MICHIGAN OFFICE OF RETIREMENT SERVICES
Big Plans. Small Steps.

DTMB
Technology, Management & Budget

Summary Annual Report

for the Michigan Public School Employees' Retirement System, a Pension and Other Postemployment Benefit Trust Fund of the State of Michigan
Fiscal Year Ended Sept. 30, 2018

Prepared By
Office of Retirement Services
Department of Technology, Management and Budget

A Message From The Director

Director Kerrie Vanden Bosch

The Department of Technology, Management and Budget (DTMB) Office of Retirement Services (ORS) is pleased to present the Summary Annual Report for the Michigan Public School Employees' Retirement System (MPSERS), henceforth referred to as the System, for the fiscal year ended Sept. 30, 2018.

Average Admin. Cost

$57 per member-retiree

ORS provides retirement and related retiree healthcare plans to help more than 675 public school employers attract, retain, and reward a highly qualified workforce.

ORS is able to cost-effectively provide these benefits to retirees. In 2017, the total defined benefit pension administration cost was $57 per active member and retiree. This was $37 below the peer average of $94 per active member and retiree (CEM Benchmarking).

Accomplishments

Dedicated Gains Policy Successfully Reduces Assumed Rate of Return

In summer 2017, the DTMB director and the retirement board adopted a mechanism that gradually reduces the assumed rate of investment return (AROR). This policy was necessary to align the AROR with industry trends toward more prudent investment expectations. Whenever investment returns exceed the assumed return (e.g., we achieve 9 percent instead of the expected 7.50 percent), the Dedicated Gains Policy uses those excess returns to lower the AROR going forward. This is done without increasing unfunded actuarial accrued liabilities (UAAL) and largely offsetting contribution increases toward the UAAL from employers. Excess investment returns in fiscal year 2018 resulted in the pension AROR being reduced to 6.80 percent for the legacy Defined Benefit (DB) plan and the Pension Plus plan from 7.05 percent and 7.00 percent respectively; and to 6.95 percent from 7.15 percent for the Other Postemployment Benefit (OPEB) plan beginning with the actuarial valuation as of Sept. 30, 2018.

Actuarial Experience Studies Result in Adjustments to Assumptions

Every five years the plan actuary evaluates how well the assumptions used to determine system liabilities and set employer contributions match the real experience of the plan. These experience studies are statutorily required and are an industry best practice that allows the System to make adjustments that ensure the System is valued and funded properly. The most recent 5-year cycle concluded on Sept. 30, 2017, and the actuary delivered its evaluation in spring 2018. The results of the evaluation are more conservative economic and demographic assumptions. The actuary and ORS collaborated to provide detailed information to department leaders and the retirement board about the proposed adjustments and the impact to the State and school budgets. The proposed changes were approved for use with the actuarial valuations beginning Sept. 30, 2018. These changes will protect the long-term security of both the pension and healthcare trusts.

Patient-Centered Medical Homes Provide Better Healthcare Results

Patient-Centered Medical Homes (PCMHs) give members greater access to clinical decision makers, more robust medication reviews and management for patients with chronic conditions, and primary prevention programs that focus on educating patients to reduce their risk of disease and injury. MPSERS retirees who participated in a PCMH achieved significantly better health outcomes, specifically related to emergency room visit trends, higher office visits, lower prescription use and lower treatment costs. In a recent survey, retirees also rated their

Accomplishments, continued

health plan and doctors significantly better if their primary care physician was designated a PCMH. ORS (with our vendors and consultants) highlighted the success of this initiative in a presentation at the IBM Watson Health Advantage Conference in May 2018.

Call Center Upgrade

ORS is modernizing its toll-free phone service from a dial-tone system to a modern voice-over-internet solution. This effort involved a sweeping overhaul of the existing software and hardware to ensure optimum performance, a redesign and rewrite of the call routing software, and improved security. Customers will reach a call agent more quickly because of streamlined menus and more automatic methods for authenticating the caller. ORS will have more flexibility in the way new menu options and associated queues are used for seasonal business topics. In total, the new system is more secure, more stable, provides a better experience for customers and gives ORS ways to adapt to changes in demand.

Redesign of Insurance Systems

In spring 2018, ORS successfully deployed the redesign of insurance eligibility and enrollment systems. The redesign applied a flexible rules-based approach to system development that allows ORS to update business rules to match insurance offerings, regulations or requirements more quickly. The new system improves both the customer and staff experience with insurance enrollment management. New customer-focused features include: per-person itemized enrollment cost, a shopping cart so customers can clearly understand their costs, printable bills available in miAccount, and online account management for COBRA enrollees.

Healthcare Contributions

On Dec. 20, 2017, the Michigan Supreme Court ruled that the healthcare contributions public school employees made between July 1, 2010, and Sept. 3, 2012, were unconstitutional and needed to be returned. ORS quickly collected and analyzed data to return more than $554,000,000 from over 274,000 members to 707 school districts by Jan. 22, 2018. The school districts were highly responsive, navigated the payroll and tax adjustments, and returned the money to the members within a few months. ORS notified 230,737 members of their individual contribution amounts by email and responded to 5,595 phone calls and 6,370 messages.

Mobile Application Launch

ORS developed a mobile application for members and retirees of the defined benefit plans. The highlight of this new application is the ability to upload documents directly to ORS. This feature allows the user to take a picture of a form, birth certificate, or other insurance proof and send the document(s) securely to ORS, eliminating the need to locate a fax machine or rely on standard postal delivery. The application also allows ORS to send custom-crafted alerts and announcements to targeted user-types, based on their retirement system and account status. Active members will be able to estimate their pensions, update beneficiaries and dependents, and update contact information. Retirees will be able to manage their direct deposit, update tax withholdings, update dependents, and view their payment history.

Publications Redesign

ORS redesigned the publications for communicating important messages to members and retirees. The primary goal was to help customers understand their plan quickly and easily; a secondary goal was to modernize the design so customers would recognize that the publication is from ORS and be interested in reading them. Content was simplified, graphics were added, and visual elements were integrated into the material to balance the publication and reinforce information in an alternative format. The publications used during the mid-career and late-career workshops were converted to workbooks and developed in tandem with reinvigorated workshops designed to engage the audience in their own retirement planning. These workshops use activities to encourage audience participation, help them determine what actions they need to consider before retirement, and give a place to record those actions and ideas.

Accomplishments, continued

System Reform
In July 2017, Public Act (PA) 92 was signed into law. In fiscal year 2018, ORS completed the second and third phase of implementation, including the introduction of the Pension Plus 2 plan, the remodeling of the new member retirement plan election process, and changes to the employer match for Defined Contribution participants. Phase two testing was deployed on Feb. 2, 2018. In addition to the technology changes, ORS revised letters, publications, websites, and online e-learning modules, while communicating the changes to members and employers. Phase three changes included modernizing survivor option factor tables for all plans. Phase three testing was completed ahead of schedule and deployed on Sept. 18, 2018.

Imaging Enhancements
The ORS team depends on images of customer correspondence. These images are carefully indexed and stored in a way that call agents and processors can access them quickly and easily. This year, significant upgrades of both the hardware and the software applications for document storage and retrieval were completed and will ensure that this system is stable and secure for years to come. A pivotal change was a move away from a complex, custom-built solution to more standardized tools that are easier to maintain.

Honors

Government Finance Officers Association Award
The Government Finance Officers Association (GFOA) of the United States and Canada awarded the retirement system with the Certificate of Achievement for Excellence in Financial Reporting for our fiscal year 2017 Comprehensive Annual Financial Report (CAFR). This marks the 27th consecutive year ORS has received this prestigious award.

Public Pension Standards Award
ORS was awarded the 2018 Standards Award from the Public Pension Coordinating Councils Standards Program (PPCC) for both funding and administration. ORS has received this award every year since 2004. The PPCC Standards reflect expectations for public retirement system management and administration and serve as a benchmark for all defined benefit public plans to be measured.

About the Michigan Public School Employees' Retirement System

This report is issued in compliance with the Public Employee Retirement System Investment Act, 1965 PA 314, and the Public School Employees Retirement Act, 1980 PA 300, both as amended. The contents come from the complete MPSERS 2018 CAFR, available on our website at **michigan.gov/orsschools**, the Annual Actuarial Valuations as of Sept. 30, 2018, the 5-Year Actuarial Experience Study covering the period Oct. 1, 2012, through Sept. 30, 2017, and additional analysis performed after Sept. 30, 2018.

Public school employees' pensions are protected by Michigan's Constitution. The System's net assets are held in trust to meet future benefit payments.

The state treasurer is the investment fiduciary and custodian of all investments of the System pursuant to state law.

Executive Summary

The present value of the assets as of Sept. 30, 2018, was $56.7 billion for pension and OPEB, and the total actuarial accrued liability (AAL) was $97.1 billion resulting in a total UAAL of $40.4 billion.

The System's assets increased by $4.3 billion in fiscal year 2018. Asset increases were primarily due to positive investment experience and contributions from employers and employees. The AAL for pension and OPEB increased by $6.8 billion primarily due to assumption changes adopted with the most recent actuarial experience study and the reduction in the AROR for pension and OPEB due to the dedicated gains policy. The pension AROR was reduced to 6.80 percent from 7.05 percent for the legacy DB (Basic and MIP) plans and 7.00 percent for the Pension Plus plan. The OPEB AROR was reduced to 6.95 percent from 7.15 percent.

While overall experience was positive in 2018, the pension funding ratio declined slightly by 0.92 percentage points as a result of the assumption changes noted above. If not for these assumption changes, the pension funding ratio would have improved 1.68 percentage points. The OPEB funding ratio improved by 6.18 percentage points due to continued positive experience in the retiree health care plan.

Statement of Assets and Liabilities

FY 2018	Pension[1]	OPEB[2]
AAL	$83,375,340,066	$13,748,938,948
Present Value of Assets	$50,630,333,694	$6,089,485,632
UAAL	$32,745,006,372	$7,659,453,316
Funding Ratio	60.70%	44.29%
FY 2017	**Pension[3]**	**OPEB[4]**
AAL	$76,693,475,788	$13,587,700,412
Present Value of Assets	$47,255,286,564	$5,177,774,602
UAAL	$29,438,189,224	$8,409,925,810
Funding Ratio	61.62%	38.11%

1. 2018 MPSERS Pension Actuarial Valuation, Page B–1.
2. 2018 MPSERS OPEB Actuarial Valuation, Page A–2.
3. 2017 MPSERS Pension Actuarial Valuation, Page B–1.
4. 2017 MPSERS OPEB Actuarial Valuation, Page A–2.

Membership

Members of this defined benefit plan include employees of:

- K–12 public school districts
- Intermediate school districts
- District libraries
- Public school academies/Charter schools
- Community colleges

In some instances, membership includes certain employees who began working for the following universities before Jan. 1, 1996:

- Central Michigan University
- Eastern Michigan University
- Ferris State University
- Lake Superior State University
- Michigan Technological University
- Northern Michigan University
- Western Michigan University

Plan Membership and Retirement Allowances as of Sept. 30, 2018	
Membership[1]	
Retirees and Beneficiaries Currently Receiving Benefits	
Regular Benefits	192,296
Survivor Benefits	18,252
Disability Benefits	6,070
Total	**216,618**
Current Employees	
Vested	99,009
Non-vested	108,723
Total[2]	**207,732**
Inactive Employees	
Entitled to benefits and not yet receiving them	18,598
Total All Members	**442,948**
Retirement Allowances[3]	
Average annual retirement allowance	$22,930
Total annual retirement allowances being paid (in thousands)	**$4,967,055**

1. CAFR for the fiscal year ended Sept. 30, 2018, Page 23.
2. Includes DB members who converted to the Defined Contribution (DC) plan and employees who elected to participate only in the DC plan.
3. Pension Actuarial Valuation for the fiscal year ended Sept. 30, 2018, Page D-2.

Assets and Liabilities

The System's total assets on a market basis as of Sept. 30, 2018, were $59.2 billion, mostly composed of cash, investments, and contributions due from employers.

Total liabilities as of Sept. 30, 2018, were $2.8 billion and include accounts payable, unearned revenue, and obligations under securities lending.

Total net assets held in trust for pension and OPEB increased $4.3 billion from the previous year.

Assets and Liabilities[1] (Dollars In Thousands) (Combined Pension and OPEB)

Assets	**FY 2017**	**FY 2018**
Cash	$ 149,556	$ 104,050
Receivables	407,445	373,671
Investments	52,417,070	56,180,698
Securities Lending Collateral	3,329,249	2,549,816
Total Assets	**$ 56,303,321**	**$ 59,208,235**
Liabilities	**FY 2017**	**FY 2018**
Warrants Outstanding	$ 717	$ –
Unearned Revenue	2,526	2,733
Accounts Payable and Other Liabilities	783,146	200,259
Obligations Under Securities Lending	3,327,374	2,550,504
Total Liabilities	**4,113,763**	**2,753,495**
Net Assets	**$ 52,189,558**	**$ 56,454,740**

1. CAFR for the fiscal year ended Sept. 30, 2018, Page 17. Liabilities in this context are exclusive of AAL for pension and OPEB.

Revenue and Expenditures, Change in Net Assets

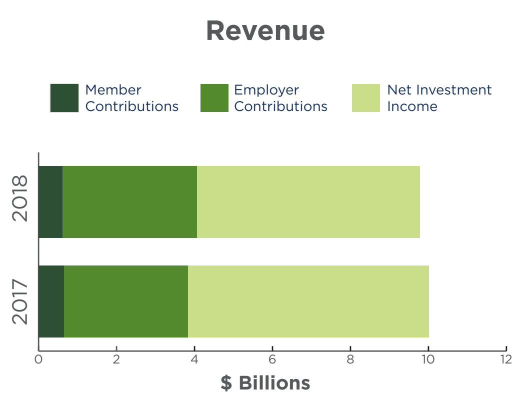
The reserves needed to finance pension and OPEB are accumulated through the collection of employer and employee contributions including earnings on investments.

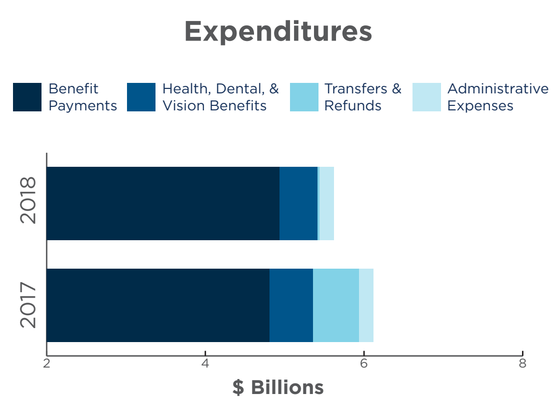
Contributions and net investment income for fiscal year 2018 totaled $9.9 billion. The primary expenses of the System include the payment of pension benefits to members and beneficiaries, payment for health, dental and vision benefits, refunds of contributions to former members, and the cost of administering the System.

Additions and Deductions[1] (Dollars In Thousands)

Additions	FY 2017	FY 2018
Member Contributions	$ 642,237	$ 603,739
Employer Contributions	3,193,612	3,455,217
Other Governmental Contributions	5	96,708
Net Investment Income (Loss)	6,177,748	5,730,759
Miscellaneous Income	987	600
Total Additions	**$ 10,014,589**	**$ 9,887,023**
Deductions	**FY 2017**	**FY 2018**
Pension Benefits	$ 4,806,971	$ 4,934,697
Healthcare Benefits	548,258	477,066
Refunds & Transfers to Other Systems	580,073	28,977
Administrative and Other Expenses	182,488	181,101
Total Deductions	**$ 6,117,789**	**$ 5,621,841**
Net Position	**FY 2017**	**FY 2018**
Net Increase (Decrease) in Net Position	$ 3,896,800	$ 4,265,182
Beginning of Year	48,292,758	52,189,558
End of Year	**$ 52,189,558**	**$ 56,454,740**

1. CAFR for the fiscal year ended Sept. 30, 2018, Page 18.





2018 Plan Expenditures

Plan Expenses for Fiscal Year Ended Sept. 30, 2018[1]		
Pension Plan Administrative and Other Expenses		**Dollars**
These expenditures are the administrative costs of running the retirement system and are paid by DTMB–Office of Retirement Services and DTMB–Financial Services through an annual appropriation.		
Personnel Services		
Staff Salaries	$	4,458,768
Retirement and Social Security		2,374,744
Other Fringe Benefits		808,844
Subtotal	**$**	**7,642,356**
Professional Services		
Accounting	$	1,812,619
Actuarial		362,314
Attorney General		347,843
Audit		399,573
Consulting		269,779
Medical		372,157
Subtotal	**$**	**3,564,285**
Building and Equipment		
Building Rentals	$	1,390,705
Equipment Purchase, Maintenance, and Rentals		49,300
Subtotal	**$**	**1,440,005**
Miscellaneous		
Travel and Board Meetings (Excluding Travel and Education for Board Members)	$	24,920
Office Supplies		13,186
Postage, Telephone, and Other		2,149,845
Printing		302,691
Technological Support		10,812,148
Subtotal		**13,302,789**
Travel and Education for Board Members		2,525
Total Administrative and Other Expenses	**$**	**25,951,960**

2018 Plan Expenditures, Continued

Health, Dental, and Vision Plan Administrative Expenses		Dollars
These expenditures are for self–insurance of the health and dental plans, and are paid from the retirement system's trust fund.		
Staff Salaries	$	2,451,758
Health Fees		145,701,196
Dental Fees		5,436,879
Vision Fees		99,029
Total Health, Dental, and Vision Administrative Expenses	**$**	**153,688,862**
Investment Expenses		**Dollars**
These expenditures are related to the Department of Treasury's Bureau of Investments for managing the retirement system's assets, and are paid from the retirement system's trust fund.		
Real Estate Operating Expenses	$	3,060,923
Securities Lending Expenses		54,123,817
Other Investment Expenses		
ORS–Investment Expenses		13,769,138
Custody Fees		1,286,761
Management Fees		208,512,376
Research Fees		4,036,704
Total Investment Expenses	**$**	**284,789,719**
Benefits Paid to Members		**Dollars**
These were the retirement benefits paid to members of the retirement system during the 2018 fiscal year.		
Pension Benefits	$	4,934,696,520
Health Benefits		402,688,977
Dental/Vision Benefits		74,377,251
Refunds of Member Contributions		28,976,528
Total Payments to Members	**$**	**5,440,739,276**
Soft Dollar Expenses[2]		**Dollars**
These expenditures are for research provided by the retirement system's service providers and are incorporated into the brokerage fees and commissions.		
Bass Trading International Group (BTIG)		
Macro Mavens Newsletter	$	13,471
High Tech Strategist		115
Total Soft Dollar Expenditures	**$**	**13,586**
Total of All Sections	**$**	**5,905,183,403**

1. DTMB–Financial Services report.
2. Department of Treasury, Bureau of Investments report.

2019 Budget for Plan Expenditures

Budget for Plan Expenses for Fiscal Year Ending Sept. 30, 2019[1]		
Pension Plan Administrative and Other Expenses		**Dollars**
These expenditures are the administrative costs of running the retirement system and are paid by DTMB–Office of Retirement Services and DTMB–Financial Services through an annual appropriation.		
Personnel Services		
Staff Salaries	$	3,908,592
Retirement and Social Security		3,338,914
Other Fringe Benefits		1,234,254
Subtotal	**$**	**8,481,760**
Professional Services		
Accounting	$	2,084,512
Actuarial		507,297
Attorney General		313,059
Audit		505,000
Consulting		371,048
Medical		488,662
Subtotal	**$**	**4,269,577**
Building and Equipment		
Building Rentals	$	1,023,725
Equipment Purchase, Maintenance, and Rentals		85,654
Subtotal	**$**	**1,109,379**
Miscellaneous		
Travel and Board Meetings (Excluding Travel and Education for Board Members)	$	66,947
Office Supplies		22,914
Postage, Telephone, and Other		1,483,618
Printing		267,107
Technological Support		12,095,433
Subtotal		**13,936,019**
Travel and Education for Board Members		3,106
Total Administrative and Other Expenses	**$**	**27,799,841**

2019 Budget Continued

Health, Dental, and Vision Plan Administrative Expenses		Dollars
These expenditures are for self–insurance of the health and dental plans, and are paid from the retirement system's trust fund.		
Staff Salaries	$	2,149,231
Health Fees		142,787,172
Dental Fees		6,143,673
Vision Fees		100,000
Total Health, Dental, and Vision Administrative Expenses	**$**	**151,180,076**
Investment Expenses		**Dollars**
These expenditures are related to the Department of Treasury's Bureau of Investments for managing the retirement system's assets and are paid from the retirement system's trust fund.		
Real Estate Operating Expenses	$	3,795,545
Securities Lending Expenses		67,113,533
Other Investment Expenses		
ORS–Investment Expenses		17,073,731
Custody Fees		1,595,584
Management Fees		258,555,346
Research Fees		5,005,513
Total Investment Expenses	**$**	**353,139,252**
Benefits Paid to Members		**Dollars**
These are the projected retirement benefits paid to members of the retirement system.		
Pension Benefits	$	5,082,737,416
Health Benefits		370,473,859
Dental/Vision Benefits		68,427,071
Refunds of Member Contributions		24,004,243
Total Payments to Members	**$**	**5,545,642,588**
Soft Dollar Expenses[2]		**Dollars**
These expenditures are for research provided by the retirement system's service providers and are incorporated into the brokerage fees and commissions.		
Bass Trading International Group (BTIG)		
Macro Mavens Newsletter	$	13,471
High Tech Strategist		115
Total Soft Dollar Expenditures	**$**	**13,586**
Total of All Sections	**$**	**6,077,775,343**

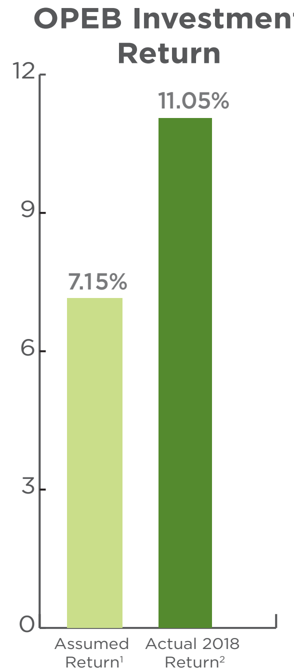
1. DTMB–Financial Services report.
2. Department of Treasury, Bureau of Investments report.

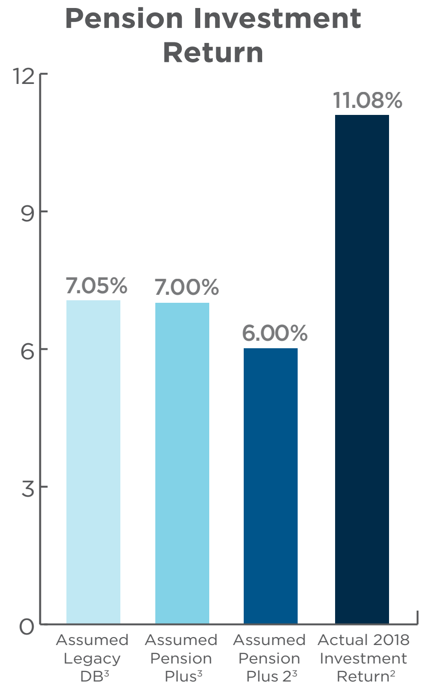
Assumed and Actual Investment Returns

This section includes the additional investment return disclosures established by PA 92 of 2017 which are due by April 1 in the year following an actuarial experience study. The additional information is the 15- and 20-year actual investment returns and forecasted investment returns at specified probability levels.

The state treasurer administers all of the System's investments in accordance with the Public Employee Retirement System Investment Act, PA 314 of 1965. The main objective is maximizing the rate of return while meeting the actuarial assumptions through maintaining a diverse portfolio, eliminating unnecessary risks, and investing prudently.

The AROR is a key assumption used by the plan actuary in determining the employer contribution rates each year. Due to the adoption of the dedicated gains policy by the retirement board and the DTMB director combined with positive investment experience in fiscal year 2018, the AROR for the legacy DB plans was reduced from 7.05 percent to 6.80 percent. The AROR for the Pension Plus plan was reduced from 7.00 percent to 6.80 percent. The AROR for the Pension Plus 2 plan remains at 6.00 percent. The actual rate of investment return for the pension plan in fiscal year 2018 was 11.08 percent.





1. MPSERS 5-Year Experience Study, Oct. 1, 2012, through Sept. 30, 2017, Page A-7.
2. Department of Treasury, Bureau of Investments report.
3. MPSERS 5-Year Experience Study, Oct. 1, 2012, through Sept. 30, 2017, Page A-6.

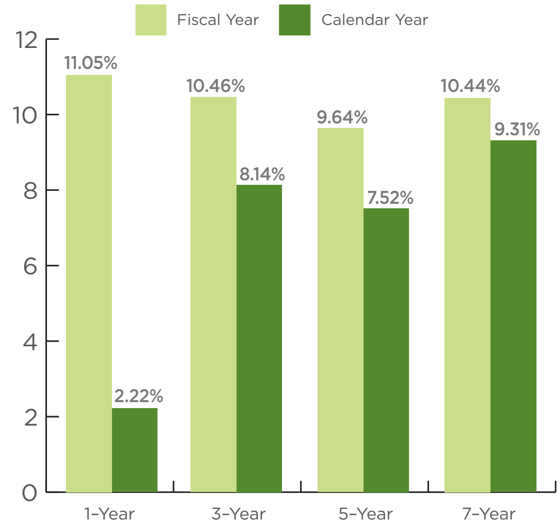
The dedicated gains policy reduced the AROR for OPEB from 7.15 percent to 6.95 percent. The actual rate of investment return for OPEB was 11.05 percent.

All changes to the AROR are reflected in the Sept. 30, 2018, actuarial valuations, but for comparison with current year investment results, the prior-year assumptions are presented in the chart.

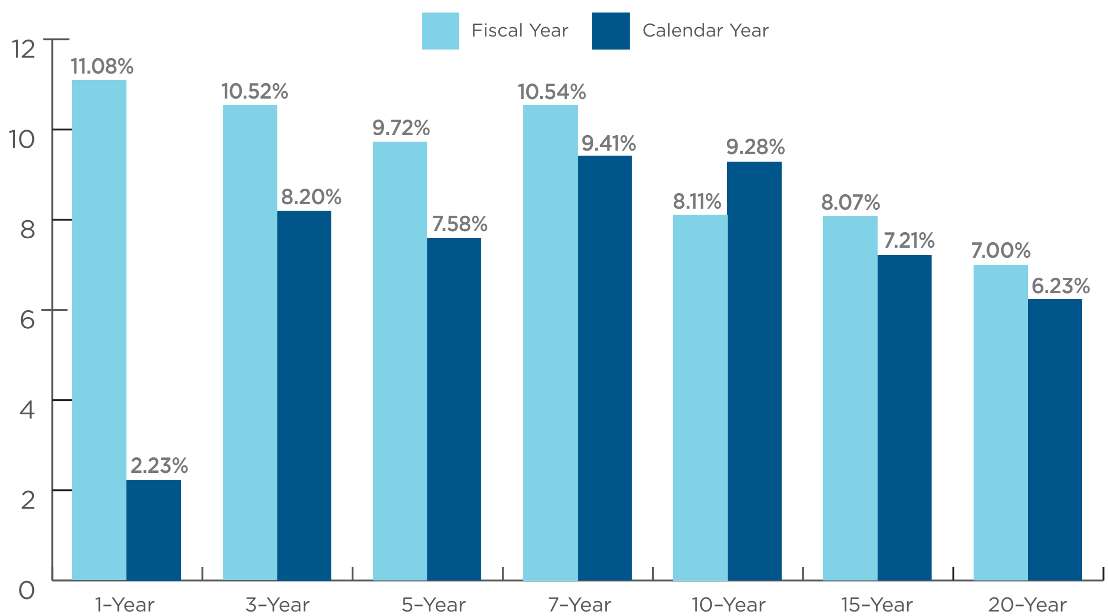
Historical Investment Returns

Historical investment returns for both pension and OPEB are presented in the following charts. Because MPSERS OPEB is in the early stages of prefunding, longer-term investment results are not available. Over time, as the plan gains more experience, 10-, 15-, and 20-year investment returns will be reported.

OPEB Historical Investment Returns For 2018[1]



Pension Historical Investment Returns For 2018[1]

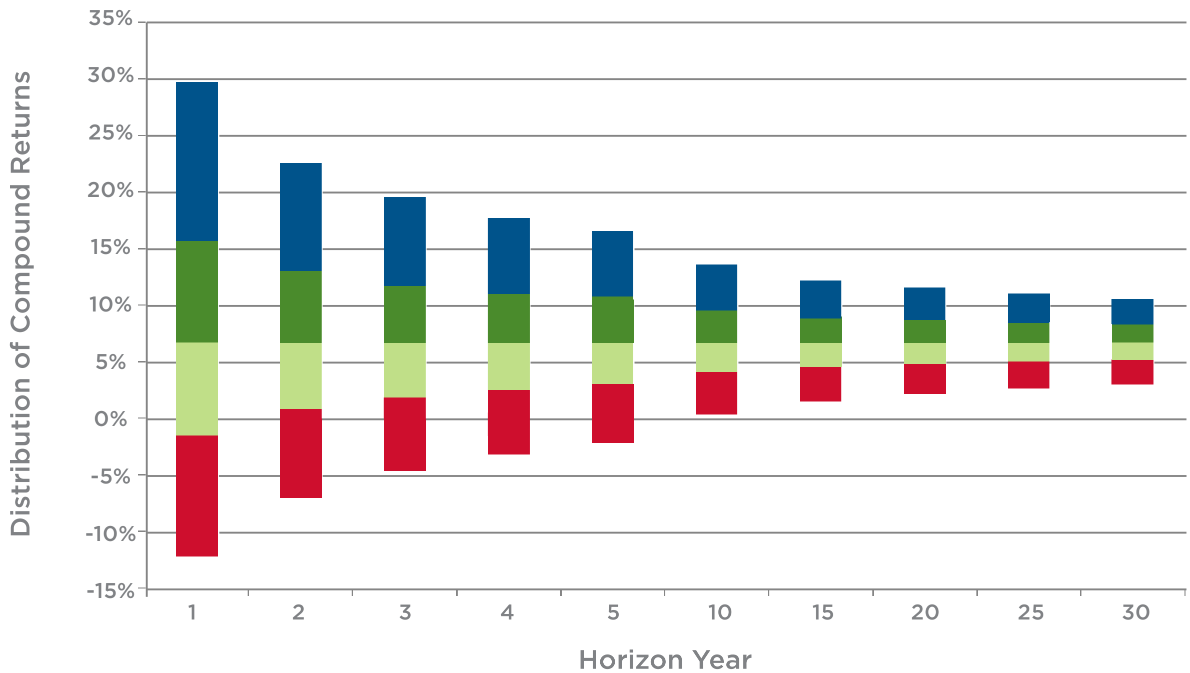


1. Department of Treasury Bureau of Investments report. These figures are shown net of fees. Information shown in the CAFR is shown gross of fees.

Forecasted Investment Returns[1]

The distribution of annual returns presented below is based upon the target asset allocation and the capital market assumptions provided by Department of Treasury, Bureau of Investments investment consultant. The results are based upon a price inflation assumption of 2.25 percent.

The expected annual investment return is 7.47 percent. The median of the distribution, that is the return that is expected to be achieved 50 percent of the time, is 6.71 percent.



Percentile	1	2	3	4	5	10	15	20	25	30
95th	29.71%	22.50%	19.44%	17.65%	16.44%	13.51%	12.23%	11.47%	10.96%	10.58%
75th	15.60%	12.93%	11.76%	11.07%	10.60%	9.45%	8.94%	8.64%	8.43%	8.28%
50th	6.71%	6.71%	6.71%	6.71%	6.71%	6.71%	6.71%	6.71%	6.71%	6.71%
25th	-1.49%	0.84%	1.89%	2.53%	2.96%	4.05%	4.53%	4.82%	5.02%	5.16%
5th	-12.21%	-7.04%	-4.66%	-3.21%	-2.21%	0.33%	1.47%	2.16%	2.63%	2.98%
Geometric Average	7.47%	7.09%	6.96%	6.90%	6.86%	6.79%	6.76%	6.75%	6.74%	6.74%

1. MPSERS 5-Year Experience Study, Oct. 1, 2012 through Sept. 30, 2017, Page B-6.

Investments and Earnings

A key function of the investment fiduciary is to ensure the retirement system's investment portfolio is diversified. Having a diverse portfolio helps to maximize investment income responsibly while minimizing risk. Even though market performance may fluctuate, the long-term performance of the retirement system's portfolio is stable.

Investments and Earnings[1]

	Market Value (Dollars)	Total Investment And Interest Income (Dollars)
Fixed Income Pools	$ 6,803,539,651	$ 79,876,645
Domestic Equity Pools	14,811,687,957	2,592,713,542
Real Estate & Infrastructure Pools	5,927,213,228	693,176,727
Private Equity Pools	9,228,590,797	1,517,894,793
International Equity Pools	9,680,716,629	172,165,750
Absolute Return Pools	8,462,370,208	832,552,633
Short-Term Investment Pools	1,370,628,864	33,964,988
Market Value and Net Investment Gain	**$ 56,284,747,334**	**$ 5,922,345,078**

Fixed Income Pools – 12.1%
Domestic Equity Pools – 26.3%
Real Estate & Infrastructure Pools – 10.5%
Private Equity Pools – 16.4%
International Equity Pools – 17.2%
Absolute Pools – 15.0%
Short-Term Investment Pools – 2.5%

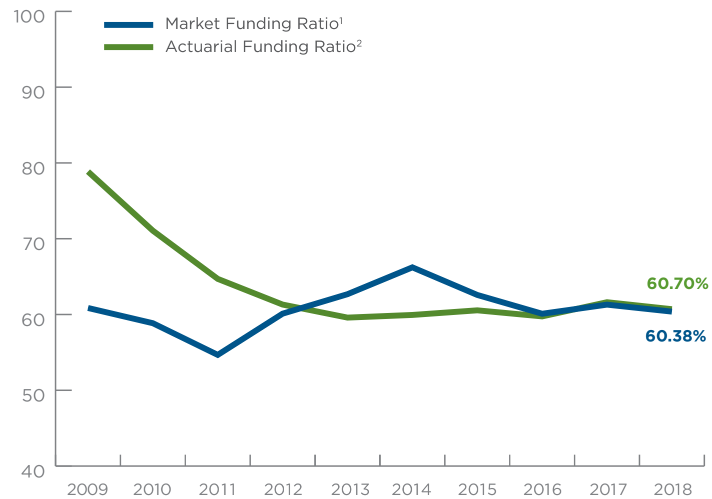
1. CAFR for the Fiscal Year ended Sept. 30, 2018, Page 78.

Market and Actuarial Funding Ratios

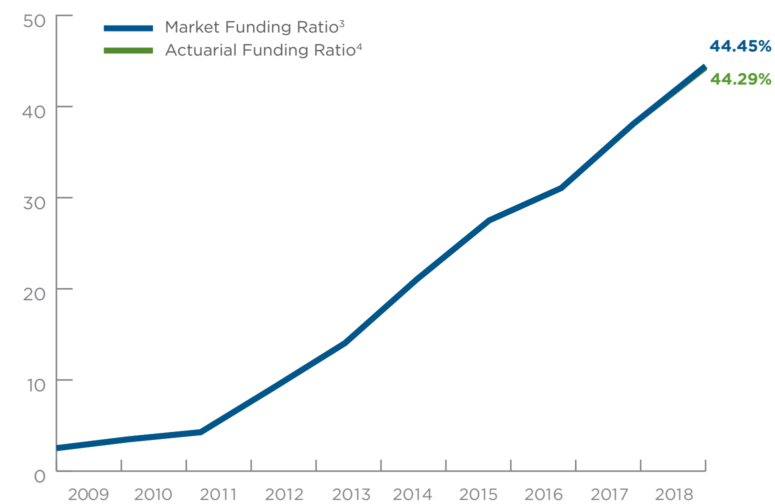
Pension
The market funding ratio is based on the market value of assets at fiscal year end. The actuarial funding ratio is the best practice used by all pension plans nationwide. It incorporates a 5-year smoothing period, which minimizes volatility in a pension system's funding requirements.

OPEB
Starting in fiscal year 2013, the System began pre-funding OPEB costs, which significantly decreased the liability and increased the asset levels. Pre-funding is a best practice that invests assets and allows investment returns to help fund the plan. Many states do not pre-fund OPEB costs. This reform put Michigan on the leading edge of OPEB funding practices.

Prior to the 2018 fiscal year, the market funding ratio was equal to the actuarial funding ratio. 5-year smoothing was adopted for the OPEB plan with the 2018 valuation so separate actuarial and market funding ratios will be calculated on a going-forward basis. The market value of assets as of Sept. 30, 2018, was $6.1 billion, while the actuarial value of assets was $6.0 billion.



1. Calculated on market value of assets.
2. Pension Actuarial Valuation for the fiscal year ended Sept. 30, 2018, Page B-5.



3. Calculated on market value of assets.
4. OPEB Actuarial Valuation for the fiscal year ended Sept. 30, 2018, Page A-2.

Member and Employer Contributions

Employer Contributions

Statute requires participating employers to contribute to finance the benefits of plan members. These employer contributions are determined annually by the System's actuary and are based upon level percent of payroll funding principles so the contribution rates remain stable. With the enactment of PA 181 of 2018, the UAAL will gradually shift from level percent of payroll amortization to level dollar amortization over a period of seven years.

Definition of Normal Cost

Normal cost is the cost of the retirement benefit a member earns each year, and is set using the AROR in addition to other actuarial assumptions. All Pension Plus, Pension Plus 2, MIP, and some Basic plan members contribute toward the cost of their retirement benefits. After member contributions are accounted for, the employer pays the remainder of the Normal cost as shown below.

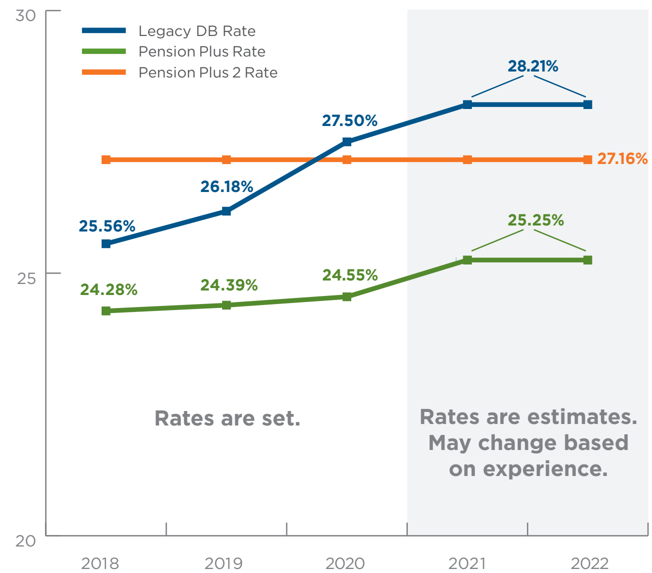
Member and Employer Pension Contributions[1]	
Member Contributions	
Weighted Average	
Legacy DB	4.75%
Pension Plus	5.04%
Pension Plus 2	6.20%
Employer Contributions	
Normal Cost of benefits expressed as a percentage of valuation payroll	
Legacy DB	6.39%
Pension Plus[2]	3.43%
Pension Plus 2[2]	6.20%
UAAL contribution rate expressed as a percentage of valuation payroll	
Legacy DB	26.70%
Pension Plus	26.70%
Pension Plus 2	26.70%
Valuation Payroll	
For Normal Cost	$7,777,059,752
For UAAL	$8,984,201,569

1. Pension Actuarial Valuation for the fiscal year ended Sept. 30, 2018, Page A–1.
2. This is the defined benefit component of Pension Plus and Pension Plus 2. There is an additional 1 percent employer match for the defined contribution component.

Contribution Rates

Contribution rates are determined actuarially, based on the economic conditions and an assumed investment return each year. Contribution rates for fiscal years 2019 and 2020 have been calculated, provided to the employers, and published on the employer website.

Rates for fiscal years 2021 and 2022 are estimated using a projection of the most recent data available.



Actuarial Assumptions

Actuarial valuations for both the pension and OPEB plans involve estimates of the value of reported amounts and assumptions about the probability of occurrence of events far into the future. In accordance with Section 41(1) of the MPSERS statute (Act 300 of the Public Acts of 1980, as amended), the actuarial assumptions are adopted by the retirement board and the DTMB director after consultation with the actuary and the state treasurer. Examples include assumptions about future employment, investment performance, and the healthcare cost trend.

Actuarial Assumptions for Fiscal Year Ended Sept. 30, 2018

Pension and OPEB[1,2]	
Actuarial Cost Method	Entry Age, Normal
Amortization Method	Level Percent of Payroll
Payroll Growth Assumption[3]	3.50% reduced to 0% by Sept. 30, 2025
Amortization Period	Closed Period, 18 years beginning Oct. 1, 2020
Asset Valuation Method	5-Year Smoothed
Wage Inflation Rate	2.75%
OPEB	
Healthcare Cost Trend Rate[2]	7.50% Year 1 graded to 3.50% Year 12
AROR—Closed[2,4]	6.95%
Pension-AROR[1]	
Legacy DB plan—Closed	6.80%
Pension Plus—Closed	6.80%
Pension Plus 2—Open	6.00%

1. MPSERS Pension Actuarial Valuation for the fiscal year ended Sept. 30, 2018.
2. MPSERS OPEB Actuarial Valuation for the fiscal year ended Sept. 30, 2018.
3. PA 181 of 2018 enacted a gradual phase-in reduction to the payroll growth assumption to 0% in 50 basis point increments beginning with the Sept. 30, 2019, valuations. Once the 0% payroll growth assumption is fully phased-in, the amortization method for both pension and OPEB will be level dollar.
4. The OPEB plan closed to employees first hired on or after Sept. 4, 2012. These employees participate in the Personal Healthcare Fund and may become eligible for a lump sum payment into a Health Reimbursement Account upon their first termination from employment ($1,000 with at least 10 years of service if under age 60; $2,000 with at least 10 years of service if age 60 or older). These employees have the option of enrolling in the System's retiree healthcare at full cost at termination.

Mortality Assumptions

The mortality tables used in the valuation of the plan are described below:

- **Active Members:** Retirement Plan (RP)–2014 Male and Female Employee Mortality Tables scaled by 100 percent for both males and females and adjusted for mortality improvements using projection scale Mortality Projection (MP)–2017 from 2006.
- **Healthy Retirees:** RP–2014 Male and Female Healthy Annuitant Mortality Tables scaled by 82 percent for males and 78 percent for females and adjusted for mortality improvements using projection scale MP–2017 from 2006.
- **Disabled Retirees:** RP–2014 Male and Female Disabled Annuitant Mortality Tables scaled by 100 percent for both males and females and adjusted for mortality improvements using projection scale MP–2017 from 2006.

Future Life Expectancy[1]				
Sample Attained	Probability Of Dying Next Year		Future Life Expectancy (Years)	
Ages	Men	Women	Men	Women
Active Members				
20	0.04%	0.02%	67.92	72.16
25	0.05%	0.02%	62.59	66.83
30	0.05%	0.02%	57.26	61.50
35	0.06%	0.03%	51.95	56.20
40	0.07%	0.05%	46.66	50.91
45	0.10%	0.07%	41.38	45.66
50	0.11%	0.11%	36.17	40.46
55	0.28%	0.18%	31.08	35.34
60	0.49%	0.27%	26.16	30.34
65	0.88%	0.39%	21.54	25.45
Healthy Retirees				
50	0.33%	0.21%	36.35	39.37
55	0.48%	0.30%	31.52	34.36
60	0.67%	0.45%	26.86	29.50
65	0.96%	0.66%	22.43	24.84
70	1.42%	1.02%	18.22	20.36
75	2.27%	1.68%	14.29	16.15
80	3.84%	2.88%	10.75	12.33
Disabled Retirees				
50	2.04%	1.18%	24.23	28.67
55	2.37%	1.54%	21.11	24.86
60	2.80%	1.88%	18.11	21.36
65	3.37%	2.20%	15.28	17.97
70	4.17%	2.88%	12.55	14.59
75	5.61%	4.23%	9.93	11.44
80	8.01%	6.47%	7.56	8.71

1. Pension Actuarial Valuation for the fiscal year ended Sept. 30, 2018, pages E-5 and E-6.

Retirement Age Assumptions[1]

The rates of retirement used to measure the probability of eligible members retiring during the next year are shown below. These assumptions will first be used for the Sept. 30, 2018 valuation of the System.

Basic members are eligible for normal retirement after attaining age 55 with 30 or more years of credited service, or after attaining age 60 with 10 or more years of credited service.

MIP members are eligible for normal retirement after 30 years of service, or after attaining age 60 with 5 or more years of service.

Basic or MIP members are eligible for early retirement after attaining age 55 with 15 but less than 30 years of credited service.

Pension Plus members are eligible for normal retirement after attaining age 60 with 10 or more years of credited service. Pension Plus members are not eligible for early retirement. Currently, Pension Plus 2 members have the same retirement eligibility and retirement rates as Pension Plus members.

Eligible Members Retiring With An Early Retirement

Age	Basic And MIP Members
55	4.0%
56	5.0%
57	5.5%
58	5.5%
59	6.0%

Eligible Members Retiring With A Normal Retirement

Age	Basic Members		MIP And Pension Plus Members	
	Teachers	Non-Teachers	Teachers	Non-Teachers
55	25%	20%	N/A	N/A
56	21%	20%	N/A	N/A
57	16%	18%	N/A	N/A
58	16%	18%	N/A	N/A
59	18%	18%	N/A	N/A
60	20%	18%	20%	17%
61	20%	18%	20%	17%
62	29%	29%	23%	24%
63	29%	29%	23%	24%
64	25%	24%	23%	20%
65	25%	24%	25%	20%
66	30%	30%	25%	26%
67	25%	28%	25%	20%
68	25%	23%	25%	16%
69	25%	20%	25%	16%
70	25%	20%	25%	16%
71	21%	20%	25%	16%
72	21%	20%	25%	16%
73	21%	20%	20%	16%
74	21%	20%	20%	16%
75 and older	100%	100%	100%	100%

Eligible Members Retiring With A Normal Retirement

Years Of Service	MIP Members With 30+ Years of Service	
	Teachers	Non-Teachers
30	25%	25%
31	20%	25%
32	20%	20%
33	18%	20%
34	19%	20%
35	19%	20%
36	21%	20%
37	24%	20%
38	24%	20%
39	27%	25%
40	30%	25%
41	30%	25%
42	30%	30%
43	30%	30%
44	30%	30%
45	30%	30%
46	30%	30%
47	30%	30%
48	30%	30%
49	30%	30%
50	100%	100%

1. Pension Actuarial Valuation for the fiscal year ended Sept. 30, 2018, pages E-7 and E-8.

Investment Service Providers

A service provider is any individual, third-party agent or consultant, or other entity that receives direct or indirect compensation for consulting, investment management, brokerage, or custody services related to the System's assets.

5 AM Ventures
Accel Partners
Advent International Corp.
AEW Capital Management
Affinity Equity Partners
Ancora Advisors
Aon Hewitt
Apax Partners Worldwide LLP
Apollo Capital Management
Apollo Global Management
Apollo-Stonetower
Arboretum Ventures
Arclight Capital Partners
Ardian
Ares Management LLC
Ark Investments
Asana Partners
Attucks Asset Management
Avanath Capital Management
Axiom Asia Private Capital
Bank of Montreal
Barclays Capital
Barings
Basalt Infrastructure Partners
BB&T Capital Markets
BC Partners
Beacon Capital Partners
Bentall Kennedy
Beringea
Berkshire Partners LLC
BGC Financial
Bivium Capital Partners
Blackrock
BlackRock Financial Management
Blackstone Alternative Asset Management
Blackstone Group
BMO Capital Markets
BNP Paribas
BNY Convergex
BOA-Merrill Lynch
Bridgepoint Capital
BroadRiver Asset Management
Brookfield Asset Management Inc.
BTIG
Cantor Fitzgerald
Capital Institutional Services
Capri Capital Partners
Carlyle Group L.P.
Carlyle Investment Management
Centerbridge
Centerbridge Capital
Cerberus Capital Management L.P.
Charlesbank Capital Partners
CIE Management-BC Partners
CIM Investment Advisors
Citigroup Global Markets
Clarion Partners
Clarkston Capital Partners
Coller Capital
Columbia Management
CoStar Realty Information Inc.
Cowen & Co.
Credit Suisse
Credit Suisse-Commercial Paper
Crescent Capital Group
Crescent Direct Lending
CVC Capital Partners
Czech Asset Management
DA Davidson
Dalmore Capital Limited
Deutsche Bank
Dodge & Cox
Domain Capital Advisors
Domain Mercury/Ploutos
Drexel Hamilton
Effissimo
Elegantree Fund
EnCap Investments L.P.
EnTrust Capital
Fidelity Institutional Asset Management, (fka Pyramis)
FIMI Opportunity Funds
FirstMark Capital
Fisher Investments
Five Star Realty Partners
Flagship Ventures
Fortress Investment Group
Fox Paine & Company LLC
Freeman, Spogli & Co.
FTN Financial
Gateway Capital
Genstar LLC
Goldman Sachs
Greenspring Associates
Grosvenor Capital Management
GSO Capital Partners
H.C. Wainwright
HarbourVest Partners LLC
HarbourVest TOPE LLC
Harvest Partners LLC
Heitman Capital Management
Highbridge Principal Strategies
Hilltop Securities
Hopen Life Sciences Ventures
HPS Investment Partners III LLC
Huron Capital Partners LLC
ICG Advisors
InSight Venture Partners
Invesco Ltd.
Jana Partners
JANA Special Situations Management
JP Morgan
JP Morgan Asset Management
JP Morgan Private Equity Fund Services
Kayne Anderson
KBS Realty Advisors
Kelso & Company
Kensington Realty Advisors
Kevin Miller Financial Services
Khosla Ventures
Kohlberg, Kravis, Roberts & Co.
L&B Realty Advisors
Landmark Realty Advisors
LaSalle Investment Management
Lazard Asset Management
Lead Edge Capital
Leonard Green & Partners L.P.
LGT Capital Partners

Investment Service Providers, continued

Lightspeed Ventures
Lombard International Life Assurance Company
Lonestar
Loomis Sayles & Company
Los Angeles Capital Management
Lubert-Adler Management Company
Marathon Asset Management
Marathon London
MarketAxess Corporation
Martin Currie
Matlin Patterson Global Advisors
MBS Securities
Mellon Capital Management
Menlo Management Partners
Merit Energy
Meritech Capital Partners
Mesirow Financial
Metropolitan West Asset Management
MFR Securities
MI Growth Capital Partners SBIC
Mischler Financial Group
Morgan Stanley
Morgan Stanley Smith Barney LLC
Multi Bank Securities Inc.
Munder Capital Management AKA Victory Capital Management
Napier Park Global Capital
Natural Gas Partners
New Leaf Venture Partners
Nordic Capital
Northpointe Capital
Oak Investment Partners
Oaktree Capital Management LLC
Oppenheimer
Orchard Global Asset Management
Orion Resource Partners
OTA Ltd Partnership
Paladin Realty Partners
Parallel Resource Partners
Parthenon Capital Inc.
Peninsula Capital Partners LLC
Permira
PIMCO
Piper Jaffray
Pitchbook
Preqin
Principal CMBS
Principal Financial Group
Pritzker Group
Proprium Capital Partners
Prudential
Prudential Fixed Income
Public Pension Capital
R.W. Baird
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Renaissance Venture Capital
Rhone Capital
Rialto Capital
Ridgewood Capital Management
Ridgewood Energy
Riverside
Rohatyn Group
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Science Media LLC
ScotiaBank
Seizert Capital Partners
Shamrock Capital Advisors
Silver Lake
SJC Direct Lending & Onshore
SK Capital
Societe Generale
Southwest Securities
Sprott Resources
State Street Bank
State Street Global Advisors
Stifel
Stockbridge Capital Group
Stonepeak Advisors LLC
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T. Rowe Price Trust Company
Tahquamenon
TH Real Estate Limited
The John Buck Company
The Riverside Company
The TCW Group Inc.
Thomas Bravo
TICP Fund
TPG Real Estate Advisors
TPG TSSP
TPG Inc.
Tradition Securities
Transwestern Investment Management
Trilantic Capital Management LLC
True North Management Group
Trusted Insight
TSG Consumer Partners
Turnbridge Capital Management, LLC
U.S. Bank
Veritas Capital Fund Management LLC
Vida Capital Inc.
Visium Capital Management
Vista Equity Partners
Warburg, Pincus LLC
Warwick Energy Group
Wayne Co.
Wellington Trust Company
Wells Fargo
Western National Group

Office of Retirement Services

Department of Technology, Management and Budget
Kerrie Vanden Bosch, director

Our Purpose

ORS is an innovative retirement organization driven to empower our customers for a successful today and a secure tomorrow.

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