

STATE OF MICHIGAN INVESTMENT BOARD MEETING

June 10, 2021

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

JUNE 10, 2021

Agenda



- 9:30 a.m. **Call to Order and Opening Remarks**
- Approval of the 3/25/21 SMIB Meeting Minutes**
- 9:35 a.m. **Executive Summary & Performance for Periods Ending 3/31/21**
- 9:45 a.m. **Current Asset Allocation Review**
- Markets Review and Outlook**
- 10:00 a.m. **Review of Investment Reports**
- **Private Equity**
 - **Domestic Equity – Receive and File**
 - **International Equity – Receive and File**
 - **Real & Opportunistic Return – Receive and File**
 - **Real Estate & Infrastructure – Receive and File**
 - **Fixed Income – Receive and File**
 - **Absolute Return – Receive and File**
 - **Defined Contribution – Receive and File**
- Basket Clause – Receive and File**
- 10:10 a.m. **Guest Speaker: Sandra Horbach, Managing Director - The Carlyle Group**
- 10:55 a.m. **Public Comment**
- 11:00 a.m. **Closing Remarks ~ Adjournment**



2021 Meeting Schedule

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

June 10, 2021



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN INVESTMENT BOARD

March 25, 2021 Meeting Minutes

Board Members Present

Chairman – Treasurer Rachael Eubanks – via Microsoft Teams - East Lansing, MI
Ms. Dina Richard – via Microsoft Teams – Northville, MI
Mr. Reginald Sanders – via Microsoft Teams – Portage, MI
Mr. James Nicholson – via Microsoft Teams – Detroit, MI
Mr. David Massaron – via Microsoft Teams – Lansing, MI

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

Jon Braeutigam	Lori Barrett	Joanne Bump
Robert Brackenburg	Patrick Moraniec	Anne Clifford-Alicea
Karl Borgquist	Daniel Quigley	Todd Warstler
Greg Parker	Jennifer Yeung	Jack Behar
Jim Elkins	Woodrow Tyler	Semone James
Peter Woodford	Mark Porrell	Anthony Estell
Annette Russell	Karen Stout	Lan Chen
Janet Sudac	Molly Jason	Travis Haney
Jeffrey Guilfoyle	Paul Lerg	Allison Wardlaw
Ann Storberg	Pavel Stolarczyk	Ryan Marr
Nicholas Whitman	Ryan Rathman	Betty Nicklesen
Mary Pollack	Steve Cummings	

Many others were present via Microsoft Teams teleconference.

Opening Remarks:

Rachael Eubanks called the meeting to order at 9:30 am. She mentioned the hard work put forth in the implementation of the new emerging markets program. A welcome to new board member David Massaron.

Approval of Minutes:

Approval of the December 10, 2020 SMIB Meeting Minutes – Motion to approve by Reginald Sanders. Seconded: James Nicholson. The vote was unanimous to approve.

AGENDA

Executive Summary

Mr. Jon Braeutigam, Chief Investment Officer for the Bureau of Investments, reviewed the executive summary performance section discussing performance returns and markets. He explained that over the past 10 years, returns have been strong at 9.8%. The 7, 5, 3 and 1-year returns have been remarkably consistent. In general, he believes it has been a very good decade for pension funds as well as investors and equity markets. During this time, bond rates have come down to rock bottom levels and that has helped all asset classes.

Mr. Braeutigam stated that on a relative basis, the SMRS' 10-year return is 120 basis points (bps) better than the peer return. This added about \$13.2 billion in value. The pension fund is actually at a record high at the end of December at \$84.2 billion, this is the combined systems market value. This record high was reached despite paying out over \$21 billion to pensioners.

Asset Allocation Review, Markets Review and Outlook

Mr. Gregory Parker, Director of Investments – Public Markets discussed that the markets over the past year have been called lots of things: unprecedented, unusual, volatile, wild, crazy, never seen anything like it, once in a lifetime. He believes it is fair to say that even under the best of circumstances it is unwise to predict markets, but last year truly was unpredictable. It wasn't just the markets, it was how we lived, worked, everything day-to-day was not usual in the least, obviously mostly due to the pandemic. But added to the anxiety, we had a highly contested, very close U.S. presidential election.

The Director of Investments assists the Bureau of Investments (BOI) in coming up with a coherent plan for the assets collectively to earn the required rate of return, to help think through the risks and trade-offs, and to understand how the SMRS Plan portfolio may differ from other public pension plans. This is called "Strategic Asset Allocation" and when coming up with the plan we do try to consider outlier markets. While we don't have a pandemic model per se, we do consider markets that act and behave in an unprecedented, unusual, volatile, kind of way.

The Strategic Asset Allocation consists of two main parts; the strategic weights for the major asset classes we use at the BOI and the policy return (benchmark) for each of the major asset classes we hold at the BOI. He went on to explain further.

As the Director of Public Markets, the Divisions which invest in the traditional asset classes such as cash, bonds, domestic equity and international equity report to him. Mr. Parker stated that we would hear discussion of at least two key reasons why the future long-term expected returns are lower than average and what we are trying to do to add incremental value. In short, starting interest rates and valuations are below the long-term averages, and in the case of fixed income, well below normal.

Domestic Equity Review

Mr. Jack Behar, Senior Investment Manager of the Domestic Equity Division reviewed performance, stating that in the quarter ended December 31, 2020, Total Domestic Equity outperformed its peer group over three, five, seven and ten years while outperforming or matching the S&P 1500 over three, five and seven years. During the past year, performance was 90 bps behind the benchmark, net of fees, with incurred tracking error of 3.5%.

The division's strategy update indicated that the division is well positioned for an economic recovery, further fiscal stimulus, low interest rates and the Fed's accommodative stance, with a relative overweight to both smaller cap value stocks as well as to in-favor momentum stocks.

The division is very gradually rebalancing its portfolio away from less profitable stocks that have experienced significant price appreciation over the past year (and likely still have a very bright future) into solidly profitable companies that can weather any environment.

The division is also keeping an eye on interest rates and the potential for more significant inflation than has been experienced over the past decade, potentially driven by the end of the pandemic, pent up demand and more money in the system. If interest rates were to rise in a significant way,

it could lead to a value stock outperformance cycle while putting a cap on or potentially lowering the market price/earnings ratio.

International Equity Review

Mr. Patrick Moraniec, Senior Investment Manager of the International Equity Division reviewed performance reporting which showed the division outperformed the benchmark in 2020 by 240 bps. The division outperformed peers as well as the benchmark over all listed periods. Although 2020 was not their largest 12-month outperformance, it was possibly the most satisfying given the current environment.

Mr. Moraniec explained that in February 2020 the fastest decline of 30% ever occurred. It took only 22 trading days to fall 30% from its record high. Oil futures prices went to 37 cents a barrel. Then we had the largest 50-day rally in the history of the markets, according to LPL Financial. It was the shortest bear market in history.

He stated that the outperformance in this volatile and chaotic environment was good, but the most satisfying part of 2020 was watching the division's core strategies hold up in a truly difficult two-sided market environment. He touched on the difficulty in adding value above the benchmark in such a volatile and chaotic environment, discussed continuous improvement strategies within the division as well as portfolio positioning.

Fixed Income Review

Mr. Daniel Quigley, Senior Investment Manager of the Fixed Income Division reviewed performance, explaining that performance was terrific in the bond markets.

Performance in the bond markets was terrific at 7.5%, however, relative performance lagged. The biggest reason for this is that we operate what is effectively a core-plus strategy. Our strategy tilted very much towards securitized assets which was at the epicenter of the sell-off in the first quarter. Since then they have had an excellent recovery. Last year we had meaningful decreases in interest rates which really benefited the benchmark and then a very severe sell-off in credit spreads in the first quarter followed by a very dramatic recovery.

He discussed positioning, explaining high-yield and high-yield characteristics and touched on markets and the positioning of the portfolio.

Review of remaining Investment Reports and Basket Clause – Received and Filed

Closing Remarks

Chairman Eubanks thanked the speakers for their well-prepared presentations.

Public Comment:

No public comment.

Adjournment:

The meeting concluded at 11:09 am.

Approved:

Rachael Eubanks, Chairman

State of Michigan Retirement System

EXECUTIVE SUMMARY

State of Michigan Investment Board Meeting

June 10, 2021



Gregory J. Parker, CFA

Director of Investments – Public Markets

Director of Asset Allocation

Bureau of Investments

EXECUTIVE SUMMARY

March 31, 2021

Performance

Great peer comparison.

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	27.5%	10.7%	11.4%	9.6%	9.8%
Policy Returns	26.2%	10.8%	11.3%	9.6%	9.9%
Peer Median Returns*	29.0%	9.7%	10.3%	8.3%	8.7%

*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 9.5%.
- Compounding at higher than peer returns can add significant value. For example, based on the \$51.4 billion March 2011 market value, a ten-year annualized return of 9.8% compared to the 8.7% peer median return would add about \$12.5 billion in excess value.
- Most asset classes earned returns comparable to or better than peer median returns over the longer-term in addition to meeting or exceeding the asset class specific benchmarks.

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 March 2021, the equity risk (beta) is approximately 0.38 which is the lowest measurement in three decades, and it is lower than peer median at approximately 0.6.
- Liquidity is another fundamental risk assumed and it is managed through asset allocation. The plans have outstanding capital commitments to fund approximately \$13.5 billion in illiquid assets, primarily in private equity. In the March 2021 quarter, \$1.7 billion of new commitments were made.
- The combined systems paid out approximately \$2.0 billion net of contributions over the past twelve months ending in March 2021. Over the past year, the allocation to long-term fixed income was reduced by \$773 million, absolute return by \$712 million, domestic equity by \$522 million, private equity by \$251 million, real return & opportunistic by \$132 million and real estate by \$109 million. The allocation to short-term cash increased by approximately \$545 million.

Investment Update

Highlighting the quarter.

(\$ Millions)

NEW COMMITMENTS

January 1, 2021 – March 31, 2021

Asset class	Fund Name / (Managed By)	Commitment
Private Equity		
	HarbourVest Partners Co-Investment Fund VI, L.P. (HarbourVest Partners, L.P.)	\$ 200.0
	Berkshire Fund X, L.P. (Tenth Berkshire Associates LLC)	150.0
	Michigan SEMF-Barings (Barings)	150.0
	Michigan SEMF-Grosvenor (GCM Grosvenor)	150.0
	Charlesbank Equity Fund X, L.P. (Charlesbank Capital Partners, LLC)	100.0
	Charlesbank Equity Overage Fund X, L.P. (Charlesbank Capital Partners, LLC)	50.0
	Insight Partners Fund X Follow-On Fund, L.P. (Insight Venture Management, LLC)	50.0
	Khosla Ventures VII, L.P. (Khosla Ventures Opportunity Associates I, LLC)	50.0
	5AM Opportunities II, L.P. (5AM Partners, LLC)	25.0
	5AM Ventures VII, L.P. (5AM Partners, LLC)	25.0
	Khosla Ventures Opportunity I, L.P. (Khosla Ventures Opportunity Associates I, LLC)	25.0
	Khosla Ventures Seed E, L.P. (Khosla Ventures Opportunity Associates I, LLC)	5.0
Real Estate and Infrastructure Division		
	BentallGreenOak US Cold Storage, L.P. (BentallGreenOak)	75.0
	ISO III SMRS Sidecar, L.P. (Invesco Advisers, Inc.)	35.0
Real Return & Opportunistic Division		
	Axton Holding, LLC (Great Mountain Partners LLC)	250.0
	Blackstone Capital Opportunities Fund IV, L.P. (Blackstone Capital Partners, LP)	150.0
	Turning Rock Fund II (Turning Rock Partners, L.P.)	75.0
	Blackstone COF IV Co-Investment Fund, L.P. (Blackstone Capital Partners, LP)	37.5
Fixed Income Division-Absolute Return		
	Kayne Partners BDC, LLC (Kayne Anderson)	100.0
TOTAL		\$1,702.5

State of Michigan Retirement System

PERFORMANCE

State of Michigan Investment Board Meeting

June 10, 2021



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 March 31, 2021

	% of Portfolio 3/31/21	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	9.8	10	9.6	10	11.4	15	10.7	15	27.5	64	4.8	22
Median - Greater than \$10 Billion ²		8.7		8.3		10.3		9.7		29.0		3.8	
MPSERS Total Plan Policy		9.9		9.6		11.3		10.8		26.2		4.5	
DOMESTIC EQUITIES	23.3	13.8	16	13.3	18	16.5	23	16.5	12	63.3	19	7.2	22
Median ²		11.4		10.6		13.9		13.2		58.3		5.9	
S&P 1500 Index		13.7		13.4		16.2		16.5		58.7		6.9	
PRIVATE EQUITY AND VENTURE CAPITAL	20.6	14.6	9	14.2	7	15.4	11	16.0	5	22.6	20	8.2	34
Median ²		10.5		9.3		9.8		8.3		14.9		7.1	
Private Equity and VC Benchmark ³		17.3		16.3		18.6		17.6		21.9		13.0	
INTERNATIONAL EQUITIES	17.1	6.4	33	6.8	29	10.9	31	7.7	39	53.2	52	3.9	63
Median ²		6.1		6.0		10.1		7.1		53.2		4.2	
International Blended Benchmark ⁴		5.1		5.3		9.8		6.5		49.4		3.5	
REAL RETURN AND OPPORTUNISTIC	12.7	11.1		11.7		13.7		13.5		21.8		4.4	
50% (CPI + 4%) + 50% (6.8% actuarial rate) ⁵		7.2		7.0		7.1		6.7		6.9		2.2	
FIXED INCOME	10.9	4.4	37	4.4	21	4.5	30	5.0	47	6.3	28	-1.4	22
Median ²		4.0		3.6		3.9		5.0		3.3		-3.0	
Barclays Aggregate		3.4		3.3		3.1		4.7		0.7		-3.4	
REAL ESTATE & INFRASTRUCTURE	7.2	9.0	47	8.1	62	5.9	66	3.3	72	-4.5	89	2.5	15
Median ²		9.0		8.3		6.1		5.0		2.7		1.3	
NCREIF - Property Blended Index ⁶		7.4		6.2		4.5		3.6		1.3		1.4	
NCREIF Open Fund Index Net		8.7		7.3		5.3		4.0		1.5		1.9	
ABSOLUTE RETURN	4.4	5.0		4.5		6.9		5.8		9.0		6.3	
HFRI FOF Cons 1 month lagged		3.1		3.2		4.6		4.8		10.1		5.8	
CASH EQUIVALENTS	3.8	1.0		1.2		1.5		1.8		0.5		0.1	
1 Month T-Bill		0.6		0.8		1.1		1.4		0.1		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 MSCI ACWI ex USA Gross 10/1/10 to present.

⁵ History prior to 12/1/18 reflects 50% (CPI +5%) + 50% (actuarial rate).

⁶ NCREIF - Property Blended Index is NPI minus 130 bps.

Source: State Street Analytics; the NCREIF - NPI (Property Index) source is NCREIF.

Cumulative and Consecutive Total Fund Returns

MPSERS

Cumulative For Years Ending 3/31/21

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MPSERS	27.5	13.0	10.7	11.5	11.4	9.7	9.6	10.3	10.4	9.8
Public Plan - Median (> \$10 billion)*	29.0	12.7	9.7	9.9	10.3	8.4	8.3	8.8	9.0	8.7
Rank	64	34	15	14	15	15	10	11	11	10
bp Difference - Median	-149	37	95	158	113	123	135	156	134	112

Consecutive For Years Ending

	03/21	03/20	03/19	03/18	03/17	03/16	03/15	03/14	03/13	03/12
MPSERS	27.5	0.2	6.1	13.8	11.2	1.4	9.3	15.7	10.4	5.0
Public Plan - Median (> \$10 billion)*	29.0	-1.7	4.5	11.2	11.6	-0.1	6.8	13.1	10.8	4.3
Rank	64	15	9	12	55	11	11	8	59	38
bp Difference - Median	-149	183	168	261	-39	146	250	257	-41	68

MSERS

Cumulative For Years Ending 3/31/2021

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSERS	27.5	13.0	10.7	11.5	11.4	9.7	9.6	10.3	10.3	9.8
Public Plan - Median (> \$1 billion)*	30.2	12.7	9.7	10.0	10.3	8.6	8.4	8.8	9.0	8.6
Rank	67	38	16	19	19	20	14	15	15	17
bp Difference - Median	-265	31	95	148	109	110	121	154	133	121

Consecutive For Years Ending

	03/21	03/20	03/19	03/18	03/17	03/16	03/15	03/14	03/13	03/12
MSERS	27.5	0.2	6.1	13.8	11.3	1.3	9.2	15.6	10.4	4.8
Public Plan - Median (> \$1 billion)*	30.2	-3.0	4.3	11.2	11.7	-0.2	7.2	12.6	10.5	4.5
Rank	67	12	7	11	58	9	10	11	54	42
bp Difference - Median	-265	319	184	261	-46	149	206	296	-14	38

*State Street Public Funds Universe

Cumulative and Consecutive Total Fund Returns

MSPRS

Cumulative For Years Ending 3/31/21

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSPRS	27.5	13.0	10.7	11.4	11.4	9.7	9.6	10.3	10.3	9.8
Public Plan - Median (> \$1 billion)*	30.2	12.7	9.7	10.0	10.3	8.6	8.4	8.8	9.0	8.6
Rank	68	42	17	20	19	21	16	15	17	19
bp Difference - Median	-269	29	94	147	108	109	119	151	131	120

Consecutive For Years Ending

	03/21	03/20	03/19	03/18	03/17	03/16	03/15	03/14	03/13	03/12
MSPRS	27.5	0.2	6.1	13.8	11.2	1.3	9.2	15.5	10.4	4.9
Public Plan - Median (> \$1 billion)*	30.2	-3.0	4.3	11.2	11.7	-0.2	7.2	12.6	10.5	4.5
Rank	68	12	7	11	58	9	10	15	56	41
bp Difference - Median	-269	319	183	261	-50	149	205	286	-18	44

MJRS

Cumulative For Years Ending 3/31/21

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MJRS	27.3	13.0	10.6	11.4	11.4	9.7	9.6	10.2	10.2	9.7
Public Plan - Median (> \$1 billion)*	30.2	12.7	9.7	10.0	10.3	8.6	8.4	8.8	9.0	8.6
Rank	71	45	18	20	20	21	18	17	20	20
bp Difference - Median	-285	24	90	144	107	108	117	141	120	109

Consecutive For Years Ending

	03/21	03/20	03/19	03/18	03/17	03/16	03/15	03/14	03/13	03/12
MJRS	27.3	0.2	6.1	13.8	11.3	1.3	9.1	14.9	10.2	4.9
Public Plan - Median (> \$1 billion)*	30.2	-3.0	4.3	11.2	11.7	-0.2	7.2	12.6	10.5	4.5
Rank	71	12	7	12	58	9	10	28	58	42
bp Difference - Median	-285	322	183	260	-43	148	191	223	-38	42

*State Street Public Funds Universe

State of Michigan Retirement System

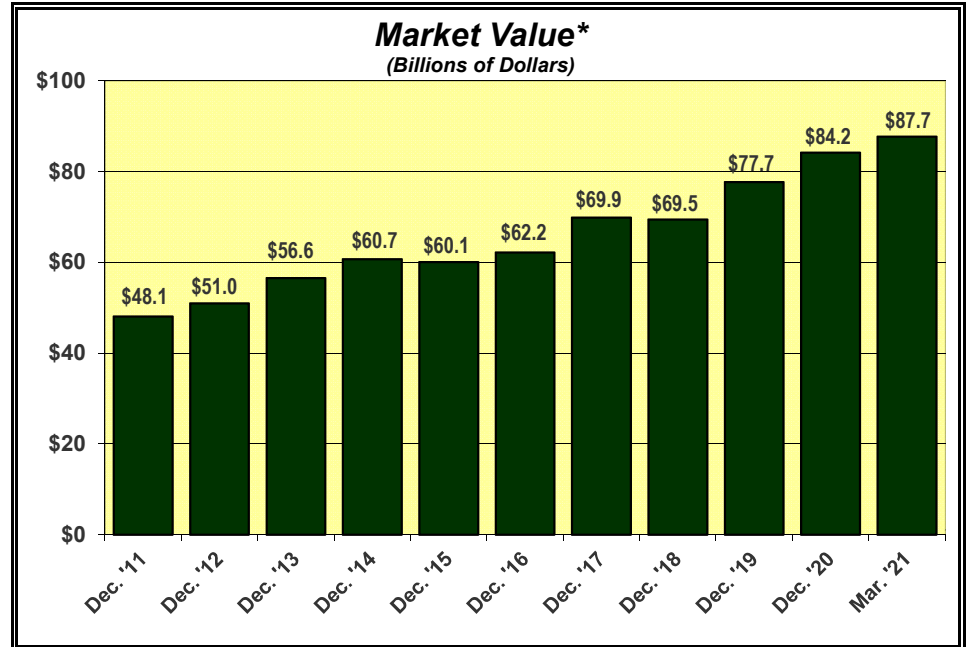
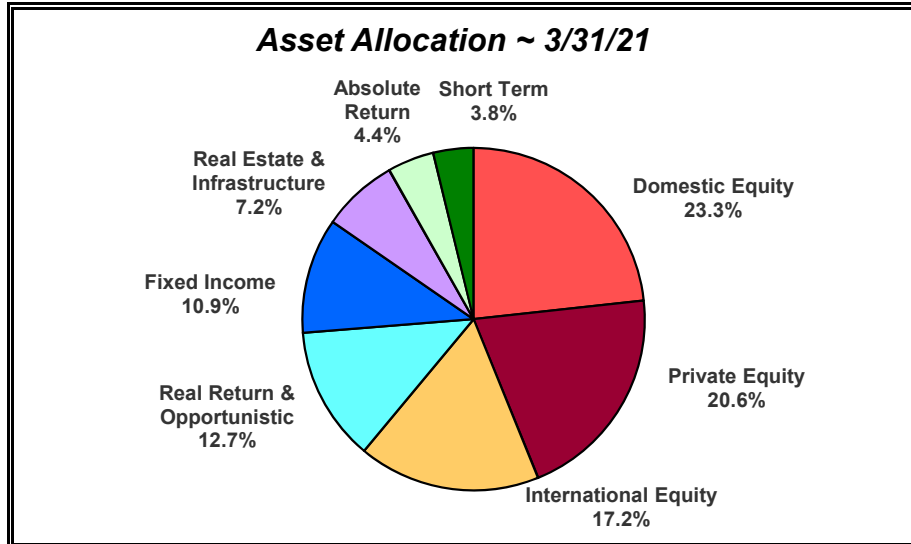
ASSET ALLOCATION REVIEW

State of Michigan Investment Board Meeting
June 10, 2021



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN RETIREMENT SYSTEM PROFILE - MARCH 2021



Asset Allocation By Market Value (In Millions)

Investment Strategies	3/31/2021		3/31/2020	
Domestic Equity	\$20,408	23.3%	\$12,954	18.4%
Private Equity	18,038	20.6%	14,973	21.2%
International Equity	15,094	17.2%	9,835	13.9%
Real Return & Opportunistic	11,165	12.7%	9,330	13.2%
Fixed Income	9,520	10.9%	9,630	13.7%
Real Estate & Infrastructure	6,303	7.2%	6,745	9.6%
Absolute Return	3,837	4.4%	4,269	6.1%
Short Term***	3,316	3.8%	2,768	3.9%
TOTAL	\$87,681	100.0%	\$70,504	100.0%

Market Value By Plan ~ 3/31/21 (in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPSERS	\$58,338	\$9,250	\$67,588	77.1%
MSERS - (closed)	13,528	4,253	17,781	20.3%
MSPRS	1,700	320	2,020	2.3%
MJRS - (closed)	282	10	292	0.3%
TOTAL	\$73,848	\$13,833	\$87,681	100.0%

MSERS includes the Military Pension Fund

Short Term Equivalents (in Billions)

Short Term Strategy***	\$3.3	
Short Term in Other Inv. Strategies	1.7	
TOTAL SHORT TERM	\$5.0	5.7% of Total Funds

15th Largest State Public Retirement System in the U.S.

Pensions & Investments survey - February 8, 2021 issue

*The combined net payout for the plans for FY 2020 was \$1.6 billion with \$22.9 billion paid out FY 2010 thru FY 2020 (Pension CAFRs). This represents the amount paid to beneficiaries in excess of employer and employee contributions.

**OPEB - Other Post Employment Benefits

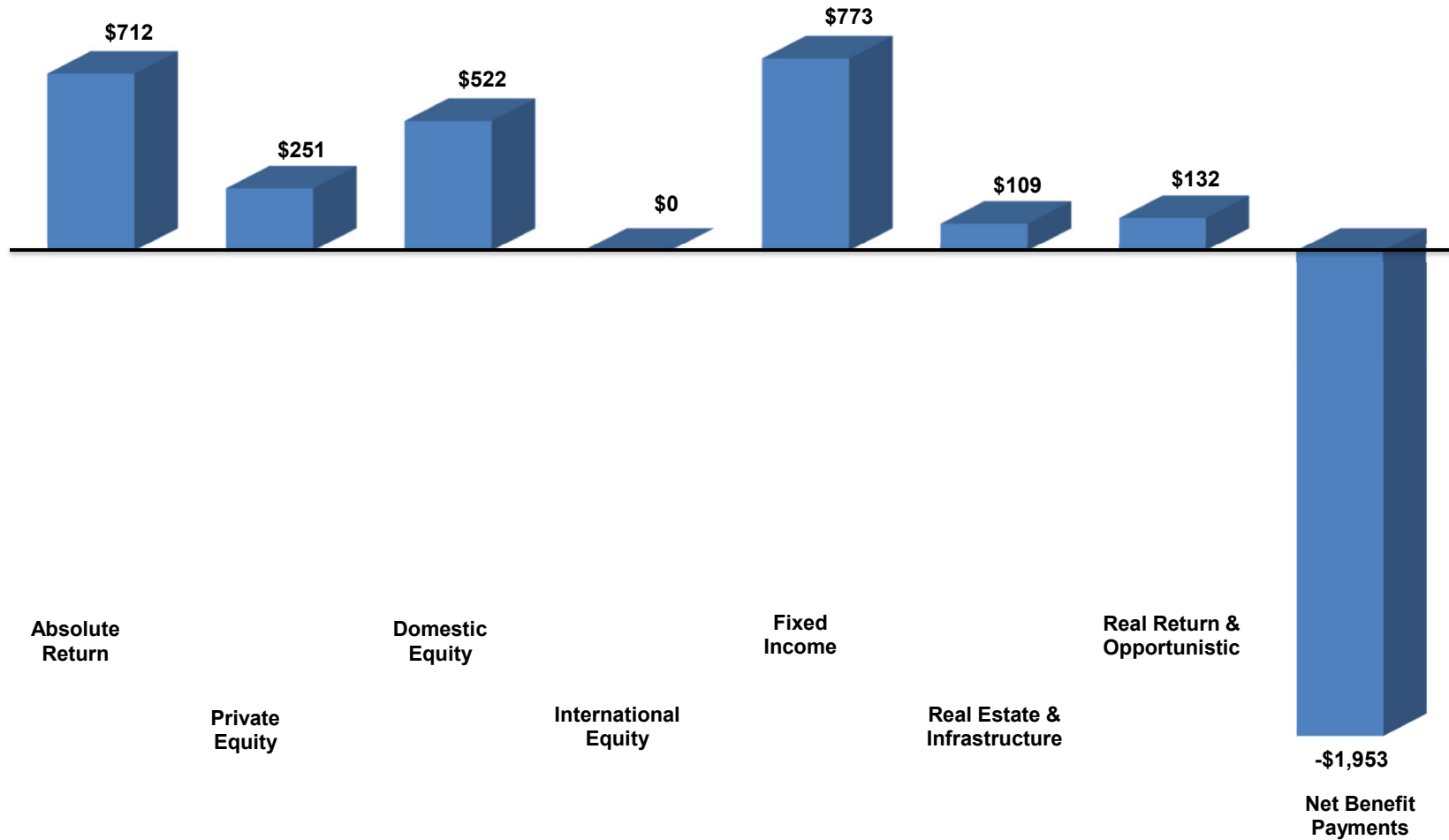
Sources and Uses of Cash

April 2020 ~ March 2021

4/01/20 Short-Term Cash Balance: \$ 2,772

3/31/21 Short-Term Cash Balance: 3,317

Net Short-Term Cash Increase: \$ 545



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 3/31/21

	MPSERS		MSERS		MSPRS		MJRS		SMRS
<i>Asset Class</i>	<i>3/31/21</i>	<i>Target*</i>	<i>3/31/21</i>	<i>Target*</i>	<i>3/31/21</i>	<i>Target*</i>	<i>3/31/21</i>	<i>Target*</i>	<i>Ranges</i>
Domestic Equity	23.3%	25.0%	23.3%	25.0%	23.3%	25.0%	23.3%	25.0%	17% - 32%
Private Equity	20.6%	16.0%	20.6%	16.0%	20.6%	16.0%	20.6%	16.0%	13% - 25%
International Equity	17.1%	15.0%	17.1%	15.0%	17.1%	15.0%	17.1%	15.0%	12% - 22%
Real Return & Opportunistic	12.7%	12.5%	12.7%	12.5%	12.7%	12.5%	12.8%	12.5%	8% - 18%
Long Term Fixed Income	10.9%	10.5%	10.9%	10.5%	10.9%	10.5%	10.9%	10.5%	8% - 18%
Real Estate & Infrastructure	7.2%	10.0%	7.2%	10.0%	7.2%	10.0%	7.2%	10.0%	8% - 18%
Absolute Return	4.4%	9.0%	4.4%	9.0%	4.4%	9.0%	4.4%	9.0%	5% - 11%
Short Term Fixed Income	3.8%	2.0%	3.8%	2.0%	3.8%	2.0%	3.8%	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

June 10, 2021



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%	17.3%
International Equity	8.9%	21.6%	4.9%
Real Ret/Oppportunistic	8.1%	9.5%	7.2%
Domestic Equity	7.3%	18.2%	13.7%
Real Estate (Core)	7.0%	15.0%	7.4%
Absolute Return	5.2%	9.0%	3.1%
Long-Term Fixed Income	2.3%	4.0%	3.4%
Short-Term	2.2%	1.0%	0.6%

* Aon Investment Consultants 2021 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.
- Longer term interest rates have been rising over the past year, however short-term rates (3-year maturity and in) continued to fall. Because of this, the U.S. Treasury rate curve is the steepest it has been since June 2015. This was six months prior to the Fed first tightening rates coming out of the Global Financial Crisis.
- The commodities prices broadly, as measured by the CRB index, are up sharply at 37% over the 12-month period ending March 2021. These are the highest levels in roughly a decade. Many economists maintain the viewpoint that these prices reflect some short-term supply and demand imbalances. Alternative viewpoints suggest that the Federal Reserve's monetary policies, and the U.S. government's fiscal policies have created structural imbalances and will cause longer-term inflation to be higher than normal.
- Dividend yields on REITs at the end of March 2021 were estimated to be around 3.0%, which is nearly 1.3% higher than the yield of the 10-year U.S. Treasury. This is at the historical metric and may be seen as fairly attractive.
- Based on an expected annualized equity market return of approximately 7.3%, should historical hedge fund betas and alphas continue, a 5.2% annualized net return seems like a reasonable assumed rate of return for hedge funds.

U.S. Fixed Income

Tough valuations in Fixed Income.

- Longer term interest rates have been rising over the past year, however short-term rates (3-year maturity and in) continued to fall. Because of this, the U.S. Treasury rate curve is the steepest it has been since June 2015. This was six months prior to the Fed first tightening rates coming out of the Global Financial Crisis.
- Interest rates at both the long and short end are earning less than the year-over-year increase in CPI.
- Both investment grade and high yield spreads have tightened considerably. Today spreads are at their tightest levels since the early months of 2007.
- It would seem that rates have some upward pressure due to a healing economy and inflation rates higher than nominal rates. This potentially places some stronger headwinds on bond returns. However, as long as the Federal Reserve's policy rate remains at these levels, the shape of the yield curve could put a lid of sorts on the longer dated rates.

Domestic Equity

Another good quarter for risk assets.

- The broad U.S. stock market return for the one year ending March 2021 was 58.4%. This is the third highest 12-month return in the past 50 years.
- 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.
- The quarter ending March 2021 was another great quarter for risk assets. The small cap Russell 2000 outperformed the larger cap S&P 500 by 6.5%, lifting the outperformance for the year to 38.5%. The value style also had a good quarter relative to the growth style, outperforming by 10.7%. However, over the past year, value still badly trailed growth by -5.9%.

International Equity

A good quarter for risk assets here too.

- International equities underperformed domestic equities for the year ending March 2021 by -9.3%. Over the past three, five, seven, and ten years, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -10.0%, -6.4%, -8.1%, and -8.8% annualized, respectively.

- Within international equities, emerging market returns exceeded developed markets over the past one, three, five and seven years by 12.5%, 0.1%, 3.2% and 1.8% annualized, respectively. However, over the past ten years, emerging markets returns were -1.6% annualized less than developed markets.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 23% discount to U.S. counterparts while emerging markets are at a 30% discount.

Real Estate

Comparing public vs. private real estate.

- Over the one year ending March 2021, the NAREIT index increased by 34.3% including dividends which was 31.7% higher than their private market counterparts. Over the medium to longer-term, publicly traded REITs have earned 0.5% - 1.5% higher return than their private market counterparts but they are about three times more volatile.
- Dividend yields on REITs at the end of March 2021 were estimated to be around 3.0%, which is nearly 1.3% higher than the yield of the 10-year U.S. Treasury. This is at the historical metric and may be seen as fairly 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 7.3%, should historical hedge fund betas and alphas continue, a 5.2% annualized net return seems like a reasonable assumed rate of return for hedge funds. This return is approximately 3-month U.S. Libor plus 320 basis points. However, it should also be noted that in the past after times of market dislocations, the realized alpha has been higher.

Commodities

Inflation; transitory or something else?

- As the economic recovery has gained momentum, and Fed policy remains ultra-accommodative, the attention has turned towards inflation. The U.S. dollar has fallen in value over the past year ending March 2021 by -5.9% as measured by the DXY index and it is at the low end of the past 5 year's trading range.
- The commodities prices broadly, as measured by the CRB index, are up sharply at 37% over the 12-month period ending March 2021. These are the highest levels in roughly a decade. Many economists maintain the viewpoint that these prices reflect some short-term supply and demand imbalances. Alternative viewpoints suggest that the Federal Reserve's monetary policies, and the U.S. government's fiscal policies have created structural imbalances and will cause longer-term inflation to be higher than normal.

Annual Total Returns of Key Asset Classes 2001 - 2020

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020		
Best ↑	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	U.S. Equity	Best ↑	
	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%	17.92%		
	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	Int'l Equity		
	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%	10.65%		
	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	Corp. Bonds		
	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%	9.89%		
	Cash	Hedge Funds	Real Estate	Hedge Funds	Hedge Funds	Hedge Funds	Hedge Funds	Corp. Bonds	Hedge Funds	Corp. Bonds	Corp. Bonds	Inflation	Corp. Bonds	Hedge Funds	Gov't Bonds	Inflation	Int'l Equity	Corp. Bonds	Gov't Bonds	Gov't Bonds		Gov't Bonds
	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%	7.94%		
	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	Real Estate	Real Estate		Hedge Funds
	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%	4.75%		
Worst ↓	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	Real Estate	Worst ↓	
	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%	4.40%	1.60%		
	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	Inflation		
	-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%	1.40%		
	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	Cash		
	-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%	0.45%		

		Annualized Returns 2001 - 2020																			
Return		Cash		Infl.		Hedge		Gov't		Int'l		Corp.		US Eq.		R.E.					Return
Risk		0.83%		1.34%		5.28%		4.61%		19.88%		5.60%		17.32%		4.61%					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

PRIVATE EQUITY REVIEW

State of Michigan Investment Board Meeting

June 10, 2021



Peter A. Woodford
Senior Investment Manager
Private Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	22.6%	16.0%	15.4%	14.2%	14.6%
PE Benchmark Returns	21.9%	17.6%	18.6%	16.3%	17.3%
Peer Median Returns	14.9%	8.3%	9.8%	9.3%	10.5%
Percentile Rank vs. Peers*	20	5	11	7	9

*State Street Universe greater than \$1 billion

- Private equity returns have been strong relative to peer median returns, ranking in the top 9% of peers over the past ten years. Outperformance to peers is attributable to strategy as well as fund and co-investment selectivity.
- 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 70 basis points (ten-year S&P 500 return 13.9%) but underperformed the benchmark by 2.7%.
- For the twelve months ending March 31, 2021, the Private Equity Division returned approximately \$251 million to the plan, net of contributions. Although COVID-19 slowed distributions for much of 2020, the first three months of 2021 have been positive. This trend will likely continue due to current market conditions.
- Commitments closed during the quarter include:
 - \$200 million to HarbourVest Partners Co-Investment Fund VI, L.P.
 - \$150 million to Berkshire X, L.P. a middle market buyout fund
 - \$150 million to Michigan Small and Emerging Manager Fund-Barings, L.P.
 - \$150 million to Michigan Small and Emerging Manager Fund-GCM Grosvenor, L.P.
 - \$100 million to Charlesbank Equity Fund X, L.P., a middle market buyout fund
 - \$50 million to Charlesbank Equity Overage Fund X, L.P. a middle market buyout fund
 - \$50 million to Insight Partners Fund X Follow-On Fund, L.P., a growth equity fund
 - \$50 million to Khosla Ventures VII, L.P. an early stage venture technology fund
 - \$25 million 5AM Opportunities II, L.P., a late state venture healthcare fund
 - \$25 million to 5AM Ventures VII, L.P., an early stage venture healthcare fund
 - \$25 million to Khosla Ventures Opportunity I, L.P., a growth stage venture fund
 - \$5 million to Khosla Ventures Seed E, L.P., a seed stage venture fund

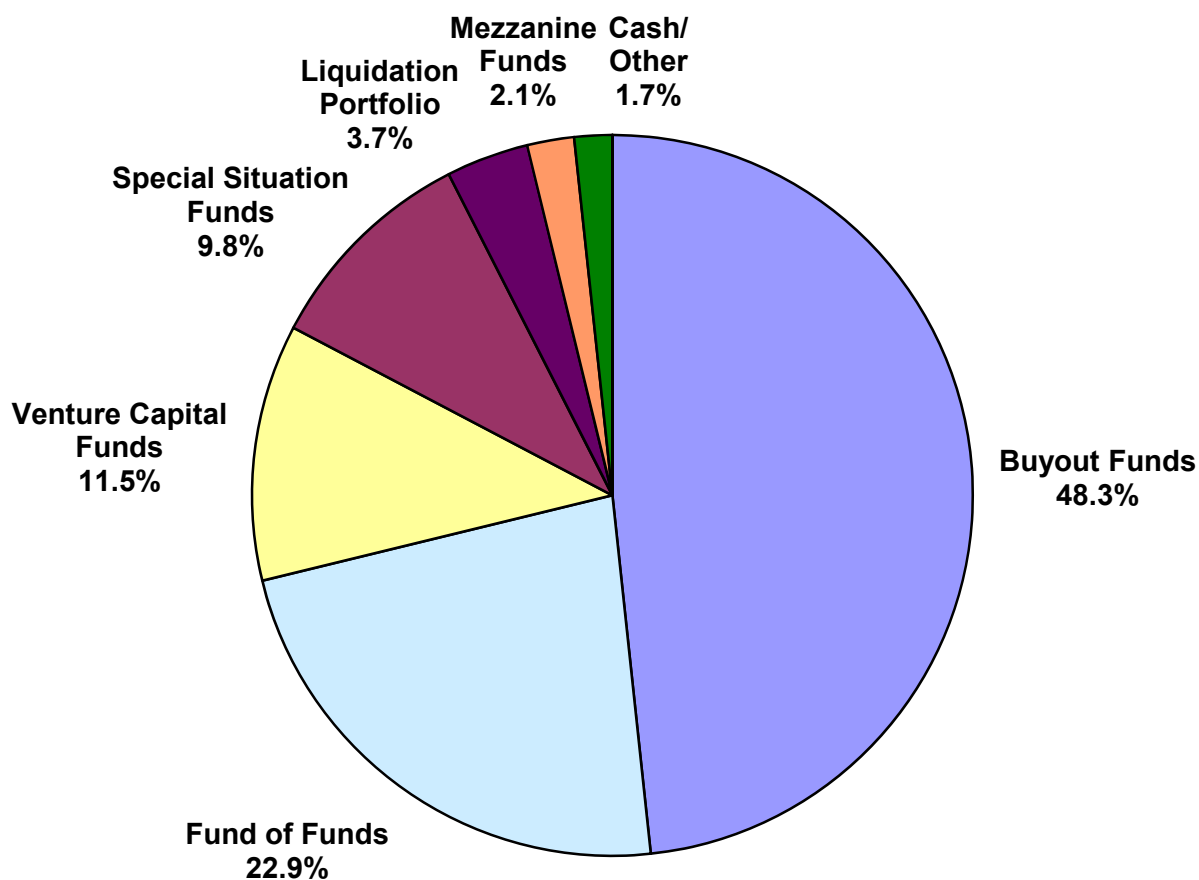
Strategy Update

The strategy for the next twelve months will focus on new sponsors raising capital and existing sponsors raising successor funds. This may be a combination of buyout, venture capital, secondary, and growth equity funds seeking new commitments. 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

3/31/21



Market Value in Millions				
	<u>3/31/21</u>		<u>3/31/20</u>	
Buyout Funds	\$8,703	48.3%	\$6,844	45.7%
Fund of Funds	4,137	22.9%	2,882	19.2%
Venture Capital Funds	2,067	11.5%	1,565	10.5%
Special Situation Funds	1,775	9.8%	1,882	12.6%
Liquidation Portfolio	673	3.7%	938	6.3%
Mezzanine Funds	373	2.1%	304	2.0%
Cash/Other	310	1.7%	558	3.7%
Total	<u>\$18,038</u>	<u>100.0%</u>	<u>\$14,973</u>	<u>100.0%</u>

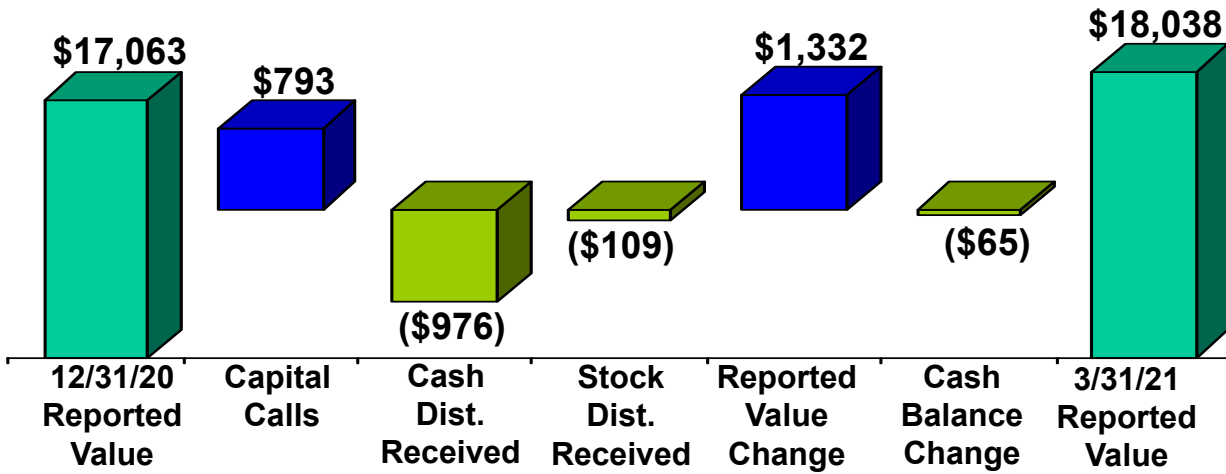
SMRS

Private Equity

3/31/21

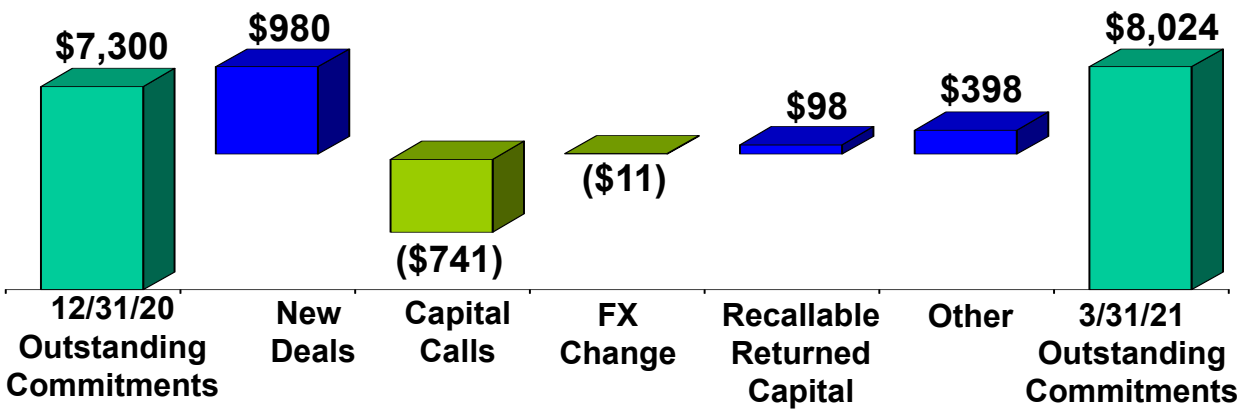
Invested Commitments

(\$ in Millions)



Outstanding Commitments

(\$ in Millions)

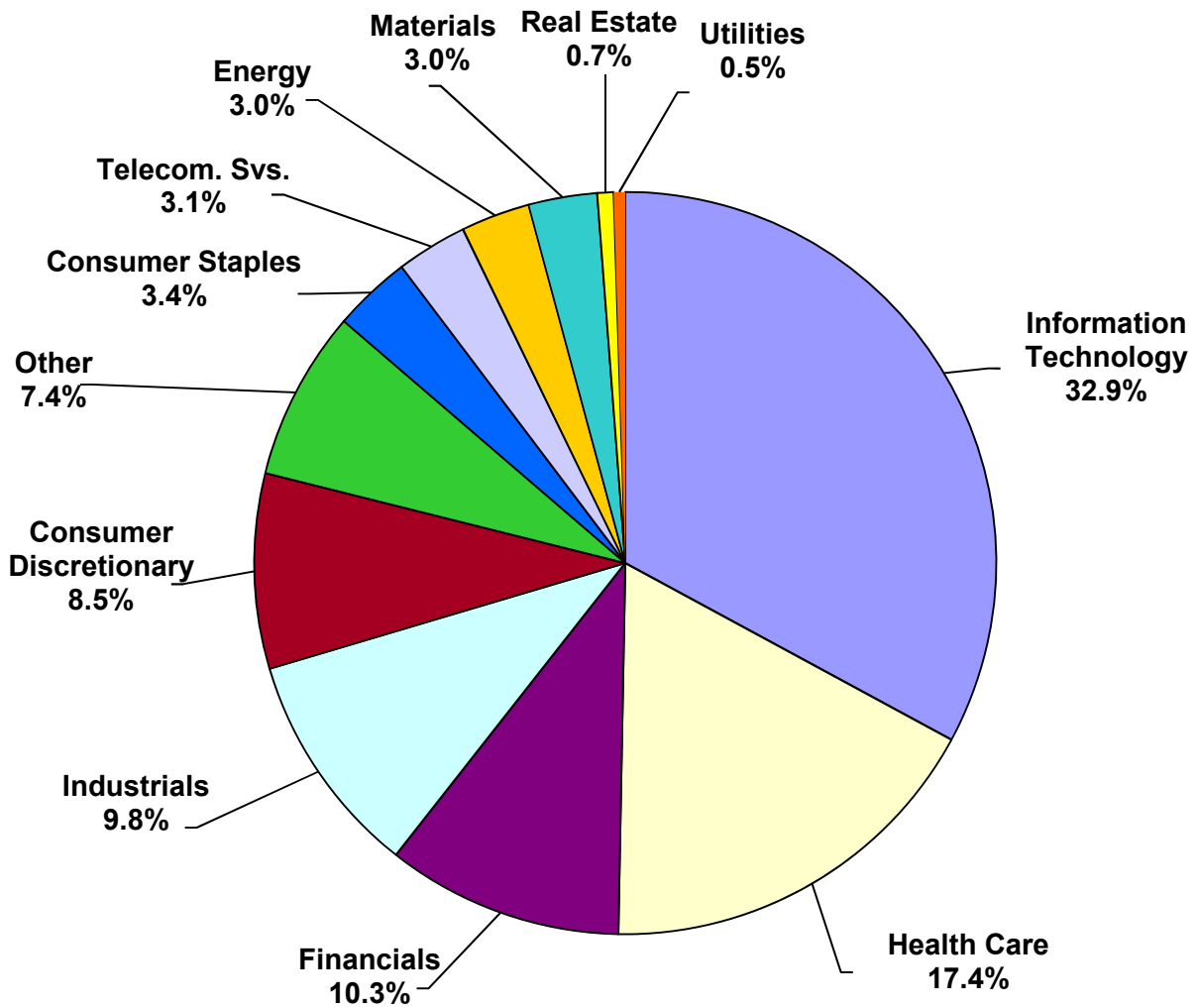


SMRS

Private Equity

3/31/21

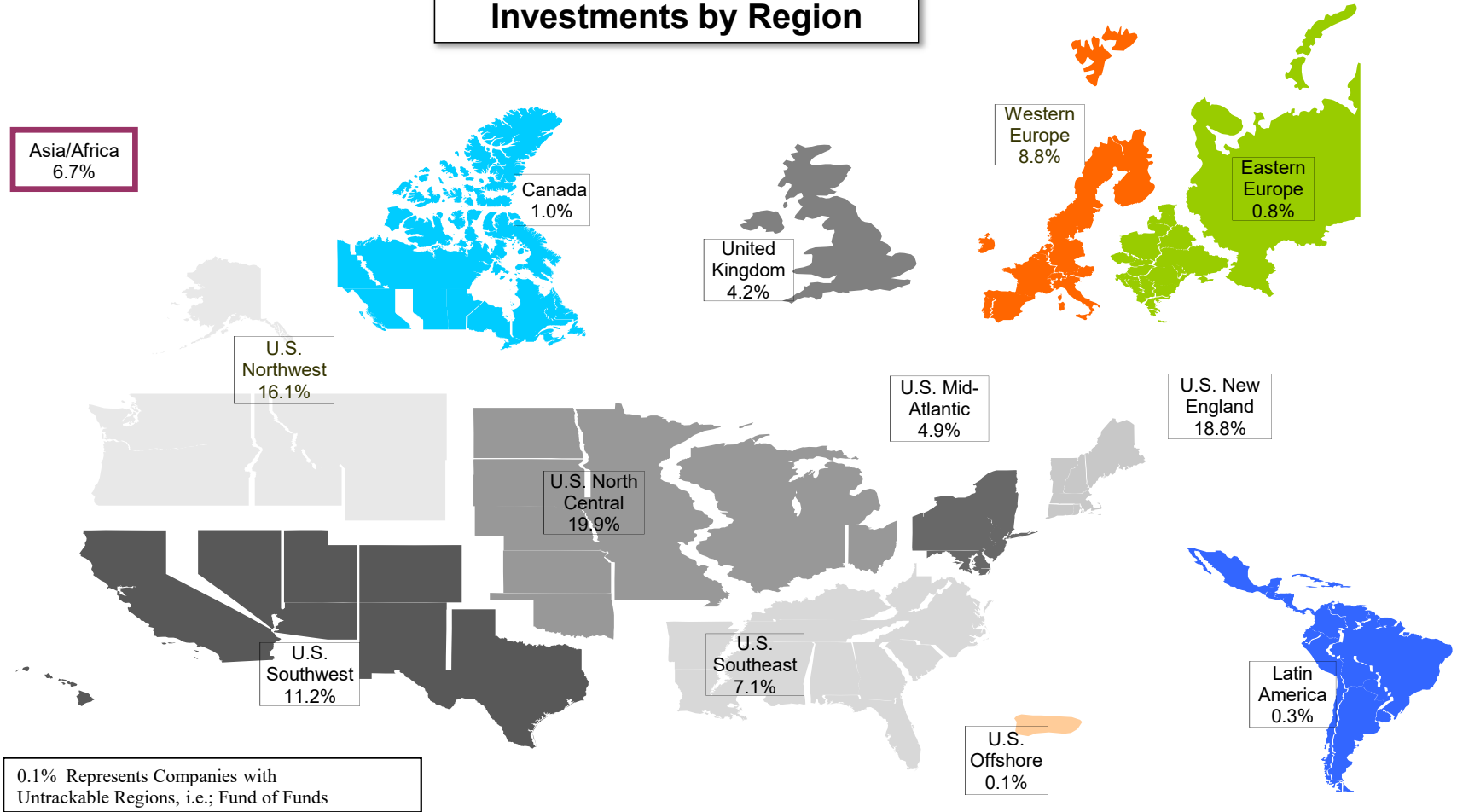
Investments by Industry



These numbers are based on the most recent available General Partner Data; primarily 12/31/20 and are subject to change.

SMRS Private Equity 3/31/21

Investments by Region



Geographic Report: North America 78%, Europe 14%, Asia 7%, Other 1%

SMRS

Private Equity

3/31/21

Portfolio by Vintage Year

(\$ in Millions)

Asset Vintage	Reported Value	Outstanding Commitment	Total Exposure
1986-2005	\$ 278	\$ 99	\$ 377
2006*	328	110	438
2007	157	108	265
2008	325	75	400
2009	15	1	16
2010	215	4	219
2011	643	94	737
2012	1,119	62	1,181
2013	284	78	362
2014	1,504	227	1,731
2015	5,981	747	6,728
2016	2,535	436	2,971
2017	1,309	679	1,988
2018	1,911	1,730	3,641
2019	829	1,656	2,485
2020	290	944	1,234
2021	5	974	
Income Accruals	2	0	2
Cash	294	0	294
Act. Small Cap - Stock Dist	14	0	14
Total	\$ 18,038	\$ 8,024	\$ 26,062

*Liquidation portfolio is 2006 vintage

FX Exposure

(\$ in Millions)

	Reported Value	Outstanding Commitment	Total Exposure	Total (USD)
Euro (\$1.18/ €)	€ 519	€ 337	€ 856	\$1,006

SMRS

Private Equity

3/31/21

Top 10 Sponsors

(\$ in Millions)

Asset Type	Reported Value	Outstanding Commitment	Total
HarbourVest Partners	\$ 4,319	\$ 6,406	\$ 10,725
Grosvenor Capital Management	528	1,961	2,489
KKR	696	1,739	2,435
Blackstone Capital Partners	603	1,410	2,013
Advent International	681	1,120	1,801
The Carlyle Group	475	1,166	1,641
Leonard Green & Partners	587	975	1,562
TPG	219	1,220	1,439
Apax Partners	349	764	1,113
Berkshire Partners	316	760	1,076
Top 10 Total Value	\$ 8,773	\$ 17,521	\$ 26,294

Cash Weighted Rates of Return*

(Net IRR)	Current Qtr.	1-Year	3-Year	5-Year	10-Year
Buyout	10.5%	24.9%	18.1%	17.7%	15.7%
Fund of Funds	1.5%	15.8%	13.1%	13.1%	13.3%
Mezzanine	6.1%	8.8%	10.9%	11.5%	11.2%
Special Situations	5.6%	11.2%	9.6%	11.0%	11.5%
Venture Capital	19.5%	44.7%	24.6%	18.6%	18.5%

*These numbers are based on most recent available General Partner reported data; primarily 12/31/20 and are subject to change.

SMRS

Private Equity

3/31/21

Net Market Values by Ownership Entity

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
5AM Opportunities I, L.P.	\$ 17,432,654	\$ 11,325,000
** 5AM Opportunities II, L.P.	0	25,000,000
5AM Ventures VI, L.P.	13,481,822	8,200,000
** 5AM Ventures VII, L.P.	0	25,000,000
Accel Europe I, L.P.	1,501,743	1
Accel Europe II	26,517,109	3,300,000
Accel Growth Fund II, L.P.	17,501,575	0
Accel Growth Fund III, L.P.	12,097,562	280,000
Accel Growth Fund IV L.P.	35,394,080	990,000
Accel Growth Fund V L.P.	22,055,436	6,091,054
Accel IX, L.P.	1,555,367	4,522,725
Accel Leaders Fund 3, L.P.	6,000,000	34,000,000
Accel Leaders Fund II L.P.	10,424,774	0
Accel Leaders Fund L.P.	23,317,716	0
Accel London V L.P.	45,472,037	1,320,000
Accel London VI, L.P.	8,880,466	5,250,000
Accel VI-S	1,939,235	652,611
Accel VI, L.P.	758,579	0
Accel X, L.P.	5,379,768	0
Accel XI, L.P.	6,209,931	1,440,000
Accel XII, L.P.	13,444,616	980,000
Accel XIII, L.P.	9,983,417	2,500,000
Accel XIV L.P.	6,391,841	3,650,000
Acorn Bioventures, L.P.	84,868,182	35,000,000
Advent Global Private Equity V	5,549,952	8,700,000
Advent International GPE IX, L.P.	137,715,180	144,344,818
Advent International GPE VI-A L.P.	25,559,161	0
Advent International GPE VII-B, L.P.	132,548,385	12,000,000
Advent International GPE VIII-B, L.P.	346,630,074	11,474,998
Advent International LAPEF VII	0	60,000,000
Advent Latin American Private Equity Fund VI, L.P.	33,148,627	4,130,000
Affinity Asia Pacific Fund III, L.P.	12,761,912	8,520,204
Affinity Asia Pacific Fund IV, L.P.	65,919,682	17,590,077
Affinity Asia Pacific Fund V L.P.	42,566,549	140,620,493
AIP VII, L.P.	24,067,793	50,672,679
Apax Digital, L.P.	33,580,235	30,283,614
Apax Europe Fund VI	18,697,090	2,485,522

	Adjusted Reported Value	Unfunded Commitment
Apax Europe VII, L.P.	511,884	1,750,469
Apax IX, L.P.	225,038,639	16,028,952
Apax US VII	1,664,474	417,509
Apax VIII - B, L.P.	48,962,771	5,890,984
Apax X USD L.P.	19,903,826	134,505,000
Apollo Investment Fund IX, L.P.	26,287,041	73,693,606
Apollo Investment Fund VIII L.P.	74,458,549	13,455,695
Arboretum Ventures II	969,793	0
Arboretum Ventures III, L.P.	6,685,659	0
Arboretum Ventures IV, L.P.	29,929,612	6,810,000
Arboretum Ventures V, L.P.	11,437,095	25,025,000
Ares Corporate Opportunities Fund II, L.P.	104,988	11,423,773
Ares Corporate Opportunities Fund III, LP	4,980,041	6,656,978
Ares Corporate Opportunities Fund IV, L.P.	47,241,633	13,920,918
ASF VIII B	44,203,924	119,067,222
AXA ASF Miller Co-Investment	354,115	6,656,684
Axiom Asia 6, L.P.	1,750,000	48,250,000
Axiom Asia Co-Investment Fund I, L.P.	46,416,656	10,425,818
Axiom Asia Co-Investment Fund II, L.P.	0	50,000,000
Axiom Asia IV, L.P.	63,519,837	9,950,886
Axiom Asia Private Capital Fund III, L.P.	87,370,581	5,729,639
Axiom Asia V, L.P.	30,309,443	24,450,000
BC European Capital IX, L.P.	113,772,128	7,519,099
BC European Capital VII, L.P.	753,242	0
BC European Capital VIII, L.P.	4,334,731	9,163,163
Berkshire Fund IX Coinvestment Fund, L.P.	29,324,433	13,288,223
Berkshire Fund IX, L.P.	146,507,161	39,916,905
Berkshire Fund VI, L.P.	22,565,521	7,600,677
Berkshire Fund VII, L.P.	7,615,673	2,444,220
Berkshire Fund VIII, L.P.	109,903,794	6,709,012
** Berkshire Fund X, L.P.	0	150,000,000
Blackstone Capital Partners IV, L.P.	3,750,190	4,580,765
Blackstone Capital Partners V, L.P.	2,843,023	13,069,148
Blackstone Capital Partners V-S, L.P.	350,615	712,476
Blackstone Capital Partners VI, L.P.	184,187,004	32,592,057
Blackstone Capital Partners VII, L.P.	312,670,369	20,703,036
Blackstone Capital Partners VIII L.P.	21,542,606	178,457,394
Bridgepoint Europe IV	12,686,368	5,052,959
Carlyle Europe Partners II, L.P.	879,134	1,058,522
Carlyle Europe Partners III, L.P.	8,056,207	2,224,802
Carlyle Europe Partners IV, L.P.	76,937,297	11,384,862
Carlyle Europe Partners V, S.C.SP., L.P.	39,161,279	101,270,514
Carlyle Partners V L.P.	29,283,255	53,227,845
Carlyle Partners VI, L.P.	197,734,048	9,479,788
Carlyle Partners VII, L.P.	123,267,298	128,548,884
Centerbridge Capital Partners III, L.P.	76,508,977	21,491,907

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
Cerberus SMRS Partners, L.P.	27,167,276	23,304,657
Charlesbank Equity Fund IX, L.P.	57,741,300	28,933,378
** Charlesbank Equity Fund X, L.P.	0	100,000,000
** Charlesbank Equity Overage Fund X, L.P.	0	50,000,000
Charlesbank Fund IX Overage Allocation Program	32,585,341	11,904,902
CircleUp Credit Fund I, L.P.	19,228,672	5,771,328
CLEARLAKE CAPITAL PARTNERS VI, L.P.	36,955,423	38,613,821
Clearlake Opportunities Partners II, L.P.	21,349,536	55,939,901
Coller International Partners V, L.P.	7,694,418	2,000,000
Coller International Partners VI, L.P.	27,780,664	29,389,115
Coller International Partners VII, L.P.	119,889,990	44,654,951
Crescent Mezzanine Partners VI, L.P.	20,928,701	5,681,254
Crescent Mezzanine Partners VII, L.P.	90,590,128	52,611,190
CVC Capital Partners VII, L.P.	139,339,110	63,539,213
CVC Capital Partners VIII, L.P.	0	117,530,000
Dover Street IX, L.P.	69,151,397	20,000,000
Dover Street X, L.P.	37,140,519	116,250,000
EnCap Energy Capital Fund X, L.P.	25,072,855	4,550,206
FIMI Opportunity 6, L.P.	45,893,910	10,681,820
FirstMark Capital I, L.P.	21,802,093	196,596
FirstMark Capital IV, L.P.	37,885,067	6,650,000
FirstMark Capital OF I, L.P.	30,296,878	0
FirstMark Capital OF II, L.P.	58,737,340	0
FirstMark Capital OF III, L.P.	12,400,498	22,925,000
FirstMark Capital P2, L.P.	0	0
FirstMark Capital V, L.P.	9,442,941	25,375,000
Flagship Pioneering Origination Fund VII, L.P.	6,769,407	66,750,000
Flagship Pioneering Special Opportunities Fund II, L.P.	52,026,682	54,000,000
Flagship Pioneering VI, L.P.	151,987,645	21,750,000
Flagship Ventures Fund 2004, L.P.	14,376	0
Flagship Ventures Fund 2007, L.P.	6,222,807	0
Flagship Ventures Fund IV, L.P.	152,705,755	0
Flagship Ventures Fund V, L.P.	157,140,704	0
Flagship Ventures Opportunities Fund I, L.P.	53,869,886	2,000,000
Fox Paine Capital Fund II, L.P.	18,671,021	15,382,699
FS Equity Partners VII, L.P.	81,436,206	11,134,055
FS Equity Partners VIII, L.P.	28,176,993	43,592,912
G-IV Acquisition Holdings, LLC	4,721,776	0
GCM Grosvenor Fund Investment Program I, L.P.	7,033,301	1,219,800
GCM Grosvenor Fund Investment Program II, L.P.	16,448,567	13,267,284
GCM Grosvenor Fund Investment Program III - 2004	29,766,769	4,405,982
GCM Grosvenor Fund Investment Program III - 2006	37,733,422	6,271,112
GCM Grosvenor Fund Investment Program V, L.P.	42,050,438	8,961,138
GCM Grosvenor Fund Investment Program VI, L.P.	24,291,148	1,453,568
GCM Grosvenor Fund Investment Program VIII, L.P.	91,593,711	13,161,627
GCM Grosvenor SeasPriFIP L.P. (PIS06-10)	36,023,595	13,821,794

	Adjusted Reported Value	Unfunded Commitment
GCM Grosvenor SeasPriFIP L.P. (PIS14)	213,872,890	10,369,835
GCM Grosvenor SeasPriFIP L.P. (Seed)	29,350,266	16,533,172
Genstar Capital Partners IX, L.P.	37,178,071	47,311,013
Genstar Capital Partners VIII, L.P.	67,243,045	4,794,191
Genstar IX Opportunities Fund I, L.P.	35,744,148	19,959,168
Genstar VIII Opportunities Fund I, L.P.	63,434,611	2,402,486
Golden Bell Azalea, LLC	14,283,957	0
Green Equity Investors V, L.P.	121,315,021	25,966,435
Green Equity Investors VI, L.P.	149,560,245	10,127,675
Green Equity Investors VII, L.P.	259,442,378	43,046,391
Green Equity Investors VIII, L.P.	32,611,312	216,273,367
Greenspring Master G, L.P.	165,909,156	444,000,000
Greenspring Micro II, L.P.	15,946,580	10,966,263
GSO Capital Opportunities Fund II, L.P.	7,843,854	7,875,581
GSO Capital Opportunities Fund III, L.P.	56,188,647	19,634,254
GSO COF III Co-Investment Fund, L.P.	14,076,523	22,889,819
GTCR Fund XIII, L.P.	0	50,000,000
HarbourVest Credit Opportunities Fund II, L.P.	24,856,514	50,250,000
HarbourVest Dover Street VIII, L.P.	20,535,329	5,400,000
HarbourVest Int'l III Partnership, L.P.	151,260	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P.	97,423,853	19,107,835
HarbourVest Partners Co-Investment Fund V L.P.	179,689,975	60,000,000
** HarbourVest Partners Co-Investment Fund VI, L.P.	0	200,000,000
HarbourVest Partners Mezzanine Income Fund, L.P.	66,809,760	16,310,000
HarbourVest V Partnership, L.P.	127,310	300,000
HarbourVest VI - Direct Fund LP	1,996,983	750,000
HarbourVest VI Partnership, L.P.	372,290	2,000,000
Harvest Partners VII, L.P.	88,176,920	3,801,792
Harvest Partners VIII, L.P.	59,160,805	44,542,004
HPS Mezzanine Partners III, L.P.	43,781,335	3,456,845
** Insight Partners Fund X Follow-On Fund, L.P.	0	50,000,000
Insight Partners XI, L.P.	73,747,473	39,800,000
Insight Venture Partners GBCF, L.P.	119,435,043	6,664,610
Insight Venture Partners IX, L.P.	263,518,890	6,972,280
Insight Venture Partners X, L.P.	194,205,787	0
Jade Equity Investors, L.P.	23,830,221	80,869,945
Kelso Investment Associates IX, L.P.	54,835,372	9,329,542
Kelso Investment Associates VII, L.P.	153,911	0
Kelso Investment Associates VIII, L.P.	26,639,065	7,245,681
Kelso Investment Associates X, L.P.	66,376,472	43,548,049
Khosla Ventures III, L.P.	13,818,555	750,000
Khosla Ventures IV, L.P.	58,193,278	950,000
** Khosla Ventures Opportunity I, L.P.	0	25,000,000
Khosla Ventures Seed D, L.P.	6,840,398	3,000,000
** Khosla Ventures Seed E, L.P.	0	5,000,000
Khosla Ventures V, L.P.	64,985,032	1,750,000

	Adjusted Reported Value	Unfunded Commitment
Khosla Ventures VI, L.P.	51,241,810	23,250,000
** Khosla Ventures VII, L.P.	0	50,000,000
KKR 2006 Fund, L.P.	72,936,959	4,940,163
KKR Americas Fund XII, L.P.	174,381,904	84,470,176
KKR Asian, L.P.	969,183	0
KKR Asian Fund II, L.P.	41,213,259	21,990
KKR Asian Fund III, L.P.	92,146,141	33,216,770
KKR China Growth Fund, L.P.	17,728,696	3,383,656
KKR European Fund II, L.P.	1,065,796	0
KKR European Fund III, L.P.	5,010,970	6,430,608
KKR European Fund IV L.P.	123,750,585	330,287
KKR European Fund V (USD) SCSp	56,126,085	73,392,885
KKR Millennium Fund, L.P.	232,956	0
KKR North America Fund XI, L.P.	110,060,939	5,550,428
Lead Edge Capital IV, L.P.	25,563,220	4,049,876
Lead Edge Capital V, L.P.	12,204,571	17,795,429
Lightspeed Opportunity Fund, L.P.	17,460,540	10,250,000
Lightspeed Venture Partners Select IV, L.P.	9,049,926	16,000,000
Lightspeed Venture Partners VII, L.P.	10,912,035	0
Lightspeed Venture Partners XIII, L.P.	3,565,211	6,400,000
Menlo Special Opportunities Fund II, L.P.	18,516,396	13,515,852
Menlo Ventures IX, L.P.	1,192,273	0
Menlo Ventures X, L.P.	2,854,268	0
Menlo Ventures XI, L.P.	28,319,730	0
Menlo Ventures XIV, L.P.	9,967,607	350,000
Menlo Ventures XV, L.P.	4,924,188	20,000,000
Meritech Capital Partners IV, L.P.	4,782,944	300,000
Meritech Capital Partners V, L.P.	71,491,947	1,450,000
Meritech Capital Partners VI, L.P.	60,153,728	3,506,250
Meritech Capital Partners VII, L.P.	5,180,512	37,081,250
Michigan Growth Capital Partners II, L.P.	114,410,255	2,278,264
Michigan Growth Capital Partners III, L.P.	93,509,216	42,216,858
Michigan Growth Capital Partners, LP	12,803,934	7,550,304
** Michigan SEMF Barings	5,154,075	144,845,925
** Michigan SEMF Grosvenor	0	150,000,000
New Leaf Biopharma Opportunities II, L.P.	132,147,625	8,000,000
New Leaf Growth Fund I, L.P.	59,900,139	0
New Leaf Ventures II, L.P.	6,454,622	0
New Leaf Ventures III, L.P.	63,875,164	0
New Leaf Ventures IV, L.P.	35,865,733	20,562,500
Nordic Capital VI, L.P.	13,183	1
Nordic Capital VII, L.P.	54,882	3,286,902
Nordic Capital VIII, L.P. (Alpha)	40,439,004	1,673,161
Oak Investment Partners X, L.P.	382,936	0
Oak Investments Partners IX, L.P.	93,913	0
Oaktree Opportunities Fund X, L.P.	26,889,198	5,100,000

	Adjusted Reported Value	Unfunded Commitment
Oaktree Opportunities Fund Xb, L.P.	46,918,423	28,000,000
OCM Opportunities Fund IX, L.P.	51,010,231	0
OCM Opportunities Fund VII (B), L.P.	95,327	2,500,000
OCM Opportunities Fund VII, L.P.	397,540	0
OCM Opportunities Fund VIII B, L.P.	11,241,246	0
OCM Opportunities Fund VIII, L.P.	1,081,176	0
OCM Principal Opportunities Fund IV, L.P.	82,264	4,996,695
Ocqueoc Holdings, LLC	70,907	48,328,397
Odyssey Investment Partners Fund VI, LP	13,709,957	84,813,551
Parthenon Investors II, L.P.	421,332	3,186,779
Parthenon Investors III, L.P.	53,866,882	2,656,037
Parthenon Investors IV, L.P.	51,681,420	1,813,379
Peninsula Fund VI, L.P.	31,244,654	3,530,301
Permira Growth Opportunities I, L.P. 1	24,186,152	28,122,414
Permira VII L.P. 1	36,554,611	53,312,061
PPC Fund II	77,280,441	8,286,334
Public Pension Capital, LLC	45,003,265	41,202,024
Renaissance Venture Capital Fund IV, L.P.	867,396	24,000,000
Rhone Partners V, L.P.	118,206,630	15,397,554
Riverside Capital Appreciation Fund VI, L.P.	34,776,843	6,100,550
Riverside Capital Appreciation Fund VII, L.P.	76,826,184	33,438,633
Riverside Micro Cap Fund I, L.P.	13,797,381	5,632,976
Riverside Micro-Cap Fund II, L.P.	61,540,168	2,735,834
Riverside Micro-Cap Fund III, L.P.	116,176,233	4,347,998
Riverside Micro-Cap Fund IV, L.P.	65,816,811	3,617,302
Riverside Micro-Cap Fund IV B, L.P.	8,325,381	7,255,266
Riverside Micro-Cap Fund V, L.P.	45,289,004	53,320,739
Science Ventures Fund II, L.P.	29,336,659	3,800,000
Science Ventures Fund III, L.P.	4,365,385	20,000,000
Shamrock Capital Content Fund I, L.P	36,148,842	18,816,118
Shamrock Growth Capital Fund IV, L.P.	44,333,618	3,217,536
Silver Lake Partners II, L.P.	22,180	3,531,586
Silver Lake Partners III, L.P.	17,065,776	11,777,723
Silver Lake Partners IV, L.P.	84,914,243	2,084,020
Silver Lake Partners V, L.P.	80,690,814	11,981,977
Silver Lake Partners VI, L.P.	8,935,367	66,064,633
Silver Lake SL SPV-2	49,197,584	0
SK Capital Partners V, L.P.	30,068,830	17,621,005
SKCP Catalyst Fund I-A, L.P.	8,160,643	24,465,013
SM/TCP L.P.	14,251,232	1,386,616
SMRS - TOPE LLC	3,318,235,744	290,733,071
SMRS-CAPP LLC	109,375,225	33,331,651
SMRS-NCRP LLC	393,531,521	171,958,521
Summit Partners Growth Equity Fund X, L.P.	43,994,864	62,379,998
Sycamore Partners III, L.P.	28,490,355	67,475,455
TCW/Crescent Mezzanine Partners V, LLC	13,155,017	12,395,466

	Adjusted Reported Value	Unfunded Commitment
TCW/Crescent Mezzanine Partners VC Secondary	3,929,358	0
The Huron Fund III, L.P.	5,999,289	2,072,756
The Huron Fund IV, L.P.	31,869,102	2,502,309
The Huron Fund V, L.P.	16,460,531	17,784,697
The Shansby Group 5 (TSG5)	0	4,261,291
Thoma Bravo Discover Fund II, L.P.	89,914,125	15,225,864
Thoma Bravo Fund XII, L.P.	232,141,257	20,521,950
Thoma Bravo Fund XIII, L.P.	142,616,643	38,426,399
Thoma Bravo XIV, L.P.	0	125,000,000
TI Platform BOV, L.P.	6,534,005	8,323,101
TI Platform Fund II, L.P.	7,122,522	7,478,288
TI Platform SMRS SMA, L.P.	26,924,545	34,199,147
TPG Healthcare Partners, L.P.	6,878,176	18,534,817
TPG IV (Texas Pacific Group IV)	99,968	211,725
TPG Partners III, LP	0	2,087,002
TPG Partners VI, L.P.	42,978,624	8,329,720
TPG Partners VIII, L.P.	21,089,027	103,296,939
TPG Partners, VII, L.P.	145,113,415	12,839,107
TPG V (Texas Pacific Group V)	3,093,062	5,841,509
Trilantic Capital Partners V (North America) Fund A, L.P.	28,581,202	2,921,917
Trilantic Capital Partners VI (North America) L.P.	19,447,982	55,444,563
TSG6, L.P.	34,681,962	21,105,230
TSG7 A L.P.	145,631,161	28,366,877
TSG8, L.P.	38,066,892	102,719,552
Turnbridge Capital Partners I , L.P.	49,946,404	30,387,163
Veritas Capital Fund V, L.P.	165,481,083	8,918,273
Veritas Capital Fund VI, L.P.	188,474,037	6,390,783
Veritas Capital Fund VII, L.P.	43,085,174	55,721,946
Veritas V Co-Investors, L.P.	79,811,974	0
Vista Equity Endeavor Fund I, L.P.	44,953,748	13,928,524
Vista Equity Endeavor Fund II, LP	10,794,103	53,606,130
Vista Equity Partners Fund V, L.P.	55,121,544	11,166,072
Vista Equity Partners Fund VI, L.P.	100,670,237	17,471,861
Vista Equity Partners VII, L.P.	46,724,820	29,611,799
Vista Foundation Fund III, L.P.	16,345,380	7,193,234
Vista Foundation Fund IV, L.P.	7,108,378	66,876,897
Warburg Pincus China-Southeast Asia II, L.P.	12,836,684	61,950,000
Warburg Pincus China, L.P.	59,565,041	2,632,500
Warburg Pincus Energy MCIP, L.P.	0	10,396,887
Warburg Pincus Energy, L.P.	45,263,933	10,300,000
Warburg Pincus Equity Partners, L.P.	1,179,427	0
Warburg Pincus Financial Sector, L.P.	41,766,477	11,227,500
Warburg Pincus Global Growth, L.P.	75,786,610	75,975,000
Warburg Pincus International Partners, L.P.	0	1,018
Warburg Pincus Private Equity IX, L.P.	6,600,689	0
Warburg Pincus Private Equity VIII, L.P	0	3,457

	Adjusted Reported Value	Unfunded Commitment
Warburg Pincus Private Equity X, L.P.	25,490,079	0
Warburg Pincus Private Equity XI, L.P.	115,594,996	0
Warburg Pincus Private Equity XII Secondary, L.P.	29,097,644	337,500
Warburg Pincus Private Equity XII, L.P.	203,942,212	2,362,500
* Total Private Equity	\$17,728,061,803	\$ 8,023,520,275
Cash	250,271,330	0
Active Small Cap Cash	43,660,813	
Active Small Cap	14,318,837	0
Income Accruals	1,821,215	0
Grand Total	\$18,038,133,997	\$ 8,023,520,275

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

** New Commitments made during quarter reported

State of Michigan Retirement System

DOMESTIC EQUITY REVIEW

State of Michigan Investment Board Meeting
June 10, 2021



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	63.3%	16.5%	16.5%	13.3%	13.7%
S&P 1500	58.7%	16.5%	16.2%	13.4%	13.7%
Peer Median Return	58.3%	13.2%	13.9%	10.6%	11.4%
Percentile Rank vs. Peers *	19	12	23	18	16

*State Street Universe greater than \$1 billion

- In the quarter ended March 31, 2021, Total Domestic Equity outperformed its peer group and exceeded the S&P 1500 Index over one, five, and ten-year time periods. During the past year, performance was over 450 basis points (bps) ahead of the benchmark with incurred tracking error of 2.1%.
- A number of managers in SMRS' portfolio, both internal and external, and across both value and growth styles, contributed to strong performance on the year.
- On the internal management side, SMRS' internal value-oriented strategies rebounded and extended gains, while SMRS Disruptive Innovation Momentum returned over 65% in just six months.
- On the external manager side, Ark Investments returned in excess of 163% while a trio of Michigan-based value managers – Ancora Asset Management, Clarkston Capital and Seizert Capital - all posted stellar, market-beating returns.
- The first quarter of 2021 was marked by the continued resurgence of value stocks, coupled with a significant correction in highflying, young, and disruptive companies. SMRS' portfolio managed to slightly outperform in the quarter despite considerable exposure to such companies, due to strong performance from its value manager lineup.

Asset Class Goal

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

Strategy Update

- The domestic equity division continues to be positioned for an economic recovery, with a relative overweight to value and momentum stocks and a portfolio beta of 1.12.
- There are number of crosscurrents we are paying close attention to that could impact our cyclical portfolio positioning as we make our way through the year. In particular, higher interest rates driven by inflationary pressure, coupled with continued appreciation of equity markets, could make stocks less appealing over time.

- On the margin we have been slowly reducing our small cap overweight in exchange for value oriented, quality and often more defensive stocks. For example, several companies in the health care sector exhibit all three of these qualities, and we have added exposure there.
- DED sector overweights include financials, health care, communication services and utilities. Underweights include consumer discretionary and industrials.
- The division's portfolio trades at a roughly 15% discount to the S&P 1500, despite higher levels of profitability and faster rates of reinvestment.

Market Environment and Outlook

- At ~23X forward earnings, equity markets trade at a premium to both their long-term historical average of 15.7X and their twenty-five-year average of 21X.
- Meanwhile 10-year treasury bonds trade at a yield of 1.6%, or ~60X earnings, versus their long-term historical average of 5%, or ~20X earnings.
- Factoring this in, alongside the enormous influx of money injected into the financial system by the Federal Reserve, the sharp rebounding of the economy, continued economic stimulus, and the continued availability of many attractively valued companies, stocks remain a reasonable alternative to bonds and bond-like asset classes.
- Long-term we expect the market to return roughly 7.75%, driven by a dividend yield of 1.4% and earnings per share growth of 6.35%.
- EPS growth is expected to be driven by 4.5% economic growth + 1.85% growth in the form of share buybacks. Such growth is roughly in line with the S&P 500 thirty-year historical dividend growth rate.

SMRS

Domestic Equity Strategies

3/31/21

Markets	Amount	Total	% of Total
Internal Indexed (\$ in Millions)			
Indexed Portfolios	\$9,825		
Total Indexed		\$9,825	48.1%
Internal Active			
Active Portfolios	\$5,869		
Total Internal Active		\$5,869	28.8%
External Active			
Los Angeles Capital	\$1,458		
Mellon Capital	885		
ARK Investments	679		
Seizert Capital Partners	529		
Clarkston Capital Partners	527		
Martin Currie US LT Unconstrained	285		
Attucks Asset Management	127		
Bivium Capital	118		
Ancora	<u>106</u>		
Total External Active		\$4,714	23.1%

Total Domestic Equity

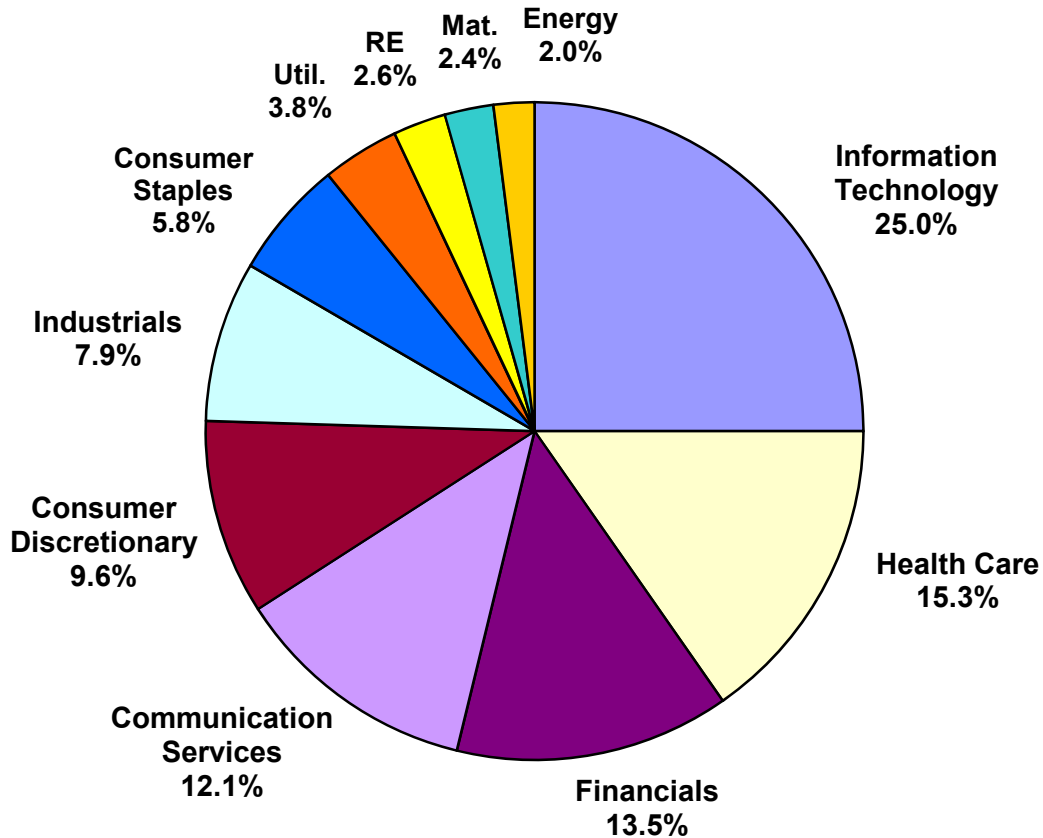
\$20,408

100.0%

SMRS

Domestic Equity By Sector

3/31/21



Market Value in Millions				
3/31/21				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Information Technology	\$5,098	25.0%	25.5%	-0.5%
Health Care	3,133	15.3%	12.9%	2.4%
Financials	2,757	13.5%	11.8%	1.7%
Communication Services	2,465	12.1%	10.1%	2.0%
Consumer Discretionary	1,955	9.6%	12.7%	-3.1%
Industrials	1,608	7.9%	9.7%	-1.8%
Consumer Staples	1,194	5.8%	5.9%	-0.1%
Utilities	771	3.8%	2.7%	1.1%
Real Estate	527	2.6%	3.0%	-0.4%
Materials	490	2.4%	3.0%	-0.6%
Energy	410	2.0%	2.7%	-0.7%
Total	<u>\$20,408</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: S&P 1500

SMRS

Domestic Equities Composite

3/31/21

Date:	<u>3/31/21</u>	<u>12/31/20</u>	<u>9/30/20</u>	<u>6/30/20</u>
Assets (\$ in Millions):	\$20,408	\$19,046	\$16,491	\$15,080
Number of Securities:	1,346	1,317	1,292	1,304
Active Share:	36%	37%	35%	31%

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)	\$403.0	\$449.9
FY1 P/E	19.7	22.8
P/E Upside to S&P 1500	16.0%	0.0
Return on Equity	22.9%	17.4%
Risk Metrics		
Beta	1.12	1.00
Tracking Error	2.9%	0.0%
Projected Returns		
Dividend Yield	1.7%	1.4%
Buyback Yield	2.3%	1.9%
Reinvestment Rate	<u>5.0%</u>	<u>4.5%</u>
Projected Investment Return	<u>9.0%</u>	<u>7.8%</u>

TOP TEN EXPOSURES – Domestic Equities vs S&P 1500

3/31/21

<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	6.6%	Apple, Inc.	5.3%
Apple, Inc.	4.4%	Microsoft Corp.	4.9%
Microsoft Corp.	3.9%	Amazon.com, Inc.	3.7%
Amazon.com, Inc.	2.7%	Facebook, Inc. Class A	1.9%
Facebook, Inc. Class A	2.6%	Alphabet, Inc., Class A	1.8%
Bristol-Myers Squibb Co.	1.7%	Alphabet, Inc., Class C	1.7%
Alphabet, Inc., Class A	1.5%	Berkshire Hathaway, Inc. B	1.3%
JPMorgan Chase & Co.	1.4%	JPMorgan Chase & Co.	1.2%
Verizon Communications, Inc.	1.3%	Johnson & Johnson	1.1%
NextEra Energy, Inc.	1.2%	Visa, Inc. Class A	1.0%
TOTAL	<u>27.3%</u>	TOTAL	<u>23.9%</u>

Manager Performance - Net of Fees

3/31/21

<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	\$8,938,987,275	56.3%	16.7%	16.3%	13.7%	--	N/A
S&P 500		56.4%	16.8%	16.3%	13.6%	--	
Style & Risk Adjusted Benchmark		56.2%	16.7%	16.3%	13.6%	--	
Lipper Large-Cap Core		54.5%	15.7%	15.3%	12.4%	--	
<i>Excess Return</i>		-0.1%	-0.1%	0.1%	0.1%	--	
<i>Alpha</i>		0.1%	0.0%	0.1%	0.1%	--	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		46	39	32	18	--	
SMRS All-Cap Garp	1,737,239,411	43.3%	10.2%	12.2%	10.1%	12.8%	4/30/11
S&P 1500 Super Composite		58.7%	16.5%	16.2%	13.4%	13.7%	
Style & Risk Adjusted Benchmark		49.5%	16.3%	15.5%	13.2%	13.5%	
Lipper Multi-Cap Core		60.6%	14.0%	14.3%	11.3%	11.9%	
<i>Excess Return</i>		-15.4%	-6.3%	-3.9%	-3.2%	-0.9%	
<i>Alpha</i>		-6.2%	-6.1%	-3.3%	-3.0%	-0.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		92	89	84	78	34	
SMRS Large-Cap Core	1,730,832,835	121.8%	15.8%	16.7%	12.5%	10.0%	8/31/07
S&P 500		56.4%	16.8%	16.3%	13.6%	9.9%	
Style & Risk Adjusted Benchmark		82.0%	12.8%	14.0%	10.4%	8.2%	
Lipper Large-Cap Core		54.5%	15.7%	15.3%	12.4%	9.3%	
<i>Excess Return</i>		65.5%	-1.0%	0.4%	-1.1%	0.1%	
<i>Alpha</i>		39.8%	3.0%	2.7%	2.2%	1.9%	
<i>Pct Rank vs Lipper Large-Cap Core</i>		1	52	23	53	23	
SMRS Mid-Cap Index	887,162,313	83.0%	13.5%	14.7%	11.7%	--	N/A
S&P 400		83.5%	13.4%	14.4%	11.3%	--	
Style & Risk Adjusted Benchmark		83.1%	13.3%	14.3%	11.2%	--	
Lipper Mid-Cap Core		72.8%	12.1%	12.8%	9.5%	--	
<i>Excess Return</i>		-0.4%	0.1%	0.4%	0.4%	--	
<i>Alpha</i>		-0.1%	0.1%	0.4%	0.5%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		21	30	14	10	--	
Mellon US Equity Enhanced	884,560,881	40.4%	26.5%	--	--	27.7%	3/1/17
S&P 500		56.4%	16.8%	--	--	15.8%	
Style & Risk Adjusted Benchmark		62.7%	20.0%	--	--	16.5%	
Lipper Large-Cap Core		54.5%	15.7%	--	--	14.9%	
<i>Excess Return</i>		-15.9%	9.7%	--	--	11.9%	
<i>Alpha</i>		-22.2%	6.4%	--	--	11.1%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		93	1	--	--	1	
SMRS Large-Cap Growth	847,645,072	54.6%	21.6%	19.1%	16.2%	11.8%	5/31/05
S&P 500 Growth		59.4%	20.6%	19.3%	16.5%	12.0%	
Style & Risk Adjusted Benchmark		56.8%	20.0%	18.9%	16.5%	12.0%	
Lipper Large-Cap Growth		60.8%	21.3%	20.0%	16.1%	11.8%	
<i>Excess Return</i>		-4.8%	1.0%	-0.3%	-0.3%	-0.1%	
<i>Alpha</i>		-2.2%	1.6%	0.1%	-0.2%	-0.1%	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		81	44	67	53	42	
LA Capital All-Cap Growth	830,441,027	52.5%	16.9%	15.7%	14.8%	12.8%	5/31/05
S&P 1500 Growth		61.0%	20.0%	19.0%	16.1%	11.9%	
Style & Risk Adjusted Benchmark		55.0%	18.7%	17.6%	14.5%	10.4%	
Lipper Multi-Cap Growth		71.7%	21.7%	20.1%	15.3%	11.8%	
<i>Excess Return</i>		-8.5%	-3.1%	-3.3%	-1.3%	0.8%	
<i>Alpha</i>		-2.5%	-1.8%	-1.9%	0.3%	2.3%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		87	81	87	48	26	
Ark Investments	679,068,308	163.2%	36.8%	39.3%	--	40.5%	3/1/16
S&P 1500 Growth		61.0%	20.0%	19.0%	--	20.2%	
Style & Risk Adjusted Benchmark		124.7%	18.5%	29.8%	--	31.4%	
Lipper Multi-Cap Growth		71.7%	21.7%	20.1%	--	21.2%	
<i>Excess Return</i>		102.2%	16.7%	20.2%	--	20.3%	
<i>Alpha</i>		38.4%	18.3%	9.4%	--	9.1%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		2	7	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>
LA Capital Deep Value	626,999,479	52.1%	6.8%	9.2%	--	7.5%	4/1/15
S&P 1500 Value		53.8%	11.8%	12.4%	--	10.1%	
Style & Risk Adjusted Benchmark		45.1%	12.8%	13.2%	--	10.7%	
Lipper Multi-Cap Value		63.8%	10.2%	11.5%	--	8.8%	
<i>Excess Return</i>		-1.7%	-5.0%	-3.2%	--	-2.6%	
<i>Alpha</i>		7.1%	-6.0%	-4.0%	--	-3.3%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		82	88	86	--	81	
Large-Cap Consistent Growth	601,082,437	48.3%	17.8%	16.9%	--	14.9%	3/1/15
S&P 500		56.4%	16.8%	16.3%	--	13.2%	
Style & Risk Adjusted Benchmark		62.0%	20.0%	18.8%	--	15.3%	
Lipper Large-Cap Core		54.5%	15.7%	15.3%	--	12.1%	
<i>Excess Return</i>		-8.1%	1.0%	0.6%	--	1.6%	
<i>Alpha</i>		-13.7%	-2.1%	-1.9%	--	-0.5%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		86	16	14	--	2	
Seizert Capital Partners	529,471,334	66.2%	13.9%	15.4%	10.7%	14.2%	11/30/09
S&P 1500 Value		53.8%	11.8%	12.4%	10.0%	12.6%	
Style & Risk Adjusted Benchmark		54.8%	11.8%	12.2%	10.0%	12.7%	
Lipper Multi-Cap Value		63.8%	10.2%	11.5%	8.8%	11.4%	
<i>Excess Return</i>		12.4%	2.1%	3.0%	0.8%	1.6%	
<i>Alpha</i>		11.4%	2.2%	3.2%	0.7%	1.5%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		35	10	4	14	3	
Clarkston Capital Small/Mid-Cap	527,161,058	71.6%	16.4%	15.1%	14.1%	14.0%	1/1/14
S&P 400		86.9%	13.5%	14.7%	11.4%	11.4%	
Style & Risk Adjusted Benchmark		50.7%	10.2%	11.1%	8.8%	8.8%	
Lipper Mid-Cap Core		72.8%	12.1%	12.8%	9.5%	9.5%	
<i>Excess Return</i>		-15.4%	2.9%	0.3%	2.7%	2.6%	
<i>Alpha</i>		20.8%	6.2%	4.0%	5.3%	5.2%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		53	5	11	1	1	
Value, Quality, Momentum Composite	354,406,283	--	--	--	--	22.2%	10/1/20
S&P 1500		--	--	--	--	21.1%	
Style & Risk Adjusted Benchmark		--	--	--	--	22.5%	
Lipper Multi-Cap Core		--	--	--	--	23.0%	
<i>Excess Return</i>		--	--	--	--	1.2%	
<i>Alpha</i>		--	--	--	--	-0.3%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		--	--	--	--	47	
Martin Currie	284,869,434	--	--	--	--	13.9%	11/1/20
S&P 1500 Growth		--	--	--	--	17.9%	
Style & Risk Adjusted Benchmark		--	--	--	--	39.7%	
Lipper Multi-Cap Growth		--	--	--	--	19.0%	
<i>Excess Return</i>		--	--	--	--	-3.9%	
<i>Alpha</i>		--	--	--	--	-25.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		--	--	--	--	89	
Disruptive Innovation Momentum	280,867,593	--	--	--	--	66.3%	9/1/20
MSCI Momentum Index		--	--	--	--	5.1%	
Style & Risk Adjusted Benchmark		--	--	--	--	52.4%	
Lipper Multi-Cap Growth		--	--	--	--	13.2%	
<i>Excess Return</i>		--	--	--	--	61.2%	
<i>Alpha</i>		--	--	--	--	13.8%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		--	--	--	--	1	
Attucks Asset Management	127,207,911	50.0%	10.4%	11.6%	8.7%	7.4%	11/30/07
S&P 1500		58.7%	16.5%	16.2%	13.4%	9.6%	
Style & Risk Adjusted Benchmark		46.8%	11.3%	11.7%	9.5%	9.6%	
Lipper Multi-Cap Core		60.6%	14.0%	14.3%	11.3%	8.3%	
<i>Excess Return</i>		-8.7%	-6.1%	-4.6%	-4.6%	-2.2%	
<i>Alpha</i>		3.2%	-0.9%	-0.1%	-0.8%	-2.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		82	88	86	89	75	

<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 Momentum Index	119,791,387	--	--	--	--	9.5%	10/1/20
MSCI Momentum Index		--	--	--	--	9.4%	
Style & Risk Adjusted Benchmark		--	--	--	--	38.2%	
Lipper Multi-Cap Growth		--	--	--	--	16.3%	
<i>Excess Return</i>		--	--	--	--	0.1%	
<i>Alpha</i>		--	--	--	--	-28.6%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		--	--	--	--	92	
Bivium Capital Partners	117,990,028	40.3%	8.0%	10.6%	7.9%	6.6%	11/30/07
S&P 1500 Value		53.8%	11.8%	12.4%	10.0%	7.1%	
Style & Risk Adjusted Benchmark		54.7%	11.4%	12.1%	9.7%	9.9%	
Lipper Multi-Cap Value		63.8%	10.2%	11.5%	8.8%	6.7%	
<i>Excess Return</i>		-13.5%	-3.8%	-1.8%	-2.0%	-0.5%	
<i>Alpha</i>		-14.3%	-3.4%	-1.5%	-1.8%	-3.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		95	78	67	69	58	
SMRS Value Index	117,416,088	--	--	--	--	40.3%	10/1/20
MSCI Value Index		--	--	--	--	40.3%	
Style & Risk Adjusted Benchmark		--	--	--	--	29.9%	
Lipper Multi-Cap Value		--	--	--	--	33.1%	
<i>Excess Return</i>		--	--	--	--	0.0%	
<i>Alpha</i>		--	--	--	--	10.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		--	--	--	--	19	
SMRS Quality Index	117,198,807	--	--	--	--	18.3%	10/1/20
MSCI Quality Index		--	--	--	--	18.2%	
Style & Risk Adjusted Benchmark		--	--	--	--	21.0%	
Lipper Multi-Cap Core		--	--	--	--	23.0%	
<i>Excess Return</i>		--	--	--	--	0.1%	
<i>Alpha</i>		--	--	--	--	-2.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		--	--	--	--	78	
Ancora	105,516,208	86.5%	12.3%	--	--	11.9%	10/1/17
S&P 1000		86.9%	13.5%	--	--	13.1%	
Style & Risk Adjusted Benchmark		74.9%	11.0%	--	--	9.9%	
Lipper Mid-Cap Core		72.8%	12.1%	--	--	11.6%	
<i>Excess Return</i>		-0.4%	-1.2%	--	--	-1.2%	
<i>Alpha</i>		11.6%	1.3%	--	--	2.0%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		12	49	--	--	44	

State of Michigan Retirement System

INTERNATIONAL EQUITY REVIEW

State of Michigan Investment Board Meeting

June 10, 2021



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	53.2%	7.7%	10.9%	6.8%	6.4%
MSCI ACWI ex USA Returns	49.4%	6.5%	9.8%	5.3%	5.1%
Peer Median Returns	53.2%	7.1%	10.1%	6.0%	6.1%
Percentile Rank vs. Peers*	52	39	31	29	33

*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 3.8% over the last twelve months.
- Outperformance was driven by the value factor, momentum factor, energy sector, and information technology 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 1.8%, which is below the division's risk budget of 3.0%.
 - The division's core strategy of exposure to the quality, value and momentum factors (QVM), accounts for only 34.0% of the total tracking error indicating that long-term, the portfolio is not materially exposed to any one single risk.
- Quarterly changes to International Equity Division allocation.
 - Rebalanced \$0.8 billion of equity swaps to match the division's long-term equity factor strategy.
 - Allocated \$0.2 billion of Internal Stock Plus' Tier 3 collateral to LGT Crown European Private Debt III (CEPD III). The investment improves the estimated returns of the collateral portfolio without taking on additional undo market risk.

Market Environment and Outlook

Market Performance

- International stock markets declined nearly -33.0% in early 2020. Since early April 2020, markets have dramatically rebounded up nearly 53.0% through early May 2021. Fundamentals remained sluggish with earnings per share declining -6.3%, leading to significant multiple expansion of approximately 63.0% during the period.
- Performance of the quality, value, and momentum factors remains strategically important to the IED. The value factor outperformed the MSCI ACWI ex USA by 7.9% year-to-date. The quality and momentum factors both have underperformed the benchmark, down -1.5% and -5.6% respectively. IED's core strategy remains balanced and has collectively outperformed the division's benchmark 1.4% year-to-date.
- Emerging markets underperformed the MSCI ACWI ex USA by -3.6% year-to-date. Developed markets outperformed the broader index by 1.6%.
- The U.S. dollar was essentially flat year-to-date up 0.3%.
- Commodities have surged in 2021 up 20.4% year-to-date outperforming international stocks by 11.9%. Oil and copper are both up 33.8% and 34.9% for the year indicating a full recovery is underway as markets attempt to price in a reopening of the economy. Gold has declined -3.4% this year.
- Global government interest rates (index weighted) remain subdued, at approximately 1.1%.

Outlook

- Global stock markets and commodity markets have looked beyond trailing economic fundamentals in anticipation of a fully reopened economy and potentially the emergence of global inflation. Record levels of central bank liquidity have driven stock markets to new market highs despite an above average global recession which is different than prior economic cycles.
- More recently, several signs indicate the global economy is accelerating. The key question remains, can the global economy deliver on the stock market's lofty 2021 growth expectations.
- Europe top line sales and earnings contracted year-over-year at -1.3% and -3.2%. This marks a downward acceleration in trailing fundamentals for Europe. Forward looking sales and earnings per share have continued to improve and are expected to be up over the next 12 months, 7.7% and 28.0% respectively.
- Japan has been slower in its recovery relative to other nations. Sales and earnings per share declined year-over-year -7.5% and -10.3% respectively. Forward looking sales and earnings growth are forecasted at 3.0% and 23.0%.
- Central banks are fully committed to an "anything it takes" policy. The question will be if the vast amounts of liquidity can offset the gap between high market valuations and actual fundamentals especially if growth expectations don't transpire.

- Analysts' expectations are high with forward-looking earnings per share growth estimated at 27.8% for the MSCI ACWI ex USA index.
- Go-forward returns for the MSCI ACWI ex USA index on an annualized basis are estimated at 7.6%. This rate is based on the current price and actual fundamentals over multiple periods to remove fundamental variability, better estimating the earnings power of the index.
- A ten-year blended international government yield of 1.1% implies an international equity risk premium of 6.5%. The equity risk premium decreased during the quarter due to significant increases in stock prices and only minor increases to the long-term earnings projections of the index.

Conclusion

International stock market fundamentals have stabilized. Global government bond yields remain near all-time lows as central banks remain committed to ultra-accommodative monetary policies not seen since the Great Financial Crisis. 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.

Forward looking estimates for stock markets are lofty. International stocks are expected to grow earnings per share by 27.8% in the next twelve months. The markets seem to already have priced in this expected growth with 47.0% multiple expansion over the last year. If stock market fundamentals do not match high expectations, IED believes that market multiples may come under significant pressure in 2021.

International stock markets trade at approximately their twenty-three-year average of 17.0x price to earnings history, and a wide spread 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

3/31/21

Markets	Amount	Total	% of Total
Active (\$ in Millions)			
BlackRock MSCI	\$2,539		
Wellington	1,110		
IED Quality Equity	725		
Martin Currie	520		
Marathon-London	377		
Lazard	293		
UBS	235		
Total Active		\$5,801*	38.4%
Stock Plus			
Internal	\$3,486		
PIMCO	2,369		
Total Stock Plus		\$5,855	38.8%
Indexed			
SSGA	\$1,790		
BlackRock	1,649		
Total Indexed		\$3,439	22.8%

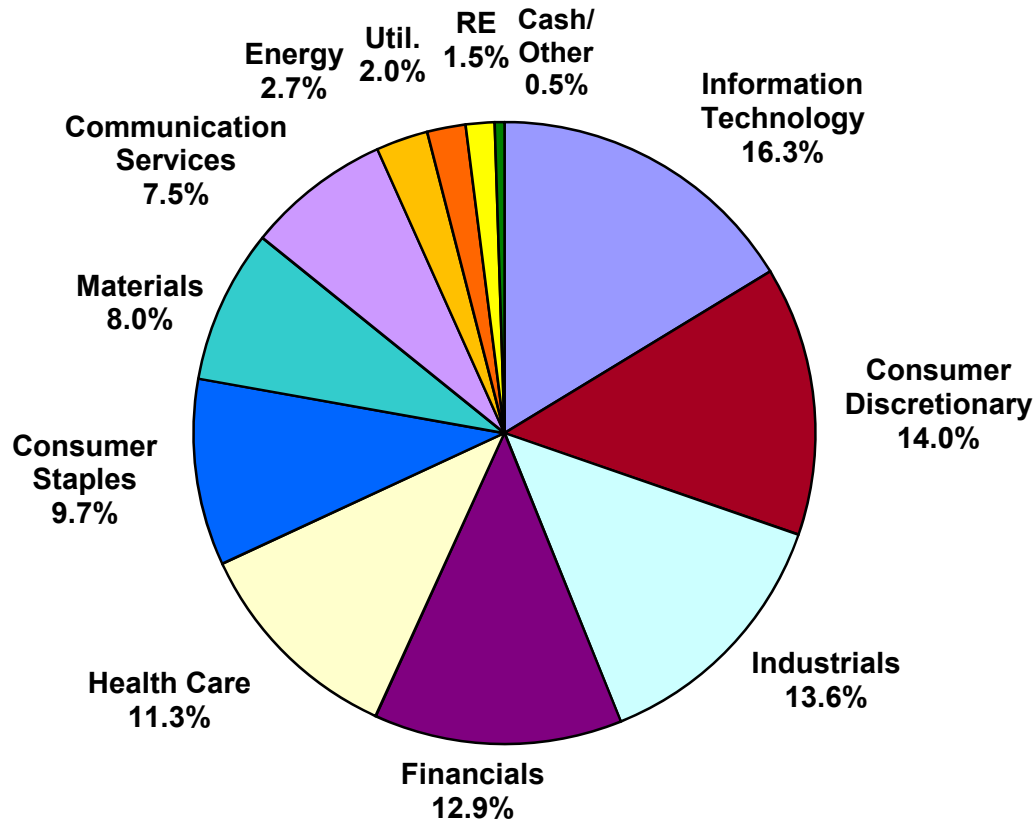
*Note: Total includes residual cash total of \$1,136,398 from the closed fund of LA Capital World ex US.

TOTAL	<u>\$15,094</u>	<u>100.0%</u>
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SMRS

International Equity By Sector

3/31/21



Market Value in Millions				
3/31/21				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Information Technology	\$2,459	16.3%	12.5%	3.8%
Consumer Discretionary	2,121	14.0%	13.4%	0.6%
Industrials	2,049	13.6%	11.9%	1.7%
Financials	1,947	12.9%	19.0%	-6.1%
Health Care	1,709	11.3%	8.9%	2.4%
Consumer Staples	1,470	9.7%	8.4%	1.3%
Materials	1,209	8.0%	8.8%	-0.8%
Communication Services	1,134	7.5%	6.9%	0.6%
Energy	402	2.7%	4.5%	-1.8%
Utilities	300	2.0%	3.1%	-1.1%
Real Estate	221	1.5%	2.6%	-1.1%
Total Investments	\$15,021	99.5%	100.0%	
Cash/Other	73	0.5%	0.0%	0.5%
Total	\$15,094	100.0%	100.0%	

Benchmark: MSCI ACWI ex USA

SMRS

International Equities

3/31/21

Date:	<u>3/31/21</u>	<u>12/31/20</u>	<u>9/30/20</u>	<u>6/30/20</u>
Assets (\$ in Millions):	\$15,094	\$14,527	\$12,315	\$11,458
Number of Securities:	2,632	2,616	2,655	2,677
Active Share:	34%	34%	33%	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	8.2%	8.7%	6.8%	7.6%
Sustainable Growth Rate	6.1%	6.4%	5.3%	5.7%
Dividend Yield	1.5%	1.7%	1.7%	1.9%
Buyback Yield	-0.1%	0.0%	-0.2%	0.0%
Collateral Yield	0.7%	0.7%	--	--
Risk:				
Beta	0.97	--	1.00	--
Volatility	19.7%	--	20.4%	--
Tracking Error	1.8%	--	0.0%	--
Information Ratio	0.8	0.6	--	--
Fundamental:				
Average Capitalization (\$ in Billions)	110.9	--	111.0	--
Price/Earnings	22.9	23.5	23.7	23.0
Price/Book	2.1	2.4	2.0	2.3
ROE	9.1%	10.4%	8.4%	10.1%

TOP TEN HOLDINGS

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

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
Tencent Holdings Ltd.	2.6%	\$752.8	33.4	\$385.1
Taiwan Semiconductor Manufacturing Co., Ltd.	2.5%	533.5	26.3	373.5
ASML Holding NV	2.1%	254.9	49.3	316.0
Samsung Electronics Co., Ltd.	1.7%	482.4	15.1	251.0
Nestle S.A.	1.3%	322.5	24.0	203.6
Alibaba Group Holding	1.2%	613.7	22.1	183.0
Roche Holding	1.2%	282.9	15.6	182.9
SAP	0.8%	150.8	21.4	126.7
Novo Nordisk A/S Class B	0.8%	123.1	22.4	121.3
CSL Limited	<u>0.8%</u>	<u>91.7</u>	39.1	<u>115.5</u>
TOTAL	<u>15.0%</u>	<u>\$3,608.4</u>		<u>\$2,258.7</u>

International Equity Performance - Net of Fees
3/31/21

<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 Equity	\$15,094,261,516	52.9%	7.4%	10.7%	6.6%	6.5%	1/1/04
MSCI ACWI ex USA		49.4%	6.5%	9.8%	5.3%	6.5%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	6.0%	
<i>Excess Return</i>		3.5%	0.9%	1.0%	1.3%	0.0%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		20	10	4	6	23	

Total International Active Strategy	\$5,800,670,695*	51.8%	7.9%	10.3%	6.4%	6.0%	5/1/05
MSCI ACWI ex USA		49.4%	6.5%	9.8%	5.3%	6.0%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	5.5%	
<i>Excess Return</i>		2.4%	1.4%	0.5%	1.1%	0.0%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		26	10	10	9	25	
BlackRock MSCI Systematic Return	2,539,277,781	51.0%	--	--	--	16.8%	12/1/18
MSCI ACWI ex USA		49.4%	--	--	--	12.9%	
Lipper International Multi-Cap Core		46.8%	--	--	--	11.6%	
<i>Excess Return</i>		1.6%	--	--	--	3.9%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		29	--	--	--	2	
IED Quality Equity	725,045,905	54.2%	--	--	--	24.7%	2/1/20
MSCI ACWI ex USA		49.4%	--	--	--	15.0%	
Lipper International Multi-Cap Core		46.8%	--	--	--	13.0%	
<i>Excess Return</i>		4.8%	--	--	--	9.7%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		16	--	--	--	2	
Martin Currie International Long-Term	520,242,814	50.5%	16.1%	--	--	16.3%	2/1/17
MSCI ACWI ex USA		49.4%	6.5%	--	--	9.6%	
Lipper International Multi-Cap Core		46.8%	46.8%	--	--	8.5%	
<i>Excess Return</i>		1.1%	9.6%	--	--	6.6%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		32	32	--	--	1	
Wellington IRE	511,791,052	48.0%	6.5%	9.9%	5.7%	5.4%	12/1/05
MSCI World ex USA		45.9%	6.3%	8.9%	4.8%	4.9%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	5.0%	
<i>Excess Return</i>		2.1%	0.2%	1.0%	0.9%	0.4%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		45	27	21	13	24	
Marathon-London International Fund	377,138,799	51.4%	7.0%	8.8%	6.2%	9.0%	2/1/12
MSCI World ex USA		45.9%	6.3%	8.9%	4.8%	7.0%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	7.2%	
<i>Excess Return</i>		5.5%	0.7%	-0.1%	1.5%	2.0%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		29	14	59	9	4	
Wellington Emerging Markets Local Equity	359,324,715	60.0%	4.1%	11.6%	6.9%	7.9%	12/1/11
MSCI Emerging Market Index		58.4%	6.5%	12.1%	6.6%	6.3%	
Lipper Emerging Markets		63.0%	6.1%	11.4%	5.9%	5.9%	
<i>Excess Return</i>		1.6%	-2.4%	-0.5%	0.3%	1.6%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		58	74	52	39	21	
Lazard/Wilmington International Equity	293,175,000	43.7%	5.4%	6.8%	--	4.0%	6/1/14
MSCI World ex USA		45.9%	6.3%	8.9%	--	4.4%	
Lipper International Large-Cap Core		46.8%	5.5%	8.6%	--	4.7%	
<i>Excess Return</i>		-2.2%	-0.9%	-2.1%	--	-0.3%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		74	55	87	--	81	
Wellington Select China Equity	238,551,978	81.8%	--	--	--	54.5%	9/1/19
MSCI China On shore		46.0%	--	--	--	39.6%	
Lipper Emerging Markets		63.0%	--	--	--	21.3%	
<i>Excess Return</i>		35.8%	--	--	--	14.9%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		9	--	--	--	1	
UBS China A Opportunity Fund	234,986,253	--	--	--	--	49.1%	5/1/20
MSCI China On shore		--	--	--	--	39.6%	
Lipper Emerging Markets		--	--	--	--	48.2%	
<i>Excess Return</i>		--	--	--	--	9.5%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		--	--	--	--	46	

<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	\$5,854,808,777	55.7%	7.2%	11.5%	7.1%	8.3%	1/1/09
MSCI ACWI ex USA		49.4%	6.5%	9.8%	5.3%	8.2%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	7.9%	
<i>Excess Return</i>		6.3%	0.7%	1.7%	1.8%	0.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		13	10	2	6	27	
Internal Stock Plus	3,486,089,833	52.5%	6.5%	9.0%	6.6%	6.8%	9/1/11
MSCI ACWI ex USA		49.4%	6.5%	9.8%	5.3%	6.2%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	6.7%	
<i>Excess Return</i>		3.1%	0.0%	-0.8%	1.3%	0.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		24	26	44	6	41	
PIMCO StocksPLUS	2,368,718,944	60.6%	--	--	--	16.7%	4/1/19
MSCI ACWI ex USA		49.4%	--	--	--	12.3%	
Lipper International Multi-Cap Core		46.8%	--	--	--	11.2%	
<i>Excess Return</i>		11.2%	--	--	--	4.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		8	--	--	--	4	

Total International Index Strategy	\$3,438,782,045	50.1%	6.8%	10.6%	6.5%	8.5%	7/1/09
MSCI ACWI ex USA		49.4%	6.5%	9.8%	5.3%	7.4%	
Lipper International Multi-Cap Core		46.8%	5.5%	8.6%	4.9%	7.5%	
<i>Excess Return</i>		0.7%	0.3%	0.8%	1.2%	1.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		35	19	5	8	11	
SSGA MSCI ACWI ex USA Index	1,789,836,205	50.5%	6.8%	--	--	6.6%	11/1/17
MSCI ACWI ex USA		49.4%	6.5%	--	--	6.3%	
Lipper International Multi-Cap Core		46.8%	46.8%	--	--	5.2%	
<i>Excess Return</i>		1.0%	0.3%	--	--	0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		32	32	--	--	15	
Blackrock ACWI ex USA Index	1,648,945,840	49.7%	6.8%	--	--	6.0%	3/1/18
MSCI ACWI ex USA		49.4%	6.5%	--	--	5.7%	
Lipper International Multi-Cap Core		46.8%	5.5%	--	--	5.1%	
<i>Excess Return</i>		0.3%	0.3%	--	--	0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		37	18	--	--	32	

* Note: Total includes residual cash total of \$1,136,398 from the closed fund of LA Capital World ex US.

State of Michigan Retirement System

REAL RETURN & OPPORTUNISTIC REVIEW

State of Michigan Investment Board Meeting
June 10, 2021



Jennifer Yeung
Senior Investment Manager
Real Return & Opportunistic Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (03/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Real & Opportunistic	21.8%	13.5%	13.7%	11.7%	11.1%
Custom Benchmark	6.9%	6.7%	7.1%	7.0%	7.2%

- The portfolio value is \$11.2 billion with a one-year return of 21.8%. As global markets continued to rebound in the first quarter of 2021, the valuation of our portfolio holdings increased as well.
- Performance for the year was driven by i) income earned from entertainment royalties, investments in asset managers, credit investments and natural resource strategies and ii) capital appreciation of our natural resources and media and entertainment assets.

Strategy Update

- The objective of the Real Return & Opportunistic portfolio is to provide an inflation hedge and/or to gain exposure to attractive opportunities that may not fit in another plan portfolio.
- 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 \$3.8 billion of unfunded commitments. The following are new commitments closed during the quarter.
 - \$250.0 million to Axton Holdings LLC., follow-on equity contribution to acquire publishing and copyrights and purchase shares currently owned by Management. Music assets generate strong cash flows and are largely uncorrelated to traditional asset classes.
 - \$150.0 million to Blackstone Capital Opportunities Fund IV L.P. and \$37.5 million to Blackstone COF IV Co-Investment Fund L.P., comingled funds focused on upper-middle market, performing companies, with ability to invest flexibly across the capital structure. The Fund is expected to generate a high single digit cash yield and low mid-teens total return.
 - \$75.0 million to Turning Rock Fund II L.P., comingled fund focused on North American, lower-middle market businesses, providing transitional capital for special situations and structured securities. The Fund is expected to generate 3-4% cash yield and low-teens total return.
- In addition to monitoring the impact of COVID-19 and pace of economic recovery, we remain focused on finding differentiated strategies that are additive to the current portfolio mix and continue to favor private credit opportunities and niche strategies with some scalability. Specifically, we like opportunities that have defensible, contractual 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

3/31/21

Top Ten Advisors or Entities

(\$ in Millions)

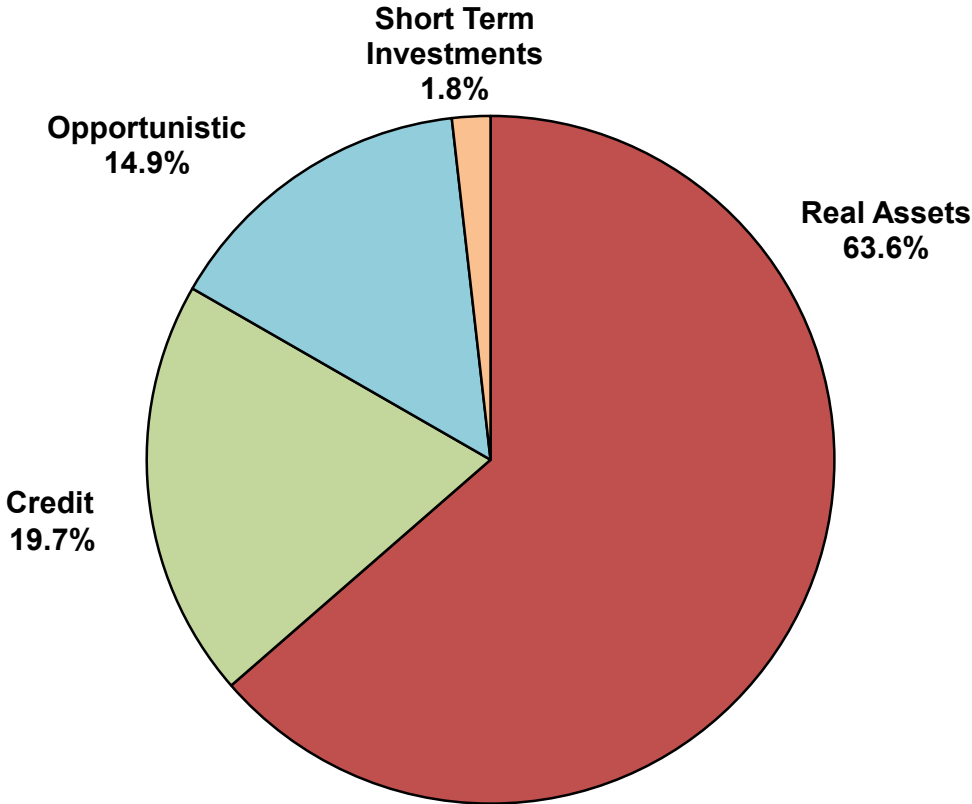
Advisor or Entity	Market Value
Great Mountain Partners LLC	\$ 4,449
Apollo Global Management	1,043
Barings Alternative Investments	880
Domain Capital Advisors	783
Sixth Street Partners	543
Blackstone Alternative Asset Management	343
Czech Asset Management	332
Kayne Anderson Capital Partners	288
Orion Resource Partners	255
Ridgewood Energy	251
Total Market Value	\$ 9,167

SMRS

Real Return and Opportunistic

3/31/21

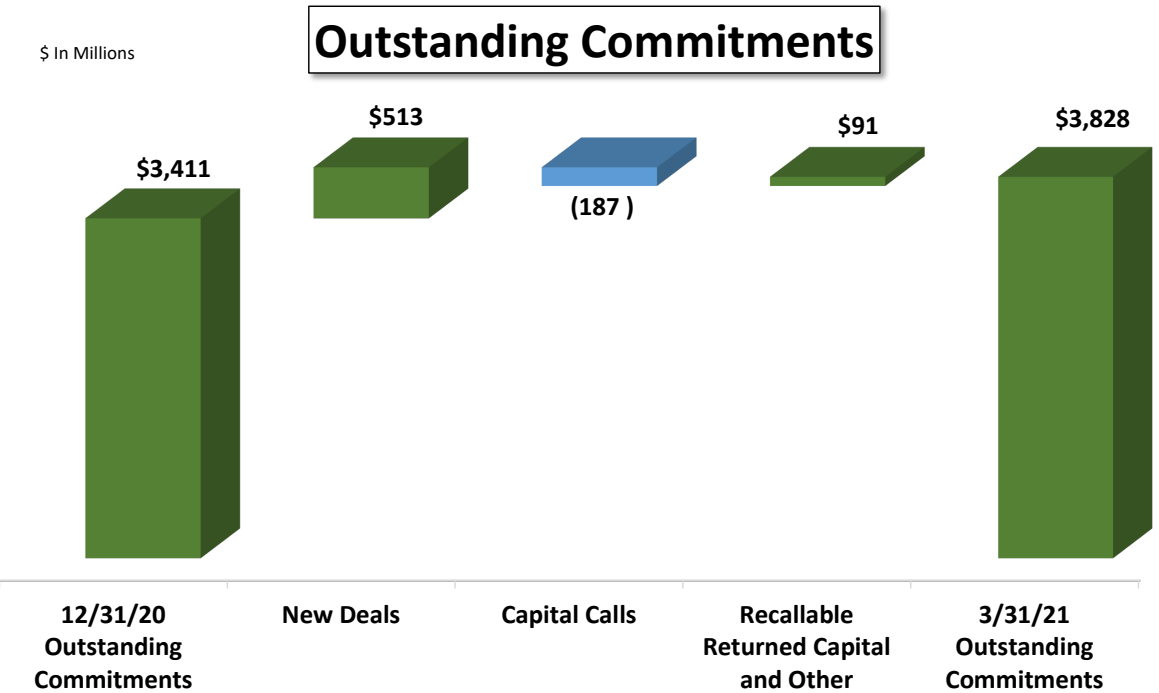
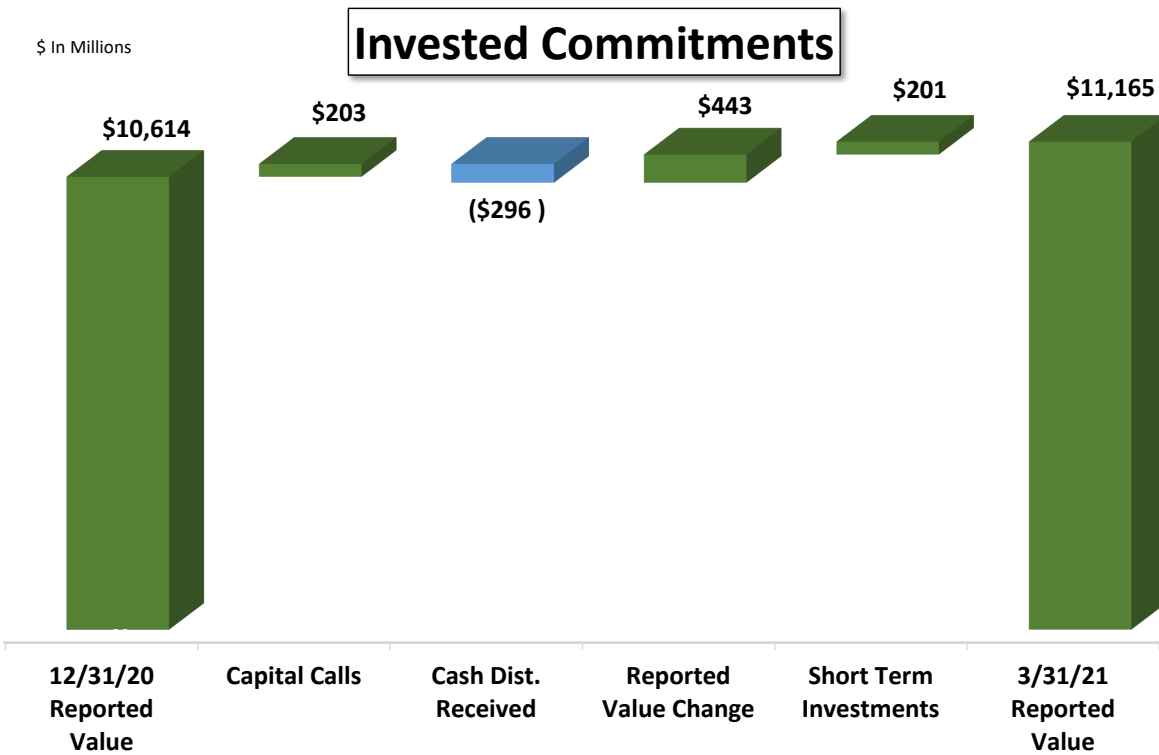
Investments By Strategy



Market Value in Millions	
	<u>3/31/21</u>
Real Assets	\$7,103
Credit	2,198
Opportunistic	1,664
Short Term Investments	<u>200</u>
Total Investments	<u><u>\$11,165</u></u>

SMRS

Real Return and Opportunistic 3/31/21



SMRS

Real Return and Opportunistic

3/31/21

Net Market Value by Entity

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
* Abernathy	\$ 279,032,660	\$ 11,147,622
* Abernathy II	4,863,381	0
Altus Midstream	9,182,250	0
Angelo Gordon Credit Solutions Fund	79,206,832	31,325,340
Apollo European Principal Finance Fund II	10,307,950	7,961,890
Apollo HK TMS Investments Holdings LP	212,737	0
** Axton Holdings	2,685,534,210	248,233,218
Barings Asset Based Income Fund I	171,831,598	95,867,960
Barings Global Real Asset Fund I	63,124,622	22,468,266
** Blackstone Capital Opportunities Fund IV, L.P.	3,853,719	146,146,281
** Blackstone COF IV Co-Investment Fund, L.P.	0	37,500,000
Blackstone Strategic Capital Holdings, LP	83,482,918	42,641,015
Blue Peninsula Fund LP	152,187,801	42,474,933
Broadriver III	141,465,971	57,077,823
BSCH Parallel (MLG) I LP	159,604,809	0
BSCH II	33,024,708	217,500,000
Blackstone Strategic Capital Holdings (Side Car)	66,680,356	31,195,124
Carlyle Energy Mezzanine Opportunity Fund II	16,852,819	7,650,436
Carlyle IEP Co-Invest (Varo)	13,685,147	837,818
Carlyle International Energy Partners	48,627,601	13,445,788
Carlyle International Energy Partners II	21,679,953	119,665,451
Castle Credit SMRS Holdings LLC	124,462,534	75,113,187
Centerbridge SCP III	21,022,674	1,432,213
Centerbridge SCP III, LP – Flex, L.P.	29,378,135	51,019,030
Content Holdings, LLC	364,417,196	44,816,704
Credit Opportunity Fund III	15,164,409	19,568,605
Energy Recap and Restructuring	11,508,941	7,085,025
ERR MI Holdings LP	1,740,912	2,269,933
FCO MA MI LP	159,148,018	35,783,758
Financial Credit Investment II	249,627,985	183,297,353
Financial Credit Investment III	215,725,252	147,494,918
Flywheel Energy Co-Invest	48,326,044	7,000,000
Fortress Transportation & Infrastructure	106,471,459	0
Greatrock LLC	110,623,140	0
Global Maritime	54,733,297	3,414,854
GSO Credit Alpha Fund	38,086,919	37,910,063
HarbourVest Direct Lending Fund (L) L.P.	24,742,167	75,000,000

	Net Market Value	Unfunded Commitment
Hopen Life Science Fund II	3,572,385	485,000
HPS Red Cedar Fund	207,758,470	113,748,021
HPS Mezzanine Partners 2019, L.P.	23,284,119	27,520,984
Kayne Anderson Energy Fund VII, LP	19,173,775	9,609,541
Kayne Anderson Private Energy Income Fund	102,173,018	31,670,432
Kayne Anderson Private Energy Income Fund II	38,827,123	124,349,623
Kayne Solutions Fund	44,025,064	193,000,331
KKR Energy Income & Growth Fund	33,609,228	0
KKR Lending Partners	3,458,348	11,524,868
KKR Lending Partners II	16,276,467	11,737,239
Lakewater	105,244,663	1,556,450
Lakewater II	72,219,100	54,788
Lakewater III	244,555,985	59,616
Lakewater IV	33,448,398	1,049,139
Lakewater V	78,978,460	3,023,810
Marathon CLO Equity Fund	15,215,559	0
Merit Energy Partners I LP	31,250,123	0
MidCap Finco Holdings LTD	290,837,505	0
Mortgage Servicing Rights	56,991,695	0
Napier Park Aircraft Leasing Vehicle I, LLC	40,784,676	17,944,862
Napier Park AL Rollover Fund I	14,529,165	59,939,034
Nash Co-Investment	12,673,286	94,259
New Fortress Energy HLDGS	1,638,551,616	0
NGP Natural Resources XII	80,366,597	67,625,036
Orion Mine Finance	49,499,250	0
Orion Mine Finance 1A	35,839,055	0
Orion Mine Finance Co-Fund II LP	6,831,426	35,000,000
Orion Mine Finance II	113,839,171	7,494,843
Orion Mine Finance III LP	48,757,017	30,969,948
Redding Ridge Holdings, LP	88,774,070	10,842,105
* Ren Venture Fund II	29,089,549	1,000,000
* Ren Venture Fund III	15,968,865	11,000,000
Ridgewood Energy Oil & Gas II	63,796,224	6,457,461
Ridgewood Energy Oil & Gas III	138,595,980	100,533,035
Ridgewood Fund II Co-Invest (REOG)	18,823,855	4,516,974
Riverside Credit Solutions FD I LP	33,318,338	14,219,291
RPEP Energy Opportunistic Institutional Partners	29,652,544	6,182,043
Sixth Street SSLE II (USD Feeder)	14,001,187	111,035,779
SJC Direct Lending Fund II	1,125,306	38,261,315
SJC Direct Lending Fund III	186,245,692	23,671,042
SJC Direct Lending Fund III Co-Invest G-III	43,209,110	0
SJC Onshore Direct Lending Fund IV – SMRS-L.P.	101,738,017	147,796,675
* Social Network Holdings	135,056,800	5,590,289
Specialty Loan Fund III	2,432,163	5,875,333

	Net Market Value	Unfunded Commitment
Sprott Private Resource Lending (US), LP	6,083,606	94,399,472
Sprott PRL(M) LP	1,193,703	23,653,148
Sprott PRL(M-Co-Invest) LP	1	25,000,000
Structured Credit Recovery Fund IV	172,804,531	0
Terra Co-Investment	35,462,806	14,000,000
TICP CLO Partners II	40,965,437	1,480,904
TICP CLO Partners III	49,673,194	49,648,858
TSSP Agriculture Partners	26,126,494	73,139,563
TSSP Adjacent Opportunities Partners	206,215,380	127,257,525
TSSP Capital Solutions	154,249,007	187,688,913
TSSP Opportunities Partners IV	51,348,731	56,995,779
Turning Rock Fund I, LP	52,619,801	26,167,976
** Turning Rock Fund II	0	75,000,000
Vida Insurance Credit Opportunity Fund II	100,705,732	9,433,075
Warwick (SMRS) Co-Invest, L.P.	30,313,027	2,089,081
Warwick Partners III	53,219,672	2,017,705
Total Real Return and Opportunistic	\$10,965,000,693	\$ 3,827,755,771
Short-Term Investments & Other	200,006,145	0
Grand Total	\$11,165,006,838	\$ 3,827,755,771

* Fund of Funds

** **New Commitment**

State of Michigan Retirement System

REAL ESTATE AND INFRASTRUCTURE REVIEW

State of Michigan Investment Board Meeting
June 10, 2021



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	-4.5%	3.3%	5.9%	8.1%	9.0%
NCREIF NPI	1.3%	3.6%	4.5%	6.2%	7.4%
Peer Median Returns	2.7%	5.0%	6.1%	8.3%	9.0%
Percentile Rank vs. Peers*	89	72	66	62	47

*State Street Universe greater than \$1 billion

- Underperformance relative to the one-year benchmark resulted primarily from the Real Estate and Infrastructure Division's (REID) strategy of being overweight in hospitality, performance in certain sectors of the infrastructure portfolio and an underweight in the industrial sector. Over the ten-year timeframe the REID is outperforming the benchmark by 160 basis points.

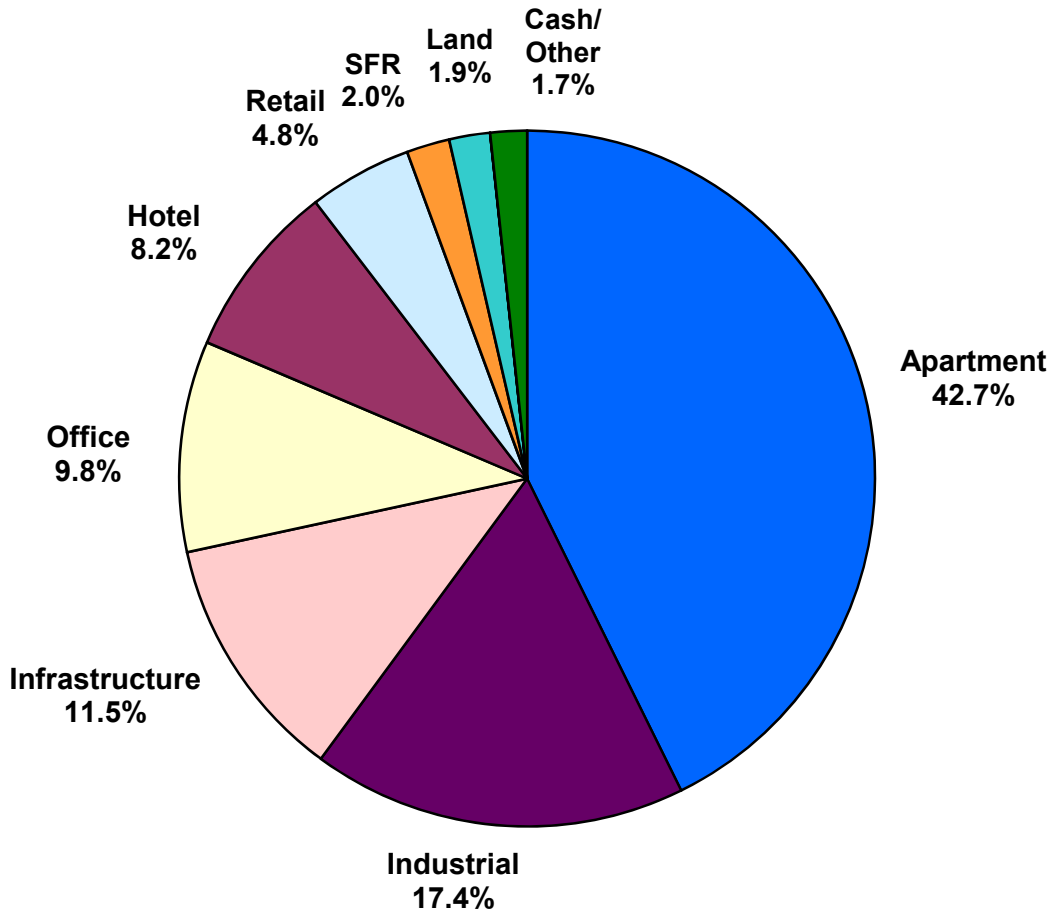
Strategy Update

- 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 certain segments of the 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 being felt in the commercial markets have been uneven across the real estate and infrastructure sectors. We continue to monitor, assess, and shift strategies, as necessary. US and foreign investors remain cautious, transaction volumes dropped to very low levels at the beginning of the pandemic and remain low for some sectors while rebounding nicely for others.
- We are focused on sourcing off-market opportunities through our extensive network and where available 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 approximately \$433 million, and funding for new or existing investments of just over \$575 million over the past 12 months.
- The REID has approximately \$1.6 billion in unfunded commitments. Two new commitments were made during the quarter.
 - \$75 million in BentallGreenOak US Cold Storage, LP, a closed-end vehicle investing in the US Cold Storage industrial sector, managed by BentallGreenOak.
 - \$35 million in ISO III SMRS Sidecar, L.P., co-investment into a European industrial platform alongside Invesco Strategic Opportunities III, L.P. fund investment, managed by Invesco Advisers, Inc.

SMRS

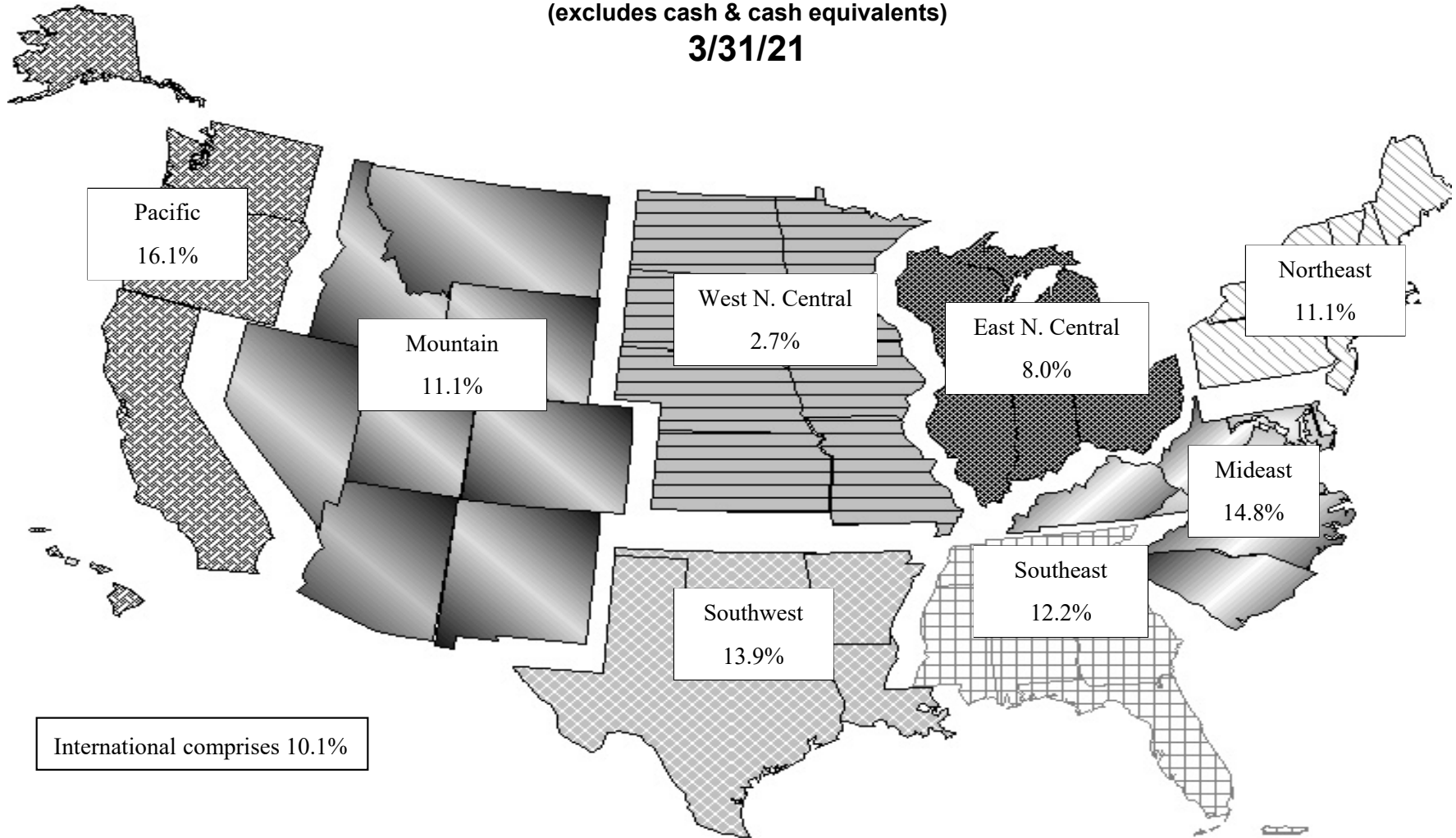
Real Estate and Infrastructure

3/31/21



Market Value in Millions				
	<u>3/31/21</u>		<u>3/31/20</u>	
Apartment	\$2,693	42.7%	\$2,676	39.7%
Industrial	1,093	17.4%	866	12.8%
Infrastructure	727	11.5%	862	12.8%
Office	618	9.8%	797	11.8%
Hotel	517	8.2%	893	13.2%
Retail	305	4.8%	342	5.1%
Single Family Residential (SFR)	128	2.0%	121	1.8%
Land	118	1.9%	85	1.3%
	<u>\$6,199</u>	<u>98.3%</u>	<u>\$6,642</u>	<u>98.5%</u>
Cash/Other	104	1.7%	103	1.5%
Total Investments	<u>\$6,303</u>	<u>100.0%</u>	<u>\$6,745</u>	<u>100.0%</u>

SMRS
Real Estate by Region
Based on Market Value
(excludes cash & cash equivalents)
3/31/21



3

Geographic regions defined by NCREIF, whose property index composition is: Pacific 33.7%, Mountain 6.6%, West N. Central 1.2%, Southwest 10.8%, East N. Central 6.9%, Southeast 9.9%, Northeast 19.5%, Midwest 11.4%

SMRS
Real Estate and Infrastructure
3/31/21

**Top Ten
Advisors or Entity**

<u>Advisor or Entity</u>	(\$ in millions)
	<u>Market Value</u>
MWT Holdings LLC	\$ 1,944
Principal Real Estate Investors	685
Clarion Partners	428
Domain Capital Advisors Inc	275
Five Star Realty Partners LLC	252
Blackstone Group	239
Transwestern Investment Management	182
L&B Realty Advisors	173
CIM Investment Advisors LLC	154
Rialto Capital Management LLC	149
	<u>\$ 4,481</u>

**Occupancy
by Property Type**

	Apartment	Office	Industrial	Retail	Hotel
SMRS Portfolio	93.1%	85.3%	95.5%	88.3%	33.0%
National Average	93.5%	85.0%	92.7%	94.9%	58.2%

SMRS
Market Values by Ownership Entity
3/31/21
REAL ESTATE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
801 Grand Avenue Capital, LLC	\$ 58,266,594	\$ 0
AEW Senior Housing III	3,832,523	715,013
AEW Senior Housing Investors IV	20,247,232	28,665,969
Apollo Asia Real Estate Fund	54,072,862	25,751,871
Asana Partners Fund I	27,468,999	3,499,559
Asana Partners Fund II	15,226,906	33,217,905
Avanath Affordable Housing II, LLC	31,355,416	0
Avanath II SMRS Co-Investment Fund LLC	6,480,783	0
Avanath Affordable Housing III	43,228,729	5,311,980
Avanath Affordable Housing IV	6,710,144	24,546,772
* BentallGreenOak US Cold Storage LP	0	75,000,000
BGO Europe III Co Invest	5,330,620	30,997,096
Blackstone R/E Partners V, LP	1,590,313	0
Blackstone R/E Partners VI, LP	2,928,239	3,680,930
Blackstone R/E Partners VIII, LP	57,744,323	12,209,681
Blackstone R/E Partners IX, LP	76,992,968	126,601,588
Capri Urban Investors, LLC	6,912,623	0
CIM Commercial Trust Corp	7,575,633	0
CIM Fund III, LP	31,107,699	0
CIM Fund VIII, L.P.	91,599,212	0
CIM VI (Urban REIT), LLC	23,765,506	0
Clarion Gables Multifamily Trust, LP	31,471,117	0
Columbus Circle Holdings, LLC	168,971,389	130,961,093
Crown Small Cap Real Estate	14,121,772	4,402,500
DM2501, LLC	0	0
Domain GVA-1, LLC	27,423,355	1,940,056
Domain Hotel Properties, LLC	126,075,174	0
Eastport Properties, LLC	0	0
Gateway Capital Real Estate Fund II, LP	2,782,818	0
Great Lakes Property Group Trust	14,935,455	746,897
GreenOak Europe III, LP	19,920,465	58,130,901
Heitman Credit	48,233,235	0
IDR Core Property Index Fund LLC	25,320,735	0
IMRF II ColInvest Spiga LP	56,636	0
India Property Fund II, LLC	15,489,136	1,552,610
Invesco Mortgage Recovery Feeder Fund	1,041,150	0
Invesco Mortgage Recovery Fund II, L.P.	28,781,636	26,390,889
Invesco Strategic Opportunities III, L.P.	21,930,783	82,461,385
IPF II Co-Invest LP	16,648,365	1,270,897
* ISO III SMRS Sidecar, LP	0	35,000,000
JBC Funds North LaSalle LLC	18,790,928	0
JBC Opportunity Fund III, LP	495,673	0
KBS/SM Fund III, LP	43,779,007	0
KBS/SM Fund IV	141,646	0
L-A Saturn Acquisition	41,243,049	0

	Market Value	Unfunded Commitment
Landmark Real Estate Partners V, LP	6,039,495	0
LaSalle Asia Opportunity Fund III, LP	1,230,502	0
Lion Industrial Trust	267,024,749	0
Lion Mexico Fund, LP	4,300,703	0
Lombard GVA0016 (former AGL Annuity)	252,204,888	0
Lone Star Fund X LP	171,066,576	29,311,293
Lone Star Fund XI LP	5,261,155	181,894,355
Lubert-Adler Real Estate Fund VII, LP	54,082,377	4,663,662
M301W CoInvest LLC	783,327	0
MERS Acquisitions Ltd.	173,520,670	0
MIP Holdco LLC	96,137,428	5,759,653
MSREF V - International	2,505,377	0
MSRESS Fund III Institutional LP	5,554,707	0
MWT Holdings, LLC	1,944,172,454	0
Northpark Land Associates	38,175,822	1,056,594
Orange Investors LLC	422,837	0
Paladin Realty Brazil Investors III (USA), LP	6,795,314	0
Paladin Realty Latin America Investors IV-CI, LP	24,995,992	0
Paladin Realty TB COINV V LP	9,616,741	0
Penmain Office LLC	40,792,671	0
Principal Separate Account	627,160,692	153,185,656
Proprium RE Spec. Situations Fund, LP	105,205,269	0
Rialto Credit Partshp LP	19,790,293	0
Rialto Real Estate Fund, LP	19,139,188	0
Rialto Real Estate Fund II, LP	23,201,011	0
Rialto Real Estate Fund III-Debt, LP	36,332,817	0
Rialto Real Estate Fund III-Property, LP	37,127,962	0
Rialto Real Estate Fund IV-Debt, LP	14,061,437	85,000,000
Rialto Mezzanine Partners Fund	107,269	0
SM Brell II LP	18,146,072	0
Stockbridge RE Fund II-C, LP	4,689,217	0
Strategic II LLC	61,825,757	37,364,243
TPG RE Finance Trust Inc. (TRTX)	54,031,510	0
TPG Real Estate Partners II	16,457,447	9,784,519
TPG Real Estate Partners III	16,710,941	32,285,452
TSP Spartan C-II LLC	16,691,745	0
TSP Value & Income Fund II, LP	28,058,342	22,118,936
Trophy Property Development LP	203,236	0
True North High Yield Invest. Fund II, LLC	1,872,734	0
True North Real Estate Fund III, LLC	26,908,327	5,000,000
	\$ 5,472,495,899	\$ 1,280,479,955
Short-Term Investments and Other	87,944,463	0
Total Real Estate Investments	\$ 5,560,440,362	\$ 1,280,479,955

* New or additional commitment made during the quarter reported

SMRS
Market Values by Ownership Entity
3/31/21

INFRASTRUCTURE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Arclight Energy Partners VI, LP	\$ 31,182,501	\$ 7,004,763
Arclight Energy Partners VII, LP	11,124,841	37,655,102
ASF VI Infrastructure B LP	24,534,887	5,662,895
ASF VII Infrastructure Fund B L.P.	19,657,969	12,874,916
ASF Como Co-Investment LP	7,193,902	2,405,051
Basalt Infrastructure Partners, LP	42,104,635	2,219,045
Blackstone Energy Partners, LP	13,223,929	4,728,291
Blackstone Energy Partners II, LP	60,047,076	8,184,851
Brookfield Infrastructure Fund II-B, L.P.	57,832,377	3,905,559
Customized Infrastructure Strategies, LP	14,187,584	4,509,834
Dalmore Capital Fund	71,590,799	0
GCM Grosvenor Infrastructure Investment Program, L.P.	59,838,109	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	40,560,783	11,786,100
Global E&P Infrastructure Fund II L.P.	43,824,617	3,625,768
GSO Energy Select Opportunities Fund LP	19,765,972	23,027,260
GSO Energy Select Opportunities Fund II, LP	7,078,028	43,260,908
JPMorgan AIRRO India SideCar Fund US, LLC	74,923,041	1,103,288
JPMorgan AIRRO Fund II	8,553,368	7,013,452
Kayne Renewable Opportunities Partners, LP	9,621,287	87,010,800
KKR Eagle CoInvest L.P.	33,510,596	1,703,268
KKR Global Infrastructure Investors, LP	48,435	2,935,433
Ridgewood Water & Strategic Infrastructure Fund LP	11,216,846	38,564,918
RPEP SMRS Infra II, LLC	15,957,399	3,469,723
StonePeak Infrastructure Fund LP	49,545,947	9,456,616
	<u>\$ 727,124,928</u>	<u>\$ 322,107,841</u>
Short-Term Investments and Other	15,820,816	0
Total Infrastructure Investments	<u>\$ 742,945,744</u>	<u>\$ 322,107,841</u>
TOTAL INVESTMENTS	<u>\$ 6,303,386,106</u>	<u>\$ 1,602,587,796</u>

* New or additional commitment made during the quarter reported

State of Michigan Retirement System

FIXED INCOME REVIEW

State of Michigan Investment Board Meeting

June 10, 2021



Daniel J. Quigley
Senior Investment Manager
Fixed Income Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	6.3%	5.0%	4.5%	4.4%	4.4%
Bloomberg Barclays US Agg	0.7%	4.7%	3.1%	3.3%	3.4%
Peer Median Returns	3.3%	5.0%	3.9%	3.6%	4.0%
Percentile Rank vs. Peers*	28	47	30	21	37

*State Street Universe greater than \$1 billion

- The fixed income portfolio outperformed its benchmark and peer group on a one-year basis. This outperformance was driven by a recovery in risk assets over the previous twelve months, particularly for structured credit securities. The portfolio also maintains a shorter duration than the benchmark which has helped recent performance as interest rates have increased over the previous quarters.
- The performance of fixed income indices was driven by the increase in intermediate and long-term interest rates during the quarter. Long duration indices, such as the U.S. Investment Grade Corporate index, had negative returns for the quarter, offsetting strong gains last year. Shorter duration indices such as U.S. Agency RMBS and High Yield outperformed.
- The year-over-year (YOY) tightening of spreads for high yield credit and structured credit securities was the main driver of performance on a one-year basis. Credit spreads were near their highest levels at the end of March 2020 and have recovered materially over the previous year.

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 3.1% versus a benchmark yield of 1.2%. 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 March 31, 2021, 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 58.6%. This includes a 26.5% allocation to U.S. Treasuries, TIPS, and cash.
 - **Plus:** The portfolio maintains a strategic out-of-benchmark allocation to high-yield corporate debt, securitized credit, and global fixed income strategies as market opportunities allow. This allocation increases the portfolio yield and total return potential but results in lower liquidity and higher volatility. The allocation to the Plus portfolio was 41.4% as of March 31, 2021.

Tactical Update

- The allocation to securitized credit, primarily in CMBS, ABS, non-agency RMBS, and CLO securities, was 29.3% 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 1st quarter of 2020 but has recovered meaningfully in the twelve months since. The one-year return on this portfolio was 8.3%.
- The allocation to high-yield strategies was 5.4% at the end of the quarter. This out-of-benchmark position has outperformed for the quarter and on a one-year basis. This has been driven by credit spread compression as well as having a shorter interest rate duration than the benchmark in a rising interest rate environment. The one-year performance of this allocation was 21.9%, outperforming the core index by over 2,000 basis points (bps).
- 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.
- We exited our allocation to U.S. TIPS during the quarter. This exit occurred as breakeven inflation expectations reached their highest levels in the past eight years, ending the quarter at 2.4%. The TIPS allocation has outperformed nominal U.S. Treasuries by roughly 1,200 bps for the previous year. We will continue to monitor inflation expectations and may increase our allocation if valuation levels move closer to historical averages.

Market Environment and Outlook

- The yield curve for U.S. Treasury securities steepened during the previous year as short-term interest rates increased by a smaller amount than long-term interest rates. Three-month U.S. Treasury Bills increased by 10 bps to 0.19% on a YOY basis while ten-year U.S. Treasuries increased by 111 bps to 1.78%.
- Inflation expectations increased by 39 bps during the quarter and by 145 bps over the previous twelve months.
- Credit markets continued to recover during the quarter with high yield corporate bond spreads tightening by 50 bps to 310 bps at the end of the quarter. High yield spreads are roughly 80 bps below their five-year average. Investment grade corporate bond spreads also tightened during the quarter, decreasing by 5 bps to 91 bps.
- Emerging Markets debt was relatively flat during the quarter with spreads decreasing by 2 bps to 279 bps. Emerging markets spreads are 378 bps tighter for the previous twelve months.
- The recovery of Commercial Mortgage Backed Securities (CMBS) was strong as securitized assets outperformed corporate credit last quarter. BBB CMBS spreads declined by 137 bps during the quarter to 336 bps. These spreads are 351 bps tighter YOY.

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

3/31/21

	Amount	Total	% of Total
Core (\$ in Millions)			
FID Internal	\$4,511		
PIMCO Mortgage Fund	590		
PGIM Investment Grade Credit	224		
Total Core		\$5,325	55.9%
Tactical			
Fidelity Tactical	\$513		
Total Tactical		\$513	5.4%
Securitized Debt			
TICP CLO Debt	\$811		
Met West Securitized Ops	509		
Napier Park ABS Income	437		
Principal CMBS	435		
Fortress Credit ABI	358		
Putnam DMS	157		
Napier Park Strategic Loan	86		
Total Securitized Debt		\$2,794	29.3%
High Yield			
PGIM High Yield	\$239		
Columbia Management	215		
Crescent Direct Lending	58		
Total High Yield		\$512	5.4%
Global			
T. Rowe Global Multi-Sector	\$264		
PGIM Global Liquid Relative Value	113		
Total Global		\$377	4.0%

TOTAL

\$9,520

100.0%

NOTE: Totals may not be exact due to rounding.

SMRS

Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

3/31/21

<u>Characteristic</u>	<u>Portfolio</u>	<u>Benchmark</u>
Average Maturity (Yrs)	8.1	8.2
Duration (Yrs)	5.2	6.0
Spread Duration (Yrs)	6.0	6.3
Coupon (%)	3.3	2.8
Yield to Maturity (%)	3.1	1.2
Credit Rating	A	AA
VaR (%)	7.6	6.5
Tracking Error (%)	3.8	NA
Beta (vs S&P 500)	0.07	-0.01

Commentary

Objectives

Income:

The coupon of the portfolio is approximately 50 bps higher than the benchmark. Price movement has been the main driver of U.S. bond market returns for the year, but Income is the primary driver of long-term performance.

Liquidity:

26.5% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.

Principal Preservation:

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

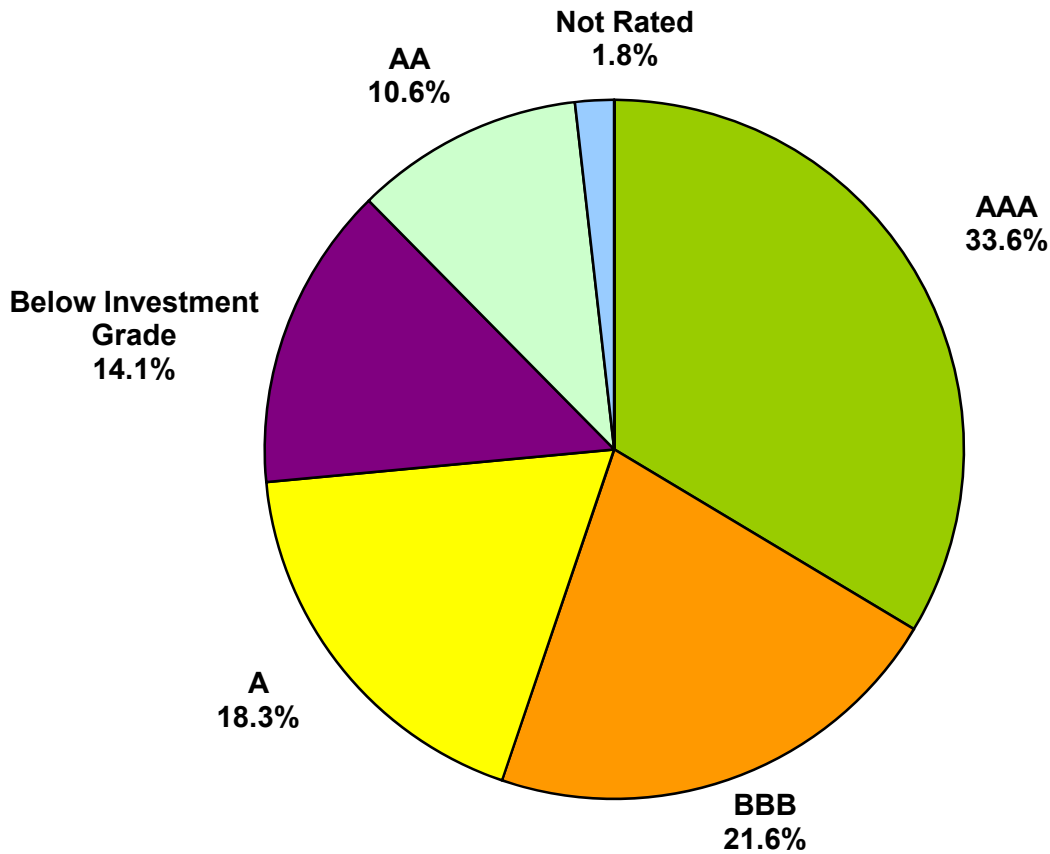
Diversification:

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

SMRS

Fixed Income By Rating

3/31/21



Market Value in Millions				
3/31/21				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
AAA	\$3,200	33.6%	68.7%	-35.1%
AA	1,010	10.6%	3.2%	7.4%
A	1,738	18.3%	11.2%	7.1%
BBB	2,051	21.6%	13.8%	7.8%
* Below Investment Grade	1,346	14.1%	0.4%	13.7%
Not Rated	175	1.8%	2.7%	-0.9%
Total Investments	<u>\$9,520</u>	<u>100.0%</u>	<u>100.0%</u>	

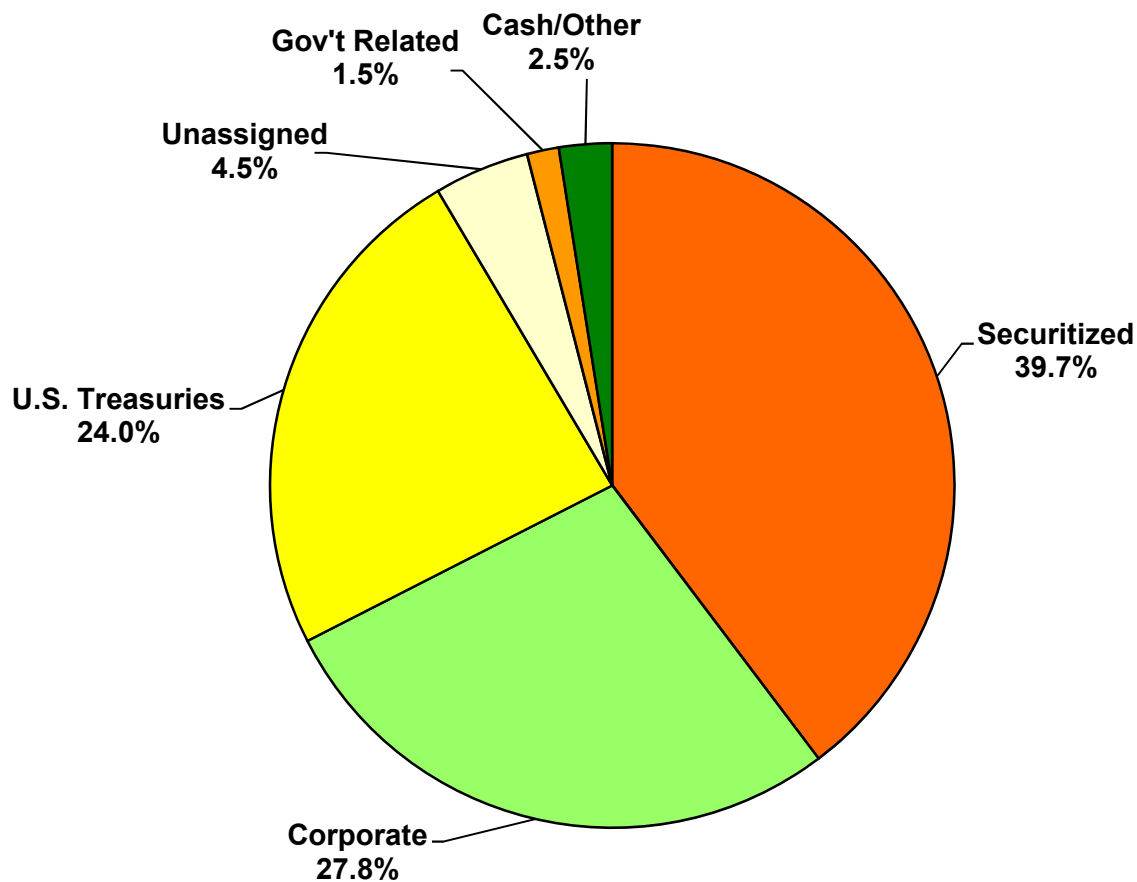
* Comprised of approximately 9.0% High Yield Credit and 5.1% High Yield RMBS/ABS

Benchmark: Barclays US Aggregate

SMRS

Fixed Income By Asset Type

3/31/21



Market Value in Millions				
3/31/21				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Securitized	\$3,783	39.7%	30.1%	9.6%
Corporate	2,642	27.8%	26.6%	1.2%
U.S. Treasuries	2,286	24.0%	37.1%	-13.1%
Unassigned	424	4.5%	0.0%	4.5%
Government Related	146	1.5%	6.2%	-4.7%
Cash/Other	239	2.5%	0.0%	2.5%
Total Investments	<u>\$9,520</u>	<u>100.0%</u>	<u>100.0%</u>	

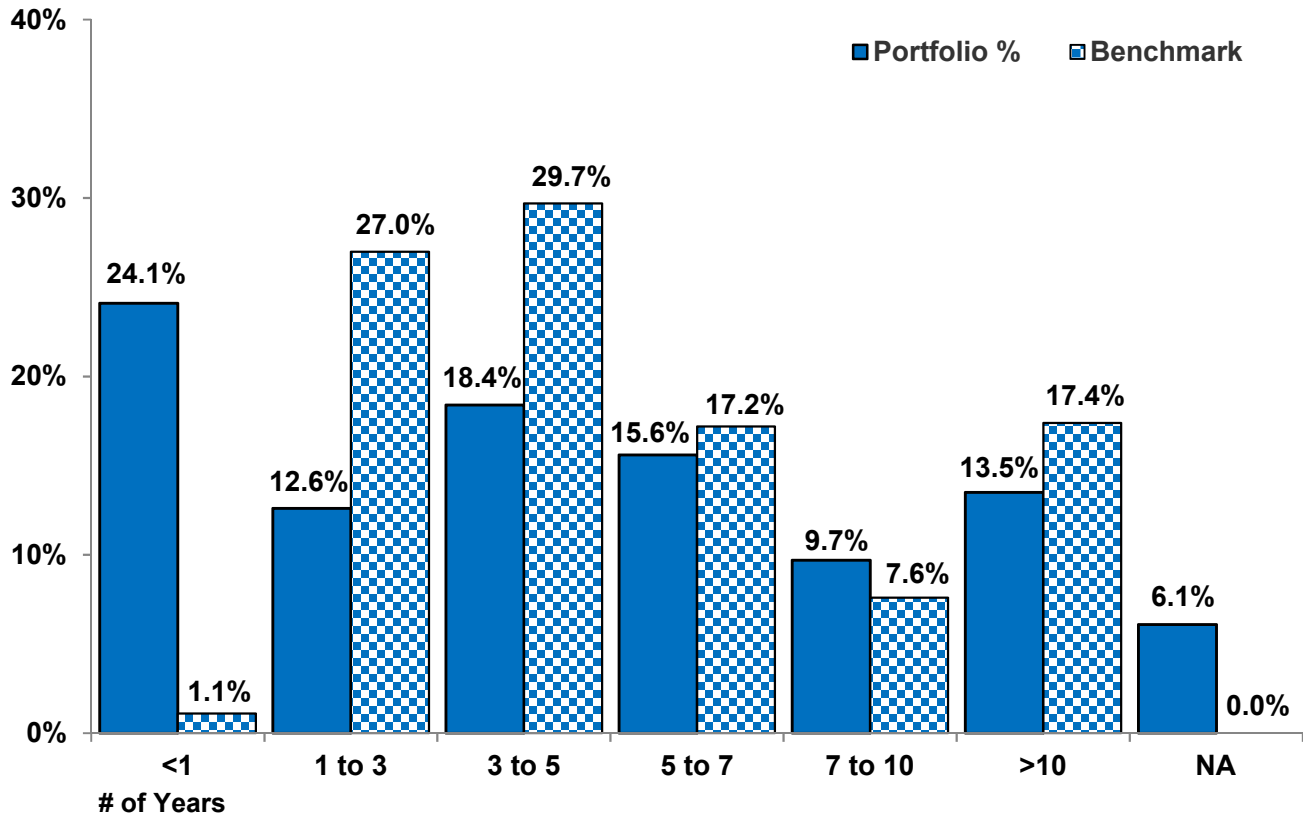
Benchmark: Barclays US Aggregate

SMRS

Duration Distribution

Fixed Income Composite Versus Benchmark

3/31/21



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	\$2,291	24.1%	1.1%	2.0	0.9
1 to 3	1,197	12.6%	27.0%	2.3	2.3
3 to 5	1,754	18.4%	29.7%	3.9	4.1
5 to 7	1,487	15.6%	17.2%	5.9	5.8
7 to 10	924	9.7%	7.6%	8.3	8.1
>10	1,282	13.5%	17.4%	18.1	16.2
NA	585	6.1%	0.0%	0.3	4.1
Total	\$9,520	100.0%	100.0%	5.5	6.3

* Effective Duration

Benchmark: Barclays US Aggregate

Total Fixed Income Performance - Net of Fees (MPERS)

3/31/21

	<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	\$9,520,283,600	6.03%	4.75%	4.30%	4.17%	4.21%
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>0.71%</i>	<i>4.65%</i>	<i>3.10%</i>	<i>3.31%</i>	<i>3.44%</i>
Internal Core Fixed Income	\$4,511,186,172	2.14%	4.75%	4.30%	4.17%	4.21%
Externally Managed Fixed Income	\$5,009,097,428	9.79%	4.37%	4.97%	4.27%	4.63%
PIMCO Mortgage Fund	589,796,975	0.39%	3.88%			
<i>Bloomberg/Barclays US MBS Agy Fixed Indx</i>	<i>N/A</i>	<i>-0.09%</i>	<i>3.75%</i>			
Investment Grade Credit	\$224,166,279	11.83%	6.67%	5.41%	4.99%	5.36%
PGIM Investment Grade	224,166,279	11.83%	6.67%	5.41%	4.99%	5.47%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>	<i>7.88%</i>	<i>5.95%</i>	<i>4.67%</i>	<i>4.42%</i>	<i>4.83%</i>
Tactical Fixed Income	\$512,767,112	12.54%	5.96%	5.55%	4.68%	5.44%
Fidelity Tactical Bond Fund	512,767,112	12.54%	6.33%	6.17%		
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>0.71%</i>	<i>4.65%</i>	<i>3.10%</i>	<i>3.31%</i>	<i>3.44%</i>
High Yield Fixed Income	\$511,831,439	21.91%	7.66%	7.47%	5.87%	
Columbia Management High Yield	215,403,033	19.70%	6.91%	6.78%	5.49%	
PGIM High Yield	238,819,024	26.23%	8.27%	8.14%	6.21%	
Crescent Direct Lending	57,609,382	14.43%				
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>	<i>21.97%</i>	<i>7.27%</i>	<i>7.61%</i>	<i>5.52%</i>	
Structured Fixed Income	\$2,793,657,719	8.34%	3.20%			
Principal CMBS	435,215,244	17.69%	4.62%	4.67%	4.46%	5.41%
MetWest Securitized Opportunities	508,959,014	10.33%	3.74%	4.99%	3.97%	
Napier Park ABS Income	437,377,933	3.49%	8.20%	9.74%		
Napier Park Strategic Loan LP	85,865,612	0.42%	4.08%			
TICP CLO Debt	811,167,407	26.57%	5.96%			
Fortress ABI	357,700,839	-0.08%				
Putnam DMS	157,371,670	14.44%				
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>0.71%</i>	<i>4.65%</i>	<i>3.10%</i>	<i>3.31%</i>	<i>3.44%</i>
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>4.86%</i>	<i>5.26%</i>	<i>3.53%</i>	<i>4.47%</i>	<i>5.29%</i>
Global Fixed Income	\$376,877,903	10.75%	4.66%	4.78%		
T. Rowe Global Multi-Sector	264,123,986	14.04%	4.90%	4.99%		
PGIM GLRV	112,753,918	3.70%	4.10%			
<i>Custom GMS Benchmark</i>	<i>N/A</i>	<i>8.64%</i>	<i>4.82%</i>	<i>4.59%</i>		

State of Michigan Retirement System

ABSOLUTE RETURN REVIEW

State of Michigan Investment Board Meeting

June 10, 2021



Daniel J. Quigley
Senior Investment Manager
Absolute Return Strategy

EXECUTIVE SUMMARY

Performance

MPSERS Plan (3/31/21)	1-Year	3-Years	5-Years	7-Years	10-Years
Absolute Return	9.0%	5.8%	6.9%	4.5%	5.0%
HFRI FOF Conservative	10.1%	4.8%	4.6%	3.2%	3.1%

- The value of the Absolute Return portfolio is \$3.8 billion with a one-year return of 9.0%. Performance of the portfolio was positive for the first quarter across all strategies, benefiting from broader equity markets rallying and credit spreads tightening.
- 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. This included equity activist, distressed credit, and fixed income relative value strategies. A hedge fund seeding strategy performed well as underlying managers continued to raise capital and generate strong returns. A Special Situations strategy also contributed positively, driven by an investment in growth-oriented assets as well as capital markets-oriented opportunities. Overall, Multi-Strategy managers served as effective diversifiers and reliable sources of alpha for the portfolio this quarter.
- Credit strategies also drove strong performance in the quarter. Corporate credit performance was positive, driven by broad-based spread tightening in high yield. Managers rotated out of higher dollar price, COVID-impacted credits, that have limited remaining upside. Residential Mortgage managers posted positive performance driven by spread tightening across reperforming loans, legacy mortgage-backed securities, and credit risk transfers. Performance was also supported by strong house price appreciation, additional government stimulus, stable consumer balance sheets and strong supply/demand dynamics.

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.
- Commitments closed during the quarter include:
 - \$100 million seed investment to Kayne Anderson BDC, Inc.- a direct lending strategy, focused on high quality middle market loans.
- In terms of allocation priorities, we will continue to increase exposure to high quality multi-strategy exposures, which act as a ballast to the portfolio. We will also build out equities allocations, specifically in quantitative strategies and sector-focused fundamental equity.

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

SMRS

Absolute Return

3/31/21

Net Market Values by Entity

	Net Market Value
* Tahquamenon Fund, LP	\$ 3,337,855,022
Cerberus Manitou Residential Loan Fund, LP	142,907,928
JM IV, LP	88,973,573
SJC Direct Lending Revolver Fund III, LP	85,274,343
AG Essential Housing, LP	51,321,082
Kayne CLO Partners Fund II	39,413,706
MP Securitized Credit Master Fund, LP	27,076,613
* EnTrust White Pine Partners, LP	13,983,900
Visium Balanced Fund, LP	299,801
Monument Park, LLC	22,247
Kayne Anderson BDC, Inc	0
Total Absolute Return Strategies	\$ 3,787,128,215
Short-Term Investments & Other	50,007,865
Grand Total	\$ 3,837,136,080

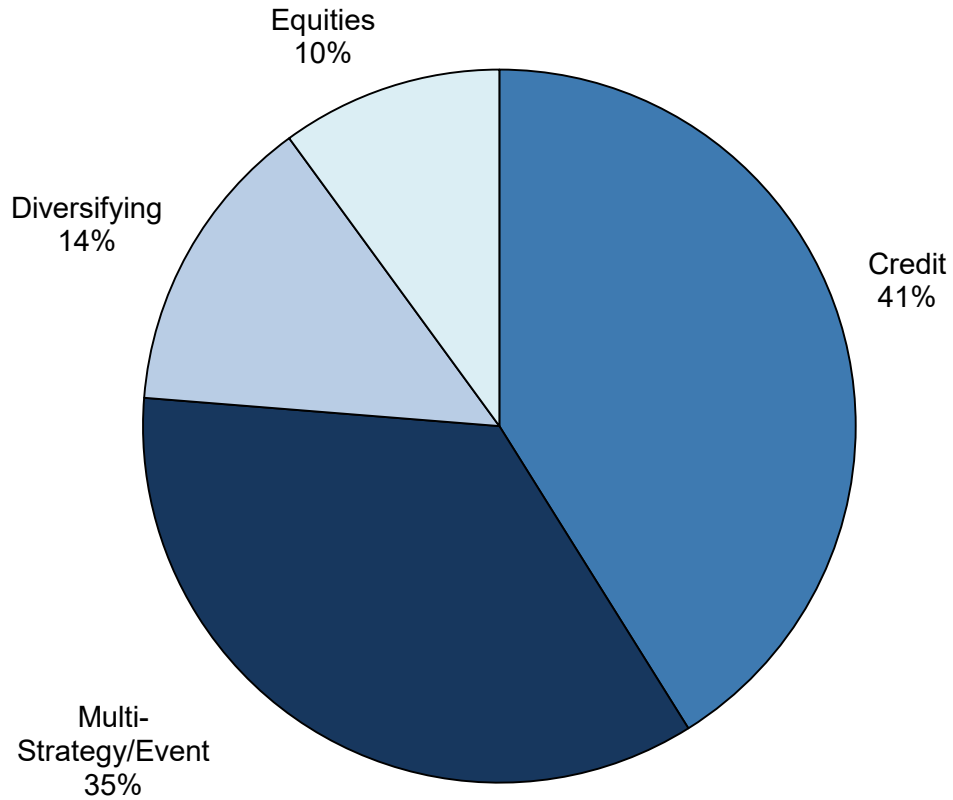
* Fund of Funds

SMRS

Absolute Return

3/31/21

Investments By Strategy



Strategy Breakdown			
Underlying Funds:	73	Median Position Size:	0.6%
Strategies:	4	Average Position Size:	1.4%
Relationships:	11	Largest Position Size:	8.1%

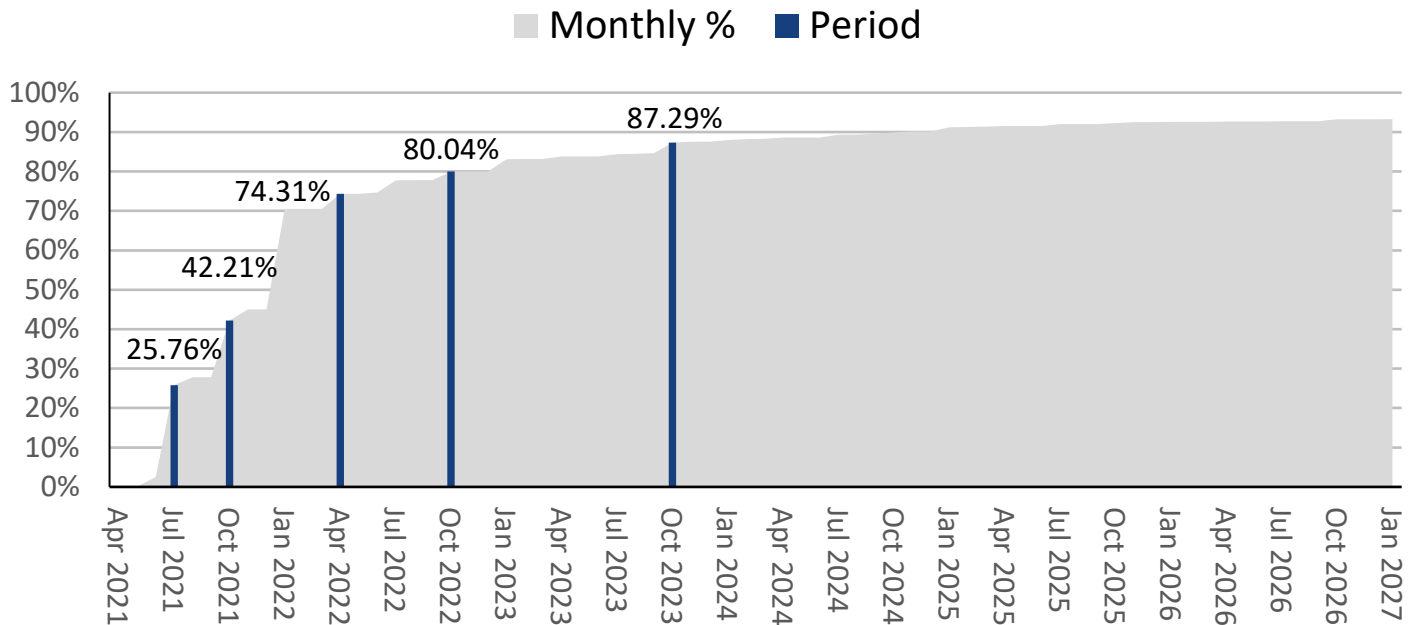
SMRS

Absolute Return

3/31/21

Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 7/1/21	25.76%	25.76%
By 10/1/21	16.45%	42.21%
By 4/1/22	32.10%	74.31%
By 10/1/22	5.73%	80.04%
After 10/1/23	7.25%	87.29%
Illiquid	12.71%	100.00%
Total	100.00%	N/A



State of Michigan Retirement System

DEFINED CONTRIBUTION REVIEW

State of Michigan Investment Board Meeting
June 10, 2021



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 which will allow participants enough choice 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" which 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 the long term (5+ years).

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.

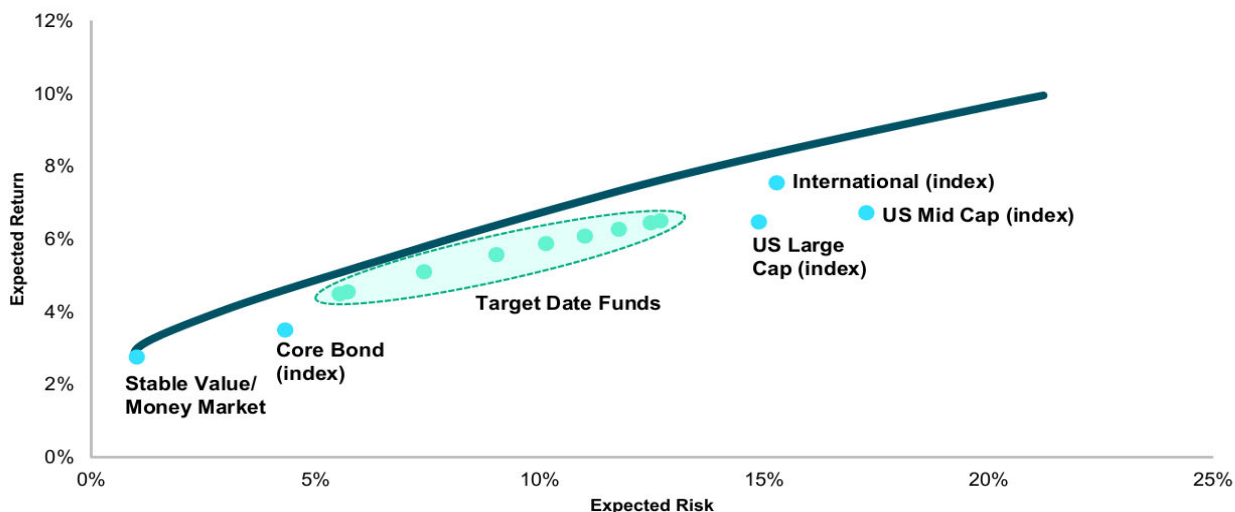
SOM Plans	3/31/20	3/31/21
State of Michigan 401(k)	\$5,711	\$8,100
State of Michigan 457	1,603	2,018
Pension Plus 401(k) & 457	863	1,525
EAA	9	12
Total	\$8,186	\$11,655

(\$ 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.

Michigan DC Plan Efficient Frontier
Target Date & Select Core Funds Plotted



Source: State Street analysis based on information provided by plan sponsor, as of April 2019.

Market Environment and Outlook

Significant progress in vaccination programs, states reopening, combined with still very accommodative government policy along with the release of massive pent-up demand from excess consumer savings is expected to drive economic growth through the remainder of 2021.

The benefits of a strengthening economy led to improved earnings 4Q20 which has carried into 1Q21 and is expected to persist through the remainder of the year. While equity returns were mostly driven by defensive, pandemic growth stocks for the better part of 2020, the prospects of a continued strong economy have helped cyclical areas of the equity market since the announcements of the approval of several vaccinations back in early November 2020.

For the first quarter, the S&P 500 index gained 6.2% and the Dow Jones Industrial Average increased by 6.4%. By market capitalization, small and mid-cap stocks performed even better, with the S&P Midcap Index gaining 13.5% while the Russell 2000 small cap index gained 12.7%. Non-U.S. markets, as measured by the MSCI EAFE index, gained 0.03% while the MSCI Emerging Markets index returned 2.3%.

The prospects of the strengthening economy resulted in rising inflation expectations causing a corresponding increase in interest rates. As a result, bond returns were negative over the quarter. The Bloomberg Barclays U.S. Aggregate Bond index lost 3.4% while the U.S. High Yield index gained 0.8% in the same period. Longer duration bonds suffered the most, as the Bloomberg U.S. Intermediate Bond index return was -1.6% while the Bloomberg U.S. Treasury Long-Term Bond Index return was -13.4%.

DC Plan news on SECURE Act 2.0

The House Ways and Means Committee is considering a bill called the Securing a Strong Retirement Act of 2021. This comes less than a year and a half after passage of another major retirement savings bill called the SECURE Act of 2019 and it is meant to build upon several of its ideas.

This bill has broad bipartisan support and is expected to pass later this year. Several of the key provisions in the bill:

- **Treatment of student loan payments as elective deferrals for purposes of matching contributions-** an employer under the bill would be permitted to make matching contributions under a 401 (k) or 403 (b) plan, to “qualified student loan payments”. The idea is that employees who are overwhelmed with student debt may not realistically be able to save for retirement.
- **Enhancement of 403(b) plans-** these plans have been generally limited to annuity contracts and mutual funds. Under the legislation, these plans would be permitted to invest in collective investment trusts.
- **Increase in age for required beginning date for mandatory distribution-** under current law, participants are generally required to begin taking distributions from their retirement plans at age 72. The legislation would increase the required minimum distribution age further to 75.
- **Higher catch-up contribution to apply at age 60-** the limit on catch-up contributions for 2020 is \$6,500, except in the case of SIMPLE plans, which is \$3,000. The legislation would increase these limits to \$10,000 and \$5,000.
- **Remove required minimum distribution barriers for life annuities-** the legislation would eliminate certain barriers to the availability of life annuities in qualified plans and IRAs
- **Qualifying longevity annuity contracts-** qualifying longevity annuity contracts (QLACs) have been limited to no more than 25% of investment or \$135,000. Now the 25% limit has been eliminated and the \$135,000 has been increased to \$200,000

SMRS

Defined Contribution Strategies

3/31/21

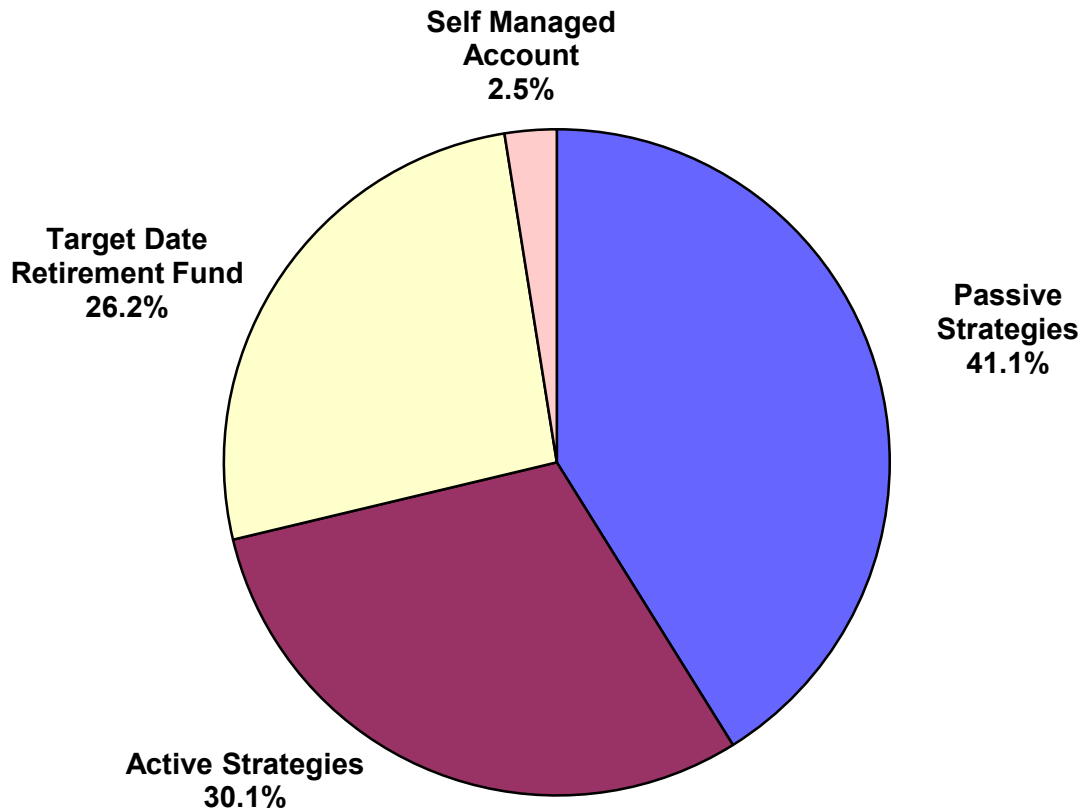
Markets	Amount		% of Total	Fee per \$1,000
QDIA (\$ in Millions)				
	<u>3/31/21</u>	<u>3/31/20</u>		
Total Target Date Fund	\$3,055	\$1,861	26.2%	\$0.70
Tier I Index Funds				
State Street S&P 500 Index Fund	\$1,636	\$1,061		\$0.13
State Street Bond Market Index Fund	\$1,052	882		0.20
State Street Global All Cap Equity ex-U.S. Index Fund	\$815	540		0.45
State Street S&P Mid Cap Index Fund	\$750	441		0.20
BlackRock Government Short-Term Investment CL F	\$221	248		0.56
BlackRock S&P Small Cap 600 Equity Index CL F	\$177	97		0.25
BlackRock Emerging Markets Index CL F	\$142	95		0.69
Total Tier I Index	\$4,793	\$3,363	41.1%	\$0.25
Tier II Active Funds				
Stable Value Fund	\$1,248	\$1,205		\$2.22
Dodge & Cox Stock Fund	\$633	410		4.15
Jennison Large Cap Growth Fund	\$562	359		2.83
American Funds EuroPacific Growth R6	\$343	244		4.60
Artisan Mid Cap Fund	\$185	104		6.77
Voya Small Cap Growth Equity Fund	\$174	106		4.30
T. Rowe Price Mid-Cap Value Fund	\$134	81		6.30
PIMCO Total Return I Fund	\$122	121		7.00
Virtus Ceredex Small-Cap Value Eq I	\$69	44		7.00
Prudential High Yield Fund	\$42	29		3.80
Oakmark Equity & Income I	\$0	88		4.30
Total Tier II Active	\$3,513	\$2,791	30.1%	\$3.68
Tier III				
Total Self Directed Brokerage Account	\$293	\$171	2.5%	NA
Total Defined Contribution Assets	<u>\$11,655</u>	<u>\$8,186</u>	<u>100.0%</u>	\$1.40

NOTE: Totals may not be exact due to rounding.

SMRS

Defined Contribution by Investment Strategy

3/31/21



Market Value in Millions				
	<u>3/31/21</u>		<u>3/31/20</u>	
Passive Strategies	\$4,793	41.1%	\$3,363	41.1%
Active Strategies	3,513	30.1%	2,791	34.1%
Target Date Retirement Fund	3,055	26.2%	1,861	22.7%
Self Managed Account	293	2.5%	171	2.1%
Total Investments	<u>\$11,655</u>	<u>100.0%</u>	<u>\$8,186</u>	<u>100.0%</u>

*Loan Fund \$199M as of 3/31/21
 Note: Totals may not be exact due to rounding.

Defined Contribution Performance by Fund 3/31/21

<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	\$121,032,560	20.5%	7.3%	6.6%	5.3%
State Street Income Custom Index		20.3%	7.3%	6.5%	5.4%
Morningstar Target-Date Retirement		17.6%	6.4%	6.0%	4.9%
<i>Variance State Street Income Custom Index</i>		0.2%	0.0%	0.1%	-0.1%
<i>Variance Morningstar Target-Date Retirement</i>		2.9%	0.9%	0.6%	0.4%
State Street Target Retirement 2020 Fund	145,013,743	26.8%	8.5%	8.5%	7.7%
State Street 2020 Custom Index		26.6%	8.4%	8.5%	7.7%
Morningstar Target-Date 2020		25.0%	7.9%	7.9%	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>		1.8%	0.6%	0.6%	1.4%
State Street Target Retirement 2025 Fund	271,140,308	33.8%	10.2%	10.3%	8.7%
State Street 2025 Custom Index		33.5%	10.2%	10.3%	8.8%
Morningstar Target-Date 2025		29.6%	8.7%	9.0%	7.1%
<i>Variance State Street 2025 Custom Index</i>		0.3%	0.0%	0.0%	-0.1%
<i>Variance Morningstar Target-Date 2025</i>		4.2%	1.5%	1.3%	1.6%
State Street Target Retirement 2030 Fund	307,933,308	38.5%	11.2%	11.3%	9.3%
State Street 2030 Custom Index		38.1%	11.2%	11.3%	9.3%
Morningstar Target-Date 2030		35.2%	9.5%	10.0%	7.6%
<i>Variance State Street 2030 Custom Index</i>		0.4%	0.0%	0.0%	0.0%
<i>Variance Morningstar Target-Date 2030</i>		3.3%	1.7%	1.3%	1.7%
State Street Target Retirement 2035 Fund	348,513,925	42.6%	11.7%	12.0%	9.6%
State Street 2035 Custom Index		42.2%	11.7%	12.0%	9.6%
Morningstar Target-Date 2035		41.5%	10.5%	11.1%	8.4%
<i>Variance State Street 2035 Custom Index</i>		0.4%	0.0%	0.0%	0.0%
<i>Variance Morningstar Target-Date 2035</i>		1.1%	1.2%	0.9%	1.2%
State Street Target Retirement 2040 Fund	352,782,570	46.5%	12.1%	12.6%	9.8%
State Street 2040 Custom Index		46.1%	12.1%	12.5%	9.8%
Morningstar Target-Date 2040		46.4%	11.0%	11.7%	8.6%
<i>Variance State Street 2040 Custom Index</i>		0.4%	0.0%	0.1%	0.0%
<i>Variance Morningstar Target-Date 2040</i>		0.1%	1.1%	0.9%	1.2%
State Street Target Retirement 2045 Fund	371,391,482	50.4%	12.5%	13.1%	10.0%
State Street 2045 Custom Index		49.9%	12.4%	13.0%	10.0%
Morningstar Target-Date 2045		50.2%	11.5%	12.3%	9.1%
<i>Variance State Street 2045 Custom Index</i>		0.5%	0.1%	0.1%	0.0%
<i>Variance Morningstar Target-Date 2045</i>		0.2%	1.0%	0.8%	0.9%
State Street Target Retirement 2050 Fund	474,143,298	52.5%	12.7%	13.2%	10.1%
State Street 2050 Custom Index		52.0%	12.7%	13.2%	10.1%
Morningstar Target-Date 2050		51.5%	11.6%	12.4%	9.0%
<i>Variance State Street 2050 Custom Index</i>		0.5%	0.0%	0.0%	0.0%
<i>Variance Morningstar Target-Date 2050</i>		1.0%	1.1%	0.8%	1.1%
State Street Target Retirement 2055 Fund	482,446,494	52.4%	12.7%	13.2%	N/A
State Street 2055 Custom Index		52.0%	12.7%	13.2%	N/A
Morningstar Target-Date 2055		52.6%	11.8%	12.6%	N/A
<i>Variance State Street 2055 Custom Index</i>		0.4%	0.0%	0.0%	N/A
<i>Variance Morningstar Target-Date 2055</i>		-0.2%	0.9%	0.6%	N/A
State Street Target Retirement 2060 Fund	177,815,189	52.4%	12.7%	13.2%	N/A
State Street 2060 Custom Index		52.0%	12.7%	13.2%	N/A
Morningstar Target-Date 2060+		53.3%	11.8%	12.7%	N/A
<i>Variance State Street 2060 Custom Index</i>		0.4%	0.0%	0.0%	N/A
<i>Variance Morningstar Target-Date 2060+</i>		-0.9%	0.9%	0.5%	N/A

<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	\$2,870,661	52.4%	N/A	N/A	N/A
<i>State Street 2065 Custom Index</i>		52.0%	N/A	N/A	N/A
<i>Morningstar Target-Date 2060+</i>		53.3%	N/A	N/A	N/A
<i>Variance State Street 2065 Custom Index</i>		0.4%	N/A	N/A	N/A
<i>Variance Morningstar Target-Date 2060+</i>		-0.9%	N/A	N/A	N/A
TIER 1					
State Street S&P 500 Index Fund	\$1,635,972,944	56.3%	16.8%	16.3%	13.9%
S&P 500 Index		56.4%	16.8%	16.3%	13.9%
Morningstar Large Blend		55.3%	14.4%	14.4%	11.7%
Variance S&P 500 Index		-0.1%	0.0%	0.0%	0.0%
Variance Morningstar Large Blend		1.0%	2.4%	1.9%	2.2%
State Street Bond Market Index Fund	1,051,554,162	0.7%	4.7%	3.1%	3.4%
Bloomberg Barclays U.S. Aggregate Index		0.7%	4.7%	3.1%	3.4%
Morningstar Intermediate-Term Bond		2.7%	4.4%	3.3%	3.4%
Variance Bloomberg Barclays U.S. Aggregate Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Intermediate-Term Bond		-2.0%	0.3%	-0.2%	0.0%
State Street Global All Cap Equity ex-U.S. Index Fund	815,119,292	53.3%	6.6%	10.1%	5.3%
MSCI ACWI ex USA IMI (Net)		51.9%	6.5%	9.8%	5.1%
Morningstar Foreign Large Blend		47.6%	5.7%	8.6%	5.0%
Variance MSCI ACWI ex USA IMI (Net)		1.4%	0.1%	0.3%	0.2%
Variance Morningstar Foreign Large Blend		5.7%	0.9%	1.5%	0.3%
State Street S&P Mid Cap Index Fund	750,152,187	83.4%	13.4%	14.3%	11.9%
S&P 400 Index		83.5%	13.4%	14.4%	11.9%
Morningstar Mid-Cap Blend		73.7%	11.9%	12.5%	10.0%
Variance S&P 400 Index		-0.1%	0.0%	-0.1%	0.0%
<i>Variance Morningstar Mid-Cap Blend</i>		9.7%	1.5%	1.8%	1.9%
BlackRock Government Short-Term Investment CL F	221,499,649	0.2%	1.4%	1.1%	N/A
BofA Merrill Lynch US 3-Month Treasury Bill Index		0.1%	1.5%	1.2%	N/A
Variance BofA Merrill Lynch US 3-Month Treasury Bill Index		0.1%	-0.1%	-0.1%	N/A
BlackRock S&P Small Cap 600 Equity Index CL F	176,591,111	95.4%	13.7%	N/A	N/A
S&P SmallCap 600 Index		95.3%	13.7%	N/A	N/A
Morningstar Small Blend		88.6%	11.5%	N/A	N/A
Variance S&P SmallCap 600 Index		0.1%	0.0%	N/A	N/A
Variance Morningstar Small Blend		6.8%	2.2%	N/A	N/A
BlackRock Emerging Markets Index CL F	142,367,707	58.1%	6.2%	12.0%	N/A
MSCI Emerging Market (Net)		58.4%	6.5%	12.1%	N/A
Morningstar Diversified Emerging Mkts		61.8%	5.8%	11.1%	N/A
Variance MSCI Emerging Market (Net)		-0.3%	-0.3%	-0.1%	N/A
<i>Variance Morningstar Diversified Emerging Mkts</i>		-3.7%	0.4%	0.9%	N/A
TIER 2					
Stable Value Fund	\$1,248,014,536	2.1%	2.5%	2.4%	2.3%
Barclays Int Gov/Credit A or Higher Index		0.2%	4.1%	2.4%	2.6%
Hueler Universe		2.1%	2.3%	2.2%	2.1%
Variance Barclays Int Gov/Credit A or Higher Index		1.9%	-1.6%	0.0%	-0.3%
Variance Hueler Universe		0.0%	0.2%	0.2%	0.2%
Dodge & Cox Stock Fund	632,776,145	73.0%	13.2%	15.6%	12.9%
<i>Russell 1000 Value Index</i>		56.1%	11.0%	11.7%	11.0%
<i>Morningstar Large Value</i>		56.2%	10.3%	11.4%	9.9%
<i>Variance Russell 1000 Value Index</i>		16.9%	2.2%	3.9%	1.9%
<i>Variance Morningstar Large Value</i>		16.8%	2.9%	4.2%	3.0%

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>10-Years</u>
Jennison Large Cap Growth Fund	562,261,288	70.2%	24.0%	24.2%	N/A
<i>Russell 1000 Growth Index</i>		62.7%	22.8%	21.0%	N/A
<i>Morningstar Large Growth</i>		63.2%	20.2%	19.2%	N/A
<i>Variance Russell 1000 Growth Index</i>		7.5%	1.2%	3.2%	N/A
<i>Variance Morningstar Large Growth</i>		7.0%	3.8%	5.0%	N/A
American Funds EuroPacific Growth R6	343,242,634	60.8%	10.2%	12.9%	7.7%
<i>MSCI EAFE Index - Net Div</i>		44.6%	6.0%	8.8%	5.5%
<i>Morningstar Foreign Large Blend</i>		47.6%	5.7%	8.6%	5.0%
<i>Variance MSCI EAFE Index - Net Div</i>		16.2%	4.2%	4.1%	2.2%
<i>Variance Morningstar Foreign Large Blend</i>		13.2%	4.5%	4.3%	2.7%
Artisan Mid Cap Fund	185,290,004	75.1%	25.9%	21.4%	15.0%
<i>Russell Midcap Growth Index</i>		68.6%	19.4%	18.4%	14.1%
<i>Morningstar Mid-Cap Growth</i>		79.9%	19.9%	18.7%	12.9%
<i>Variance Russell Midcap Growth Index</i>		6.5%	6.5%	3.0%	0.9%
<i>Variance Morningstar Mid-Cap Growth</i>		-4.8%	6.0%	2.7%	2.1%
Voya Small Cap Growth Equity Fund	174,282,070	76.6%	11.8%	14.1%	11.8%
<i>Russell 2000 Growth Index</i>		90.2%	17.2%	18.6%	13.0%
<i>Morningstar Small Growth</i>		94.2%	19.7%	19.9%	12.8%
<i>Variance Russell 2000 Growth Index</i>		-13.6%	-5.4%	-4.5%	-1.2%
<i>Variance Morningstar Small Growth</i>		-17.6%	-7.9%	-5.8%	-1.0%
T. Rowe Price Mid-Cap Value Fund	134,458,353	76.0%	10.7%	12.0%	11.0%
<i>Russell Midcap Value Index</i>		73.8%	10.7%	11.6%	11.1%
<i>Morningstar Mid-Cap Value</i>		76.7%	9.8%	11.1%	9.7%
<i>Variance Russell Midcap Value Index</i>		2.2%	0.0%	0.4%	-0.1%
<i>Variance Morningstar Mid-Cap Value</i>		-0.7%	0.9%	0.9%	1.3%
PIMCO Total Return I Fund	122,107,603	3.3%	4.9%	3.8%	3.7%
<i>Bloomberg Barclays U.S. Aggregate Index</i>		0.7%	4.7%	3.1%	3.4%
<i>Morningstar Intermediate Core-Plus Bond</i>		6.5%	4.9%	3.8%	3.8%
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>		2.6%	0.2%	0.7%	0.3%
<i>Variance Morningstar Intermediate Core-Plus Bond</i>		-3.2%	0.0%	0.0%	-0.1%
Virtus Ceredex Small-Cap Value Eq I	69,191,927	75.4%	7.9%	9.9%	9.2%
<i>Russell 2000 Value Index</i>		97.1%	11.6%	13.6%	10.1%
<i>Morningstar Small Value</i>		100.2%	10.0%	11.7%	9.2%
<i>Variance Russell 2000 Value Index</i>		-21.7%	-3.7%	-3.7%	-0.9%
<i>Variance Morningstar Small Value</i>		-24.8%	-2.1%	-1.8%	0.0%
Prudential High Yield Fund	41,627,698	24.6%	8.0%	7.9%	N/A
<i>Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		23.8%	6.6%	7.9%	N/A
<i>Morningstar High Yield Bond</i>		21.3%	5.3%	6.4%	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		0.8%	1.4%	0.0%	N/A
<i>Variance Morningstar High Yield Bond</i>		3.3%	2.7%	1.5%	N/A
Self Directed	293,337,221				
TOTAL	\$11,654,930,070				

Loan Fund: \$199,466,641

State of Michigan Retirement System

BASKET CLAUSE REVIEW

State of Michigan Investment Board Meeting
June 10, 2021



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

SMRS

Basket Clause Investments

3/31/21

<u>Asset Class</u>	<u>Value</u>
Total Absolute Return	\$ 3,787,128,231
Total Real Return and Opportunistic	764,516,635
Total Fixed Income	<u>72,263,512</u>
Total Basket Clause Investments	<u><u>\$ 4,623,908,378</u></u>

The basket clause investments on March 31, 2021, were \$4.6 billion or 5.3% of the total portfolio value of \$87.7 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.