2019 Annual Report

New York State Teachers' Retirement System

Comprehensive Annual Financial Report

Fiscal Years Ended June 30, 2019 and 2018

Comprehensive Annual Financial Report

Fiscal Years Ended June 30, 2019 and 2018

Our Mission:

To provide our members with a secure pension.

Our Vision:

To be the model for pension fund excellence and exceptional customer service.

Our Values:

Integrity | Excellence | Respect | Resourcefulness | Diversity | Diligence | Balance

Acknowledgment:

The following departments have assisted with the preparation of this report:

Actuary
Finance
Fixed Income
Internal Audit
Investment Operations
Member Relations
Private Equity
Public Equities
Public Information Office
Real Estate

New York State Teachers' Retirement System

10 Corporate Woods Drive | Albany, NY 12211-2395

(800) 348-7298 | NYSTRS.org

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Government Finance Officers Association

Certificate of Achievement for Excellence in Financial Reporting

Presented to

New York State

Teachers' Retirement System

For its Comprehensive Annual
Financial Report
for the Fiscal Year Ended

June 30, 2018

Christopher P. Morrill

Executive Director/CEO

PPCC

Public Pension Coordinating Council

Public Pension Standards Award
For Funding and Administration
2018

Presented to

New York State Teachers' Retirement System

In recognition of meeting professional standards for
plan funding and administration as
set forth in the Public Pension Standards.

Presented by the Public Pension Coordinating Council, a confederation of

National Association of State Retirement Administrators (NASRA)
National Conference on Public Employee Retirement Systems (NCPERS)
National Council on Teacher Retirement (NCTR)

Alan H Winkle

Alan H. Winkle
Program Administrator

Introduction

GOVERNANCE STRUCTURE

Maintaining a strong governance structure is how we ensure NYSTRS operates effectively, efficiently and ethically. It requires that we be fiscally responsible and transparent, and that we manage risk. The checks and balances built into the structure places a premium on compliance with all applicable laws and regulations.

Introduction

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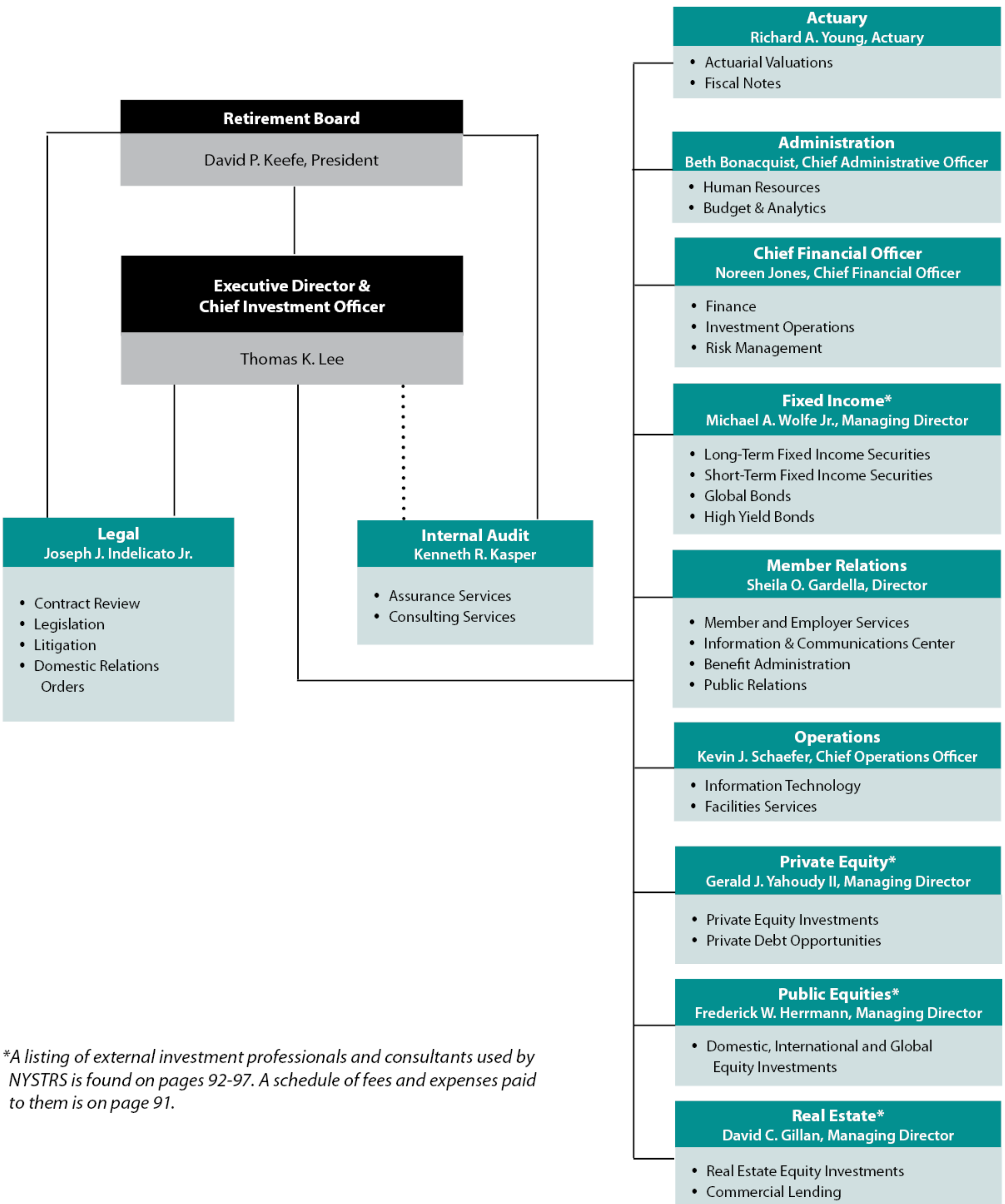
BOARD OF TRUSTEES

ORGANIZATIONAL STRUCTURE & EXECUTIVE STAFF — as of June 30, 2019



**A listing of external investment professionals and consultants used by NYSTRS is found on pages 92-97. A schedule of fees and expenses paid to them is on page 91.*

EXECUTIVE STAFF — as of June 30, 2019

Thomas K. Lee
Executive Director &
Chief Investment Officer

Beth Bonacquist
Chief Administrative Officer

Sheila O. Gardella
Director of Member Relations

David C. Gillan
Managing Director of Real Estate

Frederick W. Herrmann
Managing Director of Public Equities

Joseph J. Indelicato Jr.
General Counsel

Noreen Jones
Chief Financial Officer

Kenneth R. Kasper
Director of Internal Audit

Kevin J. Schaefer
Chief Operations Officer

Michael A. Wolfe Jr.
Managing Director of Fixed Income

Gerald J. Yahoudy II
Managing Director of Private Equity

Richard A. Young
Actuary

LETTER OF TRANSMITTAL

New York State Teachers' Retirement System
10 Corporate Woods Drive
Albany, NY 12211-2395
(800) 348-7298 or (518) 447-2900
NYSTRS.org

Thomas K. Lee, Executive Director & CIO

October 31, 2019

Trustees of the Retirement System Board:

On behalf of System staff, I present you with the Comprehensive Annual Financial Report (CAFR) of the New York State Teachers' Retirement System (NYSTRS or the System) for the fiscal years ended June 30, 2019 and 2018. This report complies with all requirements governing the preparation and contents of annual reports.

History and Overview

Created in 1921 by an act of the state Legislature, NYSTRS administers the fund from which most New York State public school teachers and administrators receive retirement and ancillary benefits. Retirement benefits are provided in accordance with New York State law and may not under the New York Constitution be diminished or impaired. A summary of NYSTRS benefits is provided on pages 15-16 of this report.

The System is governed by a 10-member Board of Trustees, which sets policy and oversees operations consistent with its fiduciary obligations under applicable law. A staff of approximately 380 is responsible for the day-to-day administration. NYSTRS serves 823 employers – including public school districts, BOCES, institutions of higher education and charter schools that elect to participate. NYSTRS has 432,720 active and retired members, including beneficiaries *(see chart below)*.

Membership Figures — as of June 30, 2019

Active Members:	263,517
Retired Members:	162,807
Beneficiaries:	6,396
Total Membership:	432,720

See page 111 for additional membership information.

The retirement fund is one of the 10 largest public funds in the U.S. based on portfolio size. NYSTRS is also consistently among the top-performing and best-funded public pension plans. Consistent receipt of required employee and employer contributions; a disciplined, risk-controlled investment policy; and partnerships with top-performing fund managers are major contributing factors to this stability. As a long-term investor with liabilities often not payable for three decades or more, Board and staff take a prudent approach to asset management.

LETTER OF TRANSMITTAL *(continued)*

Awards

Recognition from various industry organizations further demonstrates the System's commitment to excellence. Honors received within the most recently completed fiscal year include:

Certificate of Achievement for Excellence in Financial Reporting, awarded by the Government Finance Officers Association (GFOA) of the United States and Canada. Given in recognition of the System's 2018 Comprehensive Annual Financial Report (CAFR), the award certifies the report was prepared in conformity with the highest standards in government accounting and financial reporting.

Award for Outstanding Achievement in Popular Annual Financial Reporting, also awarded by GFOA. The System's 2018 Popular Annual Financial Report was recognized for its high quality and for successfully presenting data from the 2018 CAFR in a manner easily understandable to the general public.

Distinguished Budget Presentation Award for the fiscal year July 1, 2018 through June 30, 2019, also awarded by GFOA. To be eligible for this recognition, the budget document must meet established criteria as a policy document, operations guide, financial plan and communications device.

Public Pension Principles Achievement Award, presented by the Public Pension Coordinating Council. The criterion to qualify for this award includes compliance with specific principles in the areas of benefits, actuarial valuation, financial reporting, investment and disclosure.

Legislation

Chapter 24 of the Laws of 2019 (Part D) amends Section 130 of the Civil Service Law by ratifying the collective bargaining agreements for certain state employees and providing a new maximum salary for the purposes of calculating the Paragraph 2 ordinary death benefit.

Chapter 59 of the Laws of 2019 (Budget, Article VII, Part YYY) amends the General Municipal Law to allow certain eligible participating employers (school districts and BOCES) to establish a retirement contribution reserve fund for the purposes of the New York State Teachers' Retirement System.

Noteworthy Actions

Modernization Initiatives

The Public Equities, Fixed Income, Investment Operations, Risk Management and Information Technology teams partnered with an external consultant to develop a plan for modernizing our operational investment infrastructure. Among other improvements, the new framework will allow us to manage a larger percentage of our public markets internally. We also implemented a software solution that allows multiple users to collaborate on financial documents in a shared environment. This solution was used to produce this Comprehensive Annual Financial Report, and we anticipate using it to produce the Actuarial Valuation Report, operating budget book, Board reports and other data-driven documents.

Service Improvements

The MyNYSTRS member portal was refreshed and mobile optimized to encourage increased use of self-service features and thus achieve further organizational efficiencies. A new feature was added that allows retired members to report online any earnings after retirement, helping retired members comply with New York State law governing annual earnings limits and potentially mitigating overpayments that would need to be recouped.

Technology Upgrades

Many technological upgrades were completed or are in process. These include upgrading Windows servers, deploying enhancements to our enterprise resource management system and related tools, adding new servers and replacing storage devices near the end of their useful life.

LETTER OF TRANSMITTAL *(continued)*

Reducing Costs
With more than half of our assets administered internally by system staff, we are able to manage investments at a very low cost — 26 basis points — compared to the value of assets. On a smaller scale, to reduce production costs and further protect member data, the member annual statement is now produced in-house. The average size of the statement was reduced from 12 pages to four pages, saving the System considerable printing and assembly costs.

Significant Litigation

None.

Financial Information

Members of the NYSTRS Board, who serve without pay, have a fiduciary responsibility to safeguard the fund used to pay guaranteed retirement and ancillary benefits to the System's members and beneficiaries. The System's long-term pension obligations for this population are well funded. Strict governmental requirements for transparency and public accountability as established by the Governmental Accounting Standards Board (GASB), as well as state and federal laws, are rigorously followed. Consistently favorable audits of System finances from a variety of independent sources affirm this.

The design, implementation and administration of appropriate internal controls protecting the security of assets are the responsibility of System management. The internal control framework has been designed to provide reasonable rather than absolute assurance that the financial statements will be free from material misstatement. The concept of reasonable assurance recognizes that the cost of a control should not exceed the benefits likely to be derived, and that the valuation of costs and benefits requires estimates and judgments by management. To ensure the validity of these controls, a system of both external and internal checks and balances exists. Financial information and internal controls are subject to audit by the New York State Department of Financial Services and the Retirement System's Internal Audit Department. In addition, KPMG LLP, an independent certified public accountant, whose unmodified opinion appears on page 19 of this report, audits the financial statements. An audit of our actuarial valuation, methods and assumptions was completed in 2019 by Cheiron, which concluded the actuarial valuation of the System fairly represented the actuarial position and funding requirements of the System. These oversight mechanisms provide scrupulous and transparent adherence to applicable regulations.

Major System expenses result from retirement benefit payments, death benefits and refunds of contributions to certain eligible members and beneficiaries. The increase in retirement benefit payments from 2018 to 2019 is attributable to a net increase of 2,918 retirees and beneficiaries (details are found on page 30 in the *Notes to Financial Statements-Plan Description*). Also see the *Benefits and Return of Contributions by Type* chart on pages 126-127 for more information.

For an overview of NYSTRS' financial activities for the fiscal year ended June 30, 2019, see *Management's Discussion and Analysis* beginning on page 21. This section provides explanations and further details of the information provided in the financial statements, its notes and required supplementary information.

Responsibility for both the accuracy of the data and the completeness and fairness of the presentation, including all disclosures, rests with the management of the System. To the best of our knowledge and belief, the enclosed data is accurate in all material respects and is reported in a manner designed to present fairly the financial position and results of operations of the System.

Funding

Funds used to pay promised benefits come from employer contributions, member contributions and investment income. Assets are professionally managed and invested on a long-term basis using sound investment policies. See *Statements of Changes in Fiduciary Net Position* on page 29 for more information.

The employer contribution rate (ECR) — expressed as a uniform percentage of member payroll — is set annually at the level necessary to properly fund benefits. The rate is established in accordance with an actuarial valuation of System assets and liabilities. The most recently adopted ECR of 8.86% will apply to 2019-2020 school year salaries. The payments associated with this rate will be collected in the fall of 2020. These contributions have been collected without fail throughout the System's history, keeping NYSTRS among the most secure plans in the country.

LETTER OF TRANSMITTAL *(continued)*

The System's year-end net assets totaled $122.5 billion. During the same period, benefits paid to retirees and beneficiaries were approximately $7.3 billion.

The plan's funded ratio as of June 30, 2018, the date of the most-recent annual actuarial valuation and calculated using the Actuarial Value of Assets, was 99.2%. Details of our funding progress may be obtained by turning to page 105.

Investments

The System's assets are invested in the most prudent manner possible in order to achieve optimum long-term total returns with an appropriate level of risk. The System is committed to a disciplined, risk-controlled investment approach that focuses on thoughtful and prudent diversification of assets across a broad spectrum of capital market segments. The allocation of assets within the portfolio, as well as the fund's overall structure, are continuously reviewed and adjusted as appropriate to achieve these goals.

The System's total portfolio returned 7.1%, net of fees, for the fiscal year ended June 30, 2019. Our 30-year rate of return is 8.8%, net of fees.

Refer to pages 65-97 for further information on NYSTRS' investments. A listing of our equity and fixed income holdings can be viewed on our website at NYSTRS.org.

Acknowledgments

This Comprehensive Annual Financial Report is prepared by NYSTRS staff and reviewed by external auditors prior to publication. The intent of the publication is to provide complete and reliable information for making management decisions, determining compliance with legal provisions and determining responsible stewardship of System assets.

The full report is available on the System's website at NYSTRS.org. Printed copies are available upon request. A Popular Annual Financial Report that presents information from this report in a format more easily understandable to those without a background in public finance will also be prepared.

As this annual report demonstrates, NYSTRS Board and staff are dedicated to fulfilling our mission: to provide our members with a secure pension. Required member and employer contributions are consistently collected in full and without fail, keeping this System among the most stable, secure and best-funded public pension plans in the country. Prudent, risk-controlled investment of those contributions, with a focus on long-term returns, provides our members with the peace of mind that their pensions will continue for life.

In turn, NYSTRS retirees spend those benefits largely in New York state, thus helping to support and stabilize local and state economies. The NYSTRS Board and staff are proud to be doing their part in supporting the public school teachers and administrators who have devoted their lives to the next generation.

Respectfully submitted,

Thomas K. Lee
Executive Director & Chief Investment Officer

Introduction

PRESIDENT'S MESSAGE

David P. Keefe

Dear NYSTRS Members, Administrators and Teachers,

Back when I was a middle school social studies teacher, I would have been thrilled to see my students' grades consistently hovering around 100%. Today, I am equally thrilled to see that our Retirement System's funding level soars around that same 100%.

It is with great pride that I report NYSTRS remains one of the most stable, secure and best-funded public pension plans in the country. As a result, our members have peace of mind knowing they will receive a pension for as long as they live.

NYSTRS is 99.2% funded using an actuarial value of assets and 100.9% funded using a market value of assets. According to the Center for Retirement Research at Boston College, the average funding level for public retirement systems is 73%. Being fully funded means we have the assets necessary to pay all accrued benefits to our more than 430,000 active and retired members and beneficiaries.

Maintaining a well-funded pension plan is a shared responsibility. In our case, a relatively small portion of our funding comes from member and employer contributions – which have been collected without fail throughout the System's nearly 100-year history. The bulk of the funding – some 85%, well above the national average of 62% – comes from investment income. Contributions collected and existing assets are pooled and prudently invested across a broad spectrum of capital market segments, and the results speak for themselves.

The fact that we keep management costs as low as possible contributes to our success. About 60% of total System assets are managed internally by NYSTRS investment staff, so the fees we would have paid a third party to manage these assets can instead be invested.

The primary reasons for our excellence, however, are our exemplary governance model and the outstanding people who manage the fund and provide our members with incomparable customer service. From the highly capable and experienced trustees who serve on our Board to the staff who are the face of NYSTRS with our stakeholders, at every level of the organization, the quality of staff and their dedication to the people we serve are self-evident. I'm honored to be associated with such a wonderful group.

David P. Keefe
President

SUMMARY OF BENEFITS

Types of Benefits

NYSTRS provides pension benefits for service, vested and disability retirement, as well as death benefits. Following is a general summary of benefits. Members are advised to refer to the *Active Members' Handbook* at NYSTRS.org for complete information on benefit calculation.

Membership Tiers

System members are organized using a tier structure based on date of membership. There are six tiers, each with different benefit structures and eligibility rules.

Tier 1:	Membership prior to 7/1/73	Tier 4:	Membership 9/1/83 — 12/31/09
Tier 2:	Membership 7/1/73 — 7/26/76	Tier 5:	Membership 1/1/10 — 3/31/12
Tier 3:	Membership 7/27/76 — 8/31/83	Tier 6:	Membership on or after 4/1/12

Service Retirement Benefit

A Tier 1 member is eligible to retire at age 55 under the Career Plan without a reduction in benefits if credited with at least 20 years of state service. The pension for 20 years of New York State service rendered after July 1, 1959, is 40% of final average salary. With few exceptions, the maximum pension under the Career Plan is 79% of final average salary. This includes the two years of service added under the Article 19 Benefit Enhancement legislation.

A Tier 2 member may retire at age 55 without a reduction in benefits if credited with at least 30 years of service. The pension for 30 years of service is 60% of final average salary. The maximum pension payable under Tier 2 is also 79% of final average salary, including two years of service added under the Article 19 Benefit Enhancement legislation.

A Tier 4 member, and a Tier 3 member retiring under Tier 4, may retire at age 55 without a reduction in benefits if credited with at least 30 years of service. The pension for 30 years of service is 60% of final average salary. Each year beyond 30 years increases the pension 1½% of final average salary.

A Tier 5 member may retire at age 57 without a reduction in benefits if credited with at least 30 years of service. A Tier 6 member may retire at age 63 without a reduction in benefits.

Vested Retirement Benefit

NYSTRS members in Tiers 1-4 who cease employment with five or more years of credited service are eligible for a vested retirement. Ten years are required for Tier 5 and 6 members. The vested benefit is payable at age 55 and is calculated using the same factors as a service retirement benefit.

Death Benefits

NYSTRS offers several types of death benefits: In-Service (which includes post-retirement coverage for Tiers 2-6); Accidental; Vested; and Accelerated. Eligibility depends on an individual's membership status and, in certain cases, the cause or timing of death.

Disability Retirement Benefit

Generally, members credited with at least 10 years of New York State service who become disabled, as defined by applicable statute and approved by the Medical Board, are entitled to a disability retirement benefit from the System. In most cases, the minimum disability benefit is one-third of final average salary. For Tier 3-6 members who become disabled as the result of an accident sustained in the performance of their teaching duties, the 10-year eligibility requirement is waived.

SUMMARY OF BENEFITS *(continued)*

The members of the Medical Board are:

STEVEN D. KRONICK, M.D.	**RICHARD T. MACDOWELL, M.D.**	**LAURA E. PICA, M.D.**
Board Certified Psychiatrist; Additional Qualifications in Geriatric Psychiatry Psychiatrist Pine Bush Mental Health, LLP Psychiatric Consultant Albany County Community Mental Health Center Clinical Assistant Professor of Psychiatry Albany Medical College Diplomate of the National Board of Medical Examiners Member of the American Board of Psychiatry and Neurology Member of the American Psychiatric Association	Attending Surgeon at Albany Medical College Member of the American College of Surgeons Member of the American Board of Surgery	Diplomate of the National Board of Medical Examiners Diplomate of the American Board of Internal Medicine Member of the American College of Physicians Member of the American Society of Internal Medicine St. Peter's Health Partners Medical Association - Primary Care Physician - Internal Medicine

Member Contributions

Tier 3 and 4 members are mandated to contribute 3% of their salary to the Retirement System until they have been a member for 10 years or have 10 years of service credit, whichever occurs first. Tier 5 members are required to contribute 3.5% of their salary throughout their active membership. Tier 6 members are required to contribute at a variable rate based on earnings throughout their active membership.

Transfer and Prior Service

Under certain circumstances, members are eligible to transfer membership to or from another New York State public retirement system, or request reinstatement of a former membership in a NYS public retirement system. Credit for NYS public employment prior to joining NYSTRS and active duty military service are also creditable in certain situations.

Retirement Options

At the time of retirement, a member may elect the Maximum retirement benefit with no protection for a beneficiary, or one of many actuarially equivalent options (i.e., lump sum, survivor, guarantee or alternative) providing protection for a beneficiary or beneficiaries.

Cost-of-Living Adjustment (COLA)

All eligible current and future retired members will receive an automatic COLA based on 50% of the Consumer Price Index increase from one March to the next. It will be a minimum of 1% and a maximum of 3% of the first $18,000 of the retiree's Maximum retirement benefit and is effective each September. Most service retirees must be age 62 and retired five years to be eligible.

Financial

QUALITY WORKFORCE

Organizational success requires a high-performing, dedicated team that puts service to our customers first. We recruit and retain only the best of the best, and we provide staff with ample professional development opportunities. We encourage diversity of people and ideas, and require team members to live the System's values.

Financial

Page

INDEPENDENT AUDITORS' REPORT

KPMG LLP
515 Broadway
Albany, NY 12207-2974

The Retirement Board
New York State Teachers' Retirement System

We have audited the accompanying financial statements of the New York State Teachers' Retirement System (the System), as of and for the years ended June 30, 2019 and 2018, and the related notes to the financial statements, which collectively comprise the System's basic financial statements for the years then ended as listed in the table of contents.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with U.S. generally accepted accounting principles; this includes the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, the financial statements referred to above present fairly, in all material respects, the fiduciary net position of the New York State Teachers' Retirement System as of June 30, 2019 and 2018, and the changes in its fiduciary net position for the years then ended in accordance with U.S. generally accepted accounting principles.

INDEPENDENT AUDITORS' REPORT *(continued)*

KPMG

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that management's discussion and analysis and the schedules and related notes included under Required Supplementary Information in the accompanying table of contents be presented to supplement the basic financial statements. Such information, although not a part of the basic financial statements, is required by the Governmental Accounting Standards Board who considers it to be an essential part of financial reporting for placing the basic financial statements in an appropriate operational, economic, or historical context. We have applied certain limited procedures to the required supplementary information in accordance with auditing standards generally accepted in the United States of America, which consisted of inquiries of management about the methods of preparing the information and comparing the information for consistency with management's responses to our inquiries, the basic financial statements, and other knowledge we obtained during our audit of the basic financial statements. We do not express an opinion or provide any assurance on the information because the limited procedures do not provide us with sufficient evidence to express an opinion or provide any assurance.

Other Supplementary Information

Our audits were conducted for the purpose of forming an opinion on the financial statements that collectively comprise the System's basic financial statements. The schedules of administrative expenses and schedules of investment expenses as listed in the accompanying table of contents, and the introduction, investments, actuarial, and statistical sections of this report are presented for purposes of additional analysis and are not a required part of the basic financial statements.

The schedules of administrative expenses and schedules of investment expenses are the responsibility of management and were derived from and relate directly to the underlying accounting and other records used to prepare the basic financial statements. Such information has been subjected to the auditing procedures applied in the audit of the basic financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the basic financial statements or to the basic financial statements themselves, and other additional procedures in accordance with auditing standards generally accepted in the United States of America. In our opinion, the schedules of administrative expenses and schedules of investment expenses are fairly stated, in all material respects, in relation to the basic financial statements as a whole.

The introduction, investments, actuarial and statistical sections have not been subjected to the auditing procedures applied in the audit of the basic financial statements, and accordingly, we do not express an opinion or provide any assurance on them.

KPMG LLP

Albany, New York
October 31, 2019

MANAGEMENT'S DISCUSSION AND ANALYSIS
June 30, 2019 and 2018
(Unaudited)

The following discussion and analysis of the financial performance of the New York State Teachers' Retirement System (NYSTRS or the System) provides an overview of its activities for the years ended June 30, 2019, 2018, and 2017. Its purpose is to provide explanations and insights into the information presented in the financial statements, notes to the financial statements, and required supplementary information.

Financial Highlights

- The System's investments experienced appreciation of $5.6 billion in 2019 and $7.7 billion and $10.7 billion in 2018 and 2017, respectively.
- The net position of the System represents funds available to pay current and future benefits. Net position was $122.5 billion at June 30, 2019, and $119.9 billion and $115.5 billion at June 30, 2018 and 2017, respectively.
- The 2019 net position increased from 2018 by $2.6 billion or 2.2 %, and 2018 net position increased from 2017 by $4.5 billion, or 3.9%.
- Contributions from employers were $1.8 billion in 2019, $1.6 billion in 2018, and $1.9 billion in 2017, consistent with the change in the employer contribution rate.
- The size of the System's active membership has declined over the past three years. However, the number of retired members and beneficiaries receiving benefits has increased, leading to an increase in the retirement benefits paid. Retirement benefits paid in 2019, 2018, and 2017 were $7.3 billion, $7.1 billion, and $6.9 billion, respectively.
- The System's funded ratio, a comparison of the actuarial value of assets to the accrued pension benefit liability, was 99.2% as of the June 30, 2018 valuation. Valuations in 2017 and 2016 resulted in the System's funded ratio of 97.7% and 97.9%, respectively.

Overview of Financial Statements

The following discussion and analysis is intended to assist the reader in better understanding the purpose and meaning of each of the key components of NYSTRS' financial statements, which comprise the following:

1. The Statements of Fiduciary Net Position present NYSTRS' assets and deferred outflows of resources and liabilities and deferred inflows of resources by major categories and may serve over time as a useful indicator of the System's financial position. The difference between assets and deferred outflows of resources and liabilities and deferred inflows of resources represents the net position restricted for pensions. The statements also compare assets and deferred outflows of resources and liabilities and deferred inflows of resources by class to the previous year, which offers the reader the opportunity to note changes in each class from year to year.
2. The Statements of Changes in Fiduciary Net Position provide information on the change in the System's net position during the current year. The majority of additions are normally derived from net investment income, primarily in the form of changes in the fair value of assets from the prior year. Deductions include retirement benefit payments, beneficiary payments, return of contributions, and administrative expenses. For comparison purposes, information pertaining to the previous year's Statement of Changes in Fiduciary Net Position is also provided.
3. The Notes to the Basic Financial Statements are an essential part of the basic financial statements. They provide important background and detailed information about NYSTRS, the plan and the basic financial statements themselves.
4. The Required Supplementary Information (RSI) consists of information pertaining to NYSTRS' actuarial methods and assumptions and provides data on changes in the school districts' net pension liability, the composition of the school districts' net pension liability, the school districts' contributions, and NYSTRS' investment returns. Other supplemental information is also presented and includes the schedules of administrative expenses and investment expenses.

MANAGEMENT'S DISCUSSION AND ANALYSIS *(continued)*
June 30, 2019 and 2018
(Unaudited)

Financial Analysis

Tables 1 and 2 summarize and compare the System's financial results for the years 2019, 2018 and 2017. It is important to note that the change from year to year in a particular investment category is attributable not only to the change in fair value but also to purchases and sales or maturities of that investment.

TABLE 1 - SUMMARY OF FIDUCIARY NET POSITION
(dollars in thousands)

	June 30			Amount increase (decrease) 2018 to 2019	Percentage change of total 2018 to 2019
	2019	2018	2017		
Investments at fair value:					
Cash equivalents	$ 2,714,874	$ 2,669,572	$ 4,563,961	$ 45,302	0.0 %
Domestic fixed income	20,143,856	19,804,701	18,473,419	339,155	0.3
Global bonds	3,002,833	2,667,873	2,543,227	334,960	0.3
Domestic equity	42,397,951	43,891,046	42,132,171	(1,493,095)	(1.2)
International equity	20,635,621	22,202,302	21,651,581	(1,566,681)	(1.3)
Global equity	2,578,365	1,003,867	—	1,574,498	1.3
Mortgages	4,487,273	3,764,533	3,337,830	722,740	0.6
Real estate	8,928,350	8,343,360	8,134,301	584,990	0.5
Real estate investment trusts	2,853,691	2,486,569	2,389,238	367,122	0.3
Alternative investments*	12,472,102	11,007,906	10,008,555	1,464,196	1.2
Total investments	120,214,916	117,841,729	113,234,283	2,373,187	2.0
Net other assets, liabilities, and deferrals	2,262,565	2,073,789	2,234,077	188,776	0.2
Net position restricted for pensions	**$ 122,477,481**	**$ 119,915,518**	**$ 115,468,360**	**$ 2,561,963**	**2.2%**

**Alternative investments include real estate alternative investments, private equity and private debt.*

TABLE 2 - SUMMARY OF CHANGES IN FIDUCIARY NET POSITION
(dollars in thousands)

	Years ended June 30			Amount increase (decrease) 2018 to 2019	Percentage change of total 2018 to 2019
	2019	2018	2017		
Net appreciation in fair value of investments	$ 5,631,436	$ 7,683,568	$ 10,743,830	$ (2,052,132)	(45.6)%
Other investment income	2,391,744	2,244,443	2,208,062	147,301	3.3
Contributions	1,920,343	1,738,012	1,994,974	182,331	4.1
Retirement benefits	(7,285,362)	(7,088,949)	(6,903,361)	(196,413)	(4.4)
Other deductions	(96,198)	(80,660)	(81,287)	(15,538)	(0.3)
Net increase in net position	**$ 2,561,963**	**$ 4,496,414**	**$ 7,962,218**	**$ (1,934,451)**	**(42.9)%**

MANAGEMENT'S DISCUSSION AND ANALYSIS *(continued)*
June 30, 2019 and 2018
(Unaudited)

Fiscal Year 2019

In 2019, the internally managed domestic fixed income portfolio was little changed in dollar terms on a year over year basis. The June 30, 2019 balance was approximately 15.6% of invested System assets, lower than the 15.9% allocation at the end of the prior fiscal year and still within the allowable range of 12.0% to 20.0%. During the year, bond purchases of approximately $2.2 billion were exceeded by the sum of bond maturities, sales, tenders, calls, and agency mortgage principal prepayments by approximately $610.5 million.

The intermediate portion of the treasury yield curve flattened during the fiscal year as the two-year point on the curve declined by approximately 0.77%. While further out, the interest rate curve at the seven-year and 10-year points declined by 0.95% and 0.86% respectively. However, beyond the intermediate portion of the interest rate curve the 30-year treasury yield decline of 0.46% was lower than the 10-year point's interest rate decline of 0.86%, resulting in a steeper interest rate curve beyond 10 years year over year. The overall decline in interest rates produced asset capital appreciation that, combined with the addition of interest income, resulted in a solid positive return for the fiscal year.

The weighted average coupon of the domestic fixed income portfolio was marginally higher during the fiscal year, increasing by 0.1%, as lower coupon bonds with shorter original tenors continued to mature while bonds with higher coupons were added, resulting in a small increase in interest income from the prior fiscal year.

The System continued to add to the high-yield bond asset class during the fiscal year, within the domestic fixed income portfolio. The System funded one new high-yield bond money manager and allocated additional moneys across managers into the asset class. The System's asset allocation target for high-yield bonds is 1.0% with a range of 0.0% to 3.0%. At year end the System's high yield bond exposure was approximately 0.2%.

Exposure to global bonds continued to increase during the 2019 fiscal year due to positive returns and continued reinvestment of coupon in all three global bond portfolios. These factors resulted in a fiscal year-end total of approximately $3.0 billion invested in the separately managed accounts. The global bond balance was roughly 2.4% of invested System assets at June 30, 2019, within the allowable range of 0.0% to 3.0%.

Net appreciation of $2.8 billion for domestic equities was driven by strong equity market returns, with the S&P 1500 index rising 9.2% for the fiscal year. During the period, $4.4 billion was raised from the domestic equity portfolio, while a further $750.0 million was transferred to fund an allocation to global equities. The combination of investment performance, rebalancing activities and funding for the global equity asset class resulted in a decrease in net position for domestic equities of $1.5 billion.

Despite the MSCI All Country World index rising 1.3% over the fiscal year, the international equity portfolio experienced a net depreciation of $137.5 million. During the fiscal year, $1.0 billion was raised from the international portfolio, while a further $750.0 million was transferred to fund the System's allocation to global equities, contributing to an overall decrease in net position for international equities of $1.6 billion.

The global equity portfolio net position at the end of the fiscal period was $2.6 billion, an increase of $1.6 billion from the prior year, which included $1.5 billion transferred from domestic and international equities as noted above. The global equity balance was approximately 2.1% of invested System assets at June 30, 2019, within the allowable range of 0.0% to 8.0%.

Real estate investments consist of a globally diversified portfolio of public and private commercial real estate assets. Net new investments coupled with positive investment returns resulted in net appreciation of $291.7 million for the equity real estate portfolio and appreciation of $166.8 million for the debt real estate portfolio. The balance of equity real estate was approximately 10.7% of invested System assets at June 30, 2019, remaining in the allowable range of 6.0% to 16.0%. The debt real estate investments were approximately 5.9% of invested System assets at June 30, 2019, remaining in the allowable range of 3.0% to 11.0%. The debt real estate investments remain on the low end of the allowable range due to historically low yields available in the market. Commercial real estate values, as measured by the National Council of Real Estate Investment Fiduciaries (NCREIF), continued to grow modestly each quarter during the year. Total unlevered appreciation for the fiscal year was 1.9%, slightly less than the prior year.

The System's real estate investment trusts (REITs) consist of domestic and global REITs.

MANAGEMENT'S DISCUSSION AND ANALYSIS *(continued)*
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The blended domestic REITs benchmark index generated a return of 10.5% for the fiscal year. The domestic REITs portfolio outperformed the index, returning 13.0% for the fiscal year. In March 2018, the System consolidated three separate domestic strategies managed by one investment manager into a single multi-strategy portfolio that outperformed the related benchmark since inception, returning 17.4%. Market gains along with reinvested dividend income of $82.6 million contributed to an overall increase of $285.2 million in net position, resulting in a year-end market value of $1.9 billion for the domestic REIT portfolio.

The global REIT benchmark index generated a return of 8.6% for the fiscal year. The global REIT portfolio slightly outperformed the index returning 9.0% for the fiscal year. Market gains along with reinvested dividend income of approximately $39.1 million contributed to an overall increase of $82.7 million in net position, resulting in a year-end market value of $956.4 million for the global REIT portfolio.

Alternative investments presented in tables 1 and 3 include real estate alternative investments, private equity and private debt.

Net appreciation in the private equity portfolio continued to remain positive as distributions from existing investments increased from the prior year. The System made $2.0 billion in capital contributions to new and existing private equity funds and took $2.1 billion in distributions from existing private equity investments. The balance was approximately 7.8% of invested System assets at June 30, 2019, within the allowable range of 3.0% to 13.0%. Twenty-four new private equity commitments were made during the year.

Effective July 1, 2017, NYSTRS added private debt to its asset allocation. During the year, the System made $202.7 million in contributions to new private debt funds and took $160.0 million in distributions. The market value was approximately 0.5% of invested System assets at June 30, 2019, within the allowable range of 0.0% to 5.0%. Two new commitments were made during the year.

Securities lending industry trends put downward pressure on the System's earnings during the 2019 fiscal year with the double setbacks of lower aggregate on-loan balances and tighter spreads. Industry lendable assets hit an all-time high while broad directional demand to borrow securities continues to subside given the run-up in global equity markets. The System's collateral schedule of U.S. Dollar cash, U.S. Treasuries, U.S. Agencies, and U.S. Agency MBS also reduced loan opportunities and earnings as borrowers continue to optimize their balance sheets by preferring to pledge non-cash collateral such as equities and sovereign debt rather than U.S. Treasuries when borrowing securities.

Investment expenses are primarily composed of investment management fees that are based on the market value of assets managed, and in some cases the returns achieved. The investment expense increase in 2019 from 2018 is primarily the result of activity within the System's alternative investments.

The change in employer contributions was a function of an increase in the employer contribution rate from 9.80% in 2018 to 10.62% in 2019.

Fiscal Year 2018

In 2018, as a result of rebalancing, the internally managed domestic fixed income portfolio increased on a year over year basis. The June 30, 2018 balance was approximately 15.9% of invested System assets, higher than the 15.4% allocation at the end of the prior fiscal year and still within the allowable range of 12.0% to 20.0%. During the year, bond purchases of approximately $4.70 billion exceeded the sum of bond maturities, sales, tenders, calls, and agency mortgage principal prepayments by approximately $1.80 billion.

The yield curve continued its flattening trend during the fiscal year as the increase in rates at the long end of the curve was less than that at the front of the curve. The magnitude of the interest rate moves was reflected in the front and middle of the curve. For instance, at the 3- and 5-year points on the curve, yields increased by approximately 108 and 85 basis points, respectively, year over year. Contrast that with the 30-year point on the curve, where yields only increased by 15 basis points. The increase in interest rates produced asset capital depreciation that, although partially offset with the addition of interest income, resulted in a small negative return for the fiscal year.

The weighted average coupon of the domestic fixed income portfolio was relatively unchanged during the fiscal year, increasing by a little more than 2 basis points as the maturity of lower coupon bonds that had shorter original tenors was offset by the

MANAGEMENT'S DISCUSSION AND ANALYSIS *(continued)*
June 30, 2019 and 2018
(Unaudited)

maturities of older high coupon bonds. The face amount of bonds held increased year over year, resulting in an increase in interest income from the prior fiscal year.

Exposure to global bonds continued to increase during the 2018 fiscal year due to asset allocation into global bonds, positive global bond returns during the fiscal year and continued reinvestment of coupon in all three global bond portfolios. These factors resulted in a fiscal year-end total of $2.5 billion invested in the separately managed accounts. The global bond balance was approximately 2.2% of invested System assets at June 30, 2018, within the allowable range of 0.0% to 3.0%.

The System added a high-yield bonds asset class during the fiscal year and funded two high-yield bond money managers. The System's asset allocation target for high-yield bonds is 1.0% with a range of 0.0% to 3.0%. At year end, the System's high yield bond exposure was approximately 0.1%.

At its April 2018 meeting, the Board approved a 4.0% asset allocation target for global equities and corresponding 2.0% reductions in the targets and allowable ranges for both domestic and international equities. The reduction in the allowable range for domestic equities, combined with strong market returns, left the balance at approximately 37.2% of invested System assets at June 30, 2018, falling slightly outside the revised allowable range of 29.0% to 37.0%.

Net appreciation of $4.9 billion for domestic equities was primarily driven by strong equity market returns, with the S&P 1500 index rising 14.5% for the fiscal year. During this period, $2.8 billion was raised from the domestic equity portfolio, while a further $500 million was transferred to fund the allocation to global equities. The combination of investment performance, portfolio rebalancing activities and funding for the new global equity asset class resulted in an increase in net position for domestic equities of $1.8 billion.

Net appreciation of $1.4 billion for international equities was also driven by positive equity market returns in Europe, Asia and Latin America, as measured by the MSCI All Country World Ex-U.S. index, which rose 7.3% for the fiscal year. Rebalancing towards the System's asset allocation targets, $665 million was raised from the international portfolio during the year, while $500 million was transferred to fund the System's new allocation to global equities, contributing to an overall increase in net position for international equities of $550 million. The balance was approximately 18.8% of invested System assets at June 30, 2018, remaining within the allowable range of 12.0% to 20.0%.

Real estate investments consist of a globally diversified portfolio of public and private commercial real estate assets. Net new investments coupled with positive investment returns resulted in net appreciation of $297 million for the equity real estate portfolio and depreciation of $108 million for the debt real estate portfolio. The balance of equity real estate was approximately 10.0% of invested System assets at June 30, 2018, remaining in the allowable range of 6.0% to 16.0%. The debt real estate investments were approximately 5.1% of invested System assets at June 30, 2018, remaining in the allowable range of 3.0% to 11.0%. The debt real estate investments remain on the low end of the allowable range due to historically low yields available in the market. Commercial real estate values, as measured by the National Council of Real Estate Investment Fiduciaries (NCREIF), continued to grow modestly each quarter during the year. Total unlevered appreciation for the fiscal year was 2.5%, consistent with the prior year.

The blended domestic REIT benchmark index generated a return of 3.9% for the fiscal year. The domestic REIT portfolio outperformed the index, returning 4.2% for the fiscal year. In March 2018, the System consolidated three separate domestic strategies managed by one investment manager into a single multi-strategy portfolio that outperformed the related benchmark since inception, returning 9.5%. In addition, the System liquidated one domestic REIT portfolio valued at $398.4 million to help fund four new global REIT mandates. This liquidation, offset by $65.1 million of reinvested dividends within the portfolios, contributed to an overall decrease in net position for the domestic REIT portfolios of $324.1 million.

The international REIT portfolios were liquidated during the year to help fund the four new global REIT mandates. The global REIT benchmark index generated a return of 2.8% since inception (September 2017). The global REIT portfolio outperformed the index returning 3.0% since inception. Market gains along with reinvested dividend income of approximately $28.3 million within the portfolios contributed to the year-end market value of $873.8 million for the global REIT portfolio.

Net appreciation in the private equity portfolio continued to remain positive as distributions from existing investments increased from the prior year. The System made $1.7 billion in capital contributions to new and existing private equity funds and took $2.6

MANAGEMENT'S DISCUSSION AND ANALYSIS *(continued)*
June 30, 2019 and 2018
(Unaudited)

billion in distributions from existing private equity investments. The balance was approximately 7.1% of invested System assets at June 30, 2018, within the allowable range of 3.0% to 13.0%. Nineteen new private equity commitments were made during the year.

Effective July 1, 2017, NYSTRS added private debt to its asset allocation. During the year, the System made $104.1 million in contributions to new private debt funds and took $140.7 million in distributions. The market value was approximately 0.4% of invested System assets at June 30, 2018, within the allowable range of 0.0% to 5.0%.

Within the money market space, which impacts the securities lending market, the Federal Reserve has continued their methodical pace of removing monetary accommodation by raising their Federal Funds target range three times during the fiscal year. In addition to the rate increases, the Federal Reserve has begun to reduce the size of its balance sheet by decreasing their reinvestment of the principal payments they receive from securities held. The primary factors in their removal of policy accommodation were the continued improvement in the employment picture during the fiscal year, and inflation readings hovering near their 2% objective as measured by the Personal Consumption Expenditures Core Price Index. The Federal Funds target range would end the fiscal year at 1.75%–2.00%, 75 basis points (bps) higher than the range of 1.00%-1.25% at the beginning of the fiscal year.

As a result of the passage of the Tax Cut and Jobs Act in January 2018, the demand for money market and front end paper declined at the same time Treasury was issuing a heavy amount of net bill supply. The increasing supply of Treasury bills would have a ripple effect through the money markets while the decreasing demand from large, "offshore" accounts (i.e., corporate cash portfolios) would cause spreads to widen. The three month Libor-OIS spread widened to 59 bps, a level which exceeded the measure during the run-up to the SEC Money Market reform in 2016 and the Eurozone crisis in 2011. Securities lending cash loan balances were stable throughout the year as equity borrowers continued to lack conviction for shorts in prolonged risk-on periods. This was coupled with their preference to shift pledged collateral from cash to securities (aka non-cash) for regulatory capital purposes. Though year-end loan balances were higher year over year, throughout the 2018 fiscal year loan balances were lower, despite the System's participation in international non-cash lending. These lower loan balances combined with increased broker rebates resulted in a decline in securities lending net earnings year over year.

Investment expenses are primarily composed of investment management fees that are based on the market value of assets managed, and in some cases the returns achieved. The investment expense increase in 2018 from 2017 is primarily the result of activity within the System's alternative investments.

The change in employer contributions was a function of a decrease in the employer contribution rate from 11.72% in 2017 to 9.80% in 2018.

MANAGEMENT'S DISCUSSION AND ANALYSIS *(continued)*
June 30, 2019 and 2018
(Unaudited)

Net Appreciation (Depreciation)

For the year ended June 30, 2019, NYSTRS reported net investment income of $8.0 billion compared to $9.9 billion in 2018 and $12.9 billion in 2017. The most significant change was in appreciation (depreciation) on investments as follows:

TABLE 3 - NET APPRECIATION (DEPRECIATION) ON INVESTMENTS
(dollars in thousands)

	Years ended June 30			Amount increase (decrease)
	2019	2018	2017	2018 to 2019
Cash equivalents	$ 53,595	$ 47,087	$ 26,395	$ 6,508
Domestic fixed income	807,979	(559,127)	(475,254)	1,367,106
Global bonds	153,543	(18,413)	(43,706)	171,956
Domestic equity	2,759,314	4,909,624	6,078,746	(2,150,310)
International equity	(138,261)	1,441,942	3,499,966	(1,580,203)
Global equity	41,498	(14,494)	—	55,992
Mortgages	166,843	(108,279)	(135,434)	275,122
Real estate	291,673	296,957	360,522	(5,284)
Real estate investment trusts	239,869	65,879	(67,672)	173,990
Alternative investments*	1,254,979	1,623,497	1,499,449	(368,518)
Other	404	(1,105)	818	1,509
Totals	**$ 5,631,436**	**$ 7,683,568**	**$ 10,743,830**	**$ (2,052,132)**

**Alternative investments include real estate alternative investments, private equity and private debt.*

Economic Factors

The economic factor that is of primary significance to NYSTRS is the investment rate of return earned in the capital markets. Legislative, demographic, and actuarial assumption changes can also have a significant impact on the net pension liability and funded status of the plan. All of these factors are incorporated into the annual actuarial valuation, which determines the rate at which participating employers must contribute in order to appropriately fund member benefits. In terms of demographics, the System will likely continue to experience a shift toward a greater proportion of retirees relative to active members. This year, the System experienced moderate appreciation in investments. Investment returns are smoothed (averaged) by NYSTRS over a five-year period for purposes of computing the actuarial value of assets used to determine the employer contribution rate. A decrease in the System's valuation rate of interest assumption led to an increase in the employer contribution rate, from 9.80% on 2017-18 member salaries to 10.62% on 2018-19 member salaries.

Requests for Information

This financial report is designed to provide active members, retirees, employers, and anyone else who is interested, with a general overview of the financial activities of NYSTRS. Questions about this report or requests for additional financial information should be addressed to the Public Information Office, New York State Teachers' Retirement System, 10 Corporate Woods Drive, Albany, NY 12211, or by email at communit@nystrs.org.

STATEMENTS OF FIDUCIARY NET POSITION
June 30, 2019 and 2018

(dollars in thousands)

Assets:	2019	2018
Investments — at fair value (notes 4, 5 and 6):		
Cash equivalents	**$ 2,714,874**	$ 2,669,572
Domestic fixed income	**20,143,856**	19,804,701
Global bonds	**3,002,833**	2,667,873
Domestic equity	**42,397,951**	43,891,046
International equity	**20,635,621**	22,202,302
Global equity	**2,578,365**	1,003,867
Mortgages	**4,487,273**	3,764,533
Real estate	**8,928,350**	8,343,360
Real estate investment trusts	**2,853,691**	2,486,569
Alternative investments	**12,472,102**	11,007,906
Total investments	**120,214,916**	117,841,729
Receivables:		
Employer	**1,750,533**	1,580,797
Member contributions	**109,435**	104,410
Investment income	**272,140**	258,983
Investment sales	**413,676**	428,434
Total receivables	**2,545,784**	2,372,624
Other assets:		
Securities lending collateral — invested (note 5)	**881,304**	1,200,766
Member loans	**264,721**	253,745
Capital assets, net of depreciation	**27,038**	25,605
Miscellaneous assets	**18,953**	16,627
Total other assets	**1,192,016**	1,496,743
Total assets	**123,952,716**	121,711,096
Deferred outflows of resources:		
Changes in net OPEB liability (note 10)	**5,500**	5,500
Changes in net pension liability (note 9)	**3,717**	9,279
Total deferred outflows of resources	**9,217**	14,779
Liabilities:		
Securities lending collateral — due to borrowers (note 5)	**877,766**	1,197,376
Investment purchases payable	**406,053**	412,437
Mortgage escrows and deposits — net of investments	**527**	592
Net OPEB liability (note 10)	**49,677**	45,494
Other liabilities (notes 5 and 9)	**139,129**	134,609
Total liabilities	**1,473,152**	1,790,508
Deferred inflows of resources:		
Changes in net OPEB liability (note 10)	**8,637**	8,382
Changes in net pension liability (note 9)	**2,663**	11,467
Total deferred inflows of resources	**11,300**	19,849
Net position restricted for pensions (note 3)	**$ 122,477,481**	$ 119,915,518

See accompanying notes to financial statements.

STATEMENTS OF CHANGES IN FIDUCIARY NET POSITION
Fiscal Year Ended June 30, 2019 and 2018

(dollars in thousands)

Additions:	**2019**	**2018**
Investment income:		
Net appreciation in fair value of investments	**$ 5,631,436**	$ 7,683,568
Interest income	**829,852**	737,383
Dividend income	**1,406,530**	1,326,510
Real estate — net operating income	**433,087**	442,740
Securities lending — gross earnings	**32,667**	26,519
Other — net	**5,423**	1,611
	8,338,995	10,218,331
Less:		
Investment expenses	**294,160**	276,769
Securities lending:		
Broker rebates	**19,951**	12,031
Management fees	**1,852**	2,159
Depreciation (appreciation) of collateral	**(148)**	(639)
Net investment income	**8,023,180**	9,928,011
Contributions:		
Employer (note 1)	**1,774,646**	1,597,139
Member contributions	**136,610**	131,595
Transfers	**9,087**	9,278
Total contributions	**1,920,343**	1,738,012
Net additions	**9,943,523**	11,666,023
Deductions:		
Retirement benefit payments — periodic	**7,223,248**	7,023,870
Beneficiary payments	**62,114**	65,079
Return of contributions	**21,956**	20,050
Administrative expenses	**74,242**	60,610
Total deductions	**7,381,560**	7,169,609
Net increase in net position	**2,561,963**	4,496,414
Net position restricted for pensions, beginning of year	**119,915,518**	115,419,104
Net position restricted for pensions, end of year	**$ 122,477,481**	$ 119,915,518

See accompanying notes to financial statements.

NOTES TO FINANCIAL STATEMENTS
June 30, 2019 and 2018
(dollars in thousands)

(1) Plan Description

The New York State Teachers' Retirement System (NYSTRS or the System) was created and exists, pursuant to Article 11 of the New York State Education Law. The System is the administrator of a cost-sharing, multiple-employer public employee retirement system (PERS), administered by a 10-member Board to provide pension benefits for teachers employed by participating employers in the State of New York, excluding New York City. The System's Board is composed of:

- Three teacher members elected from the active membership.
- One retired member elected by a mail vote of all retired members.
- Two school administrators appointed by the Commissioner of Education.
- Two present or former school board members, experienced in the fields of finance and investment, elected by the Board of Regents. At least one of these individuals must have experience as an executive of an insurance company.
- One present or former bank executive elected by the Board of Regents.
- The State Comptroller or his/her designee.

Funding of the System is accomplished through member and employer contributions and investment earnings, according to New York State Education Law.

As of June 30, the number of participating employers was:

	2019	2018
Public school districts	680	680
B.O.C.E.S.	37	37
S.U.N.Y.	31	31
Community colleges	30	30
Charter schools	26	27
Special act districts	10	10
Other	9	9
Total	823	824

As of June 30, the System's membership consisted of:

	2019	2018
Retired members and beneficiaries currently receiving benefits	169,203	166,285
Members:		
Active members	254,740	255,930
Terminated members entitled to but not yet receiving benefits	8,777	8,660
Subtotal	263,517	264,590
Total	432,720	430,875

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

(a) Benefits

The benefits provided to members of the System are established by New York State law and may be amended only by the Legislature with the Governor's approval. Benefit provisions vary depending on date of membership and are subdivided into the following six classes:

Tier 1
Members who last joined prior to July 1, 1973 are covered by the provisions of Article 11 of the Education Law.

Tier 2
Members who last joined on or after July 1, 1973 and prior to July 27, 1976 are covered by the provisions of Article 11 of the Education Law and Article 11 of the Retirement and Social Security Law (RSSL).

Tier 3
Members who last joined on or after July 27, 1976 and prior to September 1, 1983 are covered by the provisions of Article 14 and Article 15 of the RSSL.

Tier 4
Members who last joined on or after September 1, 1983 and prior to January 1, 2010 are covered by the provisions of Article 15 of the RSSL.

Tier 5
Members who joined on or after January 1, 2010 and prior to April 1, 2012 are covered by the provisions of Article 15 of the RSSL.

Tier 6
Members who joined on or after April 1, 2012 are covered by the provisions of Article 15 of the RSSL.

(b) Service Retirements

Tier 1 and 2 members are eligible for a service retirement allowance of 2.0% per year of credited service times final average salary (FAS). Tier 1 members can retire without reduction at age 55 with 2 years of service or at any age with 35 years of service. Tier 2 members can retire without reduction at age 55 with 30 years of service or age 62 with 5 years of service. Reductions and maximums may apply depending on age and years of service at retirement.

Tier 3 and 4 members with less than 20 years of credited service are eligible for a service retirement allowance of 1.67% per year of credited service times FAS. Once a Tier 3 or 4 member has 20 or more but less than 30 years of service credit they are eligible for a service retirement allowance of 2.0% per year of credited service times FAS. Tier 3 and 4 members with 30 or more years of service credit are eligible for a service retirement allowance of 60% plus 1.5% per year of service credit in excess of 30 years times FAS. Tier 3 and 4 members can retire without reduction at age 55 with 30 years of service or age 62 with 5 years of service. Reductions may apply depending on age and years of service at retirement.

Tier 5 members with less than 25 years of credited service are eligible for a service retirement allowance of 1.67% per year of credited service times FAS. Once a Tier 5 member has 25 or more but less than 30 years of service credit they are eligible for a service retirement allowance of 2.0% per year of credited service times FAS. Tier 5 members with 30 or more years of service credit are eligible for a service retirement allowance of 60% plus 1.5% per year of service credit in excess of 30 years times FAS. Tier 5 members can retire without reduction at age 57 with 30 years of service or age 62 with 10 years of service. Reductions may apply depending on age and years of service at retirement.

Tier 6 members with less than 20 years of credited service are eligible for a service retirement allowance of 1.67% per year of credited service times FAS. Once a Tier 6 member has 20 or more years of service credit they are eligible for a service retirement allowance of 35% plus 2.0% per year of service credit in excess of 20 years times FAS. Tier 6 members can retire without reduction at age 63 with 10 years of service. Reductions may apply depending on age and years of service at retirement.

(dollars in thousands)

(c) Vested Benefits

Retirement benefits vest after 5 years of credited service except for Tiers 5 and 6 where 10 years of credited service are required. Benefits are payable at age 55 or greater with the limitations noted for service retirements above.

(d) Disability Retirement

Members are eligible for disability retirement benefits after 10 years of credited New York State service except for Tier 3 where disability retirement is permissible after 5 years of credited New York State service pursuant to the provisions of Article 14 of the RSSL. The Tier 3 benefit is integrated with Social Security.

(e) Death Benefits

Death benefits are paid to the beneficiary of active members who die in service and certain retirees. For active members, the benefit is based on final salary, age and the number of years of credited service. For retired members, it is also based on the number of years in retirement.

(f) Prior and Military Service

After 2 years of membership, members of all tiers may claim and receive credit for prior New York State public or teaching service. Only Tiers 1 and 2 members may, under certain conditions, claim out-of-state service. Certain members may also claim military service credit prior to or interrupting membership.

(g) Tier Reinstatement

In accordance with Chapter 640 of the Laws of 1998, any active member who had a prior membership may elect to be reinstated to their original date and Tier of membership.

(h) Employer Contributions

Pursuant to Article 11 of the New York State Education Law, employers are required to contribute at an actuarially determined rate adopted annually by the Retirement Board. The actuarially determined employer contribution rate applied to 2018-19 and 2017-18 member salaries is 10.62% and 9.80%, respectively. A reconciliation of total required employer contributions presented in the Schedule of the School Districts' Contributions and additions from employer contributions per the System's Statements of Changes in Fiduciary Net Position for fiscal years 2019 and 2018 is as follows:

	June 30	
	2019	2018
Total required employer contributions	$ 1,772,651	$ 1,596,311
Miscellaneous billing adjustments	1,995	828
Additions from employer contributions	$ 1,774,646	$ 1,597,139

In April 2013, the System's Retirement Board adopted a Stable Contribution Option (SCO) provided for under Chapter 57 of the Laws of 2013. Under the law, BOCES and public school districts participating in NYSTRS were offered the choice of either paying the actuarially determined contribution (ADC) or electing to participate in the SCO program, thereby paying a stable contribution rate for up to seven years beginning with the rate applied to the 2013-14 salaries and concluding with the rate applied to the 2019-20 salaries; deferring payment of the difference between the ADC and the contribution determined applying the SCO rate. Interest on deferred contribution amounts were based on the monthly average yield on 10-year U.S. Treasury securities for the 12-month period that precedes August 1 of the applicable deferred year, plus 1.0%. As of June 30, 2017, all districts that participated in the SCO have opted out and have either paid their outstanding deferral

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

in full, or have opted to repay the System over 5 years. The SCO receivable balances at June 30, 2019 and 2018 were $15,692 and $22,417 respectively.

(i) Member Contributions

Tier 3 and Tier 4 members are required by law to contribute 3% of salary to the System. Effective October 2000, contributions were eliminated for Tiers 3 and 4 members with 10 or more years of service or membership. Effective January 1, 2010, Tier 5 members are required by law to contribute 3.5% of salary throughout their active membership. Effective April 1, 2012, Tier 6 members are required by law to contribute between 3.0% and 6.0% of salary throughout their active membership in accordance with a schedule based upon salary earned. Pursuant to Article 14 and Article 15 of the RSSL, those member contributions are used to help fund the benefits provided by the System. However, if a member dies or leaves covered employment with less than 5 years of credited service for Tiers 3 and 4, or 10 years of credited service for Tiers 5 and 6, the member contributions with interest calculated at 5.0% per annum are refunded to the employee or designated beneficiary. Eligible Tier 1 and Tier 2 members may make member contributions under certain conditions pursuant to the provisions of Article 11 of the Education Law and Article 11 of the RSSL. Upon termination of membership, such accumulated member contributions are refunded. At retirement, such accumulated member contributions can be withdrawn or are paid as a life annuity.

(j) Permanent Cost-of-Living Adjustment (COLA)

Section 532-a of the Education Law provides a permanent cost-of-living benefit to both current and future retired members. This benefit will be paid commencing September of each year to retired members who have attained age 62 and have been retired for 5 years or attained age 55 and have been retired for 10 years. Disability retirees must have been retired for 5 years, regardless of age, to be eligible. The annual COLA percentage is equal to 50.0% of the increase in the consumer price index, not to exceed 3.0% nor be lower than 1.0%. It is applied to the first $18,000 dollars of annual benefit. The applicable percentage payable beginning September 2019 and 2018 is 1.0% and 1.2%, respectively.

Members who retired prior to July 1, 1970 are eligible for a minimum benefit of $17,500 dollars for 35 years of credited full-time New York State service. Certain members who retire pursuant to the provisions of Article 14 of the RSSL are eligible for automatic cost-of-living supplementation based on the increase in the consumer price index with a maximum per annum increase of 3.0%.

(2) Summary of Significant Accounting Policies

(a) Basis of Accounting

The System's financial statements are prepared using the accrual basis of accounting. Plan member contributions are recognized in the period in which the contributions are due. Employer contributions are recognized when due and the employer has a legal requirement to provide the contributions. Benefits and refunds are recognized when due and payable in accordance with the terms of the plan. Investment purchases and sales are recorded on a trade-date basis.

(b) Investments

Plan investments are reported at fair value. Fair value is the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. Where plan investments do not have a readily determinable fair market value, fair value of the plan investments has been established using the net asset value per share (or its equivalent) of the investment to establish fair value. Refer to note 6 for more detail regarding the methods used to measure the fair value of investments.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(c) System Employees' Pension Plan and Other Postemployment Benefits

For purposes of measuring the net pension liability, deferred outflows of resources and deferred inflows of resources related to pensions and pension expense, information about the fiduciary net position of the Employees Retirement System (ERS) and additions to/deductions from ERS's fiduciary net position have been determined on the same basis as they are reported for ERS by the New York State and Local Retirement System (NYSLRS).

For purposes of measuring the net other postemployment benefits (OPEB) liability, deferred outflows of resources and deferred inflows of resources related to OPEB and OPEB expense, information about the fiduciary net position of the New York State Teachers' Retirement System Retired Employee Health Benefits Trust (the Trust) and additions to/deductions from the Trust's fiduciary net position have been determined on the same basis as they are reported for by the Trust.

For these purposes, benefit payments (including refunds of employee contributions) are recognized when due and payable in accordance with the benefit terms, and investments are reported at fair value for both plans.

(d) Capital Assets

Capital assets of one hundred thousand dollars or more are recorded at historical cost and capitalized over their useful life. Depreciation has been provided over the estimated useful lives using the straight-line method. The estimated useful lives are as follows:

	Years
Building	39
Building improvements	15
Roads and shrubbery	10
Office furniture and equipment	7
Computer equipment and software	3 - 5
Automobiles	5

(e) Federal Tax Status

The System is exempt from federal income taxes under Section 501(a) of the IRC.

(f) Reclassifications

Where necessary, amounts in the prior year's financial statements have been reclassified to conform to the presentation in the current year's financial statements.

(g) Use of Estimates

Management of the System has made a number of estimates and assumptions relating to the reporting of assets and liabilities and in the disclosure of contingencies to prepare these financial statements in conformity with U.S. generally accepted accounting principles. The System's most significant estimates relate to assumptions made about future events as part of the annual actuarial valuation process and the valuation of alternative investments. Due to the inherent nature of these estimates, actual results could differ from those estimates.

(h) Accounting Pronouncements Applicable to the System, Issued but Not Yet Effective

GASB Statement No. 84, *Fiduciary Activities* (GASB 84): GASB 84 provides guidance on the identification of fiduciary activities for accounting and financial reporting purposes, including clarification of fiduciary activities and how these activities should be reported. GASB 84 will be effective for fiscal years beginning after December 15, 2018. The System is evaluating the impact of this statement.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(3) Funds

The following funds were established pursuant to the laws of the State of New York. All of the funds, with the exception of the Administrative Fund, are available for the payment of benefits to members or beneficiaries.

(a) Annuity Savings Fund

The fund in which contributions of Tiers 1 and 2 members covered by the provisions of Article 11 of the Education Law and Article 11 of the RSSL are accumulated. For reporting purposes below, this fund is combined with the Annuity Reserve Fund.

(b) Annuity Reserve Fund

The fund from which the accumulated contributions of members covered by the provisions of Article 11 of the Education Law and Article 11 of the RSSL are paid as a life annuity. For reporting purposes below, this fund is combined with the Annuity Savings Fund.

(c) Pension Accumulation Fund

The fund in which all reserves for the payment of all benefits are accumulated with the exception of the annuity provided by the accumulated contributions of Tiers 1 and 2 members, supplemental retirement allowances, and group term life insurance.

(d) Pension Reserve Fund

The fund that pays pensions with the reserves from the Pension Accumulation Fund.

(e) Group Life Insurance Fund

Pursuant to Article 4-B of the RSSL, the Retirement Board established a Group Life Insurance Fund. The Group Life Insurance Fund provides a group term death benefit not to exceed fifty thousand dollars, payable upon the death of eligible members. Group term death benefits paid for the years ended June 30, 2019 and 2018 were $18,623 and $19,113, respectively. For reporting purposes below, this fund is combined with the Pension Accumulation Fund.

(f) CO-ESC Member Contributions Fund

Members covered by the provisions of Article 14 and Article 15 of the RSSL contributed a range of 3% to 6% of salary depending on their tier to the System's CO-ESC Member Contribution Fund. Contributions to this fund were $115,553 and $109,345 for the years ended June 30, 2019 and 2018, respectively. For reporting purposes below, this fund is combined with the Pension Accumulation Fund.

(g) Administrative Fund

All operating expenses of the System are paid through this fund. The fund receives an allocation from employer contributions, which are designated by law to cover all non-investment-related operating expenses.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(h) Summary of Fund Balances

Net position restricted for pensions at June 30, 2019 and 2018 consist of the following:

	2019	2018
Administrative fund	$ 62,431	$ 63,572
Annuity savings and reserve funds	89,079	98,710
Pension accumulation, group life insurance and CO-ESC funds	55,353,250	53,697,883
Pension reserve fund	66,972,721	66,055,353
Total	$ 122,477,481	$ 119,915,518

(4) Pension Plan Investments

(a) Investment Policy

The System has been authorized by the New York State Legislature pursuant to the Banking Law, Section 235; the Education Law, Article 11, Section 508; and the RSSL, Article 4-A, Sections 176 and 177, to invest in stocks, bonds, mortgages, real estate, and other investments. A specific investment within these broad asset classes may be subject to particular restrictions or limitations contained in the applicable statutory provision. The "Leeway Clause" of Section 177 provides that, subject to guidelines adopted by the Retirement Board, up to 25.0% of assets may be invested in types of assets not otherwise specifically authorized, provided the Retirement Board is satisfied such investments were made with the care, skill, prudence, and diligence of a prudent person acting in a like capacity and familiar with such matters. Pursuant to regulations promulgated by the New York State Department of Financial Services, investments must be made in a manner consistent with those of a reasonably prudent person exercising care, skill, and caution. In addition to applicable legal constraints, the Retirement Board has adopted policies governing the investments made by the System.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(b) Asset Allocation

The System's asset allocation policy as of June 30, 2019 and 2018, as adopted by the Retirement Board is as follows:

Asset Class	Target	Range
Domestic equity	33%	29-37%
International equity	16	12-20
Global equity	4	0-8
Real estate	11	6-16
Private equity	8	3-13
Total equity	72	
Domestic fixed income	16	12-20
Global bonds	2	0-3
High-yield bonds	1	0-3
Private debt	1	0-5
Real estate debt	7	3-11
Cash equivalents	1	0-4
Total fixed income	28	
Total	100%	

(c) Rate of Return

For the years ended June 30, 2019 and 2018, the annual money-weighted rate of return on System investments, net of pension plan investment expense, was 6.93% and 8.95%, respectively. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for the changing amounts actually invested.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(5) Deposit and Investment Risk Disclosure

(a) Credit Risk

The quality ratings of investments in fixed income securities as described by nationally recognized statistical rating organizations at June 30, 2019 and 2018 are as follows:

	2019		2018	
Quality rating	Fair value	Percentage of portfolio	Fair value	Percentage of portfolio
Short-term:				
P-1	$ 2,422,946	9.4%	$ 2,203,592	8.8%
Long-term:				
Aaa	6,183,844	24.0	6,703,866	26.8
Aa	1,597,774	6.2	1,240,573	5.0
A	3,548,156	13.7	3,464,061	13.8
Baa	2,881,773	11.2	2,536,675	10.1
Ba	216,900	0.8	172,207	0.7
B	147,870	0.6	76,105	0.3
Other	36,471	0.1	19,020	0.1
Total credit risk debt securities	17,035,734	66.0	16,416,099	65.6
U.S. government fixed income securities*	8,762,456	34.0	8,610,163	34.4
Total fixed income securities**	$ 25,798,190	100.0%	$ 25,026,262	100.0%

** Obligations of the U.S. government or obligations explicitly guaranteed by the U.S. government are not considered to have credit risk and do not have purchase limitations.*

*** Cash equivalents, domestic fixed income and global fixed income on the Statements of Fiduciary Net Position at June 30, 2019 and 2018 include $63,373 and $115,884, respectively, in cash and commingled commercial mortgage backed securities.*

Additionally, as of June 30, 2019 and 2018, the System held mortgages, secured by a lien of the properties, valued at $4.5 billion and $3.8 billion, respectively, that are not publicly traded assets and are not rated by the rating agencies.

(b) Custodial Credit Risk

Custodial credit risk is the risk that, in the event of a failure of the counterparty, the System will not be able to recover the value of its deposit or investment, or collateral securities that are in the possession of an outside party. Deposits are exposed to custodial credit risk if they are uninsured and uncollateralized. Investment securities are exposed to custodial credit risk if the securities are uninsured, are not registered in the name of the System, and are held by either the counterparty or the counterparty's trust department or agent but not in the System's name.

The head of the Division of the Treasury in the New York State Department of Taxation and Finance (the Treasurer) is the statutory custodian of the funds of the System, and, in this capacity, has arranged to have bank accounts collateralized. Collateral is held in the name of the Treasurer, as custodian for the System, by a bank that does not act as an agent for the System. The System's bank accounts were fully collateralized during the year. At June 30, 2019 and 2018, the System's bank balance was $(6,335) and $(8,695), respectively, representing a managed overdraft. Consistent with the System's investment policy, all of the System's securities are held by the System's custodial bank in the System's name.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(c) Concentration of Investment and Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of the System's investment in a single issuer.

As of June 30, 2019 and 2018, the System did not hold investments in any one issuer that would represent 5.0% or more of fiduciary net position. Obligations issued or explicitly guaranteed by the U.S. government and pooled investments are not considered subject to concentration of credit risk.

Issuer limits for investments held by the System are established for each investment area by the RSSL Article 4-A, Sections 176-179.

Short-term fixed income investments are generally limited to the following investment types maturing in one year or less:

- Obligations issued by any Federal Home Loan Bank or obligations fully guaranteed as to principal and interest by Fannie Mae or Freddie Mac.
- Commercial paper that has the highest rating by two nationally recognized rating services.

Fixed income securities are generally limited to the following investment types with maturities longer than one year:

- Obligations payable in U.S. dollars issued by any department, agency, or political subdivision of the U.S. government or issued by any corporation, company, or other issuer of any kind or description created or existing under the laws of the U.S.; any state of the U.S., District of Columbia or Commonwealth of Puerto Rico; and obligations of Canada or any province or city of Canada, provided each obligation shall be rated investment grade by two nationally recognized rating services. The aggregate investment by the System in the obligations of any one issuer shall not exceed 2.0% of the assets of the System or 5.0% of the direct liabilities of the issuer.
- Notwithstanding the 2.0% limitation stated above, the System may invest not more than 2.5% of its assets in the obligations of any one railroad or industrial corporation, or any one corporation engaged directly and primarily in the production, transportation, distribution, or sale of electricity or gas or the operations of telephone and telegraph systems or waterworks or in some combination thereof.
- In no event may more than 30.0% of the System's assets be invested in bonds of electric and gas corporations. Equipment trust certificates, subject to the provisions of the law, are not to exceed 5.0% of the assets of the System.
- Obligations issued or guaranteed by the Inter-American Development Bank, Asian Development Bank, the African Development Bank, or the Youth Facilities Project Guarantee Fund and participations therein.
- Obligations of the Dominion of Canada, of any province of the Dominion of Canada, and of any city of the Dominion of Canada, payable in U.S. funds, provided that the aggregate unpaid principal amount of all such obligations at any time held by the System shall not exceed 5.0% of the System's assets.
- Bonds of the Savings and Loan Bank of the State of New York, Federal Land Bank, Federal Intermediate Credit Banks, and Banks for Cooperatives.
- Bonds of Freddie Mac, Federal Home Loan Banks, Tennessee Valley Authority, Fannie Mae, and the United States Postal Service.
- Obligations issued or guaranteed by the International Bank for Reconstruction and Development, provided the aggregate unpaid principal amount of such obligations at any time held by the System shall not exceed 5.0% of the System's assets.
- Bonds and notes of any bank, trust company, savings bank, or savings and loan association organized under the laws of New York State having a net worth of at least $10 million, which meet all applicable statutes, provided the aggregate unpaid principal amount of bonds and notes secured by conventional mortgages shall not exceed 5.0% of the assets of the System.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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- Mortgage pass-through certificates, provided the certificates evidence ownership of undivided interests in pools or mortgage loans secured by first mortgages on real property located in New York State improved by one-to-four family residential dwellings, which meet all applicable statutes. The aggregate unpaid principal on conventional mortgages securing mortgage pass-through certificates cannot exceed 10.0% of the assets of the System nor can the total unpaid principal on any single pool of conventional mortgages securing mortgage pass-through certificates exceed 1.0% of the assets of the System.
- Collateralized Mortgage Obligations, which meet the requirements of applicable statutes.
- Private placements, where the purchase of unrated obligations is authorized by the Banking Law or the RSSL, governing fixed income obligations; if not so provided, private placements as well as other domestic fixed income not otherwise provided for may be purchased under the Leeway Clause.

The System may invest in domestic equity securities and interest-bearing obligations payable in U.S. funds, which are convertible into equity securities of any corporation created or existing under the laws of the U.S., any state of the U.S., District of Columbia, and the Commonwealth of Puerto Rico, or any investment company, as defined by, and which is registered under, an act of Congress of the United States, entitled to the Investment Company Act of 1940, as amended, subject to certain limitations.

The System's international equity investments may not exceed 10.0% of the System's assets including emerging market equity securities. To the extent the 10.0% limitation is exceeded, the System's international equity securities may be invested in Leeway investments (which amount shall not exceed 25.0% of System assets).

The maximum amount invested within the System's equities, including domestic and international, may not exceed, in any one year, 15.0% of System assets or 70.0% of the total System assets in aggregate. The System may not own more than 5.0% of the total issued and outstanding equity securities of any one corporation.

The System's real estate investments will be diversified across geographic regions to allow for competitive portfolio performance in the event of a temporary weakness in any one region and to allow for differing urban and suburban market trends within any region. The System may invest in certain conventional mortgages constituting a first lien upon real property located in the U.S. pursuant to statute subject to certain provisions. The value of all real property held by the System shall not exceed ten percent (10.0%) of System assets and the cost of each parcel of real property shall not exceed two percent (2.0%) of the System's assets.

Alternative investments are made pursuant to the Leeway Clause of the RSSL.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(d) Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of the investment. The System is exposed to interest rate risk at June 30, 2019 and 2018 as follows:

	2019		2018	
Investment type	Fair value	Duration (in years)	Fair value	Duration (in years)
Mortgages	$ 4,487,273	3.875	$ 3,764,533	4.611
Cash equivalents	2,714,874	0.065	2,669,572	0.107
Domestic fixed income	20,143,856	4.047	19,804,701	4.257
Global bonds	3,002,833	6.840	2,667,873	7.000
Total fair value	$ 25,861,563		$ 25,142,146	
Cash equivalents and fixed income portfolio modified duration		3.954		4.108

Duration is a measure of a debt investment's exposure to fair value changes arising from changing interest rates. The greater the duration, the greater its price volatility will be in response to a change in interest rates and vice versa.

NOTES TO FINANCIAL STATEMENTS *(continued)*
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(e) Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely affect the fair value of an investment or a deposit. The System has exposure through global and international holdings in commingled investment trust funds and separate accounts, global and international real estate investment trusts (REITs), global bonds, and alternatives. The "alternatives" represent private equity and real estate investments denominated in foreign currency. With respect to global bond investments, the majority of currency risk inherent in non-U.S. dollar denominated bonds owned by the System in a separate account is hedged away by the managers through currency forwards. The System has an exposure to foreign currency fluctuation at June 30, 2019 and 2018 as follows (holdings valued in U.S. dollars):

	2019		2018	
	Equity Securities and REITs	Alternatives, Cash, and Global Fixed Income	Equity Securities and REITs	Alternatives, Cash, and Global Fixed Income
Currency:				
Euro	$ 4,871,370	$ 2,067,149	$ 5,054,995	$ 1,913,818
Japanese Yen	3,484,697	274,630	3,816,562	295,666
British Pound Sterling	2,525,781	514,081	2,914,215	403,547
Canadian Dollar	1,407,957	77,797	1,489,227	88,489
Swiss Franc	1,279,994	6,651	1,146,168	7,730
Hong Kong Dollar	1,282,807	—	1,252,895	(2)
Australian Dollar	1,016,219	76,834	1,017,535	111,442
China Renminbi	819,340	2	795,730	113
South Korean Won	656,785	27,547	771,809	24,099
New Taiwan Dollar	533,299	7	592,618	25
Indian Rupee	422,442	30	380,552	19
Swedish Krona	411,345	8,030	438,269	12,896
Brazilian Real	396,039	98	274,066	8,611
South African Rand	315,081	8,707	364,154	18,942
Danish Krone	300,231	13,627	307,871	13,532
Other	1,463,467	80,374	1,405,250	124,692
Totals	$ 21,186,854	$ 3,155,564	$ 22,021,916	$ 3,023,619

(f) Securities Lending Transactions

The Retirement and Social Security Law authorizes the System to enter into agreements to loan securities. Agreements to lend a security must be with a broker dealer or with New York State or nationally chartered banks and must not exceed a period of one year. The market value of securities loaned may not exceed 20% of the market value of the System's invested assets. Domestic and international bonds, domestic and international equities, and global REIT securities are loaned. Initial collateral of at least 102% of the market value of loaned securities is received from the borrower for domestic securities and 105% for international securities. Securities on loan are marked to market daily and collateral for the loan is required not to fall below 100%. The fair value of invested cash collateral is reported as an asset and cash collateral due to borrowers is reported as a liability on the Statement of Fiduciary Net Position. The fair value of the cash collateral invested exceeded the amount the System owed borrowers by approximately $3.5 million as of June 30, 2019 and $3.4 million as of June 30, 2018. For each year end, the System had limited credit risk exposure to borrowers because the amounts the System owes the borrowers (the collateral) exceeds the amounts the borrowers owe the System (the loaned securities).

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As of June 30, 2019 and 2018, JP Morgan Securities Lending (JP Morgan) acted as agent for the domestic equity and fixed income securities lending program and State Street Bank and Trust Co. (State Street) acted as agent for the international equity, global bonds and global REIT securities lending program. Under the terms of the contract with the lending agents, the System is fully indemnified against failure of the borrowers to return the loaned securities (to the extent the collateral is inadequate to replace the loaned securities) or failure to pay the System for income distributions by the securities' issuers while the securities are on loan. There were no significant violations of legal or contractual provisions, no borrower or lending agent defaults, and no material recoveries of prior period losses during the year. The majority of securities on loan can be recalled by the System on demand or returned by the borrower at any time. Cash collateral is invested by the System's lending agents in short term investment funds managed by the agent lenders pursuant to System approved investment guidelines. There is no direct match of the maturities of the collateral investments with the maturities of the securities loans. Investments are restricted to issuers with a short term credit rating issued by Standard & Poor's and Moody's Investors Service, not lower than A- 1/P -1 or long term ratings not lower than A/A2, respectively, or the equivalent thereof. Non-cash collateral received is limited to high quality U.S. Treasuries, agency securities and agency mortgage backed securities. At June 30, 2019 and 2018, the average effective duration of the funds managed by JP Morgan was 18 and 25 days, respectively, and of those managed by State Street was 1 day compared to 2 days, respectively. Securities loans and related collateral investments are monitored on a daily basis to ensure compliance with collateral requirements, limitations, and cash collateral investment guidelines.

Securities Lending Program		2019		2018
Fair value of securities on loan — cash collateral	$	855,208	$	1,167,384
Fair value of securities on loan — non-cash collateral		909,291		789,986
Total fair value of securities on loan	$	1,764,499	$	1,957,370
Fair value of liabilities to borrowers — cash collateral	$	877,766	$	1,197,376
Fair value of liabilities to borrowers — non-cash collateral		938,724		810,042
Total collateral due to borrowers	$	1,816,490	$	2,007,418
Fair value of cash collateral invested by System	$	881,304	$	1,200,766
Fair value of non-cash collateral held by System		938,724		810,042
Total collateral invested and held by the System	$	1,820,028	$	2,010,808

(6) Fair Value Measurement

NYSTRS' investments measured and reported at fair value are classified according to the following hierarchy in which the levels are based on the nature of inputs used to measure the fair value of the investment:

Level 1 – Investments' fair values based on prices quoted in active markets for identical assets.

Level 2 – Investments' fair values based on observable inputs for the assets either directly or indirectly, other than those considered Level 1 inputs, which may include quoted prices for identical assets in markets that are not considered to be active, and quoted prices of similar assets in active or inactive markets.

Level 3 – Investments' fair values based upon unobservable inputs.

The categorization of investments within the hierarchy above is based solely upon the objectivity of the inputs used in the measurement of fair value of the investments and does not reflect the level of risk associated with the investments.

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Investments classified in Level 1 of the fair value hierarchy are valued from predetermined external pricing vendors or primary dealers who source quoted prices in active markets which are readily attainable exit values of these securities. Investments classified in Level 2 are subject to alternative pricing sources, including a combination of price sources, descriptive data and pricing models based on attributes such as spread data, sector, quality, duration, and prepayment characteristics. Investments classified as Level 3 are valued using best available sources such as property appraisals, discounted cash flow models and public market comparables of similar assets where applicable. The values are supplied by advisors or general partners who hold those or similar assets in investments vehicles they oversee. These pricing sources may or may not be indicative of realizable exit value attainable for the assets.

NYSTRS' investments and securities lending collateral reinvested have the following fair value measurements or net asset values (NAV) as of June 30, 2019 and 2018, respectively:

Investments by Fair Value Level	June 30, 2019	Fair Value Measurements Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Fixed income securities:				
Short-term instruments	$ 3,595,569	$ —	$ 3,593,756	$ 1,813
Domestic fixed income	18,994,086	—	18,993,976	110
Domestic commercial mortgage backed securities	1,149,556	7,327	1,142,229	—
Global bonds	2,996,734	—	2,996,734	—
Total fixed income securities	$ 26,735,945	$ 7,327	$ 26,726,695	$ 1,923
Equity securities:				
Domestic equity	$ 42,397,971	$ 42,332,135	$ 65,809	$ 27
International equity	19,600,095	19,454,103	144,975	1,017
Global equity	2,568,772	2,522,203	46,569	—
Total equity securities	$ 64,566,838	$ 64,308,441	$ 257,353	$ 1,044
Real estate investment trusts:				
Domestic REIT	$ 1,904,374	$ 1,798,434	$ 105,940	$ —
Global REIT	947,639	935,812	11,816	11
Total real estate investment trusts	$ 2,852,013	$ 2,734,246	$ 117,756	$ 11
Mortgages:	$ 4,487,273	$ —	$ —	$ 4,487,273
Real estate:				
Direct equity real estate investments	$ 3,614,183	$ —	$ —	$ 3,614,183
Real estate alternative investments	662,154	—	—	662,154
Total real estate	$ 4,276,337	$ —	$ —	$ 4,276,337
Total investments by fair value level	$ 102,918,406	$ 67,050,014	$ 27,101,804	$ 8,766,588

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Investments Measured at the NAV	June 30, 2019	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Commingled global fixed income fund (1)	$ —	$ —	Semi-monthly	15 days
Commingled international equity funds (2)	951,141	—	Daily or Monthly	5-30 days
Privately held real estate investment trusts (3)	1,942,289	153,500	NA	NA
Real estate commingled funds (4)				
Closed-end funds	2,266,647	—	NA	NA
Open-end funds	1,105,232	1,928,529	Quarterly	30-120 days
Alternative investments (5)			NA	NA
Closed-end funds	11,748,907	9,223,279	NA	NA
Open-end funds	61,041	40,339	Quarterly	90 days
Total investments measured at the NAV	$ 18,075,257	$ 11,345,647		
Investment related cash, receivables and payables not included in above	102,557			
Total investments and securities lending collateral reinvested	$ 121,096,220			

Investments by Fair Value Level	June 30, 2018	Fair Value Measurements Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Fixed income securities:				
Short-term instruments	$ 3,867,295	$ —	$ 3,864,854	$ 2,441
Domestic fixed income	18,714,153	99,881	18,614,127	145
Domestic commercial mortgage backed securities	1,088,810	4,510	1,084,299	1
Global bonds	2,629,068	12,691	2,616,377	—
Total fixed income securities	$ 26,299,326	$ 117,082	$ 26,179,657	$ 2,587
Equity securities:				
Domestic equity	$ 43,892,631	$ 43,855,022	$ 37,609	$ —
International equity	21,178,020	20,997,102	177,151	3,767
Global equity	1,002,948	989,382	13,566	—
Total equity securities	$ 66,073,599	$ 65,841,506	$ 228,326	$ 3,767

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

Investments by Fair Value Level	June 30, 2018	Fair Value Measurements Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Real estate investment trusts:				
Domestic REIT	$ 1,616,803	$ 1,535,211	$ 81,592	$ —
Global REIT	867,950	857,503	10,447	—
Total real estate investment trusts	$ 2,484,753	$ 2,392,714	$ 92,039	$ —
Mortgages:	$ 3,764,533	$ —	$ —	$ 3,764,533
Real estate:				
Direct equity real estate investments	$ 3,125,470	$ —	$ —	$ 3,125,470
Real estate alternative investments	507,804	—	—	507,804
Total real estate	$ 3,633,274	$ —	$ —	$ 3,633,274
Total investments by fair value level	$ 102,255,485	$ 68,351,302	$ 26,500,022	$ 7,404,161

Investments Measured at the NAV	June 30, 2018	Unfunded Commitments	Redemption Frequency	Redemption Notice Period
Commingled global fixed income fund (1)	$ 20,668	$ —	Semi-monthly	15 days
Commingled international equity funds (2)	892,166	—	Daily or monthly	5–30 days
Privately held real estate investment trusts (3)	1,914,299	153,500	NA	NA
Real estate commingled funds (4):				
Closed-end funds	2,199,484	1,524,634	NA	NA
Open-end funds	1,104,107	—	Quarterly	30–120 days
Alternative investments (5)	10,498,270	8,011,896	NA	NA
Total investments measured at the NAV	$ 16,628,994	$ 9,690,030		
Investment related cash, receivables and payables not included in above	158,016			
Total investments and securities lending collateral reinvested	$ 119,042,495			

(1) Commingled global fixed income fund consists of one commingled investment vehicle which invests primarily in publicly traded global fixed income securities. The investment is valued at the net asset value of units held at the end of the period based upon the fair value of the underlying investments. Subsequent to June 30, 2018, this investment was liquidated.

(2) Commingled international equity funds consist of three commingled investment vehicles which invest primarily in publicly traded global equity securities. The funds are valued at the net asset value of units held at the end of the period based upon the fair value of the underlying investments.

(3) Privately held real estate investment trusts consist of two trusts which primarily invest in U.S. commercial real estate. The fair values of the investments in this group have been determined using the net asset value of units held at the end of the period based upon the property appraisals of the underlying assets. The trusts are perpetual in nature, making periodic operating distributions to shareholders. Capital calls and redemptions are determined by a unanimous vote of the trust board members.

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

(4) Real estate commingled funds include equity real estate funds that invest primarily in U.S. commercial real estate. The investment structures are either open-end funds or closed-end funds. In these structures, NYSTRS commits funds along with other investors to create a pool of capital that the fund manager then invests according to an agreed upon strategy such as core, value add or opportunistic. The fair values of the investments in this group have been determined using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital. Open-end funds may be redeemed on a quarterly basis with notice. Closed-end funds are not redeemable; however, distributions will be received as the underlying investments of the funds are liquidated, which on average can occur over the span of eight to ten years after final closing.

(5) Alternative investments include private equity, private debt, real estate debt funds, and real estate equity funds assessed through a variety of vehicles including but not limited to: commingled funds, fund of funds, secondary funds and separately managed accounts. Private equity (79.1% at 6/30/19, 79.9% at 6/30/18) consists of buyout, growth equity, venture capital, co-investment, turnaround/restructuring strategies and real estate funds. Private debt (5.0% at 6/30/19, 4.7% at 6/30/18) consists of direct lending mezzanine, special situation and distressed debt investments. The real estate debt funds (9.2% at 6/30/19, 8.8% at 6/30/18) consist of funds investing primarily in transitional first mortgage, mezzanine and subordinate debt positions. The real estate equity funds (6.8% at 6/30/19, 6.5% at 6/30/18) consist of global commercial real estate funds. The fair values of the investments in this type have been determined using the NAV per share (or its equivalent) of the Plan's ownership interest in partners' capital. These funds are not eligible for redemption. Distribution is received as underlying investments within the funds are liquidated, which on average can occur over the span of 5 to 10 years.

(7) Net Pension Liability (Asset) of NYSTRS Participating School Districts

The components of the net pension liability (asset) of the NYSTRS participating school districts at June 30, 2019 and 2018 were as follows:

	2019	2018
Total pension liability	$ 119,879,474	$ 118,107,254
Plan fiduciary net position	122,477,481	119,915,518
School districts' net pension liability (asset)	$ (2,598,007)	$ (1,808,264)
Plan fiduciary net position as a percentage of total pension liability	102.2%	101.5%

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

(a) Actuarial Methods and Assumptions

The total pension liability at June 30, 2019 was determined using an actuarial valuation as of June 30, 2018, with update procedures used to roll forward the total pension liability to June 30, 2019. The total pension liability at June 30, 2018 was determined using an actuarial valuation as of June 30, 2017, with update procedures used to roll forward the total pension liability to June 30, 2018. These actuarial valuations applied the following actuarial methods and assumptions:

Actuarial cost method	Entry age normal
Inflation	2.20% for June 30, 2019 and 2.25% for June 30, 2018
Projected salary increases	Rates of increase differ based on service They have been calculated based upon recent NYSTRS member experience.

Service	Rate
5	4.72%
15	3.46
25	2.37
35	1.90

Projected COLAs	1.3% for June 30, 2019 and 1.5% for June 30, 2018
Investment rate of return	7.10% for June 30, 2019 and 7.25% for June 30, 2018 measurement of total pension liability. The rates are compounded annually, net of pension plan investment expense, including inflation.
Mortality	Annuitant mortality rates are based on plan member experience, with adjustments for mortality improvements based on Society of Actuaries Scale MP2018 for June 30, 2019 and MP2014 for June 30, 2018, applied on a generational basis. Active member mortality rates are based on plan member experience.
Experience Period	The actuarial assumptions were based on the results of an actuarial experience study for the period July 1, 2009 to June 30, 2014.

The long-term expected rate of return on pension plan investments was determined in accordance with Actuarial Standard of Practice (ASOP) No. 27, *Selection of Economic Assumptions for Measuring Pension Obligations*. ASOP No. 27 provides guidance on the selection of an appropriate assumed investment rate of return. Consideration was given to expected future real rates of return (expected returns, net of pension plan investment expense and inflation) for each major asset class as well as historical investment data and plan performance.

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

The Long-Term Expected Real Rates of Return are presented by asset allocation classification, which differs from the financial statement presentation. Best estimates of arithmetic real rates of return for each major asset class included in the System's target asset allocation as of the measurement date of June 30, 2019 and June 30, 2018 (see the discussion of the pension plan's investment policy) are summarized in the following table:

Long-Term Expected Real Rate of Return*		
Asset Class	**2019**	**2018**
Domestic equity	6.3%	5.8%
International equity	7.8	7.3
Global equity	7.2	6.7
Real estate equity	4.6	4.9
Private equity	9.9	8.9
Domestic fixed income	1.3	1.3
Global bonds	0.9	0.9
Private debt	6.5	6.8
Real estate debt	2.9	2.8
High-yield bonds	3.6	3.5
Cash equivalents	0.3	0.3

**Real rates of return are net of the long-term inflation assumption of 2.2% for 2019 and 2.3% for 2018.*

(b) Discount Rate

The discount rate used to measure the total pension liability as of June 30, 2019 is 7.10%. The discount rate used to measure the total pension liability as of June 30, 2018 was 7.25%. The projection of cash flows used to determine the discount rate assumed that contributions from plan members will be made at the current member contribution rates and that contributions from school districts will be made at statutorily required rates, actuarially determined. Based on those assumptions, the System's fiduciary net position was projected to be available to make all projected future benefit payments of current plan members. Therefore, the long-term expected rate of return on pension plan investments was applied to all periods of projected benefit payments to determine the total pension liability.

(c) Sensitivity of the Net Pension Liability (Asset) to Changes in the Discount Rate

The following presents the net pension liability (asset) of the NYSTRS participating school districts calculated using the discount rate of 7.10% for June 30, 2019 and 7.25% for June 30, 2018, as well as what the school districts' net pension liability (asset) would be if it were calculated using a discount rate that is 1 percentage point lower or 1 percentage point higher than the current rate:

System's Net Pension Liability (Asset)			
	1% Decrease	**Current Discount Rate**	**1% Increase**
June 30, 2019	(6.10%)	(7.10%)	(8.10%)
	$11,727,131	$(2,598,007)	$(14,615,181)
	1% Decrease	**Current Discount Rate**	**1% Increase**
June 30, 2018	(6.25%)	(7.25%)	(8.25%)
	$12,423,071	$(1,808,264)	$(13,730,169)

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

(8) Commitments and Contingencies

The System, in the normal course of business, enters into commitments with off-balance-sheet risk. The System adheres to the same credit policies, financial and administrative controls, and risk limiting and monitoring procedures for commitments as for on-balance-sheet investments.

The commitments for loans on real estate or purchases of real estate are subject to satisfactory appraisals prior to closing. Once investments are made, the System's exposure to potential loss is determined by the value of the underlying collateral.

The future financial commitments outstanding at June 30, 2019 and 2018, respectively, were: real estate and real estate alternative investments of $3.4 billion and $3.0 billion; mortgages and real estate debt funds of $1.2 billion and $1.1 billion; CMBS $2.2 million and $91.8 million; private equity $6.5 billion and $5.7 billion; and private debt investments of $687.3 million and $624.9 million.

(9) System Employees' Pension Plan

(a) Plan Description

As an employer, the System participates in ERS, a cost-sharing, multiple-employer defined benefit pension plan which falls under NYSLRS and is administered by the Comptroller of the State of New York. ERS provides retirement, disability, withdrawal, and death benefits to plan members and beneficiaries as authorized by the RSSL of the State of New York. Benefits are guaranteed by the State Constitution and cannot be diminished or impaired. Benefits can be reduced for future members only by an act of the State Legislature. The NYSLRS issues a publicly available financial report that contains financial statements and required supplementary information for ERS. The report may be obtained on the Comptroller's website at www.osc.state.ny.us/pension.

(b) Benefits

The classes of employees covered under the ERS range from Tiers 1 – 6. In order to be eligible for retirement, all members must be at least age 55 and have a minimum between 5 and 10 years of service. There is no minimum service requirement for Tier 1 members. Generally, all members are eligible for early retirement at age 55 with a benefit calculation of 1.67% of final average salary. Benefit calculations for Tiers 1 – 5 members with greater than 20 years of service credit are 2.0% of final average salary. Tiers 3 – 5 members are eligible for an additional 1.5% of final average salary applied to each year of service over 30 years. Generally, Tier 6 member retirement benefits are 1.8% of final average salary with 20 years of service, with an additional 2.0% of final average salary for each year of service over 20 years.

For Tiers 1 – 5, final average salary is the average of the wages earned in the three highest consecutive years of employment. Tier 6 final average salary is the average of the wages earned in the five highest consecutive years of employment.

Other benefits provided under the ERS include: ordinary disability, accidental disability, and post retirement benefit increases.

(c) Funding Policy

Funding of ERS is accomplished through member and employer contributions and investment earnings, according to the New York State RSSL.

Plan members are required to contribute between 0% and 6% throughout active service. Employers are required to contribute at an actuarially determined rate. An average employer contribution rate for the tiers of 14.6% and 15.1% was applicable to the annual covered payroll for the years ended March 31, 2019 and March 31, 2018, respectively. The contributions paid to ERS during the System's years ended June 30, 2019 and 2018 were $4.3 million for both years, and were 100% of the contributions required.

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

(d) Pension Liabilities, Pension Expense, Deferred Outflows of Resources, and Deferred Inflows of Resources Related to Pensions

At June 30, 2019 and 2018, the System reported a liability of $7.8 million and $3.6 million, respectively, for its proportionate share of the ERS net pension liability measured as of March 31, 2019 and 2018, respectively.

NYSTRS' proportion of the ERS net pension liability was based on the projection of the long-term share of contributions to ERS relative to the projected contributions of all participating employers, actuarially determined. At March 31, 2019, the System's proportion was 0.1095732% and was 0.1115115% at March 31, 2018.

For the years ended June 30, 2019 and 2018, the System recognized pension expense of $5.2 million and $4.5 million, respectively.

Deferred outflows of resources were $3.7 million and $9.3 million at June 30, 2019 and 2018, respectively. Deferred inflows of resources were $2.7 million at June 30, 2019 and $11.5 million at June 30, 2018.

(10) System Employees' Other Postemployment Benefits

(a) Plan Description

The System's Board established the Trust in 2008 to provide postemployment health insurance benefits. Contributions from the System to the Trust are irrevocable.

The Trust is a defined-benefit, single-employer other postemployment benefit (OPEB) plan that accumulates resources to pay current and future health insurance premiums for retired System employees and beneficiaries. The Trust is administered by a 10-member Board whose members are the same as the System Board. The Trust is a legally separate entity with standalone financial statements and required supplementary information, which can be found on the System's website at www.nystrs.org. The fiduciary net position of the OPEB and changes in fiduciary net position of the OPEB have been determined on the same basis as they are reported in the financial statements of the Trust.

(b) Benefits

Pursuant to contractual agreement and policy, the System provides postemployment healthcare benefits to eligible System employees who retire from the System and reimburses Medicare eligible retirees for their Medicare Part B premiums. The System is a voluntary participating employer in the New York State Health Insurance Program (NYSHIP), administered by the State of New York. Article XI of the New York State Civil Service Law assigns the authority to NYSHIP to establish and amend the benefit provisions of the plan and to establish maximum obligations of the plan members to contribute to the plan. The System's Board is authorized to establish the contribution rates of System employees and retirees up to those set by Civil Service Law, and they are set as part of the collective bargaining process.

In order to be eligible, employees must have worked for at least 10 years for the System, retire directly from System employment, and commence receipt of their pension from ERS. Dependents may also be covered.

System retirees are required to contribute toward the cost of their coverage. Employees who retire on or after July 1, 1985 contribute an amount equal to 12.0% of the premium up to the premium of the Empire Plan option. If more expensive coverage is elected, the retiree pays 12.0% of the Empire Plan option and 100% of the difference between the two.

Employees who retire on or after April 1, 1991, are eligible to have accumulated unused sick leave converted into a credit to offset their contribution requirement.

As of June 30, 2019, 645 participants including 359 current employees and 286 retired and/or spouses of retired employees participated in the healthcare plan. As of June 30, 2018, 626 participants including 354 current employees and 272 retired and/or spouses of retired employees participated in the healthcare plan.

NOTES TO FINANCIAL STATEMENTS *(continued)*
June 30, 2019 and 2018
(dollars in thousands)

(c) Employer Contribution

The employer contribution, or funding, of the System's OPEB obligation is at the discretion of the System's management and Board. The System's current policy is to prefund benefits by contributing an amount that is, at a minimum, equal to the ADC. At June 30, 2019 and 2018, the Trust recognized contributions of $5.5 million, which were approximately 102.8% and 104.0% of the ADC or 17.9% and 18.5% of covered payroll, respectively.

(d) OPEB Liabilities, OPEB Expense, Deferred Outflows of Resources and Deferred Inflows of Resources Related to OPEB

At June 30, 2019 and 2018, the System reported a net OPEB liability of $49.7 million and $45.3 million, respectively. The June 30, 2019 OPEB liability was determined using an actuarial valuation as of July 1, 2017, with update procedures used to roll forward the total OPEB liability to the measurement date of June 30, 2018. The total OPEB liability at June 30, 2018 was determined using an actuarial valuation as of July 1, 2016, with update procedures used to roll forward the total OPEB liability to June 30, 2017.

For the years ended June 30, 2019 and 2018, the System recognized OPEB expense of $9.9 million and $4.6 million, respectively.

Deferred outflows of resources were $5.5 million for both June 30, 2019 and 2018. Deferred inflows of resources were $8.6 million at June 30, 2019 and $8.4 million at June 30, 2018.

(11) Risk Management

The System is exposed to various risks of loss related to torts; theft of, damage to, and destruction of assets; errors and omissions; job-related illnesses or injuries to employees; and certain natural disasters for which the System carries commercial insurance. There were no settlements in the past three years that exceeded coverage. Management of the System believes there would be no material adverse effect on the financial statements as a result of the outcome of these matters if they occur.

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REQUIRED SUPPLEMENTARY INFORMATION

SCHEDULE OF CHANGES IN THE SCHOOL DISTRICTS' NET PENSION LIABILITY (ASSET) (UNAUDITED)

(Last Seven Fiscal Years)
(dollars in thousands)

	2019	2018	2017	2016
Total pension liability				
Service cost	$ 1,528,402	$ 1,319,513	$ 1,292,143	$ 1,181,609
Interest	8,189,405	8,224,221	7,988,167	7,809,566
Changes of benefit terms	815	—	—	—
Differences between expected and actual experience	753,802	964,258	727,895	(111,652)
Changes of assumptions	(1,392,886)	—	3,045,909	7,085,423
Benefit payments, including refunds of member contributions	(7,307,318)	(7,108,999)	(6,923,037)	(6,719,866)
Net change in total pension liability	1,772,220	3,398,993	6,131,077	9,245,080
Total pension liability — beginning	118,107,254	114,708,261	108,577,184	99,332,104
Total pension liability — ending (a)	$ 119,879,474	$ 118,107,254	$ 114,708,261	$ 108,577,184
Plan fiduciary net position				
Contributions — employer	$ 1,774,646	$ 1,597,139	$ 1,857,359	$ 2,046,562
Contributions — member	136,610	131,595	129,770	124,587
Net investment income	8,023,180	9,928,011	12,951,892	2,392,354
Benefit payments, including refunds of member contributions	(7,307,318)	(7,108,999)	(6,923,037)	(6,719,866)
Administrative expenses	(74,242)	(60,610)	(61,611)	(60,426)
Other	9,087	9,278	7,845	4,014
Net change in plan fiduciary net position	2,561,963	4,496,414	7,962,218	(2,212,775)
Plan fiduciary net position — beginning	119,915,518	115,468,360	107,506,142	109,718,917
Cumulative effect of change in accounting principle	—	(49,256)	—	—
Beginning balance as restated	119,915,518	115,419,104	107,506,142	109,718,917
Plan fiduciary net position — ending (b)	$ 122,477,481	$ 119,915,518	$ 115,468,360	$ 107,506,142
School districts' net pension liability (asset) — ending (a) — (b)	$ (2,598,007)	$ (1,808,264)	$ (760,099)	$ 1,071,042

Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

See accompanying independent auditors' report.

REQUIRED SUPPLEMENTARY INFORMATION *(continued)*

SCHEDULE OF CHANGES IN THE SCHOOL DISTRICTS' NET PENSION LIABILITY (ASSET) (UNAUDITED) *(continued)*

(Last Seven Fiscal Years)
(dollars in thousands)

2015	2014	2013
$ 1,396,824	$ 1,397,547	$ 1,406,084
7,611,757	7,434,764	7,252,357
—	—	—
(161,043)	(181,834)	(128,194)
—	—	—
(6,531,140)	(6,343,538)	(6,139,718)
2,316,398	2,306,939	2,390,529
97,015,706	94,708,767	92,318,238
$ 99,332,104	$ 97,015,706	$ 94,708,767
$ 2,633,682	$ 2,400,386	$ 1,734,908
119,411	120,762	128,903
5,400,265	16,664,703	11,636,480
(6,531,140)	(6,343,538)	(6,139,718)
(56,948)	(55,616)	(54,338)
3,213	1,365	4,522
1,568,483	12,788,062	7,310,757
108,155,083	95,367,021	88,056,264
(4,649)	—	—
108,150,434	95,367,021	88,056,264
$ 109,718,917	$ 108,155,083	$ 95,367,021
$ (10,386,813)	$ (11,139,377)	$ (658,254)

Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

See accompanying independent auditors' report.

REQUIRED SUPPLEMENTARY INFORMATION *(continued)*

SCHEDULE OF THE SCHOOL DISTRICTS' NET PENSION LIABILITY (ASSET) (UNAUDITED)

(Last Seven Fiscal Years)

(dollars in thousands)

	2019	2018	2017	2016	2015
Total pension liability	$ 119,879,474	$ 118,107,254	$ 114,708,261	$ 108,577,184	$ 99,332,104
Plan fiduciary net position	122,477,481	119,915,518	115,468,360	107,506,142	109,718,917
School districts' net pension liability (asset)	$ (2,598,007)	$ (1,808,264)	$ (760,099)	$ 1,071,042	$ (10,386,813)
Plan fiduciary net position as a percentage of the total pension liability	102.2 %	101.5 %	100.7 %	99.0%	110.5 %
Covered payroll	$ 16,691,626	$ 16,288,884	$ 15,846,705	$ 15,431,009	$ 15,021,357
School districts' net pension liability (asset) as a percentage of covered payroll	(15.6)%	(11.1)%	(4.8)%	6.9%	(69.1)%

Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

SCHEDULE OF THE SCHOOL DISTRICTS' CONTRIBUTIONS (UNAUDITED)

(Last Ten Fiscal Years)

(dollars in thousands)

	2019	2018	2017	2016
Actuarially determined contribution	$ 1,772,651	$ 1,596,311	$ 1,857,234	$ 2,046,152
Contributions in relation to the actuarially determined contribution	1,772,651	1,596,311	1,857,234	2,046,152
Contribution deficiency	$ —	$ —	$ —	$ —
Covered payroll	$ 16,691,626	$ 16,288,884	$ 15,846,705	$ 15,431,009
Contributions as a percentage of covered payroll	10.62%	9.80%	11.72%	13.26%

See accompanying independent auditors' report.

REQUIRED SUPPLEMENTARY INFORMATION *(continued)*

SCHEDULE OF THE SCHOOL DISTRICTS' NET PENSION LIABILITY (ASSET) (UNAUDITED) *(continued)*

(Last Seven Fiscal Years)
(dollars in thousands)

2014	2013
$ 97,015,706	$ 94,708,767
108,155,083	95,367,021
$ (11,139,377)	$ (658,254)
111.5%	100.7%
$ 14,771,301	$ 14,647,830
(75.4)%	(4.5)%

Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

SCHEDULE OF THE SCHOOL DISTRICTS' CONTRIBUTIONS (UNAUDITED) *(continued)*

(Last Ten Fiscal Years)
(dollars in thousands)

2015	2014	2013	2012	2011	2010
$ 2,633,244	$ 2,400,378	$ 1,734,303	$ 1,626,589	$ 1,269,976	$ 915,632
2,608,266	2,383,145	1,734,303	1,626,589	1,269,976	915,632
$ 24,978	$ 17,233	$ —	$ —	$ —	$ —
$ 15,021,357	$ 14,771,301	$ 14,647,830	$ 14,640,764	$ 14,732,895	$ 14,792,116
17.36%	16.13%	11.84%	11.11%	8.62%	6.19%

See accompanying independent auditors' report.

REQUIRED SUPPLEMENTARY INFORMATION *(continued)*

NOTES TO REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED)
(Last Seven Fiscal Years)

Method and assumptions used in calculations of school districts' Total Pension Liability (TPL)

Changes of benefit terms. Effective with the 2019 actuarial valuation an increase in the NYS Governor's salary limit from $179,000 to $200,000 per annum went into effect, impacting Tier 6 members. The Governor's salary may ultimately increase to $250,000 phased in over the next two years.

Changes of assumptions. Actuarial assumptions are revised periodically to more closely reflect actual, as well as anticipated future experience. The actuarial assumptions were revised and adopted by the Retirement Board on October 29, 2015 and first used in the 2016 determination of the Total Pension Liability.

The System's long term rate of return assumption for purposes of the NPL is 7.10%, effective with the 2019 actuarial valuation. For the 2018 and 2017 actuarial valuations, the System's long term rate of return assumption was 7.25%. For the 2016 actuarial valuation, the System's long term rate of return assumption was 7.5%. Prior to the 2016 actuarial valuation, the System's long term rate of return was 8.0%.

The System's assumed annual inflation rate is 2.2%, effective with the 2019 actuarial valuation. For the 2018 and 2017 actuarial valuations, the System's annual inflation assumption was 2.25%. For the 2016 actuarial valuation, the System's annual inflation assumption was 2.5%. Prior to the 2016 actuarial valuation, the System's annual inflation assumption was 3.0%.

Effective with the 2019 actuarial valuation, COLAs are projected to increase at a rate of 1.30% annually. Effective with the 2015 actuarial valuation, COLAs were projected to increase at a rate of 1.50% annually. Prior to the 2015 actuarial valuation, COLAs were projected to increase at a rate of 1.625% annually.

Effective with the 2019 actuarial valuation, the assumed scale for mortality improvement is changed from MP2014 to MP2018.

Effective with the 2019 actuarial valuation, there is a change in the actuarial valuation software that resulted in a slight change in the determination of Entry Age Normal Total Pension Liability and Service Cost.

See accompanying independent auditors' report.

REQUIRED SUPPLEMENTARY INFORMATION *(continued)*

NOTES TO REQUIRED SUPPLEMENTARY INFORMATION (UNAUDITED) *(continued)*
(Last Ten Fiscal Years)

Method and assumptions used in calculations of school districts' Actuarially Determined Contributions. The actuarially determined contribution rates in the schedule of school districts' contributions are calculated as of June 30, two years prior to the end of the fiscal year in which contributions are reported. The following actuarial methods and assumptions were used to determine school districts' contributions in 2019. For assumptions and plan provisions used in contributions reported for years prior to 2019, refer to the Annual Actuarial Report for two years prior to the end of the fiscal year in which contributions are reported.

Valuation Date	June 30, 2017
Actuarial cost method	Aggregate (level percent of payroll)*
Amortization method	n/a*
Remaining amortization period	n/a*
Asset valuation method	Five-year phased-in deferred recognition of each year's net investment income/loss in excess of (or less than) the assumed valuation rate of interest at a rate of 20.0% per year, until fully recognized after 5 years.
Inflation	2.25%
Projected salary increases	Rates of increase differ based on service. They have been calculated based upon recent NYSTRS member experience.

Service	Rate
5	4.72%
15	3.46
25	2.37
35	1.90

Projected COLAs	1.5% compounded annually
Valuation rate of interest	7.25% compounded annually, net of pension plan investment expense.

** The System is funded in accordance with the Aggregate Cost Method, which does not identify or separately amortize unfunded actuarial liabilities. Costs are determined by amortizing the unfunded present value of benefits over the average future working lifetime of active plan members, which currently for NYSTRS is approximately 13 years.*

See accompanying independent auditors' report.

REQUIRED SUPPLEMENTARY INFORMATION *(continued)*

SCHEDULE OF INVESTMENT RETURNS (UNAUDITED)

(Last Seven Fiscal Years)

	2019	2018	2017	2016	2015	2014	2013
Annual money-weighted rate of return, net of investment expense	6.93%	8.95%	13.05%	2.28%	5.18%	18.16%	13.73%

Schedule is intended to show information for 10 years. Additional years will be displayed as they become available.

See accompanying independent auditors' report.

OTHER SUPPLEMENTAL SCHEDULES
SCHEDULES OF ADMINISTRATIVE EXPENSES
Years ended June 30, 2019 and 2018

(dollars in thousands)

	2019	2018
Salaries and benefits:		
Salaries	$ 31,605	$ 30,864
Civil service	48	52
Employees retirement	9,908	4,253
Health and dental insurance	12,019	11,180
Overtime salaries	49	46
Social Security	2,214	2,170
Total salaries and benefits	55,843	48,565
Building occupancy expenses:		
Building, grounds and equipment	$ 1,667	1,780
Depreciation - building and improvements	1,821	1,667
Depreciation - Equipment	401	427
Office supplies and expenses	180	223
Utilities and municipal assessments	891	930
Total building occupancy expenses	4,960	5,027
Computer expenses:		
Amortization/depreciation - computer micro	$ 756	969
Computer hardware and software	3,409	2,676
Computer maintenance and supplies	65	85
Total computer expenses	4,230	3,730
Personnel and meeting expenses:		
Board - meetings, travel and education	$ 78	73
Delegates meeting	63	39
Preretirement seminars	154	151
Professional development	786	720
Travel and automobile expense	221	181
Other personnel expenses	62	74
Total personnel and meeting expenses	1,364	1,238
Professional and governmental services:		
Auditors - financial	$ 377	375
Auditors - Department of Financial Services	158	300
Disability medical examinations	80	82
Postage and cartage	701	805
Professional fees and services	872	759
Publications	173	286
Statutory custodian charges	125	124
Total professional and governmental services	2,486	2,731
Total administrative fund expenses	68,883	61,291
Reconciliation of contribution expense to pension and OPEB expense	5,359	(681)
Total Administrative Expenses	$ 74,242	$ 60,610

See accompanying independent auditors' report.

OTHER SUPPLEMENTAL SCHEDULES *(continued)*

SCHEDULES OF INVESTMENT EXPENSES
Years ended June 30, 2019 and 2018

(dollars in thousands)

Investment Category	2019 Fair Value of Assets Serviced or Under Management	2019 Expenses	2018 Fair Value of Assets Serviced or Under Management	2018 Expenses
Externally managed/serviced assets:				
International equity	$ 20,579,929	$ 26,970	$ 22,193,959	$ 29,037
Real estate equity	12,874,261	86,826	11,832,639	90,835
Private equity	9,341,489	123,982	8,394,621	107,228
Real estate debt	4,230,636	12,419	3,404,429	8,995
Global bonds	3,002,833	4,622	2,635,706	4,446
Domestic equity	2,914,712	12,578	2,909,629	14,469
Global equity	2,578,188	6,254	999,250	465
Private debt	586,303	9,683	493,481	11,794
High yield bonds	240,429	721	99,737	131
Sub-total	56,348,780	284,055	52,963,451	267,400
General expenses	—	10,105	—	9,369
Totals	**$ 56,348,780**	**$ 294,160**	**$ 52,963,451**	**$ 276,769**

See accompanying independent auditors' report.

Investments

SAFEGUARD SYSTEM FUNDS

We invest funds prudently to achieve optimal long-term returns within an appropriate level of risk. As disciplined long-term investors, we do not overreact to short-term market volatility. Instead we maintain a well-diversified portfolio with established risk tolerances.

Investments

Page

Disclaimers

REPORT ON INVESTMENT ACTIVITY FOR FISCAL YEAR ENDING JUNE 30, 2019

Overall Objectives and Performance

NYSTRS' long-term investment philosophy centers on a disciplined, risk-controlled strategy. With many liabilities not coming due for 25 years or more, this investment approach has resulted in the System being routinely recognized as one of the best-funded public pension plans in the nation.

NYSTRS' funded ratio was 99.2% based on an actuarial value of assets and our net position at fiscal year-end was $122.5 billion.

Our total fund return, net of fees, for the fiscal year ended June 30, 2019 was 7.1%, compared to the assumed rate of return of 7.25%. Our 10-year and 30-year annualized net rates of return were 10.4 and 8.8%, respectively.

Basis of Presentation

Following is an overview of how each asset class performed during the past fiscal year. Performance calculations are prepared using time-weighted rates of return and are net of fees unless otherwise indicated. Returns for periods longer than one year are annualized.

Public Equities

A volatile 2018-19 fiscal year saw U.S. equities outperform international markets, reflecting stronger economic conditions at home than in other parts of the world. U.S. equities rose despite a sharp sell-off in the second fiscal quarter amid concerns over rising interest rates, an escalating trade war with China, falling commodity prices and a federal government shutdown. But robust earnings growth and record low unemployment eased fears of an imminent recession, enabling the market to recover to near all-time highs by the end of the fiscal year. The market was led higher by defensive stocks such as utilities and consumer staples, with investors remaining cautious as a flattening yield curve signaled a possible end to a decade of economic expansion. Technology stocks performed strongly despite their increasingly expensive valuations, as investors continued to prefer companies expected to grow earnings in a low growth environment. Large-cap stocks also outperformed the more economically sensitive small-cap segment of the market, while energy stocks were notable laggards on oil price weakness.

In contrast to the United States, returns to international equities were mixed, both in developed and emerging markets. While European equities posted modestly positive gains, uncertainty regarding Brexit continued to erode investor confidence in the United Kingdom. Japanese equities were another weak spot while China was one of the worst performing regions, as that country's policy makers responded to the additional impact of tariffs on a slowing economy. Elsewhere in emerging markets, Brazil was the strongest performing region as investors reacted favorably to the election of a new pro-business government.

Staff prudently responded to rising markets by opportunistically rebalancing the public equity portfolio toward its long-term asset allocation targets. During the year, $3.6 billion was raised from the domestic equity portfolio while $1.0 billion was raised from the international portfolio. Staff also continued to build out the program's global equity allocation with the hiring of a third external manager for that initiative, approved by the Retirement Board at its January meeting and incepted in May.

A significant portion of the System's domestic and international investments are passively managed versus their respective policy benchmarks. These passive investments generated returns for the period that were consistent with expectations. The System also utilizes multiple diverse active strategies, both internally and externally managed, with the objective of generating combined returns in excess of their respective policy benchmarks over a full market cycle. The fiscal year was a difficult period for several of these strategies, particularly those with a focus on identifying long-term value opportunities, generating disappointing results that detracted from overall performance. Despite underperforming over this short period, the long-term track record for the System's active strategies is favorable, and staff remains confident in the ability of these strategies to add value for the public equity program.

The domestic equity portfolio, which represented 35.2% of System assets at the end of the fiscal year, generated a return of 8.8%, trailing its benchmark by 0.4%. The international equity portfolio, which represented 17.2% of System assets, generated a return of 1.3%, in line with its benchmark, the MSCI ACWI Ex-U.S. index. The global equity portfolio, which represented 2.1% of System assets and is exclusively actively managed, returned 1.2% trailing its benchmark, the MSCI ACWI index, by 4.5%.

Overall, the NYSTRS public equity portfolio returned 6.1% for the fiscal year. Over the past five years, the System's public equity investments have generated an average return of 7.6% per year.

Real Estate Equity

Commercial real estate markets continue to benefit from a global search for yield among accommodative central bank policies in the United States and throughout the world. Large institutional investors, along with sovereign wealth funds, continue to focus primarily on properties in global gateway cities where they have experienced consistent income streams held in stable currencies — although yield and return levels are materially lower than they were several years ago. With lower yield and return expectations in the primary markets, investors have begun to move into larger secondary markets and execute more opportunistic strategies as a means to access increased yields and bolster lower return expectations, albeit with a higher associated risk.

Overall, U.S. asset pricing has continued its steady rise, up 2% year over year across all commercial property sectors. Pricing increases, however, have not been equally distributed, with the industrial sector driving market pricing, supported by a continually growing e-commerce demand at the expense of big box retail.

Accommodative monetary policy, domestically and abroad, has been the key driver for pricing levels as the low cost of debt financing has allowed levered investors the ability to achieve more attractive returns with a lower cost of capital in their pricing models. Commercial returns going forward are expected to be driven by operating earnings, as the anticipation of another step up in pricing for all property types appears to be limited at the current capitalization rates.

Globally, GDP growth forecasts remain tepid with anticipation of slowing consumer spending, Brexit uncertainties and continued trade tensions. The sharp drop in interest rates has significantly lowered hedging costs for foreign buyers looking for opportunities to deploy capital. This, coupled with investors' desire for income-producing hard assets, has allowed real estate private equity funds to have continued success raising large amounts of capital with substantial real estate buying power. The amount of available capital-seeking investments may help sustain property values in the near term.

NYSTRS has been an active seller of commercial assets over the past three years, taking advantage of elevated pricing levels to realize gains on capital intensive assets and less competitive assets that may have difficulty generating cash flow. Redeployed capital has focused on quality, well-located assets acquired at a discount to perfected core pricing, favoring develop-to-core strategies or investments where value can be derived through repositioning, renovation and re-leasing at increased rent levels. NYSTRS' primary focus will continue to be in and around densely populated metropolitan areas, where growth continues to be fueled by world-class education, transportation, technology and health care centers.

Demand for amenity-rich, densely located multifamily assets remains strong due in large part to the 80 million millennials that, to date, have been more focused on leasing rather than homeownership. This created a significant supply of newly constructed apartments in several primary urban areas, putting downward pressure on historically high rent levels. In addition, increased construction costs and wage growth that have lagged rents have created headwinds for lease up of new projects in the delivery pipeline.

The System has a globally diversified portfolio of public and private commercial real estate investments, including both equity and debt components.

NYSTRS' $12.9 billion global commercial equity portfolio consists of high-quality assets primarily located in major U.S. gateway markets and global metro areas throughout Europe and Asia. For the fiscal year ended June 30, 2019, NYSTRS' commercial real estate equity portfolio returned 8.1% on a net basis. Since inception, the portfolio has returned 8.5%. The portfolio has

REPORT ON INVESTMENT ACTIVITY FOR FISCAL YEAR ENDING JUNE 30, 2019 *(continued)*

outperformed its benchmark by 82 basis points (bps) over the past year and 188 bps, or 1.9%, on an annualized basis since the program's 1985 inception.

To date, the System's global gateway focus has driven the performance of the portfolio as there has been consistent demand from multinational tenants for space in these markets, as well as strong demand from institutional and sovereign wealth investors seeking stable yield opportunities.

Private Equity

NYSTRS made its first private equity investment in 1984 and formally committed to the asset class in 1999, establishing an initial target of 1.0% of plan assets. Today, the target allocation is 8.0% with an allocation range of 3.0% to 13.0%. Partnership structures generally cover periods of 10 years or more, with the goal to achieve higher long-term returns than available through marketable securities. The program seeks to outperform public equities by 500 basis points (S&P 500 plus 5.0%) over the long term.

Private equity activity continues to be characterized by an abundance of capital. The demand for private equity exposure has continued to steadily increase, with interest from new entrants and an increased appetite from well-established limited partners fueling record fundraising levels across strategies and geographies. Continued robustness in the capital markets and increased competition for assets (from both sponsors and well-capitalized strategic buyers) continue to drive entry and leverage multiples higher. Given the current market environment, the System is focused on investing with disciplined top-performing managers that have demonstrated an ability to prudently invest across varying macroeconomic backdrops and cycles. Alignment of interest remains a paramount consideration.

The Retirement System's private equity portfolio is comprised of buyout, growth, venture capital, co-investment and turnaround/restructuring strategies accessed through a variety of vehicles including, but not limited to, commingled funds, fund of funds, secondary funds and separately managed accounts.

The Retirement System has a mature, cash-flow positive private equity program diversified by both investment strategy and geographic focus. The program continues to focus on recommitting to its top-performing partnerships, while strategically adding new relationships that provide increased exposure to particular strategies and geographies. Specifically, NYSTRS continues to de-emphasize large and mega buyout exposure, while increasing small and medium buyout exposure in both North America and Europe. Additionally, the System will continue to marginally increase exposure to sector-focused opportunities and mid-size distressed/turnaround managers.

The program also seeks to supplement its venture portfolio through selective commitments to growth strategies. Exposure to Asia and Latin America has increased and is expected to continue to do so over the next five to 10 years through selective commitments with top-performing, country-specific and pan-regional managers. Finally, the System will opportunistically seek to rebalance the private equity portfolio through secondary markets should pricing become compelling.

By fiscal year-end, the System had active commitments of $22.6 billion across 98 fund sponsors. The private equity portfolio was valued at $9.3 billion, representing 7.8% of the System's total assets. Unfunded commitments totaled $6.4 billion. Over the last 10 years, the private equity program has returned 14.8%, versus the stated benchmark of 19.7%. Over the last 20 years, the private equity program has returned 10.7%, versus the stated benchmark of 10.9%.

Fixed Income

During the first half of the System's 2019 fiscal year, the Federal Open Market Committee (FOMC) continued to tighten monetary policy by increasing short-term rates and reducing its balance sheet. The FOMC based its policy on a low unemployment rate, growth in household spending and business fixed investment, inflation close to its two percent (2.0%) target, and stable inflation expectations. With risks to the economic outlook roughly balanced and a federal funds target rate range of 1.75% to 2.0%, the FOMC's median projection in June 2018 showed an additional 0.5% and 0.75% in rate hikes in 2018 and 2019, respectively.

REPORT ON INVESTMENT ACTIVITY FOR FISCAL YEAR ENDING JUNE 30, 2019 *(continued)*

The FOMC continued to tighten monetary policy through December 2018 with two additional hikes that resulted in a 2.25% to 2.5% federal funds target rate range. However, the FOMC switched to an easing bias after the December meeting as a result of slowing global growth, financial market volatility, increased downside risks to the U.S. economy, and subdued inflation pressures. As of the June 2019 meeting, the FOMC no longer projected rate hikes for 2019 and instead forecast a 0.25% rate cut through year-end 2020. In addition, the FOMC announced an end to the reduction of its balance sheet holdings of Treasury and mortgage-backed securities.

With the FOMC's pivot to a more accommodative policy stance in the first half of 2019 and the other global factors, U.S. Treasury rates declined across the curve. Over the System's 2018-19 fiscal year, yields on two-, five-, 10- and 30-year Treasuries were lower by 0.8%, 1.0%, 0.9% and 0.5%, respectively.

The global economy continued to expand during the fiscal year, but growth slowed in many markets including Europe, Japan and China. Central banks outside the U.S. reacted by continuing loose monetary policy. These measures, along with expected slower global growth and continued low inflation, led to lower rates across most global interest rate curves. The stock of negative-yielding debt continued to increase. By one benchmark measure, negative yielding debt reached nearly 24.0% of global fixed income as of the System's 2019 fiscal year end.

The increasing stock of global negative yielding debt presents a challenge for market participants, including the Retirement System, that rely upon income from debt securities. In addition, negative yields outside the U.S. may pressure U.S. yields lower, which further reduces yield income.

NYSTRS' focus remains on generating cash flow to help meet its $7.3 billion annual retirement benefit obligation and preserving capital. Both are accomplished within the context of receiving proportionate return for risk taken. To mitigate risk, the System's internally and externally managed fixed income portfolios are well diversified by sector, issuer and interest rate exposure. In addition, the System's internal and external portfolio managers actively monitor and manage risk while striving to generate returns in excess of what could be earned in risk-free fixed income investments. They also strive to take advantage of market opportunities as they arise.

At fiscal year-end, roughly 70.0% of the internally managed domestic fixed income portfolio consisted of Aaa securities, the highest credit quality rating granted. About 44.1% was invested in U.S. Treasury securities with the remaining 25.9% invested in high-quality U.S. agencies, agency mortgage-backed securities and supranational debt. A portion of the portfolio was invested in corporate bonds with a weighted average credit rating of low single A. These positions, many of which are issued by multinational industry leaders, provide the System with yields greater than what could be gained by investing solely in U.S. Treasury securities of similar duration.

The externally managed global bond portfolios had a sizeable 37.6% allocation to the highest rated Aaa securities. These managers rely on their deep sovereign and corporate credit research resources to identify and invest in lower-rated investment-grade securities that have value and, to a lesser extent, non-investment-grade bonds that provide additional yield. Roughly 94.5% of the combined portfolios were invested in investment-grade bonds, with a modest position in cash.

Primarily as a result of the decline in rates across the curve, the investment-grade domestic fixed income market as measured by the Bloomberg Barclays U.S. Aggregate Float Adjusted Index generated returns of 8.0%. All sectors of the index had positive absolute returns. Bonds with maturities over 10 years outperformed with returns of 13.9% while one- to three-year securities returned 4.3%. Lower rated investment grade with a credit quality of Baa outperformed with returns of 11.4% versus 6.9% for Aaa rated securities.

From a sector perspective, government-related securities returned 7.9% and securitized assets returned 6.3% for the year. The two sectors with the greatest interest rate sensitivity, U.S. Treasuries and corporate bonds, had 7.2% and 10.7% returns, respectively.

In the global bond universe measured by the Bloomberg Barclays Global Aggregate Float Adjusted Bond Index, returns were significantly better for securities hedged to the U.S. dollar, with higher levels of interest rate risk and with lower credit ratings. The unhedged Bloomberg Barclays Global Aggregate Float Adjusted Index returned 5.9%, which underperformed

REPORT ON INVESTMENT ACTIVITY FOR FISCAL YEAR ENDING JUNE 30, 2019 *(continued)*

the 8.1% return earned by the hedged version of the benchmark. Hedged global bonds with maturities greater than 10 years significantly outperformed with a return of 13.3%. From a credit quality standpoint, Baa rated bonds outperformed with a 10.2% return during the fiscal year. The hedged return of 8.5% on the European portion of the global benchmark outperformed the U.S. and Asia returns of 8.0% and 7.0%, respectively.

As of June 30, 2019, the internally managed domestic fixed income portfolio represented approximately 15.6% of System investments. For the one- and three-year periods ended June 30, 2019, the System's long-term bond portfolio's annual return was 6.8% and 2.0%, respectively, versus the benchmark return of 8.0% and 2.3% for the comparable periods. The one-year underperformance is attributable to assuming less interest rate or duration risk for U.S. Treasuries, as well as less spread duration risk as compared to the benchmark.

As of June 30, 2019, approximately 2.4% of System assets were invested in externally managed global bond portfolios significantly hedged to U.S. dollars. Net of fees, for the one- and three-year periods, global bonds returned 8.4% and 3.5%, respectively, compared to 8.1% and 3.0% for the respective benchmarks. Country selection, currency positioning, and an overweight to the corporate sector were the primary factors for outperforming the benchmark over the past fiscal year. Long term, NYSTRS expects these managers will continue to add investment diversification and help generate greater risk-adjusted fixed income returns than the benchmark.

NYSTRS commenced investing in non-investment-grade fixed income (aka, high yield) in fiscal 2018. As of June 30, 2019, approximately 0.2% of System assets were invested in externally managed high yield portfolios. Net of fees, high yield returned 8.2% for the one-year period versus 8.6% for the benchmark. Security selection, yield curve and sector positioning were the primary factors for underperforming the benchmark over the past fiscal year.

Real Estate Debt

NYSTRS' commercial real estate debt portfolio consists primarily of conventional fixed-rate, first-mortgage loans on core, high-quality assets. Market yields for this product have significantly decreased as a result of the recent drop in U.S. Treasury yields, as well as aggressive pricing from the lending community with a great deal of capital to deploy.

To supplement the lower yields currently available for first mortgages, NYSTRS continued to take advantage of opportunities in bridge and senior mezzanine strategies, which have provided increased (i.e., floating rate) yields on shorter duration product. The collateral for these types of loans is typically on transitional types of assets, using experienced borrowers that have a history of repositioning commercial assets. The NYSTRS team focuses on as-is values from inception of the loan throughout the repositioning process, limiting loan proceeds to 75% of the as-is underlying collateral value. Over the past year, NYSTRS has increased its exposure to this strategy by approximately $525 million with an additional $1.2 billion committed to this space, with current yields in excess of 5%.

Finally, the System has approximately $1.2 billion in commercial mortgage-backed securities (CMBS) primarily focused on investment-grade single asset/small pool publicly traded securities currently yielding in the low 3% range. This is a highly liquid portfolio that can be redeployed as relatively more attractive opportunities are available in the private lending markets.

For the fiscal year ended June 30, 2019, NYSTRS' overall $7.1 billion commercial real estate debt portfolio focused on U.S. gateway markets returned 8.0% on a net basis, as the existing portfolio experienced appreciation in light of rate decreases and all in yields across the broader debt markets. The portfolio underperformed its benchmark by 115 bps over the past year and underperformed its benchmark by 23 bps since inception.

Private Debt

Historically, NYSTRS selectively pursued private debt exposure by utilizing its private equity allocation and targeting specific mezzanine lending opportunities. In August 2017, NYSTRS formally committed to the asset class and established a 1.0% target, with an allocation range of 0.0% to 5.0% of total plan assets. Partnership structures typically cover periods of 10 years or more, with the objective of achieving higher long-term returns than available through marketable debt securities. The program seeks to outperform the S&P/LSTA U.S. Leveraged Loan Index plus 3.0% over the long term.

Institutional interest in private debt has grown significantly over the last five years due to the attractive yields attainable in the sector on both an absolute and relative basis. As more capital has entered this market, the availability of debt has increased and returns have generally begun to trend down. This is particularly true as it relates to large-cap direct lending, which is predominantly comprised of private equity sponsor-led transactions. Recognizing these trends, NYSTRS' current strategic focus is on small- to middle-market lenders who seek outsized returns through highly negotiated situations and non-sponsor-led transactions. In addition, given the risk return characteristics available in the marketplace, NYSTRS will generally avoid non-U.S.-dollar denominated investment strategies to avoid taking currency risk.

The Retirement System's private debt portfolio is comprised of direct lending, mezzanine, special situation and distressed debt investments accessed through a variety of vehicles including, but not limited to, commingled funds, fund of funds and evergreen structures.

Although the private debt asset class is early in its development, the historic commitments made through the System's private equity allocation provided for instant diversification across both investment strategy and geographic focus. Diversification is expected to increase as the portfolio is built out over time. Since formal adoption of the program in 2017, the System has made several commitments in line with its strategic objectives.

By fiscal year-end, the System had active commitments of $1.7 billion across 11 fund sponsors. The private debt portfolio was valued at $586.3 million, representing 0.5% of the System's total assets. Unfunded commitments totaled $687.3 million. Over the last full fiscal year, the private debt program has returned 10.1%, versus the stated benchmark of 7.0%.

Short-Term (Cash Equivalents)

The System's short-term fixed income portfolio consists of high-quality securities which can easily be converted into cash for the purposes of making monthly payment of pension benefits, facilitating asset allocation, or supporting the operating commitments of the System. Securities held in this portfolio generally mature in 12 months or less. Securities that have maturities greater than 13 months at the time of purchase have a floating-rate coupon that resets every three months or less.

The System's short-term portfolio has an asset allocation target of 1.0%. As of June 30, 2019, the portfolio represented 2.4% of total invested System assets, within the allowable range of 0.0% to 4.0%. In addition, as of that date, the portfolio's weighted average maturity and weighted average life were 25 and 29 days, respectively. For the 12 months ended June 30, 2019, the short-term portfolio returned 2.4%, versus the iMoneyNet Money Fund Averages/All-Taxable Index benchmark of 1.9%.

Other Programs

Securities Lending

The System's securities lending program generates incremental income by lending in-demand domestic and international equity, and fixed income securities. The System uses multiple agent lenders to manage the securities lending program. Each lending program is proactively monitored by NYSTRS' staff to ensure it is managed in compliance with the System's contractual, statutory and risk guidelines.

The System earns a spread (the difference in income earned on reinvestment of cash collateral less the amount rebated to the borrower of the security) on loans collateralized by cash from demand and reinvestment components. The reinvestment portion of the spread is generated by investing the cash collateral received for securities loaned into high-quality, short-term fixed income securities. The demand piece of the spread is a function of borrower interest. The System also enters into non-cash loans collateralized by U.S. government and agency securities, whereby the System earns income via a fee paid by the borrower.

On average, cash loan balances declined from the prior fiscal year as equity borrowers continued to lack conviction for shorts, due to prolonged risk-on periods coupled with their preference to shift the collateral they pledge from cash to securities for regulatory

REPORT ON INVESTMENT ACTIVITY FOR FISCAL YEAR ENDING JUNE 30, 2019 *(continued)*

capital relief purposes. Net earnings from securities lending decreased year over year primarily as a result of the decline in demand to borrow securities.

As of June 30, 2019, 2.2% of the System's assets available to lend were on loan, collateralized at 102.9%. The utilization percentage decreased from 2.4% on June 30, 2018. Borrower demand continued to generate the majority of securities lending income, which totaled $10.9 million for the fiscal year, compared to $12.3 million for the fiscal year ended June 30, 2018. The decline in income from the prior year was primarily driven by the decline in balances. The prior fiscal year's unrealized gain on investments in the System's cash collateral reinvestment portfolio improved during the 2019 fiscal year, settling at $3.5 million (including unpaid income) as of June 30, 2019.

For information describing the securities lending process, please see the Notes to Financial Statements under the heading "Securities Lending Transactions."

Prepared by the following NYSTRS Executive Staff members:

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ASSET ALLOCATION — as of June 30, 2019

The most significant contributor to a fund's long-term investment performance is the allocation decision among the various asset classes, including equities, fixed income and real estate. The allocation process helps control risk and sets the guidelines to diversify the System's portfolio. The asset allocation policy adopted by the Board allows ranges around an optimal target allocation. The Retirement Board, with the assistance of an external consultant, reviews the asset allocation policy on an annual basis to analyze recent and historical investment experience. Since this is a long-term plan, adjustments to the allocation are usually made on an annual basis when necessary. The current targets, ranges and actual allocations are detailed below:

	Target	Range	Actual
Equity			
Domestic Equity	33%	29-37%	35.2%
International Equity	16%	12-20%	17.2%
Global Equity	4%	0-8%	2.1%
Real Estate Equity	11%	6-16%	10.7%
Private Equity	8%	3-13%	7.8%
Total Equity	*72%*		*73.0%*
Debt			
Domestic Fixed Income	16%	12-20%	15.6%
High Yield Bonds	1%	0-3%	0.2%
Global Bonds	2%	0-3%	2.4%
Real Estate Debt	7%	3-11%	5.9%
Private Debt	1%	0-5%	0.5%
Cash Equivalents	1%	0-4%	2.4%
Total Debt	*28%*		*27.0%*

CHANGES IN NET ASSET VALUE

The fair value of investments are presented below in the aggregate by asset allocation classification, which differs from the financial statement presentation.

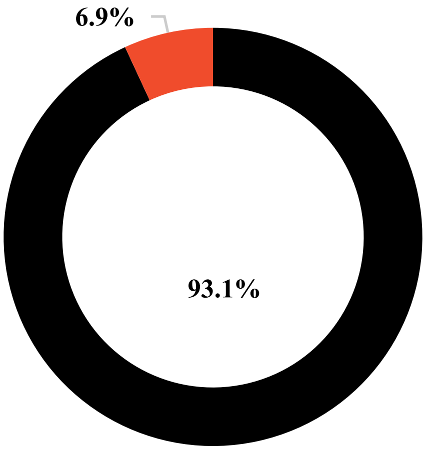
Asset Class	Net Asset Value 6/30/2018	Net Income	Net Appreciation (Depreciation)	Net Cash Inflows (Outflows)	Net Asset Value 6/30/2019
Equity					
Domestic Equity	$ 43,953,805,636	$ 867,640,384	$ 2,759,772,723	$ (5,153,996,791)	$ 42,427,221,952
International Equity	22,248,257,963	390,337,242	(153,674,987)	(1,774,497,159)	20,710,423,059
Global Equity	999,250,160	44,944,499	41,556,295	1,497,466,628	2,583,217,582
Real Estate Equity	11,837,638,544	431,408,405	596,590,182	29,920,163	12,895,557,294
Private Equity	8,394,621,168	(123,981,514)	1,133,446,821	(62,597,264)	9,341,489,211
Total Equity	**87,433,573,471**	**1,610,349,016**	**4,377,691,034**	**(5,463,704,423)**	**87,957,909,098**
Debt					
Domestic Fixed Income	18,792,791,744	522,091,107	736,152,426	(1,013,053,221)	19,037,982,056
High Yield Bonds	99,736,654	10,130,634	6,390,663	125,000,000	241,257,951
Global Bonds	2,635,706,318	64,225,525	162,234,383	—	2,862,166,226
Real Estate Debt	5,983,243,731	296,306,230	214,990,587	586,529,705	7,081,070,253
Private Debt	493,480,816	(9,683,144)	59,818,983	42,686,478	586,303,133
Cash Equivalents	2,670,442,095	71,741,818	2,056,409	(28,146,627)	2,716,093,695
Total Debt	**30,675,401,358**	**954,812,170**	**1,181,643,451**	**(286,983,665)**	**32,524,873,314**
Total	**$ 118,108,974,829**	**$ 2,565,161,186**	**$ 5,559,334,485**	**$ (5,750,688,088)**	**$ 120,482,782,412**

DIVERSIFICATION OF INVESTMENTS — June 30, 2019
(dollars in thousands)

Asset Class		Net Asset Value 6/30/2019	Percent	Net Asset Value 6/30/2018	Percent
Equity:					
Public Equity (Domestic Equity, International Equity and Global Equity)					
Communications Services		$5,107,546		$0	
Consumer Discretionary		7,145,804		8,426,588	
Consumer Staples		4,981,060		4,986,844	
Energy		3,519,332		4,300,406	
Financials		10,482,379		10,923,010	
Health Care		7,975,000		7,921,105	
Industrials		7,330,000		7,445,819	
Information Technology		11,606,932		13,892,677	
Materials		2,985,094		3,292,249	
Other		423,267		485,044	
Real Estate		2,045,043		2,053,956	
Telecommunication Services		0		1,581,546	
Utilities		2,119,406		1,892,070	
	Total Public Equity	65,720,863	54.5%	67,201,314	56.9%
Real Estate Equity					
Core Funds		1,621,357		1,617,088	
Direct Properties/Other Real Estate Owned		5,556,471		5,039,768	
Opportunistic Funds		1,746,736		1,556,454	
Real Estate Investment Trusts (REITs)		2,869,988		2,502,468	
Timber		298,132		306,840	
Value Added Funds		802,873		815,020	
	Total Real Estate Equity	12,895,557	10.7	11,837,638	10.0
Private Equity					
Co-Investments		988,381		783,116	
Fund of Funds		902,391		1,000,076	
LBO/MBO		5,914,042		5,156,724	
Other		171		4,186	
Secondary Funds		389,028		502,737	
Turnaround		344,596		289,474	
Venture Capital		802,880		658,308	
	Total Private Equity	9,341,489	7.8	8,394,621	7.1
	Total	**87,957,909**	73.0%	**87,433,573**	**74.0%**
Debt:					
Fixed Income (Domestic Fixed Income, High Yield Bonds, Global Bonds)					
Corporate		6,836,017		6,354,765	
Global Treasuries		9,787,914		9,819,269	
Government Related		1,029,898		1,145,050	
Other		77,916		69,711	
Securitized		4,409,661		4,139,440	
	Total Fixed Income	22,141,406	18.4	21,528,235	18.2
Real Estate Debt					
Commercial Mortgage Backed (CMBS)		1,146,708		1,090,717	
Core Plus		1,127,774		933,694	
Direct Mortgages		4,487,273		3,764,533	
Opportunistic		319,316		194,300	
	Total Real Estate Debt	7,081,071	5.9	5,983,244	5.1
Private Debt					
Direct Lending		136,587		53,697	
Distressed		92,205		127,115	
Mezzanine		171,405		164,695	
Special Situation		186,106		147,974	
	Total Private Debt	586,303	0.5	493,481	0.4
Short Term (Cash Equivalents)					
Corporate		1,649,308		1,590,369	
Global Treasuries		145,736		294,267	
Government Related		318,933		307,101	
Other		609		718	
Securitized		601,507		477,987	
	Total Short Term	2,716,093	2.2	2,670,442	2.3
	Total Debt	**32,524,873**	**27.0%**	**30,675,402**	**26.0%**
	Total	**$ 120,482,782**	**100.0%**	**$ 118,108,975**	**100.0%**

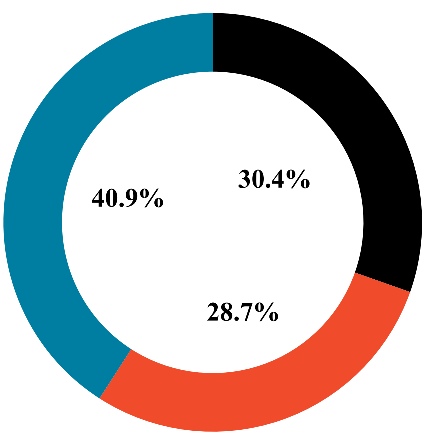
The above schedule is presented at net asset value based on asset allocation, which differs from the financial statement presentation.

DOMESTIC EQUITY DISTRIBUTION — as of June 30, 2019



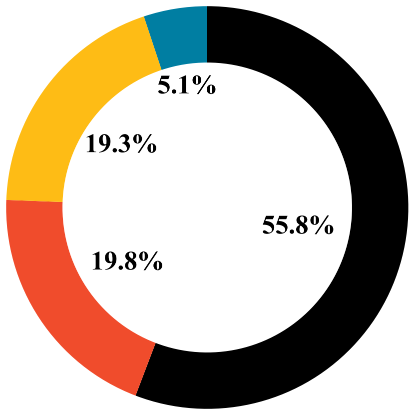
●	**Internal**	**93.1%**
	S&P 1500 Index2	77.6%
	S&P 100 Index	3.7%
	S&P 1500 Value Tilt2	3.0%
	S&P 1500 Growth Tilt2	3.0%
	S&P 500 Index	3.6%
	S&P 600 Index	0.7%
	All Cap Disciplined Equity	1.5%
●	**External**	**6.9%**
	Large Cap	4.0%
	Mid Cap	2.4%
	Small Cap	0.5%

DOMESTIC EQUITY EXTERNALLY MANAGED STYLE DISTRIBUTION — as of June 30, 2019



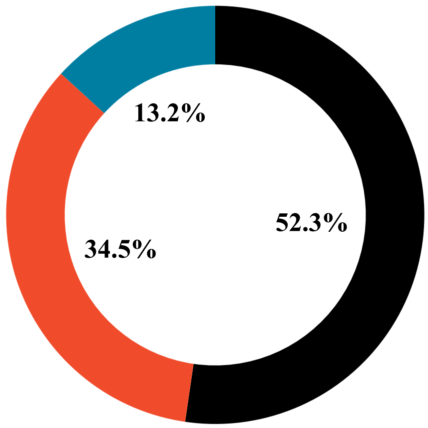
●	**Mid Cap**	**30.4%**
●	**Large Cap Enhanced**	**28.7%**
●	**Fund of Funds**	**40.9%**
	Growth	8.1%
	Value	9.9%
	Core	22.9%

INTERNATIONAL EQUITY STYLE DISTRIBUTION — as of June 30, 2019



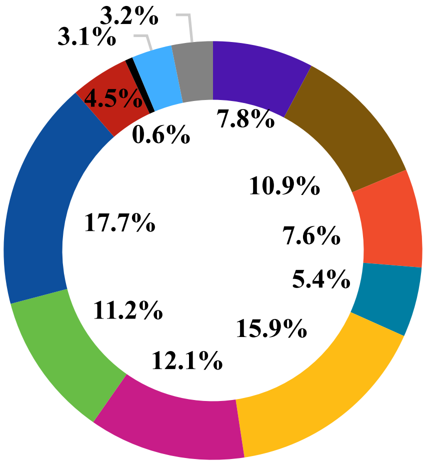
Developed Markets - Passive	55.8%
Developed Markets - Active	19.8%
Emerging Markets - Passive	19.3%
Emerging & Frontier Markets - Active	5.1%

GLOBAL EQUITY STYLE DISTRIBUTION — as of June 30, 2019



U.S. Markets - Active	52.3%
International Developed - Active	34.5%
International Emerging - Active	13.2%

PUBLIC EQUITY HOLDINGS BY INDUSTRY DISTRIBUTION — as of June 30, 2019



Communications Services	7.8%
Consumer Discretionary	10.9%
Consumer Staples	7.6%
Energy	5.4%
Financials	15.9%
Health Care	12.1%
Industrials	11.2%
Information Technology	17.7%
Materials	4.5%
Other	0.6%
Real Estate	3.1%
Utilities	3.2%

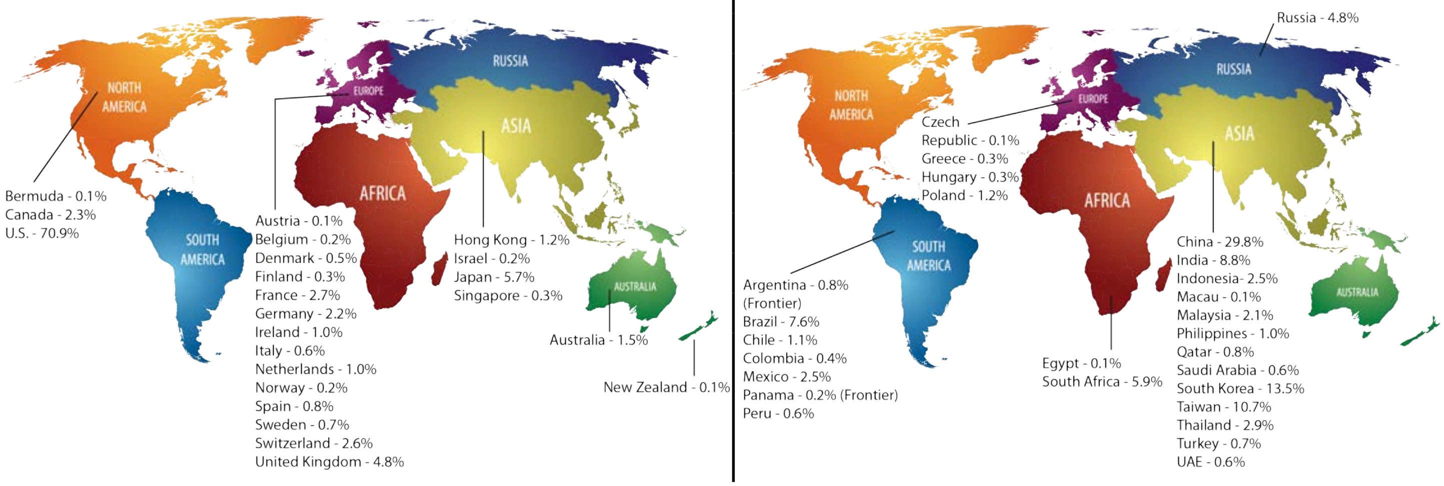
TEN LARGEST PUBLIC EQUITY HOLDINGS — as of June 30, 2019

Rank	Company	Cost	Market Value	Percent of Equities
1	Microsoft Corp.	$ 265,978,340	$ 1,631,176,666	2.5%
2	Apple Inc.	81,395,100	1,376,471,057	2.1
3	Amazon.com Inc.	106,646,565	1,247,481,784	1.9
4	Alphabet Inc. (formerly Google)	282,221,378	1,064,655,564	1.6
5	Facebook Inc.	265,199,144	748,319,672	1.1
6	Berkshire Hathaway Inc.	250,287,550	633,489,653	1.0
7	Johnson & Johnson	114,157,077	595,085,639	0.9
8	JPMorgan & Co.	111,072,775	574,549,591	0.9
9	Exxon Mobil Corp.	131,843,067	515,746,414	0.8
10	Visa Inc.	78,749,301	480,118,092	0.7
Total		**$ 1,687,550,297**	**$ 8,867,094,132**	**13.5%**

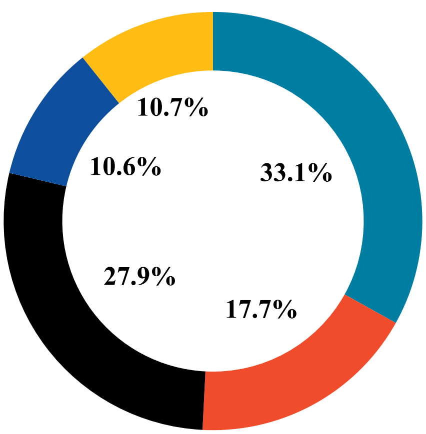
A complete list of the System's equity holdings is available on our website (see About Us > Investments) or through the Public Information Office.

PUBLIC EQUITY COUNTRY EXPOSURE DISTRIBUTION — as of June 30, 2019

Percentage of Portfolio for Developed Countries $60,320,346,087	Percentage of Portfolio for Emerging & Frontier Markets $5,400,516,506

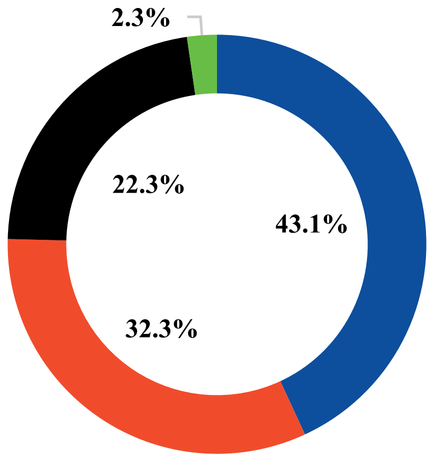


REAL ESTATE EQUITY BY PROPERTY TYPE — as of June 30, 2019



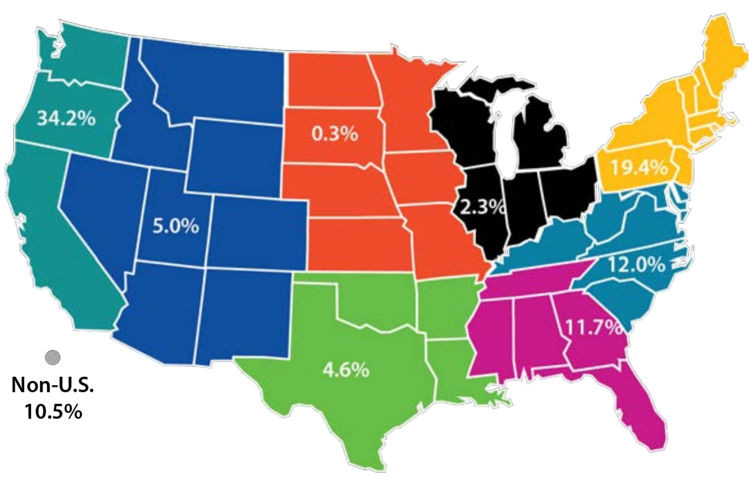
Office	33.1 %
Residential	17.7 %
Retail	27.9 %
Hotel/Other	10.6 %
Industrial/R&D	10.7 %

BREAKDOWN OF REAL ESTATE EQUITY PORTFOLIO — as of June 30, 2019



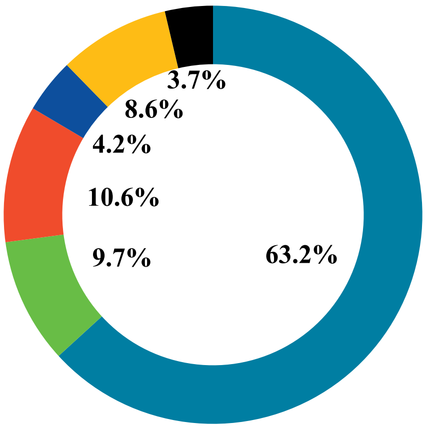
●	Direct Investments	43.1 %
●	Private Securities	32.3 %
●	Public Securities	22.3 %
●	Timber Investments	2.3 %

GEOGRAPHICAL DISTRIBUTION OF THE REAL ESTATE EQUITY PORTFOLIO — as of June 30, 2019



●	Pacific	34.2%
●	Mountain	5.0%
●	West North Central	0.3%
●	East North Central	2.3%
●	Northeast	19.4%
●	Mideast	12.0%
●	Southeast	11.7%
●	Southwest	4.6%
●	Non-U.S.	10.5%

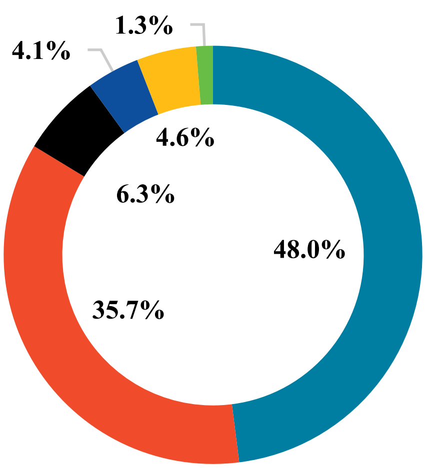
PRIVATE EQUITY NET ASSET VALUE BY INVESTMENT TYPE* — as of June 30, 2019



LBO/MBO	**63.2%**
Fund of Funds	**9.7%**
Co-Investments	**10.6%**
Secondary Funds	**4.2%**
Venture Capital	**8.6%**
Turnaround	**3.7%**
Other	**<0.1%**

**Percentages may not sum to 100% due to rounding.*

PRIVATE EQUITY NET ASSET VALUE BY GEOGRAPHY* — as of June 30, 2019

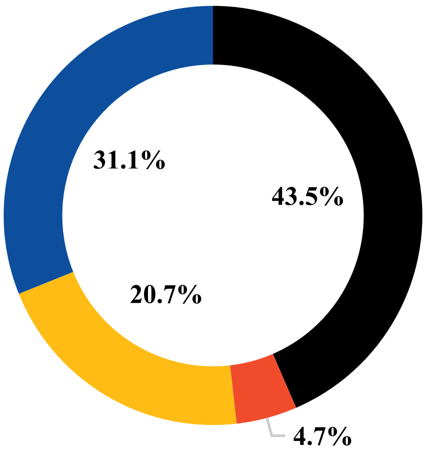


North America	**48.0%**
Multi-National	**35.7%**
Western Europe	**6.3%**
United Kingdom	**4.1%**
Asia	**4.6%**
Rest of World	**1.3%**

**Excluding fund of funds and secondary funds.*

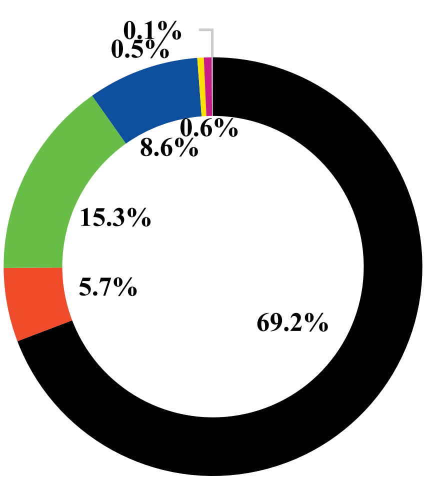
DOMESTIC FIXED INCOME AND HIGH YIELD BONDS DISTRIBUTION — as of June 30, 2019

Yield to Maturity 2.3%



U.S. Treasury Yield to Maturity - 1.86%	43.5%
Federal Agency, Notes/Debentures Yield to Maturity - 1.99%	4.7%
Federal Agency, Mortgage Backed & Asset Backed Yield to Maturity - 2.72%	20.7%
Corporate Yield to Maturity - 2.68%	31.1%

DOMESTIC FIXED INCOME AND HIGH YIELD BONDS QUALITY DISTRIBUTION* — as of June 30, 2019



Aaa**	69.2%
Aa	5.7%
A	15.3%
Baa	8.6%
Ba	0.5%
B	0.6%
Caa & Below	0.1%
Not Rated***	<0.1%

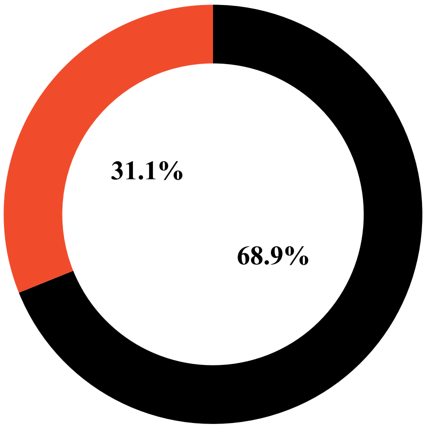
**Percentages may not sum to 100% due to rounding.*

***Includes explicitly and implicitly guaranteed debt issued by the U.S. government and its agencies.*

****Includes cash (U.S. dollar equivalents) and State Street Government Short-Term Investment Fund.*

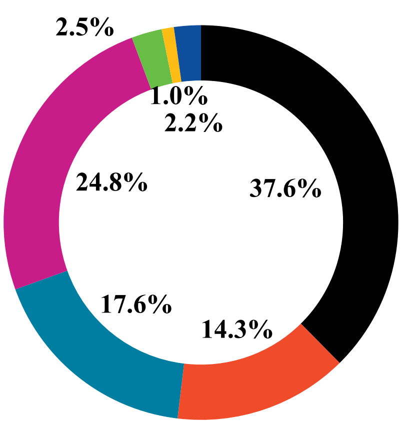
DOMESTIC FIXED INCOME AVERAGE MATURITY — as of June 30, 2019

Effective Duration 3.78 Years



●	Less than 5 Years Duration 2.69 Years	**68.9%**
●	5-10 Years Duration 6.21 Years	**31.1%**

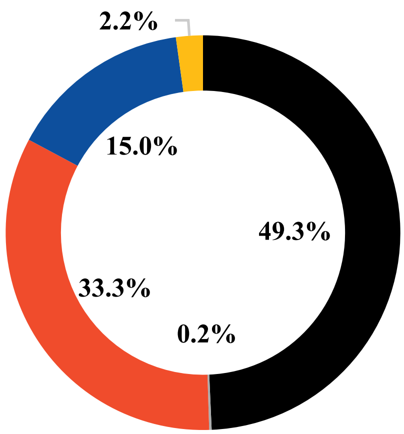
GLOBAL BONDS QUALITY DISTRIBUTION — as of June 30, 2019



●	Aaa	**37.6%**
●	Aa	**14.3%**
●	A	**17.6%**
●	Baa	**24.8%**
●	Ba	**2.5%**
●	B	**1.0%**
●	Not Rated*	**2.2%**

**Includes cash (U.S. dollar equivalents) and State Street Government Short-Term Investment Fund.*

GLOBAL BONDS SECTOR DISTRIBUTION — as of June 30, 2019



●	Global Treasuries	**49.3%**
●	Government Related	**0.2%**
●	Corporate	**33.3%**
●	Securitized	**15.0%**
●	Other*	**2.2%**

**Includes cash (U.S. dollar equivalents) and State Street Government Short-Term Investment Fund.*

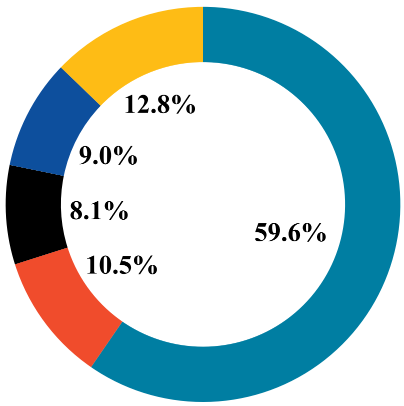
TEN LARGEST FIXED INCOME HOLDINGS* — as of June 30, 2019

Rank	Issue	Market Value	Percent Total Fixed Income Market Value
1	AID-Israel 5.5% Due 04/26/2024	$116,250,956	0.5%
2	U.S. Treasury Note 1.25% Due 08/31/2019	111,807,736	0.5%
3	Fannie Mae Pool 3.50% Due 7/15/2049	103,632,811	0.5%
4	U.S. Treasury Note 2.25% Due 08/15/2027	103,122,276	0.5%
5	U.S. Treasury Note 2.25% Due 10/31/2024	102,332,031	0.5%
6	U.S. Treasury Note 2.125% Due 12/31/2022	101,363,281	0.5%
7	U.S. Treasury Note 1.375% Due 09/30/2019	99,792,969	0.5%
8	U.S. Treasury Note 2.75% Due 02/15/2028	99,616,694	0.4%
9	U.S. Treasury Note 2.625% Due 12/31/2023	95,889,814	0.4%
10	Fannie Mae Pool 3.00% Due 10/01/2046	90,582,220	0.4%
Total		**$1,024,390,788**	**4.7%**

**Includes internally managed domestic and externally managed high yield and global bond portfolios, excludes short-term portfolio holdings.*

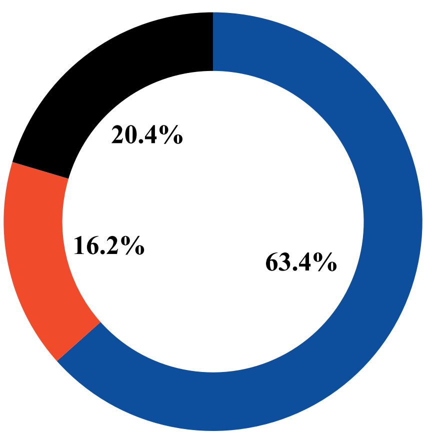
A complete list of the System's fixed income holdings (excluding short-term) is available on our website (see About Us > Investments) or through the Public Information Office.

REAL ESTATE DEBT BY PROPERTY TYPE — as of June 30, 2019



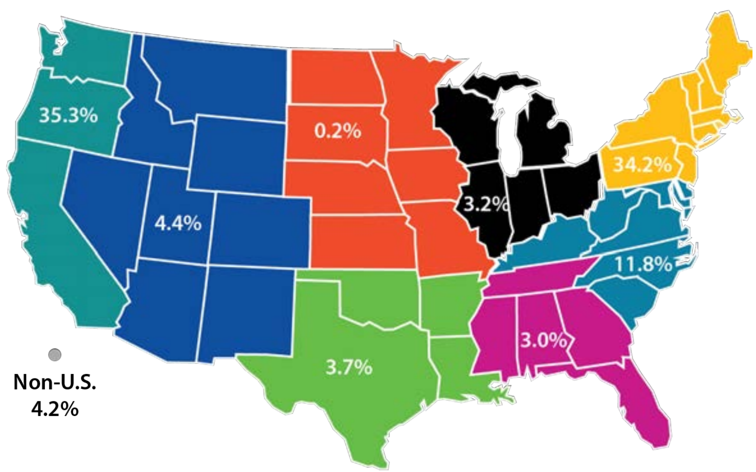
Office	59.6%
Residential	10.5%
Retail	8.1%
Mixed Use/Other	9.0%
Industrial/R&D	12.8%

BREAKDOWN OF REAL ESTATE DEBT PORTFOLIO — as of June 30, 2019



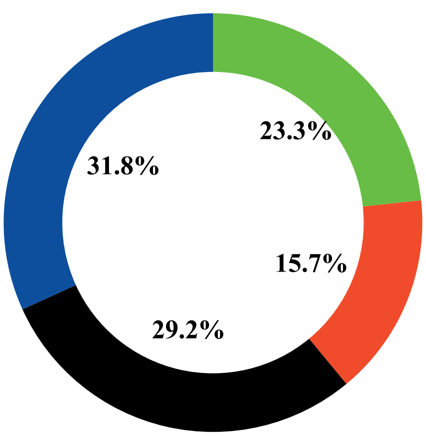
Conventional Mortgages	63.4%
CMBS	16.2%
Mezzanine Debt	20.4%

GEOGRAPHICAL DISTRIBUTION OF THE REAL ESTATE DEBT PORTFOLIO — as of June 30, 2019



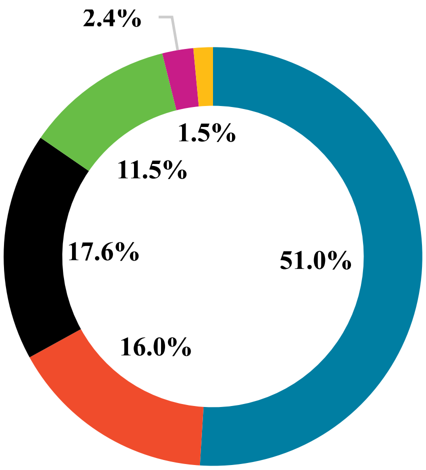
Pacific	35.3%
Mountain	4.4%
West North Central	0.2%
East North Central	3.2%
Northeast	34.2%
Mideast	11.8%
Southeast	3.0%
Southwest	3.7%
Non-U.S.	4.2%

PRIVATE DEBT NET ASSET VALUE BY INVESTMENT TYPE — as of June 30, 2019



Direct Lending	23.3%
Distressed	15.7%
Mezzanine	29.2%
Special Situation	31.8%

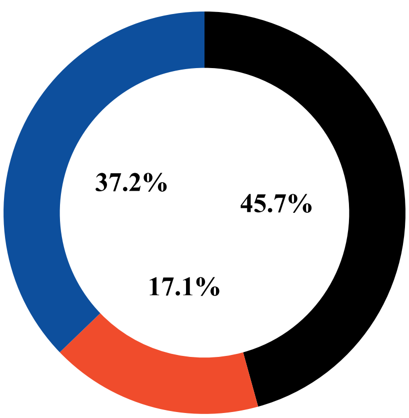
PRIVATE DEBT NET ASSET VALUE BY GEOGRAPHY* — as of June 30, 2019



North America	51.0%
Multi-National	16.0%
Western Europe	17.6%
United Kingdom	11.5%
Asia	2.4%
Rest of World	1.5%

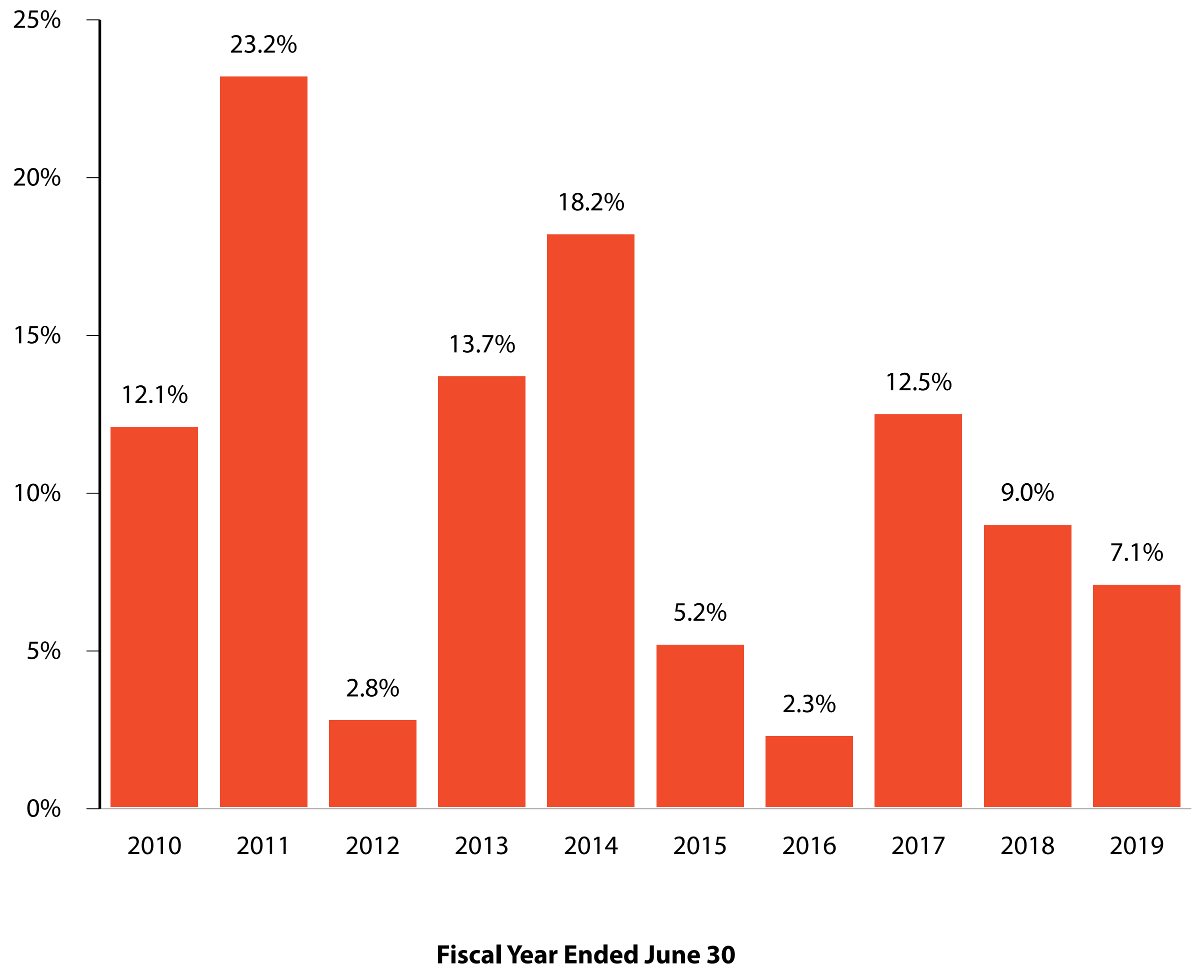
**Excluding fund of funds and secondary funds.*

SHORT TERM SECTOR DISTRIBUTION — as of June 30, 2019



Industrial	45.7%
Governmental/Agency/Supranational	17.1%
Banks & Finance	37.2%

ANNUAL PERFORMANCE HISTORY



INVESTMENT PERFORMANCE RESULTS — as of June 30, 2019

The System is a long-term investor and therefore can withstand some short-term volatility. The liabilities are generally long-term in nature and may not become payable for 30 or more years in the future. The time-weighted performance (net of fees) and associated benchmark returns are shown in the following table.

	Annualized Rates of Return				
	1-YR	3-YR	5-YR	10-YR	30-YR
Domestic Equity	**8.8%**	**13.7%**	**10.2%**	**14.7%**	**10.1%**
Benchmark: S&P/Russell	9.2	13.9	10.4	14.7	10.2
International Equity	**1.3**	**9.6**	**2.5**	**6.7**	**—**
Benchmark: MSCI ACWI (Ex-U.S.)/EAFE	1.3	9.4	2.2	6.3	—
Global Equity	**1.2**	**—**	**—**	**—**	**—**
Benchmark: MSCI ACWI	5.7	—	—	—	—
Real Estate Equity	**8.1**	**7.7**	**9.9**	**11.7**	**8.8**
Benchmark: NCREIF/NAREIT	7.3	6.7	8.8	9.9	6.7
Private Equity	**12.1**	**15.8**	**14.2**	**14.8**	**—**
Benchmark: S&P 500 plus 5%	15.4	19.2	15.7	19.7	—
Domestic Fixed Income	**6.8**	**2.0**	**2.5**	**3.3**	**6.0**
Benchmark: Bloomberg Barclays U.S. Aggregate Float Adj[1]	8.0	2.3	3.0	3.9	6.1
High Yield Bonds	**8.2**	**—**	**—**	**—**	**—**
Benchmark: ICE BofAML U.S. BB-B Constr.[1]	8.6	—	—	—	—
Global Bonds	**8.4**	**3.5**	**4.0**	**—**	**—**
Benchmark: Bloomberg Barclays Global Agg. Ex-CNY Hedged (Flt. Adj)[1]	8.1	3.0	3.9	—	—
Real Estate Debt	**8.0**	**4.1**	**4.7**	**6.6**	**7.4**
Benchmark: GLCMP/Bloomberg Barclays CMBS[1]	9.1	4.0	4.4	6.1	7.9
Private Debt	**10.1**	**—**	**—**	**—**	**—**
Benchmark: S&P/LSTA plus 3%	7.0	—	—	—	—
Short-Term	**2.4**	**1.5**	**1.0**	**0.6**	**3.2**
Benchmark: iMoneyNet Money Fund Avg/Taxable (All)	1.9	1.0	0.6	0.3	2.8
Total Fund	**7.1**	**9.5**	**7.2**	**10.4**	**8.8**
Benchmark: Blended Benchmark	**8.3%**	**9.9%**	**7.4%**	**10.6%**	**8.7%**

[1] *See footnote on the Investments divider page.*

MANAGER INVESTMENT PERFORMANCE RESULTS — as of June 30, 2019

The assets under management (at market), time-weighted performance results (unless indicated otherwise) and the appropriate benchmark or equity multiple for each manager/advisor are summarized in the following table.

	Assets Managed ($ millions)	Rates of Return from Inception[1]	Benchmark from Inception[1]	Equity Multiple[3]	Inception Date
Domestic Equity					
Managers					
Iridian Asset Management LLC	$884.8	9.6%	6.2%		Apr-99
Leading Edge Investment Advisors	423.3	10.2	12.3		Dec-10
Progress Investment Management Co.	767.7	11.2	13.3		Nov-10
T. Rowe Price Associates Inc.	835.6	15.5	15.1		Jan-09
International Equity					
Managers					
AQR Capital Management LLC	933.4	6.1	5.8		Feb-12
Ariel Investments LLC	262.0	3.0	5.6		Apr-17
Arrowstreet Capital LP	623.8	4.2	2.5		Jul-17
Baillie Gifford Overseas Ltd.	808.2	9.0	6.1		Sep-11
BlackRock Institutional Trust Co. NA	7,782.9	7.0	6.7		Dec-11
Dimensional Fund Advisors	181.9	2.6	2.5		Feb-13
FIS Group Inc.	266.2	4.0	4.1		May-13
LSV Asset Management	698.6	4.4	3.6		Jul-11
Marathon Asset Management LLP	570.9	7.7	6.6		Jan-12
State Street Global Advisors	7,773.1	6.5	6.2		Jul-12
William Blair & Company	753.2	6.6	4.3		Oct-10
Global Equity					
Managers					
Arrowstreet Capital LP	504.2	3.5	3.2		May-19
Harding Loevner LP	1,075.2	1.3	3.1		May-18
LSV Asset Management	1,003.4	-4.9	3.1		May-18
Real Estate Equity					
Advisors					
Bentall Kennedy	149.3	10.4	8.1		Apr-95
Cabot Properties LP	33.9	1.1	3.1		May-19
CBRE Global Investors	58.8	-0.3	4.0		Nov-18
Clarion Partners	444.0	9.4	6.4		Jun-90
Forest Investment Associates	298.1	4.0	5.3		Dec-98
Invesco Advisors Inc. - Industrial	267.9	9.5	8.1		Nov-94
Invesco Advisors Inc. - Multifamily	124.2	11.5	7.5		Dec-98
JPMorgan Asset Management	4,018.7	10.6	6.6		Oct-90
Sentinel Real Estate Corporation	$454.5	11.7%	8.2%		Mar-96

[1] *Returns for periods over 1 year are annualized.*

[2] *Return is an IRR (Internal Rate of Return), not time-weighted.*

[3] *Equity multiples are only shown for aggregates where returns are calculated as an IRR.*

MANAGER INVESTMENT PERFORMANCE RESULTS — as of June 30, 2019 *(continued)*

	Assets Managed ($ millions)	Rates of Return from Inception[1]	Benchmark from Inception[1]	Equity Multiple[3]	Inception Date
Real Estate Equity *(continued)*					
Managers					
Adelante Capital Management LLC	$422.0	10.3%	9.8%		Aug-98
AEW Capital Management LP	240.4	7.3	7.2		Oct-17
Brookfield Investment Management	233.4	5.0	6.5		Sep-17
Cohen & Steers Capital Management Inc.	1,491.5	17.4	15.5		Feb-18
Dimensional Fund Advisors	244.1	8.4	7.1		Nov-17
Heitman Real Estate Securities LLC	238.6	6.6	6.5		Sep-17
Fund Investments					
Real Estate Equity Core Funds	1,621.4	6.9[2]	—	2.4	Jul-85
Real Estate Equity Opportunistic Funds	1,746.7	11.3[2]	—	1.4	Mar-99
Real Estate Equity Value-Added Funds	802.9	11.5[2]	—	1.4	Dec-89
Private Equity					
Fund Investments	9,341.5	12.4[2]	—	1.6	Oct-92
High Yield Bonds					
Managers					
Columbia Management Investment Advisers, LLC	79.8	8.0	7.7		Oct-18
J.P. Morgan Asset Management	80.7	7.5	7.4		Apr-18
Nomura Corp Research and Asset Mgt Inc.	80.7	4.6	5.3		Dec-17
Global Bonds					
Managers					
Goldman Sachs Asset Management LP	689.7	3.0	2.9		Aug-16
Loomis, Sayles & Company	1,087.1	3.6	3.6		Nov-12
Wellington Management Company LLP	1,085.3	4.2	4.3		Aug-13
Real Estate Debt					
Managers					
BlackRock Financial Management Inc.	588.3	5.3	5.3		Apr-01
Prima Capital Advisors LLC	534.1	5.5	4.8		Nov-03
Raith Capital Partners LLC	24.3	0.6	4.5		Mar-19
Fund Investments					
Real Estate Debt Core Plus Funds	1,127.8	5.9[2]	—	1.1	Dec-04
Real Estate Debt Opportunistic Funds	319.3	-0.3[2]	—	1.0	Jun-98
Private Debt					
Fund Investments	$586.3	12.1% [2]	—%	1.1%	Jul-17

[1] *Returns for periods over 1 year are annualized.*

[2] *Return is an IRR (Internal Rate of Return), not time-weighted.*

[3] *Equity multiples are only shown for aggregates where returns are calculated as an IRR.*

CORPORATE GOVERNANCE

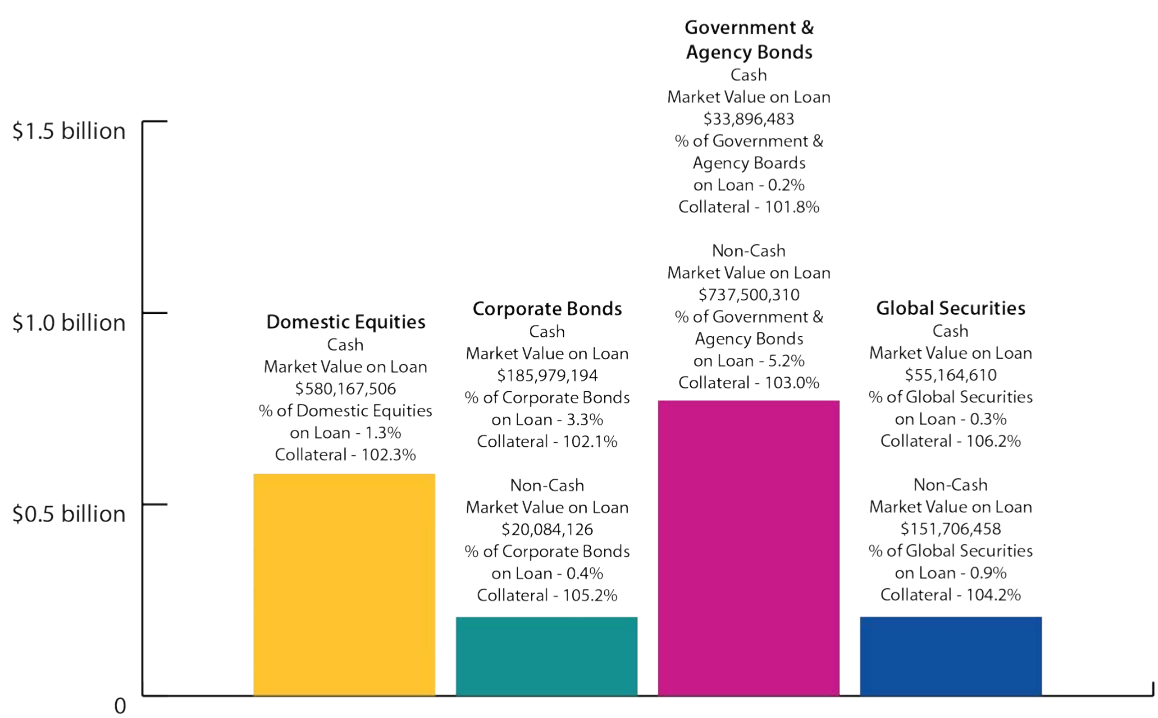
Shareholder responsibility is fundamental to good corporate governance, which recognizes an appropriate balance between the rights of shareholders (the owners of the corporation) and the need for management and the Board to direct the corporation's affairs with a long-term perspective. The System's shareholder voting rights must be managed with the same care as any of its other assets. Therefore, the Retirement Board has established a formal proxy voting policy reflecting three objectives: to protect the System's rights, to promote responsible corporate policies and activities, and to enhance long-term value.

For the 2018 calendar year, a total of 20,733 proposals were voted on, representing 2,128 meetings for the companies it owns in the System's equity portfolio. Many of the proxies focused on auditors/CPA and board-related issues, and executive compensation. System policies generally support management if the position is reasonable, is not detrimental to the long-term economic prospects of the company, and does not tend to diminish the rights of shareholders.

Management Proposals (20,236)			Shareholder Proposals (497)		
Position	Number of Proposals	Percentage of Position	Portion	Number of Proposals	Percentages of Position
For	18,209	90.0%	For	231	46.5%
Against	1,979	9.8%	Against	260	52.3%
Abstain	48	0.2%	Abstain	6	1.2%

SECURITIES LENDING PROGRAM — as of June 30, 2019

Cash: $855,207,793 - Non-Cash: $909,290,894 - Total: $1,764,498,687



SCHEDULE OF INVESTMENT FEES AND EXPENSES — Year ended June 30, 2019*

(dollars in thousands)

Portfolio Manager	Investment Management Expenses 2018-2019
Domestic Equity:	
Iridian Asset Management LLC	$ 4,350
Leading Edge Investment Advisors	2,527
Progress Investment Management Co.	3,829
T. Rowe Price Associates Inc.	1,872
Total Domestic Equity:	$ 12,578
International Equity:	
Aberdeen Asset Management Inc.**	$ 1,501
AQR Capital Management LLC	3,353
Ariel Investments LLC	1,006
Arrowstreet Capital LP	2,860
Baillie Gifford Overseas LTD	2,771
BlackRock Institutional Trust Co. N.A.	2,368
Dimensional Fund Advisors	822
FIS Group Inc.	1,532
LSV Asset Management	3,047
Marathon Asset Management LLP	3,053
State Street Global Advisors	2,164
William Blair & Company	2,493
Total International Equity:	$ 26,970
Global Equity:	
Arrowstreet Capital LP	$ 334
Harding Loevner LP	3,224
LSV Asset Management	2,696
Total Global Equity:	$ 6,254
Real Estate Equity:	
Adelante Capital Management LLC	$ 1,210
AEW Capital Management LP	1,002
Bentall Kennedy	453
Brookfield Public Securities Group LLC	1,411
CBRE Global Investors	130
Clarion Partners	2,402
Cohen & Steers Capital Management Inc.	3,338
Dimensional Fund Advisors	329
Forest Investment Associates	1,621
Heitman Real Estate Securities LLC	1,385
Invesco Advisors Inc.	1,471
J.P. Morgan Asset Management	9,529
Real Estate Equity Core Funds	12,880
Real Estate Equity Opportunistic Funds	32,834
Real Estate Equity Value Added Funds	14,268
Sentinel Real Estate Corporation	2,563
Total Real Estate Equity:	$ 86,826
Private Equity:	$ 123,982

Portfolio Manager	Investment Management Expenses 2018-2019
High Yield Bonds:	
Columbia Management Investment Advisors LLC	$ 91
J.P. Morgan Asset Management	255
Nomura Corp Research and Asset Mgt Inc.	375
Total High Yield Bonds:	$ 721
Global Bonds:	
Goldman Sachs Asset Management LP	$ 945
Loomis, Sayles & Company	2,257
Wellington Management Company LLP	1,420
Total Global Bonds:	$ 4,622
Real Estate Debt:	
BlackRock Financial Management Inc.	$ 988
NY Life	28
PGIM Real Estate Finance	66
Prima Capital Advisors LLC	1,059
Real Estate Debt Core Plus Funds	6,816
Real Estate Debt Opportunistic Funds	3,462
Total Real Estate Debt:	$ 12,419
Private Debt:	$ 9,683
Legal Expenses:	
DLA Piper LLP (US)	$ 98
K&L Gates	137
Morgan, Lewis & Bockius	73
Nixon Peabody	213
Nossman LLP	66
Robinson Bradshaw	137
Seward & Kissel	164
Teigland Hunt	108
Other legal expenses	92
Total Legal Expenses:	$ 1,088
General Expenses:	
Advisory Committee - Investment	$ 44
Advisory Committee - Real Estate	75
Abel Noser Solutions, LLC	48
Aon Hewitt Investment Consulting Inc.	529
Callan Associates	691
Investment Information Services	5,053
Real Estate Origination Costs	117
Real Estate Professional Fees	354
Real Estate Service Costs	19
State Street Corporation	1,232
TorreyCove Capital Partners LLC	855
Total General Expenses:	$ 9,017
Total Investment Fees and Expenses:	**$ 294,160**

**The above schedule is presented based on asset allocation, which differs from financial statement presentation.*
***Indicates portfolio manager was terminated during fiscal year.*

INVESTMENT ADVISORY COMMITTEE

Robert Levine, CFA, Chairman
Chief Investment Officer (Retired)
Nomura Corporate Research and Asset Management Inc.
New York, New York

Howard J. Bicker
Executive Director/CIO (Retired)
Minnesota State Board of Investment
Saint Paul, Minnesota

Daniel J. Bukowski
Managing Partner
Net Alpha Advisors, LLC
Chicago, Illinois

Johanna Fink
Chief Operating Officer
Leducq Corporation
Boston, Massachusetts

Steven Huber
Global Fixed Income Portfolio Manager (Retired)
T. Rowe Price Group, Inc.
Baltimore, Maryland

James W. O'Keefe
Managing Director (Retired)
UBS Realty Investors LLC
Hartford, Connecticut

June W. Yearwood
Managing Director
The Church Pension Fund
New York, New York

REAL ESTATE ADVISORY COMMITTEE

James W. O'Keefe, Chairman
Managing Director (Retired)
UBS Realty Investors LLC
Hartford, Connecticut

Herman Bulls
President & Chief Executive Officer
Bulls Advisory Group LLC
McLean, Virginia

Eileen Byrne
Managing Director (Retired)
BlackRock Inc.
New York, New York

Paul J. Dolinoy
President (Retired)
Equitable Real Estate/Lend Lease
Atlanta, Georgia

Blake Eagle
Chief Executive Officer (Retired)
National Council of Real Estate Investment Fiduciaries
Chicago, Illinois

Maureen A. Ehrenberg
Global Head of Facility Management Services
WeWork
Chicago, Illinois

Jill S. Hatton
Managing Director (Retired)
BlackRock Inc.
Boston, Massachusetts

INVESTMENT CONSULTANTS

Aon Hewitt Investment Consulting Inc.
Chicago, Illinois

Callan LLC
San Francisco, California

Abel Noser Solutions, LLC
New York, New York

TorreyCove Capital Partners
San Diego, California

MASTER CUSTODIAN

State Street Bank & Trust Co.
Boston, Massachusetts

SECURITIES LENDING

JPMorgan Chase Bank N.A.
New York, New York

State Street Bank & Trust Co.
Boston, Massachusetts

EXTERNAL INVESTMENT MANAGERS & ADVISORS

Domestic Equity:

- Iridian Asset Management LLC
- Leading Edge Investment Advisors (Manager of Managers)
- Progress Investment Management Co. (Manager of Managers)
- T. Rowe Price Associates Inc.

International Equity:

- AQR Capital Management LLC
- Ariel Investments LLC
- Arrowstreet Capital LP
- Baillie Gifford Overseas Ltd.
- BlackRock Institutional Trust Co. NA
- Dimensional Fund Advisors
- FIS Group Inc. (Manager of Managers)
- LSV Asset Management
- Marathon Asset Management LLP (Marathon-London)
- State Street Global Advisors
- William Blair & Company

Global Equity:

- Arrowstreet Capital LP
- Harding Loevner LP
- LSV Asset Management

Real Estate Equity:

Advisors:

- Bentall Kennedy
- Cabot Properties LP
- CBRE Global Investors
- Clarion Partners
- Federal Capital Partners
- Forest Investment Associates
- Invesco Advisers Inc.
- JPMorgan Asset Management
- Sentinel Real Estate Corporation

Managers:

- Adelante Capital Management LLC
- AEW Capital Management LP
- Brookfield Public Securities Group LLC
- Cohen & Steers Capital Management Inc.
- Dimensional Fund Advisors LP
- Heitman Real Estate Securities LLC

Fund Investments:

- Abacus Multi-Family Partners II LP
- Abacus Multi-Family Partners III LP
- Abacus Multi-Family Partners IV LP
- Aermont Capital Real Estate Fund IV SCSP
- AG Core Plus Realty Fund IV LP
- AG Realty Fund VI LP
- AG Realty Fund VII LP
- AG Realty Fund VIII LP
- AG Realty Fund IX LP
- AG Realty Value Fund X LP

EXTERNAL INVESTMENT MANAGERS & ADVISORS *(continued)*

Real Estate Equity: *(continued)*

Fund Investments: *(continued)*

Artemis Real Estate Partners Fund I LP
Artemis Real Estate Partners Fund II LP
Artemis Real Estate Partners Fund III LP
BlackRock Asia Property Fund II LP
BlackRock Asia Property Fund III LP
BlackRock Europe Parallel Property Fund II LP
BlackRock Europe Property Fund III LP
Blackstone Real Estate Partners Asia LP
Blackstone Real Estate Partners Asia II LP
Blackstone Real Estate Partners Europe IV LP
Blackstone Real Estate Partners Europe V LP
Blackstone Real Estate Partners V TE2 LP
Blackstone Real Estate Partners VI TE2 LP
Blackstone Real Estate Partners VII TE1 LP
Blackstone Real Estate Partners VIII LP
Brockton Capital Fund III LP
Brookfield DC Office Partners LLC
Brookfield DTLA Holdings LLC
Brookfield Properties Office Partners Inc.
Brookfield Strategic Real Estate Partners III LP
Cabot Industrial Core Fund LP
Cabot Industrial Value Fund II LP
Cabot Industrial Value Fund IV LP
Cabot Industrial Value Fund V LP
California Select Industrial Partners LP
CBRE Strategic Partners U.S. Opportunity 5 LP
CBRE Strategic Partners Europe III LP
CBRE Strategic Partners U.S. Value Fund 7 LP
Cerberus Institutional Real Estate Partners LP
Cerberus Institutional Real Estate Partners LP - Series Two
Cerberus Institutional Real Estate Partners III LP
Clarion Development Ventures III LP
DLJ Real Estate Capital Partners III LP
DLJ Real Estate Capital Partners IV LP
Excelsior II LLC
Exeter Industrial Value Fund LP
Exeter Industrial Value Fund II LP
Exeter Industrial Value Fund III LP
Exeter Industrial Value Fund IV LP
FCP Realty Fund II LP
FCP Realty Fund III LP
FCP Realty Fund IV LP
Gateway Real Estate Fund IV LP
Gateway Real Estate Fund V LP
Gateway Real Estate Fund VI LP
GCM Grosvenor - NYSTRS RE Inv. Partners LP
GCM Grosvenor - NYSTRS RE Inv. Partners LP 2016-1
GCM Grosvenor - NYSTRS RE Inv. Partners LP 2018-1
GreenOak US III LP
Heritage Fields LLC
Hines U.S. Office Value Added Fund II LP
Landmark Real Estate Trust IV
LaSalle Asia Opportunity Fund III
Lone Star Fund III (U.S.) LP
Lone Star Fund IV (U.S.) LP
Lone Star Fund V (U.S.) LP
Lone Star Fund VI (U.S.) LP
Lone Star Fund VII (U.S.) LP
Lone Star Fund IX (U.S.) LP
Lone Star Fund X (U.S.) LP
Lone Star Fund XI LP
Lone Star Real Estate Fund II (U.S.) LP
Lone Star Real Estate Fund III (U.S.) LP
Northwood Real Estate Partners LP - Series VI
Northwood Real Estate Partners LP - Series VIII
O'Connor North America Property Partners LP
O'Connor North America Property Partners II LP
Penwood Select Industrial Partners III LP
Penwood Select Industrial Partners IV LP
Penwood Select Industrial Partners V LP
Perella Weinberg Real Estate Fund I LP
Perella Weinberg Real Estate Fund II LP
PLA Residential Fund III LP
PRISA I
PRISA II
PRISA III
PW Real Estate Fund III LP
Rockpoint Finance Fund I LP
Rockpoint Growth and Income Real Estate Fund I LP
Rockpoint Growth and Income Real Estate Fund II LP
Rockpoint Real Estate Fund II LP
Rockpoint Real Estate Fund III LP
Rockpoint Real Estate Fund IV LP
Rockpoint Real Estate Fund V LP
Rockwood Capital Real Estate Partners Fund VI LP
Rockwood Capital Real Estate Partners Fund VII LP
Rockwood Capital Real Estate Partners Fund VIII LP
Starwood Distressed Opportunity Fund IX LP
Starwood Global Opportunity Fund VII-A LP
Starwood Opportunity Fund X Global LP
Starwood Opportunity Fund XI Global LP
UBS Trumbull Property Fund
Walton Street Real Estate Fund VI LP
WB SJC Residential Site Partnership LP
Westbrook Real Estate Fund VI LP
Westbrook Real Estate Fund VII LP
Westbrook Real Estate Fund VIII LP
Westbrook Real Estate Fund IX LP
Westbrook Real Estate Fund X LP
Westbrook Real Estate Partners LP (Fund 5)

EXTERNAL INVESTMENT MANAGERS & ADVISORS *(continued)*

Private Equity:

Fund Investments:

A&M Capital Partners II, LP
Abbott Select Buyout Fund II
Abbott Select Buyouts Fund
ABRY Partners Fund V
ABRY Partners Fund VI
ABRY Partners Fund VII
ABRY Partners Fund VIII
ABRY Partners Fund IX
ADV Opportunities Fund II LP
Aisling Capital II LP
Aisling Capital III LP
Alchemy Plan
Amulet Capital Fund I LP
Amulet Capital Fund II LP
Apex VI
Apollo Real Estate Fund IV
Ares Corporate Opportunities Fund II LP
Ares Corporate Opportunities Fund III LP
Ares Corporate Opportunities Fund IV LP
Ares Corporate Opportunities Fund V LP
Astorg VII
BGH Capital Fund I LP
Blackstone Capital Partners Fund IV
Blackstone Capital Partners Fund V
CapStreet IV LP
Capvis Equity V LP
Carlyle Asia Partners IV LP
Carlyle Asia Partners V LP
Carlyle European Partners III LP
Carlyle Partners IV LP
Carlyle Partners V LP
Carlyle/Riverstone Global Energy & Power Fund III
Charterhouse Capital Partners VIII
Charterhouse Capital Partners IX
Chisholm Partners III
ChrysCapital VIII LP
Cinven III
Cinven IV
Cinven V
Cinven VI
Cinven VII
Clayton Dubilier & Rice VI
Clearlake Capital Partners III LP
Clearlake Capital Partners IV LP
Clearlake Capital Partners V LP
Close Brothers Private Equity Fund VII
Co-Investment Partners (NY) LP
Co-Investment Partners (NY) II LP
Co-Investment Partners (NY) III LP
Co-Investment Partners Europe LP
Cortec Group Fund V LP
Cortec Group Fund VI LP
Cressey & Co. V LP
Cressey & Co. VI LP
Cressey & Co. Overage VI LP
CVC Capital Partners Asia Pacific IV LP
CVC Capital Partners VI LP
CVC European Equity Partners V LP
DCP Capital Partners LP
Doughty Hanson & Co. V
ECI 11 LP
EIV Capital III LP
Energy Capital Partners II LP
Energy Capital Partners III LP
Fairview Ventures Fund II
Fairview Ventures Fund III
FirstMark Capital II LP
FirstMark Capital III LP
GCM Grosvenor Cleantech
GCM Grosvenor Seasoned Primaries
GCM Grosvenor Seasoned Primaries II
GCM Grosvenor Seasoned Primaries III
General Catalyst Group VII LP
Gilde Buy-Out Fund V CV
Gilde Buy-Out Fund VI
Green Equity Investors V
GTCR Fund VIII
GTCR Fund IX
GTCR Fund X
GTCR Fund XI
GTCR Fund XII
Hahn & Company III LP
Hahn & Company III-S LP
HarbourVest International PEP IV
HarbourVest International PEP V
HarbourVest International PEP VI - Asia Pacific Fund
HarbourVest Partners VII-Mezzanine Fund
HarbourVest Partners VII-Venture Fund
HarbourVest Partners VIII-Venture Fund
HarbourVest VI - Partnership Fund
HarbourVest/The Maple Fund (Tranche H1)
HarbourVest/The Maple Fund (Tranche H2)
HarbourVest/The Maple Fund (Tranche N1)
HarbourVest/The Maple Fund (Tranche N2)
HarbourVest/The Maple Fund (Tranche N3)
HarbourVest/The Maple Fund (Tranche N4)
HarbourVest/NYSTRS Co-Investment Fund
HarbourVest/NYSTRS Co-Investment Fund II
Hellman & Friedman VI LP
Hellman & Friedman VII LP
Hellman & Friedman VIII LP
Hellman & Friedman IX LP
Highland Capital Partners IX LP
HIPEP Select Asia Fund LP

EXTERNAL INVESTMENT MANAGERS & ADVISORS *(continued)*

Private Equity: *(continued)*

Fund Investments: *(continued)*

HIPEP Select Asia II LP
HIPEP Select Asia III LP
Horsley Bridge VII
IK Fund VII LP
IK Fund VIII LP
IK Small Cap II Fund
Industri Kapital 2007 Fund
Inflexion 2010 Buyout Fund
Inflexion Buyout Fund IV LP
Inflexion Buyout Fund V LP
Inflexion Enterprise Fund IV LP
Inflexion Enterprise Fund V LP
Inflexion Partnership Capital Fund LP
Inflexion Partnership Capital Fund II LP
Inflexion Strategic Partners LP
Inflexion Supplemental Fund IV LP
Inflexion Supplemental Fund V LP
Institutional Venture Partners XIV LP
Institutional Venture Partners XV LP
JC Flowers II LP
JLL Partners Fund V LP
JLL Partners Fund VI LP
Kelso Investment Associates VII
Kelso Investment Associates VIII
Kinderhook Capital Fund VI LP
KKR Asian Fund II LP
KRG Capital Fund IV
Lexington Capital Partners V
Lexington Capital Partners VI
Lexington Capital Partners VII
Lexington Emerging Partners LP
Lexington Middle Market Investors
Lexington Middle Market Investors II
Lightspeed Venture Partners Select LP
Lightspeed Venture Partners IX LP
Lightspeed Venture Partners X LP
Linden Capital Partners Fund IV LP
Lovell Minnick Partners Fund V LP
LS Power Equity Partners IV LP
Madison Dearborn Capital Partners IV
Madison Dearborn Capital Partners V
Madison Dearborn Capital Partners VI
MBK Partners Fund IV LP
Metalmark Capital Partners LP
Monomoy Capital Partners III LP
Nautic V LP
Nautic VI LP
Nautic VII LP
Nautic Partners VIII LP
Nautic Partners IX LP
NMS Fund III LP
Olympus Growth Fund V
Olympus Growth Fund VI
One Rock Capital Partners II LP
P123 Ltd
Pacific Equity Partners Fund V LP
Pacific Equity Partners Fund VI LP
Patria - Brazilian Private Equity Fund V LP
Patria - Private Equity Fund VI LP
PEG Pooled Venture Capital Institutional Investors II LLC
PEG Pooled Venture Capital Institutional Investors III LLC
Permira IV
Phoenix Equity Partners 2010 Fund
Phoenix Equity Partners 2016 Fund
Pine Brook Capital Partners LP
Pine Brook Capital Partners II LP
Primavera Capital Fund III LP
Rhone Partners IV LP
Rhone Partners V LP
Riverstone/Carlyle Global Energy and Power Fund IV
Silver Lake Partners II LP
Silver Lake Partners III LP
Silver Lake Partners IV LP
Silver Lake Partners V LP
Siris Partners III LP
Siris Partners IV LP
SK Capital Partners V LP
SK Capital Partners Overage V LP
Spark Capital Growth Fund II LP
Spark Capital Partners IV LP
Spark Capital Partners V LP
StepStone Pioneer Capital Buyout Fund I LP
StepStone Pioneer Capital Europe I LP
StepStone Pioneer Capital Europe II LP
StepStone Pioneer Capital Fund II LP
StepStone Pioneer Capital Fund III LP
Sterling Group Partners III LP
Sterling Group Partners IV LP
Strategic Partners III - Venture LP
Strategic Partners III LP
Strategic Partners IV - VC LP
Strategic Partners IV LP
Strategic Partners V LP
Sun Capital Partners V LP
Sycamore Partners III LP
Tailwater Energy Fund III LP
TCV IX LP
TCV X LP
TDR Capital IV LP
Technology Crossover Ventures V
Technology Crossover Ventures VI
Technology Crossover Ventures VII
Tenex Capital Partners II LP
The First Capital Access Fund LP

EXTERNAL INVESTMENT MANAGERS & ADVISORS *(continued)*

Private Equity: *(continued)*

Fund Investments: *(continued)*

Thoma Bravo Discover Fund LP
Thoma Bravo Discover Fund II LP
Thoma Bravo Fund X
Thoma Bravo Fund XI LP
Thoma Bravo Fund XII LP
Thoma Bravo Fund XIII LP
Thoma Bravo Special Opportunities Fund I LP
Thoma Bravo Special Opportunities Fund II LP
Thomas H. Lee VI
TPG Partners III
TPG Partners IV
TPG Partners V
TPG Partners VI
Trident VII LP
TSG5 LP
TSG6 LP
TSG7 A LP
TSG7 B LP
TSG8 LP
Valhalla Partners II LP
Valor Equity Partners IV LP
VantagePoint NY Venture Partners
VantagePoint Venture Partners 2006
VantagePoint Venture Partners IV
VCFA Private Equity Partners IV
Veritas Capital Buyout Fund VI LP
Vista Equity Partners Fund IV
Warburg Pincus Private Equity VIII
Waud Capital Partners III LP
Waud Capital Partners IV LP
Welsh, Carson, Anderson, & Stowe X
Wynnchurch Capital Partners III LP

High Yield Bonds:

Columbia Management Investment Advisors LLC
J.P. Morgan Asset Management
Nomura Corp. Research and Asset Mgt. Inc.

Global Bonds:

Goldman Sachs Asset Management LP
Loomis, Sayles & Company
Wellington Management Company LLP

Real Estate Debt:

Managers:

BlackRock Financial Management Inc.
Prima Capital Advisors LLC
Raith Capital Partners LLC

Fund Investments:

Barings Real Estate Credit Strategies Account-NY LP
Blackstone Real Estate Debt Strategies II LP

Real Estate Debt: *(continued)*

Fund Investments: *(continued)*

Blackstone Real Estate Debt Strategies High-Grade LP
Brookfield Real Estate Finance Fund IV LP
Brookfield Real Estate Finance Fund V LP
Brookfield Senior Mezzanine Real Estate Finance Fund LP
Brookfield Senior Real Estate Finance Account (N) LP
Capri Select Income II
Cornerstone Enhanced Mortgage Fund I LP
GCM Grosvenor - NYSTRS Debt Inv. Partners LP
GCM Grosvenor - NYSTRS Debt Inv. Partners LP 2018-1
Latitude Management Real Estate Investors II Inc.
Madison Realty Capital Debt Fund III LP
PCCP First Mortgage Fund II LP
PCCP Mezzanine Recovery Partners I LP
PCCP Mezzanine Recovery Partners II LP
Pramerica Real Estate Capital IV LP
Prima Capital Advisors LLC
Sullivan Debt Fund LP
TCI Real Estate Partners Fund II LP
Torchlight Debt Opportunity Fund II LLC

Private Debt:

Fund Investments:

ABRY Advanced Securities Fund II
ABRY Advanced Securities Fund III
ABRY Advanced Securities Fund IV
ABRY Mezzanine Partners
ABRY Senior Equity Fund II
ABRY Senior Equity Fund III
ABRY Senior Equity Fund IV
ABRY Senior Equity Fund V
AG Capital Recovery Partners VII LP
Caltius Partners IV LP
Clearlake Opportunities Partners LP
Clearlake Opportunities Partners II LP
Hutton Collins Capital Partners II LP
Hutton Collins Capital Partners III LP
ICG Europe Fund V
ICG Europe Fund VI
ICG Europe Fund VII
ICG North American Private Debt Fund II LP
MGG SF Evergreen Fund LP
Oaktree European Principal Fund III LP
Orion Energy Credit Opportunities Fund II LP
Peninsula Fund V
WCAS Capital Partners IV

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Actuarial

SHARED ACCOUNTABILITY

At NYSTRS, we believe each member of our team is individually and collectively responsible for excellence and exceptional customer service. We set and exceed high standards, and work together to reach common goals. We are accountable in every way and go the extra mile every day.

Actuarial

Page

ACTUARIAL CERTIFICATION LETTER

New York State Teachers' Retirement System
10 Corporate Woods Drive
Albany, NY 12211-2395
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NYSTRS.org
Thomas K. Lee, Executive Director & CIO

Office of the Actuary

October 18, 2019

Retirement Board
New York State Teachers' Retirement System
10 Corporate Woods Drive
Albany, New York 12211-2395

Dear Members of the Board:

The financial objective of the New York State Teachers' Retirement System is to properly fund the retirement and ancillary benefits of members in order to ensure sufficient assets are being accumulated in order to pay benefits as they become due. The Retirement System is a cost-sharing multiple-employer defined benefit pension plan. Employer contributions are made by participating employers in accordance with an actuarially determined employer contribution rate. This rate is determined by an actuarial valuation made as of each June 30th. Members contribute in accordance with a fixed rate schedule as required by statute.

The most recently completed actuarial valuation was made as of June 30, 2018. This valuation relies on member data provided by the participating employers to the Retirement System. The administrative and actuarial staffs review this data for reasonability as well as reconcile it against prior data. In addition, the valuation relies on financial data provided by the Retirement System's Finance Department. The Retirement System's independent auditors provide reasonable assurances of the data provided by the Finance Department as part of the annual audit. We believe the member and financial data to be reasonable and appropriate for purposes of this valuation. Plan provisions are summarized in both the introduction section and the financial section of this report.

Actuarial assumptions, as adopted by the Retirement Board, are reviewed each year against experience on both an annual and quinquennial basis and changes are recommended when warranted. Assumptions are typically revised every five years. The current actuarial assumptions, other than the valuation rate of interest, were adopted by the Retirement Board in October 2015 and first effective with the June 30, 2015 actuarial valuation. A new valuation rate of interest was adopted by the Retirement Board in October 2017, lowering the rate from 7.50% to 7.25% effective with the June 30, 2017 actuarial valuation.

The actuarial funding method is the Aggregate Cost Method and is specified in statute. In this method, actuarial gains and losses are not separately amortized, but are spread as part of the annual normal rate calculation over the present value of future salaries of active members. This method is an appropriate contribution allocation procedure for the purpose of ongoing plan funding and having sufficient assets to pay benefits as they become due. A summary of the actuarial methods and assumptions used in the actuarial valuation is included later in this section. More detail on the valuation and actuarial methods and assumptions is available in the System's Actuarial Valuation Report. The actuarial cost method for funding differs from that used for financial reporting purposes.

The System's market value rate of return on assets for the fiscal year ending June 30, 2018 was 9.0%. The System's five-year annualized rate of return stood at 9.3%. The June 30, 2018 actuarial valuation produced a required employer contribution rate of 8.86% of payroll, representing a decrease of approximately 17% over the prior year's rate of 10.62%. The System's actuarial gain on investments was the primary reason for the decrease in the employer contribution rate.

ACTUARIAL CERTIFICATION LETTER *(continued)*

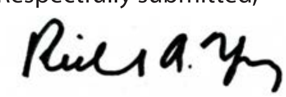
Looking ahead to next year, the capital markets produced a modest return during the fiscal year ending June 30, 2019, and the System achieved a net rate of return of 7.1% for the fiscal year. This will bring the System's five-year annualized rate of return to 7.2%. The actuarial value of assets smoothing process recognizes gains and losses gradually over a five-year period thereby moderating their impact on the employer contribution rate.

As of this date the Retirement System is contemplating a lowering of its assumed rate of return to 7.1% for the actuarial valuation as of June 30, 2019. Additionally the Retirement System is considering lowering its expected COLA increase assumption to 1.3% and updating its mortality improvement scale to MP-2018. The next scheduled revision of all other actuarial assumptions is expected to be implemented for the June 30, 2020 actuarial valuation.

The plan's funded ratio as of June 30, 2018, calculated using the Actuarial Value of Assets (AVA) was 99.2% and calculated using the Market Value of Assets (MVA) was 100.9%. While the funded ratios will fluctuate from year to year, a funded ratio of 100% is desirable and indicative of a well-funded System. The primary reason for this healthy funded ratio is that in accordance with statute the System has collected the actuarially-required contribution annually from employers. The significance of this cannot be overstated. It does not, however, imply that future contributions will not be required. A ten-year schedule of actuarially determined and actual contributions made are provided as required supplementary information in the financial section. Various exhibits in this section provide further information on the actuarial assets, liabilities, and the funding level.

All actuarial calculations have been prepared using actuarial assumptions and methods determined in accordance with generally accepted actuarial principles, procedures, and standards of practice as prescribed by the Actuarial Standards Board, and Statements of the Governmental Accounting Standards Board, where applicable. All schedules in the Actuarial section were prepared under my direction. Specifically these schedules consist of the Summary of Actuarial Methods and Assumptions, Actuarial Present Value of Future Benefits, Analysis of Funding Progress, Percent Funded, Solvency Test, Analysis of Financial Experience, History of Member Payroll and the Employer Contribution Rate, and Schedule of Retired Members and Beneficiaries Added to and Removed from the Benefit Payroll. I am a member of the Society of Actuaries and the American Academy of Actuaries and meet the qualification standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Respectfully submitted,



Richard A. Young, A.S.A., E.A., M.A.A.A., F.C.A.
Actuary

cc: T. Lee

SUMMARY OF PLAN PROVISIONS AND ACTUARIAL METHODS AND ASSUMPTIONS — as of June 30, 2018

Plan Provisions

Plan Provisions are summarized in the Introduction section and Notes to the Financial Statements. Detailed Plan Provisions are available in the annual Actuarial Valuation Report and online at NYSTRS.org. All Plan Provisions and all changes in Plan Provisions are valued as part of the Actuarial Valuation.

Methods

Actuarial funding method:	Aggregate Cost Method (gains and losses are smoothed over the average future working lifetime of active members). All benefits are included in the actuarial valuation. See *Summary of Benefits* in the Introduction.
Actuarial asset valuation method:	Five-year phased in deferred recognition of each year's net investment income/loss, in excess of (or less than) the assumed gain for each year in the five-year period.

Assumptions

Assumptions are computed by the Actuary and adopted by the Retirement Board. They are based upon recent NYSTRS member experience. Selected sample rates are shown below. Adoption dates are shown in parentheses. Detailed assumption information may be found in NYSTRS' annual Actuarial Valuation Report.

Valuation Rate of Interest (10/2017)
7.25% compounded annually. The valuation rate of interest contains a 2.25% assumed annual rate of inflation.

Rates of Salary Increase (10/2015) Including Cost-of-Living, Merit and Productivity	
Years of Service	
5	4.72%
15	3.46
25	2.37
35	1.90

Projected COLA Rate (10/2015)
1.5% annually

Base Rates of Mortality (10/2015)

Male Age	Active Members	Male Age	Retired Members & Beneficiaries*	Male Age	Disabled Members*
30	0.03%	20	0.03%	30	18.00%
40	0.05	40	0.05	40	13.29
50	0.08	60	0.39	60	4.26
60	0.20	80	4.04	80	7.56
Female Age		Female Age		Female Age	
30	0.01%	20	0.01%	30	10.65%
40	0.02	40	0.04	40	8.19
50	0.06	60	0.29	60	3.13
60	0.10	80	2.82	80	7.40

Rates of Withdrawal (10/2015) Ten-Year Ultimate Rates

Male Age	
35	0.85%
40	0.75
45	0.87
50	0.92
Female Age	
35	1.88%
40	1.15
45	1.01
50	0.94

Rates of Service Retirement (10/2015)

Male Age	Tier 1 & Tiers 2-4 age 62 or with 30 years of service & Tier 5 age 62	Tiers 2-4 less than age 62 & less than 30 years of service	Tier 5 less than age 62 & less than 30 years of service	Tier 5 less than age 62 & with 30 years of service	Tier 6
55	30.67%	3.20%	1.60%	1.60%	1.60%
60	31.10	6.36	3.18	25.94	3.18
65	20.97	—	—	—	25.24
70	16.36	—	—	—	27.03
Female Age					
55	31.40%	3.46%	1.73%	1.73%	1.73%
60	27.94	7.04	3.52	26.10	3.52
65	23.83	—	—	—	26.95
70	22.93	—	—	—	25.72

Rates of Disability Retirement (10/2015)

Male Age	
35	0.01%
40	0.02
45	0.05
50	0.09
Female Age	
35	0.01%
40	0.02
45	0.05
50	0.10

No assumption is made for optional forms of benefit available at retirement because options are actuarially equivalent to the single life benefit.

There are no other specific assumptions or significant events that have a material impact on the most recent Actuarial Valuation.

*Future annuitant mortality rates are the annuitant mortality base rates adjusted for mortality improvement using Society of Actuaries Scale MP-2014.

ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS — as of June 30, 2018 and June 30, 2017

(in thousands)

Each year an actuarial valuation determines the actuarial present value of future benefits (PVB), which is the present value of retirement and ancillary benefit payments, excluding group life insurance benefits, that the Retirement System can expect to pay in the future to current retirees and members. The PVB is based upon both service and salary projected to retirement. The results of the two most recent actuarial valuations are displayed in the following table.

	2018	2017
Present Value of Benefits Currently Being Paid:		
Service Retirement Benefits	$ 63,093,963	$ 61,860,357
Disability Retirement Benefits	357,913	348,674
Death Benefits	2,287	1,892
Survivor Benefits	1,063,411	1,006,708
Cost-of-Living Allowance	5,242,492	5,190,639
Total Present Value of Benefits Currently Being Paid	69,760,066	68,408,270
Present Value of Benefits Payable in the Future to Current Active Members:		
Service Retirement Benefits	56,167,649	54,353,782
Disability Retirement Benefits	232,210	225,220
Termination Benefits	2,188,574	2,142,148
Death and Survivor Benefits	396,140	379,665
Cost-of-Living Allowance	1,415,449	1,393,242
Total Active Member Liabilities	60,400,022	58,494,057
Present Value of Benefits Payable in the Future to Current Inactive (Vested) Members:		
Retirement Benefits	377,266	368,451
Death Benefits	319	317
Cost-of-Living Allowance	32,016	31,411
Total Vested Liabilities	409,601	400,179
Unclaimed Funds	17,701	16,617
Total Actuarial Present Value of Future Benefits	**$ 130,587,390**	**$ 127,319,123**

Note: Totals may not sum due to rounding.

FUNDING PROGRESS

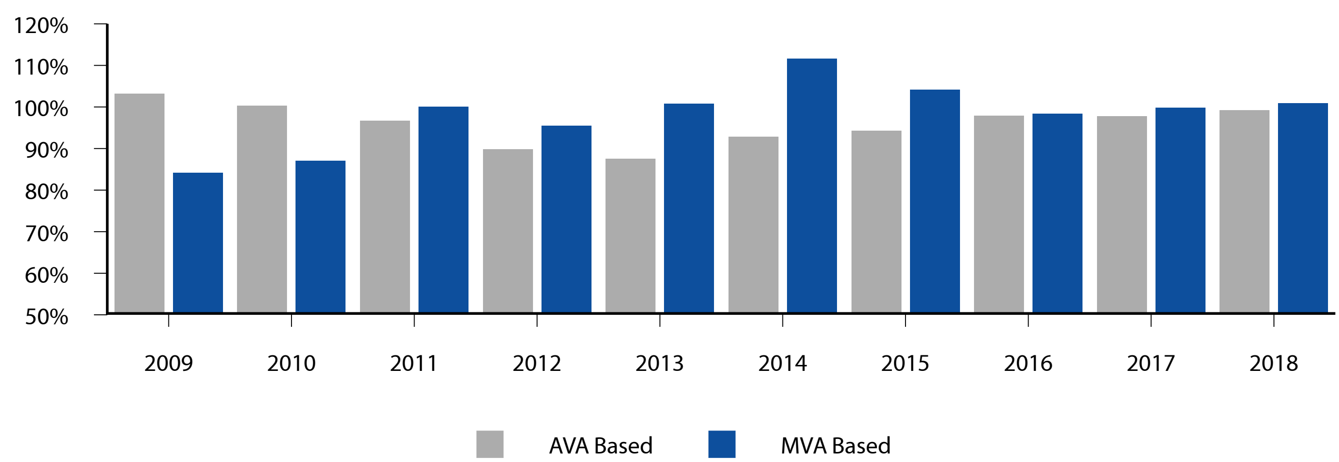
The portion of the actuarial present value of future benefits that is attributed to service rendered as of the valuation date is known as the actuarial accrued liability. In order to effectively assess the funding progress of a retirement system, it is necessary to compare the ratio of plan assets to the actuarial accrued liability over a period of time. Plan assets can be expressed as the market value of assets or as the actuarial value of assets. The market value of assets represents the market value of investments as of a particular date. The actuarial value of assets smooths the volatility inherent in the market value of assets by phasing in unexpected gains and losses over a period of five years, and represents more of an average value. The Retirement System's funding method has allowed the accumulation of assets appropriate for the funding of its liabilities in a systematic and reasonable manner.

ANALYSIS OF FUNDING PROGRESS

(in millions)

Fiscal Year Ended	Market Value of Assets (MVA)	Actuarial Value of Assets (AVA)[1]	Actuarial Accrued Liability[2]	Unfunded Actuarial Accrued Liability (Surplus)	Annual Member Payroll	Unfunded Actuarial Accrued Liability as a Percentage of Payroll	Percent Funded Based On MVA	Percent Funded Based On AVA
2009	$72,471.8	$88,805.5	$86,062.0	$(2,743.5)	$14,366.4	(19.1)%	84.2%	103.2%
2010	76,844.9	88,544.4	88,318.8	(225.6)	14,792.1	(1.5)	87.0	100.3
2011	89,889.7	86,892.2	89,824.9	2,932.7	14,732.9	19.9	100.1	96.7
2012	88,056.3	82,871.4	92,250.9	9,379.5	14,640.8	64.1	95.5	89.8
2013	95,367.0	82,742.5	94,583.8	11,841.3	14,647.8	80.8	100.8	87.5
2014	108,155.1	90,007.1	96,904.5	6,897.4	14,771.3	46.7	111.6	92.9
2015	109,718.9	99,301.8	105,401.8	6,100.0	15,021.4	40.6	104.1	94.2
2016	107,506.1	107,039.2	109,305.1	2,265.9	15,431.0	14.7	98.4	97.9
2017	115,468.4	113,059.7	115,672.5	2,612.8	15,846.7	16.5	99.8	97.7
2018	119,915.5	117,859.5	118,861.1	1,001.6	16,288.9	6.1	100.9	99.2

PERCENT FUNDED



[1] The Retirement System's asset valuation method was changed effective with the June 30, 2015 actuarial valuation.

[2] Effective June 30, 2006, the Actuarial Accrued Liability is calculated under the Entry Age Normal Cost Method, including the Group Life Insurance Fund, as was required by Governmental Accounting Standards Board (GASB) Statement No. 50 prior to its replacement by GASB Statement No. 67. The System is funded in accordance with the Aggregate Cost Method. GASB Statement No. 50 required that the Entry Age Normal Cost Method be used to calculate the accrued liability for purposes of presenting the funded percentage.

SOLVENCY TEST

(in millions)

Fiscal Year Ended	Aggregate Accrued Liabilities* for: Active Member Accumulated Contributions (A)	Current Retired Members and Beneficiaries (B)	Service Rendered by Active Members (Employer-Financed Portion) (C)	Actuarial Value of Assets (D)	Percentage of Aggregate Accrued Liabilities Covered by Actuarial Value of Assets (A)	(B)	(C)
2009	$3,665.9	$49,091.3	$33,304.8	$88,805.5	100.0%	100.0%	108.2%
2010	4,016.4	50,546.3	33,756.1	88,544.4	100.0	100.0	100.7
2011	4,111.2	54,635.2	31,078.5	86,892.2	100.0	100.0	90.6
2012	4,256.4	56,197.6	31,796.9	82,871.4	100.0	100.0	70.5
2013	4,366.3	57,681.9	32,535.6	82,742.5	100.0	100.0	63.6
2014	4,457.8	59,190.2	33,256.5	90,007.1	100.0	100.0	79.3
2015	4,555.1	64,504.9	36,341.8	99,301.8	100.0	100.0	83.2
2016	4,657.8	65,858.4	38,788.9	107,039.2	100.0	100.0	94.2
2017	4,751.2	68,736.2	42,185.1	113,059.7	100.0	100.0	93.8
2018	4,844.9	70,128.9	43,887.3	117,859.5	100.0	100.0	97.7

**NYSTRS is funded in accordance with the Aggregate Cost Method. The accrued liabilities in this chart are calculated in accordance with the Entry Age Normal Cost Method for purposes of disclosing the funded ratio.*

ANALYSIS OF FINANCIAL EXPERIENCE

The table below shows, for each potentially significant experience source, the effect on the employer contribution rate due to the difference between actual experience and that predicted by the actuarial assumptions.

Experience Source	Change in the Employer Contribution Rate during Fiscal Year Ended June 30, 2018	June 30, 2017
Revised Actuarial Assumptions:	0.00%	+3.38%
Net Investment Gain:	-1.30	-2.38
Salary/Service:	+0.12	+0.16
New Entrants:	-0.11	-0.08
Withdrawal:	-0.04	-0.03
Mortality:	+0.01	+0.03
Retirement:	-0.16	-0.15
Pension Payments:	-0.02	-0.02
Cost-of-Living Adjustment:	-0.05	-0.08
Change in the Administrative Rate:	0.00	-0.01
Miscellaneous:	-0.21	0.00
Total Change in Employer Contribution Rate	**-1.76%**	**+0.82%**
Employer Contribution Rate at Prior Year End	10.62%	9.80%
Employer Contribution Rate at Year End	8.86%	10.62%

HISTORY OF MEMBER PAYROLL AND THE EMPLOYER CONTRIBUTION RATE*

Fiscal Year Ended	Participating Employers	Active Members	Annual Member Payroll (in millions)	Percentage Increase In Annual Member Payroll	Average Full-Time Member Salary	Percentage Increase in Average Full-Time Member Salary	Employer Contribution Rate (Percent of Payroll)
2010	826	285,774	$14,792.1	3.0%	$71,225	3.6%	6.19%
2011	826	280,435	14,732.9	-0.4	72,947	2.4	8.62
2012	825	277,273	14,640.8	-0.6	74,922	2.7	11.11
2013	827	273,328	14,647.8	0.0	76,348	1.9	11.84
2014	824	270,039	14,771.3	0.8	77,585	1.6	16.25
2015	822	267,715	15,021.4	1.7	78,695	1.4	17.53
2016	821	266,350	15,431.0	2.7	79,813	1.4	13.26
2017	822	264,761	15,846.7	2.7	80,951	1.4	11.72
2018	824	264,590	16,288.9	2.8	82,071	1.4	9.80
2019	823	263,517	16,691.6	2.5	84,078	2.4	10.62

*For recent changes in the actuarial methods and assumptions, plan provisions, or significant events, please refer to the annual Actuarial Valuation Report and the Report on Recommended Actuarial Assumptions.

SCHEDULE OF RETIRED MEMBERS AND BENEFICIARIES ADDED TO AND REMOVED FROM THE BENEFIT PAYROLL*

	Number of Retired Members and Beneficiaries		Annual Benefit of Retired Members and Beneficiaries						
Fiscal Year Ended	Added During the Year	Removed During the Year	Added During the Year	Removed During the Year	Total Number of Retired Members and Beneficiaries	Total Annual Benefit**	Percentage Increase in Total Annual Benefit	Average Annual Benefit	Percentage Increase in Average Annual Benefit
2010	5,879	3,460	$287,886,459	$88,868,015	141,716	$5,455,153,878	3.79%	$38,494	2.0%
2011	8,873	3,746	469,318,353	97,889,187	146,843	5,826,583,044	6.81	39,679	3.1
2012	6,463	3,494	319,324,379	96,522,713	149,812	6,049,384,710	3.82	40,380	1.8
2013	6,776	3,766	327,889,400	104,595,554	152,822	6,272,678,556	3.69	41,046	1.6
2014	7,003	3,894	332,495,800	110,681,561	155,931	6,494,492,795	3.54	41,650	1.5
2015	6,679	4,152	314,972,220	123,973,317	158,458	6,685,491,698	2.94	42,191	1.3
2016	6,719	4,029	318,693,576	122,540,821	161,148	6,881,644,453	2.93	42,704	1.2
2017	6,880	4,210	332,625,259	131,259,139	163,818	7,083,010,573	2.93	43,237	1.2
2018	6,951	4,484	342,878,955	144,338,778	166,285	7,281,550,750	2.80	43,790	1.3
2019	7,424	4,506	366,842,566	149,818,310	169,203	7,498,575,006	2.98	44,317	1.2

**Computed on the Maximum annual benefit including supplementation and COLA.*

***Annual benefits paid in this chart may differ from retirement benefit payments that appear elsewhere in this report because this chart reflects the rate of annual payment for retired members and their beneficiaries in pay as of the last day of the fiscal year.*

INDEPENDENT ACTUARIAL REVIEW

KPMG LLP
515 Broadway
Albany, NY 12207-2974

Retirement Board
New York State Teachers' Retirement System:

As part of our audit of the financial statements of the New York State Teachers' Retirement System (the System) as of and for the year ended June 30, 2019, we performed procedures over the actuarial assumptions, methods, and procedures used by the System's Actuary to calculate the employer contributions for the System to determine the reasonableness of the employer contributions reported in the System's June 30, 2019 basic financial statements. As part of those procedures, an actuary from our firm reviewed the following for reasonableness as compared to Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations, as adopted by the Actuarial Standards Board:

- The actuarial assumptions, methods and procedures described in the System's Actuarial Valuation Report as of June 30, 2017, used to derive the resultant employer contribution rate of 10.62% applied to employer payroll for the fiscal year ended June 30, 2019.

- The methodology used to estimate the payroll as of June 30, 2019, from which the employer contributions for the fiscal year ended June 30, 2019 and the related employer contribution receivable as of June 30, 2019 are derived.

- The System's Experience Studies as of June 30, 2017, and the opinions of the System's Actuary presented thereon.

Based on the results of the above procedures, we determined that the methods, procedures, and actuarial assumptions used to develop the employer contributions reported in the System's 2019 basic financial statements appeared reasonable in the context of ASOP No. 4.

This report is intended solely for the use of the New York State Teachers Retirement System and should not be used for any other purpose.

KPMG LLP

October 31, 2019

Statistical

CUSTOMER SERVICE

Our commitment is to the customer. We understand our connection to all System stakeholders and strive to put their needs before our own. Staff is expected to contribute to a culture of excellence, as well as look for better ways to serve.

Statistical

The objective of the statistical section is to provide financial statement users with historical perspective, context and detail to assist in using the information in the financial statements, notes to financial statements, and required supplementary information to better understand and assess the economic condition of NYSTRS. This section relies on a snapshot of member data provided by the participating employers to the Retirement System taken at the end of each fiscal year.

DEMOGRAPHIC & ECONOMIC INFORMATION

The schedules on pages 111-123 are intended to assist users in understanding the environment within which NYSTRS operates and to provide information that facilitates comparison of financial statement information over time and among similar entities. The demographic and economic information schedules presented are:

FINANCIAL TRENDS INFORMATION

The schedules on pages 124-127 are intended to assist users in understanding and assessing how the financial position of NYSTRS has changed over time. The financial trend schedules presented are:

OPERATING INFORMATION

The schedules on pages 128-133 are intended to provide contextual information about the operations and resources of NYSTRS to assist readers in using financial statement information. The operating information schedules are:

Demographic & Economic Information

ACTIVE MEMBERS:

	Male	Female	Total
June 30, 2018	62,252	202,338	**264,590**
Changes During Year:			
Added	2,595	9,679	**12,274**
Withdrawn	1,512	4,768	**6,280**
Retired	1,397	5,493	**6,890**
Died	67	110	**177**
June 30, 2019	61,871	201,646	**263,517**

MEMBERS RETIRED FOR:

	Service*			Disability				Total		
	Male	Female	Total	Male	Female	Total		Male	Female	Total
June 30, 2018	49,561	108,372	**157,933**	458	1,658	**2,116**		50,019	110,030	**160,049**
Changes During Year:										
Retired	1,379	5,413	**6,792**	18	80	**98**		1,397	5,493	**6,890**
Died	1,542	2,289	**3,831**	35	75	**110**		1,577	2,364	**3,941**
Lump Sum	30	151	**181**	0	0	**0**		30	151	**181**
Restored to Active Membership	0	0	**0**	2	8	**10**		2	8	**10**
June 30, 2019	49,368	111,345	**160,713**	439	1,655	**2,094**	**	49,807	113,000	**162,807**

BENEFICIARIES OF DECEASED:

	Service Annuitants			Disability Annuitants			Active Members			Total		
	Male	Female	Total	Male	Female	Total	Male	Female	Total	Male	Female	Total
June 30, 2018	1,350	4,504	**5,854**	107	161	**268**	25	89	**114**	1,482	4,754	**6,236**
Changes During Year:												
Added	157	366	**523**	5	6	**11**	0	0	**0**	162	372	**534**
Died	84	275	**359**	3	5	**8**	2	5	**7**	89	285	**374**
June 30, 2019	1,423	4,595	**6,018**	109	162	**271**	23	84	**107**	1,555	4,841	**6,396**

SUMMARY:

	Male	Female	Total
Active Members	61,871	201,646	**263,517**
Retired Members	49,807	113,000	**162,807**
Beneficiaries	1,555	4,841	**6,396**
Total	113,233	319,487	**432,720**

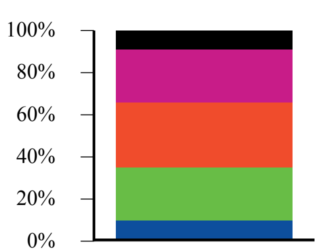
**Also includes vested retirees.*
***Includes 18 males and 41 females retired for disability who receive a service benefit.*

DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND YEARS OF SERVICE*— as of June 30, 2019

		Years of Credited Service				
Age		**0-5**	**6-10**	**11-15**	**16-20**	**21-25**
20-24	**Number of Members**	**5,939**	**0**	**0**	**0**	**0**
	Average Salary	*$41,063*	*$0*	*$0*	*$0*	*$0*
25-29	**Number of Members**	**20,266**	**1,354**	**0**	**0**	**0**
	Average Salary	*$52,865*	*$64,490*	*$0*	*$0*	*$0*
30-34	**Number of Members**	**17,837**	**10,410**	**2,011**	**3**	**0**
	Average Salary	*$56,981*	*$67,492*	*$77,522*	*$75,496*	*$0*
35-39	**Number of Members**	**10,701**	**7,608**	**15,046**	**2,734**	**1**
	Average Salary	*$56,298*	*$68,065*	*$82,290*	*$93,666*	*$116,234*
40-44	**Number of Members**	**7,576**	**4,993**	**8,935**	**16,572**	**1,783**
	Average Salary	*$52,468*	*$66,790*	*$85,403*	*$98,076*	*$106,390*
45-49	**Number of Members**	**6,589**	**4,665**	**5,556**	**11,137**	**12,190**
	Average Salary	*$48,037*	*$62,500*	*$80,016*	*$99,288*	*$107,488*
50-54	**Number of Members**	**5,318**	**4,142**	**4,769**	**6,292**	**8,006**
	Average Salary	*$45,043*	*$56,124*	*$71,442*	*$92,037*	*$106,461*
55-59	**Number of Members**	**3,634**	**2,544**	**3,611**	**5,022**	**4,269**
	Average Salary	*$43,048*	*$54,466*	*$65,605*	*$82,227*	*$97,771*
60-64	**Number of Members**	**2,121**	**1,242**	**1,899**	**3,392**	**3,009**
	Average Salary	*$45,148*	*$54,151*	*$63,731*	*$77,967*	*$92,189*
65-69	**Number of Members**	**912**	**555**	**623**	**1,125**	**1,035**
	Average Salary	*$44,260*	*$62,617*	*$67,440*	*$80,324*	*$90,873*
70+	**Number of Members**	**448**	**181**	**180**	**215**	**203**
	Average Salary	*$35,782*	*$49,409*	*$56,573*	*$70,705*	*$76,471*
Total	**Number of Members**	**81,341**	**37,694**	**42,630**	**46,492**	**30,496**
	Average Salary	*$52,469*	*$65,250*	*$79,138*	*$93,671*	*$103,562*

**Average salary data is for the 192,623 members who earned a full year of service. The average salary for all active members, full-time and part-time, is $75,458.*

DISTRIBUTION OF ACTIVE MEMBERS BY AGE — as of June 30, 2019



Age Group	Percent
60+ Years of Age	**9%**
50-59 Years of Age	**25%**
40-49 Years of Age	**31%**
30-39 Years of Age	**25%**
20-29 Years of Age	**10%**

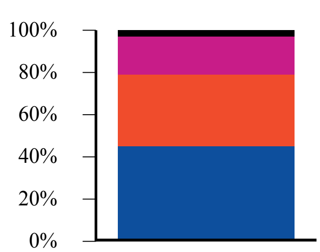
Averages — as of June 30, 2019

Gender	Age	Years of Service
Female	44	12
Male	44	13

DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND YEARS OF SERVICE* — as of June 30, 2019 *(continued)*

Years of Credited Service						
26-30	31-35	36-40	41-45	46-50	51+	Total
0	**0**	**0**	**0**	**0**	**0**	**5,939**
$0	*$0*	*$0*	*$0*	*$0*	*$0*	*$41,063*
0	**0**	**0**	**0**	**0**	**0**	**21,620**
$0	*$0*	*$0*	*$0*	*$0*	*$0*	*$54,105*
0	**0**	**0**	**0**	**0**	**0**	**30,261**
$0	*$0*	*$0*	*$0*	*$0*	*$0*	*$64,280*
0	**0**	**0**	**0**	**0**	**0**	**36,090**
$0	*$0*	*$0*	*$0*	*$0*	*$0*	*$76,396*
0	**0**	**0**	**0**	**0**	**0**	**39,859**
$0	*$0*	*$0*	*$0*	*$0*	*$0*	*$88,489*
1,129	**2**	**0**	**0**	**0**	**0**	**41,268**
$110,765	*$87,091*	*$0*	*$0*	*$0*	*$0*	*$93,964*
7,568	**1,137**	**1**	**0**	**0**	**0**	**37,233**
$111,223	*$112,884*	*$134,228*	*$0*	*$0*	*$0*	*$94,501*
4,526	**3,911**	**257**	**0**	**0**	**0**	**27,774**
$108,842	*$114,787*	*$118,716*	*$0*	*$0*	*$0*	*$91,567*
2,334	**1,339**	**704**	**78**	**1**	**0**	**16,119**
$103,833	*$114,927*	*$121,493*	*$131,212*	*$128,409*	*$0*	*$88,680*
657	**372**	**196**	**139**	**28**	**0**	**5,642**
$98,853	*$111,289*	*$120,291*	*$130,457*	*$134,505*	*$0*	*$89,348*
150	**130**	**74**	**48**	**56**	**27**	**1,712**
$89,391	*$87,472*	*$111,156*	*$134,981*	*$135,890*	*$145,859*	*$84,309*
16,364	**6,891**	**1,232**	**265**	**85**	**27**	**263,517**
$108,797	*$113,795*	*$120,117*	*$131,502*	*$135,345*	*$145,859*	*$84,078*

DISTRIBUTION OF ACTIVE MEMBERS BY SERVICE — as of June 30, 2019

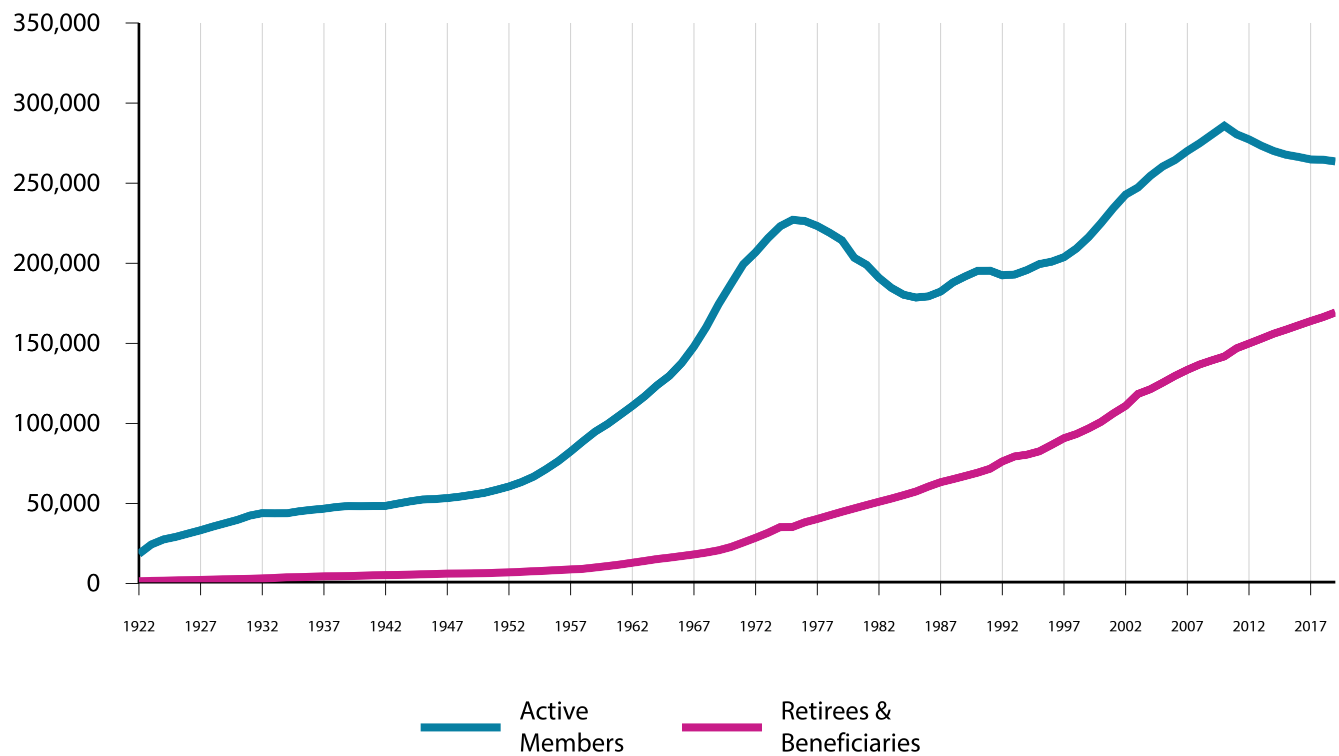


Service Group	Percent
31+ Years of Service	3%
21-30 Years of Service	18%
11-20 Years of Service	34%
0-10 Years of Service	45%

ACTIVE MEMBERS AND ANNUITANTS 1922-2019

As of June 30	Active Members	Retirees & Beneficiaries	As of June 30	Active Members	Retirees & Beneficiaries
1922	18,412	1,296	1970	186,914	22,700
1925	29,057	1,815	1975	227,038	35,252
1930	39,663	2,732	1980	203,330	46,812
1935	45,031	3,919	1985	178,516	57,366
1940	48,193	4,771	1990	195,194	69,127
1945	52,359	5,637	1995	199,398	82,459
1950	56,504	6,374	2000	224,986	100,839
1955	71,273	7,897	2005	260,356	125,325
1960	99,555	10,796	2010	285,774	141,716
1965	129,543	16,043	2015	267,715	158,458
			2019	263,517	169,203

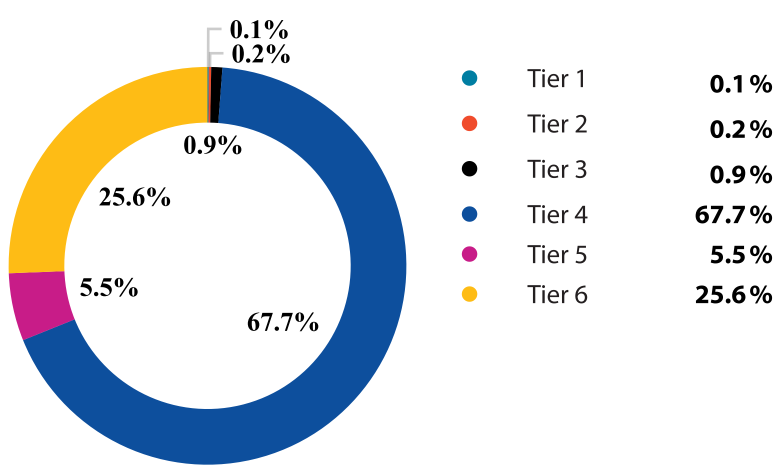
See related graph below.



NUMBER OF ACTIVE MEMBERS BY TIER

As of June 30	Tier 1	Tier 2	Tier 3	Tier 4	Tier 5	Tier 6	Total
2000	47,234	15,700	20,159	141,893	0	0	224,986
2001	41,169	15,472	19,914	157,795	0	0	234,350
2002	35,601	15,121	19,674	172,438	0	0	242,834
2003	28,327	14,463	19,083	185,374	0	0	247,247
2004	22,986	13,947	18,835	198,747	0	0	254,515
2005	17,901	13,210	18,535	210,710	0	0	260,356
2006	13,621	12,084	18,173	220,532	0	0	264,410
2007	10,838	10,178	17,743	231,286	0	0	270,045
2008	8,630	8,171	17,007	241,093	0	0	274,901
2009	6,943	6,752	16,111	250,532	0	0	280,338
2010	5,582	5,706	14,942	255,966	3,578	0	285,774
2011	3,814	4,137	12,690	247,530	12,264	0	280,435
2012	2,756	3,253	11,180	239,199	19,969	916	277,273
2013	1,968	2,447	9,450	231,258	19,452	8,753	273,328
2014	1,439	1,810	7,753	222,545	19,124	17,368	270,039
2015	1,116	1,348	6,222	214,020	18,878	26,131	267,715
2016	832	974	4,920	204,912	18,540	36,172	266,350
2017	607	720	3,881	195,226	17,722	46,605	264,761
2018	446	546	2,993	186,581	16,499	57,525	264,590
2019	349	403	2,276	178,516	14,595	67,378	263,517

ACTIVE MEMBERS BY TIER



MEMBERS RETIRED IN 2018-2019 FOR:

	Service*	Disability
Number Retired	**6,792**	**98**
Age at Retirement:		
Average	61 yrs., 0 mos.	51 yrs., 4 mos.
Median	61 yrs., 1 mo.	51 yrs., 3 mos.
Years of Service:		
Average	25 yrs., 1 mo.	18 yrs., 6 mos.
Median	27 yrs., 3 mos.	18 yrs., 0 mos.
**Benefit:		
Average	$45,713	$29,949
Median	$47,621	$28,643
Final Average Salary (FAS):		
Average	$87,085	$85,500
Median	$86,737	$83,915
***Benefit as % of FAS:		
Average	47.25%	34.34%
Median	53.33%	33.33%

MEMBERS RETIRED IN 2018-2019 FOR SERVICE* WITH:

	Less Than 10 Yrs. Svc.	10 or More Yrs. and Less Than 20 Years Svc.	20 or More Yrs. and Less Than 30 Yrs. Svc.	30 or More Yrs. Svc.
Number Retired	**531**	**1,075**	**2,218**	**2,968**
Age at Retirement:				
Average	61 yrs., 4 mos.	60 yrs., 11 mos.	62 yrs., 10 mos.	59 yrs., 8 mos.
Median	60 yrs., 4 mos.	61 yrs., 0 mos.	62 yrs., 9 mos.	58 yrs., 9 mos.
Years of Service:				
Average	7 yrs., 0 mos.	14 yrs., 5 mos.	24 yrs., 1 mo.	33 yrs., 0 mos.
Median	7 yrs., 0 mos.	14 yrs., 7 mos.	24 yrs., 0 mos.	32 yrs., 0 mos.
**Benefit:				
Average	$3,419	$12,646	$40,722	$68,986
Median	$2,989	$9,927	$39,424	$64,696
Final Average Salary (FAS):				
Average	$34,396	$56,813	$87,803	$106,941
Median	$29,668	$51,865	$85,406	$99,564
***Benefit as % of FAS:				
Average	9.81%	21.58%	45.87%	64.27%
Median	9.80%	21.11%	45.11%	63.00%

**Also includes vested retirees.*
***The Maximum, even though the member may have chosen an option.*
****The average and median of individual benefits as percentages of final average salary.*

ALL RETIREES AS OF JUNE 30, 2019 RETIRED FOR:

	Service*	Disability
Number Retired	**160,772**	**2,035**
Age at Retirement:		
Average	58 yrs., 10 mos.	49 yrs., 7 mos.
Median	57 yrs., 10 mos.	50 yrs., 5 mos.
Age Attained as of June 30, 2019		
Average	73 yrs., 2 mos.	65 yrs., 7 mos.
Median	72 yrs., 2 mos.	66 yrs., 3 mos.
Years of Service:		
Average	28 yrs., 0 mos.	18 yrs., 4 mos.
Median	30 yrs., 2 mos.	17 yrs., 5 mos.
**Benefit:		
Average	$42,700	$21,149
Median	$43,025	$19,259
Final Average Salary (FAS):		
Average	$73,539	$58,349
Median	$71,973	$55,646
***Benefit as % of FAS:		
Average	53.86%	35.50%
Median	60.17%	33.33%

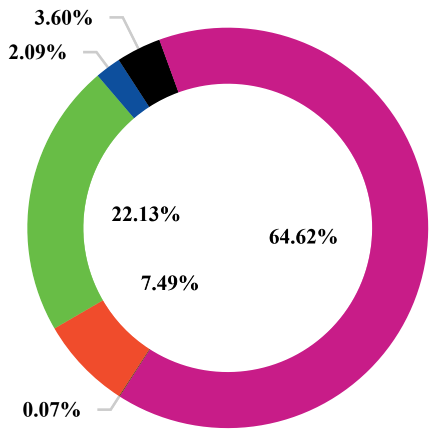
ALL RETIREES AS OF JUNE 30, 2019 RETIRED FOR SERVICE* WITH:

	Less Than 10 Yrs. Svc.	10 or More Yrs. and Less Than 20 Years Svc.	20 or More Yrs. and Less Than 30 Yrs. Svc.	30 or More Yrs. Svc.
Number Retired	**4,701**	**23,009**	**47,470**	**85,592**
Age at Retirement:				
Average	60 yrs., 5 mos.	59 yrs., 0 mos.	60 yrs., 0 mos.	58 yrs., 1 mo.
Median	59 yrs., 7 mos.	57 yrs., 5 mos.	60 yrs., 0 mos.	57 yrs., 1 mo.
Years of Service:				
Average	7 yrs., 3 mos.	14 yrs., 5 mos.	24 yrs., 7 mos.	34 yrs., 4 mos.
Median	7 yrs., 4 mos.	14 yrs., 4 mos.	25 yrs., 0 mos.	34 yrs., 0 mos.
**Benefit:				
Average	$4,165	$9,515	$33,283	$58,960
Median	$3,551	$7,381	$30,842	$55,417
Final Average Salary (FAS):				
Average	$39,986	$42,410	$69,147	$86,185
Median	$36,368	$35,536	$65,288	$81,595
***Benefit as % of FAS:				
Average	10.46%	21.83%	47.86%	68.18%
Median	10.04%	20.92%	48.44%	67.67%

**Also includes vested retirees.*
***The Maximum, even though the member may have chosen an option.*
****The average and median of individual benefits as percentages of final average salary.*

RETIREMENT BENEFIT OPTIONS AND PERCENT OF ELECTION

2015-2019 Retirees



Option	Number Electing	Percent of Election*
Maximum	20,748	64.62%
Annuity/Declining Reserve	23	0.07%
Joint & Survivor	2,404	7.49%
Pop-Up	7,104	22.13%
Guarantee	672	2.09%
Alternative	1,157	3.60%
Total	**32,108**	**100.00%**

**Percentages may not sum to 100% due to rounding.*

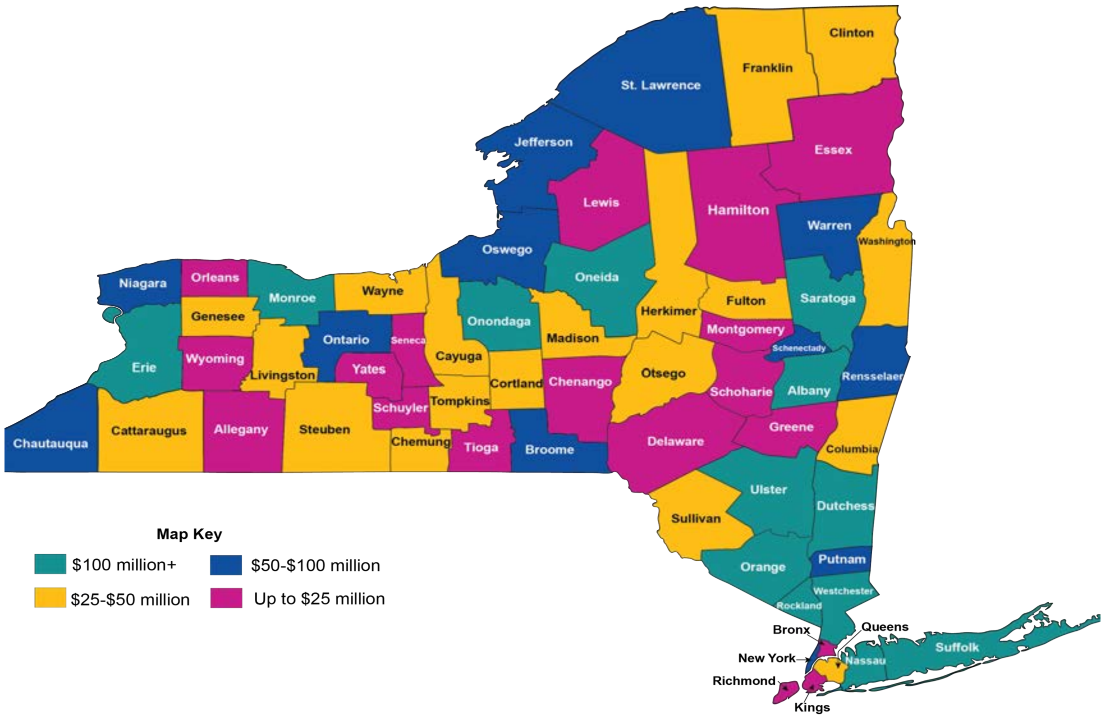
RETIRED MEMBERS' CHARACTERISTICS*

By Year of Retirement

Retired in Fiscal Year Ended	Number of Retired Members	Average Age at Retirement (yrs.- mos.)	Average Service at Retirement (yrs.- mos.)	Average Final Average Salary	Average Maximum Annual Benefit
2010	5,501	60-0	27-5	$79,615	$46,489
2011	8,423	60-3	28-7	85,010	51,200
2012	6,033	60-9	26-3	82,461	45,759
2013	6,330	60-10	25-6	81,987	44,768
2014	6,547	61-0	25-4	84,545	44,978
2015	6,161	60-11	25-4	84,362	44,487
2016	6,245	61-2	25-0	84,308	44,215
2017	6,396	61-3	25-0	85,242	45,049
2018	6,416	61-1	25-1	86,910	45,725
2019	6,890	61-0	25-1	87,085	45,713

**Averages are for service and vested retirees.*

DISTRIBUTION OF BENEFITS PAID BY COUNTY* — as of June 30, 2019



County	Retired Members and Beneficiaries	Annual Benefits Paid**	County	Retired Members and Beneficiaries	Annual Benefits Paid**	County	Retired Members and Beneficiaries	Annual Benefits Paid**
Albany	3,097	$124,697,270	Jefferson	1,367	$51,039,468	St. Lawrence	1,703	$60,840,223
Allegany	638	$22,110,510	Kings	228	$9,972,267	Saratoga	3,580	$149,819,070
Bronx	253	$12,589,198	Lewis	381	$13,429,552	Schenectady	1,742	$68,661,306
Broome	2,348	$87,983,813	Livingston	969	$37,522,024	Schoharie	447	$16,062,612
Cattaraugus	936	$36,542,616	Madison	987	$37,499,333	Schuyler	260	$8,977,006
Cayuga	1,036	$38,026,384	Monroe	9,035	$362,996,174	Seneca	420	$15,520,413
Chautauqua	1,908	$76,828,793	Montgomery	550	$21,252,653	Steuben	1,397	$49,649,073
Chemung	1,090	$39,108,444	Nassau	9,519	$538,676,785	Suffolk	17,245	$1,011,416,532
Chenango	690	$23,883,084	New York	1,281	$61,112,298	Sullivan	828	$37,040,005
Clinton	1,249	$46,924,221	Niagara	2,260	$97,883,622	Tioga	565	$20,865,765
Columbia	735	$29,213,868	Oneida	3,159	$119,333,130	Tompkins	1,037	$33,940,534
Cortland	749	$27,438,790	Onondaga	6,891	$256,299,517	Ulster	2,779	$122,086,101
Delaware	624	$21,425,603	Ontario	1,965	$76,589,212	Warren	1,409	$55,890,155
Dutchess	3,302	$150,773,741	Orange	3,297	$155,822,822	Washington	754	$27,614,966
Erie	10,814	$464,143,142	Orleans	460	$19,452,110	Wayne	1,259	$46,952,071
Essex	632	$21,214,122	Oswego	1,696	$61,274,510	Westchester	6,745	$369,297,918
Franklin	712	$25,065,651	Otsego	1,089	$36,561,736	Wyoming	502	$18,905,238
Fulton	777	$30,288,841	Putnam	988	$54,557,149	Yates	414	$15,107,130
Genesee	771	$30,907,484	Queens	833	$44,605,453			
Greene	542	$20,351,316	Rensselaer	1,634	$63,525,868	Out of State	41,051	$1,480,037,697
Hamilton	138	$5,325,552	Richmond	49	$2,020,868			
Herkimer	1,031	$36,096,166	Rockland	2,356	$117,336,090	**Grand Total**	**169,203**	**$7,218,385,065**

**Computed on the optional annual benefit including supplementation and COLA.*
***Annual benefits paid in this chart may differ from retirement benefit payments that appear elsewhere in this report because this chart reflects the rate of annual payment for retired members and their beneficiaries in pay as of the last day of the fiscal year.*

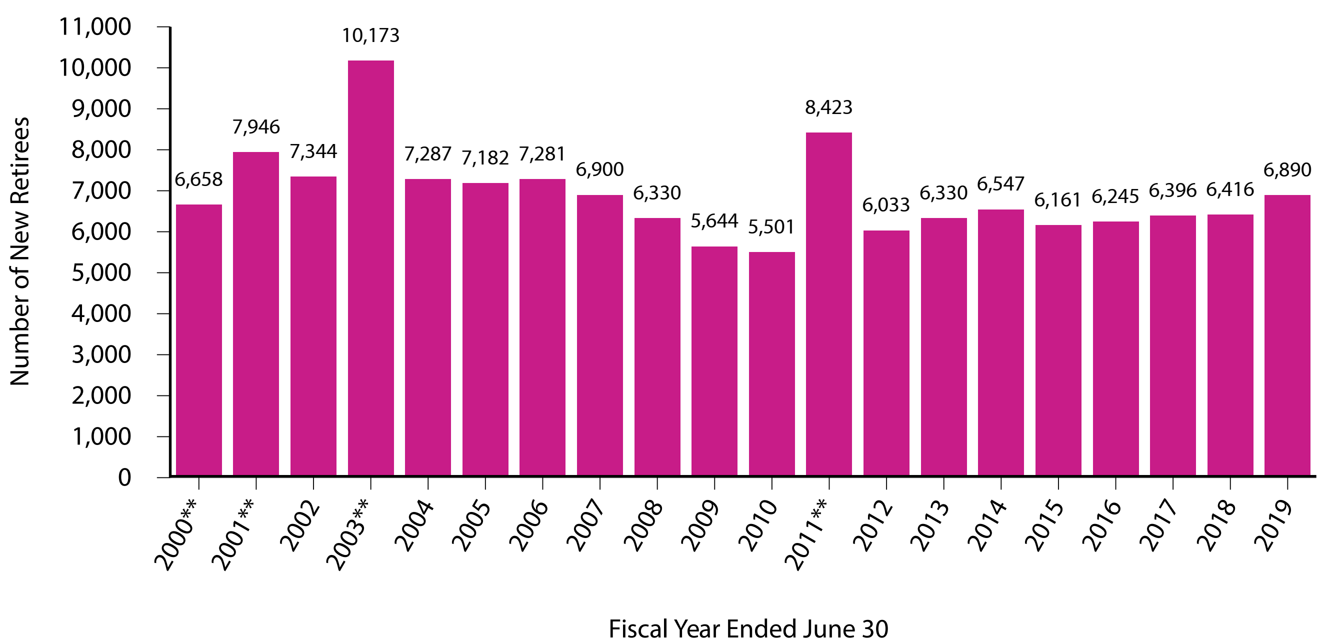
DISTRIBUTION OF RETIRED MEMBERS AND BENEFICIARIES BY TIER — as of June 30, 2019

	Tier 1	Tier 2	Tier 3		Tier 4	Tier 5	Tier 6	Total
Members Retired for:								
Service*	84,411	16,795	19,417	(209) **	40,052	29	9	160,713
Disability	583	174	241	(30) **	1,096	0	0	2,094
Beneficiaries of Deceased:								
Service Annuitants	4,974	346	306	(6) **	391	1	0	6,018
Disability Annuitants	160	23	30	(5) **	58	0	0	271
Active Members	105	1	1	(0) **	0	0	0	107
Total	**90,233**	**17,339**	**19,995**	**(250)****	**41,597**	**30**	**9**	**169,203**

Also includes vested retirees.

***Those receiving an Article 14 (Tier 3) benefit. The remainder are receiving an Article 15 (Tier 4) benefit. Tier 3 members receive the better of the two benefits.*

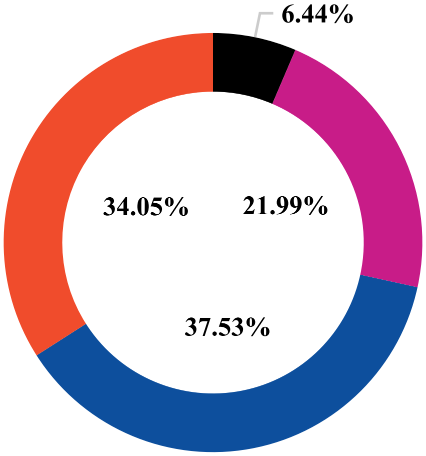
HISTORY OF THE NUMBER OF NEW RETIREES*



Includes service, vested and disability retirements.

***Retirements in this fiscal year include the impact of legislatively enacted early retirement incentive programs.*

RETIRED MEMBERS AND BENEFICIARIES* WITH MONTHLY BENEFITS BY DECADE OF RETIREMENT — as of June 30, 2019



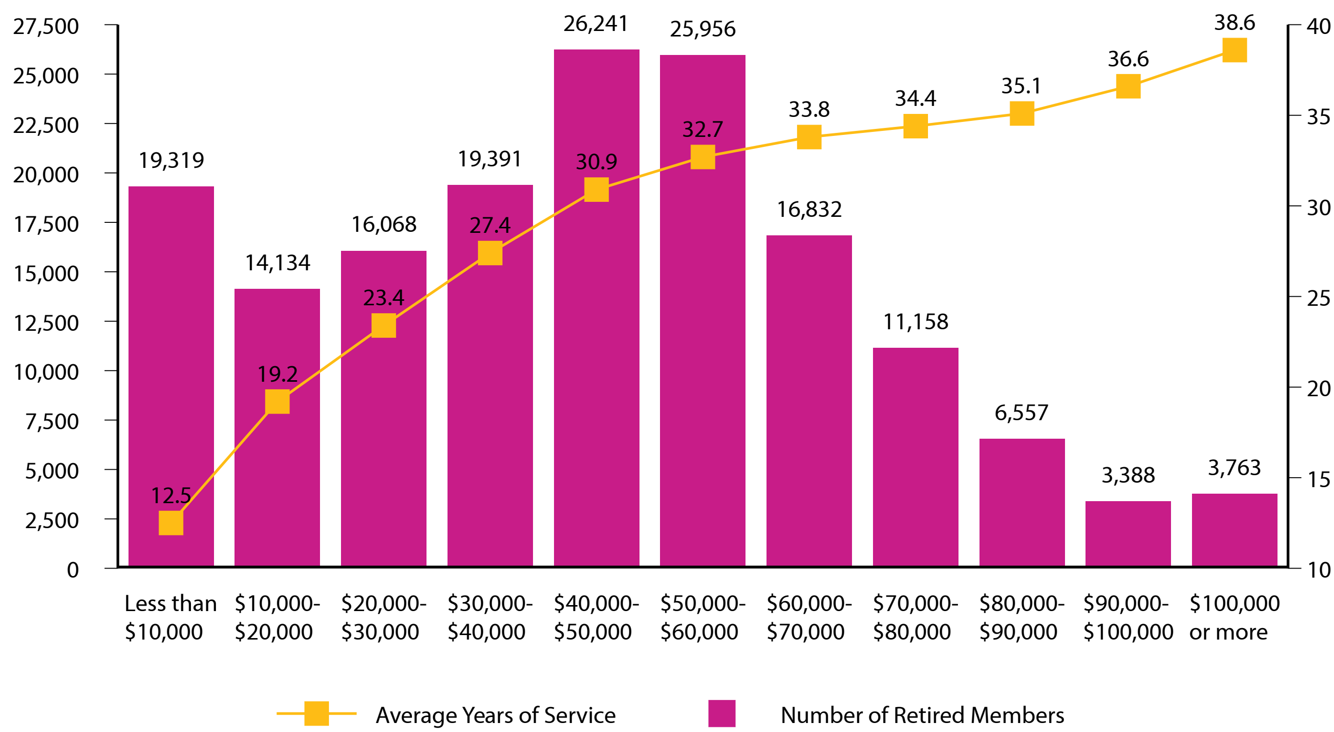
Calendar Years	Number of People	Percentage**	Average Monthly Maximum Benefit	Average Total Monthly Maximum Benefit***
● 1989 or earlier	10,887	6.44%	$1,454.46	$2,010.90
● 1990-1999	37,176	21.99%	$2,881.81	$3,208.74
● 2000-2009	63,458	37.53%	$3,879.68	$4,037.12
● 2010-2019	57,575	34.05%	$3,929.46	$3,951.09
Total	**169,096**			

**Excludes 107 beneficiaries of deceased active members.*

***Percentages may not sum to 100% due to rounding.*

****Average total monthly Maximum benefit includes supplementation and COLA.*

DISTRIBUTION OF THE ANNUAL BENEFIT* OF ALL RETIRED MEMBERS — as of June 30, 2019



**Maximum annual retirement benefit including supplementation and COLA.*

HISTORY OF THE MONTHLY COLA

Commencing September	Year Ended March 31 CPI Percentage Change	Applicable COLA Percentage	Maximum Annual Base Benefit Amount	Maximum Monthly COLA Increase	Cumulative Maximum Monthly COLA	Average Monthly COLA Increase	Cumulative Average Monthly COLA
2001	2.92%	1.5%	$18,000	$22.50	$22.50	$18.80	$18.80
2002	1.48%	1.0%	$18,000	$15.00	$37.50	$12.64	$31.44
2003	3.02%	1.6%	$18,000	$24.00	$61.50	$20.32	$51.76
2004	1.74%	1.0%	$18,000	$15.00	$76.50	$12.85	$64.61
2005	3.15%	1.6%	$18,000	$24.00	$100.50	$20.68	$85.29
2006	3.36%	1.7%	$18,000	$25.50	$126.00	$22.09	$107.38
2007	2.78%	1.4%	$18,000	$21.00	$147.00	$18.29	$125.67
2008	3.98%	2.0%	$18,000	$30.00	$177.00	$26.24	$151.91
2009	-0.38%	1.0%	$18,000	$15.00	$192.00	$13.17	$165.08
2010	2.31%	1.2%	$18,000	$18.00	$210.00	$15.86	$180.94
2011	2.68%	1.4%	$18,000	$21.00	$231.00	$18.55	$199.49
2012	2.65%	1.4%	$18,000	$21.00	$252.00	$18.59	$218.08
2013	1.47%	1.0%	$18,000	$15.00	$267.00	$13.30	$231.38
2014	1.51%	1.0%	$18,000	$15.00	$282.00	$13.32	$244.70
2015	-0.07%	1.0%	$18,000	$15.00	$297.00	$13.36	$258.06
2016	0.85%	1.0%	$18,000	$15.00	$312.00	$13.36	$271.42
2017	2.38%	1.2%	$18,000	$18.00	$330.00	$16.03	$287.45
2018	2.36%	1.2%	$18,000	$18.00	$348.00	$16.02	$303.47
2019	1.86%	1.0%	$18,000	$15.00	$363.00	$13.35	$316.82

DISTRIBUTION OF MONTHLY COLA INCREASE COMMENCING SEPTEMBER 2019

Monthly COLA Increase	Number of Retired Members and Beneficiaries
$15.00	110,691
$12.50 - $14.99	3,136
$10.00 - $12.49	3,265
$7.50 - $9.99	8,595
$5.00 - $7.49	4,623
$2.50 - $4.99	6,633
$0.01 - $2.49	2,923
$0 (currently ineligible)	29,337
Total	**169,203**

DISTRIBUTION OF CUMULATIVE MONTHLY COLA COMMENCING SEPTEMBER 2019

Cumulative Monthly COLA	Number of Retired Members and Beneficiaries
$363.00	21,899
$302.50 - $362.99	9,052
$242.00 - $302.49	16,386
$181.50 - $241.99	22,919
$121.00 - $181.49	20,614
$60.50 - $120.99	27,867
$0.01 - $60.49	21,129
$0 (currently ineligible)	29,337
Total	**169,203**

Financial Trends Information

CHANGES IN FIDUCIARY NET POSITION
Last Ten Fiscal Years
(dollars in thousands)

Additions:	**2010**	**2011**	**2012**	**2013**
Net investment income	$ 8,702,215	$ 17,250,415	$ 2,375,262	$ 11,636,480
Employer contributions	925,506	1,389,415	1,628,491	1,734,908
Member contributions	139,369	154,327	138,583	128,903
Transfers	6,037	2,144	4,188	4,522
Total additions	9,773,127	18,796,301	4,146,524	13,504,813
Deductions: (See Benefits and Return of Contributions by Type on Pages 126-127)				
Benefit payments	5,333,788	5,681,007	5,907,795	6,118,849
Return of contributions	17,071	20,348	19,732	20,869
Administrative expenses	49,088	50,159	52,457	54,338
Total deductions	5,399,947	5,751,514	5,979,984	6,194,056
Change in fiduciary net position restricted for pensions	$ 4,373,180	$ 13,044,787	$ (1,833,460)	$ 7,310,757

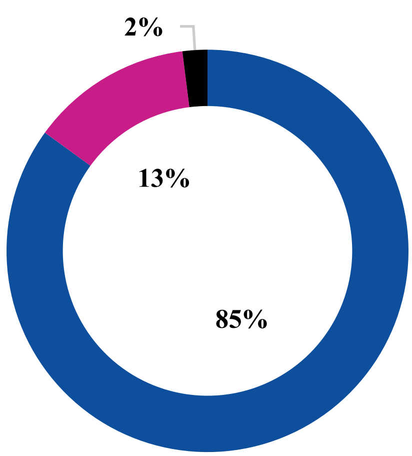
CHANGES IN FIDUCIARY NET POSITION *(continued)*

Last Ten Fiscal Years
(dollars in thousands)

2014	2015	2016	2017	2018	2019
$ 16,664,703	$ 5,400,265	$ 2,392,354	$ 12,951,892	$ 9,928,009	$ 8,023,180
2,400,386	2,633,682	2,046,562	1,857,359	1,597,139	1,774,646
120,762	119,411	124,587	129,770	131,595	136,610
1,365	3,213	4,014	7,845	9,278	9,087
19,187,216	8,156,571	4,567,517	14,946,866	11,666,021	9,943,523
6,324,546	6,513,931	6,701,637	6,903,361	7,088,949	7,285,362
18,992	17,209	18,229	19,676	20,049	21,956
55,616	56,948	60,426	61,611	60,610	74,242
6,399,154	6,588,088	6,780,292	6,984,648	7,169,608	7,381,560
$ 12,788,062	$ 1,568,483	$ (2,212,775)	$ 7,962,218	$ 4,496,413	$ 2,561,963

BREAKDOWN OF INCOME SOURCES

Fiscal Years Ended 1990-2019



- Investment Income **85%**
- Employer Contributions **13%**
- Member Contributions **2%**

BENEFITS AND RETURN OF CONTRIBUTIONS BY TYPE
Last Ten Fiscal Years
(dollars in thousands)

Type of Benefit	2010	2011	2012	2013
Age and service benefits:				
Retirees	$ 5,237,032	$ 5,593,968	$ 5,811,739	$ 6,023,506
Survivors	38,516	28,237	29,153	32,879
Death in service benefits	20,244	22,852	29,266	23,666
Disability benefits:				
Ordinary	37,628	35,667	37,350	38,507
Accidental	368	283	287	291
Total benefits	$ 5,333,788	$ 5,681,007	$ 5,907,795	$ 6,118,849
Type of Return of Contributions				
Death	$ 2,287	$ 2,240	$ 2,393	$ 2,434
Separation from service	14,784	18,108	17,339	18,435
Total return of contributions	$ 17,071	$ 20,348	$ 19,732	$ 20,869

BENEFITS AND RETURN OF CONTRIBUTIONS BY TYPE *(continued)*

Last Ten Fiscal Years

(dollars in thousands)

2014	2015	2016	2017	2018	2019
$ 6,233,619	$ 6,419,576	$ 6,601,664	$ 6,794,278	$ 6,978,694	$ 7,179,640
28,918	31,888	34,051	41,662	35,234	40,775
21,634	20,730	22,801	23,606	29,845	21,339
39,871	41,251	42,591	43,469	44,828	43,256
504	486	530	346	348	352
$ 6,324,546	$ 6,513,931	$ 6,701,637	$ 6,903,361	$ 7,088,949	$ 7,285,362

$ 2,325	$ 2,350	$ 3,011	$ 3,061	$ 3,211	$ 2,865
16,667	14,859	15,218	16,615	16,838	19,091
$ 18,992	$ 17,209	$ 18,229	$ 19,676	$ 20,049	$ 21,956

Operating Information

AVERAGE BENEFIT PAYMENTS — JULY 1, 2009 – JUNE 30, 2019

	Years of Credited Service							
Retirement Effective Dates	**0-5**	**5-10**	**10-15**	**15-20**	**20-25**	**25-30**	**30-35**	**35+**
Period 7/1/2009 to 6/30/2010								
Average monthly benefit	$146	$298	$736	$1,419	$2,405	$3,839	$4,779	$6,361
Average final average salary	$29,089	$32,606	$46,779	$58,769	$69,544	$85,340	$90,489	$100,436
Number of retired members	46	377	438	360	770	752	1,351	1,407
Period 7/1/2010 to 6/30/2011								
Average monthly benefit	$166	$301	$710	$1,386	$2,571	$3,924	$5,017	$6,877
Average final average salary	$38,073	$33,593	$44,505	$58,067	$72,641	$86,710	$94,654	$106,004
Number of retired members	38	403	507	431	1,128	1,705	2,103	2,108
Period 7/1/2011 to 6/30/2012								
Average monthly benefit	$196	$371	$818	$1,402	$2,748	$3,807	$5,142	$6,992
Average final average salary	$43,570	$39,131	$50,185	$59,356	$77,772	$85,469	$96,934	$108,825
Number of retired members	44	431	571	444	1,079	840	1,604	1,020
Period 7/1/2012 to 6/30/2013								
Average monthly benefit	$201	$326	$782	$1,513	$2,721	$3,910	$5,285	$7,061
Average final average salary	$33,171	$34,780	$47,730	$62,797	$76,501	$89,200	$100,095	$110,455
Number of retired members	48	501	705	452	1,061	954	1,709	900
Period 7/1/2013 to 6/30/2014								
Average monthly benefit	$221	$367	$837	$1,571	$2,836	$4,140	$5,275	$7,305
Average final average salary	$41,966	$38,623	$51,493	$65,104	$80,215	$93,124	$100,079	$115,852
Number of retired members	47	484	649	562	1,133	1,161	1,778	733
Period 7/1/2014 to 6/30/2015								
Average monthly benefit	$255	$306	$842	$1,543	$2,879	$4,163	$5,277	$6,887
Average final average salary	$35,508	$33,815	$51,353	$64,139	$82,057	$92,745	$100,927	$110,667
Number of retired members	37	400	615	521	1,081	1,255	1,660	592
Period 7/1/2015 to 6/30/2016								
Average monthly benefit	$188	$321	$873	$1,532	$2,873	$4,280	$5,353	$6,907
Average final average salary	$35,355	$34,747	$51,987	$63,932	$81,515	$94,402	$102,221	$112,592
Number of retired members	32	491	589	582	1,079	1,223	1,676	573
Period 7/1/2016 to 6/30/2017								
Average monthly benefit	$120	$329	$868	$1,645	$2,871	$4,282	$5,452	$7,076
Average final average salary	$23,555	$35,957	$52,383	$66,494	$81,188	$94,415	$104,070	$115,549
Number of retired members	117	457	569	565	1,079	1,185	1,864	560
Period 7/1/2017 to 6/30/2018								
Average monthly benefit	$119	$335	$854	$1,665	$2,960	$4,499	$5,433	$7,112
Average final average salary	$29,014	$36,702	$51,465	$68,612	$83,811	$98,562	$103,842	$116,274
Number of retired members	51	493	567	581	1,173	1,088	1,921	542
Period 7/1/2018 to 6/30/2019								
Average monthly benefit	$172	$329	$813	$1,733	$2,972	$4,406	$5,518	$7,006
Average final average salary	$39,231	$35,270	$51,300	$70,026	$84,394	$96,529	$105,222	$115,394
Number of retired members	55	516	582	657	1,250	1,177	2,124	529

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RETIRED MEMBERS AND BENEFICIARIES BY TYPE OF BENEFIT — as of June 30, 2019

Amount of Monthly Benefit	Number of Retired Members	Type of Retirement					
		1	2	3	4	5	6
$1 - $500	13,966	7,562	5,868	112	321	24	79
$501 - $1,000	12,433	6,450	5,077	388	437	70	11
$1,001 - $1,500	10,712	6,814	2,866	433	525	66	8
$1,501 - $2,000	10,288	6,926	2,389	405	523	44	1
$2,001 - $2,500	11,148	8,133	2,125	307	550	30	3
$2,501 - $3,000	11,678	9,104	1,756	199	600	15	4
$3,001 - $3,500	13,553	11,492	1,322	118	610	10	1
$3,501 - $4,000	16,172	14,576	974	66	553	3	0
$4,001 - $4,500	16,638	15,378	688	38	527	7	0
$4,501 - $5,000	13,641	12,776	429	13	423	0	0
over $5,000	38,974	37,371	637	15	949	2	0
Total	**169,203**	**136,582**	**24,131**	**2,094**	**6,018**	**271**	**107**

Type of retirement:

1 - Normal retirement for age and service

2 - Early retirement*

3 - Disability retirement

4 - Beneficiary payment, normal or early retirement

5 - Beneficiary payment, disability retirement

6 - Beneficiary payment, death in service

**Tiers 2-5: retirement at age less than 62 and service less than 30 years.*

Tier 6: retirement at age less than 63.

RETIRED MEMBERS AND BENEFICIARIES BY TYPE OF BENEFIT — as of June 30, 2019 *(continued)*

Option Selected					
1	2	3	4	5	6
10,659	781	1,073	639	432	382
8,970	827	1,529	540	283	284
7,528	772	1,538	439	262	173
7,217	815	1,565	343	193	155
7,781	894	1,813	349	152	159
7,999	975	2,073	291	171	169
9,194	1,153	2,520	345	108	233
10,784	1,239	3,396	370	118	265
10,823	1,283	3,779	347	92	314
8,624	1,155	3,243	254	68	297
22,990	3,638	10,230	693	140	1,283
112,569	**13,532**	**32,759**	**4,610**	**2,019**	**3,714**

Option selected:

1 - Unmodified; Single life annuity (Maximum)

2 - Joint and survivor

3 - Joint and survivor with pop-up

4 - Guarantee period

5 - Declining reserve / Annuity reserve

6 - Alternative

PRINCIPAL PARTICIPATING EMPLOYERS

Current Year and Nine Years Ago

Participating Employer 2019	Covered Employees	Rank	Percentage of Total System**
Buffalo Public Schools	4,706	1	1.79%
Rochester City School District	4,252	2	1.61%
Syracuse City School District	2,921	3	1.11%
Yonkers Public Schools	2,160	4	0.82%
Brentwood Union Free Schools	1,893	5	0.72%
Greece Central Schools	1,389	6	0.53%
Newburgh City School District	1,350	7	0.51%
Sachem Central Schools	1,314	8	0.50%
Albany City School District	1,304	9	0.49%
Eastern Suffolk 1 BOCES	1,284	10	0.49%
All Other*	240,944 +		91.43%
Total	**263,517** +		**100.00%**

+ Covered Employees represents members of the System which includes those currently employed and members formerly employed by a participating employer but not yet retired.
** For a breakdown of the "All Other" category, please see below.*
***Percentages may not sum to 100% due to rounding.*

All Other Participating Employers:

Type	Number	Covered Employees
Public School Districts	671	219,541 +
BOCES	36	13,335
SUNY	31	2,472
Community Colleges	30	2,909
Charter Schools	26	1,721
Special Act Districts	10	631
Other	9	335
Total "All Other"	**813**	**240,944** +

+ Covered Employees represents members of the System which includes those currently employed and members formerly employed by a participating employer but not yet retired.

PRINCIPAL PARTICIPATING EMPLOYERS (continued)

Current Year and Nine Years Ago

Participating Employer 2010	Covered Employees	Rank	Percentage of Total System**
Buffalo Public Schools	5,212	1	1.82%
Rochester City School District	4,795	2	1.68%
Syracuse City School District	3,504	3	1.23%
Yonkers Public Schools	2,475	4	0.87%
Brentwood Union Free Schools	1,992	5	0.70%
Greece Central Schools	1,762	6	0.62%
Eastern Suffolk 1 BOCES	1,671	7	0.58%
Sachem Central Schools	1,658	8	0.58%
Newburgh City School District	1,632	9	0.57%
East Ramapo Central Schools	1,560	10	0.55%
All Other	259,513 +		90.81%
Total	**285,774** +		**100.00%**

+ Covered Employees represents members of the System which includes those currently employed and members formerly employed by a participating employer but not yet retired.
***Percentages may not sum to 100% due to rounding.*

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