

STATE OF MICHIGAN INVESTMENT BOARD MEETING

December 10, 2020

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

DECEMBER 10, 2020

Agenda



- 9:30 a.m.** **Call to Order and Opening Remarks**
Approval of the 9/10/20 SMIB Meeting Minutes
- 9:35 a.m.** **Executive Summary & Performance for Periods Ending 9/30/20**
- 9:50 a.m.** **Current Asset Allocation Review**
Markets Review and Outlook
- 10:00 a.m.** **Defined Contribution Presentations**
Defined Contribution Overview: Woodrow Tyler
Michigan's DC Plan: Anthony Estell & Allison Wardlaw
Michigan's DC Plan Investments: Lan Chen
Target Date Funds (State Street Global Advisors): Mary Guy, Brenden Curran, David Ireland
- Review of Investment Reports**
- **Domestic Equity – Receive and File**
 - **Private Equity – Receive and File**
 - **International Equity – Receive and File**
 - **Real Return & Opportunistic – 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



2021 Meeting Schedule

Thursday, March 25, 2021

Thursday, June 10, 2021

Thursday, September 16, 2021

Thursday, December 9, 2021

All meetings start at 9:30 a.m.

State of Michigan Retirement System

MINUTES

State of Michigan Investment Board Meeting

December 10, 2020



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN INVESTMENT BOARD

September 10, 2020 Meeting Minutes

Board Members Present:

Chairman – Treasurer Rachael Eubanks – via Microsoft Teams
Ms. Dina Richard – via Microsoft Teams
Mr. Reginald Sanders – via Microsoft Teams
Mr. James Nicholson – via conference line
Mr. Chris Kolb – via Microsoft Teams

Members of the Public and Bureau of Investments Staff Present – via Microsoft Teams

Jon Braeutigam	Annette Russell	Bahij Hourani
Robert Brackenbury	Janet Sudac	Semone James
Karl Borgquist	Lori Barrett	Anthony Estell
Greg Parker	Travis Haney	Allison Wardlaw
Jim Elkins	Patrick Moraniec	Jeffrey Guilfoyle
Ann Storberg	Daniel Quigley	Bradley Hartwell
Tim McEnery	Jennifer Yeung	Anne Clifford-Alicea
Henry James	Woodrow Tyler	Steve Strandberg
Peter Woodford	Todd Warstler	
Max Kotary	Jack Behar	

Many others were present by AT&T phone line.

Opening Remarks:

Rachael Eubanks called the meeting to order at 9:30 am.

Approval of Minutes:

Approval of the June 11, 2020 SMIB Meeting Minutes – Motion to approve by Dina Richard.
Seconded: Reggie Sanders. The vote was unanimous to approve.

AGENDA

Guest Speaker: Henry McVey of KKR

Mr. Henry McVey presented a KKR macro update. He explained that given the heavy debt loads and high unemployment rate, KKR envisions more of a square root recovery than a V-shaped recovery and that we have entered a structurally slower growth environment. He then answered many questions.

Executive Summary

Jon Braeutigam, Chief Investment Officer for the Bureau of Investments, reviewed the executive summary performance section discussing performance returns and markets. He discussed the low interest rates and having liquidity during this time. He stated that we are being very cautious in making new commitments. There was uncertainty at how the stock market was going to behave but the Federal Reserve came through and this helped all pension funds and retirees by keeping

asset prices high. This gives us a little more confidence and ability to very carefully make more commitments as opportunities arise.

Asset Allocation Review, Markets Review and Outlook

Mr. Gregory Parker, Director of Investments – Public Markets discussed performance, pointing out areas of stability in the Fixed Income portfolio and the bond-like return that SMRS strives for. He believes this will continue and that the benchmark has more volatility than our portfolio.

In the International Equities portfolio, he discussed the stability in excess returns over the benchmark, somewhere between 70 and 150 basis points annualized over the past 10 years. He noted that over the past few years, changes have been made to the International Equities portfolio. There is a significant investment managed by Blackrock that is 4.3% ahead of its benchmark and a new internal portfolio that was initiated at the beginning of the year that is almost 10% ahead of its benchmark. We also have established a presence in China over the past year, which is one of the many strategies that Mr. McVey mentioned in his presentation.

Mr. Parker stated that if there is a risk to the base case market outlook, it could surprise to the upside given the amount of stimulus and pent-up demand in the economy. Mr. Parker discussed SMRS's asset allocation standings relative to Henry McVey's discussion. He explained that our critical function is to pay our pensioners, which we accomplish. Mr. Parker answered questions from Board members.

BOI Investment Staff Focus: Henry James

Mr. Henry James, Portfolio Manager, Disruptive Innovation Momentum Fund, Domestic Equity Division, spoke on Disruptive Innovation in Healthcare. He discussed biotechnology and technologies and trends, what it means and what is possible. He further discussed companies that benefit from this and then offered a Q&A session. Mr. James brought to light that DNA in the body is the "instruction manual" of the body. We don't completely understand the instruction manual yet but once we do, we will be able to not only treat each person individually and preventatively but will be able to cure diseases.

Review of Investment Reports and Basket Clause – Received and Filed

Public Comment:

None.

Adjournment:

Treasurer Eubanks adjourned the meeting at 11:08 am. Motion to adjourn by James Nicholson. Seconded: Dina Richard. The vote was unanimous to adjourn.

Approved:

Rachael Eubanks, Chairman

State of Michigan Retirement System

EXECUTIVE SUMMARY

State of Michigan Investment Board Meeting

December 10, 2020



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

EXECUTIVE SUMMARY

September 30, 2020

Performance

Great peer comparison.

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	5.3%	7.4%	8.7%	8.8%	9.4%
Policy Returns	8.4%	8.3%	9.7%	9.0%	9.8%
Peer Median Returns*	7.0%	6.2%	8.1%	7.3%	8.1%

*State Street Universe greater than \$10 billion.

- Over the past three, five, seven, and ten years, the returns are significantly higher than peer median returns. The peers are defined as the State Street Universe of public pension plans greater than \$10 billion. Notably, the standard deviation of the monthly returns was in the lowest quartile for the longer time horizons.
- Over a very long horizon, since 1979, the annualized rate of return on the plan assets has been approximately 9.3%.
- Compounding at higher than peer returns can add significant value. For example, based on the \$47.5 billion September 2010 market value, a ten-year annualized return of 9.4% compared to the 8.1% peer median return would add about \$12.5 billion in excess value.
- Most asset classes earned returns comparable to peer median returns or higher over the past ten years.

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 rate of return, additional risks (primarily equity risk) must be assumed. At the end of September 2020, the equity risk (beta) is approximately 0.36 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 \$12.5 billion in illiquid assets, primarily in private equity. In the September 2020 quarter, \$280 million of new commitments were made.
- The combined systems paid out approximately \$2.15 billion net of contributions over the past twelve months ending in September 2020. Over the past year, real return & opportunistic was a net purchaser of \$827 million and private equity approximately \$485 million. Over the past year, the allocation to domestic equity was reduced by \$1.93 billion, long-term fixed income by \$1.19 billion, absolute return by \$484 million, real estate by \$477 million, and international equity by \$313 million. The allocation to short-term cash increased by approximately \$934 million.

Investment Update*Highlighting the quarter.*

(\$ Millions)

NEW COMMITMENTS**July 1, 2020 – September 30, 2020**

Asset class	Fund Name / (Managed By)	Commitment
Private Equity		
	Thoma Bravo XIV (Thoma Bravo Partners XIV and XIV-P, L.P.)	\$125.0
	Axiom Asia VI, L.P. (Mission Capital GP VI)	50.0
	Lead Edge V, L.P. (Lead Edge Capital Partners V, LLC)	30.0
	Menlo Ventures XV, L.P. (MV Management XV, LLC)	25.0
Real Estate and Infrastructure Division		
	No new commitments	0.0
Real Return & Opportunistic Division		
	HPS Mezzanine Partners 2019, L.P. (HPS Investment Partners)	50.0
Absolute Return Division		
	No new commitments	0.0
TOTAL		\$280.0

State of Michigan Retirement System

PERFORMANCE

State of Michigan Investment Board Meeting

December 10, 2020



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.*

MPSERS PENSION

Time-Weighted Rates of Return

Periods Ending September 30, 2020

	% of Portfolio 9/30/20	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	9.4	11	8.8	9	8.7	31	7.4	26	5.3	79	6.7	4
Median - Greater than \$10 Billion ²		8.1		7.3		8.1		6.2		7.0		5.1	
MPSERS Total Plan Policy		9.8		9.0		9.7		8.3		8.4		6.9	
DOMESTIC EQUITIES	21.6	13.1	27	12.0	20	13.0	25	11.1	22	10.5	56	9.4	20
Median ²		10.7		8.9		10.7		8.1		11.0		8.0	
S&P 1500 Index		13.5		12.2		13.6		11.3		13.4		8.6	
PRIVATE EQUITY AND VENTURE CAPITAL	19.9	14.0	8	13.3	6	11.3	6	12.3	9	6.6	18	10.7	7
Median ²		9.6		8.1		7.0		5.6		1.5		4.9	
Private Equity and VC Benchmark ³		17.4		15.5		14.0		14.0		10.7		21.4	
INTERNATIONAL EQUITIES	16.1	5.4	34	4.7	34	7.3	45	2.3	50	6.1	45	8.1	40
Median ²		5.2		4.0		7.0		2.2		5.2		7.4	
International Blended Benchmark ⁴		4.2		3.2		6.2		1.2		3.0		6.3	
FIXED INCOME	12.4	4.3	61	4.6	44	4.9	55	4.7	70	3.4	88	2.0	12
Median ²		4.6		4.1		5.1		5.2		7.4		1.1	
Barclays Aggregate		3.6		4.0		4.2		5.2		7.0		0.6	
REAL RETURN AND OPPORTUNISTIC	12.4	10.0		11.5		9.9		10.7		7.4		8.3	
50% (CPI +500 bps) + 50% (6.8% actuarial rate)		7.2		7.0		7.1		6.8		6.2		1.8	
REAL ESTATE & INFRASTRUCTURE	8.1	9.5	52	8.9	50	6.3	63	4.3	71	-6.4	94	-1.7	76
Median ²		9.6		8.8		6.8		5.2		0.4		0.1	
NCREIF - Property Blended Index ⁵		8.0		6.6		4.9		3.8		0.7		0.4	
NCREIF Open Fund Index Net		9.3		7.6		5.7		4.3		0.5		0.3	
ABSOLUTE RETURN	4.9	4.7		4.3		3.8		4.3		2.9		5.3	
HFRI FOF Cons 1 month lagged		2.8		2.7		2.1		2.5		2.2		4.5	
CASH EQUIVALENTS	4.7	1.0		1.2		1.6		2.0		1.5		0.1	
1 Month T-Bill		0.6		0.8		1.1		1.6		0.9		0.0	

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 9/30/20

	<u>1 Year</u>	<u>2 Year</u>	<u>3 Year</u>	<u>4 Year</u>	<u>5 Year</u>	<u>6 Year</u>	<u>7 Year</u>	<u>8 Year</u>	<u>9 Year</u>	<u>10 Year</u>
MPSERS	5.4	5.5	7.5	9.0	8.7	7.7	8.8	9.2	9.7	9.4
Public Plan - Median (> \$10 billion)*	7.0	5.8	6.2	7.8	8.1	6.8	7.3	7.9	8.7	8.1
Rank	78	58	25	16	31	17	7	12	22	11
bp Difference - Median	-168	-35	124	123	61	84	145	134	101	126

Consecutive For Years Ending

	<u>09/20</u>	<u>09/19</u>	<u>09/18</u>	<u>09/17</u>	<u>09/16</u>	<u>09/15</u>	<u>09/14</u>	<u>09/13</u>	<u>09/12</u>	<u>09/11</u>
MPSERS	5.4	5.6	11.6	13.8	7.6	2.6	15.6	12.5	13.4	6.6
Public Plan - Median (> \$10 billion)*	7.0	5.2	7.6	12.7	9.5	0.2	11.1	12.6	15.3	2.6
Rank	78	43	5	23	91	5	4	51	77	8
bp Difference - Median	-168	40	391	113	-192	241	449	-4	-188	404

MSERS

Cumulative For Years Ending 9/30/2020

	<u>1 Year</u>	<u>2 Year</u>	<u>3 Year</u>	<u>4 Year</u>	<u>5 Year</u>	<u>6 Year</u>	<u>7 Year</u>	<u>8 Year</u>	<u>9 Year</u>	<u>10 Year</u>
MSERS	5.3	5.5	7.5	9.0	8.7	7.7	8.8	9.2	9.7	9.4
Public Plan - Median (> \$1 billion)*	7.2	5.7	6.1	7.7	8.0	6.5	7.1	7.4	8.3	7.6
Rank	78	55	19	17	25	16	10	13	19	12
bp Difference - Median	-190	-25	138	135	70	119	171	186	137	172

Consecutive For Years Ending

	<u>09/20</u>	<u>09/19</u>	<u>09/18</u>	<u>09/17</u>	<u>09/16</u>	<u>09/15</u>	<u>09/14</u>	<u>09/13</u>	<u>09/12</u>	<u>09/11</u>
MSERS	5.3	5.6	11.5	13.8	7.6	2.6	15.5	12.5	13.4	6.5
Public Plan - Median (> \$1 billion)*	7.2	4.3	7.7	12.7	9.7	-0.3	10.4	12.8	15.8	2.1
Rank	78	29	5	30	88	4	4	54	81	6
bp Difference - Median	-190	124	382	108	-203	287	516	-29	-239	432

*State Street Public Funds Universe

Cumulative and Consecutive Total Fund Returns

MSPRS

Cumulative For Years Ending 9/30/20

	<u>1 Year</u>	<u>2 Year</u>	<u>3 Year</u>	<u>4 Year</u>	<u>5 Year</u>	<u>6 Year</u>	<u>7 Year</u>	<u>8 Year</u>	<u>9 Year</u>	<u>10 Year</u>
MSPRS	5.4	5.5	7.5	9.0	8.7	7.7	8.8	9.2	9.6	9.4
Public Plan - Median (> \$1 billion)*	7.2	5.7	6.1	7.7	8.0	6.5	7.1	7.4	8.3	7.6
Rank	78	55	19	17	26	16	12	14	19	12
bp Difference - Median	-187	-25	138	134	69	119	170	184	133	172

Consecutive For Years Ending

	<u>09/20</u>	<u>09/19</u>	<u>09/18</u>	<u>09/17</u>	<u>09/16</u>	<u>09/15</u>	<u>09/14</u>	<u>09/13</u>	<u>09/12</u>	<u>09/11</u>
MSPRS	5.4	5.6	11.5	13.8	7.6	2.5	15.5	12.4	13.3	6.7
Public Plan - Median (> \$1 billion)*	7.2	4.3	7.7	12.7	9.7	-0.3	10.4	12.8	15.8	2.1
Rank	78	30	5	30	88	4	4	54	87	5
bp Difference - Median	-187	121	381	108	-204	286	508	-34	-252	458

MJRS

Cumulative For Years Ending 9/30/20

	<u>1 Year</u>	<u>2 Year</u>	<u>3 Year</u>	<u>4 Year</u>	<u>5 Year</u>	<u>6 Year</u>	<u>7 Year</u>	<u>8 Year</u>	<u>9 Year</u>	<u>10 Year</u>
MJRS	5.3	5.4	7.4	9.0	8.7	7.7	8.7	9.1	9.6	9.3
Public Plan - Median (> \$1 billion)*	7.2	5.7	6.1	7.7	8.0	6.5	7.1	7.4	8.3	7.6
Rank	78	56	19	17	26	16	13	16	20	16
bp Difference - Median	-193	-28	135	134	69	118	162	173	131	163

Consecutive For Years Ending

	<u>09/20</u>	<u>09/19</u>	<u>09/18</u>	<u>09/17</u>	<u>09/16</u>	<u>09/15</u>	<u>09/14</u>	<u>09/13</u>	<u>09/12</u>	<u>09/11</u>
MJRS	5.3	5.6	11.5	13.9	7.6	2.5	14.9	12.1	13.9	6.1
Public Plan - Median (> \$1 billion)*	7.2	4.3	7.7	12.7	9.7	-0.3	10.4	12.8	15.8	2.1
Rank	78	29	5	30	88	4	4	60	73	8
bp Difference - Median	-193	122	379	116	-203	284	451	-68	-186	393

*State Street Public Funds Universe

State of Michigan Retirement System

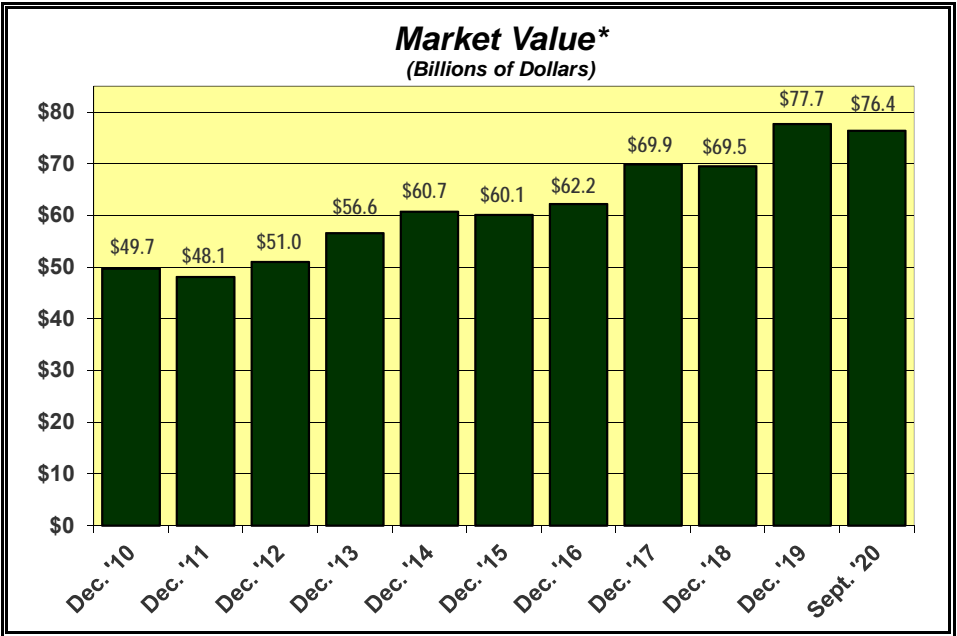
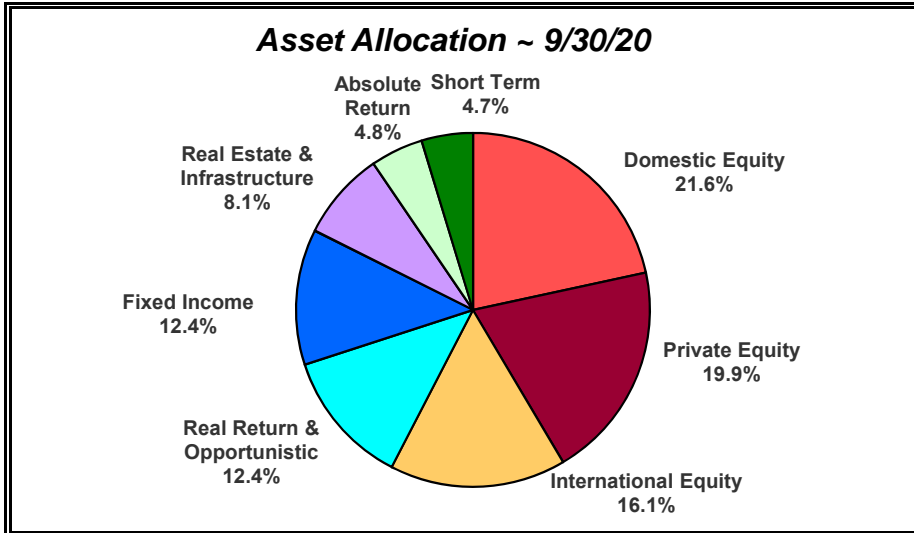
ASSET ALLOCATION REVIEW

State of Michigan Investment Board Meeting
December 10, 2020



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN RETIREMENT SYSTEM PROFILE - SEPTEMBER 2020



Asset Allocation By Market Value (In Millions)

Investment Strategies	9/30/2020		9/30/2019	
Domestic Equity	\$16,491	21.6%	\$16,789	22.5%
Private Equity	15,206	19.9%	13,893	18.6%
International Equity	12,315	16.1%	11,929	15.9%
Real Return & Opportunistic	9,456	12.4%	8,055	10.8%
Fixed Income	9,448	12.4%	10,170	13.6%
Real Estate & Infrastructure	6,180	8.1%	7,113	9.5%
Absolute Return	3,707	4.8%	4,125	5.5%
Short Term***	3,612	4.7%	2,679	3.6%
TOTAL	\$76,416	100.0%	\$74,753	100.0%

Market Value By Plan ~ 9/30/20 (in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPSERS	\$51,244	\$7,750	\$58,994	77.1%
MSERS - (closed)	12,046	3,343	15,389	20.2%
MSPRS	1,508	261	1,769	2.3%
MJRS - (closed)	255	9	264	0.4%
TOTAL	\$65,053	\$11,363	\$76,416	100.0%

MSERS includes the Military Pension Fund

Short Term Equivalents (in Billions)

Short Term Strategy***	\$3.6	
Short Term in Other Inv. Strategies	1.2	
TOTAL SHORT TERM	\$4.8	6.3% of Total Funds

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

Pensions & Investments survey - February 10, 2020 issue

*The combined net payout for the plans for FY 2019 was \$1.8 billion with \$21.3 billion paid out FY 2010 thru FY 2019 (Pension CAFRs). This represents the amount paid to beneficiaries in excess of employer and employee contributions.

**OPEB - Other Post Employment Benefits

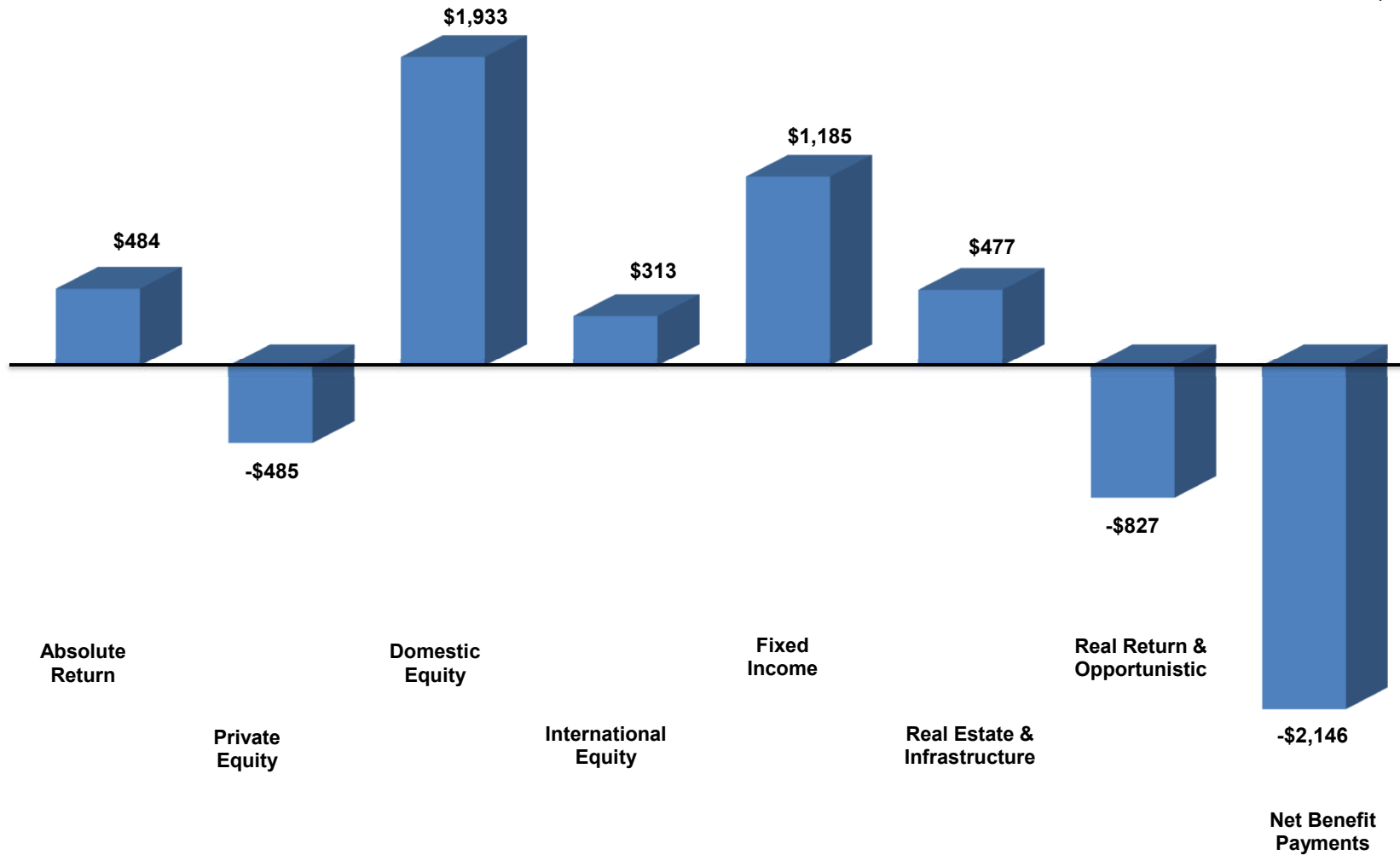
Sources and Uses of Cash

October 2019 ~ September 2020

10/01/19 Short-Term Cash Balance: \$ 2,680

9/30/20 Short-Term Cash Balance: 3,614

Net Short-Term Cash Increase: \$ 934



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 9/30/20

	MPSERS		MSERS		MSPRS		MJRS		SMRS
<i>Asset Class</i>	<i>9/30/20</i>	<i>Target*</i>	<i>9/30/20</i>	<i>Target*</i>	<i>9/30/20</i>	<i>Target*</i>	<i>9/30/20</i>	<i>Target*</i>	<i>Ranges</i>
Domestic Equity	21.6%	25.0%	21.6%	25.0%	21.6%	25.0%	21.5%	25.0%	17% - 32%
Private Equity	19.9%	16.0%	19.9%	16.0%	19.9%	16.0%	19.7%	16.0%	13% - 25%
International Equity	16.1%	15.0%	16.1%	15.0%	16.1%	15.0%	16.0%	15.0%	12% - 22%
Real Return & Opportunistic	12.4%	12.5%	12.4%	12.5%	12.4%	12.5%	12.2%	12.5%	8% - 18%
Long Term Fixed Income	12.4%	10.5%	12.4%	10.5%	12.4%	10.5%	12.2%	10.5%	8% - 18%
Real Estate & Infrastructure	8.1%	10.0%	8.1%	10.0%	8.1%	10.0%	7.9%	10.0%	8% - 18%
Absolute Return	4.9%	9.0%	4.9%	9.0%	4.8%	9.0%	4.7%	9.0%	5% - 11%
Short Term Fixed Income	4.7%	2.0%	4.7%	2.0%	4.7%	2.0%	5.7%	2.0%	1% - 8%
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

December 10, 2020



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	11.0%	25.0%	17.4%
International Equity	9.5%	21.4%	4.2%
Real Ret/Opportunistic	8.1%	9.5%	7.2%
Domestic Equity	7.4%	17.6%	13.5%
Real Estate (Core)	7.4%	15.0%	8.0%
Absolute Return	4.6%	9.0%	2.8%
Long-Term Fixed Income	1.3%	4.0%	3.6%
Short-Term	0.7%	1.0%	0.6%

* Aon Investment Consultants 2020 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.
- Corporations in the U.S. as well as globally have access to capital through the debt market. The June 2020 quarter saw record issuances globally as well as in the U.S., as both investment grade and high yield issuance was at a record high.
- In many ways, the Covid-19 pandemic accelerated business trends that were already in place headed into the year 2020. Many economically disruptive companies are included in the NASDAQ 100 Index and the contrast of this index return compared to the broader S&P 1500 Composite return exemplifies this point. The one-year return for the NASDAQ 100 ending September 2020 was 47.3%, out-returning the S&P 1500 by 33.9%
- Within international equities, emerging market returns exceeded developed markets over the past one, three, five and seven years by 10.3%, 3.5%, 1.7% and 0.7% annualized, respectively. However, over the past ten years, emerging markets returns were -2.0% annualized less than developed markets.
- Safe haven commodity assets such as gold have performed well recently. At the end of September 2020, the dollar price for an ounce of gold was at \$1,887.50. This is 29% higher than the year prior.

U.S. Fixed Income

The debt markets are open.

- The March 2020 quarter witnessed one of the most severe market dislocations within the U.S. Fixed Income asset class as well as some of the most awe-inspiring actions taken by the U.S. Federal Reserve and U.S. Treasury.
- To highlight a few of the policy responses:
 - The Fed will be lending as much as \$5 Trillion, which is more than its entire balance sheet before the crisis, as it's part of the CARES act.
 - The Fed created new lending facilities targeting the corporate and municipal bond markets and is able to extend loans directly to large and small companies as well as buy bond ETFs.
 - The expanded policies also allow the Fed to buy corporate bonds from “fallen angels” that have been recently downgraded.
 - These programs are on top of the usual liquidity facilities of lowering rates and providing currency swap lines to foreign central banks.
- The responses to these policy actions had a calming effect on the markets. By the end of September 2020, the 10-year U.S. interest rate was 0.69% and the 2-year rate was at 0.13%. Spreads on investment-grade corporate debt were 1.3% which is 0.2% above average and high yield fixed income spreads were 5.2% which are 0.7% above long-term medians.
- Corporations in the U.S. as well as globally have access to capital through the debt market. The June 2020 quarter saw record issuances globally as well as in the U.S., as both the investment grade and high yield issuance was at a record high.

Domestic Equity

A bifurcated market.

- The broad U.S. stock market return for the one year ending September 2020 was 13.4%. The market hit an all-time high in the month of September 2020.
- Many domestic equity valuation metrics are above historical averages, and analysts expect that fundamentals will continue to deteriorate over the next twelve months. Consequently, the returns over the next cycle may not be as strong as the historical average of 11 – 12% year-over-year total returns. Fundamentally, however, the market's returns on equity continue to be historically higher than average and some of the largest companies in the market today are less cyclical (economically sensitive) than past market leaders. These facts lend support to the argument that higher valuations are justified, and therefore the market could perhaps continue to deliver historical average rates of return in the future.
- In many ways, the Covid-19 pandemic accelerated business trends that were already in place headed into the year 2020. Many economically disruptive companies are included in the NASDAQ 100 Index and the contrast of this index return compared to the broader S&P 1500 Composite return exemplifies this point. The one-year return for the NASDAQ 100 ending September 2020 was 47.3%, out-returning the S&P 1500 by 33.9%. Analysts expect the S&P 500 EPS to grow 7.5% in the next twelve months, however, they estimate that the NASDAQ 100 EPS will grow 17.8% over the same time period.

International Equity

Are fundamentals priced in?

- International equities underperformed domestic equities over the year ending September 2020 by -10.0%. Over the past three, five, seven, and ten years, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -9.7%, -6.8%, -8.5%, and -9.0% annualized, respectively.
- Within international equities, emerging market returns exceeded developed markets over the past one, three, five and seven years by 10.3%, 3.5%, 1.7% and 0.7% annualized, respectively. However, over the past ten years, emerging markets returns were -2.0% annualized less than developed markets.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 16% discount to U.S. counterparts while emerging markets are at a 29% discount.

Real Estate

Comparing Public vs. Private Real Estate

- Over the one year ending September 2020, the NAREIT index decreased by -12.1% including dividends, as the economic hit of the global pandemic began to take hold. Over the medium to longer-term; publicly traded REITs have earned a similar rate of annualized returns, but they are about three times more volatile.
- Dividend yields on REITs at the end of September 2020 were estimated to be around 3.9% which is nearly 3.1% higher than the yield of the ten-year U.S. Treasury. Historically, REIT dividend yields have averaged only 1.2% higher than the ten-year U.S. Treasury and at these levels may be seen as relatively attractive.

Hedge Funds

Estimating the asset class return.

- Over the past five years, the Absolute Return portfolio's return has had a monthly beta of approximately 0.2 and annualized alpha of 2.1%.
- Based on an expected annualized equity market return of approximately 7.2%, should historical hedge fund betas and alphas continue, a 3.75% annualized net return seems like a reasonable assumed rate of return for hedge funds. This return is approximately 3-month U.S. Libor plus 350 basis points. However, it should also be noted that in the past after times of market dislocations, the realized alpha has been higher.

Commodities

Safe havens shine.

- The U.S. dollar has fallen in value over the past year ending September 2020 by -5.5% as measured by the DXY index and it is slightly weaker than it has been on average over the past 5 years.
- Safe haven commodity assets such as gold have performed well recently. At the end of September 2020, the dollar price for an ounce of gold was at \$1,887.50. This is 29% higher than the year prior. Over the past decade, the precious metal has appreciated by more than 44%, this is in sharp contrast to the broad commodity market in general. Investors in gold believe that the significant increase in debt by the U.S. as well as other large economies provides a tail-wind for the supply constraint metal.

Annual Total Returns of Key Asset Classes 2000 - 2019

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019		
Best ↑ 4 ↓ Worst	Gov't Bonds	Corp. Bonds	Gov't Bonds	Int'l Equity	Int'l Equity	Real Estate	Int'l Equity	Int'l Equity	Gov't Bonds	Int'l Equity	U.S. Equity	Real Estate	Int'l Equity	U.S. Equity	U.S. Equity	Real Estate	U.S. Equity	Int'l Equity	Real Estate	U.S. Equity	Worst	
	13.23%	10.40%	11.50%	40.82%	20.90%	20.06%	26.65%	16.65%	12.38%	41.44%	16.38%	14.26%	16.83%	32.80%	13.08%	13.32%	11.93%	27.19%	6.71%	30.90%		
	Real Estate	Real Estate	Corp. Bonds	U.S. Equity	Real Estate	Int'l Equity	Real Estate	Real Estate	Cash	U.S. Equity	Real Estate	Gov't Bonds	U.S. Equity	Int'l Equity	Real Estate	U.S. Equity	Real Estate	U.S. Equity	Inflation	Int'l Equity		
	12.24%	7.28%	10.52%	29.58%	14.48%	16.62%	16.59%	15.84%	2.05%	27.24%	13.11%	9.02%	16.17%	15.29%	11.81%	1.01%	7.97%	21.13%	1.91%	22.13%		
	Corp. Bonds	Gov't Bonds	Real Estate	Hedge Funds	U.S. Equity	U.S. Equity	U.S. Equity	Gov't Bonds	Inflation	Corp. Bonds	Int'l Equity	Corp. Bonds	Real Estate	Real Estate	Corp. Bonds	Gov't Bonds	Corp. Bonds	Real Estate	Cash	Corp. Bonds		
	9.40%	7.24%	6.74%	9.01%	11.78%	5.65%	15.34%	8.67%	0.10%	16.05%	11.15%	8.35%	10.54%	10.99%	7.53%	0.86%	5.63%	6.96%	1.88%	14.54%		
	Cash	Cash	Hedge Funds	Real Estate	Hedge Funds	Hedge Funds	Hedge Funds	Hedge Funds	Corp. Bonds	Hedge Funds	Corp. Bonds	Inflation	Corp. Bonds	Hedge Funds	Gov't Bonds	Inflation	Int'l Equity	Corp. Bonds	Gov't Bonds	Gov't Bonds		
	6.16%	4.43%	3.57%	8.99%	5.83%	5.13%	9.21%	7.68%	-3.07%	9.65%	8.46%	2.96%	9.37%	7.70%	4.92%	0.66%	4.50%	6.42%	0.88%	6.83%		
	Hedge Funds	Hedge Funds	Inflation	Corp. Bonds	Corp. Bonds	Inflation	Cash	U.S. Equity	Real Estate	Inflation	Gov't Bonds	U.S. Equity	Hedge Funds	Inflation	Hedge Funds	Hedge Funds	Inflation	Hedge Funds	Hedge Funds	Hedge Funds	Real Estate	
	5.77%	3.11%	2.39%	7.69%	5.25%	3.42%	4.81%	5.47%	-6.46%	2.72%	5.52%	1.75%	4.22%	1.49%	3.14%	0.37%	2.09%	3.88%	-1.05%	6.42%		
Inflation	Inflation	Cash	Gov't Bonds	Gov't Bonds	Cash	Corp. Bonds	Corp. Bonds	Hedge Funds	Cash	Hedge Funds	Cash	Gov't Bonds	Cash	Inflation	Cash	Hedge Funds	Gov't Bonds	Corp. Bonds	Hedge Funds			
3.39%	1.55%	1.79%	2.36%	3.48%	3.06%	4.27%	5.10%	-19.86%	0.19%	5.07%	0.10%	2.02%	0.07%	0.68%	0.01%	1.89%	2.30%	-2.51%	6.35%			
U.S. Equity	U.S. Equity	Int'l Equity	Inflation	Inflation	Gov't Bonds	Gov't Bonds	Cash	U.S. Equity	Gov't Bonds	Inflation	Hedge Funds	Inflation	Corp. Bonds	Cash	Corp. Bonds	Gov't Bonds	Inflation	U.S. Equity	Inflation			
-6.98%	-10.64%	-14.95%	1.88%	3.25%	2.65%	3.46%	5.03%	-36.72%	-2.19%	1.50%	-3.55%	1.70%	-2.01%	0.04%	-0.77%	1.05%	2.12%	-4.96%	2.29%			
Int'l Equity	Int'l Equity	U.S. Equity	Cash	Cash	Corp. Bonds	Inflation	Inflation	Int'l Equity	Real Estate	Cash	Int'l Equity	Cash	Gov't Bonds	Int'l Equity	Int'l Equity	Cash	Cash	Int'l Equity	Cash			
-15.31%	-19.74%	-21.30%	1.16%	1.33%	1.95%	2.55%	4.06%	-45.52%	-16.86%	0.13%	-13.71%	0.11%	-2.60%	-3.87%	-5.67%	0.27%	0.84%	-14.20%	2.28%	Worst		

		Annualized Returns 2000 - 2019																			
Return		Cash		Infl.		Hedge		Int'l.		Gov't.		Corp.		US Eq.		R.E.					Return
Risk		0.96%		1.33%		4.79%		18.66%		4.44%		5.22%		15.93%		4.55%					Risk

- Hedge Funds are represented by the HFRI FOF Conservative Index
- Inflation is represented by the U.S. Consumer Price Index (SA)
- International Equity is represented by the MSCI - AC World EX-USA Index
- Cash is represented by 30-day T-Bills
- U.S. Equity is represented by the S&P 1500 Index
- Real Estate is represented by the NCREIF National Property Index
- Corporate Bonds are represented by the BBG Barclays - U.S. Corp. Inv. Gd. Index
- Government Bonds are represented by the BBG Barclays - U.S. Government Index

State of Michigan Retirement System

DOMESTIC EQUITY REVIEW

State of Michigan Investment Board Meeting

December 10, 2020



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	10.5%	11.1%	13.0%	12.0%	13.1%
S&P 1500	13.4%	11.3%	13.6%	12.2%	13.5%
Peer Median Return	11.0%	8.1%	10.7%	8.9%	10.7%
Percentile Rank vs. Peers *	56	22	25	20	27

*State Street Universe greater than \$1 billion

- In the quarter ended September 30, 2020, Total Domestic Equity outperformed its peer group over three, five, seven and ten years while underperforming the S&P 1500 over all time periods. During the past year, performance was 290 basis points (bps) behind the benchmark net of fees, with incurred tracking error of 3.3%.
- Since the end of March, markets have continued to perform in an exceptionally bifurcated fashion, with a narrow group of companies that are less sensitive to or even benefitting from the current “work from home” environment, skyrocketing in value to arguably inappropriate levels, while many other companies remain priced for a recessionary environment.
- This dynamic has led to one of the widest valuation dispersions between growth and value stocks in history, similar to the technology bubble of the late 1990’s.
- Despite this challenging environment, since the end of March, Total Domestic Equity has outperformed the S&P 1500 by nearly 75 bps for the period ending September 30, 2020. Strong performance has continued into the month of October.
- This performance is particularly notable given the division’s significant value stock exposure and is a testament to the skill and diversity of its investment managers, both internal and external.
- While extreme valuation dispersion can make it difficult for active managers to outperform in the current period, it can also lay the foundation for future excess returns if and when such relationships normalize.

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 division is well positioned for an eventual economic recovery, with a relative overweight to smaller cap, value stocks that have yet to be bid up.
- Small cap stocks are currently more attractively priced relative to their larger counterparts than they have been in 20 years. Over long periods of time, research has shown that small cap, value stocks tend to outperform large caps.
- The division also maintains ample exposure to technology and biotechnology stocks that are both in favor and have large, disruptive market potential.
- Sector overweights include financials, health care and communication services. Underweights include consumer discretionary and commodity related sectors.
- The division's portfolio trades at nearly a 10% discount to the S&P 1500, despite higher levels of profitability and faster rates of reinvestment.
- Portfolio beta is very slightly above one (1.03), implying that a rising market should provide a slight tailwind to performance while a falling market would generate a slight headwind.

Market Environment and Outlook

- At ~20x forward earnings, equity markets trade at a premium to both their historical average of 15.7x and their twenty-five-year historical average of 18x.
- Meanwhile 10 year treasury bonds trade at roughly 125x earnings versus their historical average of 21x.
- Factoring this in, alongside near zero percent returns on cash, the enormous influx of money injected into the financial system from the Federal Reserve, and the continued availability of many attractively valued companies, stocks remain a reasonable alternative to bonds and bond-like asset classes.
- As of September 30, the market was paying out 1.7% of its earnings in dividends and reducing shares outstanding by 1.2% through share buybacks, for a 2.9% total shareholder yield.
- The market was also reinvesting back into growth at a rate of 4.3%, thus generating a roughly 7.2% investment return (shareholder yield of 2.9% + reinvestment rate of 4.3%).
- Such returns compare favorably to the 30-year U.S. Treasury at 1.4%, and unfavorably to the historical compound annual return for the S&P 500 from 1928-2018 of 9.5%.

SMRS

Domestic Equity Strategies

9/30/20

Markets	Amount	Total	% of Total
Internal Indexed (\$ in Millions)			
Indexed Portfolios	\$8,140		
Total Indexed		\$8,140	49.4%
Internal Active			
Active Portfolios	\$4,486		
Total Internal Active		\$4,486	27.2%
External Active			
Los Angeles Capital	\$1,210		
Mellon Capital	1,024		
ARK Investments	582		
Clarkston Capital Partners	391		
Seizert Capital Partners	385		
Attucks Asset Management	102		
Bivium Capital	99		
Ancora	<u>72</u>		
Total External Active		\$3,865	23.4%

Total Domestic Equity

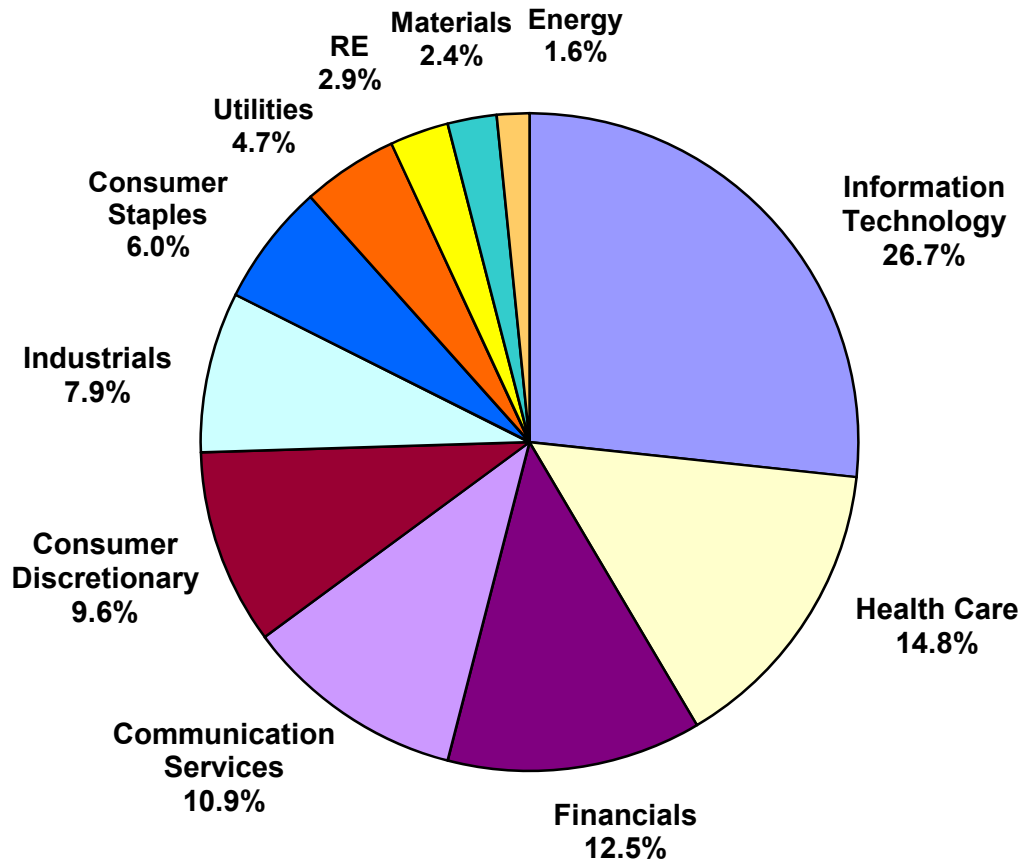
\$16,491

100.0%

SMRS

Domestic Equity By Sector

9/30/20



Market Value in Millions				
9/30/20				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Information Technology	\$4,408	26.7%	27.2%	-0.5%
Health Care	2,431	14.8%	14.0%	0.8%
Financials	2,065	12.5%	10.0%	2.5%
Communication Services	1,788	10.9%	10.1%	0.8%
Consumer Discretionary	1,580	9.6%	11.9%	-2.3%
Industrials	1,306	7.9%	9.0%	-1.1%
Consumer Staples	996	6.0%	6.8%	-0.8%
Utilities	775	4.7%	3.0%	1.7%
Real Estate	473	2.9%	3.1%	-0.2%
Materials	402	2.4%	2.9%	-0.5%
Energy	267	1.6%	2.0%	-0.4%
Total	<u>\$16,491</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: S&P 1500

SMRS

Domestic Equities Composite

9/30/20

Date:	<u>9/30/20</u>	<u>6/30/20</u>	<u>3/31/20</u>	<u>12/31/19</u>
Assets (\$ in Millions):	\$16,491	\$15,080	\$12,954	\$17,645
Number of Securities:	1,292	1,304	1,316	1,354
Active Share:	35%	31%	35%	41%

Description: The Domestic Equities Composite seeks to deliver excess returns through a blend of index investing and active management with value-added, but diverse strategies. While the goal is for most managers to outperform in the long run, 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>
Market Capitalization (\$ in Billions)	\$343.3	\$408.9
FY1 P/E	18.1	19.8
P/E Upside to S&P 1500	9.4%	0.0
Price/Book	3.5	3.3
Return on Equity	19.4%	16.8%
Risk Metrics		
Beta	1.03	1.00
Tracking Error	2.0%	0.0%
Projected Returns		
Dividend Yield	1.9%	1.7%
Buyback Yield	1.3%	1.2%
Reinvestment Rate	<u>5.1%</u>	<u>4.3%</u>
Projected Investment Return	<u>8.3%</u>	<u>7.2%</u>

TOP TEN EXPOSURES – Domestic Equities vs S&P 1500 9/30/20

<u>Domestic Equity Portfolio</u>		<u>S&P 1500</u>	
<u>Company Name</u>	<u>Portfolio Weight</u>	<u>Company Name</u>	<u>Market Weight</u>
SPDR S&P 500 ETF Trust	9.8%	Apple, Inc.	6.2%
Apple, Inc.	4.4%	Microsoft Corp.	5.3%
iShares 20+ Yr. Treas. Bond ETF	4.1%	Amazon.com, Inc.	4.4%
Microsoft Corp.	3.8%	Facebook, Inc. Class A	2.1%
Amazon.com, Inc.	2.9%	Alphabet, Inc., Class A	1.5%
NextEra Energy, Inc.	1.8%	Alphabet, Inc., Class C	1.4%
Facebook, Inc. Class A	1.7%	Berkshire Hathaway, Inc. B	1.4%
Visa, Inc. Class A	1.1%	Johnson & Johnson	1.3%
Berkshire Hathaway, Inc. B	1.1%	Procter and Gamble Co.	1.2%
Alphabet, Inc., Class A	<u>1.0%</u>	Visa, Inc. Class A	<u>1.1%</u>
TOTAL	<u>31.7%</u>	TOTAL	<u>25.9%</u>

Manager Performance - Net of Fees

9/30/20

<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	\$7,507,341,440	14.9%	12.2%	14.2%	12.7%	--	N/A
S&P 500		15.1%	12.3%	14.1%	12.7%	--	
Style & Risk Adjusted Benchmark		15.1%	12.3%	14.1%	12.6%	--	
Lipper Large-Cap Core		13.3%	11.0%	12.7%	11.3%	--	
<i>Excess Return</i>		-0.3%	-0.1%	0.0%	0.0%	--	
<i>Alpha</i>		-0.2%	-0.1%	0.1%	0.1%	--	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		47	37	22	15	--	
SMRS All-Cap Garp	1,482,356,824	4.5%	6.8%	9.7%	9.9%	11.7%	4/30/11
S&P 1500 Super Composite		13.4%	11.3%	13.6%	12.2%	12.2%	
Style & Risk Adjusted Benchmark		11.9%	10.9%	13.0%	12.4%	12.3%	
Lipper Multi-Cap Core		9.1%	8.1%	10.8%	9.7%	10.1%	
<i>Excess Return</i>		-8.9%	-4.6%	-3.9%	-2.2%	-0.6%	
<i>Alpha</i>		-7.4%	-4.1%	-3.3%	-2.4%	-0.6%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		72	70	73	50	26	
SMRS Large-Cap Core	1,125,106,464	-10.3%	3.8%	6.8%	8.4%	6.9%	8/31/07
S&P 500		15.1%	12.3%	14.1%	12.7%	8.8%	
Style & Risk Adjusted Benchmark		-11.8%	-5.3%	5.8%	5.6%	10.2%	
Lipper Large-Cap Core		13.3%	11.0%	12.7%	11.3%	8.1%	
<i>Excess Return</i>		-25.5%	-8.5%	-7.3%	-4.3%	-2.0%	
<i>Alpha</i>		1.5%	9.0%	1.1%	2.8%	-3.3%	
<i>Pct Rank vs Lipper Large-Cap Core</i>		100	99	98	94	86	
Mellon US Equity Enhanced	1,024,448,560	23.0%	24.7%	--	--	26.9%	3/1/17
S&P 500		15.1%	12.3%	--	--	12.5%	
Style & Risk Adjusted Benchmark		11.9%	18.3%	--	--	18.7%	
Lipper Large-Cap Core		13.3%	11.0%	--	--	11.4%	
<i>Excess Return</i>		7.9%	12.4%	--	--	14.4%	
<i>Alpha</i>		11.1%	6.4%	--	--	8.3%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		4	1	--	--	1	
SMRS Large-Cap Growth	776,349,234	37.8%	21.7%	18.2%	16.8%	11.6%	5/31/05
S&P 500 Growth		30.6%	19.1%	18.4%	16.4%	11.5%	
Style & Risk Adjusted Benchmark		27.6%	19.0%	18.5%	16.7%	11.6%	
Lipper Large-Cap Growth		35.3%	20.2%	18.3%	15.8%	11.3%	
<i>Excess Return</i>		7.1%	2.6%	-0.2%	0.4%	0.1%	
<i>Alpha</i>		10.1%	2.7%	-0.3%	0.1%	0.0%	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		32	34	56	32	34	
LA Capital All-Cap Growth	725,707,822	14.8%	14.5%	15.0%	14.4%	12.2%	5/31/05
S&P 1500 Growth		28.5%	17.9%	17.6%	15.8%	11.4%	
Style & Risk Adjusted Benchmark		27.7%	16.8%	15.9%	14.2%	9.1%	
Lipper Multi-Cap Growth		35.5%	18.6%	16.9%	14.2%	11.0%	
<i>Excess Return</i>		-13.7%	-3.4%	-2.6%	-1.4%	0.9%	
<i>Alpha</i>		-12.9%	-2.2%	-0.9%	0.2%	3.1%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		88	75	60	42	23	
SMRS Mid-Cap Index	632,706,304	-0.3%	3.7%	9.0%	8.4%	--	N/A
S&P 400		-2.2%	2.9%	8.1%	7.6%	--	
Style & Risk Adjusted Benchmark		-3.9%	2.9%	8.1%	7.6%	--	
Lipper Mid-Cap Core		-2.5%	2.8%	6.9%	6.3%	--	
<i>Excess Return</i>		1.8%	0.8%	0.8%	0.7%	--	
<i>Alpha</i>		3.6%	0.8%	0.9%	0.8%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		39	44	23	19	--	
Large-Cap Consistent Growth	590,034,539	19.2%	19.7%	16.7%	--	14.5%	3/1/15
S&P 500		15.1%	12.3%	14.1%	--	11.0%	
Style & Risk Adjusted Benchmark		14.0%	17.5%	17.2%	--	13.9%	
Lipper Large-Cap Core		13.3%	11.0%	12.7%	--	9.6%	
<i>Excess Return</i>		4.0%	7.4%	2.6%	--	3.5%	
<i>Alpha</i>		5.1%	2.2%	-0.5%	--	0.6%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		15	1	1	--	1	

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception	Inception Date
Ark Investments	581,824,663	72.4%	30.5%	--	--	35.5%	3/1/16
S&P 1500 Growth		28.5%	17.9%	--	--	19.1%	
Style & Risk Adjusted Benchmark		9.5%	27.3%	--	--	29.3%	
Lipper Multi-Cap Growth		35.5%	18.6%	--	--	19.4%	
<i>Excess Return</i>		43.9%	12.6%	--	--	16.4%	
<i>Alpha</i>		62.9%	3.3%	--	--	6.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		8	9	--	--	3	
LA Capital Deep Value	484,296,115	-12.4%	-0.2%	5.4%	--	3.2%	4/1/15
S&P 1500 Value		-3.8%	3.5%	8.5%	--	6.0%	
Style & Risk Adjusted Benchmark		-4.4%	-1.5%	9.4%	--	6.6%	
Lipper Multi-Cap Value		-6.6%	0.9%	6.1%	--	3.7%	
<i>Excess Return</i>		-8.7%	-3.7%	-3.1%	--	-2.8%	
<i>Alpha</i>		-8.0%	1.3%	-4.0%	--	-3.3%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		90	67	67	--	62	
Clarkston Capital Small/Mid-Cap	390,370,754	6.5%	7.1%	10.2%	--	10.1%	1/1/14
S&P 400		-4.0%	1.9%	7.9%	--	6.3%	
Style & Risk Adjusted Benchmark		-6.0%	9.9%	6.2%	--	5.1%	
Lipper Mid-Cap Core		-2.5%	2.8%	6.9%	--	5.2%	
<i>Excess Return</i>		10.5%	5.2%	2.3%	--	3.9%	
<i>Alpha</i>		12.5%	-2.8%	4.0%	--	5.1%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		6	11	10	--	1	
Seizert Capital Partners	384,990,527	0.8%	3.8%	9.3%	7.4%	11.6%	11/30/09
S&P 1500 Value		-3.8%	3.5%	8.5%	7.8%	10.6%	
Style & Risk Adjusted Benchmark		-3.7%	3.5%	8.4%	7.7%	10.6%	
Lipper Multi-Cap Value		-6.6%	0.9%	6.1%	5.8%	8.8%	
<i>Excess Return</i>		4.6%	0.3%	0.8%	-0.4%	1.0%	
<i>Alpha</i>		4.5%	0.4%	0.9%	-0.3%	1.0%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		10	15	6	17	2	
Attucks Asset Management	102,329,874	-2.3%	4.5%	8.0%	7.1%	5.9%	11/30/07
S&P 1500		13.4%	11.3%	13.6%	12.2%	8.4%	
Style & Risk Adjusted Benchmark		-3.8%	3.4%	8.2%	7.5%	8.4%	
Lipper Multi-Cap Core		9.1%	8.1%	10.8%	9.7%	6.8%	
<i>Excess Return</i>		-15.7%	-6.8%	-5.6%	-5.1%	-2.5%	
<i>Alpha</i>		1.5%	1.1%	-0.2%	-0.5%	-2.5%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		95	84	85	88	76	
Bivium Capital Partners	98,680,689	-3.8%	2.6%	6.9%	6.5%	5.4%	11/30/07
S&P 1500 Value		-3.8%	3.5%	8.5%	7.8%	5.3%	
Style & Risk Adjusted Benchmark		13.0%	4.2%	8.5%	7.8%	8.6%	
Lipper Multi-Cap Value		-6.6%	0.9%	6.1%	5.8%	4.4%	
<i>Excess Return</i>		0.0%	-0.9%	-1.6%	-1.3%	0.1%	
<i>Alpha</i>		-16.8%	-1.6%	-1.6%	-1.4%	-3.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		25	26	35	39	27	
Ancora	71,697,234	-3.8%	--	--	--	0.3%	10/1/17
S&P 1000		-4.0%	--	--	--	1.9%	
Style & Risk Adjusted Benchmark		-12.0%	--	--	--	1.9%	
Lipper Mid-Cap Core		-2.5%	--	--	--	2.8%	
<i>Excess Return</i>		0.1%	--	--	--	-1.7%	
<i>Alpha</i>		8.1%	--	--	--	-1.7%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		60	--	--	--	71	

State of Michigan Retirement System

PRIVATE EQUITY REVIEW

State of Michigan Investment Board Meeting

December 10, 2020



Peter A. Woodford
Senior Investment Manager
Private Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	6.6%	12.3%	11.3%	13.3%	14.0%
PE Benchmark Returns	10.7%	14.0%	14.0%	15.5%	17.4%
Peer Median Returns	1.5%	5.6%	7.0%	8.1%	9.6%
Percentile Rank vs. Peers*	18	9	6	6	8

*State Street Universe greater than \$1 billion

- COVID 19 had a significant impact on private equity performance, but the 1-year return does not reflect the full recovery because of the lag effect.
- Private equity returns have been strong relative to peer median returns, ranking in the top 8% 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. Over this period, the Private Equity Division has outperformed the S&P by 30 basis points (ten-year S&P 500 return 13.7%) but underperformed the benchmark by 3.4%.
- For the twelve months ending September 30, 2020, the Private Equity Division made contributions of approximately \$485 million, net of distributions. While the pace of distributions slowed considerably because of the pandemic, recent activity shows a significant increase to transactional activity on both the buy and sell side.
- Commitments closed during the quarter include:
 - \$125 million to Thoma Bravo XIV, a large cap fund focused on the tech and software sectors.
 - \$50 million to Axiom Asia VI, a fund-of-funds manager focused on growth, small buyout and venture funds.
 - \$30 million to Lead Edge Capital V, a growth equity fund focused on the tech sector.
 - \$25 million to Menlo Ventures XV, a venture capital fund focused on early stage technology.

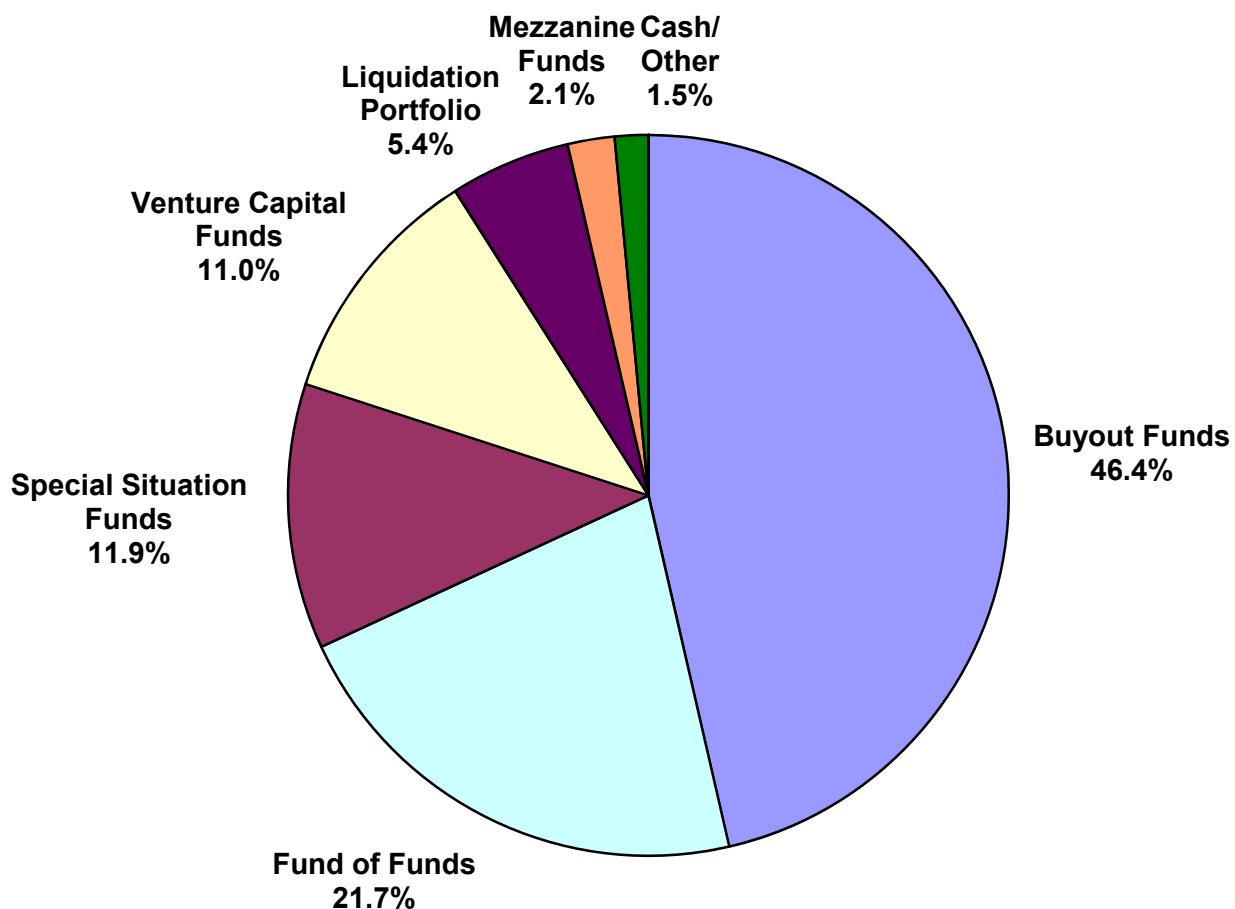
Strategy Update

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 Venture Capital Division will continue to pursue attractive opportunities across all strategies with a focus on early stage and a bias towards healthcare versus the broader market. 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

9/30/20



Market Value in Millions				
	<u>9/30/20</u>		<u>9/30/19</u>	
Buyout Funds	\$7,057	46.4%	\$6,178	44.5%
Fund of Funds	3,293	21.7%	2,594	18.7%
Special Situation Funds	1,806	11.9%	1,868	13.4%
Venture Capital Funds	1,680	11.0%	1,607	11.6%
Liquidation Portfolio	821	5.4%	972	7.0%
Mezzanine Funds	317	2.1%	295	2.1%
Cash/Other	232	1.5%	379	2.7%
Total	<u>\$15,206</u>	<u>100.0%</u>	<u>\$13,893</u>	<u>100.0%</u>

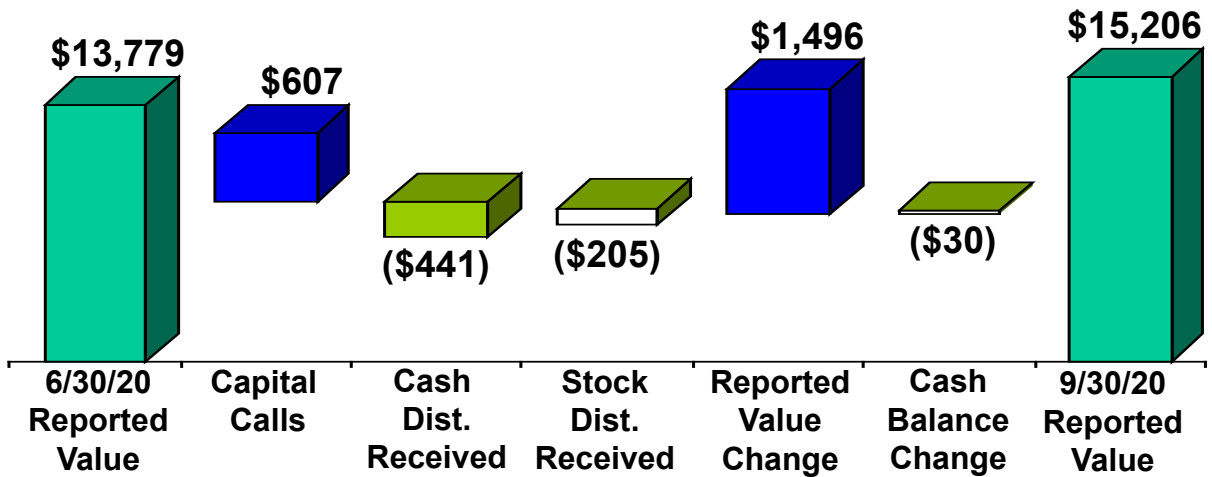
SMRS

Private Equity

9/30/20

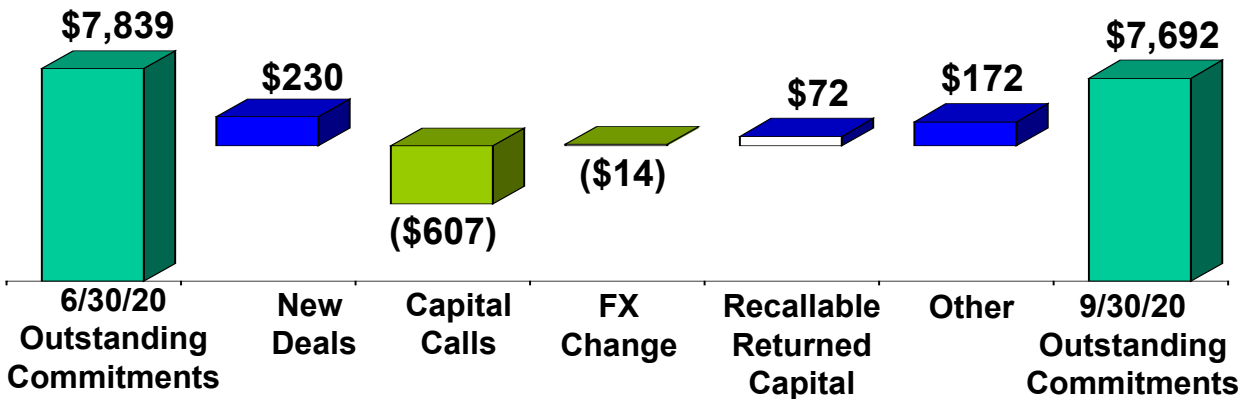
Invested Commitments

(\$ in Millions)



Outstanding Commitments

(\$ in Millions)

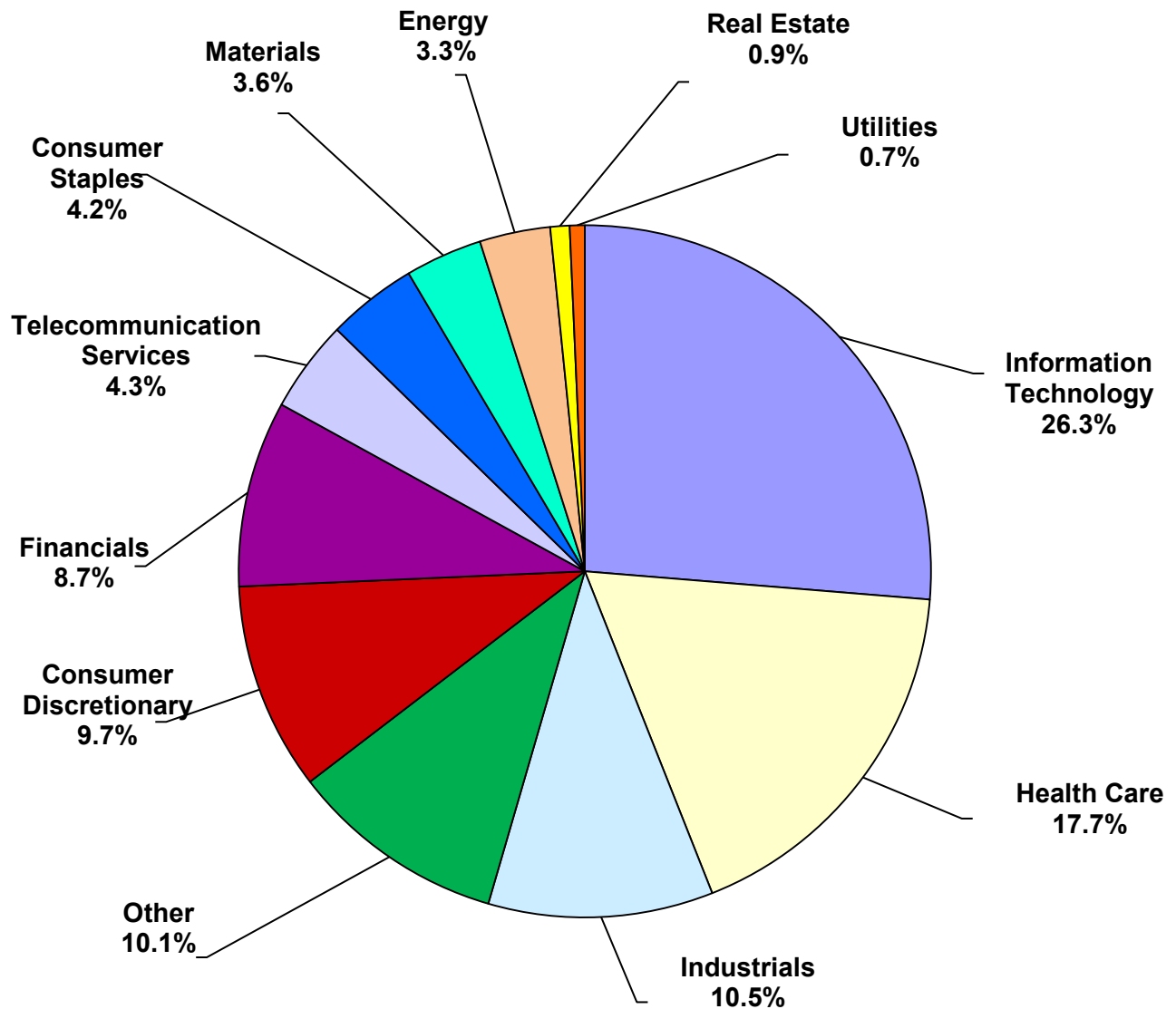


SMRS

Private Equity

9/30/20

Investments by Industry



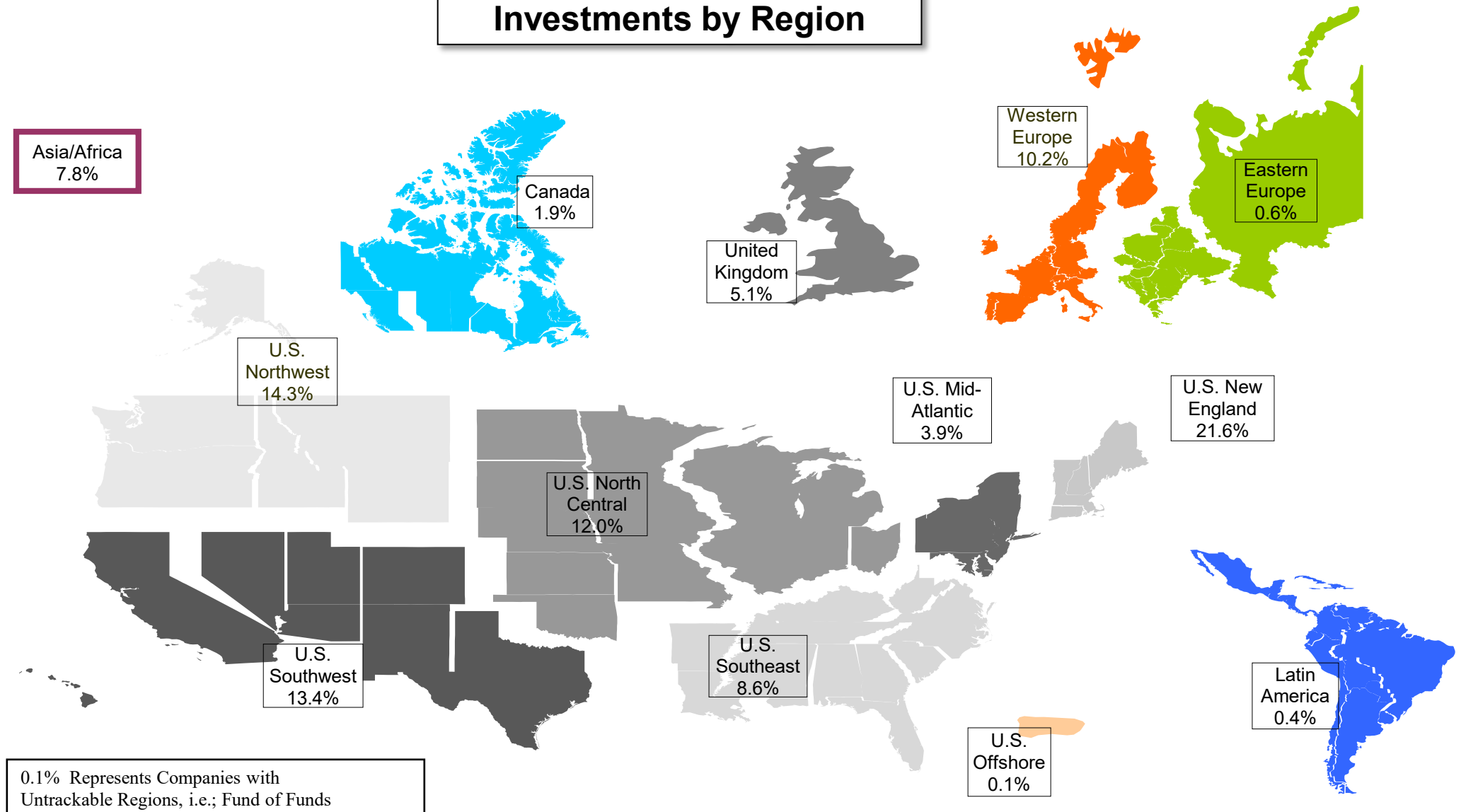
These numbers are based on the most recent available General Partner Data; primarily 6/30/20 and are subject to change.

SMRS

Private Equity

9/30/20

Investments by Region



Geographic Report: North America 74%, Europe 15%, Asia 8%, Other 3%

SMRS

Private Equity

9/30/20

Portfolio by Vintage Year

(\$ in Millions)

Asset Vintage	Reported Value	Outstanding Commitment	Total Exposure
1986-2005	\$ 260	\$ 103	\$ 363
2006*	307	110	417
2007	148	122	270
2008	362	77	439
2009	14	1	15
2010	187	4	191
2011	571	98	669
2012	1,092	68	1,160
2013	281	106	387
2014	1,440	264	1,704
2015	5,392	731	6,123
2016	2,188	494	2,682
2017	980	819	1,799
2018	1,195	1,789	2,984
2019	435	1,963	2,398
2020	122	943	1,065
Income Accruals	1	0	1
Cash	225	0	225
Act. Small Cap - Stock Dist	6	0	6
Total	\$ 15,206	\$ 7,692	\$ 22,898

*Liquidation portfolio is 2006 vintage

FX Exposure

(\$ in Millions)

	Reported Value	Outstanding Commitment	Total Exposure	Total (USD)
Euro (\$1.17/ €)	€ 398	€ 403	€ 801	\$939

SMRS

Private Equity

9/30/20

Top 10 Sponsors

(\$ in Millions)

Asset Type	Reported Value	Outstanding Commitment	Total
HarbourVest Partners	\$ 3,735	\$ 832	\$ 4,567
Blackstone Capital Partners	533	357	890
Leonard Green & Partners	455	409	864
Advent International	584	261	845
KKR	577	250	827
The Carlyle Group	428	342	770
Warburg Pincus Capital	554	213	767
Flagship Ventures	432	181	613
Grosvenor Capital Management	501	99	600
Insight Venture Partners	445	86	531
Top 10 Total Value	\$ 8,244	\$ 3,030	\$ 11,274

Cash Weighted Rates of Return*

(Net IRR)	Current Qtr.	1-Year	3-Year	5-Year	10-Year
Buyout	0.6%	5.9%	12.2%	13.6%	14.8%
Fund of Funds	0.0%	4.0%	9.2%	10.4%	11.2%
Mezzanine	0.0%	2.8%	8.1%	8.9%	10.3%
Special Situations	0.2%	0.7%	6.8%	8.6%	11.0%
Venture Capital	-0.7%	15.6%	16.1%	13.0%	17.4%

*These numbers are based on most recent available General Partner reported data; primarily 6/30/2020 and are subject to change.

SMRS

Private Equity

9/30/20

Net Market Values by Ownership Entity

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
5AM Opportunities I, L.P.	\$ 15,572,085	\$ 17,250,000
5AM Ventures VI, L.P.	8,101,298	11,700,000
Accel Europe I, L.P.	2,822,925	1
Accel Europe II, L.P.	26,299,613	3,300,000
Accel Growth Fund II, L.P.	12,218,383	0
Accel Growth Fund III, L.P.	9,909,697	840,000
Accel Growth Fund IV L.P.	25,354,505	990,000
Accel Growth Fund V L.P.	14,366,705	13,403,554
Accel IX, L.P.	1,674,398	4,522,725
Accel Leaders Fund II, L.P.	6,668,258	2,531,250
Accel Leaders Fund, L.P.	13,860,526	0
Accel London V, L.P.	21,985,963	1,560,000
Accel London VI, L.P.	3,574,477	8,750,000
Accel VI, L.P.	779,146	0
Accel VI-S, L.P.	1,976,876	652,611
Accel X, L.P.	6,021,235	0
Accel XI, L.P.	4,317,269	1,440,000
Accel XII, L.P.	10,354,498	1,190,000
Accel XIII, L.P.	7,197,953	3,300,000
Accel XIV, L.P.	3,450,867	6,250,000
Acorn Bioventures, L.P.	59,858,583	45,000,000
Advent Global Private Equity V, L.P.	5,356,426	8,700,000
Advent International GPE IX, L.P.	98,164,492	161,875,000
Advent International GPE VI-A, L.P.	28,048,039	0
Advent International GPE VII-B, L.P.	140,131,987	12,000,000
Advent International GPE VIII-B, L.P.	286,037,398	11,474,998
Advent International LAPEF VII SCSp	0	60,000,000
Advent Latin American Private Equity Fund VI, L.P.	26,192,427	6,580,000
Affinity Asia Pacific Fund III, L.P.	8,413,351	8,520,204
Affinity Asia Pacific Fund IV, L.P.	63,683,166	18,227,850
Affinity Asia Pacific Fund V, L.P.	34,078,155	138,772,906
AIP VII, L.P.	3,344,478	71,026,423
Apax Digital, L.P.	25,843,198	28,318,858
Apax Europe Fund VI, L.P.	16,237,165	2,479,918
Apax Europe VII, L.P.	918,612	1,746,522
Apax IX, L.P.	199,586,617	15,247,386
Apax US VII, L.P.	2,013,098	417,509
Apax VIII - B, L.P.	58,617,494	7,832,881

	Adjusted Reported Value	Unfunded Commitment
Apax X USD, L.P.	0	150,000,000
Apollo Investment Fund IX, L.P.	22,998,860	75,028,110
Apollo Investment Fund VIII, L.P.	71,138,684	13,597,577
Arboretum Ventures II, L.P.	962,532	0
Arboretum Ventures III, L.P.	6,564,439	0
Arboretum Ventures IV, L.P.	22,821,686	8,640,000
Arboretum Ventures V, L.P.	2,093,263	31,955,000
Ares Corporate Opportunities Fund II, L.P.	172,835	11,423,773
Ares Corporate Opportunities Fund III, L.P.	4,680,581	6,852,952
Ares Corporate Opportunities Fund IV, L.P.	67,413,145	14,047,567
ASF VIII B, L.P.	29,349,383	122,894,781
AXA ASF Miller Co-Investment, L.P.	372,673	6,656,684
** Axiom Asia VI, L.P.	0	50,000,000
Axiom Asia Co-Investment Fund I, L.P.	29,903,186	19,939,731
Axiom Asia IV, L.P.	56,624,875	9,950,886
Axiom Asia Private Capital Fund III, L.P.	65,888,252	5,729,639
Axiom Asia V, L.P.	21,707,451	28,750,000
BC European Capital IX, L.P.	67,355,870	7,757,900
BC European Capital VII, L.P.	661,609	0
BC European Capital VIII, L.P.	2,431,000	9,142,502
Berkshire Fund IX Coinvestment Fund, L.P.	15,439,542	27,421,161
Berkshire Fund IX, L.P.	111,921,976	67,917,597
Berkshire Fund VI, L.P.	20,936,405	7,600,677
Berkshire Fund VII, L.P.	6,820,669	2,444,220
Berkshire Fund VIII, L.P.	85,166,362	7,115,318
Blackstone Capital Partners IV, L.P.	3,907,890	4,580,765
Blackstone Capital Partners V, L.P.	6,961,119	13,069,148
Blackstone Capital Partners VI, L.P.	161,204,357	32,907,897
Blackstone Capital Partners VII, L.P.	275,864,174	34,774,172
Blackstone Capital Partners VIII, L.P.	0	200,000,000
Blackstone Capital Partners V-S, L.P.	992,962	712,476
Bridgepoint Europe IV, L.P.	11,369,024	5,041,565
Carlyle Europe Partners II, L.P.	808,141	1,056,136
Carlyle Europe Partners III, L.P.	7,580,737	2,219,785
Carlyle Europe Partners IV, L.P.	85,428,558	11,371,163
Carlyle Europe Partners V, S.C.SP.	28,949,807	110,658,831
Carlyle Partners V, L.P.	29,296,897	53,227,845
Carlyle Partners VI, L.P.	186,112,178	9,841,867
Carlyle Partners VII, L.P.	89,457,942	153,060,930
Centerbridge Capital Partners III, L.P.	67,905,255	35,029,602
Cerberus SMRS Partners, L.P.	28,396,143	23,304,657
Charlesbank Equity Fund IX, L.P.	49,184,291	53,191,615
Charlesbank Fund IX Overage Allocation Program	39,046,109	22,458,489
CircleUp Credit Fund I, LP	15,001,802	2,242,795
Clearlake CapitalPartners VI, L.P.	10,210,744	64,705,524
Clearlake Opportunities Partners II, L.P.	20,236,235	55,939,901

	Adjusted Reported Value	Unfunded Commitment
CM Liquidity Fund, L.P.	0	25,000,000
Coller International Partners V, L.P.	9,165,922	2,000,000
Coller International Partners VI, L.P.	26,795,742	29,723,267
Coller International Partners VII, L.P.	119,076,539	35,935,936
Crescent Mezzanine Partners VI, L.P.	20,139,712	5,681,254
Crescent Mezzanine Partners VII, L.P.	86,113,251	57,061,737
CVC Capital Partners VII, L.P.	93,823,063	88,245,619
CVC Capital Partners VIII, L.P.	0	117,264,998
Dover Street IX, L.P.	71,514,263	21,000,000
Dover Street X, L.P.	14,731,389	135,000,000
EnCap Energy Capital Fund X, L.P.	28,411,379	6,468,684
FIMI Opportunity 6, L.P.	33,793,182	23,181,821
FirstMark Capital I, L.P.	14,853,334	196,596
FirstMark Capital IV, L.P.	33,706,598	8,400,000
FirstMark Capital OF I, L.P.	25,713,650	0
FirstMark Capital OF II, L.P.	51,631,071	0
FirstMark Capital OF III, L.P.	6,783,365	28,175,000
FirstMark Capital P2, L.P.	116,363,391	0
FirstMark Capital V, L.P.	2,100,000	32,900,000
Flagship Pioneering Origination Fund VII, L.P.	3,121,959	71,250,000
Flagship Pioneering Special Opportunities Fund II, L.P.	23,400,702	75,500,000
Flagship Pioneering VI, L.P.	98,967,635	28,875,000
Flagship Ventures Fund 2004, L.P.	66,257	0
Flagship Ventures Fund 2007, L.P.	7,434,879	0
Flagship Ventures Fund IV, L.P.	130,510,130	0
Flagship Ventures Fund V, L.P.	124,951,016	0
Flagship Ventures Opportunities Fund I, L.P.	43,542,492	5,750,000
Fox Paine Capital Fund II, L.P.	20,876,783	15,382,699
FS Equity Partners VII, L.P.	103,275,941	13,096,981
FS Equity Partners VIII, L.P.	20,360,082	51,695,261
GCM Grosvenor Fund Investment Program I, L.P.	6,997,814	1,219,800
GCM Grosvenor Fund Investment Program II, L.P.	17,377,178	13,267,284
GCM Grosvenor Fund Investment Program III - 2004	27,019,808	4,412,859
GCM Grosvenor Fund Investment Program III - 2006	33,527,218	6,475,413
GCM Grosvenor Fund Investment Program V, L.P.	45,891,267	9,093,949
GCM Grosvenor Fund Investment Program VI, L.P.	26,528,744	2,662,665
GCM Grosvenor Fund Investment Program VIII, L.P.	77,789,279	21,061,853
GCM Grosvenor SeasPriFIP L.P. (PIS06-10)	37,168,396	13,805,864
GCM Grosvenor SeasPriFIP L.P. (PIS14)	204,622,072	10,325,427
GCM Grosvenor SeasPriFIP L.P. (Seed)	23,881,279	16,533,172
Genstar Capital Partners IX, L.P.	29,087,850	47,887,143
Genstar Capital Partners VIII, L.P.	64,220,071	5,262,600
Genstar IX Opportunities Fund I, L.P.	30,378,579	20,866,237
Genstar VIII Opportunities Fund I, L.P.	61,068,154	2,632,860
G-IV Acquisition Holdings, LLC	4,721,776	0
Golden Bell Azalea, LLC	9,615,291	0

	Adjusted Reported Value	Unfunded Commitment
Green Equity Investors V, L.P.	107,029,277	25,966,435
Green Equity Investors VI, L.P.	130,956,369	10,453,635
Green Equity Investors VII, L.P.	208,538,398	31,759,978
Green Equity Investors VIII, L.P.	0	250,000,000
Greenspring Master G, L.P.	84,530,613	66,000,000
Greenspring Micro II, L.P.	11,461,948	13,466,263
GSO Capital Opportunities Fund II, L.P.	8,505,103	8,095,124
GSO Capital Opportunities Fund III, L.P.	52,393,171	35,665,406
GSO COF III Co-Investment Fund, L.P.	23,331,825	27,195,034
HarbourVest Credit Opportunities Fund II, L.P.	0	75,000,000
HarbourVest Dover Street VIII, L.P.	20,339,419	6,075,000
HarbourVest Int'l III Partnership, L.P.	150,375	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P.	91,623,055	19,107,835
HarbourVest Partners Co-Investment Fund V L.P.	101,609,610	110,000,000
HarbourVest Partners Mezzanine Income Fund, L.P.	73,246,227	16,310,000
HarbourVest V Partnership, L.P.	127,143	300,000
HarbourVest VI - Direct Fund, L.P.	1,839,036	750,000
HarbourVest VI Partnership, L.P.	493,079	2,000,000
Harvest Partners VII, L.P.	82,363,169	3,986,834
Harvest Partners VIII, L.P.	39,701,242	59,702,412
HPS Mezzanine Partners III, L.P.	42,310,176	5,909,466
Insight Partners XI, L.P.	29,826,517	72,000,000
Insight Venture Partners GBCF, L.P.	87,480,221	6,664,610
Insight Venture Partners IX, L.P.	204,976,006	1,624,927
Insight Venture Partners X, L.P.	122,482,326	6,200,000
Jade Equity Investors, L.P.	8,573,063	91,223,637
Kelso Investment Associates IX, L.P.	74,283,431	9,685,670
Kelso Investment Associates VII, L.P.	158,244	0
Kelso Investment Associates VIII, L.P.	23,814,680	22,021,257
Kelso Investment Associates X, L.P.	31,941,648	67,622,055
Khosla Ventures III, L.P.	13,604,399	750,000
Khosla Ventures IV, L.P.	70,698,012	950,000
Khosla Ventures Seed D, L.P.	5,312,874	4,550,000
Khosla Ventures V, L.P.	64,557,650	1,750,000
Khosla Ventures VI, L.P.	38,990,843	35,400,000
KKR 2006 Fund, L.P.	69,692,727	4,765,956
KKR Americas Fund XII, L.P.	126,381,715	95,315,963
KKR Asian, L.P.	1,117,636	0
KKR Asian Fund II, L.P.	42,995,678	262,660
KKR Asian Fund III, L.P.	69,202,131	40,964,480
KKR China Growth Fund, L.P.	22,257,289	3,383,656
KKR European Fund II, L.P.	1,073,077	0
KKR European Fund III, L.P.	5,747,690	6,430,608
KKR European Fund IV, L.P.	98,508,924	7,590,357
KKR European Fund V (USD) SCSp	39,703,577	84,589,219
KKR Millennium Fund, L.P.	232,956	0

	Adjusted Reported Value	Unfunded Commitment
KKR North America Fund XI, L.P.	100,515,495	7,159,587
Lead Edge Capital IV, L.P.	28,860,618	3,373,187
** Lead Edge Capital V, L.P.	0	30,000,000
Lightspeed Opportunity Fund, L.P.	9,182,684	15,750,000
Lightspeed Venture Partners Select IV, L.P.	2,809,366	22,000,000
Lightspeed Venture Partners VII, L.P.	10,643,678	0
Lightspeed Venture Partners XIII, L.P.	1,383,058	8,600,000
Menlo Special Opportunities Fund II, L.P.	10,604,075	20,405,284
Menlo Ventures IX, L.P.	952,300	0
Menlo Ventures X, L.P.	2,099,301	0
Menlo Ventures XI, L.P.	15,791,372	0
Menlo Ventures XIV, L.P.	5,816,166	1,400,000
** Menlo Ventures XV, L.P.	0	25,000,000
Meritech Capital Partners IV, L.P.	9,559,680	300,000
Meritech Capital Partners V, L.P.	43,756,938	1,450,000
Meritech Capital Partners VI, L.P.	35,863,665	7,168,750
Meritech Capital Partners VII, L.P.	0	42,500,000
Michigan Growth Capital Partners II, L.P.	145,668,608	3,201,944
Michigan Growth Capital Partners III, L.P.	90,101,621	47,111,563
Michigan Growth Capital Partners, LP	64,430,023	8,723,872
New Leaf Biopharma Opportunities II, L.P.	113,633,744	12,000,000
New Leaf Growth Fund I, L.P.	69,188,240	0
New Leaf Ventures II, L.P.	6,288,803	0
New Leaf Ventures III, L.P.	50,807,452	0
New Leaf Ventures IV, L.P.	32,364,989	23,562,500
Nordic Capital VI, L.P.	113,788	1
Nordic Capital VII, L.P.	272,465	3,279,491
Nordic Capital VIII, L.P. (Alpha)	42,532,217	3,145,631
Oak Investment Partners X, L.P.	408,565	0
Oak Investments Partners IX, L.P.	139,172	0
Oaktree Opportunities Fund X, L.P.	24,841,989	5,100,000
Oaktree Opportunities Fund Xb, L.P.	37,984,687	31,500,000
OCM Opportunities Fund IX, L.P.	45,470,501	0
OCM Opportunities Fund VII (B), L.P.	90,091	2,500,000
OCM Opportunities Fund VII, L.P.	357,434	0
OCM Opportunities Fund VIII B, L.P.	9,052,053	0
OCM Opportunities Fund VIII, L.P.	875,136	0
OCM Principal Opportunities Fund IV, L.P.	528,467	4,998,467
Ocqueoc Holdings, LLC	66,352	48,575,083
Odyssey Investment Partners Fund VI, LP	3,090,067	95,978,554
Parthenon Investors II, L.P.	310,795	3,186,779
Parthenon Investors III, L.P.	43,739,943	2,682,182
Parthenon Investors IV, L.P.	45,872,178	2,757,740
Peninsula Capital Fund IV, L.P.	1,710,392	2,201,026
Peninsula Fund VI, L.P.	33,408,191	5,809,714
Permira Growth Opportunities I, L.P.1	16,357,004	33,750,000

	Adjusted Reported Value	Unfunded Commitment
Permira VII L.P. 1	15,630,119	72,117,974
PPC Fund II, L.P.	42,772,928	37,790,756
Public Pension Capital, LLC	66,923,982	50,629,711
Renaissance Venture Capital Fund IV, L.P.	500,000	24,500,000
Rhone Partners V, L.P.	92,356,953	37,273,364
Riverside Capital Appreciation Fund VI, LP	40,251,923	7,189,562
Riverside Capital Appreciation Fund VII, L.P.	41,315,932	58,655,964
Riverside Micro Cap Fund I, L.P.	13,853,921	5,632,976
Riverside Micro-Cap Fund II, L.P.	49,167,993	2,735,834
Riverside Micro-Cap Fund III, L.P.	92,676,182	4,823,424
Riverside Micro-Cap Fund IV, L.P.	57,796,333	3,617,302
Riverside Micro-Cap Fund IV B, L.P.	6,144,503	9,317,702
Riverside Micro-Cap Fund V, L.P.	30,268,798	66,093,423
Science Ventures Fund II, L.P.	23,501,313	3,800,000
Science Ventures Fund III, L.P.	4,689,837	20,000,000
Shamrock Capital Content Fund I, L.P.	32,536,216	18,656,980
Shamrock Growth Capital Fund IV, L.P.	27,265,829	20,493,113
Silver Lake Partners II, L.P.	22,643	3,531,586
Silver Lake Partners III, L.P.	10,645,699	11,777,723
Silver Lake Partners IV, L.P.	63,633,363	2,084,020
Silver Lake Partners V, L.P.	57,466,751	16,604,588
Silver Lake Partners VI, L.P.	0	75,000,000
Silver Lake SL SPV-2	37,657,876	0
SK Capital Partners V, L.P.	11,474,837	35,812,545
SKCP Catalyst Fund I-A, L.P.	8,116,029	25,635,429
SM/TCP, L.P.	14,064,006	1,615,217
SMRS - TOPE LLC	2,738,099,260	190,883,071
SMRS-CAPP LLC	65,338,371	73,331,651
SMRS-NCRP LLC	555,907,962	180,958,521
Summit Partners Growth Equity Fund X, L.P.	10,232,922	91,139,999
Sycamore Partners III, L.P.	10,711,807	83,862,589
TCW/Crescent Mezzanine Partners V, LLC	7,077,091	12,395,466
TCW/Crescent Mezzanine Partners VC Secondary	2,196,146	0
The Huron Fund III, L.P.	6,729,386	2,072,756
The Huron Fund IV, L.P.	30,697,528	2,502,309
The Huron Fund V, L.P.	12,141,636	22,083,436
The Shansby Group 5 (TSG5), LLC	459,726	4,261,291
Thoma Bravo Discover Fund II, L.P.	53,968,950	29,338,156
Thoma Bravo Fund XII, L.P.	212,402,367	792,291
Thoma Bravo Fund XIII, L.P.	77,386,771	72,047,195
** Thoma Bravo XIV. L.P.	0	125,000,000
TI Platform BOV, L.P.	6,010,877	8,709,309
TI Platform Fund II, L.P.	4,765,158	9,789,248
TI Platform SMRS SMA, L.P.	22,781,328	37,698,794
TPG Healthcare Partners, L.P.	3,660,779	20,772,187
TPG Partners IV, L.P.	607,909	211,725

	Adjusted Reported Value	Unfunded Commitment
TPG Partners III, LP	457,265	2,087,002
TPG Partners VI, L.P.	44,157,995	8,329,720
TPG Partners VIII, L.P.	12,896,551	109,539,931
TPG Partners VII, L.P.	128,444,648	13,972,386
TPG Partners V, L.P.	2,650,500	5,841,509
Trilantic Capital Partners V (North America) Fund A, L.P.	25,971,278	3,165,998
Trilantic Capital Partners VI (North America) L.P.	16,389,005	56,590,295
TSG6, L.P.	50,255,657	21,765,751
TSG7 A, L.P.	115,358,164	29,809,227
TSG8, L.P.	19,217,189	119,850,129
Turnbridge Capital Partners I, LP	42,996,400	37,927,757
Veritas Capital Fund V, L.P.	155,988,019	8,918,273
Veritas Capital Fund VI, L.P.	173,200,290	6,418,952
Veritas Capital Fund VII, LP	18,992,178	80,250,823
Veritas V Co-Investors, L.P.	81,049,386	0
Vista Equity Endeavor Fund I, L.P.	49,572,584	7,576,019
Vista Equity Endeavor Fund II, LP	6,215,346	58,320,001
Vista Equity Partners Fund V, L.P.	54,230,905	11,426,692
Vista Equity Partners Fund VI, L.P.	101,716,298	18,048,943
Vista Equity Partners VII, L.P.	26,147,963	48,831,329
Vista Foundation Fund III, L.P.	24,051,099	10,638,422
Vista Foundation Fund IV, L.P.	1,289,835	73,710,165
Warburg Pincus China, L.P.	51,728,777	2,632,500
Warburg Pincus China-Southeast Asia II, L.P.	9,125,793	65,475,000
Warburg Pincus Energy MCIP, L.P.	0	10,396,887
Warburg Pincus Energy, L.P.	56,555,891	10,300,000
Warburg Pincus Equity Partners, L.P.	1,180,927	0
Warburg Pincus Financial Sector, L.P.	33,203,608	13,477,500
Warburg Pincus Global Growth, L.P.	42,853,470	104,550,000
Warburg Pincus International Partners, L.P.	617,845	0
Warburg Pincus Private Equity IX, L.P.	6,654,377	0
Warburg Pincus Private Equity VIII, L.P.	294,879	0
Warburg Pincus Private Equity X, L.P.	34,285,098	0
Warburg Pincus Private Equity XI, L.P.	99,589,463	0
Warburg Pincus Private Equity XII Secondary, L.P.	27,264,202	737,500
Warburg Pincus Private Equity XII, L.P.	191,066,306	5,162,500
WestAm COREplus Private Equity QP	35,585	2,086,719
* Total Private Equity	\$ 14,974,810,137	\$ 7,692,390,762
Cash	206,270,688	-
Active Small Cap Cash	18,542,035	-
Active Small Cap	5,925,018	-
Income Accruals	863,232	-
Grand Total	\$ 15,206,411,110	\$ 7,692,390,762

* 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

December 10, 2020



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	6.1%	2.3%	7.3%	4.7%	5.4%
MSCI ACWI ex USA Returns	3.0%	1.2%	6.2%	3.2%	4.2%
Peer Median Returns	5.2%	2.2%	7.0%	4.0%	5.2%
Percentile Rank vs. Peers*	45	50	45	34	34

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

- The International Equity Division (IED) outperformed both peers and the division's benchmark over all listed periods.
- The portfolio outperformed the benchmark by 3.1% over the last twelve months.
- Outperformance was driven by the momentum factor, quality factor, energy sector, financials sector, and communication services sector.

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 division allocates capital with the intention of persistent exposure to the quality factor, momentum factor, and value factor.
- Persistent factor exposures should create consistent, transparent, and efficient returns.
- Current portfolio drivers of risk and return.
 - Tracking error of the portfolio is approximately 2.2% which is below the division's risk budget of 3.0%.
 - The momentum factor, the largest strategic contributor to tracking error, accounts for only 9.1% of the total tracking error indicating that long-term the portfolio is not materially exposed to any one single risk.
- No quarterly changes to the International Equity Division's allocations.

Market Environment and Outlook

Market Performance

- International stock markets declined nearly -33.0% in 2020. Since late March, markets have dramatically rebounded down only -1.0% year-to-date. Earnings per share growth further declined now down -24.0% year-over-year versus a February reading of -7.0%. Multiples have expanded approximately 31.0% year-over-year.
- Performance of the quality, value, and momentum factors remain strategically important to the IED. The quality and momentum factors outperformed the MSCI ACWI ex USA up year-to-date 13.6% and 20.9% respectively. The value factor continued to underperform, down -14.7%.
- Emerging markets have outperformed the MSCI ACWI ex USA up 6.6% year-to-date. Developed markets trail the broader index down -4.0%.
- The U.S. dollar is down year-to-date -4.0% and has fallen -10.0% since its March high. Part of the outperformance in emerging markets can be attributed to the weakening U.S. dollar.
- Commodities remain depressed, down -9.0% for the year. Oil is down -36.0% in 2020, copper is up 11.0%, and gold is up nearly 28.0%.
- Global government interest rates (index weighted) remain subdued at approximately 0.9%, down from 1.3% in early 2020.

Outlook

- IED's assessment of the global economy indicates a higher probability that the world remains in a protracted recession but there are signs of stability.
- World trade volumes, a proxy for economic growth, declined -4.4% year-over-year. The recent data marks an improvement from May 2020 where the year-over-year volumes contracted -17.7%. For context, the twenty-average year-over-year growth rate is 3.0%.
- Global manufacturing PMIs have returned to expansionary levels and now measure 52.9. A reading above 50.0 indicates expansion. In April 2020, global PMIs had collapsed to 39.8.
- Europe top line sales and earnings contracted year-over-year at -8.1% and -26.2%, a level not seen since the periphery debt crisis. This marks a downward acceleration in trailing fundamentals for Europe. Forward looking sales and earnings per share have improved and are expected to be up over the next 12 months, 4.4% and 20.6% respectively.
- Japan has been slower in its recovery relative to other nations. Manufacturing PMIs contracted for the nineteenth consecutive month with a reading below 50.0. Sales growth year-over-year declined -3.5% and earnings per share growth further accelerated to the downside at -28.8%. Forward looking sales and earnings growth are forecasted at 1.4% and 18.6%.

- Central banks are fully committed to an “anything it takes” policy similarly to what Mario Draghi adopted near the end of his ECB term. The question will be if the vast amounts of liquidity can offset a major solvency crisis in the next two years.
- Analysts’ forward-looking earnings per share growth is estimated at 20.8% for the MSCI ACWI ex USA index through October 2021. The sentiment has rapidly changed. As of May 2020, analysts were projecting negative -4.6% year-over-year earnings per share growth which was the first negative forward-looking estimate since the GFC. The current health and economic crisis make it difficult to accurately project earnings over the next two years.
- Go-forward returns for the MSCI ACWI ex USA index on an annualized basis are estimated at 8.2%. 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 0.9% implies an international equity risk premium of 7.3%. The equity risk premium remained unchanged during the quarter with slight increases in both stock prices and long-term government bond interest rates.

Conclusion

International stock market fundamentals slowed their rate of decline in the third quarter of 2020 and global government bond yields remained near all-time lows as central banks stayed committed to ultra-accommodative monetary policies not seen since the GFC. The policies in Japan, Europe, and now the U.S. are open-ended inflation targeting processes. Central banks’ policies will remain low indefinitely as the global recession will last longer than the COVID-19 pandemic. The liquidity crisis caused by COVID-19, may slowly turn into a solvency crisis forcing monetary policy to remain accommodative if not requiring additional large non-standard policies.

Forward looking estimates for markets have improved. The question remains can markets stay at current levels without continued monetary and fiscal support from governments around the world? The IED believes it is possible but is dependent on three variables. One, governments and central banks continue to support the local economies albeit at a reduced level. Two, stock market price appreciation slows. Three, projected growth estimates for 2021 are realized despite a resurgence in a global second wave.

International stock markets trade at approximately their twenty-three-year average of 17.0x price to earning history and a widespread relative to global risk-free rates. To capture the spread to bonds, international stock investors will need a long investment horizon as the short-term environment may experience increased volatility.

SMRS
International Equity Strategies
9/30/20

Markets	Amount	Total	% of Total
Active (\$ in Millions)			
BlackRock MSCI	\$2,078		
Wellington	919		
IED Quality Equity	592		
Martin Currie	447		
Marathon-London	305		
Lazard	250		
UBS	200		
Total Active		\$4,791	38.9%
Stock Plus			
Internal	\$2,777		
PIMCO	1,908		
Total Stock Plus		\$4,686	38.0%
Indexed			
SSGA	\$1,477		
BlackRock	1,361		
Total Indexed		\$2,838	23.1%

TOTAL

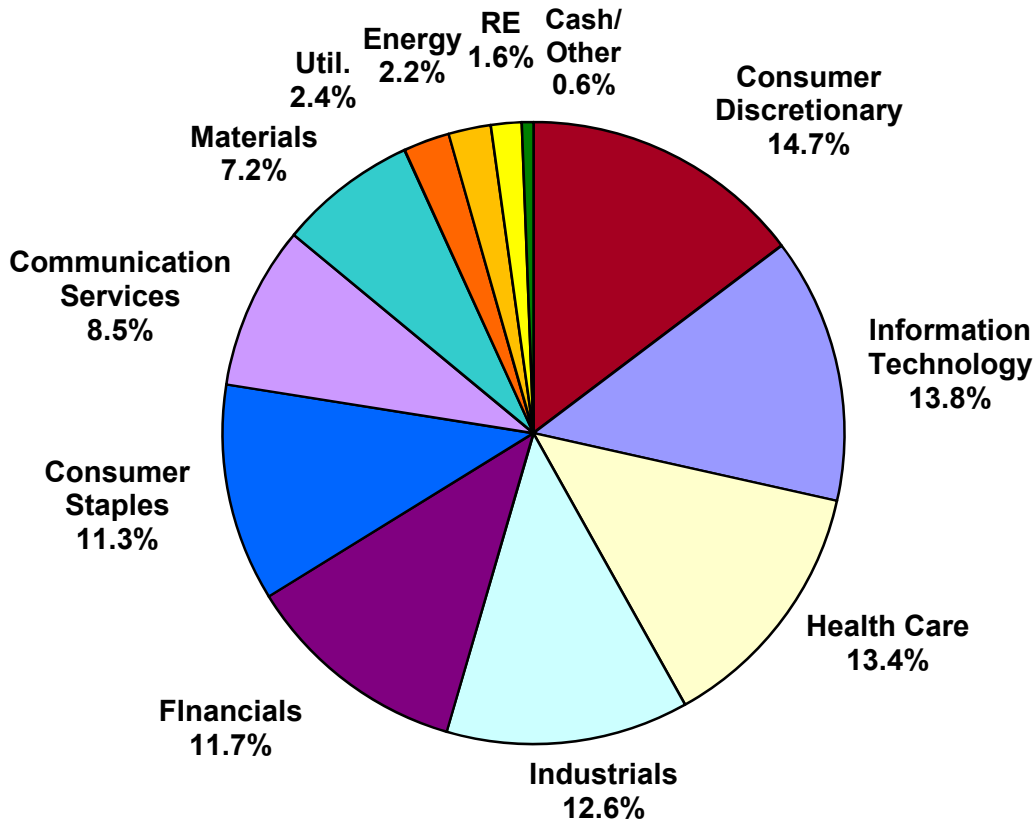
\$12,315

100.0%

SMRS

International Equity By Sector

9/30/20



Market Value in Millions				
9/30/20				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Consumer Discretionary	\$1,808	14.7%	14.1%	0.6%
Information Technology	1,698	13.8%	11.6%	2.2%
Health Care	1,654	13.4%	10.0%	3.4%
Industrials	1,547	12.6%	11.7%	0.9%
Financials	1,444	11.7%	17.4%	-5.7%
Consumer Staples	1,395	11.3%	9.5%	1.8%
Communication Services	1,043	8.5%	7.7%	0.8%
Materials	892	7.2%	7.9%	-0.7%
Utilities	290	2.4%	3.4%	-1.0%
Energy	276	2.2%	4.0%	-1.8%
Real Estate	195	1.6%	2.7%	-1.1%
Total Investments	\$12,242	99.4%	100.0%	
Cash/Other	73	0.6%	0.0%	0.6%
Total	\$12,315	100.0%	100.0%	

Benchmark: MSCI ACWI ex USA

SMRS

International Equities

9/30/20

Date:	<u>9/30/20</u>	<u>6/30/20</u>	<u>3/31/20</u>	<u>12/31/19</u>
Assets (\$ in Millions):	\$12,315	\$11,458	\$9,835	\$13,129
Number of Securities:	2,655	2,677	2,715	2,982
Active Share:	33%	33%	32%	33%

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 Total Return	7.3%	9.2%	6.0%	8.2%
Sustainable Growth Rate	4.7%	6.4%	3.9%	5.8%
Dividend Yield	1.9%	2.2%	2.2%	2.4%
Buyback Yield	0.1%	0.0%	0.0%	0.0%
Collateral Yield	0.7%	0.7%	--	--
Risk:				
Beta	0.93	--	1.00	--
Volatility	19.8%	--	21.2%	--
Tracking Error	2.2%	--	0.0%	--
Information Ratio	0.6	0.5	--	--
Fundamental:				
Average Capitalization (\$ in Billions)	106.9	--	97.6	--
Price/Earnings	20.9	18.2	22.5	18.5
Price/Book	1.7	1.9	1.7	1.9
ROE	8.0%	10.6%	7.5%	10.5%

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.	3.4%	\$632.5	35.8	\$414.3
Taiwan Semiconductor Manufacturing Co., Ltd.	2.5%	387.7	23.4	313.7
Alibaba Group Holding, Ltd.	1.8%	769.7	31.0	223.8
Roche Holding AG	1.7%	296.1	15.9	207.7
Samsung Electronics Co., Ltd.	1.6%	332.6	15.2	198.0
Nestle S.A.	1.5%	342.9	25.9	189.9
ASML Holding NV	1.3%	157.1	42.5	163.3
CSL Limited	1.1%	93.6	41.8	130.4
Sanofi	1.0%	126.0	14.4	126.6
Novo Nordisk A/S Class B	<u>1.0%</u>	<u>125.5</u>	24.7	<u>124.2</u>
TOTAL	<u>17.0%</u>	<u>\$3,263.5</u>		<u>\$2,091.9</u>

International Equity Performance - Net of Fees
9/30/20

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception	Inception Date
Total International Equity	\$12,315,424,228	5.9%	2.1%	7.1%	4.5%	5.5%	1/1/04
MSCI ACWI ex USA		3.0%	1.2%	6.2%	3.2%	5.5%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	4.9%	
<i>Excess Return</i>		2.9%	1.0%	0.9%	1.3%	0.0%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		8	8	2	3	21	
Total International Active Strategy	\$4,792,667,704	11.5%	3.1%	7.1%	4.7%	5.0%	5/1/05
MSCI ACWI ex USA		3.0%	1.2%	6.2%	3.2%	4.9%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	4.4%	
<i>Excess Return</i>		8.5%	2.0%	0.9%	1.5%	0.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		1	3	2	3	19	
BlackRock MSCI Systematic Return	2,076,990,305	8.5%	--	--	--	9.1%	12/1/18
MSCI ACWI ex USA		3.0%	--	--	--	5.2%	
Lipper International Multi-Cap Core		0.7%	--	--	--	3.7%	
<i>Excess Return</i>		5.5%	--	--	--	3.9%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		2	--	--	--	2	
IED Quality Equity	591,716,261	--	--	--	--	16.3%	2/1/20
MSCI ACWI ex USA		--	--	--	--	-2.8%	
Lipper International Multi-Cap Core		--	--	--	--	-4.3%	
<i>Excess Return</i>		--	--	--	--	19.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		--	--	--	--	1	
Martin Currie International Long-Term	447,358,279	26.9%	11.3%	--	--	13.9%	2/1/17
MSCI ACWI ex USA		3.0%	1.2%	--	--	5.4%	
Lipper International Multi-Cap Core		0.7%	0.7%	--	--	4.2%	
<i>Excess Return</i>		23.9%	10.1%	--	--	8.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		1	1	--	--	1	
Wellington IRE	424,617,713	2.8%	2.0%	5.9%	4.1%	4.3%	12/1/05
MSCI World ex USA		0.2%	0.6%	5.3%	2.9%	3.8%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	3.7%	
<i>Excess Return</i>		2.7%	1.4%	0.6%	1.2%	0.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		30	10	26	12	22	
Marathon-London International Fund	305,240,808	1.9%	0.6%	5.3%	4.2%	6.9%	2/1/12
MSCI World ex USA		0.2%	0.6%	5.3%	2.9%	5.2%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	5.1%	
<i>Excess Return</i>		1.7%	0.0%	0.0%	1.3%	1.7%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		37	47	44	10	4	
Wellington Emerging Markets Local Equity	302,063,795	8.5%	1.5%	8.6%	5.4%	6.2%	12/1/11
MSCI Emerging Market Index		10.5%	2.4%	9.0%	3.7%	4.3%	
Lipper Emerging Markets		8.4%	1.7%	7.9%	2.9%	3.8%	
<i>Excess Return</i>		-2.0%	-1.0%	-0.3%	1.7%	2.0%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		53	53	41	22	19	
Lazard/Wilmington International Equity	249,975,000	0.8%	1.3%	4.0%	--	1.7%	6/1/14
MSCI World ex USA		0.2%	0.6%	5.3%	--	1.7%	
Lipper International Large-Cap Core		0.7%	0.1%	5.0%	--	1.8%	
<i>Excess Return</i>		0.7%	0.7%	-1.3%	--	0.0%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		49	24	80	--	68	
UBS China A Opportunity Fund	199,732,650	--	--	--	--	26.7%	5/1/20
MSCI China On shore		--	--	--	--	23.1%	
Lipper Emerging Markets		--	--	--	--	19.7%	
<i>Excess Return</i>		--	--	--	--	3.6%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		--	--	--	--	15	
Wellington Select China Equity	192,578,130	62.6%	--	--	--	54.8%	9/1/19
MSCI China On shore		33.3%	--	--	--	30.6%	
Lipper Emerging Markets		8.4%	--	--	--	9.2%	
<i>Excess Return</i>		29.3%	--	--	--	24.2%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		1	--	--	--	1	

<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>
Total International Stock Plus Strategy	\$4,685,518,450	1.9%	1.6%	7.3%	4.5%	6.6%	1/1/09
MSCI ACWI ex USA		3.0%	1.2%	6.2%	3.2%	6.8%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	6.4%	
<i>Excess Return</i>		-1.1%	0.4%	1.1%	1.3%	-0.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		37	15	2	3	30	
Internal Stock Plus	2,777,444,928	-2.4%	0.8%	5.1%	3.7%	4.5%	9/1/11
MSCI ACWI ex USA		3.0%	1.2%	6.2%	3.2%	4.4%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	4.6%	
<i>Excess Return</i>		-5.4%	-0.4%	-1.1%	0.5%	0.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		83	40	56	16	57	
PIMCO StocksPLUS	1,908,107,626	8.4%	--	--	--	6.3%	4/1/19
MSCI ACWI ex USA		3.0%	--	--	--	2.8%	
Lipper International Multi-Cap Core		0.7%	--	--	--	1.6%	
<i>Excess Return</i>		5.4%	--	--	--	3.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		2	--	--	--	5	

Total International Index Strategy	\$2,837,407,416	3.5%	2.2%	7.2%	4.4%	7.0%	7/1/09
MSCI ACWI ex USA		3.0%	1.2%	6.2%	3.2%	5.9%	
Lipper International Multi-Cap Core		0.7%	0.1%	5.0%	2.9%	5.9%	
<i>Excess Return</i>		0.5%	1.0%	0.9%	1.2%	1.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		20	7	2	5	7	
SSGA MSCI ACWI ex USA Index	1,477,002,881	3.8%	--	--	--	0.9%	11/1/17
MSCI ACWI ex USA		3.0%	--	--	--	0.6%	
Lipper International Multi-Cap Core		0.7%	--	--	--	-0.5%	
<i>Excess Return</i>		0.8%	--	--	--	0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		16	--	--	--	22	
Blackrock ACWI ex USA Index	1,360,404,535	3.2%	--	--	--	-0.5%	3/1/18
MSCI ACWI ex USA		3.0%	--	--	--	-0.8%	
Lipper International Multi-Cap Core		0.7%	--	--	--	-1.3%	
<i>Excess Return</i>		0.2%	--	--	--	0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		26	--	--	--	38	

State of Michigan Retirement System

REAL RETURN & OPPORTUNISTIC REVIEW

State of Michigan Investment Board Meeting
December 10, 2020



Jennifer Yeung
Senior Investment Manager
Real Return & Opportunistic Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Real & Opportunistic	7.4%	10.7%	9.9%	11.5%	10.0%
Custom Benchmark	6.2%	6.8%	7.1%	7.0%	7.2%

- The portfolio value is \$9.5 billion with a one-year return of 7.4%. Despite market volatility in early 2020 and uncertainty of economic activity through the remainder of the year and into 2021, our portfolio has been resilient and our outlook for long-term valuations remains positive.
- Portfolio return was positively impacted by income earned from entertainment royalties, investments in asset managers, credit investments and natural resource strategies.

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.
- During the quarter, the Real Return & Opportunistic portfolio continued to benefit from exposure to assets with low equity beta and diversity of strategy, industry and geography.
- The Real Return & Opportunistic portfolio has approximately \$3.5 billion of unfunded commitments. The following are new commitments closed during the quarter.
 - \$50 million to HPS Mezzanine Partners 2019, L.P. (HPS Investment Partners), a commingled fund that invests in mezzanine securities, primarily targeting sponsored-backed companies in the United States. The fund is well positioned to provide large, comprehensive and complex solutions.
- In addition to monitoring the impact of COVID-19, we remain focused on finding differentiated strategies that are additive to the current portfolio mix and continue to like private credit opportunities, niche strategies with some scalability, and contractual cash flow. Specifically, we like opportunities that have defensible cash flows and offer structural downside protection. We continue to be selective and favor experienced investment teams with a proven track record.

SMRS

Real Return and Opportunistic

9/30/20

Top Ten Advisors or Entities

(\$ in Millions)

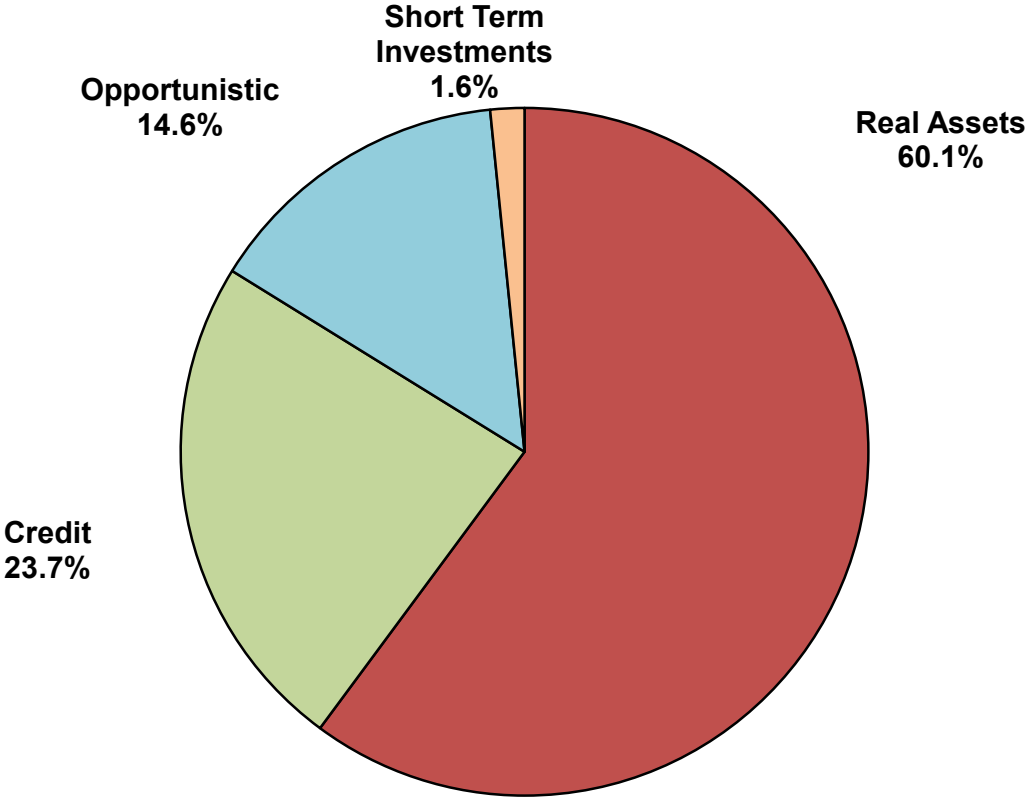
Advisor or Entity	Market Value
Great Mountain Partners LLC	\$ 3,107
Apollo Global Management	1,037
Domain Capital Advisors	833
Barings Alternative Investments	792
Sixth Street Partners	412
Czech Asset Management	397
Kayne Anderson Capital Partners	303
Ridgewood Energy	235
Orion Resource Partners	221
HPS Investment Partners	219
Total Market Value	\$ 7,556

SMRS

Real Return and Opportunistic

9/30/20

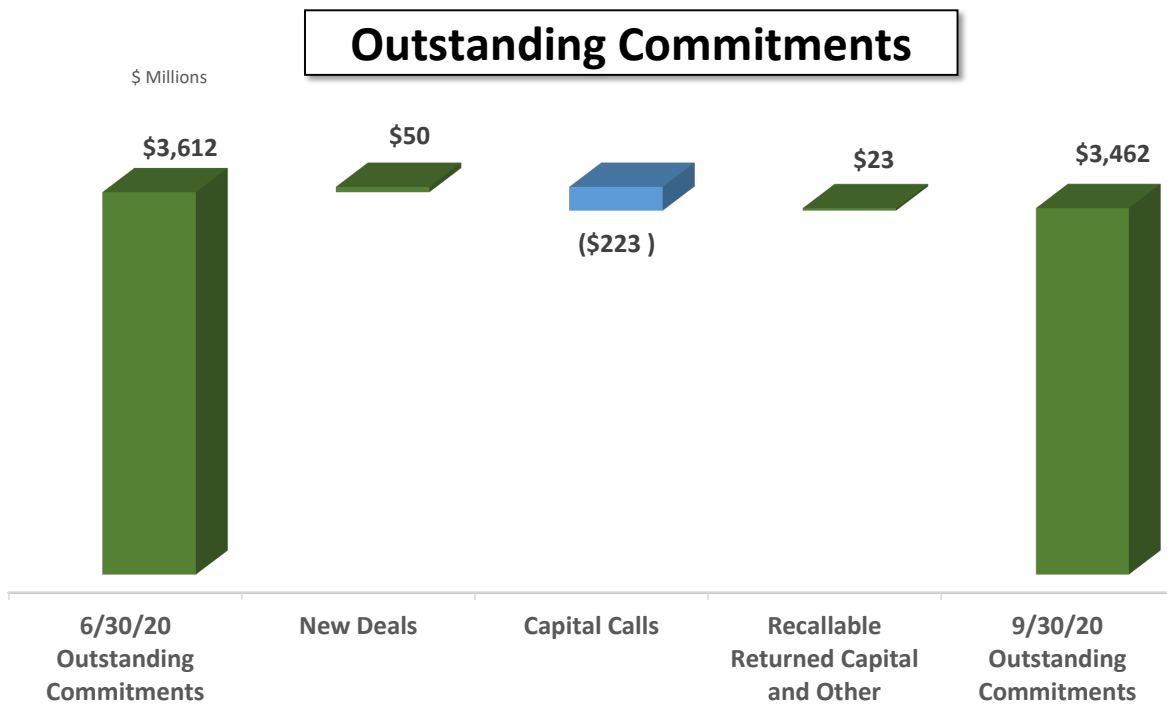
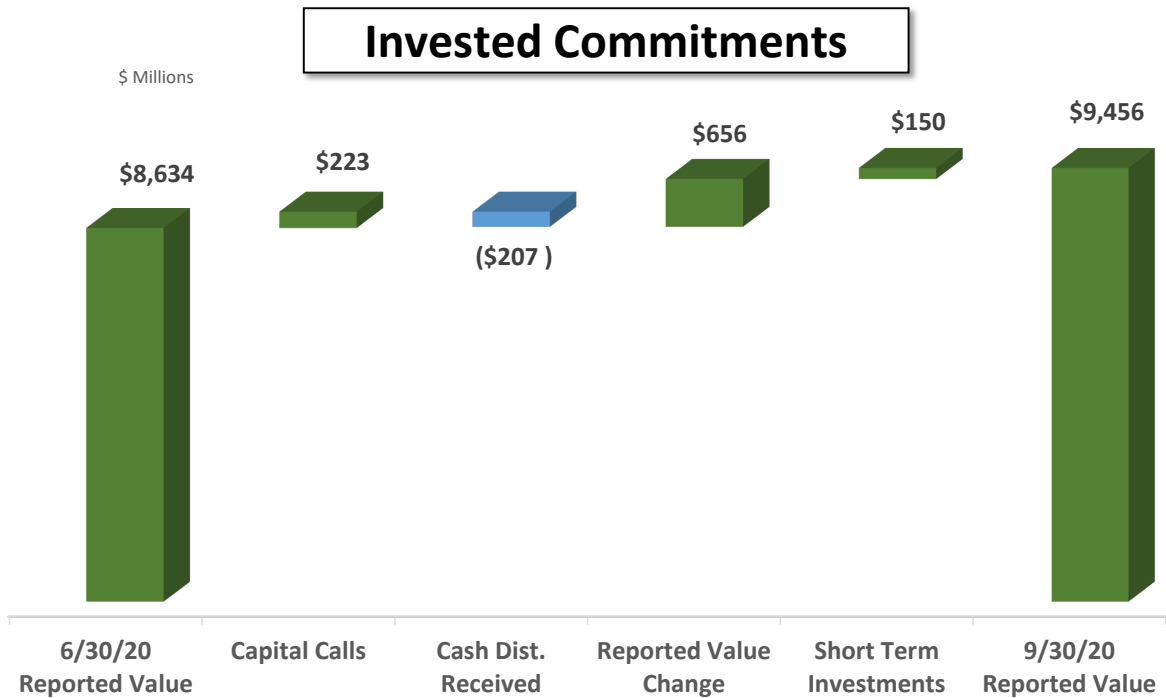
Investments By Strategy



Market Value in Millions	
	<u>9/30/20</u>
Real Assets	\$5,689
Credit	2,237
Opportunistic	1,380
Short Term Investments	<u>150</u>
Total Investments	<u><u>\$9,456</u></u>

SMRS

Real Return and Opportunistic 9/30/20



SMRS

Real Return and Opportunistic

9/30/20

Net Market Value by Entity

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
* Abernathy	\$ 274,731,518	\$ 9,247,812
* Abernathy II	4,225,794	5,320,450
Altus Midstream	1,944,250	0
Angelo Gordon Credit Solutions Fund	60,489,644	36,045,189
Apollo European Principal Finance Fund II	10,657,496	8,168,753
Apollo HK TMS Investments Holdings LP	215,839	0
Axton Holdings	2,640,145,830	0
Barings Asset Based Income Fund I	150,367,775	126,378,012
Barings Global Real Asset Fund I	67,679,013	43,992,231
Blackstone Strategic Capital Holdings, LP	69,740,623	33,560,208
Blue Peninsula Fund LP	139,358,978	51,826,881
Broadriver III	104,194,107	93,877,554
BSCH Parallel (MLG) I LP	137,004,511	0
BSCH II	12,102,582	237,500,000
BSCH II Co-Invest	0	100,000,000
Carlyle Energy Mezzanine Opportunity Fund II	16,423,822	17,721,298
Carlyle IEP Co-Invest (Varo)	13,690,364	837,818
Carlyle International Energy Partners	46,900,326	15,117,996
Carlyle International Energy Partners II	22,967,374	121,166,598
Castle Credit SMRS Holdings LLC	122,722,328	86,179,017
Centerbridge SCP III	22,118,516	3,025,715
Centerbridge SCP III, LP – Flex, L.P.	13,599,807	56,269,030
Content Holdings, LLC	439,717,026	41,570,712
Credit Opportunity Fund III	18,543,361	19,711,623
Energy Recap and Restructuring	14,346,223	7,085,025
ERR MI Holdings LP	1,810,369	2,269,933
FCO MA MI LP	145,273,158	39,327,496
Financial Credit Investment II	247,464,284	183,297,353
Financial Credit Investment III	218,009,385	134,030,298
Flywheel Energy Co-Invest	44,983,658	7,000,000
Fortress Transportation & Infrastructure	64,698,691	0
Greatrock LLC	59,067,533	0
Global Maritime	67,023,067	3,414,854
GSO Credit Alpha Fund	31,281,275	37,910,063
HarbourVest Direct Lending Fund (L) L.P.	0	100,000,000
Hopen Life Science Fund II	3,803,166	535,000
HPS Red Cedar Fund	211,134,066	93,762,984
** HPS Mezzanine Partners 2019, L.P.	0	50,000,000
Kayne Anderson Energy Fund VII, LP	18,412,252	15,469,791
Kayne Anderson Private Energy Income Fund	105,909,230	25,332,190
Kayne Anderson Private Energy Income Fund II	37,882,002	123,242,875
Kayne Solutions Fund	71,093,442	182,640,181
KKR Energy Income & Growth Fund	28,312,724	0
KKR Lending Partners	3,724,186	11,524,868
KKR Lending Partners II	19,442,390	11,737,239
Lakewater	95,032,812	1,668,856

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
Lakewater II	69,789,259	1,800,000
Lakewater III	239,047,998	2,900,000
Lakewater IV	31,207,332	823,959
Lakewater V	79,836,093	3,023,810
Marathon CLO Equity Fund	11,180,738	2,451,579
Merit Energy Partners I LP	34,297,014	0
MidCap Finco Holdings LTD	288,858,497	0
Mortgage Servicing Rights	66,904,895	0
Napier Park Aircraft Leasing Vehicle I, LLC	40,307,483	17,944,862
Napier Park AL Rollover Fund I	14,423,283	60,067,481
Nash Co-Investment	12,829,457	94,259
New Fortress Energy HLDGS	466,716,808	0
NGP Natural Resources XII	65,582,869	70,713,238
Orion Co-Investments III, LP	2,430,341	0
Orion Mine Finance	48,156,151	1,057,949
Orion Mine Finance 1A	34,918,618	827,618
Orion Mine Finance Co-Fund II LP	13,070,852	35,000,000
Orion Mine Finance II	94,584,808	24,023,234
Orion Mine Finance III LP	27,695,017	51,577,822
Redding Ridge Holdings, LP	71,349,246	10,842,105
* Ren Venture Fund II	30,229,958	1,000,000
* Ren Venture Fund III	11,238,013	15,000,000
Ridgewood Energy Oil & Gas II	62,555,891	17,104,339
Ridgewood Energy Oil & Gas III	121,567,636	110,057,713
Ridgewood Fund II Co-Invest (REOG)	18,468,541	4,516,974
Riverside Credit Solutions FD I LP	39,300,898	8,493,140
RPEP Energy Opportunistic Institutional Partners	32,307,345	6,952,840
SJC Direct Lending Fund II	257,081	38,261,315
SJC Direct Lending Fund III	193,047,994	25,279,108
SJC Direct Lending Fund III Co-Invest G-III	19,035,392	0
SJC Onshore Direct Lending Fund IV – SMRS, L.P.	184,464,445	65,000,000
* Social Network Holdings	113,903,821	5,590,289
Specialty Loan Fund III	7,922,653	5,902,301
Sprott Private Resource Lending (US), LP	22,535,107	79,519,993
Sprott PRL(M) LP	1,634,916	26,218,145
Sprott PRL(M-Co-Invest) LP	7,604,344	17,687,500
Structured Credit Recovery Fund IV	182,021,508	0
Terra Co-Investment	24,851,138	14,000,000
TICP CLO Partners II	35,063,777	1,724,474
TICP CLO Partners III	23,636,314	76,147,588
TSSP Agriculture Partners	4,784,566	94,657,148
TSSP Adjacent Opportunties Partners	193,833,229	129,278,398
TSSP Capital Solutions	121,668,057	183,861,915
TSSP Opportunities Partners IV	32,745,678	68,293,223
Turning Rock Fund I, LP	46,207,373	32,778,917
Vida Insurance Credit Opportunity Fund II	98,939,171	9,433,075
Warwick (SMRS) Co-Invest, L.P.	30,090,325	2,089,081
Warwick Partners III	54,243,581	2,017,705
Total Real Return and Opportunistic	\$ 9,305,590,310	\$ 3,461,778,999
Short-Term Investments & Other	150,015,304	0
Grand Total	\$ 9,455,605,614	\$ 3,461,778,999

* Fund of Funds

** New Commitment

State of Michigan Retirement System

REAL ESTATE AND INFRASTRUCTURE REVIEW

State of Michigan Investment Board Meeting
December 10, 2020



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	-6.4%	4.3%	6.3%	8.9%	9.5%
NCREIF NPI	0.7%	3.8%	4.9%	6.6%	8.0%
Peer Median Returns	0.4%	5.2%	6.8%	8.8%	9.6%
Percentile Rank vs. Peers*	94	71	63	50	52

*State Street Universe greater than \$1 billion

- Underperformance relative to the one-year benchmark resulted from the Real Estate and Infrastructure Division's (REID) strategy of being overweight in hospitality and performance in the infrastructure portfolio particularly in the energy sector.

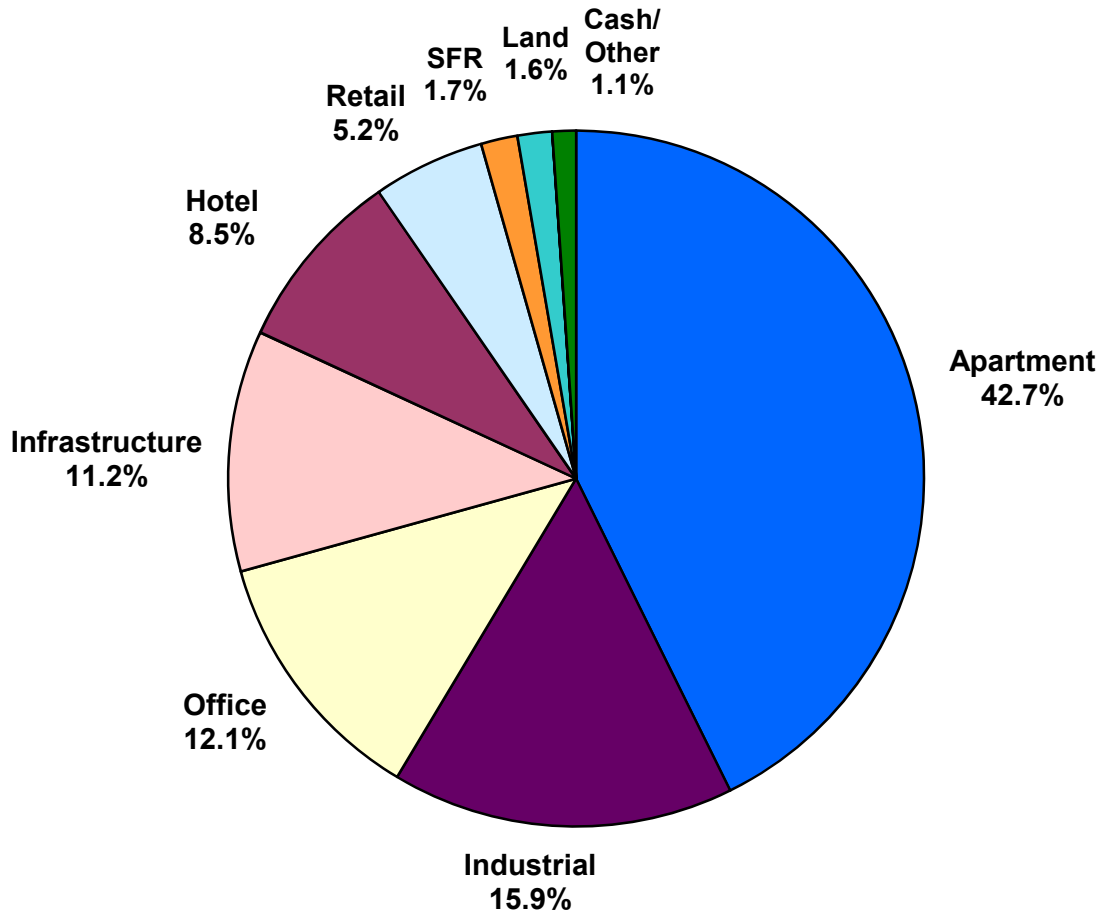
Strategy Update

- The Covid-19 global pandemic and Shelter-in-Place orders implemented to slow the spread of the virus resulted in major negative impacts to the US economy and commercial real estate and infrastructure markets. Large segments of the US economy remain shuttered to various degrees with economic reopening at various stages across the country. The impacts are only beginning to be felt in the commercial markets with uneven impacts across the real estate and infrastructure sectors. We will monitor, assess, and shift strategies, as necessary. US and foreign investors remain cautious and transaction volumes have dropped to very low levels.
- We are focused on sourcing off-market opportunities through our 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. We have selectively acquired properties where we can add value through management and leasing and have continued to develop properties at attractive risk-adjusted returns. The team continues to assemble 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.
- We have been actively managing the portfolio with capital returned of just under \$800 million, and funding for new or existing investments of just under \$586 million over the past 12 months. We will continue to work with our advisors in executing the disposition of properties and realizing gains at low capitalization rates where these opportunities still exist.
- The REID has approximately \$1.3 billion in unfunded commitments. No new commitments were made during the quarter.

SMRS

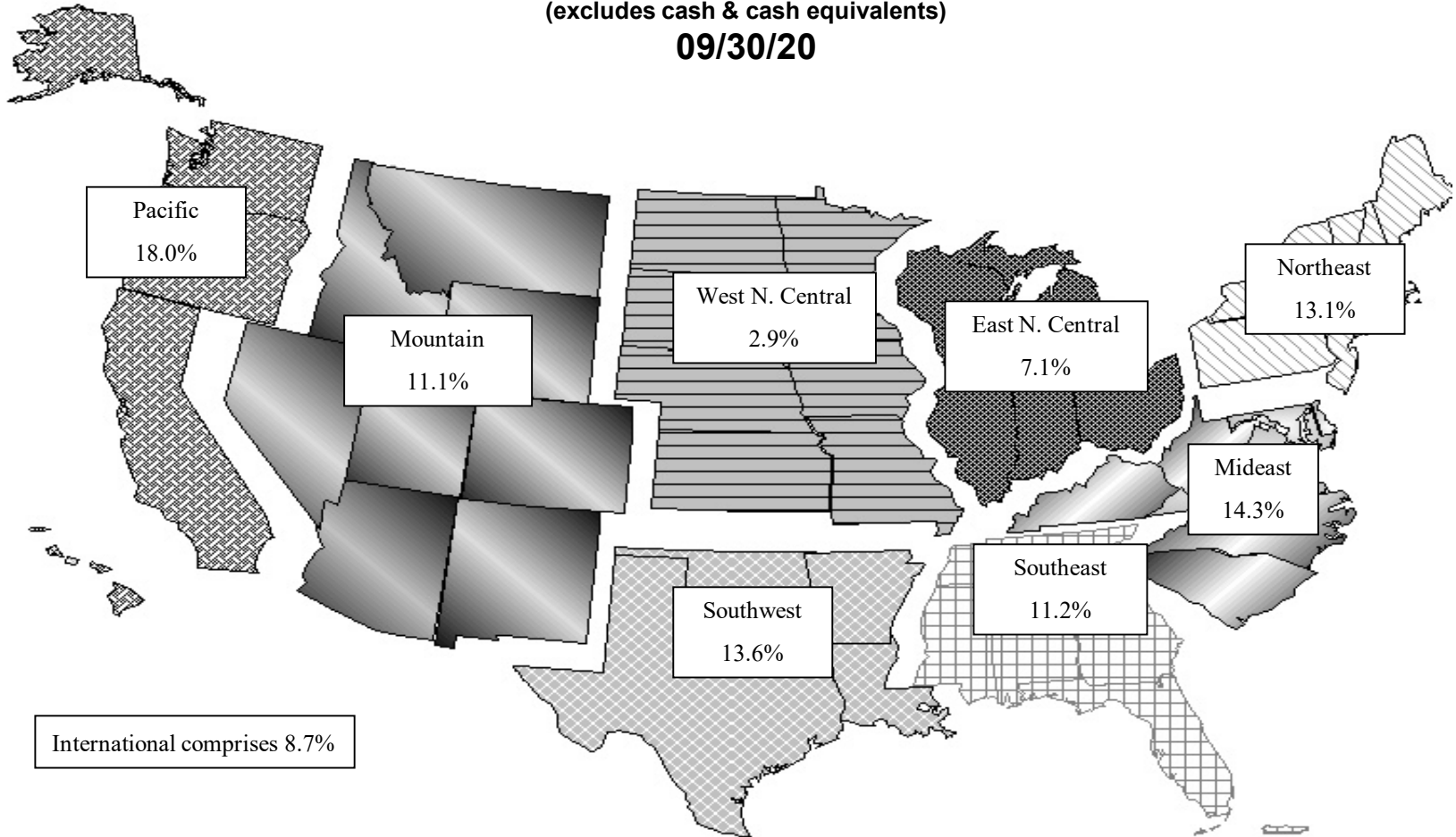
Real Estate and Infrastructure

9/30/20



Market Value in Millions				
	<u>9/30/20</u>		<u>9/30/19</u>	
Apartment	\$2,639	42.7%	\$2,820	39.6%
Industrial	981	15.9%	749	10.5%
Office	745	12.1%	930	13.1%
Infrastructure	690	11.2%	864	12.1%
Hotel	527	8.5%	933	13.1%
Retail	324	5.2%	355	5.0%
Single Family Residential (SFR)	105	1.7%	291	4.1%
Land	100	1.6%	89	1.3%
	<u>\$6,111</u>	<u>98.9%</u>	<u>\$7,031</u>	<u>98.8%</u>
Cash/Other	69	1.1%	82	1.2%
Total Investments	<u>\$6,180</u>	<u>100.0%</u>	<u>\$7,113</u>	<u>100.0%</u>

SMRS
Real Estate by Region
Based on Market Value
(excludes cash & cash equivalents)
09/30/20



Geographic regions defined by NCREIF, whose property index composition is: Pacific 33.7%, Mountain 6.5%, West N. Central 1.2%, Southwest 10.7%, East N. Central 7.0%, Southeast 10.0%, Northeast 19.4%, Midwest 11.5%

SMRS
Real Estate and Infrastructure
9/30/20

**Top Ten
Advisors or Entity**

<u>Advisor or Entity</u>	(\$ in millions)	<u>Market Value</u>
MWT Holdings LLC	\$	1,964
Principal Real Estate Investors		568
Clarion Partners		415
Domain Capital Advisors Inc		277
Five Star Realty Partners LLC		276
Blackstone Group		230
Rialto Capital Management LLC		207
Transwestern Investment Management		181
CIM Investment Advisors LLC		172
L&B Realty Advisors		169
	<u>\$</u>	<u>4,001</u>

**Occupancy
by Property Type**

	Apartment	Office	Industrial	Retail	Hotel
SMRS Portfolio	93.8%	86.7%	95.8%	89.0%	13.8%
National Average	94.3%	87.0%	92.4%	95.2%	33.5%

SMRS
Market Values by Ownership Entity
9/30/20
REAL ESTATE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
801 Grand Avenue Capital, LLC	\$ 57,151,198	\$ 0
AEW Senior Housing III	3,934,118	715,013
AEW Senior Housing Investors IV	33,506,631	15,771,635
Apollo Asia Real Estate Fund	48,949,459	30,234,574
Asana Partners Fund I	26,931,309	3,945,809
Asana Partners Fund II	9,135,321	37,905,405
Avanath Affordable Housing II, LLC	32,855,864	0
Avanath II SMRS Co-Investment Fund LLC	13,205,325	0
Avanath Affordable Housing III	43,117,870	5,311,980
Avanath Affordable Housing IV	7,855,235	24,546,772
Blackstone R/E Partners V, LP	1,255,050	0
Blackstone R/E Partners VI, LP	3,017,961	3,680,930
Blackstone R/E Partners VIII, LP	74,183,150	12,753,548
Blackstone R/E Partners IX, LP	57,843,628	144,685,022
Capri Urban Investors, LLC	7,043,390	0
CIM Commercial Trust Corp	5,794,860	0
CIM Fund III, LP	32,933,647	0
CIM Fund VIII, L.P.	96,293,648	1,487,563
CIM VI (Urban REIT), LLC	30,486,560	0
Clarion Gables Multifamily Trust, LP	31,389,416	0
Columbus Circle Holdings, LLC	170,279,924	157,736,372
Crown Small Cap Real Estate	15,275,453	4,402,500
DM2501, LLC	0	0
Domain GVA-1, LLC	26,229,045	1,940,056
Domain Hotel Properties, LLC	128,349,044	0
Eastport Properties, LLC	0	0
Gateway Capital Real Estate Fund II, LP	2,850,564	0
Great Lakes Property Group Trust	7,841,658	9,233,796
GreenOak Europe III, LP	14,157,605	70,969,096
Heitman Credit	48,869,781	0
IDR Core Property Index Fund LLC	25,493,424	0
India Property Fund II, LLC	15,187,869	1,552,610
Invesco Mortgage Recovery Feeder Fund	3,625,239	0
Invesco Mortgage Recovery Fund II, L.P.	22,433,316	34,249,727
Invesco Strategic Opportunities III, L.P.	23,408,208	82,461,385
IPF II Co-Invest LP	16,264,222	1,270,897
JBC Funds North LaSalle LLC	17,630,356	0
JBC Opportunity Fund III, LP	495,673	0
KBS/SM Fund III, LP	49,627,954	0
KBS/SM Fund IV	149,497	0
L-A Saturn Acquisition	37,263,166	0
Landmark Real Estate Partners V, LP	6,078,038	0
LaSalle Asia Opportunity Fund II, LP	119	0
LaSalle Asia Opportunity Fund III, LP	1,223,274	0
Lion Industrial Trust	250,993,026	0
Lion Mexico Fund, LP	4,873,529	0

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Lombard GVA0016 (former AGL Annuity)	276,090,017	0
Lone Star Fund X LP	140,336,288	29,311,293
Lone Star Fund XI LP	6,229,809	182,258,993
Lubert-Adler Real Estate Fund VII, LP	53,888,073	6,538,662
M1 Westgate CoInvest LLC	6,388,084	0
M301W CoInvest LLC	1,435,647	0
MERS Acquisitions Ltd.	169,738,712	3,349,404
MIP Holdco LLC	145,724,452	13,859,458
MSREF V - International	2,335,836	0
MSRESS Fund III Institutional LP	6,064,901	0
MWT Holdings, LLC	1,964,467,656	0
Northpark Land Associates	37,952,292	7,622,264
Orange Investors LLC	438,892	0
Paladin Realty Brazil Investors III (USA), LP	7,097,733	0
Paladin Realty Latin America Investors IV-CI, LP	24,819,062	0
Paladin Realty TB COINV V LP	10,097,957	0
Penmain Office LLC	42,912,526	0
Principal Separate Account	511,010,976	50,232,567
Proprium RE Spec. Situations Fund, LP	82,813,819	16,143,656
Rialto Absolute Partnership I	68,037,690	0
Rialto Credit Partshp LP	19,955,972	0
Rialto Real Estate Fund, LP	19,641,657	0
Rialto Real Estate Fund II, LP	26,160,698	0
Rialto Real Estate Fund III-Debt, LP	39,071,303	0
Rialto Real Estate Fund III-Property, LP	34,290,544	5,342,466
Rialto Mezzanine Partners Fund	246,404	0
SM Brell II LP	20,500,368	0
Stockbridge RE Fund II-C, LP	5,705,412	0
Strategic II LLC	53,138,276	30,946,825
TPG RE Finance Trust Inc. (TRTX)	40,813,087	0
TPG Real Estate Partners II	24,165,757	9,531,098
TPG Real Estate Partners III	6,525,732	41,814,220
TSP Spartan C-I LLC	7,154	0
TSP Spartan C-II LLC	15,940,290	0
TSP Value & Income Fund II, LP	20,184,524	23,693,841
Trophy Property Development LP	550,661	0
True North High Yield Invest. Fund II, LLC	1,878,495	0
True North Real Estate Fund III, LLC	29,689,623	5,000,000
	\$ 5,421,830,005	\$ 1,070,499,435
Short-Term Investments and Other	58,683,285	0
Total Real Estate Investments	\$ 5,480,513,290	\$ 1,070,499,436

* New or additional commitment made during the quarter reported

SMRS
Market Values by Ownership Entity
9/30/20

INFRASTRUCTURE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Arclight Energy Partners VI, LP	\$ 33,200,966	\$ 7,004,763
Arclight Energy Partners VII, LP	3,521,315	45,814,263
ASF VI Infrastructure B LP	22,080,329	9,156,177
ASF VII Infrastructure Fund B L.P.	14,028,008	17,789,037
ASF Como Co-Investment LP	6,593,520	2,405,051
Basalt Infrastructure Partners, LP	41,321,270	2,219,045
Blackstone Energy Partners, LP	11,970,366	4,728,291
Blackstone Energy Partners II, LP	59,489,065	4,332,432
Brookfield Infrastructure Fund II-B, L.P.	52,547,881	4,414,002
Customized Infrastructure Strategies, LP	30,835,221	4,608,964
Dalmore Capital Fund	64,417,329	0
GCM Grosvenor Infrastructure Investment Program, L.P.	46,654,450	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	40,205,875	13,813,661
Global E&P Infrastructure Fund II L.P.	47,876,354	3,722,004
GSO Energy Select Opportunities Fund LP	19,677,205	23,237,456
GSO Energy Select Opportunities Fund II, LP	3,404,905	46,638,959
JPMorgan AIRRO India SideCar Fund US, LLC	74,892,638	1,312,998
JPMorgan AIRRO Fund II	8,583,841	7,013,452
KKR Eagle CoInvest L.P.	30,975,121	1,853,268
KKR Global Infrastructure Investors, LP	8,177,809	2,935,433
Ridgewood Water & Strategic Infrastructure Fund LP	7,018,266	42,612,201
RPEP SMRS Infra II, LLC	12,795,071	4,704,100
StonePeak Infrastructure Fund LP	49,337,043	9,900,211
	<hr/>	<hr/>
	\$ 689,603,848	\$ 260,215,768
Short-Term Investments and Other	10,018,282	0
	<hr/>	<hr/>
Total Infrastructure Investments	\$ 699,622,130	\$ 260,215,768
	<hr/>	<hr/>
TOTAL INVESTMENTS	\$ 6,180,135,420	\$ 1,330,715,204

* New or additional commitment made during the quarter reported

State of Michigan Retirement System

FIXED INCOME REVIEW

State of Michigan Investment Board Meeting
December 10, 2020



Daniel J. Quigley
Senior Investment Manager
Fixed Income Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	3.4%	4.7%	4.9%	4.6%	4.3%
Bloomberg Barclays US Agg	7.0%	5.2%	4.2%	4.0%	3.6%
Peer Median Returns	7.4%	5.2%	5.1%	4.1%	4.6%
Percentile Rank vs. Peers*	88	70	55	44	61

*State Street Universe greater than \$1 billion

- The fixed income portfolio underperformed its benchmark and peer group on a one-year and three-year basis. This underperformance was driven by an overweight to corporate credit and structured credit securities and an underweight to U.S. Treasury securities and Agency Residential Mortgage Backed Securities (RMBS).
- The performance of risk assets was strong during the quarter as markets started to recover from the first quarter selloff. This recovery was supported by record amounts of Monetary and Fiscal Policy support as the Federal Reserve and U.S. Treasury sought to support the economy and stabilize financial markets during the Covid-19 economic shutdown. Investment Grade corporates, high yield, and emerging market debt all experienced quarterly returns above 9%. The performance of the U.S. Aggregate Index was driven by this credit spread tightening in corporate bonds and returned 2.9% for the quarter.
- The year-over-year (YOY) widening of spreads for high yield credit and structured credit securities was the main driver of performance on a one-year basis. In addition to this, the portfolio had a shorter duration than the U.S. Aggregate benchmark. This hurt relative performance as interest rates declined substantially on a YOY basis.

Strategy Update

- The objective 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 while having a risk profile that is similar to the long-term volatility experienced in traditional core fixed income. The yield-to-maturity of the portfolio is currently 3.0% versus a benchmark yield of 1.3%. In addition to this, the portfolio exhibits risk characteristics that are in line with the historical volatility of traditional fixed income benchmarks and has an equity beta of 0.1.
- The Core-plus strategy implemented to achieve this goal includes:
 - Core: As of September 30, 2020, 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 58.3%. This includes a 18.4% 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 results in lower liquidity and higher volatility. The allocation to the Plus portfolio was 41.7% as of September 30, 2020.

Tactical Update

- The allocation to securitized credit, primarily in CMBS, ABS, non-agency RMBS, and CLO securities, was 29.9% of the portfolio at the end of the quarter. The combination of low interest rate duration and high coupon income (often floating rate) offers attractive characteristics for the overall fixed income portfolio in this low interest rate environment. This portion of the portfolio experienced large mark-to-market losses in the first half of the calendar year as securitized markets experienced a dramatic selloff and freeze in market liquidity. The one-year return on this portfolio was -4.2%.
- The allocation to high-yield strategies was 5.2% at the end of the quarter. This out-of-benchmark position underperformed during the first quarter but has recovered strongly the last two quarters. The one-year performance of this allocation was 3.9%, underperforming the core index by over 600 basis points (bp).
- 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 during risk-off markets when interest rates decline, however, it should exhibit strong risk-adjusted return characteristics on a go forward basis in this low interest rate environment.
- The allocation to U.S. TIPS was reduced during the quarter and ended the period at 1.7% of the fixed income portfolio to capture gains driven by relative outperformance recently. The TIPS allocation has outperformed nominal U.S. Treasuries by roughly 675 bp between March 31, 2020 and September 30, 2020. 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 steepened during the fiscal year as short-term interest rates fell by a larger amount than long-term interest rates. Three-month U.S. Treasury Bills declined by 169 bp to 0.10% at the end of the quarter while ten-year U.S. Treasuries decreased by 134 bp to 0.69%.
- Inflation expectations increased during the quarter, with ten-year breakeven inflation expectations ending September at 1.63%, an increase of 24 bp for the quarter.
- Credit markets continued to recover during the quarter with HY corporate bond spreads tightening by 97 bp to 517 bp at the end of the quarter. These HY spreads were still 186 bp higher on a YTD basis after the selloff in February and March. Investment grade corporate bond spreads also tightened during the quarter, decreasing by 11 bp to 136 bp.
- Emerging Markets debt also strengthened during the quarter with spreads decreasing by 55 bp to 349 bp. EM spreads are 50 bp wider on a YTD basis.
- The recovery of Commercial Mortgage Backed Securities (CMBS) was strong during the quarter after lagging corporate credit last quarter. This bumpy performance was driven by markets pricing in the increased likelihood of delinquencies and defaults for commercial real estate loans in the current economic environment. BBB CMBS spreads declined by 136 bp during the quarter to 601 bp. These spreads are 344 bp higher on a YTD basis.

Conclusion

- The portfolio currently has a neutral interest rate duration to the benchmark but remains overweight to corporate and structured debt securities. This positioning increases the income of the portfolio while also increasing the potential for price volatility. The portfolio will continue to look for attractive risk-adjusted opportunities within the fixed income opportunity set.

SMRS

Fixed Income by Strategy

9/30/20

	Amount	Total	% of Total
Core (\$ in Millions)			
FID Internal	\$4,539		
PIMCO Mortgage Fund	492		
PGIM Investment Grade Credit	225		
Total Core		\$5,257	55.6%
Tactical			
Fidelity Tactical	\$505		
Total Tactical		\$505	5.3%
Securitized Debt			
TICP CLO Debt	\$767		
Napier Park ABS Income	551		
Met West Securitized Ops	501		
Principal CMBS	413		
Fortress Credit ABI	339		
Putnam DMS	144		
Napier Park Strategic Loan	113		
Total Securitized Debt		\$2,828	29.9%
High Yield			
PGIM High Yield	\$222		
Columbia Management	205		
Crescent Direct Lending	61		
Total High Yield		\$488	5.2%
Global			
T. Rowe Global Multi-Sector	\$259		
PGIM Global Liquid Relative Value	112		
Total Global		\$371	3.9%

TOTAL

\$9,448

100.0%

NOTE: Totals may not be exact due to rounding.

SMRS

Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

9/30/20

<u>Characteristic</u>	<u>Portfolio</u>	<u>Benchmark</u>
Average Maturity (Yrs)	8.6	8.0
Duration (Yrs)	5.4	6.0
Spread Duration (Yrs)	6.9	6.3
Coupon (%)	3.4	3.0
Yield to Maturity (%)	3.0	1.3
Credit Rating	A	AA
VaR (%)	11.1	7.7
Tracking Error	4.47	NA
Beta (vs S&P 500)	0.08	0.01

Commentary

Objectives

Income:

Liquidity:

Principal Preservation:

Diversification:

Highlights

The coupon of the portfolio is approximately 40 bps higher than the benchmark. Price movement has been the main driver of U.S. bond market returns YTD, but Income is the primary driver of long-term performance.

18.4% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.

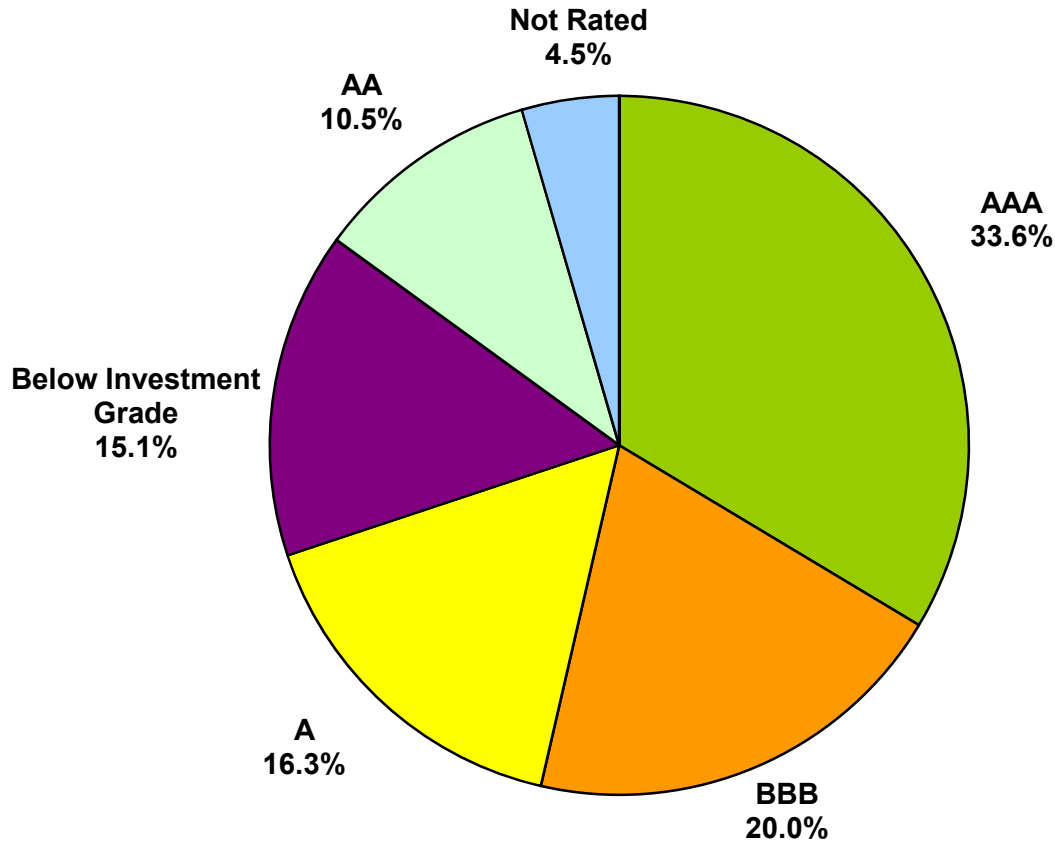
The portfolio has a large allocation to U.S. Treasuries and carries an investment-grade credit rating.

The equity beta of the portfolio is roughly 0.1 meaning that the portfolio returns have a low correlation with equity market movements.

SMRS

Fixed Income By Rating

9/30/20



Market Value in Millions				
9/30/20				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
AAA	\$3,178	33.6%	68.0%	-34.4%
AA	993	10.5%	3.4%	7.1%
A	1,540	16.3%	11.9%	4.4%
BBB	1,889	20.0%	13.7%	6.3%
* Below Investment Grade	1,425	15.1%	0.5%	14.6%
Not Rated	423	4.5%	2.5%	2.0%
Total Investments	<u>\$9,448</u>	<u>100.0%</u>	<u>100.0%</u>	

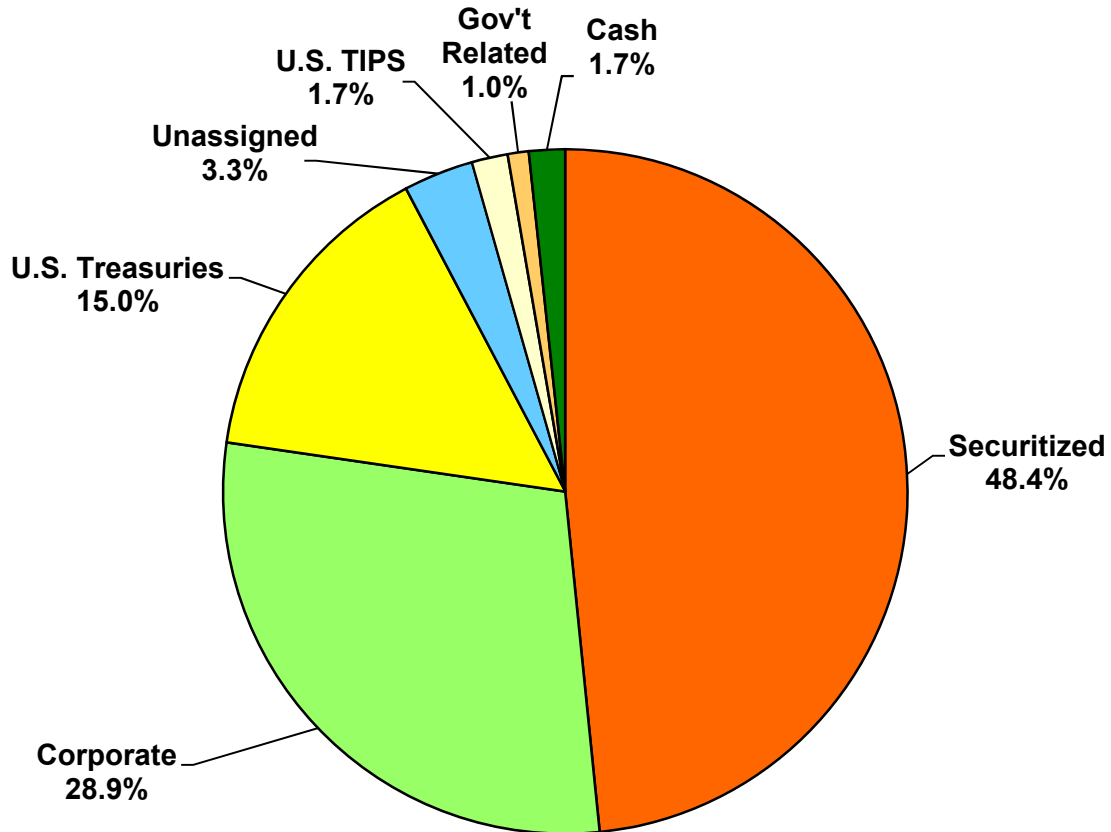
* Comprised of approximately 9.7% High Yield Credit and 5.4% High Yield RMBS/ABS

Benchmark: Barclays US Aggregate

SMRS

Fixed Income By Asset Type

9/30/20



Market Value in Millions				
9/30/20				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Securitized	\$4,570	48.4%	29.5%	18.9%
Corporate	2,730	28.9%	27.3%	1.6%
U.S. Treasuries	1,414	15.0%	37.0%	-22.0%
Unassigned	311	3.3%	0.0%	3.3%
U.S. TIPS	162	1.7%	0.0%	1.7%
Government Related	98	1.0%	6.2%	-5.2%
Cash	163	1.7%	0.0%	1.7%
Total Investments	<u>\$9,448</u>	<u>100.0%</u>	<u>100.0%</u>	

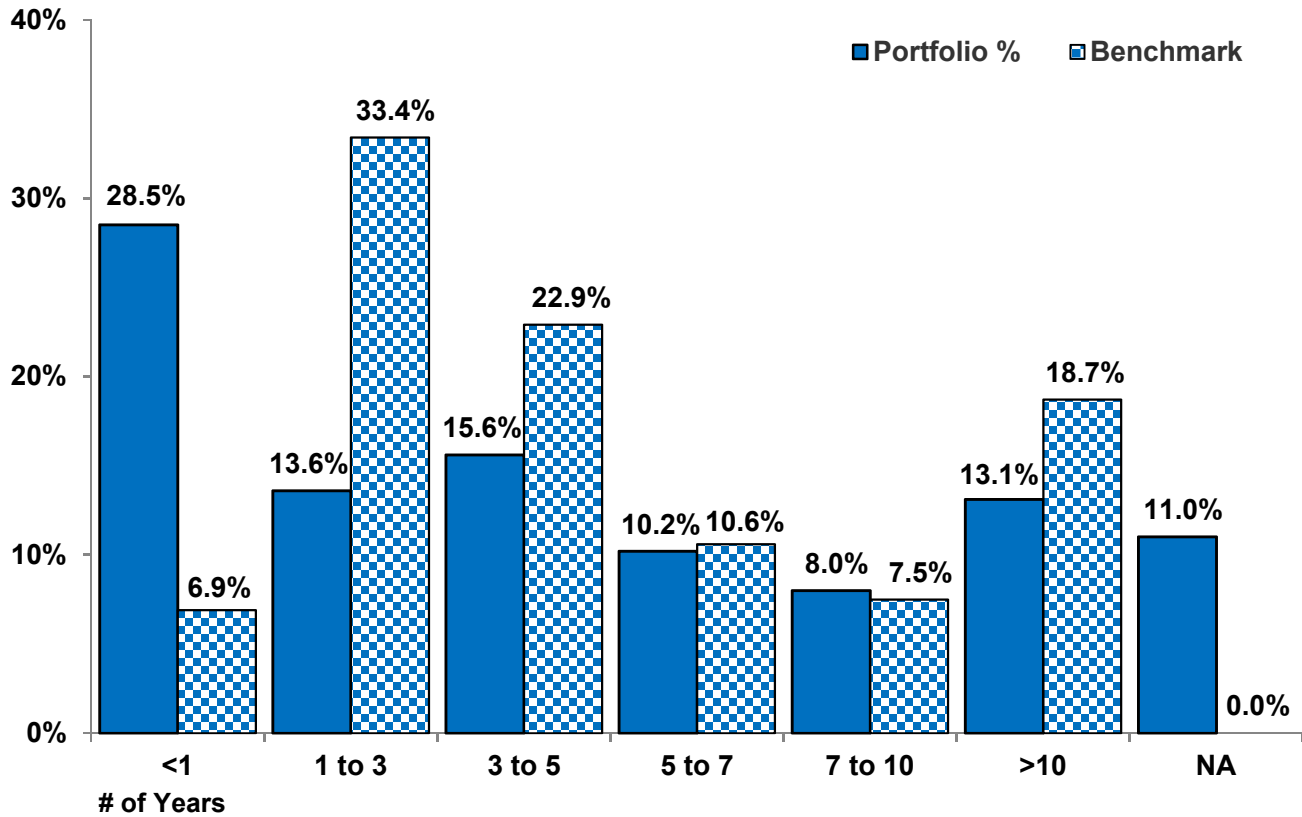
Benchmark: Barclays US Aggregate

SMRS

Duration Distribution

Fixed Income Composite Versus Benchmark

9/30/20



Source: Factset

Market Value in Millions					
<u>Duration</u>	<u>Assets</u>	<u>Portfolio Weight</u>	<u>Benchmark Weight</u>	<u>Portfolio Duration*</u>	<u>Benchmark Duration*</u>
<1	\$2,697	28.5%	6.9%	0.1	0.3
1 to 3	1,282	13.6%	33.4%	2.1	2.1
3 to 5	1,476	15.6%	22.9%	4.0	3.9
5 to 7	969	10.2%	10.6%	5.9	6.0
7 to 10	752	8.0%	7.5%	7.9	8.2
>10	1,235	13.1%	18.7%	19.3	17.3
NA	1,037	11.0%	0.0%	0.0	0.0
Total	<u>\$9,448</u>	<u>100.0%</u>	<u>100.0%</u>	<u>5.3</u>	<u>6.1</u>

* Effective Duration

Benchmark: Barclays US Aggregate

Total Fixed Income Performance - Net of Fees (MPSERS)

9/30/20

	<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	\$9,448,312,237	3.20%	4.51%	4.67%	4.38%	4.10%
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>6.98%</i>	<i>5.24%</i>	<i>4.18%</i>	<i>3.97%</i>	<i>3.64%</i>
Internal Core Fixed Income	4,539,292,628.24	6.60%	5.86%	5.11%	4.73%	4.18%
Externally Managed Fixed Income	\$4,909,019,608.56	-0.03%	3.18%	4.44%	4.19%	4.20%
PIMCO Mortgage Fund	491,843,289	5.29%				
<i>Bloomberg/Barclays US MBS Agy Fixed Indx</i>	<i>N/A</i>	<i>4.36%</i>				
Investment Grade Credit	\$225,435,348	8.47%	6.50%	6.28%	5.68%	5.41%
PGIM Investment Grade	225,435,348	8.47%	6.50%	6.28%	5.72%	5.51%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>	<i>7.50%</i>	<i>6.19%</i>	<i>5.75%</i>	<i>5.26%</i>	<i>4.92%</i>
Tactical Fixed Income	\$504,995,902	6.29%	5.56%	5.24%	5.17%	8.40%
Fidelity Tactical Bond Fund	504,995,902	6.48%	6.01%	6.17%		
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>6.98%</i>	<i>5.24%</i>	<i>4.18%</i>	<i>3.97%</i>	<i>3.64%</i>
High Yield Fixed Income	\$487,952,600	3.94%	4.77%	6.64%	5.65%	
Columbia Management High Yield	204,844,729	3.72%	4.51%	6.47%	5.52%	
PGIM High Yield	222,100,044	5.15%	5.44%	7.06%		
Crescent Direct Lending	61,007,826	3.18%				
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>	<i>4.41%</i>	<i>4.94%</i>	<i>6.81%</i>	<i>5.56%</i>	
Structured Fixed Income	\$2,827,511,591	-4.17%	1.87%			
Principal CMBS	412,828,585	-3.75%	3.18%	3.44%	4.55%	7.96%
MetWest Securitized Opportunities	501,009,787	3.18%	4.07%	4.53%		
Napier Park ABS Income	550,512,804	-0.31%	5.62%	7.97%		
Napier Park Strategic Loan LP	113,331,445	2.81%	5.44%			
TICP CLO Debt	766,740,333	7.44%	4.45%			
Fortress ABI	339,011,698	-3.67%				
Putnam DMS	144,076,939	-4.03%				
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>6.98%</i>	<i>5.24%</i>	<i>4.18%</i>	<i>3.97%</i>	<i>3.64%</i>
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>5.95%</i>	<i>5.28%</i>	<i>4.47%</i>	<i>5.16%</i>	<i>5.35%</i>
Global Fixed Income	\$371,280,879	5.00%	4.40%			
T. Rowe Global Multi-Sector	259,093,956	4.10%	4.59%			
PGIM GLRV	112,186,923	7.15%				
<i>Custom GMS Benchmark</i>	<i>N/A</i>	<i>3.37%</i>	<i>4.74%</i>			

State of Michigan Retirement System

ABSOLUTE RETURN REVIEW

State of Michigan Investment Board Meeting

December 10, 2020



Daniel J. Quigley
Senior Investment Manager
Absolute Return Strategy

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/20)	1-Year	3-Years	5-Years	7-Years	10-Years
Absolute Return	2.9%	4.3%	3.8%	4.3%	4.7%
HFRI FOF Conservative	2.2%	2.5%	2.1%	2.7%	2.8%

- The value of the Absolute Return portfolio is \$3.7 billion with a one-year return of 2.9%. The performance of the portfolio was positive for the third quarter with several strategies continuing to bounce back from the market selloff in the first quarter.
- Multi-Strategy and Event strategies were the largest contributors to performance for the quarter. Core Multi-Strategy managers with low volatility, high Sharpe ratios and low beta profiles drove performance across asset classes, including equity activism, distressed credit and fixed income relative value. The Special Situations sub-strategy performed well with key contributors including a capital markets strategy and a control equity investment in a technology company. Overall, Multi-Strategy managers have served as effective diversifiers and strong performers for the portfolio year-to-date.
- Credit strategies also drove strong performance in the quarter, specifically across structured credit and residential mortgages, which continue to rebound from March lows. Managers with exposure to Mortgage Servicing Rights (“MSRs”) and Credit Risk Transfer (“CRT”) positions performed well. Mortgage and CRT delinquencies have remained stable in recent months despite government aid programs rolling off. Managers have also been able to source these exposures at highly discounted prices.

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, we are focused on continuing to recover losses from the first quarter market selloff and protecting capital going forward. We have slightly increased our exposure to multi-strategy and less-liquid credit managers.

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

SMRS

Absolute Return

9/30/20

Net Market Values by Entity

		<u>Net Market Value</u>
* Tahquamenon Fund, LP	\$	3,100,989,230
Cerberus Manitou Residential Loan Fund, LP		131,387,531
JM IV, LP		73,896,999
SJC Direct Lending Revolver Fund III, LP		85,274,343
MP Securitized Credit Master Fund, LP		40,030,820
* EnTrust White Pine Partners, LP		12,162,897
Visium Balanced Fund, LP		299,801
Monument Park, LLC		238,105,030
Total Absolute Return	\$	3,682,146,650
Short-Term Investments & Other		<u>25,026,733</u>
Grand Total	\$	<u><u>3,707,173,383</u></u>

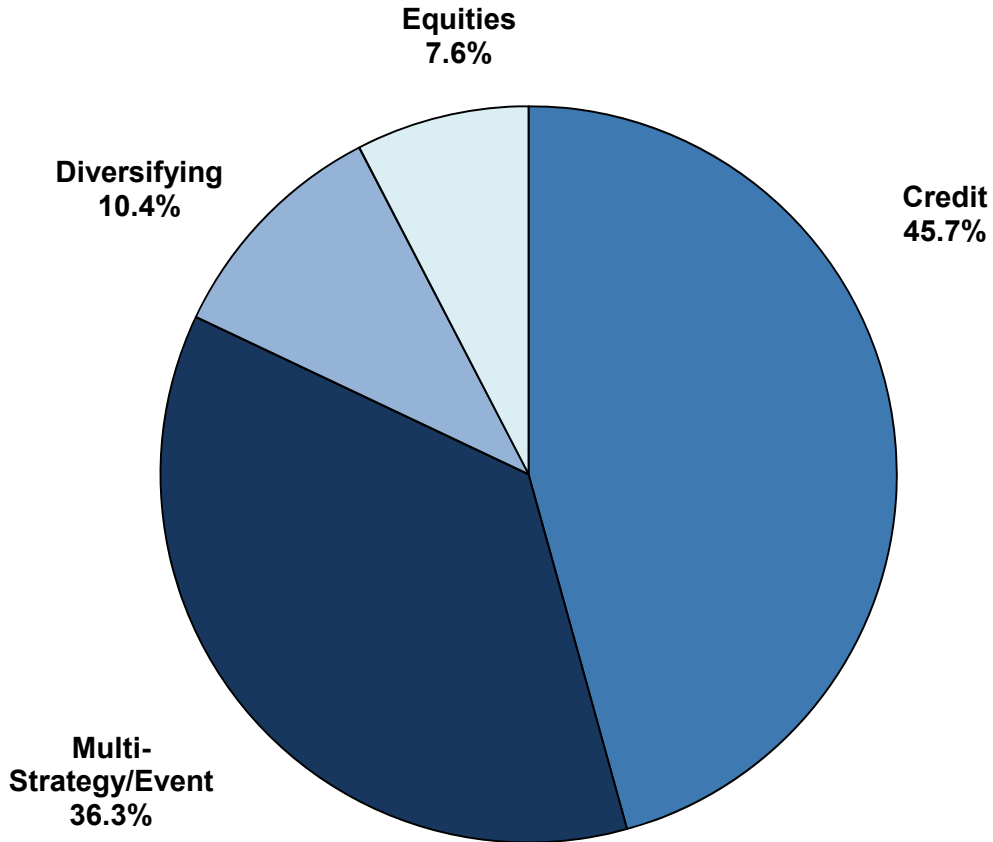
* Fund of Funds

SMRS

Absolute Return

9/30/20

Investments By Strategy



Strategy Breakdown			
Underlying Funds:	71	Median Position Size:	0.4%
Strategies:	4	Average Position Size:	1.4%
Relationships:	8	Largest Position Size:	8.0%

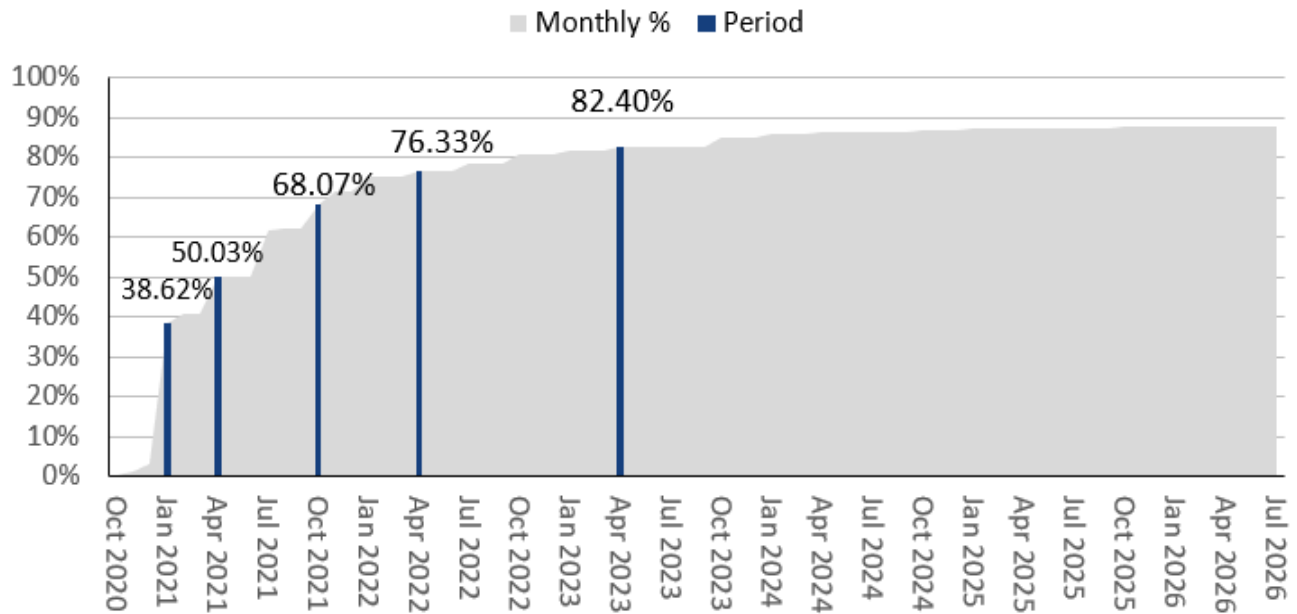
SMRS

Absolute Return

9/30/20

Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 1/1/21	38.62%	38.62%
By 4/1/21	11.41%	50.03%
By 10/1/21	18.04%	68.07%
By 4/1/22	8.26%	76.33%
After 4/1/23	6.07%	82.40%
Illiquid	17.6%	100.00%
Total	100.00%	N/A



State of Michigan Retirement System

DEFINED CONTRIBUTION REVIEW

State of Michigan Investment Board Meeting
December 10, 2020



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.

SOM Plans	9/30/19	9/30/20
State of Michigan 401(k)	\$6,312	\$6,977
State of Michigan 457	1,782	1,835
Pension Plus 401(k) & 457	842	1,205
EAA	11	11
Total	\$8,947	\$10,028

(\$ in millions)

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.

Market Environment and Outlook

The rapid drop in global stock markets back in March, was followed by a quick response by central bankers around the world which unleashed policies to help offset contracting growth and ease widespread liquidity strains. In the US, the Federal Reserve lowered rates significantly and launched several lending and asset purchase programs in order to provide stability in the commercial paper, Treasury debt, corporate and municipal bond and mortgage backed markets.

This stimulus had a significant beneficial impact on financial markets and led to a sharp recovery in equities and bonds over the second and third quarters of this year. The S&P 500 registered its best two-quarter performance since 2009 and reached an all-time high in September. Optimism regarding a COVID-19 vaccine and signs of corporate earnings strength have bolstered investor confidence heading into the final quarter of the year.

In this challenging economic environment, companies have fallen into two groups: businesses that are largely immune to the economic impact of the pandemic (“COVID defensive”) and those that have been hit hard by the economic consequences of the pandemic (“COVID cyclical”). Large technology -related companies have surged, especially the FAANGM stocks- Facebook, Amazon, Apple, Netflix, Google (aka, Alphabet), and Microsoft, while other, more cyclical sectors have been hard hit, especially energy and industrials.

Looking forward, the next several months look challenging for financial markets as new cases of COVID-19 outbreaks pick up across the globe, especially in most of Europe and the U.S. How this impacts various economies and earnings is yet to be determined and will likely remain so well into the first quarter of 2021.

DC Plan Evolution

The SECURE Act (Setting Every Community Up for Retirement Enhancement) was signed into law with broad bi-partisan support at the end of 2019. While there are 29 provisions in the law, they can be categorized into three main provisions which will allow more Americans to participate in workplace plans and empower greater retirement readiness:

1. Extend Retirement Plan Access
 - a. Authorize open Multiple Employer Plans (MEPs) and repeal of the “one bad apple” rule
 - b. Encourage small employers to adopt plans and auto enroll by providing tax credits
 - c. Establish long-term part-time worker status
2. Increase Savings Contributions
 - a. Increase the limit on automatic escalation from 10% to 15%
 - b. Allow contributions to a traditional IRA after age 70½
 - c. Change required minimum distributions age from 70½ to 72
3. Expand Savings Distribution Options
 - a. Modified the fiduciary Safe Harbor for selecting an annuity provider
 - b. Enable portability of lifetime income products
 - c. Offer penalty-free distributions upon birth or adoption of a child
 - d. Amend wealth transfer strategies by limiting the window of post-death payments
 - e. Feature lifetime income disclosure

SMRS

Defined Contribution Strategies

9/30/20

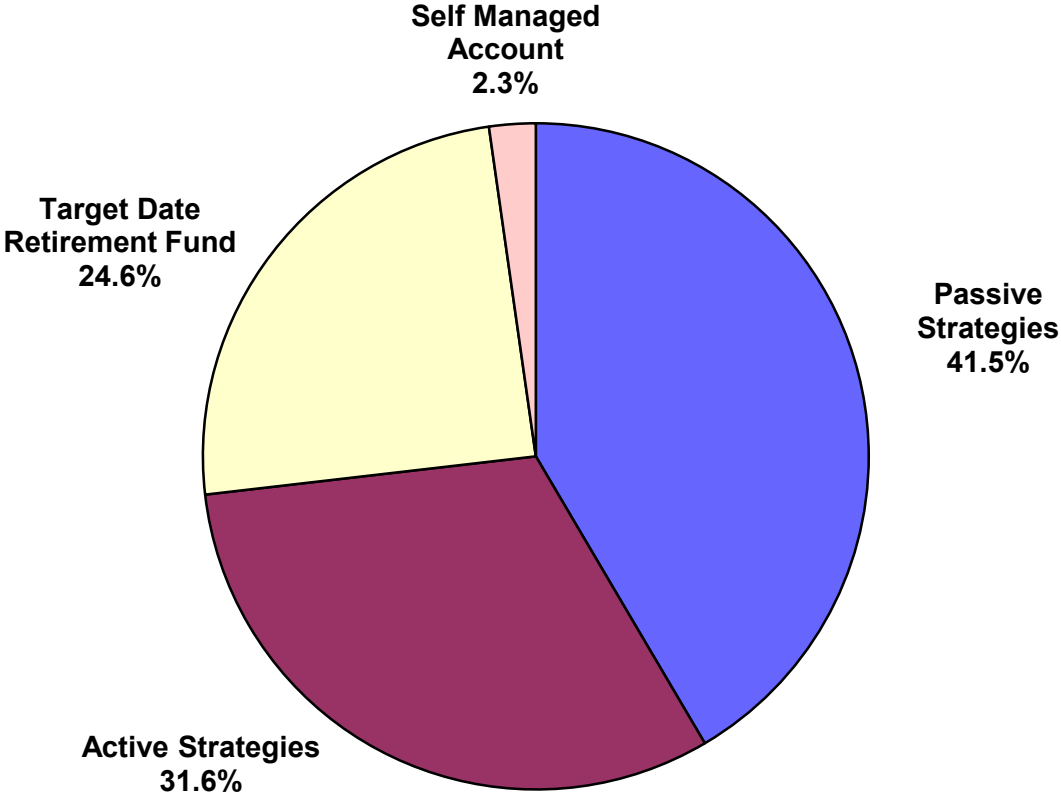
Markets	Amount		% of Total	Fee per \$1,000
QDIA (\$ in Millions)				
	<u>9/30/20</u>	<u>9/30/19</u>		
Total Target Date Fund	\$2,465	\$1,909	24.6%	\$0.70
Tier I Index Funds				
State Street S&P 500 Index Fund	\$1,423	\$1,229		\$0.13
State Street Bond Market Index Fund	\$997	841		0.20
State Street Global All Cap Equity ex-U.S. Index Fund	\$695	619		0.45
State Street S&P Mid Cap Index Fund	\$569	578		0.20
BlackRock Government Short-Term Investment CL F	\$244	229		0.56
BlackRock S&P Small Cap 600 Equity Index CL F	\$120	131		0.25
BlackRock Emerging Markets Index CL F	\$116	119		0.69
Total Tier I Index	\$4,164	\$3,745	41.5%	\$0.25
Tier II Active Funds				
Stable Value Fund	\$1,224	\$1,160		\$2.23
Jennison Large Cap Growth Fund	\$550	382		2.92
Dodge & Cox Stock Fund	\$482	554		4.13
American Funds EuroPacific Growth R6	\$306	303		4.90
Artisan Mid Cap Fund	\$166	119		7.05
Voya Small Cap Growth Equity Fund	\$133	139		4.33
PIMCO Total Return I Fund	\$129	118		4.60
T. Rowe Price Mid-Cap Value Fund	\$101	112		6.30
Virtus Ceredex Small-Cap Value Eq I	\$50	71		6.80
Prudential High Yield Fund	\$32	35		3.76
Oakmark Equity & Income I	\$0	113		4.30
Total Tier II Active	\$3,173	\$3,107	31.6%	\$3.55
Tier III				
Total Self Directed Brokerage Account	\$226	\$186	2.3%	NA
Total Defined Contribution Assets	<u>\$10,028</u>	<u>\$8,947</u>	<u>100.0%</u>	\$1.40

NOTE: Totals may not be exact due to rounding.

SMRS

Defined Contribution by Investment Strategy

9/30/20



Market Value in Millions				
	<u>9/30/20</u>		<u>9/30/19</u>	
Passive Strategies	\$4,164	41.5%	\$3,745	41.9%
Active Strategies	3,173	31.6%	3,107	34.7%
Target Date Retirement Fund	2,465	24.6%	1,909	21.3%
Self Managed Account	226	2.3%	186	2.1%
Total Investments	<u>\$10,028</u>	<u>100.0%</u>	<u>\$8,947</u>	<u>100.0%</u>

*Loan Fund \$214M as of 9/30/20
 Note: Totals may not be exact due to rounding.

Defined Contribution Performance by Fund 9/30/20

<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	\$106,944,027	6.9%	5.2%	5.7%	5.2%
State Street Income Custom Index		6.7%	5.1%	5.6%	5.3%
Morningstar Target-Date Retirement		5.7%	4.8%	5.4%	4.8%
<i>Variance State Street Income Custom Index</i>		0.2%	0.1%	0.1%	-0.1%
<i>Variance Morningstar Target-Date Retirement</i>		1.2%	0.4%	0.3%	0.4%
State Street Target Retirement 2020 Fund	136,238,854	7.7%	6.0%	7.4%	7.7%
State Street 2020 Custom Index		7.5%	5.9%	7.4%	7.7%
Morningstar Target-Date 2020		6.9%	5.5%	6.8%	6.3%
<i>Variance State Street 2020 Custom Index</i>		0.2%	0.1%	0.0%	0.0%
<i>Variance Morningstar Target-Date 2020</i>		0.8%	0.5%	0.6%	1.4%
State Street Target Retirement 2025 Fund	222,724,815	10.5%	7.2%	8.9%	8.7%
State Street 2025 Custom Index		10.3%	7.2%	8.8%	8.7%
Morningstar Target-Date 2025		7.6%	6.0%	7.6%	7.2%
<i>Variance State Street 2025 Custom Index</i>		0.2%	0.0%	0.1%	0.0%
<i>Variance Morningstar Target-Date 2025</i>		2.9%	1.2%	1.3%	1.5%
State Street Target Retirement 2030 Fund	257,015,043	12.1%	7.9%	9.6%	9.2%
State Street 2030 Custom Index		12.0%	7.8%	9.6%	9.3%
Morningstar Target-Date 2030		8.1%	6.2%	8.2%	7.5%
<i>Variance State Street 2030 Custom Index</i>		0.1%	0.1%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2030</i>		4.0%	1.7%	1.4%	1.7%
State Street Target Retirement 2035 Fund	287,503,420	12.5%	8.1%	10.0%	9.4%
State Street 2035 Custom Index		12.2%	8.0%	10.0%	9.5%
Morningstar Target-Date 2035		8.6%	6.5%	8.8%	8.2%
<i>Variance State Street 2035 Custom Index</i>		0.3%	0.1%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2035</i>		3.9%	1.6%	1.2%	1.2%
State Street Target Retirement 2040 Fund	284,726,847	12.4%	8.0%	10.3%	9.6%
State Street 2040 Custom Index		12.3%	8.0%	10.2%	9.6%
Morningstar Target-Date 2040		8.5%	6.5%	9.0%	8.2%
<i>Variance State Street 2040 Custom Index</i>		0.1%	0.0%	0.1%	0.0%
<i>Variance Morningstar Target-Date 2040</i>		3.9%	1.5%	1.3%	1.4%
State Street Target Retirement 2045 Fund	294,569,605	12.4%	8.0%	10.4%	9.6%
State Street 2045 Custom Index		12.2%	7.9%	10.4%	9.7%
Morningstar Target-Date 2045		8.8%	6.6%	9.3%	8.7%
<i>Variance State Street 2045 Custom Index</i>		0.2%	0.1%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2045</i>		3.6%	1.4%	1.1%	0.9%
State Street Target Retirement 2050 Fund	373,388,098	12.3%	7.9%	10.4%	9.6%
State Street 2050 Custom Index		12.3%	7.9%	10.4%	9.7%
Morningstar Target-Date 2050		8.6%	6.5%	9.3%	8.5%
<i>Variance State Street 2050 Custom Index</i>		0.0%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2050</i>		3.7%	1.4%	1.1%	1.1%
State Street Target Retirement 2055 Fund	375,960,834	12.3%	7.9%	10.4%	
State Street 2055 Custom Index		12.3%	7.9%	10.4%	
Morningstar Target-Date 2055		8.8%	6.6%	9.4%	
<i>Variance State Street 2055 Custom Index</i>		0.0%	0.0%	0.0%	
<i>Variance Morningstar Target-Date 2055</i>		3.5%	1.3%	1.0%	
State Street Target Retirement 2060 Fund	125,553,815	12.3%	7.9%	10.4%	
State Street 2060 Custom Index		12.3%	7.9%	10.4%	
Morningstar Target-Date 2060+		8.4%	6.6%	9.4%	
<i>Variance State Street 2060 Custom Index</i>		0.0%	0.0%	0.0%	
<i>Variance Morningstar Target-Date 2060+</i>		3.9%	1.3%	1.0%	

<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 2065 Fund	\$604,889				
<i>State Street 2065 Custom Index</i>					
<i>Morningstar Target-Date 2060+</i>					
<i>Variance State Street 2065 Custom Index</i>					
<i>Variance Morningstar Target-Date 2060+</i>					
TIER 1					
State Street S&P 500 Index Fund	\$1,423,317,416	15.1%	12.3%	14.1%	13.7%
<i>S&P 500 Index</i>					
<i>Morningstar Large Blend</i>					
<i>Variance S&P 500 Index</i>					
<i>Variance Morningstar Large Blend</i>					
State Street Bond Market Index Fund	996,514,450	7.1%	5.3%	4.2%	3.6%
<i>Bloomberg Barclays U.S. Aggregate Index</i>					
<i>Morningstar Intermediate-Term Bond</i>					
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>					
<i>Variance Morningstar Intermediate-Term Bond</i>					
State Street Global All Cap Equity ex-U.S. Index Fund	694,992,952	3.9%	1.4%	6.6%	N/A
<i>MSCI ACWI ex USA IMI (Net)</i>					
<i>Morningstar Foreign Large Blend</i>					
<i>Variance MSCI ACWI ex USA IMI (Net)</i>					
<i>Variance Morningstar Foreign Large Blend</i>					
State Street S&P Mid Cap Index Fund	568,944,602	-2.2%	2.9%	8.1%	10.4%
<i>S&P 400 Index</i>					
<i>Morningstar Mid-Cap Blend</i>					
<i>Variance S&P 400 Index</i>					
<i>Variance Morningstar Mid-Cap Blend</i>					
BlackRock Government Short-Term Investment CL F	244,297,695	0.9%	1.6%	1.1%	N/A
<i>BofA Merrill Lynch US 3-Month Treasury Bill Index</i>					
<i>Variance BofA Merrill Lynch US 3-Month Treasury Bill Index</i>					
BlackRock Emerging Markets Index CL F	120,065,507	10.4%	2.4%	8.9%	N/A
<i>MSCI Emerging Market (Net)</i>					
<i>Morningstar Diversified Emerging Mkts</i>					
<i>Variance MSCI Emerging Market (Net)</i>					
<i>Variance Morningstar Diversified Emerging Mkts</i>					
BlackRock S&P Small Cap 600 Equity Index CL F	115,883,569	-8.4%	-0.3%	N/A	N/A
<i>S&P SmallCap 600 Index</i>					
<i>Morningstar Small Blend</i>					
<i>Variance S&P SmallCap 600 Index</i>					
<i>Variance Morningstar Small Blend</i>					
TIER 2					
Stable Value Fund	\$1,224,417,518	2.6%	2.6%	2.4%	2.3%
<i>Barclays Int Gov/Credit A or Higher Index</i>					
<i>Hueler Universe</i>					
<i>Variance Barclays Int Gov/Credit A or Higher Index</i>					
<i>Variance Hueler Universe</i>					
Jennison Large Cap Growth Fund	549,906,917	54.1%	25.1%	22.3%	N/A
<i>Russell 1000 Growth Index</i>					
<i>Morningstar Large Growth</i>					
<i>Variance Russell 1000 Growth Index</i>					
<i>Variance Morningstar Large Growth</i>					

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
Dodge & Cox Stock Fund	481,589,924	-3.2%	2.6%	8.9%	0.11
<i>Russell 1000 Value Index</i>		-5.0%	2.6%	7.7%	0.099
<i>Morningstar Large Value</i>		-4.7%	2.4%	7.1%	0.089
<i>Variance Russell 1000 Value Index</i>		1.8%	0.0%	1.2%	0.011
<i>Variance Morningstar Large Value</i>		1.5%	0.2%	1.8%	0.021
American Funds EuroPacific Growth R6	305,651,202	15.0%	5.7%	9.1%	6.8%
<i>MSCI EAFE Index - Net Div</i>		0.5%	0.6%	5.3%	4.6%
<i>Morningstar Foreign Large Blend</i>		2.0%	0.5%	5.0%	4.1%
<i>Variance MSCI EAFE Index - Net Div</i>		14.5%	5.1%	3.8%	2.2%
<i>Variance Morningstar Foreign Large Blend</i>		13.0%	5.2%	4.1%	2.7%
Artisan Mid Cap Fund	166,438,053	44.0%	23.0%	17.9%	15.8%
<i>Russell Midcap Growth Index</i>		23.2%	16.2%	15.5%	14.6%
<i>Morningstar Mid-Cap Growth</i>		22.6%	14.1%	13.8%	12.6%
<i>Variance Russell Midcap Growth Index</i>		20.8%	6.8%	2.4%	1.2%
<i>Variance Morningstar Mid-Cap Growth</i>		21.4%	8.9%	4.1%	3.2%
Voya Small Cap Growth Equity Fund	133,376,336	8.7%	2.8%	8.5%	11.1%
<i>Russell 2000 Growth Index</i>		15.7%	8.2%	11.4%	12.3%
<i>Morningstar Small Growth</i>		17.7%	10.6%	12.4%	12.1%
<i>Variance Russell 2000 Growth Index</i>		-7.0%	-5.4%	-2.9%	-1.2%
<i>Variance Morningstar Small Growth</i>		-9.0%	-7.8%	-3.9%	-1.0%
PIMCO Total Return I Fund	128,671,746	7.4%	5.2%	4.7%	4.0%
<i>Bloomberg Barclays U.S. Aggregate Index</i>		7.0%	5.2%	4.2%	3.6%
<i>Morningstar Intermediate Core-Plus Bond</i>		6.4%	4.8%	4.3%	3.9%
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>		0.4%	0.0%	0.5%	0.4%
<i>Variance Morningstar Intermediate Core-Plus Bond</i>		1.0%	0.4%	0.4%	0.1%
T. Rowe Price Mid-Cap Value Fund	100,778,482	-1.6%	1.0%	7.1%	9.2%
<i>Russell Midcap Value Index</i>		-7.3%	0.8%	6.4%	9.7%
<i>Morningstar Mid-Cap Value</i>		-10.0%	-1.3%	4.6%	8.0%
<i>Variance Russell Midcap Value Index</i>		5.7%	0.2%	0.7%	-0.5%
<i>Variance Morningstar Mid-Cap Value</i>		8.4%	2.3%	2.5%	1.2%
Virtus Ceredex Small-Cap Value Eq I	49,630,236	-18.4%	-3.9%	3.4%	6.9%
<i>Russell 2000 Value Index</i>		-14.9%	-5.1%	4.1%	7.1%
<i>Morningstar Small Value</i>		-14.3%	-5.5%	2.6%	6.5%
<i>Variance Russell 2000 Value Index</i>		-3.5%	1.2%	-0.7%	-0.2%
<i>Variance Morningstar Small Value</i>		-4.1%	1.6%	0.8%	0.4%
Prudential High Yield Fund	32,450,820	4.4%	5.4%	6.9%	N/A
<i>Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		2.8%	4.0%	6.7%	N/A
<i>Morningstar High Yield Bond</i>		1.2%	2.8%	5.0%	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		1.6%	1.4%	0.2%	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		3.2%	2.6%	1.9%	N/A
Self Directed	225,896,602				
TOTAL	\$10,028,054,272				

Loan Fund: \$213,747,980

State of Michigan Retirement System

BASKET CLAUSE REVIEW

State of Michigan Investment Board Meeting
December 10, 2020



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

SMRS

Basket Clause Investments

9/30/20

<u>Asset Class</u>	<u>Value</u>
Total Absolute Return	\$ 3,634,848,606
Total Real Return and Opportunistic	735,511,842
Total Fixed Income	<u>82,532,999</u>
Total Basket Clause Investments	<u><u>\$ 4,452,893,447</u></u>

The basket clause investments on September 30, 2020, were \$4.5 billion or 5.8% of the total portfolio value of \$76.4 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, 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.