



**Fiscal Year 2019**  
**Actuarial Valuation Report**  
for the  
**New York City**  
**Board of Education**  
**Retirement System**

*JUNE 30, 2017 (LAG) ACTUARIAL VALUATION*

prepared by the  
**New York City**  
**Office of the Actuary**

**2019**



## OFFICE OF THE ACTUARY

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SHERRY S. CHAN  
CHIEF ACTUARY

August 23, 2019

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

Re: Fiscal Year 2019 Actuarial Valuation Report (Report)

Dear Trustees:

This Report presents the results of the June 30, 2017 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, 2017 (Lag) valuation, forms the basis for determining the actuarially-required contribution (Actuarial Contribution) of \$269,636,601 for Fiscal Year 2019 (i.e. for the period beginning July 1, 2018 and ending June 30, 2019). 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, 2016 (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, 2017 (Lag) and June 30, 2016 (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, 2017 and June 30, 2016.

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.

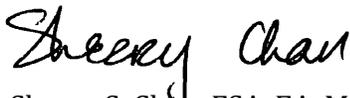
A summary of the benefits available under the terms of the Plan is shown in SECTION VIII – SUMMARY OF PLAN PROVISIONS. The benefits under the Plan are unchanged from the prior valuation.

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, 2017 valuation were changed from those used for the June 30, 2016 valuation. The changes 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. The proposed actuarial assumptions and methods were adopted by the Board of Trustees at the February 27, 2019 Board meeting.

This report does not present Governmental Accounting Standards Board (GASB) results. The Office of the Actuary will publish Fiscal Year 2019 GASB67 and GASB68 results in a Report later this calendar year, which will be available on the website of the Office of the Actuary ([www.nyc.gov/actuary](http://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, 2017 (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 2019 (i.e. July 1, 2018 to June 30, 2019),
- 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 it has equaled the Actuarial Contribution in all 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, 2017 (Lag) actuarial valuation and, for comparative purposes, the June 30, 2016 (Lag) actuarial valuation.

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
SUMMARY OF VALUATION RESULTS		
Valuation Date	June 30, 2017 (Lag)	June 30, 2016 (Lag)
Fiscal Year	2019	2018
<b>Funded Status</b>		
1. Accrued Liability	\$ 4,743,881,094	\$ 4,767,760,226
2. Actuarial Value of Assets (AVA) <sup>1</sup>	<u>3,289,191,000</u>	<u>2,858,737,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 1,454,690,094	\$ 1,909,023,226
4. Funded Ratio (AVA Basis) (2. / 1.)	69.3%	60.0%
5. Market Value of Assets (MVA) <sup>1</sup>	4,099,571,000	3,416,433,000
6. Unfunded Accrued Liability (MVA Basis) (1. - 5.)	\$ 644,310,094	\$ 1,351,327,226
7. Funded Ratio (MVA Basis) (5. / 1.)	86.4%	71.7%
<b>Contribution</b>		
1. Normal Cost	\$ 133,096,063	\$ 137,982,408
2. Unfunded Accrued Liability	118,810,617	165,985,598
3. Administrative Expenses	<u>17,729,921</u>	<u>14,675,328</u>
4. Actuarial Contribution (1. + 2. + 3.)	\$ 269,636,601	\$ 318,643,334
5. Statutory Contribution	\$ 269,636,601	\$ 318,643,334
<b>Participant Data</b>		
1. Active Members		
a. Number	25,794	25,864
b. Annual Salary	\$ 1,201,925,550	\$ 1,149,019,892
c. Average Salary	\$ 46,597	\$ 44,425
2. Active Off Payroll Members <sup>2</sup>	2,618	2,629
3. Terminated Vested Members	1,528	851
4. Retirees and Beneficiaries		
a. Number	17,425	16,937
b. Total Annual Benefits	\$ 238,156,322	\$ 227,068,574
c. Average Benefit	\$ 13,668	\$ 13,407

<sup>1</sup> Actuarial Value of Assets and Market Value of Assets are rounded to the nearest thousand.

<sup>2</sup> Represents members no longer on payroll, but not otherwise classified.

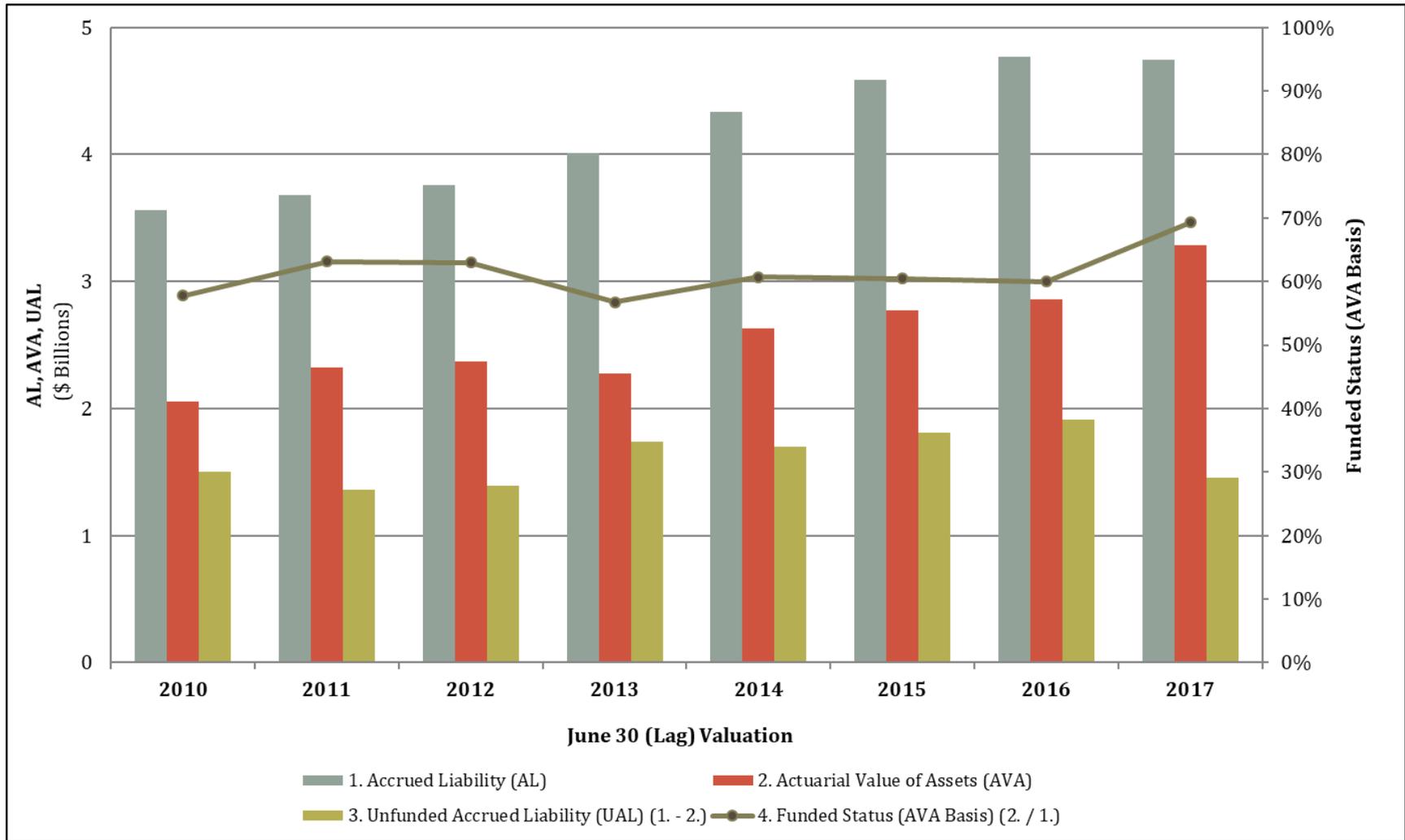
**Table I-2**  
**Actuarial Liabilities**

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
ACTUARIAL LIABILITIES BY STATUS		
Valuation Date	June 30, 2017 (Lag)	June 30, 2016 (Lag)
Fiscal Year	2019	2018
<b>Accrued Liability</b>		
1. Active Members	\$ 2,256,013,405	\$ 2,380,352,597
2. Active Off Payroll Members <sup>1</sup>	65,073,169	45,594,094
3. Terminated Vested Members	56,465,781	43,038,655
4. Retirees and Beneficiaries	<u>2,364,059,287</u>	<u>2,273,411,493</u>
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 4,741,611,642	\$ 4,742,396,839
6. Actuarial Adjustments <sup>2</sup>	<u>2,269,452</u>	<u>25,363,387</u>
7. Total Accrued Liability (AL) (5. + 6.)	\$ 4,743,881,094	\$ 4,767,760,226
<b>Present Value of Benefits</b>		
1. Active Members	\$ 3,624,626,886	\$ 3,745,180,435
2. Active Off Payroll Members <sup>1</sup>	65,073,169	45,594,094
3. Terminated Vested Members	56,465,781	43,038,655
4. Retirees and Beneficiaries	<u>2,364,059,287</u>	<u>2,273,411,493</u>
5. Present Value of Benefits (1. to 4.)	\$ 6,110,225,123	\$ 6,107,224,677
6. Actuarial Adjustments <sup>2</sup>	<u>2,269,452</u>	<u>25,363,387</u>
7. Total Present Value of Benefits (5. + 6.)	\$ 6,112,494,575	\$ 6,132,588,064

<sup>1</sup> Represents members no longer on payroll, but not otherwise classified.

<sup>2</sup> Beginning June 30, 2017 the majority of the actuarial adjustments are calculated directly and included in the appropriate member category.

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, actual 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.

**Table II-1**  
**Statement of Plan Net Assets**

(\$ Thousands)		
	June 30, 2017	June 30, 2016
<b>ASSETS</b>		
Cash	\$ 3,232	\$ 327
Receivables		
Investment Securities Sold	\$ 98,675	\$ 119,062
Member Loans	47,935	46,748
Accrued Interest and Dividends	9,080	247
Other	60	3
Total Receivables	<u>\$ 155,750</u>	<u>\$ 166,060</u>
<b>INVESTMENTS AT FAIR VALUE</b>		
Fixed return funds		
Short-Term Investments		
Commercial Paper	\$ 21,496	\$ 71,888
Short-term Investment Fund	30,587	35,933
U.S. Treasury Bills	0	0
Discount Notes	0	0
Debt Securities	1,103,180	879,762
Equity Securities	145,431	291,144
Alternative Investments	612,677	506,922
Collective Trust Funds		
Fixed Income	113,962	106,684
Domestic Equity	1,738,135	1,401,665
International Equity	1,251,628	942,911
Mortgage Debt Security	30,925	28,956
Treasury Inflation Protected Securities	236,943	218,608
Promissory Notes	0	0
Collateral From Securities Lending	374,326	476,001
Variable return funds		
Short-Term Investments	513	571
Debt Securities	828	976
Equities	46,309	40,953
Collateral From Securities Lending	617	1,622
Total Investments	<u>\$ 5,707,557</u>	<u>\$ 5,004,596</u>
TDA Program's interest in the fixed return fund	0	0
<b>OTHER ASSETS</b>	<u>160,453</u>	<u>124,031</u>
TOTAL ASSETS	<u>\$ 6,026,992</u>	<u>\$ 5,295,014</u>
<b>LIABILITIES</b>		
Accounts Payable	\$ 13,884	\$ 6,907
Payable for Investment Securities Purchased	92,173	103,213
Accrued Benefits Payable	9,943	7,357
TDA Program's interest in the fixed return fund	1,436,478	1,283,481
Other Liabilities	0	0
Security Lending	374,943	477,623
TOTAL LIABILITIES	<u>\$ 1,927,421</u>	<u>\$ 1,878,581</u>
<b>PLAN ASSETS HELD IN TRUST FOR PENSION BENEFITS</b>	<u>\$ 4,099,571</u>	<u>\$ 3,416,433</u>

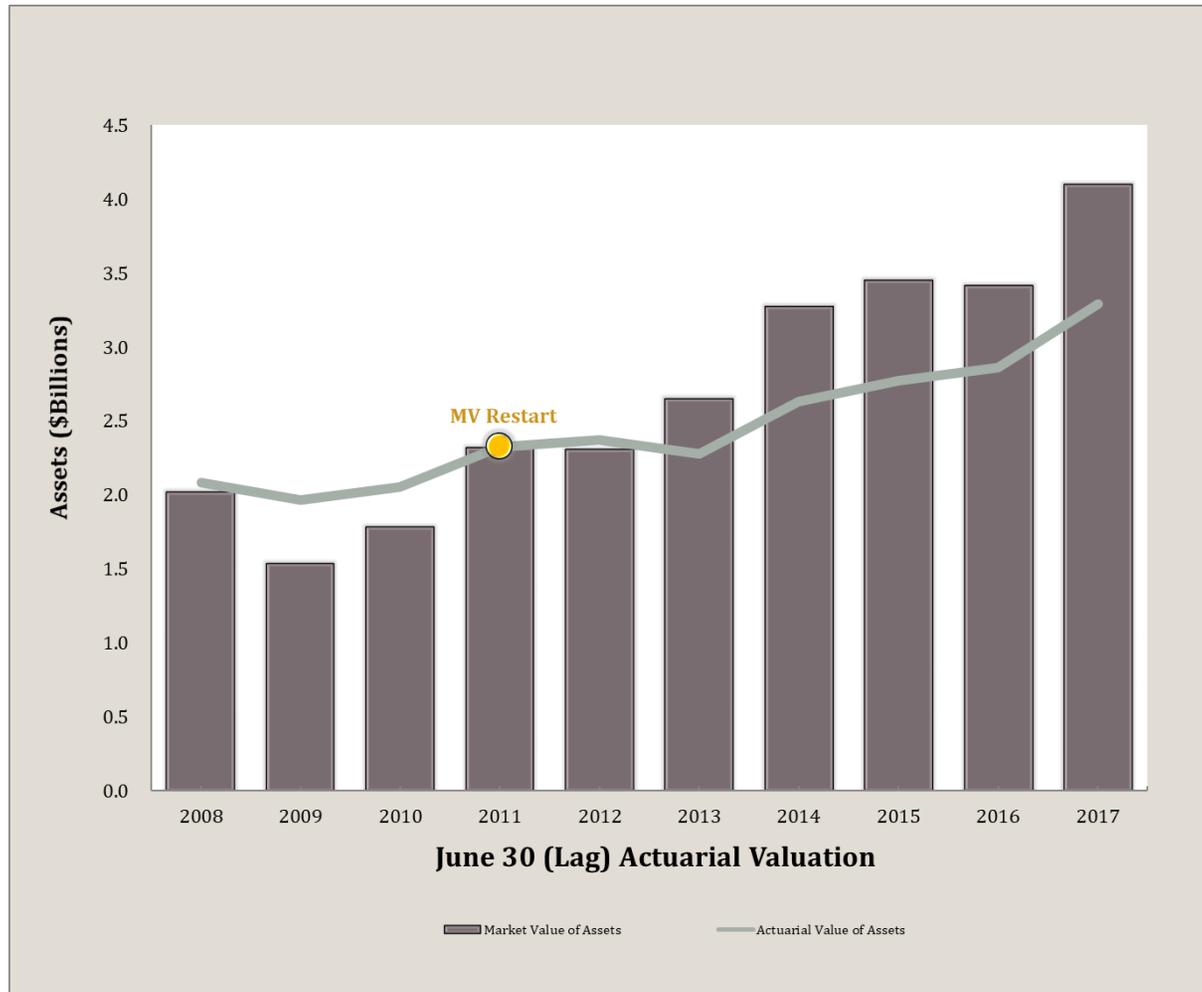
**Table II-2**  
**Statement of Changes in Plan Net Assets**

(\$ Thousands)		
	<b>June 30, 2017</b>	<b>June 30, 2016</b>
<b>ADDITIONS</b>		
Contributions		
Member Contributions	\$ 39,821	\$ 38,581
Employer Contributions	<u>288,233</u>	<u>265,532</u>
<b>Total Contributions</b>	<b>\$ 328,054</b>	<b>\$ 304,113</b>
Investment Income (Loss)		
Interest Income	\$ 54,965	\$ 44,782
Dividend Income	70,611	51,328
Net Appreciation (Depreciation) in Fair Value	<u>760,260</u>	<u>79,014</u>
<b>Total Investment Income (Loss)</b>	<b>\$ 885,836</b>	<b>\$ 175,124</b>
Less Investment Expenses	29,204	14,296
<b>Net Income (Loss)</b>	<b>\$ 856,632</b>	<b>\$ 160,828</b>
Securities Lending Transactions		
Securities Lending Income	\$ 6,118	\$ 3,547
Securities Lending Fees	<u>(240)</u>	<u>(231)</u>
<b>Net Securities Lending Income (Loss)</b>	<b>\$ 5,878</b>	<b>\$ 3,316</b>
<b>Net Investment Income (Loss)</b>	<b>\$ 862,510</b>	<b>\$ 164,144</b>
Other		
<b>Payments to Other Retirement Systems &amp; Other Revenues/Expenses</b>	<b>\$ (122,954)</b>	<b>\$ (157,499)</b>
<b>TDA Program's Interest Income in the Fixed Return Fund</b>	<b>\$ (106,554)</b>	<b>\$ (94,789)</b>
<b>TOTAL ADDITIONS</b>	<b>\$ 961,056</b>	<b>\$ 215,969</b>
<b>DEDUCTIONS</b>		
Benefit Payments and Withdrawals	\$ 262,432	\$ 240,727
Administrative Expenses	<u>15,486</u>	<u>12,818</u>
<b>TOTAL DEDUCTIONS</b>	<b>\$ 277,918</b>	<b>\$ 253,545</b>
<b>NET INCREASE (DECREASE) IN PLAN NET ASSETS</b>	<b>\$ 683,138</b>	<b>\$ (37,576)</b>
<b>PLAN NET ASSETS HELD IN TRUST FOR PENSION BENEFITS</b>		
Beginning of Year	\$ 3,416,433	\$ 3,454,009
End of Year	\$ 4,099,571	\$ 3,416,433

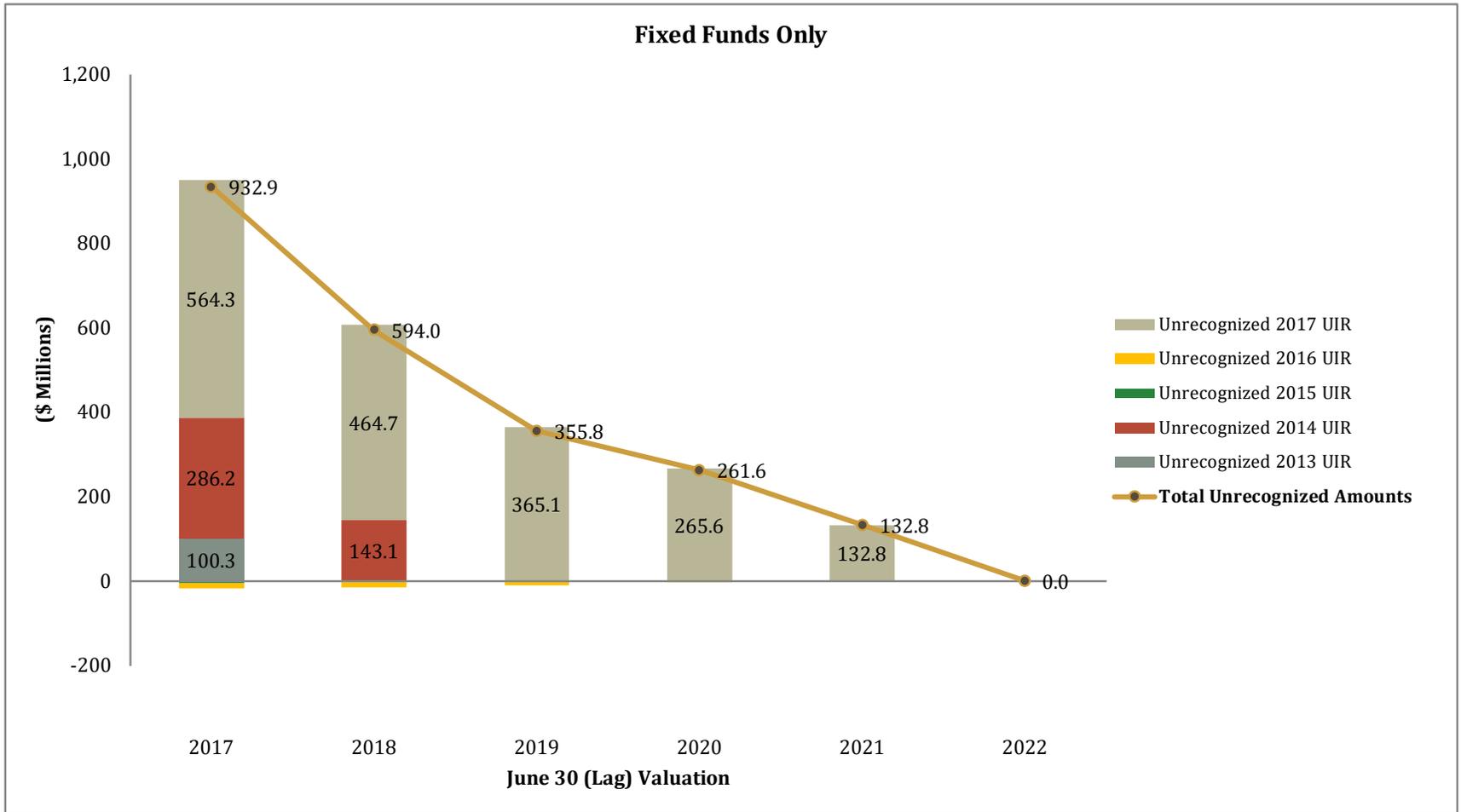
**Table II-3**  
**Development of Actuarial Value of Assets**

(\$ Thousands)		
Valuation Date	June 30, 2017	June 30, 2016
<b>Fixed Fund</b>		
Market Value of Assets (MVA)		
Beginning of Year (BOY)	\$ 3,373,846	\$ 3,407,717
End of Year (EOY)	\$ 4,051,902	\$ 3,373,846
1. Contributions		
a. Employee	\$ 39,804	\$ 38,563
b. Employer	<u>288,233</u>	<u>265,532</u>
c. Total Contributions	\$ 328,037	\$ 304,095
2. Net Investment Income		
a. Investment Income	\$ 884,044	\$ 178,642
b. Investment Expenses	<u>(29,204)</u>	<u>(14,296)</u>
c. Total Net Investment Income	\$ 854,840	\$ 164,346
3. Cash Flow (Other)	\$ (504,821)	\$ (502,312)
4. Net Cash Flow (1.c. + 3.)	\$ (176,784)	\$ (198,217)
5. Average invested assets		
a. AVA @ BOY	\$ 2,816,150	\$ 2,726,174
b. 1/2 Net Cash Flow ((1.c. + 3.) / 2)	<u>(88,392)</u>	<u>(99,109)</u>
c. Total	\$ 2,727,758	\$ 2,627,065
6. Expected Rate of Return (AIR)	7.00%	7.00%
7. Expected Investment Return (EIR) (5.c. x 6.)	\$ 190,943	\$ 183,895
8. Unexpected Investment Return (UIR) (2.c. - 7.)	\$ 663,897	\$ (19,549)
9. AVA @ EOY		
a. AVA @ BOY (prior to corridor limit)	\$ 2,816,150	\$ 2,666,391
b. Net Cash Flow (4.)	(176,784)	(198,217)
c. Expected Investment Return (7.)	190,943	183,895
d. Phase in of UIR		
15% * UIR for prior year	99,585	(2,932)
15% * UIR for second prior year	(2,932)	(1,161)
15% * UIR for third prior year	(1,161)	107,336
15% * UIR for fourth prior year	107,336	75,195
20% * UIR for fifth prior year	100,260	(14,357)
20% * UIR for sixth prior year	<u>(14,357)</u>	<u>N/A</u>
Total	\$ 288,731	\$ 164,081
e. Preliminary AVA (9.a. + 9.b. + 9.c. + 9.d.)	\$ 3,119,039	\$ 2,816,150
10. Corridor		
a. 80% of MVA	\$ 3,241,522	\$ 2,699,077
b. 120% of MVA	\$ 4,862,282	\$ 4,048,615
<b>11. Final AVA @ EOY (9e. bounded by 10)</b>	<b>\$ 3,241,522</b>	<b>\$ 2,816,150</b>
<b>12. Variable Assets</b>	<b>\$ 47,669</b>	<b>\$ 42,587</b>
<b>13. Total AVA @ EOY (11. + 12.)</b>	<b>\$ 3,289,191</b>	<b>\$ 2,858,737</b>

Graph II-4  
Historical Market and Actuarial Value of Assets



**Graph II-5**  
**Future Recognition of UIR as of June 30, 2017**



## SECTION III - CONTRIBUTION DEVELOPMENT AND HISTORY

**Table III-1**  
**Statutory Contributions**

**Table III-1** shows the components of the Fiscal Year 2019 and the Fiscal Year 2018 Statutory Contributions.

COMPONENTS OF CURRENT AND PRIOR FISCAL YEAR STATUTORY CONTRIBUTIONS		
Valuation Date	June 30, 2017 (Lag)	June 30, 2016 (Lag)
Fiscal Year	2019	2018
Normal Cost	\$ 133,096,063	\$ 137,982,408
Amortization of Unfunded Accrued Liability		
-Initial UAL	121,238,945	117,707,714
-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	16,568,028	16,568,028
-2014 Method Changes	(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)	NA
-2017 Method Changes	11,007,581	NA
-2017 Assumption Changes	(22,230,444)	NA
Total	118,810,617	165,985,598
Administrative Expenses	17,729,921	14,675,328
<b>Total Contribution to the New York City Board of Education Retirement System</b>	<b>\$ 269,636,601 <sup>1</sup></b>	<b>\$ 318,643,334</b>

<sup>1</sup> If necessary, a portion of the Fiscal Year 2019 contribution should be used to true-up the Group Term Life Insurance (GTLI) Plan reserve to a total of \$8,013,585. This amount represents the present value of benefits as of June 30, 2019 attributable to the GTLI.

**Table III-2**  
**Schedule of Unfunded Accrued Liability Bases**

The Initial 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 Unfunded Accrued Liability (UAL) Bases as of June 30, 2017. Note that a change to the schedule at June 30, 2017 reduced amounts remaining to be amortized by the prior fiscal year's amortization payments, which are now included as a receivable in plan assets. This change has no impact on the determination of the amortization payments or the Employer Contribution.

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, 2017
Initial UAL	6/30/10	\$ 1,312,067,636 <sup>1</sup>	22	\$ 121,238,945	14	\$ 1,211,300,642
(Gain)/Loss	6/30/11	\$ (182,268,307)	15	\$ (21,558,572)	8	\$ (124,450,569)
(Gain)/Loss	6/30/12	\$ 36,911,124	15	\$ 4,365,823	9	\$ 27,498,190
(Gain)/Loss	6/30/13	\$ 325,722,811	15	\$ 38,526,274	10	\$ 261,591,573
(Gain)/Loss	6/30/14	\$ 84,146,947	15	\$ 9,952,845	11	\$ 72,150,575
Assumption Change <sup>2</sup>	6/30/14	\$ 165,544,370	20	\$ 16,568,028	16	\$ 151,306,186
Asset Method Change	6/30/14	\$ (275,445,000)	20	\$ (27,567,113)	16	\$ (251,754,452)
(Gain)/Loss	6/30/15	\$ 128,325,391	15	\$ 15,178,241	12	\$ 116,545,887
(Gain)/Loss	6/30/16	\$ 108,322,889	15	\$ 12,812,358	13	\$ 103,519,318
(Gain)/Loss	6/30/17	\$ (333,814,462)	15	\$ (39,483,349)	14	\$ (333,814,462)
Method Changes <sup>3</sup>	6/30/17	\$ 109,985,516	20	\$ 11,007,581	19	\$ 109,985,516
Assumption Change <sup>4</sup>	6/30/17	\$ (222,122,082)	20	\$ (22,230,444)	19	\$ (222,122,082)

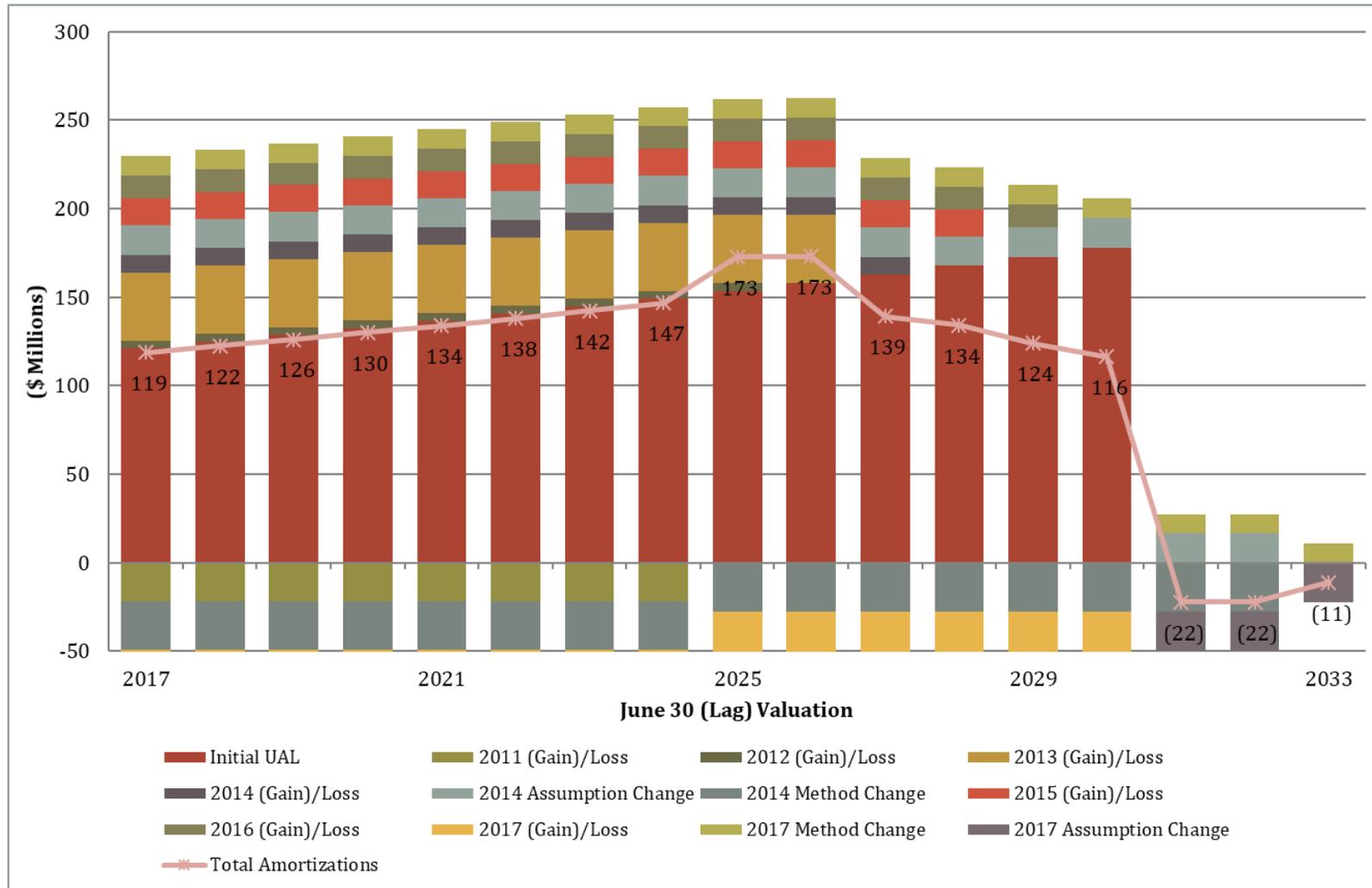
<sup>1</sup> Initial UAL as of June 30, 2010 after adjustments under OYLM. The amount prior to adjustments under OYLM was \$1,501,798,520.

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

<sup>3</sup> Refinements to valuation methodologies.

<sup>4</sup> Changes in demographic assumptions to better align with future experience and change to the mortality improvement scale MP-2018.

**Graph III-3**  
**Remaining UAL Amortizations as of June 30, 2017**



**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 <sup>1</sup>
Initial UAL Amortization Base	\$ 1,312,068	\$ 1,403,912	\$ 1,400,216	\$ 1,393,202	\$ 1,382,546	\$ 1,367,898	\$ 1,348,883	\$ 1,211,301
2010-2011 (Gain)/Loss		(182,268)	(195,027)	(186,379)	(177,125)	(167,223)	(156,628)	(124,451)
ERI		148	159	123	85	44	0	0
2011-2012 (Gain)/Loss			36,911	39,495	37,744	35,870	33,864	27,498
2012-2013 (Gain)/Loss				325,723	348,523	333,068	316,531	261,591
2013-2014 (Gain)/Loss					84,147	90,038	86,044	72,150
Assumption Change at June 30, 2014					165,544	177,132	172,394	151,306
AVA Change at June 30, 2014					(275,445)	(294,726)	(286,841)	(251,754)
2014-2015 (Gain)/Loss						128,325	137,308	116,546
2015-2016 (Gain)/Loss							108,323	103,519
2016-2017 (Gain)/Loss								(333,814)
Method Change at June 30, 2017								109,986
Assumption Change								(222,122)
<b>Sum of Outstanding Amortization Amounts</b>	<b>\$ 1,312,068</b>	<b>\$ 1,221,792</b>	<b>\$ 1,242,259</b>	<b>\$ 1,572,164</b>	<b>\$ 1,566,019</b>	<b>\$ 1,670,426</b>	<b>\$ 1,759,878</b>	<b>\$ 1,121,756</b>

June 30 (Lag) Valuation Date	2010	2011	2012	2013	2014	2015	2016	2017
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
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. Due To/From TDA	15,533	15,830	27,915	32,966	1,982	1,773	2,005	8,871
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
5. PV 1-year Adjusted Employer Contribution <sup>2</sup>	174,198	102,338	102,516	113,311	114,830	118,963	121,755	293,857
6. PV Future Administrative Expense Reimbursement	0	18,105	18,828	18,849	19,993	22,153	25,385	30,206
<b>7. Adjusted UAL (4. - 5. - 6.)</b>	<b>\$ 1,312,068</b>	<b>\$ 1,221,792</b>	<b>\$ 1,242,258</b>	<b>\$ 1,572,163</b>	<b>\$ 1,566,019</b>	<b>\$ 1,670,426</b>	<b>\$ 1,759,878</b>	<b>\$ 1,121,756</b>

<sup>1</sup> Beginning at June 30, 2017, amounts remaining to be amortized have been reduced by the prior valuation year's amortization payments. When considered with (2) below, this change has no effect.

<sup>2</sup> Beginning at June 30, 2017, the PV 1-year Adjusted Employer Contribution includes amounts used to pay UAL bases and one year of administrative expenses. When considered with (1) above, this change has no effect.

**Table III-5**  
**Actuarial and Statutory Contribution History**

**Table III-5** compares the Statutory Contributions to the Actuarial Contributions for Fiscal Years 2010 through 2019.

(\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution Certified	Statutory Contribution Contributed	Percentage of Actuarial Contribution Contributed
2010	147,349	147,349	100.0%
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%

**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 2010 through 2019.

CITY RATES (\$ Thousands)			
Fiscal Year Ended June 30	Actuarial Contribution	Salary <sup>1</sup> at Time = 1.0	City Rate
2010	147,349	826,795	17.822%
2011	180,191	880,648	20.461%
2012	213,651	879,472	24.293%
2013	196,246	886,178	22.145%
2014	214,590	989,160	21.694%
2015	258,099	1,016,822	25.383%
2016	265,532	1,008,056	26.341%
2017	288,233	1,052,171	27.394%
2018	318,643	1,102,184	28.910%
2019	269,637	1,180,855	22.834%

<sup>1</sup>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, 2017 (Lag)					
Fiscal Year	2019					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education	Total
<b>Contribution</b>						
1. Normal Cost	\$ 68,998	\$ 0	\$ 68,998	\$ 6,064,661	\$ 126,962,404	\$ 133,096,063
2. Amortization of Unfunded Accrued Liability	(35,341)	1,477	(33,864)	5,269,272	113,575,209	118,810,617
3. Administrative Expenses	6,738	374	7,112	355,235	17,367,574	17,729,921
4. Actuarial Contribution (1. + 2. + 3.)	\$ 40,395	\$ 1,851	\$ 42,246	\$ 11,689,168	\$ 257,905,187	\$ 269,636,601
5. Statutory Contribution (4.)	\$ 40,395	\$ 1,851	\$ 42,246	\$ 11,689,168	\$ 257,905,187	\$ 269,636,601

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

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM						
ACCRUED LIABILITIES BY OBLIGOR						
Valuation Date	June 30, 2017 (Lag)					
Fiscal Year	2019					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education	Total
<b>Accrued Liability</b>						
1. Active Members	\$ 472,317	\$ 0	\$ 472,317	\$ 134,330,208	\$ 2,121,210,880	\$ 2,256,013,405
2. Active Off Payroll Members <sup>1</sup>	0	0	0	1,380,484	63,692,685	65,073,169
3. Terminated Vested Members	12,583	24,262	36,845	2,930,425	53,498,511	56,465,781
4. Retirees and Beneficiaries	91,406	0	91,406	78,743,509	2,285,224,372	2,364,059,287
5. Accrued Liability Pre-Adjustments (1. to 4.)	\$ 576,306	\$ 24,262	\$ 600,568	\$ 217,384,626	\$ 4,523,626,448	\$ 4,741,611,642
6. Actuarial Adjustments <sup>2</sup>	0	0	0	30,972	2,238,480	2,269,452
7. Total Accrued Liability (AL) (5. + 6.)	\$ 576,306	\$ 24,262	\$ 600,568	\$ 217,415,598	\$ 4,525,864,928	\$ 4,743,881,094
<b>Present Value of Benefits</b>						
1. Active Members	\$ 1,153,619	\$ 0	\$ 1,153,619	\$ 199,464,020	\$ 3,424,009,247	\$ 3,624,626,886
2. Active Off Payroll Members <sup>1</sup>	0	0	0	1,380,484	63,692,685	65,073,169
3. Terminated Vested Members	12,583	24,262	36,845	2,930,425	53,498,511	56,465,781
4. Retirees and Beneficiaries	91,406	0	91,406	78,743,509	2,285,224,372	2,364,059,287
5. Present Value of Benefits (1. to 4.)	\$ 1,257,608	\$ 24,262	\$ 1,281,870	\$ 282,518,438	\$ 5,826,424,815	\$ 6,110,225,123
6. Actuarial Adjustments <sup>2</sup>	0	0	0	30,972	2,238,480	2,269,452
7. Total Present Value of Benefits (5. + 6.)	\$ 1,257,608	\$ 24,262	\$ 1,281,870	\$ 282,549,410	\$ 5,828,663,295	\$ 6,112,494,575

<sup>1</sup> Represents members no longer on payroll, but not otherwise classified.

<sup>2</sup> 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, 2017 (Lag)					
Fiscal Year	2019					
Obligor	Renaissance Charter School	KIPP Charter School	Charter School Subtotal	NYC School Construction Authority	Department of Education	Total
<b>Participant Data</b>						
1. Active Members						
a. Number	16	0	<b>16</b>	641	25,137	<b>25,794</b>
b. Annual Salary <sup>1</sup>	\$ 577,548	\$ 0	\$ <b>577,548</b>	\$ 66,388,984	\$ 1,134,959,018	\$ <b>1,201,925,550</b>
c. Average Salary	\$ 36,097	\$ 0	\$ <b>36,097</b>	\$ 103,571	\$ 45,151	\$ <b>46,597</b>
2. Active Off Payroll Members <sup>2</sup>	0	0	<b>0</b>	23	2,595	<b>2,618</b>
3. Terminated Vested Members	1	1	<b>2</b>	33	1,493	<b>1,528</b>
4. Retirees and Beneficiaries						
a. Number	1	0	<b>1</b>	252	17,172	<b>17,425</b>
b. Total Annual Benefits	\$ 12,301	\$ 0	\$ <b>12,301</b>	\$ 7,672,681	\$ 230,471,340	\$ <b>238,156,322</b>
c. Average Annual Benefit	\$ 12,301	\$ 0	\$ <b>12,301</b>	\$ 30,447	\$ 13,421	\$ <b>13,668</b>

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

<sup>2</sup> 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, 2016 (Lag) actuarial valuation and the June 30, 2017 (Lag) actuarial valuation.

DEVELOPMENT OF EXPERIENCE (GAIN) / LOSS		
June 30, 2017		
(\$ Thousands)		
1.	Expected Accrued Liability (AL)	
	a. AL at June 30, 2016	\$ 4,767,760
	b. Total Normal Cost and Administrative Expenses at June 30, 2016	178,133
	c. Interest on 1.a. and 1.b. to June 30, 2017	346,213
	d. Fiscal Year 2017 Benefit Payments with Interest to June 30, 2017	<u>(271,462)</u>
	e. Expected AL at June 30, 2017	\$ 5,020,644
2.	Actual AL at June 30, 2017 (prior to Method Changes & Assumption Changes)	\$ 4,855,985
3.	Expected Total Actuarial Value of Assets (AVA) <sup>1</sup>	
	a. Total at June 30, 2016	\$ 2,860,742
	b. Interest on 3.a. to June 30, 2017	200,252
	c. Total Contributions Paid in Fiscal Year 2017	328,054
	d. Interest on 3.c. to June 30, 2017	11,288
	e. Fiscal Year 2017 Benefit Payments with Interest to June 30, 2017 (1.d.)	<u>(271,462)</u>
	f. Expected Total at June 30, 2017	\$ 3,128,874
4.	Actual Total AVA at June 30, 2017 <sup>2</sup>	\$ 3,298,029
5.	Accrued Liability (Gain) / Loss (2. - 1.e.)	\$ <b>(164,659)</b>
6.	Actuarial Asset (Gain) / Loss (3.f. - 4.)	\$ <b>(169,155)</b>
7.	Total Actuarial (Gain) / Loss (5. + 6.)	\$ <b>(333,814)</b>

<sup>1</sup> Includes amount due from TDA of \$2,005.

<sup>2</sup> Includes amount due from TDA of \$8,838.

## 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%

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 actuarial assumptions and methods adopted by the Board of Trustees during Fiscal Year 2019 are referred to as the "2019 A&M." The Fiscal Year 2019 employer contribution is based on the census data reported as of June 30, 2017 and on the 2019 A&M.

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. Many of the risks faced by the Plan are described in fuller detail below; quantifying these risks for the Plan is beyond the scope of this valuation but may be undertaken in future years.

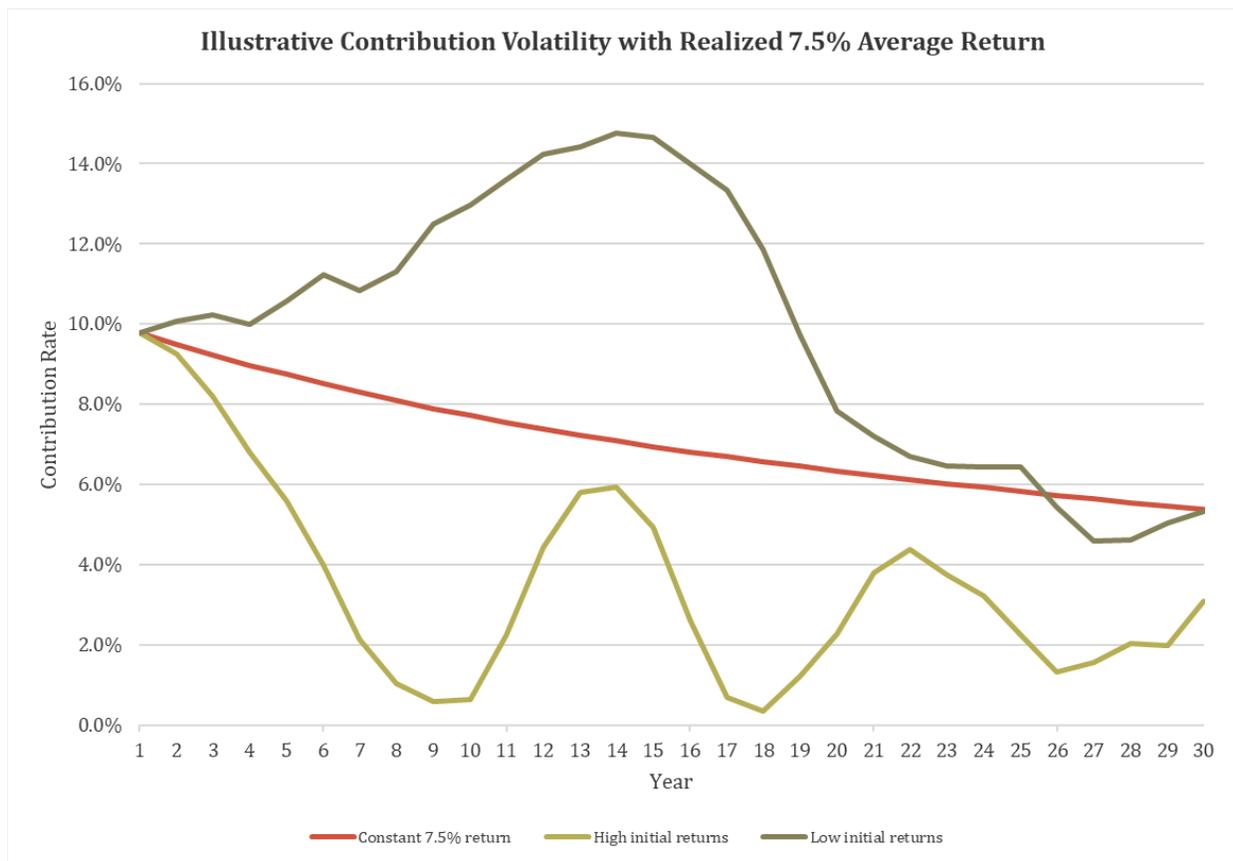
These risks have been separated, based on the Actuary's professional judgement, into high, medium, and low risks.

## High Risk Types

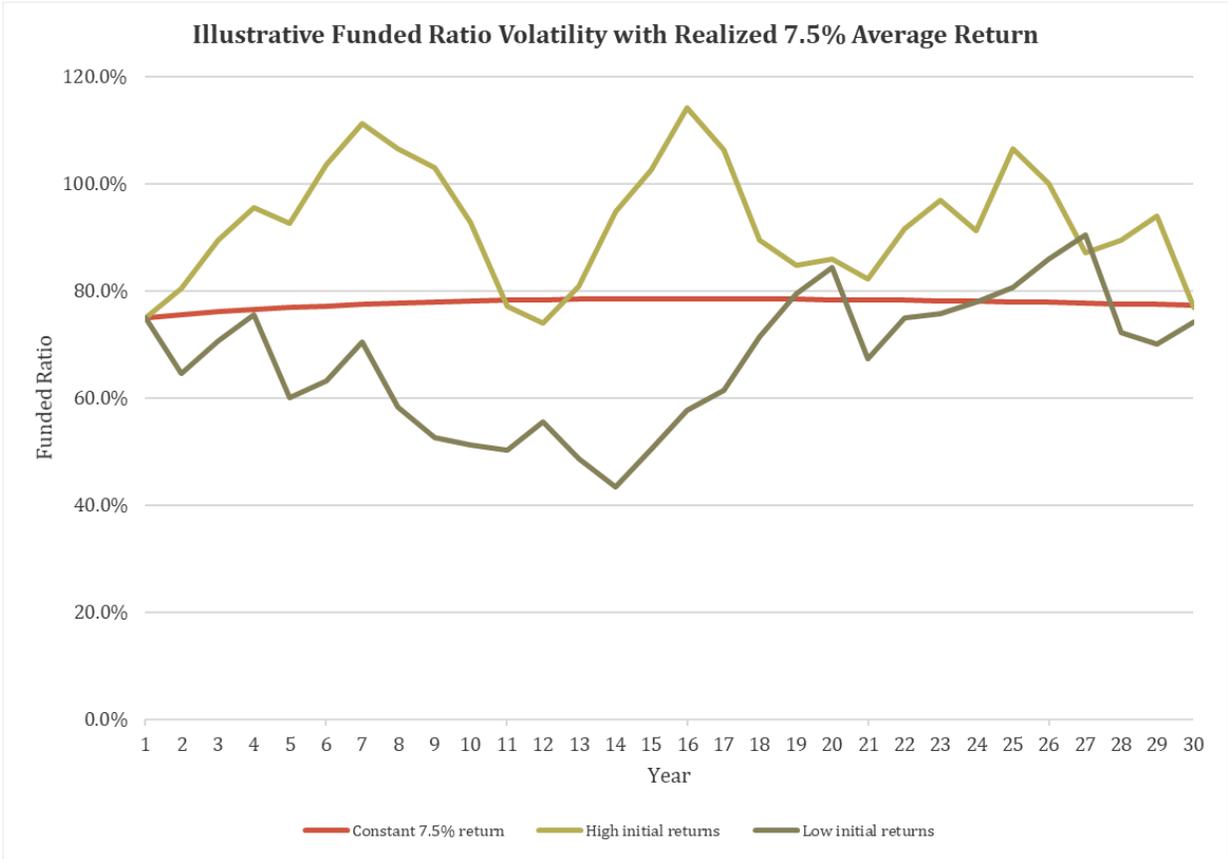
### Investment Risk

The most substantial risk for BERS is investment returns may be less than assumed. As risk-free investment return rates have fallen in recent decades, more aggressive asset allocations have become necessary to achieve long-term rates of return commensurate with the actuarial assumption of 7.0%.

This investment return volatility can contribute substantially to contribution and funded status volatility, even if the long-term investment return assumption of 7.0% is realized. While not 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.<sup>1</sup> Similar scenario analysis could be done for BERS.



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



Note these illustrations show volatility even if long-term expected rates of return are realized. Further risk exists that long-term expected rates of return may not be realized.

## Medium Risk Types

### Maturity Risk

With respect to future fiscal years, it should be noted that BERS is not a fully mature retirement system. A mature retirement system has a significant ratio of retirees to active members and, usually, of assets to active member payroll and of Accrued Liability (AL) to active member payroll. These ratios, sometimes known as volatility ratios, for the Plan can be found in the chart below.

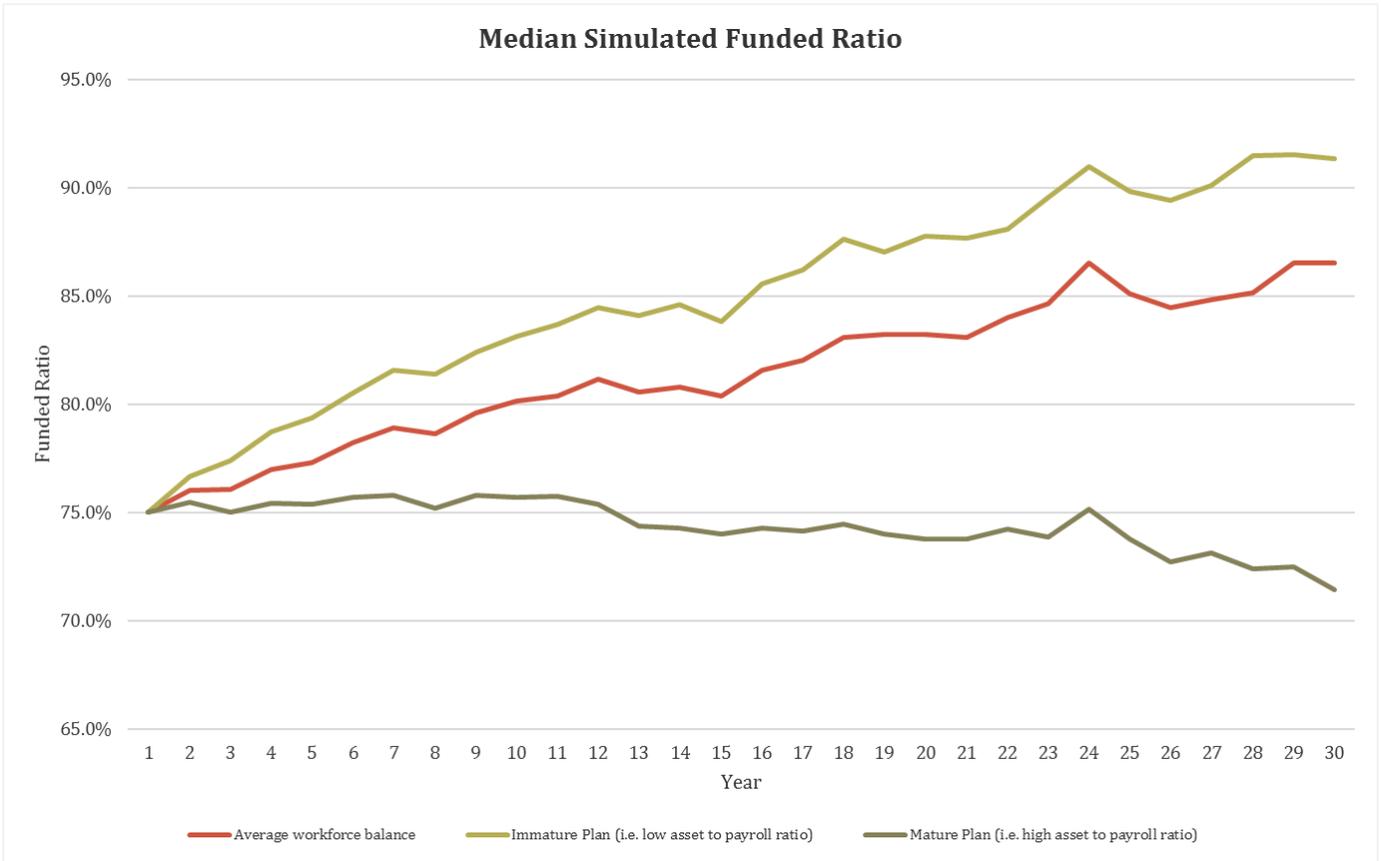
Valuation Date	June 30, 2017 (Lag)	June 30, 2016 (Lag)
Fiscal Year	2019	2018
<b>Volatility Ratios</b>		
1. Market Value of Assets (MVA)	\$ 4,099,571,000	\$ 3,416,433,000
2. Actuarial Value of Assets (AVA)	3,289,191,000	2,858,737,000
3. Accrued Liability	4,743,881,094	4,767,760,226
4. Active Salary	1,201,925,550	1,149,019,892
5. Asset Volatility Ratio (MVA basis) (1. / 4.)	3.4	3.0
6. Asset Volatility Ratio (AVA basis) (2. / 4.)	2.7	2.5
7. Liability Volatility Ratio (3. / 4.)	3.9	4.1

As a plan approaches maturity, Asset Volatility and Liability Volatility Ratios increase, and the plan becomes more sensitive to investment losses. The same percentage of investment losses in more mature plans can increase contributions as a percentage of payroll more than in less mature plans. Generally, mature plans need to consider more conservative investment strategies. These ratios for the Plan are not yet overly high.

While not available specifically for the Plan, illustrative forecasts of sample plans of various maturities can demonstrate this effect.<sup>1</sup>

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<sup>1</sup> Boyd, Donald J. and Yin, Yimeng. "How Public Pension Plan Demographic Characteristics Affect Funding and Contribution Risk." Pension Simulation Project. *The Nelson A. Rockefeller Institute of Government*.



A plan’s Support Ratio (i.e. the ratio of inactive participants to active participants) is a measure of maturity risk. A low Support Ratio implies that contributions are potentially low as a percentage of active payroll and support the benefit payments of few inactive participants. A high Support Ratio implies that contributions are potentially high as a percentage of active payroll and support the benefit payments of many inactive participants. Because the Plan’s Support Ratio is low, contributions for active members form a larger proportion of the total actuarial contribution than in more mature pension funds (see Page 58).

## Interest Rate Risk

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 Investment Risk above, the long-term rate of return assumption of 7.0% depends itself on the allocation of Plan assets.

If market conditions or the allocation of Plan assets no longer justifies a long-term rate of return assumption of 7.0%, a reduction in the Actuarial Interest Rate (AIR) may significantly increase the Accrued Liability and Unfunded Accrued Liability of the Plan, as well as the Normal Cost and resulting contribution. 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, 2017	
Valuation Date	June 30, 2017
<b>Results at 7.0%</b>	
1. Accrued Liability	\$ 4,743,881,094
2. Actuarial Value of Assets (AVA)	<u>3,289,191,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 1,454,690,094
4. Funded Ratio (2. / 1.)	69.3%
5. Normal Cost	\$ 133,096,063
<b>Results at 6.0%</b>	
1. Accrued Liability	\$ 5,290,202,779
2. Actuarial Value of Assets (AVA)	<u>3,289,191,000</u>
3. Unfunded Accrued Liability (AVA Basis) (1. - 2.)	\$ 2,001,011,779
4. Funded Ratio (2. / 1.)	62.2%
5. Normal Cost	\$ 190,917,495
<b>Sensitivity Analysis for 1.0% Reduction in Interest Rate</b>	
1. Increase in Accrued Liability	11.5%
2. Increase in Unfunded Accrued Liability (AVA Basis)	37.6%
3. Decrease in Funded Ratio	7.1%
4. Increase in Normal Cost	43.4%

## Inflation Risk

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). More granular analysis is not currently available but will be considered in future years.

## Longevity Risk

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.<sup>1</sup>

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.

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.”<sup>2</sup> 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 (SSA) 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%.

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<sup>1</sup> Retirement Plans Experience Committee. “Mortality Improvement Scale MP-2018 Report” and “Mortality Improvement Scale MP-2014 report.” *Society of Actuaries*.

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

## Low Risk Types

### Credit/Solvency Risk

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 and BERS face low solvency risk.

### Contribution Risk

Many public pension systems suffer from high contribution risk, wherein sponsoring governmental entities fail to make contributions as determined by the actuary under their funding policies. A recent study found that in 2010, the Annual Required Contribution<sup>1</sup> was not made for over 35% of the 110 public plans in the study.<sup>2</sup>

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 as 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.

### Agency Risk

Because of long-term asset returns and the gradual amortization of unfunded liabilities, the long-term funded status of the Plan is expected to improve. 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.

### Intergenerational Equity Risk

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 future taxpayers. The reverse can also be true if aggressive or unrealistic assumptions are used. As the Plan is ongoing, current and future taxpayers should be expected to offer similar funding contributions over the lifetime of the Plan.

In future years of higher funded status, intergenerational equity risk could increase as current taxpayers and plan members may receive preferential treatment over taxpayers and plan members prior to and subsequent to them when considering changes in statute and plan provisions.

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<sup>1</sup> As defined at the time in GASB 25/27.

<sup>2</sup> Shnitser, Natalya. "Funding Discipline for U.S. Public Pension Plans: An Empirical Analysis of Institutional Design." *Iowa Law Review*, Vol. 100 (2015).

## 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.<sup>1</sup> For more information about plan provisions, see the applicable Summary Plan Descriptions at [www.nycbers.org](http://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% per year interest compounded annually.

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

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<sup>1</sup> Less than 0.2% of active members as of June 30, 2017 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 Additional Member Contributions 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% <sup>1</sup>	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
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, the AMC contribution rate is 6.25% of Salary and AMC contributions are required for 30 years of Credited Service.

#### E. Credited Service

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

- Membership Service is service earned while a member of BERS.

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<sup>1</sup> Members of Chapter 96 55/25 and 57/5 who work in physically taxing employment contribute 1.98% more.

- Previous Service is 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.
- Transferred Service is service earned as a member of another public retirement system in the City or State of New York.
- Part-time Service is service that is prorated based on the number of hours or days worked in the year.
- Military Service is 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.

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

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

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 or in the final 36 months of employment if greater.

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

## H. Service Retirement

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

<b>Tier</b>	<b>Plan Description</b>	<b>Minimum Age</b>	<b>Minimum Service</b>
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	Chapter 504 55/27 plan	55	27
6	Basic 63/10 Plan	63	10
6	Special Officers 25-yr plan	N/A	25

2. Benefits:

- a. Tier 4 Plans except for the Special Officers 25-year 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. Tier 4 Special Officers 25-year plan:

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

- c. 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.
- d. Tier 6 Special Officers 25-year plan:
  - 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 plan. The eligibility requirements for early retirement plans are summarized in the table below:

<b>Tier</b>	<b>Plan Description</b>	<b>Minimum Age</b>	<b>Minimum Service</b>
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:

<b>Age</b>	<b>Early Retirement Factor</b>
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: Accident in the performance of duties while a 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.
- 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 – Active Members

- a. Eligibility: 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 annual wages earned during the year prior to death. The benefit is based on 50% of the annual wage rate if the member had less than one year of Credited Service.

2. Ordinary Death Benefit – Active and Terminated Vested Members

- a. Eligibility
  - i. Active members: Death while not in the performance of duties.
  - ii. Terminated vested members: 10 years of Credited Service.
- b. Death benefit
  - i. Active members and members who retired from active service: Refund of BMC and the employee portion of AMC with interest plus a salary-based death benefit. The salary-based death benefit is equal to

one year's wages times completed years of Credited Service up to 3 years times an Adjustment Factor described in the table below:

<b>Year of Death</b>	<b>Adjustment Factor</b>
Pre-retirement	100%
Post-retirement – death in 1 <sup>st</sup> year	50%
Post-retirement – death in 2 <sup>nd</sup> year	25%
Post-retirement – death after 2 <sup>nd</sup> year	10% times the benefit in effect at age 60 or at retirement if earlier

The pre-retirement death benefit and post-retirement death benefit for death in the first two years of retirement are also reduced by another adjustment factor that is equal to 100% minus 5% times the lesser of 10 years and the number of years by which the age at commencement exceeds 60.

- ii. Terminated vested members and members who retired from terminated vested status: Refund of BMC and the employee portion of AMC, if any, plus one half of the salary-based death benefit applicable to active members described above.
- c. Form of Payment: Lump sum.

**L. Vested Retirement 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:

- a. Tier 4 Special Officers 25-year plan: The service retirement benefit is payable when the member would have earned 25 years of Credited Service if he or she had continued working in covered employment.
- b. All other Tier 4 plans: The service retirement benefit is payable at age 62.
- c. Tier 6 Plans: The service retirement benefit is payable at age 63, but in no case can 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.

Optional forms of payment are subject to actuarial reduction. The unreduced amount of the Normal Form is known as the maximum retirement allowance.

## **N. Cost of Living Adjustments (COLA)**

Annuity payments are increased annually on September 1<sup>st</sup>, 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), not less than 1.0% and not 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 that the employee portion is 100% for the Special Officers plans.
2. Non-vested termination: BMC and AMC are refunded with interest.
3. Vested termination: A member may elect a refund of BMC and AMC with interest in lieu of a pension benefit, but only if he or she has less than 10 years of Credited Service.
4. Ordinary death: BMC and the employee portion of AMC are refunded with interest.
5. Accidental death: The employee portion of AMC are refunded with interest.
6. Disability Retirement: The employee portion of AMC are refunded with interest.
7. Service Retirement: The employee portion of AMC including AMC-PT are refunded with interest if the member retires on or after age 62. For retirement prior to age 62, 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.
8. 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 prior to earning 15 years of Credited Service as a special officer.

**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: Tier 4 members with Tier 3 rights 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 that (1) Credited Service under the Tier 3 benefit formula is capped at 30 years, (2) the Tier 3 benefit formula includes an offset starting at age 62 equal to 50% of the Primary Social Security benefit, and (3) 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:

- a. COLA: The COLA provisions applicable to Tier 4 retirement benefits are not applicable to Tier 3 retirement benefits.
- b. Escalation: Tier 3 retirement benefits may be adjusted annually by escalation. A Tier 3 retirement benefit cannot be less than the Tier 3 retirement benefit without escalation.
  - i. Full Escalation: Benefits commencing on or after age 65 are eligible. It is 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.
  - ii. Partial Escalation: Applicable for benefits commencing after age 62. It is 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, 2017 (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. This law will be reflected in future valuations as participants request military service credit.
- **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 plan year April 1 to March 31 to plan year January 1 to 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.
- **Chapter 489 of the Laws of 2013** (Chapter 489/13) addressed limitations in existing disability provisions intended to protect public employees who suffered injuries or illnesses in WTC rescue, recovery, and cleanup operations.
- **Chapter 3 of the Laws of 2013** (Chapter 3/13), effective retroactive to July 1, 2011, enacted those new actuarial assumptions and methods that require State legislation.
- **Chapter 18 of the Laws of 2012** (Chapter 18/12), placed certain limitations on the Tier 3 and Tier 4 benefits available to participants hired on and after April 1, 2012 in most New York State Public Employee Retirement Systems, including BERS, and is generally referred to as Tier 6.

## SECTION X - SUBSEQUENT EVENTS

The Board of Directors, 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 own 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 2019 Board meeting and are referred to as the “2019 A&M.”

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% *	20.00%/15.00% **	10.00%	50.00%	20.00%
63	0.00%	15.00%/20.00% ***	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%

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

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

\*\*\* 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%
21	1.40%	1.40%
22	1.40%	1.40%
23	1.40%	1.40%
24	1.40%	1.40%
25+	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 Scale
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%

## 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:** 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, actual 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).

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

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

7. **Actuarial Cost Method:** Beginning with the June 30, 2010 (Lag) actuarial valuation, the Entry Age Normal (EAN) cost method of funding is used by the Actuary to calculate the contribution required of the employer under the 2019 A&M.

Under this method, the Present Value of Future Benefits (PVFB) of each individual included in the actuarial valuation is allocated on a level basis over the earnings between the age a member enters the plan 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 Present Value 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 employer normal cost remains constant as a percentage of payroll and changes gradually over time for the entire Plan as the characteristics of the members change (e.g. more Tier 6 active members decrease the average employer normal cost).

8. **Lump Sum Death Benefits:** Liabilities for group life lump sum death benefits are calculated under the One-Year Term Cost method.
9. **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.
10. **WTC Disability and Death Benefits:** For actuarial valuations beginning June 30, 2014 and after, obligations attributable to the WTC Disability Law and to the WTC Death Benefits Law are determined using explicit assumptions in the 2019 A&M, and through estimation techniques for post-retirement reclassifications.
11. **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 mid-year normal cost for Fiscal Year XX.

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.

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

**13. Term Cost for TDA Fixed Fund:** Beginning with the June 30, 2016 (Lag) actuarial valuation, 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

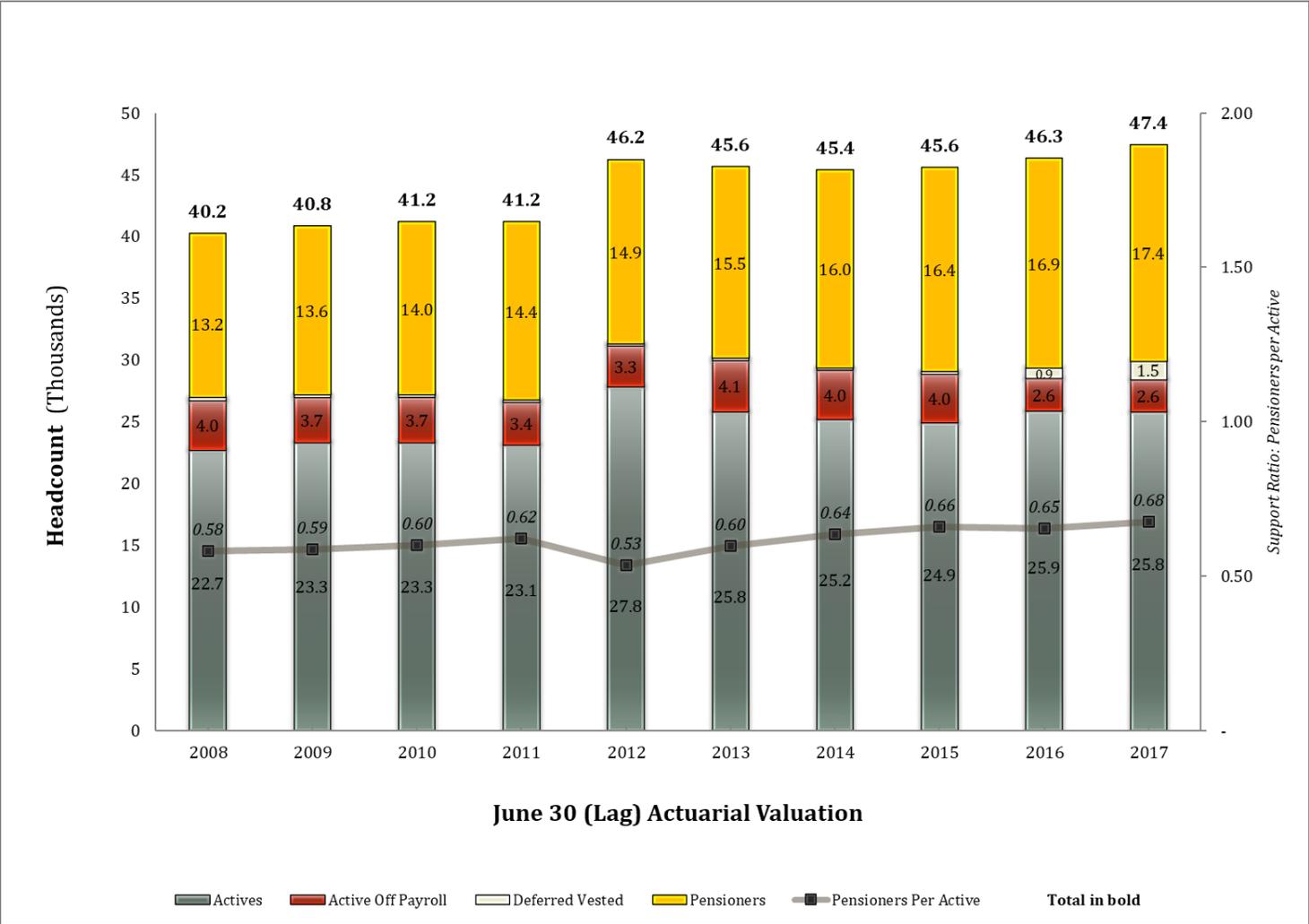
The June 30, 2017 (Lag) and June 30, 2016 (Lag) actuarial valuations are based upon census data as of those dates submitted by the Plan's administrative staff and the employer's payroll facilities. Financial information was provided by the Office of the Comptroller as of June 30, 2017 and June 30, 2016.

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)
<b>Number at June 30, 2016</b>	25,864	2,629	851	15,034	937	168	2	796	16,937	46,281
New Entrants	2,204	0	630	0	0	0	0	0	0	2,834
Rehires	239	(213)	(10)	0	0	0	0	0	0	16
Leaving Active Payroll	(1,519)	1,519	0	0	0	0	0	0	0	0
Vested Termination	(72)	(80)	152	0	0	0	0	0	0	0
Non-Vested Termination / Cashout	(129)	(1,156)	(56)	0	0	0	0	0	0	(1,341)
Accidental Death (from Active)	0	0	0	0	0	0	0	0	0	0
Ordinary Death (from Active)	(21)	(3)	0	0	0	0	0	0	0	(24)
Service Retirement	(693)	(50)	(39)	906	0	0	0	0	906	124
Ordinary Disability Retirement	(72)	(17)	0	0	92	0	0	0	92	3
Accidental Disability Retirement	(7)	(11)	0	0	0	19	0	0	19	1
Death with Beneficiary	0	0	0	(28)	(2)	(1)	0	44	13	13
Death without Beneficiary	0	0	0	(458)	(28)	(4)	0	(18)	(508)	(508)
Off Pension Payroll	0	0	0	0	0	0	0	(34)	(34)	(34)
Net Change	(70)	(11)	677	420	62	14	0	(8)	488	1,084
<b>Number at June 30, 2017</b>	25,794	2,618	1,528	15,454	999	182	2	788	17,425	47,365

Graph XII-2  
Headcount Summary by Status

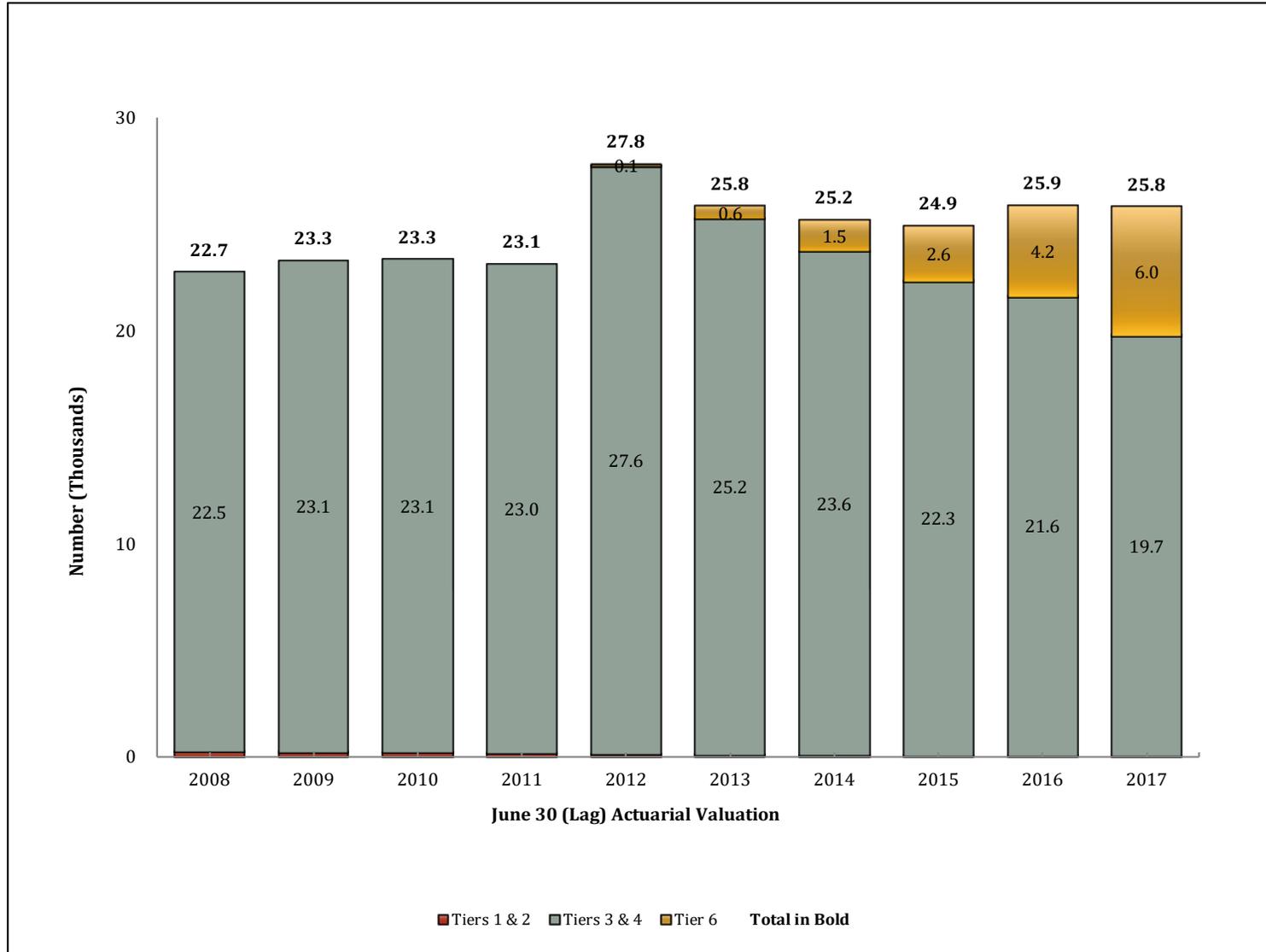


**Table XII-3**  
**Summary of Active Membership**

NEW YORK CITY BOARD OF EDUCATION RETIREMENT SYSTEM		
ACTIVE MEMBERS INCLUDED IN THE JUNE 30, 2017 (LAG) AND THE JUNE 30, 2016 (LAG) ACTUARIAL VALUATIONS		
	<b>June 30, 2017 (Lag)</b>	<b>June 30, 2016 (Lag)</b>
<b>Number</b>		
Males	6,427	6,301
Females	19,367	19,563
Total	25,794	25,864
<b>Annual Salary<sup>1</sup></b>		
Males	\$ 419,754,504	\$ 393,227,215
Females	782,171,046	755,792,677
Total	\$ 1,201,925,550	\$ 1,149,019,892
<b>Average Salary<sup>1</sup></b>		
Males	\$ 65,311	\$ 62,407
Females	40,387	38,634
Total Average	\$ 46,597	\$ 44,425
<b>Average Age</b>		
Males	49.0	49.1
Females	51.8	51.9
Total Average	51.1	51.2
<b>Average Past Service</b>		
Males	10.0	10.5
Females	9.2	10.3
Total Average	9.4	10.4

<sup>1</sup>Salaries 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**

<b>June 30 (Lag) Actuarial Valuation</b>	<b>Number</b>	<b>Annual Salary</b>	<b>Average Annual Salary</b>	<b>Percentage Increase/ (Decrease) In Avg. Salary</b>
2008(Lag)	22,729	\$852,105,791	\$37,490	5.8%
2009(Lag)	23,303	910,609,483	39,077	4.2%
2010(Lag)	23,324	912,290,136	39,114	0.1%
2011(Lag)	23,131	920,369,154	39,789	1.7%
2012(Lag)	27,840	1,018,895,365	36,598	- 8.0%
2013(Lag)	25,848	1,051,571,168	40,683	11.2%
2014(Lag)	25,182	1,045,187,738	41,505	2.0%
2015(Lag)	24,903	1,093,962,316	43,929	5.8%
2016(Lag)	25,864	1,149,019,892	44,425	1.1%
2017(Lag)	25,794	1,201,925,550	46,597	4.9%

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, 2017**

		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	4	0	0	0	0	0	0	0	0	4
20 TO 24	56	1	0	0	0	0	0	0	0	57
25 TO 29	282	37	2	0	0	0	0	0	0	321
30 TO 34	349	165	16	1	0	0	0	0	0	531
35 TO 39	296	227	92	19	0	0	0	0	0	634
40 TO 44	254	261	179	73	8	1	0	0	0	776
45 TO 49	266	226	206	118	49	13	2	0	0	880
50 TO 54	269	234	204	160	104	66	11	1	0	1,049
55 TO 59	240	186	155	166	115	109	52	9	1	1,033
60 TO 64	120	148	119	109	71	85	51	17	2	722
65 TO 69	37	63	60	48	23	14	11	9	9	274
70 & UP	30	30	37	27	10	7	2	0	3	146
<b>TOTAL</b>	<b>2,203</b>	<b>1,578</b>	<b>1,070</b>	<b>721</b>	<b>380</b>	<b>295</b>	<b>129</b>	<b>36</b>	<b>15</b>	<b>6,427</b>

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	165	0	0	0	0	0	0	0	0	165
20 TO 24	2,025	51	0	0	0	0	0	0	0	2,076
25 TO 29	12,372	1,920	124	0	0	0	0	0	0	14,416
30 TO 34	17,585	9,367	949	34	0	0	0	0	0	27,935
35 TO 39	15,794	14,366	6,783	1,323	0	0	0	0	0	38,266
40 TO 44	13,720	17,837	14,565	5,632	763	86	0	0	0	52,601
45 TO 49	13,535	14,025	17,669	9,537	3,742	1,246	153	0	0	59,906
50 TO 54	14,169	14,720	16,752	13,183	8,502	6,127	880	79	0	74,413
55 TO 59	11,248	10,493	11,728	12,748	9,139	9,959	4,623	974	128	71,039
60 TO 64	5,998	8,384	8,643	8,667	6,279	7,790	5,279	1,874	79	52,993
65 TO 69	1,560	3,110	3,532	3,320	1,920	1,518	1,126	912	652	17,650
70 & UP	918	1,569	2,010	1,844	887	494	261	0	311	8,294
<b>TOTAL*</b>	<b>109,089</b>	<b>95,841</b>	<b>82,755</b>	<b>56,288</b>	<b>31,232</b>	<b>27,219</b>	<b>12,323</b>	<b>3,839</b>	<b>1,169</b>	<b>419,755</b>

<i>AVERAGE SALARIES: **</i>										
UNDER 20	41,331	0	0	0	0	0	0	0	0	41,331
20 TO 24	36,169	50,700	0	0	0	0	0	0	0	36,424
25 TO 29	43,873	51,878	62,184	0	0	0	0	0	0	44,910
30 TO 34	50,387	56,768	59,339	34,101	0	0	0	0	0	52,609
35 TO 39	53,358	63,285	73,724	69,642	0	0	0	0	0	60,356
40 TO 44	54,014	68,340	81,366	77,152	95,349	85,653	0	0	0	67,785
45 TO 49	50,883	62,057	85,770	80,826	76,363	95,812	76,631	0	0	68,075
50 TO 54	52,674	62,908	82,116	82,392	81,754	92,833	80,042	79,356	0	70,938
55 TO 59	46,865	56,413	75,667	76,794	79,468	91,366	88,899	108,184	127,840	68,769
60 TO 64	49,987	56,652	72,627	79,511	88,444	91,644	103,512	110,211	39,272	73,397
65 TO 69	42,158	49,363	58,871	69,161	83,458	108,455	102,371	101,344	72,444	64,415
70 & UP	30,602	52,296	54,332	68,304	88,740	70,520	130,488	0	103,547	56,809
<b>TOTAL</b>	<b>49,519</b>	<b>60,736</b>	<b>77,341</b>	<b>78,069</b>	<b>82,190</b>	<b>92,267</b>	<b>95,525</b>	<b>106,630</b>	<b>77,935</b>	<b>65,311</b>

Note: Age is last birthday. Service is completed years.

\* 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, 2017 (cont'd)**

		<b>Female Total</b>								
<b>AGE \ SVC</b>	<b>UNDER 5</b>	<b>5-9</b>	<b>10-14</b>	<b>15-19</b>	<b>20-24</b>	<b>25-29</b>	<b>30-34</b>	<b>35-39</b>	<b>40 &amp; UP</b>	<b>ALL YEARS</b>
<i>NUMBER:</i>										
UNDER 20	5	0	0	0	0	0	0	0	0	5
20 TO 24	102	0	0	0	0	0	0	0	0	102
25 TO 29	599	37	0	0	0	0	0	0	0	636
30 TO 34	741	268	23	1	0	0	0	0	0	1,033
35 TO 39	777	435	211	27	0	0	0	0	0	1,450
40 TO 44	857	504	325	130	11	1	0	0	0	1,828
45 TO 49	1,012	734	412	228	72	15	1	0	0	2,474
50 TO 54	1,116	974	757	403	130	80	28	1	0	3,489
55 TO 59	829	985	903	613	225	87	72	18	0	3,732
60 TO 64	439	691	722	574	284	104	47	20	10	2,891
65 TO 69	174	220	321	246	129	49	11	6	7	1,163
70 & UP	60	101	162	111	79	29	14	6	2	564
<b>TOTAL</b>	<b>6,711</b>	<b>4,949</b>	<b>3,836</b>	<b>2,333</b>	<b>930</b>	<b>365</b>	<b>173</b>	<b>51</b>	<b>19</b>	<b>19,367</b>

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	235	0	0	0	0	0	0	0	0	235
20 TO 24	3,479	0	0	0	0	0	0	0	0	3,479
25 TO 29	30,189	1,965	0	0	0	0	0	0	0	32,154
30 TO 34	37,705	16,895	1,408	50	0	0	0	0	0	56,058
35 TO 39	33,660	27,181	14,198	1,983	0	0	0	0	0	77,021
40 TO 44	30,093	26,884	21,083	8,461	733	96	0	0	0	87,350
45 TO 49	29,719	29,454	20,360	13,761	5,161	1,126	78	0	0	99,659
50 TO 54	31,351	33,784	30,177	18,511	8,436	5,857	2,246	54	0	130,417
55 TO 59	22,592	32,807	31,336	25,862	10,759	5,533	5,217	1,492	0	135,599
60 TO 64	12,136	22,152	24,050	22,430	12,738	5,637	3,362	1,609	778	104,892
65 TO 69	4,160	5,967	9,914	9,125	5,587	2,685	583	306	433	38,760
70 & UP	1,385	2,526	3,935	3,308	2,775	1,340	697	352	229	16,547
<b>TOTAL *</b>	<b>236,704</b>	<b>199,615</b>	<b>156,461</b>	<b>103,492</b>	<b>46,189</b>	<b>22,273</b>	<b>12,184</b>	<b>3,814</b>	<b>1,439</b>	<b>782,171</b>

<i>AVERAGE SALARIES: **</i>										
UNDER 20	47,015	0	0	0	0	0	0	0	0	47,015
20 TO 24	34,104	0	0	0	0	0	0	0	0	34,104
25 TO 29	50,399	53,096	0	0	0	0	0	0	0	50,556
30 TO 34	50,884	63,042	61,228	49,966	0	0	0	0	0	54,268
35 TO 39	43,320	62,484	67,291	73,429	0	0	0	0	0	53,118
40 TO 44	35,114	53,341	64,872	65,085	66,610	96,054	0	0	0	47,784
45 TO 49	29,366	40,128	49,418	60,356	71,683	75,055	77,960	0	0	40,283
50 TO 54	28,093	34,685	39,864	45,934	64,892	73,215	80,232	53,708	0	37,380
55 TO 59	27,252	33,307	34,702	42,189	47,817	63,596	72,459	82,917	0	36,334
60 TO 64	27,646	32,058	33,310	39,077	44,851	54,201	71,533	80,472	77,782	36,282
65 TO 69	23,908	27,122	30,884	37,095	43,313	54,787	53,017	51,011	61,806	33,327
70 & UP	23,086	25,014	24,288	29,800	35,129	46,209	49,802	58,655	114,261	29,338
<b>TOTAL</b>	<b>35,271</b>	<b>40,334</b>	<b>40,788</b>	<b>44,360</b>	<b>49,665</b>	<b>61,023</b>	<b>70,427</b>	<b>74,777</b>	<b>75,736</b>	<b>40,387</b>

Note: Age is last birthday. Service is completed years.

\* 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, 2017 (cont'd)**

AGE \ SVC	Total									
	UNDER 5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40 & UP	ALL YEARS
<i>NUMBER:</i>										
UNDER 20	9	0	0	0	0	0	0	0	0	9
20 TO 24	158	1	0	0	0	0	0	0	0	159
25 TO 29	881	74	2	0	0	0	0	0	0	957
30 TO 34	1,090	433	39	2	0	0	0	0	0	1,564
35 TO 39	1,073	662	303	46	0	0	0	0	0	2,084
40 TO 44	1,111	765	504	203	19	2	0	0	0	2,604
45 TO 49	1,278	960	618	346	121	28	3	0	0	3,354
50 TO 54	1,385	1,208	961	563	234	146	39	2	0	4,538
55 TO 59	1,069	1,171	1,058	779	340	196	124	27	1	4,765
60 TO 64	559	839	841	683	355	189	98	37	12	3,613
65 TO 69	211	283	381	294	152	63	22	15	16	1,437
70 & UP	90	131	199	138	89	36	16	6	5	710
<b>TOTAL</b>	<b>8,914</b>	<b>6,527</b>	<b>4,906</b>	<b>3,054</b>	<b>1,310</b>	<b>660</b>	<b>302</b>	<b>87</b>	<b>34</b>	<b>25,794</b>

<i>SALARIES (IN THOUSANDS):</i>										
UNDER 20	400	0	0	0	0	0	0	0	0	400
20 TO 24	5,504	51	0	0	0	0	0	0	0	5,555
25 TO 29	42,561	3,884	124	0	0	0	0	0	0	46,570
30 TO 34	55,290	26,262	2,358	84	0	0	0	0	0	83,994
35 TO 39	49,454	41,546	20,981	3,306	0	0	0	0	0	115,287
40 TO 44	43,813	44,721	35,648	14,093	1,495	182	0	0	0	139,952
45 TO 49	43,254	43,479	38,029	23,299	8,903	2,371	231	0	0	159,565
50 TO 54	45,521	48,504	46,929	31,694	16,938	11,984	3,127	133	0	204,831
55 TO 59	33,840	43,300	43,064	38,610	19,898	15,492	9,840	2,466	128	206,637
60 TO 64	18,135	30,537	32,692	31,097	19,017	13,427	8,641	3,483	856	157,885
65 TO 69	5,720	9,077	13,446	12,445	7,507	4,203	1,709	1,218	1,085	56,410
70 & UP	2,303	4,095	5,945	5,152	3,663	1,834	958	352	539	24,841
<b>TOTAL *</b>	<b>345,794</b>	<b>295,456</b>	<b>239,216</b>	<b>159,780</b>	<b>77,421</b>	<b>49,492</b>	<b>24,507</b>	<b>7,652</b>	<b>2,608</b>	<b>1,201,926</b>

<i>AVERAGE SALARIES: **</i>										
UNDER 20	44,489	0	0	0	0	0	0	0	0	44,489
20 TO 24	34,836	50,700	0	0	0	0	0	0	0	34,936
25 TO 29	48,310	52,487	62,184	0	0	0	0	0	0	48,662
30 TO 34	50,725	60,651	60,453	42,034	0	0	0	0	0	53,704
35 TO 39	46,089	62,759	69,244	71,865	0	0	0	0	0	55,320
40 TO 44	39,435	58,458	70,730	69,424	78,710	90,854	0	0	0	53,745
45 TO 49	33,845	45,290	61,535	67,337	73,578	84,692	77,074	0	0	47,575
50 TO 54	32,867	40,152	48,833	56,295	72,386	82,083	80,178	66,532	0	45,137
55 TO 59	31,655	36,977	40,704	49,563	58,523	79,040	79,353	91,339	127,840	43,366
60 TO 64	32,442	36,397	38,873	45,530	53,569	71,040	88,175	94,136	71,363	43,699
65 TO 69	27,108	32,073	35,292	42,330	49,387	66,713	77,694	81,211	67,790	39,255
70 & UP	25,591	31,262	29,874	37,333	41,152	50,936	59,888	58,655	107,832	34,987
<b>TOTAL</b>	<b>38,792</b>	<b>45,267</b>	<b>48,760</b>	<b>52,318</b>	<b>59,100</b>	<b>74,988</b>	<b>81,148</b>	<b>87,958</b>	<b>76,706</b>	<b>46,597</b>

Note: Age is last birthday. Service is completed years.

\* Total may not add up due to rounding.

\*\* Average based on unrounded salary.

**Table XII-7**  
**Detailed Reconciliation of Active Membership**

		<u>TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2017</u>					<u>TOTAL ACTIVE MEMBERS AS OF JUNE 30, 2016</u>				
<u>TIER</u>	<u>GENDER</u>	<u>NUMBER</u>	<u>SALARY</u>	<u>AVG SAL</u>	<u>AVG AGE</u>	<u>AVG SVC</u>	<u>NUMBER</u>	<u>SALARY</u>	<u>AVG SAL</u>	<u>AVG AGE</u>	<u>AVG SVC</u>
1	M	9	839,701	93,300	68.3	25.6	10	937,276	93,728	67.0	35.7
1	F	17	1,184,765	69,692	69.8	28.4	21	1,436,731	68,416	69.2	35.7
		26	2,024,466	77,864	69.3	27.4	31	2,374,007	76,581	68.5	35.7
2	M	8	819,353	102,419	68.3	29.3	11	982,112	89,283	66.3	39.4
2	F	12	722,905	60,242	68.8	30.1	19	1,103,997	58,105	66.6	36.1
		20	1,542,258	77,113	68.6	29.8	30	2,086,109	69,537	66.5	37.3
4	M	4,834	329,434,059	68,149	51.2	12.6	5,220	335,702,072	64,311	50.5	12.3
4	F	14,903	601,350,935	40,351	54.2	11.3	16,346	631,678,613	38,644	53.5	12.0
		19,737	930,784,994	47,159	53.5	11.6	21,566	967,380,685	44,857	52.8	12.0
6	M	1,576	88,661,391	56,257	42.1	1.7	1,060	55,605,755	52,458	41.7	1.4
6	F	4,435	178,912,441	40,341	43.4	1.7	3,177	121,573,336	38,267	43.4	1.5
		6,011	267,573,832	44,514	43.1	1.7	4,237	177,179,091	41,817	43.0	1.5
<b>ALL</b>		<b>25,794</b>	<b>1,201,925,550</b>	<b>46,597</b>	<b>51.1</b>	<b>9.4</b>	<b>25,864</b>	<b>1,149,019,892</b>	<b>44,425</b>	<b>51.2</b>	<b>10.4</b>
		<u>JUNE 30, 2017 MEMBERS ALSO PRESENT AS OF JUNE 30, 2016</u>					<u>JUNE 30, 2016 MEMBERS ALSO PRESENT AS OF JUNE 30, 2017</u>				
1	M	9	839,701	93,300	68.3	25.6	9	825,374	91,708	67.3	34.9
1	F	16	1,148,089	71,756	70.1	27.4	16	1,147,633	71,727	69.1	36.6
		25	1,987,790	79,512	69.4	26.8	25	1,973,007	78,920	68.4	36.0
2	M	7	710,571	101,510	67.9	32.1	7	678,344	96,906	66.9	39.3
2	F	11	631,980	57,453	68.9	31.6	11	615,627	55,966	67.9	34.5
		18	1,342,551	74,586	68.5	31.8	18	1,293,971	71,887	67.5	36.3
4	M	4,746	324,410,185	68,354	51.3	12.7	4,746	311,778,477	65,693	50.3	12.3
4	F	14,657	590,625,263	40,296	54.3	11.4	14,657	576,791,478	39,353	53.3	11.9
		19,403	915,035,448	47,159	53.6	11.7	19,403	888,569,955	45,795	52.6	12.0
6	M	958	56,556,960	59,036	43.0	2.3	958	51,398,321	53,652	42.0	1.5
6	F	2,902	117,639,114	40,537	44.5	2.3	2,902	110,688,987	38,142	43.5	1.5
		3,860	174,196,074	45,129	44.2	2.3	3,860	162,087,308	41,992	43.2	1.5
<b>ALL</b>		<b>23,306</b>	<b>1,092,561,863</b>	<b>46,879</b>	<b>52.0</b>	<b>10.2</b>	<b>23,306</b>	<b>1,053,924,241</b>	<b>45,221</b>	<b>51.0</b>	<b>10.3</b>
		<u>ADDITIONS DURING THE YEAR *</u>					<u>SEPARATIONS FROM MEMBERSHIP DURING THE YEAR *</u>				
1	M	0	0	0	0.0	0.0	1	111,902	111,902	64.0	43.0
1	F	1	36,676	36,676	65.0	44.0	5	289,098	57,820	69.6	32.6
		1	36,676	36,676	65.0	44.0	6	401,000	66,833	68.7	34.3
2	M	1	108,782	108,782	71.0	9.0	4	303,768	75,942	65.3	39.5
2	F	1	90,925	90,925	68.0	13.0	8	488,370	61,046	64.8	38.4
		2	199,707	99,854	69.5	11.0	12	792,138	66,012	64.9	38.8
4	M	88	5,023,874	57,089	45.8	7.5	474	23,923,595	50,472	52.2	12.2
4	F	246	10,725,672	43,600	49.7	8.0	1,689	54,887,135	32,497	55.8	12.8
		334	15,749,546	47,154	48.7	7.9	2,163	78,810,730	36,436	55.0	12.7
6	M	618	32,104,431	51,949	40.6	0.7	102	4,207,434	41,249	38.8	1.3
6	F	1,533	61,273,327	39,970	41.2	0.6	275	10,884,349	39,579	41.5	1.5
		2,151	93,377,758	43,411	41.1	0.6	377	15,091,783	40,031	40.8	1.5
<b>ALL</b>		<b>2,488</b>	<b>109,363,687</b>	<b>43,956</b>	<b>42.1</b>	<b>1.6</b>	<b>2,558</b>	<b>95,095,651</b>	<b>37,176</b>	<b>53.0</b>	<b>11.2</b>

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

\* Separations and additions do not include members who joined after June 30, 2016 and are no longer members on June 30, 2017.

Table XII-8  
Summary of Non-Pensioner Membership as of June 30, 2017

STATUS	TIER 1		TIER 2		TIER 4		TIER 6		ALL TIERS	
	NUMBER	SALARY	NUMBER	SALARY	NUMBER	SALARY	NUMBER	SALARY	NUMBER	SALARY
<i>MALES:</i>										
ACTIVES	9	839,701	8	819,353	4,834	329,434,059	1,576	88,661,391	6,427	419,754,504
ACTIVE OFF PAYROLL	0	0	1	68,294	490	20,430,798	115	4,926,799	606	25,425,891
VESTED	0	0	3	15,000	523	15,260,623	0	0	526	15,275,623
<b>ALL STATUS</b>	<b>9</b>	<b>839,701</b>	<b>12</b>	<b>902,647</b>	<b>5,847</b>	<b>365,125,480</b>	<b>1,691</b>	<b>93,588,190</b>	<b>7,559</b>	<b>460,456,018</b>
<i>FEMALES:</i>										
ACTIVES	17	1,184,765	12	722,905	14,903	601,350,935	4,435	178,912,441	19,367	782,171,046
ACTIVE OFF PAYROLL	0	0	2	81,313	1,679	56,358,491	331	12,331,823	2,012	68,771,627
VESTED	2	10,000	1	27,666	999	24,696,341	0	0	1,002	24,734,007
<b>ALL STATUS</b>	<b>19</b>	<b>1,194,765</b>	<b>15</b>	<b>831,884</b>	<b>17,581</b>	<b>682,405,767</b>	<b>4,766</b>	<b>191,244,264</b>	<b>22,381</b>	<b>875,676,680</b>
<i>TOTAL:</i>										
ACTIVES	26	2,024,466	20	1,542,258	19,737	930,784,994	6,011	267,573,832	25,794	1,201,925,550
ACTIVE OFF PAYROLL	0	0	3	149,607	2,169	76,789,289	446	17,258,622	2,618	94,197,518
VESTED	2	10,000	4	42,666	1,522	39,956,964	0	0	1,528	40,009,630
<b>ALL STATUS</b>	<b>28</b>	<b>2,034,466</b>	<b>27</b>	<b>1,734,531</b>	<b>23,428</b>	<b>1,047,531,247</b>	<b>6,457</b>	<b>284,832,454</b>	<b>29,940</b>	<b>1,336,132,698</b>

**Table XII-9**  
**Summary of Pensioner Membership**

Group	June 30, 2017 (Lag)					June 30, 2016 (Lag)				
	Number	Annual Amounts Payable				Number	Annual Amounts Payable			
		Fixed	Variable	Supplement	Total		Fixed	Variable	Supplement	Total
Service Pensioners	15,454	\$ 197,552,380	\$ 2,010,690	\$ 12,496,531	\$ 212,059,601	15,034	\$ 187,479,625	\$ 1,978,095	\$ 12,294,144	\$ 201,751,864
Ordinary Disability Pensioners	999	11,292,808	9,604	646,042	11,948,454	937	10,586,528	8,447	609,029	11,204,004
Accidental Disability Pensioners	182	1,991,135	0	299,274	2,290,409	168	1,952,643	0	294,708	2,247,351
Accidental Death Pensioners	2	5,696	0	9,750	15,446	2	5,696	0	9,627	15,323
Other Beneficiaries	788	10,479,643	266,046	1,096,723	11,842,412	796	10,445,450	253,188	1,151,394	11,850,032
<b>Total</b>	<b>17,425</b>	<b>\$ 221,321,662</b>	<b>\$ 2,286,340</b>	<b>\$ 14,548,320</b>	<b>\$ 238,156,322</b>	<b>16,937</b>	<b>\$ 210,469,942</b>	<b>\$ 2,239,730</b>	<b>\$ 14,358,902</b>	<b>\$ 227,068,574</b>

**Table XII-10**  
**Distribution of Pension Benefits by Cause and Age as of June 30, 2017**

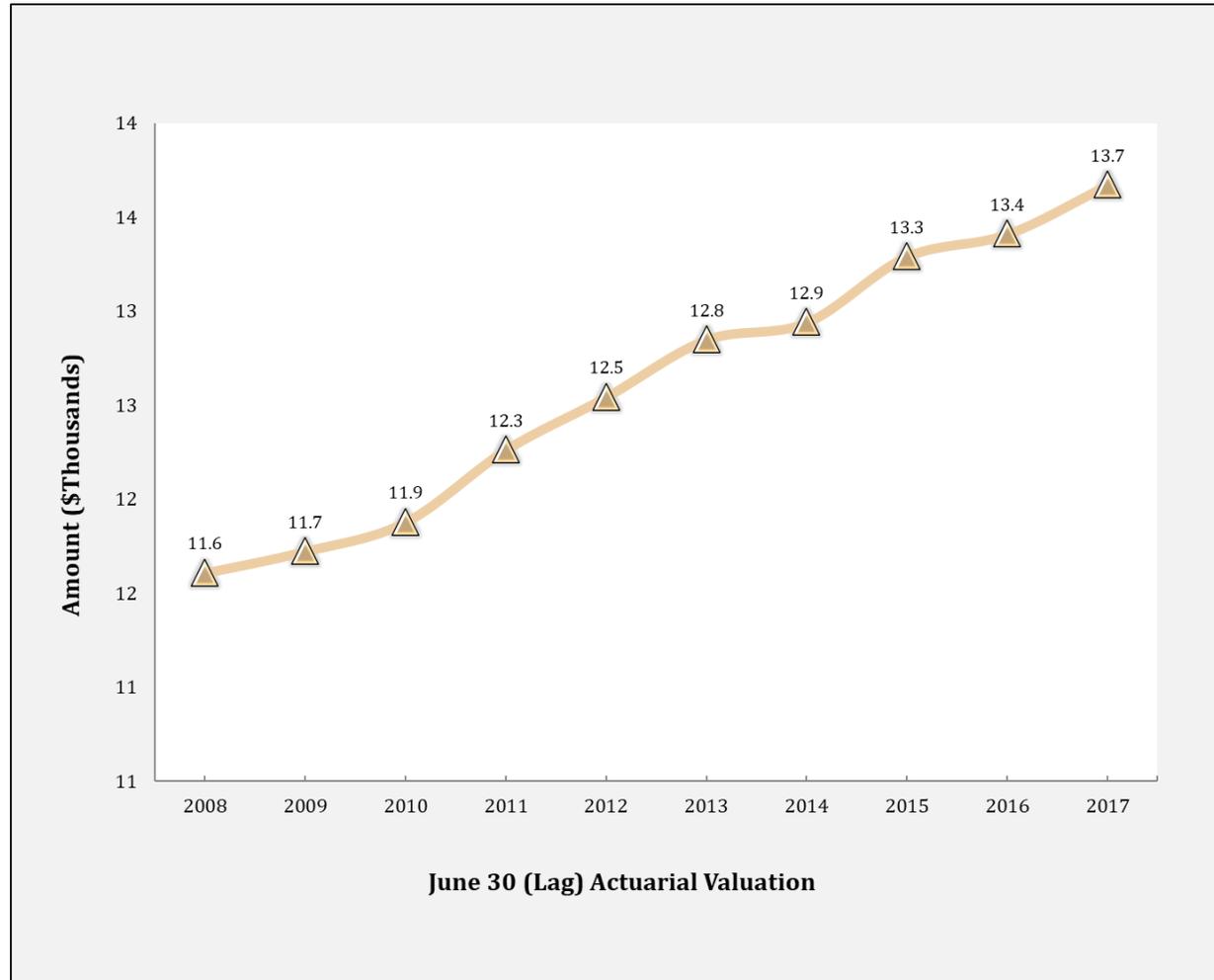
AGE	MALE			FEMALE			TOTAL		
	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE	NUMBER	BENEFITS	AVERAGE
<i>SERVICE RETIREMENT:</i>									
UNDER 30	0	0	0	0	0	0	0	0	0
30 TO 34	0	0	0	0	0	0	0	0	0
35 TO 39	0	0	0	0	0	0	0	0	0
40 TO 44	0	0	0	1	2,522	2,522	1	2,522	2,522
45 TO 49	0	0	0	1	25,226	25,226	1	25,226	25,226
50 TO 54	8	372,901	46,613	4	77,669	19,417	12	450,570	37,548
55 TO 59	91	2,856,450	31,390	261	2,747,370	10,526	352	5,603,820	15,920
60 TO 64	347	10,430,189	30,058	1,225	15,441,688	12,605	1,572	25,871,877	16,458
65 TO 69	642	19,043,996	29,664	2,607	29,818,597	11,438	3,249	48,862,593	15,039
70 TO 74	618	17,491,248	28,303	2,764	30,159,422	10,912	3,382	47,650,670	14,089
75 TO 79	481	13,866,287	28,828	2,084	19,818,683	9,510	2,565	33,684,970	13,133
80 TO 84	389	10,241,809	26,329	1,507	13,152,822	8,728	1,896	23,394,631	12,339
85 TO 89	260	6,291,941	24,200	1,134	9,506,791	8,383	1,394	15,798,732	11,333
90 & UP	156	3,684,997	23,622	874	7,028,993	8,042	1,030	10,713,990	10,402
<b>TOTAL</b>	<b>2,992</b>	<b>84,279,818</b>	<b>28,168</b>	<b>12,462</b>	<b>127,779,783</b>	<b>10,254</b>	<b>15,454</b>	<b>212,059,601</b>	<b>13,722</b>
<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	0	0	0	0	0	0
40 TO 44	1	8,087	8,087	3	48,826	16,275	4	56,913	14,228
45 TO 49	2	32,897	16,449	11	168,714	15,338	13	201,611	15,509
50 TO 54	16	274,627	17,164	40	463,007	11,575	56	737,634	13,172
55 TO 59	50	930,834	18,617	111	1,305,932	11,765	161	2,236,766	13,893
60 TO 64	55	912,353	16,588	160	1,792,300	11,202	215	2,704,653	12,580
65 TO 69	47	778,390	16,561	172	1,732,057	10,070	219	2,510,447	11,463
70 TO 74	33	561,891	17,027	150	1,456,208	9,708	183	2,018,099	11,028
75 TO 79	23	293,065	12,742	75	675,037	9,000	98	968,102	9,879
80 TO 84	6	90,989	15,165	22	189,819	8,628	28	280,808	10,029
85 TO 89	7	100,187	14,312	11	86,125	7,830	18	186,312	10,351
90 & UP	2	31,824	15,912	2	15,285	7,643	4	47,109	11,777
<b>TOTAL</b>	<b>242</b>	<b>4,015,144</b>	<b>16,592</b>	<b>757</b>	<b>7,933,310</b>	<b>10,480</b>	<b>999</b>	<b>11,948,454</b>	<b>11,960</b>
<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	0	0	0	0	0	0
40 TO 44	0	0	0	3	25,463	8,488	3	25,463	8,488
45 TO 49	0	0	0	2	16,882	8,441	2	16,882	8,441
50 TO 54	4	83,828	20,957	5	55,497	11,099	9	139,325	15,481
55 TO 59	9	185,157	20,573	17	151,119	8,889	26	336,276	12,934
60 TO 64	6	97,044	16,174	24	270,971	11,290	30	368,015	12,267
65 TO 69	10	138,117	13,812	27	281,795	10,437	37	419,912	11,349
70 TO 74	9	177,183	19,687	19	143,314	7,543	28	320,497	11,446
75 TO 79	6	177,807	29,635	13	97,819	7,525	19	275,626	14,507
80 TO 84	3	77,923	25,974	12	85,883	7,157	15	163,806	10,920
85 TO 89	2	74,417	37,209	4	32,234	8,059	6	106,651	17,775
90 & UP	4	91,083	22,771	3	26,873	8,958	7	117,956	16,851
<b>TOTAL</b>	<b>53</b>	<b>1,102,559</b>	<b>20,803</b>	<b>129</b>	<b>1,187,850</b>	<b>9,208</b>	<b>182</b>	<b>2,290,409</b>	<b>12,585</b>

Table XII-10

## Distribution of Pension Benefits by Cause and Age as of June 30, 2017 (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	6,061	6,061	0	0	0	1	6,061	6,061
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	9,385	9,385	0	0	0	1	9,385	9,385
85 TO 89	0	0	0	0	0	0	0	0	0
90 & UP	0	0	0	0	0	0	0	0	0
<b>TOTAL</b>	<b>2</b>	<b>15,446</b>	<b>7,723</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2</b>	<b>15,446</b>	<b>7,723</b>
<i>OTHER BENEFICIARIES:</i>									
UNDER 30	5	25,586	5,117	2	9,248	4,624	7	34,834	4,976
30 TO 34	6	61,272	10,212	4	20,166	5,042	10	81,438	8,144
35 TO 39	3	31,834	10,611	10	157,960	15,796	13	189,794	14,600
40 TO 44	3	30,121	10,040	9	35,264	3,918	12	65,385	5,449
45 TO 49	7	36,013	5,145	20	254,927	12,746	27	290,940	10,776
50 TO 54	9	26,351	2,928	22	159,454	7,248	31	185,805	5,994
55 TO 59	13	58,695	4,515	24	213,250	8,885	37	271,945	7,350
60 TO 64	13	141,885	10,914	36	515,665	14,324	49	657,550	13,419
65 TO 69	23	184,705	8,031	52	851,946	16,384	75	1,036,651	13,822
70 TO 74	26	163,679	6,295	60	1,010,904	16,848	86	1,174,583	13,658
75 TO 79	16	90,769	5,673	92	2,037,838	22,150	108	2,128,607	19,709
80 TO 84	20	146,290	7,315	103	2,260,225	21,944	123	2,406,515	19,565
85 TO 89	16	134,552	8,410	95	1,624,781	17,103	111	1,759,333	15,850
90 & UP	10	64,751	6,475	89	1,494,281	16,790	99	1,559,032	15,748
<b>TOTAL</b>	<b>170</b>	<b>1,196,503</b>	<b>7,038</b>	<b>618</b>	<b>10,645,909</b>	<b>17,226</b>	<b>788</b>	<b>11,842,412</b>	<b>15,028</b>
<i>ALL PENSIONERS AND BENEFICIARIES:</i>									
UNDER 30	5	25,586	5,117	2	9,248	4,624	7	34,834	4,976
30 TO 34	6	61,272	10,212	4	20,166	5,042	10	81,438	8,144
35 TO 39	3	31,834	10,611	10	157,960	15,796	13	189,794	14,600
40 TO 44	4	38,208	9,552	16	112,075	7,005	20	150,283	7,514
45 TO 49	9	68,910	7,657	34	465,749	13,699	43	534,659	12,434
50 TO 54	37	757,707	20,479	71	755,627	10,643	108	1,513,334	14,012
55 TO 59	164	4,037,197	24,617	413	4,417,671	10,697	577	8,454,868	14,653
60 TO 64	421	11,581,471	27,509	1,445	18,020,624	12,471	1,866	29,602,095	15,864
65 TO 69	722	20,145,208	27,902	2,858	32,684,395	11,436	3,580	52,829,603	14,757
70 TO 74	686	18,394,001	26,813	2,993	32,769,848	10,949	3,679	51,163,849	13,907
75 TO 79	526	14,427,928	27,430	2,264	22,629,377	9,995	2,790	37,057,305	13,282
80 TO 84	419	10,566,396	25,218	1,644	15,688,749	9,543	2,063	26,255,145	12,727
85 TO 89	285	6,601,097	23,162	1,244	11,249,931	9,043	1,529	17,851,028	11,675
90 & UP	172	3,872,655	22,515	968	8,565,432	8,849	1,140	12,438,087	10,911
<b>TOTAL</b>	<b>3,459</b>	<b>90,609,470</b>	<b>26,195</b>	<b>13,966</b>	<b>147,546,852</b>	<b>10,565</b>	<b>17,425</b>	<b>238,156,322</b>	<b>13,668</b>

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 <sup>1</sup>	Number	Annual Allowances	Number	Annual Allowances		
2008	667	8,148,653	462	4,350,475	13,196	153,120,898	2.5%	11,604
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

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

## 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 Contribution(s)
AMC-PT	Additional Member Contribution(s) for Physically-Taxing employment
AVA	Actuarial Value of Assets
BERS	New York City Board of Education Retirement System
BMC	Basic Member Contribution(s)
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
GASB5	Governmental Accounting Standards Board Statement No. 5
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