Financial Section

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Independent Auditor's Report

To the Board of Trustees
Missouri State Employees' Retirement System
Jefferson City, Missouri

Report on Financial Statements

We have audited the accompanying financial statements of the pension and other trust funds and aggregate remaining fund information of the Missouri State Employees' Retirement System (MOSERS), a pension (and other employee benefit) trust fund of the state of Missouri, which comprise the statements of fiduciary net position as of June 30, 2020, and the related statements of changes in fiduciary net position, for the year then ended, and the related notes to the financial statements.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with accounting principles generally accepted in the United States of America; 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.

Auditor's Responsibility

Our responsibility is to express opinions on these financial statements based on our audit. We conducted our audit 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 auditor's 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 opinions.

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Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the pension and other trust funds and aggregate remaining fund information of MOSERS as of June 30, 2020, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in accordance with accounting principles generally accepted in the United States of America.

Other Matters

Required Supplementary Information

Accounting principles generally accepted in the United States of America require that the *Management's Discussion and Analysis* and *Required Supplementary Information* on pages 19-25 and 56-63 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 Information

Our audit was conducted for the purpose of forming an opinion on the financial statements that collectively comprise MOSERS' *Basic Financial Statements* as a whole. The *Introductory*, *Investment*, *Actuarial*, *Statistical Sections* and *Additional Supplemental Schedules* as listed in the table of contents are presented for purposes of additional analysis and are not a required part of the financial statements.

The additional supplementary information accompanying financial information listed as *Additional Supplemental Schedules* in the table of contents 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 accompanying financial information listed as supplemental schedules are fairly stated, in all material respects, in relation to the *Basic Financial Statements* as a whole.

The *Introductory*, *Investment*, *Actuarial*, *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.

Eide Bailly LLP

Boise, Idaho

October 16, 2020

Management's Discussion and Analysis

This discussion and analysis of the Missouri State Employees' Retirement System (MOSERS) provides an overview of the retirement system's financial activities for the fiscal year ended June 30, 2020. It is intended to be used in conjunction with the *Transmittal Letter* beginning on page 6 and *Basic Financial Statements* and *Notes to the Basic Financial Statements*, beginning on page 26 of this report.

Using This Financial Report

This Comprehensive Annual Financial Report (CAFR) reflects the activities of MOSERS as reported in the *Statements of Fiduciary Net Position* and the *Statements of Changes in Fiduciary Net Position*, which begin on page 26. These statements are prepared in conformity with generally accepted accounting principles. The *Notes to the Basic Financial Statements* are an integral part of the financial statements and include additional information not readily evident in the statements themselves. The *Required Supplementary Information* (RSI) and *Additional Financial Information* following the *Notes to the Basic Financial Statements* provide historical information and additional details considered useful in evaluating the condition of the plan.

See the *Actuarial Section* of this report for a detailed discussion of the actuarial value of assets and liabilities and the funded status of the plans.

The *Basic Financial Statements* contained in this section of the CAFR consist of:

- The *Statements of Fiduciary Net Position* report the pension trust funds' assets, deferred outflows, liabilities, deferred inflows, and resulting net position, where total assets plus deferred outflows less current liabilities and deferred inflows equal net position held in trust for future pension benefits available at the end of the fiscal year. It is a snapshot of the financial position of the pension trust funds at that specific point in time.
- The *Statements of Changes in Fiduciary Net Position* summarize the pension trust funds' financial transactions that have occurred during the fiscal year where additions less deductions equal the change in net position. It supports the change that has occurred to the prior year's net position on the *Statements of Fiduciary Net Position.*
- The *Statement of Net Position* of the internal service funds is similar to the *Statements of Fiduciary Net Position* in that it is also a snapshot of the financial position of the internal service funds where net position plus liabilities equals assets.
- The *Statement of Revenues, Expenses, and Changes in Net Position* of the internal service funds is similar to the *Statements of Changes in Fiduciary Net Position* in that it also reports a summary of the financial activity that occurred over the period of the fiscal year where revenues less expenses equals net revenue and supports the change to the prior year's net position.
- The *Statement of Cash Flows* of the internal service funds reports the cash activity of the fiscal year of the internal service funds. The focus of this statement is on the sources and uses of cash within the internal service funds.
- The *Notes to the Basic Financial Statements* are an integral part of the above financial statements and include additional information not readily evident in the statements themselves.

Funding Analysis

The unfunded actuarial accrued liability (UAAL) for the Missouri State Employees' Plan (MSEP) increased by $0.3 billion from $5.2 billion at June 30, 2019, to $5.5 billion at June 30, 2020, with a corresponding decrease in funded percentage from 62.9% to 61.1%. The UAAL for the Judicial Plan decreased by $1.2 million from $445.3 million at June 30, 2019, to $444.1 million at June 30, 2020, with an increase in funded percentage from 27.9% to 28.9%. The assumed rate of investment return was reduced from 7.10% to 6.95% effective Jufor both the MSEP and the Judicial Plan, which has a negative impact on the funded status and UAAL. The Judical Plan had a positive change in net position this year because contributions and investment earnings exceeded benefit payments. MSEP, on the other hand, experienced a decrease in fund net position because benefit payments exceeded contributions and investment earnings.

To determine the UAAL of the plans for setting contribution rates, MOSERS uses a smoothed value of assets which recognizes market gains and losses on the actuarial value of assets over a closed five-year period. For GASB 67 financial statement reporting purposes, the market value actuarial method is used to determine the net pension liability. The net pension liability of the MSEP Fund at June 30, 2020, was $6.3 billion, an increase from $6.0 billion as of June 30, 2019. The net pension liability of the Judicial Plan Fund at June 30, 2020, was $0.5 billion, relatively consistent with June 30, 2019. The fund net position as a percentage of total pension liability decreased from 56.7% at June 30, 2019, to 55.5% at June 30, 2020, for the MSEP Fund and increased from 25.6% to 26.8% for the Judicial Plan Fund.

Financial Reporting Highlights

- MOSERS' net position restricted for pensions increased by $3.3 million during the year ended June 30, 2020. On June 30, 2020, total plan assets (including net capital assets of $7.5 million) were $11.9 billion, exceeding total liabilities of $3.8 billion, resulting in a net position held in trust for pension benefits of $8.1 billion.
- Covered payroll, from which both employee and employer contributions are calculated, increased $56.6 million for the MSEP and increased $0.8 million for the Judicial Plan, or 2.9% and 1.3% respectively, over the last fiscal year.
- Total contributions during fiscal year 2020 were $516.6 million, up from $469.1 million in fiscal year 2019. Based upon the June 30, 2018 actuarial valuation, the fiscal year 2020 actuarial required employer contribution rates were determined to be 21.77% for the MSEP and 63.80% for the Judicial Plan.
- Investment income, net of related fees, was $408.5 million. Investments of the pension trust funds generated a time-weighted rate of return of 5.2%, net of fees, for the year, up from the prior year's return of 4.3%. The money-weighted rate of return, net of investment expenses for fiscal year 2020, was 5.2%.
- Investment manager fees were $35.6 million in fiscal year 2020, down from $40.7 million in fiscal year 2019. The lower manager fees were driven by investment staff reducing exposure to higher fee managers. Incentive fees in fiscal year 2020 were $4.4 million, which was an increase of $8.2 million, over the 2019 gain on a net reversal of incentive fees of $(3.8) million.
- Member benefit payments were $904.4 million in fiscal year 2020, up $24.0 million from $880.4 million in fiscal year 2019. Service transfers and refunds totaled $9.0 million in fiscal year 2020, relatively consistent with fiscal year 2019.
- Administrative expenses totaled $8.5 million in fiscal year 2020, compared to $9.3 million in fiscal year 2019. MOSERS experienced a decrease in administrative expense due to a variety of factors, including less professional fees, depreciation and other expenses. In addition to the $8.5 million in administrative expenses, MOSERS capitalized a total of $2.7 million in project costs incurred during the year, which includes staff payroll costs of $0.8 million. These capitalized software development project costs will be amortized over the estimated useful life the new pension administration system.
- The fiscal impact of MOSERS' response to the COVID-19 pandemic during fiscal year 2020 was not significant to MOSERS' overall financial results. MOSERS spent approximately $61,000 on expenses and capital assets related to the COVID-19 pandemic in fiscal year 2020. These expenses included air filtration equipment, equipment to facilitate working remotely, and supplies. These costs were partially offset by savings associated with reduced facility usage and travel savings. MOSERS estimates that it experienced a net increase in costs of approximately $25,000 during fiscal year 2020 to maintain business continuity and protect the health and safety of its members and employees.

The schedules on pages 21-25 present summary comparative financial statements of the pension trust funds and internal service funds for fiscal year 2020 and fiscal year 2019. For each schedule, there is a brief summary of the significant changes noted in that schedule.

Requests for Information

This financial report is designed to provide a general overview of the System's finances for all those interested in the System. Questions concerning any of the information provided in this report or requests for additional information should be addressed to MOSERS at P.O. Box 209, Jefferson City, MO 65102 or by email at *FOIArequest@mosers.org.*

Pension Trust Funds

Summary Comparative Statements of Fiduciary Net Position

		As of June 30, 2020		As of June 30, 2019		Amount of Change	Percentage Change
Assets							
Cash and short-term instruments	$	4,903,993	$	263,269,711	$	(258,365,718)	(98.14)%
Receivables		395,470,195		346,692,311	$	48,777,884	14.07
Investments		11,463,190,890		11,596,260,814	$	(133,069,924)	(1.15)
Capital assets, net of accumulated depreciation		7,530,526		4,887,103	$	2,643,423	54.09
Other assets		17,717		75,750	$	(58,033)	(76.61)
Total assets		11,871,113,321		12,211,185,689	$	(340,072,368)	(2.78)
Deferred outflow of resources		899,535		743,472	$	156,063	20.99
Liabilities							
Administrative and other payables		5,240,423		1,666,007	$	3,574,416	214.55
Investment activities payable		342,104,677		202,258,228	$	139,846,449	69.14
Obligations under repurchase agreements		3,434,907,955		3,921,700,618	$	(486,792,663)	(12.41)
MOSERS investment portfolio liability (MIP)		3,481,031		3,470,132	$	10,899	0.31
Net OPEB liability		7,695,160		7,666,038	$	29,122	0.38
Total liabilities		3,793,429,246		4,136,761,023	$	(343,331,777)	(8.30)
Deferred inflow of resources		465,011		369,869	$	95,142	25.72
Net positions restricted for pensions	$	8,078,118,599	$	8,074,798,269	$	3,320,330	0.04

The largest components of the net position of the pension trust funds are the cash and short-term instruments, receivables, and investments, less obligations under repurchase agreements (which represents the amount of money MOSERS is borrowing to lever the portfolio).

MOSERS' net position restricted for pension benefits slightly increased by $3.3 million, to end at $8.078 billion in fiscal year 2020. Net position did not change significantly from last year because contributions and investments revenue only slightly exceeded benefit payments and administrative expenses.

The change in cash and receivables is primarily related to the timing of investment activity, including the timing of investment transactions that had not settled by June 30.

Administrative and other payables increased and investment activities payable increased as a result of the timing of normal business and investing activity.

Obligations under repurchase agreements decreased because MOSERS is transitioning to a new portfolio that is using less leverage.

Detailed information regarding MOSERS' investment portfolio is included in the *Investment Section* of this report.

Pension Trust Funds

Summary Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2020	Year Ended June 30, 2019	Amount of Change	Percentage Change
Additions				
Contributions	$ 516,580,486	$ 469,065,954	$ 47,514,532	10.13%
Net investment income	408,517,012	319,211,119	89,305,893	27.98
Miscellaneous income	133,952	500,793	(366,841)	(73.25)
Total additions	925,231,450	788,777,866	136,453,584	17.30
Deductions				
Benefit payments	904,429,822	880,399,391	24,030,431	2.73
Service transfers and refunds	9,008,684	9,015,238	(6,554)	(0.07)
Administrative expenses	8,472,614	9,272,967	(800,353)	(8.63)
Total deductions	921,911,120	898,687,596	23,223,524	2.58
Net increase (decrease)	3,320,330	(109,909,730)	113,230,060	103.02
Net position beginning of year	8,074,798,269	8,184,707,999	(109,909,730)	(1.34)
Net positions restricted for pensions	$ 8,078,118,599	$ 8,074,798,269	$ 3,320,330	0.04

The 10.13% increase in contributions received is primarily attributable to an increase in contribution rates from 20.21% in fiscal year 2019 to 21.77% in fiscal year 2020, and an increase in the growing percentage of MSEP 2011 tier members who contribute 4% of pay.

The increase in net investment income from fiscal year 2019 to fiscal year 2020 is attributable to market performance. The fund returned 5.2% in fiscal year 2020 compared to 4.3% in fiscal year 2019. The *Investment Section* of this report contains additional information regarding investments activity.

The total benefit payments increased as a result of an increase in the number of benefit recipients plus cost-of-living adjustments provided to existing benefit recipients. Detailed schedules of these changes can be viewed on pages 116-117 of the *Actuarial Section* of this report.

MOSERS experienced a decrease in administrative expense due to a variety of factors, including less professional fees, depreciation and other expenses. In addition to the $8.5 million in administrative expenses, MOSERS capitalized a total of $2.7 million in project costs incurred during the year, which includes staff payroll costs of $0.8 million.

Internal Service Funds

Summary Comparative Statements of Net Position

	As of June 30, 2020	As of June 30, 2019	Amount of Change	Percentage Change
Assets				
Premiums receivable	$ 1,002,946	$ 957,787	$ 45,159	4.71%
Short-term instruments	5,592,351	6,919,257	(1,326,906)	(19.18)
Capital assets, net of accumulated depreciation	0	6,947	(6,947)	(100.00)
Total assets	6,595,297	7,883,991	(1,288,694)	(16.35)
Deferred outflow of resources	13,340	0	13,340	100.00
Liabilities				
Premiums payable	2,462,189	5,170,302	(2,708,113)	(52.38)
Deferred revenue	1,879,564	2,008,209	(128,645)	(6.41)
Other liabilities	1,565,665	239,771	1,325,894	552.98
Total liabilities	5,907,418	7,418,282	(1,510,864)	(20.37)
Deferred inflow of resources	8,133	0	8,133	100.00
Unrestricted net position	$ 693,086	$ 465,709	$ 227,377	48.82

The slight increase in premiums receivable is attributable to normal fluctuations in the month-end balance of life and long-term disability insurance premiums receivable during the year, which are dependent on the number of members participating and amount of their coverage.

The decrease in short-term instruments and premiums payable is attributable to the timing of remitting premiums received to the vendor that underwrites the insurance activities.

The increase in other liabilities is the result of an allocation of expenses from pension trust funds to the internal service fund, but not yet paid for by the fund.

Long-term disability premiums are paid by the state on all active employees based upon a blended rate estimated by MOSERS. The Standard is paid the actual rate based upon active employees that are not yet eligible to retire. The deferred revenue balance represents amounts paid by the state in excess of that needed to pay the premiums. The reduction in deferred revenue during fiscal year 2020 reflects a lower amount received than was needed to pay the premiums. This amount reduced the deferred revenue balance. This balance is estimated to continue to decrease in the future. The Standard is the insurance company that underwrites the life insurance and long-term disability programs.

Internal Service Funds

Summary Comparative Statements of Revenues, Expenses, and Changes in Net Position

	Year Ended June 30, 2020	Year Ended June 30, 2019	Amount of Change	Percentage Change
Operating revenues				
Premium receipts	$ 32,582,558	$ 31,342,778	$ 1,239,780	3.96%
Deferred compensation receipts	1,315,076	1,215,000	100,076	8.24
Miscellaneous income	484,075	494,722	(10,647)	(2.15)
Total operating revenues	34,381,709	33,052,500	1,329,209	4.02
Operating expenses				
Premium disbursements	32,549,567	31,325,399	1,224,168	3.91
Premium refunds	32,991	17,379	15,612	89.83
Administrative expenses	1,625,602	1,649,467	(23,865)	(1.45)
Total operating expenses	34,208,160	32,992,245	1,215,915	3.69
Net operating income (loss)	173,549	60,255	113,294	188.02
Nonoperating revenues				
Gain on sale of capital assets	0	145	(145)	(100.00)
Investment income	53,828	127,197	(73,369)	(57.68)
Total nonoperating revenues	53,828	127,342	(73,514)	(57.73)
Net revenues over (under) expenses	227,377	187,597	39,780	21.21
Net position beginning of year	465,709	278,112	187,597	67.45
Net position end of year	$ 693,086	$ 465,709	$ 227,377	48.82

Premium receipts and disbursements were slightly higher this year due to a slight increase in covered payroll and also an increase in enrollments in optional insurance products.

Deferred compensation receipts were greater this year due to greater cash receipts from the State of Missouri Deferred Compensation Plan's third-party record keeper, which collects deferred compensation contributions directly from employers.

Internal Service Funds

Summary Comparative Statements of Cash Flows

	Year Ended June 30, 2020	Year Ended June 30, 2019	Amount of Change	Percentage Change
Cash flows from (used for) operating activities	$ (1,380,734)	$ 2,497,662	$ (3,878,396)	(155.28)%
Cash flows from noncapital financing activities	0	145	(145)	(100.00)
Cash flows from (used for) investing activities	1,380,734	(2,497,807)	3,878,541	155.28
Net change in cash	0	0	0	
Cash balances beginning of year	0	0	0	
Cash balances end of year	$ 0	$ 0	$ 0	

The decrease in cash flows from operating activities, and the corresponding increase in cash flows from investing activities is due to timing differences between the receipt of premiums from employers and participants, and the remittance of those funds to The Standard. The Standard is the insurance company that underwrites the life insurance and long-term disability programs.

Pension Trust Funds

Statements of Fiduciary Net Position

As of June 30, 2020

	MSEP	Judicial Plan	Total
Assets			
Cash and short-term instruments	$ 4,806,082	$ 97,911	$ 4,903,993
Receivables			
Contributions	18,481,427	1,690,103	20,171,530
Investment income	206,474,889	4,206,367	210,681,256
Investment sales	156,500,854	3,188,281	159,689,135
Due from other funds	0	4,729,158	4,729,158
Other receivables	199,116	0	199,116
Total receivables	381,656,286	13,813,909	395,470,195
Investments and derivatives			
Investments - custodial bank cash and currency	58,476,141	1,191,293	59,667,434
Investments - treasuries	4,734,478,097	96,452,171	4,830,930,268
Investments - fixed income	1,145,866,749	23,343,932	1,169,210,681
Investments - equities	893,300,338	18,198,576	911,498,914
Investments - real estate investments	397,684,384	8,101,742	405,786,126
Investments - alternatives and limited partnerships	1,720,855,915	35,057,780	1,755,913,695
Investments - derivative instruments	(2,429,484)	(49,494)	(2,478,978)
Investments - cash equivalents	2,286,089,859	46,572,891	2,332,662,750
Total investments and derivatives	11,234,321,999	228,868,891	11,463,190,890
Capital assets, net of accumulated depreciation	7,530,526	0	7,530,526
Prepaid and other expenses	17,717	0	17,717
Total assets	11,628,332,610	242,780,711	11,871,113,321
Deferred outflow of resources	898,164	1,371	899,535
Liabilities			
Administrative and benefit expense payables	1,257,253	6,758	1,264,011
Employee vacation and overtime liability	737,372	6,537	743,909
Payable for investments purchased	237,813,634	4,844,809	242,658,443
Management and incentive fees payable	11,495,083	234,181	11,729,264
Investment activities payable	85,965,653	1,751,317	87,716,970
Obligations under repurchase agreements	3,366,328,134	68,579,821	3,434,907,955
MOSERS investment portfolio liability (MIP)	3,411,530	69,501	3,481,031
Due to other funds	3,232,503	0	3,232,503
Net OPEB liability	7,694,904	256	7,695,160
Total liabilities	3,717,936,066	75,493,180	3,793,429,246
Deferred inflow of resources	464,175	836	465,011
Net position restricted for pensions	$ 7,910,830,533	$ 167,288,066	$ 8,078,118,599

See accompanying *Notes to the Basic Financial Statements*.

Pension Trust Funds

Statements of Changes in Fiduciary Net Position

For the Year Ended June 30, 2020

	MSEP	Judicial Plan	Total
Additions			
Contributions			
Employer contributions	$ 436,895,653	$ 39,174,515	$ 476,070,168
Member contributions	35,141,960	1,314,570	36,456,530
Member purchases of service credit	1,388,992	0	1,388,992
Service transfer contributions	2,664,796	0	2,664,796
Total contributions	476,091,401	40,489,085	516,580,486
Investment activity			
Investing activity income:			
Net appreciation in fair value of investments	(312,028,302)	(6,356,731)	(318,385,033)
Interest	13,546,075	275,965	13,822,040
Dividends	174,382,347	3,552,443	177,934,790
Other	253,058	5,156	258,214
Total investing activity income	(123,846,822)	(2,523,167)	(126,369,989)
Investing activity expenses:			
Management and incentives fees	(45,241,017)	(921,664)	(46,162,681)
Custody and other fees	(598,509)	(12,193)	(610,702)
Consultant fees	(582,049)	(5,160)	(587,209)
Internal investment activity expenses	(4,032,395)	(82,149)	(4,114,544)
Total investing activity expenses	(50,453,970)	(1,021,166)	(51,475,136)
Reverse repurchase agreement activity:			
Income from assets in reverse repurchase funds	649,454,973	13,230,887	662,685,860
Interest expense from reverse repurchase agreements	(74,799,878)	(1,523,845)	(76,323,723)
Total net income from reverse repurchase agreement activity	574,655,095	11,707,042	586,362,137
Total net investment income	400,354,303	8,162,709	408,517,012
Miscellaneous income	133,952	0	133,952
Total additions	876,579,656	48,651,794	925,231,450
Deductions			
Benefit payments	800,896,058	39,622,268	840,518,326
BackDROP payments	63,666,199	0	63,666,199
Buyout and lump-sum payments	245,297	0	245,297
Service transfer payments	3,784,195	0	3,784,195
Contribution refunds	5,224,489	0	5,224,489
Administrative expenses	8,398,164	74,450	8,472,614
Total deductions	882,214,402	39,696,718	921,911,120
Net (decrease) increase in net position	(5,634,746)	8,955,076	3,320,330
Net position restricted for pensions:			
Beginning of year	7,916,465,279	158,332,990	8,074,798,269
End of year	$ 7,910,830,533	$ 167,288,066	$ 8,078,118,599

See accompanying *Notes to the Basic Financial Statements.*

Internal Service Funds

Statement of Net Position

As of June 30, 2020

	Total
Assets	
Current assets	
Premiums receivable	$ 1,002,946
Short-term instruments	5,592,351
Total current assets	6,595,297
Total assets	6,595,297
Deferred outflows of resources	13,340
Liabilities	
Current liabilities	
Premiums payable	2,462,189
Due to other funds	1,496,655
Other liabilities	66,521
Total current liabilities	4,025,365
Deferred revenue	1,879,564
Net OPEB liability	2,489
Total liabilities	5,907,418
Deferred inflow of resources	8,133
Net Position	
Unrestricted net position	693,086
Total net position	$ 693,086

See accompanying *Notes to the Basic Financial Statements*.

Internal Service Funds

Statement of Revenues, Expenses, and Changes in Net Position

For the Year Ended June 30, 2020

		Total
Operating revenues		
Premium receipts	$	32,582,558
Deferred compensation receipts		1,315,076
Miscellaneous income		484,075
Total operating revenues		34,381,709
Operating expenses		
Premium disbursements		32,549,567
Premium refunds		32,991
Administrative expenses		1,625,602
Total operating expenses		34,208,160
Net operating income		173,549
Nonoperating revenues		
Interest income		53,828
Total nonoperating revenues		53,828
Net revenues over expenses		227,377
Net position beginning of year		465,709
Net position end of year	$	693,086

See accompanying *Notes to the Basic Financial Statements*.

Internal Service Funds

Statement of Cash Flows

For the Year Ended June 30, 2020

		Total
Cash flows from operating activities		
Cash received from employers and members	$	35,474,501
Payments to outside carriers		(35,261,818)
Refund of premiums to members		(32,991)
Cash payments to employees for services		(1,041,529)
Cash payments to other suppliers of goods and services		(518,897)
Net cash (used) provided by operating activities		(1,380,734)
Cash flows from investing activities		
Purchase of short-term instruments		(1,956,190,851)
Proceeds from sale and maturities of short-term instruments		1,957,517,757
Cash received from investing activities		53,828
Net cash provided (used) by investing activities		1,380,734
Net increase (decrease) in cash		0
Cash balances beginning of year		0
Cash balances end of year	$	0
Reconciliation of net operating income to net cash provided by operating activities		
Net operating income	$	173,549
Adjustments to reconcile net operating income to net cash provided (used) by operating activities		
Depreciation expense		6,947
Change in assets and liabilities:		
(Increase) in operational accounts receivable		(45,159)
Deferred outflows of resources		(13,340)
Increase (decrease) in operational liabilities		(1,513,353)
Net OPEB liability		2,489
Deferred inflows of resources		8,133
Total adjustments		(1,554,283)
Net cash (used) provided by operating activities	$	(1,380,734)

See accompanying *Notes to the Basic Financial Statements*.

Notes to the Basic Financial Statements

Note 1 – Plan Descriptions and Contribution Information

The MSEP and the Judicial Plan are pension plans covering substantially all state of Missouri employees and judges.

Missouri State Employees' Plan (MSEP)

The MSEP is a cost-sharing multiple-employer, defined benefit public employee retirement plan with two benefit structures known as the MSEP (closed plan) and MSEP 2000 (which includes the MSEP 2011 tier), which are administered by the Missouri State Employees' Retirement System (MOSERS) in accordance with Sections 104.010 and 104.312 to 104.1215 of the Revised Statutes of Missouri (RSMo). As established under Section 104.320, RSMo, MOSERS is a body corporate and an instrumentality of the state. In the System are vested the powers and duties specified in Sections 104.010 and 104.312 to 104.1215, RSMo, and such other powers as may be necessary or proper to enable it, its officers, employees, and agents to carry out fully and effectively all the purposes of Sections 104.010 and 104.312 to 104.1215, RSMo.

Responsibility for the operation and administration of the System is vested in the 11-member MOSERS Board of Trustees (the Board) as defined by state law. Due to the nature of MOSERS' reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the MSEP is considered a pension trust fund of the state of Missouri, and is included in the state's financial reports as a pension trust fund.

The Board intends to follow a financing pattern which computes and requires contribution amounts which, expressed as a percent of active member payroll, will remain approximately level from year to year and from one generation of citizens to the next. For the year ended June 30, 2020, the employer contribution rate was 21.77% of covered payroll.

Complete recognition of the year-to-year swings in the fair value of System assets would produce contribution rate changes that would run counter to the "approximately level" goal. A common actuarial practice, referred to as asset smoothing, is used to address that issue. Recognizing the difference between the actual and assumed investment returns over a closed, five-year period helps ensure a more stable contribution rate.

At any point in time, the ratio of actuarial to fair value of assets will be more or less than the fair value but, if the smoothing method is prudent and properly constructed, those values will converge over time. As of June 30, 2020 and 2019, the ratio of actuarial value of assets to fair value of assets was 110.1% and 110.9%, respectively, for the MSEP.

Per the June 30, 2020 actuarial valuation, membership in the MSEP consisted of the following:

Retirees and beneficiaries currently receiving benefits		50,857
Active		
Vested	28,790	
Nonvested	17,209	45,999
Inactive		
Vested (not yet receiving benefits)*	17,198	
Nonvested (with contribution balances)	21,735	38,933
Total membership		**135,789**

** Includes 247 members on leave of absence and 651 members on long-term disability*

Generally, all full-time state employees, employed before July 2000, who became vested and were not covered under another state-sponsored retirement plan, are eligible for membership in the MSEP (closed plan). Full-time state employees who were employed after July 1, 2000, but before January 1, 2011, are members of the MSEP 2000.

Those first employed in a benefit-eligible position on or after January 1, 2011, are members of the MSEP 2011 tier of the MSEP 2000.

MOSERS participates as an employer in the MSEP and MSEP 2000, including the MSEP 2011 tier.

Unless otherwise delineated, data for MSEP is inclusive of members in the MSEP 2000 and MSEP 2011, which all provide defined benefit pension, survivor, life insurance, and long-term disability benefits.

Employer contributions for the MSEP are determined through annual actuarial valuations. The required contributions are expressed as a percentage of covered payroll. The state of Missouri and its component employers make required contributions to the plans. Employer contributions for the fiscal year ended June 30, 2020 were 21.77% of covered payroll. Members of MSEP and MSEP 2000 do not make employee contributions. Members of MSEP 2011 tier are required to contribute 4% of covered payroll.

Final average pay (FAP), is the average pay of a member for the 36 full, consecutive months of service before termination of employment when the member's pay was greatest. If the member was on workers compensation leave of absence or medical leave of absence due to an employee illness, or on long term disability, FAP is the amount of pay the member would have received, but for such leave of absence as reported and verified by the employing department. If the member was employed for less than 36 months, FAP is the average monthly pay of a member during the period for which the member was employed.

For a summary of benefits for general state employees, legislators, and statewide elected officials under the MSEP, MSEP 2000, and MSEP 2011 tier, refer to the *Summary of Plan Provisions* in the *Actuarial Section* of this report.

MSEP (closed plan)

General state employees are fully vested for benefits upon accruing five years of credited service. Under the MSEP, general employees may retire with full benefits upon the earliest of attaining:

- Age 65 with 5 years of service;
- Age 60 with 15 years of service; or
- Age 48 with age and service equaling 80 or more − "Rule of 80."

General employees may retire early at age 55 with at least 10 years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.6% multiplied by the final average pay multiplied by years of credited service.

Members employed prior to August 28, 1997 receive cost-of-living adjustments (COLAs) annually based on 80% of the percentage increase in the average consumer price index (CPI) from one year to the next, with a minimum rate of 4% and maximum rate of 5% until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated. Members employed on or after August 28, 1997, and members who have met their COLA cap receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Qualified, inactive-vested members may make a one-time election to receive the present value of their future benefit in a lump-sum payment rather than a monthly benefit at retirement age. To qualify, members must have left state employment on or after October 1, 1984, and prior to September 1, 2002, have less than 10 years of service, not be within five years of retirement eligibility, and meet age requirements. In addition, if members left state employment on or after August 28, 1997, and prior to September 1, 2002, the present value of their benefit must be less than $10,000.

MSEP 2000

General state employees are fully vested for benefits upon accruing 5 years of credited service. Under the MSEP 2000, general employees may retire with full benefits upon the earliest of attaining:

- Age 62 with 5 years of service; or
- Age 48 with age and service equaling 80 or more − "Rule of 80."

General employees may retire early at age 57 with at least five years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.7% multiplied by final average pay multiplied by years of credited service.

Those retiring under the "Rule of 80" receive an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service, which is payable until age 62.

COLAs are provided annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

MSEP 2011 Tier

On July 19, 2010, legislation was signed into law adding a new tier (MSEP 2011) to the MSEP 2000 defined benefit pension plan. This tier includes all members first employed in a benefit-eligible position on or after January 1, 2011.

Legislation signed into law on July 14, 2017, changed the original vesting requirement of 10 years to five years for actively employed members of the MSEP 2011, effective January 1, 2018.

Under the MSEP 2011, general employees may retire with full benefits upon the earliest of attaining:

- Age 67 with 5 years of service; or
- Age 55 with age and service equaling 90 or more – "Rule of 90."

General employees may retire early at age 62 with at least five years of service with reduced benefits. The base benefit in the general employee plan is equal to 1.7% multiplied by final average pay multiplied by years of credited service.

Those retiring under "Rule of 90" receive an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service, which is payable until age 62.

COLAs are provided annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Judicial Plan

The Judicial Plan is a single-employer, defined benefit public employee retirement plan administered in accordance with Sections 476.445 to 476.690, RSMo. Responsibility for the operation and administration of the Judicial Plan is vested in the MOSERS Board of Trustees. Due to the nature of MOSERS' reliance on funding from the state of Missouri and the overall control of the plan document by the legislative and executive branches of state government, the Judicial Plan is considered a pension trust fund of the state of Missouri financial reporting entity and is included in the state's financial reports as a pension trust fund.

Judges and commissioners of the supreme court or the court of appeals, judges of any circuit court, probate court, magistrate court, court of common pleas, court of criminal corrections, justices of the peace, commissioners or deputy commissioners of the probate division of the circuit court appointed after February 29, 1972, in a first class county having a charter form of government in a city not within a county, commissioners of the juvenile division of the circuit court appointed pursuant to Section 211.023, RSMo, commissioners of the drug court or commissioners of any family court are eligible for membership in the Judicial Plan. The Judicial Plan provides defined benefit pension, survivor, life insurance, and disability benefits. Members are immediately vested.

Per the June 30, 2020 actuarial valuation, membership in the Judicial Plan consisted of the following:

Retirees and beneficiaries currently receiving benefits		590
Active		
Vested	418	
Nonvested	0	418
Inactive		
Vested (not yet receiving benefits)		35
Total membership		**1,043**

Funding of the Judicial Plan on an actuarial basis began on July 1, 1998. Employer contributions are determined through annual actuarial valuations. For the year ended June 30, 2020, the employer contribution rate was 63.80% of covered payroll. The state of Missouri makes the employer contribution to the Judicial Plan. Members of Judicial Plan (closed plan) do not make employee contributions. Members of the Judicial Plan 2011 tier are required to contribute 4% of covered payroll.

Judicial Plan (closed plan)

Members of the Judicial Plan may retire with full benefits upon the earliest of attaining:

- Age 62 with 12 years of service; or
- Age 60 with 15 years of service; or
- Age 55 with 20 years of service.

Employees may retire early at age 62 with less than 12 years of service or age 60 with less than 15 years of service with a reduced benefit that is based upon years of service relative to 12 or 15 years.

In the Judicial Plan, the base benefit for members with 12 or more years of service is equivalent to 50% of compensation on the highest court served.

Members first employed prior to August 28, 1997, receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, with a minimum rate of 4% and a maximum rate of 5% until the cumulative amount of COLAs equals 65% of the original benefit. Thereafter, the 4% minimum rate is eliminated. Members first employed on or after August 28, 1997, and members who have met their COLA cap receive COLAs annually based on 80% of the percentage increase in the average CPI from one year to the next, up to a maximum rate of 5%.

Qualified, inactive-vested members may make a one-time election to receive the present value of their future benefit in a lump-sum payment rather than a monthly benefit at retirement age. To qualify, they must have left state employment on or after August 28, 1997, and prior to September 1, 2002, have less than 10 years of service, not be within five years of retirement eligibility, and have a benefit present value of less than $10,000.

Judicial Plan 2011 Tier

On July 19, 2010, an additional tier of the defined benefit Judicial Plan was signed into law. This tier (Judicial Plan 2011) includes all new judicial members first employed as a judge on or after January 1, 2011.

Under the Judicial Plan 2011, members may retire with full benefits upon the earliest of attaining:

- Age 67 with 12 years of service; or
- Age 62 with 20 years of service;

Judicial Plan 2011 members may retire early at age 67 with less than 12 years of service with reduced benefits, or age 62 with less than 20 years of service with a reduced benefit based on years of service.

For a more detailed summary of benefits for members of the Judicial Plan, refer to the *Summary of Plan Provisions* in the *Actuarial Section* of this report.

Administrative Law Judges and Legal Advisors' Plan

On April 26, 2005, Senate Bill 202 was enacted, which terminated the Administrative Law Judges and Legal Advisors' Plan (ALJLAP) for new hires only. Under this legislation, administrative law judges and legal advisors (ALJs) who assume a position after April 26, 2005, who would have otherwise been covered by the ALJLAP, will instead participate in the MSEP or the MSEP 2000, depending on when they initially became state employees. For fiscal years 2005 and after, all liabilities and assets of the ALJLAP were transferred and combined with the MSEP. Membership totals for the ALJLAP are included in the MSEP in all relevant sections of this report.

Missouri State Insured Defined Benefit Insurance Plan

The Missouri State Insured Defined Benefit Insurance Plan is administered through, and underwritten by, The Standard Insurance Company (The Standard), which is a third-party administrator with oversight by MOSERS. It provides basic life insurance in an amount equal to one times annual salary while actively employed (with a $15,000 minimum) to eligible members of the MSEP, MSEP 2000 (except employees of the Missouri Department of Conservation and certain state colleges and universities), MSEP 2011, Judicial Plan, Judicial Plan 2011, and certain members of the Public School Retirement System (PSRS).

The plan also provides duty-related death benefits, optional life insurance for active employees and retirees who are eligible for basic coverage, and a long-term disability insurance plan for eligible members. For a more detailed description of insurance benefits, refer to page 128-129 in the *Actuarial Section* of this report.

Due to the nature of MOSERS' reliance on funding from the state of Missouri and its component employers, and the overall control of the plan document by the legislative and executive branches of state government, the Missouri State Insured Defined Benefit Insurance Plan is considered a component unit of the state of Missouri financial reporting entity and is included in the state's financial reports as an internal service fund.

State of Missouri Deferred Compensation Plan (MO Deferred Comp)

MO Deferred Comp is a retirement savings plan for state of Missouri employees, including faculty and staff at 10 state colleges and universities. Money invested in the plan provides income in retirement to supplement the member's defined benefit pension and Social Security benefits. Funds are automatically deducted from the employee's pay and placed in their account. The participant decides how the money will be invested. Employees may also roll over eligible pre-tax distributions from other qualified retirement plans.

The MO Deferred Comp plan is comprised of a 457 deferred compensation plan for employee contributions and a related 401(a) plan for an employer incentive match contribution. MOSERS uses ICMA-RC as an external provider for record keeping for the plans. These plans have separately issued financial statements. The net position of these plans was approximately $1,656 million and $644 million as of June 30, 2020 for the 457 and 401(a) plans, respectively.

MOSERS unitizes investments for the purpose of allowing participants in the State of Missouri Deferred Compensation Plan the option to invest in the MOSERS investment portfolio (MIP). For financial reporting purposes, investments throughout this CAFR are reported in whole and include 0.03%, or approximately $3 million, of the units invested in the MIP by Deferred Compensation participants. Effective June 30, 2017, the option to invest in the MIP fund was no longer available to Plan participants. All participants invested in the MIP fund as of that date may continue to defer into it, but no rollovers or new elections are permitted.

Audited financial statements for the State of Missouri Deferred Compensation Plan can be viewed online at *www.modeferredcomp.org*.

Colleges & Universities Retirement Plan (CURP)

The Colleges & Universities Retirement Plan (CURP) is a defined contribution plan administered by MOSERS for education employees (as determined by the university) at nine Missouri state universities. Retirement income from the plan is dependent upon the employee's plan account balance at retirement. The employee's plan account balance is built from mandatory contributions to the plan and the investment returns generated from employee-selected investment options. To be eligible for the CURP, the employee must:

- meet the definition of "education employee" as defined by their employer, and
- be employed in this position for the first time on or after July 1, 2002, and
- not have previous employment in a position covered by another defined benefit pension plan administered by MOSERS, and
- be employed at a participating regional Missouri university.

After six years of participation in CURP, the employee may transfer to a MOSERS defined benefit pension plan and will immediately become a vested member of the MSEP 2000 or MSEP 2011, depending on their hire date. By transferring to MOSERS the employee forfeits all rights to future participation in CURP (i.e., they can't go back to CURP). However, the employee will continue to own and control their CURP account.

Note 2 – Summary of Significant Accounting Policies

Basis of Accounting
The financial statements of the MSEP, the Judicial Plan, and the Internal Service Fund were prepared using the accrual basis of accounting. The accompanying financial statements are prepared in accordance with accounting principles generally accepted in the U.S. that apply to governmental accounting.

Contributions are recognized as revenues when due, pursuant to statutory requirements. Benefits and refunds are recognized when due and payable and expenses are recorded when the corresponding liabilities are incurred regardless of when contributions are received or payment is made. The direct method of reporting cash flows is used.

Estimates
The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the accompanying financial statements and disclosures. Actual results could differ from those estimates.

Method Used to Value Investments
Investment assets are reported at fair value, in accordance with Standards issued by the Governmental Accounting Standards Board (see Note 3 for discussion of the valuation methodology for investment assets). The *Schedule of Investments and Derivative Instruments Measured at Fair Value* in Note 3 presents the fair value information of the investments as reported on the *Statements of Fiduciary Net Position* of the pension trust funds.

MOSERS Participation in Other Post-Employment Benefit (OPEB) Programs
Other Post-employement Benefit (OPEB) related items, including: Net OPEB liability, deferred outflows of resources, deferred inflows of resources, net OPEB expense, fiduciary net assets, additions to and deductions from fiduciary net assets have been determined on the same basis as they are reported by MCHCP. For this purpose, employer contributions are recognized as revenue when due and payable. Benefits are recognized when due and payable in accordance with the terms of the Plan (see *Note 7 – MCHCP Post-Employment Retiree Health Care OPEB Program*).

Capital & Intangible Assets
The MOSERS building and other capital assets are stated at cost less accumulated depreciation. Intangible assets include software applications and are stated at costs less accumulated amortization. Intangible assets are reported with capital assets in the *Statements of Changes in Fiduciary Net Position.* Capital and intangible assets are depreciated on a straight-line basis over their estimated useful lives.

Note 3 – Cash and Investments

Cash Deposits with Financial Institutions
MOSERS requires its business bank to collateralize amounts on deposit that exceed the Federal Deposit Insurance Corporation (FDIC) insured amount. The types of collateral security shall be included on a list maintained by the State Treasurer's office in accordance with Section 30.270 RSMo. Securities pledged as collateral are held in agency by a separate bank. As of June 30, 2020, all deposit balances with MOSERS' business bank were fully collateralized.

Deposits with MOSERS' business bank are invested in short-term repurchase agreements to earn interest. These items are reported with cash and short-term instruments in the *Statements of Fiduciary Net Position* of the pension trust funds, and with short-term instruments in the *Statements of Net Position* of the internal service funds.

Investment Policy

Section 104.440, RSMo allows the Board of Trustees to invest the trust fund assets in accordance with the prudent person rule. In 2015, MOSERS completed a transition to a portfolio that shifted from a return-driven process to a risk-driven process using an allocation approach that focuses on fundamental economic factors such as growth and inflation as well as other factors with expected return values such as credit, carry, and illiquidity. In June 2018, the Board voted to transition the portfolio to a new asset allocation, which includes four broad categories: growth, income, inflation hedge, and alternative betas/absolute return.

MOSERS' policy, with respect to the allocation of invested assets, is established and may be amended by the Board of Trustees' majority vote. The Board's guiding principles with respect to the investment of MOSERS' assets are to preserve the long-term corpus of the Fund, maximize total return within prudent risk parameters, and act in the exclusive interest of the members of the System. The Board has developed a policy allocation that is designed to achieve the long-term required return objectives of the System, given certain risk constraints. The current asset allocation reflects a diversified portfolio, which will perform well in a variety of economic conditions and will help reduce the portfolio's overall volatility.

The Board has authorized staff to create and maintain an internally managed beta-balanced portfolio that utilizes a modest amount of leverage in order to balance the risk allocations equally across the five asset classes contained in that portfolio. The leverage is limited to 1.83 times beta-balanced capital. The limit may also be stated as 183% of beta-balanced capital. In June 2018, the Board authorized staff to transition to a new portfolio that utilizes a modest amount of leverage in order to more evenly distribute the risk allocations equally across the 11 asset classes contained in that portfolio. The leverage is limited to 1.50 times capital. The limit may also be stated as 150% of capital. The transition from the old portfolio to the new portfolio began in January 2019. The tables below illustrate the fair value, market exposure, and policy exposure of the old portfolio and the new portfolio by asset class as of June 30, 2020.

Schedule of Internally Managed Leverage - Old Portfolio

Old Portfolio (42% of Total Fund)	Fair Value Capital	Percent of Investments at Fair Value	Market Exposure	Percent of Investments at Market Exposure	Policy Exposure
Opportunistic global equities	$ 1,105,132,410	33.2%	$ 1,357,937,984	40.8%	38.0%
Nominal bonds	530,832,018	15.9	1,332,375,801	40.0	44.0
Commodities	239,151,989	7.2	642,073,473	19.3	20.0
Inflation-protected bonds	472,593,549	14.2	1,232,492,649	37.0	39.0
Alternative beta	982,998,813	29.5	982,998,813	29.5	31.0
Total old portfolio	$ 3,330,708,779	100.0%	$ 5,547,878,720	166.6%	172.0%

Schedule of Internally Managed Leverage - New Portfolio

New Portfolio (58% of Total Fund)	Fair Value Capital	Percent of Investments at Fair Value	Market Exposure	Percent of Investments at Market Exposure	Policy Exposure
Growth	$ 1,776,929,966	37.9%	$ 2,206,991,169	47.1%	45.0%
Income	1,013,895,278	21.7	1,556,334,433	33.2	35.0
Inflation hedge	937,235,640	20.0	1,791,595,694	38.3	40.0
Alternative beta	957,204,230	20.4	955,707,726	20.4	20.0
Total new portfolio	$ 4,685,265,114	100.0%	$ 6,510,629,022	139.0%	140.0%

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate rates of expected future rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future rates of return by the target asset allocation percentage and by adjusting for expected inflation, volatility and correlations. Best estimates of the real rates of return expected for both the old and new portfolio are summarized by asset class in the tables below.

Target Asset Allocation - Old Portfolio

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Opportunistic global equities	38.0%	8.3%	5.8%	3.1%
Nominal bonds	44.0	3.3	0.8	1.5
Commodities	20.0	7.8	5.3	1.6
Inflation-protected bonds	39.0	2.4	(0.1)	0.9
Alternative beta	31.0	6.6	4.1	2.0
Cash and cash equivalents**	(72.0)	1.0	(1.5)	(0.7)
	100.0%			
			Correlation/volatility adjustment	(0.7)
			Long-term expected net nominal return	7.7
			Less: investment inflation assumption	(2.5)
			Long-term expected geometric net real return	5.2 %

* *Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for each portfolio.*

** *Cash and cash equivalents policy allocation amounts are negative due to use of leverage.*

Target Asset Allocation - New Portfolio

Asset Class	Policy Allocation	Long-Term Expected Nominal Return*	Long-Term Expected Real Return	Weighted Average Long-Term Expected Nominal Return
Global public equities	30.0%	7.7%	5.8%	2.3%
Global private equities	15.0	9.3	7.4	1.4
Long treasuries	25.0	3.5	1.6	0.9
Core bonds	10.0	3.1	1.2	0.3
Commodities	5.0	5.5	3.6	0.3
TIPS	25.0	2.7	0.8	0.7
Private real assets	5.0	7.1	5.2	0.3
Public real assets	5.0	7.7	5.8	0.4
Hedge funds	5.0	4.8	2.9	0.2
Alternative beta	10.0	5.3	3.4	0.5
Private credit	5.0	9.5	7.6	0.5
Cash and cash equivalents**	(40.0)	0.0	0.0	0.0
	100.0%			
			Correlation/volatility adjustment	(0.6)
			Long-term expected net nominal return	7.2
			Less: investment inflation assumption	(1.9)
			Long-term expected geometric net real return	5.3 %

* *Long-term expected arithmetic returns of the asset classes at the time of the asset allocation study for each portfolio.*

** *Cash and cash equivalents policy allocation amounts are negative due to use of leverage.*

Money-Weighted Rate of Return

The annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 5.2% for the year ended June 30, 2020. The money-weighted rate of return expresses investment performance, net of investment expense, adjusted for changing amounts actually invested.

Fair Value Measurement

MOSERS categorizes its fair value measurements within the fair value hierarchy established by generally accepted accounting principles. The hierarchy is based on the valuation inputs used to measure the fair value of the asset and give the highest priority to unadjusted quoted prices in active markets for identical assets or liabilities (level 1 measurements) and the lowest priority to unobservable inputs (level 3 measurements).

- **Level 1** – Unadjusted quoted prices for identical instruments in active markets.
- **Level 2** – Quoted prices for similar instruments in active markets; quoted prices for identical or similar instruments in markets that are not active; and model-derived valuations in which all significant inputs are observable.
- **Level 3** – Valuations derived from valuation techniques in which significant inputs are unobservable.

Investments that are measured at fair value using the net asset value (NAV) per share (or its equivalent) as a practical expedient are not classified in the fair value hierarchy.

The categorization of investments within the hierarchy is based upon the pricing transparency of the instrument and should not be perceived as the particular investment's risk.

In instances where inputs used to measure fair value fall into different levels in the fair value hierarchy, fair value measurements in their entirety are categorized based on the lowest level input that is significant to the valuation. MOSERS' assessment of the significance of particular inputs to these fair value measurements requires judgment and considers factors specific to each asset or liability. The tables on pages 40-41 show the fair value leveling of the investments.

Debt, equities, and investment derivatives classified in level 1 of the fair value hierarchy are valued using prices quoted in active markets for those securities.

Debt securities classified in level 2 have non-proprietary information that was readily available to market participants from multiple independent sources, which are known to be actively involved in the market. Pricing inputs may include market quotations, yields, maturities, call features and ratings. Derivative securities classified in level 2 are securities whose values are derived daily from associated traded securities.

Fair values for the equity real estate investments are based on appraisals. Fair values of the limited partnership investments are based on valuations of the underlying companies of the limited partnerships as reported by the general partner. Certain limited partnerships reflect values and related performance on a quarter lag basis due to the nature of those investments and the time it takes to value them. Fair value of the commingled funds is determined based on the underlying asset values. The remaining assets are primarily valued by the System's master custodian using the last trade price information supplied by various pricing data vendors.

Investments and Derivative Instruments Measured at Fair Value

June 30, 2020	Total	Fair Value Measurement Using: Quoted Prices in Active Markets for Identical Assets (Level 1)	Significant Other Observable Inputs (Level 2)	Significant Unobservable Inputs (Level 3)
Investment by fair value level				
Treasuries				
U.S. government securities	$ 4,830,930,268	$ 4,825,557,401	$ 0	$ 5,372,867
Repurchase agreements	1,050,000,000	0	1,050,000,000	0
Fixed income securities				
Corporate bonds and asset-backed securities	318,308,951	0	314,268,502	4,040,449
U.S. government agencies	330,882,790	0	330,882,790	0
Non U.S. sovereign	635,222	0	635,222	0
Collateralized mortgage obligations	9,673,143	0	9,673,143	0
Total fixed income securities	659,500,106	0	655,459,657	4,040,449
Equities				
Real estate	405,786,127	405,635,171	150,956	0
Other	39,016,160	38,949,473	0	66,687
Total equities	444,802,287	444,584,644	150,956	66,687
Exchange traded funds				
U.S. fixed income index	118,768,660	118,768,660	0	0
Total investment by fair value level	7,104,001,321	5,388,910,705	1,705,610,613	9,480,003
Investments measured at the NAV				
Commingled funds - equity funds	872,482,754			
Commingled funds - fixed income funds	390,941,915			
Commingled funds - short-term investment funds	532,659,000			
Hedge funds	1,298,312,268			
Private equity funds	420,078,956			
Private real estate and timber funds	37,522,470			
Total investments measured at the NAV	3,551,997,363			
Total investments measured at fair value	10,655,998,684	5,388,910,705	1,705,610,613	9,480,003
Investment derivative instruments				
Future contracts	(2,478,978)	(2,478,978)	0	0
Total investment derivative instruments	(2,478,978)	(2,478,978)	0	0
Investments at cost or cost plus accrued interest:				
Cash held in investment accounts	809,671,184			
Total investments	11,463,190,890	5,386,431,727	1,705,610,613	9,480,003
Obligations under repurchase agreements	(3,434,907,955)			
Total investments, net of obligations under repurchase agreements	$ 8,028,282,935	$ 5,386,431,727	$ 1,705,610,613	$ 9,480,003

Investments Measured at the Net Asset Value

	June 30, 2020	Unfunded Commitments	Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Commingled fund - equity funds	$ 872,482,754		Daily, Monthly	2-10
Commingled fund - fixed income funds	390,941,915		Daily	2
Commingled fund - short-term investment funds	532,659,000		Daily	0
Active hedge funds				
Merger arbitrage	138,968,100		Monthly	45
Equity market neutral	91,419,763		Quarterly	90
Event driven	193,563,000		Semi-annually	60
Marco	155,201,837		Monthly, Quarterly	30
Risk premia	212,472,572		Monthly	30
Quantitative	65,800,537		Monthly	30
Multi strategy	68,380,981		Quarterly	90
Fund-of-funds	359,251,396		Monthly	95
Pending liquidated hedge funds	13,254,082			
Private equity funds	420,078,956	$ 350,638,950		
Private real estate and timber funds	37,522,470	139,636,107		
Total investments measured at the net asset value (NAV)	$ 3,551,997,363	$ 490,275,057		

- **Commingled fund - equity funds** – Four equity funds are considered to be commingled in nature. Each are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Commingled fund - fixed income funds** – Two fixed income funds are considered to be commingled in nature. Each are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Commingled fund - short term investment funds** – Two short-term investment funds are considered to be commingle in nature. Each are valued at the NAV held at the end of the period based upon the fair value of the underlying investments.
- **Merger arbitrage hedge fund** – Consisting of one fund, this strategy invests in the common stock of companies that are involved in publicly announced mergers and seeks to generate attractive returns while dampening volatility. This investment is valued at the NAV, is redeemable monthly, and is not subject to lock-up restrictions.
- **Equity market neutral hedge fund** – Consisting of one fund, this strategy invests both long and short in U.S. and global equity securities, with the goal of having little to no net market exposure. This investment is valued at the NAV, is redeemable quarterly, and is not subject to lock-up restrictions.
- **Event driven hedge fund** – Consisting of one fund, this strategy seeks to gain an advantage from pricing inefficiencies that may occur in the onset or aftermath of a corporate action or related event. This investment is valued at the NAV, is redeemable semi-annually, and is not subject to lock-up restrictions.
- **Macro hedge funds** – Consisting of two funds, this strategy seeks to take advantage of macroeconomic dislocations between countries by trading a number of different markets and financial instruments. These investments are valued at the NAV, are redeemable monthly and quarterly, and are not subject to lock-up restrictions.
- **Risk premia hedge fund** – Consisting of one fund, this strategy seeks to capture hedge fund betas through the use of systematic, bottoms up security selection across major hedge fund strategies. Style premia such as value, momentum and carry help build the long/short portfolios. This investment is valued at the NAV, is redeemable at least monthly, and is not subject to lock-up restrictions.
- **Quantitative hedge funds** – Consisting of two funds, this strategy attempts to achieve uncorrelated returns using advanced statistical methods to select securities across liquid public markets. These investments are valued at the NAV, are redeemable monthly, and are not subject to lock-up restrictions.

- **Multi strategy hedge fund** – Consisting of one fund, this fund aims to pursue varying strategies in order to diversify risks and reduce volatility. This investment is valued at the NAV, is redeemable quarterly, but is subject to lock-up restrictions.
- **Fund-of-funds** – Consisting of one fund, this fund seeks to provide diversification by holding a number of funds within a single fund structure. This investment is valued at the NAV, is redeemable monthly, and is not subject to lock-up restrictions.
- **Pending liquidated hedge funds** – Consisting of 11 funds which have been fully redeemed as of June 30, 2020, for which MOSERS is awaiting final distribution of the proceeds, which will be received upon sale of the underlying investments or upon completion of the audit of the firm's annual financial statements.
- **Private equity, real estate, and timber funds** – MOSERS' private equity portfolio consists of 43 funds with exposure to buyout funds, distressed funds, infrastructure, energy, secondary, royalty funds, and special situations. The real estate portfolio, comprised of six funds, invests mainly in U.S. commercial real estate. The timber portfolio consists of one fund in liquidation which invests in global timberland. The fair values of the majority of these funds have been determined using net assets valued one quarter in arrears plus current quarter cash flows. These funds are not eligible for redemption. Distributions are received as underlying investments within the funds are liquidated, which, on average, can occur over the span of five to 10 years.

Credit Risk

Credit risk is the risk that an issuer or other counterparty to an investment will not fulfill its obligations to MOSERS. As of June 30, 2020, MOSERS' fixed income assets that are not U.S. government guaranteed represented 39.1% of fixed income securities. In preparing this report, credit risk associated with all fixed income holdings, including collateral for repurchase agreements has been included. The tables below summarize MOSERS' fixed income security exposure levels and credit qualities.

As a matter of practice, there are no overarching limitations for credit risk exposures within the overall fixed income portfolio. Each individual portfolio within fixed income is managed in accordance with operational guidelines that are specific as to permissible credit quality ranges, exposure levels within individual quality tiers, and average credit quality.

Credit risk for derivative instruments held by the System results from counterparty risk assumed by MOSERS. This is essentially the risk that the counterparty to a MOSERS transaction will be unable to meet its obligation. Information regarding MOSERS' credit risk related to derivatives is found under the derivatives disclosures on page 47 of the notes.

The commingled funds - investment grade fixed income is invested and reinvested primarily in a portfolio of debt securities with the objective of approximating as closely as practicable the total rate of return of the market for debt securities as defined by the *Bloomberg Barclays U.S. Aggregate Bond Index*. The average rating for the underlying securities within this fund is AA.

The commingled funds - high yield fixed income is invested and reinvested primarily in a portfolio of U.S. dollar denominated below investment-grade corporate debt obligations (including private placements and 144A issues) with the objective of approximating the total rate of return of the *BofA Merrill Lynch U.S. High Yield Constrained Index*. The average rating for the underlying securities within this fund is BB.

Average Credit Quality and Exposure Levels of Nongovernment Guaranteed Securities

Fixed Income Security Type	Fair Value June 30, 2020	Percent of all Fixed Income Assets	Weighted Average Credit Quality	Ratings Dispersion Requiring Further Disclosure
U.S. government agencies	$ 330,882,790	4.0%	AA+	See below
Asset-backed securities	571,723	0.0	AA-	See below
Collateralized mortgage obligations	9,673,143	0.1	AA+	See below
Corporate bonds	317,737,228	3.9	BBB+	See below
Non-U.S. sovereign	635,222	0.0	A	See below
Total nongov't fixed income securities	659,500,106	8.0		
Bank deposits	750,000,000	9.1	FDIC insured	None
Nongov't. guaranteed repurchase agreements	875,000,000	10.7	Not rated	None
Commingled funds - investment grade fixed income	345,179,897	4.2	Not rated	None
Commingled funds - high yield fixed income	45,762,018	0.6	Not rated	None
Pooled instruments	532,659,000	6.5	AAA	None
Total nongov't. guaranteed securities	$ 3,208,101,021	39.1%		
U.S. government securities held in portfolio	$ 4,830,930,268	58.8		
Repurchase agreement with U.S. government securities held as collateral	175,000,000	2.1		
Total fixed income securities	$ 8,214,031,289	100.0%		

Ratings Dispersion Detail - Fair Value

Credit Rating Level	U.S. Government Agencies	Asset-Backed Securities	Collateralized Mortgage Obligations	Corporate Bonds	Non-U.S. Sovereign
AAA	$ 0	$ 0	$ 0	$ 2,012,971	$ 0
AA	330,882,790	0	9,673,143	13,927,443	0
A	0	545,485	0	119,727,839	635,222
BBB	0	0	0	178,588,289	0
BB	0	0	0	3,071,706	0
Not rated	0	26,238	0	408,980	0
	$ 330,882,790	$ 571,723	$ 9,673,143	$ 317,737,228	$ 635,222

Interest Rate Risk

Interest rate risk is the risk that changes in interest rates will adversely affect the fair value of an investment. This risk is managed by using the effective duration or option adjusted methodology. It is widely used in the management of fixed income assets by quantifying the risk of interest rate changes. This methodology takes into account optionality on bonds and scales the risk of price changes on bonds depending upon the degree of change in rates and the slope of the yield curve. Within the investment policy, operational guidelines specify the degree of interest rate risk taken within the System's fixed income portfolios, with the exception of some portfolios in which credit risk is the predominant factor and is also controlled by specific guidelines. MOSERS believes that the reporting of effective duration found in the tables below quantifies to the fullest extent possible the interest rate risk of the System's fixed income securities.

MOSERS invests in mortgage-backed securities, which have embedded within them the option of being called, whereby the issuer has the option to keep the debt outstanding in rising interest rate environments or repay the debt in declining interest rate environments, a factor that advantages the issuer. This risk is incorporated within the effective duration calculation used in the interest rate risk analysis.

Effective Duration of Fixed Income Assets by Security Type

Fixed Income Security Type	Fair Value June 30, 2020	Percent of all Fixed Income Assets	Weighted Average Effective Duration (Years)	Interest Rate Risk Requiring Further Disclosure
U.S. treasuries	$ 4,830,930,268	58.8%	9.8	See below
U.S. government agencies	330,882,790	4.0	0.2	None
Asset-backed securities	571,723	0.0	6.0	None
Collateralized mortgage obligations	9,673,143	0.1	0.1	None
Corporate bonds	317,737,228	3.9	4.7	None
Non-U.S. sovereign	635,222	0.0	2.3	None
Bank deposits	750,000,000	9.1	0.0	None
Repurchase agreements	1,050,000,000	12.8	0.0	None
Commingled funds - investment grade fixed income	345,179,897	4.2	6.0	None
Commingled funds - high yield fixed income	45,762,018	0.6	3.9	None
Pooled instruments	532,659,000	6.5	0.0	None
	$ 8,214,031,289	100.0%	6.2	

Effective Duration Analysis of U.S. Treasuries

Maturity	Fair Value June 30, 2020	Average Effective Duration of the Security Type (Years)	Contribution to Effective Duration (Years)
Less than 1 year to maturity	$ 555,584,996	0.0	0.0
1- to 10-year maturities	2,332,976,143	4.9	2.4
Long coupon treasuries	1,942,369,129	18.5	7.4
	$ 4,830,930,268		9.8

Repurchase Agreements

Tri-party repurchase agreements (repos) are a secured loan by a financial institution with the collateral held at a custodian bank. In a tri-party repo transaction, MOSERS transfers cash to a financial institution and the financial institution transfers securities to the custodian bank. Simultaneously, the financial institution promises to repay the loan in the future plus interest in exchange for the return of the securities.

Reverse repurchase agreements (reverse repos) are used to convert securities into cash. In a reverse repo transaction, MOSERS transfers securities that are owned in the portfolio to a financial institution and the financial institution transfers cash to MOSERS. Simultaneously, MOSERS promises to repay the loan in the future plus interest in exchange for the return of the securities.

Typical collateral for repos and reverse repos include treasury securities, agency securities, mortgage-backed securities, investment grade corporate bonds, commercial paper, and common stock. Repos and reverse repos are typically done for an overnight term; however, they can be done for a longer term. MOSERS enters into repo transactions to earn interest on short-term funds and enters into reverse repos to finance the purchase of additional securities.

The yield earned by MOSERS on the repo transactions ranged from 0.01% to 5.50% with maturities of one to five days.

The yield earned by the counterparties on the reverse repo transactions ranged from 0.00% to 2.54% and had maturities of one month to one year. The maturities of the investments made with reverse repo proceeds generally have maturities of one to 30 years.

In repo transactions, MOSERS may have credit risk if the counterparty fails to repay the loan and the value of the securities held as collateral falls below the loan balance. To minimize this risk, MOSERS requires the financial institution to send collateral with a fair value greater than the value of the loan and revalues the collateral on a daily basis. As of fiscal year end, MOSERS held approximately $63.2 million of counterparty collateral in excess to the repo balance.

In a reverse repo transaction, MOSERS may be subject to credit risk if the counterparty fails to return the securities and the value of the securities held as collateral rise above the loan balance. To minimize this risk, MOSERS sends the minimum amount of collateral required by the financial institution and requires the financial institution to revalue the collateral and return excess collateral on a daily basis. As of fiscal year end, counterparties held approximately $58.8 million of MOSERS' collateral in excess to the reverse repo balance.

The tables below summarize MOSERS' exposure for repo and reverse repo transactions.

Tri-Party Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2020	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2020	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	$ 178,500,581	$ 175,000,000	$ 3,500,581	
U.S. government agencies	255,000,000	250,000,000	5,000,000	
Common stock	679,741,455	625,000,000	54,741,455	
Accrued interest	0	5,451	(5,451)	
	$ 1,113,242,036	$ 1,050,005,451	$ 63,236,585	6.0%

Reverse Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2020	Fair Value Including Accrued Interest of Repurchase Agreements June 30, 2020	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	$ 3,503,036,730	$ 3,434,907,955	$ 68,128,775	
Receivables	(7,067,638)	0	(7,067,638)	
Accrued interest	0	2,219,913	(2,219,913)	
	$ 3,495,969,092	$ 3,437,127,868	$ 58,841,224	1.7 %

Foreign Currency Risk

Foreign currency risk is the risk that changes in exchange rates will adversely impact the fair value of an investment. MOSERS' currency risk exposures, or exchange rate risk, primarily reside within MOSERS' international equity investment holdings. MOSERS' implementation policy allows external managers to decide what action to take regarding their respective portfolio's foreign currency exposures using currency forward contracts. MOSERS' exposure to foreign currency risk in U.S. dollars, as of June 30, 2020, is highlighted in the table below.

Currency Exposures by Asset Class

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Alternatives	Total
Australian Dollar	$ 8,043,939	$ 1,304,336	$ 34,814	$ 0	$ 9,383,089
Brazilian Real	0	10,321,453	0	0	10,321,453
Canadian Dollar	5,224,588	5,364,187	28,825	0	10,617,600
Chilean Peso	0	1,040,425	133,503	0	1,173,928
Chinese Yuan Renminbi	0	9,114,566	0	0	9,114,566
Colombian Peso	7	301,613	115,924	0	417,544
Czech Koruna	(692)	224,245	0	0	223,553
Danish Krone	0	3,338,423	0	0	3,338,423
Egyptian Pound	0	233,734	0	0	233,734
Euro	2,584,022	83,738,323	(385,087)	39,382	85,976,640
Hong Kong Dollar	(6,535,295)	90,101,063	0	0	83,565,768
Hungarian Forint	0	453,305	0	0	453,305
Indian Rupee	0	15,968,368	0	0	15,968,368
Indonesian Rupiah	0	2,978,556	0	0	2,978,556
Israeli Shekel	0	57,290	0	0	57,290
Japanese Yen	(4,032,612)	168,361,625	(109,746)	0	164,219,267
Malaysian Ringgit	0	3,514,376	0	0	3,514,376
Mexican Peso	174	4,714,139	0	0	4,714,313
New Taiwan Dollar	0	40,492,696	0	0	40,492,696
New Zealand Dollar	0	61,095	0	0	61,095
Norwegian Krone	0	97,223	0	0	97,223
Pakistani Rupee	0	40,144	0	0	40,144
Philippines Peso	0	1,619,888	0	0	1,619,888
Polish Zloty	80	1,439,273	0	0	1,439,353
Qatari Riyal	0	1,599,841	0	0	1,599,841
Russian Ruble	0	4,726,455	116,774	0	4,843,229
Saudi Riyal	0	5,235,258	0	0	5,235,258
Singapore Dollar	120	10,583,536	0	0	10,583,656
South African Rand	(560,121)	14,198,333	0	0	13,638,212
South Korean Won	(2,423,229)	35,309,207	1,450,200	0	34,336,178
Swedish Krona	88	572,553	0	0	572,641
Swiss Franc	0	50,873,765	0	0	50,873,765
Thai Baht	0	9,791,356	0	0	9,791,356
Turkish Lira	0	3,428,250	0	0	3,428,250
United Arab Emirates Dirham	0	1,067,719	0	0	1,067,719
United Kingdom Pound Sterling	1,175,090	73,899,017	23,019	0	75,097,126
	$ 3,476,159	$ 656,165,636	$ 1,408,226	$ 39,382	$ 661,089,403

Derivatives

Derivative instruments are financial contracts whose values depend on the values of one or more underlying assets, reference rates, or financial indexes. They include futures contracts, swap contracts, options contracts, and forward foreign currency exchange. The following tables summarize the various contracts in the portfolio as of June 30, 2020.

Futures Contracts

Futures Contract		Notional Value		Exposure
Currency futures	$	(149,081,854)	$	(770,384)
Fixed income futures		54,762,229		(478,711)
Equity index futures		279,520,435		2,035,984
Commodity futures		(79,971,944)		(3,265,867)
Total	$	105,228,866	$	(2,478,978)

Foreign Currency Forward Contracts

Currency		Net Notional Long (Short)		Exposure
Euro	$	(555,362)	$	618
U.S. Dollar		555,980		0
Foreign currency forward contract asset	$	618	$	618

Swap Contracts

Counterparty Credit Rating		Notional Value		Exposure
Total return swaps - equity				
A+	$	1,980,626,724	$	113,860,069
A		102,937,311		7,809,824
Total	$	2,083,564,035	$	121,669,893
Total return swaps - fixed income				
A+	$	295,674,382	$	6,296,085
A		587,600,167		14,634,657
Total	$	883,274,549	$	20,930,742
Total return swaps - commodities				
A+	$	537,315,431	$	71,192
A		34,639,265		130,521
Total	$	571,954,696	$	201,713

While the Board has no formal policy specific to derivatives, the MOSERS investment implementation program, through its external managers, holds investments in futures contracts, swap contracts, and forward foreign currency exchange. MOSERS enters into these certain derivative instruments as investments primarily to enhance the performance and reduce the volatility of its portfolio. It enters swaps and futures contracts to gain or hedge exposure to certain markets and to manage interest rate risk and enters into forward foreign currency exchange contracts primarily to hedge foreign currency exposure.

The notional values associated with these derivative instruments are generally not recorded in the financial statements; however, the fair values of these instruments are recorded in the *Statements of Fiduciary Net Position* and the total changes in fair value for the year are included as net appreciation in fair value of investments in the *Statements of Changes in Fiduciary Net Position*. For the year ended June 30, 2020, the change in fair value in the swap contracts resulted in a loss of $214.7 million of investment income. The change in fair value in the futures contracts resulted in a gain of $63.9 million of investment income. The change in fair value in the foreign exchange contracts resulted in a loss of $0.3 million of investment income. MOSERS does not anticipate additional significant market risk from the derivative arrangements.

MOSERS could be exposed to risk if the counterparties to the contracts are unable to meet the terms of the contracts. MOSERS' investment managers seek to control this risk through counterparty credit evaluations and approvals, counterparty credit limits, and exposure monitoring procedures. MOSERS anticipates that the counterparties will be able to satisfy their obligations under the contracts. Investments in limited partnerships and commingled funds may include derivatives that are not shown in the derivative totals.

Securities Lending Program

The Board of Trustees' *Investment Policy Statement* permits the pension trust funds to participate in a securities lending program. Fixed income, international equity and domestic equity securities of the pension trust funds are loaned to participating brokers who provide collateral in the form of cash, U.S. Treasury or government agency securities, or letters of credit issued by approved banks. Collateral must be provided in the amount of 102% of fair value for domestic loans and 105% of fair value for international loans. MOSERS does not have the authority to pledge or sell collateral securities, without borrower default.

There was no securities lending activity in fiscal year 2020.

Note 4 – Capital Assets

Office building, furniture, fixtures, equipment and software costing $1,000 or more are capitalized. Capital assets are valued at cost and reported net of accumulated depreciation. Improvements, which increase the useful life of the property, are also capitalized. The cost of internally developed software incurred during the application development state, including staff payroll costs, are capitalized in accordance with GASB Statement 51. Maintenance and repairs are charged to expense as incurred. Depreciation is computed using the straight-line method over the estimated useful life of the related assets according to the following guidelines:

- 5 years for furniture, fixtures, and equipment
- 40 years for building
- 5 years for software and licensing

Schedules of the capital asset account balances for the year ended June 30, 2020 are as follows:

Pension Trust Funds

Capital Assets

	Land	CIP - Internally Developed Pension Admin. System	Building and Building Improvements	Furniture, Fixtures and Equipment	Software	Total Capital Assets
Capital assets						
Balances June 30, 2019	$ 267,286	$ 2,140,057	$ 4,079,816	$ 1,378,222	$ 743,506	$ 8,608,887
Additions	0	2,737,676	38,868	166,370	5,268	2,948,182
Deletions	0	0	(133,640)	(100,687)	(4,950)	(239,277)
Capital assets June 30, 2020	267,286	4,877,733	3,985,044	1,443,905	743,824	11,317,792
Accumulated depreciation						
Balances June 30, 2019	0	0	2,043,638	1,043,017	628,182	3,714,837
Depreciation expense	0	0	104,685	118,335	92,865	315,885
Deletions	0	0	(138,608)	(99,898)	(4,950)	(243,456)
Accumulated depreciation June 30, 2020	0	0	2,009,715	1,061,454	716,097	3,787,266
Net capital assets June 30, 2020	$ 267,286	$ 4,877,733	$ 1,975,329	$ 382,451	$ 27,727	$ 7,530,526

Note 5 – Employers’ Net Pension Liability

The components of net pension liability as of June 30, 2020, are in the *Schedule of Employers’ Net Pension Liability* below.

Schedule of Employers’ Net Pension Liability

	MSEP	Judicial Plan
Total pension liability	$ 14,258,408,888	$ 624,847,011
MOSERS' fiduciary net position	7,910,830,533	167,288,066
Employers’ net pension liability	$ 6,347,578,355	$ 457,558,945
Plan net position as a percentage of the total pension liability	55.48%	26.77%
Covered payroll	$ 2,006,870,248	$ 61,402,061
Employers’ net pension liability as a percentage of covered payroll	316.29%	745.18%

An actuarial valuation of an ongoing plan involves estimates of the reported amounts and assumptions about the probability of occurrence of events far into the future. Examples include assumptions about future employment, mortality, and future salary increases. Amounts determined regarding the net pension liability are subject to continual revision as actual results are compared with past expectations and new estimates are made about the future. The *Schedule of Changes in Employers’ Net Pension Liability* presents multi-year trend information about whether the plan fiduciary net positions are increasing or decreasing over time relative to the total pension liability. These schedules are presented in the *Required Supplementary Information.* The total pension liability, as of June 30, 2020, is $14,258,408,888 for MSEP and $624,847,011 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2020, and a measurement date of June 30, 2020, using generally accepted actuarial procedures.

Actuarial Assumptions Used to Determine Net Pension Liability

In July 2018, the Board made several changes to actuarial methods and assumptions based upon a review of actuarial methods and economic assumptions performed by its outside actuarial consultant. Based upon this study, the Board voted to reduce the investment return assumption to 7.25% with a 2.5% inflation assumption, effective June 30, 2018; then to 7.10% with a 2.35% inflation assumption, effective June 30, 2019; and then to 6.95% with a 2.25% inflation assumption, effective June 30, 2020, and thereafter.

Summary of Actuarial Assumptions for the MSEP & the Judicial Plan Used to Determine Net Pension Liability

Valuation date	June 30, 2020
Actuarial cost method	Entry age normal
Amortization period	30 years
Asset valuation method	Market value
Investment rate of return	6.95%
Projected salary increases	2.75 – 8.25% (MSEP)
	2.50 – 4.70% (Judicial Plan)
Rate of payroll growth	2.25%
COLAs	4.00%/1.80%*
Price inflation	2.25%

Mortality rates are based on the RP-2014 Healthy Annuitant mortality table, projected from 2006 to 2026 with Scale MP-2015 and scaled by 120% for the MSEP and 98% for the Judicial Plan. The preretirement mortality table used was the RP-2014 Employee mortality table, projected from 2006 to 2026 with Scale MP-2015 and scaled by 95% for males and 90% for females for the MSEP.

An experience study covering the five-year period ended June 30, 2015, was performed in 2016.

* *4.00% compounded annually, when a minimum COLA of 4.00% is in effect. 1.80% compounded annually, when no minimum COLA is in effect (80% of price inflation).*

The discount rate used to measure the total pension liability was 6.95%. The projection of cash flows used to determine the discount rate assumed that contributions from participating employers will be made using the actuarially determined rates. Based on those assumptions, MOSERS' fiduciary net position was projected to be available to make all the projected future benefit payments of the current plan members. As a result, the long-term expected rate of return on pension plan investments of 6.95% was applied to all periods of projected benefit payments to determine the total pension liability.

The table below presents the net pension liability of the plans, as of June 30, 2020, calculated using the discount rate of 6.95%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1% lower (5.95%) or 1% higher (7.95%) than the current rate.

Sensitivity of Net Pension Liability to Changes in the Discount Rate

Employers' Net Pension Liability	1% Decrease (5.95)%	Current Discount Rate (6.95)%	1% Increase (7.95)%
MSEP	$ 7,948,076,582	$ 6,347,578,355	$ 5,001,434,609
Judicial Plan	$ 520,117,555	$ 457,558,945	$ 403,982,082

The funding status of the plans and *Employer Schedule of Funding Progress* can be found in the *Actuarial Section* on page 112.

Note 6 – Retiree Life Insurance and Long-Term Disability Insurance Programs

In addition to the defined benefit pension provided through MOSERS, the state of Missouri also funds, either partially or in its entirety, retiree life insurance, and long-term disability insurance programs for eligible members. These insurance programs are underwritten by The Standard. MOSERS collects premiums for participants of these programs and remits them to the The Standard on behalf on the state of Missouri.

Retiree Life Insurance

Members who retire on or after October 1, 1985, are eligible for $5,000 of state-sponsored basic life insurance coverage if they retire directly from active employment. As of June 30, 2020, 28,324 retirees were participating in the program. This insured defined benefit coverage is financed on a percentage of payroll (.115%) and is purchased as a group policy through The Standard. The cost for the year ended June 30, 2020, was $1,937,852. Premiums are contributed entirely by the state and its component employers as provided by Section 104.515, RSMo.

Retirees of the Department of Labor and Industrial Relations (DOLIR), who retired prior to January 1, 1996, are eligible for state-sponsored insured defined benefit insurance coverage in the same amount of coverage they were receiving through the DOLIR. As of June 30, 2020, 126 retirees were participating in the program. The coverage for this closed group is purchased as a group policy at a current cost of $2.07 per thousand dollars of coverage, per month, per eligible participant ($16,422 for the year ended June 30, 2020). Premiums are paid entirely by the DOLIR as provided by Section 288.225, RSMo. Retirees of the DOLIR who retired on or after January 1, 1996, are eligible for $5,000 of state-sponsored life insurance coverage if they retire directly from active employment. They are included in the group described in the preceding paragraph.

Long-Term Disability Insurance (LTD)

MOSERS provides LTD coverage for eligible members and generally includes those active members of MOSERS' retirement plans who do not have other disability coverage and are not yet eligible to receive normal (unreduced) retirement benefits.

There were 31,737 members covered under the program as of June 30, 2020. This insured defined benefit coverage is financed on a percentage of covered payroll (0.55%). Purchased as a group policy, LTD is administered by The Standard. The cost for the year ended June 30, 2020, was $8,385,281. Premiums are contributed by the state and its component employers as provided for by Section 104.515, RSMo.

Note 7 – MCHCP Post-Employment Retiree Health Care OPEB Program

MOSERS participates as an employer in a cost-sharing, multiple-employer, defined benefit, other post-employment benefits plan, the State Retiree Welfare Benefit Trust (SRWBT), operated by Missouri Consolidated Health Care Plan (MCHCP). Employees may participate at retirement if eligible to receive a monthly retirement benefit from MOSERS. The terms and conditions governing post-employment benefits are vested with the MCHCP Board of Trustees within the authority granted under Chapter 103, Sections 103.003 through 103.178, RSMo. The SRWBT does not issue a separate stand-alone financial report. Financial activity of the SRWBT is included in the *MCHCP Comprehensive Annual Financial Report* as a fiduciary fund and is intended to present only the financial position of the activities attributable to the SRWBT. Additionally, MCHCP is considered a component unit of the state of Missouri reporting entity and is included in the state's financial report.

The Plan's financial statements are available on MCHCP's website at *www.mchcp.org*.

Benefits

The SRWBT was established and organized on June 27, 2008, pursuant to Sections 103.003 through 103.178, RSMo, to provide health and welfare benefits for the exclusive benefit of current and future retired employees of the state and their dependents who meet eligibility requirements, except for those retired members covered by other OPEB plans of the state. MCHCP's three medical plans offer the same basic coverage such as preventative care, freedom to choose care from a nationwide network of primary care providers, specialists, pharmacies, and hospitals, usually at a lower negotiated group discount and the same covered benefits for both medical and pharmacy. Benefits are the same in all three plans; other aspects differ such as premium, deductible and out-of-pocket costs. Retiree benefits are the same as for active employees, until they are Medicare eligible.

Contributions

Contributions are established, and may be amended by the MCHCP Board of Trustees, with the authority granted under Chapter 103, Sections 103.003 through 103.178, RSMo. For the fiscal year ended June 30, 2019, employers were required to contribute 4.99% of gross active employee payroll for the periods July 1, 2018, through January 31, 2019; 6.19% for the periods February 1, 2019 through April 15, 2019; and 4.33% for the periods April 16, 2019, through June 30, 2019. Employees do not contribute to this plan. No payables to the plan were outstanding at year end.

OPEB Liabilities, OPEB Expense, and Deferred Outflows of Resources and Deferred Inflows of Resources

At June 30, 2020, MOSERS reported a liability of $7,697,649 for its proportionate share of the net OPEB liability. The net OPEB liability was measured as of June 30, 2019, and the total OPEB liability used to calculate the net OPEB liability was determined by an actuarial valuation as of that date. MOSERS' proportion of the net OPEB liability was based on a projection of its long-term share of contributions to the OPEB plan relative to the projected contributions of all participating entities, actuarially determined. At June 30, 2019, MOSERS' proportionate share was 0.4352%. For the year ended June 30, 2020, MOSERS recognized OPEB expense of $305,311. As of June 30, 2020, MOSERS reported deferred outflows of resources and deferred inflows of resources as follows:

Deferred Outflows/Inflows of Resources Related to Post-Employment Retiree Health Care

	Deferred Outflows of Resources	Deferred Inflows of Resources
Difference between expected and actual experience	$ 272,239	$ 103,191
Changes of assumptions	0	326,063
Net difference between projected and actual earnings on plan investments	12,335	0
Changes in proportion and differences between MOSERS' contributions and proportionate share of contributions	316,791	43,890
MOSERS' contributions subsequent to the measurement date	311,510	0
	$ 912,875	$ 473,144

The $311,510 currently reported as deferred outflows of resources related to OPEB resulting from MOSERS' contributions subsequent to the measurement date will be recognized as a reduction of the net OPEB liability in the year ended June 30, 2020. Other amounts reported as deferred inflows of resources related to OPEB will be recognized in OPEB expense as follows:

Deferred Outflows/Inflows of Resources Related to Post-Employment Retiree Health Care to be Recognized in Future Years

Year Ending June 30		
2021	$	16,616
2022		16,615
2023		16,792
2024		13,756
2025		12,861
Thereafter		51,581
Total	$	128,221

Actuarial Assumptions

The collective total OPEB liability for the June 30, 2019, measurement date was determined by an actuarial valuation as of July 1, 2018, with updated procedures used to roll forward the total OPEB liability to June 30, 2019. This actuarial valuation used the following actuarial assumptions:

Summary of MCHCP's Actuarial Assumptions for Post-Employment Retiree Health Care

Valuation year	July 1, 2018 - June 30, 2019
Actuarial cost method	Entry age normal, level percentage of payroll
Asset valuation method	Market value
Discount rate (blended)	5.24%
Projected payroll growth rate	4.0%
Inflation rate	3.0%
Health care cost trend rate (medical & prescription drugs combined)	
Non-Medicare	6.0%
	(rate decreases by 0.25% per year until an ultimate rate of 5.0% in fiscal year 2023 and later)
Medicare	10.0%
(rate changes to 22.0% in fiscal year 2021, 10.0% in fiscal year 2022 and 2023, 9.5% in fiscal 2024, 9.0% in fiscal 2025, 8.5% in fiscal 2026, then 8.0% in fiscal 2027, decreasing by 1.0% per year to an ultimate rate of 5.0% in fiscal year 2030 and after.)	

Mortality: RP-2016 for Employees/Annuitants without collar adjustments using Scale MP-2016.

The last experience study was conducted for the period July 1, 2008, through June 30, 2012. The last independent actuarial review of the reasonableness and accuracy of actuarial assumptions, actuarial cost methods, and valuations was conducted as of June 30, 2018.

Discount Rate

A discount rate of 5.24% was used to measure the total OPEB liabilities. The projection of cash flows used to determine the discount rate assumed that contributions from plan members will be made at the current contribution rates and the contributions will be made at statutorily required rates, actuarially determined. This discount rate was determined as a blend of the best estimate of the expected return on plan assets and the 20-year high quality municipal bond rate as of the measurement date. For years where expected benefit payments can be covered by projected trust assets, expected returns are used. For years where payments are not expected to be covered by trust assets, the municipal Bond Buyer 20-Bond General Obligation Index rate is utilized.

Sensitivity to Changes in the MCHCP Discount Rate

The following table presents MOSERS' net OPEB liability, calculated using a discount rate of 5.24%, as well as what the net OPEB liability would be if it were calculated using a discount rate that is one percent lower or one percent higher:

Sensitivity of the Net MCHCP OPEB Liability to Changes in Discount Rate

	1% Decrease in Discount Rate (4.24%)	Current Discount Rate (5.24%)	1% Increase in Discount Rate (6.24%)
Net OPEB liability	$ 9,135,350	$ 7,697,649	$ 6,559,357

Sensitivity to Changes in the Health Care Cost Trend Rates

The following table presents MOSERS' net OPEB liability, calculated using the current trend rate, as well as what the net OPEB liability would be if it were calculated using a trend rate that is one percent lower or one percent higher:

Sensitivity of the Net MCHCP OPEB Liability to Changes in Health Care Cost Trend Rates

	1% Decrease in Trend Rates	Current Trend Rates	1% Increase in Trend Rates
Net OPEB liability	$ 6,473,006	$ 7,697,649	$ 9,254,457

Long-Term Expected Rate of Return

The target allocation and expected real rate of return for each major asset class are listed below:

MCHCP's Long-Term Expected Rate of Return

Asset Class	Target Allocation	Expected Real Rate of Return
Large cap stocks	16.0%	8.5%
Mid cap stocks	7.0	8.8
Small cap stocks	7.0	8.8
High-yield bonds	5.0	9.0
BarCap aggregate bonds	63.0	3.7
Cash equivalents	2.0	3.3

Note 8 – Commitments

As of June 30, 2020, MOSERS has $490.3 million in unfunded commitments in the private asset class.

MOSERS has contracted with various software and consulting firms to provide and implement a pension administration system at a cost of approximately $9.3 million. In addition to the cost of the System, MOSERS has engaged consultants to assist with project governance, change management, and data validation. The contracts for these consulting services have an approximate cost of $2.0 million. As of June 30, 2020, the remaining commitments on these agreements was approximately $7.5 million.

Note 9 – Contingencies

There were no contingencies which would have a material impact on the financial statements as of June 30, 2020.

Note 10 – Risk Management

MOSERS is exposed to various risks of loss related to natural disasters, errors, and omissions, loss of assets, torts, etc. MOSERS has chosen to cover such losses through the purchase of commercial insurance to help mitigate some of the exposure to those risks.

Schedule of Changes in Employers' Net Pension Liability - MSEP

*For Years Ended June 30, 2014 – 2020**

MSEP

	2020	2019
Total pension liability		
Service cost	$ 159,559,528	$ 158,190,866
Interest on the total pension liability	960,644,327	956,725,536
Benefit changes	0	0
Difference between expected and actual experience	(70,371,777)	7,426,685
Assumption changes	124,766,739	74,340,841
Benefit payments and member refunds	(873,816,238)	(851,821,580)
Net change in total pension liability	300,782,579	344,862,348
Total pension liability - beginning	13,957,626,309	13,612,763,961
Total pension liability - ending (a)	$ 14,258,408,888	$ 13,957,626,309
Plan fiduciary net position		
Employer contributions	$ 436,895,653	$ 394,150,042
Employee contributions	35,141,960	31,286,632
Pension plan net investment income (loss)	400,354,303	313,159,178
Benefit payments and member refunds	(873,816,238)	(851,821,580)
Pension plan administrative expense	(8,398,164)	(9,200,826)
Other	4,187,740	4,383,409
Net change in plan fiduciary net position	(5,634,746)	(118,043,145)
Plan fiduciary net position - beginning	7,916,465,279	8,034,508,424
Plan fiduciary net position - ending (b)	7,910,830,533	7,916,465,279
Net pension liability - ending (a)-(b)	$ 6,347,578,355	$ 6,041,161,030
Plan fiduciary net position as a percentage of total pension liability	55.48%	56.72%
Covered payroll	$ 2,006,870,248	$ 1,950,272,350
Net pension liability as a percentage of covered payroll	316.29%	309.76%

* *Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.*

Schedule of Changes in Employers' Net Pension Liability - MSEP (continued)

*For Years Ended June 30, 2014 – 2020**

2018	2017	2016	2015	2014
$ 157,351,979	$ 152,766,134	$ 149,021,755	$ 150,412,577	$ 158,116,026
956,201,619	945,654,398	913,877,923	896,451,618	869,878,195
0	(1,696,059)	0	0	0
(118,252,032)	(104,203,260)	61,150,083	(27,983,267)	12,376,237
351,899,973	202,554,786	656,805,085	(57,568,553)	0
(886,711,473)	(793,964,857)	(757,310,503)	(728,265,800)	(680,436,107)
460,490,066	401,111,142	1,023,544,343	233,046,575	359,934,351
13,152,273,895	12,751,162,753	11,727,618,410	11,494,571,835	11,134,637,484
$ 13,612,763,961	$ 13,152,273,895	$ 12,751,162,753	$ 11,727,618,410	$ 11,494,571,835
$ 379,557,962	$ 335,217,422	$ 329,957,369	$ 329,752,832	$ 326,370,336
28,303,994	25,439,343	21,684,920	18,099,455	14,025,328
576,188,826	272,595,668	1,740,269	(237,070,529)	1,193,952,121
(886,711,473)	(793,964,857)	(757,310,503)	(728,265,800)	(680,436,107)
(9,799,256)	(8,759,341)	(8,489,375)	(8,077,692)	(7,336,922)
1,610,073	5,668,849	4,923,622	5,434,820	296,369,500
89,150,126	(163,802,916)	(407,493,698)	(620,126,914)	1,142,944,256
7,945,358,298	8,109,161,214	8,516,654,912	9,136,781,826	7,993,837,570
8,034,508,424	7,945,358,298	8,109,161,214	8,516,654,912	9,136,781,826
$ 5,578,255,537	$ 5,206,915,597	$ 4,642,001,539	$ 3,210,963,498	$ 2,357,790,009
59.02%	60.41%	63.60%	72.62%	79.49%
$ 1,951,454,817	$ 1,975,353,105	$ 1,921,528,936	$ 1,918,527,768	$ 1,902,719,928
285.85%	263.59%	241.58%	167.37%	123.92%

Schedule of Changes in Employers' Net Pension Liability - Judicial Plan

*For Years Ended June 30, 2014 – 2020**

Judicial Plan

	2020	2019
Total pension liability		
Service cost	$ 13,119,646	$ 13,573,453
Interest on the total pension liability	42,458,800	41,710,768
Benefit changes	0	0
Difference between expected and actual experience	(14,933,643)	978,884
Assumption changes	6,341,771	5,024,057
Benefit payments and member refunds	(39,622,268)	(37,593,049)
Net change in total pension liability	7,364,306	23,694,113
Total pension liability - beginning	617,482,705	593,788,592
Total pension liability - ending (a)	$ 624,847,011	$ 617,482,705
Plan fiduciary net position		
Employer contributions	$ 39,174,515	$ 38,604,668
Employee contributions	1,314,570	1,138,101
Pension plan net investment income (loss)	8,162,709	6,051,941
Benefit payments	(39,622,268)	(37,593,049)
Pension plan administrative expense	(74,450)	(72,141)
Other	0	3,895
Net change in plan fiduciary net position	$ 8,955,076	$ 8,133,415
Plan fiduciary net position - beginning	158,332,990	150,199,575
Plan fiduciary net position - ending (b)	167,288,066	158,332,990
Net pension liability - ending (a)-(b)	$ 457,558,945	$ 459,149,715
Plan fiduciary net position as a percentage of total pension liability	26.77%	25.64%
Covered payroll	$ 61,402,061	$ 60,594,362
Net pension liability as a percentage of covered payroll	745.18%	757.74%

* *Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.*

Schedule of Changes in Employers' Net Pension Liability - Judicial Plan (continued)

*For Years Ended June 30, 2014 – 2020**

2018	2017	2016	2015	2014
$ 12,997,198	$ 12,945,567	$ 10,932,097	$ 10,613,686	$ 8,990,293
41,018,371	40,617,091	37,755,240	36,161,612	34,013,615
0	0	0	0	0
(1,319,696)	(10,687,091)	(5,036,696)	5,103,664	13,360,614
12,332,042	7,905,466	53,991,379	0	0
(35,657,248)	(33,984,725)	(32,989,714)	(31,245,906)	(29,406,625)
29,370,667	16,796,308	64,652,306	20,633,056	26,957,897
564,417,925	547,621,617	482,969,311	462,336,255	435,378,358
$ 593,788,592	$ 564,417,925	$ 547,621,617	$ 482,969,311	$ 462,336,255
$ 36,892,203	$ 34,246,826	$ 33,642,498	$ 32,696,686	$ 29,264,877
902,319	786,745	661,206	488,193	294,810
10,677,666	4,680,131	28,081	(3,610,352)	17,199,701
(35,657,248)	(33,984,725)	(32,989,714)	(31,245,906)	(29,406,625)
(181,595)	(150,387)	(136,983)	(123,015)	(105,693)
(68,711)	0	0	0	4,195,049
$ 12,564,634	$ 5,578,590	$ 1,205,088	$ (1,794,394)	$ 21,442,119
137,634,941	132,056,351	130,851,263	132,645,657	111,203,538
150,199,575	137,634,941	132,056,351	130,851,263	132,645,657
$ 443,589,017	$ 426,782,984	$ 415,565,266	$ 352,118,048	$ 329,690,598
25.30%	24.39%	24.11%	27.09%	28.69%
$ 59,417,302	$ 58,591,661	$ 57,421,016	$ 55,656,457	$ 49,587,936
746.57%	728.40%	723.72%	632.66%	664.86%

Pension Trust Funds

Schedule of Employer Contributions

Last Ten Fiscal Years

MSEP

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Contributions as a Percentage of Covered Payroll
2020	$ 436,895,653	$ 436,895,653	$ 0	$ 2,006,870,248	21.77%
2019	394,150,042	394,150,042	0	1,950,272,350	20.21
2018	379,557,962	379,557,962	0	1,951,454,817	19.45
2017	322,772,697	335,217,422	(12,444,725)	1,975,353,105	16.97
2016	310,124,928	329,957,369	(19,832,414)	1,921,528,936	16.97
2015	329,752,832	329,752,832	0	1,918,527,768	16.97
2014	326,370,336	326,370,336	0	1,902,719,928	16.98
2013	274,655,284	274,655,284	0	1,880,212,950	14.45
2012	263,373,924	263,373,924	0	1,864,069,493	13.97
2011	263,418,048	263,418,048	0	1,875,569,816	13.81

Judicial Plan

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution*	Contribution Deficiency (Excess)	Covered Payroll**	Contributions as a Percentage of Covered Payroll
2020	$ 39,174,515	$ 39,174,515	$ 0	$ 61,402,061	63.80%
2019	38,604,668	38,604,668	0	60,594,362	63.71
2018	36,892,203	36,892,203	0	59,417,302	62.09
2017	32,670,710	34,246,826	(1,576,116)	58,591,661	58.45
2016	31,604,527	33,642,498	(2,037,971)	57,421,016	58.45
2015	32,696,686	32,696,686	0	55,656,457	58.45
2014	29,264,877	29,264,877	0	49,587,936	59.69
2013	28,330,649	28,330,649	0	48,697,726	56.92
2012	26,324,526	26,324,526	0	45,835,501	57.30
2011	27,702,682	27,702,682	0	45,888,020	60.03

* *Since the percent of payroll contributions rate was applied to the pension payroll during the fiscal year, the actuarially determined contribution is equal to the actual contribution. In fiscal years 2016 and 2017, excess contributions were made because the actuarially determined contribution rate fell below the Board-established minimum contribution rate.*

** *For fiscal years 2016 and prior, covered payroll totals from the valuation report were used, which includes actual covered payroll from July through May with estimated amounts for June. For fiscal years 2017 and forward, covered payroll totals used are actual covered payroll from July through June, as reported in the GASB 67 report.*

Pension Trust Funds

Schedule of Annual Money-Weighted Rate of Return on Investments*

Year Ended June 30	Annual Money-Weighted Rate of Return - Net of Investment Expense
2020	5.25%
2019	4.10
2018	7.57
2017	3.51
2016	0.08
2015	(2.60)
2014	19.25

** Schedule is intended to show last 10 fiscal years and will be displayed as it becomes available.*

Pension Trust Funds

Notes to the Schedules of Required Supplementary Information

Actuarial Methods and Assumptions for Valuations Performed as of June 30, 2020

The entry-age actuarial cost method of valuation is used in determining liabilities and normal cost. Regular actuarial valuations provide valuable information about the composite change in the unfunded actuarial accrued liabilities (whether or not the liabilities are increasing or decreasing, and by how much). Since the future cannot be predicted with precision, actual experience is expected to differ from assumed experience. Differences occurring in the past between assumed experience and actual experience (actuarial gains and losses) become part of actuarial accrued liabilities. Unfunded actuarial accrued liabilities are amortized to produce payments (principal and interest), which are expressed as a percent of payroll. A layered, closed 30-year amortization period was used for the June 30, 2020 valuations to determine the fiscal year 2022 contribution rates. The actuarial value is calculated by recognizing the difference between the actual and expected return on the fair value of assets each year over a closed five-year period. In addition, the total unrecognized investment experience as of June 30, 2017, will be recognized evenly over a seven-year period beginning June 30, 2018.

The investment return rate assumption was reduced from 7.10%, as of June 30, 2019, to 6.95% per year, as of June 30, 2020, compounded annually (net of investment expenses). The price inflation assumption used was 2.25% per year. Projected salary assumptions were 2.75% to 8.25% for the MSEP and 2.50% to 4.70% for the Judicial Plan. The assumption used for annual post-retirement benefit increases (COLAs) is 4.0% (on a compound basis) when a minimum COLA is in effect. When no minimum COLA is in effect, the annual COLA is assumed to be 1.80% (80% of the 2.25% price inflation), on a compounded basis.

Actuarial Assumptions and Methods Used to Set the Actuarially Determined Contributions - Five-Year Review

MSEP & Judicial

Valuation year	2020	2019	2018	2017	2016
Contribution rate for fiscal year	2022	2021	2020	2019	2018
Actuarial cost method	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal	Entry Age Normal
Amortization method	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Layered bases approach - Level percentage of payroll	Single base approach - Level percentage of payroll	Single base approach - Level percentage of payroll
Amortization periods	Closed 30-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period	Closed 30-year period
Inflation	2.25%	2.35%	2.50%	2.50%	2.50%
Cost-of-living adjustment	4% or 1.80%	4% or 1.88%	4% or 2%	4% or 2%	4% or 2%
Salary increase	varied	varied	varied	varied	varied
Payroll growth	2.25%	2.35%	2.50%	3.00%	3.00%
Investment rate of return	6.95%	7.10%	7.25%	7.50%	7.65%

Schedule of Proportionate Share of the Net OPEB Liability

*For Years Ended June 30, 2018 – 2020**

State Retiree Welfare Benefit Trust

	2020	2019	2018
MOSERS' proportion of the net OPEB liability	0.4352%	0.4375%	0.4121%
MOSERS' proportionate share of the net OPEB liability	$ 7,697,649	$ 7,666,038	$ 7,272,038
MOSERS' covered payroll	$ 7,370,032	$ 7,056,668	$ 6,669,717
MOSERS' proportionate share of the net OPEB liability as a percentage of its covered payroll	104.45%	108.64%	109.03%
Plan fiduciary net position as a percentage of the total OPEB liability	7.31%	6.90%	6.64%

* *The amounts presented in this schedule were determined as of the previous fiscal year end. Intended to show information for 10 years, data for additional years will be displayed as it becomes available.*

Schedule of Employer Contributions for OPEB

*For Years Ended June 30, 2018 – 2020**

	2020	2019	2018
Contractually required contribution	$ 311,510	$ 331,275	$ 301,182
Contributions in relation to the contractually required contribution	$ 311,510	$ 331,275	$ 301,182
Contribution deficiency (excess)	$ 0	$ 0	$ 0
MOSERS' covered payroll	$ 7,569,252	$ 7,370,032	$ 7,056,668
Contributions as a percentage of covered payroll	4.12%	4.49%	4.27%

* *Intended to show information for 10 years, data for additional years will be displayed as it becomes available.*

Schedules of Investment Expenses

For the Year Ended June 30, 2020

Investing activity	MSEP	Judicial Plan	Total
Investment management and incentive fees			
Equity			
Blakeney Onyx, LP	$ 33,089	$ 674	$ 33,763
Harvest Fund Advisors, LLC	153,994	3,137	157,131
Silchester International Investors	3,169,958	64,579	3,234,537
SSGA Emerging Markets	41,015	836	41,851
Fixed income			
Stone Harbor Investment Partners	110,166	2,244	112,410
Multi-asset			
Blackrock	61,379	1,250	62,629
NISA Investment Advisors	5,695,919	116,039	5,811,958
Alternatives			
Actis Emerging Markets III	126,424	2,576	129,000
Actis Emerging Markets IV	627,939	12,793	640,732
AQR DELTA Sapphire Fund, LP	2,935,496	59,803	2,995,299
Axiom Asia Private Capital Fund II, LP	343,693	7,002	350,695
Axiom Asia Private Capital Fund III, LP	703,870	14,339	718,209
Axxon Brazil Private Equity Fund II B, LP	258,371	5,264	263,635
Bayview Opportunity Domestic IIIb, LP	127,183	2,591	129,774
Blackstone Real Estate Partners IV	479,082	9,760	488,842
Blackstone Real Estate Partners V	(278,046)	(5,664)	(283,710)
Blackstone Real Estate Partners VI	206,243	4,202	210,445
Blackstone Real Estate Partners VII	4,061	83	4,144
Blackstone Topaz Fund, LP	2,609,394	53,159	2,662,553
Blackstone Topaz Private Credit	138,439	2,820	141,259
Bridgewater Associates - All Weather @ 12%, LLC	704,848	14,359	719,207
Bridgewater Associates - Diamond Ridge Fund, LLC	3,953,415	80,540	4,033,955
CarVal Investors CVI Global Value Fund A, LP - private debt	12,623	257	12,880
CarVal Investors CVI Global Value Fund A, LP - real estate	12,623	257	12,880
Catalyst Fund Limited Partnership III	695,628	14,171	709,799
Catalyst Fund Limited Partnership IV	313,327	6,383	319,710
Catalyst Fund Limited Partnership V	2,308,216	47,024	2,355,240
Cornwall Domestic, LP	67,965	1,385	69,350
DRI Capital - LSRC	357,923	7,292	365,215
EIG Energy Fund XIV, LP	82,149	1,674	83,823
EIG Energy Fund XV, LP	378,631	7,714	386,345
EIG Energy Fund XVI, LP	(865,172)	(17,625)	(882,797)
Elliott International Limited	9,292,212	189,303	9,481,515
Exodus Point	727,349	14,818	742,167
Farallon Capital Institutional Partners, LP	(55,060)	(1,122)	(56,182)
Gaoling Fund, LP	26,410	538	26,948

Schedule of Investment Expenses continued on page 65

Schedules of Investment Expenses (continued)

For the Year Ended June 30, 2020

Investing activity	MSEP	Judicial Plan	Total
Gateway Energy & Resource Holdings, LLC	$ 338,395	$ 6,894	$ 345,289
Glenview Capital Opportunity Fund, LP	494,514	10,074	504,588
Glenview Sidecar	101,031	2,058	103,089
Global Forest Partners GTI7 Institutional Investors Company Ltd.	3,175	65	3,240
HBK Merger Strategies Offshore Fund, Ltd.	3,310,028	67,433	3,377,461
JLL Partners Fund V, LP	(187,963)	(3,829)	(191,792)
JLL Partners Fund VI, LP	(1,623,779)	(33,080)	(1,656,859)
Kennedy Capital	186,928	3,808	190,736
King Street Capital, LP	35,759	729	36,488
King Street Capital, Ltd.	623	13	636
Linden Capital Partners II, LP	1,108,445	22,581	1,131,026
Mast Credit Opportunities I, LP	44,869	914	45,783
Merit Energy Partners F-II, LP	36,882	751	37,633
MHR Institutional Partners IIA, LP	(76,831)	(1,565)	(78,396)
MHR Institutional Partners III, LP	301,347	6,139	307,486
MHR Institutional Partners IV, LP	915,209	18,645	933,854
Millennium Technology Value Partners II	(256,267)	(5,221)	(261,488)
OCM Opportunities Fund VIIb, LP	(6,598)	(134)	(6,732)
OCM Opportunities Fund VIIIb, LP	199,918	4,073	203,991
OCM Power Opportunities Fund III, LP	(295,709)	(6,024)	(301,733)
OCM/GFI Power Opportunities Fund II, LP	(46)	(1)	(47)
Perry Partners, LP	118	2	120
Pharo Macro Fund, Ltd.	1,325,665	27,007	1,352,672
Silver Creek Special Opportunities Fund I, LP	29,119	593	29,712
Silver Creek Special Opportunities Fund II, LP	33,442	681	34,123
Silver Lake Partners II, LP	(24,803)	(505)	(25,308)
Standard Investment Research Hedged Equity Fund	2,775,871	56,551	2,832,422
StepStone Capital Buyout Fund II, LP	78,848	1,606	80,454
StepStone Opportunities Fund II, LP	38,739	789	39,528
Voleon Investors Fund, LP	203,784	4,152	207,936
Voleon Institutional Strategies Fund, LP	589,548	12,010	601,558
Total investment management and incentive fees	45,241,017	921,664	46,162,681
Other investment fees			
Investment consultant fees			
Meketa Investment Group	264,861	2,348	267,209
NEPC	317,188	2,812	320,000
Total investment consultant fees	582,049	5,160	587,209
Investment custodial and other fees			
BNY Mellon (custodial)	371,576	7,570	379,146
BNY Mellon (performance calculation)	226,933	4,623	231,556
Total investment custodial and other fees	598,509	12,193	610,702
Internal investment activity expenses	4,032,395	82,149	4,114,544
Total investing activity expenses	$ 50,453,970	1,021,166	$ 51,475,136

Pension Trust Funds

Schedules of Internal Investment Activity Expenses

For the Year Ended June 30, 2020

Personnel services	
Salaries	$ 2,458,734
Fringe benefits	957,983
Total personnel services	3,416,717
Professional services	
Attorney services	143,096
Total professional services	143,096
Communications	
Telephone	8,744
Total communications	8,744
Facilities	
Utilities	5,555
Lease expense	84,088
Facility maintenance	9,979
Total facilities	99,622
Software and equipment	
Computer supplies and software	4,781
Total software and equipment	4,781
Education, meetings and travel	
Professional development including travel	15,553
Due diligence travel	3,751
Total education, meetings and travel	19,304
General	
Research and information services	402,236
Membership dues	9,539
Office supplies	15
Periodicals and publications	10,490
Total general	422,280
Total internal investment activity expenses	$ 4,114,544

Pension Trust Funds

Schedules of Administrative Expenses

For the Year Ended June 30, 2020

Personnel services	
Salaries	$ 4,167,657
Fringe benefits	1,987,567
Total personnel services	6,155,224
Professional services	
Actuarial services	151,534
Attorney services	80,715
Auditing services	67,890
Consulting services	602,162
Total professional services	902,301
Communications	
Video production	3,789
Telephone	49,872
Printing	33,366
Postage and mailing	155,023
Total communications	242,050
Facilities	
Utilities	95,810
Facility maintenance	72,036
Vehicle maintenance and operation	3,569
Total facilities	171,415
Software and equipment	
Computer supplies and software	71,682
Maintenance agreements	486,092
Equipment rental	71,896
Gain on sale of equipment	(39,185)
Total software and equipment	590,485
Education, meetings and travel	
Board travel and meetings	9,783
Professional development including travel	66,109
MOSERS sponsored seminars	75,316
Due diligence	4,399
Tuition reimbursement	8,732
Total education, meetings and travel	164,339
General	
Advertising	5,506
Banking services	45,692
Employee services	3,855
Research and information services	26,903
Insurance	185,410
Membership dues	17,078
Business continuity	85,954
Office supplies	19,345
Periodicals and publications	2,995
Depreciation	308,938
Miscellaneous	24,350
Insurance activities fiscal agent fees	(479,226)
Total general	246,800
Total administrative expenses	$ 8,472,614

Schedules of Professional Service Fees

For the Year Ended June 30, 2020

Professional Services	Pension Trust Funds	Internal Service Funds
Operations administrative expenses		
Actuarial services		
Cavanaugh Macdonald Consulting, LLC	$ 151,534	$ 0
Attorney services		
Ice Miller, LLP	19,124	0
Thompson Coburn, LLP	61,591	6,359
Total attorney services	80,715	6,359
Auditing services		
Eide Bailly	67,890	33,450
Consulting services		
Avtex – information technology	25,679	0
Charlesworth & Associates – risk management	36,085	0
CherryRoad Technologies – information technology	165,600	0
Gamble & Schlemeier, Ltd. – governmental affairs	26,967	0
Huber & Associates – information technology	52,006	0
Indelible, LLC – information technology	5,000	0
Norlem Technology Consulting – information technology	6,140	0
SHI International Corp – information technology	11,920	0
Verus Advisory, Inc. – investment consulting	272,500	0
Other consulting services	265	0
Total consulting services	602,162	0
Total operations administrative expenses	902,301	39,809
Investment administrative expenses		
Attorney services		
Purrington Moody Weil, LLP	3,753	0
Thompson Coburn, LLP	138,184	0
Other attorney services	1,159	0
Total attorney services	143,096	0
Total investment administrative expenses	143,096	0
Total professional fees	$ 1,045,397	$ 39,809

Information on investment management and consulting fees can be found in the Schedule of Investment Expenses on pages 64-65.

Capitalized professional service fees for the pension administration system	
Consulting services	
ICON Integration and Design, Inc.	$ 250,327
Linea Solutions	188,552
Tegrit	1,532,928
Total consulting services	$ 1,971,807

Internal Service Funds

Combined Statements of Net Position

As of June 30, 2020

	Life and LTD	Deferred Compensation	Total
Assets			
Current assets			
Premiums receivable	$ 1,002,946	$ 0	$ 1,002,946
Short-term instruments	4,897,697	694,654	5,592,351
Total current assets	5,900,643	694,654	6,595,297
Total assets	5,900,643	694,654	6,595,297
Deferred outflows of resources	0	13,340	13,340
Liabilities			
Current liabilities			
Premiums payable	2,462,189	0	2,462,189
Due to other funds	1,434,957	61,698	1,496,655
Other liabilities	4,546	61,975	66,521
Total current liabilities	3,901,692	123,673	4,025,365
Deferred revenue	1,879,564	0	1,879,564
Net OPEB liability	0	2,489	2,489
Total liabilities	5,781,256	126,162	5,907,418
Deferred inflow of resources	0	8,133	8,133
Net Position			
Unrestricted net position	119,387	573,699	693,086
Total net position	$ 119,387	$ 573,699	$ 693,086

Internal Service Funds

Combined Statements of Revenues, Expenses, and Changes in Net Position

For Year Ended June 30, 2020

	Life & LTD	Deferred Compensation	Total
Operating revenues			
Premium receipts	$ 32,582,558	$ 0	$ 32,582,558
Deferred compensation receipts	0	1,315,076	1,315,076
Miscellaneous income	484,075	0	484,075
Total operating revenues	33,066,633	1,315,076	34,381,709
Operating expenses			
Premium disbursements	32,549,567	0	32,549,567
Premium refunds	32,991	0	32,991
Administrative expenses	480,120	1,145,482	1,625,602
Total operating expenses	33,062,678	1,145,482	34,208,160
Net operating income	3,955	169,594	173,549
Nonoperating revenues			
Interest income	46,539	7,289	53,828
Total nonoperating revenues	46,539	7,289	53,828
Net revenues over expenses	50,494	176,883	227,377
Net position beginning of year	68,893	396,816	465,709
Net position end of year	$ 119,387	$ 573,699	$ 693,086

Internal Service Funds

Combined Statements of Cash Flows

For the Year Ended June 30, 2020

	Life & LTD	Deferred Compensation	Total
Cash flows from operating activities			
Cash received from employers and members	$ 34,159,425	$ 1,315,076	$ 35,474,501
Payments to outside carriers	(35,261,818)	0	(35,261,818)
Refund of premiums to members	(32,991)	0	(32,991)
Cash payments to employees for services	0	(1,041,529)	(1,041,529)
Cash payments to other suppliers of goods and services	(480,283)	(38,614)	(518,897)
Net cash (used) provided by operating activities	(1,615,667)	234,933	(1,380,734)
Cash flows from investing activities			
Purchase of short-term instruments	(1,948,347,710)	(7,843,141)	(1,956,190,851)
Proceeds from sale and maturities of short-term instruments	1,949,916,838	7,600,919	1,957,517,757
Cash received from investing activities	46,539	7,289	53,828
Net cash provided (used) by investing activities	1,615,667	(234,933)	1,380,734
Net increase (decrease) in cash	0	0	0
Cash balances beginning of year	0	0	0
Cash balances end of year	$ 0	$ 0	$ 0
Reconciliation of net operating (loss) income to net cash provided by operating activities			
Net operating income (loss)	$ 3,955	$ 169,594	$ 173,549
Adjustments to reconcile net operating (loss) to net cash provided (used) by operating activities			
Depreciation expense	0	6,947	6,947
Change in assets and liabilities:			
(Increase) in operational accounts receivable	(45,159)	0	(45,159)
Deferred outflows of resources	0	(13,340)	(13,340)
Increase (decrease) in operational liabilities	(1,574,463)	61,110	(1,513,353)
Net OPEB liability	0	2,489	2,489
Deferred inflows of resources	0	8,133	8,133
Total adjustments	(1,619,622)	65,339	(1,554,283)
Net cash (used) provided by operating activities	$ (1,615,667)	$ 234,933	$ (1,380,734)

Internal Service Funds
Schedules of Administrative Expenses
For the Year Ended June 30, 2020

Personnel services		
Salaries	$	681,818
Employee fringe benefits		303,917
Total personnel services		985,735
Professional services		
Attorney services		6,359
Auditing services		33,450
Total professional services		39,809
Communications		
Video production expense		865
Telephone		7,356
Printing		263
Postage and mailing		262
Total communications		8,746
Facilities		
Building use charge		10,000
Maintenance		574
Total facilities		10,574
Software and equipment		
Computer supplies and equipment		6,042
Maintenance agreements		12,435
Total software and equipment		18,477
Education, meetings and travel		
Professional development including travel		6,983
MOSERS sponsored seminars		45,609
Due diligence travel		1,945
Total education, meetings and travel		54,537
General		
Advertising		7,085
Banking services		894
Research and information services		3,897
Membership dues		1,455
Periodicals and publications		8,220
Depreciation		6,947
Administrative expenses allocation		479,226
Total general		507,724
Total administrative expenses	$	1,625,602