

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 2013 (FY 2013) was the third in the current five year experience study cycle. The August 2010 report based on experience studies for the period April 1, 2005 through March 31, 2010 recommended changes in virtually all of the assumptions. This year's report displays the FY 2013 experience and recommends that the current assumptions be maintained, but that the asset valuation method be revised.

### Summary of Assumptions and Methods

<b>Assumption or Method</b>	<b>Recommendation</b>
<b>Inflation / COLA</b>	2.7 % / 1.4%
<b>Investment Return</b>	7.5 %
<b>ERS Salary Scale</b>	4.9 % average (using FY 2010 data) Indexed by Service
<b>PFRS Salary Scale</b>	6.0 % average (using FY 2010 data) Indexed by Service
<b>Asset Valuation Method</b>	5 year level smoothing of gains or losses <b>above or below the assumed return applied to all assets and cash flow</b>
<b>Pensioner Mortality</b>	Gender/Collar specific tables based upon FY 2006-2010 experience with Society Of Actuaries Scale AA loading for mortality improvement (fully generational in the inactive valuation, static projection in the active valuation).
<b>Active Member Decrements</b>	Based upon FY 2006-2010 experience

This recommendation has been shared with the Systems' Actuarial Advisory Committee (AAC) for their review and comment. This Committee is composed of 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 the DFS is in progress. The most recent review by an independent actuarial firm was completed in August 2013 by Buck Consultants, LLC. The draft of this report was distributed to the AAC prior to the July meeting. The report provides support for the change in asset valuation method.

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 2/1/2015, for the many different plans covered by the Employees Retirement System (ERS) and the Police and Fire Retirement System (PFRS)

FY 2009 market losses were managed by retirement fund actuaries in a variety of ways. Perhaps most common was some form of smoothing method elongation.

The New York State and Local Retirement System (NYSLRS) approach was to maintain existing methodologies and allow the employer contribution rate increase to reflect the magnitude of the market loss. A Contribution Stabilization Program (CSP) was developed to provide employers with an optional tool to assist in managing the contribution impact.

Each year, employers have the option of amortizing, over a period of ten years or less, a portion of their current year retirement bill above a specified percentage of payroll. The percentage of payroll above which a participating employer could amortize (the mitigated rate) increases by up to one percentage point of payroll per year, thereby permitting employers' pension contributions to increase more slowly than the increase in the actuarial rate. When normal rates go below the mitigated rate, contribution rates will go down at a rate of up to one percentage point of payroll annually. When the normal rate goes down more than one percentage point of payroll, the difference between one percent and the actual reduction will be used to accelerate the payoff of past amortizations and then fund a reserve account to use to mitigate any future increase in rates. Participants have a payment schedule with the System based on the amount owed and an interest rate established for each year's amortization. The FY 2013 outstanding balance of all amortizations since the CSP began is \$2.1b, less than 1.3 percent of the net assets held in trust for benefits.

The avoidance of extraordinary contribution rate manipulation provided a transparent view of post Great Recession pension funding realities. State and Local policymakers responded to this environment with salary restraint (as seen in Section II C) and benefit reductions (as detailed in the 2012 Annual Report to the Comptroller on Actuarial Assumptions).

During the development of the FY 2014 Executive Budget, the Executive Branch reported that some employers were seeking near-term pension contribution relief beyond that offered by the CSP. The Executive Budget included a proposal that would have given the Comptroller the authority to implement a new Stable Contribution Option (SCO), which would have been available to participating counties, cities, towns, villages, BOCES, school districts, and medical centers in Nassau, Westchester and Erie counties which elect to participate. The plan was not extended to the State, special districts, or other public authorities.

The initial fixed employer contribution rate, as a percentage of payroll, established by the proposal was:

- o 12% for Employees' Retirement System (ERS)
- o 18.5% for Police & Fire Retirement System (PFRS).

Participating employers would pay the stable rate beginning with the invoice for 2013-2014, until such time as the amounts deferred in early years are paid off, with interest. The Comptroller would review the rates at the five and ten year marks and could increase or decrease rates by up to 2 percent, with a minimum at the initial rate and a maximum rate of no more than 4 percent greater than the initial rate. The Comptroller could extend or shorten the proposal's 25-year period in order to ensure adequate funding (i.e., the payoff of amounts deferred). Participants would not be permitted any further amortizations under the current CSP. However, those with ongoing amortizations would pay the required installments in addition to the new stable rate.

The proposal sought to use long-term savings projected from the phase-in of the new and less expensive Tier VI to repay (with interest) payments to be deferred during the coming years. The memorandum in support stated that the proposal "offers local governments and schools a bridge to the long-term savings of Tier VI, as well as greater predictability, through a Tier VI refinancing plan which offers a stable pension contribution option."

In my judgment, after the two rate increases, a program where the only possible response to valuation losses was the extension of the program period was not actuarially sound. The proposal was not enacted.

However, given the Fund's performance since FY 2009, the employer's salary restraint over the same period, and the implementation of tier VI, a one-time opt-in to an alternative path in the CSP was enacted for those employer's targeted by the Executive proposal.

Under the alternative path, employers have the option of amortizing, over a period of twelve years or less, a portion of their current year retirement bill above a mitigated rate that would move toward the actuarial rate by up to one-half percent a year, thereby permitting employers' pension contributions to increase more slowly than the increase in the actuarial rate and the original mitigated rate. The initial mitigated rates in the alternate path are 12.0% in ERS and 20.0% in PFRS. These rates are held constant for the second year, after which they move toward the actuarial rate by up to one-half percent a year. The additional relief provided is modest, but presumably helpful to municipalities in fiscal distress.

Finally, I am proposing to revise the asset smoothing method.

The current method divides invested assets into two groups, equity and non-equity. For equities, the appreciation above or below an expected 7% is recognized evenly over a 5 year period. For non-equities, the amortized cost of the investments is used in place of the market value. As investments become more sophisticated it becomes increasingly more difficult to assign certain asset classes to one of the two groups. Further, the current smoothing method requires a determination of the net purchases (or sales) between equities and non-equities, which is complex. Finally, the CSP results in some employer contributions being classified as receivables, which are not among the invested assets, but are used in the valuation. This makes it preferable to smooth the entire net assets held in trust for benefits rather than just the invested assets.

The new method is a level five year smoothing of the asset gains/losses above/below the assumed investment rate of return applied to the entire assets held in trust for benefits with consideration of contributions received and benefits and expenses paid. This will be implemented retroactively.

The new method is responsive to the recommendation found in Buck's 2013 quinquennial review, from which the following quotes are extracted (pages 32-33):

“We recommend the Actuary consider a more straight-forward method whereby the assumed return rate is applied to the entire portfolio when determining expected returns.”

“If the Actuary decides to change the asset method to the more straight forward method, we recommend to not have another market restart, but rather to apply the new method retroactively for all years in the smoothing period.”

As the asset smoothing methodology does not rely on system experience, there is no reason to wait until the completion of the current quinquennial experience study period to implement a more straightforward method, and therefore I recommend a revised approach for the 4/1/13 actuarial valuation. All the numbers required for the new, simpler smoothing method can be found in the annual audited financial statements on the Statement of Changes in Plan Net Assets. Additional details are provided in the last two pages of this report.

## **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
3/31/2013	232.773	1.47%	1.0%
3/31/2012	229.392	2.65%	1.4%
3/31/2011	223.467	2.68%	1.4%
3/31/2010	217.631		

As a result, there will be a  $\frac{1.47\%}{2} = 0.74\%$  rounded up to 1.0% COLA applied in September of 2013, which is 0.4% 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 2013 investment rate of return, as reported by the Division of Investment and Cash Management, is 10.38%. This is well above the 7.50% assumption. The 3, 5, and 10 year returns are 10.25%, 4.43% and 8.67% respectively.

The high cost of oil (averaging \$86.46 per barrel in 2012<sup>1</sup>) and government (averaging 34.0% of GDP in 2012<sup>2</sup>) continue to create a headwind, potentially prolonged, that the markets must overcome.

<sup>1</sup> [http://inflationdata.com/inflation/inflation\\_rate/historical\\_oil\\_prices\\_table.asp](http://inflationdata.com/inflation/inflation_rate/historical_oil_prices_table.asp)

<sup>2</sup> <http://www.gpo.gov/fdsys/pkg/BUDGET-2014-TAB/xls/BUDGET-2014-TAB-15-3.xls>

On the other hand, there is reason to suspect that recent Federal Reserve policy has support of asset prices as one of its goals. This creates a tailwind supporting the strong market performance of FY 2013.

The actuarial bureau has developed a more mature methodology for determining a best estimate range for the investment return assumption. Common to the method used in the previous quinquennial report is the belief that a fund's asset allocation (mix of stocks and bonds) is the most relevant characteristic for determining the fund's expected investment income. However, the new methodology uses stochastic simulations with forward looking asset class capital market assumptions, as opposed to a less rigorous calculation using general historical returns for equities and fixed income.

The goal is to develop a best estimate range for the investment rate of return over a 30 year period. Each stochastic simulation represents one year's performance. Groupings of 30 simulations provide an annualized return over a 30 year period. Multiple groups of 30 provide a range of annualized returns over a 30 year period.

Given a set of capital market assumptions developed by one of the fund's external investment consultants, and, after adjusting for investment expenses, the best estimate range (defined as the 25th percentile to the 75th percentile) for the investment rate of return over a 30 year period based upon 5,000 thirty year groupings is 4.88% to 7.69%.

The actuarial assumed rate of return of 7.50% is exceeded in 28.1% of the thirty year groupings.

This analysis has not been updated since last year because the Chief Investment Officer is planning an asset allocation study to be completed just before the next five year actuarial experience study. The asset allocation study will be foundational to any recommended revision in the rate of return on investments. Given the actuarial bureau analysis, it seems more likely that the Actuary will be considering a reduction in the assumed investment rate of return than an increase.

Retirement and Social Security Law Section 11, Paragraph b, directs the Comptroller to "engage the services of an actuary" upon whose recommendation the Comptroller shall "from time to time, but at least once in each five years, promulgate a rate or rates of estimated future investment earnings."

Pension funding is a long term endeavor. In the words of the Buck report (page 12), "the valuation interest rate is the single most important assumption and is also, perhaps, the most difficult to select." Given these realities, it is my personal position that the assumed rate of return is to be revised infrequently and only after due deliberation. Although the law gives the actuary the ability to recommend a change in the assumed investment rate of return at any time, I have chosen to examine the assumed rate of return using the longest time interval allowed, namely, five years. In my opinion, this protects the pension fund stakeholders from actuarial caprice and the actuary from reacting to external pressures stimulated by short-term occurrences. It also allows for the orderly scheduling of due deliberation. By continuing this practice, my recommendation will be better informed by the 2015 asset allocation study.



I believe my position is reasonable and supported by both the Buck review and the working draft of the proposed revision to Actuarial Standard of Practice (ASOP) No. 27, which addresses the Selection of Economic Assumptions for Measuring Pension Obligations.

The following is extracted from page 16 of the Buck report.

“Given the downward trend in assumed valuation interest rates, systems may tend to feel pressure to review their assumed rate prior to the next scheduled periodic experience study, which is typically every three to five years. It is more common to review the investment return assumption prior to the next scheduled experience study if there is a change in the asset allocation, e.g. lowering the equity target and increasing the fixed income target would typically result in a lower overall assumed return. Even if there is no change in the allocation, a review can be warranted if there are material changes within an asset class, e.g. aggressive domestic equities are replaced with more conservative domestic equities. Since this assumption is of a long-term nature, reviewing and/or changing the expected rate too frequently can imply too much reliance on short-term occurrences.”

The Buck report summarizes the main proposed changes in ASOP 27, and states on page 22,

“The actuary may want to consider including external experts when developing certain assumptions, such as the investment return rate. While the actuary is still responsible for selecting the assumptions to reflect his own professional judgment, the revisions make it clear that it is appropriate to incorporate the reviews of experts such as investment advisors, economists, other professionals and representatives of the plan sponsor and administrator.”

Thus, from the perspective of a disciplined process compliant with the law, I am very comfortable with my position of next addressing the assumed rate of return during the 2015 quinquennial study, which will occur after Pension Investment and Cash Management’s scheduled asset allocation study.

I am also comfortable with the current assumed rate of return from the perspective of peer comparison. The NASRA Public Fund Survey from July 2013 shows 15 plans with an assumed rate of return below 7.5%, 25 plans at 7.5%, and 84 plans above 7.5%. Thus at present we are not “behind the curve” in our assumed rate of return.

### C. Salary Scales

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

	FY2011			FY2012			FY2013		
	Actual	Expected	A/E	Actual	Expected	A/E	Actual	Expected	A/E
ERS	4.279%	4.860%	0.8804	2.762%	4.847%	0.5698	2.537%	4.767%	0.5322
PFRS	6.411%	5.745%	1.1161	3.928%	5.421%	0.7246	3.713%	5.376%	0.6907
Combined	4.533%	4.966%	0.9129	2.927%	4.928%	0.5938	2.712%	4.858%	0.5582

Note that the expected salary scale for FY 2013 in PFRS was 5.376% (which differs from the stated assumed value of 6.0%). This is because there was a shift in the demographics of the PFRS population, namely a smaller percentage of employees at the lower service levels, which have the higher salary growth assumptions.

When reducing an indexed salary scale to one number, the result is only a constant insofar as the demographics of the group remain constant. Indexing by service is more sensitive to demographic shifts than indexing by age as the former has a larger range in salary growth assumptions.

### **III. Asset Valuation Method**

The values since FY2000 are given below (in billions):

#### **Market Value v. Actuarial Value of Assets**

FY	MVA <sup>a</sup>	AVA	AL <sub>EAN</sub>	Ratio	UAL <sub>EAN</sub>	FY	MVA <sup>a</sup>	AVA	AL <sub>EAN</sub>	Ratio	UAL <sub>EAN</sub>
2000	\$128.9	\$110.6	\$90.6	122.1%	\$-20.0	2007	\$156.5	\$142.5	\$134.6	105.9%	\$-7.9
2001	114.0	119.4	98.0	121.9	-21.4	2008	155.8	151.7	141.3	107.4	-10.4
2002	112.7	125.1	103.9	120.4	-21.2	2009	110.9	148.9	146.7	101.5	-2.1
2003	97.3	106.6	107.3	99.4	0.6	2010	134.2	147.7	156.6	94.3	8.9
2004 <sup>b</sup>	120.8	117.4	116.2	101.0	-1.2	2011	149.5	148.6	164.3	90.5	15.7
2005	128.0	123.7	120.0	103.1	-3.7	2012	153.3	147.8	169.3	87.3	21.5
2006	142.6	132.0	126.6	104.3	-5.4	2013	164.1	155.3	175.1	88.7	19.8

a) Financial Statement Plan Net Assets (i.e. Invested Assets + Receivables)

[both the MVA & AVA exclude funds for group term life insurance]

b) 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)

	Male (ERS & Benes) - Service (PFRS)					Female (ERS & Benes) - Disability (PFRS)				
	FY2013		FYs11-13			FY2013		FYs11-13		
	Actual	Expected	Actual	Expected	A/E	Actual	Expected	Actual	Expected	A/E
ERS Clerk (White Collar) Service Retirements	57.517	57.118	163.303	161.090	1.014	45.559	50.153	131.554	139.489	0.943
ERS Laborer (Blue Collar) Service Retirements	32.295	32.346	89.997	91.922	0.979	5.768	6.174	17.022	17.356	.981
ERS Disability Retirements	6.874	6.474	20.088	18.750	1.071	4.119	3.977	11.860	11.541	1.028
Beneficiaries (uses actual pension received)	1.406	1.041	3.709	2.835	1.308	9.764	10.412	29.123	28.999	1.004
PFRS Retirements	15.161	16.135	41.493	45.220	0.918	2.377	2.718	7.176	7.612	0.943
All Pensioner Mortality for FYs 2011-2013								515.325	524.814	0.982

### B. Active Member Decrement Experience

Decrement	FY2013			FYs11-13			
	Exposures	Actual	Expected	Exposures	Actual	Expected	A/E
ERS Withdrawals 0 ≤ Srv < 2 Age 55 Plan	58,899	10,372	9,123	184,390	31,579	28,355	1.114
ERS Withdrawals 2 ≤ Srv < 3 “	22,202	2,730	2,075	77,184	8,064	7,172	1.124
ERS Withdrawals 3 ≤ Srv < 4 “	20,662	1,966	1,560	76,686	5,764	5,806	0.993
ERS Withdrawals 4 ≤ Srv < 5 “	24,744	1,612	1,504	74,871	4,147	4,539	0.914
ERS Withdrawals 5 ≤ Srv < 10 “	76,281	3,192	2,985	223,387	8,361	8,700	0.961
ERS Withdrawals 10 ≤ Service “	143,462	2,404	2,108	439,924	6,123	6,465	0.947
PFRS Withdrawals	22,061	254	271	67,114	826	827	0.999
All Withdrawals	368,308	22,530	19,626	1,143,554	64,864	61,864	1.048
ERS T-1 Reg Plan Srv Ret 0 ≤ Srv < 20	1,473	238	235	5,380	821	801	1.026
ERS T-1 Reg Plan Srv Ret 20 ≤ Srv < 30	1,200	249	291	4,514	1,138	1,038	1.096*
ERS T-1 Reg Plan Srv Ret 30 ≤ Service	2,414	584	590	10,136	4,112	2,580	1.594*
ERS T-2,3,4,5,6 Reg Plan Srv Ret 0 ≤ Srv < 20	61,605	4,593	4,612	175,174	13,295	13,052	1.019
ERS T-2,3,4,5,6 Reg Plan Srv Ret 20 ≤ Srv < 30	34,872	3,872	4,447	101,991	15,056	12,978	1.160*
ERS T-2,3,4,5,6 Reg Plan Srv Ret 30 ≤ Service	13,469	1,761	3,923	39,105	13,479	11,448	1.177*
ERS State T-1,2 Correction Officer Srv Ret	77	25	~20	363	113	~97	1.167
ERS State T-3 Correction Officer Srv Ret	3,381	562	644	9,591	1,818	1,795	1.013
ERS County Correction Officer Srv Ret	1,056	210	159	2,933	565	444	1.273
All ERS Service Retirements	119,544	12,094	14,921	349,184	50,397	44,232	1.139
PFRS 20 Year Plan Srv Ret	2,015	243	251	6,217	739	803	0.920
PFRS 20 Year Plan w add'l 60ths Srv Ret	5,053	532	462	15,418	1,591	1,378	1.154
PFRS State Police 20 Year Plan Srv Ret	1,416	185	114	4,413	485	347	1.397
All PFRS Service Retirements	8,483	960	827	26,048	2,815	2,529	1.113
ERS Accidental Deaths Age 55 Plan	461,278	2	~5	1,412,600	3	~15	0.198
ERS Ordinary Deaths Age 55 Plan	461,278	613	744	1,412,600	2,021	2,274	0.889
PFRS Accidental Deaths	30,848	2	~2	94,146	10	~7	1.360
PFRS Ordinary Deaths	30,848	31	~21	94,146	76	~64	1.183
ERS Accidental Disability	232,286	7	~11	730,829	16	~36	0.450
ERS Ordinary Disability	150,866	381	446	469,054	1,287	1,365	0.943
PFRS Accidental Disability	30,848	62	~96	94,146	225	289	0.778
PFRS Ordinary Disability	11,042	5	~6	32,579	18	~16	1.100
PFRS IPOD Disability	30,848	71	~61	94,146	222	183	1.210

\* The FY 2011 ERS retirement incentive resulted in an earlier harvest of near-term retirees (12,207).

## V. Effect on Contributions

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

Valuation	Local Employer Billing Date	ERS (GLIP)	PFRS (GLIP)	Total Employer Contributions	Contribution Stabilization Program Mitigated Rates (does not apply to GLIP)			
					ERS		PFRS	
4/1/2005	2/1/2007	10.7%	17.0%	\$2.7b				
4/1/2006	2/1/2008	9.6	16.6	2.6b				
4/1/2007	2/1/2009	8.5	15.8	2.5b				
4/1/2008	2/1/2010	7.3	15.1	2.3b	Original		Original	
4/1/2009	2/1/2011	11.9 (0.4)	18.2 (0.1)	3.6b	9.5%		17.5%	
4/1/2010	2/1/2012	16.3 (0.4)	21.6 (0.0)	4.9b	10.5		18.5	
4/1/2011	2/1/2013	18.9 (0.4)	25.8 (0.1)	5.5b	11.5	Alternate	19.5	Alternate
4/1/2012	2/1/2014	20.9 (0.4)	28.9 (0.0)	6.2b	12.5	12.0%	20.5	20.0%
4/1/2013	<b>2/1/2015</b>	<b>20.1 (0.4)</b>	<b>27.6 (0.1)</b>	<b>6.1b</b>	<b>13.5</b>	<b>12.0</b>	<b>21.5</b>	<b>20.0</b>

In ERS the associated new entrant rate is 11.4%, and  $20.1\%/11.4\% = 176\%$ .

In PFRS the associated new entrant rate is 19.0%, and  $27.6\%/19.0\% = 145\%$ .

The associated new entrant contribution is \$3.5b. The additional \$2.6b is 13.1% of the  $UAL_{EAN}$  of \$19.8b.

The new funded ratios are 88.5% in ERS and 89.5% in PFRS, up from 87.2% and 87.9% respectively.

The FY2009 investment loss has been entirely recognized with this valuation. Contribution rates will no longer increase due to this loss. The graph on the last page shows that the new rates are similar to those in the early 1970s.

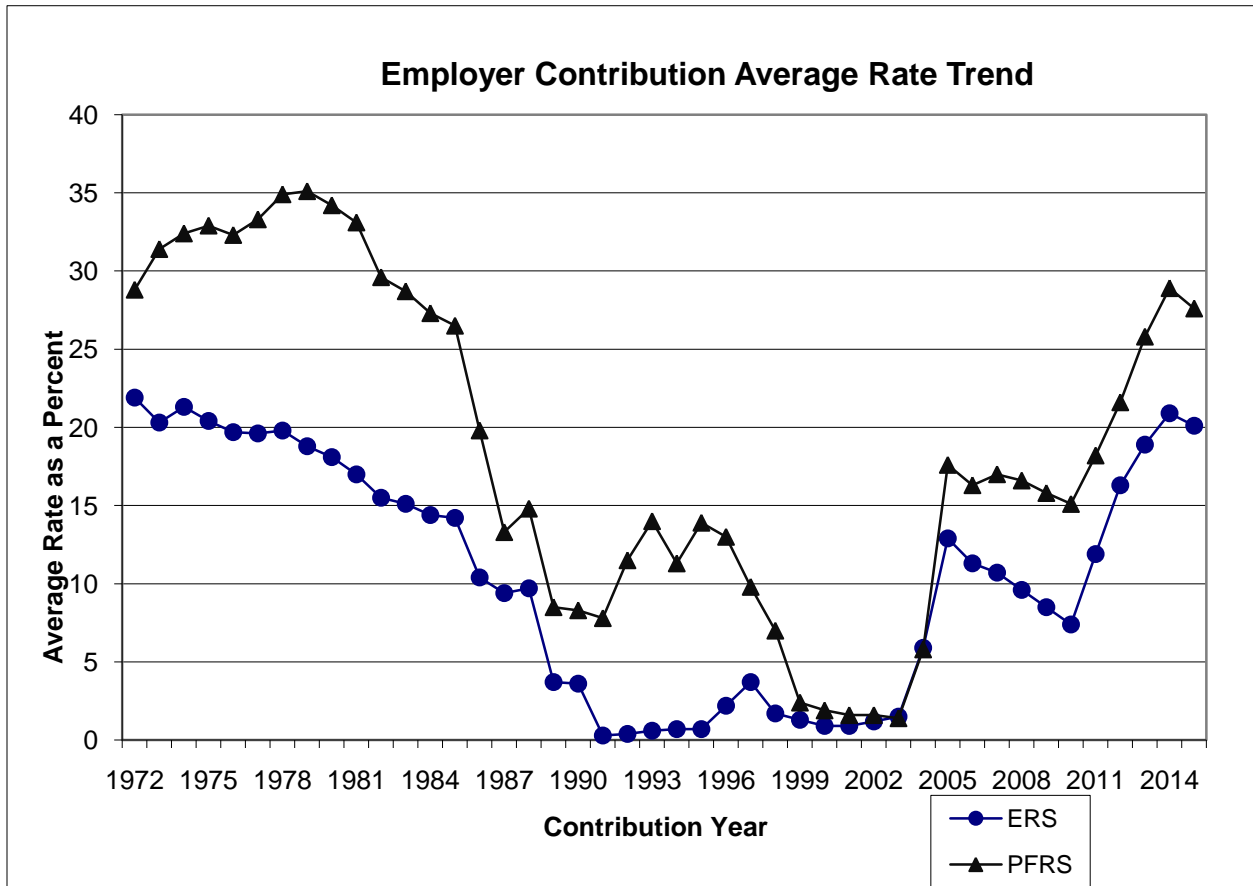
## VI. Summary of Recommendations

I recommend that the current assumptions be maintained, but that the asset valuation method be revised. 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 July 30, 2013.

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



Asset Smoothing

1) Financial Statement Data

FYE	ERS (MV <sub>ERS</sub> )	PFRS (MV <sub>PFRS</sub> )	Net Assets Held in Trust for Benefits (MV)	Contributions (C)	Deductions (D)
3/31/2009			110,937,778,292.74		
3/31/2010	114,057,640,420.70	20,194,091,213.32	134,251,731,634.02	2,710,493,989.46	7,818,899,850.43
3/31/2011	127,191,893,731.86	22,356,656,652.28	149,548,550,384.14	4,578,478,666.90	8,621,556,617.29
3/31/2012	130,506,039,515.65	22,888,393,774.10	153,394,433,289.75	5,016,049,316.00	9,038,479,735.39
3/31/2013	139,746,991,872.50	24,474,839,863.17	164,221,831,735.67	5,737,031,821.26	9,627,255,200.67

2) Calculated System Percentages & Gains

Employee contributions are collected roughly evenly throughout the year.  
 Employer contributions are primarily collected on 12/15, 2/1, and 3/1.  
 An average contribution date of 2/1 is assumed (2 months before fiscal year end).

Deductions are paid roughly evenly throughout the year.  
 An average deduction date of 10/1 is assumed (6 months before fiscal year end).

$$AG_T = MV_T - MV_{T-1} - C_T + D_T$$

$$EG_T = 7.5\% * MV_{T-1} + (1.075^{2/12} - 1) * C_T - (1.075^{6/12} - 1) * D_T$$

$$UG_T = AG_T - EG_T$$

Demonstration supporting gain formulas:

$$UG_T = MV_T - 1.075 * MV_{T-1} - 1.075^{2/12} * C_T + 1.075^{6/12} * D_T$$

$$UG_T = MV_T - (1.075 * MV_{T-1} + 1.075^{2/12} * C_T - 1.075^{6/12} * D_T)$$

$$UG_T = \text{Actual Assets} - \text{Expected Assets}$$

System Percentage of MV

FYE	ERS (MV <sub>ERS</sub> /MV)	PFRS (MV <sub>PFRS</sub> /MV)	Actual Gain (AG)	Expected Gain (EG)	Unexpected Gain (UG)
3/31/2010	84.9580%	15.0420%	28,422,359,202.25	8,065,293,790.24	20,357,065,412.01
3/31/2011	85.0506%	14.9494%	19,339,896,700.51	9,806,936,699.39	9,532,960,001.12
3/31/2012	85.0787%	14.9213%	7,868,313,325.00	10,944,152,281.96	(3,075,838,956.96)
3/31/2013	85.0965%	14.9035%	14,717,621,825.33	11,219,656,477.03	3,497,965,348.30

3) Calculated Smoothing Adjustment (SA) & Actuarial Value of Assets (AV)

$$SA_T = - 80\% UG_T - 60\% UG_{T-1} - 40\% UG_{T-2} - 20\% UG_{T-3}$$

A system's % of assets for each year is applied to the unexpected gain (UG) for that year.

$$AV_T = MV_T + SA_T$$

	ERS	PFRS	TOTAL
MV	139,746,991,872.50	24,474,839,863.17	164,221,831,735.67
SA	(7,513,312,799.53)	(1,324,153,187.79)	(8,837,465,987.31)
AV	132,233,679,072.97	23,150,686,675.38	155,384,365,748.36

NEW YORK STATE AND LOCAL RETIREMENT SYSTEM  
 COMBINED STATEMENT OF CHANGES IN NET ASSETS  
 AVAILABLE FOR BENEFITS

	2010	2011	2012	2013
<b>Additions:</b>				
Income from investing activities:				
Net appreciation in fair value				
of investments	\$ 25,631,185,128.11	\$ 16,740,554,777.85	\$ 4,958,927,363.83	\$ 11,592,363,085.18
Interest income	1,540,094,592.15	1,426,941,056.72	1,379,423,452.91	1,394,442,633.22
Dividend income	1,202,420,783.70	1,269,009,179.67	1,405,869,824.67	1,512,907,816.26
Other income	352,994,403.56	321,669,150.69	517,629,303.75	658,305,514.78
Less investment expenses	(364,478,722.21)	(446,862,654.69)	(423,527,510.15)	(469,751,668.34)
Total income from investing activities	28,362,216,185.31	19,311,311,510.24	7,838,322,435.01	14,688,267,381.10
Income from securities lending activities:				
Securities lending income	62,224,173.13	31,328,667.63	18,598,907.05	16,351,276.67
Securities lending rebates	4,600,826.38	430,281.67	14,723,872.49	16,264,154.33
Securities lending management fees	(6,681,982.57)	(3,173,759.03)	(3,331,889.55)	(3,260,986.77)
Total income from securities lending activities	60,143,016.94	28,585,190.27	29,990,889.99	29,354,444.23
Total net investment gain	28,422,359,202.25	19,339,896,700.51	7,868,313,325.00	14,717,621,825.33
<b>Contributions:</b>				
Employers	2,344,222,243.53	4,164,571,039.66	4,585,177,807.75	5,336,044,329.16
Members	284,291,163.12	286,199,040.95	273,246,262.44	269,134,198.57
Interest on accounts receivable	11,386,704.00	37,185,990.00	72,084,046.00	58,030,681.25
Other	70,593,878.81	90,522,596.29	85,541,199.81	73,822,612.28
Total contributions	2,710,493,989.46	4,578,478,666.90	5,016,049,316.00	5,737,031,821.26
Total additions	31,132,853,191.71	23,918,375,367.41	12,884,362,641.00	20,454,653,646.59
<b>Deductions:</b>				
Benefits paid:				
Retirement benefits	(7,480,100,518.39)	(8,272,262,207.31)	(8,677,822,385.68)	(9,256,052,447.02)
Death benefits	(183,022,590.16)	(192,264,824.58)	(184,959,109.78)	(194,169,769.07)
Other	(55,747,966.53)	(55,696,946.88)	(75,049,377.89)	(71,313,528.74)
Total benefits paid	(7,718,871,075.08)	(8,520,223,978.77)	(8,937,830,873.35)	(9,521,535,744.83)
Administrative expenses	(100,028,775.35)	(101,332,638.52)	(100,648,862.04)	(105,719,455.84)
Total deductions	(7,818,899,850.43)	(8,621,556,617.29)	(9,038,479,735.39)	(9,627,255,200.67)
Net increase	23,313,953,341.28	15,296,818,750.12	3,845,882,905.61	10,827,398,445.92
<b>Net assets held in trust for pension benefits - beginning of year</b>				
	110,937,778,292.74	134,251,731,634.02	149,548,550,384.14	153,394,433,289.75
<b>Net assets held in trust for pension benefits - end of year</b>				
ERS	114,057,640,420.70	127,191,893,731.86	130,506,039,515.65	139,746,991,872.50
PFRS	20,194,091,213.32	22,356,656,652.28	22,888,393,774.10	24,474,839,863.17
Total net assets - end of year	\$ 134,251,731,634.02	\$ 149,548,550,384.14	\$ 153,394,433,289.75	\$ 164,221,831,735.67