

STATE OF MICHIGAN INVESTMENT BOARD MEETING

September 12, 2019

State of Michigan Retirement System
Quarterly Investment Review



Rachael Eubanks, State Treasurer
Prepared by Bureau of Investments
Michigan Department of Treasury

STATE OF MICHIGAN INVESTMENT BOARD MEETING

SEPTEMBER 12, 2019

Agenda



- 9:30 a.m. Call to Order and Opening Remarks
- 9:35 a.m. Approval of the 6/6/2019 SMIB Meeting Minutes
- 9:40 a.m. Executive Summary & Performance for Periods Ending 6/30/19
- 9:45 a.m. Current Asset Allocation Review
Markets Review and Outlook
- 10:00 a.m. Guest Speaker: Cathie Wood, CEO
- ARK Invest
- 10:45 a.m. Review of Investment Reports
- Domestic Equity
 - Private Equity
 - International Equity – *Receive and File*
 - Real & Opportunistic Return – *Receive and File*
 - Real Estate & Infrastructure – *Receive and File*
 - Fixed Income – *Receive and File*
 - Absolute Return – *Receive and File*
 - Defined Contribution – *Receive and File*
- Basket Clause – *Receive and File*
- 11:00 a.m. Public Comment
- Closing Remarks ~ Adjournment



2019 Meeting Schedule

Thursday, December 19, 2019

2020 Meeting Schedule

Thursday, March 12, 2020

Thursday, June 11, 2020

Thursday, September 10, 2020

Thursday, December 10, 2020

All meetings start at 9:30 a.m.

www.michigan.gov/treasury

State of Michigan Retirement System

MINUTES

State of Michigan Investment Board Meeting

September 12, 2019



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN INVESTMENT BOARD

June 6, 2019 Meeting Minutes

Members Present:

Chairman – Treasurer Rachael Eubanks (9:40 am)
Mr. Chris Kolb (9:40 am)
Ms. Dina Richard
Mr. Reginald Sanders
Mr. James Nicholson

Members of the Public and Bureau of Investments Staff Present:

Molly Jason	Karen Stout	Jack Behar
Karl Borgquist	Paul Lerg	Richard Holcomb
Mary Pollock	Anthony Estell	Kerrie VandenBosch
Vikram Ambekar	Todd Warstler	Henry Washburn
Bradley Hartwell	Semone James	Mark Porrell
Ann Stange	Patrick Moraniec	LeAnn Auer
Lan Chen	Ann Storberg	Jennifer Yeung
Thad Townsel	Jon Braeutigam	Robert Brackenbury
Peter Woodford	Woody Tyler	Travis Haney
Greg Parker	Giles Feldpausch	Janet Sudac
Lori Barrett	Annette Russell	Max Kotary
Ryan Rathman	Tim McEnery	Kevin Fedewa
Jamie Prevo	Navneet Adhi	Steve Cummings (via phone)
Henry McVey	J.B. Kiley	

Opening Remarks:

James Nicholson called the meeting to order at 9:30 am. Treasurer Eubanks appointed Mr. Nicholson chairman as she needed to arrive late. The Treasurer joined the meeting at 9:40 am.

Approval of Minutes:

Approval of the March 7, 2019, SMIB Meeting Minutes – Motion to approve: Dina Richard. Seconded: Reggie Sanders. The vote was unanimous to approve.

AGENDA

Executive Summary and Performance

Jon Braeutigam, Chief Investment Officer for the Bureau of Investments, highlighted that in the fourth quarter of 2018 the S&P was down -14 percent and SMRS was down -4.2 percent. This was higher than the peer median return of -5.9 percent. Mr. Braeutigam mentioned that he prefers to focus on long-term rates of return, however the past two quarters highlight the fact that in short time frames it is expected that SMRS returns will lag a strong directional stock market, outperforming peers in a down market and underperforming in a (strong) up-market. This is primarily due to the lagged effect of private markets. He believes that based on the first few quarters of the fiscal year and the estimates for returns for this quarter, the estimated fiscal YTD return to be roughly flat to up 1 percent.

Mr. Braeutigam gave a short macro economy overview stating that globally PMIs are showing deterioration in the global economy and the risks of a recession are estimated to be higher today. Since May, the allocation to domestic equity has been reduced by \$2 billion at levels which are slightly higher than today's levels, on average, which helps to ensure benefit payments can be made should market disruptions occur over the next year.

Asset Allocation Review, Markets Review and Outlook

Gregory Parker, Director of Investments - Public Markets gave a quick reminder of the risk within the SMRS portfolio from an asset allocation perspective. Equity risk is the main contributor to return volatility. This is true for nearly all public plans. Illiquidity risk is also a big risk factor. Having annual benefit payments of about \$2 billion and unfunded capital commitments of \$12.8 billion limits our ability to take advantage of market dislocations directly.

Guest Speaker

Henry McVey of KKR – Head of Global Macro & Asset Allocation and CIO of KKR's Balance Sheet

Mr. McVey spoke of economic trends, discussed his viewpoint that interest rates should go higher as deficits grow larger, the business cycle, discussed key themes, and risks and key conclusions about the global market. The SMIB board was very active asking a number of questions regarding the presentation.

Review of Investment Reports – Received and Filed

Public Comment

Mr. Nicholson asked that any attendees wishing to address the Board come forward. No public comment.

Adjournment

Mr. Nicholson adjourned the meeting at 10:53 am. Motion to adjourn by Treasurer Eubanks. Seconded: Reggie Sanders. The vote was unanimous to adjourn.

Approved:

Rachael Eubanks, Chairman

State of Michigan Retirement System

EXECUTIVE SUMMARY

State of Michigan Investment Board Meeting

September 12, 2019



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

EXECUTIVE SUMMARY

June 2019

Performance

Great peer comparison.

MPSERS Plan (06/30/19)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	8.0%	11.0%	8.1%	10.2%	10.5%
Policy Returns	8.3%	10.6%	8.2%	10.0%	10.9%
Peer Median Returns*	6.6%	9.2%	6.2%	8.5%	9.4%

*State Street Universe greater than \$10 billion.

- Over the past one, three, five, seven, and ten years, the returns are significantly higher than peer median returns. Compared to the State Street Universe of public pension plans greater than \$10 billion, the returns are mostly near the top decile of returns. Also, the plans' returns were among the least risky, as measured by standard deviation.
- The ten-year return begins at the cyclical low of the global financial crisis and because risk assets were trading at depressed prices, the trailing 10-year returns are above average. Over a very long horizon, since 1979, the annualized rate of return on the plan assets has been approximately 9.4%.
- Compounding at higher than peer returns can add significant value. For example, based on the \$43.3 billion June 2009 market value, a ten-year annualized return of 10.5% compared to the 9.4% peer median return would add about \$12 billion in excess value.
- The returns were generally in-line with the policy benchmark.
- For the year ending June 2019, returns exceeded the peer median return by 1.4%. Most of the individual asset class returns were better than median, and private equity and domestic equity returns were in the top quartile of returns for their respective asset classes.

Asset Allocation

A low return environment.

- Given the low rates of return available in the capital markets for safe assets, and in order to earn the actuarial rates of returns, additional risks (primarily equity risk) must be assumed. However, at the end of June 2019, the equity risk (beta) is approximately 0.4 which is the lowest measurement in three decades, and it is lower than peer median at approximately 0.6.
- Liquidity is another fundamental risk assumed and it is managed through asset allocation. The plans have outstanding capital commitments to fund approximately \$13.2 billion in illiquid assets, primarily in private equity. In the June 2019 quarter, over \$1.1 billion of new commitments were made.
- The combined systems paid out approximately \$2.1 billion net of contributions over the past twelve months ending in June 2019. Over the past year, private equity was a net purchaser of approximately \$855 million, real return & opportunistic of \$760 million, and absolute return allocation increased by \$136 million. Over the past year in round numbers, the allocation to domestic equity was reduced by \$2.8 billion, real estate decreased by \$1.5 billion, international equity by \$500 million and absolute return by \$70 million. The allocation to short-term cash increased by approximately \$1 billion.

Economy and Capital Markets

Potentially slowing economy.

- The most recent reading of the annualized U.S. GDP growth was 2.1%, slightly ahead of the consensus estimate of 1.8%. Current estimates for 2020 GDP growth for the U.S. are around 1.8%, however there are increasingly more concerns regarding lower than forecasted growth.
- The JPMorgan Global Manufacturing Purchasing Manager Index (PMI) peaked in December 2017 and has been steadily declining since. In June 2019, the index fell to its lowest mark in over six years and it has been under 50 (deteriorating economic conditions) for two months in a row.
- The Federal Reserve Bank of New York recession probability index currently estimates the chance of a recession occurring in the U.S. in the next 12 months to be just over 30%. Important for consideration with this index; the measure has never hit 100% certainty even during a recession, in the last three recessions the measure failed to hit over 50%, and in the last 50 years every measure of at least 30% has been associated with a recession.
- By the end of July 2019, the U.S. 10-year Treasury was yielding 2.06% which was roughly 0.10% below the 3-month T-bill rate. This inversion of interest rates has persisted for close to two and a half months now and the 25-basis point cut in July did not help to change the yield curve slope to become positive.
- In terms of major currencies besides the U.S. dollar (Japanese Yen, British Pound, Canadian and Australian Dollar) the price for an ounce of gold is at all-time highs.

Defined Contribution

Projects in the works.

- As discussed during the December 2018 and March 2019 State of Michigan Investment Board meetings, on-going analysis on the Tier II Active Funds is being performed. The key areas of focus have been on options to simplify and potentially reduce the number of active equity managers in the plan line-up.
- An industry trend for defined contribution plans has been to streamline the number of investment options offered on plan. The State of Michigan Retirement System offers about a half dozen more options than similar sized plans.
- The goals for streamlining the plan would focus on driving value to participants through lower fees (additional economies of scale), overall plan simplification, and to potentially add to investment returns. Less complexity seems to correspond with higher utilization rates.
- Tier III, the self-managed brokerage account, will remain as an option for plan participants who desire the highest levels of investment choices.

Investment Update

Highlighting the quarter.

(\$ Millions)

NEW COMMITMENTS

April 1 – June 30, 2019

<u>Asset class</u>	<u>Fund Name / (Managed By)</u>	<u>Commitment</u>
Private Equity		
	Advent International GPE IX, L.P. (Advent International GPE IX, LLC)	\$250.0
	Dover Street X, L.P. (HarbourVest Partners, LP)	150.0
	Harvest Partners VIII (Harvest Partners, L.P.)	100.0
	Permira VII L.P. 1 (Permira VII G.P. Limited)	85.4
	Clearlake Opportunities Partners II, LP (Clearlake Capital Group, L.P.)	75.0
	HarbourVest Credit Opportunities Fund II, LP (HarbourVest Partners, LP)	75.0
	Warburg Pincus China-Southeast Asia II, L.P. (Warburg Pincus LLC)	75.0
	Vista Equity Endeavor Fund II, LP (VEEF Management, L.P.)	65.0
	Accel London VI, L.P. (Accel XIV Associates L.L.C.)	12.5
Real Estate and Infrastructure Division		
	GSO Energy Select Opportunities Fund II, LP (GSO Capital Partners LP)	50.0
Real & Opportunistic Division		
	Castle Credit SMRS Holdings, LLC (Fortress/ICG Advisors LLC)	177.0
Absolute Return Division		
	No new commitments	0.0
TOTAL		\$1,114.9

State of Michigan Retirement System

PERFORMANCE

State of Michigan Investment Board Meeting

September 12, 2019



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

Bureau of Investments

Mission Statement

The Bureau of Investments continually strives to provide quality investment management services, broad professional expertise, and independent advice to the State of Michigan Investment Board as fiduciary of the State of Michigan Retirement System, and independent of the Board, to the State Treasurer for various Michigan trust funds and the State's common cash, for which the State Treasurer is the fiduciary.

SMRS Goals

Maintain sufficient liquidity to pay benefits.

*Meet or exceed the actuarial assumption
over the long term.*

*Perform in the top half of the public plan
universe over the long term.*

Diversify assets to reduce risk.

*Exceed individual asset class benchmarks
over the long term.*

MPSPERS PENSION

Time-Weighted Rates of Return Periods Ending June 30, 2019

	% of Portfolio 6/30/19	Ten Years ¹		Seven Years ¹		Five Years ¹		Three Years ¹		One Year		Current Quarter	
		Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank	Rate	Rank
TOTAL PLAN	100.0	10.5	14	10.2	5	8.1	6	11.0	10	8.0	18	3.2	46
Median - Greater than \$10 Billion ²		9.4		8.5		6.2		9.2		6.6		3.2	
MPSPERS Total Plan Policy		10.9		10.0		8.2		10.6		8.3		5.1	
DOMESTIC EQUITIES	22.4	14.6	33	14.4	12	10.6	17	15.1	15	9.6	13	4.1	29
Median ²		13.7		12.4		7.9		11.5		6.4		3.6	
S&P 1500 Index		14.7		13.9		10.5		13.9		9.3		4.2	
PRIVATE EQUITY AND VENTURE CAPITAL	18.0	15.4	15	14.0	10	12.6	15	15.3	12	14.0	8	4.7	12
Median ²		10.6		9.9		8.7		10.0		7.7		3.5	
Private Equity and VC Benchmark ³		19.4		16.2		14.2		16.9		12.8		14.5	
INTERNATIONAL EQUITIES	16.3	7.7	45	7.4	72	3.4	34	10.0	35	1.1	58	3.0	56
Median ²		7.6		7.5		3.0		9.8		1.3		3.0	
International Blended Benchmark ⁴		6.3		6.5		2.2		9.4		1.3		3.0	
FIXED INCOME	12.6	5.2	27	4.0	16	4.4	11	4.4	23	8.0	29	3.1	34
Median ²		4.7		3.0		3.2		2.8		7.3		2.9	
Barclays Aggregate		3.9		2.6		3.0		2.3		7.9		3.1	
REAL RETURN AND OPPORTUNISTIC	10.7			11.5		10.1		13.4		12.4		2.9	
50% (CPI +500 bps) + 50% (6.8% actuarial rate)				7.2		7.1		7.3		6.6		1.7	
REAL ESTATE & INFRASTRUCTURE	9.4	7.5	72	11.2	39	10.8	37	9.3	24	7.7	53	2.2	33
Median ²		9.2		10.5		9.5		8.0		7.7		1.8	
NCREIF - Property Blended Index ⁵		7.9		8.0		7.4		5.5		5.2		1.2	
NCREIF Open Fund Index Net		8.9		9.5		8.8		6.6		5.5		0.8	
ABSOLUTE RETURN	5.7	5.9		5.3		3.5		5.4		2.7		0.9	
HFRI FOF Cons 1 month lagged		3.1		3.3		2.1		3.4		1.4		1.3	
CASH EQUIVALENTS	4.8	0.9		1.0		1.3		1.8		2.7		0.7	
1 Month T-Bill		0.4		0.6		0.8		1.3		2.3		0.6	

¹ Annualized Returns and Percentile Rank.

² Comparison universe is the State Street Universe comprised of Public Funds greater than \$10 billion on the total plan level and greater than \$1 billion for asset classes.

³ SP500 + 300 bps with a 3 month lag.

⁴ International blended benchmark is S&P Developed BMI-EPAC 50/50 prior to 1/1/10. S&P Developed BMI-EPAC 75 USD / 25 Local, 1/1/10 to 9/30/10. MSCI ACWI ex USA Gross 10/1/10 to present.

⁵ NCREIF - Property Blended Index is NPI minus 130 bps.

Source: State Street Analytics; the NCREIF - NPI (Property Index) source is NCREIF; the S&P BMI-EPAC Index source is S&P.

Cumulative and Consecutive Total Fund Returns

MPSERS											
Cumulative For Years Ending 6/30/19											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
MPSERS	8.0	10.0	11.0	8.5	8.1	9.8	10.2	9.2	10.5	10.5	10.5
Public Plan - Median (> \$10 billion)*	6.6	7.4	9.2	6.9	6.2	7.9	8.5	7.7	9.0	9.4	9.4
Rank	18	4	10	10	6	6	5	5	9	14	14
bp Difference - Median	134	261	175	165	181	194	164	153	149	119	119
Consecutive For Years Ending											
	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12	06/11	06/10	
MPSERS	8.0	12.0	12.9	1.5	6.2	19.1	12.2	2.6	21.7	10.9	10.9
Public Plan - Median (> \$10 billion)*	6.6	8.9	13.0	1.3	3.4	16.9	12.4	1.8	21.8	12.2	12.2
Rank	18	4	56	45	5	10	53	30	52	66	66
bp Difference - Median	134	318	-10	22	284	225	-18	80	-4	-137	-137

MSERS											
Cumulative For Years Ending 6/30/2019											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
MSERS	7.9	10.0	11.0	8.5	8.1	9.8	10.2	9.2	10.5	10.5	10.5
Public Plan - Median (> \$1 billion)*	6.4	7.3	9.2	6.8	6.2	7.7	8.5	7.6	8.9	9.1	9.1
Rank	15	6	8	8	5	4	6	6	9	16	16
bp Difference - Median	157	267	176	173	184	208	168	160	162	135	135
Consecutive For Years Ending											
	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12	06/11	06/10	
MSERS	7.9	12.0	13.0	1.5	6.2	19.1	12.2	2.4	21.7	10.5	10.5
Public Plan - Median (> \$1 billion)*	6.4	8.6	12.9	1.1	3.0	17.0	12.5	1.3	21.9	12.3	12.3
Rank	15	4	44	42	3	16	55	31	53	76	76
bp Difference - Median	157	344	6	48	319	206	-31	116	-20	-181	-181

*State Street Public Funds Universe

Cumulative and Consecutive Total Fund Returns

MSPRS										
Cumulative For Years Ending 6/30/19										
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSPRS	7.9	10.0	11.0	8.5	8.1	9.8	10.1	9.1	10.5	10.5
Public Plan - Median (> \$1 billion)*	6.4	7.3	9.2	6.8	6.2	7.7	8.5	7.6	8.9	9.1
Rank	15	6	8	9	6	4	8	7	9	17
bp Difference - Median	155	266	175	172	183	206	165	158	161	133
Consecutive For Years Ending										
	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12	06/11	06/10
MSPRS	7.9	12.0	13.0	1.5	6.2	19.0	12.1	2.5	21.8	10.4
Public Plan - Median (> \$1 billion)*	6.4	8.6	12.9	1.1	3.0	17.0	12.5	1.3	21.9	12.3
Rank	15	4	44	42	3	17	57	30	52	76
bp Difference - Median	155	345	5	47	317	198	-42	120	-13	-184

MJRS										
Cumulative For Years Ending 6/30/19										
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MJRS	7.9	10.0	11.0	8.5	8.1	9.7	10.0	9.1	10.4	10.2
Public Plan - Median (> \$1 billion)*	6.4	7.3	9.2	6.8	6.2	7.7	8.5	7.6	8.9	9.1
Rank	15	6	7	8	5	5	9	9	10	29
bp Difference - Median	156	266	177	174	184	194	157	150	157	106
Consecutive For Years Ending										
	06/19	06/18	06/17	06/16	06/15	06/14	06/13	06/12	06/11	06/10
MJRS	7.9	12.0	13.0	1.5	6.2	18.2	12.2	2.4	22.1	8.0
Public Plan - Median (> \$1 billion)*	6.4	8.6	12.9	1.1	3.0	17.0	12.5	1.3	21.9	12.3
Rank	15	4	43	42	3	30	53	31	46	94
bp Difference - Median	156	345	12	45	316	118	-26	110	22	-426

*State Street Public Funds Universe

State of Michigan Retirement System

ASSET ALLOCATION REVIEW

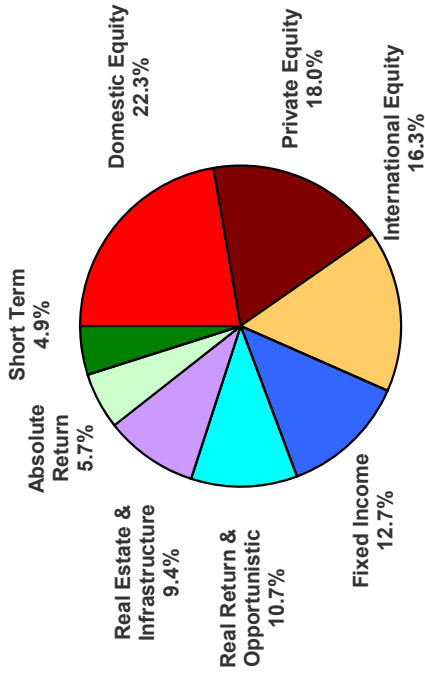
State of Michigan Investment Board Meeting
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Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN RETIREMENT SYSTEM PROFILE - JUNE 2019

Asset Allocation ~ 6/30/19



Asset Allocation By Market Value

(In Millions)

Investment Strategies	6/30/2019	6/30/2018
Domestic Equity	\$16,636	\$17,831
Private Equity	13,380	11,078
International Equity	12,131	12,491
Fixed Income	9,459	8,726
Real Return & Opport.	7,951	6,373
Real Estate & Infra.	6,994	8,040
Absolute Return	4,260	4,023
Short Term***	3,648	2,655
TOTAL	\$74,459	\$71,217

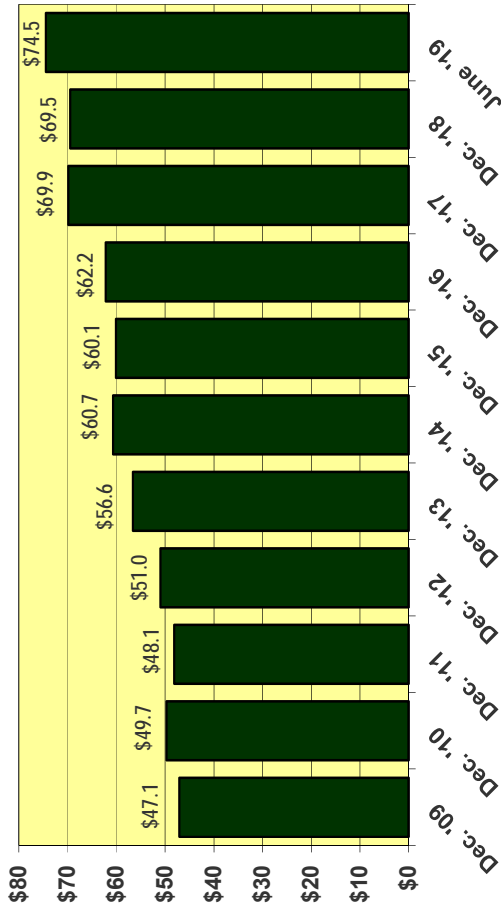
Short Term Equivalents (in Billions)

Short Term Strategy***	\$3.6
Short Term in Other Inv. Strategies	1.2
TOTAL SHORT TERM	\$4.8

6.4% of Total Funds

Market Value*

(Billions of Dollars)



Market Value By Plan ~ 6/30/19

(in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPSERS	\$50,606	\$6,723	\$57,329	77.0%
MSERS - (closed)	12,343	2,802	15,145	20.3%
MSPRS	1,502	211	1,713	2.3%
MJRS - (closed)	263	9	272	0.4%
TOTAL	\$64,714	\$9,745	\$74,459	100.0%

MSERS includes the Military Pension Fund

18th Largest DB Public Pension Fund in the U.S.

Pensions & Investments Survey - February 4, 2019 issue

*The combined net payout for the plans for FY 2018 was \$1.7 billion with \$22.0 billion paid out FY 2009 thru FY 2018 (Pension CAFRs). This represents the amount paid to beneficiaries in excess of employer and employee contributions.

**OPEB - Other Post Employment Benefits

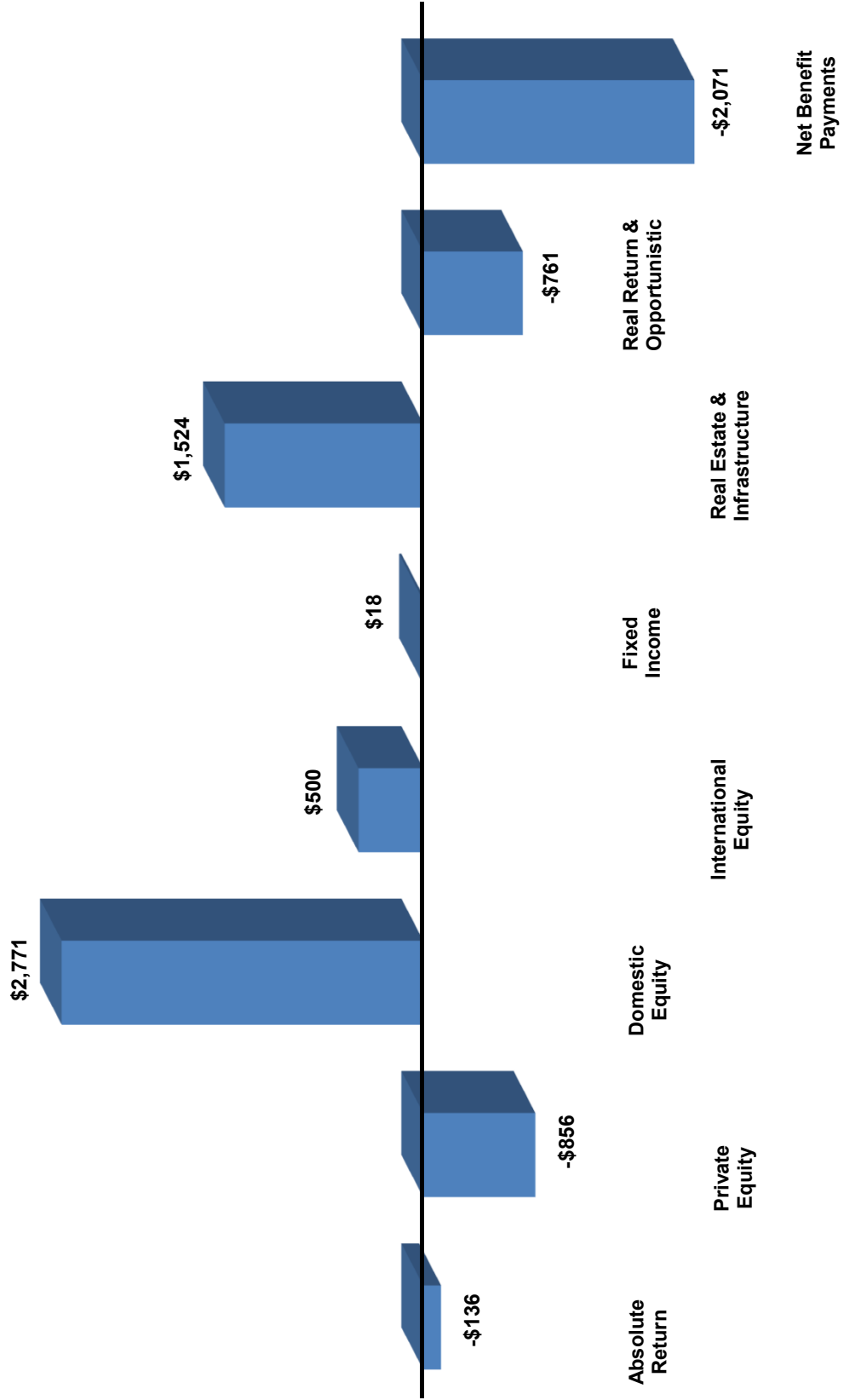
Sources and Uses of Cash

July 2018 ~ June 2019

7/01/18 Balance of Short-Term Cash: \$ 2,660

6/30/19 Balance of Short-Term Cash: 3,649

Net Short-Term Cash Increase: \$ 989



A negative number in an asset category indicates a use of cash, a positive number indicates a source of cash.

Dollars in millions

Asset Allocation Targets As of 6/30/19

Asset Class	MPERS		MSERS		MSPRS		MJRS		SMRS
	6/30/19	Target*	6/30/19	Target*	6/30/19	Target*	6/30/19	Target*	Ranges
Domestic Equity	22.4%	28.0%	22.4%	28.0%	22.4%	28.0%	22.5%	28.0%	20% - 35%
Private Equity	18.0%	18.0%	18.0%	18.0%	18.0%	18.0%	18.1%	18.0%	10% - 20%
International Equity	16.3%	16.0%	16.4%	16.0%	16.3%	16.0%	16.4%	16.0%	15% - 25%
Long Term Fixed Income	12.6%	10.5%	12.7%	10.5%	12.6%	10.5%	12.7%	10.5%	10% - 20%
Real Return & Opportunistic	10.7%	9.5%	10.7%	9.5%	10.7%	9.5%	10.7%	9.5%	5% - 15%
Real Estate & Infrastructure	9.4%	10.0%	9.4%	10.0%	9.4%	10.0%	9.4%	10.0%	5% - 15%
Absolute Return	5.7%	6.0%	5.7%	6.0%	5.7%	6.0%	5.8%	6.0%	3% - 9%
Short Term Fixed Income	4.8%	2.0%	4.6%	2.0%	4.8%	2.0%	4.4%	2.0%	1% - 6%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

*Complies with basket clause and international restrictions.

State of Michigan Retirement System

MARKETS REVIEW AND OUTLOOK

State of Michigan Investment Board Meeting

September 12, 2019



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

CAPITAL MARKETS

Return and Risk Assumptions, Benchmark and Outlook

A starting point.

MPSERS Plan	Assumed Return* (Arithmetic)	Standard Deviation*	Trailing 10-Year (Benchmark**)
Private Equity	11.4%	25.0%	18.9%
International Equity	9.5%	20.0%	6.3%
Domestic Equity	7.7%	18.0%	14.7%
Real Estate (Core)	7.0%	11.5%	7.9%
Absolute Return	5.3%	9.0%	4.4%
Real Ret/Opportunistic	8.7%	9.5%	4.9%
Long-Term Fixed Income	2.6%	4.0%	3.9%
Short-Term	2.0%	1.0%	0.4%

* Aon Investment Consultants 2019 Long-Term Return/Risk Assumptions

** Investment Policy Statement; Annualized Returns

*** Actual investments may differ due to changing conditions and the availability of new information

Overview

A market update.

- Capital market assumptions used for determining strategic asset allocations are being reduced across the board, and especially for safer, publicly traded fixed income securities. This is the general opinion for most consultants, investment banks, and other market participants. The reason for this phenomenon is the low interest rate environment caused by the policies of the Federal Reserve (Fed) and other central banks, as well as the run-up in prices for most risk assets over the past several years.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 17% discount to U.S. counterparts while emerging markets are at a 30% discount.
- The -13.7% underperformance of the Russell 2000 small cap index to the S&P 500 index over the past year is the second worst relative return between the two indexes in the past twenty years.
- By the end of July 2019, the U.S. 10-year Treasury was yielding 2.06% which was roughly 0.10% below the 3-month T-bill rate. This inversion of interest rates has persisted for close to two and a half months now and the 25 basis point cut in July did not help to change the yield curve slope to become positive.
- Over the past ten, twenty, and thirty years, publicly traded REITs have out-performed private real estate by 7.3%, 3.4% and 4.2% annualized respectively, though they are about three times more volatile.
- Since its inception, the Absolute Return portfolio's return has had a monthly beta of approximately 0.15 and annualized net alpha of 2.3%. The fund also has a low correlation to the Fixed Income benchmark; -0.1%, making it a good diversifier to equity and rates.
- In terms of major currencies besides the U.S. dollar (Japanese Yen, British Pound, Canadian and Australian Dollar) the price for an ounce of gold is at all-time highs.

International Equity

A compelling case.

- International equities underperformed domestic equities over the year ending June 2019 by -8.0%. Over the past three, five, seven, and ten years ending June 2019, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -4.5%, -8.3%, -7.5, and -8.2% annualized, respectively.
- The primary explanation for the MSCI ACWI ex USA index's annualized underperformance of -8.2% to the S&P 1500 domestic equity index over the past ten years is the -8.6% annualized differences in change in the multiples of the two indexes. The MSCI ACWI ex USA index multiple contracted at an annualized rate of -7.2% per year, while the multiple expansion in the U.S. market added approximately 1.4%. International earnings per share growth and dividend yields both were higher than the domestic equity index over the past decade.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 17% discount to U.S. counterparts while emerging markets are at a 30% discount.
- Within international equities, emerging market returns matched developed markets over the past year and exceeded over the past three and five years by 1.7% and 0.5% annualized, respectively. Over the past seven and ten years though, emerging has underperformed developed by -2.8%, and -0.9% annualized.

Domestic Equity

Size and Style factors in focus.

- The broad U.S. stock market return for the one year ending June 2019 was 9.3%. Small caps represented by the Russell 2000 index have underperformed larger caps S&P 500 index over the past decade. Over the past one, three, five, seven, and ten years small caps have underperformed large caps by -13.7%, -1.9%, -3.7%, -2.4% and -1.3% annualized respectively.
- The -13.7% underperformance of the Russell 2000 small cap index to the S&P 500 index over the past year is the second worst relative return between the two indexes in the past twenty years.
- Meanwhile, growth style continued its dominance over value stocks in the U.S. having outperformed by 3.4%, 6.2%, 4.9%, 3.1% and 2.9% annualized over the past one, three, five, seven and ten years, respectively. Earnings per share growth for U.S. value stocks averaged twice the rate as U.S. growth stocks over the past decade. However, value stock's multiples contracted while growth stock's multiples expanded significantly.
- Many equity valuation metrics are near historical averages. However, the absolute returns over the next cycle may not be as strong as the historical average of 11 – 12% year-over-year total returns. One reason for this is the fact that market EPS is above trend as is returns on equity. However, some of the largest companies in the market today are less cyclical (economically sensitive) as past market leaders.

Interest Rates

Lower interest rates.

- At its July 2019 meeting, the Federal Reserve Board voted to lower its key interest rate by 25 basis points. This was the first rate cut in over a decade, though certainly other major easing policies were implemented along the way such as the various Quantitative Easing (QE) policies. The market is currently pricing the probability of at least two additional rate cuts in 2019.
- By the end of July 2019, the U.S. 10-year Treasury was yielding 2.06% which was roughly 0.10% below the 3-month T-bill rate. This inversion of interest rates has persisted for close to two and a half months now and the 25 basis point cut in July did not help to change the yield curve slope to become positive.
- Spreads on investment-grade fixed income ended July at around its average level of 1.1%. Spreads on riskier high-yield assets were tighter at 90 basis points below average. Globally, at the end of July 2019, interest rates are very low. For example, the yields on German sovereign bonds are negative out through 20 years.

Real Estate

The benefit adding REITs.

- Over the one year ending June 2019, the REIT market, as measured by the NAREIT index, increased by 12.6% including dividends, significantly outpacing private real estate returns as measured by the NCREIF-ODCE Index by 8.7%. Over the past ten, twenty, and thirty years, publicly traded REITs have out-returned private real estate by 7.3%, 3.4% and 4.2% annualized, respectively, though they are about three times more volatile.
- Although investing in similar assets, the returns of publicly traded REITs and private real estate have historically been lowly (and at times are anti-) correlated to one another, meaning much of the REIT volatility is diversifiable.
- In fact, had the REID allocated up to 15% of its portfolio to REITs over the past decade, it could have earned approximately 130 basis points annualized higher returns without meaningfully changing the average annual volatility of returns.
- Dividend yields on REITs are around 3.7% which is nearly 1.7% higher than the yield of the ten-year U.S. Treasury. Historically, REIT dividend yields have averaged 1.2% higher than the ten-year U.S. Treasury.

Hedge Funds

Estimating the asset class return.

- Since its inception, the Absolute Return portfolio's return has had a monthly beta of approximately 0.15 and annualized net alpha of 2.3%. The fund also has a low correlation to the Fixed Income benchmark, -0.1%, making it a good diversifier to equity and rates.
- Based on an expected annualized equity market return of approximately 7.4%, should historical hedge fund betas and alphas continue, a 5.1% annualized net return seems like a reasonable assumed rate of return for hedge funds. This return is approximately 3-month U.S. Libor plus 300 basis points.

Commodities

Safe havens on a roll.

- Over the past ten years, commodities prices broadly have fallen, as measured by the Thomson Reuters CRB Commodity Index, down by roughly -27% from June 2009.
- The price for crude oil has decreased over the past year ending June 2019, down -21% year-over-year to approximately \$58.50 per barrel.
- The U.S. dollar has strengthened over the past year and a half. As measured by the DXY index, the dollar gained about 7% of value since December 2017 versus a basket of currencies.
- Safe haven commodity assets such as gold have performed well recently. By the end of July 2019, the dollar price for an ounce of gold was at \$1,426. This is 11.3% higher than the beginning of the year and 16.5% higher than one year prior. In terms of major currencies besides the U.S. dollar (Japanese Yen, British Pound, Canadian and Australian Dollar) the price for an ounce of gold is at all-time highs.
- At the end of July 2019, the price for the enigmatic cryptocurrency Bitcoin has nearly tripled year-to-date, hitting a price of \$10,026.61. This is about 30% higher than the previous year, but approximately -46% lower than its all-time high set in December 2017.

ECONOMIC OUTLOOK

Economic Overview

Will tariffs lead to a trade war?

- The most recent reading of the annualized U.S. GDP growth was 2.1%, slightly ahead of the consensus estimate of 1.8%. Current estimates for 2020 GDP growth for the U.S. are around 1.8%, however, there are increasingly more concerns regarding lower than forecasted growth.
- One primary area of concern is the changing global trade policies between the U.S. and its major trade partners, especially China, which are often referred to as a “trade war”. To date, various tariffs on Chinese exports have been levied, announcements for potential additional tariffs and negotiation meetings are made, and policy responses come from the trade partners.
- The JPMorgan Global Manufacturing Purchasing Manager Index (PMI) peaked in December 2017 and has been steadily declining since. In June 2019, the index fell to its lowest mark in over six years and it has been under 50 (deteriorating economic conditions) for two months in a row.
- A majority of countries have PMIs below 50, though the U.S. PMIs are still showing some modest expansions. However, within the U.S., Chicago (a regionally focused PMI) has measured a sharp contraction year-to-date and is now below 50.
- The Citi Global Economic Surprise Index is a measurement of whether global economic data is on average coming in above or below expectations. Since April of 2018, the index has been below 0, suggesting that economic data globally has been coming in below expectations on average for quite some time.
- The Federal Reserve Bank of New York recession probability index currently estimates the chance of a recession occurring in the U.S. in the next 12 months to be just over 30%. Important for consideration with this index, the measure has never hit 100% certainty even during a recession. In the last three recessions, the measure failed to hit over 50%, and in the last 50 years every measure of at least 30% has been associated with a recession.
- According to the U.S. Bureau of Economic Analysis, corporate profit earned in the U.S. peaked in Q3-2018 at just over \$1.87 trillion and its growth is essentially flat over the past four and a half years and is currently at \$1.79 trillion.
- Personal interest payments have soared by 55% over the past five years, despite historically low interest rates. Notable past periods that experienced this level of growth were the early 1980’s, the late 1990’s and 2007.
- Housing is performing poorly. The median selling price (smoothed over six months) for a new house has been lower year-over-year since November 2018. Historically, since the mid-1960’s, these prices have been flat to higher. Other notable periods that experienced negative prices were the 1970 recession, 1990 recession and Global Financial Crisis.
- Nationally the unemployment rate is very low by historical standards at 3.7%. The economy is still adding jobs, however according to data from the Bureau of Labor Statistics, the six-month average rate of 134,000 jobs added is a seven-year low.

State of Michigan Retirement System

DOMESTIC EQUITY REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Jack A. Behar, CFA
Senior Investment Manager
Domestic Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/19)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	9.6%	15.1%	10.6%	14.4%	14.6%
S&P 1500	9.3%	13.9%	10.5%	13.9%	14.7%
Peer Median Return	6.4%	11.5%	7.9%	12.4%	13.7%
Percentile Rank vs. Peers *	13	15	17	12	33

*State Street Universe greater than \$1 billion

- Total Domestic Equity outperformed its peer group and the S&P 1500 over one, three, five and seven-year time periods. During the past year performance was 20 basis points (bps) in excess of the benchmark net of fees, with incurred tracking error of 1.8%.
- SMRS pays roughly 8 bps per year in domestic equity fees versus its peer group at an estimated 20-25 bps (per the research of Aon/Hewitt in 2017), making net of fee peer group comparisons more favorable than what the table above indicates.
- Performance continued to be led by our growth manager roster which, in aggregate, outperformed the S&P 1500 by over 400 bps for the year. SMRS's internal Large Cap Consistent Growth fund posted an especially notable 22% return, besting the S&P 1500 by nearly 1200 bps.
- Performance driven by investments in Exelon, Square, Worldpay, Invitae, Conagra and Advanced Micro Devices among others.
- Mellon Capital returned 28.7% over the past year, contributing ~100 bps to the portfolio's overall return. This high beta portfolio is designed to help the division outperform in a rising market. It also holds long dated treasuries, which enabled the portfolio to outperform during the market selloff in May.
- LA Capital All-Cap Growth returned 14.6% for the year, beating the S&P 1500 by 530 bps while outpacing its benchmark S&P 1500 Growth Index over nearly all time periods. This is particularly notable because such outperformance was achieved with a lower risk profile than most indices and managers.
- Clarkston Capital's Large Cap strategy outperformed the S&P 1500 by 350 basis points over the past year. Inception to date performance for this Michigan based manager ranks in the top decile of managers in its peer group.

Asset Class Goal

To provide the SMRS with long-term domestic equity market returns or better, by investing in a diversified and attractively valued portfolio of companies at an index fund-like cost.

Strategy Update

- The Domestic Equity Portfolio is overweight the financial sector, defensive stocks and information technology while remaining underweight consumer discretionary and commodity related sectors. It's estimated portfolio beta is 1.1, so a significant market correction would present a modest headwind to performance.
 - Total Domestic Equity's portfolio would outperform the S&P 1500 by ~20% were it to appreciate to the market multiple of 17.5x from where it stands now at 14.4x, or if multiples between it and the benchmark were otherwise to converge.
 - In the event that multiples do not converge, the division remains in a position to outperform based on its higher level of dividend yield, coupled with faster earnings per share growth than the S&P 1500.
 - At the broader portfolio level, allocations to attractively valued financial and defensive stocks offset each other from an interest rate risk standpoint, paving the way for potential outperformance in most stable rate environments.

Market Environment and Outlook

- At ~17.5x forward earnings, equity markets trade at a premium to their historical average of 15.7x and nearly 3% below their twenty-five-year historical average of 18x, albeit with higher levels of profitability, which may prove to be cyclical.
- Factoring in the existing low level of interest rates, stocks are attractively priced for an environment where long-term bond yields are 4% or lower.
- The market is currently paying out 1.9% of its earnings in dividends and reducing shares outstanding by 3.1% by way of share buybacks, for a 5.0% total shareholder yield.
- It is also growing shareholders' equity at a rate of 2.2% by reinvesting roughly 15% of its earnings back into its underlying businesses.
- The market is thus poised to earn roughly 7.2% (shareholder yield of 5.0% + reinvestment rate of 2.2%) in an environment where stock multiples and returns on equity are stable. Go forward returns may also pick up if the reinvestment environment improves.
- Prospective market returns compare favorably to the 30-year U.S. Treasury at 2.5%, and unfavorably to the historical compound annual return for the S&P 500 from 1928 – 2018 of 9.5%.

SMRS
Domestic Equity Strategies
6/30/19

Markets	Amount	Total	% of Total
Internal Indexed (\$ in Millions)			
Indexed Portfolios	\$6,725		
Total Indexed		\$6,725	40.5%
Internal Active			
Active Portfolios	\$5,176		
Total Internal Active		\$5,176	31.0%
External Active			
Los Angeles Capital	\$1,225		
Mellon Capital	946		
Fisher Investments	664		
Seizert Capital Partners	537		
ARK Investments	490		
Clarkston Capital Partners	473		
Attucks Asset Management	133		
Bivium Capital	130		
Ancora	96		
NorthPointe Capital	22		
Munder Capital Management	16		
Total External Active		\$4,735	28.5%

Total Domestic Equity

\$16,636

100.0%

SMRS

Domestic Equities Composite

6/30/19

Date:	<u>6/30/19</u>	<u>3/31/19</u>	<u>12/31/18</u>	<u>9/30/18</u>
Assets (\$ in Millions):	\$16,636	\$17,963	\$15,693	\$19,214
Number of Securities:	1,296	1,314	1,295	1,370
Active Share:	49%	47%	49%	44%

Description: The Domestic Equities Composite combines both the SMRS' Actively Managed Composite and its index funds.

Characteristics	<u>SMRS</u>	<u>S&P 1500</u>	<u>S&P 1500 Value</u>
Market Capitalization (\$ in Billions)	\$225.0	\$217.7	\$162.8
P/E FY1	14.4x	17.5x	14.2x
P/E upside to S&P 1500	21.8%	0.0	23.3%
Price/Book	3.7x	3.1x	2.1x
Return on Equity	24.3%	17.7%	15.2%
Risk Metrics			
Beta	1.13	1.00	0.89
Tracking Error	2.6%	0.0%	3.8%
Projected Returns			
Dividend Yield	3.0%	1.9%	2.5%
Buyback Yield	3.2%	3.1%	3.7%
Reinvestment Rate	<u>2.6%</u>	<u>2.2%</u>	<u>1.9%</u>
Projected Investment Return	<u>8.8%</u>	<u>7.2%</u>	<u>8.1%</u>

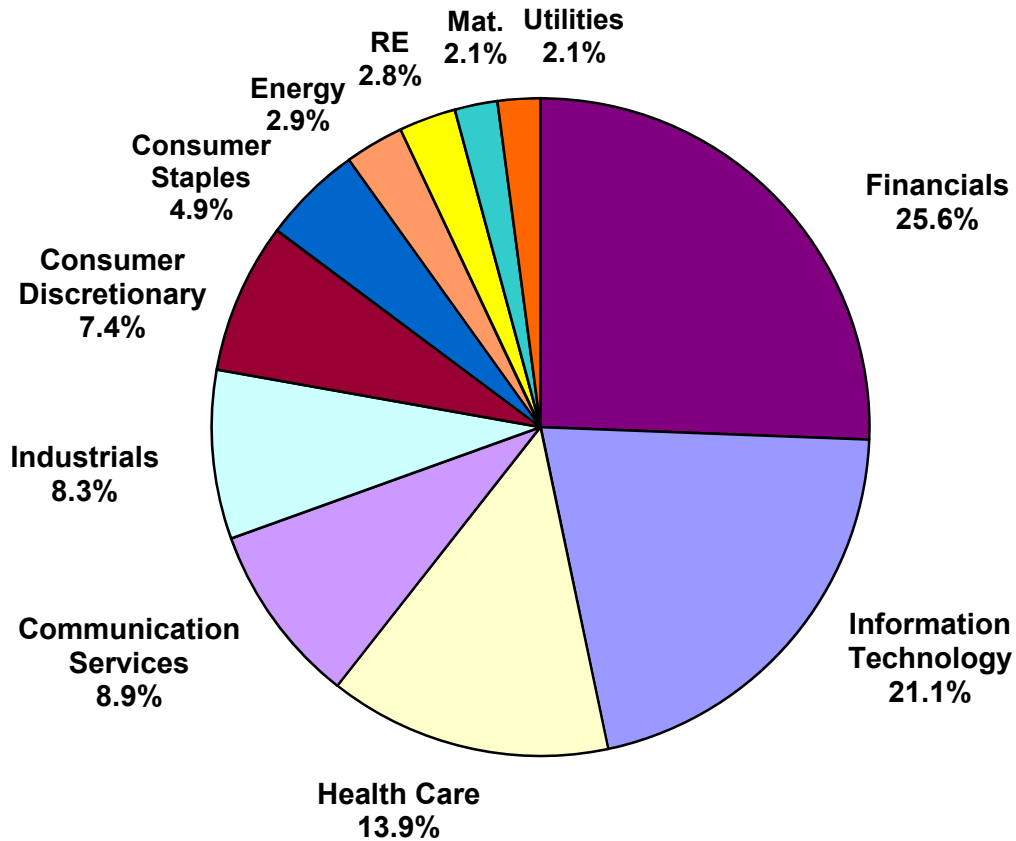
TOP TEN EXPOSURES – Domestic Equities vs S&P 1500 6/30/19

<u>Domestic Equity Portfolio</u>			<u>S&P 1500</u>		
<u>Company Name</u>	<u>Portfolio Weight</u>	<u>FY1 P/E</u>	<u>Company Name</u>	<u>Market Weight</u>	<u>FY1 P/E</u>
SPDR S&P 500 ETF Trust	18.5%	17.7	Microsoft Corp.	3.8%	29.6
SPDR Port. LT Treasury ETF	7.6%	39.0	Apple, Inc.	3.2%	17.6
Berkshire Hathaway, Inc. B	2.7%	14.3	Amazon.com, Inc.	2.9%	70.3
Apple, Inc..	2.7%	17.6	Facebook, Inc. Class A	1.7%	26.4
AGNC Investment Corp.	2.7%	8.3	Berkshire Hathaway, Inc. B	1.5%	14.3
Microsoft Corp.	2.7%	29.6	Johnson & Johnson	1.4%	16.2
Facebook, Inc. Class A	2.1%	26.4	JPMorgan Chase & Co.	1.4%	11.3
Wells Fargo & Company	1.8%	10.1	Alphabet, Inc., Class C	1.2%	23.8
Annaly Capital Mgmt., Inc.	1.8%	8.4	Alphabet, Inc., Class A	1.2%	23.8
Amazon.com, Inc.	1.8%	70.3	Exxon Mobil Corp.	1.2%	19.4
TOTAL	<u>44.4%</u>	<u>17.8</u>	TOTAL	<u>19.5%</u>	<u>20.1</u>

SMRS

Domestic Equity By Sector

6/30/19



Market Value in Millions				
6/30/19				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$4,254	25.6%	13.4%	12.2%
Information Technology	3,506	21.1%	20.9%	0.2%
Health Care	2,321	13.9%	13.8%	0.1%
Communication Services	1,475	8.9%	9.5%	-0.6%
Industrials	1,380	8.3%	10.1%	-1.8%
Consumer Discretionary	1,234	7.4%	10.4%	-3.0%
Consumer Staples	826	4.9%	6.9%	-2.0%
Energy	478	2.9%	4.9%	-2.0%
Real Estate	470	2.8%	3.6%	-0.8%
Materials	347	2.1%	3.1%	-1.0%
Utilities	345	2.1%	3.4%	-1.3%
Total	<u>\$16,636</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: S&P 1500

SMRS

Actively Managed Composite

6/30/19

Date:	<u>6/30/19</u>	<u>3/31/19</u>	<u>12/31/19</u>	<u>9/30/18</u>
Assets (\$ in Millions):	\$9,911	\$10,005	\$8,655	\$10,696
Number of Securities:	1,036	1,086	1,021	1,073
Active Share:	82%	83%	85%	77%

Description: The Actively Managed Composite is designed to add consistent alpha by investing in managers with value-added, but diverse strategies. While the expectation is that most will outperform over time, the composite is designed such that they do so during differing parts of the business cycle.

Characteristics	<u>SMRS</u>	<u>S&P 1500</u>	<u>S&P 1500 Value</u>
Market Capitalization (\$ in Billions)	\$178.3	\$217.7	\$162.8
P/E FY1	12.6x	17.5x	14.2x
P/E upside to S&P 1500	38.9%	0.0	23.3%
Price/Book	3.9x	3.1x	2.1x
Return on Equity	29.1%	17.7%	15.2%
Risk Metrics			
Beta	1.21	1.00	0.89
Tracking Error	4.3%	0.0%	3.8%
Projected Returns			
Dividend Yield	3.8%	1.9%	2.5%
Buyback Yield	3.4%	3.1%	3.7%
Reinvestment Rate	<u>2.8%</u>	<u>2.2%</u>	<u>1.9%</u>
Projected Investment Return	<u>10.0%</u>	<u>7.2%</u>	<u>8.1%</u>

TOP TEN EXPOSURES – Actively Managed Equities vs S&P 1500

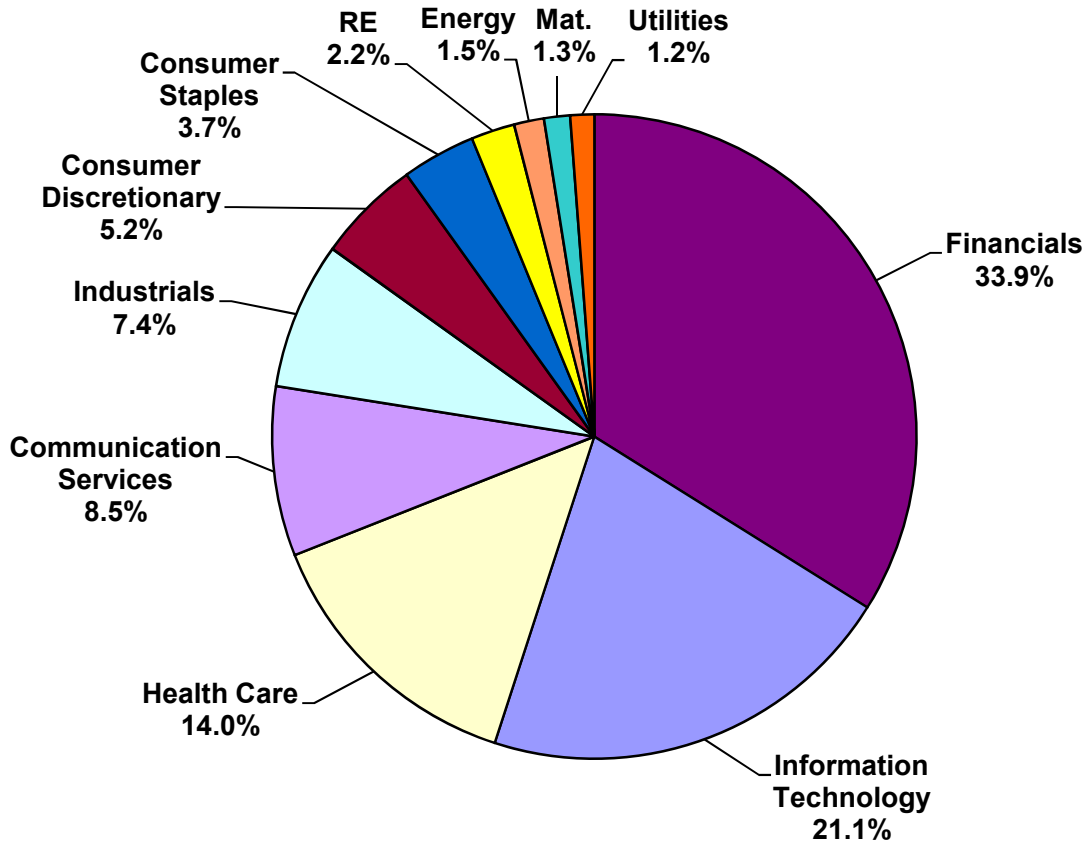
6/30/19

<u>Actively Managed Equity Portfolio</u>			<u>S&P 1500</u>		
<u>Company Name</u>	<u>Portfolio Weight</u>	<u>FY1 P/E</u>	<u>Company Name</u>	<u>Market Weight</u>	<u>FY1 P/E</u>
SPDR S&P 500 ETF Trust	27.7%	17.7	Microsoft Corp.	3.8%	29.6
SPDR Port. LT Treasury ETF	12.7%	39.0	Apple, Inc.	3.2%	17.6
AGNC Investment Corp.	4.5%	8.3	Amazon.com, Inc.	2.9%	70.3
Berkshire Hathaway, Inc. B	4.0%	14.3	Facebook, Inc. Class A	1.7%	26.4
Annaly Capital Mgmt., Inc.	3.0%	8.4	Berkshire Hathaway, Inc. B	1.5%	14.3
Wells Fargo & Company	2.6%	10.1	Johnson & Johnson	1.4%	16.2
Ally Financial, Inc.	2.4%	8.6	JPMorgan Chase & Co.	1.4%	11.3
Apple, Inc.	2.4%	17.6	Alphabet, Inc., Class C	1.2%	23.8
Facebook, Inc. Class A	2.4%	26.4	Alphabet, Inc., Class A	1.2%	23.8
Gilead Sciences, Inc.	<u>2.4%</u>	<u>9.9</u>	Exxon Mobil Corp.	<u>1.2%</u>	<u>19.4</u>
TOTAL	<u>64.1%</u>	<u>15.7</u>	TOTAL	<u>19.5%</u>	<u>20.1</u>

SMRS

Active Equity By Sector

6/30/19



Market Value in Millions				
6/30/19				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$3,359	33.9%	13.4%	20.5%
Information Technology	2,092	21.1%	20.9%	0.2%
Health Care	1,391	14.0%	13.8%	0.2%
Communication Services	837	8.5%	9.5%	-1.0%
Industrials	736	7.4%	10.1%	-2.7%
Consumer Discretionary	515	5.2%	10.4%	-5.2%
Consumer Staples	367	3.7%	6.9%	-3.2%
Real Estate	222	2.2%	3.6%	-1.4%
Energy	150	1.5%	4.9%	-3.4%
Materials	126	1.3%	3.1%	-1.8%
Utilities	116	1.2%	3.4%	-2.2%
Total	<u>\$9,911</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: S&P 1500

Manager Performance - Net of Fees

6/30/19

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
SMRS S&P 500 Index	\$6,185,609,690	10.3%	14.3%	10.8%	14.2%	--	N/A
S&P 500		10.4%	14.2%	10.7%	14.0%	--	
Style & Risk Adjusted Benchmark		10.4%	14.1%	10.7%	13.9%	--	
Lipper Large-Cap Core		9.4%	13.1%	9.4%	12.9%	--	
<i>Excess Return</i>		-0.1%	0.1%	0.1%	0.2%	--	
<i>Alpha</i>		0.0%	0.1%	0.2%	0.2%	--	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		40	27	19	14	--	
SMRS Large-Cap Core	2,285,673,422	6.3%	16.1%	9.8%	15.0%	8.7%	8/31/07
S&P 500		10.4%	14.2%	10.7%	14.0%	8.4%	
Style & Risk Adjusted Benchmark		13.2%	18.5%	11.7%	15.3%	9.0%	
Lipper Large-Cap Core		9.4%	13.1%	9.4%	12.9%	7.6%	
<i>Excess Return</i>		-4.2%	1.9%	-1.0%	1.1%	0.3%	
<i>Alpha</i>		-6.9%	-2.4%	-1.9%	-0.2%	-0.3%	
<i>Pct Rank vs Lipper Large-Cap Core</i>		83	5	47	7	15	
SMRS All-Cap Garp	1,648,807,805	7.3%	12.4%	8.7%	12.5%	12.7%	4/30/11
S&P 1500 Super Composite		9.3%	13.9%	10.5%	13.9%	12.3%	
Style & Risk Adjusted Benchmark		7.5%	14.9%	10.8%	14.2%	12.5%	
Lipper Multi-Cap Core		6.0%	12.1%	7.9%	12.1%	10.1%	
<i>Excess Return</i>		-2.0%	-1.5%	-1.8%	-1.4%	0.4%	
<i>Alpha</i>		-0.2%	-2.4%	-2.1%	-1.7%	0.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		46	51	43	56	3	
Mellon US Equity Enhanced	946,721,320	28.7%	--	--	--	27.9%	3/1/17
S&P 500		10.4%	--	--	--	12.0%	
Style & Risk Adjusted Benchmark		14.5%	--	--	--	21.9%	
<i>Lipper Large-Cap Core</i>		9.4%	--	--	--	11.1%	
<i>Excess Return</i>		18.2%	--	--	--	15.9%	
<i>Alpha</i>		14.1%	--	--	--	6.1%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		1	--	--	--	1	
SMRS Large-Cap Growth	696,282,800	11.5%	17.4%	12.5%	15.6%	10.2%	5/31/05
S&P 500 Growth		12.0%	17.3%	13.1%	15.5%	10.4%	
Style & Risk Adjusted Benchmark		11.8%	18.7%	13.8%	16.5%	10.7%	
Lipper Large-Cap Growth		10.7%	17.8%	12.5%	15.1%	10.0%	
<i>Excess Return</i>		-0.5%	0.2%	-0.6%	0.1%	-0.2%	
<i>Alpha</i>		-0.3%	-1.3%	-1.3%	-0.8%	-0.4%	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		35	54	57	36	37	
Fisher All-Cap	664,547,024	10.9%	17.3%	12.8%	14.5%	11.1%	10/31/04
S&P 1500		9.3%	13.9%	10.5%	13.9%	9.2%	
Style & Risk Adjusted Benchmark		10.5%	14.8%	11.5%	14.8%	11.0%	
Lipper Multi-Cap Core		6.0%	12.1%	7.9%	12.1%	7.9%	
<i>Excess Return</i>		1.6%	3.4%	2.3%	0.6%	1.9%	
<i>Alpha</i>		0.4%	2.5%	1.3%	-0.3%	0.1%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		15	1	2	3	1	
LA Capital All-Cap Growth	623,747,030	14.6%	14.7%	13.5%	16.6%	12.2%	5/31/05
S&P 1500 Growth		11.0%	16.8%	12.7%	15.3%	10.4%	
Style & Risk Adjusted Benchmark		10.1%	15.1%	11.0%	13.6%	9.6%	
Lipper Multi-Cap Growth		10.2%	16.8%	10.8%	14.0%	9.8%	
<i>Excess Return</i>		3.6%	-2.1%	0.8%	1.3%	1.7%	
<i>Alpha</i>		4.5%	-0.4%	2.5%	2.9%	2.5%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		21	72	15	14	8	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
LA Capital Deep Value	600,887,599	1.2%	9.5%	--	--	6.7%	4/1/15
S&P 1500 Value		7.5%	10.6%	--	--	8.2%	
Style & Risk Adjusted Benchmark		0.9%	11.2%	--	--	8.5%	
Lipper Multi-Cap Value		3.2%	9.8%	--	--	6.3%	
<i>Excess Return</i>		-6.3%	-1.0%	--	--	-1.4%	
<i>Alpha</i>		0.3%	-1.7%	--	--	-1.8%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		73	60	--	--	40	
SMRS Mid-Cap Index	539,416,236	1.4%	11.4%	8.6%	13.3%	--	N/A
S&P 400		1.4%	10.9%	8.0%	12.7%	--	
Style & Risk Adjusted Benchmark		1.4%	10.9%	8.0%	12.6%	--	
Lipper Mid-Cap Core		3.6%	10.5%	6.5%	11.5%	--	
<i>Excess Return</i>		0.0%	0.5%	0.6%	0.6%	--	
<i>Alpha</i>		0.0%	0.6%	0.6%	0.7%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		68	39	26	12	--	
Seizert Capital Partners	536,972,417	3.7%	12.8%	7.1%	13.1%	13.0%	11/30/09
S&P 1500 Value		7.5%	10.6%	7.8%	12.2%	12.2%	
Style & Risk Adjusted Benchmark		-4.9%	10.4%	7.9%	12.2%	12.3%	
Lipper Multi-Cap Value		3.2%	9.8%	6.0%	11.0%	10.8%	
<i>Excess Return</i>		-3.8%	2.3%	-0.7%	1.0%	0.8%	
<i>Alpha</i>		8.6%	2.5%	-0.7%	0.9%	0.6%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		41	3	28	5	6	
Large-Cap Consistent Growth	514,065,966	22.1%	18.8%	--	--	14.7%	3/1/15
S&P 500		10.4%	14.2%	--	--	10.3%	
Style & Risk Adjusted Benchmark		11.5%	15.2%	--	--	11.1%	
Lipper Large-Cap Core		9.4%	13.1%	--	--	9.0%	
<i>Excess Return</i>		11.6%	4.7%	--	--	4.4%	
<i>Alpha</i>		10.6%	3.6%	--	--	3.6%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		1	1	--	--	1	
Ark Investments	489,982,841	7.1%	33.8%	--	--	33.5%	3/1/16
S&P 1500 Growth		11.0%	16.8%	--	--	17.7%	
Style & Risk Adjusted Benchmark		-2.1%	29.7%	--	--	30.5%	
Lipper Multi-Cap Growth		10.2%	16.8%	--	--	17.4%	
<i>Excess Return</i>		-3.9%	17.0%	--	--	15.7%	
<i>Alpha</i>		9.1%	4.1%	--	--	2.9%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		73	1	--	--	1	
Clarkston Capital Large-Cap	273,015,281	12.7%	11.0%	--	--	9.8%	4/1/15
S&P 500 Value		8.7%	10.6%	--	--	8.3%	
Style & Risk Adjusted Benchmark		6.5%	8.6%	--	--	6.6%	
Lipper Large-Cap Value		6.8%	10.9%	--	--	7.8%	
<i>Excess Return</i>		4.0%	0.3%	--	--	1.5%	
<i>Alpha</i>		6.2%	2.4%	--	--	3.2%	
<i>Pct. Rank vs. Lipper Large-Cap Value</i>		5	49	--	--	6	
Clarkston Capital Small/Mid-Cap	200,257,553	4.4%	10.4%	10.4%	--	10.7%	1/1/14
S&P 400		-0.6%	11.2%	8.1%	--	8.6%	
Style & Risk Adjusted Benchmark		1.4%	7.6%	5.9%	--	6.4%	
Lipper Mid-Cap Core		3.6%	10.5%	6.5%	--	7.1%	
<i>Excess Return</i>		5.0%	-0.9%	2.3%	--	2.2%	
<i>Alpha</i>		3.0%	2.8%	4.5%	--	4.3%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		46	54	3	--	3	
Attucks Asset Management	133,574,050	5.7%	11.5%	7.0%	11.4%	6.6%	11/30/07
S&P 1500		9.3%	13.9%	10.5%	13.9%	8.0%	
Style & Risk Adjusted Benchmark		9.1%	9.7%	10.4%	13.9%	8.0%	
Lipper Multi-Cap Core		6.0%	12.1%	7.9%	12.1%	6.5%	
<i>Excess Return</i>		-3.6%	-2.4%	-3.4%	-2.5%	-1.4%	
<i>Alpha</i>		-3.4%	1.8%	-3.4%	-2.6%	-1.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		57	65	70	73	49	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
Bivium Capital Partners	130,290,264	7.0%	11.2%	7.0%	10.8%	6.2%	11/30/07
S&P 1500 Value		7.5%	10.6%	7.8%	12.2%	6.0%	
Style & Risk Adjusted Benchmark		7.9%	11.1%	8.2%	12.6%	8.3%	
Lipper Multi-Cap Value		3.2%	9.8%	6.0%	11.0%	5.5%	
<i>Excess Return</i>		-0.5%	0.7%	-0.8%	-1.3%	0.2%	
<i>Alpha</i>		-0.8%	0.1%	-1.1%	-1.8%	-2.1%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		21	21	30	60	27	
Ancora	96,074,054	-1.6%	--	--	--	3.4%	10/1/17
S&P 1000		-0.6%	--	--	--	5.8%	
Style & Risk Adjusted Benchmark		-6.0%	--	--	--	5.6%	
Lipper Mid-Cap Core		3.6%	--	--	--	6.2%	
<i>Excess Return</i>		-1.0%	--	--	--	-2.4%	
<i>Alpha</i>		4.4%	--	--	--	-2.1%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		83	--	--	--	76	
NorthPointe All-Cap Core	22,021,525	5.3%	8.3%	6.1%	10.6%	7.0%	10/31/04
S&P 1500 Value		7.5%	10.6%	7.8%	12.2%	8.0%	
Style & Risk Adjusted Benchmark		6.6%	9.0%	7.0%	10.3%	9.7%	
Lipper Multi-Cap Value		3.2%	9.8%	6.0%	11.0%	7.1%	
<i>Excess Return</i>		-2.2%	-2.3%	-1.7%	-1.5%	-0.9%	
<i>Alpha</i>		-1.3%	-0.7%	-0.9%	0.4%	-2.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		30	85	49	66	51	

State of Michigan Retirement System

PRIVATE EQUITY REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Peter A. Woodford
Senior Investment Manager
Private Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/19)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	14.0%	15.3%	12.6%	14.0%	15.4%
PE Benchmark Returns	12.8%	16.9%	14.2%	16.2%	19.4%
Peer Median Returns	7.7%	10.0%	8.7%	9.9%	10.6%
Percentile Rank vs. Peers*	8	12	15	10	15

*State Street Universe greater than \$1 billion

- Private Equity returns have been strong relative to peer median returns, ranking in the top 15% of peers over the past ten years. Outperformance to peers is attributable to fund selectivity and strategy.
- It is not unusual for private equity returns to lag the public benchmark returns during periods of expansion and lead the public benchmark during periods of contraction. The past ten years have been no exception due to the longest expansion in U.S. history. Over this period, the Private Equity Division has outperformed the S&P by 72 basis points (ten-year S&P 500 return 14.7%) and underperformed the benchmark by 3.9%.
- For the twelve months ending June 30, 2019, the Private Equity Division made contributions of approximately \$856 million, net of distributions. Although the pace of distributions continues to slow, distribution activity should remain healthy for as long as the economic expansion continues with General Partners incentivized to exit investments at current valuations. This, however, is offset by newly raised funds continuing to deploy capital at the aforementioned valuations.
- Commitments closed during the quarter include:
 - \$250 million to Advent International GPE IX, a large buyout fund focused on Western Europe and North America.
 - \$150 million to Dover Street X, a global secondary fund.
 - \$100 million to Harvest Partners VIII, a middle-market buyout fund focused on North America.
 - \$85.4 million to Permira VII, a global large buyout fund.
 - \$75 million to Clearlake Opportunities Partners II, a non-control and special situations focused fund.
 - \$75 million to HarbourVest Credit Opportunities Fund II, a global junior credit fund.
 - \$75 million to Warburg Pincus China-Southeast Asia II, a growth equity fund.
 - \$65 million to Vista Equity Endeavor Fund II, a control oriented lower middle-market growth fund.
 - \$12.5 million to Accel London VI, a Europe-focused multi-stage venture capital fund.

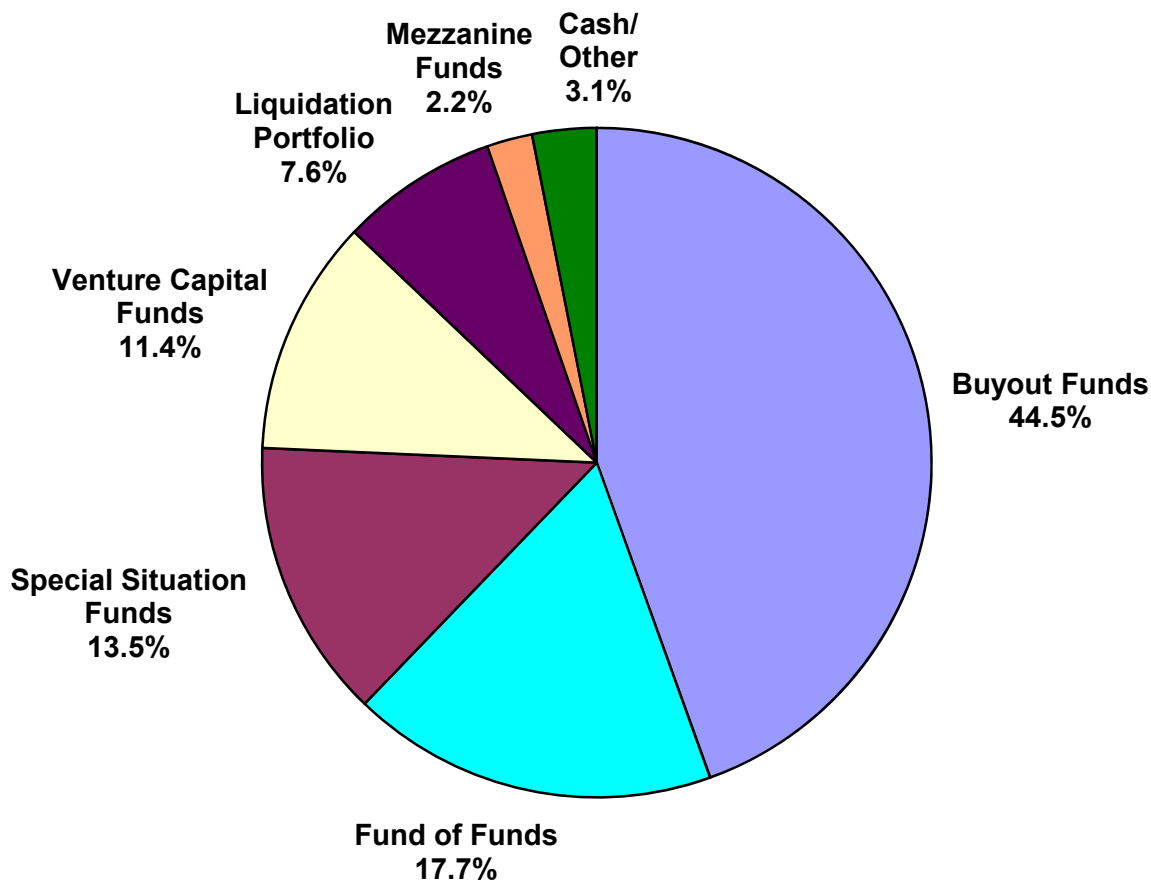
Strategy Update

The strategy for the next twelve months will focus on new sponsors raising capital and existing sponsors raising successor funds. This may be a combination of buyout, venture capital, secondary, and growth equity funds seeking new commitments. The Private Equity Division continues to tilt slightly toward the middle and lower-middle market to diversify its exposure to large funds. Co-investments continue to play an important role in both averaging down costs and targeting specific investments with attractive risk/return characteristics.

SMRS

Private Equity

6/30/19



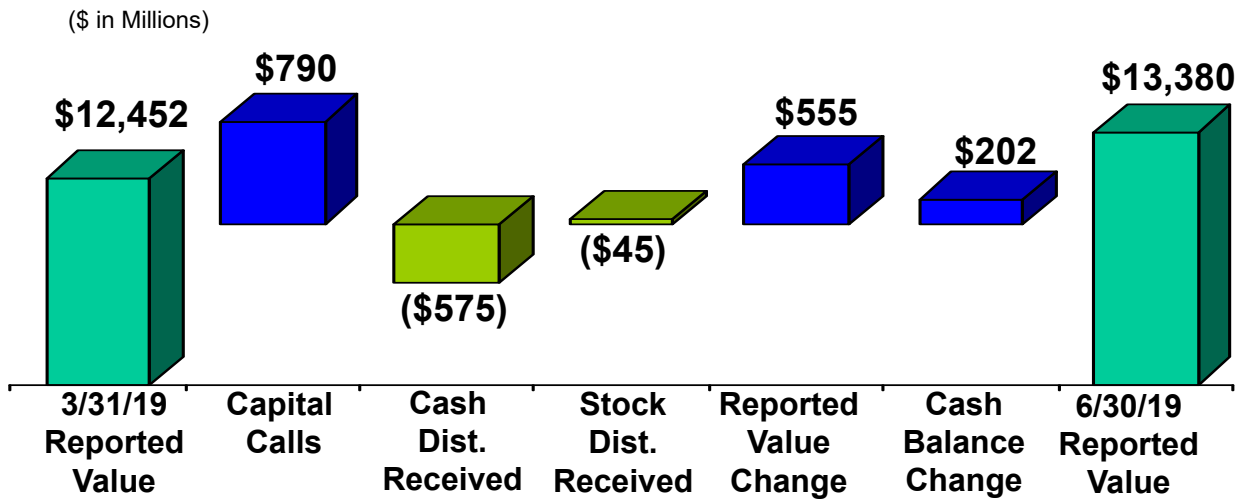
Market Value in Millions				
	<u>6/30/19</u>		<u>6/30/18</u>	
Buyout Funds	\$5,947	44.5%	\$4,975	44.9%
Fund of Funds	2,368	17.7%	1,458	13.2%
Special Situation Funds	1,810	13.5%	1,736	15.7%
Venture Capital Funds	1,518	11.4%	1,192	10.7%
Liquidation Portfolio	1,022	7.6%	1,310	11.8%
Mezzanine Funds	295	2.2%	201	1.8%
Cash/Other	420	3.1%	206	1.9%
Total	<u>\$13,380</u>	<u>100.0%</u>	<u>\$11,078</u>	<u>100.0%</u>

SMRS

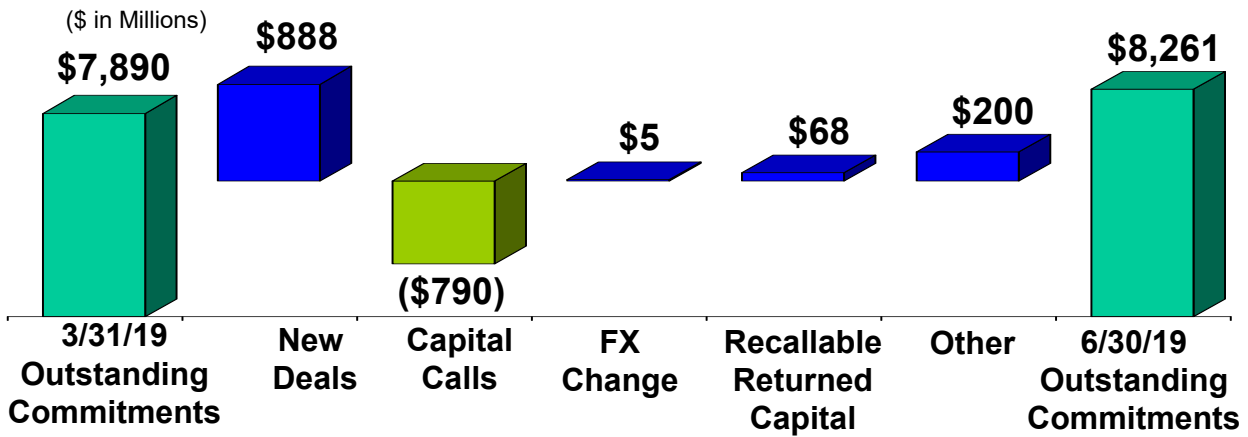
Private Equity

6/30/19

Invested Commitments



Outstanding Commitments

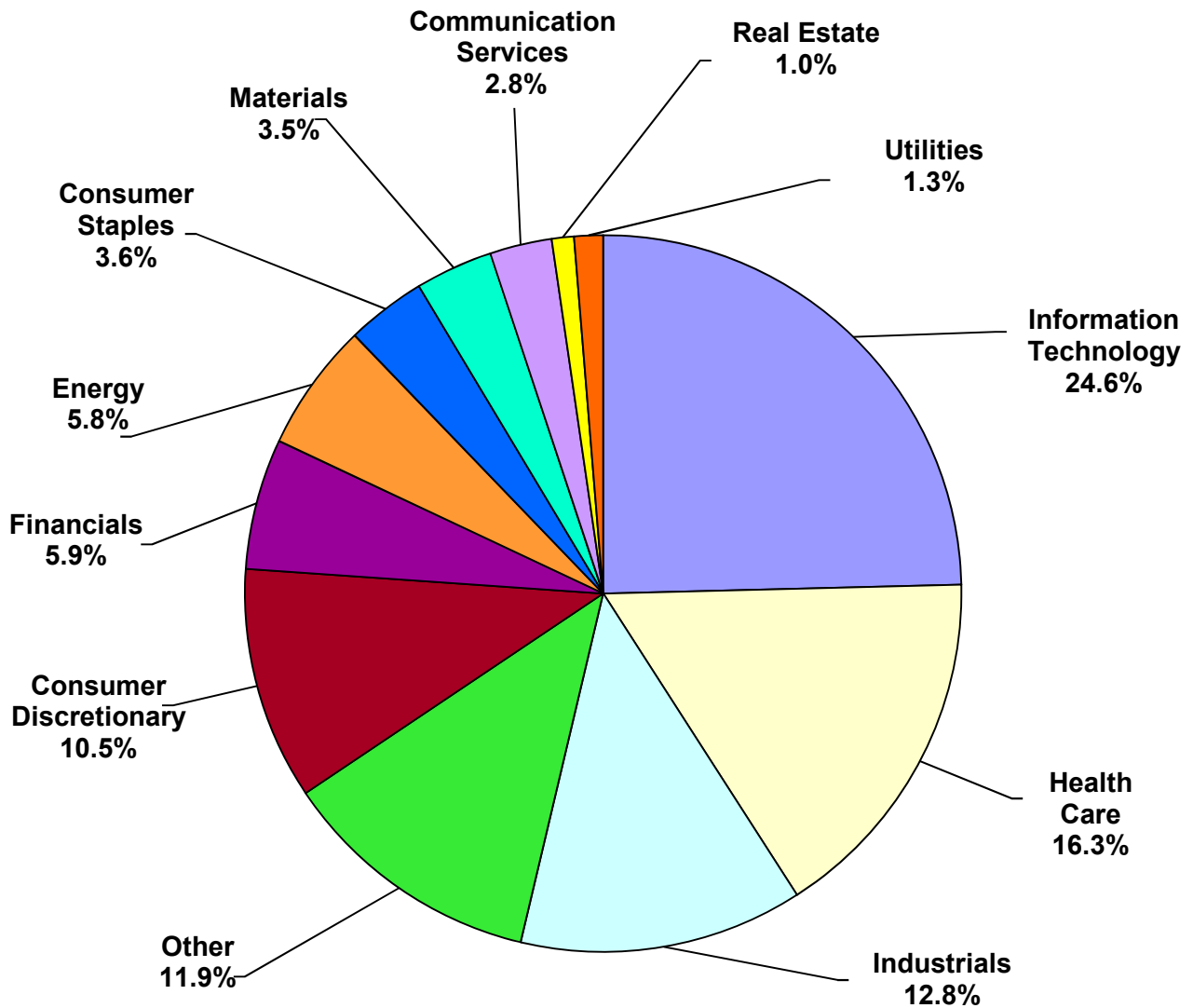


SMRS

Private Equity

6/30/19

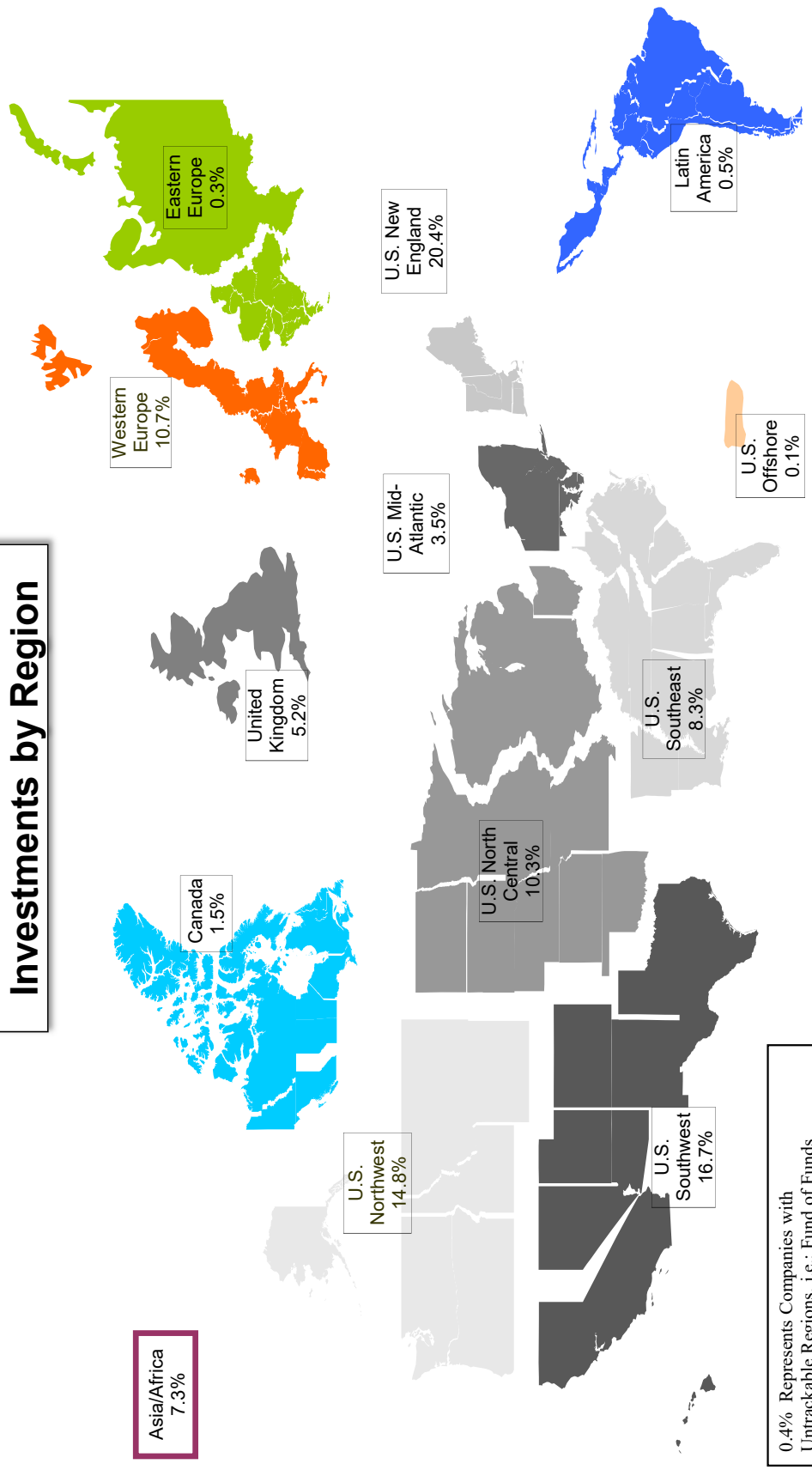
Investments by Industry



These numbers are based on the most recent available General Partner Data; primarily 3/31/19 and are subject to change.

SMRS Private Equity 6/30/19

Investments by Region



0.4% Represents Companies with Untrackable Regions, i.e.; Fund of Funds

Geographic Report: North America 74%, Europe 16%, Asia 7%, Other 3%

SMRS Private Equity 6/30/19

Portfolio by Vintage Year

(\$ in Millions)

Asset Vintage	Reported Value	Outstanding Commitment	Total Exposure
1986-98	\$ 2	\$ 2	\$ 4
1999	5	5	10
2000	34	21	55
2001	56	30	86
2002	2	3	5
2003	5	8	13
2004	82	34	116
2005	204	24	228
2006*	479	172	651
2007	362	128	490
2008	569	93	662
2009	27	1	28
2010	247	4	251
2011	638	96	734
2012	1,257	94	1,351
2013	387	114	501
2014	1,421	299	1,720
2015	4,583	1,221	5,804
2016	1,557	836	2,393
2017	546	1,134	1,680
2018	441	2,418	2,859
2019	55	1,524	1,579
Income Accruals	1	0	1
Cash	409	0	409
Act. Small Cap - Stock Dist	11	0	11
Total	\$ 13,380	\$ 8,261	\$ 21,641

*Liquidation portfolio is 2006 vintage

FX Exposure

(\$ in Millions)

	Reported Value	Outstanding Commitment	Total Exposure	Total (USD)
Euro (\$1.14/ €)	€ 383	€ 406	€ 789	\$899

SMRS

Private Equity

6/30/2019

Top 10 Sponsors

(\$ in Millions)

<u>Asset Type</u>	<u>Reported Value</u>	<u>Outstanding Commitment</u>	<u>Total</u>
HarbourVest Partners	\$ 2,989	\$ 1,122	\$ 4,111
Blackstone Capital Partners	537	477	1,014
Warburg, Pincus Capital	625	337	962
KKR	563	347	910
The Carlyle Group	379	450	829
Advent International	455	317	772
Grosvenor Capital Management	553	115	668
Leonard Green & Partners	415	123	538
Flagship Ventures	336	144	480
The Riverside Company	263	212	475
Top 10 Total Value	\$ 7,115	\$ 3,644	\$ 10,759

Cash Weighted Rates of Return*

<u>(Net IRR)</u>	<u>Current Qtr.</u>	<u>1-Year</u>	<u>3-Year</u>	<u>5-Year</u>	<u>10-Year</u>
Buyout	0.3%	9.3%	16.7%	13.0%	17.6%
Fund of Funds	0.0%	10.0%	14.5%	12.9%	12.6%
Mezzanine	0.0%	8.1%	12.1%	8.1%	10.5%
Special Situations	0.4%	2.9%	10.7%	8.1%	13.1%
Venture Capital	0.0%	4.0%	14.3%	13.1%	20.9%

*These numbers are based on most recent available General Partner reported data; primarily 3/31/19 and are subject to change.

SMRS

Private Equity

6/30/19

Net Market Values by Ownership Entity

	Adjusted Reported Value	Unfunded Commitment
5AM Opportunities I, L.P.	\$ 3,171,156	\$ 26,775,000
5AM Ventures VI, L.P.	1,334,517	18,400,000
Accel Europe I, L.P.	3,204,303	1
Accel Europe II	20,658,702	3,300,000
Accel Growth Fund II, L.P.	14,169,006	240,000
Accel Growth Fund III, L.P.	16,986,729	1,120,000
Accel Growth Fund IV L.P.	22,804,524	990,000
Accel Growth Fund V L.P.	5,625,000	22,500,000
Accel IX, L.P.	3,744,794	3,000,000
Accel Leaders Fund II L.P.	1,406,250	7,968,750
Accel Leaders Fund L.P.	6,287,064	0
Accel London V L.P.	15,547,462	2,400,000
** Accel London VI, L.P.	750,000	11,750,000
Accel VI-S	2,128,408	652,611
Accel VI, L.P.	872,686	0
Accel VIII, L.P.	245,777	4,782,499
Accel X, L.P.	13,861,080	0
Accel XI, L.P.	9,717,563	1,680,000
Accel XII, L.P.	7,775,709	1,190,000
Accel XIII, L.P.	5,899,629	4,300,000
Accel XIV L.P.	1,450,000	8,550,000
Advent Global Private Equity V	6,887,299	8,700,000
** Advent International GPE IX, L.P.	0	250,000,000
Advent International GPE VI-A LP	38,749,154	0
Advent International GPE VII-B, L.P.	166,676,430	12,000,000
Advent International GPE VIII-B, L.P.	219,516,062	35,775,001
Advent Latin American Private Equity Fund VI, L.P.	23,596,448	10,605,000
Affinity Asia Pacific Fund III, L.P.	37,039,442	10,550,074
Affinity Asia Pacific Fund IV, L.P.	99,714,611	20,327,369
Affinity Asia Pacific Fund V L.P.	33,911,768	139,921,607
AIP VII, L.P.	0	75,000,000
Apax Digital, L.P.	11,582,144	38,352,832
Apax Europe Fund VI	18,110,990	2,408,332
Apax Europe VII, L.P.	25,265,792	1,696,107
Apax IX, L.P.	94,685,107	81,077,199
Apax US VII	10,208,513	417,509
Apax VIII - B, L.P.	65,074,227	7,322,257
Apollo Investment Fund IX, L.P.	7,942,154	90,427,643
Apollo Investment Fund VIII L.P.	86,368,446	16,376,666

	Adjusted Reported Value	Unfunded Commitment
Arboretum Ventures II	1,975,941	0
Arboretum Ventures III, L.P.	16,406,726	0
Arboretum Ventures IV, L.P.	23,805,590	12,090,000
Arboretum Ventures V, L.P.	280,000	34,720,000
Ares Corporate Opportunities Fund II	3,296,786	11,181,642
Ares Corporate Opportunities Fund III, LP	66,388,035	7,700,904
Ares Corporate Opportunities Fund IV, L.P.	92,956,869	15,947,581
ASF VIII B	521,868	149,985,000
AXA ASF Miller Co-Investment	444,548	6,656,684
Axiom Asia Co-Investment Fund I, L.P.	3,624,941	46,248,591
Axiom Asia IV, L.P.	41,252,569	16,065,886
Axiom Asia Private Capital Fund III, L.P.	50,410,981	6,649,264
Axiom Asia V, L.P.	3,358,794	46,500,000
BC European Capital IX	54,527,122	1,616,319
BC European Capital VII, L.P.	606,889	0
BC European Capital VIII, L.P.	11,571,642	8,878,593
Berkshire Fund IX Coinvestment Fund, L.P.	5,112,904	42,932,166
Berkshire Fund IX, L.P.	77,905,834	89,959,335
Berkshire Fund VI, L.P.	13,685,647	7,600,677
Berkshire Fund VII, L.P.	36,175,887	2,449,845
Berkshire Fund VIII, L.P.	80,124,559	4,372,796
Blackstone Capital Partners IV	7,690,345	4,655,896
Blackstone Capital Partners V	10,452,665	13,069,148
Blackstone Capital Partners V-S	1,481,292	712,476
Blackstone Capital Partners VI, LP	264,133,556	39,598,866
Blackstone Capital Partners VII, L.P.	167,978,866	132,612,504
Blackstone Capital Partners VIII L.P.	0	200,000,000
Bridgepoint Europe IV	30,446,632	6,080,387
Carlyle Europe Partners II	842,492	4,211,220
Carlyle Europe Partners III	12,195,572	5,208,342
Carlyle Europe Partners IV, L.P.	120,724,426	13,216,468
Carlyle Europe Partners V, S.C.SP.	10,110,152	130,806,393
Carlyle Partners IV, L.P.	4,153,926	16,009,296
Carlyle Partners V L.P.	38,760,120	54,261,025
Carlyle Partners VI, L.P.	160,750,891	12,369,962
Carlyle Partners VII, L.P.	30,872,199	213,590,767
Centerbridge Capital Partners III, LP	46,775,837	42,214,332
Cerberus SMRS Partners, L.P.	40,632,202	23,304,657
Charlesbank Equity Fund IX, L.P.	21,357,808	77,787,386
Charlesbank Fund IX Overage Allocation Program	14,159,771	35,649,059
CircleUp Credit Fund I, LP	0	25,000,000
** Clearlake Opportunities Partners II, LP	0	75,000,000
CM Liquidity Fund, L.P.	0	25,000,000
Coller International Partners V, L.P.	16,653,264	43,600,000
Coller International Partners VI, L.P.	33,833,340	29,723,267
Coller International Partners VII, L.P.	116,496,969	46,951,976
Crescent Mezzanine Partners VI, L.P.	28,362,941	7,378,675

	Adjusted Reported Value	Unfunded Commitment
Crescent Mezzanine Partners VII	50,409,610	98,553,662
CVC Capital Partners VII, L.P.	35,077,352	143,825,455
Dover Street IX, L.P.	61,429,142	37,000,000
** Dover Street X, L.P.	0	150,000,000
EnCap Energy Capital Fund X, L.P.	38,842,777	9,940,612
FIMI Opportunity 6, L.P.	19,513,000	30,727,275
FirstMark Capital I, L.P.	76,913,329	196,596
FirstMark Capital IV, L.P.	16,219,817	20,125,000
FirstMark Capital OF I, L.P.	28,679,068	0
FirstMark Capital OF II, L.P.	24,839,825	11,725,000
FirstMark Capital P2, L.P.	168,045,579	0
Flagship Pioneering Special Opportunities Fund II, L.P.	10,000,000	90,000,000
Flagship Pioneering VI	33,978,499	43,125,000
Flagship Ventures Fund 2004	9,095,741	0
Flagship Ventures Fund 2007, L.P.	14,058,557	0
Flagship Ventures Fund IV, L.P.	137,748,943	0
Flagship Ventures Fund V	86,923,190	525,000
Flagship Ventures Opportunities Fund I, L.P.	43,968,823	10,250,000
Fox Paine Capital Fund II, LP	24,866,650	15,382,699
FS Equity Partners VII, L.P.	104,720,333	11,812,822
FS Equity Partners VIII, L.P.	7,390,408	67,609,592
G-IV Acquisition Holdings, LLC	13,521,776	0
GCM Grosvenor Fund Investment Program I, L.P.	6,933,672	1,317,800
GCM Grosvenor Fund Investment Program II, L.P.	20,180,816	13,809,851
GCM Grosvenor Fund Investment Program III - 2004	40,641,469	4,506,596
GCM Grosvenor Fund Investment Program III - 2006	40,298,506	6,871,370
GCM Grosvenor Fund Investment Program V, L.P.	59,051,767	9,856,595
GCM Grosvenor Fund Investment Program VI, L.P.	24,909,954	7,381,060
GCM Grosvenor Fund Investment Program VIII, L.P.	74,011,997	29,806,440
GCM Grosvenor SeasPriFIP LP (PIS06-10)	51,991,278	16,759,825
GCM Grosvenor SeasPriFIP LP (PIS14)	206,355,045	8,617,638
GCM Grosvenor SeasPriFIP LP (Seed)	29,075,753	16,582,427
Genstar Capital Partners IX, L.P.	0	75,000,000
Genstar Capital Partners VIII, L.P.	58,247,210	2,509,380
Genstar IX Opportunities Fund I, LP	0	50,000,000
Genstar VIII Opportunities Fund I, L.P.	53,921,500	6,178,509
Green Equity Investors IV	909,520	1,136,036
Green Equity Investors V	156,061,824	25,966,435
Green Equity Investors VI, L.P.	129,080,977	13,031,501
Green Equity Investors VII, L.P.	128,875,540	82,636,927
Greenspring Master G, L.P.	21,145,191	103,750,000
Greenspring Micro II, L.P.	4,850,520	19,716,263
GSO Capital Opportunities Fund II, L.P.	14,409,059	9,760,201
GSO Capital Opportunities Fund III, L.P.	52,939,875	44,597,323
GSO COF III Co-Investment Fund, L.P.	17,460,479	32,449,566
** HarbourVest Credit Opportunities Fund II, LP	0	75,000,000
HarbourVest Dover Street VIII, L.P.	26,610,278	6,750,000

	Adjusted Reported Value	Unfunded Commitment
HarbourVest Int'l III Partnership	164,880	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P.	89,509,899	19,107,835
HarbourVest Partners Co-Investment Fund V L.P.	20,000,000	180,000,000
HarbourVest Partners Mezzanine Income Fund	80,397,880	16,310,000
HarbourVest V Partnership	157,659	300,000
HarbourVest VI - Direct Fund LP	3,577,916	750,000
HarbourVest VI Partnership	813,092	2,000,000
Harvest Partners VII, L.P.	60,541,365	19,006,969
** Harvest Partners VIII	0	100,000,000
HPS Mezzanine Partners III, L.P.	43,855,802	8,197,255
Insight Venture Partners Growth-Buyout Coinvestment Fund, L.P.	87,254,092	7,578,566
Insight Venture Partners IX, L.P.	174,490,416	2,828,363
Insight Venture Partners X, L.P.	76,082,391	29,000,000
Kelso Investment Associates IX, L.P.	86,619,451	22,677,785
Kelso Investment Associates VII	2,235,843	0
Kelso Investment Associates VIII	34,213,417	22,068,923
Kelso Investment Associates X, L.P.	8,734,261	91,183,559
Khosla Ventures III, L.P.	25,305,803	750,000
Khosla Ventures IV, L.P.	90,403,955	950,000
Khosla Ventures Seed D, L.P.	1,915,428	7,900,000
Khosla Ventures V, L.P.	56,985,843	4,500,000
Khosla Ventures VI, L.P.	16,564,606	57,900,000
KKR 2006 Fund, L.P.	92,250,886	4,955,653
KKR Americas Fund XII, L.P.	84,300,635	119,348,220
KKR Asian	4,668,439	0
KKR Asian Fund II, L.P.	54,480,850	2,514,074
KKR Asian Fund III	38,622,886	65,504,002
KKR China Growth Fund	26,547,682	3,383,656
KKR E2 Investors (Annex) Fund	0	0
KKR European Fund II	1,588,745	0
KKR European Fund III	12,177,131	5,765,245
KKR European Fund IV L.P.	129,303,346	11,045,449
KKR European Fund V (USD) SCSp	0	125,000,000
KKR Millennium Fund	256,392	0
KKR North America Fund XI, L.P.	118,971,474	9,508,048
Lead Edge Capital IV, L.P.	16,178,927	7,388,446
Lightspeed Venture Partners VI	324,336	0
Lightspeed Venture Partners VII, L.P.	12,238,819	0
Menlo Special Opportunities Fund II, L.P.	2,968,811	27,000,000
Menlo Ventures IX, L.P.	2,126,309	0
Menlo Ventures X, L.P.	23,025,839	0
Menlo Ventures XI, L.P.	50,219,846	0
Menlo Ventures XIV, L.P.	3,844,884	3,500,000
Meritech Capital Partners III, L.P.	240,532	0
Meritech Capital Partners IV, L.P.	19,148,703	600,000
Meritech Capital Partners V, L.P.	24,233,930	1,450,000
Meritech Capital Partners VI, L.P.	15,738,705	24,487,500

	Adjusted Reported Value	Unfunded Commitment
Michigan Growth Capital Partners II, L.P.	157,911,551	6,171,507
Michigan Growth Capital Partners III, L.P.	51,834,108	65,723,995
Michigan Growth Capital Partners, LP	52,128,519	11,034,124
Midtown Fund III, L.P.	0	0
Midtown II Liquidating Trust	0	0
New Leaf Biopharma Opportunities II, L.P.	91,640,270	15,000,000
New Leaf Growth Fund I, L.P.	134,033,105	0
New Leaf Ventures II, L.P.	15,351,917	0
New Leaf Ventures III, L.P.	30,663,569	3,750,000
New Leaf Ventures IV, L.P.	8,209,756	40,812,500
Nordic Capital VI, L.P.	769,325	1
Nordic Capital VII	1,728,936	3,184,825
Nordic Capital VIII, L.P. (Alpha)	41,937,876	7,203,110
Oak Investment Partners X, L.P.	4,821,341	0
Oak Investments Partners IX, L.P.	319,078	0
Oaktree Opportunities Fund X, L.P.	28,370,049	5,100,000
Oaktree Opportunities Fund Xb, L.P.	8,667,574	61,250,000
OCM Opportunities Fund IX, L.P.	55,088,083	0
OCM Opportunities Fund VII (B), L.P.	1,117,880	5,000,000
OCM Opportunities Fund VII, L.P.	2,460,091	0
OCM Opportunities Fund VIII B, L.P.	13,293,997	0
OCM Opportunities Fund VIII, L.P.	1,800,033	0
OCM Principal Opportunities Fund IV	1,157,679	5,002,377
Ocqueoc Holdings, LLC	13,930,803	49,322,568
Parthenon Investors II	1,002,924	3,186,779
Parthenon Investors III	24,154,007	2,682,182
Parthenon Investors IV, L.P.	56,627,974	3,730,111
Peninsula Capital Fund IV	816,762	2,201,026
Peninsula Fund VI, L.P.	31,359,685	9,534,373
Permira Growth Opportunities I, L.P.1	5,249,186	45,000,000
** Permira VII L.P. 1	0	85,410,002
PPC Fund II	27,822,734	48,791,926
Public Pension Capital, LLC	51,667,492	52,507,568
Rhone Partners V, L.P.	72,705,063	48,098,370
Riverside Capital Appreciation Fund VI, LP	67,034,327	8,203,828
Riverside Capital Appreciation Fund VII, L.P.	10,298,733	89,701,267
Riverside Micro Cap Fund I, LP	18,275,157	5,782,975
Riverside Micro-Cap Fund II, L.P.	35,387,216	2,735,834
Riverside Micro-Cap Fund III, L.P.	73,639,362	4,823,424
Riverside Micro-Cap Fund IV	49,850,003	9,201,544
Riverside Micro-Cap Fund V, L.P.	8,691,036	91,308,964
Science Ventures Fund II, L.P.	15,661,240	6,600,000
Shamrock Capital Content Fund I, L.P.	16,273,416	31,790,097
Shamrock Growth Capital Fund IV, L.P.	20,271,562	27,955,966
Silver Lake Partners II	270,498	3,531,586
Silver Lake Partners III	24,893,836	13,199,137
Silver Lake Partners IV, L.P.	68,652,457	3,528,819

	Adjusted Reported Value	Unfunded Commitment
Silver Lake Partners V, L.P.	28,533,453	40,406,601
Silver Lake SL SPV-2	39,931,851	13,892,735
SK Capital Partners V, L.P.	5,876,748	43,977,185
SM/TCP L.P.	34,130,345	1,615,217
SMRS - TOPE LLC	1,938,443,444	385,266,815
SMRS-CAPP LLC	33,261,799	67,300,000
SMRS-NCRP LLC	734,760,369	180,958,521
Summit Partners Growth Equity Fund X, L.P.	0	100,000,000
Sycamore Partners III, L.P.	10,088,008	87,157,654
TCW/Crescent Mezzanine Partners IV, L.P.	217,051	13,660,773
TCW/Crescent Mezzanine Partners IVB Secondary	204,416	0
TCW/Crescent Mezzanine Partners V, LLC	4,174,747	12,395,466
TCW/Crescent Mezzanine Partners VC Secondary	1,373,076	0
The Huron Fund III, L.P.	7,110,987	4,207,756
The Huron Fund IV, L.P.	31,095,624	3,331,960
The Huron Fund V, L.P.	9,674,423	25,952,500
The Shansby Group 5 (TSG5)	1,656,555	4,261,291
Thoma Bravo Discover Fund II, L.P.	16,834,590	57,495,437
Thoma Bravo Fund XII, L.P.	171,601,820	10,415,876
Thoma Bravo Fund XIII, L.P.	44,328,061	80,383,320
TI Platform BOV, L.P.	2,409,707	12,619,642
TI Platform Fund II, L.P.	1,871,405	13,072,277
TI Platform SMRS SMA, L.P.	10,561,233	49,438,767
TPG Healthcare Partners, L.P.	0	25,000,000
TPG IV (Texas Pacific Group IV)	1,447,629	211,725
TPG Partners III, LP	597,281	2,087,002
TPG Partners VI, L.P.	66,303,845	10,258,102
TPG Partners VIII, L.P.	0	125,000,000
TPG Partners, VII, L.P.	145,539,552	26,553,597
TPG V (Texas Pacific Group V)	19,191,460	5,841,509
Trilantic Capital Partners V (North America) Fund A, L.P.	35,239,246	4,188,120
Trilantic Capital Partners VI (North America) L.P.	15,373,444	58,485,080
TSG6, L.P.	94,671,080	24,117,484
TSG7 A L.P.	94,039,727	41,966,831
TSG8, L.P.	2,043,380	147,956,620
Turnbridge Capital Partners I , LP	98,445,689	12,577,405
Veritas Capital Fund V, L.P.	107,344,461	12,958,273
Veritas Capital Fund VI, L.P.	82,794,325	34,166,691
Veritas V Co-Investors, L.P.	49,104,113	4,990,000
Vista Equity Endeavor Fund I, L.P.	38,212,473	14,677,288
** Vista Equity Endeavor Fund II, LP	0	65,000,000
Vista Equity Partners Fund V, L.P.	57,616,682	14,933,326
Vista Equity Partners Fund VI, L.P.	87,596,536	12,654,826
Vista Equity Partners VII, L.P.	10,159,659	64,726,662
Vista Foundation Fund III, L.P.	18,469,061	7,425,268
** Warburg Pincus China-Southeast Asia II, L.P.	2,625,000	72,375,000
Warburg Pincus China, L.P.	40,697,967	8,977,500

	Adjusted Reported Value	Unfunded Commitment
Warburg Pincus Energy MCIP, L.P.	0	10,396,887
Warburg Pincus Energy, L.P.	81,049,416	26,700,000
Warburg Pincus Equity Partners, L.P.	1,159,584	0
Warburg Pincus Financial Sector, L.P.	17,297,376	26,415,000
Warburg Pincus Global Growth, L.P.	1,317,168	148,200,000
Warburg Pincus International Partners	571,527	0
Warburg Pincus Private Equity IX	12,043,119	0
Warburg Pincus Private Equity VIII, L.P.	1,044,691	0
Warburg Pincus Private Equity X, L.P.	113,939,032	0
Warburg Pincus Private Equity XI, L.P.	179,420,194	0
Warburg Pincus Private Equity XII Secondary, L.P.	21,726,730	5,462,500
Warburg Pincus Private Equity XII, L.P.	152,320,945	38,237,500
WestAm COREplus Private Equity QP	393,697	2,086,719
Total Private Equity	\$ 12,959,531,110	\$ 8,261,071,339
Cash	394,533,715	-
Active Small Cap Cash	14,444,429	-
Active Small Cap	11,265,285	-
Income Accruals	353,182	-
Grand Total	\$ 13,380,127,720	\$ 8,261,071,339

Total Private Equity amounts do not include Cash and Active Small Cap

** New Commitments made during quarter reported

State of Michigan Retirement System

INTERNATIONAL EQUITY REVIEW

State of Michigan Investment Board Meeting

September 12, 2019



Patrick M. Moraniec, CFA
Senior Investment Manager
International Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/2019)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	1.1%	10.0%	3.4%	7.4%	7.7%
MSCI ACWI ex USA Returns	1.3%	9.4%	2.2%	6.5%	6.3%
Peer Median Returns	1.3%	9.8%	3.0%	7.5%	7.6%
Percentile Rank vs. Peers*	58	35	34	72	45

*Source: State Street Universe greater than \$1 billion

- The International Equity Division (IED) portfolio underperformed the benchmark by 0.2% over the last twelve months. Outperformance from the energy sector, information technology sector, and quality factor was offset by underperformance in the value factor and low volatility factor.

Asset Class Goals

- Construct a non-U.S. equity-focused portfolio to generate, on a consistent basis, ten-year returns that exceed the MSCI ACWI ex USA by 1.0%.
- Perform in the top half of the public plan peer universe percentile rankings.
- Advance people, processes, and systems to continuously improve investment decisions.

Strategy

- The International Equity Division has three distinct portfolio strategies.
 - Active investments, 37.7% of assets, to gain specific international stock market exposures.
 - Stock plus investments, 36.7% of assets, to implement a portable alpha strategy onto high-level strategic tilts.
 - Index investments, 25.6% of assets, to gain broad international stock market exposure with minimal tracking risk.
- Current portfolio drivers of risk and return.
 - Tracking error of the portfolio is approximately 1.0% which is below the division's risk budget of 3.0%.
 - Emerging markets, the largest contributor to tracking error, accounts for only 21.0% of the total tracking error indicating the portfolio is not materially exposed to any one single risk.
 - Future portfolio returns will be driven by the performance of the quality factor, value factor, momentum factor, and emerging markets overweight.

- Quarterly changes to International Equity Division allocation.
 - Rebalanced \$1.0 billion of maturing equity swaps to MSCI factor indexes maintaining the portfolio's exposure to the quality, value and momentum factors. The internal stock plus strategy has an estimated information ratio of 1.1.

Market Environment and Outlook

- International stock markets rebounded through the first half of 2019, up 13.6% through the end of June. The performance stands juxtapose to the 2018 fourth quarter where international markets were down -11.5%. Markets were down -14.2% in 2018, marking the single worse annual performance since the Great Financial Crisis of 2008-09.
- Last fall many feared a slowing Chinese economy would tip the world into a recession. Those fears have continued to linger in 2019 as the world's second largest economy has seen manufacturing PMIs increase steadily through March only to fall back into contraction with below 50 readings for June and July.
- Since July 2018, China's leadership shifted from a policy of debt reduction to growth as the economy began slowing across many fronts. Between fiscal and monetary spending, the economy received an estimated \$1.2 trillion injection, equating to about 8.0% of the total Chinese economy.
- The impact of China's stimulus seems to be wearing off and taking a back seat to the trade negotiations with the U.S. Through the end of April, China's stock market was up more than 20.0% relative to the MSCI ACWI ex USA index return of 13.0%. The resurgence of trade tensions coupled with concerns about a contracting domestic economy have erased all excess gains against the benchmark. China and the MSCI ACWI ex USA index are both up approximately 12.0% through the end of July.
- The U.S. - China trade war escalated post the Japan G-20. Neither side appears ready to concede. The U.S. has announced plans to add tariffs of \$300.0 billion to all remaining Chinese imports starting September 1, 2019. In response, China has suspended U.S. agriculture imports and weakened the yuan below the 7.0 threshold for the first time since 2008.
- Europe remains mired in slow growth. Sales growth contracted for the second straight quarter on a year-over-year basis. Interest rates have fallen precipitously across all government yield curves. The entire government yield curves (1-30-year bonds) of Switzerland, Germany, and Netherlands are now negative. Ten of the 15 Western European economies in the MSCI ACWI ex USA index now have negative interest rates on their ten-year government bond yields. Last quarter, the negative yield curve dynamic was concentrated in the front end of the curve and only one ten-year bond was negative, Switzerland.
- The IED indicated in early spring that the negative rate dynamic would box-in the European Central Bank (ECB) from raising rates in 2019 and potentially all of 2020. In June, the ECB confirmed not only are rate hikes off the table for 2019 but rather paved the way for a September rate cut and no interest raises until late 2020.

- Germany has remained in a prolonged contraction that began 19 months ago in January 2018. Germany's July manufacturing PMI was 43.2 marking the seventh consecutive month of contraction and raising questions whether Europe's largest economy is headed into a recession.
- World trade volumes, a proxy for economic growth, continue to exhibit negative year-over-year growth. Trade volume growth over the last twelve months averaged 1.7% which is below the historical average of 3.6% over the last 20 years. On-going trade disputes between U.S., Europe and China may explain the subdued growth.
- Analysts continue to project positive earnings growth of about 12.0% over the next twelve months for the MSCI ACWI ex USA index. International investors are paying a forward price-to-earnings of about 13.3x and trailing 14.9x. The trailing price-to-earnings has contracted approximately 20.0% since early 2018.
- The U.S. Dollar has strengthened slightly year-to-date, up about 0.8%. Central banks around the world are now embarking on a cycle of easing monetary policy. If the U.S. Federal Reserve's monetary policy lags or is significantly less accommodative, the U.S. dollar may further strengthen, creating additional head winds for international stocks specifically the emerging markets. It is important to note the dollar remains range bound since December of 2014.
- Stock prices already reflect much of this slower economic reality and recently stronger U.S. dollar. The MSCI ACWI ex USA index trailing twelve-month normalized price-to-earnings ratio is 16.8 which is below the twenty-year average of 22.3, implying return upside should earnings growth materialize.
- Go-forward annualized returns for the MSCI ACWI ex USA index are estimated at 8.8%. This rate is based on the current price and actual fundamentals over multiple periods to remove fundamental variability, better estimating the earnings power of the index.
- A ten-year blended international government yield of 1.1% implies an international equity risk premium of 7.7%. The premium increased primarily due to a fall in global government bond rates.

Conclusion

International economic fundamentals and global government bond yields continued to decline in the second quarter of 2019. Central banks around the world have begun an easing cycle to offset the continued weakness that began in January 2018. International stock markets trade at approximately a 24.0% discount relative to their 20-year history and a wide-spread to global risk-free rates. To capture this upside, international stock investors will need a long investment horizon as the short-term environment could experience increased volatility and a higher probability of a significant drawdown in equity markets.

SMRS
International Equity Strategies
6/30/19

Markets	Amount	Total	% of Total
Active (\$ in Millions)			
BlackRock	\$1,936		
Wellington	1,022		
Los Angeles Capital Management	378		
Martin Currie	370		
Marathon-London	302		
Lazard	252		
SSGA	240		
Effissimo Capital Management	78		
Total Active		\$4,578	37.7%
Stock Plus			
Internal StocksPLUS	\$2,666		
PIMCO	1,785		
Total Stock Plus		\$4,451	36.7%
Indexed			
SSGA	\$1,760		
BlackRock	1,342		
Total Indexed		\$3,102	25.6%

TOTAL

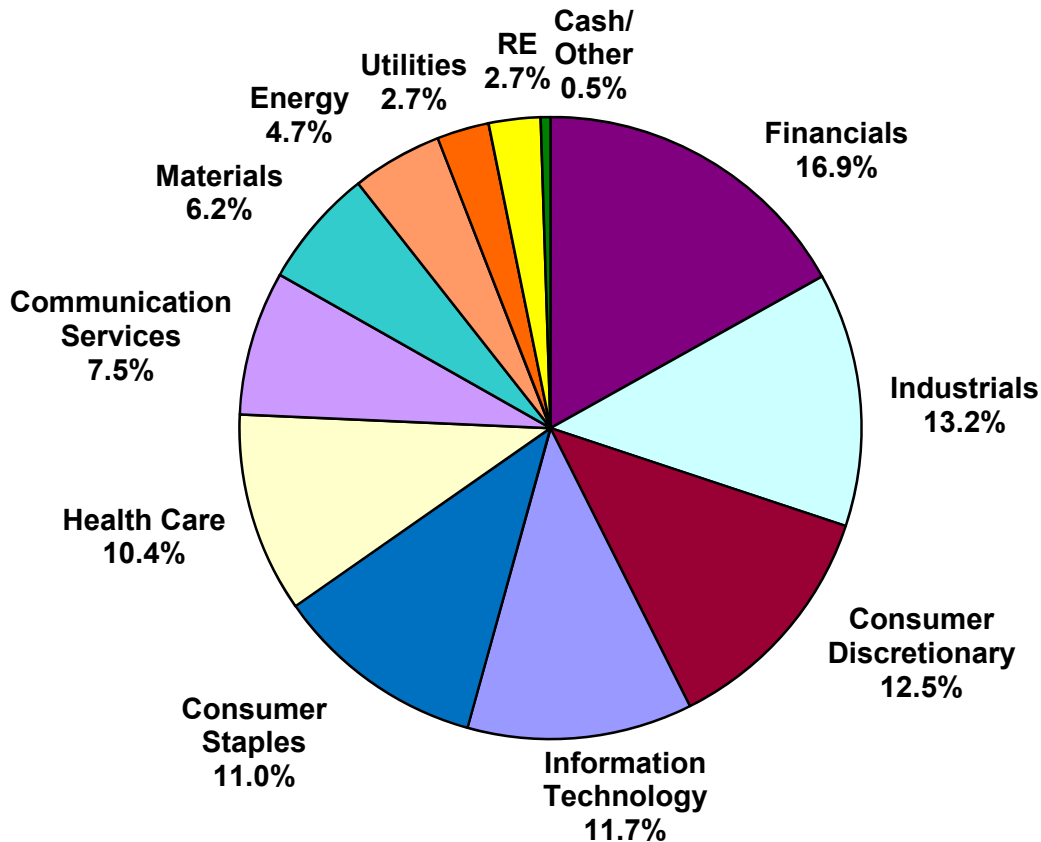
\$12,131

100.0%

SMRS

International Equity By Sector

6/30/19



Market Value in Millions				
6/30/19				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$2,054	16.9%	21.8%	-4.9%
Industrials	1,599	13.2%	11.9%	1.3%
Consumer Discretionary	1,514	12.5%	11.5%	1.0%
Information Technology	1,414	11.7%	8.7%	3.0%
Consumer Staples	1,337	11.0%	10.0%	1.0%
Health Care	1,263	10.4%	8.3%	2.1%
Communication Services	915	7.5%	7.0%	0.5%
Materials	750	6.2%	7.4%	-1.2%
Energy	571	4.7%	6.8%	-2.1%
Utilities	332	2.7%	3.4%	-0.7%
Real Estate	326	2.7%	3.2%	-0.5%
Total Investments	<u>\$12,075</u>	<u>99.5%</u>	<u>100.0%</u>	
Cash/Other	56	0.5%	0.0%	0.5%
Total	<u>\$12,131</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: MSCI ACWI ex USA

SMRS

International Equities

6/30/19

Date:	<u>6/30/19</u>	<u>3/31/19</u>	<u>12/31/18</u>	<u>9/30/18</u>
Assets (\$ in Millions):	\$12,131	\$12,264	\$11,084	\$12,558
Number of Securities:	2,705	2,636	2,646	2,669
Active Share:	31%	26%	22%	22%

Benchmark: MSCI ACWI ex USA

Description: The International Equities Composite represents all International Equity Division investments.

Portfolio Characteristics:	SMRS		MSCI ACWI ex USA	
	<u>LTM</u>	<u>Normalized</u>	<u>LTM</u>	<u>Normalized</u>
Return:				
Annualized Compound Rate	9.8%	9.9%	8.6%	8.8%
Sustainable Growth Rate	6.0%	6.9%	5.4%	6.3%
Dividend Yield	2.6%	2.3%	2.7%	2.4%
Buyback Yield	0.6%	0.1%	0.5%	0.0%
Collateral Yield	0.6%	0.6%	0.0%	0.0%
Risk:				
Beta	1.01	--	1.0	--
Volatility	12.7%	--	12.5%	--
Tracking Error	1.0%	--	0.0%	--
Information Ratio	1.2	1.1	--	--
Fundamental:				
Average Capitalization (\$ in Billions)	67.8	--	70.5	--
Price/Earnings	15.5	17.4	14.7	16.8
Price/Book	1.7	1.9	1.7	1.9
ROE	10.8%	11.1%	11.3%	11.4%

TOP TEN HOLDINGS

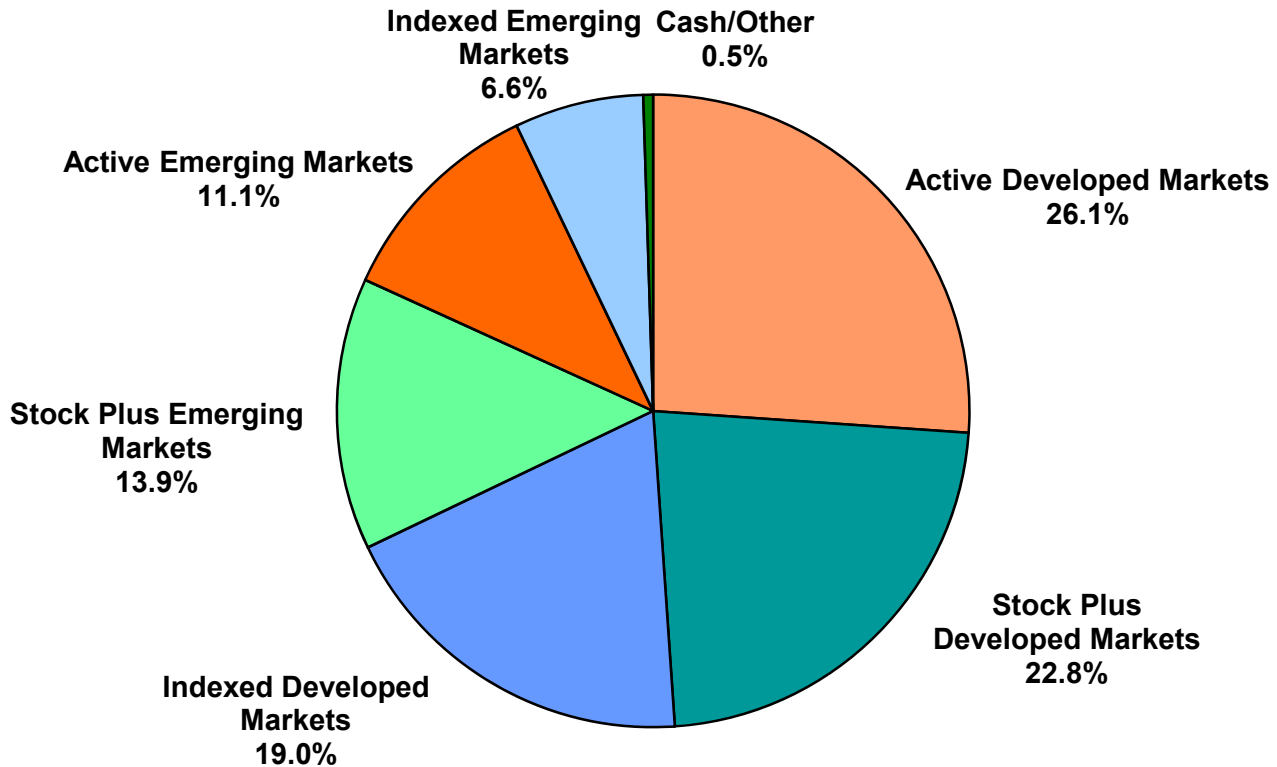
(\$ in Billions* - \$ in Millions**)

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
Tencent Holdings Ltd.	2.2%	\$429.7	31.7	\$263.2
Samsung Electronics Co., Ltd.	2.0%	270.3	14.4	237.1
Roche Holding AG	1.5%	242.8	14.4	186.9
Taiwan Semiconductor Manufacturing Co., Ltd.	1.5%	199.5	18.8	180.6
Novartis AG	1.3%	231.2	18.8	157.1
Nestle S.A.	1.2%	308.5	23.2	149.1
LVMH Moët Hennessy Louis Vuitton SE	1.0%	215.4	25.5	115.4
Diageo PLC	0.9%	102.2	26.3	110.8
ASML Holding NV	0.8%	89.1	30.4	102.1
Toyota Motor Corp.	<u>0.8%</u>	<u>202.6</u>	8.3	<u>92.4</u>
TOTAL	<u>13.1%</u>	<u>\$2,291.2</u>		<u>\$1,594.6</u>

SMRS

International Equity Exposure By Category

6/30/19



Market Value in Millions				
	<u>6/30/19</u>		<u>6/30/18</u>	
<u>Active</u>				
Developed Markets	\$3,172	26.1%	\$3,708	29.7%
Emerging Markets	1,351	11.1%	756	6.0%
Cash/Other	56	0.5%	148	1.2%
Total Active	<u>\$4,579</u>	<u>37.7%</u>	<u>\$4,612</u>	<u>36.9%</u>
<u>Stock Plus</u>				
Developed Markets	\$2,768	22.8%	\$2,204	17.6%
Emerging Markets	1,682	13.9%	2,118	17.0%
Total Stock Plus	<u>\$4,450</u>	<u>36.7%</u>	<u>\$4,322</u>	<u>34.6%</u>
<u>Indexed</u>				
Developed Markets	\$2,305	19.0%	\$2,671	21.4%
Emerging Markets	797	6.6%	886	7.1%
Total Indexed	<u>\$3,102</u>	<u>25.6%</u>	<u>\$3,557</u>	<u>28.5%</u>
Total International Equity	<u><u>\$12,131</u></u>	<u><u>100.0%</u></u>	<u><u>\$12,491</u></u>	<u><u>100.0%</u></u>

International Equity Performance - Net of Fees
6/30/19

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception Date</u>
Total International Equity	\$12,130,755,931	0.8%	9.8%	3.2%	7.2%	1/1/04
MSCI ACWI ex USA		1.3%	9.4%	2.2%	6.5%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		<i>-0.5%</i>	<i>0.4%</i>	<i>1.1%</i>	<i>0.7%</i>	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		<i>38</i>	<i>10</i>	<i>14</i>	<i>38</i>	

Total International Active Strategy	\$4,578,353,717	-0.9%	9.0%	2.6%	6.9%	5/1/05
MSCI ACWI ex USA		1.3%	9.4%	2.2%	6.5%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		<i>-2.2%</i>	<i>-0.4%</i>	<i>0.4%</i>	<i>0.5%</i>	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		<i>63</i>	<i>29</i>	<i>24</i>	<i>51</i>	

BlackRock MSCI Systematic Return	1,936,295,891	--	--	--	--	12/1/18
MSCI ACWI ex USA		--	--	--	--	
Lipper International Multi-Cap Core		--	--	--	--	
<i>Excess Return</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		<i>--</i>	<i>--</i>	<i>--</i>	<i>--</i>	

Wellington IRE	729,119,257	2.3%	10.4%	3.0%	7.8%	12/1/05
MSCI World ex USA		1.3%	9.0%	2.0%	7.0%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		<i>1.0%</i>	<i>1.4%</i>	<i>0.9%</i>	<i>0.9%</i>	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		<i>17</i>	<i>8</i>	<i>18</i>	<i>13</i>	

LACM Emerging Markets Fund	373,533,166	0.0%	9.3%	2.1%	3.7%	12/1/09
MSCI Emerging Market Index		1.2%	10.7%	2.5%	4.2%	
Lipper Emerging Markets		1.3%	9.1%	1.7%	4.1%	
<i>Excess Return</i>		<i>-1.2%</i>	<i>-1.4%</i>	<i>-0.4%</i>	<i>-0.5%</i>	
<i>Pct Rank vs. Lipper Emerging Markets</i>		<i>61</i>	<i>52</i>	<i>52</i>	<i>61</i>	

Martin Currie International Long-term Uncons	370,481,259	11.5%	--	--	--	2/1/17
MSCI ACWI ex USA		1.3%	--	--	--	
Lipper International Multi-Cap Core		-0.1%	--	--	--	
<i>Excess Return</i>		<i>10.2%</i>	<i>--</i>	<i>--</i>	<i>--</i>	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		<i>1</i>	<i>--</i>	<i>--</i>	<i>--</i>	

Marathon-London International Fund	302,412,482	-1.7%	8.0%	3.4%	8.5%	2/1/12
MSCI World ex USA		1.3%	9.0%	2.0%	7.0%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		<i>-3.0%</i>	<i>-1.0%</i>	<i>1.3%</i>	<i>1.6%</i>	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		<i>72</i>	<i>61</i>	<i>13</i>	<i>5</i>	

Wellington Emerging Markets Local Equity	293,164,213	1.5%	11.2%	4.3%	6.9%	12/1/11
MSCI Emerging Market Index		1.2%	10.7%	2.5%	4.2%	
Lipper Emerging Markets		1.3%	9.1%	1.7%	4.1%	
<i>Excess Return</i>		<i>0.3%</i>	<i>0.6%</i>	<i>1.9%</i>	<i>2.8%</i>	
<i>Pct Rank vs. Lipper Emerging Markets</i>		<i>46</i>	<i>27</i>	<i>12</i>	<i>10</i>	

Lazard/Wilmington International Equity	251,550,000	2.6%	6.8%	2.1%	--	6/1/14
MSCI World ex USA		1.3%	9.0%	2.0%	--	
Lipper International Large-Cap Core		-0.1%	8.1%	2.0%	--	
<i>Excess Return</i>		<i>1.3%</i>	<i>-2.2%</i>	<i>0.1%</i>	<i>--</i>	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		<i>16</i>	<i>80</i>	<i>55</i>	<i>--</i>	

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception Date
SSGA International Alpha Small Cap	239,874,532	-7.5%	7.6%	2.6%	9.2%	5/1/07
MSCI World ex USA Small Cap		-6.2%	8.4%	3.4%	8.8%	
Lipper International Small/Mid-Cap Core		-7.4%	6.7%	1.5%	6.8%	
<i>Excess Return</i>		-1.3%	-0.8%	-0.7%	0.4%	
<i>Pct Rank vs. Lipper International Small/Mid-Cap Core</i>		43	57	51	13	
Effissimo Capital Management Japan	78,151,046	-10.6%	12.0%	--	--	12/1/15
MSCI Japan		-4.2%	8.1%	--	--	
Lipper International Small/Mid-Cap value		-5.6%	6.7%	--	--	
<i>Excess Return</i>		-6.4%	3.9%	--	--	
<i>Pct Rank vs. Lipper International Small/Mid-Cap Value</i>		89	1	--	--	
Total International Stock Plus Strategy	\$4,450,442,515	2.2%	10.6%	3.8%	8.0%	1/1/09
MSCI ACWI ex USA		1.3%	9.4%	2.2%	6.5%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		0.9%	1.2%	1.6%	1.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		15	6	10	11	
Internal Stock Plus	2,665,599,284	4.4%	7.9%	4.0%	8.0%	9/1/11
MSCI ACWI ex USA		1.3%	9.4%	2.2%	6.5%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		3.1%	-1.5%	1.8%	1.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		8	64	9	11	
PIMCO StocksPLUS	1,784,843,231	--	--	--	--	4/1/19
MSCI ACWI ex USA		--	--	--	--	
Lipper International Multi-Cap Core		--	--	--	--	
<i>Excess Return</i>		--	--	--	--	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		--	--	--	--	

Total International Index Strategy	\$3,101,959,698	1.3%	10.5%	3.7%	7.1%	7/1/09
MSCI ACWI ex USA		1.3%	9.4%	2.2%	6.5%	
Lipper International Multi-Cap Core		-0.1%	8.1%	2.0%	6.6%	
<i>Excess Return</i>		0.1%	1.1%	1.6%	0.6%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		30	7	12	45	
SSGA MSCI ACWI EX USA INDEX	1,759,862,285	1.2%	--	--	--	11/1/17
MSCI ACWI ex USA		1.3%	--	--	--	
Lipper International Multi-Cap Core		-0.1%	--	--	--	
<i>Excess Return</i>		0.0%	--	--	--	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		35	--	--	--	
Blackrock ACWI ex USA Index	1,342,097,413	1.6%	--	--	--	3/1/18
MSCI ACWI ex USA		1.3%	--	--	--	
Lipper International Multi-Cap Core		-0.1%	--	--	--	
<i>Excess Return</i>		0.3%	--	--	--	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		23	--	--	--	

State of Michigan Retirement System

REAL & OPPORTUNISTIC RETURN REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Jennifer Yeung
Senior Investment Manager
Real & Opportunistic Return Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/19)	1-Year	3-Years	5-Years	7-Years	10-Years
Real Return and Opport.	12.4%	13.4%	10.1%	11.5%	N/A
Custom Benchmark	6.6%	7.3%	7.1%	7.2%	N/A

- Total Real Return and Opportunistic portfolio value is \$7.9 billion with a total one-year return of 12.4%. Performance for the year was driven by current income from credit investments, natural resource strategies and media and entertainment holdings, as well as capital appreciation of the media and entertainment assets.

Strategy Update

- The objective of the Real Return & Opportunistic portfolio is to provide an inflation hedge and/or to gain exposure to attractive opportunities that may not fit in another plan portfolio.
- The Real Return & Opportunistic portfolio has approximately \$3.6 billion of unfunded commitments. One new commitment was closed during the quarter:
 - \$177 million to Castle Credit SMRS Holdings for an investment in a opportunistic credit fund (Fortress FCO separate account) that seeks to generate returns through current income and long-term capital appreciation. The fund targets idiosyncratic opportunities to provide financing at attractive valuations, securing high quality collateral and structural downside protection to minimize capital loss.
- We remain focused on finding differentiated strategies that are additive to the current portfolio mix.
 - We continue to like private credit opportunities, niche strategies with some scalability, and contractual cash flow.
 - Specifically, we like opportunities in the opportunistic credit space. Strategies that have defensible cash flows, are backed by high quality collateral and offer structural downside protection. We continue to be selective and favor investment teams that are disciplined and have experience investing over multiple cycles.

SMRS

Real Return and Opportunistic

6/30/19

Top Ten Advisors or Entities

(\$ in Millions)

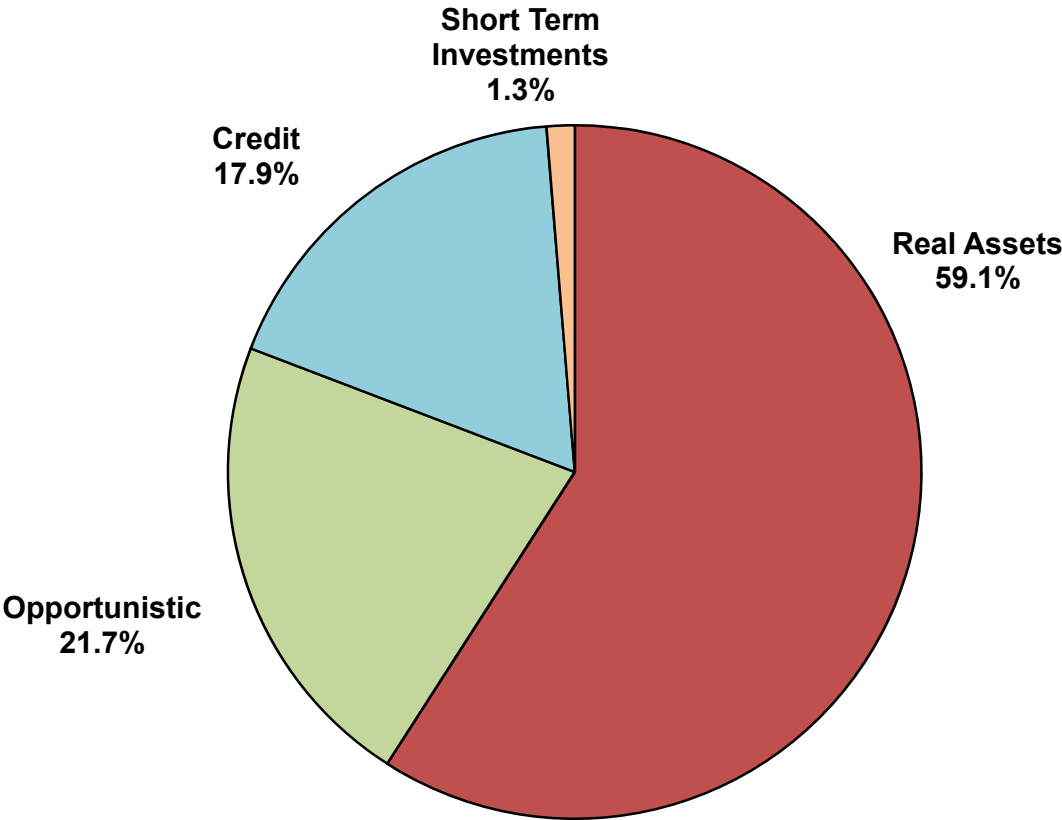
<u>Advisor or Entity</u>	<u>Market Value</u>
Barings Alternative Investments	\$ 2,627
Apollo Global Management	1,073
Domain Capital Advisors	799
ICG Advisors	482
Kayne Anderson Capital Partners	322
TPG Sixth Street Partners	274
Fortress Investment Group	248
Orion Resource Partners	245
Ridgewood Energy	239
Blackstone Alternative Asset Management	164
Total Market Value	\$ 6,473

SMRS

Real Return and Opportunistic

6/30/19

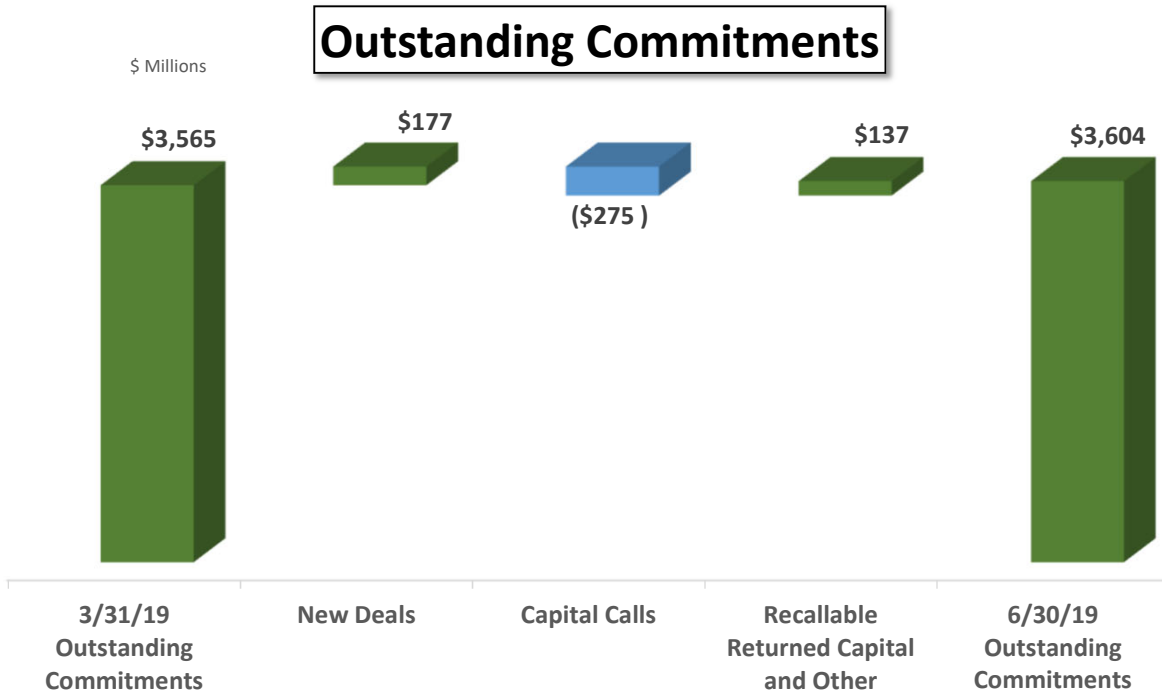
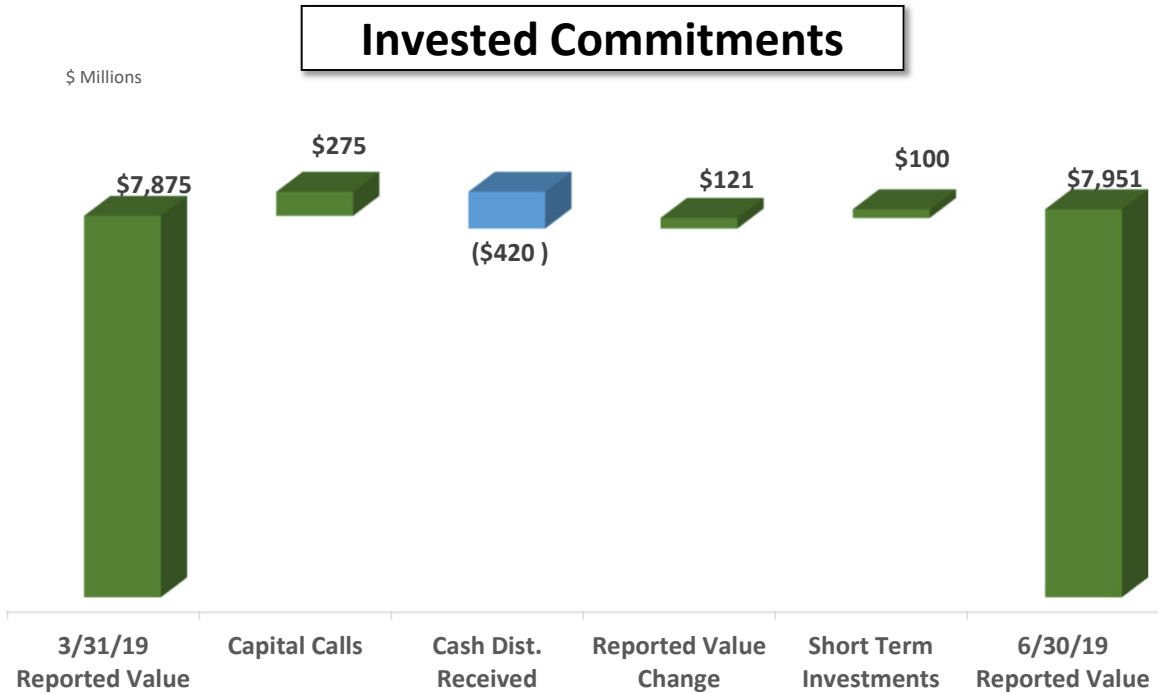
Investments By Strategy



Market Value in Millions	
	<u>6/30/19</u>
Real Assets	\$4,700
Opportunistic	1,724
Credit	1,427
Short Term Investments	<u>100</u>
Total Investments	<u>\$7,951</u>

SMRS

Real Return and Opportunistic 6/30/19



SMRS

Real Return and Opportunistic

6/30/19

Net Market Value by Entity

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
* Abernathy	\$ 268,023,615	\$ 45,769,120
Altus Midstream	13,020,000	0
Apollo European Principal Finance Fund II	18,644,903	8,168,753
Apollo HK TMS Investments Holdings LP	6,717,409	0
Apollo Offshore Credit Fund	28,254,677	0
Axton Holdings	1,803,508,311	0
Barings Asset Based Income Fund I	124,571,050	176,097,137
Barings Global Real Asset Fund I	59,918,209	43,992,231
Blackstone Strategic Capital Holdings, LP	58,464,104	69,795,552
Blue Peninsula Fund LP	153,649,213	47,977,894
Broadriver III	28,405,798	172,533,837
BSCH Parallel (MLG) I LP	105,484,273	38,874,114
Carlyle Energy Mezzanine Opportunity Fund II	19,286,691	30,870,900
Carlyle IEP Co-Invest (Varo)	16,228,780	887,052
Carlyle International Energy Partners	41,913,683	30,257,633
Carlyle International Energy Partners II	0	150,000,000
** Castle Credit SMRS Holdings LLC	29,969,913	146,783,562
Centerbridge SCP III	23,830,065	8,758,582
Content Holdings, LLC	381,358,265	53,332,736
Credit Opportunity Fund III	26,437,716	21,041,184
* EleganTree Fund SPC	0	3,079
Energy Recap and Restructuring	31,740,966	7,085,025
ERR MI Holdings LP	4,868,706	2,269,933
Fairfield	31,056,227	81,078,084
* FCO MA MI LP	168,382,435	50,300,000
Financial Credit Investment II	252,219,426	185,797,353
Financial Credit Investment III	203,518,647	150,501,380
Flywheel Energy Co-Invest	27,991,130	7,000,000
Fortress Transportation & Infrastructure	57,031,537	0
Greatrock LLC	19,810,074	0
Global Maritime	79,300,605	3,414,854
GSO Credit Alpha Fund	50,866,800	37,910,063
Hopen Life Science Fund II	4,903,020	1,090,000
HPS Red Cedar Fund	135,140,410	158,913,894
Kayne Anderson Energy Fund VII, LP	63,977,970	20,260,878
Kayne Anderson Private Energy Income Fund	120,605,061	31,677,572
Kayne Anderson Private Energy Income Fund II	25,701,690	123,150,000
Kayne Solutions Fund	51,654,316	197,216,824
KKR Energy Income & Growth Fund	51,308,626	1,953,202
KKR Lending Partners	13,674,999	11,930,723
KKR Lending Partners II	33,873,148	11,737,239
Lakewater	122,157,403	767,870
Lakewater II	74,366,994	10,411,430
Lakewater III	275,481,602	1,538,559

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
Lakewater IV	32,634,631	2,196,174
Lakewater V	114,058,294	3,729,801
Marathon CLO Equity Fund	13,823,836	9,529,470
Merit Energy Partners I LP	33,413,998	0
MidCap Finco Holdings LTD	304,351,210	1,453,424
Mortgage Servicing Rights	79,377,108	0
Napier Park Aircraft Leasing Vehicle I, LLC	44,247,443	16,392,165
Napier Park AL Rollover Fund I	13,789,423	66,250,877
Nash Co-Investment	15,509,858	94,259
New Fortress Energy HLDGS	452,430,429	0
New Fortress Energy LLC	1,861,890	0
NGP Natural Resources XII	42,239,889	104,376,687
Orion Co-Investments III, LP	6,528,498	2,236,552
Orion Mine Finance	91,238,308	2,982,344
Orion Mine Finance 1A	49,539,214	2,941,196
Orion Mine Finance Co-Fund II LP	17,556,101	34,927,191
Orion Mine Finance II	80,127,282	19,783,572
Redding Ridge Holdings, LP	64,573,638	37,443,359
* Ren Venture Fund II	27,306,050	1,750,000
* Ren Venture Fund III	4,597,182	21,000,000
Ridgewood Energy Oil & Gas II	117,449,775	18,998,643
Ridgewood Energy Oil & Gas III	70,234,951	172,679,621
Ridgewood Fund II Co-Invest (REOG)	31,127,045	6,149,585
Riverside Credit Solutions FD I LP	5,789,200	43,099,993
RPEP Energy Opportunistic Institutional Partners	20,269,905	15,951,933
SJC Direct Lending Fund	730,240	15,088,120
SJC Direct Lending Fund IA	238,444	3,764,486
SJC Direct Lending Fund II	7,384,614	38,261,315
SJC Direct Lending Fund III	131,512,411	101,911,921
SJC Direct Lending Fund III Co-Invest G-III	20,000,000	0
* Social Network Holdings	118,622,017	19,428,315
Specialty Equity Strategy LP	267,077	19,647,000
Specialty Loan Fund III	16,703,008	6,179,423
Sprott Private Resource Lending (US), LP	47,109,160	54,788,628
Sprott PRL(M) LP	2,693,054	15,333,019
Sprott PRL(M-Co-Invest) LP	7,207,576	17,685,500
Structured Credit Recovery Fund IV	168,013,113	71,219,864
Terra Co-Investment	31,587,020	14,000,000
TICP CLO Partners II	41,391,630	5,689,242
TSSP Adjacent Opportunities Partners	164,336,573	147,001,075
TSSP Capital Solutions	56,895,968	244,006,272
TSSP Opportunities Partners IV	11,137,370	87,535,716
Vida Insurance Credit Opportunity Fund II	92,965,265	6,988,814
Warwick (SMRS) Co-Invest, L.P.	34,614,278	2,732,720
Warwick Partners III	56,333,336	7,454,932
Total Real Return and Opportunistic	\$ 7,851,135,779	\$ 3,603,831,455
Short-Term Investments & Other	99,873,488	-
Grand Total	\$ 7,951,009,267	\$ 3,603,831,455

* Fund of Funds

** New Commitment

State of Michigan Retirement System

REAL ESTATE AND INFRASTRUCTURE REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Todd A. Warstler
Senior Investment Manager
Real Estate and Infrastructure Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6-30-19)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	7.7%	9.3%	10.8%	11.2%	7.5%
NCREIF NPI	5.2%	5.5%	7.4%	8.0%	7.9%
Peer Median Returns	7.7%	8.0%	9.5%	10.5%	9.2%
Percentile Rank vs. Peers*	53	24	37	39	72

*State Street Universe greater than \$1 billion

- Outperformance relative to the one-year benchmark resulted from the Real Estate and Infrastructure Division's (REID) strategy of being underweight in retail, overweight in hotels, team selectivity within the apartment sector, several favorable sale executions in the real estate portfolio, credit strategies, and appreciation and gains in the infrastructure portfolio.

Strategy Update

- The REID is focusing on sourcing off-market opportunities through its extensive network and reducing risk in the portfolio through early income-generating investments including credit strategies that are higher in the capital stack with a shorter projected hold period. The REID has selectively acquired properties where it can add value through management and leasing and has continued to develop properties at attractive risk-adjusted returns. The REID will continue its strategy of assembling portfolios in both traditional and non-traditional real estate sectors that we believe will become institutional property types, providing above market appreciation and total returns.
- The REID has been actively managing the portfolio with dispositions in excess of \$1.8 billion, and funding for new or existing investments of nearly \$614 million over the past 12 months. The REID is purposely a biased seller and is working with its advisors in executing the disposition of properties and realizing gains from the sale of assets at historically low capitalization rates where these opportunities exist.
- The REID has approximately \$1.4 billion in unfunded commitments. New commitments during the quarter include:
 - \$50 million in GSO Energy Select Opportunities Fund II, LP, a commingled fund specializing in debt and equity opportunities in the energy infrastructure sector primarily in North America with the ability to invest in Europe as opportunities may become available, managed by GSO Capital Partners LP.

Market Environment

- Fund flows to the real estate sector slowed in the second quarter; however, there is significant dry powder in the system which should continue to act as a support for pricing. Retail properties continue to be less attractive to investors as e-commerce sales continue to grow, with investors instead favoring warehouse/logistics (as a retail

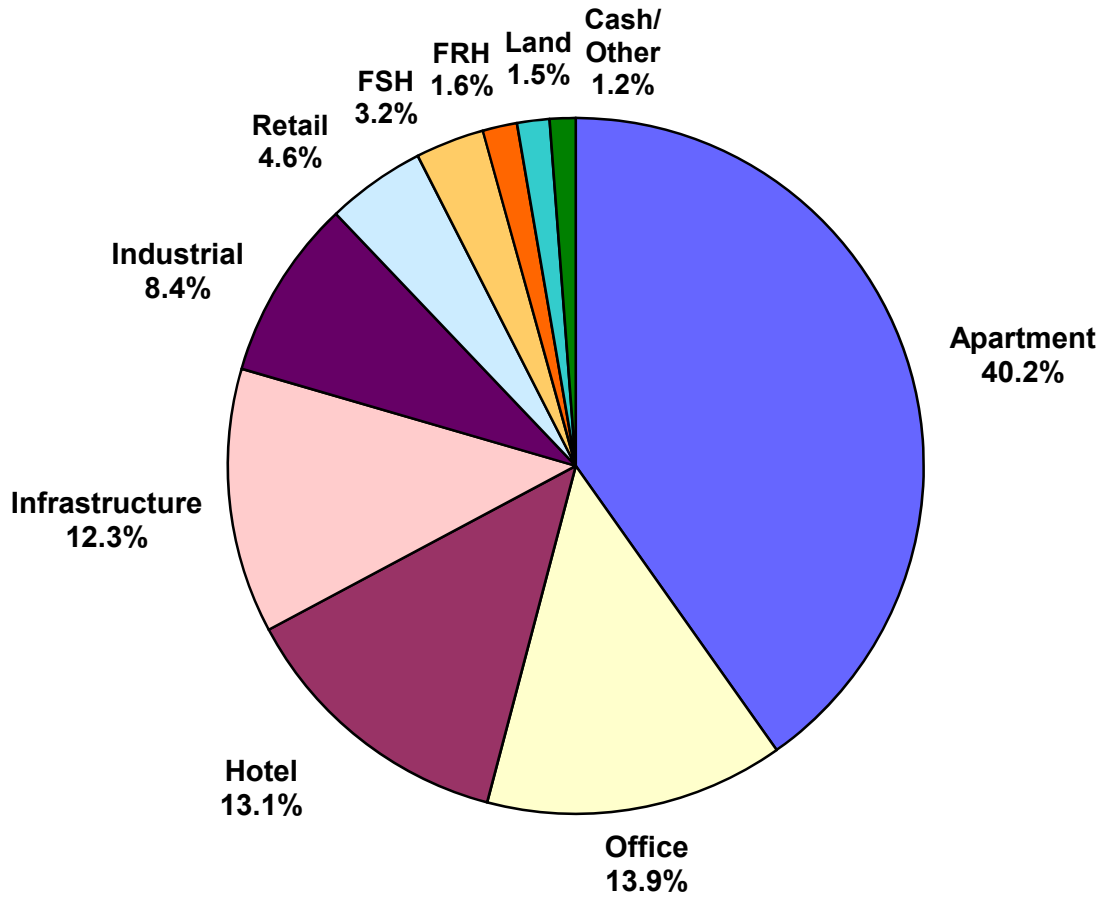
substitute in some cases) and the apartment sector. Senior housing, student housing, data centers and medical office once considered niche sectors are attracting more investor attention. Supply of new buildings in all property types, except retail, has increased in many markets and is beginning to raise concern from investors. However, a strong economy has so far kept demand for space high enough to absorb new supply. Additionally, lenders have become more selective in quality and location of the collateral and have been disciplined in their underwriting standards for construction lending. The cost of new construction in land, labor and materials has steadily increased, making it more difficult for developers to meet return thresholds.

- The passage of the U.S. tax reform bill is generally viewed as favorable to the real estate industry. Economic growth from companies increasing investment in their U.S. business operations would increase demand for office labor and industrial space. Real estate developers will benefit from a lower pass-through tax rate. The increase in the standard deduction could further delay apartment renters from purchasing a home. Some areas of the country (high cost, high tax regions) are feeling a negative impact from this tax bill. The limits on mortgage interest deductions and the loss of the state and local tax deduction (SALT) are exacerbating affordability in these areas. Many of these regions are seeing population declines as business and residents move to lower tax/cost states. Manhattan, Chicago and L.A. are notable examples and though not dramatic, a flat to declining population can have negative impacts across all property sectors.
- Capital flows into the infrastructure sector remain strong, as the asset class matures, and investor interest continues to grow. Opportunities include North American energy, power generation, decarbonization efforts, the rising need for data, and emerging market fundamental infrastructure projects. Much of the capital raised in 2018/2019 is in very large fund format and this may impact (lower) returns as there is a limited opportunity set at the largest investment sizes. The REID believes there may be more opportunities for outperformance for regional and/or midsize funds or those with niche strategies. The industry has gained attention from the Federal Administration's intent on rebuilding U.S. infrastructure; however, details on legal and financial framework of Public Private Partnerships (P3) are limited and will take time to develop. A tight labor market for construction workers, rising wage and materials cost, budget considerations and political gridlock in Washington could inhibit timing of funding and completions.
- Tightening lending standards combined with heightened bank regulations after the global financial crisis have worked to constrain lending activity in many instances. Demand for private credit from non-traditional capital providers, particularly when a financial sponsor requires speed and certainty of execution is expected to continue to grow. Real estate credit in the U.S., Europe and Asia in various forms should continue to present opportunities.

SMRS

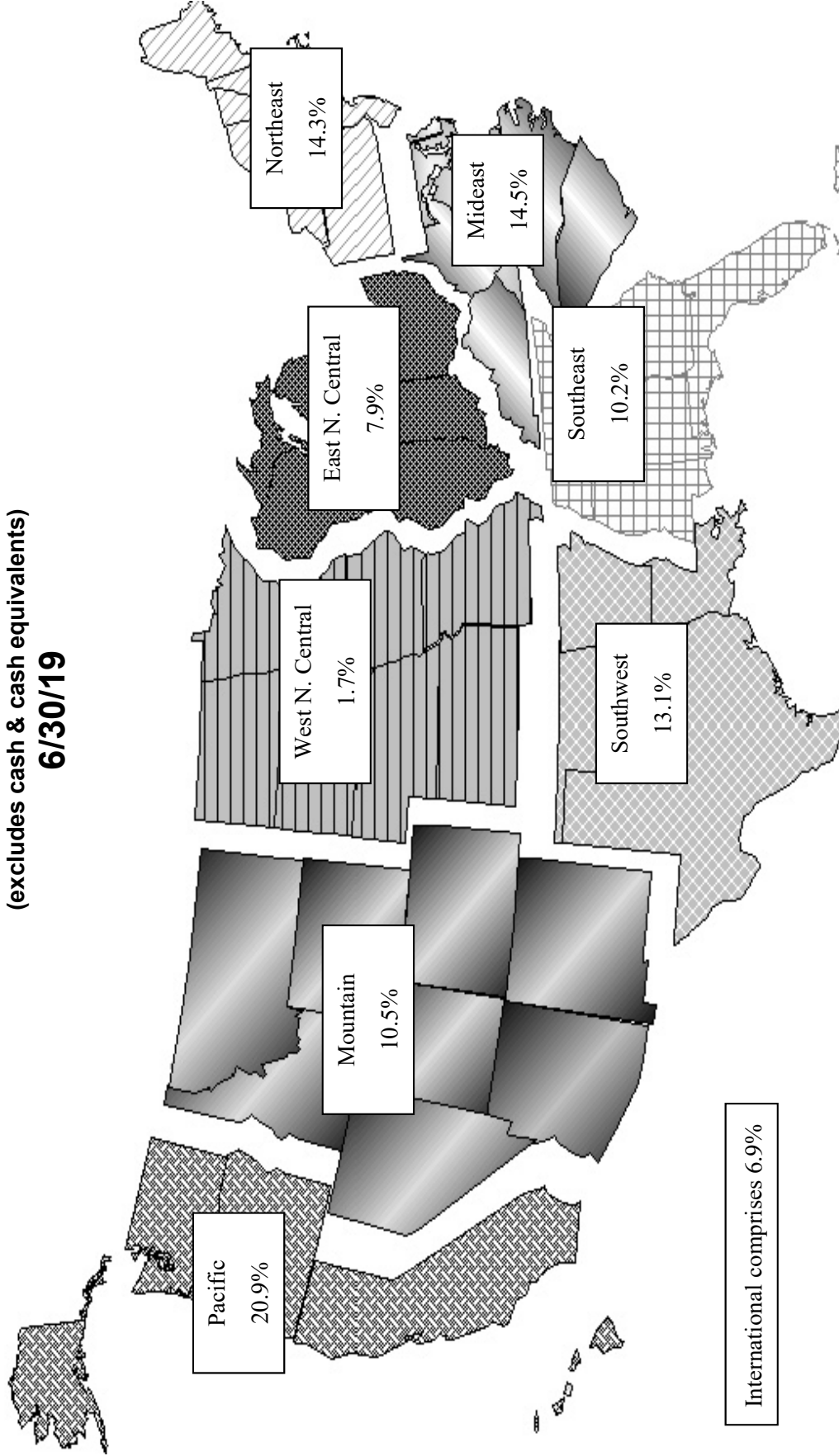
Real Estate and Infrastructure

6/30/19



Market Value in Millions				
	<u>6/30/19</u>		<u>6/30/18</u>	
Apartment	\$2,813	40.2%	\$3,641	45.3%
Office	970	13.9%	894	11.1%
Hotel	919	13.1%	944	11.7%
Infrastructure	861	12.3%	841	10.5%
Industrial	588	8.4%	639	8.0%
Retail	325	4.6%	321	4.0%
For Sale Homes (FSH)	222	3.2%	308	3.8%
For Rent Homes (FRH)	109	1.6%	314	3.9%
Land	102	1.5%	105	1.3%
	<u>\$6,909</u>	<u>98.8%</u>	<u>\$8,007</u>	<u>99.6%</u>
Cash/Other	85	1.2%	33	0.4%
Total Investments	<u>\$6,994</u>	<u>100.0%</u>	<u>\$8,040</u>	<u>100.0%</u>

SMRS
Real Estate by Region
Based on Market Value
(excludes cash & cash equivalents)
6/30/19



Geographic regions defined by NCREIF, whose property index composition is: Pacific 32.6%, Mountain 6.5%, West N. Central 1.3%, Southwest 10.4%, East N. Central 7.1%, Southeast 9.8%, Northeast 20.5%, Midwest 11.8%

SMRS
Real Estate and Infrastructure
6/30/19

**Top Ten
 Advisors or Entity**

<u>Advisor or Entity</u>	(\$ in millions)
	<u>Market Value</u>
MWT Holdings LLC	\$ 2,121
Clarion Partners	668
Principal Real Estate Investors	422
Five Star Realty Partners LLC	359
Blackstone Group	336
Domain Capital Advisors Inc	321
Rialto Capital Management LLC	287
CIM Investment Advisors LLC	264
L&B Realty Advisors	165
Transwestern Investment Management	160
	<u>\$ 5,103</u>

**Occupancy
 by Property Type**

	Apartment	Office	Industrial	Retail	Hotel
SMRS Portfolio	94.4%	85.5%	96.2%	92.4%	73.4%
National Average	93.2%	87.8%	92.9%	95.5%	70.0%

SMRS
Market Values by Ownership Entity
6/30/19

REAL ESTATE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
801 Grand Avenue Capital, LLC	\$ 69,471,746	\$ 0
AEW Senior Housing III	3,752,842	715,013
AEW Senior Housing IV	0	46,292,613
Apollo Asia Real Estate Fund	24,171,463	51,116,044
Asana Partners Fund I	23,815,805	5,416,828
Asana Partners Fund II, LP	375,000	49,625,000
Avanath Affordable Housing II, LLC	35,130,268	0
Avanath II SMRS Co-Investment Fund LLC	14,374,017	0
Avanath Affordable Housing III	44,450,276	5,516,898
Blackstone R/E IH3 Co-Inv Partners	107,791,801	0
Blackstone R/E Partners V, LP	4,303,077	0
Blackstone R/E Partners VI, LP	6,777,539	3,680,930
Blackstone R/E Partners VIII, LP	63,663,117	25,378,416
Blackstone R/E Partners IX, LP	0	200,000,000
Capri Select Income II	58,122	0
Capri Urban Investors, LLC	8,295,019	0
CIM Fund III, LP	39,204,792	0
CIM Fund VIII, L.P.	107,575,828	8,480,084
CIM Urban REIT, LLC	42,136,731	0
CIM VI (Urban REIT), LLC	31,693,474	0
Clarion Gables Multifamily Trust, LP	31,883,342	0
Columbus Circle Holdings, LLC	213,821,106	30,246,764
Crown Small Cap Real Estate	17,427,565	8,375,000
Domain GVA-1, LLC	37,631,420	2,487,251
Domain Hotel Properties, LLC	403,549,368	0
Gateway Capital Real Estate Fund II, LP	10,554,535	0
Great Lakes Property Group Trust	42,648,767	9,565,475
Heitman Credit	50,794,565	0
IDR Core Property Index Fund, LLC	21,775,000	3,225,000
India Property Fund II, LLC	24,047,166	2,784,470
Invesco Mortgage Recovery Feeder Fund	3,817,062	0
Invesco Mortgage Recovery Fund II, L.P.	27,894,265	34,249,727
IPF II Co-Invest Cayman LP	23,965,406	2,220,897
JBC Funds North LaSalle LLC	17,205,744	0
JBC Opportunity Fund III, LP	495,673	0
KBS/SM Fund III, LP	47,853,506	0
KBS/SM Fund IV	154,132	0
L-A Saturn Acquisition	31,197,731	0
Landmark Real Estate Partners V, LP	8,408,243	0
LaSalle Asia Opportunity Fund II, LP	279,741	0
LaSalle Asia Opportunity Fund III, LP	1,216,463	0
Lion Industrial Trust	226,879,052	0
Lion Mexico Fund, LP	5,347,679	0

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Lombard GVA0016	359,516,052	0
Lone Star Fund X LP	135,829,764	55,078,472
Lone Star Fund XI LP	\$ 773,766	\$ 199,226,234
Lubert-Adler Real Estate Fund VII, LP	64,132,732	6,538,662
M1 Westgate CoInvest LLC	19,104,104	0
M301W CoInvest LLC	23,952,595	0
MERS Acquisitions Ltd.	164,633,869	26,950,000
MG Alliance, LLC	50,994	0
MIP Holdco LLC	128,623,881	25,102,580
MSREF V - International	2,370,523	0
MSREF VI - International	4,720,951	0
MSRESS Fund III Institutional LP	21,365,276	0
MWT Holdings, LLC	2,121,078,630	0
Northpark Land Associates	33,664,938	10,796,703
Orange Investors LLC	1,191,470	
Paladin Realty Brazil Investors III (USA), LP	17,112,506	0
Paladin Realty Latin America Investors IV-CI, LP	41,019,516	0
Paladin Realty TB COINV V LP	11,231,549	0
Penmain Office LLC	36,210,692	0
Principal Separate Account	352,504,326	91,064,768
Proprium RE Spec. Situations Fund, LP	57,939,567	26,442,252
Rialto Absolute Partnership I	75,365,184	0
Rialto Credit Partshp LP	84,479,382	1,374,858
Rialto Real Estate Fund, LP	20,841,789	0
Rialto Real Estate Fund II, LP	38,323,739	0
Rialto Real Estate Fund III-Debt, LP	40,059,112	8,816,227
Rialto Real Estate Fund III-Property, LP	23,908,688	25,205,480
Rialto Mezzanine Partners Fund	4,241,392	0
SM Brell II LP	27,665,486	0
Stockbridge RE Fund II-C, LP	26,174,898	0
Strategic LP	5,197,398	0
Strategic II LLC	19,184,938	48,341,000
TPG RE Finance Trust Inc. (TRTX)	93,059,628	0
TPG Real Estate Partners II	28,431,501	15,678,032
TPG Real Estate Partners III, LP	0	50,000,000
TSP Spartan C-I LLC	16,999	0
TSP Spartan C-II LLC	19,320,363	0
TSP Value and Income Fund II, LP	11,746,865	38,519,334
True North High Yield Invest. Fund II, LLC	3,493,563	0
True North Real Estate Fund III, LLC	46,920,154	11,283,407
Venture Center, LLC	16,140	0
Western National Realty Fund II, LP	4,143,165	0
	\$ 6,045,506,533	\$ 1,129,794,419
Short-Term Investments and Other	65,581,482	0
Total Real Estate Investments	\$ 6,111,088,015	\$ 1,129,794,419

* New or additional commitment made during the quarter reported

SMRS
Market Values by Ownership Entity
6/30/19

INFRASTRUCTURE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Arclight Energy Partners VI, LP	\$ 46,848,687	\$ 9,640,788
ASF VI Infrastructure B LP	22,588,622	10,109,497
ASF VII Infrastructure Fund B L.P.	12,074,074	18,546,932
ASF Como Co-Investment LP	7,268,022	3,004,353
Basalt Infrastructure Partners, LP	47,631,661	2,219,047
Blackstone Energy Partners, LP	45,862,856	4,728,291
Blackstone Energy Partners II, LP	75,709,483	23,702,753
Brookfield Infrastructure Fund II-B, L.P.	54,369,412	5,179,454
Customized Infrastructure Strategies, LP	40,826,293	5,788,139
Dalmore Capital Fund	64,845,573	0
GCM Grosvenor Infrastructure Investment Program, L.P.	77,171,251	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	45,756,115	11,374,186
Global E&P Infrastructure Fund II L.P.	59,364,835	9,349,664
GSO Energy Select Opportunities Fund LP	29,622,845	25,684,982
* GSO Energy Select Opportunities Fund II, LP	2,566,230	47,433,770
JPMorgan AIRRO India SideCar Fund US, LLC	83,852,926	3,187,421
JPMorgan AIRRO Fund II	11,057,583	7,440,094
KKR Eagle CoInvest L.P.	34,180,422	1,853,268
KKR Global Infrastructure Investors, LP	39,511,360	4,182,224
Ridgewood Water & Strategic Infrastructure Fund LP	5,864,076	45,137,013
RPEP SMRS Infra II, LLC	2,879,042	500,000
StonePeak Infrastructure Fund LP	51,147,615	11,387,841
	<u>\$ 860,998,983</u>	<u>\$ 250,449,717</u>
Short-Term Investments and Other	21,438,924	0
Total Infrastructure Investments	<u>\$ 882,437,907</u>	<u>\$ 250,449,717</u>
 TOTAL INVESTMENTS	 <u>\$ 6,993,525,922</u>	 <u>\$ 1,380,244,136</u>

* New or additional commitment made during the quarter reported

State of Michigan Retirement System
FIXED INCOME REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Daniel J. Quigley
Senior Investment Manager
Fixed Income Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/19)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	8.0%	4.4%	4.4%	4.0%	5.2%
Bloomberg Barclays US Agg	7.9%	2.3%	3.0%	2.6%	3.9%
Peer Median Returns	7.3%	2.8%	3.2%	3.0%	4.7%
Percentile Rank vs. Peers*	29	23	11	16	27

*State Street Universe greater than \$1 billion

- The fixed income portfolio outperformed its benchmark and peer group across all time periods. This year-over-year (YOY) outperformance was driven by strong performance in the internal core bond portfolio as well as an overweight to investment grade and high yield corporate credit.
- The duration positioning of the internal portfolio helped performance as an overweight to floating-rate securities and longer duration securities outperformed intermediate duration bonds.
- Investment Grade and High Yield Credit experienced a strong recovery in the first half of the year after underperforming in the 4th quarter of 2018. The Structured Fixed Income portion of the portfolio has slightly underperformed the benchmark on a one-year basis but has outperformed over longer time horizons.

Strategy Update

- The goal of the Fixed Income Division portfolio is to meet or exceed the returns of the Bloomberg U.S. Aggregate Bond Index while satisfying the overall characteristics of a core fixed income portfolio. These characteristics are: income, liquidity, principal preservation, and diversification from equity market risk. The portfolio has a higher yield than the benchmark without having meaningfully more risk than the U.S. Aggregate Index. The yield-to-maturity of the portfolio is currently 3.6% versus a benchmark yield of 2.5%. In addition to this, the portfolio has an equity beta of 0.0, in line with the U.S. Aggregate Index.
- The Core-plus strategy implemented to achieve this goal includes:
 - Core: As of June 30, 2019, the portfolio's allocation to U.S. Treasuries, investment-grade corporate bonds, government-guaranteed U.S. Agency Debentures, RMBS, and Commercial Mortgage Backed Securities (CMBS) was 66.9%. This includes a 20.5% allocation to U.S. Treasuries, TIPS, and cash.
 - Plus: The portfolio maintains a strategic out-of-benchmark allocation to high-yield corporate debt, securitized credit, and global fixed income strategies as market opportunities allow. This allocation increases the portfolio yield and total return potential, but will result in lower liquidity and higher volatility. The allocation to the Plus portfolio was 33.1% as of June 30, 2019.

Tactical Update

- The allocation to securitized credit, primarily in CMBS, ABS, non-agency RMBS, and CLO securities, was 23.8% of the portfolio at the end of the quarter. The combination of low interest

rate duration and high coupon income (often floating rate) is attractive at this point in the interest rate cycle. This portion of the portfolio had a return of 5.6% on a one-year basis, underperforming the benchmark on a relative basis by 2.3%.

- The allocation to high-yield strategies was 5.7% at the end of the quarter. This out-of-benchmark position has benefitted portfolio performance as the high yield portion of the portfolio had a return of 9.3% on a one-year basis.
- The portfolio has a meaningful allocation to floating rate securities, including AAA CLO investments and investment-grade floating rate corporate bonds. This allocation accounts for approximately 20% of portfolio assets. This allocation will underperform in a falling interest rate environment but should exhibit strong risk-adjusted return characteristics in many market environments.
- The allocation to U.S. TIPS was stable during the quarter at 3.6% of the fixed income portfolio. The TIPS allocation has outperformed nominal U.S. Treasuries on a year to date (YTD) basis, but has underperformed over the past year. We believe that this allocation offers an attractive hedge to the portfolio should inflation expectations increase in the future.

Market Environment and Outlook

- The yield curve for U.S. Treasury securities flattened for the year. This was primarily driven by declining long-term interest rates. The yield on the ten-year U.S. Treasury decreased by 97 bp on a year-over-year (YOY) basis to 1.96% while the three-month T-Bill yield decreased by one bp YOY, ending June at 2.32%. The yield curve is inverted with short-term rates exceeding yields for longer maturity debt.
- Inflation expectations decreased during the quarter with ten-year breakeven inflation expectations ending June at 1.70%. This was a 17 bp decrease for the quarter.
- Credit markets continued their recovery with high-yield spreads ending June at 377 bp. This represented a 160 bp decrease for spread YTD. These spread levels are roughly 60 bp tighter than their five-year average. Investment grade credit spreads tightened by 42 bp YTD to 115 bp, 12 bp tighter than the five-year average.
- Emerging Markets Debt has also recovered this year with the EMD Index returning 9.4% YTD. EMD spreads were flat for the quarter at 291 bp and have decreased by 50 bp YTD.
- Developed market interest rates declined across most major markets during the quarter as investors priced in lower global growth expectations. The yield on the ten-year German Bund ended the quarter at -0.33%, down 57 bp on a YTD basis. The Japanese JGB ended the quarter with a ten-year yield of -0.16%.

Conclusion

- The portfolio maintains a defensive position for rising interest rates. The duration remains short of the benchmark and the portfolio maintains an underweight to long-term debt. This position is offset through a larger allocation to structured and corporate debt securities which increases the income of the portfolio. The portfolio has also reduced corporate credit exposure due to poor valuations in various credit markets. The portfolio will continue to look for attractive risk-adjusted opportunities within the fixed income opportunity set.

SMRS

Fixed Income by Strategy

6/30/19

	Amount	Total	% of Total
Core (\$ in Millions)			
FID Internal	\$5,243		
PIMCO Mortgage Fund	263		
PGIM Investment Grade Credit	250		
Total Core		\$5,756	60.9%
Tactical			
Pyramis	\$323		
Loomis Core Plus	240		
Total Tactical		\$564	6.0%
Securitized Debt			
Met West Securitized Ops	\$480		
Napier Park CLO Debt	471		
Principal CMBS	420		
Napier Park ABS Income	416		
TICP CLO Debt	368		
Napier Park Strategic Loan	99		
Total Securitized Debt		\$2,254	23.8%
High Yield			
PGIM High Yield	\$260		
Columbia Management	245		
Crescent Direct Lending	32		
Total High Yield		\$537	5.7%
Global			
T. Rowe Global Multi-Sector	\$244		
PGIM Global Liquid Relative Value	104		
Total Global		\$348	3.7%
TOTAL		<u>\$9,459</u>	<u>100.0%</u>

NOTE: Totals may not be exact due to rounding.

SMRS

Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

6/30/19

<u>Characteristic</u>	<u>Portfolio</u>	<u>Benchmark</u>
Average Maturity (Yrs)	8.1	7.8
Duration (Yrs)	4.8	5.7
Spread Duration (Yrs)	5.9	5.9
Coupon (%)	3.8	3.2
Yield to Maturity (%)	3.6	2.5
Credit Rating	A	AA
VaR (%)	3.8	4.2
Tracking Error	1.26	NA
Beta (vs S&P 500)	0.02	-0.02

Commentary

Objectives

Income:

The coupon of the portfolio is approximately 60 bps higher than the benchmark. Price appreciation has been the main driver of U.S. bond market returns YTD but Income is the primary driver of long-term performance.

Liquidity:

20.5% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.

Principal Preservation:

The portfolio has a large allocation to U.S. Treasuries and carries an investment-grade credit rating.

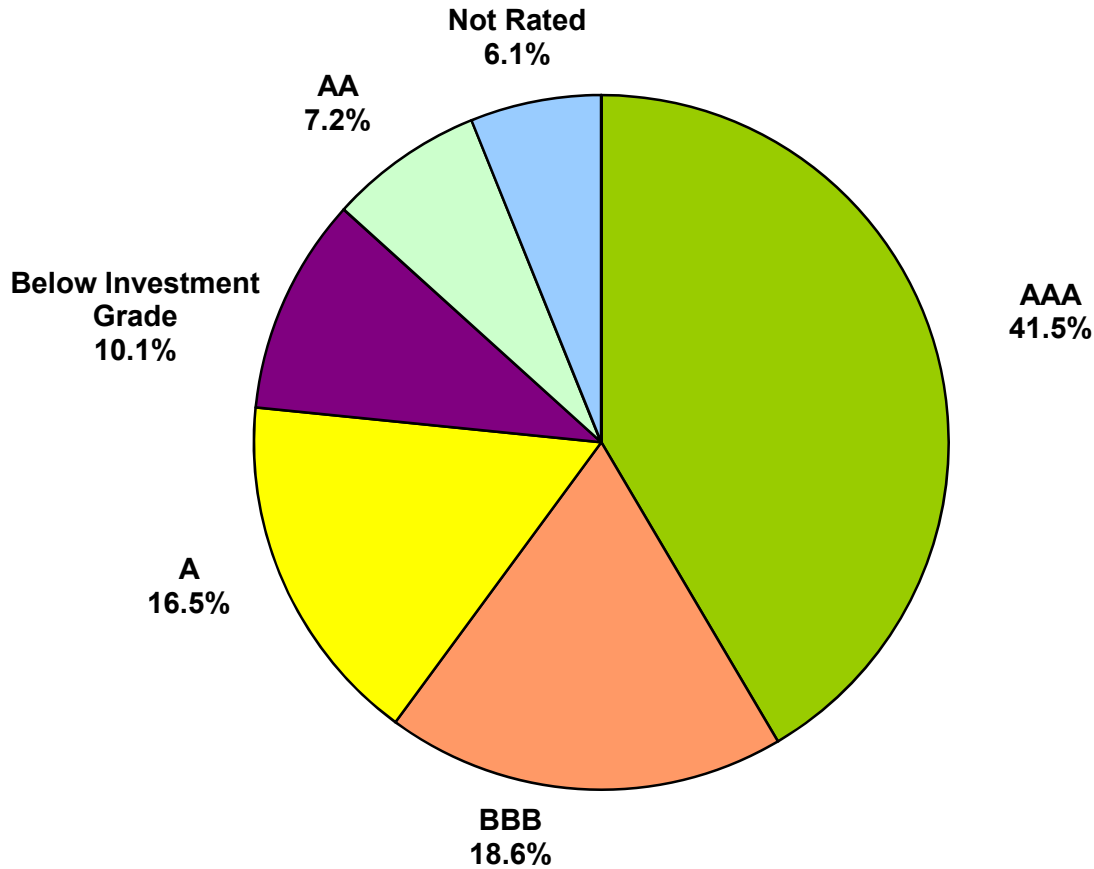
Diversification:

The equity beta of the portfolio is roughly 0.0 meaning that the portfolio returns are uncorrelated with equity market movements, and in line with the benchmark bond index.

SMRS

Fixed Income By Rating

6/30/19



Market Value in Millions				
6/30/19				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
AAA	\$3,924	41.5%	71.5%	-30.0%
AA	681	7.2%	3.3%	3.9%
A	1,556	16.5%	10.6%	5.9%
BBB	1,763	18.6%	12.4%	6.2%
* Below Investment Grade	956	10.1%	0.6%	9.5%
Not Rated	579	6.1%	1.6%	4.5%
Total Investments	<u>\$9,459</u>	<u>100.0%</u>	<u>100.0%</u>	

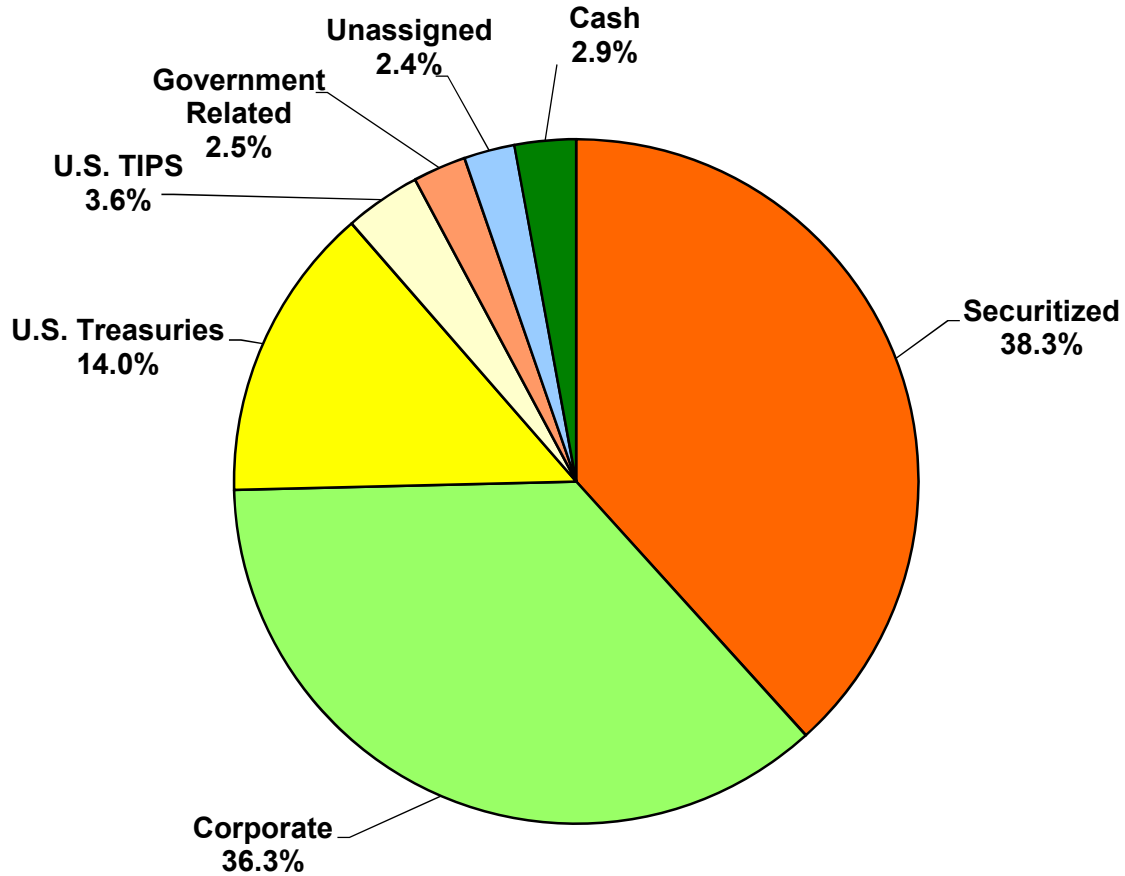
* Comprised of approximately 7.7% High Yield Credit and 2.4% High Yield RMBS/ABS

Benchmark: Barclays US Aggregate

SMRS

Fixed Income By Asset Type

6/30/19



Market Value in Millions				
6/30/19				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Securitized	\$3,619	38.3%	29.7%	8.6%
Corporate	3,433	36.3%	25.0%	11.3%
U.S. Treasuries	1,328	14.0%	39.5%	-25.5%
U.S. TIPS	340	3.6%	0.0%	3.6%
Government Related	236	2.5%	5.8%	-3.3%
Unassigned	231	2.4%	0.0%	2.4%
Cash	272	2.9%	0.0%	2.9%
Total Investments	<u>\$9,459</u>	<u>100.0%</u>	<u>100.0%</u>	

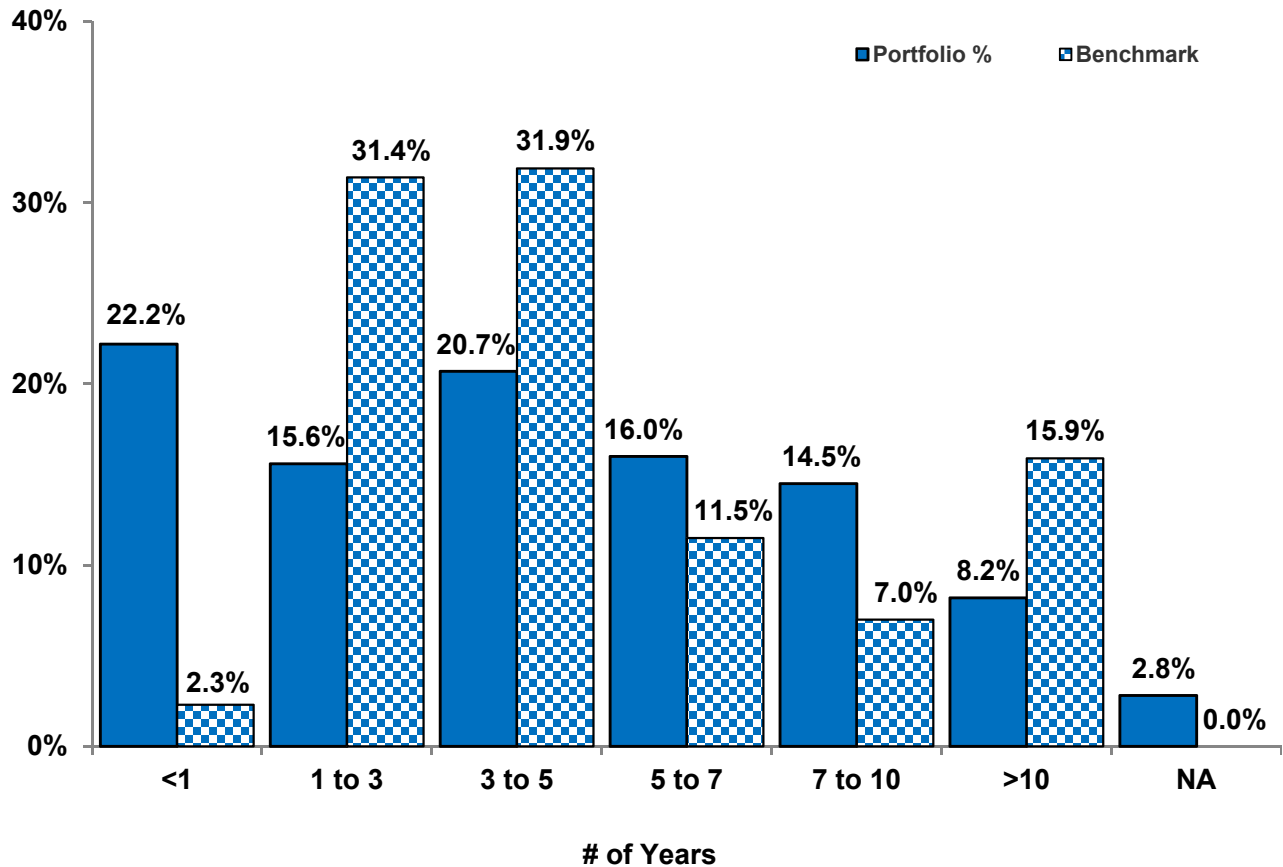
Benchmark: Barclays US Aggregate

SMRS

Duration Distribution

Fixed Income Composite Versus Benchmark

6/30/19



Source: Factset

Market Value in Millions					
Duration	Assets	Portfolio Weight	Benchmark Weight	Portfolio Duration*	Benchmark Duration*
<1	\$2,101	22.2%	2.3%	0.1	0.9
1 to 3	1,473	15.6%	31.4%	2.3	2.1
3 to 5	1,959	20.7%	31.9%	4.1	3.9
5 to 7	1,512	16.0%	11.5%	6.0	5.9
7 to 10	1,372	14.5%	7.0%	7.9	7.9
>10	774	8.2%	15.9%	18.8	16.2
NA	268	2.8%	0.0%	0.0	0.0
Total	\$9,459	100.0%	100.0%	5.0	5.7

* Effective Duration

Benchmark: Barclays US Aggregate

Total Fixed Income Performance - Net of Fees (MPSERS)

6/30/19

	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>10-Years</u>
Total Fixed Income	\$9,458,709,440	7.77%	4.21%	4.18%	3.86%	5.10%
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>7.87%</i>	<i>2.31%</i>	<i>2.95%</i>	<i>2.62%</i>	<i>3.90%</i>
Internal Core Fixed Income	5,243,381,082.71	8.62%	3.53%	4.07%	3.56%	4.69%
Externally Managed Core Fixed Income	\$263,163,916	6.19%	3.07%	3.18%	3.11%	4.70%
PIMCO Mortgage Fund	263,163,916	6.09%				
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>4.48%</i>	<i>2.03%</i>	<i>2.74%</i>	<i>2.48%</i>	<i>3.77%</i>
Investment Grade Credit	\$249,907,729	10.43%	4.13%	4.26%	4.45%	6.32%
PGIM Investment Grade	249,907,729	10.43%	4.13%	4.26%	4.53%	6.34%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>	<i>10.34%</i>	<i>3.74%</i>	<i>3.92%</i>	<i>3.97%</i>	<i>5.77%</i>
Tactical Fixed Income	\$563,717,041	8.04%	5.08%	4.13%	6.73%	15.53%
Loomis Sayles CorePlus	240,492,073	7.12%	3.78%	3.00%	N/A	N/A
Fidelity Tactical Bond Fund	323,224,968	8.90%	5.38%	5.00%	N/A	N/A
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>4.48%</i>	<i>2.03%</i>	<i>2.74%</i>	<i>2.48%</i>	<i>3.77%</i>
High Yield Fixed Income	\$537,100,899	9.31%	6.97%	5.14%	N/A	N/A
Columbia Management High Yield	245,040,138	9.43%	6.59%	4.99%	N/A	N/A
PGIM High Yield	259,739,933	9.13%	7.42%	5.33%	N/A	N/A
Crescent Direct Lending	32,320,828	4.75%	N/A	N/A	N/A	N/A
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>	<i>6.37%</i>	<i>7.53%</i>	<i>4.64%</i>		
Structured Fixed Income	\$2,253,721,215	5.55%	N/A	N/A	N/A	N/A
Principal CMBS	419,752,892	9.28%	5.79%	4.82%	7.64%	16.22%
MetWest Securitized Opportunities	479,665,508	4.34%	5.80%	3.96%	N/A	N/A
Napier Park ABS Income	416,364,300	8.40%	10.72%	N/A	N/A	N/A
Napier Park Strategic Loan LP	98,850,415	6.05%	N/A	N/A	N/A	N/A
Napier Park CLO Debt	471,489,802	3.27%	N/A	N/A	N/A	N/A
TICP CLO Debt	367,598,297	3.24%	N/A	N/A	N/A	N/A
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>4.48%</i>	<i>2.03%</i>	<i>2.74%</i>	<i>2.48%</i>	<i>3.77%</i>
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>8.95%</i>	<i>2.36%</i>	<i>4.06%</i>	<i>4.22%</i>	<i>8.51%</i>
Global Fixed Income	\$347,717,558	6.48%	4.31%	N/A	N/A	N/A
T. Rowe Global Multi-Sector	243,534,058	8.02%	4.61%	N/A	N/A	N/A
PGIM GLRV	104,183,500	3.06%	N/A	N/A	N/A	N/A
<i>Custom GMS Benchmark</i>	<i>N/A</i>		<i>4.65%</i>	<i>4.44%</i>	<i>N/A</i>	<i>N/A</i>

State of Michigan Retirement System

ABSOLUTE RETURN REVIEW

State of Michigan Investment Board Meeting

September 12, 2019



Daniel J. Quigley
Senior Investment Manager
Absolute Return Strategy

EXECUTIVE SUMMARY

Performance

MPSERS Plan (6/30/19)	1-Year	3-Years	5-Years	7-Years	10-Years
Absolute Return	2.7%	5.4%	3.5%	5.3%	5.9%
HFRI FOF Conservative	1.4%	3.4%	2.1%	3.3%	3.1%

- The value of the Absolute Return portfolio is \$4.3 billion with a one-year return of 2.7%. Manager selection and exposure to multi-strategy, event-driven, and diversifying strategies contributed to positive second quarter performance.
- Multi-strategy and event-driven strategies drove second quarter performance as all underlying managers delivered positive returns. Positive macroeconomic developments and the market recovery helped drive performance. Special situations managers contributed to performance, this was largely due to strong and stable cash flow generation. Event-driven managers also had a strong quarter.
- Diversifying strategies were the second largest contributor to performance for the quarter, with performance mostly driven by a variety of fixed income positions for macro managers. Strong performing directional macro managers benefitted from USD interest rate/curve trades, longs in EUR interest rates, and an overall long volatility stance.

Strategy Update

- The objective of the Absolute Return portfolio is to diversify the total plans' holdings, targeting returns above investment-grade fixed income with lower volatility than the equity portfolio. The portfolio utilizes a diverse mix of managers that invest both long and short to target specific exposures and seek to hedge out unwanted risk.
- No new commitments for the quarter.
- In terms of allocation priorities, the focus is on adding to diversifying strategies and targeted opportunities in structured credit. We have slightly increased our exposure to multi-strategy, macro, and emerging markets managers. Due to lower alpha expectations, we are continuing to reduce our exposure to fundamental equity strategies.
- The absolute return portfolio is estimated to earn an annual net return of the Consumer Price Index (CPI) +300 basis points. Historically the portfolio has been managed with an average equity beta exposure of 0.15. The portfolio is expected to maintain this low beta over full market cycles while earning a positive inflation-adjusted rate of return.

Overall, we will continue to focus on opportunities that seek to provide diversification, protect the downside and deliver absolute return.

SMRS

Absolute Return

6/30/19

Net Market Values by Entity

		<u>Net Market Value</u>
Drawbridge Opportunities Fund	\$	250,120,433
* EnTrust White Pine Partners, LP		18,873,426
JM IV, LP		87,809,393
MP Securitized Credit Master Fund, LP		72,121,848
SJC Direct Lending Revolver Fund III, LP		27,592,806
* Tahquamenon Fund, LP		3,768,278,698
Visium Balanced Fund, LP		299,801
Total Absolute Return	\$	4,225,096,404
Short-Term Investments & Other		35,006,347
Grand Total	\$	4,260,102,750

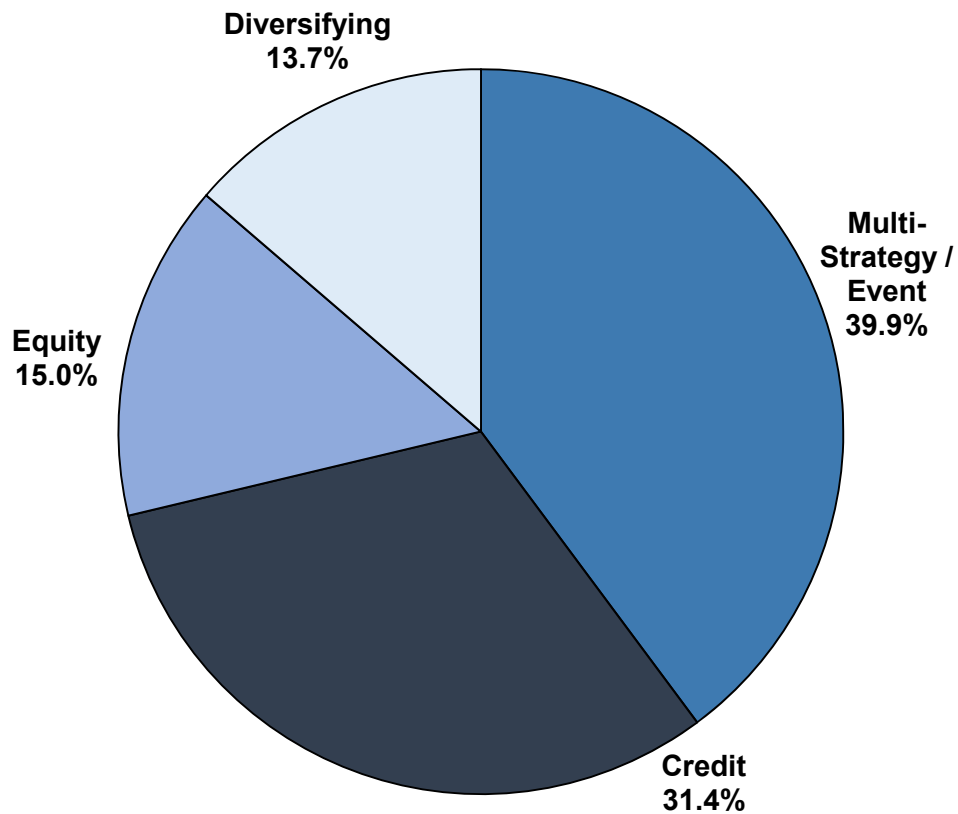
* Fund of Funds

SMRS

Absolute Return

6/30/19

Investments By Strategy



Strategy Breakdown			
Underlying Funds:	72	Median Position Size:	0.5%
Strategies:	4	Average Position Size:	1.4%
Relationships:	7	Largest Position Size:	9.9%

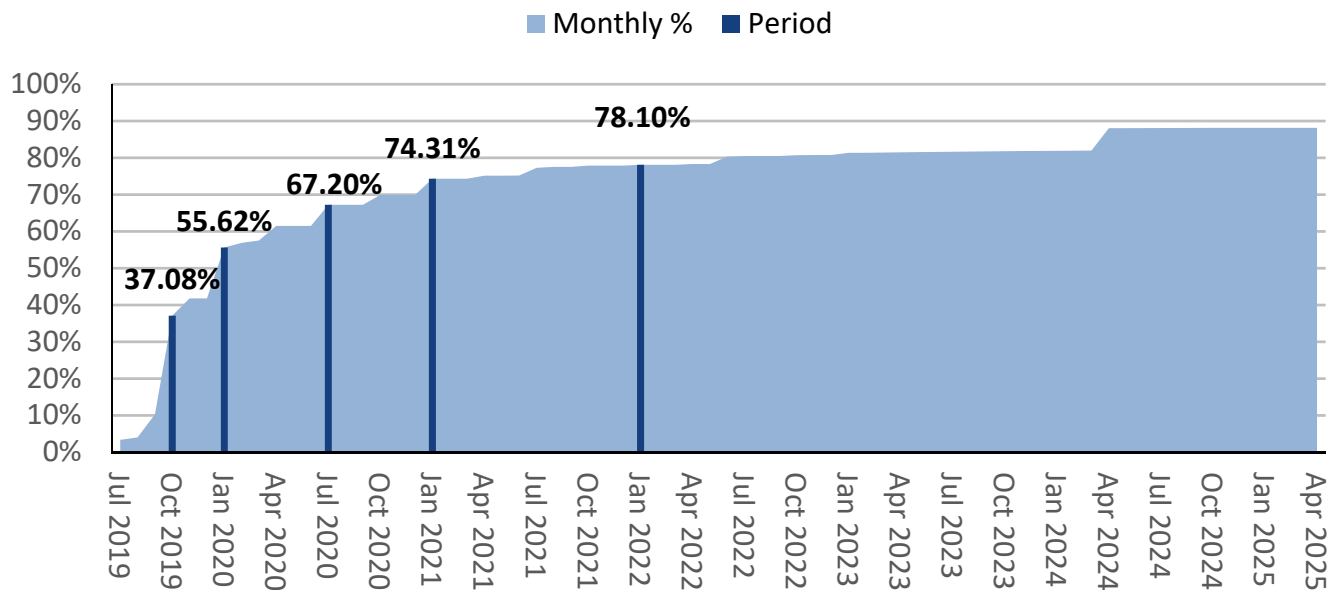
SMRS

Absolute Return

6/30/19

Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 10/1/19	37.08%	37.08%
By 1/1/20	18.54%	55.62%
By 7/1/20	11.58%	67.20%
By 1/1/21	7.11%	74.31%
By 1/1/22	3.79%	78.10%
After 1/1/22	10.06%	88.16%
Illiquid	11.84%	100.00%
Total	100.00%	N/A



State of Michigan Retirement System

DEFINED CONTRIBUTION REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Woodrow S. Tyler
Senior Investment Manager
Defined Contribution, Trusts & Agencies Division

EXECUTIVE SUMMARY

Overview

Defined Contribution (DC) plans are participant led investments. The role of the Bureau of Investments is to offer a sufficient range of investment options to allow the participants to diversify their individual retirement accounts and construct portfolios that reasonably span the risk/return spectrum. To this end, the Plans may be comprised of at least one investment option from the categories below.

Investments Options

Tier I: Target Date Funds and Passively Managed Index Funds

- Target Date Funds (TDFs) are the default option for plan participants. Each TDF seeks to achieve its objective by investing in a set of underlying index funds representing various asset classes. Over time, the allocation to asset classes and funds change according to a predetermined "glide path" and will become more conservative as it approaches the target retirement date.
- Passively Managed Index Funds are comprised of low-cost index funds which seek to replicate the performance of a variety of cash, bond and stock indices with very little tracking error and at a low fee.

Tier II: Actively Managed Funds

- These are funds actively managed by investment managers in an attempt to outperform various cash, bond and stock indices over long periods of time.

Tier III: Self Directed Brokerage Account – Non-Core Options

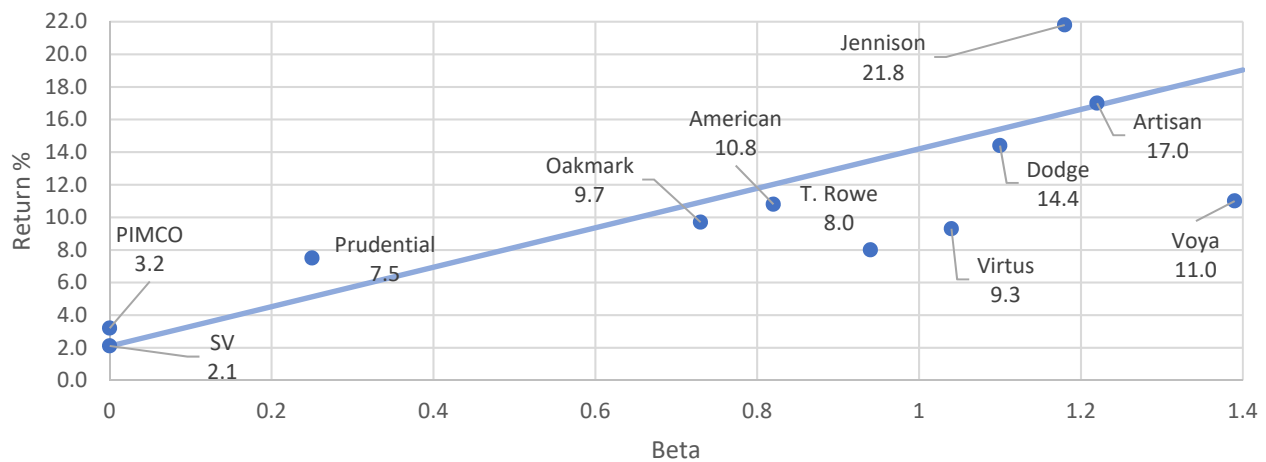
- TD Ameritrade provides access to a broad range of investment choices including individual stocks, bonds, CDs, over 100 commission-free ETFs, and more than 13,000 mutual funds—including more than 2,100 no-load, no-transaction-fee (NTF) mutual funds.

Investment Selection

- The selection of each investment option for the Plans is based on the prudence standards set by the Governing Documents and applicable law, with flexibility built-in to allow a search to take full advantage of strategic opportunities. The search will focus on finding opportunities which are tailored to the Plans' specific needs. The BOI, in consultation with the Office of Retirement Services (ORS), will establish search criteria that aligns with the purpose and objective an investment option is seeking to attain. Due diligence will be completed with the goal of selecting a plan that, in the totality of circumstances, offers fair and reasonable investment options for the Plan participants.
- With respect to Tier III investments, the universe of available options is extensive. Since the selection of investments is directed solely by the participants which elect the Tier III option, the State does not provide any criteria for selecting or monitoring these non-core investment options.

Current Line-Up

Return vs Beta July 2016 - June 2019



Market Environment and Outlook

- Structural changes in the U.S. retirement system are supporting growth in the DC industry:
 - Rapid decline of employer funded pensions
 - Potential erosion of Social Security benefits
 - Workforce aging
 - New regulations, specifically, the Pension Protection Act of 2006;
 - Automatically enroll employees into the DC plan
 - Establish safe harbor investments known as QDIA
- SECURE Act - Setting Every Community Up for Retirement
 - Repeal of maximum age for traditional IRA contributions (currently 70½).
 - Disclosure regarding lifetime income - require benefit statements provided to DC participants to include a lifetime income disclosure at least once during any 12-month period.
 - Allow long-term/part-time workers to participate in 401(k) plans.
 - Increase age for required date for mandatory distributions (from 70½ to 72).
 - Fiduciary safe harbor for selection of lifetime income provider- fiduciaries are afforded an optional safe harbor to satisfy the prudence requirement with respect to the selection of insurers for a guaranteed retirement income contract and are protected from liability for any losses that may result to the participant due to an insurer's inability in the future to satisfy its financial obligations under the terms of the contract.
 - Simplify safe harbor 401(k) rules- eliminate notice requirements.
- In an effort to simplify the investment process for participants, industry trend has been to reduce the number of investment options offered in a DC plan.
- Another trend in the industry is the focus on retirement income. As fewer individuals have access to pension plans and DC plans have become the primary retirement vehicle for many Americans, more plan sponsors are exploring the ability to generate sustainable income in retirement.

SMRS

Defined Contribution Strategies

6/30/19

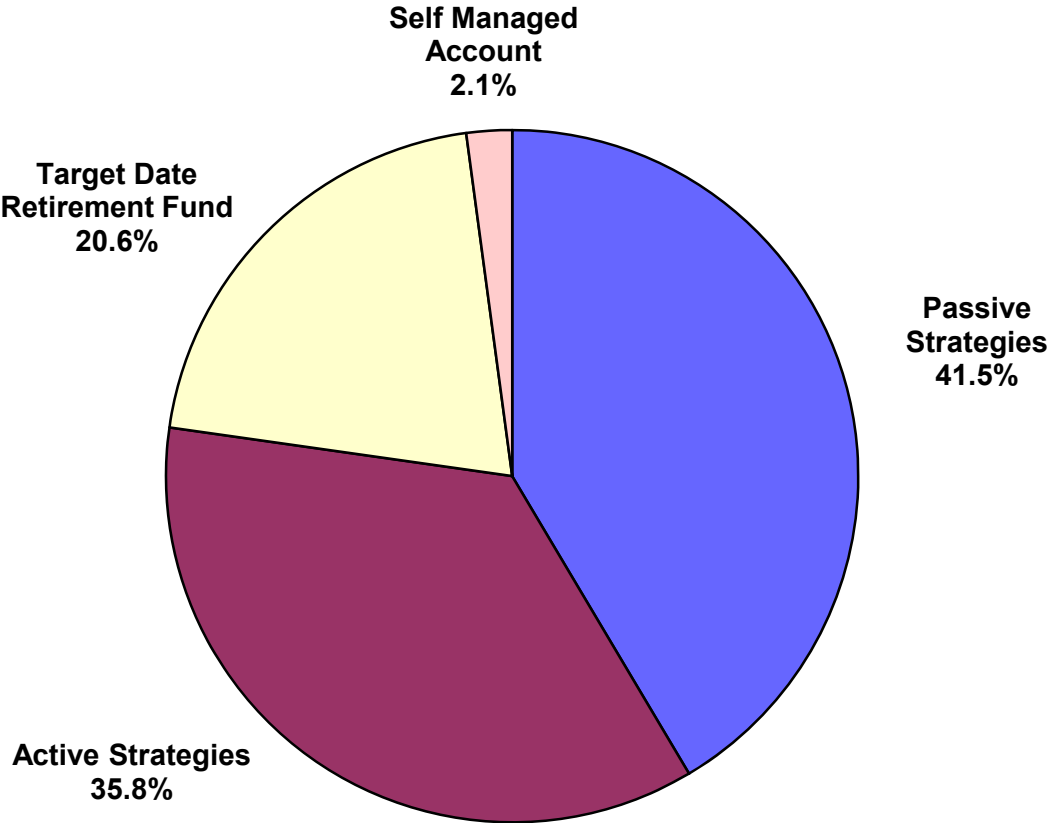
Markets	Amount		% of Total	Fee per \$1,000
QDIA (\$ in Millions)				
	<u>6/30/2019</u>	<u>6/30/2018</u>		
Total Target Date Fund	\$1,837	\$1,485	20.6%	\$0.70
Tier I Index Funds				
State Street S&P 500 Index Fund	\$1,212	\$1,126		\$0.10
State Street Bond Market Index Fund	804	704		0.20
State Street Global All Cap Equity ex-US Index Fund	609	545		0.50
State Street S&P Mid Cap Index Fund	577	587		0.20
BlackRock Government Short-Term Investment CL F	232	228		0.60
BlackRock S&P Small Cap 600 Equity Index CL F	134	143		0.30
BlackRock Emerging Markets Index CL F	123	134		0.70
Total Tier I Index	\$3,691	\$3,467	41.5%	\$0.26
Tier II Active Funds				
Stable Value Fund	\$1,161	\$1,153		\$2.20
Dodge & Cox Stock Fund	571	602		4.10
Jennison Large Cap Growth Fund	403	390		2.90
American Funds EuroPacific Growth R6	319	361		4.90
Voya Small Cap Growth Equity Fund	152	173		4.30
Artisan Mid Cap Fund	124	92		7.00
T. Rowe Price Mid-Cap Value Fund	118	132		6.30
PIMCO Total Return I Fund	118	117		5.50
Oakmark Equity & Income I Fund	116	121		4.30
Virtus Ceredex Small-Cap Value Eq I	73	80		6.80
Prudential High Yield Fund	32	26		3.80
Total Tier II Active	\$3,187	\$3,246	35.8%	\$3.66
Tier III				
Total Self Directed Brokerage Account	\$189	\$194	2.1%	NA
Total Defined Contribution Assets	\$8,904	\$8,392	100.0%	\$1.56

NOTE: Totals may not be exact due to rounding.

SMRS

Defined Contribution by Investment Strategy

6/30/19



Market Value in Millions				
	<u>6/30/19</u>		<u>6/30/18</u>	
Passive Strategies	\$3,691	41.5%	\$3,467	41.3%
Active Strategies	3,187	35.8%	3,246	38.7%
Target Date Retirement Fund	1,837	20.6%	1,485	17.7%
Self Managed Account	189	2.1%	194	2.3%
Total Investments	<u>\$8,904</u>	<u>100.0%</u>	<u>\$8,392</u>	<u>100.0%</u>

*Loan Fund \$199M as of 6/30/19

Defined Contribution Performance by Fund 6/30/19

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
State Street Target Retirement Income Fund	\$40,711,894	5.9%	5.1%	3.4%	6.0%
State Street Income Custom Index		5.8%	5.1%	3.4%	6.2%
Morningstar Target-Date Retirement		5.9%	5.0%	3.4%	5.9%
<i>Variance State Street Income Custom Index</i>		0.1%	0.0%	0.0%	-0.2%
<i>Variance Morningstar Target-Date Retirement</i>		0.0%	0.1%	0.0%	0.1%
State Street Target Retirement 2015 Fund	56,153,010	5.9%	5.8%	3.8%	8.2%
State Street 2015 Custom Index		5.8%	5.8%	3.8%	8.3%
Morningstar Target-Date 2015		5.9%	6.3%	4.2%	7.3%
<i>Variance State Street 2015 Custom Index</i>		0.1%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2015</i>		0.0%	-0.5%	-0.4%	0.9%
State Street Target Retirement 2020 Fund	131,491,739	6.2%	7.2%	4.7%	9.3%
State Street 2020 Custom Index		6.2%	7.2%	4.7%	9.4%
Morningstar Target-Date 2020		5.9%	6.7%	4.3%	7.8%
<i>Variance State Street 2020 Custom Index</i>		0.0%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2020</i>		0.3%	0.5%	0.4%	1.5%
State Street Target Retirement 2025 Fund	181,046,764	6.3%	8.5%	5.5%	10.1%
State Street 2025 Custom Index		6.2%	8.5%	5.5%	10.2%
Morningstar Target-Date 2025		6.0%	7.9%	4.9%	8.8%
<i>Variance State Street 2025 Custom Index</i>		0.1%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2025</i>		0.3%	0.6%	0.6%	1.3%
State Street Target Retirement 2030 Fund	199,269,611	6.3%	9.2%	5.8%	10.6%
State Street 2030 Custom Index		6.2%	9.2%	5.8%	10.7%
Morningstar Target-Date 2030		5.8%	8.6%	5.3%	9.1%
<i>Variance State Street 2030 Custom Index</i>		0.1%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2030</i>		0.5%	0.6%	0.5%	1.5%
State Street Target Retirement 2035 Fund	219,423,987	6.0%	9.7%	6.0%	10.9%
State Street 2035 Custom Index		6.0%	9.8%	6.0%	11.0%
Morningstar Target-Date 2035		5.7%	9.7%	5.8%	10.0%
<i>Variance State Street 2035 Custom Index</i>		0.0%	-0.1%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2035</i>		0.3%	0.0%	0.2%	0.9%
State Street Target Retirement 2040 Fund	212,493,773	5.7%	10.2%	6.2%	11.0%
State Street 2040 Custom Index		5.7%	10.3%	6.2%	11.1%
Morningstar Target-Date 2040		5.5%	9.9%	5.9%	10.0%
<i>Variance State Street 2040 Custom Index</i>		0.0%	-0.1%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2040</i>		0.2%	0.3%	0.3%	1.0%
State Street Target Retirement 2045 Fund	216,691,849	5.4%	10.6%	6.3%	11.1%
State Street 2045 Custom Index		5.4%	10.6%	6.3%	11.2%
Morningstar Target-Date 2045		5.5%	10.5%	6.2%	10.5%
<i>Variance State Street 2045 Custom Index</i>		0.0%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2045</i>		-0.1%	0.1%	0.1%	0.6%
State Street Target Retirement 2050 Fund	267,706,072	5.4%	10.6%	6.3%	11.1%
State Street 2050 Custom Index		5.3%	10.6%	6.3%	11.2%
Morningstar Target-Date 2050		5.3%	10.4%	6.1%	10.3%
<i>Variance State Street 2050 Custom Index</i>		0.1%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2050</i>		0.1%	0.2%	0.2%	0.8%
State Street Target Retirement 2055 Fund	252,702,100	5.4%	10.6%	6.3%	N/A
State Street 2055 Custom Index		5.3%	10.6%	6.3%	N/A
Morningstar Target-Date 2055		5.3%	10.7%	6.3%	N/A
<i>Variance State Street 2055 Custom Index</i>		0.1%	0.0%	0.0%	N/A
<i>Variance Morningstar Target-Date 2055</i>		0.1%	-0.1%	0.0%	N/A

Fund Name	Market Value	1-Year	3-Years	5-Years	10-Years
State Street Target Retirement 2060 Fund	\$59,068,782	5.4%	10.6%	N/A	N/A
<i>State Street 2060 Custom Index</i>		5.3%	10.6%	N/A	N/A
<i>Morningstar Target-Date 2060+</i>		5.4%	10.9%	N/A	N/A
<i>Variance State Street 2060 Custom Index</i>		0.1%	0.0%	N/A	N/A
<i>Variance Morningstar Target-Date 2060+</i>		0.0%	-0.3%	N/A	N/A
TIER I					
State Street S&P 500 Index Fund	1,212,486,572	10.4%	14.2%	10.7%	14.6%
S&P 500 Index		10.4%	14.2%	10.7%	14.7%
Morningstar Large Blend		8.1%	12.6%	8.4%	12.7%
Variance S&P 500 Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Large Blend		2.3%	1.6%	2.3%	1.9%
State Street Bond Market Index Fund	804,236,311	7.9%	2.3%	2.9%	3.8%
Bloomberg Barclays U.S. Aggregate Index		7.9%	2.3%	2.9%	3.9%
Morningstar Intermediate-Term Bond		7.2%	2.5%	2.6%	4.3%
Variance Bloomberg Barclays U.S. Aggregate Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Intermediate-Term Bond		0.7%	-0.2%	0.3%	-0.5%
State Street Global All Cap Equity ex-U.S. Index Fund	608,964,072	0.5%	9.2%	2.5%	N/A
MSCI ACWI ex USA IMI (Net)		0.3%	9.2%	2.2%	N/A
Morningstar Foreign Large Blend		-0.1%	8.1%	1.9%	N/A
Variance MSCI ACWI ex USA IMI (Net)		0.2%	0.0%	0.3%	N/A
Variance Morningstar Foreign Large Blend		0.6%	1.1%	0.6%	N/A
State Street S&P Mid Cap Index Fund	576,743,185	1.3%	10.9%	8.0%	14.5%
S&P 400 Index		1.4%	10.9%	8.0%	14.6%
Morningstar Mid-Cap Blend		2.2%	10.1%	5.8%	12.4%
Variance S&P 400 Index		-0.1%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Mid-Cap Blend</i>		-0.9%	0.8%	2.2%	2.1%
BlackRock Government Short-Term Investment CL F	232,042,491	2.3%	1.4%	0.9%	N/A
BofA Merrill Lynch US 3-Month Treasury Bill Index		2.3%	1.4%	0.9%	N/A
Variance BofA Merrill Lynch US 3-Month Treasury Bill Index		0.0%	0.0%	0.0%	N/A
BlackRock S&P Small Cap 600 Equity Index CL F	133,862,870	-4.8%	N/A	N/A	N/A
S&P SmallCap 600 Index		-4.9%	N/A	N/A	N/A
Morningstar Small Blend		-4.0%	N/A	N/A	N/A
Variance S&P SmallCap 600 Index		0.1%	N/A	N/A	N/A
Variance Morningstar Small Blend		-0.8%	N/A	N/A	N/A
BlackRock Emerging Markets Index CL F	123,284,520	1.2%	10.6%	2.5%	N/A
MSCI Emerging Market (Net)		1.2%	10.7%	2.5%	N/A
Morningstar Diversified Emerging Mkts		1.0%	8.8%	1.6%	N/A
Variance MSCI Emerging Market (Net)		0.0%	-0.1%	0.0%	N/A
<i>Variance Morningstar Diversified Emerging Mkts</i>		0.2%	1.8%	0.9%	N/A
TIER II					
Stable Value Fund	1,160,884,223	2.3%	2.1%	2.2%	2.2%
Barclays Int Gov/Credit A or Higher Index		6.5%	1.6%	2.2%	2.9%
Hueler Universe		2.4%	2.1%	2.0%	2.2%
Variance Barclays Int Gov/Credit A or Higher Index		-4.2%	0.5%	0.0%	-0.7%
Variance Hueler Universe		-0.1%	0.0%	0.2%	0.0%
Dodge & Cox Stock Fund	571,478,114	4.2%	14.4%	8.3%	14.1%
<i>Russell 1000 Value Index</i>		8.5%	10.2%	7.5%	13.2%
<i>Morningstar Large Value</i>		5.8%	10.3%	6.6%	11.8%
<i>Variance Russell 1000 Value Index</i>		-4.3%	4.2%	0.8%	0.9%
<i>Variance Morningstar Large Value</i>		-1.6%	4.1%	1.7%	2.3%

Fund Name	Market Value	1-Year	3-Years	5-Years	10-Years
Jennison Large Cap Growth Fund	\$403,088,900	8.4%	21.8%	14.7%	N/A
<i>Russell 1000 Growth Index</i>		11.6%	18.1%	13.4%	N/A
<i>Morningstar Large Growth</i>		10.1%	16.8%	11.2%	N/A
<i>Variance Russell 1000 Growth Index</i>		-3.2%	3.7%	1.3%	N/A
<i>Variance Morningstar Large Growth</i>		-1.7%	5.0%	3.5%	N/A
American Funds EuroPacific Growth R6	319,004,484	1.9%	10.8%	4.5%	8.2%
<i>MSCI EAFE Index - Net Div</i>		1.1%	9.1%	2.2%	6.9%
<i>Morningstar Foreign Large Blend</i>		-0.1%	8.1%	1.9%	6.4%
<i>Variance MSCI EAFE Index - Net Div</i>		0.8%	1.7%	2.3%	1.3%
<i>Variance Morningstar Foreign Large Blend</i>		2.0%	2.7%	2.6%	1.8%
Voya Small Cap Growth Equity Fund	151,498,416	-4.1%	11.0%	7.2%	N/A
<i>Russell 2000 Growth Index</i>		-0.5%	14.7%	8.6%	N/A
<i>Morningstar Small Growth</i>		3.2%	16.0%	8.9%	N/A
<i>Variance Russell 2000 Growth Index</i>		-3.6%	-3.7%	-1.4%	N/A
<i>Variance Morningstar Small Growth</i>		-7.3%	-5.0%	-1.7%	N/A
Artisan Mid Cap Fund	123,500,212	20.6%	17.0%	10.7%	16.0%
<i>Russell Midcap Growth Index</i>		13.9%	16.5%	11.1%	16.0%
<i>Morningstar Mid-Cap Growth</i>		9.4%	15.2%	9.3%	13.9%
<i>Variance Russell Midcap Growth Index</i>		6.7%	0.5%	-0.4%	0.0%
<i>Variance Morningstar Mid-Cap Growth</i>		11.2%	1.8%	1.4%	2.1%
PIMCO Total Return I Fund	118,269,222	7.6%	3.2%	3.0%	4.7%
<i>Bloomberg Barclays U.S. Aggregate Index</i>		7.9%	2.3%	2.9%	3.9%
<i>Morningstar Intermediate Core-Plus Bond</i>		7.4%	2.9%	2.9%	4.8%
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>		-0.3%	0.9%	0.1%	0.8%
<i>Variance Morningstar Intermediate Core-Plus Bond</i>		0.2%	0.3%	0.1%	-0.1%
T. Rowe Price Mid-Cap Value Fund	117,810,642	-2.8%	8.0%	6.5%	12.9%
<i>Russell Midcap Value Index</i>		3.7%	8.9%	6.7%	14.6%
<i>Morningstar Mid-Cap Value</i>		0.7%	8.7%	5.3%	12.6%
<i>Variance Russell Midcap Value Index</i>		-6.5%	-0.9%	-0.2%	-1.7%
<i>Variance Morningstar Mid-Cap Value</i>		-3.5%	-0.7%	1.2%	0.3%
Oakmark Equity & Income I Fund	116,300,749	5.0%	9.7%	5.3%	8.9%
<i>60% S&P 500/40% Barclays U.S. Gov/Credit Index</i>		10.1%	9.5%	7.8%	10.6%
<i>Morningstar Allocation--50% to 70% Equity</i>		5.7%	7.6%	4.8%	8.4%
<i>Variance 60% S&P 500/40% Barclays U.S. Gov/Credit Index</i>		-5.1%	0.2%	-2.5%	-1.7%
<i>Variance Morningstar Allocation--50% to 70% Equity</i>		-0.7%	2.1%	0.5%	0.5%
Virtus Ceredex Small-Cap Value Eq I	72,815,025	2.0%	9.3%	6.4%	14.4%
<i>Russell 2000 Value Index</i>		0.2%	10.9%	5.6%	14.1%
<i>Morningstar Small Value</i>		-2.4%	8.4%	4.2%	13.8%
<i>Variance Russell 2000 Value Index</i>		1.8%	-1.6%	0.8%	0.3%
<i>Variance Morningstar Small Value</i>		4.4%	0.9%	2.2%	0.6%
Prudential High Yield Fund	31,853,058	6.8%	7.5%	N/A	N/A
<i>Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		5.8%	8.5%	N/A	N/A
<i>Morningstar High Yield Bond</i>		4.4%	6.8%	N/A	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		1.0%	-1.0%	N/A	N/A
<i>Variance Morningstar High Yield Bond</i>		2.4%	0.7%	N/A	N/A
TIER III					
Self Directed	189,400,642				
TOTAL	\$8,904,283,290				

Loan Fund: \$198,603,628

State of Michigan Retirement System

BASKET CLAUSE REVIEW

State of Michigan Investment Board Meeting
September 12, 2019



Karen M. Stout, CPA, CGFM
Administrator
Trust Accounting Division

SMRS

Basket Clause Investments

6/30/19

<u>Asset Class</u>	<u>Value</u>
Total Absolute Return	\$ 4,225,096,404
Total Real Return and Opportunistic	715,797,148
Total International Equity	78,151,047
Total Fixed Income	<u>61,066,173</u>
Total Basket Clause Investments	<u><u>\$ 5,080,110,772</u></u>

The basket clause investments at June 30, 2019, were \$5.1 billion or 6.8% of the total portfolio value of \$74.5 billion.

The Public Employees Retirement System Investment Act, 1965, PA 314, MCL 38.1132 *et seq*, authorizes the State Treasurer to invest up to 30% of the system's assets in investments "not otherwise qualified under the act." MCL 38.1140d (1). Commonly referred to as Section 20d (after the authorizing section of PA 314) or Basket Clause investments, this provision gives the State Treasurer the flexibility to take advantage of market opportunities not specifically authorized in PA 314 while conserving protections against imprudent investment.

Disclaimer



This presentation was given solely for the purpose of explaining the structure, investment process, and returns for the State of Michigan Retirement System. It should not be interpreted in any way as financial advice.