Liability for the Plan depends heavily on the actuarial assumption used for future investment returns. While the returns themselves can produce substantial volatility, as detailed in the Investment Risk subsection above, the long-term rate of return assumption of 7.0% is highly dependent on the allocation of Plan assets.

If market conditions and/or the allocation of Plan assets no longer support a long-term rate of return assumption of 7.0%, the Actuarial Interest Rate (AIR) may have to be reduced, which can significantly increase the Accrued Liability, Unfunded Accrued Liability, Normal Cost, and resulting contribution of the Plan. The sensitivity of the Accrued Liability, the Unfunded Accrued Liability, and Normal Cost of the Plan are shown below:

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM	
SENSITIVITY ANALYSIS AS OF JUNE 30, 2021	
Valuation Date	June 30, 2021
Results at 7.0%	
1. Accrued Liability	\$ 79,153,121,519
2. Actuarial Value of Assets (AVA)	<u>66,328,295,214</u>
3. Unfunded Accrued Liability (1.-2.)	12,824,826,305
4. Normal Cost	1,436,496,889
Results at 6.0%	
1. Accrued Liability	\$ 87,800,900,650
2. Actuarial Value of Assets (AVA) ¹	<u>66,328,295,214</u>
3. Unfunded Accrued Liability (1.-2.)	21,472,605,436
4. Normal Cost	2,322,717,493
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Accrued Liability	11%
2. Increase in Unfunded Accrued Liability	67%
3. Increase in Normal Cost	62%

¹Disregarding the impact on amounts due to and from the TDA that would be revalued under a discount rate of 6.0%.

Longevity Risk: The Risk of Higher than Assumed Mortality Improvement

TRS faces risk in its assumption of future mortality rates. Actuarial experience studies were used to develop the base mortality rates assumed in the valuation; Society of Actuaries mortality improvement scale MP-2020 was subsequently applied to these base rates.¹

This scale MP-2020 is an assumption regarding the *improvement* of future mortality rates as compared to mortality when the experience studies were completed. The scale was developed using large amounts of historical data from the Social Security Administration. Risk therefore exists such that the mortality improvement inherent in the Plan population is higher than the improvement seen in the population provided by the Social Security Administration. When mortality improvement is higher than assumed, plan participants will live longer than expected, and the plan will pay more pension benefits than had been previously funded.

Furthermore, while the scale uses recent experience to develop short-term mortality improvement rates, an actuarial assumption is applied to long-term mortality improvement rates based on expert opinion. A rate of 1.0% is assumed, which the Society of Actuaries characterizes as “neither overly optimistic nor too pessimistic with respect to future longevity improvements.”² Risk to the Plan exists, however, if Plan mortality experience shows higher levels of long-term mortality improvement; expert opinion can in some cases be flawed, particularly when past experience is not indicative or predictive of future experience.

In a letter dated June 28, 2019, Buck analyzed historical Plan experience and noted “it appears that historical mortality improvement in NYC pensioners has kept pace with, and in some cases may have exceeded slightly, the mortality improvement trends in historical Social Security Administration graduated rates that are based on a broad U.S. population” and that “continued use of MP-20xx mortality improvement scales seems reasonable.” It may be prudent in future years, after longer trends can be observed, to quantify the effect of changing the ultimate mortality improvement rate to be higher than 1.0%.

Litigation Risk: The Risk of Legal Claims and Lawsuits

It is not uncommon for New York City to be a defendant in legal claims and lawsuits.³ In its most recent claims report, the Comptroller reports that in FY2022, NYC settled 12,188 claims and lawsuits for \$1.5 billion. On occasion, these settlements involve NYCERS. The 1996 case *Gulino v. Board of Education* awards damages to plaintiffs that in some cases include counterfactual service and salary in NYCERS. It remains a continuing risk that litigation may expand the scope of pension benefits beyond what is intended or codified in statute.

¹ Retirement Plans Experience Committee. “Mortality Improvement Scale MP-2020 Report,” “Mortality Improvement Scale MP-2018 Report,” and “Mortality Improvement Scale MP-2014 Report.” *Society of Actuaries*.

² Retirement Plans Experience Committee. “Mortality Improvement Scale BB Report” 5.5 Selection of 1.0% Long-Term Rate of Mortality Improvement. *Society of Actuaries*.

³ <https://comptroller.nyc.gov/reports/annual-claims-report>

Credit/Solvency Risk: The Risk of Potential Insolvency of Contributing Entities

All public pension systems face credit risk in the event their sponsoring entities become unable to pay their debts and obligations. Credit rating agencies currently consider New York City bonds to be of high quality, and the Actuary believes the City faces low credit risk as a main contributing entity to TRS.

In addition, TRS is a multiple-employer plan with several contributing entities. TRS faces risk if contributing entities become insolvent while still carrying Unfunded Accrued Liability. Existing law and precedent transfer these amounts to other employers, creating imbalanced funding responsibility in the event of default. For example, in the final June 30, 2016 actuarial valuation for FY18, the Department of Education assumed responsibility for unfunded liabilities associated with the Beginning with Children Charter School, which closed in 2016.

Other Risk Types

Inflation Risk: The Risk of Higher than Assumed Inflation

TRS faces risk if inflation is higher than expected. Inflation is a key driver of the salary increase assumptions (affecting active members) and COLA assumptions (affecting both active members and pensioners/beneficiaries). A quantitative analysis is not available at this time. Notably, however, the pensioner COLA is limited to half of CPI on the first \$18,000 of annual benefits, which limits the risk exposure to inflation.

Contribution Risk: The Risk that Future Contributions Are Less Than the Actuarially-Determined Contributions

Public pension systems can suffer from contribution risk when sponsoring governmental entities fail to make contributions as determined by the actuary under their funding policies.

The New York City Retirement Systems and Pension Funds face low contribution risk. Participating employers have historically contributed to the actuarial contribution as certified by the Actuary. The Actuary believes the City will continue to do so in future years. See Table III-5 ACTUARIAL AND STATUTORY CONTRIBUTION HISTORY.

Contribution risk may also increase in future years if the actuarial contribution determined for the Plan grows to be a larger part of the City budget. The five New York City Retirement Systems and Pension Funds currently require contributions of approximately 10% of the City's annual budget, and contribution risk may increase if this contribution rate becomes untenable.

Agency/Political Risk: The Risk of Stakeholder Influences

With assumed long-term asset returns and gradual amortization of unfunded liabilities, the funded status of the Plan is expected to improve over time. Many public pension systems suffer from agency risk, wherein different stakeholders or agents want to influence the cost calculations in directions favorable to their interests. Agents may also downplay other risks (e.g., investment risk) to advance specific agendas. These situations create cases where promises for future funding can be disregarded for political expediency or other priorities. In other cases, certain plan provisions or administrative practices intended to provide occasional clarity or relief become commonplace or intentionally sought for the benefit of members at the expense of taxpayers.

Intergenerational Equity Risk: The Risk of Inequity in the Actuarially-Determined Contributions

Intergenerational inequity could exist for certain stakeholders (e.g., public taxpayers). If, for example, liabilities are valued using overly conservative assumptions, aggressive funding patterns may occur, thus causing current taxpayers to shoulder a disproportionately high share of the funding burden, as compared to past and future taxpayers. The reverse can also be true if aggressive or unrealistic assumptions are used. As the Plan is ongoing, taxpayers across all generations should be expected to offer similar funding contributions over the lifetime of the Plan.

Additionally, in future years of higher or lower funded status, changes in the statute may take place that can improve or diminish plan provisions. If so, intergenerational equity risk could increase as taxpayers and plan members at that time may receive preferential or less preferential treatment over the taxpayers and plan members prior to and subsequent to them.

SECTION VIII – SUMMARY OF PLAN PROVISIONS

A. Covered Employment

Membership in TRS is open to eligible teachers and administrative personnel employed by the Department of Education and certain employees of New York City Charter Schools and the City University of New York. Membership in TRS may be voluntary or mandated.

B. Tier Membership

Tier membership is based on the date that the member joined TRS. The tier status of earlier membership in TRS or another New York City or New York State public employee retirement system is reflected, but only if the service associated with that membership is purchased and included in Credited Service.

Tier 1: Prior to July 1, 1973

Tier 2: July 1, 1973 through July 26, 1976

Tier 4: July 27, 1976 through March 31, 2012

Tier 6: April 1, 2012

Tier 4 members who joined TRS before September 1, 1983 may elect a Tier 3 benefit. Unless otherwise noted, Tier 1 and Tier 2 provisions are hereafter omitted for brevity.¹ For more information about plan provisions, see the applicable Summary Plan Descriptions at www.trsnyc.org. In the event of a conflict between this summary and applicable law, the applicable laws will govern.

C. Basic Member Contributions (BMC)

Basic Member Contributions earn 5% interest per year, compounded annually.

Tier 4: The contribution rate is 3% of Salary. Tier 4 members contribute BMC for the first 10 years of Credited Service except members of the Chapter 504 55/27 plan contribute BMC for the first 27 years of Credited Service.

¹ Approximately 0.1% of active members as of June 30, 2021 are members of Tier 1 and Tier 2.

Tier 6: BMC are made for all years of Credited Service according to the following schedule:

Lookback Wages	BMC Contribution Rate
Up to \$45,000	3.00%
\$45,001 up to \$55,000	3.50%
\$55,001 up to \$75,000	4.50%
\$75,001 up to \$100,000	5.75%
Greater than \$100,000	6.00%

The lookback wages used for determining the Tier 6 BMC contribution rate for a plan year are the actual wages earned two plan years prior to the plan year. A projected salary is used during the first three years of Credited Service. The BMC contribution rate was limited to 3% from April 1, 2012 through March 31, 2013.

D. Additional Member Contributions (AMC)

Additional Member Contributions earn 5% interest per year, compounded annually.

Tier 4: Members of the Basic 62/5 plan do not make AMC. For other Tier 4 members, the AMC contribution rate is 1.85% of Salary and are made in accordance with the following schedule:

Plan Description	AMC Contribution Rate	Years Required
Chapter 19 55/25	1.85%	25
Chapter 19 55/27	1.85%	27
Chapter 504 55/27 plan	1.85%	All years

Tier 6: Members of the 63/5 plan do not make AMC.

E. Credited Service

Credited Service is comprised of Membership Service, Part-time Service, Prior Service, Amman Service, Transferred Service, and Military Service:

- **Membership Service:** Service earned while a member of TRS.
- **Part-time Service:** Service that is prorated based on the number of hours or days worked in the year.
- **Prior Service:** Any creditable service earned as an employee of New York City or New York State before joining TRS that was not transferred to TRS.
- **Amman Service:** Creditable service earned as a regular substitute teacher and/or for per diem employment during a leave of absence or after separating from service.

- **Transferred Service**: Service earned as a member of another public retirement system in the City or State of New York.
- **Military Service**: Service for qualified time served in one of the armed forces of the United States.

Prior Service, Amman Service, Transferred Service, and Military Service must be purchased to count as Credited Service. Payments made for purchasing Military Service are considered Employer contributions.

F. Salary

Salary is based on the annual wages earned in covered employment including overtime pay. Some limitations apply for the Salary used to determine Final Average Salary (FAS).

Tier 4: Wages greater than 110% of the average of the previous two years are excluded for purposes of determining FAS.

Tier 6: Wages greater than 110% of the average of the previous four years are excluded for purposes of determining FAS. In addition, the following payments are also excluded from wages for purposes of determining FAS:

1. Wages greater than the annual salary paid to the Governor of the State of New York;
2. Lump sum payments for deferred compensation, sick leave, accumulated vacation, or other credits for time not worked;
3. Overtime greater than the overtime ceiling of \$15,000, effective April 1, 2012 and indexed annually by the Consumer Price Index (CPI-U);
4. Any form of termination pay;
5. Any additional compensation paid in anticipation of retirement; and
6. In the case of employees who receive wages from three or more employers in a twelve-month period, the wages paid by the third and each successive employer.

G. Final Average Salary (FAS)

Service retirement, early retirement, disability retirement, and vested retirement benefits are based on Final Average Salary (FAS).

Tier 4: FAS is the highest average Salary earned in any three consecutive years of Credited Service or in the final 36 months of Credited Service if greater.

Tier 6: FAS is the highest average Salary earned in any five consecutive years of Credited Service or in the final 60 months of Credited Service if greater.

H. Service Retirement

1. Eligibility: The eligibility requirements for an unreduced service retirement benefit are summarized in the table below:

Tier	Plan Description	Minimum Age	Minimum Service
4	Basic 62/5 Plan	Earlier of Age 55 with 30 years of Service And Age 62 with 5 years of Service	
4	Chapter 19 55/25	55	25
4	Chapter 19 55/27	55	27
4	Chapter 504 55/27 plan	55	27
6	Basic 63/5 Plan	63	5

2. Benefits:

- a. Tier 4 Plans:

- i. Less than 20 years of Credited Service: 1/60 times FAS times Credited Service;
 - ii. 20 or more years of Credited Service: Sum of 2.0% times FAS times Credited Service up to 30 years plus 1.5% times FAS times Credited Service in excess of 30 years.

- b. Basic Tier 6 63/5 Plan:

- i. Less than 20 years of Credited Service: 1/60 times FAS times Credited Service;
 - ii. 20 or more years of Credited Service: Sum of 35% times FAS plus 2.0% times FAS times Credited Service in excess of 20 years.

- c. Annuity Savings Accumulation Fund (ASAF):

- i. Annuitized value of the ASAF balance, if any, is added to the benefit.

I. Early Retirement

1. Eligibility: The eligibility requirements for early retirement plans are summarized in the table below:

Tier	Plan Description	Minimum Age	Minimum Service
4	All Tier 4 plans except the Chapter 504 55/27 plan	55	5
4	Chapter 504 55/27	55	5
6	Basic 63/5 plan	55	5

2. Benefits:

The service retirement benefit is reduced for early retirement based on the age at commencement.

a. Tier 4 Basic 62/5 Plan:

The service retirement benefit is reduced by 0.50% for each of the first 24 months that the age at commencement precedes age 62, and reduced 0.25% for each of the next 60 months that the age of commencement precedes age 60:

Age	Early Retirement Factor
61	0.94
60	0.88
59	0.85
58	0.82
57	0.79
56	0.76
55	0.73

Tier 4 members with Tier 3 rights may elect early retirement based on the provisions of the Tier 3 Basic 62/5 Plan.

b. Tier 6 Basic 63/5 Plan:

The service retirement benefit is reduced by 13/2400 for each month (i.e., 6.5% per year) that the age of commencement precedes age 63.

c. Annuity Savings Accumulation Fund (ASAF):

The annuitized value of the ASAF balance, if any, is added to the benefit.

J. Disability Retirement

1. Accidental Disability (ADR)

- a. Eligibility: No age or service requirement. Requires Medical Board determination that the active member is physically or mentally incapacitated due to an accident in the performance of duties and that the accident is not due to willful negligence of the member.
- b. Benefits: Greater of $1/60$ times FAS times Credited Service or $2/3$ times FAS. The member may elect a service retirement benefit, if eligible.

2. Ordinary Disability (ODR)

- a. Eligibility: 10 years of Credited Service. Requires Medical Board determination that the member is physically or mentally incapacitated while an active member.
- b. Benefits: Greater of $1/60$ times FAS times Credited Service or $1/3$ times FAS. The member may elect a service retirement benefit, if eligible.

3. Annuity Savings Accumulation Fund (ASAF)

The annuitized value of the ASAF balance, if any, is added to the benefit.

K. Death Benefits

1. Accidental Death Benefits

- a. Eligibility: No age or service requirement. Death due to the performance of duties while an active member.
- b. Benefits: A monthly pension is payable to the beneficiary equal to 50% of $1/12$ of annual wages earned during the year prior to death. The benefit is equal to 50% of $1/12$ of the annual wage rate if the member had less than one year of Credited Service.

2. Ordinary Death Benefits

- a. Eligibility:
 - i. Active members: No age or service requirement. Death during active employment while not in the performance of duties.
 - ii. Deferred vested members: Death after termination of employment and prior to benefit commencement.

iii. Retired Members: Death after benefit commencement.

b. Death benefit:

- i. Active members: Refund of BMC and the employee portion of AMC with interest plus a salary-based death benefit. The salary-based death benefit is equal to one year's wages times completed years of Credited Service up to 3 years. The salary-based portion of the death benefit is reduced 5% for each year the member remains in service beyond age 60 (to a maximum reduction of 50% at age 70).
- ii. Deferred vested members with 5 or more years of Credited Service: Refund of BMC and the employee portion of AMC, if any, with interest plus one half of the salary-based death benefit that would have been payable had the member died on the last day of active service as described above.
- iii. Deferred vested members with less than 5 years of Credited Service: Refund of BMC and the employee portion of AMC, if any, with interest.
- iv. Retirees: The active salary-based death benefit that would have been payable had the member died on the last day of active service times the Adjustment Factor described in the table below:

Year of Death	Adjustment Factor
1 st year after retirement	50%
2 nd year after retirement	25%
3 rd year or later after retirement	10% times the benefit in effect at age 60 or at retirement if earlier

c. Form of Payment: Lump sum.

L. Vested Benefit After Termination

1. Eligibility:

- a. Tier 4 Chapter 504 55/27 plan: 5 years of Credited Service.
- b. All other Tier 4 plans: 5 years of Credited Service.
- c. Tier 6 plan: 5 years of Credited Service.

2. Benefits: The vested benefit is equal to the amount of the Service Retirement benefit (unless noted otherwise below), payable at the times specified below.
 - a. Tier 4 Plans: A vested member may elect a service retirement benefit payable at age 62 or an early retirement benefit payable as early as age 55. The eligibility and benefit provisions for a benefit that commences prior to age 62 are the same as those for early retirement except that benefits are unreduced at age 55 if the member has earned the minimum service required for a Service Retirement benefit shown in subsection H above.
 - b. Tier 6 Plan: Age 63. In no case can the vested benefit be less than the annuity equivalent of the BMC.
3. Annuity Savings Accumulation Fund (ASAF)

The annuitized value of the ASAF balance, if any, is added to the benefit.

M. Forms of Payment

1. Normal Form of Payment: Single Life Annuity.
2. Optional Forms of Payment: Joint and Survivor Annuities, Certain and Life Annuities, and Pop-up Annuities.

N. Cost of Living Adjustments (COLA)

Annuity payments are increased annually on September 1st, but only after a pensioner has attained the applicable eligibility threshold. Some beneficiaries are not eligible for COLA increases. The COLA increase is equal to a base benefit times a COLA percentage. The COLA increase for a spouse receiving a joint & survivor annuity is one half of the COLA increase that would have been applicable to the member had he or she survived.

1. Eligibility Thresholds:
 - a. Service Retirement and Vested Retirement: The earlier of (i) and (ii):
 - i. Attainment of age 62 and 5 years since commencement
 - ii. Attainment of age 55 and 10 years since commencement
 - b. Disability Retirement: 5 years since commencement
 - c. Beneficiaries of an Accidental Death benefit: 5 years since commencement

2. Eligible beneficiaries: Spouses receiving a joint & survivor annuity. All others are non-eligible.
3. Base Benefit: The lesser of \$18,000 and the maximum retirement allowance plus the sum of prior years' COLA increases.
4. COLA percentage: 50% of the Consumer Price Index (CPI-U) based upon the 12 months ending March 31 prior to each September 1 effective date, rounded to the next highest 0.1%. Such percentage shall not be less than 1.0% nor greater than 3.0%.

O. Refund of BMC and AMC

Refunded with interest under some circumstances. Only the employee portion of AMC is refunded.

1. Employee Portion of AMC: 50% for all plans that require AMC.
2. Non-vested termination: BMC and employee portion of AMC are refunded with interest.
3. Vested termination: A member may elect a refund of BMC and the employee portion of AMC with interest in lieu of a pension benefit, but only if he or she has less than 5 years of Credited Service.
4. Ordinary death: BMC and the employee portion of AMC are refunded with interest.
5. Accidental death: The employee portion of AMC are refunded with interest.
6. Disability retirement: The employee portion of AMC are refunded with interest.
7. Service retirement: The employee portion of AMC are refunded with interest if the member retires on or after age 62.

P. Service and Early Retirement for Tier 4 Members with Tier 3 Rights

1. Eligibility: Age 55 and 5 years of Credited Service.
2. Benefits: These members may elect a Tier 3 benefit instead of a Tier 4 benefit. The benefit formula for Tier 3 is the same as the benefit formula for the Tier 4 Basic 62/5 plan except:

- a. Credited Service under the Tier 3 benefit formula is capped at 30 years,
 - b. The Tier 3 benefit formula includes an offset starting at age 62 equal to 50% of the Primary Social Security benefit, and
 - c. The early retirement factors used to reduce benefits for early commencement are smaller and thus reduce benefits more for Tier 3 than the corresponding factors used under the Basic Tier 4 62/5 plan.
3. Cost of Living Adjustments: Tier 3 retirement benefits may be adjusted annually by Escalation. A Tier 3 retirement benefit cannot be less than the initial benefit payable at the commencement date.
- a. Full Escalation: Applicable for benefits commencing on or after age 65. Equal to the lesser of 3% and the Consumer Price Index (CPI-U) for positive increases in the CPI-U, and the greater of -3% and the Consumer Price Index (CPI-U) for negative increases in the CPI-U.
 - b. Partial Escalation: Applicable for benefits commencing after age 62 and prior to age 65. Equal to full escalation reduced by 1/36 times the number of months that the age at commencement precedes age 65.

Q. Loans

A member generally may borrow up to 75% of the accumulated BMC with interest. A member's unpaid loan balance will reduce his or her retirement benefit.

R. Tax-deferred Annuity Program (TDA)

Members may elect to make voluntary employee contributions to the TRS TDA. A member's contributions to a TDA account are capped by the dollar limitations under §402(g)(1) of the Internal Revenue Code (IRC) on the exclusion for elective deferrals described in §402(g)(3), and the dollar limitation under §414(v)(2)(B)(i) of the IRC for catch-up contributions for members who have attained aged 50.

A member may withdraw his or her TDA account balance as a lump sum or convert the total accumulated balance into an annuity upon retirement.

S. Others

Continued compliance has been presumed under the OWBPA.

SECTION IX – CHAPTER AMENDMENTS

The June 30, 2021 actuarial valuation results reflect the following Chapter amendments from the prior five years.

- **Chapter 56 of the Laws of 2022 (Chapter 56/22)** reduces the Tier 6 vesting requirement from 10 years to 5 years and allows for retirement with 5 years of service, and excludes certain forms of overtime and extracurricular compensation from the salary used to determine Tier 6 BMC Contribution Rates during the specified period from 2022 through 2024.
- **Chapter 525 of the Laws of 2021 (Chapter 525/21)**, enacted on October 29, 2021, mandates certain Paraprofessionals into TRS and renders certain other titles ineligible to join TRS.
- **Chapter 424 of the Laws of 2021 (Chapter 424/21)** expands eligibility of certain public service employees for participation in the World Trade Center Rescue, Recovery, or Clean-up Operations.
- **Chapter 89 of the Laws of 2020 (Chapter 89/20)** provides death benefits to statutory beneficiaries of members whose death was a result of or was attributed to COVID-19. **Chapter 78 of the Laws of 2021 (Chapter 78/21)** amends Chapter 89/20 by extending the eligibility window of these death benefits through December 31, 2022. **Chapter 783 of the Laws of 2022 (Chapter 783/22)** extends the deadline for the COVID-19 Accidental Death Benefits from December 31, 2022 to December 31, 2024.
- **Chapter 266 of the Laws of 2018 (Chapter 266/18)** extends the deadline for filing a Notice of Participation in the World Trade Center Rescue, Recovery, and Cleanup Operations to September 11, 2022.

SECTION X – SUBSEQUENT EVENTS

The following legislation was adopted after the June 30, 2021 valuation date and could have an impact on future years' valuations:

- **Chapter 561 of the Laws of 2022 (Chapter 561/22)**, enacted September 9, 2022, extends the deadline for filing a Notice of Participation in the World Trade Center Rescue, Recovery, and Cleanup Operations from September 11, 2022 to September 11, 2026.
- **Chapter 585 of the Laws of 2022 (Chapter 585/22)**, enacted on November 10, 2022, expands the qualifications for military service buybacks.
- **Chapter 775 of the Laws of 2022 (Chapter 775/22)**, enacted on December 23, 2022, increased the asset allocation limits for "Basket Clause" investments from 25% to 35%.

SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS

The results in this valuation report are based upon standard actuarial models (including but not limited to Entry Age Normal and related parameters) that are widely used in actuarial practice. The models are intended to calculate the liabilities associated with these plan provisions using data and assumptions as of the measurement date and, using actuarial assumptions and methods further described below. Most of this liability and cashflow modeling is currently implemented using ProVal, an actuarial valuation and projection software program developed by Winklevoss Technologies. These results are reviewed for accuracy, reasonability, and consistency with prior results, consistent with the requirements of Actuarial Standard of Practice 56. The model is also reviewed extensively when significant changes are made to the software and additionally typically biennially by outside actuarial auditors hired by the New York City Comptroller.

Pension payments that exceed the Internal Revenue Code Section 415 Limit which have been or are expected to be made from the Excess Benefit Plan are excluded from this valuation. There were no other changes in actuarial assumptions and methods compared to the June 30, 2020 valuation.

**Table XI-1
Active Retirement Rates**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM					
PROBABILITIES OF SERVICE RETIREMENT					
Age	Reduced Service Retirement	Unreduced Service Retirement Probabilities For Members Who Did Not Elect an Improved Retirement Program		Unreduced Service Retirement Probabilities For Members Who Elected an Improved Retirement Program	
		Year 1	Ultimate	Year 1	Ultimate
55	2.50%	18.00%	0.00%	37.50%	0.00%
56	2.50%	18.00%	20.00%	37.50%	22.00%
57	2.50%	18.00%	20.00%	37.50%	22.00%
58	2.50%	18.00%	20.00%	37.50%	22.00%
59	3.75%	18.00%	20.00%	37.50%	22.00%
60	5.00%	18.00%	20.00%	37.50%	22.00%
61	6.25%	18.00%	20.00%	37.50%	22.00%
62	7.50% ¹	27.00%/18.00% ²	20.00%	50.00%	33.00%
63	0.00%	18.00%/27.00% ³	20.00%	37.50%	22.00%
64	0.00%	18.00%	20.00%	37.50%	22.00%
65	0.00%	27.00%	20.00%	50.00%	33.00%
66	0.00%	18.00%	20.00%	37.50%	22.00%
67	0.00%	18.00%	20.00%	37.50%	22.00%
68	0.00%	18.00%	20.00%	37.50%	22.00%
69	0.00%	18.00%	20.00%	37.50%	22.00%
70	0.00%	20.00%	20.00%	37.50%	22.00%
71	0.00%	20.00%	20.00%	37.50%	22.00%
72	0.00%	20.00%	20.00%	37.50%	22.00%
73	0.00%	20.00%	20.00%	37.50%	22.00%
74	0.00%	20.00%	20.00%	37.50%	22.00%
75	0.00%	20.00%	20.00%	37.50%	22.00%
76	0.00%	20.00%	20.00%	37.50%	22.00%
77	0.00%	20.00%	20.00%	37.50%	22.00%
78	0.00%	20.00%	20.00%	37.50%	22.00%
79	0.00%	20.00%	20.00%	37.50%	22.00%
80+	N/A	100.00%	100.00%	100.00%	100.00%

¹ 7.50% only applies to Tier 6 members; 0.00% otherwise.

² 27.00% for Tier 1, 2, & 4 members and 18.00% for Tier 6 members.

³ 18.00% for Tier 1, 2, & 4 members and 27.00% for Tier 6 members.

**Table XI-2
Active Termination Rates**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM	
PROBABILITIES OF TERMINATION	
Years of Service	Probability of Termination
0	9.00%
1	8.00%
2	7.00%
3	6.00%
4	5.00%
5	4.00%
6	3.50%
7	3.05%
8	2.65%
9	2.30%
10	2.00%
11	1.75%
12	1.55%
13	1.40%
14	1.30%
15	1.25%
16	1.20%
17	1.15%
18	1.10%
19	1.05%
20	1.00%
21	0.90%
22	0.80%
23	0.70%
24	0.60%
25+	0.50%

**Table XI-3
Active Disability Rates**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM				
PROBABILITIES OF DISABILITY RETIREMENT				
	Ordinary Disability		Accidental Disability	
Age	Males	Females	Males	Females
15	0.01%	0.01%	0.00%	0.00%
16	0.01%	0.01%	0.00%	0.00%
17	0.01%	0.01%	0.00%	0.00%
18	0.01%	0.01%	0.00%	0.00%
19	0.01%	0.01%	0.00%	0.00%
20	0.01%	0.01%	0.00%	0.00%
21	0.01%	0.01%	0.00%	0.00%
22	0.01%	0.01%	0.00%	0.00%
23	0.01%	0.01%	0.00%	0.00%
24	0.01%	0.01%	0.00%	0.00%
25	0.01%	0.01%	0.00%	0.00%
26	0.01%	0.01%	0.00%	0.00%
27	0.01%	0.01%	0.00%	0.00%
28	0.01%	0.01%	0.00%	0.00%
29	0.01%	0.01%	0.00%	0.00%
30	0.01%	0.01%	0.00%	0.00%
31	0.02%	0.01%	0.00%	0.00%
32	0.03%	0.02%	0.00%	0.00%
33	0.04%	0.03%	0.01%	0.00%
34	0.05%	0.04%	0.01%	0.00%
35	0.06%	0.05%	0.01%	0.01%
36	0.07%	0.06%	0.01%	0.01%
37	0.08%	0.07%	0.01%	0.01%
38	0.08%	0.08%	0.02%	0.01%
39	0.09%	0.09%	0.02%	0.01%
40	0.10%	0.10%	0.02%	0.01%
41	0.11%	0.11%	0.02%	0.01%
42	0.12%	0.12%	0.02%	0.01%
43	0.13%	0.13%	0.02%	0.02%
44	0.14%	0.14%	0.02%	0.02%
45	0.15%	0.15%	0.03%	0.02%
46	0.15%	0.16%	0.03%	0.02%
47	0.15%	0.17%	0.03%	0.02%
48	0.15%	0.18%	0.03%	0.03%
49	0.15%	0.19%	0.03%	0.03%
50	0.15%	0.20%	0.03%	0.03%
51	0.15%	0.20%	0.03%	0.03%
52	0.15%	0.20%	0.03%	0.03%
53	0.15%	0.20%	0.03%	0.03%
54	0.15%	0.20%	0.03%	0.03%
55	0.15%	0.20%	0.04%	0.04%
56	0.15%	0.20%	0.04%	0.04%
57	0.15%	0.20%	0.04%	0.04%
58	0.15%	0.20%	0.04%	0.04%
59	0.15%	0.20%	0.04%	0.04%
60	0.15%	0.20%	0.04%	0.04%
61	0.15%	0.20%	0.04%	0.04%
62	0.15%	0.20%	0.04%	0.04%
63	0.15%	0.20%	0.04%	0.04%
64	0.15%	0.20%	0.04%	0.04%
65	0.15%	0.20%	0.04%	0.04%
66	0.15%	0.20%	0.04%	0.04%
67	0.15%	0.20%	0.04%	0.04%
68	0.15%	0.20%	0.04%	0.04%
69	0.15%	0.20%	0.04%	0.04%
70	0.15%	0.20%	0.04%	0.04%
71	0.15%	0.20%	0.04%	0.04%
72	0.15%	0.20%	0.04%	0.04%
73	0.15%	0.20%	0.04%	0.04%
74	0.15%	0.20%	0.04%	0.04%
75	0.15%	0.20%	0.04%	0.04%
76	0.15%	0.20%	0.04%	0.04%
77	0.15%	0.20%	0.04%	0.04%
78	0.15%	0.20%	0.04%	0.04%
79	0.15%	0.20%	0.04%	0.04%
80+	N/A	N/A	N/A	N/A

Table XI-4
Active Mortality Rates

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM			
PROBABILITIES OF MORTALITY FOR ACTIVE MEMBERS BASE RATES			
Age	Ordinary Death		Accidental Death
	Males	Females	
15	0.040%	0.025%	0.000%
16	0.040%	0.025%	0.000%
17	0.040%	0.025%	0.000%
18	0.040%	0.025%	0.000%
19	0.040%	0.025%	0.000%
20	0.040%	0.025%	0.000%
21	0.040%	0.025%	0.000%
22	0.040%	0.025%	0.000%
23	0.040%	0.025%	0.000%
24	0.040%	0.025%	0.000%
25	0.040%	0.025%	0.000%
26	0.040%	0.025%	0.000%
27	0.040%	0.025%	0.000%
28	0.040%	0.025%	0.000%
29	0.040%	0.025%	0.000%
30	0.040%	0.025%	0.000%
31	0.042%	0.026%	0.000%
32	0.044%	0.028%	0.000%
33	0.046%	0.029%	0.000%
34	0.048%	0.030%	0.000%
35	0.050%	0.031%	0.000%
36	0.052%	0.033%	0.000%
37	0.054%	0.034%	0.000%
38	0.056%	0.035%	0.000%
39	0.058%	0.036%	0.000%
40	0.060%	0.038%	0.000%
41	0.070%	0.044%	0.000%
42	0.080%	0.050%	0.000%
43	0.090%	0.056%	0.000%
44	0.100%	0.063%	0.000%
45	0.110%	0.069%	0.000%
46	0.120%	0.075%	0.000%
47	0.130%	0.081%	0.000%
48	0.140%	0.088%	0.000%
49	0.150%	0.094%	0.000%
50	0.160%	0.100%	0.000%
51	0.170%	0.106%	0.000%
52	0.180%	0.113%	0.000%
53	0.190%	0.119%	0.000%
54	0.200%	0.125%	0.000%
55	0.210%	0.131%	0.000%
56	0.220%	0.138%	0.000%
57	0.230%	0.144%	0.000%
58	0.240%	0.150%	0.000%
59	0.250%	0.156%	0.000%
60	0.260%	0.163%	0.000%
61	0.270%	0.169%	0.000%
62	0.280%	0.175%	0.000%
63	0.290%	0.181%	0.000%
64	0.300%	0.188%	0.000%
65	0.320%	0.200%	0.000%
66	0.350%	0.219%	0.000%
67	0.390%	0.244%	0.000%
68	0.440%	0.275%	0.000%
69	0.500%	0.313%	0.000%
70	0.540%	0.350%	0.000%
71	0.600%	0.388%	0.000%
72	0.650%	0.425%	0.000%
73	0.700%	0.463%	0.000%
74	0.750%	0.525%	0.000%
75	0.800%	0.588%	0.000%
76	0.890%	0.650%	0.000%
77	0.980%	0.713%	0.000%
78	1.070%	0.775%	0.000%
79	1.160%	0.925%	0.000%
80+	N/A	N/A	N/A

Table XI-5
Service Retiree Mortality

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES					
BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0108%	0.0105%	68	1.3827%	0.8399%
16	0.0146%	0.0128%	69	1.5070%	0.8992%
17	0.0197%	0.0140%	70	1.6306%	0.9855%
18	0.0222%	0.0145%	71	1.7953%	1.1072%
19	0.0235%	0.0151%	72	1.9579%	1.2311%
20	0.0246%	0.0153%	73	2.1191%	1.3549%
21	0.0263%	0.0162%	74	2.2784%	1.4775%
22	0.0278%	0.0171%	75	2.4370%	1.5961%
23	0.0295%	0.0181%	76	2.7233%	1.8356%
24	0.0309%	0.0193%	77	3.0074%	2.0765%
25	0.0320%	0.0206%	78	3.2885%	2.3162%
26	0.0335%	0.0220%	79	3.5677%	2.5533%
27	0.0347%	0.0234%	80	3.8824%	2.7842%
28	0.0364%	0.0249%	81	4.4474%	3.3221%
29	0.0386%	0.0267%	82	5.0193%	3.8708%
30	0.0418%	0.0286%	83	5.5977%	4.4089%
31	0.0476%	0.0348%	84	6.1798%	5.0027%
32	0.0532%	0.0401%	85	6.7676%	5.5878%
33	0.0583%	0.0449%	86	7.7139%	6.2981%
34	0.0629%	0.0489%	87	8.6843%	6.9333%
35	0.0673%	0.0527%	88	9.6857%	7.5758%
36	0.0698%	0.0557%	89	10.7135%	8.5620%
37	0.0720%	0.0591%	90	11.7744%	9.6778%
38	0.0745%	0.0626%	91	13.6049%	10.8390%
39	0.0782%	0.0672%	92	15.5105%	11.9717%
40	0.0837%	0.0726%	93	17.4679%	13.1425%
41	0.0941%	0.0775%	94	19.5105%	15.1670%
42	0.1051%	0.0838%	95	21.6689%	17.3761%
43	0.1167%	0.0918%	96	23.7343%	19.5275%
44	0.1294%	0.1013%	97	25.7571%	21.6213%
45	0.1432%	0.1132%	98	27.8633%	23.3643%
46	0.1582%	0.1271%	99	29.8272%	23.8705%
47	0.1744%	0.1429%	100	31.5152%	23.9898%
48	0.1918%	0.1597%	101	33.0771%	24.9134%
49	0.2102%	0.1774%	102	34.4234%	26.0067%
50	0.2317%	0.1950%	103	35.6398%	27.2992%
51	0.2657%	0.2130%	104	36.6357%	28.7614%
52	0.3011%	0.2304%	105	37.3430%	30.3385%
53	0.3373%	0.2472%	106	37.7004%	31.9944%
54	0.3744%	0.2638%	107	37.8599%	33.6898%
55	0.4112%	0.2806%	108	38.0314%	35.3785%
56	0.4578%	0.3034%	109	38.1998%	37.0129%
57	0.5025%	0.3264%	110	50.0000%	50.0000%
58	0.5448%	0.3498%	111	50.0000%	50.0000%
59	0.5843%	0.3732%	112	50.0000%	50.0000%
60	0.6211%	0.3973%	113	50.0000%	50.0000%
61	0.7018%	0.4321%	114	50.0000%	50.0000%
62	0.7804%	0.4686%	115	50.0000%	50.0000%
63	0.8588%	0.5072%	116	50.0000%	50.0000%
64	0.9371%	0.5479%	117	50.0000%	50.0000%
65	0.9994%	0.5912%	118	50.0000%	50.0000%
66	1.1295%	0.6619%	119	50.0000%	50.0000%
67	1.2569%	0.7367%	120	100.0000%	100.0000%

**Table XI-6
Disabled Retiree Mortality**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.3819%	0.3483%	68	2.8007%	2.0012%
16	0.5167%	0.4712%	69	2.8946%	2.0043%
17	0.6964%	0.5141%	70	3.0268%	2.0073%
18	0.7863%	0.5351%	71	3.1148%	2.0103%
19	0.8312%	0.5569%	72	3.2684%	2.1811%
20	0.8353%	0.5649%	73	3.3926%	2.3760%
21	0.8659%	0.5961%	74	3.5875%	2.5968%
22	0.8978%	0.6295%	75	3.7271%	2.8417%
23	0.9464%	0.6597%	76	3.9657%	3.0808%
24	0.9977%	0.6908%	77	4.2691%	3.3373%
25	1.0424%	0.7150%	78	4.5349%	3.6085%
26	1.0960%	0.7387%	79	4.8252%	3.8944%
27	1.1348%	0.7520%	80	5.1378%	4.1909%
28	1.1774%	0.7625%	81	5.6917%	4.6921%
29	1.2163%	0.7686%	82	6.2841%	5.1536%
30	1.2878%	0.7763%	83	6.8835%	5.5061%
31	1.3554%	0.9885%	84	7.7954%	6.1180%
32	1.3755%	1.1922%	85	8.8286%	6.7342%
33	1.3953%	1.3874%	86	9.9032%	7.3088%
34	1.4153%	1.3942%	87	10.8837%	8.2536%
35	1.4357%	1.4012%	88	11.9567%	9.3264%
36	1.4563%	1.4082%	89	13.8059%	10.3734%
37	1.4772%	1.4152%	90	15.7270%	11.4459%
38	1.4985%	1.4223%	91	17.7012%	12.6271%
39	1.5200%	1.4294%	92	19.6428%	14.1350%
40	1.5418%	1.4366%	93	21.9234%	15.4424%
41	1.5640%	1.4436%	94	24.0761%	16.9560%
42	1.5865%	1.4509%	95	26.0577%	18.4261%
43	1.6093%	1.4581%	96	28.3614%	20.1727%
44	1.6324%	1.4654%	97	30.3483%	21.6213%
45	1.6559%	1.5299%	98	31.8739%	23.3643%
46	1.6797%	1.6016%	99	33.6652%	23.8705%
47	1.7038%	1.6623%	100	35.0392%	23.9898%
48	1.7283%	1.7238%	101	36.0496%	24.9134%
49	1.7531%	1.7485%	102	37.0460%	26.0067%
50	1.7783%	1.7736%	103	37.7767%	27.2992%
51	1.8039%	1.7991%	104	38.1460%	28.7614%
52	1.9408%	1.8530%	105	38.3076%	30.3385%
53	2.0713%	1.8909%	106	38.4698%	31.9944%
54	2.2040%	1.9173%	107	38.6325%	33.6898%
55	2.3207%	1.9622%	108	38.8076%	35.3785%
56	2.4304%	1.9652%	109	38.9794%	37.0129%
57	2.4937%	1.9681%	110	50.0000%	50.0000%
58	2.5070%	1.9711%	111	50.0000%	50.0000%
59	2.5245%	1.9741%	112	50.0000%	50.0000%
60	2.5362%	1.9770%	113	50.0000%	50.0000%
61	2.5394%	1.9801%	114	50.0000%	50.0000%
62	2.5426%	1.9831%	115	50.0000%	50.0000%
63	2.5480%	1.9861%	116	50.0000%	50.0000%
64	2.5797%	1.9891%	117	50.0000%	50.0000%
65	2.6258%	1.9921%	118	50.0000%	50.0000%
66	2.6510%	1.9951%	119	50.0000%	50.0000%
67	2.7083%	1.9982%	120	100.0000%	100.0000%

**Table XI-7
Beneficiary Mortality**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR BENEFICIARIES					
BASE RATES					
Age	Males	Females	Age	Males	Females
15	0.0105%	0.0092%	68	1.8256%	1.3605%
16	0.0142%	0.0112%	69	1.9386%	1.4332%
17	0.0191%	0.0122%	70	2.0542%	1.5007%
18	0.0222%	0.0133%	71	2.2359%	1.6745%
19	0.0240%	0.0143%	72	2.4230%	1.8463%
20	0.0251%	0.0145%	73	2.6165%	2.0157%
21	0.0268%	0.0153%	74	2.8157%	2.1838%
22	0.0284%	0.0161%	75	3.0220%	2.3492%
23	0.0301%	0.0171%	76	3.4928%	2.6652%
24	0.0315%	0.0183%	77	3.9787%	2.9831%
25	0.0327%	0.0195%	78	4.4792%	3.3011%
26	0.0342%	0.0208%	79	4.9963%	3.6207%
27	0.0354%	0.0221%	80	5.5282%	3.9391%
28	0.0371%	0.0236%	81	6.1051%	4.4386%
29	0.0394%	0.0252%	82	6.6894%	4.9473%
30	0.0427%	0.0270%	83	7.2805%	5.4665%
31	0.0495%	0.0330%	84	7.8749%	5.9942%
32	0.0562%	0.0384%	85	8.4753%	6.5354%
33	0.0625%	0.0431%	86	9.6136%	7.4659%
34	0.0682%	0.0471%	87	10.8005%	8.3995%
35	0.0743%	0.0511%	88	12.0443%	9.3428%
36	0.0780%	0.0542%	89	13.3397%	10.2918%
37	0.0818%	0.0579%	90	14.6958%	11.2477%
38	0.0861%	0.0618%	91	16.4185%	12.8868%
39	0.0917%	0.0666%	92	18.1416%	14.4887%
40	0.0997%	0.0719%	93	19.8574%	16.0801%
41	0.1394%	0.0775%	94	21.6187%	17.5854%
42	0.1774%	0.0859%	95	23.5884%	19.0626%
43	0.2143%	0.0968%	96	25.4266%	20.2474%
44	0.2507%	0.1111%	97	27.2119%	21.2937%
45	0.2875%	0.1287%	98	29.0202%	22.0663%
46	0.3207%	0.1501%	99	30.6654%	22.5443%
47	0.3534%	0.1748%	100	32.1584%	22.6473%
48	0.3849%	0.2022%	101	33.7521%	23.5294%
49	0.4150%	0.2319%	102	35.1259%	24.5619%
50	0.4431%	0.2633%	103	36.3671%	25.7825%
51	0.5156%	0.2999%	104	37.3834%	27.1635%
52	0.5928%	0.3376%	105	38.1051%	28.6530%
53	0.6740%	0.3762%	106	38.4698%	30.2169%
54	0.7583%	0.4151%	107	38.6325%	31.8182%
55	0.8440%	0.4540%	108	38.8076%	33.4131%
56	0.9048%	0.5132%	109	38.9794%	34.9566%
57	0.9604%	0.5735%	110	50.0000%	50.0000%
58	1.0101%	0.6353%	111	50.0000%	50.0000%
59	1.0536%	0.6981%	112	50.0000%	50.0000%
60	1.0919%	0.7631%	113	50.0000%	50.0000%
61	1.1835%	0.8329%	114	50.0000%	50.0000%
62	1.2676%	0.8908%	115	50.0000%	50.0000%
63	1.3473%	0.9493%	116	50.0000%	50.0000%
64	1.4238%	1.0146%	117	50.0000%	50.0000%
65	1.4985%	1.0876%	118	50.0000%	50.0000%
66	1.6059%	1.1681%	119	50.0000%	50.0000%
67	1.7146%	1.2609%	120	100.0000%	100.0000%

**Table XI-8
Salary Scale**

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM		
ANNUAL RATES OF MERIT AND SALARY INCREASE		
Years of Service	Merit Increase	Salary Increase ¹
0	10.00%	13.00%
1	8.00%	11.00%
2	6.00%	9.00%
3	5.00%	8.00%
4	6.00%	9.00%
5	5.00%	8.00%
6	5.00%	8.00%
7	4.00%	7.00%
8	2.00%	5.00%
9	5.00%	8.00%
10	1.00%	4.00%
11	1.00%	4.00%
12	3.00%	6.00%
13	1.00%	4.00%
14	5.00%	8.00%
15	1.00%	4.00%
16	1.00%	4.00%
17	2.00%	5.00%
18	1.00%	4.00%
19	9.00%	12.00%
20	1.00%	4.00%
21	5.00%	8.00%
22+	1.00%	4.00%

¹Salary Increase is the General Wage Increase of 3.00% plus the Merit Increase.

Additional Assumptions and Methods

1. **Actuarial Interest Rate (AIR):** 7.0% per annum, net of investment expenses.
2. **Mortality Assumption:** The mortality base tables are projected from 2012 using mortality improvement table MP-2020. The post-commencement base tables are also multiplied by adjustment factors to convert them from lives-weighted to amounts-weighted tables to account for socioeconomic effects on mortality. The adjustment factors are used as follows:

	Adjustment Factor	
	Male	Female
Service Retiree	0.908	0.944
Disabled Retiree	0.940	0.962
Beneficiary	0.890	0.951

3. **Marital Assumption:** All active members are assumed to be married, male employees are assumed to be four years older than their female spouses, and female employees are assumed to be two years younger than their male spouses.
4. **Credited Service:** Calculated in whole year increments for valuation purposes. For CUNY participants, since updated service is not provided on the census data, estimated service is used to calculate liabilities.
5. **Loans:** Except for Death Benefits, it is assumed that eligible members take a loan at retirement equal to 25% of their member contribution balances.
6. **Inflation:** The long-term Consumer Price Index inflation rate is assumed to be 2.50% per year. AutoCOLA is assumed to be 1.50% per year, and Escalation is assumed at 2.50% per year. The assumed 30-year Treasury rate for annuitization of outstanding loans at retirement is 3.50%.
7. **Form of Payment:** Retiring members are assumed to elect the Maximum Retirement Allowance (i.e., single life annuity) form of payment.
8. Actuarial Asset Valuation Method (AAVM):

The Actuary reset the Actuarial Value of Assets to Market Value as of June 30, 2019.

Beginning with the June 30, 2020 actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of five years.

In accordance with this AAVM, any investment return over or under the expected 7% return on the MVA is phased into the AVA over a five-year period at 20% per year.

The AVA is further constrained to be within a corridor of 80% to 120% of the MVA.

Beginning with the June 30, 2020 actuarial valuation, the AAVM includes an adjustment based on the unfunded value of guaranteed interest credits payable to the TDA. See item 15 below for more information.

For more information, see SECTION II – MARKET AND ACTUARIAL VALUES OF ASSETS.

9. **Actuarial Cost Method:** The Entry Age Normal (EAN) cost method of funding is used by the Actuary to calculate the Employer Contribution.

Under this method, the Present Value (PV) of Future Benefits (PVFB) of each individual included in the actuarial valuation is allocated on a level basis over the expected earnings (or service) of the individual between entry age and the assumed exit age(s). The employer portion of this PVFB allocated to a valuation year is the Normal Cost. The portion of this PVFB not provided for at a valuation date by the PV of Future Normal Costs or future member contributions is the Accrued Liability (AL).

The excess, if any, of the AL over the Actuarial Value of Assets (AVA) is the Unfunded Accrued Liability (UAL).

Under this method, actuarial gains and losses, as they occur, reduce and increase the UAL, respectively, and are explicitly identified and amortized. Increases or decreases in obligations due to benefit changes, actuarial assumption changes, and actuarial method changes are also explicitly identified and amortized.

The explicit UALs that are developed under EAN each year are financed over fixed periods. For more information see Page 12.

Under EAN, the Normal Cost as a percentage of pay remains stable by individual and changes gradually over time for the entire plan as the characteristics of the group changes (e.g., more Tier 6 active members decrease the average Normal Cost as a percentage of pay).

10. **Allowances for Administrative Expenses:** The Employer Contribution for a fiscal year is increased by the interest-adjusted amount of administrative expenses paid from TRS during the second prior fiscal year.

11. **WTC Disability and Death Benefits:** Obligations attributable to the WTC Disability Benefits Law and to the WTC Death Benefits Law are determined through estimation techniques for post-retirement reclassifications.
12. **One-Year Lag Methodology (OYLM):** The One-Year Lag Methodology uses a June 30, XX valuation date to determine the Fiscal Year XX+2 employer contributions as follows:
- a. Normal Cost

The normal cost as of July 1, XX (calculated in the June 30, XX valuation) is rolled forward with the assumed AIR of 7.0% to the mid-point of Fiscal Year XX+2 (i.e., December 31, XX+1).
 - b. Administrative Expenses

A reimbursement for administrative expenses deducted from plan assets during the year ending June 30, XX is rolled forward with the assumed AIR of 7.0% to the mid-point of Fiscal Year XX+2.
 - c. UAL Payments

New amortization bases for gains and losses, method and assumption changes, and any benefit improvements are established each year XX such that the UAL as of June 30, XX is equal to the sum of the:

 - 1) Outstanding prior amortization bases;
 - 2) Unpaid prior year normal cost with interest;
 - 3) Unreimbursed administrative expenses with interest, and
 - 4) New amortization bases.

The UAL payment is the sum of the payments on the amortization bases scheduled for Fiscal Year XX+2.
13. **Excess Benefit Plan:** The valuation excludes liabilities and costs, if any, associated with benefits in excess of the Internal Revenue Code Section 415 limitation.
14. **TDA Fixed Fund Normal Cost:** A cost is added to each year's Normal Cost for providing a guaranteed 8.25% return on the TDA Fixed Fund for non-UFT members.

15. Additional Assumptions used for the TDA fixed fund:

- a. Active TDA members would contribute 8.0% of compensation to the TDA fixed fund and 3.5% of compensation to the TDA variable fund.
- b. TDA members would transfer 25% of their TDA variable fund to the TDA fixed fund.
- c. Active members in the QPP who have not joined the TDA would join and contribute 2.0% of pay to the TDA fixed fund and approximately 0.9% to the variable fund.
- d. The probability that a member elects 4% per year withdrawals from the TDA fixed fund starting from the later of age 60 and the age at termination is 25%.
- e. The probability that a member elects required minimum distributions from the TDA fixed fund starting from the later of age 72 and the age at termination is 75%.
- f. Estimate techniques have been used to account for the difference in liabilities due to future annuitization of TDA funds.

SECTION XII – SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2021 and June 30, 2020 actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employers' payroll facilities. Financial information was provided by the Office of the Comptroller as of June 30, 2021 and June 30, 2020.

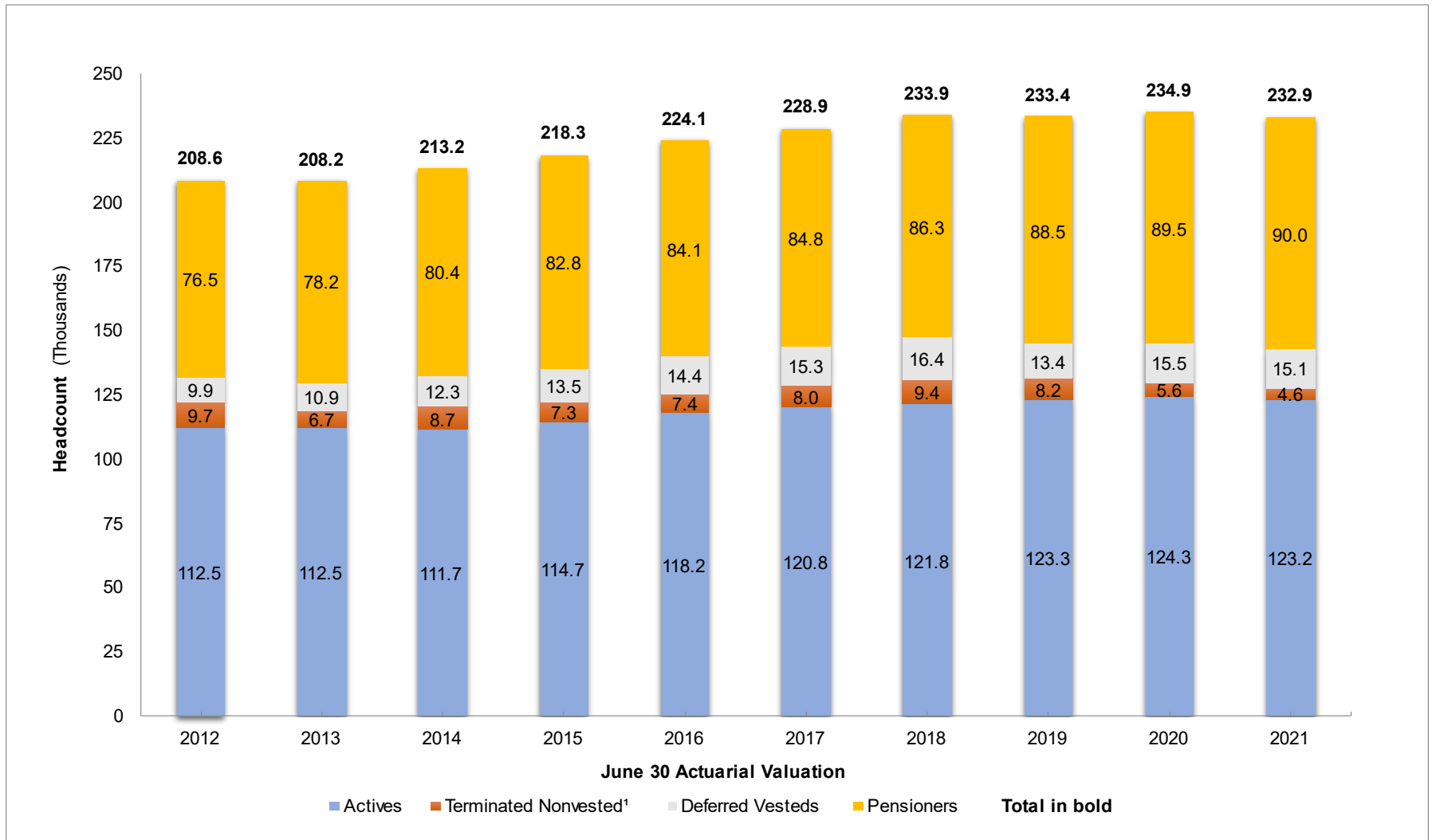
Beginning at June 30, 2020, TRS members who are no longer on payroll but not otherwise classified have been classified as Active, Terminated Nonvested, or Deferred Vested members, using actuarial judgment and consideration of available data, including leave of absence data when available.

Consistent with Actuarial Standards of Practice, the Office of the Actuary has reviewed census data and financial information for consistency and reasonability but has not audited it. The accuracy of the results and calculations contained in this Report are dependent on the accuracy of this census data and financial information. To the extent any such data or information provided is materially inaccurate or incomplete, the results contained herein will require revision.

**Table XII-1
Status Reconciliation**

CHANGES IN MEMBERSHIP DURING THE FISCAL YEAR CLASSIFIED BY STATUS										
Status	(1) Active Members	(2) Active Off Payroll / Terminated Nonvested	(3) Deferred Vested	(4) Service Pension	(5) Ordinary Disability	(6) Accidental Disability	(7) Accidental Death	(8) Other Beneficiary	(9) Pensioners Subtotal (4) to (8)	(10) Grand Total (1) + (2) + (3) + (9)
Number at June 30, 2020	124,276	5,604	15,502	80,915	2,731	750	30	5,110	89,536	234,918
New Entrants	3,630	82	0	0	0	0	0	0	0	3,712
Rehires	1,371	(659)	(591)	(3)	0	0	0	0	(3)	118
Leaving Active Payroll	(2,208)	2,208	0	0	0	0	0	0	0	0
Vested Termination	(915)	(44)	959	0	0	0	0	0	0	0
Non-Vested Termination / Cashout	(320)	(2,602)	(299)	0	0	0	0	0	0	(3,221)
Accidental Death	(2)	0	0	0	0	0	2	0	2	0
Ordinary Death	(111)	(9)	(40)	0	0	0	0	0	0	(160)
Service Retirement	(2,472)	(2)	(357)	2,831	0	0	0	0	2,831	0
Ordinary Disability Retirement	(27)	(1)	(30)	0	58	0	0	0	58	0
Accidental Disability Retirement	(11)	(3)	(16)	0	0	30	0	0	30	0
Reclassifications	0	0	0	(1)	(1)	2	0	0	0	0
Pensioner Death with Beneficiary	0	0	0	(569)	(35)	(3)	0	607	0	0
Pensioner Death without Beneficiary	0	0	0	(1,858)	(82)	(22)	(1)	(505)	(2,468)	(2,468)
On/(Off) Pension Payroll	0	0	0	(102)	(16)	1	4	124	11	11
Net Change	(1,065)	(1,030)	(374)	298	(76)	8	5	226	461	(2,008)
Number at June 30, 2021	123,211	4,574	15,128	81,213	2,655	758	35	5,336	89,997	232,910

Graph XII-2
Headcount Summary by Status



¹ Active Off Payroll prior to June 30, 2020.

Table XII-3
Summary of Active Membership

NEW YORK CITY TEACHERS' RETIREMENT SYSTEM		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2021 AND THE JUNE 30, 2020 ACTUARIAL VALUATIONS		
	June 30, 2021	June 30, 2020
Number		
Males	27,308	27,538
Females	95,903	96,738
Total	123,211	124,276
Annual Salary ¹		
Males	\$ 2,655,542,864	\$ 2,619,461,763
Females	8,813,910,122	8,584,416,263
Total	\$ 11,469,452,986	\$ 11,203,878,026
Average Salary ¹		
Males	\$ 97,244	\$ 95,122
Females	91,904	88,739
Total Average	\$ 93,088	\$ 90,153
Average Age		
Males	44.6	44.2
Females	44.6	44.1
Total Average	44.6	44.2
Average Past Service		
Males	12.6	12.1
Females	12.5	12.0
Total Average	12.5	12.0

¹Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Graph XII-4
Active Membership by Tier

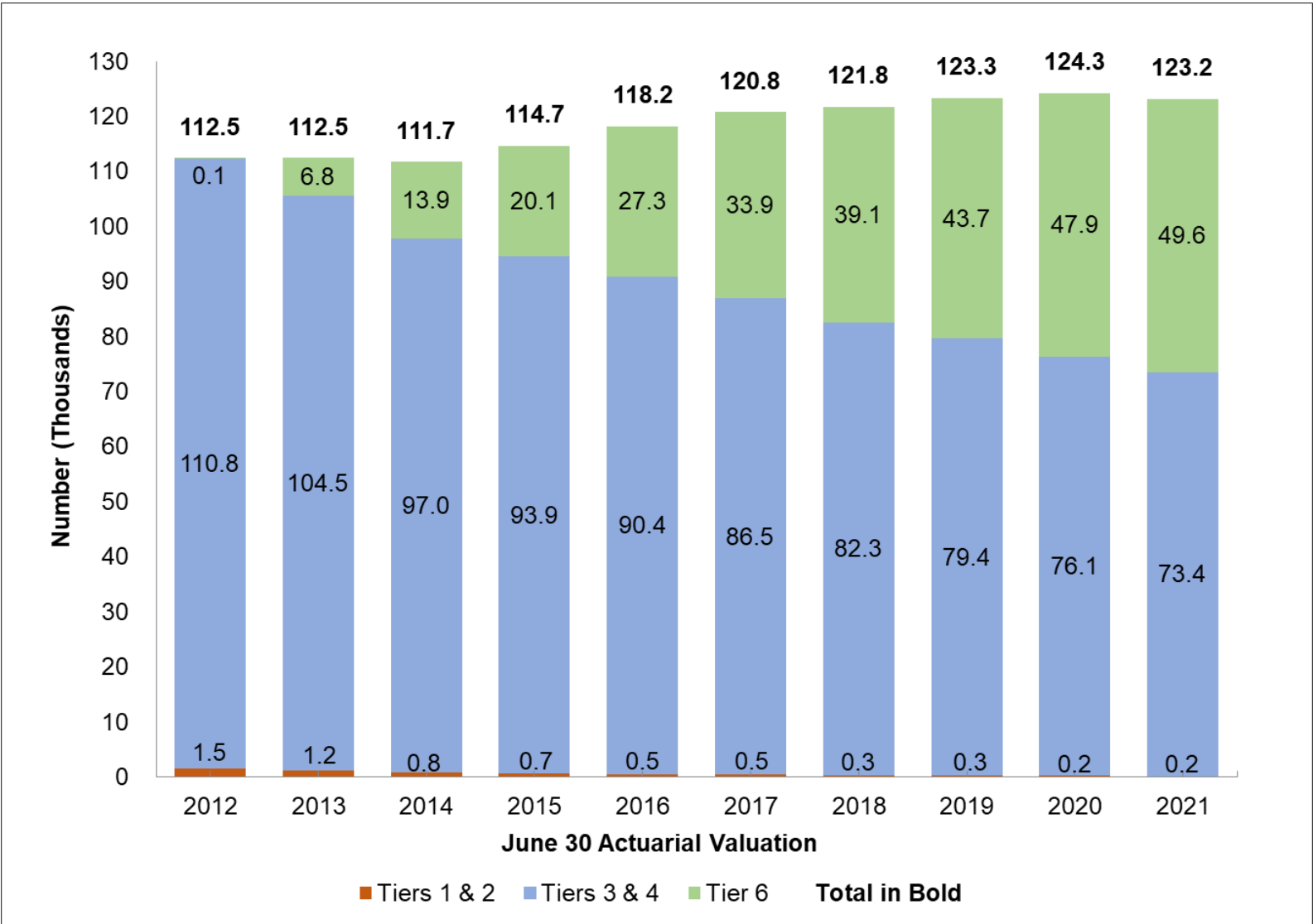


Table XII-5
Schedule of Active Member Salary Data

June 30 Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
2012	112,460	8,013,395,184	71,256	(1.0%)
2013	112,481	8,128,378,071	72,264	1.4%
2014	111,726	8,274,685,657	74,062	2.5%
2015	114,652	8,844,650,633	77,143	4.2%
2016	118,201	9,224,267,647	78,039	1.2%
2017	120,826	9,848,899,232	81,513	4.5%
2018	121,764	10,404,403,684	85,447	4.8%
2019	123,336	10,903,755,059	88,407	3.5%
2020	124,276	11,203,878,026	90,153	2.0%
2021	123,211	11,469,452,986	93,088	3.3%

Salaries reflect the impact of recent labor contract settlements and certain non-union salary increases with retroactive effective dates, if any.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2021

AGE \ SVC	Male Total									ALL YEARS	
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP		
<i>NUMBER:</i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	128	0	0	0	0	0	0	0	0	0	128
25 TO 29	1,561	353	1	0	0	0	0	0	0	0	1,915
30 TO 34	1,620	2,043	242	5	0	0	0	0	0	0	3,910
35 TO 39	928	1,569	1,359	375	1	0	0	0	0	0	4,232
40 TO 44	577	838	984	1,560	251	1	0	0	0	0	4,211
45 TO 49	357	533	573	1,203	978	132	2	0	0	0	3,778
50 TO 54	264	395	393	754	893	693	100	6	0	0	3,498
55 TO 59	178	280	299	510	539	428	285	56	0	0	2,575
60 TO 64	103	193	220	345	370	250	154	77	11	11	1,723
65 TO 69	37	94	143	202	148	92	81	34	35	35	866
70 & UP	18	60	78	87	85	49	25	24	46	46	472
TOTAL	5,771	6,358	4,292	5,041	3,265	1,645	647	197	92	92	27,308

<i>SALARIES (IN THOUSANDS):</i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	6,503	0	0	0	0	0	0	0	0	0	6,503
25 TO 29	102,251	25,497	147	0	0	0	0	0	0	0	127,895
30 TO 34	109,951	172,229	24,815	641	0	0	0	0	0	0	307,636
35 TO 39	65,678	134,852	144,095	42,860	126	0	0	0	0	0	387,612
40 TO 44	41,633	72,898	100,460	181,727	31,505	157	0	0	0	0	428,381
45 TO 49	24,736	44,385	57,028	140,990	127,090	18,832	359	0	0	0	413,420
50 TO 54	19,410	30,512	36,734	84,069	114,434	94,943	13,467	864	0	0	394,432
55 TO 59	12,747	19,380	26,387	54,249	65,918	56,618	39,512	7,478	0	0	282,289
60 TO 64	6,377	13,482	18,179	34,914	43,363	31,479	21,075	10,059	1,300	1,300	180,228
65 TO 69	1,981	4,777	11,344	19,792	16,832	11,016	10,312	4,637	4,361	4,361	85,052
70 & UP	843	2,542	5,493	6,908	8,600	5,447	2,975	3,170	6,116	6,116	42,095
TOTAL ¹	392,110	520,553	424,683	566,151	407,867	218,494	87,700	26,209	11,778	11,778	2,655,543

<i>AVERAGE SALARIES: ²</i>											
UNDER 20	0	0	0	0	0	0	0	0	0	0	0
20 TO 24	50,803	0	0	0	0	0	0	0	0	0	50,803
25 TO 29	65,504	72,230	146,718	0	0	0	0	0	0	0	66,786
30 TO 34	67,871	84,302	102,540	128,260	0	0	0	0	0	0	78,679
35 TO 39	70,774	85,948	106,030	114,294	125,694	0	0	0	0	0	91,591
40 TO 44	72,154	86,990	102,094	116,492	125,518	157,270	0	0	0	0	101,729
45 TO 49	69,288	83,274	99,526	117,198	129,949	142,669	179,400	0	0	0	109,428
50 TO 54	73,524	77,245	93,470	111,497	128,145	137,004	134,668	143,938	0	0	112,759
55 TO 59	71,610	69,215	88,252	106,371	122,296	132,284	138,638	133,544	0	0	109,627
60 TO 64	61,909	69,854	82,633	101,201	117,197	125,916	136,848	130,641	118,202	118,202	104,601
65 TO 69	53,531	50,814	79,327	97,981	113,731	119,743	127,312	136,380	124,614	124,614	98,213
70 & UP	46,849	42,364	70,422	79,399	101,179	111,173	119,007	132,092	132,966	132,966	89,185
TOTAL	67,945	81,874	98,947	112,309	124,921	132,823	135,548	133,038	128,023	128,023	97,244

Note: Age is nearest birthday. Service is nearest year.

¹ Total may not add up due to rounding.

² Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2021 (cont'd)

AGE \ SVC	Female Total									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	1	0	0	0	0	0	0	0	0	1
20 TO 24	435	2	0	0	0	0	0	0	0	437
25 TO 29	5,909	1,520	0	0	0	0	0	0	0	7,429
30 TO 34	5,095	7,838	902	3	0	0	0	0	0	13,838
35 TO 39	2,785	5,092	4,689	1,478	4	0	0	0	0	14,048
40 TO 44	1,860	2,903	3,303	5,181	1,090	2	0	0	0	14,339
45 TO 49	1,377	2,042	1,938	3,659	3,583	445	4	0	0	13,048
50 TO 54	1,072	1,719	1,548	2,474	3,068	2,108	439	6	0	12,434
55 TO 59	666	1,209	1,237	1,819	2,092	1,323	1,025	170	0	9,541
60 TO 64	328	680	775	1,417	1,825	871	478	256	27	6,657
65 TO 69	75	244	381	582	833	420	271	107	73	2,986
70 & UP	30	82	115	182	260	173	108	74	121	1,145
TOTAL	19,633	23,331	14,888	16,795	12,755	5,342	2,325	613	221	95,903

SALARIES (IN THOUSANDS):

UNDER 20	10	0	0	0	0	0	0	0	0	10
20 TO 24	24,734	95	0	0	0	0	0	0	0	24,828
25 TO 29	403,759	114,011	0	0	0	0	0	0	0	517,771
30 TO 34	351,571	681,356	92,402	312	0	0	0	0	0	1,125,641
35 TO 39	191,073	441,685	487,124	165,786	375	0	0	0	0	1,286,043
40 TO 44	123,375	236,562	328,851	589,033	130,126	238	0	0	0	1,408,186
45 TO 49	87,428	154,712	177,855	403,557	447,049	58,815	409	0	0	1,329,824
50 TO 54	65,202	116,561	127,619	251,634	363,900	273,790	55,408	802	0	1,254,917
55 TO 59	40,278	78,368	91,191	165,973	220,199	157,312	130,613	21,105	0	905,038
60 TO 64	18,936	41,758	54,733	125,090	174,313	93,297	53,737	32,725	3,598	598,186
65 TO 69	4,080	14,118	25,967	51,354	78,105	41,438	26,983	13,089	9,174	264,308
70 & UP	1,448	4,386	7,333	15,301	21,791	15,702	10,103	8,211	14,883	99,158
TOTAL ¹	1,311,894	1,883,613	1,393,075	1,768,039	1,435,859	640,591	277,254	75,931	27,655	8,813,910

AVERAGE SALARIES: ²

UNDER 20	10,000	0	0	0	0	0	0	0	0	10,000
20 TO 24	56,859	47,440	0	0	0	0	0	0	0	56,816
25 TO 29	68,330	75,007	0	0	0	0	0	0	0	69,696
30 TO 34	69,003	86,930	102,441	104,102	0	0	0	0	0	81,344
35 TO 39	68,608	86,741	103,887	112,169	93,709	0	0	0	0	91,546
40 TO 44	66,331	81,489	99,561	113,691	119,382	118,885	0	0	0	98,207
45 TO 49	63,492	75,765	91,772	110,291	124,769	132,168	102,366	0	0	101,918
50 TO 54	60,823	67,808	82,441	101,711	118,612	129,881	126,215	133,604	0	100,926
55 TO 59	60,478	64,820	73,719	91,244	105,258	118,905	127,427	124,148	0	94,858
60 TO 64	57,731	61,409	70,623	88,278	95,514	107,114	112,421	127,831	133,254	89,858
65 TO 69	54,399	57,862	68,155	88,236	93,764	98,663	99,567	122,327	125,675	88,516
70 & UP	48,277	53,494	63,767	84,069	83,813	90,761	93,546	110,954	122,998	86,601
TOTAL	66,821	80,734	93,570	105,272	112,572	119,916	119,249	123,868	125,135	91,904

Note: Age is nearest birthday. Service is nearest year.

¹ Total may not add up due to rounding.

² Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2021 (cont'd)

AGE \ SVC	Total									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	1	0	0	0	0	0	0	0	0	1
20 TO 24	563	2	0	0	0	0	0	0	0	565
25 TO 29	7,470	1,873	1	0	0	0	0	0	0	9,344
30 TO 34	6,715	9,881	1,144	8	0	0	0	0	0	17,748
35 TO 39	3,713	6,661	6,048	1,853	5	0	0	0	0	18,280
40 TO 44	2,437	3,741	4,287	6,741	1,341	3	0	0	0	18,550
45 TO 49	1,734	2,575	2,511	4,862	4,561	577	6	0	0	16,826
50 TO 54	1,336	2,114	1,941	3,228	3,961	2,801	539	12	0	15,932
55 TO 59	844	1,489	1,536	2,329	2,631	1,751	1,310	226	0	12,116
60 TO 64	431	873	995	1,762	2,195	1,121	632	333	38	8,380
65 TO 69	112	338	524	784	981	512	352	141	108	3,852
70 & UP	48	142	193	269	345	222	133	98	167	1,617
TOTAL	25,404	29,689	19,180	21,836	16,020	6,987	2,972	810	313	123,211

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	10	0	0	0	0	0	0	0	0	10
20 TO 24	31,236	95	0	0	0	0	0	0	0	31,331
25 TO 29	506,010	139,508	147	0	0	0	0	0	0	645,665
30 TO 34	461,522	853,585	117,216	954	0	0	0	0	0	1,433,277
35 TO 39	256,752	576,537	631,219	208,646	501	0	0	0	0	1,673,655
40 TO 44	165,008	309,460	429,312	770,760	161,631	395	0	0	0	1,836,567
45 TO 49	112,164	199,097	234,883	544,546	574,138	77,647	768	0	0	1,743,244
50 TO 54	84,612	147,073	164,353	335,703	478,334	368,734	68,875	1,665	0	1,649,349
55 TO 59	53,025	97,748	117,578	220,222	286,117	213,929	170,125	28,584	0	1,187,327
60 TO 64	25,313	55,240	72,912	160,005	217,675	124,775	74,812	42,784	4,898	778,414
65 TO 69	6,061	18,895	37,311	71,146	94,938	52,455	37,295	17,726	13,536	349,361
70 & UP	2,292	6,928	12,826	22,208	30,392	21,149	13,078	11,381	20,999	141,253
TOTAL ¹	1,704,004	2,404,166	1,817,758	2,334,190	1,843,726	859,084	364,953	102,140	39,433	11,469,453

<i>AVERAGE SALARIES: ²</i>										
UNDER 20	10,000	0	0	0	0	0	0	0	0	10,000
20 TO 24	55,482	47,440	0	0	0	0	0	0	0	55,454
25 TO 29	67,739	74,484	146,718	0	0	0	0	0	0	69,099
30 TO 34	68,730	86,386	102,462	119,201	0	0	0	0	0	80,757
35 TO 39	69,149	86,554	104,368	112,599	100,106	0	0	0	0	91,557
40 TO 44	67,710	82,721	100,143	114,339	120,531	131,680	0	0	0	99,006
45 TO 49	64,685	77,319	93,542	112,000	125,880	134,570	128,044	0	0	103,604
50 TO 54	63,333	69,571	84,674	103,997	120,761	131,644	127,783	138,771	0	103,524
55 TO 59	62,825	65,647	76,548	94,556	108,748	122,176	129,866	126,476	0	97,997
60 TO 64	58,730	63,276	73,278	90,809	99,169	111,307	118,373	128,480	128,897	92,889
65 TO 69	54,112	55,902	71,204	90,747	96,777	102,451	105,951	125,716	125,331	90,696
70 & UP	47,741	48,791	66,457	82,559	88,092	95,267	98,332	116,131	125,743	87,355
TOTAL	67,076	80,978	94,774	106,896	115,089	122,955	122,797	126,098	125,984	93,088

Note: Age is nearest birthday. Service is nearest year.

¹ Total may not add up due to rounding.

² Average based on unrounded salary.

Table XII-7 Detailed Reconciliation of Active Membership

TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2021						TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2020					
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	36	4,776,831	132,690	78.4	46.9	51	6,697,089	131,315	77.0	45.5
1	F	74	9,540,147	128,921	75.8	48.4	91	11,504,920	126,428	74.5	45.1
		110	14,316,978	130,154	76.7	47.9	142	18,202,009	128,183	75.4	45.2
2	M	10	1,114,748	111,475	73.1	41.4	9	1,170,772	130,086	71.9	38.1
2	F	45	5,673,344	126,074	70.6	39.2	58	7,291,045	125,708	69.4	37.2
		55	6,788,092	123,420	71.0	39.6	67	8,461,817	126,296	69.7	37.3
4	M	16,383	1,826,880,514	111,511	49.5	17.9	17,033	1,848,864,785	108,546	48.9	17.1
4	F	57,021	5,918,778,089	103,800	49.6	17.9	59,106	5,902,641,512	99,865	49.1	17.1
		73,404	7,745,658,603	105,521	49.6	17.9	76,139	7,751,506,297	101,807	49.1	17.1
6	M	10,879	822,770,771	75,629	37.1	4.5	10,445	762,729,117	73,023	36.3	3.8
6	F	38,763	2,879,918,542	74,296	37.1	4.5	37,483	2,662,978,786	71,045	36.2	3.8
		49,642	3,702,689,313	74,588	37.1	4.5	47,928	3,425,707,903	71,476	36.2	3.8
ALL TIERS		123,211	11,469,452,986	93,088	44.6	12.5	124,276	11,203,878,026	90,153	44.2	12.0

MEMBERS ALSO PRESENT AS OF JUNE 30, 2021						MEMBERS ALSO PRESENT AS OF JUNE 30, 2020					
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	34	4,503,550	132,457	77.9	46.1	34	4,347,946	127,881	76.9	45.1
1	F	72	9,388,422	130,395	75.7	48.0	72	9,299,336	129,157	74.7	47.1
		106	13,891,972	131,056	76.4	47.4	106	13,647,282	128,748	75.4	46.5
2	M	8	1,033,782	129,223	73.5	39.4	8	1,059,761	132,470	72.5	38.4
2	F	45	5,673,344	126,074	70.6	39.2	45	5,556,493	123,478	69.6	38.2
		53	6,707,126	126,550	71.0	39.2	53	6,616,254	124,835	70.0	38.2
4	M	16,189	1,811,135,337	111,874	49.5	17.9	16,189	1,759,139,436	108,663	48.5	16.9
4	F	56,144	5,840,082,001	104,020	49.7	18.0	56,144	5,612,751,100	99,971	48.7	16.9
		72,333	7,651,217,338	105,778	49.7	18.0	72,333	7,371,890,536	101,916	48.7	16.9
6	M	9,911	761,893,731	76,874	37.3	4.8	9,911	725,044,040	73,155	36.3	3.8
6	F	35,564	2,679,498,523	75,343	37.3	4.8	35,564	2,524,288,357	70,979	36.3	3.8
		45,475	3,441,392,254	75,677	37.3	4.8	45,475	3,249,332,397	71,453	36.3	3.8
ALL TIERS		117,967	11,113,208,690	94,206	44.9	12.9	117,967	10,641,486,469	90,207	43.9	11.9

ADDITIONS DURING THE YEAR ¹						SEPARATIONS FROM MEMBERSHIP DURING THE YEAR ¹					
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	2	273,281	136,641	87.5	60.5	17	2,349,143	138,185	77.3	46.1
1	F	2	151,725	75,863	81.0	60.5	19	2,205,584	116,083	74.0	37.7
		4	425,006	106,252	84.3	60.5	36	4,554,727	126,520	75.5	41.7
2	M	2	80,966	40,483	71.5	49.5	1	111,011	111,011	67.0	36.0
2	F	0	0	0	0.0	0.0	13	1,734,552	133,427	68.9	33.8
		2	80,966	40,483	71.5	49.5	14	1,845,563	131,826	68.7	33.9
4	M	194	15,745,177	81,161	48.4	11.6	844	89,725,349	106,310	56.8	21.0
4	F	877	78,696,088	89,733	43.9	11.0	2,962	289,890,412	97,870	56.6	21.3
		1,071	94,441,265	88,180	44.7	11.1	3,806	379,615,761	99,741	56.7	21.3
6	M	968	60,877,040	62,890	35.6	1.1	534	37,685,077	70,571	37.7	3.4
6	F	3,199	200,420,019	62,651	35.3	1.3	1,919	138,690,429	72,272	34.9	3.6
		4,167	261,297,059	62,706	35.3	1.3	2,453	176,375,506	71,902	35.5	3.6
ALL TIERS		5,244	356,244,296	67,934	37.3	3.4	6,309	562,391,557	89,141	48.6	14.5

Note: Age is nearest birthday. Service is nearest year. The member is considered also present if active with the same tier and gender as of both valuation dates.

¹ Separations and additions do not include members who joined after June 30, 2020 and are no longer members on June 30, 2021. Members are included in separations and additions if the tier or gender has changed.

Table XII-8
Distribution of Pension Benefits as of June 30, 2021

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>SERVICE RETIREMENT:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	0	0	0	0	0	0	0	0	0
45 TO 49	0	0	0	0	0	0	0	0	0
50 TO 54	0	0	0	0	0	0	0	0	0
55 TO 59	602	36,563,716	60,737	1,893	108,106,865	57,109	2,495	144,670,581	57,984
60 TO 64	1,652	90,797,992	54,962	5,245	265,543,276	50,628	6,897	356,341,268	51,666
65 TO 69	2,753	139,473,139	50,662	10,316	480,163,521	46,546	13,069	619,636,660	47,413
70 TO 74	5,495	347,968,374	63,325	15,050	819,590,184	54,458	20,545	1,167,558,558	56,829
75 TO 79	5,771	401,515,845	69,575	11,663	628,256,708	53,868	17,434	1,029,772,553	59,067
80 TO 84	2,921	191,303,435	65,492	7,057	341,195,504	48,349	9,978	532,498,939	53,367
85 TO 89	1,693	109,640,520	64,761	4,290	188,318,731	43,897	5,983	297,959,251	49,801
90 & UP	1,169	72,916,259	62,375	3,643	157,338,363	43,189	4,812	230,254,622	47,850
TOTAL	22,056	1,390,179,280	63,030	59,157	2,988,513,152	50,518	81,213	4,378,692,432	53,916
<i>ORDINARY DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	2	56,731	28,366	3	57,363	19,121	5	114,094	22,819
40 TO 44	8	171,189	21,399	24	683,251	28,469	32	854,440	26,701
45 TO 49	16	482,370	30,148	76	1,861,632	24,495	92	2,344,002	25,478
50 TO 54	38	1,146,809	30,179	154	4,189,866	27,207	192	5,336,675	27,795
55 TO 59	52	1,541,577	29,646	259	6,914,282	26,696	311	8,455,859	27,189
60 TO 64	77	2,055,380	26,693	369	8,815,842	23,891	446	10,871,222	24,375
65 TO 69	98	2,441,963	24,918	394	9,108,193	23,117	492	11,550,156	23,476
70 TO 74	123	3,544,119	28,814	402	9,721,962	24,184	525	13,266,081	25,269
75 TO 79	84	2,391,976	28,476	238	5,322,936	22,365	322	7,714,912	23,959
80 TO 84	22	575,307	26,150	119	2,280,395	19,163	141	2,855,702	20,253
85 TO 89	7	170,160	24,309	56	1,086,073	19,394	63	1,256,233	19,940
90 & UP	9	281,843	31,316	25	579,848	23,194	34	861,691	25,344
TOTAL	536	14,859,424	27,723	2,119	50,621,643	23,889	2,655	65,481,067	24,663
<i>ACCIDENTAL DISABILITY:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	1	38,224	38,224	4	161,249	40,312	5	199,473	39,895
40 TO 44	1	60,161	60,161	8	369,720	46,215	9	429,881	47,765
45 TO 49	8	404,681	50,585	15	659,470	43,965	23	1,064,151	46,267
50 TO 54	10	637,556	63,756	23	1,044,323	45,405	33	1,681,879	50,966
55 TO 59	5	223,047	44,609	60	2,701,746	45,029	65	2,924,793	44,997
60 TO 64	17	890,882	52,405	81	3,338,566	41,217	98	4,229,448	43,158
65 TO 69	24	1,303,478	54,312	97	4,134,721	42,626	121	5,438,199	44,944
70 TO 74	49	2,355,102	48,063	123	5,338,584	43,403	172	7,693,686	44,731
75 TO 79	45	2,329,054	51,757	94	4,000,272	42,556	139	6,329,326	45,535
80 TO 84	11	682,353	62,032	34	1,525,042	44,854	45	2,207,395	49,053
85 TO 89	8	357,119	44,640	23	725,771	31,555	31	1,082,890	34,932
90 & UP	6	266,489	44,415	11	575,454	52,314	17	841,943	49,526
TOTAL	185	9,548,146	51,612	573	24,574,918	42,888	758	34,123,064	45,017

Table XII-8
Distribution of Pension Benefits as of June 30, 2021 (cont'd)

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>ACCIDENTAL DEATH:</i>									
UNDER 30	1	22,601	22,601	3	94,326	31,442	4	116,927	29,232
30 TO 34	1	21,346	21,346	0	0	0	1	21,346	21,346
35 TO 39	0	0	0	1	48,176	48,176	1	48,176	48,176
40 TO 44	1	58,442	58,442	1	60,031	60,031	2	118,473	59,237
45 TO 49	1	51,010	51,010	3	172,064	57,355	4	223,074	55,769
50 TO 54	2	116,087	58,044	1	58,001	58,001	3	174,088	58,029
55 TO 59	2	114,832	57,416	6	332,968	55,495	8	447,800	55,975
60 TO 64	5	199,025	39,805	4	174,973	43,743	9	373,998	41,555
65 TO 69	1	54,416	54,416	2	65,564	32,782	3	119,980	39,993
70 TO 74	0	0	0	0	0	0	0	0	0
75 TO 79	0	0	0	0	0	0	0	0	0
80 TO 84	0	0	0	0	0	0	0	0	0
85 TO 89	0	0	0	0	0	0	0	0	0
90 & UP	0	0	0	0	0	0	0	0	0
TOTAL	14	637,759	45,554	21	1,006,103	47,910	35	1,643,862	46,967
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	7	186,709	26,673	13	265,482	20,422	20	452,191	22,610
30 TO 34	7	243,061	34,723	11	298,427	27,130	18	541,488	30,083
35 TO 39	12	259,984	21,665	18	593,108	32,950	30	853,092	28,436
40 TO 44	22	518,518	23,569	24	580,553	24,190	46	1,099,071	23,893
45 TO 49	23	741,024	32,218	32	657,183	20,537	55	1,398,207	25,422
50 TO 54	32	691,954	21,624	45	1,141,042	25,356	77	1,832,996	23,805
55 TO 59	50	935,730	18,715	91	1,781,472	19,577	141	2,717,202	19,271
60 TO 64	83	2,175,660	26,213	154	4,361,566	28,322	237	6,537,226	27,583
65 TO 69	117	3,674,490	31,406	231	8,969,367	38,828	348	12,643,857	36,333
70 TO 74	234	7,984,783	34,123	509	23,448,779	46,068	743	31,433,562	42,306
75 TO 79	298	11,820,936	39,668	692	32,786,519	47,379	990	44,607,455	45,058
80 TO 84	239	7,942,459	33,232	663	31,628,805	47,706	902	39,571,264	43,871
85 TO 89	213	7,048,893	33,093	559	25,392,295	45,424	772	32,441,188	42,022
90 & UP	297	8,639,655	29,090	660	26,423,585	40,036	957	35,063,240	36,639
TOTAL	1,634	52,863,856	32,352	3,702	158,328,183	42,768	5,336	211,192,039	39,579
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	8	209,310	26,164	16	359,808	22,488	24	569,118	23,713
30 TO 34	8	264,407	33,051	11	298,427	27,130	19	562,834	29,623
35 TO 39	15	354,939	23,663	26	859,896	33,073	41	1,214,835	29,630
40 TO 44	32	808,310	25,260	57	1,693,555	29,711	89	2,501,865	28,111
45 TO 49	48	1,679,085	34,981	126	3,350,349	26,590	174	5,029,434	28,905
50 TO 54	82	2,592,406	31,615	223	6,433,232	28,849	305	9,025,638	29,592
55 TO 59	711	39,378,902	55,385	2,309	119,837,333	51,900	3,020	159,216,235	52,721
60 TO 64	1,834	96,118,939	52,409	5,853	282,234,223	48,220	7,687	378,353,162	49,220
65 TO 69	2,993	146,947,486	49,097	11,040	502,441,366	45,511	14,033	649,388,852	46,276
70 TO 74	5,901	361,852,378	61,321	16,084	858,099,509	53,351	21,985	1,219,951,887	55,490
75 TO 79	6,198	418,057,811	67,450	12,687	670,366,435	52,839	18,885	1,088,424,246	57,634
80 TO 84	3,193	200,503,554	62,795	7,873	376,629,746	47,838	11,066	577,133,300	52,154
85 TO 89	1,921	117,216,692	61,019	4,928	215,522,870	43,734	6,849	332,739,562	48,582
90 & UP	1,481	82,104,246	55,438	4,339	184,917,250	42,617	5,820	267,021,496	45,880
TOTAL	24,425	1,468,088,465	60,106	65,572	3,223,043,999	49,153	89,997	4,691,132,464	52,125

**Graph XII-9
Pensioner Average Benefits**

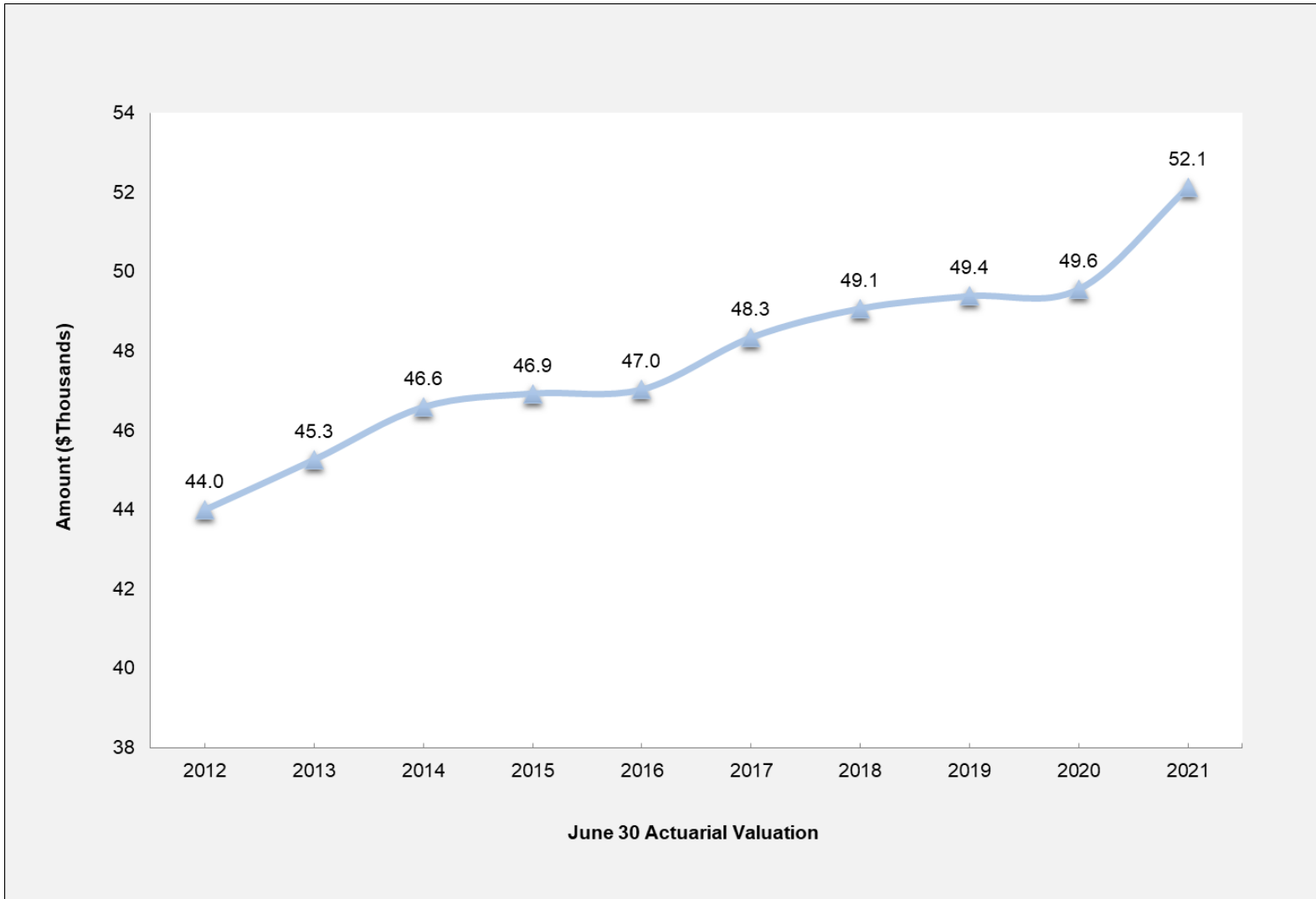


Table XII-10
Reconciliation of Pensioner and Beneficiary Data

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
June 30 Actuarial Valuation	Added to Rolls		Removed from Rolls		End of Year Rolls		% Increase in Annual Allowances	Average Annual Allowances
	Number	Annual Allowances ¹	Number	Annual Allowances	Number	Annual Allowances ²		
2012	4,684	200,786,572	2,209	62,805,438	76,539	3,366,900,574	4.3%	43,989
2013	4,078	248,087,233	2,440	77,107,240	78,177	3,537,880,567	5.1%	45,255
2014	4,356	275,947,759	2,114	67,585,789	80,419	3,746,242,537	5.9%	46,584
2015	4,728	219,769,491	2,370	81,986,287	82,777	3,884,025,741	3.7%	46,922
2016	3,808	157,518,432	2,492	86,890,450	84,093	3,954,653,723	1.8%	47,027
2017	3,519	254,567,439	2,842	111,573,800	84,770	4,097,647,362	3.6%	48,338
2018	4,107	240,586,776	2,582	103,957,220	86,295	4,234,276,918	3.3%	49,067
2019	4,921	249,898,766	2,709	113,559,733	88,507	4,370,615,951	3.2%	49,382
2020	4,144	201,792,665	3,115	135,202,307	89,536	4,437,206,309	1.5%	49,558
2021	3,780	405,781,026	3,319	151,854,871	89,997	4,691,132,464	5.7%	52,125

¹ Amounts shown include changes due to benefit finalization, changes in benefit type (e.g. Service to Accident Disability), COLA increases and other changes.

² Allowances shown are those used in the actuarial valuation as of the Year End date and are not adjusted for anticipated changes due to the finalization of benefit calculations or contract settlements.

APPENDIX: ACRONYMS AND ABBREVIATIONS

Revised 2021 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by the Board of Trustees during Fiscal Year 2021
2019 A&M	Actuarial Assumptions and Methods proposed by the Actuary and adopted by the Board of Trustees during Fiscal Year 2019
AAVM	Actuarial Asset Valuation Method
ACCNY	Administrative Code of the City of New York
AIR	Actuarial Interest Rate
AL	Accrued Liability
AMC	Additional Member Contributions
ASAF	Annuity Savings Accumulation Fund
AVA	Actuarial Value of Assets
BERS	Board of Education Retirement System
BMC	Basic Member Contributions
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
FAS	Final Average Salary
FIRE	Fire Pension Fund
FS	Final Salary
GASB	Governmental Accounting Standards Board
IRC	Internal Revenue Code
MVA	Market Value of Assets
NYCERS	New York City Employees' Retirement System
NYCRS	New York City Retirement Systems
OWBPA	Older Workers Benefit Protection Act
OYLM	One-Year Lag Methodology
POLICE	Police Pension Fund
PV	Present Value
PVFB	Present Value of Future Benefits
PVFNC	Present Value of Future Normal Costs
PVFS	Present Value of Future Salary
TDA	Tax-Deferred Annuity Program
TRS	Teachers' Retirement System
UAL	Unfunded Accrued Liability
WTC	World Trade Center