



Fiscal Year 2020
Actuarial Valuation Report
for the
New York City
Board of Education
Retirement System

JUNE 30, 2018 (LAG) ACTUARIAL VALUATION

prepared by the
New York City
Office of the Actuary

2020



OFFICE OF THE ACTUARY

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SHERRY S. CHAN
CHIEF ACTUARY

August 24, 2020

Board of Trustees
New York City Board of Education Retirement System
65 Court Street, Room 1602
Brooklyn, NY 11201-4965

Re: Fiscal Year 2020 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2018 actuarial valuation of the benefits under both the New York City Board of Education Retirement System (BERS) Qualified Pension Plan and Group Life Insurance Plan (collectively, the Plan). This valuation, known as the June 30, 2018 (Lag) valuation, forms the basis for determining the statutorily-required contribution (Statutory Contribution) of \$257,503,447 for Fiscal Year 2020 (i.e. for the period beginning July 1, 2019 and ending June 30, 2020). 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, 2017 (Lag) actuarial valuation are shown in this Report for comparative purposes. Other historical information that the Actuary believes useful is also included.

The June 30, 2018 (Lag) and June 30, 2017 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employers' payroll service provider. Financial information was provided by BERS and the Office of the Comptroller as of June 30, 2018 and June 30, 2017.

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. The benefits under the Plan are unchanged from the prior valuation.

A summary of the actuarial methods and assumptions are shown in SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS. The actuarial assumptions and methods used for the June 30, 2018 valuation were presented in the report titled “Proposed Changes in Actuarial Assumptions and Methods Used in Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2018 for the New York City Board of Education Retirement System” dated January 24, 2019, which was adopted by the Board of Trustees at the February 27, 2019 Board meeting. The actuarial assumptions and methods are unchanged from the prior year with the exception of the method for determining the Actuarial Value of Assets. Details describing this change can be found later in this Report.

This Report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary will publish Fiscal Year 2020 GASB67 and GASB68 results in a report later this year, which will be available on the website of the Office of the Actuary (www.nyc.gov/actuary).

I, Sherry S. Chan, am the Chief Actuary for, and independent of, the New York City Retirement Systems and Pension Funds. I am a Fellow of the Society of Actuaries, an Enrolled Actuary under the Employee Retirement Income and Security Act of 1974, a Member of the American Academy of Actuaries, and a Fellow of the Conference of Consulting Actuaries. I meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein. To the best of my 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,



Sherry S. Chan, FSA, EA, MAAA, FCA
Chief Actuary

SSC/eh

cc: Mr. Craig Chu - New York City Office of the Actuary
Mr. Michael Hunter - New York City Office of the Actuary
Mr. Sanford Rich - New York City Board of Education Retirement System
Mr. Michael Samet - New York City Office of the Actuary
Keith Snow, Esq. - New York City Office of the Actuary

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SECTION I – EXECUTIVE SUMMARY

This Report presents the results of the June 30, 2018 (Lag) actuarial valuation of the New York City Board of Education Retirement System (BERS) 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 2020 (i.e. July 1, 2019 to June 30, 2020),
- 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, 2018 (Lag) actuarial valuation and, for comparative purposes, the June 30, 2017 (Lag) actuarial valuation.

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
SUMMARY OF VALUATION RESULTS		
Valuation Date	June 30, 2018 (Lag)	June 30, 2017 (Lag)
Fiscal Year	2020	2019
Funded Status		
1. Accrued Liability	\$ 5,103,583,076	\$ 4,743,881,094
2. Actuarial Value of Assets (AVA) ¹	<u>3,908,833,000</u>	<u>3,289,191,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 1,194,750,076	\$ 1,454,690,094
4. Funded Ratio (AVA Basis) (2. / 1.)	76.6%	69.3%
5. Market Value of Assets (MVA) ¹	4,672,903,000	4,099,571,000
6. Unfunded Accrued Liability (MVA Basis) (1. - 5.)	\$ 430,680,076	\$ 644,310,094
7. Funded Ratio (MVA Basis) (5. / 1.)	91.6%	86.4%
Contribution		
1. Normal Cost	\$ 139,073,924	\$ 133,096,063
2. Unfunded Accrued Liability	103,303,104	118,810,617
3. Administrative Expenses	<u>15,126,419</u>	<u>17,729,921</u>
4. Actuarial Contribution (1. + 2. + 3.)	\$ 257,503,447	\$ 269,636,601
5. Statutory Contribution	\$ 257,503,447	\$ 269,636,601
Participant Data		
1. Active Members		
a. Number	25,864	25,794
b. Annual Salary	\$ 1,280,302,470	\$ 1,201,925,550
c. Average Salary	\$ 49,501	\$ 46,597
2. Active Off Payroll Members ²	10,525	2,618
3. Terminated Vested Members	1,934	1,528
4. Retirees and Beneficiaries		
a. Number	18,041	17,425
b. Total Annual Benefits	\$ 253,421,602	\$ 238,156,322
c. Average Benefit	\$ 14,047	\$ 13,668

¹ Actuarial Value of Assets and Market Value of Assets are rounded to the nearest thousand.

² Represents members no longer on payroll, but not otherwise classified.

Table I-2
Actuarial Liabilities

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	June 30, 2018 (Lag)	June 30, 2017 (Lag)
Fiscal Year	2020	2019
Accrued Liability		
1. Active Members	\$ 2,381,162,243	\$ 2,256,013,405
2. Active Off Payroll Members ¹	89,623,631	65,073,169
3. Terminated Vested Members	70,553,757	56,465,781
4. Retirees and Beneficiaries	<u>2,561,243,445</u>	<u>2,364,059,287</u>
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 5,102,583,076	\$ 4,741,611,642
6. Actuarial Adjustments ²	<u>1,000,000</u>	<u>2,269,452</u>
7. Total Accrued Liability (AL) (5. + 6.)	\$ 5,103,583,076	\$ 4,743,881,094
Present Value of Benefits		
1. Active Members	\$ 3,842,586,084	\$ 3,624,626,886
2. Active Off Payroll Members ¹	89,623,631	65,073,169
3. Terminated Vested Members	70,553,757	56,465,781
4. Retirees and Beneficiaries	<u>2,561,243,445</u>	<u>2,364,059,287</u>
5. Present Value of Benefits (1. to 4.)	\$ 6,564,006,917	\$ 6,110,225,123
6. Actuarial Adjustments ²	<u>1,000,000</u>	<u>2,269,452</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 6,565,006,917	\$ 6,112,494,575

¹ Represents members no longer on payroll, but not otherwise classified.

² Related to actuarial loading adjustments.

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 Actuarial Asset Valuation Method (AAVM) is used to determine the Actuarial Value of Assets (AVA) of the Plan.

The Actuary reset the AVA to the market value as of June 30, 2011. Beginning with the June 30, 2012 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of six years. In accordance with this AAVM, Unexpected Investment Returns (UIR) are phased into the AVA at rates of 15%, 15%, 15%, 15%, 20%, and 20% per year (i.e. UIR is recognized at cumulative rates of 15%, 30%, 45%, 60%, 80%, and 100% over a period of six years).

UIR is defined as the excess of net investment return over the Expected Investment Return (EIR) based on the expected rate of return and the AVA, where EIR equals the sum of beginning-of-fiscal-year AVA plus one-half of net cash flow, multiplied by the expected rate of return.

Beginning with the June 30, 2014 (Lag) actuarial valuation, the AVA is further constrained to be within a corridor of 80% to 120% of the market value.

Beginning with the June 30, 2018 (Lag) actuarial valuation, the Actuarial Value of Assets is determined by re-characterizing the interest credited on TDA Fixed Fund account balances as investment income instead of as a cash disbursement.

Table II-1
Statement of Plan Net Assets

(\$ Thousands)		
	June 30, 2018	June 30, 2017
ASSETS		
Cash	\$ 2,106	\$ 3,232
Receivables		
Investment Securities Sold	\$ 84,962	\$ 98,675
Member Loans	50,038	47,935
Accrued Interest and Dividends	13,273	9,080
Other	794	60
Total Receivables	\$ 149,067	\$ 155,750
INVESTMENTS AT FAIR VALUE		
Fixed return funds		
Short-Term Investments		
Commercial Paper	\$ 69,031	\$ 21,496
Short-term Investment Fund	56,088	30,587
U.S. Treasury Bills	0	0
Discount Notes	9,331	0
Debt Securities	1,531,460	1,103,180
Equity Securities	1,687,635	145,431
Alternative Investments	765,549	612,677
Collective Trust Funds		
Fixed Income	256,554	113,962
Domestic Equity	152,372	1,738,135
International Equity	1,167,563	1,251,628
Mortgage Debt Security	34,966	30,925
Treasury Inflation Protected Securities	283,241	236,943
Promissory Notes	0	0
Collateral From Securities Lending	389,554	374,326
Variable return funds		
Short-Term Investments	495	513
Debt Securities	1,076	828
Equities	51,828	46,309
Collateral From Securities Lending	586	617
Total Investments	\$ 6,457,329	\$ 5,707,557
TDA Program's interest in the fixed return fund	0	0
OTHER ASSETS	<u>206,757</u>	<u>160,453</u>
TOTAL ASSETS	\$ 6,815,259	\$ 6,026,992
LIABILITIES		
Accounts Payable	\$ 34,454	\$ 13,884
Payable for Investment Securities Purchased	115,140	92,173
Accrued Benefits Payable	9,747	9,943
TDA Program's interest in the fixed return fund	1,592,875	1,436,478
Other Liabilities	0	0
Security Lending	390,140	374,943
TOTAL LIABILITIES	\$ 2,142,356	\$ 1,927,421
PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS	\$ 4,672,903	\$ 4,099,571

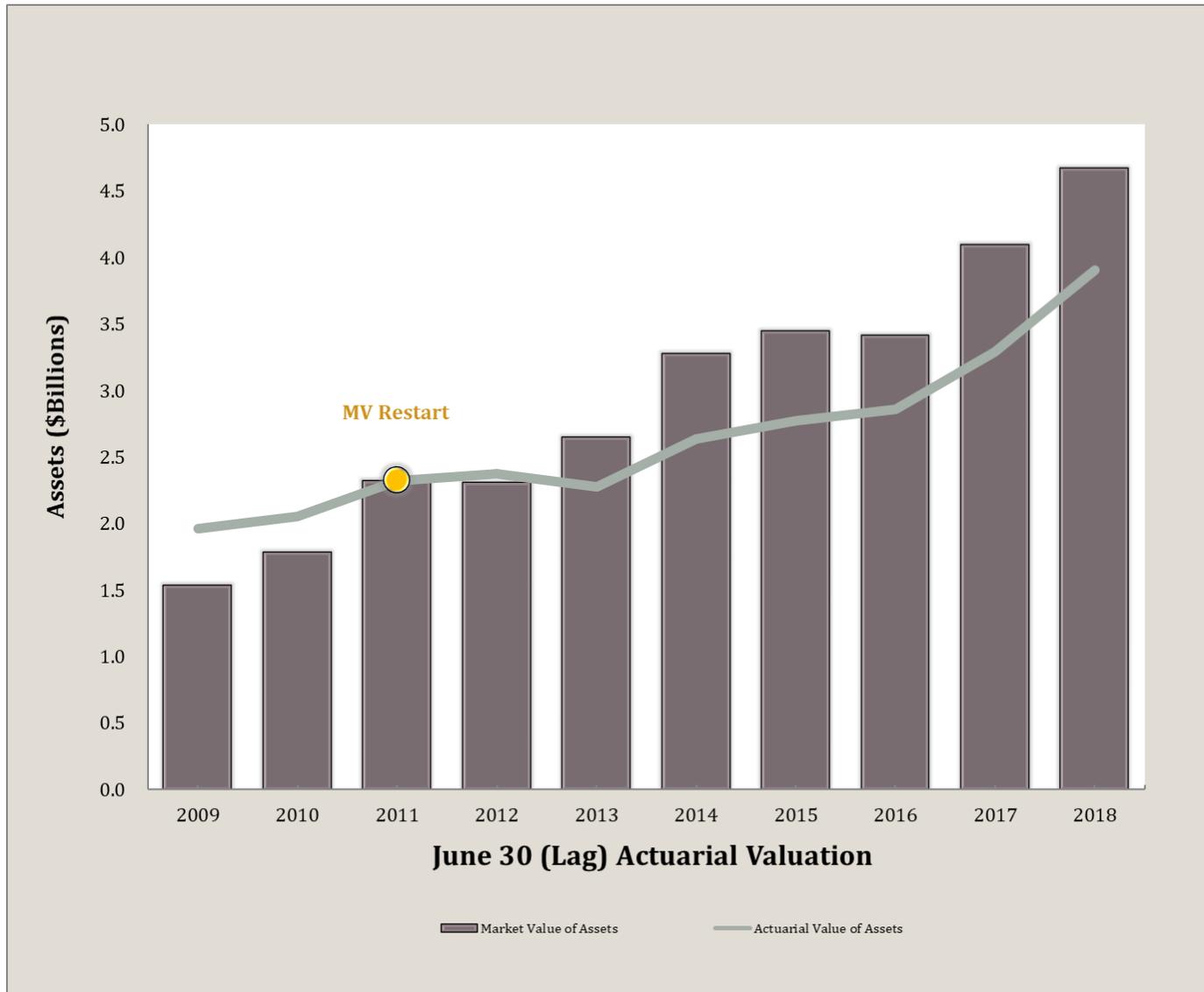
Table II-2
Statement of Changes in Plan Net Assets

(\$ Thousands)		
	June 30, 2018	June 30, 2017
ADDITIONS		
Contributions		
Member Contributions	\$ 40,846	\$ 39,821
Employer Contributions	<u>318,643</u>	<u>288,233</u>
Total Contributions	\$ 359,489	\$ 328,054
Investment Income (Loss)		
Interest Income	\$ 75,362	\$ 54,965
Dividend Income	79,629	70,611
Net Appreciation (Depreciation) in Fair Value	<u>426,315</u>	<u>760,260</u>
Total Investment Income (Loss)	\$ 581,306	\$ 885,836
Less Investment Expenses	19,429	29,204
Net Income (Loss)	\$ 561,877	\$ 856,632
Securities Lending Transactions		
Securities Lending Income	\$ 3,995	\$ 6,118
Securities Lending Fees	<u>(295)</u>	<u>(240)</u>
Net Securities Lending Income (Loss)	<u>\$ 3,700</u>	<u>\$ 5,878</u>
Net Investment Income (Loss)	\$ 565,577	\$ 862,510
Other		
Payments to Other Retirement Systems & Other Revenues/Expenses	\$ 51,024	\$ (122,954)
TDA Program's Interest Income in the Fixed Return Fund	<u>\$ (127,972)</u>	<u>\$ (106,554)</u>
TOTAL ADDITIONS	\$ 848,118	\$ 961,056
DEDUCTIONS		
Benefit Payments and Withdrawals	\$ 261,574	\$ 262,432
Administrative Expenses	<u>13,212</u>	<u>15,486</u>
TOTAL DEDUCTIONS	\$ 274,786	\$ 277,918
NET INCREASE (DECREASE) IN PLAN NET ASSETS	\$ 573,332	\$ 683,138
PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS		
Beginning of Year	\$ 4,099,571	\$ 3,416,433
End of Year	\$ 4,672,903	\$ 4,099,571

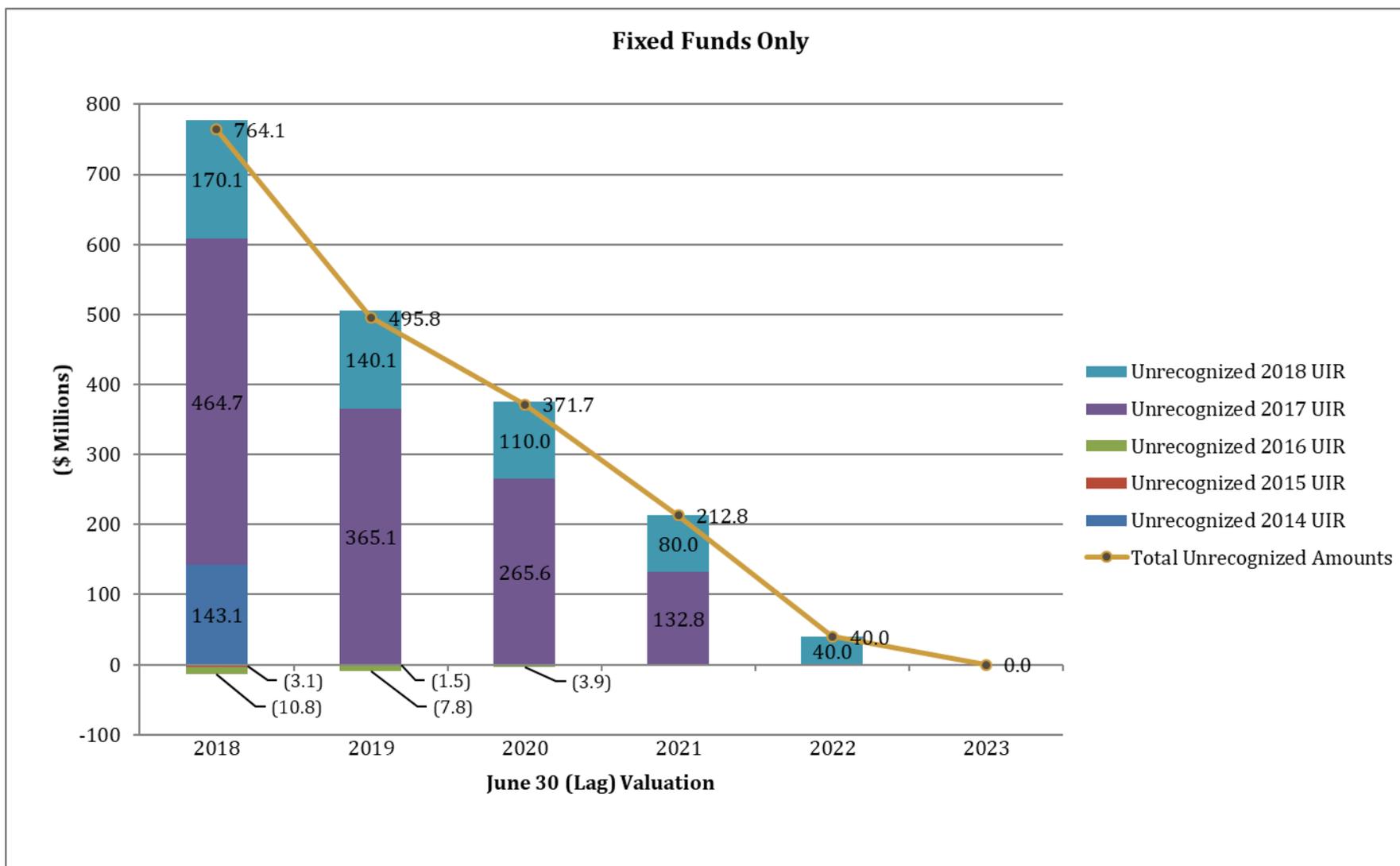
Table II-3
Development of Actuarial Value of Assets

(\$ Thousands)		
Valuation Date	June 30, 2018	June 30, 2017
Fixed Fund		
Market Value of Assets (MVA)		
Beginning of Year (BOY)	\$ 4,051,902	\$ 3,373,846
End of Year (EOY)	\$ 4,619,409	\$ 4,051,902
1. Contributions		
a. Employee	\$ 40,846	\$ 39,804
b. Employer	<u>318,643</u>	<u>288,233</u>
c. Total Contributions	\$ 359,489	\$ 328,037
2. Net Investment Income		
a. Investment Income	\$ 451,130	\$ 884,044
b. Investment Expenses	<u>(19,384)</u>	<u>(29,204)</u>
c. Total Net Investment Income	\$ 431,746	\$ 854,840
3. Cash Flow (Other)	\$ (223,728)	\$ (504,821)
4. Net Cash Flow (1.c. + 3.)	\$ 135,761	\$ (176,784)
5. Average invested assets		
a. AVA @ BOY	\$ 3,241,522	\$ 2,816,150
b. 1/2 Net Cash Flow ((1.c. + 3.) / 2)	<u>67,881</u>	<u>(88,392)</u>
c. Total	\$ 3,309,403	\$ 2,727,758
6. Expected Rate of Return (AIR)	7.00%	7.00%
7. Expected Investment Return (EIR) (5.c. x 6.)	\$ 231,658	\$ 190,943
8. Unexpected Investment Return (UIR) (2.c. - 7.)	\$ 200,088	\$ 663,897
9. AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	\$ 3,119,041	\$ 2,816,150
b. Net Cash Flow (4.)	135,761	(176,784)
c. Expected Investment Return (7.)	231,658	190,943
d. Phase in of UIR		
15% * UIR for prior year	30,013	99,585
15% * UIR for second prior year	99,585	(2,932)
15% * UIR for third prior year	(2,932)	(1,161)
15% * UIR for fourth prior year	(1,161)	107,336
20% * UIR for fifth prior year	143,114	100,260
20% * UIR for sixth prior year	<u>100,260</u>	<u>(14,356)</u>
Total	\$ 368,879	\$ 288,732
e. Preliminary AVA (9.a. + 9.b. + 9.c. + 9.d.)	\$ 3,855,339	\$ 3,119,041
10. Corridor		
a. 80% of MVA	\$ 3,695,528	\$ 3,241,522
b. 120% of MVA	\$ 5,543,290	\$ 4,862,282
11. Final AVA @ EOY (9e. bounded by 10)	\$ 3,855,339	\$ 3,241,522
12. Variable Assets	\$ 53,494	\$ 47,669
13. Total AVA @ EOY (11. + 12.)	\$ 3,908,833	\$ 3,289,191

Graph II-4
Historical Market and Actuarial Value of Assets



Graph II-5
Future Recognition of UIR as of June 30, 2018



SECTION III - CONTRIBUTION DEVELOPMENT AND HISTORY

Table III-1
Statutory Contributions

Table III-1 shows the components of the Fiscal Year 2020 and the Fiscal Year 2019 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	June 30, 2018 (Lag)	June 30, 2017 (Lag)
Fiscal Year	2020	2019
Normal Cost ¹	\$ 139,073,924	\$ 133,096,063
Amortization of Unfunded Accrued Liability		
-Initial UAL	124,876,115	121,238,945
-2011 (Gain)/Loss	(21,558,572)	(21,558,572)
-2012 (Gain)/Loss	4,365,823	4,365,823
-2013 (Gain)/Loss	38,526,274	38,526,274
-2014 (Gain)/Loss	9,952,845	9,952,845
-2014 Assumption Changes ²	16,568,028	16,568,028
-2014 Asset Method Change ³	(27,567,113)	(27,567,113)
-2015 (Gain)/Loss	15,178,241	15,178,241
-2016 (Gain)/Loss	12,812,358	12,812,358
-2017 (Gain)/Loss	(39,483,349)	(39,483,349)
-2017 Method Changes ⁴	11,007,581	11,007,581
-2017 Assumption Changes ⁴	(22,230,444)	(22,230,444)
-2018 (Gain)/Loss	(7,877,140)	NA
-2018 Asset Method Change ⁵	(11,267,543)	NA
Total	103,303,104	118,810,617
Administrative Expenses	15,126,419	17,729,921
Total Contribution to the New York City Board of Education Retirement System	\$ 257,503,447	\$ 269,636,601

¹ Includes amounts necessary, if any, to provide for financing of the Excess Benefit Plan established by Chapter 623/04, but not yet formally adopted by the Board of Trustees.

² Change in post-retirement mortality assumptions including the change to the mortality improvement scale MP-2015.

³ AVA is constrained to a corridor of 80% to 120% of the market value.

⁴ 2019 A&M.

⁵ Change in method of characterizing interest credited on TDA Fixed Fund account balances.

Table III-2
Schedule of Unfunded Accrued Liability Bases

The Initial Unfunded Accrued Liability (UAL) is being amortized over a closed 22-year period using Increasing Dollar Payments (IDP). Under IDP, amortization payments increase by 3.0% per year, consistent with the assumed rate of General Wage Increases. Increments to the UAL established after June 30, 2010 are generally amortized using Level Dollar Payments (LDP) as follows:

- Benefit Changes – Over the remaining working lifetimes of those impacted, unless the amortization period is determined by statute.
- Assumption and Method Changes – Over a closed 20-year period.
- Actuarial Gains and Losses – Over a closed 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 closed 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, 2018.

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM SCHEDULE OF UNFUNDED ACCRUED LIABILITY BASES						
Amortization Base	Date Established	Original Amount	Amortization Years	Amortization Payment	Payments Remaining	OYLM UAL June 30, 2018
Initial UAL	6/30/10	\$ 1,312,067,636	22	\$ 124,876,115	13	\$ 1,178,885,574
(Gain)/Loss	6/30/11	\$ (182,268,307)	15	\$ (21,558,572)	7	\$ (112,320,651)
(Gain)/Loss	6/30/12	\$ 36,911,124	15	\$ 4,365,823	8	\$ 25,202,464
(Gain)/Loss	6/30/13	\$ 325,722,811	15	\$ 38,526,274	9	\$ 242,658,229
(Gain)/Loss	6/30/14	\$ 84,146,947	15	\$ 9,952,845	10	\$ 67,579,339
Assumption Changes ¹	6/30/14	\$ 165,544,370	20	\$ 16,568,028	15	\$ 145,880,702
Asset Method Change ²	6/30/14	\$ (275,445,000)	20	\$ (27,567,113)	15	\$ (242,727,130)
(Gain)/Loss	6/30/15	\$ 128,325,391	15	\$ 15,178,241	11	\$ 110,030,739
(Gain)/Loss	6/30/16	\$ 108,322,889	15	\$ 12,812,358	12	\$ 98,379,495
(Gain)/Loss	6/30/17	\$ (333,814,462)	15	\$ (39,483,349)	13	\$ (319,011,480)
Method Changes ³	6/30/17	\$ 109,985,516	20	\$ 11,007,581	18	\$ 107,043,072
Assumption Changes ³	6/30/17	\$ (222,122,082)	20	\$ (22,230,444)	18	\$ (216,179,646)
(Gain)/Loss	6/30/18	\$ (66,597,775)	15	\$ (7,877,140)	14	\$ (66,597,775)
Asset Method Change ⁴	6/30/18	\$ (112,583,000)	20	\$ (11,267,543)	19	\$ (112,583,000)

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

² AVA is constrained to a corridor of 80% to 120% of the market value.

³ 2019 A&M.

⁴ Change in method of characterizing interest credited on TDA Fixed Fund account balances.

Graph III-3
Remaining UAL Amortizations as of June 30, 2018

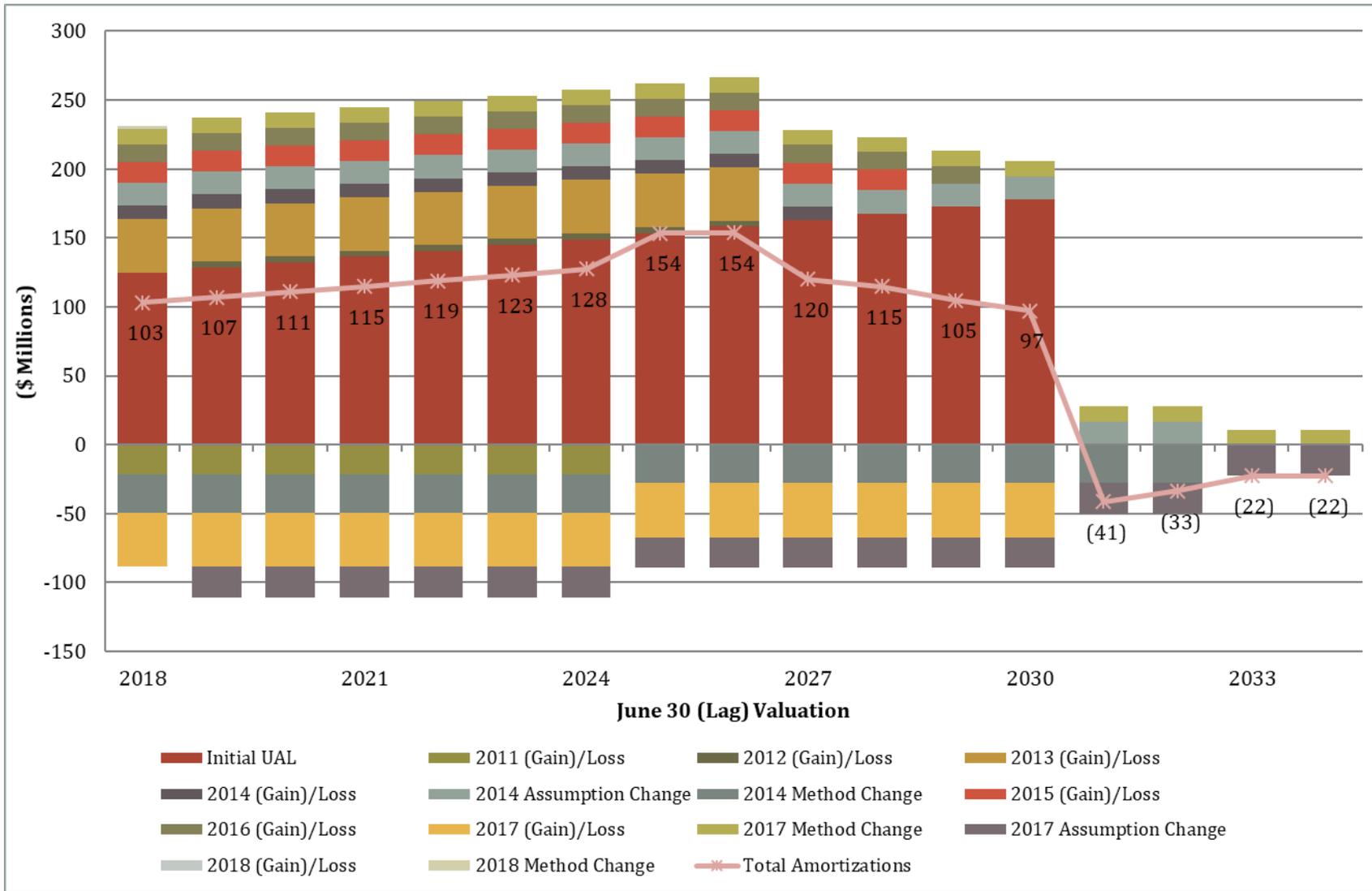


Table III-4
Reconciliation of Outstanding UAL Bases

June 30 (Lag) Valuation Date	Amounts (\$ Thousands) Remaining to be Amortized, as of								
	2010	2011	2012	2013	2014	2015	2016	2017	2018
Unfunded Accrued Liability, June 30, 2010	\$ 1,312,068	\$ 1,403,912	\$ 1,400,216	\$ 1,393,202	\$ 1,382,546	\$ 1,367,898	\$ 1,348,883	\$ 1,211,301	\$ 1,178,886
2011 (Gain)/Loss		(182,268)	(195,027)	(186,379)	(177,125)	(167,223)	(156,628)	(124,451)	(112,321)
ERI		148	159	123	85	44	0	0	0
2012 (Gain)/Loss			36,911	39,495	37,744	35,870	33,864	27,498	25,202
2013 (Gain)/Loss				325,723	348,523	333,068	316,531	261,591	242,658
2014 (Gain)/Loss					84,147	90,038	86,044	72,150	67,579
2014 Assumption Changes					165,544	177,132	172,394	151,306	145,881
2014 Asset Method Change					(275,445)	(294,726)	(286,841)	(251,754)	(242,727)
2015 (Gain)/Loss						128,325	137,308	116,546	110,031
2016 (Gain)/Loss							108,323	103,519	98,379
2017 (Gain)/Loss								(333,814)	(319,011)
2017 Method Changes								109,986	107,043
2017 Assumption Changes								(222,122)	(216,180)
2018 (Gain)/Loss									(66,598)
2018 Asset Method Change									(112,583)
Sum of Outstanding Amortization Amounts	\$ 1,312,068	\$ 1,221,792	\$ 1,242,259	\$ 1,572,164	\$ 1,566,019	\$ 1,670,426	\$ 1,759,878	\$ 1,121,756	\$ 906,239

June 30 (Lag) Valuation Date	2010	2011	2012	2013	2014	2015	2016	2017	2018
1. Accrued Liability (AL)	\$ 3,558,251	\$ 3,681,694	\$ 3,763,130	\$ 4,015,080	\$ 4,335,746	\$ 4,585,781	\$ 4,767,760	\$ 4,743,881	\$ 5,103,583
2. Actuarial Value of Assets (AVA)	2,056,452	2,323,629	2,371,613	2,277,791	2,632,922	2,772,466	2,858,737	3,289,191	3,908,833
3. Due To/From TDA	15,533	15,830	27,915	32,966	1,982	1,773	2,005	8,871	14,176
4. Unfunded Accrued Liability (UAL) (1. - 2. - 3.)	1,486,266	1,342,235	1,363,602	1,704,323	1,700,842	1,811,542	1,907,018	1,445,819	1,180,574
5. PV 1-year Adjusted Employer Contribution	174,198	102,338	102,516	113,311	114,830	118,963	121,755	293,857	260,668
6. PV Future Administrative Expense Reimbursement	0	18,105	18,828	18,849	19,993	22,153	25,385	30,206	13,667
7. Adjusted UAL (4. - 5. - 6.)	\$ 1,312,068	\$ 1,221,792	\$ 1,242,258	\$ 1,572,163	\$ 1,566,019	\$ 1,670,426	\$ 1,759,878	\$ 1,121,756	\$ 906,239

Table III-5
Actuarial and Statutory Contribution History

Table III-5 compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2011 through 2020.

(\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution Certified	Statutory Contribution Contributed	Percentage of Actuarial Contribution Contributed
2011	180,191	180,191	100.0%
2012	213,651	213,651	100.0%
2013	196,246	196,246	100.0%
2014	214,590	214,590	100.0%
2015	258,099	258,099	100.0%
2016	265,532	265,532	100.0%
2017	288,233	288,233	100.0%
2018	318,643	318,643	100.0%
2019	269,637	269,637	100.0%
2020	257,503	257,503	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 2011 through 2020.

CITY RATES (\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution	Salary ¹ at Beginning of Fiscal Year	City Rate
2011	180,191	880,648	20.5%
2012	213,651	879,472	24.3%
2013	196,246	886,178	22.1%
2014	214,590	989,160	21.7%
2015	258,099	1,016,822	25.4%
2016	265,532	1,008,056	26.3%
2017	288,233	1,052,171	27.4%
2018	318,643	1,102,184	28.9%
2019	269,637	1,180,855	22.8%
2020	257,503	1,258,395	20.5%

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

SECTION IV - RESULTS BY CONTRIBUTING ENTITY

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

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
EMPLOYER CONTRIBUTION BY OBLIGOR						
Valuation Date	June 30, 2018 (Lag)					
Fiscal Year	2020					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education	Total
Contribution						
1. Normal Cost	\$ 63,861	\$ 0	\$ 63,861	\$ 6,349,176	\$ 132,660,887	\$ 139,073,924
2. Amortization of Unfunded Accrued Liability	65,787	1,444	67,231	5,083,571	98,152,302	103,303,104
3. Administrative Expenses	<u>4,830</u>	<u>268</u>	<u>5,098</u>	<u>287,693</u>	<u>14,833,628</u>	<u>15,126,419</u>
4. Actuarial Contribution (1. + 2. + 3.)	\$ 134,478	\$ 1,712	\$ 136,190	\$ 11,720,440	\$ 245,646,817	\$ 257,503,447
5. Statutory Contribution (4.)	\$ 134,478	\$ 1,712	\$ 136,190	\$ 11,720,440	\$ 245,646,817	\$ 257,503,447

Table IV-2
Accrued Liabilities by Obligor

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
ACCRUED LIABILITIES BY OBLIGOR						
Valuation Date	June 30, 2018 (Lag)					
Fiscal Year	2020					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education	Total
Accrued Liability						
1. Active Members	\$ 1,130,021	\$ 0	\$ 1,130,021	\$ 146,965,288	\$ 2,233,066,934	\$ 2,381,162,243
2. Active Off Payroll Members ¹	0	0	0	3,324,313	86,299,318	89,623,631
3. Terminated Vested Members	9,774	25,967	35,741	2,991,075	67,526,941	70,553,757
4. Retirees and Beneficiaries	454,798	0	454,798	89,922,129	2,470,866,518	2,561,243,445
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 1,594,593	\$ 25,967	\$ 1,620,560	\$ 243,202,805	\$ 4,857,759,711	\$ 5,102,583,076
6. Actuarial Adjustments ²	0	0	0	19,319	980,681	1,000,000
7. Total Accrued Liability (AL) (5. + 6.)	\$ 1,594,593	\$ 25,967	\$ 1,620,560	\$ 243,222,124	\$ 4,858,740,392	\$ 5,103,583,076
Present Value of Benefits						
1. Active Members	\$ 1,755,882	\$ 0	\$ 1,755,882	\$ 217,451,746	\$ 3,623,378,456	\$ 3,842,586,084
2. Active Off Payroll Members ¹	0	0	0	3,324,313	86,299,318	89,623,631
3. Terminated Vested Members	9,774	25,967	35,741	2,991,075	67,526,941	70,553,757
4. Retirees and Beneficiaries	454,798	0	454,798	89,922,129	2,470,866,518	2,561,243,445
5. Present Value of Benefits (1. to 4.)	\$ 2,220,454	\$ 25,967	\$ 2,246,421	\$ 313,689,263	\$ 6,248,071,233	\$ 6,564,006,917
6. Actuarial Adjustments ²	0	0	0	19,319	980,681	1,000,000
7. Total Present Value of Benefits (5. + 6.)	\$ 2,220,454	\$ 25,967	\$ 2,246,421	\$ 313,708,582	\$ 6,249,051,914	\$ 6,565,006,917

¹ Represents members no longer on payroll, but not otherwise classified.

² Includes actuarial loading adjustments.

Table IV-3
Participant Data by Obligor

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
PARTICIPANT DATA BY OBLIGOR						
Valuation Date	June 30, 2018 (Lag)					
Fiscal Year	2020					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education	Total
Participant Data						
1. Active Members						
a. Number	14	0	14	666	25,184	25,864
b. Annual Salary ¹	\$ 579,614	\$ 0	\$ 579,614	\$ 71,410,862	\$ 1,208,311,994	\$ 1,280,302,470
c. Average Salary	\$ 41,401	\$ 0	\$ 41,401	\$ 107,224	\$ 47,979	\$ 49,501
2. Active Off Payroll Members ²	0	0	0	96	10,429	10,525
3. Terminated Vested Members	1	1	2	38	1,894	1,934
4. Retirees and Beneficiaries						
a. Number	3	0	3	272	17,766	18,041
b. Total Annual Benefits	\$ 42,006	\$ 0	\$ 42,006	\$ 8,648,234	\$ 244,731,362	\$ 253,421,602
c. Average Annual Benefit	\$ 14,002	\$ 0	\$ 14,002	\$ 31,795	\$ 13,775	\$ 14,047

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

² Represents members no longer on payroll, but not otherwise classified.

SECTION V - (GAIN)/LOSS ANALYSIS

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

Table V-1 develops the asset and liability (Gain)/Loss between the June 30, 2017 (Lag) actuarial valuation and the June 30, 2018 (Lag) actuarial valuation.

DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS	
June 30, 2018	
(\$ Thousands)	
1.	Expected Accrued Liability (AL)
	a. AL at June 30, 2017
	\$ 4,743,881
	b. Total Normal Cost and Administrative Expenses at June 30, 2017
	172,511
	c. Interest on 1.a. and 1.b. to June 30, 2018
	344,147
	d. Fiscal Year 2018 Benefit Payments
	(261,574)
	e. Interest on 1.d. to June 30, 2018
	(9,000)
	<u>4,989,965</u>
	f. Expected AL at June 30, 2018
	\$ 4,989,965
2.	Actual AL at June 30, 2018
	\$ 5,103,583
3.	Expected Total Actuarial Value of Assets (AVA) ¹
	a. Total at June 30, 2017
	\$ 3,298,062
	b. Interest on 3.a. to June 30, 2018
	230,864
	c. Total Contributions Paid in Fiscal Year 2018
	359,489
	d. Interest on 3.c. to June 30, 2018
	12,369
	e. Fiscal Year 2018 Benefit Payments
	(261,574)
	f. Interest on 2.e. to June 30, 2018
	(9,000)
	<u>3,630,210</u>
	g. Expected Total at June 30, 2018
	\$ 3,630,210
4.	Actual Total AVA at June 30, 2018 (before Method Change) ²
	\$ 3,810,426
5.	Accrued Liability (Gain) / Loss (2. - 1.e.)
	\$ 113,618
6.	Actuarial Asset (Gain) / Loss (3.f. - 4.)
	\$ (180,216)
7.	Total Actuarial (Gain) / Loss (5. + 6.)
	\$ (66,598)

¹ Includes amount due from TDA of \$8,871,000.

² Includes amount due from TDA of \$14,176,000.

SECTION VI - SCHEDULE OF FUNDING PROGRESS

A schedule of funding progress is provided below. This schedule of funding progress was previously required by GASB 25, which has been superseded by GASB 67, 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 BOARD OF EDUCATION RETIREMENT SYSTEM (\$ Thousands)						
June 30 (Lag) 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	(6) UAL as a % of Covered Payroll (3) / (5)
2010	2,056,452	3,558,251	1,501,799	57.8%	912,290	164.6%
2011	2,323,629	3,681,694	1,358,065	63.1%	920,369	147.6%
2012	2,371,613	3,763,130	1,391,517	63.0%	1,018,895	136.6%
2013	2,277,791	4,015,080	1,737,289	56.7%	1,051,571	165.2%
2014	2,632,922	4,335,746	1,702,824	60.7%	1,045,188	162.9%
2015	2,772,466	4,585,781	1,813,315	60.5%	1,093,962	165.8%
2016	2,858,737	4,767,760	1,909,023	60.0%	1,149,020	166.1%
2017	3,289,191	4,743,881	1,454,690	69.3%	1,201,926	121.0%
2018	3,908,833	5,103,583	1,194,750	76.6%	1,280,302	93.3%

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

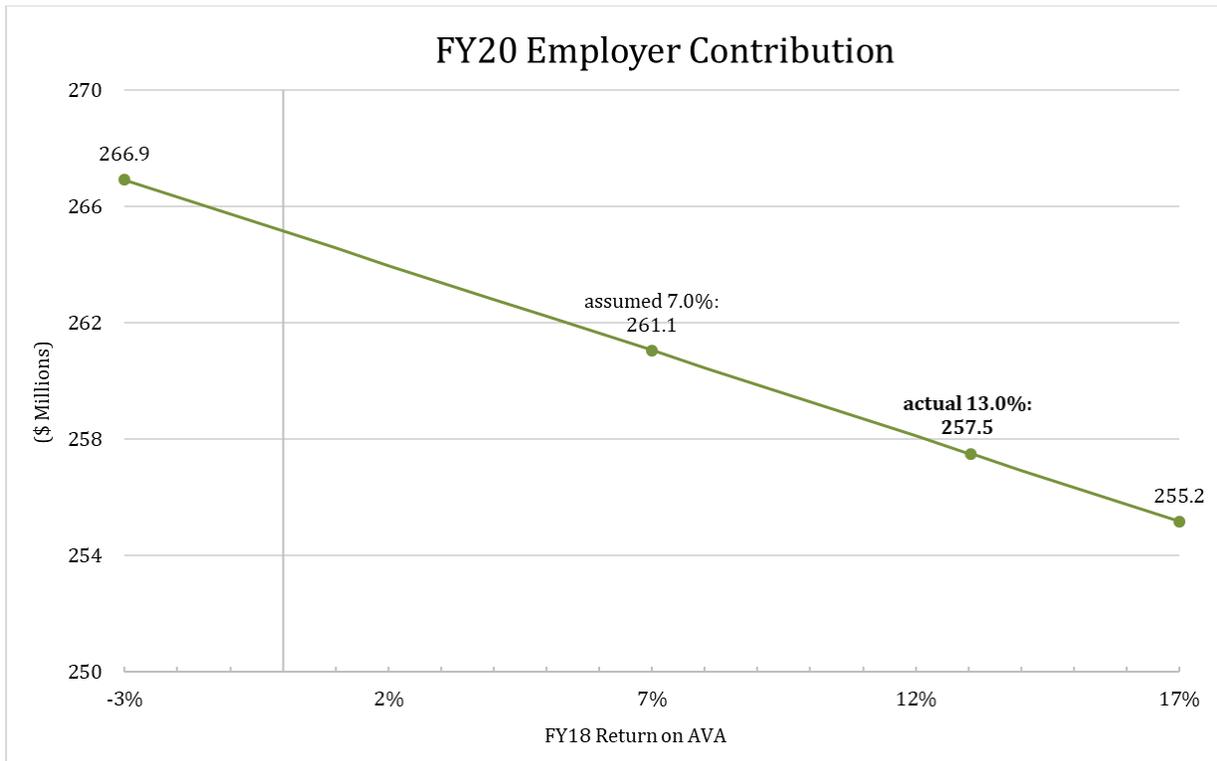
The funded status of BERS depends highly on the realization of the actuarial assumptions used, as well as certain demographic characteristics of the Plan and other exogenous factors. Risks faced by the Plan are described in this Section. These risks have been separated, based on the Actuary's professional judgement, into high, medium, and other risks.

High Risk Types

Investment Risk: The Risk of Not Realizing Expected Returns

The most substantial risk for most pension systems, BERS included, is the risk of investment returns being less than assumed. Generally speaking, as risk-free investment return rates have fallen in recent decades, more aggressive asset allocations have been taken to achieve long-term rates of return commensurate with the actuarial assumption of 7.0%.

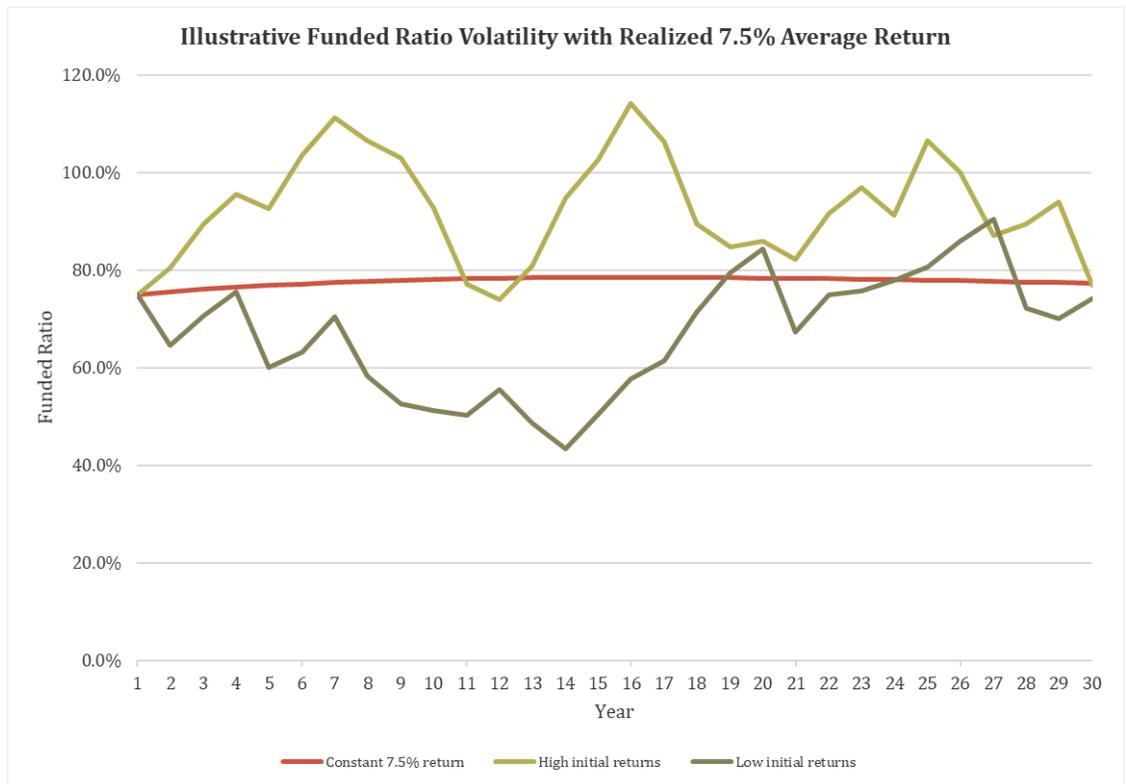
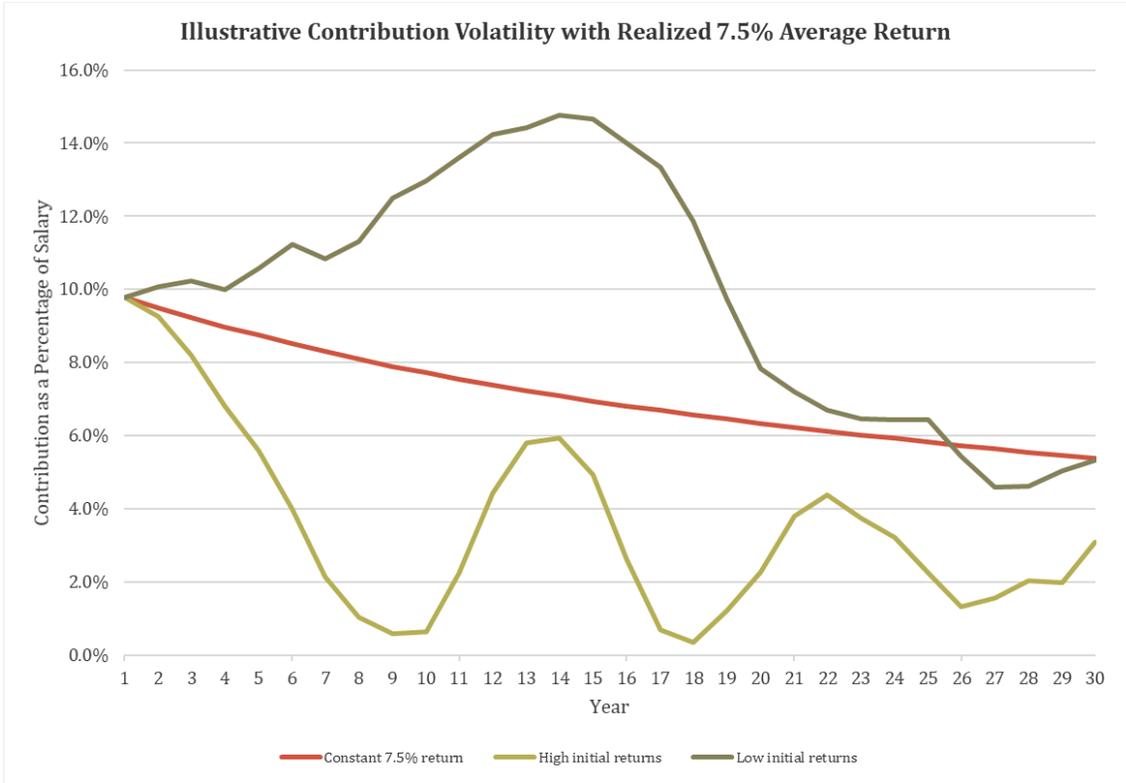
The graph below illustrates the potential FY20 employer contributions if the FY18 investment return had differed from the actual rate by up to 10%.



Investment Risk: The Risk of Volatile Realized Returns

Even when long-term investment returns meet actuarial assumptions, investment return volatility can contribute substantially to contribution and funded status volatility. While not yet available specifically for the Plan at this time, recent research demonstrates this volatility based on a sample public plan with typical characteristics, a typical contribution policy, and a long-term return assumption of 7.5%, which can be realized in different patterns.¹

¹ Yin, Yimeng; Boyd, Don. Pension Simulation Project. *The Nelson A. Rockefeller Institute of Government*.



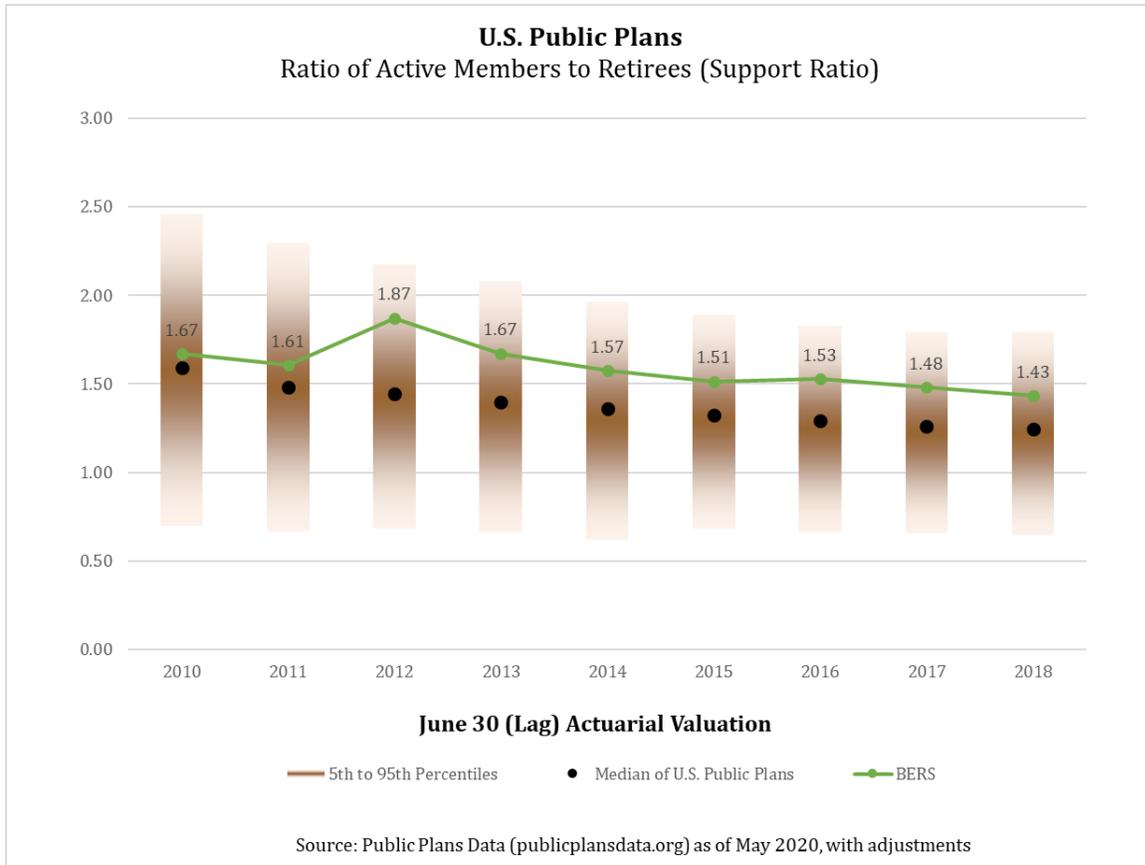
Medium Risk Types

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 BERS, this ratio has been steadily declining in recent years, meaning that fewer active workers exist to support guaranteed pensioner payments.

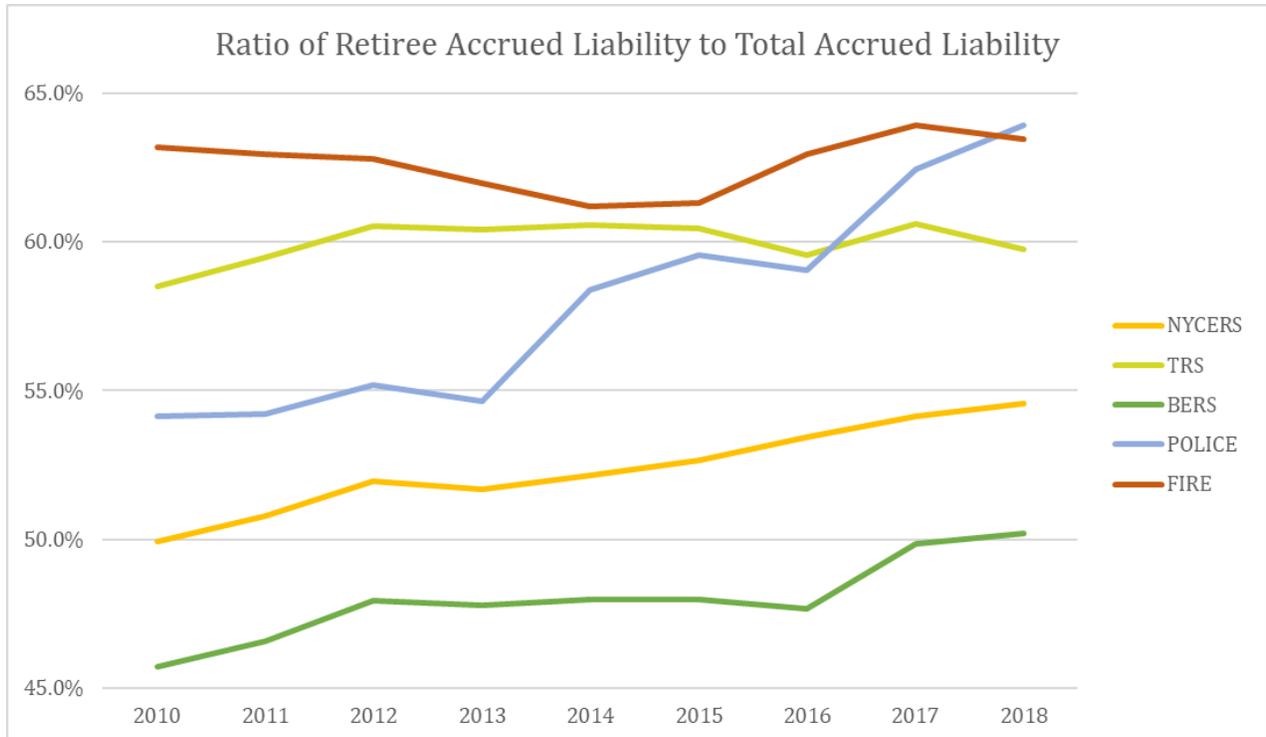


The chart above shows U.S. public pension plan Support Ratios in comparison to the Plan's. The median Support Ratio amongst US public pensions has declined from 1.59 in the 2010 valuation year to 1.24 in the 2018 valuation year. Over that same period, the Plan's Support Ratio declined from 1.67 to 1.43.

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

Ratio of Retiree Accrued Liability to Total Accrued Liability

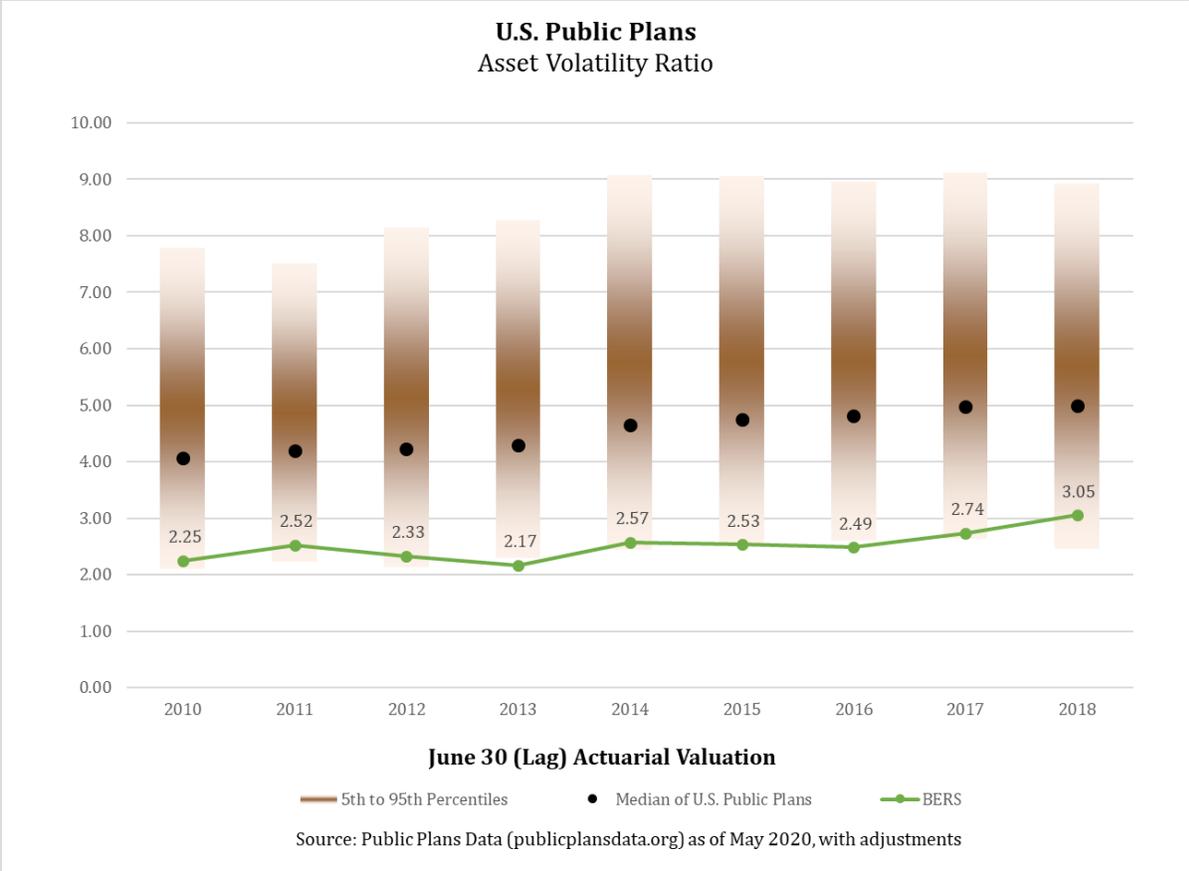
We can also consider the ratio of the Plan's retiree liability to its total liability. A new pension plan begins with this ratio at zero; as the plan matures, the ratio increases. Mature plans often have ratios above 60%. This measure is shown in the graph below for BERS; the other New York City Retirement Systems¹ are included for comparison purposes. The ratio for BERS has been between 48-50% for the past few years, indicating that BERS is not a fully 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 BERS to the population of public pension systems.

¹ New York City Employees' Retirement System (NYCERS); Teachers' Retirement System (TRS); 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 5 and 6. As shown in the tables above, for BERS, since ratios are lower than the average, BERS is not considered a mature plan under this measure.

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 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, Funded Ratio, and Normal Cost of the Plan are shown below:

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM	
SENSITIVITY ANALYSIS AS OF JUNE 30, 2018	
Valuation Date	June 30, 2018
Results at 7.0%	
1. Accrued Liability	\$ 5,103,583,076
2. Actuarial Value of Assets	<u>3,908,833,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	1,194,750,076
4. Funded Ratio (2. / 1.)	76.6%
5. Normal Cost	\$ 139,073,924
Results at 6.0%	
1. Accrued Liability	\$ 5,712,626,506
2. Actuarial Value of Assets	<u>3,908,833,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	1,803,793,506
4. Funded Ratio (2. / 1.)	68.4%
5. Normal Cost	\$ 194,286,655
Sensitivity Analysis for 1.0% Reduction in Interest Rate	
1. Increase in Accrued Liability	11.9%
2. Increase in Unfunded Accrued Liability (AVA Basis)	51.0%
3. Decrease in Funded Ratio	8.2%
4. Increase in Normal Cost	39.7%

Longevity Risk: The Risk of Higher than Assumed Mortality Improvement

BERS 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-2018 was subsequently applied to these base rates.¹

This scale MP-2018 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 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 payments 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 US 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 FY2018, NYC settled 14,094 claims and lawsuits for \$1.0 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-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/wp-content/uploads/documents/Claims-Report-FY-2018.pdf>

Other Risk Types

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 BERS.

In addition, BERS is a multiple-employer plan with several contributing entities. BERS 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 (Lag) 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.

Inflation Risk: The Risk of Higher than Assumed Inflation

BERS 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. A 2018 study¹ which used data from 50 states and 230 retirement systems, found that since 2007 the shortfall between actual contributions to state pension plans and minimum actuarial funding standards was \$200 billion.²

The New York City Retirement Systems and Pension Funds face low contribution risk. City benefits are constitutionally protected, and 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 over 10% of the City's annual budget, and contribution risk may increase if this contribution rate becomes untenable.

¹ The Pew Charitable Trusts. *"The State Pension Funding Gap: 2018."*

² Accounting standards changed in 2014. From 2007 to 2013, the shortfall is calculated between the actuarial recommended contribution and actual employer contributions. From 2014 to 2018, the shortfall represents the gap between the net amortization benchmark and employer contributions.

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 statute may take place that 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 BERS is open to all employees of the Department of Education who are not eligible to participate in the New York City Teachers' Retirement System. In addition, employees of the New York City School Construction Authority, employees of the Office of the Special Commissioner of Investigation, School Crossing Guards employed by the New York City Police Department, and employees of NYC charter schools that have elected and are approved to participate in the plan may also be eligible for membership. Membership in BERS may be voluntary or mandated.

B. Tier Membership

Tier membership is based on the date that the member joined BERS. The tier status of earlier membership in BERS 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 BERS 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.nycbers.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 Less than 0.2% of active members as of June 30, 2018 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 3 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 including AMCs for work in physically taxing employment (AMC-PT) 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 as a percentage of Salary varies by plan in accordance with the following schedule:

Plan Description	AMC Contribution Rate	Years Required
Chapter 96 55/25	1.85% ¹	30
Chapter 96 57/5		
Chapter 19 55/25	1.85%	25
Chapter 19 55/27	1.85%	27
Special Officers 25-yr plan	6.25%	30
Auto Mechanics 50/25-yr plan	4.83%	30
Chapter 504 55/27 plan	1.85%	All years

Tier 6: Members of the 63/10 plan do not make Additional Member Contributions. For members of the Special Officers 25-yr plan and Auto Mechanics 50/25-yr plan, AMC contributions of 6.25% and 4.83%, respectively, are required for the first 30 years of Credited Service.

¹ Members of Chapter 96 55/25 and 57/5 who work in physically taxing employment contribute an additional 1.98%, on top of the 1.85%.

E. Credited Service

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

1. **Membership Service**: Service earned while a member of BERS.
2. **Part-time Service**: Service that is prorated based on the number of hours or days worked in the year.
3. **Previous Service**: Service earned prior to membership while employed by the Department of Education, the City of New York, the State of New York, or any of its political subdivisions, or by another covered employer.
4. **Transferred Service**: Service earned as a member of another public retirement system in the City or State of New York.
5. **Military Service**: Service for qualified time served in one of the armed forces of the United States.

Previous 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 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 are summarized in the table below:

Tier	Plan Description	Minimum Age	Minimum Service
4	Basic 62/5 plan	62	5
4	Chapter 96 55/25 plan	55	25
4	Chapter 96 55/25 plan Physically-Taxing	50	25
4	Chapter 96 57/5 plan	57	5
4	Chapter 96 57/5 plan Physically-Taxing	50	25
4	Chapter 19 55/25	55	25
4	Chapter 19 55/27	55	27
4	Special Officers 25-yr plan	N/A	25
4	Auto Mechanics 50/25-yr plan	50	25
4	Chapter 504 55/27 plan	55	27
6	Basic 63/10 Plan	63	10
6	Special Officers 25-yr plan	N/A	25
6	Auto Mechanics 50/25-yr plan	50	25

2. Benefits:

a. Tier 4 Plans except for the Special Officers 25-year plan and Auto Mechanics 50/25-yr 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 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 63/10 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. Tier 4 and Tier 6 Special Officers 25-year and Auto Mechanics 50/25-yr plans:

- i. 2.0% times FAS times Credited Service up to 30 years.

I. Early Retirement

1. Eligibility: Not all plans provide for early retirement. However, certain participants may be eligible to elect early retirement under the Tier 4 or Tier 6 Basic plans. The eligibility requirements for early retirement plans are summarized in the table below:

Tier	Plan Description	Minimum Age	Minimum Service
4	Basic 62/5 plan	55	5
4	Chapter 504 55/27 plan	55	10
6	Basic 63/10 plan	55	10

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

b. Tier 6 Basic 63/10 Plan:

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

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 $\frac{1}{60}$ times FAS times Credited Service or $\frac{1}{3}$ 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 $\frac{1}{60}$ times FAS times Credited Service or $\frac{1}{3}$ times FAS. The member may elect a service retirement benefit, if eligible.

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 Benefit

a. Eligibility

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

b. Benefits

- i. Active members: Refund of BMC and the employee portion of AMC, if any, 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. Terminated vested members with 10 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. Terminated vested members with less than 10 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: 10 years of Credited Service.
- b. All other Tier 4 plans: 5 years of Credited Service.
- c. Tier 6 plans: 10 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 Special Officers 25-year plan: When the member would have earned 25 years of Credited Service if he or she had continued working in covered employment.
- b. Tier 4 Auto Mechanics 50/25-year plan: When the member would have earned 25 years of Credited Service if he or she had continued working in covered employment, but not prior to age 50.
- c. All other Tier 4 plans: Age 62.
- d. Tier 6 Plans: Age 63. In no case can the vested benefit be less than the annuity equivalent of the BMC.

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 higher 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. AMC include Additional Member Contributions for work in physically taxing employment (AMC-PT). Only the employee portion of AMC is refunded.

1. Employee Portion of AMC: The employee portion of AMC is 50% for all plans that require AMC except for the Special Officers and Auto Mechanics plans, it is 100%.
2. Non-vested termination: BMC and employee portion of AMC are refunded with interest.
3. Vested termination:
 - a. 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 10 years of Credited Service.

- b. A member of one of the Special Officer plans may elect a refund of AMC in lieu of remaining in the Special Officers 25-year plan if he or she leaves service as a special officer prior to earning 15 years of Credited Service as a special officer.
 - c. A member of one of the Auto Mechanics plans may elect a refund of AMC in lieu of remaining in the Auto Mechanics 50/25-year plan if he or she leaves service as an auto mechanic prior to earning 5 years of Credited Service as an auto mechanic.
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. For retirement prior to age 62, the employee portion of AMC-PT are refunded if a member of the Chapter 96 55/25 plan retires on or after age 55 with 25 years of Credited Service or if a member of the Chapter 96 57/5 plan retires on or after age 57 with 25 years of Credited Service.

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 Tier 3 reduction factors for early commencement are less than the factors applicable to 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 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 BERS TDA. A member's contributions to a TDA account are capped by the dollar limitations under §402(g)(1) of the Internal Revenue Code on the exclusion for elective deferrals described in §402(g)(3), and the dollar limitation under §414(v)(2)(B)(i) of the Internal Revenue Code 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 a portion of the accumulated balance into an annuity upon retirement.

S. Changes Since the Prior Valuation

None.

SECTION IX - CHAPTER AMENDMENTS

The June 30, 2018 (Lag) actuarial valuation results reflect the following Chapter amendments from the prior five years.

- **Chapter 41 of the Laws of 2016** (Chapter 41/16) provides up to three years of service credit to members of public retirement systems of the State of New York for military service. Chapter 41/16 removes the requirement that such military service occur during specified periods of hostilities.
- **Chapter 438 of the Laws of 2016** (Chapter 438/16), enacted on November 14, 2016, amended Retirement and Social Security Law Section 43 to eliminate restrictions upon transferring between public retirement systems.
- **Chapter 510 of the Laws of 2015** (Chapter 510/15), clarifies for Tier 6 the definition of multiple employers for the purpose of exclusion of wages and changes the plan year for contributions from April 1 - March 31 to January 1 - December 31.
- **Chapter 427 of the Laws of 2014** (Chapter 427/14), amended Military Law Section 243-d, effective November 4, 2014, to provide non-contributory retirement service credit for members of the New York City Retirement Systems called to active military duty on or after September 11, 2001 and prior to January 1, 2006 who did not receive his or her full salary from a participating employer and is otherwise eligible to receive retirement service credit for such service.

SECTION X - SUBSEQUENT EVENTS

The Board of Trustees, based on recommendations of the Actuary, adopted new factors that provide the adjustment necessary for a retiree to choose an alternative form of benefit payment that is actuarially equivalent to the benefit payable for only the retiree's lifetime (i.e. Maximum Retirement Allowance). The new Option Factors are effective for retirements on and after April 1, 2019 and produce, in almost all cases, a benefit that is greater than the benefit provided under the prior set of Option Factors.

For virtually all retirees who would have elected an Optional Retirement Allowance prior to these new Option Factors and were to elect an Optional Retirement Allowance under the new Option Factors, there will be a reduction in the actuarial gains. For those retirees who would have declined an Optional Retirement Allowance, but would now elect an Optional Retirement Allowance in light of more favorable new factors, no additional cost is expected.

SECTION XI – ACTUARIAL ASSUMPTIONS AND METHODS

The Actuary issued a Report entitled, “Proposed Changes in Actuarial Assumptions and Methods Used in Determining Employer Contributions for Fiscal Years Beginning on and After July 1, 2018 for the New York City Board of Education Retirement System,” dated January 24, 2019. The actuarial assumptions and methods described in that report were adopted by the Board of Trustees at the February 27, 2019 Board meeting and are referred to as the “2019 A&M.”

Beginning with the June 30, 2018 (Lag) actuarial valuation, the method used to determine the Actuarial Value of Assets was calculated by re-characterizing interest credited on TDA Fixed Fund account balances as investment income instead of as a cash disbursement.

The actuarial assumptions and a description of the actuarial methods follow.

Table XI-1
Active Retirement Rates

NEW YORK CITY BOARD OF EDUCATION 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%	15.00%	0.00%	35.00%	0.00%
56	2.50%	15.00%	6.50%	35.00%	12.00%
57	2.50%	15.00%	6.50%	35.00%	12.00%
58	2.50%	15.00%	6.50%	35.00%	12.00%
59	3.75%	15.00%	6.50%	35.00%	12.00%
60	5.00%	15.00%	6.50%	35.00%	12.00%
61	6.25%	15.00%	10.00%	35.00%	12.00%
62	7.50% ¹	20.00%/15.00% ²	10.00%	50.00%	20.00%
63	0.00%	15.00%/20.00% ³	10.00%	35.00%	15.00%
64	0.00%	15.00%	10.00%	35.00%	15.00%
65	0.00%	20.00%	15.00%	50.00%	20.00%
66	0.00%	15.00%	10.00%	35.00%	15.00%
67	0.00%	15.00%	10.00%	35.00%	15.00%
68	0.00%	15.00%	10.00%	35.00%	15.00%
69	0.00%	15.00%	10.00%	35.00%	15.00%
70	0.00%	20.00%	20.00%	35.00%	15.00%
71	0.00%	20.00%	20.00%	35.00%	15.00%
72	0.00%	20.00%	20.00%	35.00%	15.00%
73	0.00%	20.00%	20.00%	35.00%	15.00%
74	0.00%	20.00%	20.00%	35.00%	15.00%
75	0.00%	20.00%	20.00%	35.00%	15.00%
76	0.00%	20.00%	20.00%	35.00%	15.00%
77	0.00%	20.00%	20.00%	35.00%	15.00%
78	0.00%	20.00%	20.00%	35.00%	15.00%
79	0.00%	20.00%	20.00%	35.00%	15.00%
80+	NA	100.00%	100.00%	100.00%	100.00%

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

² 20.00% for Tier 1, 2, & 4 members and 15.00% for Tier 6 members.

³ 15.00% for Tier 1, 2, & 4 members and 20.00% for Tier 6 members.

Table XI-2
Active Termination Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
PROBABILITIES OF TERMINATION		
Years of Service	Males	Females
0	8.40%	5.60%
1	7.70%	5.30%
2	7.20%	5.00%
3	6.70%	4.70%
4	6.20%	4.50%
5	5.70%	4.20%
6	5.20%	3.90%
7	4.70%	3.60%
8	4.30%	3.30%
9	3.90%	3.00%
10	3.50%	2.80%
11	3.20%	2.60%
12	2.90%	2.50%
13	2.60%	2.40%
14	2.30%	2.20%
15	2.10%	2.10%
16	1.90%	1.90%
17	1.80%	1.80%
18	1.70%	1.70%
19	1.50%	1.50%
20+	1.40%	1.40%

Table XI-3
Active Disability Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM				
PROBABILITIES OF DISABILITY RETIREMENT				
	Ordinary Disability		Accidental Disability	
Age	Males	Females	Males	Females
15	0.20%	0.20%	0.030%	0.025%
16	0.20%	0.20%	0.030%	0.025%
17	0.20%	0.20%	0.030%	0.025%
18	0.20%	0.20%	0.030%	0.025%
19	0.20%	0.20%	0.030%	0.025%
20	0.20%	0.20%	0.030%	0.025%
21	0.20%	0.20%	0.030%	0.025%
22	0.20%	0.20%	0.030%	0.025%
23	0.20%	0.20%	0.030%	0.025%
24	0.20%	0.20%	0.030%	0.025%
25	0.20%	0.20%	0.030%	0.025%
26	0.20%	0.20%	0.030%	0.025%
27	0.20%	0.20%	0.030%	0.025%
28	0.20%	0.20%	0.030%	0.025%
29	0.20%	0.20%	0.030%	0.025%
30	0.20%	0.20%	0.030%	0.025%
31	0.22%	0.20%	0.030%	0.025%
32	0.24%	0.20%	0.030%	0.025%
33	0.26%	0.20%	0.030%	0.025%
34	0.28%	0.20%	0.030%	0.025%
35	0.30%	0.20%	0.030%	0.025%
36	0.32%	0.21%	0.030%	0.025%
37	0.34%	0.22%	0.030%	0.025%
38	0.36%	0.23%	0.030%	0.025%
39	0.38%	0.24%	0.030%	0.025%
40	0.40%	0.25%	0.030%	0.025%
41	0.42%	0.26%	0.030%	0.025%
42	0.44%	0.27%	0.030%	0.025%
43	0.46%	0.28%	0.030%	0.025%
44	0.48%	0.29%	0.030%	0.025%
45	0.50%	0.30%	0.030%	0.025%
46	0.52%	0.34%	0.030%	0.025%
47	0.54%	0.38%	0.030%	0.025%
48	0.56%	0.42%	0.030%	0.025%
49	0.58%	0.46%	0.030%	0.025%
50	0.60%	0.50%	0.030%	0.025%
51	0.62%	0.54%	0.030%	0.025%
52	0.64%	0.58%	0.030%	0.025%
53	0.66%	0.62%	0.030%	0.025%
54	0.68%	0.66%	0.030%	0.025%
55	0.70%	0.70%	0.030%	0.025%
56	0.70%	0.70%	0.030%	0.025%
57	0.70%	0.70%	0.030%	0.025%
58	0.70%	0.70%	0.030%	0.025%
59	0.70%	0.70%	0.030%	0.025%
60	0.70%	0.70%	0.030%	0.025%
61	0.70%	0.70%	0.030%	0.025%
62	0.70%	0.70%	0.030%	0.025%
63	0.70%	0.70%	0.030%	0.025%
64	0.70%	0.70%	0.030%	0.025%
65	0.70%	0.70%	0.030%	0.025%
66	0.70%	0.70%	0.030%	0.025%
67	0.70%	0.70%	0.030%	0.025%
68	0.70%	0.70%	0.030%	0.025%
69	0.70%	0.70%	0.030%	0.025%
70	0.70%	0.70%	0.030%	0.025%
71	0.70%	0.70%	0.030%	0.025%
72	0.70%	0.70%	0.030%	0.025%
73	0.70%	0.70%	0.030%	0.025%
74	0.70%	0.70%	0.030%	0.025%
75	0.70%	0.70%	0.030%	0.025%
76	0.70%	0.70%	0.030%	0.025%
77	0.70%	0.70%	0.030%	0.025%
78	0.70%	0.70%	0.030%	0.025%
79	0.70%	0.70%	0.030%	0.025%
80+	NA	NA	NA	NA

Table XI-4
Active Mortality Rates

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM			
PROBABILITIES OF ACTIVE MEMBER MORTALITY			
Age	Ordinary Death		Accidental Death
	Males	Females	
15	0.027%	0.020%	0.000%
16	0.027%	0.020%	0.000%
17	0.027%	0.020%	0.000%
18	0.027%	0.020%	0.000%
19	0.027%	0.020%	0.000%
20	0.027%	0.020%	0.000%
21	0.027%	0.020%	0.000%
22	0.027%	0.020%	0.000%
23	0.027%	0.020%	0.000%
24	0.027%	0.020%	0.000%
25	0.027%	0.020%	0.000%
26	0.029%	0.021%	0.000%
27	0.032%	0.023%	0.000%
28	0.035%	0.024%	0.000%
29	0.037%	0.025%	0.000%
30	0.040%	0.027%	0.000%
31	0.043%	0.028%	0.000%
32	0.045%	0.029%	0.000%
33	0.048%	0.031%	0.000%
34	0.051%	0.032%	0.000%
35	0.053%	0.033%	0.000%
36	0.056%	0.035%	0.000%
37	0.059%	0.036%	0.000%
38	0.061%	0.037%	0.000%
39	0.064%	0.039%	0.000%
40	0.067%	0.040%	0.000%
41	0.073%	0.045%	0.000%
42	0.080%	0.051%	0.000%
43	0.087%	0.056%	0.000%
44	0.093%	0.061%	0.000%
45	0.100%	0.067%	0.000%
46	0.107%	0.073%	0.000%
47	0.113%	0.080%	0.000%
48	0.120%	0.087%	0.000%
49	0.127%	0.093%	0.000%
50	0.133%	0.100%	0.000%
51	0.147%	0.107%	0.000%
52	0.160%	0.113%	0.000%
53	0.173%	0.120%	0.000%
54	0.187%	0.127%	0.000%
55	0.200%	0.133%	0.000%
56	0.213%	0.140%	0.000%
57	0.227%	0.147%	0.000%
58	0.240%	0.153%	0.000%
59	0.253%	0.160%	0.000%
60	0.267%	0.167%	0.000%
61	0.280%	0.173%	0.000%
62	0.293%	0.180%	0.000%
63	0.307%	0.187%	0.000%
64	0.320%	0.193%	0.000%
65	0.333%	0.200%	0.000%
66	0.360%	0.213%	0.000%
67	0.387%	0.227%	0.000%
68	0.413%	0.240%	0.000%
69	0.440%	0.253%	0.000%
70	0.500%	0.300%	0.000%
71	0.580%	0.350%	0.000%
72	0.660%	0.400%	0.000%
73	0.740%	0.450%	0.000%
74	0.820%	0.500%	0.000%
75	0.900%	0.550%	0.000%
76	1.020%	0.640%	0.000%
77	1.140%	0.730%	0.000%
78	1.260%	0.820%	0.000%
79	1.380%	1.000%	0.000%
80+	NA	NA	NA

Table XI-5
Service Retiree Mortality

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR SERVICE RETIREES					
BASE TABLE					
Age	Males	Females	Age	Males	Females
15	0.0105%	0.0090%	68	1.6659%	0.9362%
16	0.0142%	0.0110%	69	1.7932%	1.0193%
17	0.0191%	0.0120%	70	1.9258%	1.1035%
18	0.0222%	0.0130%	71	2.0702%	1.2437%
19	0.0240%	0.0140%	72	2.2162%	1.3853%
20	0.0251%	0.0142%	73	2.3643%	1.5280%
21	0.0268%	0.0150%	74	2.5141%	1.6727%
22	0.0284%	0.0158%	75	2.6665%	1.8182%
23	0.0301%	0.0168%	76	3.0461%	2.0628%
24	0.0315%	0.0179%	77	3.4300%	2.3088%
25	0.0327%	0.0191%	78	3.8175%	2.5551%
26	0.0342%	0.0204%	79	4.2104%	2.8024%
27	0.0354%	0.0217%	80	4.6069%	3.0489%
28	0.0371%	0.0231%	81	5.1554%	3.4450%
29	0.0394%	0.0247%	82	5.7232%	3.8502%
30	0.0427%	0.0265%	83	6.3098%	4.2655%
31	0.0495%	0.0316%	84	6.9124%	4.6895%
32	0.0562%	0.0360%	85	7.5337%	5.1258%
33	0.0625%	0.0398%	86	8.3597%	5.8556%
34	0.0682%	0.0427%	87	9.1919%	6.5878%
35	0.0743%	0.0455%	88	10.0369%	7.3277%
36	0.0780%	0.0474%	89	10.8896%	8.0720%
37	0.0818%	0.0497%	90	11.7567%	8.8218%
38	0.0861%	0.0521%	91	13.4856%	10.1869%
39	0.0917%	0.0551%	92	15.2819%	11.5772%
40	0.0997%	0.0588%	93	17.1377%	13.0290%
41	0.1422%	0.0633%	94	19.0983%	14.4884%
42	0.1848%	0.0702%	95	21.2134%	16.0080%
43	0.2279%	0.0792%	96	23.2990%	17.8232%
44	0.2725%	0.0907%	97	25.4356%	19.4807%
45	0.3194%	0.1052%	98	27.7079%	20.8097%
46	0.3686%	0.1228%	99	29.9402%	21.7553%
47	0.4207%	0.1427%	100	32.1584%	22.1859%
48	0.4752%	0.1652%	101	33.7521%	23.0680%
49	0.5320%	0.1896%	102	35.1259%	24.0803%
50	0.5908%	0.2151%	103	36.3671%	25.2770%
51	0.6563%	0.2401%	104	37.3834%	26.6309%
52	0.7203%	0.2647%	105	38.1051%	28.0912%
53	0.7821%	0.2889%	106	38.4698%	29.6244%
54	0.8405%	0.3120%	107	38.6325%	31.1943%
55	0.8938%	0.3338%	108	38.8076%	32.7579%
56	0.9368%	0.3689%	109	38.9794%	34.2712%
57	0.9718%	0.4030%	110	50.0000%	50.0000%
58	0.9982%	0.4360%	111	50.0000%	50.0000%
59	1.0164%	0.4677%	112	50.0000%	50.0000%
60	1.0277%	0.4987%	113	50.0000%	50.0000%
61	1.0989%	0.5398%	114	50.0000%	50.0000%
62	1.1606%	0.5722%	115	50.0000%	50.0000%
63	1.2158%	0.6041%	116	50.0000%	50.0000%
64	1.2656%	0.6395%	117	50.0000%	50.0000%
65	1.3111%	0.6785%	118	50.0000%	50.0000%
66	1.4252%	0.7529%	119	50.0000%	50.0000%
67	1.5432%	0.8397%	120	100.0000%	100.0000%

Table XI-6
Disabled Retiree Mortality

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF MORTALITY FOR DISABLED RETIREES					
BASE TABLE					
Age	Males	Females	Age	Males	Females
15	0.3309%	0.3302%	68	2.8866%	2.3870%
16	0.4477%	0.4467%	69	2.9926%	2.4723%
17	0.6034%	0.6020%	70	3.1133%	2.5721%
18	0.7007%	0.6521%	71	3.2494%	2.6887%
19	0.7591%	0.7023%	72	3.4007%	2.8231%
20	0.7745%	0.7242%	73	3.5688%	2.9757%
21	0.8177%	0.7766%	74	3.7535%	3.1493%
22	0.8636%	0.8321%	75	3.9565%	3.3428%
23	0.9115%	0.8806%	76	4.1960%	3.5573%
24	0.9623%	0.9414%	77	4.4576%	3.7722%
25	1.0128%	0.9950%	78	4.7400%	4.0056%
26	1.0629%	1.0450%	79	5.0460%	4.2512%
27	1.1121%	1.1039%	80	5.3741%	4.5399%
28	1.1590%	1.1437%	81	5.7241%	4.8505%
29	1.2025%	1.1849%	82	6.0991%	5.1822%
30	1.2403%	1.2276%	83	6.5012%	5.5379%
31	1.2721%	1.2719%	84	6.9293%	5.9081%
32	1.2964%	1.2906%	85	7.5490%	6.6447%
33	1.3125%	1.3095%	86	8.3752%	7.3415%
34	1.3230%	1.3220%	87	9.2076%	8.0805%
35	1.3497%	1.3314%	88	10.0528%	8.8285%
36	1.3769%	1.3388%	89	10.9057%	10.1243%
37	1.4047%	1.3459%	90	11.7730%	11.4944%
38	1.4330%	1.3555%	91	13.5023%	12.9995%
39	1.4619%	1.3700%	92	15.2987%	14.4425%
40	1.4914%	1.3831%	93	17.1548%	15.8488%
41	1.5215%	1.3968%	94	19.1157%	17.6512%
42	1.5522%	1.4199%	95	21.2311%	19.4304%
43	1.5835%	1.4535%	96	23.3168%	20.7560%
44	1.6154%	1.4910%	97	25.4537%	21.5692%
45	1.6480%	1.5473%	98	27.7263%	22.0007%
46	1.6812%	1.6100%	99	29.9589%	23.0087%
47	1.7151%	1.6774%	100	32.1584%	23.1230%
48	1.7497%	1.7359%	101	33.7521%	23.6022%
49	1.7850%	1.7789%	102	35.1259%	24.0803%
50	1.8210%	1.8069%	103	36.3671%	25.2770%
51	1.8577%	1.8265%	104	37.3834%	26.6309%
52	1.8952%	1.8400%	105	38.1051%	28.0912%
53	1.9838%	1.8414%	106	38.4698%	29.6244%
54	2.0700%	1.8419%	107	38.6325%	31.1943%
55	2.1499%	1.8425%	108	38.8076%	32.7579%
56	2.2301%	1.8428%	109	38.9794%	34.2712%
57	2.2996%	1.8478%	110	50.0000%	50.0000%
58	2.3571%	1.8725%	111	50.0000%	50.0000%
59	2.4033%	1.9054%	112	50.0000%	50.0000%
60	2.4415%	1.9416%	113	50.0000%	50.0000%
61	2.4758%	1.9833%	114	50.0000%	50.0000%
62	2.5090%	2.0209%	115	50.0000%	50.0000%
63	2.5475%	2.0671%	116	50.0000%	50.0000%
64	2.5926%	2.1353%	117	50.0000%	50.0000%
65	2.6476%	2.2013%	118	50.0000%	50.0000%
66	2.7148%	2.2603%	119	50.0000%	50.0000%
67	2.7940%	2.3165%	120	100.0000%	100.0000%

Table XI-7
Beneficiary Mortality

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM					
PROBABILITIES OF BENEFICIARY MORTALITY					
BASE TABLE					
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 BOARD OF EDUCATION		
ANNUAL RATES OF MERIT AND SALARY INCREASE		
Years of Service	Merit Increase	Salary Increase ¹
0	6.00%	9.00%
1	5.00%	8.00%
2	4.00%	7.00%
3	3.00%	6.00%
4	2.50%	5.50%
5	2.00%	5.00%
6	1.90%	4.90%
7	1.80%	4.80%
8	1.70%	4.70%
9	1.60%	4.60%
10	1.50%	4.50%
11	1.50%	4.50%
12	1.50%	4.50%
13	1.50%	4.50%
14	1.50%	4.50%
15	1.50%	4.50%
16	1.45%	4.45%
17	1.40%	4.40%
18	1.35%	4.35%
19	1.30%	4.30%
20	1.25%	4.25%
21	1.20%	4.20%
22	1.15%	4.15%
23	1.10%	4.10%
24	1.05%	4.05%
25+	1.00%	4.00%

¹ Salary increase is the General Wage Increase of 3% plus the Merit Increase.

Additional Assumptions and Methods

1. **Post-commencement Mortality Assumption:** The service retiree mortality, disabled retiree mortality, and beneficiary mortality base tables are projected from 2012 using mortality improvement scale MP-2018. The 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 used are as follows:

	Adjustment Factor	
	Male	Female
Service Retiree	0.980	0.980
Disabled Retiree	0.980	0.980
Beneficiary	0.890	0.951

2. **Marital Assumption:** All active members are assumed to be married and females are assumed to be three years younger than their male spouses.
3. **Credited Service:** Calculated in whole year increments for valuation purposes.
4. **Actuarial Interest Rate (AIR):** 7.0% per annum, net of investment expenses.
5. **COLA:** Based on an assumed long-term Consumer Price Index inflation rate of 2.5% per year. 1.5% per year for Auto COLA, 2.5% per year for Escalation.
6. **Actuarial Asset Valuation Method (AAVM):**

The Actuary reset the Actuarial Value of Assets to market value as of June 30, 2011.

Beginning with the June 30, 2012 (Lag) actuarial valuation, the AAVM recognizes investment returns greater or less than expected over a period of six years.

In accordance with this AAVM, Unexpected Investment Returns (UIR) are phased into the Actuarial Value of Assets (AVA) at rates of 15%, 15%, 15%, 15%, 20%, and 20% per year (i.e. cumulative rates of 15%, 30%, 45%, 60%, 80%, and 100% over a period of six years).

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

Beginning with the June 30, 2018 (Lag) actuarial valuation, the method used to determine the Actuarial Value of Assets was calculated by re-characterizing interest credited on TDA Fixed Fund account balances as investment income instead of as a cash disbursement.

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

- 7. 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 earnings (or service) 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.

Under EAN, the explicit UALs that are developed each year are generally financed over fixed periods. Ideally, these periods are reasonably consistent with the expected future working lifetimes of all active participants. For more information see Page 12.

Under EAN, the Normal Cost as a percentage of pay remains constant 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).

- 8. Allowances for Administrative Expenses:** The Employer Contribution for a fiscal year is increased by the interest-adjusted amount of administrative expenses paid from BERS during the second prior fiscal year.
- 9. WTC Disability and Death Benefits:** Obligations attributable to the WTC Disability Benefits Law and to the WTC Death Benefits Law are determined through the use of explicit assumptions in the 2019 A&M, and through estimation techniques for post-retirement reclassifications.
- 10. One-Year Lag Methodology (OYLM):** One-Year Lag Methodology uses a June 30, XX-2 valuation date to determine Fiscal Year XX employer contributions.

This methodology requires adjustments to certain components used to determine the Fiscal Year XX employer contributions as follows:

a. Normal Cost

The normal cost as of June 30, XX-2 is rolled forward with the assumed AIR of 7.0% to derive the normal cost as of December 31, XX-1.

b. UAL Payments

For determining the UAL payments for Fiscal Year XX, and to be consistent with the OYLM, the UAL as of June 30, XX-2 is adjusted by the discounted value of employer normal cost and UAL payments paid during Fiscal Year XX-1 and the discounted value of Administrative Expenses reimbursed during Fiscal Years XX-1 and XX.

11. **Excess Benefits:** The valuation includes liabilities and costs, if any, associated with benefits in excess of the Internal Revenue Code Section 415 limitation.

12. **Term Cost for TDA Fixed Fund:** 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.

SECTION XII - SUMMARY OF DEMOGRAPHIC DATA

The June 30, 2018 (Lag) and June 30, 2017 (Lag) 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, 2018 and June 30, 2017.

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 THE NUMBER OF ACTIVES AND PENSIONERS DURING THE FISCAL YEAR CLASSIFIED BY STATUS										
Status	(1) Active Members	(2) Active Off Payroll Members	(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, 2017	25,794	2,618	1,528	15,454	999	182	2	788	17,425	47,365
New Entrants	2,096	7,333	304	41	1	0	0	4	46	9,779
Rehires	190	(178)	(12)	0	0	0	0	0	0	0
Leaving Active Payroll	(1,259)	1,263	(4)	0	0	0	0	0	0	0
Vested Termination	(93)	(112)	205	0	0	0	0	0	0	0
Non-Vested Termination / Cashout	(54)	(103)	(17)	0	0	0	0	0	0	(174)
Accidental Death (from Active)	0	0	0	0	0	0	0	0	0	0
Ordinary Death (from Active)	(37)	(4)	(2)	0	0	0	0	0	0	(43)
Service Retirement	(688)	(228)	(67)	983	0	0	0	0	983	0
Ordinary Disability Retirement	(75)	(40)	0	0	115	0	0	0	115	0
Accidental Disability Retirement	(9)	(24)	0	0	0	33	0	0	33	0
Death with Beneficiary	(1)	0	(1)	(26)	(1)	0	0	29	2	0
Death without Beneficiary	0	0	0	(473)	(29)	(6)	0	(55)	(563)	(563)
Off Pension Payroll	0	0	0	0	0	0	0	0	0	0
Net Change	70	7,907	406	525	86	27	0	(22)	616	8,999
Number at June 30, 2018	25,864	10,525	1,934	15,979	1,085	209	2	766	18,041	56,364

Graph XII-2
Headcount Summary by Status

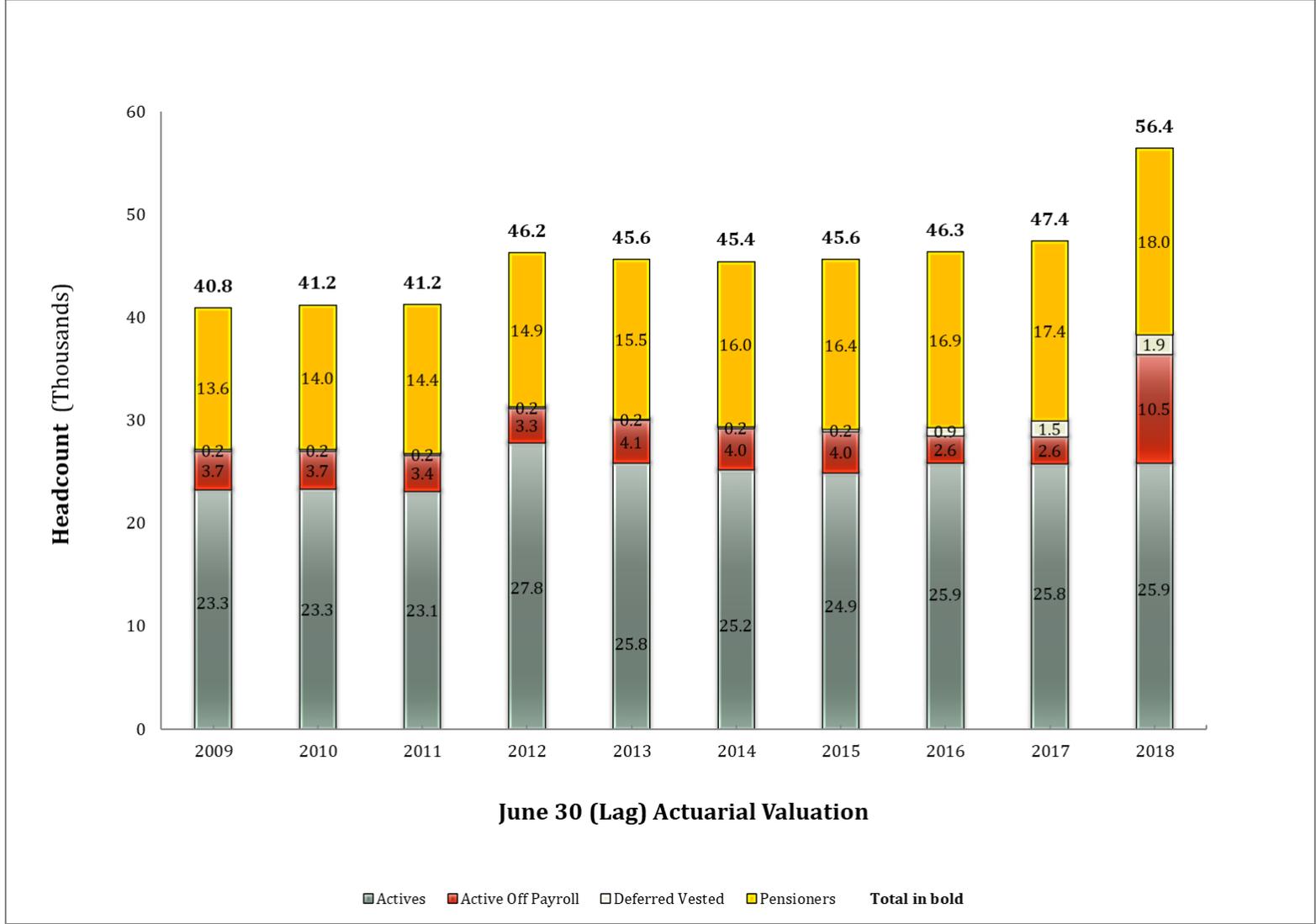


Table XII-3
Summary of Active Membership

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2018 (LAG) AND THE JUNE 30, 2017 (LAG) ACTUARIAL VALUATIONS		
	June 30, 2018 (Lag)	June 30, 2017 (Lag)
Number		
Males	6,602	6,427
Females	19,262	19,367
Total	25,864	25,794
Annual Salary¹		
Males	\$ 450,529,399	\$ 419,754,504
Females	829,773,071	782,171,046
Total	\$ 1,280,302,470	\$ 1,201,925,550
Average Salary¹		
Males	\$ 68,241	\$ 65,311
Females	43,078	40,387
Total Average	\$ 49,501	\$ 46,597
Average Age		
Males	49.0	49.0
Females	51.8	51.8
Total Average	51.1	51.1
Average Past Service		
Males	10.0	10.0
Females	9.3	9.2
Total Average	9.5	9.4

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

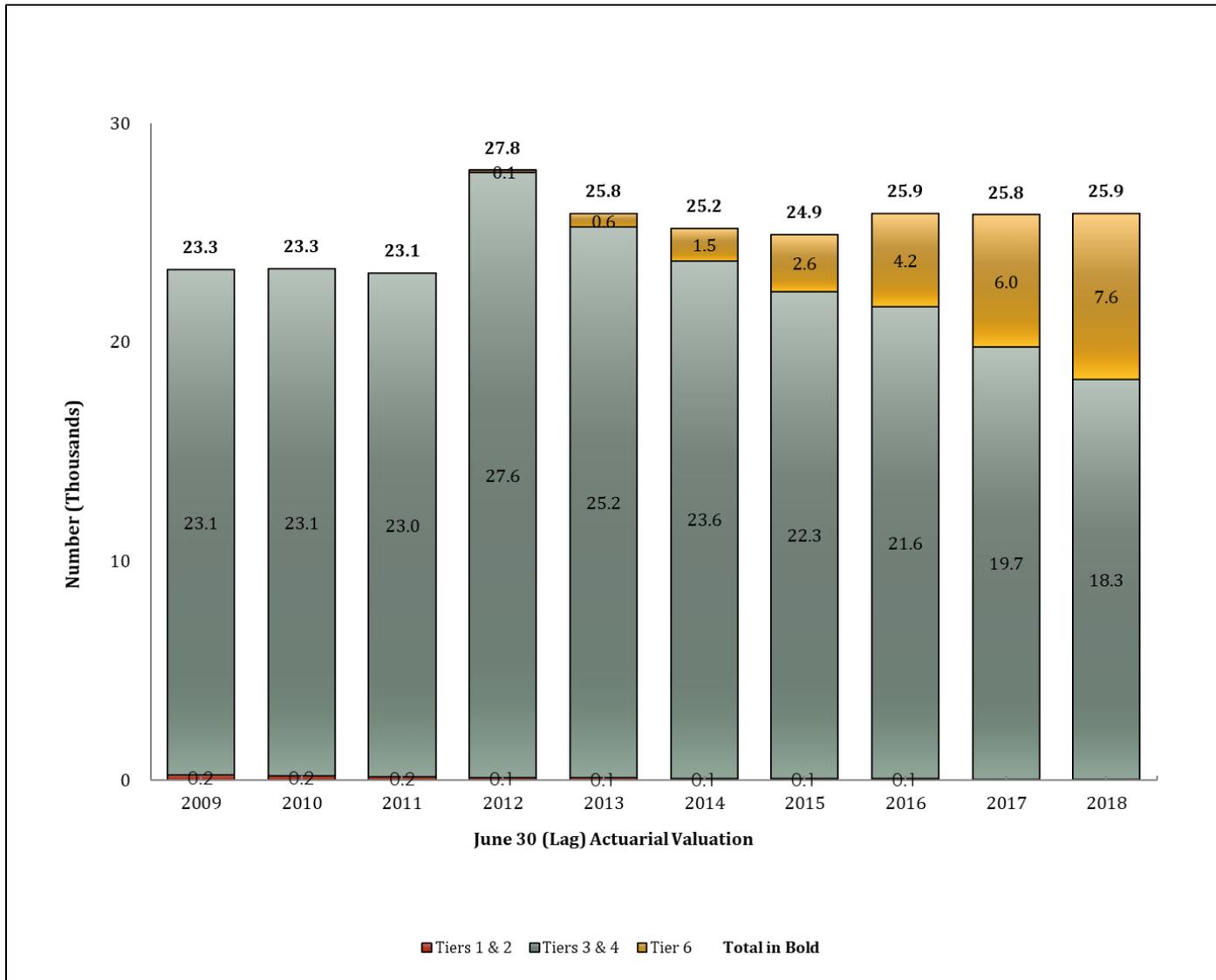


Table XII-5
Historical Active Member Salary Data

June 30 (Lag) Actuarial Valuation	Number	Annual Salary	Average Annual Salary	Percentage Increase/ (Decrease) In Avg. Salary
2009	23,303	\$910,609,483	\$39,077	4.2%
2010	23,324	912,290,136	39,114	0.1%
2011	23,131	920,369,154	39,789	1.7%
2012	27,840	1,018,895,365	36,598	- 8.0%
2013	25,848	1,051,571,168	40,683	11.2%
2014	25,182	1,045,187,738	41,505	2.0%
2015	24,903	1,093,962,316	43,929	5.8%
2016	25,864	1,149,019,892	44,425	1.1%
2017	25,794	1,201,925,550	46,597	4.9%
2018	25,864	1,280,302,470	49,501	6.2%

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, 2018

		Male Total								
AGE \ SVC	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	5	0	0	0	0	0	0	0	0	5
20 TO 24	39	0	0	0	0	0	0	0	0	39
25 TO 29	240	23	0	0	0	0	0	0	0	263
30 TO 34	396	162	21	0	0	0	0	0	0	579
35 TO 39	292	227	100	20	0	0	0	0	0	639
40 TO 44	294	232	180	75	12	1	0	0	0	794
45 TO 49	248	223	234	130	42	14	0	0	0	891
50 TO 54	235	214	226	165	112	59	15	1	0	1,027
55 TO 59	236	214	166	157	130	100	54	6	0	1,063
60 TO 64	122	163	124	110	97	91	74	14	7	802
65 TO 69	38	67	74	48	36	35	12	9	9	328
70 & UP	23	29	49	28	21	5	7	4	6	172
TOTAL	2,168	1,554	1,174	733	450	305	162	34	22	6,602

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	250	0	0	0	0	0	0	0	0	250
20 TO 24	1,394	0	0	0	0	0	0	0	0	1,394
25 TO 29	11,010	1,064	0	0	0	0	0	0	0	12,074
30 TO 34	22,174	8,613	1,461	0	0	0	0	0	0	32,248
35 TO 39	17,784	13,700	7,784	1,274	0	0	0	0	0	40,542
40 TO 44	18,015	15,330	14,872	6,018	1,046	65	0	0	0	55,347
45 TO 49	15,170	12,990	19,890	11,488	3,552	1,278	0	0	0	64,368
50 TO 54	13,865	11,787	19,418	14,533	9,981	4,897	1,300	102	0	75,883
55 TO 59	12,924	11,052	12,999	12,252	12,042	9,423	5,068	644	0	76,405
60 TO 64	7,049	8,041	9,262	8,693	7,717	8,616	7,404	1,546	643	58,972
65 TO 69	1,591	3,277	4,832	3,448	3,031	3,088	1,359	1,129	666	22,422
70 & UP	924	875	2,817	1,815	1,944	455	750	370	676	10,625
TOTAL *	122,150	86,729	93,335	59,522	39,313	27,822	15,882	3,791	1,986	450,529

<i>AVERAGE SALARIES: **</i>										
UNDER 20	50,074	0	0	0	0	0	0	0	0	50,074
20 TO 24	35,747	0	0	0	0	0	0	0	0	35,747
25 TO 29	45,876	46,254	0	0	0	0	0	0	0	45,909
30 TO 34	55,994	53,166	69,590	0	0	0	0	0	0	55,696
35 TO 39	60,903	60,353	77,841	63,706	0	0	0	0	0	63,446
40 TO 44	61,277	66,078	82,623	80,244	87,127	65,116	0	0	0	69,706
45 TO 49	61,167	58,253	85,000	88,370	84,577	91,267	0	0	0	72,242
50 TO 54	59,000	55,078	85,919	88,077	89,120	83,003	86,674	102,240	0	73,888
55 TO 59	54,763	51,646	78,309	78,037	92,628	94,234	93,857	107,319	0	71,876
60 TO 64	57,778	49,332	74,692	79,029	79,559	94,685	100,061	110,412	91,902	73,532
65 TO 69	41,876	48,914	65,293	71,844	84,186	88,214	113,276	125,434	74,051	68,358
70 & UP	40,156	30,158	57,483	64,832	92,578	90,986	107,119	92,428	112,661	61,772
TOTAL	56,342	55,810	79,501	81,203	87,362	91,220	98,037	111,486	90,261	68,241

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

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2018 (cont'd)

		Female Total								
AGE \ SVC	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	58	1	0	0	0	0	0	0	0	59
25 TO 29	511	21	0	0	0	0	0	0	0	532
30 TO 34	803	248	14	1	0	0	0	0	0	1,066
35 TO 39	743	420	197	27	2	0	0	0	0	1,389
40 TO 44	824	507	382	129	18	1	0	0	0	1,861
45 TO 49	904	680	408	252	67	12	1	0	0	2,324
50 TO 54	980	986	636	407	146	71	30	4	0	3,260
55 TO 59	740	960	891	657	251	104	61	28	0	3,692
60 TO 64	380	663	783	675	311	147	54	34	7	3,054
65 TO 69	145	280	380	294	168	59	29	9	12	1,376
70 & UP	47	115	176	141	103	42	13	7	4	648
TOTAL	6,136	4,881	3,867	2,583	1,066	436	188	82	23	19,262

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	29	0	0	0	0	0	0	0	0	29
20 TO 24	2,035	33	0	0	0	0	0	0	0	2,068
25 TO 29	27,653	1,072	0	0	0	0	0	0	0	28,725
30 TO 34	45,202	17,001	829	97	0	0	0	0	0	63,129
35 TO 39	35,165	27,489	14,338	1,673	148	0	0	0	0	78,813
40 TO 44	32,309	27,552	27,207	9,204	1,370	113	0	0	0	97,754
45 TO 49	29,452	29,274	22,975	16,024	4,929	881	99	0	0	103,634
50 TO 54	29,849	35,192	26,888	19,044	9,013	5,140	2,414	367	0	127,907
55 TO 59	21,682	31,221	33,947	27,907	13,202	6,572	4,220	2,264	0	141,015
60 TO 64	10,684	22,119	27,320	27,509	14,281	7,637	4,093	2,469	454	116,565
65 TO 69	4,365	7,957	12,282	11,713	7,241	2,938	1,816	725	858	49,895
70 & UP	1,150	3,246	4,477	4,469	3,701	1,983	572	406	236	20,240
TOTAL *	239,574	202,155	170,263	117,640	53,884	25,264	13,214	6,230	1,548	829,773

<i>AVERAGE SALARIES: **</i>										
UNDER 20	28,580	0	0	0	0	0	0	0	0	28,580
20 TO 24	35,089	32,895	0	0	0	0	0	0	0	35,052
25 TO 29	54,115	51,037	0	0	0	0	0	0	0	53,994
30 TO 34	56,291	68,551	59,221	97,158	0	0	0	0	0	59,220
35 TO 39	47,328	65,451	72,781	61,967	73,885	0	0	0	0	56,741
40 TO 44	39,210	54,343	71,222	71,348	76,100	113,000	0	0	0	52,528
45 TO 49	32,580	43,050	56,311	63,589	73,561	73,432	99,260	0	0	44,593
50 TO 54	30,458	35,692	42,277	46,790	61,734	72,397	80,480	91,639	0	39,235
55 TO 59	29,301	32,522	38,100	42,477	52,598	63,190	69,172	80,851	0	38,195
60 TO 64	28,115	33,361	34,892	40,754	45,918	51,954	75,793	72,616	64,864	38,168
65 TO 69	30,104	28,417	32,322	39,839	43,101	49,794	62,632	80,536	71,471	36,261
70 & UP	24,458	28,229	25,435	31,697	35,928	47,220	43,986	58,029	59,115	31,235
TOTAL	39,044	41,417	44,030	45,544	50,548	57,946	70,288	75,980	67,312	43,078

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

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-6
Detailed Active Membership and Salaries as of June 30, 2018 (cont'd)

		Total								
AGE \ SVC	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	6	0	0	0	0	0	0	0	0	6
20 TO 24	97	1	0	0	0	0	0	0	0	98
25 TO 29	751	44	0	0	0	0	0	0	0	795
30 TO 34	1,199	410	35	1	0	0	0	0	0	1,645
35 TO 39	1,035	647	297	47	2	0	0	0	0	2,028
40 TO 44	1,118	739	562	204	30	2	0	0	0	2,655
45 TO 49	1,152	903	642	382	109	26	1	0	0	3,215
50 TO 54	1,215	1,200	862	572	258	130	45	5	0	4,287
55 TO 59	976	1,174	1,057	814	381	204	115	34	0	4,755
60 TO 64	502	826	907	785	408	238	128	48	14	3,856
65 TO 69	183	347	454	342	204	94	41	18	21	1,704
70 & UP	70	144	225	169	124	47	20	11	10	820
TOTAL	8,304	6,435	5,041	3,316	1,516	741	350	116	45	25,864

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	279	0	0	0	0	0	0	0	0	279
20 TO 24	3,429	33	0	0	0	0	0	0	0	3,462
25 TO 29	38,663	2,136	0	0	0	0	0	0	0	40,799
30 TO 34	67,375	25,614	2,290	97	0	0	0	0	0	95,376
35 TO 39	52,949	41,190	22,122	2,947	148	0	0	0	0	119,355
40 TO 44	50,324	42,882	42,079	15,222	2,415	178	0	0	0	153,101
45 TO 49	44,621	42,264	42,865	27,513	8,481	2,159	99	0	0	168,002
50 TO 54	43,714	46,979	46,306	33,576	18,995	10,037	3,715	469	0	203,790
55 TO 59	34,606	42,273	46,947	40,159	25,244	15,995	9,288	2,908	0	217,420
60 TO 64	17,733	30,160	36,582	36,202	21,998	16,254	11,497	4,015	1,097	175,537
65 TO 69	5,956	11,234	17,114	15,161	10,272	6,025	3,176	1,854	1,524	72,316
70 & UP	2,073	4,121	7,293	6,285	5,645	2,438	1,322	776	912	30,865
TOTAL *	361,724	288,884	263,598	177,162	93,197	53,087	29,096	10,021	3,534	1,280,302

<i>AVERAGE SALARIES: **</i>										
UNDER 20	46,492	0	0	0	0	0	0	0	0	46,492
20 TO 24	35,354	32,895	0	0	0	0	0	0	0	35,329
25 TO 29	51,482	48,537	0	0	0	0	0	0	0	51,319
30 TO 34	56,193	62,472	65,442	97,158	0	0	0	0	0	57,980
35 TO 39	51,158	63,662	74,485	62,707	73,885	0	0	0	0	58,854
40 TO 44	45,013	58,027	74,873	74,619	80,511	89,058	0	0	0	57,665
45 TO 49	38,734	46,804	66,768	72,022	77,806	83,035	99,260	0	0	52,256
50 TO 54	35,979	39,149	53,719	58,700	73,622	77,210	82,545	93,759	0	47,537
55 TO 59	35,457	36,008	44,415	49,335	66,257	78,408	80,763	85,522	0	45,724
60 TO 64	35,324	36,513	40,333	46,117	53,916	68,293	89,823	83,639	78,383	45,523
65 TO 69	32,549	32,374	37,696	44,331	50,352	64,099	77,454	102,985	72,577	42,439
70 & UP	29,616	28,617	32,415	37,187	45,522	51,876	66,082	70,538	91,243	37,640
TOTAL	43,560	44,893	52,291	53,426	61,475	71,642	83,132	86,387	78,531	49,501

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

* Total may not add up due to rounding.

** Average based on unrounded salary.

Table XII-7
Detailed Reconciliation of Active Membership

		TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2018					TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2017				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	5	515,323	103,065	71.0	33.8	9	839,701	93,300	68.3	25.6
1	F	14	931,188	66,513	71.3	28.6	17	1,184,765	69,692	69.8	28.4
		19	1,446,511	76,132	71.2	30.0	26	2,024,466	77,864	69.3	27.4
2	M	9	968,131	107,570	68.2	26.4	8	819,353	102,419	68.3	29.3
2	F	12	742,834	61,903	69.2	27.2	12	722,905	60,242	68.8	30.1
		21	1,710,965	81,475	68.8	26.9	20	1,542,258	77,113	68.6	29.8
4	M	4,515	325,402,960	72,072	51.9	13.6	4,834	329,434,059	68,149	51.2	12.6
4	F	13,735	592,123,090	43,111	54.8	12.2	14,903	601,350,935	40,351	54.2	11.3
		18,250	917,526,050	50,275	54.1	12.5	19,737	930,784,994	47,159	53.5	11.6
6	M	2,073	123,642,985	59,644	42.6	2.1	1,576	88,661,391	56,257	42.1	1.7
6	F	5,501	235,975,959	42,897	44.1	2.1	4,435	178,912,441	40,341	43.4	1.7
		7,574	359,618,944	47,481	43.7	2.1	6,011	267,573,832	44,514	43.1	1.7
ALL		25,864	1,280,302,470	49,501	51.1	9.5	25,794	1,201,925,550	46,597	51.1	9.4

		MEMBERS WITH SAME GENDER AND TIER IN BOTH VALUATION YEARS					MEMBERS WITH SAME GENDER AND TIER IN BOTH VALUATION YEARS				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	5	515,323	103,065	71.0	33.8	5	492,874	98,575	70.0	32.8
1	F	14	931,188	66,513	71.3	28.6	14	925,215	66,087	70.3	31.6
		19	1,446,511	76,132	71.2	30.0	19	1,418,089	74,636	70.2	31.9
2	M	8	835,142	104,393	69.3	29.8	8	819,353	102,419	68.3	29.3
2	F	10	639,202	63,920	69.9	29.7	10	618,780	61,878	68.9	29.9
		18	1,474,344	81,908	69.6	29.7	18	1,438,133	79,896	68.6	29.6
4	M	4,440	320,853,970	72,264	52.0	13.7	4,440	305,714,488	68,855	51.0	12.6
4	F	13,554	583,405,764	43,043	54.9	12.2	13,554	553,124,810	40,809	53.9	11.2
		17,994	904,259,734	50,253	54.2	12.6	17,994	858,839,298	47,729	53.2	11.6
6	M	1,423	89,360,604	62,797	43.2	2.7	1,423	80,575,837	56,624	42.2	1.7
6	F	4,046	179,428,951	44,347	44.8	2.6	4,046	162,251,695	40,102	43.8	1.7
		5,469	268,789,555	49,148	44.4	2.6	5,469	242,827,532	44,401	43.4	1.7
ALL		23,500	1,175,970,144	50,041	51.9	10.3	23,500	1,104,523,052	47,001	50.9	9.3

		ADDITIONS DURING THE YEAR *					SEPARATIONS FROM MEMBERSHIP DURING THE YEAR *				
TIER	GENDER	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC	NUMBER	SALARY	AVG SAL	AVG AGE	AVG SVC
1	M	0	0	0	0.0	0.0	4	346,827	86,707	66.3	16.5
1	F	0	0	0	0.0	0.0	3	259,550	86,517	67.3	13.7
		0	0	0	0.0	0.0	7	606,377	86,625	66.7	15.3
2	M	1	132,989	132,989	60.0	0.0	0	0	0	0.0	0.0
2	F	2	103,632	51,816	65.5	14.5	2	104,125	52,063	68.5	31.0
		3	236,621	78,874	63.7	9.7	2	104,125	52,063	68.5	31.0
4	M	75	4,548,990	60,653	49.2	8.6	394	23,719,571	60,202	53.5	13.3
4	F	181	8,717,326	48,162	48.8	8.0	1,349	48,226,125	35,750	57.2	12.3
		256	13,266,316	51,822	48.9	8.2	1,743	71,945,696	41,277	56.4	12.5
6	M	650	34,282,381	52,742	41.1	0.6	153	8,085,554	52,847	40.6	1.5
6	F	1,455	56,547,008	38,864	42.2	0.7	389	16,660,746	42,830	39.0	1.4
		2,105	90,829,389	43,149	41.9	0.6	542	24,746,300	45,657	39.5	1.4
ALL		2,364	104,332,326	44,134	42.7	1.5	2,294	97,402,498	42,460	52.4	9.9

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

* Separations and additions do not include members who joined after June 30, 2017 and are no longer members on June 30, 2018.

Table XII-8
Summary of Non-Pensioner Membership as of June 30, 2018

STATUS	TIER 1		TIER 2		TIER 4		TIER 6		ALL TIERS	
	NUMBER	SALARY ¹	NUMBER	SALARY ¹	NUMBER	SALARY ¹	NUMBER	SALARY ¹	NUMBER	SALARY ¹
<i>MALES:</i>										
ACTIVES	5	515,323	9	968,131	4,515	325,402,960	2,073	123,642,985	6,602	450,529,399
ACTIVE OFF PAYROLL ²	1	37,714	1	68,294	499	22,480,808	164	7,881,161	665	30,467,977
VESTED	0	0	3	15,000	640	18,142,674	0	0	643	18,157,674
ALL STATUS	6	553,037	13	1,051,425	5,654	366,026,442	2,237	131,524,146	7,910	499,155,050
<i>FEMALES:</i>										
ACTIVES	14	931,188	12	742,834	13,735	592,123,090	5,501	235,975,959	19,262	829,773,071
ACTIVE OFF PAYROLL ²	0	0	1	26,343	1,674	58,853,331	524	20,527,452	2,199	79,407,126
VESTED	2	10,000	2	82,636	1,286	30,829,035	1	19,858	1,291	30,941,529
ALL STATUS	16	941,188	15	851,813	16,695	681,805,456	6,026	256,523,269	22,752	940,121,726
<i>TOTAL:</i>										
ACTIVES	19	1,446,511	21	1,710,965	18,250	917,526,050	7,574	359,618,944	25,864	1,280,302,470
ACTIVE OFF PAYROLL ²	1	37,714	2	94,637	2,173	81,334,139	688	28,408,613	2,864	109,875,103
VESTED	2	10,000	5	97,636	1,926	48,971,709	1	19,858	1,934	49,099,203
ALL STATUS	22	1,494,225	28	1,903,238	22,349	1,047,831,898	8,263	388,047,415	30,662	1,439,276,776

¹ Salary shown for Active Off Payroll and Vested members is the salary when last on payroll and has been assumed to be \$5,000 where unavailable.

² This table does not include members who are not vested and have either withdrawn or been off payroll for 5 years, and therefore are solely eligible to receive a refund of their member contributions. There are 7,661 such members who are otherwise included in the active off payroll category elsewhere in the report.

Table XII-9
Summary of Pensioner Membership

Group	June 30, 2018 (Lag)					June 30, 2017 (Lag)				
	Number	Annual Amounts Payable				Number	Annual Amounts Payable			
		Fixed	Variable	Supplement	Total		Fixed	Variable	Supplement	Total
Service Pensioners	15,979	\$ 210,997,333	\$ 2,000,755	\$ 12,911,634	\$ 225,909,722	15,454	\$ 197,552,380	\$ 2,010,690	\$ 12,496,531	\$ 212,059,601
Ordinary Disability Pensioners	1,085	12,560,802	10,362	719,878	13,291,042	999	11,292,808	9,604	646,042	11,948,454
Accidental Disability Pensioners	209	2,373,753	0	268,389	2,642,142	182	1,991,135	0	299,274	2,290,409
Accidental Death Pensioners	2	5,696	0	9,899	15,595	2	5,696	0	9,750	15,446
Other Beneficiaries	766	10,282,715	247,111	1,033,274	11,563,100	788	10,479,643	266,046	1,096,723	11,842,412
Total	18,041	\$ 236,220,299	\$ 2,258,229	\$ 14,943,074	\$ 253,421,602	17,425	\$ 221,321,662	\$ 2,286,340	\$ 14,548,320	\$ 238,156,322

Table XII-10
Distribution of Pension Benefits by Cause and Age as of June 30, 2018

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	1	2,522	2,522	1	2,522	2,522
45 TO 49	0	0	0	0	0	0	0	0	0
50 TO 54	7	340,768	48,681	3	60,317	20,106	10	401,085	40,109
55 TO 59	86	3,320,160	38,607	220	2,412,902	10,968	306	5,733,062	18,735
60 TO 64	297	9,430,068	31,751	1,128	14,276,861	12,657	1,425	23,706,929	16,636
65 TO 69	641	19,680,813	30,703	2,540	31,296,001	12,321	3,181	50,976,813	16,025
70 TO 74	660	18,943,231	28,702	2,881	32,415,313	11,251	3,541	51,358,545	14,504
75 TO 79	532	15,836,418	29,768	2,305	23,245,069	10,085	2,837	39,081,487	13,776
80 TO 84	407	10,797,799	26,530	1,631	14,352,578	8,800	2,038	25,150,377	12,341
85 TO 89	267	6,745,011	25,262	1,157	9,882,098	8,541	1,424	16,627,110	11,676
90 & UP	200	4,605,751	23,029	1,016	8,266,042	8,136	1,216	12,871,793	10,585
TOTAL	3,097	89,700,019	28,964	12,882	136,209,703	10,574	15,979	225,909,722	14,138
<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	0	0	0	1	28,251	28,251	1	28,251	28,251
40 TO 44	3	50,471	16,824	3	49,258	16,419	6	99,729	16,622
45 TO 49	1	10,721	10,721	5	60,181	12,036	6	70,902	11,817
50 TO 54	12	189,624	15,802	42	537,041	12,787	54	726,665	13,457
55 TO 59	36	683,393	18,983	116	1,449,996	12,500	152	2,133,389	14,035
60 TO 64	60	1,031,767	17,196	178	2,060,679	11,577	238	3,092,446	12,993
65 TO 69	55	927,036	16,855	180	1,934,391	10,747	235	2,861,427	12,176
70 TO 74	39	680,913	17,459	164	1,613,923	9,841	203	2,294,836	11,305
75 TO 79	26	325,063	12,502	96	939,611	9,788	122	1,264,674	10,366
80 TO 84	9	148,126	16,458	33	301,830	9,146	42	449,956	10,713
85 TO 89	3	35,853	11,951	13	100,034	7,695	16	135,887	8,493
90 & UP	6	100,915	16,819	4	31,965	7,991	10	132,880	13,288
TOTAL	250	4,183,882	16,736	835	9,107,160	10,907	1,085	13,291,042	12,250
<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	0	0	0	1	23,879	23,879	1	23,879	23,879
40 TO 44	0	0	0	3	25,574	8,525	3	25,574	8,525
45 TO 49	2	22,206	11,103	3	29,253	9,751	5	51,459	10,292
50 TO 54	1	40,367	40,367	5	56,939	11,388	6	97,306	16,218
55 TO 59	11	222,916	20,265	20	193,642	9,682	31	416,558	13,437
60 TO 64	8	174,191	21,774	26	286,553	11,021	34	460,744	13,551
65 TO 69	12	170,736	14,228	33	369,485	11,197	45	540,221	12,005
70 TO 74	7	142,263	20,323	25	206,196	8,248	32	348,459	10,889
75 TO 79	5	96,383	19,277	14	109,913	7,851	19	206,296	10,858
80 TO 84	4	144,158	36,040	16	122,639	7,665	20	266,797	13,340
85 TO 89	0	0	0	4	31,239	7,810	4	31,239	7,810
90 & UP	5	138,451	27,690	4	35,159	8,790	9	173,610	19,290
TOTAL	55	1,151,671	20,939	154	1,490,471	9,678	209	2,642,142	12,642

Table XII-10
Distribution of Pension Benefits by Cause and Age as of June 30, 2018 (cont'd)

AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>ACCIDENTAL DEATH:</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	1	6,102	6,102	0	0	0	1	6,102	6,102
60 TO 64	0	0	0	0	0	0	0	0	0
65 TO 69	0	0	0	0	0	0	0	0	0
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	1	9,493	9,493	0	0	0	1	9,493	9,493
85 TO 89	0	0	0	0	0	0	0	0	0
90 & UP	0	0	0	0	0	0	0	0	0
TOTAL	2	15,595	7,798	0	0	0	2	15,595	7,798
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	5	25,586	5,117	3	23,460	7,820	8	49,046	6,131
30 TO 34	5	31,441	6,288	2	11,297	5,649	7	42,738	6,105
35 TO 39	3	58,360	19,453	6	100,910	16,818	9	159,270	17,697
40 TO 44	4	33,426	8,357	11	63,213	5,747	15	96,639	6,443
45 TO 49	5	28,940	5,788	12	93,495	7,791	17	122,435	7,202
50 TO 54	8	24,458	3,057	22	115,020	5,228	30	139,478	4,649
55 TO 59	15	64,596	4,306	28	277,484	9,910	43	342,080	7,955
60 TO 64	15	119,522	7,968	32	459,883	14,371	47	579,405	12,328
65 TO 69	15	128,790	8,586	45	690,248	15,339	60	819,038	13,651
70 TO 74	26	172,612	6,639	67	952,030	14,209	93	1,124,642	12,093
75 TO 79	19	133,995	7,052	79	1,776,854	22,492	98	1,910,849	19,498
80 TO 84	20	141,045	7,052	104	2,264,951	21,778	124	2,405,996	19,403
85 TO 89	16	225,572	14,098	93	1,865,721	20,062	109	2,091,293	19,186
90 & UP	14	119,723	8,552	92	1,560,468	16,962	106	1,680,191	15,851
TOTAL	170	1,308,066	7,695	596	10,255,034	17,206	766	11,563,100	15,095
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	5	25,586	5,117	3	23,460	7,820	8	49,046	6,131
30 TO 34	5	31,441	6,288	2	11,297	5,649	7	42,738	6,105
35 TO 39	3	58,360	19,453	8	153,040	19,130	11	211,400	19,218
40 TO 44	7	83,897	11,985	18	140,567	7,809	25	224,464	8,979
45 TO 49	8	61,867	7,733	20	182,929	9,146	28	244,796	8,743
50 TO 54	28	595,217	21,258	72	769,317	10,685	100	1,364,534	13,645
55 TO 59	149	4,297,167	28,840	384	4,334,024	11,287	533	8,631,191	16,194
60 TO 64	380	10,755,548	28,304	1,364	17,083,976	12,525	1,744	27,839,524	15,963
65 TO 69	723	20,907,375	28,918	2,798	34,290,125	12,255	3,521	55,197,499	15,677
70 TO 74	732	19,939,019	27,239	3,137	35,187,462	11,217	3,869	55,126,481	14,248
75 TO 79	582	16,391,859	28,165	2,494	26,071,447	10,454	3,076	42,463,306	13,805
80 TO 84	441	11,240,621	25,489	1,784	17,041,998	9,553	2,225	28,282,619	12,711
85 TO 89	286	7,006,436	24,498	1,267	11,879,093	9,376	1,553	18,885,529	12,161
90 & UP	225	4,964,840	22,066	1,116	9,893,634	8,865	1,341	14,858,474	11,080
TOTAL	3,574	96,359,233	26,961	14,467	157,062,368	10,857	18,041	253,421,602	14,047

Graph XII-11
Pensioner Average Benefits

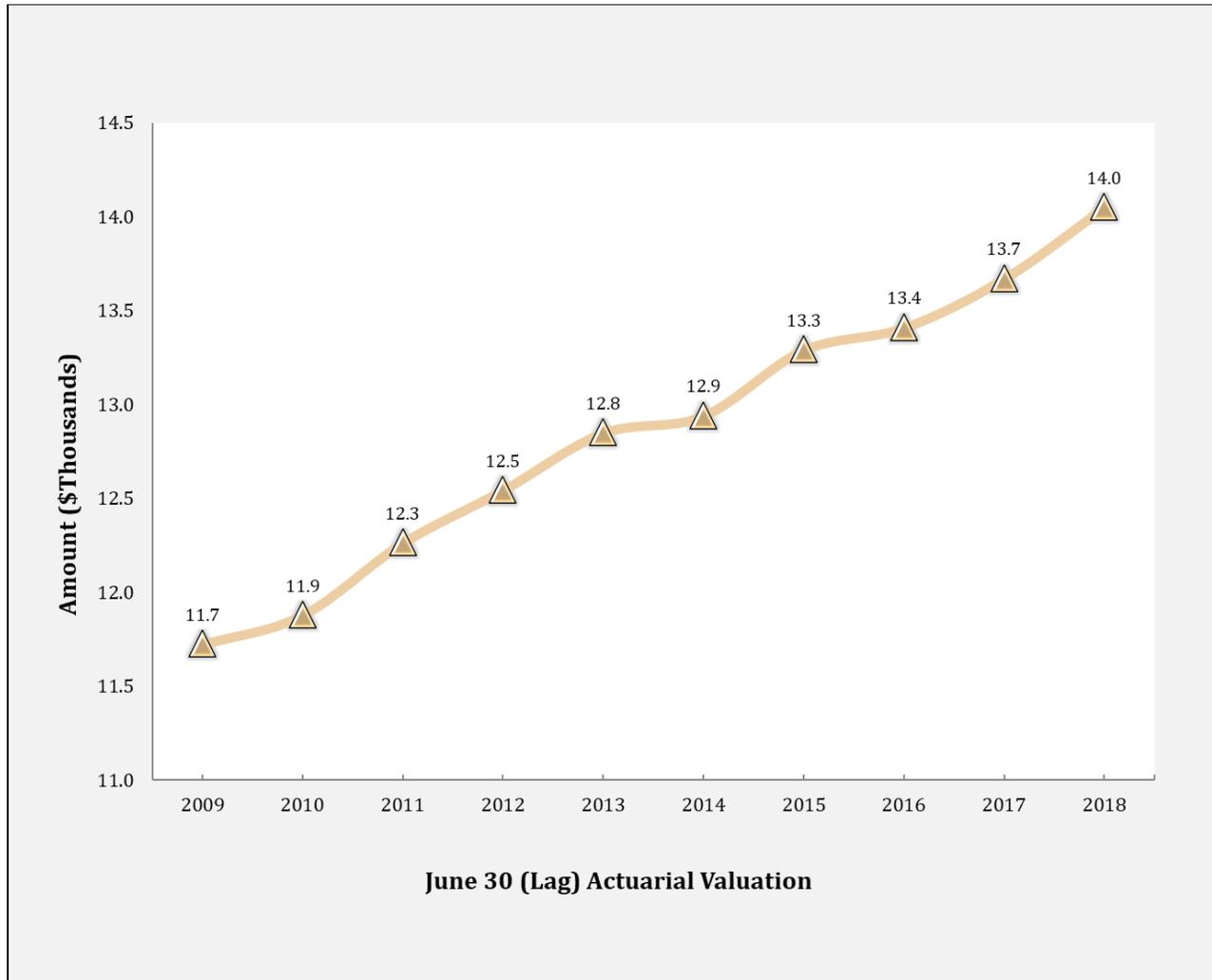


Table XII-12
Reconciliation of Pensioner and Beneficiary Data

SCHEDULE OF PENSIONERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE ROLLS								
June 30 (Lag) 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		
2009	936	10,879,798	491	4,135,086	13,641	159,865,610	4.4%	11,719
2010	850	10,705,737	522	4,700,094	13,969	165,871,253	3.8%	11,874
2011	901	14,977,636	471	4,325,573	14,399	176,523,316	6.4%	12,259
2012	1,053	16,201,746	578	6,211,198	14,874	186,513,864	5.7%	12,540
2013	1,110	16,977,455	529	4,957,022	15,455	198,534,297	6.4%	12,846
2014	1,094	13,701,890	554	5,306,812	15,995	206,929,375	4.2%	12,937
2015	1,002	16,482,509	559	4,979,621	16,438	218,432,263	5.6%	13,288
2016	1,075	14,412,852	576	5,776,541	16,937	227,068,574	4.0%	13,407
2017	1,061	17,321,922	573	6,234,174	17,425	238,156,322	4.9%	13,668
2018	1,179	20,878,837	563	5,613,557	18,041	253,421,602	6.4%	14,047

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

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

APPENDIX: ACRONYMS AND ABBREVIATIONS

2019 A&M	Actuarial Assumptions and Methods with changes 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
AMC-PT	Additional Member Contributions for Physically-Taxing employment
AVR	Asset Volatility Ratio
AVA	Actuarial Value of Assets
BERS	New York City Board of Education Retirement System
BMC	Basic Member Contributions
CAFR	Comprehensive Annual Financial Report
COLA	Cost-of-Living Adjustment
EAN	Entry Age Normal cost method
EIR	Expected Investment Return
FAS	Final Average Salary
FS	Final Salary
GASB	Governmental Accounting Standards Board
GASB25	Governmental Accounting Standards Board Statement No. 25
GASB67	Governmental Accounting Standards Board Statement No. 67
GASB68	Governmental Accounting Standards Board Statement No. 68
IRC	Internal Revenue Code
MVA	Market Value of Assets
OYLM	One-Year Lag Methodology
PT	Physically-Taxing Employment
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
UAL	Unfunded Accrued Liability
UIR	Unexpected Investment Return
WTC	World Trade Center