



New York State and Local
Employees' Retirement System
Police and Fire Retirement System
Public Employees' Group Life Insurance Plan

Thomas P. DiNapoli, Comptroller

**ANNUAL REPORT
TO THE COMPTROLLER
ON
ACTUARIAL ASSUMPTIONS**

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I. Executive Summary

Fiscal year 2017 (FY 2017) was the second in the current five year experience study cycle. The August 2015 report based on experience studies for the period April 1, 2010 through March 31, 2015 recommended changes in virtually all of the assumptions. This year's report displays the FY 2017 experience and recommends that the current assumptions be maintained.

Summary of Assumptions and Methods

Assumption or Method	Recommendation
Inflation / COLA	2.5 % / 1.3%
Investment Return	7.0 %
ERS Salary Scale	3.8 % average (using FY 2015 data) Indexed by Service
PFRS Salary Scale	4.5 % average (using FY 2015 data) Indexed by Service
Asset Valuation Method	5 year level smoothing of gains or losses above or below the assumed return applied to all assets and cash flows
Pensioner Mortality	Gender/Collar specific tables based upon FY 2011-2015 experience with Society Of Actuaries Scale MP-2014 loading for mortality improvement.
Active Member Decrements	Based upon FY 2011-2015 experience

This recommendation has been shared with the Systems' Actuarial Advisory Committee (AAC) for their review and comment. This Committee is composed of current or retired senior actuaries from major insurance companies or pension plans.

In addition to oversight provided by the AAC, the work of the Systems' actuaries is periodically reviewed by a number of organizations, including the Systems' financial statement auditors, internal auditors of the Office of the State Comptroller, examiners from the New York State Department of Financial Services (DFS), and a quinquennial review by an independent actuarial firm. The most recent review by an independent actuarial firm was completed in August 2013 by Buck Consultants, LLC.

The reviewed and finalized actuarial assumptions will be presented to Comptroller Thomas P. DiNapoli for certification and will be used in developing employer contribution rates, payable on 2/1/2019, for the many different plans covered by the Employees' Retirement System (ERS) and the Police and Fire Retirement System (PFRS).

It is customary to avoid assumption changes between quinquennial experience studies (conducted in years divisible by five), where the five most recent years of system experience are combined and used as a basis for new assumptions. That is my recommendation for FY 2017.

II. Economic Assumptions

A. Inflation (CPI-U) and the Cost of Living Adjustment (COLA)

The table below displays the applicable CPI-U data:

	CPI-U	Increase	COLA
3/31/2017	243.801	2.38%	1.2%
3/31/2016	238.132	0.85%	1.0%
3/31/2015	236.119		

As a result, there will be a $\frac{2.38\%}{2} = 1.19\%$ rounded up to 1.2% COLA applied in September of 2017, which is 0.1% less than the current assumption. (Note that COLA applies to the first \$18,000 of the pensioner's single-life pension. Spousal beneficiaries are entitled to one-half of the pensioner's COLA.)

B. Investment Rate of Return (Discount Rate)

The FY 2017 investment rate of return, as reported by the Division of Investment and Cash Management, is 11.48%. This restores a bit more than half of the FY 2016 investment loss. The 3, 5, 10, and 20 year returns are 6.17%, 8.35%, 5.59% and 7.66% respectively.

In February, 2017, a National Association of State Retirement Administrators Issue Brief titled "Public Pension Plan Investment Return Assumption" presented the following investment return assumption distribution for public systems:

<i>i</i>	Number of Public Systems		
	February 2017	May 2015	March 2010
< 7.00	10	4	0
7.00	9	4	1
7.01-7.50	53	43	21
7.51-7.99	33	36	16
8.00	19	34	51
8.01-8.49	2	3	16
8.50	1	2	19
Median	7.50	7.75	7.97

C. Salary Scales

The table below displays the actual and expected salary increases for full-time employees.

	FY 2016			FY 2017		
	Actual	Expected	A/E	Actual	Expected	A/E
ERS	3.696%	3.844%	0.9616	4.848%	3.916%	1.2381
PFRS	7.202%	4.692%	1.5350	5.104%	4.723%	1.0805
Combined	4.168%	3.958%	1.0531	4.883%	4.026%	1.2128

Note that the expected salary scale for FY 2017 in PFRS was 4.723% (slightly higher than the FY 2015 and stated assumption value of 4.5%). Service indexing has a large range in salary growth assumptions. When reducing a service indexed salary scale to one number, the year to year expectations are constant only insofar as the demographics (service, age, and plan) of the group remains constant. The PFRS full-time employees averaged slightly less service in FY 2017 than they did in FY 2015.

III. Asset Valuation Method

The values since FY 2000 are given below (in billions):

Market Value v. Actuarial Value of Assets

FY	^a MVA	AVA	AL _{EAN}	UAL _{EAN}	GASB 25 Ratio	^b TPL _{EAN}	GASB 67 Ratio
2000	\$128.9	\$110.6	\$90.6	\$-20.0	122.1%	Use AL _{EAN} as a proxy	142.3%
2001	114.0	119.4	98.0	-21.4	121.9		116.3
2002	112.7	125.1	103.9	-21.2	120.4		108.5
2003	97.3	106.6	107.3	0.6	99.4		90.7
2004 ^c	120.8	117.4	116.2	-1.2	101.0		104.0
2005	128.0	123.7	120.0	-3.7	103.1		106.7
2006	142.6	132.0	126.6	-5.4	104.3		112.6
2007	156.5	142.5	134.6	-7.9	105.9		116.3
2008	155.8	151.7	141.3	-10.4	107.4		110.3
2009	110.9	148.9	146.7	-2.1	101.5		75.6
2010	134.2	147.7	156.6	8.9	94.3		85.7
2011	149.5	148.6	164.3	15.7	90.5		91.0
2012	153.3	147.8	169.3	21.5	87.3		90.5
2013	164.1	155.3	175.1	19.8	88.7		93.7
2014	181.2	171.6	186.1	14.6	92.2	97.4	
2015	189.3	184.2	196.5	12.4	93.7	\$193.1	98.0
2016	183.5	190.6	203.0	12.4	93.9	202.7	90.6
2017	197.5	198.0	210.1	12.1	94.2	209.1	94.5
2018						216.3	

a) Financial Statement Plan Net Position (i.e. Invested Assets + Receivables)
[both the MVA & AVA exclude funds for group term life insurance]

b) TPL_{EAN} is similar to AL_{EAN}, the chief difference being that it is projected from the valuation one year earlier to allow sufficient time for financial statement auditors to audit the data and calculations

c) The equity smoothing was 'restarted'; MVA > AVA
as the market value of the fixed income portfolio exceeded the amortized cost.

IV. Demographic Assumptions

A. Pensioner Mortality Experience (annual option 0 in millions)

System	Retirement	Retiree	FY 2017			FY 2016-2017		
			Actual	Expected	A/E	Actual	Expected	A/E
ERS	Service	Male Clerk*	73.759	69.634	1.059	142.100	136.130	1.044
		Male Laborer*	39.601	38.454	1.030	77.645	75.186	1.033
		Female Clerk*	63.067	58.948	1.070	120.402	114.703	1.050
		Female Laborer*	7.622	7.394	1.031	15.384	14.453	1.064
	Disability	Male	6.797	7.629	0.891	13.624	15.046	0.906
		Female	4.710	4.495	1.048	8.644	8.882	0.973
PFRS	Service	All	19.433	18.561	1.047	37.173	36.062	1.031
	Disability	All	3.719	3.081	1.207	6.431	5.960	1.079
ERS & PFRS	Beneficiary**	Male	2.386	1.534	1.556	4.449	2.945	1.511
		Female	14.508	13.601	1.067	28.739	26.444	1.087
All Pensioner Mortality			235.602	223.331	1.055	454.589	435.812	1.043
* Clerk refers to White Collar while Laborer refers to Blue Collar ** Beneficiary dollars reflect actual pension received								

B. Mortality Improvement

NYSLRS actuarial valuations use Society of Actuaries (SOA) Mortality Improvement Scale MP-2014.

C. Active Member Decrement Experience

Decrement			FY 2017				FY 2016-2017			
			Exposures	Actual	Expected	A/E *	Exposures	Actual	Expected	A/E *
Withdrawal			355,902	23,036	23,872	0.965	707,889	45,283	46,308	0.978
ERS	Regular Plan	0 ≤ Srv < 2	80,577	12,456	13,981	0.891	152,953	23,693	26,571	0.892
		2 ≤ Srv < 3	23,140	2,545	2,553	0.997	45,371	4,929	5,007	0.984
		3 ≤ Srv < 4	19,349	1,590	1,597	0.996	36,863	3,116	3,025	1.030
		4 ≤ Srv < 5	15,755	1,121	976	1.148	31,531	2,302	1,947	1.182
		5 ≤ Srv < 10	66,565	2,930	2,534	1.156	137,849	6,169	5,271	1.170
		10 ≤ Service	127,238	2,035	1,847	1.102	257,428	4,397	3,730	1.179
PFRS	All Plans	All Service	23,280	359	385	0.932	45,895	677	757	0.894
ERS Service Retirement			125,806	14,765	16,179	0.913	253,531	29,385	32,399	0.907
Regular Plan	Tier 1	0 ≤ Srv < 20	607	90	115	0.782	1,395	228	261	0.875
		20 ≤ Srv < 30	409	111	117	0.946	969	255	274	0.929
		30 ≤ Service	817	212	197	1.076	1,894	514	462	1.113
	Tiers 2,3,4,5,6	0 ≤ Srv < 20	64,916	4,929	5,036	0.979	130,961	9,845	10,095	0.975
		20 ≤ Srv < 30	36,350	4,647	5,264	0.883	73,290	9,357	10,494	0.892
		30 ≤ Service	17,568	3,635	4,526	0.803	34,164	6,858	8,794	0.780
State CO	Tiers 1,2	All Service	11	6	3	2.245	32	16	8	2.105
	Tiers 3,5,6	All Service	3,887	852	689	1.237	8,298	1,720	1,529	1.125
County CO	All Tiers	All Service	1,243	283	232	1.219	2,529	592	483	1.226
PFRS Service Retirement			8,395	919	953	0.965	16,977	1,915	1,913	1.001
20 Year Plans	No additions	All Service	1,904	257	222	1.156	3,872	526	451	1.167
	with add'l 60ths	All Service	5,213	490	568	0.863	10,536	1,070	1,135	0.943
	State Police	All Service	1,278	172	162	1.059	2,570	319	328	0.973
Disability Retirements and Deaths										
Disability Retirement	ERS	Accidental	224,421	6	7	0.869	446,788	10	14	0.714
		Ordinary	128,474	297	343	0.865	261,139	628	698	0.899
	PFRS	Accidental	31,952	49	74	0.662	63,420	98	148	0.662
		Ordinary	11,175	2	6	0.349	21,901	6	11	0.538
Deaths	ERS Regular Plan	Accidental	453,287	0	5	0.000	904,666	3	10	0.305
		Ordinary	453,287	687	643	1.068	904,666	1,279	1,285	0.995
	PFRS	Accidental	31,952	0	2	0.000	63,420	1	5	0.206
		Ordinary	31,952	19	23	0.835	63,420	38	45	0.842

* reflects quotient of unrounded Actual and Expected counts

V. Effect on Contributions

The table below summarizes the projected average employer contribution rates for the most recent valuations.

Valuation 4/1	Local Employer Billing Date 2/1	ERS (reg plan GLIP)	PFRS (GLIP)	Total Employer Contributions (billions)	Contribution Stabilization Program (CSP) Mitigated Rates (does not apply to GLIP, strike through => no amortizing)				CSP Balance (billions)
					ERS		PFRS		
2005	2007	10.7%	17.0%	\$2.7	ERS		PFRS		
2006	2008	9.6	16.6	2.6					
2007	2009	8.5	15.8	2.5					
2008	2010	7.3	15.1	2.3	Original		Original		
2009	2011	11.9 (0.4)	18.2 (0.1)	3.6	9.5%		17.5%		
2010	2012	16.3 (0.4)	21.6 (0.0)	4.9	10.5		18.5		
2011	2013	18.9 (0.4)	25.8 (0.1)	5.5	11.5	Alternate	19.5	Alternate	\$0.3
2012	2014	20.9 (0.4)	28.9 (0.0)	6.2	12.5	12.0%	20.5	20.0%	1.1
2013	2015	20.1 (0.4)	27.6 (0.1)	6.1	13.5	12.0	21.5	20.0	2.1
2014	2016	18.2 (0.5)	24.7 (0.0)	5.5	14.5	12.5	22.5	20.5	3.3
2015	2017	15.5 (0.4)	24.3 (0.0)	4.8	15.1	13.0	23.5	21.0	4.1
2016	2018	15.3 (0.4)	24.4 (0.1)	4.9	14.9	13.5	24.3	21.5	4.2
2017	2019	14.9 (0.5)	23.5 (0.0)	4.9	14.4	14.0	23.5	22.0	3.8

The 3/31/2017 CSP amortization balance is \$2.52b state + \$1.24b local = \$3.76b total.

In ERS the associated new entrant rate is 11.6%, and $14.9\%/11.6\% = 128\%$.

In PFRS the associated new entrant rate is 19.7%, and $23.5\%/19.7\% = 119\%$.

The associated new entrant contribution is \$3.9b. The additional \$1.0b is 8.3% of the UAL_{EAN} of \$12.1b.

VI. Gain/Loss Analysis

	ERS	PFRS
2018 Estimated Contributions (2/1/18 Payment)	15.3%	24.4%
Changes Due to Gains/Losses In:		
FY 2013 Investment Performance (10.4% v 7.5%)	-0.3%	-0.3%
FY 2014 Investment Performance (13.0% v 7.5%)	-0.7%	-0.8%
FY 2015 Investment Performance (7.2% v 7.5%)	0.1%	0.1%
FY 2016 Investment Performance (0.2% v 7.0%)	1.1%	1.2%
FY 2017 Investment Performance (11.4% v 7.0%)	-0.6%	-0.7%
Non-Investment Assumptions (Demographic, Salary Scale, COLA)	0.5%	0.3%
New Entrant	-0.7%	-0.9%
GLIP, Administrative Contributions	0.0%	-0.2%
Miscellaneous	0.2%	0.4%
Net Change	-0.4%	-0.9%
2019 Estimated Contributions (2/1/19 Payment)	14.9%	23.5%

In a nutshell, the 5 year investment return of 8.11% results in modest net investment gains over the smoothing period (rate impact of -0.4% in ERS, -0.5% in PFRS). New tier 6 members with less lucrative benefits continue exerting a downward pressure on the system average rates. These rate reducing forces were in part offset by salary increases that exceeded the expected value in both systems (more so in ERS).

VII. Summary of Recommendations

I recommend that the current assumptions be maintained. I am a Member of the American Academy of Actuaries and meet the Academy's Qualification Standards to issue this Statement of Actuarial Opinion.

This recommendation was reviewed by the Actuarial Advisory Committee (AAC) in a meeting on August 10, 2017.

VIII. Historical Employer Contribution Average Rate

Average Rate			Average Rate			Average Rate		
Year	ERS	PFRS	Year	ERS	PFRS	Year	ERS	PFRS
1972	21.9	28.8	1988	9.7	14.8	2004	5.9	5.8
1973	20.3	31.4	1989	3.7	8.5	2005	12.9	17.6
1974	21.3	32.4	1990	3.6	8.3	2006	11.3	16.3
1975	20.4	32.9	1991	0.3	7.8	2007	10.7	17.0
1976	19.7	32.3	1992	0.4	11.5	2008	9.6	16.6
1977	19.6	33.3	1993	0.6	14.0	2009	8.5	15.8
1978	19.8	34.9	1994	0.7	11.3	2010	7.4	15.1
1979	18.8	35.1	1995	0.7	13.9	2011	11.9	18.2
1980	18.1	34.2	1996	2.2	13.0	2012	16.3	21.6
1981	17.0	33.1	1997	3.7	9.8	2013	18.9	25.8
1982	15.5	29.6	1998	1.7	7.0	2014	20.9	28.9
1983	15.1	28.7	1999	1.3	2.4	2015	20.1	27.6
1984	14.4	27.3	2000	0.9	1.9	2016	18.2	24.7
1985	14.2	26.5	2001	0.9	1.6	2017	15.5	24.3
1986	10.4	19.8	2002	1.2	1.6	2018	15.3	24.4
1987	9.4	13.3	2003	1.5	1.4	2019	14.9	23.5

