"It was around my year anniversary with the state that I first started contributing to the deferred compensation program. Originally, my contribution amount was based on what I felt was reasonable and wouldn't create a hardship at the time. When I think about how saving for retirement will benefit me in the long term, I like the idea of having more financial freedom, less stress, and less worry when I retire — that's my driving force. I'd rather have money later (in retirement) than right now, and I don't miss the money I put into deferred comp.

My savings advice when it comes to retirement security and planning is to start now — it feels good to watch your money grow! Any amount is a good amount and it's easy to adjust, up or down, as needed. I firmly believe in beginning with the end in mind. Planning today will help tomorrow be easier when money may not be as available."

– *Kristi*

Vocational Rehabilitation (DESE)

"My savings advice when it comes to retirement security and planning is to start now — it feels good to watch your money grow!"

Financial Section

Independent Auditors' Report

WILLIAMS KEEPERS LLC
CERTIFIED PUBLIC ACCOUNTANTS & CONSULTANTS

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The Board of Trustees
Missouri State Employees' Retirement System

We have audited the accompanying financial statements of the pension trust and internal service funds of the Missouri State Employees' Retirement System (MOSERS), a component unit of the State of Missouri, as of and for the year ended June 30, 2016, and the related notes to the financial statements, which collectively comprise the MOSERS' basic financial statements as listed in the table of contents.

Management's Responsibility for the Financial Statements

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

Auditors' Responsibility

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

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

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

Opinions

In our opinion, the financial statements referred to above present fairly, in all material respects, the respective financial position of the pension trust and internal service funds of MOSERS as of June 30, 2016, and the respective changes in financial position and, where applicable, cash flows thereof for the year then ended in conformity with U.S. generally accepted accounting principles.

Other Matters

Required Supplementary Information

U.S. generally accepted accounting principles require that the *Management's Discussion and Analysis* on pages 19-23 and the *Schedule of Changes in Employers' Net Pension Liability*, *Schedule of Employer Contributions, Schedule of Annual Money-Weighted Rate of Return on Investments,* and the *Notes to the Schedules of Required Supplementary Information* on pages 52-58 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 U.S. generally accepted auditing standards, 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 opinions on the financial statements that collectively comprise MOSERS' basic financial statements. The *Introductory*, *Investment*, *Actuarial,* and *Statistical Sections* and the additional information on pages 59-66 are presented for purposes of additional analysis and are not a required part of the financial statements.

The additional information on pages 59-66 is the responsibility of management and was derived from and relate directly to the underlying accounting and other records used to prepare the 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 U.S. generally accepted auditing standards. In our opinion, the additional information on pages 59-66 is fairly stated in all material respects in relation to the basic financial statements as a whole.

The *Introductory*, *Investment*, *Actuarial,* and *Statistical Sections* have not been subjected to the auditing procedures applied in the audit of the basic financial statements and, accordingly, we do not express an opinion or provide any assurance on them.

Williams-Keepers LLC

October 14, 2016

Management 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, 2016. It is intended to be used in conjunction with the *Transmittal Letter* beginning on page 6 and *Financial Statements* and *Notes*, on pages 24-51 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 24. These statements are presented on an accrual basis and reflect all trust fund activities as incurred. The *Notes to 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 Financial Statements* provide historical information and additional details considered useful in evaluating the condition of the plan. Investment data in the *Financial Section* is presented at fair value. See the *Actuarial Section* of this report for a detailed discussion of the actuarial value of assets and liabilities and the funded status.

The basic financial statements contained in this section of the CAFR consist of:

- The *Statements of Fiduciary Net Position* which report the pension trust funds' assets, liabilities, and resulting net position where Assets – Liabilities = Net Position held in trust for 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* which summarize the pension trust funds' financial transactions that have occurred during the fiscal year where Additions – Deductions = Net 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 *Statements 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 + Liabilities = Assets.
- The *Statements 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 – Expenses = Net Revenue and supports the change to the prior year's net position.
- The *Statements of Cash Flows* of the internal service funds report the financial transactions of the fiscal year of the internal service funds on a cash basis. It is similar to the *Statements of Revenues, Expenses and Changes in Net Position*; however, the focus of this statement is on the change to cash balances with accrued income and expense items eliminated.
- The *Notes to the Financial Statements* are an integral part of the above financial statements and include additional information not readily evident in the statements themselves.
- The required supplementary *Management Discussion and Analysis* information, the *Required Supplementary Information*, and *Additional Financial Information* following the *Notes to the Financial Statements* provide detailed historical information considered useful in evaluating the condition of the plans administered by MOSERS.
- The MSEP experienced a decrease in its actuarial funded status from 75.0% to 69.6% and the Judicial Plan experienced a decrease in its actuarial funded status from 27.8% to 26.2%. In June 2016, the board voted to reduce the nominal assumed investment return from 8% to 7.65%. Wage inflation returned from a temporary 0% assumption to 3.0% and price inflation was unchanged at 2.5%. In June 2013, the board approved a change to reduce the amortization period from an open 30 years to a closed 30 years beginning July 1, 2014, and will be reduced by one year for each subsequent annual valuation until the period reaches one year. This amortization period will be re-examined in conjunction with the 2030 actuarial valuation to determine if it should be reduced below 15 years or changed to an open 15 years.
- Also at the June 2016 meeting, the board approved a change related to the smoothing method to determine the actuarial value of assets using the investment gains or losses, relative to what would have been earned at the assumed rate on the actuarial value of assets, and combine that amount with any previously unrecognized investment gains or losses. One-fifth of that total amount would then be recognized in the current year with four-fifths deferred for future recognition. In no event would the actuarial value of assets as of the valuation date be more than 125% or less than 80% of the fair value of assets.

Financial Reporting Highlights

- MOSERS' net position restricted for pensions decreased by $406.3 million during fiscal year 2016 (FY16). On June 30, 2016, total plan assets (including net capital assets of $3.5 million) were $11.9 billion, exceeding total liabilities of $3.7 billion, resulting in a net position held in trust for pension benefits of $8.2 billion.
- Covered payroll, from which both employee and employer contributions are calculated, increased $3.0 million for the Missouri State Employees' Plan (MSEP) and $1.7 million for the Judicial Plan, or .16% and 3.1% respectively, over the last fiscal year.
- Total contributions for FY16 were $390.9 million, up from $386.5 million in FY15. During FY16, contribution rates were 16.97% for the MSEP and 58.45% for the Judicial Plan, which is the rate determined by the June 30, 2013 actuarial valuation. Although not prohibited to increase, future contribution rates shall not be reduced below these rates until the actuarial funding ratio of the plans are at least 80%. MOSERS will continue to use a funding policy that follows a financing pattern which computes and requires contribution amounts (when expressed as a percentage of active member payroll) to remain approximately level from year to year and from one generation of citizens to the next generation.
- Investment and securities lending income, net of related fees was $1.2 million. Investments of the pension trust funds generated a time-weighted 0.3% return, net of fees, for the year, up from the prior year's return of (2.64)%. The money-weighted rate of return, net of investment expenses as defined by GASB 67 was 0.08% for FY16.
- Investment activity expenses were $79.1 million in FY16 down from $124.1 million in FY15. This decrease is due to less incentive and management fees paid to investment managers, which is related closely to the performance of the funds they manage.
- Benefit payments to members increased by $28.2 million and service transfers and refunds increased by $2.6 million for FY16.
- Administrative expenses totaled $8.6 million in FY16, compared to $8.2 million in FY15.
- The internal service fund's net position decreased by $0.5 million. The decrease is due to reimbursement from the State of Missouri Deferred Compensation Plan's third party record keeper to cover administrative expenses occurring in a previous year, which covered FY16 and future years.

The following schedules present *Summary Comparative Financial Statements* of the pension trust funds and internal service funds for FY16 and FY15. For each schedule there is a brief summary of the significant changes noted in those schedules.

Pension Trust Funds

Summary Comparative Statements of Fiduciary Net Position

The largest components of the net position of the pension trust funds are the investments, cash and short-term investments, obligations under repo agreements, and securities lending collateral.

FY16 experienced a decrease in the net fair value of investments (total investments less obligations under repo agreements) of $308 million, from $6.1 billion in FY15 to $5.7 billion in FY16, primarily attributable to benefit payment obligations exceeding investment returns as evidenced by MOSERS' total investment return, net of fees, of 0.3% this year. Detailed information regarding MOSERS' investment portfolio is included in the *Investment Section* of this report.

Obligations under repo agreements decreased from $4.2 billion in FY15 to $3.6 billion in FY16 due to decreased exposure financed with reverse repos.

Cash and short-term investments increased due to multiple factors including the performance of the fund, the timing of investment funding and obligations under derivative investments and reverse repo agreements.

Investment sales receivable decreased as a result of the timing of investment purchases.

The decrease in securities lending collateral is primarily attributable to a lower utilization rate of lendable assets in the lending portfolio at fiscal year-end. As of fiscal year-end, approximately 0.15% of the collateral received has been invested in asset-backed bonds, down from 0.20% the prior year. The invested collateral was $0.7 million below the liability at the end of FY15 and FY16.

Pension Trust Funds

Summary Comparative Statements of Fiduciary Net Position

	As of June 30, 2016	As of June 30, 2015	Amount of Change	Percentage Change
Cash and short-term investments	$ 2,454,419,406	$ 2,237,194,552	$ 217,224,854	9.71%
Receivables	89,911,461	373,465,032	(283,553,571)	(75.93)
Investments	9,349,306,746	10,258,761,342	(909,454,596)	(8.87)
Invested securities lending collateral	14,258,587	19,228,051	(4,969,464)	(25.84)
Net capital assets	3,541,901	3,701,791	(159,890)	(4.32)
Other assets	68,128	26,425	41,703	157.82
Total assets	11,911,506,229	12,892,377,193	(980,870,964)	(7.61)
Administrative expense payables	2,419,569	1,399,712	1,019,857	72.86
Investment purchase payables	36,690,153	1,598,102	35,092,051	2,195.86
Securities lending collateral	14,940,141	19,918,342	(4,978,201)	(24.99)
Other liabilities	10,083,285	14,257,651	(4,174,366)	(29.28)
Obligations under repo agreements	3,601,461,597	4,203,408,628	(601,947,031)	(14.32)
MOSERS investment portfolio liability (MIP)	4,693,919	4,288,583	405,336	9.45
Total liabilities	3,670,288,664	4,244,871,018	(574,582,354)	(13.54)
Net positions restricted for pensions	$ 8,241,217,565	$ 8,647,506,175	$(406,288,610)	(4.70)

Summary Comparative Statements of Changes in Fiduciary Net Position

The increase in contributions received is primarily attributable to an increase in covered payroll from FY15 to FY16.

The increase in investment income from FY15 to FY16 is attributable to a slight improvement in market conditions experienced by the investments of the fund. The decrease in securities lending income is primarily due to less lendable assets in the lending portfolio during the fiscal year. Margins continue to be low, resulting in low income generation. The *Investment Section* of this report contains additional information regarding investments and securities lending 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 104-109 of the *Actuarial Section* of this report.

Service transfers increased $1.3 million in FY16 and are dependent on the number of members electing to transfer their service out of MOSERS. Refunds of employee contributions are the result of the number of members of the MSEP 2011 tier who have terminated employment and are eligible to request a refund, as well as members employed prior to September 1, 1972 who have contributions remaining in the system. Refunds increased in FY16 by $1.3 million due to a larger number of terminated nonvested MSEP 2011 members choosing to receive a refund.

Pension Trust Funds

Summary Comparative Statements of Changes in Fiduciary Net Position

	Year Ended June 30, 2016	Year Ended June 30, 2015	Amount of Change	Percentage Change
Contributions	$ 390,869,615	$ 386,471,986	$ 4,397,629	1.14%
Investment income (loss) – investing activities	1,213,744	(241,338,203)	242,551,947	100.50
Investment (loss) income – securities lending activities	(49)	116,204	(116,253)	(100.04)
Miscellaneous income	554,655	541,118	13,537	2.50
Total additions	392,637,965	145,791,105	246,846,860	169.32
Benefits	783,420,118	755,239,947	28,180,171	3.73
Service transfers and refunds	6,880,099	4,271,759	2,608,340	61.06
Administrative expenses	8,626,358	8,200,707	425,651	5.19
Total deductions	798,926,575	767,712,413	31,214,162	4.07
Net (decrease) increase	(406,288,610)	(621,921,308)	215,632,698	34.67
Net positions beginning of year	8,647,506,175	9,269,427,483	(621,921,308)	(6.71)
Net positions restricted for pensions	$8,241,217,565	$8,647,506,175	$(406,288,610)	(4.70)

Internal Service Funds

Summary Comparative Statements of Net Position Analysis

The decrease 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 investments is attributable to reimbursement from the State of Missouri Deferred Compensation Plan's third-party record keeper to cover administrative expenses occurring in a previous year, which covered FY16 and future years.

The increase in premiums payable is attributable to normal fluctuations in the month-end balances of premiums payable for the year, similar to the fluctuations of the premiums receivable.

Other liabilities decreased primarily as a result of the timing of reimbursements due to the pension trust funds for the internal service fund's portion of shared expenses which had not been transferred at year end.

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

Premium receipts and premium disbursements increased slightly due to normal fluctuations in the amount of optional life insurance coverage selected by state employees. These amounts are collected when employee wages are paid and remitted to The Standard insurance company on a monthly basis.

Deferred compensation receipts and disbursements were $0 for both FY15 and FY16. This is attributable to a $1 million reimbursement paid in FY14 to cover administrative expenses to the internal service fund at MOSERS from the State of Missouri Deferred Compensation Plan's third-party record keeper which collects deferred compensation contributions directly from employers. As of June 30, 2016, there were 64,904 participants (both active and terminated/retired), which is an increase of 2,863 from FY15. The state of Missouri has not contributed an employer match since March 2010.

Administrative expenses increased primarily as a result of personnel services allocated to Life and LTD *Internal Service Funds*, and an increase in personnel services directly related to the Deferred Compensation *Internal Service Funds*.

Summary Comparative Statements of Cash Flows Analysis

The decrease in cash flows from operating activities is primarily attributable to an increase in cash payments paid to outside carriers over that of FY15 of $.5 million and an increase for payments to employees for services of $.5 million, which are partially offset by an increase in payments received from employers and members of $.2 million.

The increase in cash flows from noncapital financing activities is primarily attributable to an increase in the amount of life and long-term disability premium refund checks that remained outstanding at year end.

The increase in cash flows from investing activities is attributable to several factors including the decrease in outflows for net purchase and maturities of overnight repurchase agreements of $.5 million.

Request 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 request for additional information should be addressed to MOSERS at P.O. Box 209, Jefferson City, MO 65102 or by email at *mosers@mosers.org*.

Internal Service Funds

Summary Comparative Statements of Net Position

	As of June 30, 2016	As of June 30, 2015	Amount of Change	Percentage Change
Premiums receivable	$ 962,006	$ 978,693	$ (16,687)	(1.71)%
Investments	3,935,042	4,482,083	(547,041)	(12.21)
Fixed assets net of accumulated depreciation	3,946	4,437	(491)	(11.07)
Leasehold improvements	1,940	2,910	(970)	(33.33)
Total assets	$4,902,934	$5,468,123	$(565,189)	(10.34)
Premiums payable	$4,550,931	$4,394,941	$ 155,990	3.55
Other liabilities	123,378	327,876	(204,498)	(62.37)
Total liabilities	4,674,309	4,722,817	(48,508)	(1.03)
Unrestricted net position	228,625	745,306	(516,681)	(69.32)
Total liabilities and net position	$4,902,934	$5,468,123	$(565,189)	(10.34)

Internal Service Funds

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

	Year Ended June 30, 2016	Year Ended June 30, 2015	Amount of Change	Percentage Change
Premium receipts	$30,360,162	$30,177,918	$ 182,244	0.60%
Miscellaneous income	480,120	480,120	0	0.00
Total operating revenue	30,840,282	30,658,038	182,244	0.59
Premium disbursements	30,328,802	30,157,271	171,531	0.57
Premium refunds	31,360	20,646	10,714	51.89
Administrative expenses	1,015,578	960,827	54,751	5.70
Total operating expenses	31,375,740	31,138,744	236,996	0.76
Net operating (loss)	(535,458)	(480,706)	(54,752)	(11.39)
Investment income	18,777	12,549	6,228	49.63
Net revenues (under) expenses	(516,681)	(468,157)	(48,524)	(10.36)
Net position beginning of year	745,306	1,213,463	(468,157)	(38.58)
Net position end of year	$ 228,625	$ 745,306	$(516,681)	(69.32)

Internal Service Funds

Summary Comparative Statements of Cash Flows

	Year Ended June 30, 2016	Year Ended June 30, 2015	Amount of Change	Percentage Change
Cash flows from operating activities	$(566,218)	$ 244,691	$(810,909)	(331.40)%
Cash flows from noncapital financing activities	1,596	(812)	2,408	296.55
Cash flows from investing activities	564,622	(243,879)	808,501	331.52
Net change in cash	0	0	0	
Cash balances beginning of year	0	0	0	
Cash balances end of year	$ 0	$ 0	$ 0	

BASIC FINANCIAL STATEMENTS

Pension Trust Funds

Statements of Fiduciary Net Position | As of June 30, 2016

	MSEP	Judicial Plan	Total
Assets			
Cash and short-term investments	$ 2,415,444,202	$ 38,975,204	$ 2,454,419,406
Receivables			
State contributions	14,435,893	1,441,218	15,877,111
Investment sales	36,445,191	588,074	37,033,265
Investment income receivable	36,300,888	585,745	36,886,633
Other	112,635	1,817	114,452
Total receivables	87,294,607	2,616,854	89,911,461
Investments at fair value			
U.S. treasury securities	3,895,855,245	62,862,868	3,958,718,113
Government bonds & gov't. mortgage-backed securities	46,850,062	755,965	47,606,027
Corporate bonds	109,828	1,772	111,600
Convertible bonds	953,401	15,384	968,785
U.S. dollar-denominated international corporate bonds	1,243,066	20,058	1,263,124
Limited partnerships	4,199,654,679	67,764,925	4,267,419,604
Common stock	282,345,885	4,555,886	286,901,771
International equities	776,612,307	12,531,286	789,143,593
Foreign currency	7,697,483	124,205	7,821,688
Real estate investment trust	10,477	169	10,646
Options futures	(10,488,957)	(169,248)	(10,658,205)
Total investments	9,200,843,476	148,463,270	9,349,306,746
Invested securities lending collateral	14,032,166	226,421	14,258,587
Capital assets			
Land	263,042	4,244	267,286
Building and building improvements	4,216,303	68,034	4,284,337
Furniture, fixtures and equipment	1,265,221	20,415	1,285,636
Software	713,057	11,506	724,563
Total capital assets	6,457,623	104,199	6,561,822
Accumulated depreciation	(2,971,966)	(47,955)	(3,019,921)
Net capital assets	3,485,657	56,244	3,541,901
Prepaid expenses and other	67,046	1,082	68,128
Total assets	11,721,167,154	190,339,075	11,911,506,229
Liabilities			
Administrative expenses payable	2,381,147	38,422	2,419,569
Investment purchases payable	36,107,528	582,625	36,690,153
Securities lending collateral	14,702,898	237,243	14,940,141
Investment incentive fees payable	9,405,806	151,771	9,557,577
Employee vacation and overtime liability	517,360	8,348	525,708
Obligations under repo agreements	3,544,271,820	57,189,777	3,601,461,597
MOSERS investment portfolio liability (MIP)	4,619,381	74,538	4,693,919
Total liabilities	3,612,005,940	58,282,724	3,670,288,664
Net Position			
Net position, investment in capital assets	3,485,657	56,244	3,541,901
Restricted for pension benefits	8,105,675,557	132,000,107	8,237,675,664
Net position restricted for pensions	$ 8,109,161,214	$132,056,351	$ 8,241,217,565

See accompanying *Notes to the Financial Statements*.

BASIC FINANCIAL STATEMENTS

Pension Trust Funds

Statements of Changes in Fiduciary Net Position | For Year Ended June 30, 2016

	MSEP	Judicial Plan	Total
Additions			
Contributions			
State contributions	$ 329,957,369	$ 33,642,498	$ 363,599,867
Employee contributions	21,684,920	661,206	22,346,126
Member purchases of service credit	2,815,749	0	2,815,749
Service transfer contributions	2,107,873	0	2,107,873
Total contributions	356,565,911	34,303,704	390,869,615
Investment income			
From investing activities			
Net appreciation in fair value of investments	23,165,453	373,794	23,539,247
Interest	19,177,879	309,451	19,487,330
Dividends	3,475,864	56,086	3,531,950
Other	33,176,735	535,334	33,712,069
Total investing activity income	78,995,931	1,274,665	80,270,596
Investing activity expenses:			
Management fees	(72,741,363)	(1,173,742)	(73,915,105)
Custody fees	(397,800)	(6,419)	(404,219)
Consultant fees	(860,950)	(13,892)	(874,842)
Performance measurement fees	(434,428)	(7,010)	(441,438)
Internal investment activity expenses	(3,366,920)	(54,328)	(3,421,248)
Total investing activity expenses	(77,801,461)	(1,255,391)	(79,056,852)
Net income from investing activities	1,194,470	19,274	1,213,744
From securities lending activities			
Securities lending income	41,609	671	42,280
Securities lending expenses:			
Borrower rebates	95,022	1,533	96,555
Management fees	(136,679)	(2,205)	(138,884)
Total securities lending activities expenses	(41,657)	(672)	(42,329)
Net (loss) from securities lending activities	(48)	(1)	(49)
Total net investment income	1,194,422	19,273	1,213,695
Miscellaneous income	545,847	8,808	554,655
Total additions	358,306,180	34,331,785	392,637,965
Deductions			
Benefits	672,219,486	32,979,706	705,199,192
BackDROP & lump sum benefits	78,220,926	0	78,220,926
Service transfer payments	3,071,892	0	3,071,892
Contribution refunds	3,798,199	10,008	3,808,207
Administrative expenses	8,489,375	136,983	8,626,358
Total deductions	765,799,878	33,126,697	798,926,575
Net (decrease) increase in net position	(407,493,698)	1,205,088	(406,288,610)
Net position restricted for pensions:			
Beginning of year	8,516,654,912	130,851,263	8,647,506,175
End of year	$8,109,161,214	$132,056,351	$8,241,217,565

See accompanying *Notes to the Financial Statements*.

Internal Service Funds

Statements of Net Position | As of June 30, 2016

	Life & LTD	Deferred Compensation	Total
Assets			
Premiums receivable	$ 962,006	$ 0	$ 962,006
Investments at fair value	3,639,529	295,513	3,935,042
Capital assets	0	12,466	12,466
Accumulated depreciation — capital assets	0	(8,520)	(8,520)
Leasehold improvements	0	3,880	3,880
Accumulated depreciation — leasehold	0	(1,940)	(1,940)
Total assets	$4,601,535	$301,399	$4,902,934
Liabilities and net position			
Liabilities			
Premiums payable	$4,550,931	$ 0	$4,550,931
Checks outstanding net of deposits	2,125	0	2,125
Other	114,418	6,835	121,253
Total liabilities	4,667,474	6,835	4,674,309
Unrestricted net position (deficit)	(65,939)	294,564	228,625
Total liabilities and net position	$4,601,535	$301,399	$4,902,934

See accompanying *Notes to the Financial Statements*.

Internal Service Funds

Statements of Revenues, Expenses, and Changes in Net Position | For Year Ended June 30, 2016

	Life & LTD	Deferred Compensation	Total
Operating revenues			
Premium receipts	$30,360,162	$ 0	$30,360,162
Miscellaneous income	480,120	0	480,120
Total operating revenues	30,840,282	0	30,840,282
Operating expenses			
Premium disbursements	30,328,802	0	30,328,802
Premium refunds	31,360	0	31,360
Administrative expenses	550,843	464,735	1,015,578
Total operating expenses	30,911,005	464,735	31,375,740
Operating revenues (under) operating expenses	(70,723)	(464,735)	(535,458)
Non-operating revenues			
Investment income	15,207	3,570	18,777
Net revenues (under) expenses	(55,516)	(461,165)	(516,681)
Net position (deficit) July 1, 2015	(10,423)	755,729	745,306
Net position (deficit) June 30, 2016	$ (65,939)	$ 294,564	$ 228,625

See accompanying *Notes to the Financial Statements*.

BASIC FINANCIAL STATEMENTS

Internal Service Funds

Statements of Cash Flows | Year Ended June 30, 2016

	Life & LTD	Deferred Compensation	Total
Cash flows from operating activities			
Cash received from employer and members	$ 30,856,965	$ 0	$ 30,856,965
Payments to outside carriers	(30,174,726)	0	(30,174,726)
Refunds of premiums to members	(31,360)	0	(31,360)
Cash payments to employees for services	(343,794)	(317,349)	(661,143)
Cash payments to other suppliers of goods and services	(418,060)	(137,894)	(555,954)
Net cash (used) by operating activities	(110,975)	(455,243)	(566,218)
Cash flows from noncapital financing activities			
Implicit funding of checks outstanding net of deposits	2,125	0	2,125
Implicit repayment of prior years checks outstanding net of deposits	(529)	0	(529)
Net cash provided by noncapital financing activities	1,596	0	1,596
Cash flows from investing activities			
Purchase of investment securities	(1,098,605,133)	0	(1,098,605,133)
Proceeds from sale and maturities of investment securities	1,098,699,305	452,869	1,099,152,174
Cash received from investment income	15,207	3,570	18,777
Purchase of capital assets	0	(1,196)	(1,196)
Net cash provided by investing activities	109,379	455,243	564,622
Net increase in cash	0	0	0
Cash balances June 30, 2015	0	0	0
Cash balances June 30, 2016	$ 0	$ 0	$ 0
Reconciliation of operating revenues under operating expenses to net cash (used) by operating activities			
Operating revenues (under) operating expenses	$ (70,723)	$(464,735)	$ (535,458)
Adjustments to reconcile operating revenues over (under) operating expenses to net cash provided (used) by operating activities			
Depreciation expense	0	2,658	2,658
Change in assets and liabilities:			
Increase in operational accounts receivable	16,683	0	16,683
Increase (decrease) in operational accounts payable	(56,935)	6,834	(50,101)
Total adjustments	(40,252)	9,492	(30,760)
Net cash (used) by operating activities	$ (110,975)	$(455,243)	$ (566,218)

See accompanying *Notes to the Financial Statements*.

Notes to the Financial Statements | Year Ended June 30, 2016

(1) Plan Descriptions and Contribution Information

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 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 component unit of the state of Missouri financial reporting entity 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 generation. For the year ended June 30, 2016, the employer contribution rate was 16.97% 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. As a result of smoothing, investment gains or losses, relative to what would have been earned at the assumed rate on the actuarial value of assets, are added to any previously unrecognized gains or losses and one-fifth of that total amount was recognized in the June 30, 2016 valuation, with four-fifths deferred for future recognition. In no event may the actuarial value of assets as of the valuation date be more than 125% or less than 80% of the fair value of assets on that date.

For the actuarial valuation, the nominal investment return assumption is 7.65% and wage inflation and price inflation are 3% and 2.5%, respectively. See the *Actuarial Section* for all actuarial assumptions used.

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, 2016, and 2015, the ratio of actuarial to fair value of assets was 109% and 103%, respectively for the MSEP.

Generally, all full-time state employees hired before July 2000 and became vested, who were not covered under another state-sponsored retirement plan, are eligible for membership in the MSEP (closed plan). Full-time state employees hired after July 2000, and before January 2011, are eligible for membership in the MSEP 2000. Employees hired for the first time in a benefit eligible position on or after January 2011 are eligible for membership in the MSEP 2011 tier of the MSEP 2000. MOSERS participates as an employer in the MSEP and MSEP 2000. The MSEP provides retirement, survivor, and disability benefits.

As of the June 30, 2016 valuation, membership* in the MSEP consisted of the following:

Retirees and beneficiaries currently receiving benefits		44,828
Terminated employees entitled to, but not yet receiving benefits		19,512
Active		
Vested	32,111	
Nonvested	17,353	49,464
Total membership		113,804

* *Excludes 132 members on leave of absence and 928 members on long-term disability.*

MSEP (closed plan)

General state employees are fully vested for benefits upon receiving 5 years of credited service. Under the MSEP (closed plan), 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.

For members hired prior to August 28, 1997, cost-of-living adjustments (COLAs) are provided 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. For members hired on or after August 28, 1997, 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%.

Qualified, terminated-vested members may make a one-time election to receive the present value of their benefit in a lump sum payment. A member must have terminated with at least 5, but less than 10 years of service, not within five years of retirement eligibility, be less than age 60, and with a benefit present value of less than $10,000.

Contributions are determined through annual actuarial valuations. Contributions for FY16 were 16.97% of covered payroll, which is the rate set as a minimum policy employer contribution determined by the June 30, 2013, actuarial valuation until the actuarial funding ratio of the MOSERS plan is at least 80%. Contributions will continue at the policy minimum of 16.97% through the year ended June 30, 2017. Administration of the MSEP is financed through contributions to this plan from the state of Missouri and its component employers and investment earnings.

MSEP 2000

General state employees are fully vested for benefits upon receiving 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 5 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.

For those retiring under "Rule of 80," an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service 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%.

Contributions are determined through annual actuarial valuations. Contributions for FY16 were 16.97% of covered payroll, which is the rate set as a minimum policy employer contribution determined by the June 30, 2013, actuarial valuation until the actuarial funding ratio of the MOSERS plan is at least 80%. Contributions will continue at the policy minimum of 16.97% through the year ended June 30, 2017. Administration of the MSEP 2000 is financed through contributions to this plan from the state of Missouri and its component employers and investment earnings.

The state of Missouri is required to make all contributions to the MSEP. Prior to September 1, 1972, contributions by members were required. Accumulated employee contributions made prior to that time, plus interest through August 28, 1997, are refundable to the member or designated beneficiaries upon request.

MSEP 2011

On July 19, 2010, an additional tier of the MSEP 2000 defined benefit plan was signed into law for members of MOSERS. This tier (MSEP 2011) includes all new employees first hired on or after January 1, 2011.

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

- Age 67 with 10 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 10 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.

For those retiring under "Rule of 90," an additional temporary benefit equivalent to 0.8% multiplied by final average pay multiplied by years of credited service 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%.

Member contributions are 4% of pay. Employer contributions are determined through annual actuarial valuations. Contributions for FY16 were 16.97% of covered payroll, which is the rate set as a minimum policy employer contribution determined by the June 30, 2013, actuarial valuation until the actuarial funding ratio of the MSEP is at least 80%. Contributions will continue at the policy minimum of 16.97% through the year ended June 30, 2017. Administration of the MSEP 2011 is financed through contributions to this plan from the member, state of Missouri and its component employers, and investment earnings.

The MSEP 2011 does not impact employees employed by the state prior to January 1, 2011.

For a detailed summary of benefits for general employees, legislators, and 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.

Judicial Plan

The Judicial Plan is a single-employer, 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 component unit of the state of Missouri financial reporting entity and is included in the state's financial reports as a pension trust fund.

For the actuarial valuation of the Judicial Plan, the nominal investment return assumption is 7.65% and wage inflation and price inflation are 3% and 2.5%, respectively. See the *Actuarial Section* for all actuarial assumptions used.

Judges and commissioners of the supreme court or the court of appeals, judges of the circuit court, probate court, magistrate court, court of common pleas, court of criminal corrections, justices of the peace, commissioners or deputy commissioners of the circuit court appointed after February 29, 1972, commissioners of the juvenile division of the circuit court appointed pursuant to Section 211.023, RSMo, commissioners of the drug court pursuant to Section 478.466, RSMo, or commissioners of the family court are eligible for membership in the Judicial Plan. The Judicial Plan provides retirement, survivor, and disability benefits. Members are immediately eligible for benefits.

As of the June 30, 2016 valuation, membership* in the Judicial Plan consisted of the following:

Retirees and beneficiaries currently receiving benefits		540
Terminated employees entitled to, but not yet receiving benefits		26
Active		
Vested	408	
Nonvested	0	408
Total membership		974

* *Excludes 1 member on long-term disability.*

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

- Age 62 with 12 years of service;
- 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.

For members hired prior to August 28, 1997, COLAs are provided 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. For members hired on or after August 28, 1997, 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%.

Qualified, terminated-vested members may make a one-time election to receive the present value of their benefit in a lump sum payment. A member must have terminated with at least 5, but 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.

Funding of the Judicial Plan on an actuarial basis began on July 1, 1998. Contributions are determined through annual actuarial valuations. Contributions for FY16 were 58.45% of covered payroll, which is the rate set as a minimum policy employer contribution determined by the June 30, 2013, actuarial valuation until the actuarial funding ratio of the Judicial Plan is at least 80%. Contributions will continue at the policy minimum of 58.45% through the year ended June 30, 2017. The state of Missouri makes the employer contribution to the Judicial Plan. Administration of the Judicial Plan is financed through contributions to this plan from the state of Missouri and investment earnings.

Judicial Plan 2011 Tier

On July 19, 2010, an additional tier of the Judicial defined benefit plan was signed into law. This tier (Judicial Plan 2011) includes all new judicial members first serving in a benefit eligible position 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; or

Judicial 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.

Missouri State Insured Defined Benefit Insurance Plan

The Missouri State Insured Defined Benefit Insurance Plan is accounted for as an internal service fund of the state of Missouri and is administered through 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, Judical Plan 2011, and certain members of the Public School Retirement System.

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 certain eligible members. For a more detailed description of insurance benefits, refer to page 121-122 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. Administration of the Missouri State Insured Defined Benefit Insurance Plan is financed through contributions from the state of Missouri and its component employers.

State of Missouri Deferred Compensation Plan

The State of Missouri Deferred Compensation Plan is accounted for as an internal service fund. MOSERS uses ICMA-RC as an external provider for record keeping. Total plan assets as of June 30, 2016 were $1,866,004,878.

Record keeping of individual accounts and management of investment options are paid from charges to the participants and investment option reimbursement arrangements. Participants in the plan manage individual accounts by choosing investment options from the available fund lineup. MOSERS' role is to oversee the plan, choose external providers and investment options, and develop communication to plan participants. In FY16, a total of $2,779,514 was collected from a combination of $1,918,908 in investment option reimbursements and $860,606 in participant fees.

Effective July 1, 2012, new permanent full-time and part-time employees are automatically enrolled at 1% of pay into the State of Missouri Deferred Compensation Plan. As of June 30, 2016, 12,637 currently active employees have been automatically enrolled in the plan since inception. There are 11,359 employees who continue to contribute to the plan, making the opt-out rate 10.1%.

The State of Missouri Deferred Compensation Plan offers participants the ability to purchase units of MOSERS' investments as an investment option. As of June 30, 2016, 199 participants have $4,693,919 invested in the MOSERS Investment Portfolio (MIP) fund.

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

(2) Summary of Significant Accounting Policies and Plan Asset Matters

Basis of Accounting

The financial statements of the MSEP, the Judicial Plan, the Missouri State Insured Defined Benefit Insurance Plan and the State of Missouri Deferred Compensation Plan 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 for fiduciary funds.

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 accounting principles generally accepted in the U.S. 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

Section 104.440, RSMo allows the board of trustees to invest the trust fund assets in accordance with the prudent person rule. Investments of the pension trust funds and the internal service funds are reported on the basis of fair value. 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 .05%, or $4,693,919, of the units invested in the MIP by Deferred Compensation participants. The schedule on page 47 provides a summary of the fair value of the investments as reported on the *Statements of Fiduciary Net Position* of the pension trust funds and *Statements of Net Position* of the internal service funds.

GASB Statement No. 72, Fair Value Measurement and Application, which was adopted during the year ended June 30, 2016, addresses accounting and reporting issues related to fair value measurements. This statement requires disclosures to be made about fair value measurements, the level of fair value hierarchy, and valuation techniques. Comprehensive footnote disclosures regarding this statement can be found in note *(3) Cash and Investments*.

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, BNY Mellon, using the last trade price information supplied by various pricing data vendors.

(3) Cash and Investments

Cash

Custodial credit risk for cash deposits and investments is the risk that, in the event of a bank failure, the system and plan deposits may not be returned. The board adopted the following policy on June 18, 2009:

The executive director shall require that banks managing demand deposit accounts for any retirement plan associated with MOSERS (MOSERS' defined benefit plan and the deferred compensation plan/state incentive compensation plan) to hold, at minimum, collateral security in either MOSERS' name or the State of Missouri Deferred Compensation Plan and in an amount equal to, or more than, the amount on deposit that exceeds 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, but in no case may a bank pledge collateral that does not specifically allow MOSERS to release the collateral or pledge collateral that represents securities of the pledging banks.

Cash balances represent both demand deposit accounts held at the bank and investment cash on deposit with the investment custodian. To maximize investment income, the float caused by outstanding checks is invested in an internally managed short-term investment account, thus causing a possible negative book balance. Negative book balances are reflected in the liabilities' section of the *Statements of Net Position* of the internal service funds and included in the cash and short-term investments on the *Statements of Fiduciary Net Position* of the pension trust funds.

The table below is a schedule of the aggregate book and bank balances of all cash accounts.

Aggregate Book and Bank Balances

	Cash Balances	
	Book	Bank/Investment Custodian
Pension trust funds - investment custodian	$ (40,581)	$(40,581)
Pension trust funds - demand deposits	(9,681,027)	66,551
Internal service fund - insurance plan demand deposits	(2,125)	106

Under the repurchase agreement, the bank does not have the right to substitute other appropriate securities. Central Trust Bank pledged the following securities to MOSERS on June 30, 2016, as collateral for overnight repurchase agreements:

Collateral for Overnight Repurchase Agreements

	Maturity	Pledged	Fair Value
Federal Home Loan Mortgage Corp.	1/12/2018	$5,000,000	$5,008,550
Federal Home Loan Mortgage Corp.	2/27/2018	5,000,000	5,013,450
Federal National Mortgage Association	3/13/2018	3,000,000	3,028,680
Federal Home Loan Mortgage Corp.	8/18/2018	2,436,000	2,459,751
Small Business Association Pool	6/25/2019	839,007	865,301
Small Business Association Pool	10/25/2027	2,201,670	2,247,685
Small Business Association Pool	12/25/2036	905,703	964,537
Small Business Association Pool	4/25/2039	3,624,134	4,029,301

Investments

Investment Policy

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.

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 risk-weighted 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 1.25 times of beta-balanced capital. The limit may also be stated as 225% of beta-balanced capital. The table below illustrates the fair value, market exposure, and policy exposure of the internally managed beta-balanced portfolio by asset class as of June 30, 2016.

Schedule of Internally Managed Leverage

Internal beta-balanced portfolio	Fair Value of Internally Managed Beta-Balanced Capital	Percent of Investments at Fair Value	Market Exposure	Percent of Investments at Market Exposure*	Policy Exposure Beta-Balanced
Beta-balanced equities	$1,156,949,774	20.3%	$ 1,358,911,157	23.8%	24%
Beta-balanced nominal bonds	669,269,342	11.7	2,222,780,778	38.9	46
Beta-balanced commodities	364,077,818	6.4	1,155,946,291	20.2	21
Beta-balanced inflation linked bonds	1,329,465,125	23.3	4,189,752,830	73.4	80
Beta-balanced alternative beta	2,188,780,688	38.3	2,093,608,307	36.7	39
Total internal beta-balanced portfolio	$5,708,542,747	100.0%	$11,020,999,363	193.0%	210%

* *The actual amount of leverage in the internally managed beta-balance portfolio was 0.93 and 1.17 times beta-balanced capital or 193% and 217% as of June 30, 2016, and 2015, respectively.*

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 real 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 real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of geometric real rates of return for each major asset class included in MOSERS' target asset allocation as of June 30, 2016, are summarized in the table below.

Target Asset Allocation

	Policy Allocation	Long-Term Expected Real Rate of Return*	Weighted Average Long-Term Expected Real Rate of Return
Beta-balanced portfolio	80.0%	5.7%	4.6%
Illiquids portfolio**	20.0	7.3	1.5
	100.0%		6.1%

* *Represents best estimates of geometric rates of return for each major asset class included.*

** *Illiquid portfolio upper limit of 27.5% of capital, no new commitments past 23%.*

Concentration of Credit Risk

Concentration of credit risk is the risk of loss attributed to the magnitude of an investment in a single-issuer. Issuer concentration limits are established in individual portfolio guidelines that generally do not allow a single issuer to be greater than 5% of the portfolio's fair value. As of fiscal year end, there is no single issuer exposure, exclusive of investments issued or explicitly guaranteed by the U.S. government, within MOSERS' portfolio that comprises 5% or more of the overall portfolio or MOSERS' fiduciary net position. Therefore, there is no concentration of credit risk to report.

Money-Weighted Rate of Return

The annual money-weighted rate of return on pension plan investments, net of pension plan investment expense, was 0.08% for the year ended June 30, 2016. 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 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 36 and 37 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 and liabilities 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.

Private equity securities classified in level 2 are valued at the price observed in subsequent market activity.

Investments and Derivative Instruments Measured at Fair Value

		Fair Value Measurement Using		
June 30, 2016	Total	(Level 1)	(Level 2)	(Level 3)
Investments by fair value level				
Assets				
Equity securities				
U.S. common and preferred stock	$ 110,273,551	$ 110,273,542	$ 0	$9
Foreign stocks	2,817,431	2,817,431	0	0
Private equity investments	33,584,736	0	33,584,736	0
Total equity securities	146,675,718	113,090,973	33,584,736	9
Debt securities				
U.S. short-term funds	589,280,000	589,280,000	0	0
Repurchase agreements	1,020,000,000	0	1,020,000,000	0
U.S. agency obligations	512,553,980	0	512,553,980	0
Foreign debt securities	48,740,764	0	48,740,764	0
U.S. government	4,308,956,216	4,308,844,616	111,600	0
Total debt securities	6,479,530,960	4,898,124,616	1,581,406,344	0
Total investment assets	6,626,206,678	5,011,215,589	1,614,991,080	9
Liabilities				
Reverse repurchase agreements	(3,601,461,597)	0	(3,601,461,597)	0
Total net investment assets by fair value level	3,024,745,081	5,011,215,589	(1,986,470,517)	9
Investment derivative instruments				
Futures contracts	(16,251,526)	(16,251,526)	0	0
Options contracts	(10,658,205)	(10,658,205)	0	0
Foreign exchange forward contracts	283,152	283,152	0	0
Swap market value	46,713,441	0	46,713,441	0
Total investment derivative instruments	20,086,862	(26,626,579)	46,713,441	0
Invested securities lending collateral				
U.S. short-term funds	1,150,731	1,150,731	0	0
Commingled fund	37,210	0	37,210	0
Repurchase agreements	13,070,637	0	13,070,637	0
Total invested securities lending collateral	14,258,578	1,150,731	13,107,847	0
Investments measured at the net asset value (NAV)				
Commingled international equity funds	1,015,154,207			
Hedge funds	2,682,202,360			
Private equity funds	1,038,341,403			
Private real estate funds	192,594,190			
Private timber funds	269,476,522			
Total investments measured at NAV	5,197,768,682			
Other Investments				
STIF not leveled (payable for investment purchased and other misc.)	(25,763,203)			
Other cash	7,722,350			
Other not leveled	3,315,939			
Total other investments	(14,724,914)			
Total fund value excluding securities lending collateral	$ 8,227,875,711			
Reconciliation to *Statement of Fiduciary Net Position*				
Total portfolio value	$ 8,227,875,711			
Reverse repurchase agreements	3,601,461,597			
STIF	(2,454,472,797)			
Uninvested cash	40,581			
Interest and dividends receivable	(53,130,415)			
Variation margin	16,251,526			
Accounts receivable securities sold	(37,033,265)			
Accounts payable securities purchased	36,690,153			
Fees payable	10,942,073			
Securities lending liability	681,582			
Investments per *Statement of Fiduciary Net Position*	$ 9,349,306,746			

Investments Measured at the Net Asset Value

	June 30, 2016	Unfunded Commitments		Redemption Frequency (If Currently Eligible)	Redemption Notice Period (Days)
Commingled international equity funds[1]	$1,015,154,207			Daily, Monthly	1-30
Active hedge funds					
Long/short equity [2]	323,863,713			Quarterly, Semi-Annually, Annually	30-60
Merger arbitrage [3]	52,905,567			Monthly	45
Multi-strategy [4]	70,233,163			Quarterly	65
Equity market neutral [5]	93,088,991			Quarterly	90
Long/short credit [6]	49,671,221			Quarterly	75
Event driven [7]	168,584,338			Quarterly	60-65
Macro [8]	192,630,891			Monthly, Quarterly	30
Risk premia [9]	390,077,788			Bi-Weekly, Monthly	15-30
Risk parity [10]	887,779,412			Monthly	5-15
Fund-of-funds [11]	348,119,832			Monthly	95
Pending liquidated hedge funds [12]	105,247,444				
Private equity funds [13]	1,038,341,403	$437,652,900	€ 868,751		
Private real estate funds [13]	192,594,190	20,028,847			
Private timber funds [13]	269,476,522	0			
Total investments measured at NAV	$5,197,768,682	$457,681,747	€ 868,751		

1 **Commingled international equity funds** – Three international equity funds are considered to be commingled in nature. Each are valued at the net asset value held at the end of the period based upon the fair value of the underlying investments.

2 **Long/short equity hedge funds** – Consisting of four funds, this strategy invests both long and short in U.S. and global equity securities, with a goal of adding growth and minimizing market exposure. These investments are valued at NAV. Due to contractual lock-up restrictions, these investments remain restricted for anywhere ranging from four to 30 months.

3 **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 NAV, is redeemable monthly, and is not subject to lock-up restrictions.

4 **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 NAV, is redeemable quarterly, and is not subject to lock-up restrictions.

5 **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 NAV, is redeemable quarterly, and is not subject to lock-up restrictions.

6 **Long/short credit hedge fund** – Consisting of one fund, this strategy invests in corporate bonds and leveraged loans within the U.S. and Europe with the goal of generating attractive risk adjusted returns. This investment is valued at NAV, is redeemable quarterly, and is not subject to lock-up restrictions.

7 **Event driven hedge funds** – Consisting of two funds, 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. These investments are valued at NAV. Due to contractual lock-up restrictions, approximately 16% of the value of these investments are eligible for redemption quarterly. The remaining 84% of the value of these investments remain restricted for 24 months.

8 **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. This investment is valued at NAV, is redeemable monthly and quarterly, and is not subject to lock-up restrictions.

9 **Risk premia hedge funds** – Consisting of two funds, these strategies seek 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 NAV, is redeemable at least monthly, and is not subject to lock-up restrictions.

10 **Risk parity funds** – Consisting of two funds, these strategies attempt to build a more efficient portfolio through an equal risk methodology. They take long only positions across equity indices, developed nominal bonds, TIPS, commodities and credit. Diversification benefits decrease both the expected return and volatility thus requiring leverage to maintain a similar return to a more conventional portfolio. This investment is valued at NAV, is redeemable monthly, and is not subject to lock-up restrictions.

11 **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 NAV, is redeemable monthly, and is not subject to lock-up restrictions.

12 **Pending liquidated hedge funds** – Consisting of 13 funds which have been fully redeemed as of June 30, 2016, for which MOSERS is awaiting final distribution of the proceeds. Approximately 83% of the value was received within 90 days of June 30, 2016. The remaining 17% will be received upon sale of the underlying investments or upon completion of the audit of the firm's annual financial statements.

13 **Private equity, real estate and timber funds** – MOSERS' private equity portfolio consists of 60 funds with exposure to buyout funds, distressed funds, infrastructure, energy, royalty funds, and special situations. The real estate portfolio, comprised of five funds, invests mainly in U.S. commercial real estate. The timber portfolio consists of four funds which invests in global timberland. The fair values of the majority of these funds has 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, 2016, MOSERS' fixed income assets that are not government guaranteed represented 33.6% of the fixed income securities. In preparing this report, credit risk associated with all fixed income holdings including collateral for repurchase agreements and securities lending collateral 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 can be viewed in the derivatives disclosures on page 42 of these notes.

Policies related to credit risk pertaining to MOSERS' securities lending program are found under the securities lending disclosures found on page 44 of these notes.

Average Credit Quality and Exposure Levels of Nongovernment Guaranteed Securities

Fixed Income Security Type	Fair Value June 30, 2016	Percent of all Fixed Income Assets	Weighted Average Credit Quality	Ratings Dispersion Requiring Further Disclosure
Collateralized mortgage obligations	$ 36,823,710	0.6%	AA	See below
Implicit U.S. government agencies	475,752,040	7.3	AA	See below
Non-U.S. sovereign	48,499,083	0.7	BBB	See below
Asset-backed securities	37,210	0.0	Not rated	See below
Corporate bonds	1,391,576	0.0	BBB	See below
Bank deposits	550,000,000	8.5	FDIC insured	None
Repurchase agreements	1,033,084,559	15.9	Not rated	None
Pooled investments	40,430,731	0.6	AAA	None
Total nongov't. guaranteed securities	$2,186,018,909	33.6%		
Total fixed income securities	$6,508,184,108			

Ratings Dispersion Detail - Fair Value

Credit Rating Level	Collateralized Mortgage Obligations	Non-U.S. Sovereign	Asset-Backed Securities	Corporate Bonds	Implicit U.S. Agencies
AA	$36,823,710			$ 18,031	$475,752,040
A		$13,847,733		150,002	
BBB		23,398,675		1,115,693	
BB		11,252,675			
Not Rated			$37,210	107,850	
	$36,823,710	$48,499,083	$37,210	$1,391,576	$475,752,040

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.

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.

Effective Duration of Fixed Income Assets by Security Type

Fixed Income Security Type	Fair Value June 30, 2016	Percent of all Fixed Income Assets	Weighted Average Effective Duration (Years)	Interest Rate Risk Requiring Further Disclosure
U.S. treasuries	$4,322,165,199	66.4%	6.1	See below
Implicit U.S. government agencies	475,752,040	7.3	0.2	none
Collateralized mortgage obligations	36,823,710	0.6	0.1	none
Non-U.S. sovereign	48,499,083	0.7	5.1	none
Asset-backed securities	37,210	0.0	0.1	none
Corporate bonds	1,391,576	0.0	5.1	none
Bank deposits	550,000,000	8.5	0.0	none
Repurchase agreements	1,033,084,559	15.9	0.0	none
Pooled investments	40,430,731	0.6	0.0	none
	$6,508,184,108	100.0%	4.1	

Effective Duration Analysis of U.S. Treasuries

Maturity	Fair Value June 30, 2016	Average Effective Duration of the Security Type (Years)	Contribution to Effective Duration (Years)
Less than 1 year to maturity	$ 350,302,472	0.2	0.0
1- to 10-year maturities	3,673,464,760	5.7	4.9
Long coupon treasuries	298,397,967	17.2	1.2
	$4,322,165,199		6.1

MOSERS invests in mortgage-backed securities, which are reported at fair value in the *Statements of Fiduciary Net Position* of the pension trust funds. Such securities have embedded within them the risk 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. MOSERS invests in these securities to diversify the portfolio with high quality and liquid investments which capture a significant yield premium that is intended to compensate for the call risk. This risk is incorporated within the effective duration calculation used in the interest rate risk analysis.

Repurchase Agreements

Tri-party repurchase agreements (repos) are secured loans 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 0.06% to 0.56% and had maturities of one day to 35 days. The yield earned by the counterparties on the reverse repo transactions ranged from 0.23% to 0.87% 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 $34.2 million of counterparty collateral in excess of the repo balance.

In reverse repo transactions, MOSERS may be subject to credit risk if the counterparty fails to return the securities and the value of the securities held as collateral rises 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 $13.1 million of MOSERS collateral in excess of the reverse repo balance.

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

Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2016	Fair Value Including Accrued Interest of Repos June 30, 2016	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries/U.S. agencies	$ 824,232,291	$ 808,070,637	$16,161,654	
Common stock	243,017,848	225,000,000	18,017,848	
Accrued interest	0	13,922	(13,922)	
	$1,067,250,139	$1,033,084,559	$34,165,580	3.3%

Reverse Repurchase Agreements by Collateral Type

Collateral Type	Fair Value of Collateral June 30, 2016	Market Value Including Accrued Interest of Reverse Repos June 30, 2016	Excess (Deficit) Collateral	Percent Over Collateralized
U.S. treasuries	$3,612,548,612	$3,592,235,615	$20,312,997	
Receivables	2,054,332	0	2,054,332	
Accrued interest	0	9,225,982	(9,225,982)	
	$3,614,602,944	$3,601,461,597	$13,141,347	0.4%

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, 2016, is highlighted in the table below.

Currency Exposures by Asset Class

Currency	Cash & Cash Equivalents	Equities	Fixed Income	Alternatives	Total
Argentine Peso	$ 24	$ 1			$ 25
Australian Dollar	355,661	92,982	$ 179,165		627,808
Brazilian Real	131,591	11,018,478	7,793,703		18,943,772
British Pound Sterling	(871,805)	136,683,035	662,692		136,473,922
Canadian Dollar	(93,981)	35,161	331,046		272,226
Chilean Peso	36,228	1,612,976	43,790		1,692,994
Colombian Peso	12,898	583,927	3,905,820		4,502,645
Czech Koruna	10,149	305,297			315,446
Danish Krone		10,531,097			10,531,097
Egyptian Pound	3,692	254,023			257,715
Euro	(2,079,011)	141,698,073	(3,647,460)	$58,980,158	194,951,760
Hong Kong Dollar	(400,360)	99,780,767			99,380,407
Hungarian Forint	11,475	456,849			468,324
Indian Rupee	219,150	13,785,937			14,005,087
Indonesian Rupiah	76,758	4,992,782	5,385,812		10,455,352
Israeli Shekel		13			13
Japanese Yen	1,967,970	197,398,451	298,860		199,665,281
Malaysian Ringgit	82,470	10,023,858	4,244,504		14,350,832
Mexican Peso	158,710	8,587,999	5,190,004		13,936,713
Moroccan Dirham	371				371
Norwegian Krone		5,391,160			5,391,160
Peruvian Nuevo Sol	3				3
Philippine Peso	28,944	2,642,263			2,671,207
Polish Zloty	2,143	1,902,233	5,826,979		7,731,355
Qatari Riyal	1	1,497,933			1,497,934
Romanian New Leu			638,235		638,235
Russian Ruble		537,370	3,254,070		3,791,440
Singapore Dollar		29,059,958			29,059,958
South African Rand	(82,567)	12,131,545	5,809,858		17,858,836
South Korean Won	(1,595,970)	35,339,330	1,169,914		34,913,274
Swedish Krona		7,953,842			7,953,842
Swiss Franc		80,397,457			80,397,457
Taiwan New Dollar	180,768	32,751,061			32,931,829
Thai Baht	16,547	28,070,267	2,032,167		30,118,981
Turkish Lira	66,255	10,504,465	4,735,711		15,306,431
United Arab Emirates Dirham	22,083	1,340,046			1,362,129
Venezuelan Boliviar	368				368
	$(1,739,435)	$887,360,636	$47,854,870	$58,980,158	$992,456,229

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, 2016.

Futures Contracts

Futures Contract	Expiration Date	Long (Short)	Notional Value	Exposure
Currency futures	September 2016	Long	$ 43,875,055	$ (7,560)
Fixed income futures	September 2016	Long	1,657,001,186	(7,762,711)
Equity index futures	July 2016	(Short)	(3,922,629)	(86,387)
Equity index futures	September 2016	Long	61,023,909	415,346
Commodity futures	August 2016	Long	180,079,780	(4,912,980)
Commodity futures	September 2016	Long	108,973,758	(3,744,808)
Commodity futures	October 2016	Long	7,876,068	(205,066)
Commodity futures	November 2016	Long	2,825,463	99,838
Commodity futures	December 2016	Long	5,394,528	(136,248)
Commodity futures	January 2017	Long	2,549,316	(62,462)
Commodity futures	February 2017	Long	3,393,104	(82,580)
Commodity futures	March 2017	Long	5,398,957	(128,801)
Commodity futures	April 2017	(Short)	(15,808,304)	363,061
Total			$2,058,660,191	$(16,251,358)

Foreign Currency Forward Contracts at June 30, 2016

Currency	Net Notional Long (Short)	Exposure
Brazilian Real	$ (1,976,267)	$(218,476)
Colombian Peso	281,184	4,386
Euro	(40,840,707)	637,669
Hungarian Forint	468,938	(18,542)
Indonesian Rupiah	(580,570)	(3,618)
Mexican Peso	(92,947)	(8,803)
Malaysian Ringgit	622,241	6,854
Peruvian Nuevo Sol	887,395	11,269
Polish Zloty	(965,702)	(6,802)
Romanian Leu	1,228,507	(32,997)
Russian Ruble	(539,878)	(24,701)
South African Rand	(1,332,912)	(48,153)
Thai Baht	357,019	(3,556)
Turkish Lira	(883,766)	(11,378)
U.S. Dollar	43,650,617	0
Foreign currency forward contract asset	$ 283,152	$ 283,152

Swap Contracts

Counterparty Credit Rating	Notional Value	Exposure
Total return swaps - equity		
A	$ 124,698,370	$4,256,043
BBB+	(18,173,588)	1,508,248
Total	$ 106,524,782	$5,764,291
Total return swaps - fixed income		
A	$1,094,529,923	$7,290,626
Total	$1,094,529,923	$7,290,626
Total return swaps - commodities		
A+	$ 770,011,625	$9,249,140
A-	105,208,859	53,108
Total	$ 875,220,484	$9,302,248

Options Contracts

	Expiration	Notional Value	Exposure
Written commodity call option	July 2016	$(194,416,500)	$(10,870,600)
Purchased commodity put option	July 2016	161,804,700	212,395
Total		$ (32,611,800)	$(10,658,205)

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, options, 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, futures, and options 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 amounts for the exposure on these instruments are recorded in the *Statements of Fiduciary Net Position* and the total changes in fair value for the year are included as investment income in the *Statements of Changes in Fiduciary Net Position*. For the year ended June 30, 2016, the change in fair value in the swap contracts resulted in a loss of $122.3 million of investment income. The change in fair value in the futures contracts resulted in $144.5 million of investment income. The change in fair value in the options contracts resulted in a loss of $10.6 million of investment income and the change in fair value of the foreign exchange contracts resulted in $0.2 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.

Limited Partnerships

Many of MOSERS' alternative investments are organized in the form of limited partnerships. In these partnerships, the manager is a general partner and the limited partners are the investors. Investments in limited partnerships are accounted for using the equity method of accounting and their earnings or losses for the period are included in investment income using the equity method.

As of June 30, 2016, MOSERS had contracts with over 98 limited partnerships across various types of alternative investments which collectively represent 52% of the total fund. A *Schedule of Limited Partnerships* follows on pages 45-46.

Securities Lending Program

The board of trustees' investment policy 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. Securities on loan at fiscal year end for cash collateral and on loan for noncash collateral are presented in the schedule on page 47. On June 30, 2016, MOSERS had no credit risk exposure to borrowers because the collateral amounts received exceeded amounts out on loan.

As of June 30, 2016, Deutsche Bank AG, New York branch, served as the agent for the fixed income, domestic equity and international equity securities lending programs. In this capacity, MOSERS reduces credit risk by allowing Deutsche Bank to lend these securities to a diverse group of dealers on behalf of MOSERS. Indemnification against dealer default is provided by Deutsche Bank AG, a "BBB+ rated" bank. With each of MOSERS' securities lending programs, the majority of loans are open and can be terminated on demand by either MOSERS or the borrower. Net income from the three lending programs is split on a 90/10 basis between MOSERS and Deutsche Bank, respectively.

Daily monitoring of securities that are on loan ensures proper collateralization levels and mitigates counterparty risk. Cash collateral from all three programs is commingled and invested in a separately managed short-term investment account for MOSERS. This cash collateral account is managed by Deutsche Bank. On June 30, 2016, the cash collateral account had a fair value of $14,258,587 and a weighted average maturity of one day. For all of the securities lending operational services, the custodian is paid an annual fee, which is netted against MOSERS' earnings in the securities lending programs managed by Deutsche Bank.

Schedule of Limited Partnerships

Partnership Name	Style	Investments at Fair Value as of June 30, 2016
Actis Emerging Markets III	Emerging markets	$ 18,293,330
Actis Global IV	Emerging markets	22,910,735
African Development Partners I, LLC	Emerging markets	24,708,209
African Development Partners II, LLC	Emerging markets	8,630,634
Alinda Infrastructure Fund I, LP	Infrastructure	27,244,000
American Industrial Partners Capital Fund V, LP	Corporate buyout	36,380,982
American Industrial Partners Capital Fund VI, LP	Corporate buyout	1,060,580
AQR DELTA Sapphire Fund, LP	Muti-strategy	332,367,824
AQR Global Risk Premium Fund IV, LP	Beta-balanced	404,066,465
AQR Style Premia Fund, LP	Muti-strategy	57,709,964
Axiom Asia Private Capital Fund II, LP	Emerging markets	39,685,064
Axiom Asia Private Capital Fund III, LP	Emerging markets	36,209,237
Axxon Brazil Private Equity Fund II B, LP	Emerging markets	16,347,160
Bayview Opportunity Domestic III b, LP	Distressed real estate debt	50,803,928
Bayview Opportunity Domestic, LP	Distressed real estate debt	8,114,728
Blackstone Real Estate Partners IV	Active real estate	22,968,733
Blackstone Real Estate Partners V	Active real estate	53,455,962
Blackstone Real Estate Partners VI	Active real estate	43,204,033
Blackstone Real Estate Partners VII	Active real estate	70,957,651
Blackstone Topaz Fund, LP	Multi-strategy – fund-of-funds	348,119,832
Blakeney Onyx, LP	Emerging markets	51,220,393
Bridgepoint Europe III A, LP	Corporate buyout	14,517,857
Bridgepoint Europe IV B, LP	Corporate buyout	19,060,837
Bridgewater Associates – All Weather, LLC	Beta-balanced	483,712,947
Bridgewater Associates – Diamond Ridge Fund, LLC	Global macro	85,456,582
Campbell Timber Fund II A, LP	Timberland	988,067
CarVal Investors CVI Global Value Fund A, LP – private debt	Distressed real estate debt	10,200,000
CarVal Investors CVI Global Value Fund A, LP – real estate	Distressed real estate debt	10,200,000
Castlelake Aviation II, LP	Special situations	17,171,363
Catalyst Fund Limited Partnership III	Canadian distressed debt	59,501,213
Catalyst Fund Limited Partnership IV	Canadian distressed debt	24,387,763
Catalyst Fund Limited Partnership V	Canadian distressed debt	15,620,193
Catterton Partners V, LP	Corporate buyout	16,253,905
Catterton Partners VI, LP	Corporate buyout	22,331,129
Catterton Partners VII, LP	Corporate buyout	27,634,017
Cornwall Domestic, LP	Multi-strategy	70,233,163
Davidson Kempner Institutional Partners, LP	Event driven	26,355,338
DDJ Capital Management – B IV Capital Partners, LP	Distressed debt	29,089
DRI Capital – LSRC	Intellectual property	16,467,833
DRI Capital – LSRC II	Intellectual property	225,008
EIG Energy Co-investment I	Energy (infrastructure)	5,381,648
EIG Energy Fund XIV, LP	Energy (mezzanine)	5,298,075
EIG Energy Fund XV, LP	Energy (mezzanine)	32,526,090
EIG Energy Fund XVI, LP	Energy (mezzanine)	12,383,528
Elliott International, Ltd.	Multi-strategy	142,229,000
Eton Park Fund, LP	Multi-strategy	866,874
Farallon Capital Institutional Partners, LP	Multi-strategy	3,370,000
Gaoling Fund, LP	Long/short equity	97,979,140
Garnet Sky Investors Company, Ltd.	Timberland	116,132,316
Gateway Energy & Resource Holdings, LLC	Energy (diversified)	23,479,242

Schedule of Limited Partnerships continued on page 46

Schedule of Limited Partnerships continued from page 45

Partnership Name	Style	Investments at Fair Value as of June 30, 2016
GCM Equity Partners, LP	Long/short equity	46,939,367
Glenview Capital Opportunity Fund, LP	Long/short equity	23,397,247
Global Forest Partners GTI7 Institutional Investors Company, Ltd.	Timberland	78,373,241
HBK Merger Strategies Offshore Fund, Ltd.	Merger arbitrage	52,905,567
JLL Partners Fund V, LP	Corporate buyout	13,269,317
JLL Partners Fund VI, LP	Corporate buyout	58,583,751
King Street Capital, LP	Credit driven	4,568,997
King Street Capital, Ltd.	Credit driven	463,886
Linden Capital Partners Co-investment, LP	Corporate buyout	10,588,235
Linden Capital Partners II, LP	Corporate buyout	33,799,706
Mast Credit Opportunities I, LP	Credit driven	49,671,221
Merit Energy Partners F–II, LP	Energy (oil & gas)	8,083,711
MHR Institutional Partners II A, LP	Distressed debt	28,461,085
MHR Institutional Partners III, LP	Distressed debt	30,191,084
MHR Institutional Partners IV, LP	Distressed debt	6,934,939
Millennium Technology Value Partners Co-investment	Direct secondaries	3,552,566
Millennium Technology Value Partners II, LP	Direct secondaries	14,675,981
Moon Capital Global Equity Offshore Fund, Ltd.	Long/short equity	820,251
New Mountain Partners III, LP	Corporate buyout	39,957,258
Newport Pioneer, LLC	Multi-strategy – fund-of-funds	1,209,487
Oaktree European Credit Opportunities Fund, LP	European loans	693,254
OCM/GFI Power Opportunities Fund II, LP	Corporate buyout	214,064
OCM Opportunities Fund IV b, LP	Distressed debt	339,601
OCM Opportunities Fund VII b, LP	Distressed debt	9,036,465
OCM Opportunities Fund VIII b, LP	Distressed debt	18,668,343
OCM Power Opportunities Fund III, LP	Corporate buyout	11,847,588
OCM Real Estate Opportunities Fund III, LP	Active real estate	2,007,811
Perry Partners, LP	Multi-strategy	42,042
Pharo Macro Fund, Ltd.	Global macro	107,174,309
Resource Management Service – Wildwood Timberlands, LLC	Timberland	73,982,899
Silver Creek Special Opportunities Fund I, LP	Special situations – fund-of-funds	10,762,022
Silver Creek Special Opportunities Fund II, LP	Special situations – fund-of-funds	16,920,825
Silver Lake Partners II, LP	Corporate buyout	6,086,464
Silver Point Capital Fund, LP	Credit driven	12,888
Siris II Co-investment I	Corporate buyout	3,198,821
Siris II Co-investment II	Corporate buyout	6,900,000
Siris Partners II, LP	Corporate buyout	16,811,390
Siris Partners III, LP	Corporate buyout	4,158,581
Standard Investment Research Hedged Equity Fund, LP	Equity market neutral	93,088,991
StepStone Capital Buyout Fund I, LP	Corporate buyout – fund-of-funds	6,543,365
StepStone Capital Buyout Fund II, LP	Corporate buyout – fund-of-funds	18,244,128
StepStone Opportunities Fund II, LP	Private equity co-investment	1,234,660
The Veritas Capital Fund III, LP	Corporate buyout	25,131,140
The Veritas Capital Fund IV, LP	Corporate buyout	43,974,372
TPG-Axon Partners (Offshore), Ltd.	Long/short equity	1,218,105
Viking Global Equities III, Ltd.	Long/short equity	155,547,959
Visium Balanced Fund, LP	Long/short equity	92,131,486
Wellington Management – Spindrift Investors (Bermuda)	Long/short equity	538,042
Other Miscellaneous	Miscellaneous	11,431
		$4,267,419,604

Summary of Fair Value of Investments as of June 30, 2016

	Pension Trust Funds		Internal Service Funds	
	Investments at Cost Value	Investments at Fair Value	Investments at Cost Value	Investments at Fair Value
Common stocks				
Out on loan	$ 12,604,827	$ 14,601,839		
Not on securities loan	284,713,143	272,299,932		
Total	297,317,970	286,901,771		
International equities	175,328,927	789,143,593		
Treasury bonds, notes and bills	3,920,547,677	3,958,718,113		
Corporate bonds	908,539	148,810		
Convertible bonds	911,071	968,785		
Government bonds	55,807,535	47,606,027		
Limited partnerships	3,004,385,263	4,267,419,604		
REITs	3,617	10,646		
Options	(83,620)	(10,658,205)		
Foreign currencies	7,602,952	7,821,688		
International corporate bonds	1,528,964	1,263,124		
Repurchase agreements	9,668,216	9,668,216	$3,935,042	$3,935,042
Short-term investment funds	2,468,694,173	2,468,694,173		
Total investments				
Out on loan	12,604,827	14,601,839		
Not on securities loan	9,930,016,457	11,813,104,506	3,935,042	3,935,042
Total	$9,942,621,284	$11,827,706,345	$3,935,042	$3,935,042
Reconciliation to investments on *Statement of Fiduciary Net Position*				
Total from above		$11,827,706,345		
Less short-term investments:				
Repurchase agreements		(9,668,216)		
Short-term investment funds		(2,454,472,796)		
Less invested securities lending collateral:				
Short-term investment funds		(14,221,377)		
Corporate bonds		(37,210)		
Investments on *Statement of Fiduciary Net Position*		$ 9,349,306,746		

Due to space limitations and printing costs, a detailed listing of the investment holdings and transactions is not provided in this annual report; however, the detailed reports are available for review as an appendix to this report at the MOSERS office.

(4) Capital Assets

Office building, furniture, fixtures, and equipment costing $1,000 or more when acquired are recorded at cost at the time of acquisition and are reported net of accumulated depreciation. Improvements, which increase the useful life of the property, are also capitalized. 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

Below are schedules of the capital asset account balances for the pension trust funds and the internal service funds – State of Missouri Deferred Compensation Plan as of June 30, 2015, and June 30, 2016, and changes to those account balances during the year ended June 30, 2016.

Pension Trust Funds

Capital Asset Account

	Land	Building and Building Improvements	Furniture Fixtures and Equipment	Software and Licensing	Total Capital Assets
Capital assets					
Balances June 30, 2015	$267,286	$4,662,873	$1,349,120	$277,261	$6,556,540
Additions	0	1,965	167,434	66,801	236,200
Transfers	0	(380,501)	0	380,501	0
Deletions	0	0	(230,918)	0	(230,918)
Balances June 30, 2016	267,286	4,284,337	1,285,636	724,563	6,561,822
Accumulated depreciation					
Balances June 30, 2015	0	1,572,730	1,131,009	151,010	2,854,749
Depreciation expense	0	148,140	109,262	126,512	383,914
Deletions	0	0	(218,742)	0	(218,742)
Balances June 30, 2016	0	1,720,870	1,021,529	277,522	3,019,921
Net capital assets June 30, 2016	$267,286	$2,563,467	$ 264,107	$447,041	$3,541,901

Internal Service Funds

Capital Asset Account

	Leasehold Improvements	Furniture Fixtures and Equipment	Software and Licensing	Total Capital Assets
Capital assets				
Balances June 30, 2015	$3,880	$6,319	$4,950	$15,149
Additions	0	1,197	0	1,197
Balances June 30, 2016	3,880	7,516	4,950	16,346
Accumulated depreciation				
Balances June 30, 2015	970	4,444	2,388	7,802
Depreciation expense	970	698	990	2,658
Balances June 30, 2016	1,940	5,142	3,378	10,460
Net capital assets June 30, 2016	$1,940	$2,374	$1,572	$ 5,886

(5) Employers' Net Pension Liability

The components of the net pension liability as of June 30, 2016, are shown in the *Schedule of Employers' Net Pension Liability* below.

Schedule of Employers' Net Pension Liability

	MSEP	Judicial Plan
Total pension liability	$12,751,162,753	$547,621,617
Less: MOSERS fiduciary net position	8,109,161,214	132,056,351
Employers' net pension liability	$ 4,642,001,539	$415,565,266
Plan net position as a percentage of the total pension liability	63.60%	24.11%
Covered employee payroll	$ 1,921,528,936	$ 57,421,016
Employers' net pension liability as a percentage of employee covered payroll	241.58%	723.72%

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. An experience study covering the five-year period ended June 30, 2015 was performed in 2016. 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* on page 52. The total pension liability as of June 30, 2016, is $12,751,162,753 for MSEP and $547,621,617 for the Judicial Plan based on an actuarial valuation performed as of June 30, 2016, and a measurement date of June 30, 2016 using generally accepted actuarial procedures.

Changes to Amortization Period

In June 2013, the board approved a change to the period over which unfunded actuarial accrued liabilities are amortized to reduce the amortization period from an open 30 years to a closed 30 years beginning July 1, 2014. This will continue to reduce by one year for each subsequent annual valuation until the period reaches one year. The board intends to reexamine the amortization period in connection with the 2030 actuarial valuation to determine whether or not it should be reduced below 15 years.

The *Summary of Actuarial Assumptions* below applies to all periods included in the measurement of the total pension liability.

Summary of Actuarial Assumptions

	MSEP	Judicial Plan
Valuation date	June 30, 2016	June 30, 2016
Actuarial cost method	Entry age normal	Entry age normal
Amortization method	Level percent	Level percent
Remaining amortization period	28 years closed	28 years closed
Asset valuation method	5-year rolling smoothed +25/-20% market corridor	5-year rolling smoothed +25/-20% market corridor
Investment rate of return	7.65%	7.65%
Projected salary increases	3.25-8.75%	3.0-5.2%
Rate of payroll growth	3.00%	3.00%
COLAs	4.00%*	4.00%*
Price inflation	2.50%	2.50%
Remaining amortization period	28 years	28 years

* *On a compound basis, 4.00% for the first 12 years, 3.06% for the 13th year, and 2.00% per year thereafter. When no minimum COLA is in effect, price inflation is assumed to be 2.50% and the annual COLA is assumed to be 2.00% (80% of 2.50%), on a compounded basis.*

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%. The pre-retirement 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.

The discount rate used to measure the total pension liability was 7.65%. 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 7.65% 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 state of Missouri as of June 30, 2016, calculated using the discount rate of 7.65%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1.0% lower (6.65%) or 1.0% higher (8.65%) than the current rate.

Sensitivity of Net Pension Liability to Changes in the Discount Rate

Employers' net pension liability	1% Decrease (6.65%)	Current Discount Rate (7.65%)	1% Increase (8.65%)
MSEP	$6,112,408,312	$4,642,001,539	$3,409,192,306
Judicial Plan	471,242,206	415,565,266	367,891,602

The funding status of the plans and *Employer Schedule of Funding Progress* can be found in the *Actuarial Section* on page 100.

(6) Contributions and Reserves

The MSEP and the Judicial Plan are pension plans covering substantially all state of Missouri employees and judges. The state of Missouri and its component employers are obligated by state law to make required contributions to the plans. The required contributions are expressed as a level percentage of covered payroll and are actuarially determined using an individual entry-age normal actuarial cost method. Contributions began July 2014 at the contribution rate determined by the June 30, 2013 actuarial valuation (16.97% and 58.45% for MSEP and Judicial Plan, respectively) and will continue at or above that rate until the actuarial funding of the plans is at least 80%. The unfunded accrued liabilities are amortized over a closed 28-year period as of June 30, 2016. MSEP 2011 employees and Judicial Plan 2011 members are required to contribute 4% of their pay. Costs of administering the plans are financed from the contributions to the pension trust funds and investment earnings.

(7) Other Post-Employment Benefits (OPEB)

In addition to the retirement benefits provided through MOSERS, the state of Missouri also funds, either partially or in its entirety, OPEB for eligible retirees as follows:

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, 2016, 25,226 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 competitive bids and is currently administered through The Standard insurance company. The cost for the year ended June 30, 2016, was $1,872,742. 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, 2016, 214 retirees were participating in the program. The coverage for this closed group is purchased as a group policy through competitive bids at a current cost of $2.07 per thousand dollars of coverage, per month, per eligible participant ($27,206 for the year ended June 30, 2016). Premiums are paid entirely by the DOLIR as provided by Section 228.225, 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 32,915 members covered under the program as of June 30, 2016. This insured defined benefit coverage is financed on a percentage of covered payroll (0.55%). Purchased as group policy through competitive bids, LTD is administered by The Standard insurance company. The cost for the year ended June 30, 2016, was $7,959,584. Premiums are contributed by the state and its component employers as provided for by Section 104.515, RSMo.

Post-Employment Retiree Health Care

MOSERS participates in a cost-sharing multiple-employer defined benefit post-employment health care plan administered by the Missouri Consolidated Health Care Plan (MCHCP). The plan provides medical benefits to retirees of participating governmental entities. Retirees who had medical insurance coverage for six months immediately prior to termination or state-sponsored medical coverage since the effective date of the last enrollment period (or since first eligible), before they are eligible to retire, may continue coverage into retirement.

MCHCP issues a publicly available financial report that includes financial statements and required supplementary information for the post-employment health care plan. The report may be obtained online at *www.mchcp.org* or by calling (800) 487-0771 or writing to MCHCP, 832 Weathered Rock Court, P.O. Box 104355, Jefferson City, MO 65110-4355.

Plan funding requests are actuarially determined, approved by the MCHCP Board of Trustees and subject to appropriation by the Missouri General Assembly. MOSERS contributed $257,003 in FY14, $267,315 in FY15, and $260,223 in FY16 in accordance with the state's funding policy toward the annual required contributions for post-employment retiree health care, which equaled MOSERS' required contribution each year.

(8) Plan Termination

MOSERS and its related plans are administered in accordance with Missouri statutes. Plans can only be terminated by an amendment to these statutes by the Missouri legislature.

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, individuals 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.

(9) Commitments

As of June 30, 2016, MOSERS has $457,681,747 and €868,751 unfunded commitments in the illiquids asset class.

(10) Contingencies

There were no contingencies which would have a material impact on the financial statements at June 30, 2016.

(11) 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. There have been no material insurance claims filed or paid during the past three years.

Pension Trust Funds

Schedule of Changes in Employers' Net Pension Liability | For Years Ended June 30, 2014, 2015, and 2016*

MSEP

	2014	2015	2016
Total pension liability			
Service cost	$ 158,116,026	$ 150,412,577	$ 149,021,755
Interest on the total pension liability	869,878,195	896,451,618	913,877,923
Difference between expected and actual experience	12,376,237	(27,983,267)	61,150,083
Assumption changes	0	(57,568,553)	656,805,085
Benefit payments	(679,014,251)	(725,786,536)	(753,512,304)
Refunds	(1,421,856)	(2,479,264)	(3,798,199)
Net change in total pension liability	359,934,351	233,046,575	1,023,544,343
Total pension liability - beginning	11,134,637,484	11,494,571,835	11,727,618,410
Total pension liability - ending (a)	$11,494,571,835	$11,727,618,410	$12,751,162,753
Plan fiduciary net position			
Employer contributions	$ 326,370,336	$ 329,752,832	$ 329,957,369
Employee contributions	14,025,328	18,099,455	21,684,920
Pension plan net investment income (loss)	1,485,159,992	(237,070,529)	1,740,269
Benefit payments	(679,014,251)	(725,786,536)	(753,512,304)
Refunds	(1,421,856)	(2,479,264)	(3,798,199)
Pension plan administrative expense	(7,336,922)	(8,077,692)	(8,489,375)
Other	5,161,629	5,434,820	4,923,622
Net change in plan fiduciary net position	1,142,944,256	(620,126,914)	(407,493,698)
Plan fiduciary net position - beginning	7,993,837,570	9,136,781,826	8,516,654,912
Plan fiduciary net position - ending (b)	9,136,781,826	8,516,654,912	8,109,161,214
Net pension liability - ending (a)-(b)	$ 2,357,790,009	$ 3,210,963,498	$ 4,642,001,539
Plan fiduciary net position as a percentage of total pension liability	79.49%	72.62%	63.60%
Covered employee payroll	$ 1,902,719,928	$ 1,918,527,768	$ 1,921,528,936
Net pension liability as a percentage of covered employee payroll	123.92%	167.37%	241.58%

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

REQUIRED SUPPLEMENTARY INFORMATION

Pension Trust Funds

Schedule of Changes in Employers' Net Pension Liability | For Years Ended June 30, 2014, 2015, and 2016*

Judicial Plan

	2014	2015	2016
Total pension liability			
Service cost	$ 8,990,293	$ 10,613,686	$ 10,932,097
Interest on the total pension liability	34,013,615	36,161,612	37,755,240
Difference between expected and actual experience	13,360,614	5,103,664	(5,036,696)
Assumption changes	0	0	53,991,379
Benefit payments	(29,406,625)	(31,245,906)	(32,979,706)
Refunds	0	0	(10,008)
Net change in total pension liability	26,957,897	20,633,056	64,652,306
Total pension liability - beginning	435,378,358	462,336,255	482,969,311
Total pension liability - ending (a)	$462,336,255	$482,969,311	$547,621,617
Plan fiduciary net position			
Employer contributions	$ 29,264,877	$ 32,696,686	$ 33,642,498
Employee contributions	294,810	488,193	661,206
Pension plan net investment income (loss)	17,199,701	(3,610,352)	28,081
Benefit payments	(29,406,625)	(31,245,906)	(32,979,706)
Refunds	0	0	(10,008)
Pension plan administrative expense	(105,693)	(123,015)	(136,983)
Other	4,195,049	0	0
Net change in plan fiduciary net position	21,442,119	(1,794,394)	1,205,088
Plan fiduciary net position - beginning	111,203,538	132,645,657	130,851,263
Plan fiduciary net position - ending (b)	132,645,657	130,851,263	132,056,351
Net pension liability - ending (a)-(b)	$329,690,598	$352,118,048	$415,565,266
Plan fiduciary net position as a percentage of total pension liability	28.69%	27.09%	24.11%
Covered employee payroll	$ 49,587,936	$ 55,656,457	$ 57,421,016
Net pension liability as a percentage of covered employee payroll	664.86%	632.66%	723.72%

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

REQUIRED SUPPLEMENTARY INFORMATION

Pension Trust Funds

Schedule of Employer Contributions | Last Ten Years

MSEP

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution**	Contribution Deficiency (Excess)	Covered Employee Payroll	Contributions as a Percentage of Covered Payroll*
2007	$239,488,751	$239,488,751	$0	$1,846,643,330	13.0%
2008	249,770,156	249,770,156	0	1,916,527,398	13.0
2009	252,105,008	252,105,008	0	2,002,402,087	12.6
2010	251,226,187	251,226,187	0	1,945,095,321	12.9
2011	263,418,048	263,418,048	0	1,875,569,816	14.0
2012	263,373,924	263,373,924	0	1,864,069,493	14.1
2013	274,655,284	274,655,284	0	1,880,212,950	14.6
2014	326,370,336	326,370,336	0	1,902,719,928	17.2
2015	329,752,832	329,752,832	0	1,918,527,768	17.2
2016	329,957,369	329,957,369	0	1,921,528,936	17.2

Judicial Plan

Year Ended June 30	Actuarially Determined Contribution	Contributions in Relation to the Actuarially Determined Contribution**	Contribution Deficiency (Excess)	Covered Employee Payroll	Contributions as a Percentage of Covered Payroll*
2007	$23,745,467	$23,745,467	$0	$40,846,581	58.1%
2008	26,215,309	26,215,309	0	44,542,530	58.9
2009	27,725,882	27,725,882	0	45,505,512	60.9
2010	27,029,198	27,029,198	0	46,112,730	58.6
2011	27,702,682	27,702,682	0	45,888,020	60.4
2012	26,324,526	26,324,526	0	45,835,501	57.4
2013	28,330,649	28,330,649	0	48,697,726	58.2
2014	29,264,877	29,264,877	0	49,587,936	59.0
2015	32,696,686	32,696,686	0	55,656,457	58.7
2016	33,642,498	33,642,498	0	57,421,016	58.6

* *Actuarial contribution rate shown is the actual employer contribution made divided by payroll in force on May 31 reported for valuation. This rate as computed may vary from the board's certified employer contribution rate due to the fluctuations in membership and pay during the year.*

** *Since the percent of payroll contribution rate was applied to pension payroll during the fiscal year, the actuarially determined contribution is equal to the actual contribution.*

REQUIRED SUPPLEMENTARY INFORMATION

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
2014	19.25%
2015	(2.60)
2016	0.08

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

Pension Trust Funds

Notes to the Schedules of Required Supplementary Information | Last Ten Years

Actuarial Methods and Assumptions for Valuations Performed as of June 30, 2016

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 closed 28-year amortization period was used for the June 30, 2016 valuations. The actuarial value of assets is based on a method that fully recognizes expected investment returns and averages unanticipated market returns over a 5-year period. The corridor limit is currently 80% to 125%.

The investment return rate assumption was reduced from 8.0% as of June 30, 2015, to 7.65% per year as of June 30, 2016, compounded annually (net of investment expenses). The price inflation assumption used was 2.5% per year. Projected salary assumptions were 3.25% to 8.75% for MSEP and 3.0% to 5.2% for the Judicial Plan. The assumption used for annual post-retirement benefit increases (COLA) is 4.0% (on a compound basis) when a minimum COLA is in effect. When no minimum COLA is in effect, price inflation is assumed to be 2.5% and the annual COLA is assumed to be 2.0% (80% of 2.5%), on a compound basis.

2007 | The actuarial valuations as of June 30, 2007, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2009.

	Amount	Percent of Payroll
MSEP		
Change in benefit assumptions or methods	$ (369,329)	(0.02)%
Experience and nonrecurring items	(5,355,266)	(0.29)
Judicial Plan		
Change in benefit assumptions or methods	(273,672)	(0.67)
Experience and nonrecurring items	853,694	2.09

2008 | The actuarial valuations as of June 30, 2008, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2010.

	Amount	Percent of Payroll
MSEP		
Change in benefit assumptions or methods	$4,791,318	0.25%
Experience and nonrecurring items	(574,958)	(0.03)
Judicial Plan		
Change in benefit assumptions or methods	(547,873)	(1.23)
Experience and nonrecurring items	(160,353)	(0.36)

2009 | The actuarial valuations as of June 30, 2009, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2011.

	Amount	Percent of Payroll
MSEP		
State of Missouri general pay freeze	$ (4,405,285)	(0.22)%
Experience and nonrecurring items	55,466,538	2.77
Change in valuation asset corridor from +/- 20% to +/- 30%	(29,835,791)	(1.49)
Judicial Plan		
State of Missouri general pay freeze	350,392	0.77
Experience and nonrecurring items	496,010	1.09
Change in valuation asset corridor from +/- 20% to +/- 30%	(141,067)	(0.31)

REQUIRED SUPPLEMENTARY INFORMATION

2010

The actuarial valuations as of June 30, 2010, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2012.

	Amount	Percent of Payroll
MSEP		
State of Missouri general pay freeze	$ (2,528,624)	(0.13)%
Addition of new tier of benefits effective 1-1-2011	(17,311,348)	(0.89)
Experience and nonrecurring items	25,480,749	1.31
Change in timing of contributions	(2,528,624)	(0.13)
Judicial Plan		
State of Missouri general pay freeze	(308,955)	(0.67)
Addition of new tier of benefits effective 1-1-2011	(493,406)	(1.07)
Experience and nonrecurring items	438,071	0.95
Change in timing of contributions	(894,587)	(1.94)

2011

The actuarial valuations as of June 30, 2011, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2013.

	Amount	Percent of Payroll
MSEP		
State of Missouri general pay freeze	$(6,376,937)	(0.34)%
Experience and nonrecurring items	17,630,356	0.94
Change in normal cost due to increased participants in MSEP 2011	(2,250,684)	(0.12)
Judicial Plan		
State of Missouri general pay freeze	(293,683)	(0.64)
Experience and nonrecurring items	289,095	0.63
Change in normal cost due to increased participants in Judicial Plan 2011	(169,786)	(0.37)

2012

The actuarial valuations as of June 30, 2012, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2014.

	Amount	Percent of Payroll
MSEP		
Change in assumptions or methods	$21,623,206	1.16%
Experience and nonrecurring items	25,537,752	1.37
Judicial Plan		
Change in assumptions or methods	948,795	2.07
Experience and nonrecurring items	320,849	0.70

2013

The actuarial valuations as of June 30, 2013, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2015.

	Amount	Percent of Payroll
MSEP		
Change in benefit assumptions or methods	$18,990,151	1.01%
Experience and nonrecurring items	(376,043)	(0.02)
Judicial Plan		
Change in benefit assumptions or methods	(603,852)	(1.24)

2014

The actuarial valuations as of June 30, 2014, reflected the following changes to the computed contribution rates for fiscal year ended June 30, 2016.

	Amount	Percent of Payroll
MSEP		
Recognition of asset gains	$16,173,119	0.85%
Experience and nonrecurring items	(1,141,632)	(0.06)
Change in normal cost due to increased participants in MSEP 2011 and experience	4,376,256	0.23
Judicial Plan		
Change in normal cost due to increased participants in Judicial Plan 2011 and experience	(510,756)	(1.03)
Anticipated change in salary levels	(1,180,193)	(2.38)

2015

The actuarial valuations as of June 30, 2015 reflected the following changes to the computed actuarial determined contribution (ADC) rates for fiscal year ending June 30, 2017. Actual contribution rate differs from computed ADC due to minimum funding policy adopted by the board in September 2014, requiring contributions to be no less than 16.97% of covered payroll for MSEP and 58.45% for Judicial Plan until the funding ratio is at least 80% for each plan.

	Amount	Percent of Payroll
MSEP		
Recognition of asset losses	$ 7,674,111	0.40%
Experience and nonrecurring items	4,412,614	0.23
Change in normal cost due to increased participants in MSEP 2011 and experience	(4,604,467)	(0.24)
Liability (gain) loss	(1,918,528)	(0.10)
Change in benefit assumptions or methods	3,069,644	0.16
Minimum funding policy contribution	(1,151,117)	(0.06)
Judicial Plan		
Recognition of asset losses	116,879	0.21
Experience and nonrecurring items	417,423	0.75
Change in normal cost due to increased participants in Judicial Plan 2011 and experience	(372,898)	(0.67)
Liability (gain) loss	361,767	0.65
Minimum funding policy contribution	(122,444)	(0.22)

2016

The actuarial valuations as of June 30, 2016 reflected the following changes to the computed actuarial determined contribution (ADC) rates for fiscal year ending June 30, 2018.

	Amount	Percent of Payroll
MSEP		
Recognition of asset losses	$ 21,136,818	1.10%
Change in normal cost due to increased participants in MSEP 2011 and experience	(3,843,058)	(0.20)
Liability (gain) loss	3,843,058	0.20
Projected payroll higher than expected	(192,153)	(0.01)
Change in benefit assumptions or methods	39,583,496	2.06
Minimum funding policy contribution	(768,612)	(0.04)
Judicial Plan		
Recognition of asset losses	9,415,492	0.49
Experience and nonrecurring items	(13,258,550)	(0.69)
Change in benefit assumptions or methods	130,856,121	6.81
Change in normal cost due to increased participants in Judicial 2011 and experience	(1,345,070)	(0.07)
Minimum funding policy contribution	(4,035,211)	(0.21)

ADDITIONAL FINANCIAL INFORMATION

Pension Trust Funds

Schedules of Investment Expenses

Investing Activity	MSEP	Judicial Plan	Total
Investment management and administrative fees			
Actis Emerging Markets III & IV – private equity	$1,446,657	$ 23,343	$1,470,000
Aeolus Property Catastrophe, LP – hedge funds	21,058	340	21,398
African Development Partners I & II, LLC – private equity	174,785	2,820	177,605
Alinda Infrastructure Fund I, LP – private equity	419,557	6,770	426,327
American Industrial Partners IV & V – private equity	1,634,236	26,370	1,660,606
AQR Absolute Return Institutional Fund, LP – hedge funds	3,245,833	52,374	3,298,207
AQR DELTA Sapphire Fund, LP – hedge funds	4,277,049	69,014	4,346,063
AQR Global Risk Premium Fund IV, LP – beta-balanced	2,390,779	38,577	2,429,356
AQR Style Premia Fund, LP – beta-balanced	1,104,530	17,823	1,122,353
Axiom Asia Private Capital Fund II & III, LP – private equity	1,553,195	25,062	1,578,257
Axxon Brazil Private Equity Fund II – private equity	985,168	15,897	1,001,065
Bayview Opportunity Domestic, LP – high yield	428,780	6,919	435,699
Bayview Opportunity Domestic III, LP – real estate	1,769,911	28,559	1,798,470
BlackRock Financial Management Bank Loans – high yield	1,509	24	1,533
Blackstone Real Estate Partners IV, V, VI, & VII – real estate	1,275,817	20,586	1,296,403
Blackstone Topaz Fund, LP – hedge funds	4,605,122	74,307	4,679,429
Blakeney Onyx, LP – emerging markets	1,586,007	25,592	1,611,599
Brevan Howard, LP – hedge funds	1,489,300	24,031	1,513,331
Bridgepoint Europe III A & IV B, LP – private equity	377,333	6,089	383,422
Bridgewater Associates – All Weather, LLC – beta-balanced	2,020,757	32,607	2,053,364
Bridgewater Associates Diamond Ridge Fund, LLC – hedge funds	3,495,122	56,397	3,551,519
Campbell Timber Fund II A, LP – timber	479,975	7,745	487,720
CarVal Investors CVI Global Value Fund A, LP – real estate	54,524	880	55,404
CarVal Investors CVI Global Value Fund A, LP – private debt	54,524	880	55,404
Castlelake Aviation II – private equity	1,500,044	24,204	1,524,248
Catalyst Fund Limited Partnership III, IV & V – private debt	2,997,010	48,359	3,045,369
Catterton Partners V, VI, & VII, LP – private equity	1,970,428	31,794	2,002,222
Cornwall Domestic, LP – hedge funds	3,048,137	49,184	3,097,321
Davidson Kempner Institutional Partners, LP – hedge funds	967,450	15,611	983,061
DRI Capital LSRC & LSRC II – private equity	393,061	6,342	399,403
EIG Energy Fund XIV, LP – real estate	931,619	15,032	946,651
EIG Energy Fund XV, LP – private equity	(1,577,365)	(25,452)	(1,602,817)
Elliott International, Ltd. – hedge funds	3,667,814	59,183	3,726,997
Empyrean Capital Fund, LP – hedge funds	(65,475)	(1,057)	(66,532)
Farallon Capital Institutional Partners, LP – hedge funds	(153,893)	(2,483)	(156,376)
Gaoling Fund, LP – hedge funds	232,169	3,746	235,915
Garnet Sky Investors Company, Ltd. – timber	(1,266,166)	(20,431)	(1,286,597)
Gateway Energy & Resource Holdings, LLC – real estate	288,057	4,648	292,705
GCM Equity Partners, LP – hedge funds	10,257	166	10,423
Glenview Institutional Partners & Glenview Capital Opportunity Fund, LP – hedge funds	(1,721,704)	(27,781)	(1,749,485)
Global Forest Partners GTI7 Institutional Investors Company, Ltd. – timber	742,742	11,985	754,727
Harvest Fund Advisors – real estate	908,438	14,658	923,096
HBK Merger Strategies Offshore Fund, Ltd. – hedge funds	1,469,342	23,709	1,493,051
HBK Offshore Fund, Ltd. – hedge funds	189,479	3,057	192,536
JLL Partners V & VI, LP – private equity	1,255,509	20,259	1,275,768
King Street Capital, LP – hedge funds	341,260	5,507	346,767
Linden Capital Partners II, LP – private equity	664,931	10,729	675,660
Mast Credit Opportunities I, LP – hedge funds	424,850	6,855	431,705
Merit Energy Partners F-II, LP – real estate	247,033	3,986	251,019
MHR Institutional Partners IIA, III & IV, LP – private debt	(9,287,951)	(149,869)	(9,437,820)

Schedule of Investment Expenses continued on page 60

ADDITIONAL FINANCIAL INFORMATION

Schedule of Investment Expenses continued from page 59

Investing Activity	MSEP	Judicial Plan	Total
Millennium Technology Partners II, LP – private equity	226,557	3,656	230,213
New Mountain Partners III, LP – private equity	3,838,597	61,939	3,900,536
NISA Investment Advisors, LLC – beta-balanced	4,612,310	74,423	4,686,733
OCM/GFI Power Opportunities Fund II & III, LP – private equity	677,630	10,934	688,564
OCM Opportunities Fund IV b, VII b & VIII b, LP – private debt	69,989	1,129	71,118
OCM Real Estate Opportunities Fund III, LP – real estate	(358,220)	(5,780)	(364,000)
Perry Capital – hedge funds	516	8	524
Pharo Macro Fund, Ltd. – hedge funds	3,078,210	49,669	3,127,879
Resource Management Service - Wildwood Timberlands, LLC – timber	394,299	6,362	400,661
Silchester International Investors – int'l developed equity	4,111,080	66,336	4,177,416
Silver Lake Partners II, LP – private equity	497,235	8,023	505,258
SIR Hedged Equity Fund, Ltd. – hedge funds	3,672,928	59,266	3,732,194
Siris Partners II, LP – private equity	606,155	9,781	615,936
Siris Partners III, LP – private equity	668,911	10,793	679,704
State Street Global Advisors – emerging markets	189,526	3,058	192,584
StepStone Capital Buyout Fund I & II, LP – private equity	106,847	1,724	108,571
StepStone Opportunities Fund II, LP – private equity	80,388	1,297	81,685
Stone Harbor Investment Partners, LP – emerging markets	275,147	4,440	279,587
TPG-Axon Partners (Offshore), Ltd. – hedge funds	(8,029)	(130)	(8,159)
Veritas Capital Fund III & IV, LP – private equity	2,319,698	37,430	2,357,128
Viking Global Equities III, Ltd. – domestic equity	2,500,270	40,344	2,540,614
Visium Balanced Fund, LP – hedge funds	2,112,715	34,093	2,146,808
Total investment management and administrative fees	72,741,363	1,173,742	73,915,105
Other investment fees			
Investment consultant fees			
Summit Strategies, Inc.	812,974	13,118	826,092
TimberLink Consulting	47,976	774	48,750
Investment custodial fees			
BNY Mellon	397,800	6,419	404,219
Performance and risk measurement fees			
BNY Mellon	178,557	2,881	181,438
MSCI	255,871	4,129	260,000
Internal investment activity expenses	3,366,920	54,328	3,421,248
Total investing activity expenses	77,801,461	1,255,391	79,056,852
Securities lending activity			
Securities lending borrower rebates	(95,022)	(1,533)	(96,555)
Securities lending management fees			
BNY Mellon	123,015	1,985	125,000
Deutche Bank	13,664	220	13,884
Total securities lending activity expenses	41,657	672	42,329
Total investment expenses	$77,843,118	$1,256,063	$79,099,181

ADDITIONAL FINANCIAL INFORMATION

Pension Trust Funds

Schedules of Internal Investment Activity Expenses | Year Ended June 30, 2016

	MSEP	Judicial Plan	Total
Personnel services			
Salaries	$1,937,566	$31,264	$1,968,830
Fringe benefits	827,229	13,348	840,577
Total personnel services	2,764,795	44,612	2,809,407
Professional services			
Attorney services	67,029	1,082	68,111
Total professional services	67,029	1,082	68,111
Communications			
Telephone	16,314	263	16,577
Total communications	16,314	263	16,577
Facilities			
Utilities	2,592	42	2,634
Lease expense	45,710	738	46,448
Depreciation	35,850	578	36,428
Facility maintenance	7,599	123	7,722
Vehicle maintenance and operation	119	2	121
Total facilities	91,870	1,483	93,353
Software and equipment			
Computer supplies and software	5,726	92	5,818
Depreciation	9,630	155	9,785
Loss on sale of equipment	639	10	649
Total software and equipment	15,995	257	16,252
Education, meetings and travel			
Professional development including travel	29,433	475	29,908
Due diligence travel	70,949	1,145	72,094
Total travel and meetings	100,382	1,620	102,002
General			
Research and information services	268,846	4,338	273,184
Membership dues	16,335	264	16,599
Office supplies	1,568	25	1,593
Periodicals and publications	10,393	168	10,561
Miscellaneous expense	13,393	216	13,609
Total general	310,535	5,011	315,546
Total internal investment activity expenses	$3,366,920	$54,328	$3,421,248

Pension Trust Funds

Schedules of Administrative Expenses | Year Ended June 30, 2016

	MSEP	Judicial Plan	Total
Personnel services			
Salaries	$4,132,399	$ 66,680	$4,199,079
Fringe benefits	1,721,978	27,786	1,749,764
Total personnel services	5,854,377	94,466	5,948,843
Professional services			
Actuarial services	303,720	4,901	308,621
Attorney services	189,991	3,066	193,057
Auditing services	75,630	1,220	76,850
Banking services	34,927	564	35,491
Consulting services	136,752	2,207	138,959
Total professional services	741,020	11,958	752,978
Communications			
Video production	1,285	21	1,306
Telephone	52,606	849	53,455
Printing	38,534	622	39,156
Postage and mailing	134,048	2,163	136,211
Total communications	226,473	3,655	230,128
Facilities			
Depreciation	109,939	1,774	111,713
Utilities	54,387	878	55,265
Facility maintenance	48,345	780	49,125
Vehicle maintenance and operation	5,550	90	5,640
Total facilities	218,221	3,522	221,743
Software and equipment			
Computer supplies and software	96,537	1,558	98,095
Depreciation	222,400	3,589	225,989
Maintenance agreements	314,122	5,069	319,191
Equipment rental	134,717	2,174	136,891
Loss on sale of equipment	8,634	139	8,773
Total software and equipment	776,410	12,529	788,939
Education, meetings and travel			
Board travel and meetings	33,118	534	33,652
Professional development including travel	79,227	1,278	80,505
MOSERS sponsored seminars	77,340	1,248	78,588
Due diligence travel	1,721	28	1,749
Tuition reimbursement	18,418	297	18,715
Total education, meetings and travel	209,824	3,385	213,209
General			
Advertising	27,320	438	27,758
Research and information services	99,900	1,612	101,512
Insurance	132,021	2,130	134,151
Membership dues	33,770	545	34,315
Business continuity	62,244	1,004	63,248
Office supplies	12,030	194	12,224
Periodicals and publications	95,755	1,545	97,300
Miscellaneous	10	0	10
Total general	463,050	7,468	470,518
Total administrative expenses	$8,489,375	$136,983	$8,626,358

ADDITIONAL FINANCIAL INFORMATION

Internal Service Funds

Schedules of Administrative Expenses | Year Ended June 30, 2016

	Life and LTD	Deferred Compensation	Total
Personnel services			
Salaries	$290,285	$270,585	$ 560,870
Employee fringe benefits	119,875	102,677	222,552
Total personnel services	410,160	373,262	783,422
Professional services			
Auditing services	1,847	37,259	39,106
Banking services	651	0	651
Total professional services	2,498	37,259	39,757
Communications			
Postage and mailing	7,188	0	7,188
Telephone	3,409	1,228	4,637
Printing	2,698	80	2,778
Video production expense	81	1,385	1,466
Total communications	13,376	2,693	16,069
Facilities			
Building use charge	34,786	6,838	41,624
Utilities	3,877	0	3,877
Maintenance	3,316	0	3,316
Total facilities	41,979	6,838	48,817
Software and equipment			
Computer supplies and equipment	6,487	2,629	9,116
Depreciation	0	2,658	2,658
Equipment maintenance	21,463	537	22,000
Equipment rental	9,168	0	9,168
Total software and equipment	37,118	5,824	42,942
Education, meetings and travel			
Board travel and meetings	2,180	0	2,180
Professional development including travel	6,761	9,720	16,481
MOSERS sponsored seminars	4,835	0	4,835
Due diligence travel	120	3,840	3,960
Total education, meetings and travel	13,896	13,560	27,456
General			
Advertising	1,858	9,492	11,350
Research and information services	6,980	14,600	21,580
Insurance	9,243	0	9,243
Membership dues	2,360	925	3,285
Business continuity	6,062	0	6,062
Office supplies	4,495	282	4,777
Periodicals and publications	818	0	818
Total general	31,816	25,299	57,115
Total administrative expenses	$550,843	$464,735	$1,015,578

Schedules of Professional Service Fees | Year Ended June 30, 2016

		Pension Trust Funds			Internal Service Funds		
Professional Services	Nature of Service	MSEP	Judicial Plan	Total	Life and LTD	Deferred Compensation	Total
Operation administrative expenses							
Avtex Solutions, Inc.	Information technology consulting	$ 39,776	$ 642	$ 40,418	$ 0	$ 0	$ 0
Central Bank	Banking	34,570	558	35,128	453	0	453
Charlesworth & Associates	Risk management consulting	9,945	160	10,105	0	0	0
Collector Solutions, Inc.	Banking	357	6	363	198	0	198
Cortex	Board asset advisor search	31,246	504	31,750	0	0	0
Cross Reporting Service, Inc.	Legal counsel	313	5	318	0	0	0
Dell	Information technology consulting	13,910	224	14,134	0	0	0
DocSTAR	Information technology consulting	14,171	229	14,400	0	0	0
Gabriel, Roeder, Smith & Co.	Actuarial	303,720	4,901	308,621	0	0	0
Gamble & Schlemeier, Ltd.	Governmental consulting	24,603	397	25,000	0	0	0
Huber & Associates	Information technology consulting	757	12	769	0	0	0
HyperGen, Inc.	Information technology consulting	886	14	900	0	0	0
Kramer & Frank, PC	Legal counsel	124	2	126	0	0	0
Midwest Litigation Services	Legal counsel	63	1	64	0	0	0
Monaco, Sanders, Rachine, Powell & Riedy	Legal counsel	369	6	375	0	0	0
Steptoe & Johnson	Legal counsel	849	14	863	0	0	0
Thompson Coburn, LLP	Legal counsel	188,144	3,036	191,180	0	0	0
United States District Court	Legal counsel	129	2	131	0	0	0
Williams Keepers, LLC	Financial audit	75,630	1,220	76,850	1,847	37,259	39,106
World Wide Technology	Information technology consulting	1,458	25	1,483	0	0	0
Operation administrative expenses subtotal		741,020	11,958	752,978	2,498	37,259	39,757
Internal investment administrative expenses							
Kasowitz, Benson, Torres & Friedman, LLP	Legal counsel	764	12	776	0	0	0
Thompson Coburn LLP	Legal counsel	66,265	1,070	67,335	0	0	0
Internal investment administrative expenses subtotal		67,029	1,082	68,111	0	0	0
Total professional service fees		$808,049	$13,040	$821,089	$2,498	$37,259	$39,757

Information on investment management and consulting fees can be found in the *Schedule of Investment Expenses* on pages 59-60.

ADDITIONAL FINANCIAL INFORMATION

Pension Trust Funds

Investment Summary | Year Ended June 30, 2016

	June 30, 2015				June 30, 2016		
Type of Investment	Cost Value	Fair Value	Purchases & Capital Additions at Cost	Sales & Redemptions at Cost	Cost Value	Fair Value	Percent of Total Fair Value
Fixed income							
Treasury bonds, notes, and bills	$ 4,164,585,678	$ 4,109,906,639	$ 346,074,426	$ (590,112,427)	$3,920,547,677	$ 3,958,718,113	42%
Gov't. bonds and gov't. mortgage-backed securities	53,233,538	43,001,590	7,023,361	(4,449,364)	55,807,535	47,606,027	1
Corporate bonds	1,207,470	847,433	78,467	(1,096,163)	189,774	111,600	0
Convertible bonds	0	0	911,071	0	911,071	968,785	0
International corporate bonds	5,782,442	3,964,906	1,152,036	(5,405,514)	1,528,964	1,263,124	0
Bank loans	555,751	98	0	(555,751)	0	0	0
Total fixed income	4,225,364,879	4,157,720,666	355,239,361	(601,619,219)	3,978,985,021	4,008,667,649	43
Venture capital limited partnerships	3,198,991,680	4,827,465,957	442,041,533	(636,647,950)	3,004,385,263	4,267,419,604	46
Common stock	374,656,847	415,247,698	11,440,087	(88,778,964)	297,317,970	286,901,771	3
International investments							
International equities	178,019,681	858,319,652	1,108,155	(3,798,909)	175,328,927	789,143,593	8
Foreign currency	83,401	(2,687)	7,519,605	(54)	7,602,952	7,821,688	0
Total international investments	178,103,082	858,316,965	8,627,760	(3,798,963)	182,931,879	796,965,281	8
Real estate investment trust	3,617	10,056	0	0	3,617	10,646	0
Options futures	0	0	9,198,200	(9,281,820)	(83,620)	(10,658,205)	0
Investments *(per Statements of Fiduciary Net Position page 24)*	7,977,120,105	10,258,761,342	826,546,941	(1,340,126,916)	7,463,540,130	9,349,306,746	100%
Short-term investments							
Short-term investment funds	2,237,306,891	2,237,306,892	1,168,825,843	(951,659,938)	2,454,472,796	2,454,472,796	
Repurchase agreements	12,153,028	12,153,028	2,296,621,949	(2,299,106,761)	9,668,216	9,668,216	
Total short-term investments	2,249,459,919	2,249,459,920	3,465,447,792	(3,250,766,699)	2,464,141,012	2,464,141,012	
Invested securities lending collateral							
Corporate bonds	839,357	149,065	0	(120,592)	718,765	37,210	
Short-term investment funds	19,078,986	19,078,986	342,852,240	(347,709,849)	14,221,377	14,221,377	
Total invested securities lending collateral	19,918,342	19,228,051	342,852,240	(347,830,441)	14,940,142	14,258,587	
Total investments	$10,246,498,366	$12,527,449,313	$4,634,846,973	$(4,938,724,056)	$9,942,621,284	$11,827,706,345	

Internal Service Funds

Investment Summary | Year Ended June 30, 2016

	June 30, 2015				June 30, 2016		
Type of Investment	Cost Value	Fair Value	Purchases and Capital Additions at Cost	Sales and Redemptions at Cost	Cost Value	Fair Value	Percent of Total Fair Value
Repurchase agreements	$4,482,083	$4,482,083	$1,098,605,133	$(1,099,152,174)	$3,935,042	$3,935,042	100%

Note: Due to space limitations and printing costs, a detailed listing of the investment holdings and transactions is not provided in this annual report; however, the detailed reports are available for review as an appendix to this report at the MOSERS office.