

STATE OF MICHIGAN INVESTMENT BOARD MEETING

December 11, 2018

State of Michigan Retirement Systems

Quarterly Investment Review



Nick A. Khouri, State Treasurer
Prepared by Bureau of Investments
Michigan Department of Treasury

STATE OF MICHIGAN INVESTMENT BOARD MEETING

DECEMBER 11, 2018

Agenda



- 9:30 a.m. Call to Order and Opening Remarks
- 9:40 a.m. Approval of the 11/27/18 SMIB Special Meeting Minutes
- 9:45 a.m. Executive Summary & Performance for Periods Ending 9/30/18
- 10:00 a.m. Current Asset Allocation Review
Markets Review and Outlook
- 10:15 a.m. Review of Investment Reports
- Public Markets
- DC Plans
 - Fixed Income
 - Domestic Equity
 - International Equity
- Private Markets
- Private Equity
 - Real, Opportunistic, & Absolute Return
 - Real Estate & Infrastructure
- Basket Clause – *Receive and File*
- Executive Order 2018-10 – *Receive and File*
- 11:00 a.m. Public Comment
Closing Remarks ~ Adjournment



2019 Meeting Schedule

Thursday, March 7, 2019

Thursday, June 6, 2019

Thursday, September 12, 2019

Thursday, December 12, 2019

All meetings start at 9:30 a.m.

www.michigan.gov/treasury

State of Michigan Retirement Systems

MINUTES

State of Michigan Investment Board Meeting
December 11, 2018



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN INVESTMENT BOARD
November 27, 2018 Meeting Minutes

Members Present:

Chair – Treasurer Nick Khouri
Budget Director John Walsh
Ms. Dina Richard
Mr. Reginald Sanders

Members Absent:

Mr. James Nicholson

Members of the Public and Bureau of Investments Staff Present:

Molly Jason	Jack Behar	Karl Borgquist
Semone James	Annette Russell	Todd Warstler
Patrick Moraniec	Janet Sudac	Lori Barrett

Treasurer Khouri called the meeting to order at 1:03 pm.

Opening Remarks: Brief discussion by Chair Treasurer Khouri welcomed the members of the board and provided background, acknowledging that this is the inaugural meeting of the State of Michigan Investment Board (SMIB).

AGENDA

Resolution 2018-1 Approval of Investment Policy Statement

Jon Braeutigam, Chief Investment Officer for the Bureau of Investments, provided the Board with information regarding this action item. There were no questions following this explanation.

ROLL CALL VOTE:

Ayes: 4 Nays: 0 Recused: None

Resolution 2018-2 Approval of Ethics Policy

Robert Brackenbury, Deputy Chief Investment Officer for the Bureau of Investments, provided the Board with information regarding this action item. There were no questions following this explanation.

ROLL CALL VOTE:

Ayes: 4 Nays: 0 Recused: None

Resolution 2018-3 Approval of Asset Allocation Strategy

Gregory Parker, Director of Investments - Public Markets for the Bureau of Investments, provided the Board with information regarding this action item. Board members discussed the current ranges for the Bureau of Investments' private equity allocation. Asset allocation will be discussed further when AON presents their asset liability study in the coming meetings in 2019.

ROLL CALL VOTE:

Ayes: 4 Nays: 0 Recused: None

Public Comment: Treasurer Khouri asked that any attendees wishing to address the Board come forward at this time. No public comment.

Treasurer Khouri adjourned the meeting at 1:19 pm.

Approved:

Nick A. Khouri, Chair

STATE OF MICHIGAN INVESTMENT BOARD
RESOLUTION AUTHORIZING INVESTMENT POLICY STATEMENT

Resolution 2018-1

WHEREAS, pursuant to Executive Order 2018-10 (the “Order”), the State of Michigan Investment Board (the “Board”) is required to adopt an Investment Policy Statement;

WHEREAS, the Investment Policy Statement is intended to set guidelines and expectations with respect to the prudent management and investment of the assets of the State of Michigan’s defined benefit retirement systems (the “DB Plan”) and the oversight of changes to the investment manager lineup for the State of Michigan’s 401(k) and 457 plans (the “DC Plans”);

WHEREAS, pursuant to the Order, the Board is empowered to delegate power to or otherwise authorize to the Bureau of Investments within the Department of Treasury (the “BOI”) to invest and prudently managed the assets of the DB Plans and to aid the Board in the oversight of the investment manager line up of the DC Plans, or to otherwise cause the BOI to take certain actions; and

WHEREAS, the Investment Policy Statement is intended to duly delegate all powers and authority contained therein to the BOI.

NOW, THEREFORE, BE IT RESOLVED, the Board determines that it hereby approves and adopts the Investment Policy Statement and all delegations contained therein, attached hereto as Exhibit A;

BE IT FURTHER RESOLVED, that all delegations contained in the Investment Policy Statement are effective concurrent with the adoption of this resolution and shall remain in effect until the Board takes formal action to revoke such delegation; and

BE IT FURTHER RESOLVED, that the BOI shall adhere to the Investment Policy Statement.

Ayes: Nick A. Khouri, John J. Walsh, Reginald G. Sanders, Dina L. Richard

Nays: None

Recused: None

East Lansing, Michigan

November 27, 2018

STATE OF MICHIGAN INVESTMENT BOARD
RESOLUTION AUTHORIZING ETHICS POLICY

Resolution 2018-2

WHEREAS, pursuant to Executive Order 2018-10 (the “Order”), the State of Michigan Investment Board (the “Board”) is required to adopt an Ethics Policy applicable to the Board and its members (the “Members”)

WHEREAS, the Ethics Policy shall serve to define the ethical and behavioral guidelines within which all Members are expected to conduct themselves while serving as members of the Board; and

WHEREAS, each Member is required by the Order to certify that he or she has received, reviewed and understands the requirements of the Ethics Policy.

NOW, THEREFORE, BE IT RESOLVED, the Board determines that, in furtherance of its duties and obligations, it hereby adopts the Ethics Policy attached hereto as Exhibit A;

BE IT FURTHER RESOLVED, that each Member, in accordance with the Order, shall certify as to their receipt of and continuing adherence to the Ethics Policy; and

BE IT FURTHER RESOLVED, that the Board directs the Bureau of Investments to post the Ethics Policy and each Member’s certification to the Department of Treasury’s website.

Ayes: Nick A. Khouri, John J. Walsh, Reginald G. Sanders, Dina L. Richard

Nays: None

Recused: None

East Lansing, Michigan

November 27, 2018

STATE OF MICHIGAN INVESTMENT BOARD
RESOLUTION AUTHORIZING ASSET ALLOCATION STRATEGY

Resolution 2018-3

WHEREAS, the State of Michigan Investment Board (the “Board”) pursuant to Executive Order 2018-10 (the “Order”) and the Investment Policy Statement approved by the Board, is required to approve asset allocation targets and ranges with respect to the investment of the assets of the State of Michigan’s defined benefit retirement systems (the “DB Plans”);

WHEREAS, the Board has reviewed an asset allocation submitted to it by the Department of Treasury’s Bureau of Investments (the “BOI”) and attached hereto as Exhibit A (the “Asset Allocation Strategy”).

NOW, THEREFORE, BE IT RESOLVED, the Board adopts the Asset Allocation Strategy.

Ayes: Nick A. Khouri, John J. Walsh, Reginald G. Sanders, Dina L. Richard

Nays: None

Recused: None

East Lansing, Michigan

November 27, 2018

State of Michigan Retirement Systems

EXECUTIVE SUMMARY

State of Michigan Investment Board Meeting
December 11, 2018



Gregory J. Parker, CFA
Director of Investments – Public Markets
Director of Asset Allocation
Bureau of Investments

EXECUTIVE SUMMARY

September 2018

Performance

Excellent historical returns.

MPSERS Plan (9/30/18)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	11.6%	10.9%	10.1%	10.9%	8.5%
Policy Returns	10.0%	11.2%	9.7%	11.1%	9.0%
Peer Median Returns*	7.7%	9.9%	8.1%	9.8%	7.6%

*State Street Universe greater than \$10 billion.

- Over the past one, three, five, seven, and ten years, the returns are much higher than peer median returns. Compared to the State Street Universe of public pension plans greater than \$10 billion, the returns are mostly within the top decile of returns. Also, over the past three and five years, the plans' returns were the least risky, as measured by standard deviation.
- The ten-year return includes the impact of the global financial crisis. 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 \$52.8 billion September 2008 market value, a ten-year annualized return of 8.5% compared to the 7.6% peer median return would add about \$9.5 billion in excess value. Due to these gains, it is estimated that General Fund and School Aid Fund 2018 fiscal year annual contributions into pension fund pools are nearly \$780 million less than they would have been if SMRS had earned the peer average investment return.
- The returns beat the policy benchmark over the past year by 1.6%. Many of the asset classes posted results in excess of their performance benchmarks; selectivity in domestic equity, real estate, and real return & opportunistic were all big drivers of excess return. A slightly defensive allocation offset some of the positive selectivity.
- For the year ending September 2018, returns exceeded the peer median return by 3.9%. For most of the individual asset classes, returns were better than median over this time-period. Superior selectivity in private equity and domestic equity.

Asset Allocation

A low return environment.

- Given the low rates of return available in the capital markets for safe assets, and in order to earn the actuarial rates of returns, additional risks (primarily equity risk) must be assumed.
- Liquidity is another fundamental risk assumed and it is managed through asset allocation. The plans have outstanding capital commitments to fund approximately \$12.3 billion in illiquid assets, primarily in private equity. In the September 2018 quarter, over \$1.3 billion of new commitments were made.
- The combined systems paid out approximately \$834 million net of contributions over the past twelve months ending in September 2018.
- Over the past year, fixed income and real estate both had net purchases of approximately \$320 million. Over the past year in round numbers, the allocation to domestic equity was reduced by \$900 million, private equity by \$480 million and real return & opportunistic by \$200 million. The allocation to short-term cash decreased by approximately \$980 million.

Capital Markets

Risk assets in focus.

- 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 and other central banks, as well as the run-up in prices for most risk assets over the past several years since the depths of the Great Recession.
- Fundamentals supporting domestic equities are still strong. Year-over-year growth in analyst estimated earnings for the next year are close to 12%.
- Spreads for both U.S. investment grade and high yield bonds are less attractive today, priced at to below average levels. Headwinds to the asset class include; the deterioration of U.S. corporate balance sheets, the total amount of debt rated just one notch above junk already in the system, and the prospects for future higher interest rates.
- The price to hedge the dollar is rising. Although many short-term interest rates globally are lower than the rates in the U.S., once the value of hedging is included, many non-U.S. short-term investments are more attractive for global investors.

Economic Backdrop

Housing is softening.

- Consumer confidence in the U.S. is very high. Measured by a 3-month average of the Conference Board's consumer confidence index, consumers are the most confident since October 2000.
- Beginning in January, but through the summer of 2018, President Trump has imposed a series of tariffs aimed mostly at solar panels, washing machines, steel and aluminum. These tariffs impact many large trading partners of the U.S. and in particular; China, Canada, Mexico and the European Union. Predictably, these partners responded negatively and issued their own tariffs.
- Housing is performing poorly. Since the spring of 2018, mortgage applications are averaging about a percent less month-over-month and the number of houses sold are now trending down 3% month-over-month. While house prices nationally are on average still going up month-to-month, the rate of change is dropping fast and is now about half the average over the past three years. Reflecting this market environment, homebuilder stocks are down more than a third from their January 2018 high.

Investment Update

Highlighting the quarter.

(\$ Millions)

NEW COMMITMENTS

July 1 – September 30, 2018

<u>Asset class</u>	<u>Fund Name / (Managed By)</u>	<u>Commitment</u>
Private Equity		
	ASF VIII B (ARDIAN Investment UK Ltd.)	\$150.0
	Riverside Micro-Cap Fund V, L.P. (Riverside Partners L.L.C.)	100.0
	Vista Equity Partners VII, L.P. (VEPF Management, L.P.)	75.0
	TI Platform SMRS SMA, L.P. (TI Platform Fund II GP, LLC)	60.0
	Permira Growth Opportunities I, L.P. (Permira)	50.0
Real Estate and Infrastructure Division		
	TPG Real Estate Partners III, LP (TPG)	\$50.0
	Ridgewood Water & Strategic Infrastructure Fund (Ridgewood Infrastructure)	50.0
	Principal Separate Account (Principal Real Estate Investors)	44.4
Real, Opportunistic, & Absolute Return Division		
	Barings Global Real Asset Fund I (Barings LLC)	\$100.0
	TSSP Opportunities Partners IV (TPG Sixth Street Partners)	100.0
	KAAC (Kayne Anderson Capital Advisors, L.P.)	35.0
	SJC Direct Lending Fund III Co-Invest G-III (Czech Asset Management, L.P.)	20.0
TOTAL		\$834.4

State of Michigan Retirement Systems

PERFORMANCE

State of Michigan Investment Board Meeting

December 11, 2018



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 Systems, 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.*

MPERS PENSION

Time-Weighted Rates of Return Periods Ending September 30, 2018

	% of Portfolio 9/30/18	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	8.5	15	10.9	19	10.1	4	10.9	12	11.6	5	3.7	6
Median - Greater than \$10 Billion ²		7.6		9.8		8.1		9.9		7.7		2.6	
MPERS Total Plan Policy		9.0		11.1		9.7		11.2		10.0		3.3	
DOMESTIC EQUITIES	26.3	12.3	24	17.4	11	14.2	13	17.6	17	20.9	8	7.9	7
Median ²		11.5		15.6		12.1		15.3		15.2		5.7	
S&P 1500 Index		12.1		16.9		13.8		17.3		17.7		7.4	
INTERNATIONAL EQUITIES	17.2	6.2	44	8.7	53	5.6	32	10.7	34	1.9	76	0.6	69
Median ²		6.2		8.8		5.1		10.4		2.6		0.9	
International Blended Benchmark ³		4.8		7.4		4.2		10.0		1.8		0.7	
PRIVATE EQUITIES	16.4	11.4	7	13.4	14	15.1	8	12.9	13	19.5	3	6.2	6
Median ²		7.7		9.7		10.0		9.6		9.9		2.8	
Alternative Blended Benchmark ⁴		15.5		16.4		16.7		15.2		17.7		4.2	
BONDS	12.1	5.3	29	3.6	26	3.8	17	3.8	17	1.2	8	0.6	13
Median ²		4.6		2.7		2.5		2.2		-0.5		0.2	
Barclays Aggregate		3.8		2.0		2.2		1.3		-1.2		0.0	
REAL ESTATE & INFRASTRUCTURE	10.5	4.7	38	11.2	33	12.4	22	10.2	33	12.3	22	2.4	25
Median ²		4.2		10.3		10.1		9.0		8.8		1.8	
NCREIF - Property Blended Index ⁵		5.1		8.6		8.2		6.4		5.8		1.4	
NCREIF Open Fund Index Net		4.6		10.1		9.7		7.8		7.7		1.9	
REAL RETURN AND OPPORTUNISTIC	9.1	10.8	12.6	10.8	14.4	7.3	7.5	10.6	14.4	7.6	1.6	2.5	1.6
50% (CPI +500 bps) + 50% (8% actuarial rate)													
ABSOLUTE RETURN	5.9	2.7	4.7	5.5	4.0	4.7	6.0	4.0	4.0	6.0	1.0	1.0	1.0
HFR1 FOF Cons 1 month lagged		1.5		3.0		3.0		2.3		3.7		0.5	
CASH EQUIVALENTS	2.5	0.8	0.9	0.7	1.2	0.9	2.0	1.2	0.8	2.0	0.6	0.6	0.5
1 Month T-Bill		0.3		0.3		0.5		0.8		1.5		0.5	

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

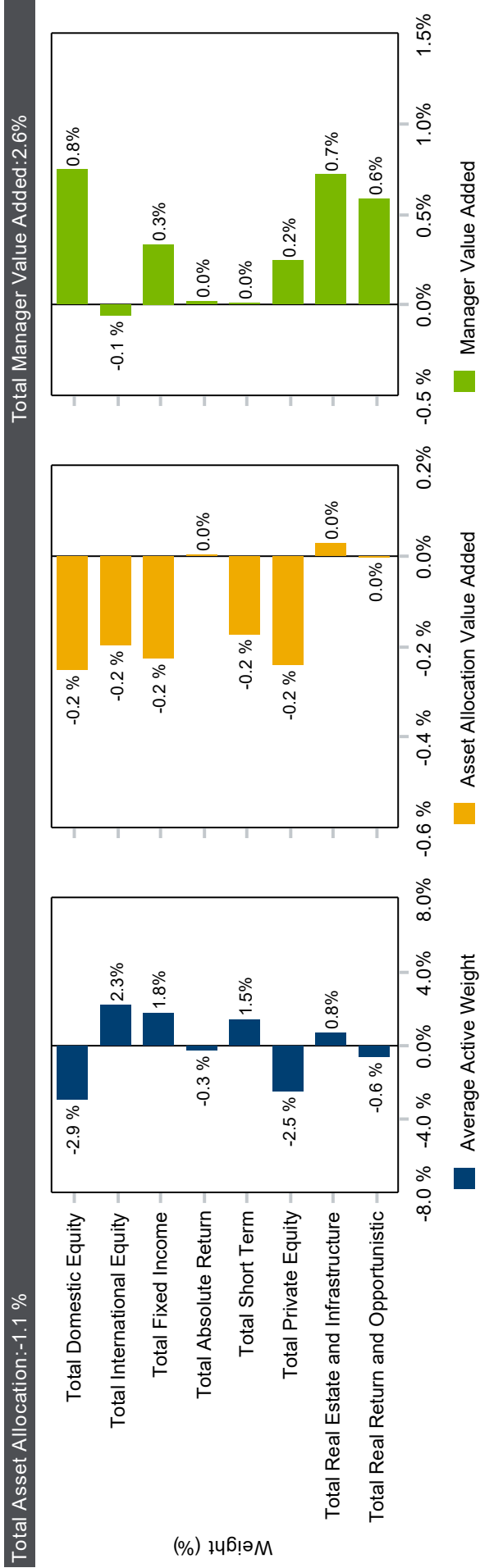
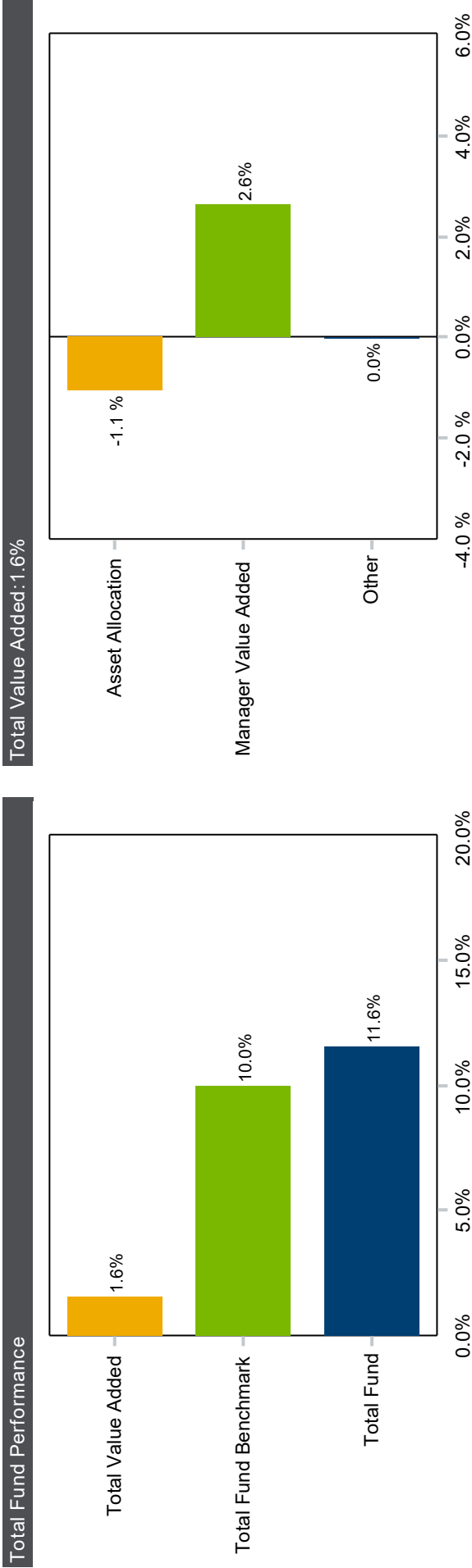
⁴ SP 500 + 300 bps thru 12/31/06. Ending market value (EMV) weighted blend of 10 yr yield + 300 bps and SP 500 + 300 bps 12/31/06 to 9/30/09. EMV weighted blend of 10 yr yield + 300 bps and SP 500 + 300 bps 3-month lagged 9/30/09 to present.

⁵ NCREIF - Property Blended Index is NPI minus 75 bps prior to October 2005, NPI minus 130 bps current.

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

Total Fund Attribution

Total Michigan vs. Total Fund Benchmark



Cumulative and Consecutive Total Fund Returns

MPSERS

Cumulative For Years Ending 9/30/18

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MPSERS	11.6	12.7	10.9	8.8	10.1	10.5	10.9	10.4	10.2	8.5
Public Plan - Median (> \$10 billion)*	7.7	10.5	9.9	7.3	8.1	8.6	9.8	8.8	8.9	7.6
Rank	5	4	12	4	4	4	19	9	9	15
bp Difference - Median	386	221	104	153	206	187	115	163	128	90

Consecutive For Years Ending

	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	09/09
MPSERS	11.6	13.8	7.6	2.6	15.6	12.5	13.4	6.6	8.8	-6.1
Public Plan - Median (> \$10 billion)*	7.7	12.7	9.5	-0.2	10.9	12.7	15.7	2.4	10.3	-0.7
Rank	5	22	92	4	3	53	80	7	83	83
bp Difference - Median	386	109	-193	277	469	-19	-229	421	-143	-546

MSERS

Cumulative For Years Ending 9/30/2018

	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSERS	11.5	12.7	11.0	8.8	10.1	10.5	10.9	10.3	10.1	8.4
Public Plan - Median (> \$1 billion)*	7.7	10.1	10.0	7.2	7.9	8.6	9.6	8.8	8.9	7.7
Rank	5	7	17	5	4	6	21	9	10	28
bp Difference - Median	381	258	95	161	224	189	131	159	124	64

Consecutive For Years Ending

	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	09/09
MSERS	11.5	13.8	7.6	2.6	15.5	12.5	13.4	6.5	8.5	-6.3
Public Plan - Median (> \$1 billion)*	7.7	12.5	9.7	-0.4	10.4	12.8	16.0	2.0	10.5	0.0
Rank	5	24	89	3	3	54	84	5	88	89
bp Difference - Median	381	127	-206	290	515	-32	-259	448	-197	-629

*State Street Public Funds Universe

State of Michigan Retirement Systems

ASSET ALLOCATION REVIEW

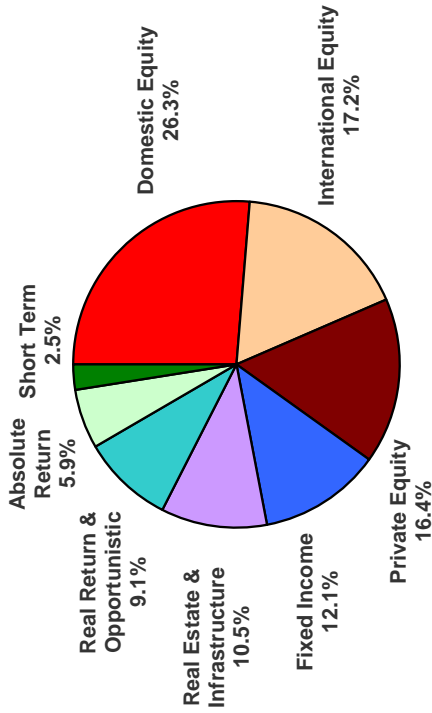
State of Michigan Investment Board Meeting
December 11, 2018



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN RETIREMENT SYSTEMS PROFILE - SEPTEMBER 2018

Asset Allocation 9/30/18



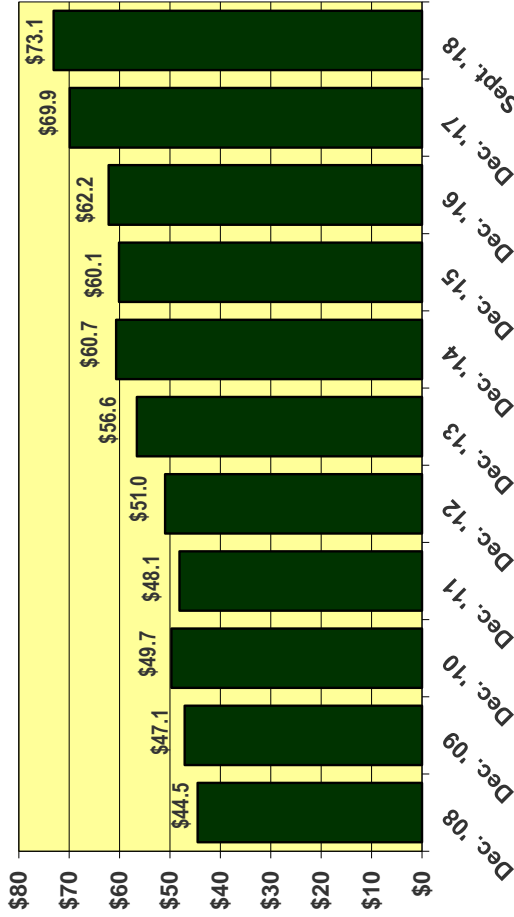
Asset Allocation By Market Value (In Millions)

Investment Strategies	9/30/2018	9/30/2017
Domestic Equity	\$19,214	\$16,751
International Equity	12,558	12,351
Private Equity	11,971	10,590
Fixed Income	8,825	8,341
Real Estate & Infra.	7,688	6,554
Real Return & Opport.	6,670	6,070
Absolute Return	4,307	4,038
Short Term***	1,826	2,801
TOTAL	\$73,059	\$67,496
	100.0%	100.0%

Short Term Equivalents (in Billions)

Short Term Strategy***	\$1.8
Short Term in Other Inv. Strategies	1.3
TOTAL SHORT TERM	\$3.1
	4.3% of Total Funds

Market Value* (Billions of Dollars)



Market Value By Plan ~ 9/30/18 (in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPERS	\$50,147	\$6,174	\$56,321	77.1%
MSERS - (closed)	12,372	2,420	14,792	20.2%
MSPRS	1,489	184	1,673	2.3%
MJRS - (closed)	271	2	273	0.4%
TOTAL	\$64,279	\$8,780	\$73,059	100.0%

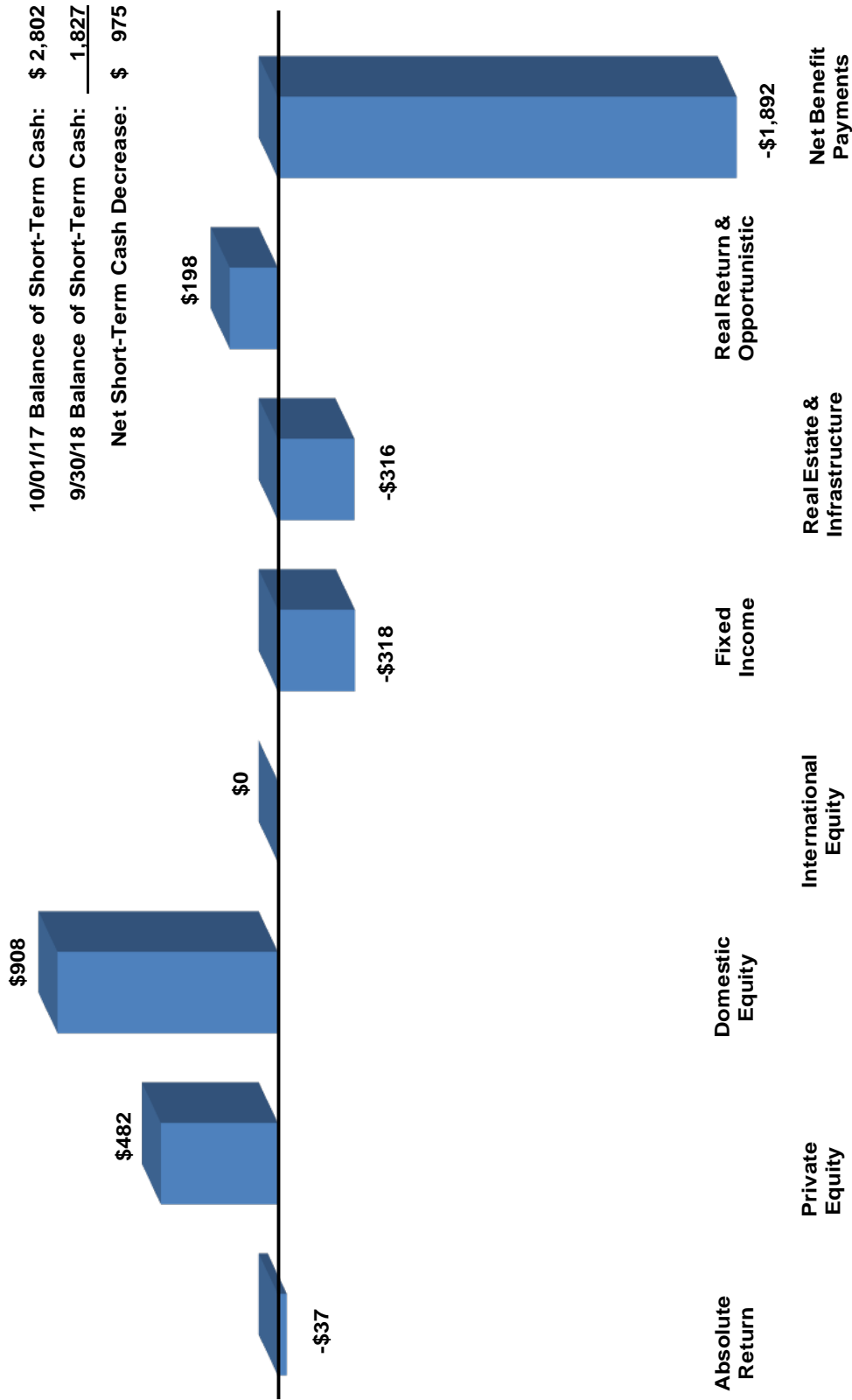
MSERS includes the Military Pension Fund

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

Pensions & Investments Survey - February 5, 2018 issue

*The combined net payout for the plans for FY 2017 was \$2.2 billion with \$24.2 billion paid out since FY 2008 thru FY 2017 (SOMCAFR). This represents the amount paid to beneficiaries in excess of employer and employee contributions.
**OPEB - Other Post Employment Benefits

Sources and Uses of Cash October 2017 ~ September 2018



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

Asset Allocation Targets As of 9/30/18

Asset Class	MPSERS			MSERS			MSPRS			MJRS			SMRS
	Actual 9/30/18	Target 9/30/18	Target* 9/30/19	Actual 9/30/18	Target 9/30/18	Target* 9/30/19	Actual 9/30/18	Target 9/30/18	Target* 9/30/19	Actual 9/30/18	Target 9/30/18	Target* 9/30/19	Ranges
Domestic Equity	26.3%	26.0%	28.0%	26.3%	26.0%	28.0%	26.3%	26.0%	28.0%	26.3%	26.0%	28.0%	20% - 35%
Private Equity	16.4%	16.5%	18.0%	16.4%	16.5%	18.0%	16.4%	16.5%	18.0%	16.4%	16.5%	18.0%	10% - 20%
International Equity	17.2%	17.5%	16.0%	17.2%	17.5%	16.0%	17.2%	17.5%	16.0%	17.2%	17.5%	16.0%	15% - 25%
Long Term Fixed Income	12.1%	11.5%	10.5%	12.1%	11.5%	10.5%	12.1%	11.5%	10.5%	12.1%	11.5%	10.5%	10% - 20%
Real Estate & Infrastructure	10.5%	10.0%	10.0%	10.5%	10.0%	10.0%	10.5%	10.0%	10.0%	10.5%	10.0%	10.0%	5% - 15%
Real Return & Opportunistic	9.1%	9.0%	9.5%	9.1%	9.0%	9.5%	9.1%	9.0%	9.5%	9.1%	9.0%	9.5%	5% - 15%
Absolute Return	5.9%	6.0%	6.0%	5.9%	6.0%	6.0%	5.9%	6.0%	6.0%	5.9%	6.0%	6.0%	3% - 9%
Short Term Fixed Income	2.5%	3.5%	2.0%	2.5%	3.5%	2.0%	2.5%	3.5%	2.0%	2.5%	3.5%	2.0%	1% - 6%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	

*Complies with basket clause and international restrictions.

Cumulative and Consecutive Total Fund Returns

MSPRS											
Cumulative For Years Ending 9/30/18											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
MSPRS	11.5	12.7	11.0	8.8	10.1	10.5	10.9	10.3	10.1	8.4	
Public Plan - Median (> \$1 billion)*	7.7	10.1	10.0	7.2	7.9	8.6	9.6	8.8	8.9	7.7	
Rank	5	7	17	5	4	6	23	9	10	28	
bp Difference - Median	380	258	95	160	222	186	127	159	124	61	
Consecutive For Years Ending											
	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	09/09	
MSPRS	11.5	13.8	7.6	2.5	15.5	12.4	13.3	6.7	8.5	-6.5	
Public Plan - Median (> \$1 billion)*	7.7	12.5	9.7	-0.4	10.4	12.8	16.0	2.0	10.5	0.0	
Rank	5	24	89	3	3	55	88	4	88	89	
bp Difference - Median	380	127	-207	289	507	-37	-272	474	-198	-651	

MJRS											
Cumulative For Years Ending 9/30/18											
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year	
MJRS	11.5	12.7	11.0	8.8	10.0	10.3	10.8	10.2	9.9	8.1	
Public Plan - Median (> \$1 billion)*	7.7	10.1	10.0	7.2	7.9	8.6	9.6	8.8	8.9	7.7	
Rank	5	7	17	5	4	8	24	10	22	31	
bp Difference - Median	378	260	97	161	212	172	124	148	97	39	
Consecutive For Years Ending											
	09/18	09/17	09/16	09/15	09/14	09/13	09/12	09/11	09/10	09/09	
MJRS	11.5	13.9	7.6	2.5	14.9	12.1	13.9	6.1	7.0	-6.4	
Public Plan - Median (> \$1 billion)*	7.7	12.5	9.7	-0.4	10.4	12.8	16.0	2.0	10.5	0.0	
Rank	5	24	89	3	3	65	77	7	100	89	
bp Difference - Median	378	135	-206	287	450	-71	-206	409	-346	-637	

*State Street Public Funds Universe

State of Michigan Retirement Systems

MARKETS REVIEW AND OUTLOOK

State of Michigan Investment Board Meeting
December 11, 2018



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**)	Tactical (Short Term) Expectations***
Private Equity	10.7%	24.0%	15.5%	Hold
International Equity	9.6%	20.0%	4.8%	Add
Domestic Equity	7.7%	17.0%	12.1%	Trim
Real Estate (Core)	6.6%	11.5%	5.1%	Trim
Absolute Return	6.0%	9.0%	1.5%	Hold
Real Ret/Opportunistic	8.7%	9.5%	4.7%	Add
Long-Term Fixed	3.6%	4.0%	3.8%	Hold
Short-Term	3.2%	1.0%	0.3%	Hold

* Aon Hewitt Investment Consultants 2018 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 and other central banks, as well as the run-up in prices for most risk assets over the past several years since the depths of the Great Recession.
- Growth continued its dominance over value stocks in the U.S., having outperformed by 7.4%, 4.4%, 4.6%, 2.9%, and 4.1% annualized over the past one, three, five, seven and ten years, respectively.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 30% discount to U.S. counterparts while emerging markets are at a 40% discount.
- Having lost value to other currencies in 2017 and early 2018, the U.S. dollar is strengthening. As measured by the DXY index, the dollar gained about 5.4% of value since December 2017 versus a basket of currencies.
- The price to hedge the dollar is rising. Although many short-term interest rates globally are lower than the rates in the U.S., once the value of hedging is included, many non-U.S. short-term investments are actually more attractive for global investors
- Dividend yields on REITs are around 4.1% which is nearly 1% higher than the yield of the ten-year U.S. Treasury. Historically, REIT dividend yields have averaged 1.2% higher than the ten-year U.S. Treasury.

International Equity

A compelling case.

- International equities underperformed domestic equities over the year ending October 2018 by -15.1%. Over the past three, five, seven, and ten years ending September 2018, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -7.1%, -9.5%, -9.5, and -6.4% annualized, respectively.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international markets trade at approximately a 30% discount to U.S. counterparts while emerging markets are at a 40% discount.
- Year-over-year earnings growth for international markets is estimated to be roughly 8% for the year. Earnings in international markets can grow around 30% just to get back to all-time highs, suggesting that there could be a runway for earnings to grow at a high rate for some time. Trading at a valuation multiple discount, international equity represents a leveraged play on continued global growth.
- Within international equities, emerging markets have underperformed developed markets over the past one, five and seven years by -5.8%, -1.1%, and -3.4% annualized, respectively. Over the past three and ten years, emerging has outperformed developed by 2.7%, and 1.1%. The plan is overweight emerging markets, with a weight of 32.7% compared to the benchmark weight of 24.9%.
- International equity small-cap stocks underperformed the broader MSCI ACWI ex USA index over the past one year trailing by -1.5%. However, over the past three, five, seven, and ten years international small-caps have outperformed by 1.1%, 1.7%, 1.8%, and 4.0% respectively. The plan historically has had a meaningful overweight to international small cap and remains so by approximately 2.6%. However, this weight has been reduced as valuations within these securities look stretched.
- The plan is underweight international equity against a global benchmark (approximately 40% versus 45% of total public equity) though at a higher allocation than the peer median allocation; 17.2% versus peer median of 16.0%.

Domestic Equity

High earnings growth.

- The broad U.S. stock market return for the one year ending October 2018 was 6.9%. Small caps have underperformed larger caps over the past decade. Over the past one, three, five, seven, and ten years small caps have underperformed large caps by -5.5%, -0.8%, -3.3%, -1.8%, and -0.8% annualized, respectively. Meanwhile, growth continued its dominance over value stocks in the U.S., outperforming by 7.4%, 4.4%, 4.6%, 2.9%, and 4.1% annualized over the past one, three, five, seven, and ten years, respectively.
- The effects of the recent tax cuts are still being digested by market participants. Year-over-year growth in analyst estimated earnings for the next year are close to 12%, which is about half the rate of the trailing twelve months.
- Many valuation metrics are near historical averages. However, the absolute returns over the next cycle may not be as strong as the historical average of 11 – 12% year-over-year total returns. One reason for this is the fact that market EPS is above trend as is returns on equity. However, the largest drivers of the market today are less cyclical (economically sensitive) than past market leaders.

Interest Rates

An accommodative Fed.

- At the end of October 2018, the U.S. 10-year Treasury was yielding only 28 basis points more than the 2-year Treasury. That is the narrowest spread between the two rates since July 2007 and the dawning of the global financial crisis.
- Flat yield curves are often viewed as worrisome. One material difference between the environment of today's flat yield curve and the one in 2007 is the fact that the current Fed Fund's rate is accommodative by historical standards, yielding a real yield of close to 0% while in the summer of 2007 the real yield was close to 3%.
- At its September 2018 meeting, the Federal Reserve Board voted to raise its key interest rate by an additional 25 basis points. The market is currently pricing in a possibility of one more rate increase in 2018. The Fed has now raised rates eight times since 2015 and the policy rate is just now less accommodative than when it started tightening rates.
- Spreads on investment-grade fixed income are around its average level of 1.1%. Spreads on riskier high-yield assets are much tighter at 120 basis points below average. The plan has reduced its credit exposure and has instead allocated towards securitized assets which now represent 21.7% of the fixed income portfolio. Over the past year ending September 2018, the Structured Fixed Income portfolio returned 3.7% while the benchmark Aggregate index was down -1.2%.

Real Estate

REIT market adjustment.

- Over the one year ending October 2018, the REIT market, as measured by the NAREIT index, gained 1.4%, nearly all from dividend yield. Over a longer time period of ten years, REITs have returned an annualized rate of return of 11.7%.
- Dividend yields on REITs are around 4.1% which is nearly 1% higher than the yield of the ten-year U.S. Treasury. Historically, REIT dividend yields have averaged 1.2% higher than the ten-year U.S. Treasury.

Commodities

Higher crude prices.

- Over the past ten years, commodities prices broadly have been falling, as measured by the Thomson Reuters CRB Commodity Index, down by roughly about 60% from the peak in 2008. However, since their lows in 2016, prices are up 17%.
- The price for crude oil has increased over the past year ending October 2018, up 20% year-over-year to approximately \$65 per barrel.
- Having lost value to other currencies in 2017 and early 2018, the U.S. dollar is strengthening. As measured by the DXY index, the dollar gained about 5.4% of value since December 2017 versus a basket of currencies.
- The price to hedge the dollar is rising. Although many short-term interest rates globally are lower than the rates in the U.S., once the value of hedging is included, many non-U.S. short-term investments are actually more attractive for global investors.

ECONOMIC OUTLOOK

Select Historic Economic Growth with Forecasts

More growth ahead.

Real GDP % Growth Actual/Forecasts	2016	2017	2018	2019	2020
World	3.3	3.7	3.8	3.6	3.3
U.S.	1.6	2.2	2.9	2.6	1.9
Developed (G8)	1.8	2.4	2.4	2.2	1.8
Asia	4.9	5.2	4.8	4.8	4.6
EMEA	1.7	3.5	2.9	2.4	2.7
Europe	1.9	2.4	2.0	1.7	1.5
Latin America	-1.1	1.8	1.4	2.3	2.8
China	6.7	6.9	6.6	6.2	6.0

*Source: Bloomberg

Economic Overview

Will tariffs lead to a trade war?

- The most recent reading of the annualized U.S. GDP growth was 3.5%, slightly ahead of the consensus estimate of 3.3%. Current estimates for 2019 GDP growth for the U.S. are around 2.6%. Coincidental economic indicators such as the Institute for Supply Management's Manufacturing and Non-Manufacturing PMI Indexes are well above 50, indicating that the U.S. economy is likely to continue to grow.
- Consumer confidence in the U.S. is very high. As measured by a 3-month average of the Conference Board's consumer confidence index, consumers are the most confident since October 2000.
- Beginning in January, but through the summer of 2018, President Trump has imposed a series of tariffs aimed mostly at solar panels, washing machines, steel and aluminum. These tariffs impact many large trading partners of the U.S. and in particular; China, Canada, Mexico and the European Union. Predictably, these partners responded negatively and issued their own tariffs.
- To date, little economic impact (positively or negatively) has been attributed to the trade tariffs, however many economists worry that the tariffs could lead to a trade war and lead to poor economic global growth, or worse yet an economic recession. Perhaps in anticipation of a negative impact to farmers due to the exchange of tariffs, in July 2018 the Trump administration announced a program offering to pay farmers up to \$12 billion.
- Housing is performing poorly. Since the spring of 2018, mortgage applications are averaging about a percent less month-over-month and the number of houses sold are now trending down 3% month-over-month. While house prices nationally are on average still going up month-to-month, the rate of change is dropping fast and is now about half the average over the past three years. Reflecting this market environment, homebuilder stocks are down more than a third from their January 2018 high.

Annual Total Returns of Key Asset Classes 1998 - 2017

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	
Best ↑	U.S. Equity	Int'l Equity	Gov't Bonds	Corp. Bonds	Gov't Bonds	Int'l Equity	Int'l Equity	Real Estate	Int'l Equity	Int'l Equity	Cash	Int'l Equity	U.S. Equity	Gov't Bonds	Real Estate	U.S. Equity	U.S. Equity	Real Estate	U.S. Equity	Int'l Equity	Best
	26.33%	26.97%	13.23%	10.40%	11.50%	40.82%	20.90%	20.06%	26.65%	16.65%	12.38%	41.44%	16.38%	14.26%	16.83%	32.80%	13.08%	13.32%	11.93%	27.19%	
	Int'l Equity	U.S. Equity	Real Estate	Real Estate	Corp. Bonds	U.S. Equity	Real Estate	Int'l Equity	Real Estate	Real Estate	Cash	U.S. Equity	Real Estate	Gov't Bonds	U.S. Equity	Int'l Equity	Real Estate	U.S. Equity	Real Estate	U.S. Equity	
	19.97%	20.27%	12.24%	7.28%	10.52%	29.58%	14.48%	16.62%	16.59%	15.84%	2.05%	27.24%	13.11%	9.02%	16.17%	15.29%	11.81%	1.01%	7.97%	21.13%	
	Real Estate	Hedge Funds	Corp. Bonds	Gov't Bonds	Real Estate	Hedge Funds	U.S. Equity	U.S. Equity	U.S. Equity	Gov't Bonds	Int'l Equity	Corp. Bonds	Int'l Equity	Corp. Bonds	Real Estate	Real Estate	Corp. Bonds	Gov't Bonds	Corp. Bonds	Real Estate	
	16.24%	18.93%	9.40%	7.24%	6.74%	9.01%	11.78%	5.65%	15.34%	8.67%	0.10%	16.05%	11.15%	8.35%	10.54%	10.99%	7.53%	0.86%	5.63%	6.96%	
	Gov't Bonds	Real Estate	Cash	Cash	Hedge Funds	Real Estate	Hedge Funds	Hedge Funds	Hedge Funds	Hedge Funds	Corp. Bonds	Hedge Funds	Corp. Bonds	Int'l Equity	Corp. Bonds	Hedge Funds	Int'l Equity	Int'l Equity	Int'l Equity	Corp. Bonds	
	9.85%	11.36%	6.16%	4.43%	3.57%	8.99%	5.83%	5.13%	9.21%	7.68%	-3.07%	9.65%	8.46%	2.96%	9.37%	7.70%	0.66%	4.50%	4.50%	6.42%	
	Corp. Bonds	Cash	Hedge Funds	Hedge Funds	Int'l Equity	Corp. Bonds	Corp. Bonds	Int'l Equity	Cash	U.S. Equity	Real Estate	Corp. Bonds	Gov't Bonds	Gov't Bonds	Hedge Funds	Int'l Equity	Hedge Funds	Int'l Equity	Int'l Equity	Hedge Funds	
	8.59%	4.83%	5.77%	3.11%	2.39%	7.69%	5.25%	4.27%	4.81%	5.47%	-6.46%	2.72%	5.52%	1.75%	4.22%	1.49%	3.14%	2.09%	2.09%	3.88%	
	Cash	Int'l Equity	Int'l Equity	Int'l Equity	Cash	Gov't Bonds	Gov't Bonds	Corp. Bonds	Corp. Bonds	Corp. Bonds	Hedge Funds	Cash	Hedge Funds	Cash	Gov't Bonds	Cash	Int'l Equity	Cash	Hedge Funds	Gov't Bonds	
	5.24%	2.68%	3.39%	1.55%	1.79%	2.36%	3.48%	3.06%	4.27%	5.10%	-19.86%	0.19%	5.07%	0.10%	2.02%	0.07%	0.01%	1.89%	2.30%	2.30%	
	Inflation	Corp. Bonds	U.S. Equity	U.S. Equity	Int'l Equity	Inflation	Inflation	Gov't Bonds	Gov't Bonds	Cash	U.S. Equity	Gov't Bonds	Inflation	Hedge Funds	Inflation	Corp. Bonds	Cash	Corp. Bonds	Gov't Bonds	Inflation	
	1.60%	-1.94%	-6.98%	-10.64%	-14.95%	1.88%	3.25%	2.65%	3.46%	5.03%	-36.72%	-2.19%	1.50%	-3.55%	1.70%	-2.01%	-0.77%	1.05%	2.12%	2.12%	
	Hedge Funds	Gov't Bonds	Int'l Equity	Int'l Equity	U.S. Equity	Cash	Cash	Corp. Bonds	Inflation	Inflation	Int'l Equity	Real Estate	Cash	Int'l Equity	Cash	Gov't Bonds	Int'l Equity	Int'l Equity	Cash	Cash	
	-1.61%	-2.25%	-15.31%	-19.74%	-21.30%	1.16%	1.33%	1.95%	2.55%	4.06%	-45.52%	-16.86%	0.13%	-13.71%	0.11%	-2.60%	-3.87%	-5.67%	0.84%	0.84%	
Worst ↓																					Worst

		Annualized Returns 1998 - 2017	
Return		Gov't.	Corp.
Risk		Int'l.	US Eq.
		1.97%	7.51%
		0.59%	15.01%
		2.16%	5.81%
		1.01%	5.29%
		3.69%	9.78%
		3.86%	8.33%

- Hedge Funds are represented by the HFRI FOF Conservative Index
- Inflation is represented by the U.S. Consumer Price Index
- International Equity is represented by the MSCI EAFE Index
- 2000 Forward - Int'l 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
- Real Estate is represented by the NPI
- Corporate Bonds are represented by the Barclays Capital - Credit Index
- Government Bonds are represented by the Barclays Capital U.S. Government

State of Michigan Retirement Systems

DEFINED CONTRIBUTION REVIEW

State of Michigan Investment Board Meeting
December 11, 2018



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

EXECUTIVE SUMMARY

Overview

The State of Michigan's Defined Contribution (DC) plan has over 76,000 participants across 4 constituent bases: teachers, judges, police officers and state employees. The State's DC program was initially established as a supplement to Defined Benefits (DB) for these 4 constituents. But effective March 31, 1997, all new employees hired to the State no longer had access to the State's DB Plan. It has been over 21 years since DB benefits have been closed to State employees. Of the 76,835 DC participant universe, over 50,000 are state employees who no longer have access to DB benefits. For 65% of the DC participant base, DC has transitioned from a supplemental retirement vehicle to their primary retirement vehicle.

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

Strategy

- **TIER I: Target Date Funds and Passively Managed Funds**

- Target Date Funds (TDFs) are the default option for plan participants. The TDFs invest in an asset mix which will vary according to the date of the participant's expected retirement listed on the fund (i.e. 2025, 2030, 2035,...). The risk of the fund will lessen over time as the investor moves closer to their retirement date. The assets the TDFs invest in are primarily low cost, indexed funds.
- Passively Managed Funds are comprised of low-cost indexed funds which seek to replicate the performance of a variety of cash, bond and stock indices with very little tracking error.

- **TIER II: Actively Managed Funds**

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

- **TIER III: Self-Managed Accounts – Non-Core Options**

- The selection of investments held in a brokerage account is directed solely by the participants.

Investment Selection

- The selection of each investment option for the Plans is to be 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, offer 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.

Investment Monitoring

- The ORS and the BOI may examine each investment option as circumstances require, to ensure that a particular investment option's investment style and other relevant investment criteria, such as performance, fee and expense levels or significant change are acceptable, given the purpose of each investment option.

Market Environment and Outlook

- Structural changes in the U.S. retirement system are supporting growth in the DC industry:
 - Rapid decline of employer funded pensions
 - Potential erosion of Social Security benefits
 - Workforce aging
 - New regulations, specifically, the Pension Protection Act of 2006 -
 - Automatically enroll employees into the DC plan
 - Establish safe harbor investments known as QDIA
- In an effort to simplify the investment process for participants, industry trend has been to reduce the number of investment options offered in a DC plan. Based on the recent CEM benchmark report, the average number of investments offered by similarly sized plans is 13 options. The State of Michigan currently offers 20 investment options. The desired outcome of streamlining would be to benefit from economies of scale and ease the burden of asset allocation at the participant level.
- Another trend in the industry is the focus on retirement income. As fewer individuals have access to pension plans and DC plans have become the primary retirement vehicle for many Americans, more plan sponsors are exploring the ability to generate sustainable income in retirement.

SMRS

Defined Contribution Strategies

9/30/18

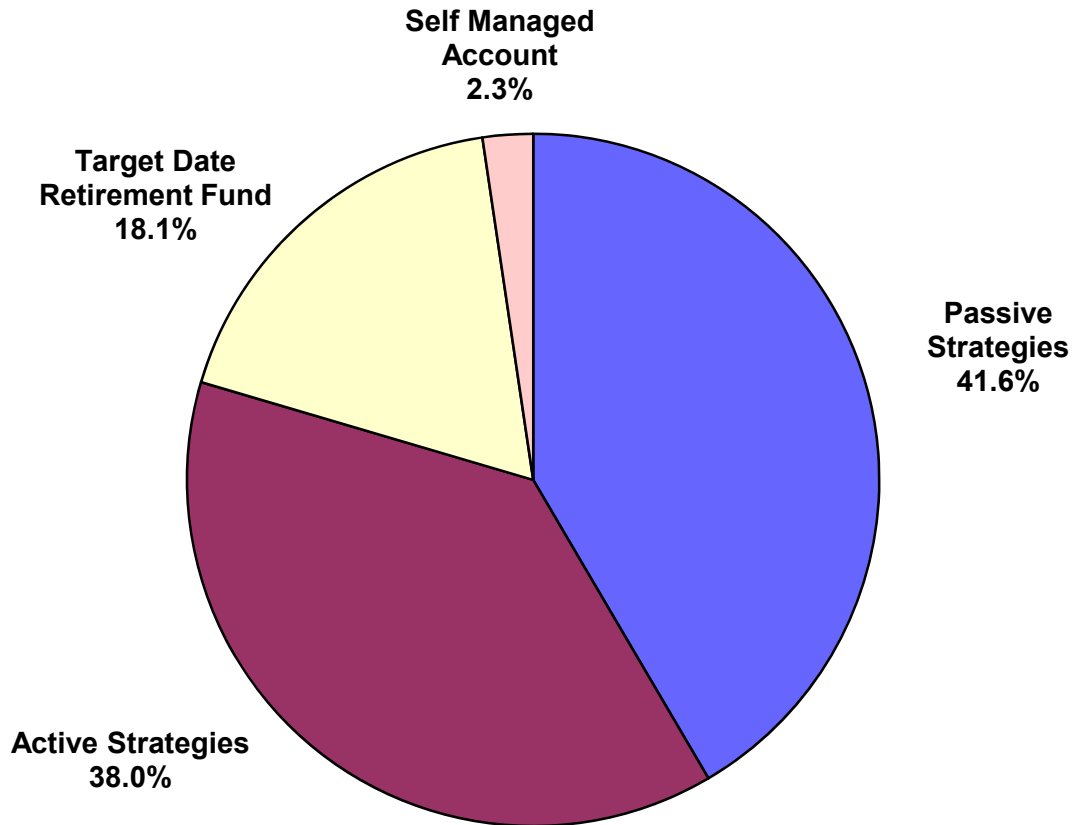
Markets	Amount	Total	% of Total	Fee per \$1,000
QDIA (\$ in Millions)				
Target Date Funds	\$1,565			\$0.70
Total Target Date		\$1,565	18.1%	\$0.70
Tier 1 Index Funds				
State Street S&P 500 Index Fund	\$1,205			\$0.23
State Street Bond Market Index Fund	708			0.52
State Street S&P Mid Cap Index Fund	607			0.52
State Street Global All Cap Equity ex-U.S. Index Fund	564			1.21
BlackRock S&P Small Cap 600 Equity Index CL F	160			0.30
BlackRock Government Short-Term Investment CL F	225			0.60
BlackRock Emerging Markets Index CL F	123			7.00
Total Tier 1 Index		\$3,593	41.6%	0.75
Tier 2 Active Funds				
Stable Value Fund	\$1,142			\$2.20
Dodge & Cox Stock Fund	625			4.10
Jennison Large Cap Growth Fund	420			2.90
American Funds EuroPacific Growth R6	345			4.90
Voya Small Cap Growth Equity Fund	177			4.30
T. Rowe Price Mid-Cap Value Fund	130			6.40
Oakmark Equity & Income I Fund	120			4.30
PIMCO Total Return I Fund	113			5.50
Artisan Mid Cap Fund	105			7.20
Virtus Ceredex Small-Cap Value Eq I	84			6.80
Prudential High Yield Fund	26			3.80
Total Tier 2 Active		\$3,286	38.0%	\$3.69
Tier 3				
Self Directed Brokerage Account	\$203			NA
Total SDBA		\$203	2.3%	NA
Total Defined Contribution Assets		<u>\$8,648</u>	<u>100.0%</u>	\$1.84

Note: All dollar amounts are expressed in millions.

SMRS

Defined Contribution by Investment Strategy

9/30/18



Market Value in Millions				
	<u>9/30/18</u>		<u>9/30/17</u>	
Passive Strategies	\$3,593	41.6%	\$3,199	40.6%
Active Strategies	3,286	38.0%	3,229	41.0%
Target Date Retirement Fund	1,565	18.1%	1,265	16.1%
Self Managed Account	203	2.3%	179	2.3%
Total Investments	<u>\$8,647</u>	<u>100.0%</u>	<u>\$7,872</u>	<u>100.0%</u>

*Loan Fund \$192M as of 9/30/18

Defined Contribution Performance by Fund

9/30/18

<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	\$39,551,444	3.2%	5.3%	3.9%	5.2%
State Street Income Custom Index		3.2%	5.4%	3.9%	5.4%
Morningstar Target-Date Retirement		2.7%	5.1%	3.9%	5.0%
Variance State Street Income Custom Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Target-Date Retirement		0.6%	0.2%	0.0%	0.2%
State Street Target Retirement 2015 Fund	\$55,675,192	3.8%	6.4%	4.9%	6.8%
State Street 2015 Custom Index		3.7%	6.4%	4.9%	6.8%
Morningstar Target-Date 2015		4.2%	6.8%	5.1%	5.7%
Variance State Street 2015 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2015		-0.5%	-0.5%	-0.1%	1.0%
State Street Target Retirement 2020 Fund	\$126,709,282	5.0%	8.1%	6.1%	7.7%
State Street 2020 Custom Index		5.0%	8.1%	6.1%	7.7%
Morningstar Target-Date 2020		4.6%	7.3%	5.4%	6.2%
Variance State Street 2020 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2020		0.4%	0.8%	0.7%	1.5%
State Street Target Retirement 2025 Fund	\$162,180,696	6.4%	9.7%	7.2%	8.3%
State Street 2025 Custom Index		6.4%	9.7%	7.2%	8.3%
Morningstar Target-Date 2025		5.8%	8.7%	6.3%	6.9%
Variance State Street 2025 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2025		0.6%	1.0%	0.8%	1.4%
State Street Target Retirement 2030 Fund	\$175,038,567	7.2%	10.5%	7.7%	8.6%
State Street 2030 Custom Index		7.2%	10.5%	7.7%	8.6%
Morningstar Target-Date 2030		6.8%	9.7%	6.9%	7.1%
Variance State Street 2030 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2030		0.3%	0.8%	0.8%	1.5%
State Street Target Retirement 2035 Fund	\$188,905,054	7.9%	11.3%	8.1%	8.7%
State Street 2035 Custom Index		7.9%	11.3%	8.1%	8.8%
Morningstar Target-Date 2035		8.0%	10.9%	7.7%	7.9%
Variance State Street 2035 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2035		0.0%	0.4%	0.4%	0.9%
State Street Target Retirement 2040 Fund	\$182,198,134	8.6%	12.0%	8.5%	9.0%
State Street 2040 Custom Index		8.5%	11.9%	8.5%	9.0%
Morningstar Target-Date 2040		8.5%	11.4%	7.9%	7.9%
Variance State Street 2040 Custom Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Target-Date 2040		0.0%	0.5%	0.5%	1.1%
State Street Target Retirement 2045 Fund	\$179,938,936	9.2%	12.5%	8.7%	9.1%
State Street 2045 Custom Index		9.1%	12.5%	8.7%	9.1%
Morningstar Target-Date 2045		9.2%	12.1%	8.4%	8.3%
Variance State Street 2045 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2045		0.0%	0.5%	0.3%	0.8%
State Street Target Retirement 2050 Fund	\$222,597,194	9.2%	12.5%	8.7%	9.1%
State Street 2050 Custom Index		9.2%	12.5%	8.7%	9.1%
Morningstar Target-Date 2050		9.2%	12.1%	8.3%	8.2%
Variance State Street 2050 Custom Index		0.0%	0.0%	0.0%	0.0%
Variance Morningstar Target-Date 2050		0.0%	0.4%	0.4%	0.9%
State Street Target Retirement 2055 Fund	\$197,814,881	9.2%	12.5%	8.7%	N/A
State Street 2055 Custom Index		9.2%	12.5%	8.7%	N/A
Morningstar Target-Date 2055		9.5%	12.3%	8.7%	N/A
Variance State Street 2055 Custom Index		0.0%	0.0%	0.0%	N/A
Variance Morningstar Target-Date 2055		-0.3%	0.2%	0.1%	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 2060 Fund	\$34,825,118	9.2%	12.5%	N/A	N/A
<i>State Street 2060 Custom Index</i>		9.2%	12.5%	N/A	N/A
<i>Morningstar Target-Date 2060+</i>		9.6%	12.4%	N/A	N/A
<i>Variance State Street 2060 Custom Index</i>		0.0%	0.0%	N/A	N/A
<i>Variance Morningstar Target-Date 2060+</i>		-0.5%	0.1%	N/A	N/A
TIER 1					
State Street S&P 500 Index Fund	\$1,205,143,746	17.9%	17.3%	13.9%	11.9%
S&P 500 Index		17.9%	17.3%	14.0%	12.0%
Morningstar Large Blend		15.4%	14.9%	11.5%	10.3%
Variance S&P 500 Index		0.0%	0.0%	0.0%	-0.1%
Variance Morningstar Large Blend		2.5%	2.4%	2.4%	1.7%
State Street Bond Market Index Fund	708,364,609	-1.3%	1.3%	2.1%	3.7%
Bloomberg Barclays U.S. Aggregate Index		-1.2%	1.3%	2.2%	3.8%
Morningstar Intermediate-Term Bond		-1.1%	1.7%	2.1%	4.1%
Variance Bloomberg Barclays U.S. Aggregate Index		0.0%	0.0%	-0.1%	-0.1%
Variance Morningstar Intermediate-Term Bond		-0.2%	-0.4%	0.0%	-0.4%
State Street S&P Mid Cap Index Fund	607,277,934	14.2%	15.6%	11.9%	12.4%
S&P 400 Index		14.2%	15.7%	11.9%	12.5%
Morningstar Mid-Cap Blend		11.6%	12.6%	9.3%	10.4%
Variance S&P 400 Index		0.0%	0.0%	-0.1%	-0.1%
Variance Morningstar Mid-Cap Blend		2.6%	3.0%	2.5%	2.0%
State Street Global All Cap Equity ex-U.S. Index Fund	564,191,625	2.0%	10.4%	4.6%	N/A
MSCI ACWI ex USA IMI (Net)		1.8%	10.1%	4.4%	N/A
Morningstar Foreign Large Blend		1.7%	8.6%	4.1%	N/A
Variance MSCI ACWI ex USA IMI (Net)		0.2%	0.3%	0.2%	N/A
<i>Variance Morningstar Foreign Large Blend</i>		0.3%	1.8%	0.5%	N/A
BlackRock Government Short-Term Investment CL F	225,074,719	1.5%	0.8%	0.5%	N/A
BofA Merrill Lynch US 3-Month Treasury Bill Index		1.6%	0.8%	0.5%	N/A
Variance BofA Merrill Lynch US 3-Month Treasury Bill Index		-0.1%	0.0%	0.0%	N/A
BlackRock S&P Small Cap 600 Equity Index CL F	159,954,534	19.1%	N/A	N/A	N/A
Russell 2000 Index		15.2%	N/A	N/A	N/A
Morningstar Small Blend		12.1%	N/A	N/A	N/A
Variance Russell 2000 Index		3.9%	N/A	N/A	N/A
Variance Morningstar Small Blend		7.0%	N/A	N/A	N/A
BlackRock Emerging Markets Index CL F	123,393,252	-0.9%	12.3%	3.6%	N/A
MSCI Emerging Market (Net)		-0.8%	12.4%	3.6%	N/A
Morningstar Diversified Emerging Mkts		-3.7%	9.9%	2.5%	N/A
Variance MSCI Emerging Market (Net)		-0.1%	0.0%	-0.1%	N/A
<i>Variance Morningstar Diversified Emerging Mkts</i>		2.8%	2.4%	1.0%	N/A
TIER 2					
Stable Value Fund	\$1,142,281,905	2.0%	2.1%	2.1%	2.3%
Barclays Int Gov/Credit A or Higher Index		-1.1%	0.5%	1.2%	2.8%
Hueler Universe		2.2%	1.9%	1.9%	2.3%
Variance Barclays Int. Gov Credit A or Better Index		3.1%	1.6%	0.9%	-0.6%
Variance Hueler Universe		-0.1%	0.2%	0.3%	0.0%
Dodge & Cox Stock Fund	624,963,213	13.7%	17.3%	12.7%	11.8%
<i>Russell 1000 Value Index</i>		9.5%	13.6%	10.7%	9.8%
<i>Morningstar Large Value</i>		10.7%	13.3%	9.9%	9.2%
<i>Variance Russell 1000 Value Index</i>		4.3%	3.7%	2.0%	2.0%
<i>Variance Morningstar Large Value</i>		3.0%	4.0%	2.8%	2.6%

<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	420,067,964	29.0%	21.8%	N/A	N/A
<i>Russell 1000 Growth Index</i>		26.3%	20.6%	N/A	N/A
<i>Morningstar Large Growth</i>		23.1%	17.7%	N/A	N/A
<i>Variance Russell 1000 Growth Index</i>		2.7%	1.2%	N/A	N/A
<i>Variance Morningstar Large Growth</i>		6.0%	4.1%	N/A	N/A
American Funds EuroPacific Growth R6	344,837,860	1.5%	9.9%	6.2%	6.8%
<i>MSCI EAFE Index - Net Div</i>		2.7%	9.2%	4.4%	5.4%
<i>Morningstar Foreign Large Blend</i>		1.7%	8.6%	4.1%	4.8%
<i>Variance MSCI EAFE Index - Net Div</i>		-1.3%	0.7%	1.8%	1.5%
<i>Variance Morningstar Foreign Large Blend</i>		-0.2%	1.4%	2.1%	2.0%
Voya Small Cap Growth Equity Fund	176,818,338	13.1%	16.1%	10.8%	N/A
<i>Russell 2000 Growth Index</i>		21.1%	18.0%	12.1%	N/A
<i>Morningstar Small Growth</i>		24.3%	18.2%	11.7%	N/A
<i>Variance Russell 2000 Growth Index</i>		-7.9%	-1.9%	-1.4%	N/A
<i>Variance Morningstar Small Growth</i>		-11.2%	-2.1%	-0.9%	N/A
T. Rowe Price Mid-Cap Value Fund	130,138,325	10.1%	14.7%	11.3%	11.8%
<i>Russell Midcap Value Index</i>		8.8%	13.1%	10.7%	11.3%
<i>Morningstar Mid-Cap Value</i>		8.9%	12.4%	9.3%	10.4%
<i>Variance Russell Midcap Value Index</i>		1.3%	1.6%	0.6%	0.5%
<i>Variance Morningstar Mid-Cap Value</i>		1.2%	2.3%	2.0%	1.4%
Oakmark Equity & Income I Fund	119,762,488	5.7%	9.6%	7.3%	7.7%
<i>60% S&P 500/40% Barclays U.S. Gov/Credit Index</i>		9.9%	10.8%	9.3%	9.0%
<i>Morningstar Allocation--50% to 70% Equity</i>		6.5%	8.7%	6.5%	7.1%
<i>Variance 60% S&P 500/40% Barclays U.S. Gov/Credit Index</i>		-4.3%	-1.2%	-1.9%	-1.3%
<i>Variance Morningstar Allocation--50% to 70% Equity</i>		-0.9%	0.9%	0.9%	0.6%
PIMCO Total Return I Fund	112,500,077	-1.5%	2.2%	2.3%	5.1%
<i>Bloomberg Barclays U.S. Aggregate Index</i>		-1.2%	1.3%	2.2%	3.8%
<i>Morningstar Intermediate-Term Bond</i>		-1.1%	1.7%	2.1%	4.1%
<i>Variance Bloomberg Barclays U.S. Aggregate Index</i>		-0.3%	0.9%	0.1%	1.3%
<i>Variance Morningstar Intermediate-Term Bond</i>		-0.4%	0.5%	0.1%	0.9%
Artisan Mid Cap Fund	104,646,525	22.2%	14.3%	10.5%	13.5%
<i>Russell Midcap Growth Index</i>		21.1%	16.7%	13.0%	13.5%
<i>Morningstar Mid-Cap Growth</i>		20.2%	15.5%	11.3%	11.5%
<i>Variance Russell Midcap Growth Index</i>		1.1%	-2.4%	-2.5%	0.0%
<i>Variance Morningstar Mid-Cap Growth</i>		2.0%	-1.2%	-0.8%	2.0%
Virtus Ceredex Small-Cap Value Eq I	83,908,694	13.8%	14.9%	10.2%	11.2%
<i>Russell 2000 Value Index</i>		9.3%	16.1%	9.9%	9.5%
<i>Morningstar Small Value</i>		8.4%	13.6%	8.6%	9.8%
<i>Variance Russell 2000 Value Index</i>		4.5%	-1.3%	0.3%	1.7%
<i>Variance Morningstar Small Value</i>		5.4%	1.3%	1.6%	1.4%
Prudential High Yield Fund	25,862,752	3.1%	7.1%	N/A	N/A
<i>Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		3.1%	8.1%	N/A	N/A
<i>Morningstar High Yield Bond</i>		2.0%	6.3%	N/A	N/A
<i>Variance Bloomberg Barclays U.S. Corp. HY 1% Issuer Cap Index</i>		0.0%	-1.0%	N/A	N/A
<i>Variance Morningstar High Yield Bond</i>		1.1%	0.9%	N/A	N/A
TIER 3					
Self Directed	203,161,998				
TOTAL	\$8,647,785,056				

Loan Fund: \$191,594,590

State of Michigan Retirement Systems

FIXED INCOME REVIEW

State of Michigan Investment Board Meeting
December 11, 2018



Daniel J. Quigley
Senior Investment Manager
Fixed Income Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/18)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	1.2%	3.8%	3.8%	3.6%	5.3%
Bloomberg Barclays US Agg	-1.2%	1.3%	2.2%	2.0%	3.8%
Peer Median Returns	-0.5%	2.2%	2.5%	2.7%	4.6%
Percentile Rank vs. Peers*	8	17	17	26	29

*State Street Universe greater than \$1 billion

- The fixed income portfolio outperformed its benchmark and peer group across all time periods. This year-over-year (YOY) outperformance was due to several key allocation decisions. An increased allocation to securitized assets has been a key driver of relative performance. Security selection has also contributed to outperformance within the corporate bond portfolio. The portfolio also benefited from an underweight to Treasuries.
- The duration positioning of the portfolio helped performance due to an overweight to floating-rate securities in a rising rate environment. An underweight to long duration securities also assisted performance as short and intermediate duration securities outperformed longer maturity bonds due to interest rate increases.
- Strategies such as High Yield Credit and Structured Fixed Income experienced strong relative returns over recent time periods which has contributed to overall portfolio performance. Structured Fixed Income returned 3.7% on a YOY basis while High Yield Credit returned 1.9%.

Strategy Update

- The goal of the Long-Term Fixed Income Division portfolio is to meet or exceed the returns of the Bloomberg Barclays U.S. Aggregate Bond Index while satisfying the overall characteristics of a core fixed income portfolio. These characteristics are: income, liquidity, principal preservation, and diversification from equity market risk. The portfolio has a higher yield than the benchmark without having meaningfully more risk than the U.S. Aggregate Index. The yield-to-maturity of the portfolio is currently 4.3% versus a benchmark yield of 3.3%. In addition to this, the portfolio has an equity beta of 0.0, in line with the U.S. Aggregate Index.
- The Core-plus strategy implemented to achieve this goal includes:
 - Core: As of September 30, 2018, the allocation to U.S. Treasuries, investment-grade corporate bonds, government-guaranteed U.S. Agency Debentures, RMBS, and Commercial Mortgage Backed Securities (CMBS) was 69.1%. This includes a 23.2% allocation to U.S. Treasuries, TIPS, and cash.
 - Plus: The portfolio maintains a strategic, out-of-benchmark allocation to high-yield corporate debt, securitized credit, and global fixed income strategies as market opportunities allow. This allocation increases the portfolio yield and total return potential but will result in lower liquidity and higher volatility. The allocation to the Plus portfolio was 30.9% as of September 30, 2018.

Tactical Update

- The allocation to securitized credit, primarily in CMBS, ABS, non-agency RMBS, and CLO securities, has increased to 21.7% of the portfolio. The combination of low interest rate duration and high coupon income (often floating rate) is attractive at this point in the interest rate cycle.
- The allocation to high-yield strategies was 5.5% at the end of the quarter, down from a peak of 14.0% in 2016. While fundamentals remain strong in this sector, the division has reduced this position due to the unattractive valuation of HY credit in the current markets.
- The portfolio has an increased 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 and should position the portfolio to outperform in a rising interest rate environment as the Federal Reserve continues to tighten monetary policy.
- The allocation to U.S. TIPS increased during the quarter to 2.7% of the fixed income portfolio. The TIPS allocation has outperformed nominal U.S. Treasuries by roughly 200 bps on a YOY basis. This allocation should continue to outperform nominal U.S. Treasuries in a rising rate environment if increases in interest rates are driven partially by increased inflation expectations.

Market Environment and Outlook

- The yield curve for U.S. Treasury securities flattened for the year with short-term interest rates increasing by more than long-term rates. The yield on the 30-year Treasury increased by 35 bps on a YOY basis to 3.21% while two-year Treasury yields increased by 134 bps to 2.82%. Short-term rate increases were driven by tightening from the Federal Reserve. The FOMC has increased the Fed Funds rate by 200 bps since December of 2015, including a 25 bps rate hike during their September meeting to take the Fed Funds rate to 2.0%. Markets expect an additional two rate increases by the end of the 2019 calendar year.
- Inflation expectations were flat during the quarter with ten-year breakeven inflation expectations ending the quarter at 2.1%. This is in line with the 2% median inflation target from the Federal Reserve. The portfolio has slightly increased its allocation to U.S. TIPS and believes that owning these securities offers value should inflation indices continue recent increases.
- Credit markets outperformed with high-yield spreads ending September at 315 bps, roughly 50 bps lower for the quarter. These spreads are over 500 bps lower than the levels reached in February of 2016 and are 120 bps below their five-year average level of 438 bps. Investment-grade spreads also tightened during the quarter, falling by 20 bps to 106 bps. The portfolio has reduced its allocation to corporate credit by roughly 4.1% YTD as spread levels have moved below their historical averages.
- Global markets recovered with the Emerging Markets Debt (EMD) Index returning 1.6% for the quarter. YTD returns for EMD are still weak at -2.3%. The spread on the EMD Index ended the quarter at 285 bps, 30 bps below its five-year average of 316 bps. Italy continued to underperform in the developed markets with the yield spread between Italian and German 10-year bonds ending the quarter at 267 bps, up from a level of 114 bps in April of this year.

- Securitized assets such as CMBS, ABS, and CLO bonds have also experienced strong tightening recently but still look relatively attractive when compared with long-term averages. Spreads on BBB CMBS securities ended the quarter at 252 bps, down 100 bps YOY.
- The higher relative yield of short-term U.S. interest rates, coupled with recent strength of the U.S. dollar, has created attractive opportunities to invest in dollar-hedged positions for short-term developed market sovereign debt. The Fixed Income Division continues to look at these opportunities and may trade in hedged positions on a relative value basis should this opportunity persist.

Conclusion

- The portfolio remains defensively positioned for rising interest rates. The duration remains short of the benchmark and the portfolio maintains an underweight to long-term debt. This position is offset through a larger allocation to structured and corporate debt securities which increase the income of the portfolio. The portfolio will continue to look for attractive risk-adjusted opportunities within the fixed income opportunity set.

SMRS
Long-Term Fixed Income by Strategy
9/30/18

	Amount	Total	% of Total
Core (\$ in Millions)			
LTFID Internal	\$4,853		
PIMCO Mortgage Fund	247		
Dodge & Cox	241		
PGIM Investment Grade Credit	228		
Total Core		\$5,570	63.1%
Tactical			
Pyramis	\$300		
Loomis Core Plus	225		
Total Tactical		\$525	6.0%
Securitized Debt			
Met West Securitized Ops	\$608		
Principal CMBS	539		
Napier Park CLO Debt	262		
TICP CLO Debt	259		
Napier Park ABS Income	166		
Napier Park Strategic Loan	81		
Total Securitized Debt		\$1,914	21.7%
High Yield			
Columbia Management	\$255		
PGIM High Yield	219		
Crescent Direct Lending	13		
Total High Yield		\$487	5.5%
Global			
T. Rowe Global Multi-Sector	\$227		
PGIM Global Liquid Relative Value	102		
Total Global		\$329	3.7%

TOTAL

\$8,825

100.0%

NOTE: Totals may not be exact due to rounding.

SMRS

Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

9/30/18

<u>Characteristic</u>	<u>Portfolio</u>	<u>Benchmark</u>
Average Maturity (Yrs)	7.9	8.4
Duration (Yrs)	4.9	6.0
Spread Duration (Yrs)	5.7	6.1
Coupon (%)	3.6	3.1
Yield to Maturity (%)	4.3	3.3
Credit Rating	A	AA
VaR (%)	3.9	4.5
Tracking Error	117 bps	n/a
Beta (vs S&P 500)	0.03	-0.03

Commentary

Objectives

Income:

Liquidity:

Principal Preservation:

Diversification:

Highlights

The coupon of the portfolio is approximately 50 bps higher than the benchmark. Roughly 20% of the portfolio is invested in floating-rate securities, allowing coupon income to increase relative to the benchmark if the yield curve continues to flatten.

23.2% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.

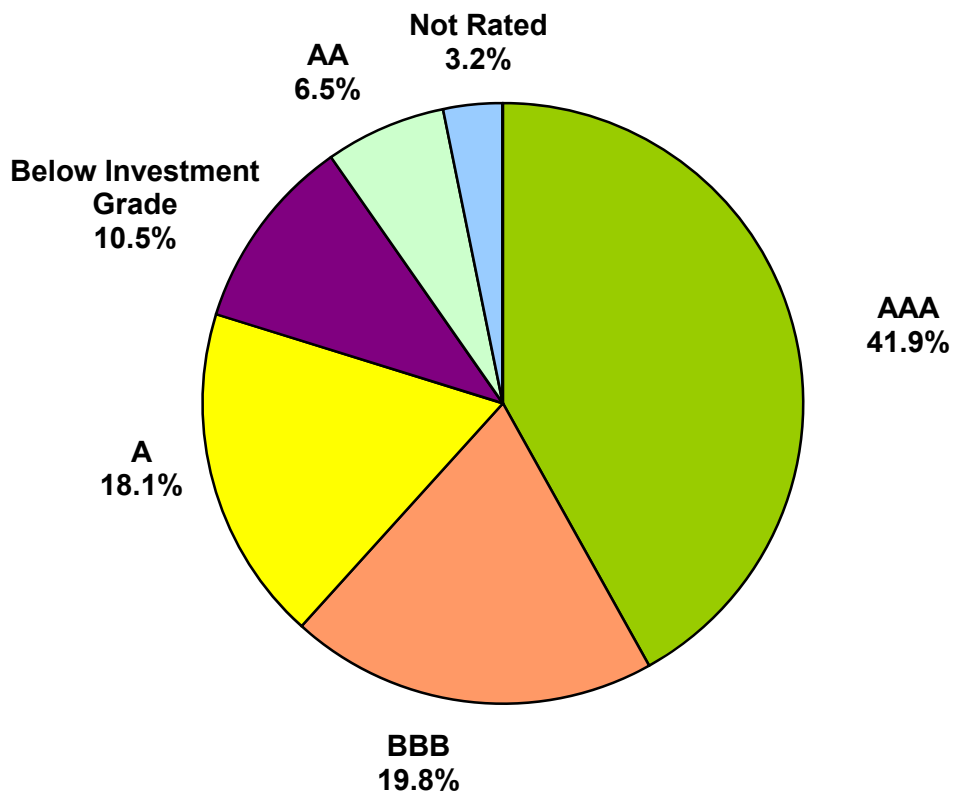
The portfolio has a large allocation to U.S. Treasuries and carries an investment-grade credit rating.

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

SMRS

Fixed Income By Rating

Total U.S. Long-Term Fixed Income 9/30/18



Market Value in Millions				
9/30/18				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
AAA	\$3,699	41.9%	71.7%	-29.8%
AA	573	6.5%	4.5%	2.0%
A	1,597	18.1%	11.1%	7.0%
BBB	1,747	19.8%	11.8%	8.0%
Not Rated	279	3.2%	0.9%	2.3%
* Below Investment Grade	930	10.5%	0.0%	10.5%
Total Investments	<u>\$8,825</u>	<u>100.0%</u>	<u>100.0%</u>	

* Comprised of approximately 7.3% High Yield Credit and 3.2% High Yield RMBS/ABS

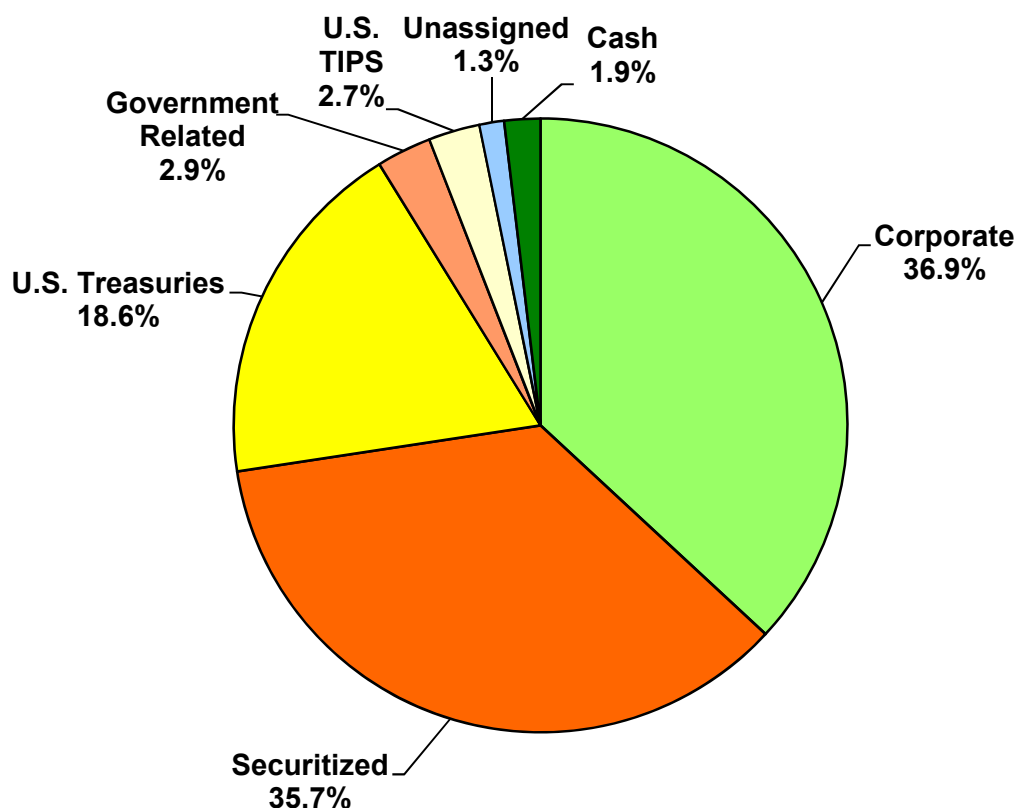
Benchmark: Barclays US Aggregate

SMRS

Fixed Income By Asset Type

Total U.S. Long-Term Fixed Income

9/30/18



Market Value in Millions				
9/30/18				
	Assets	Percent	Benchmark	Difference
Corporate	\$3,253	36.9%	25.1%	11.8%
Securitized	3,152	35.7%	30.6%	5.1%
U.S. Treasuries	1,641	18.6%	38.0%	-19.4%
Government Related	256	2.9%	6.3%	-3.4%
U.S. TIPS	243	2.7%	0.0%	2.7%
Unassigned	111	1.3%	0.0%	1.3%
Cash	169	1.9%	0.0%	1.9%
Total Investments	\$8,825	100.0%	100.0%	

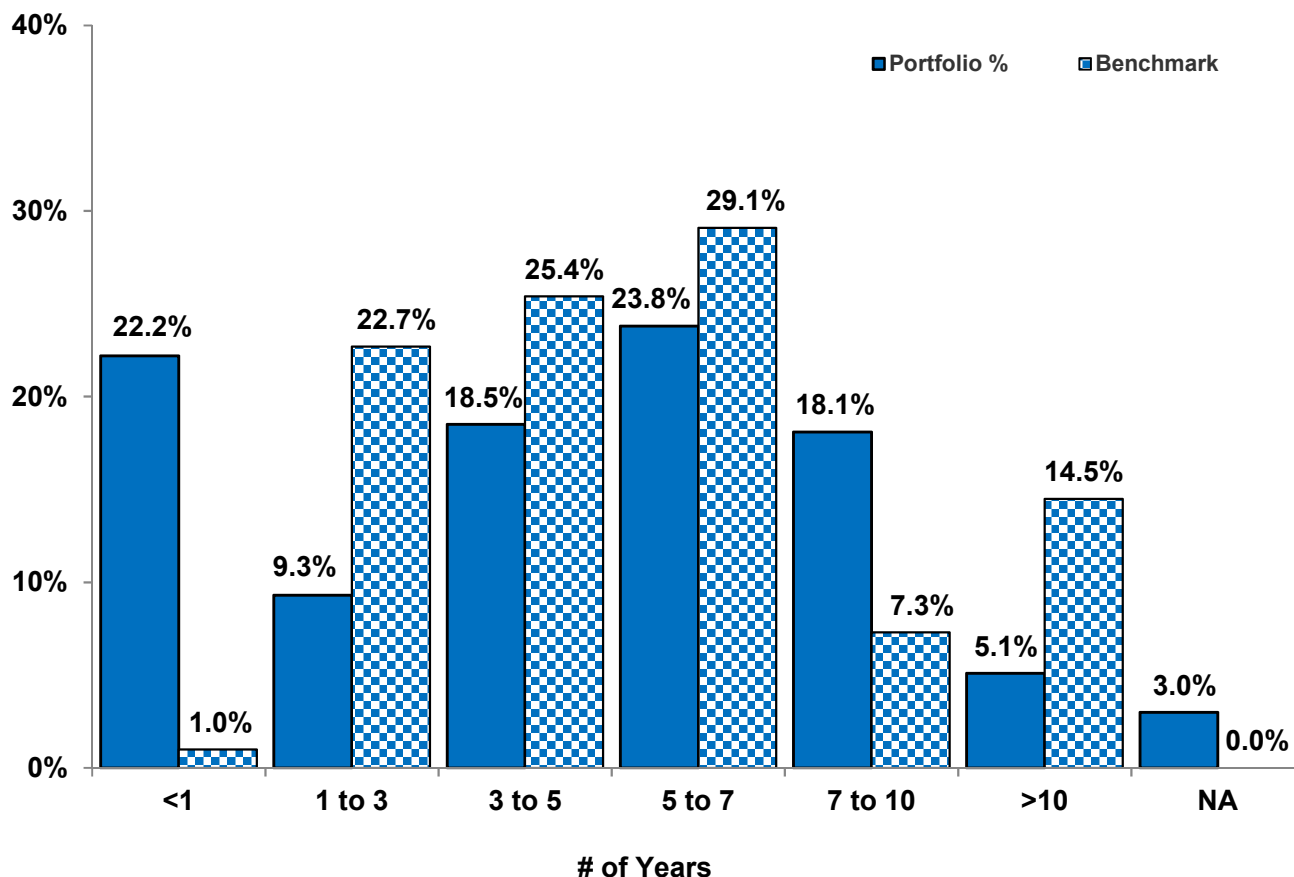
Benchmark: Barclays US Aggregate

SMRS

Duration Distribution

Fixed Income Composite Versus Benchmark

9/30/18



Source: Factset

Market Value in Millions					
Duration	Assets	Portfolio Weight	Benchmark Weight	Portfolio Duration*	Benchmark Duration*
<1	\$1,960	22.2%	1.0%	0.3	1.0
1 to 3	822	9.3%	22.7%	2.1	2.0
3 to 5	1,635	18.5%	25.4%	4.4	4.2
5 to 7	2,101	23.8%	29.1%	6.0	6.2
7 to 10	1,594	18.1%	7.3%	7.8	7.8
>10	452	5.1%	14.5%	17.4	15.3
NA	261	3.0%	0.0%	0.0	0.0
Total	\$8,825	100.0%	100.0%	4.9	6.2

* Effective Duration

Benchmark: Barclays US Aggregate

SMRS Internal/External Manager Performance – Net of Fees

9/30/18

Total Fixed Income Performance, Net of Fees (MPSERS)

	<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	\$8,825,310,832	1.01%	3.60%	3.62%	3.43%	5.13%
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-1.22%</i>	<i>1.31%</i>	<i>2.16%</i>	<i>2.02%</i>	<i>3.77%</i>
Internal Core Fixed Income	\$4,852,921,807	0.20%	2.72%	3.14%	2.87%	4.71%
Externally Managed Core Fixed Income	\$488,594,738	-0.36%	2.93%	2.81%	2.99%	4.75%
Dodge & Cox Core	241,124,126	0.23%	3.13%	3.22%	3.45%	5.18%
PIMCO Mortgage Fund	247,470,612	N/A				
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-1.22%</i>	<i>1.31%</i>	<i>2.16%</i>	<i>2.02%</i>	<i>3.77%</i>
Investment Grade Credit	\$228,475,185	-1.14%	3.53%	3.80%	4.09%	6.48%
PGIM Investment Grade	228,475,185	-1.14%	3.53%	3.85%	4.23%	6.83%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>					
Tactical Fixed Income	\$525,438,807	0.93%	3.47%	4.07%	7.35%	7.85%
Loomis Sayles CorePlus	225,353,216	0.21%	3.75%	3.28%	N/A	N/A
Fidelity Tactical Bond Fund	300,085,591	1.49%	4.75%	N/A	N/A	N/A
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-1.22%</i>	<i>1.31%</i>	<i>2.16%</i>	<i>2.02%</i>	<i>3.77%</i>
High Yield Fixed Income	\$486,869,894	1.87%	6.90%	5.41%	N/A	N/A
Columbia Management High Yield	254,850,599	1.23%	6.66%	5.26%	N/A	N/A
PGIM High Yield	218,852,411	2.63%	7.18%	N/A	N/A	N/A
Crescent Direct Lending	13,166,883	N/A	N/A	N/A	N/A	N/A
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>					
Structured Fixed Income	\$1,913,992,235	3.74%	N/A	N/A	N/A	N/A
Principal CMBS	538,693,363	3.52%	3.72%	5.18%	8.16%	8.43%
MetWest Securitized Opportunities	607,622,281	3.03%	4.49%	N/A	N/A	N/A
Napier Park ABS Income	165,603,428	8.03%	10.40%	N/A	N/A	N/A
Napier Park Strategic Loan LP	81,446,523	7.34%	N/A	N/A	N/A	N/A
Napier Park CLO Debt	261,790,903	3.33%	N/A	N/A	N/A	N/A
TICP CLO Debt	258,835,738	2.88%	N/A	N/A	N/A	N/A
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>-1.22%</i>	<i>1.31%</i>	<i>2.16%</i>	<i>2.02%</i>	<i>3.77%</i>
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>-0.24%</i>	<i>2.09%</i>	<i>3.98%</i>	<i>4.57%</i>	<i>3.98%</i>
Global Fixed Income	\$329,018,166	0.74%	N/A	N/A	N/A	N/A
T. Rowe Global Multi-Sector	226,608,166	-0.09%	N/A	N/A	N/A	N/A
PGIM GLRV	102,410,000	N/A	N/A	N/A	N/A	N/A
<i>Custom GMS Benchmark</i>	<i>N/A</i>	<i>0.51%</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>

State of Michigan Retirement Systems

DOMESTIC EQUITY REVIEW

State of Michigan Investment Board Meeting
December 11, 2018



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/18)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	20.9%	17.6%	14.2%	17.4%	12.3%
S&P 1500	17.7%	17.3%	13.8%	16.9%	12.1%
Peer Median Return	15.2%	15.3%	12.1%	15.6%	11.5%
Percentile Rank vs. Peers *	8	17	13	11	24

*State Street Universe greater than \$1 billion

- Total Domestic Equity outperformed its peer group and the S&P 1500 over all time periods, both gross and net of fees. Over the past year performance was 320 basis points (bps) in excess of the benchmark, with incurred tracking error of 1.5%.
- SMRS pays roughly 8 bps per year in domestic equity fees versus its peer group at an estimated 20-25 bps (per the research of Aon/Hewitt in 2017).
- Combined internally managed active portfolios outperformed the S&P 1500 by 870 bps during the past year.
- Success driven by investments in Square, Twitter, Apple, Illumina, Advanced Micro Devices, Abiomed and Validus Re (acquired by AIG) among others, as well as the division's internally managed overlay program.
- Ark Investments continued its run of outstanding performance, beating the S&P 1500 by 20% over the past year and by ~23% annualized since inception in March of 2016.
- Fisher Investments is beating the S&P 1500 by 230 bps annualized over the past five years, putting it in the top 1% of its peer group.
- Significant contribution from Mellon Capital overlay strategy, adding 30 bps to overall division return.
- LA Capital All-Cap Growth has outperformed its benchmark and continues to rank near the top decile of growth managers over longer time periods.
- Seizert Capital Partners and Clarkston Capital Small/Mid Cap have outperformed value benchmarks and rank in the top decile versus their value-oriented peers over longer time periods as well.

Asset Class Goal

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

Strategy Update

- The Domestic Equity Portfolio remains overweight the financial sector and defensive stocks while remaining underweight the consumer discretionary, industrials and energy sectors. During the quarter the division shifted slightly towards a more value-oriented portfolio, although it still retains healthy growth exposure. Portfolio beta is 1.14, so a significant market correction would present a modest headwind to performance.
 - Total Domestic Equity's portfolio would outperform the S&P 1500 by ~15% were it to appreciate to the market multiple of 18x from where it stands now at 15.7x, or if multiples between it and the benchmark were otherwise to converge.
 - The potential for multiple convergence is driven by active exposures in Berkshire Hathaway, AGNC, Facebook, Gilead Sciences, Annaly Capital Management, American Express and Ally Financial among others. All trade at forward PE ratios of 15x or less, with the exception of Facebook, which we believe to be significantly undervalued despite its higher multiple.
 - In the event that multiples do not converge, the division remains in a position to outperform based on its higher level of dividend yield, coupled with faster earnings per share growth than the S&P 1500.
 - At the broader portfolio level, allocations to attractively valued financial and defensive stocks offset each other from an interest rate risk standpoint, paving the way for potential outperformance in most rate environments.

Market Environment and Outlook

- At ~18x forward earnings, equity markets trade 15% above their historical average of 15.7x and in line with their 25-year historical average of 18x, albeit with higher levels of profitability, which may prove to be cyclical.
- Factoring in the existing low level of interest rates, stocks are reasonably priced for an environment where long-term bond yields are 4% or lower, as historical average PE ratios were realized in significantly higher interest rate environments.
- The market is currently paying out 1.9% of its earnings in dividends and reducing shares outstanding by 2.4% by way of share buybacks, for a 4.3% total shareholder yield.
- It is also growing shareholders' equity at a rate of 4.2% by reinvesting roughly 25% of its earnings back into its underlying businesses.
- The market is thus poised to earn roughly 8.5% (shareholder yield of 4.3% + reinvestment rate of 4.2%) in an environment where stock multiples and returns on equity are stable.
- This compares favorably to the 30-year U.S. Treasury at 3.2%, and unfavorably to the historical compound annual return for the S&P 500 from 1928 – 2017 of 9.5%.

SMRS
Domestic Equity Strategies
9/30/18

Markets	Amount	Total	% of Total
Internal Indexed (\$ in Millions)			
Indexed Portfolios	\$8,518		
Total Indexed		\$8,518	44.3%
Internal Active			
Active Portfolios	\$5,898		
Total Internal Active		\$5,898	30.7%
External Active			
Los Angeles Capital	\$1,309		
Fisher Investments	755		
Seizert Capital Partners	604		
Mellon Capital	588		
Clarkston Capital Partners	527		
ARK Investments	510		
Bivium Capital	171		
Attucks Asset Management	163		
Ancora	112		
Munder Capital Management	32		
Northpointe Capital	27		
Total External Active		\$4,798	25.0%

Total Domestic Equity

\$19,214

100.0%

SMRS

Domestic Equities Composite

9/30/18

Date:	<u>9/30/18</u>	<u>6/30/18</u>	<u>3/31/18</u>	<u>12/31/17</u>
Assets (\$ in Millions):	\$19,214	\$17,831	\$17,136	\$17,051
Number of Securities:	1,370	1,334	1,318	1,304
Active Share:	44%	39%	37%	39%

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

Characteristics	SMRS	S&P 1500	S&P 1500 Value
Market Capitalization (\$ in Billions)	\$255.2	\$222.8	\$123.5
P/E FY1	15.7x	18.0x	15.0x
P/E upside to S&P 1500	15.1%	0.0	20.0%
Price/Book	4.1x	3.3x	2.1x
Return on Equity	25.3%	18.1%	14.1%
Risk Metrics			
Beta	1.14	1.00	0.93
Tracking Error	2.3%	0.0%	3.4%
Projected Returns			
Dividend Yield	2.5%	1.9%	2.6%
Buyback Yield	2.3%	2.4%	2.4%
Reinvestment Rate	<u>6.2%</u>	<u>4.2%</u>	<u>3.6%</u>
Projected Investment Return	<u>11.0%</u>	<u>8.5%</u>	<u>8.6%</u>

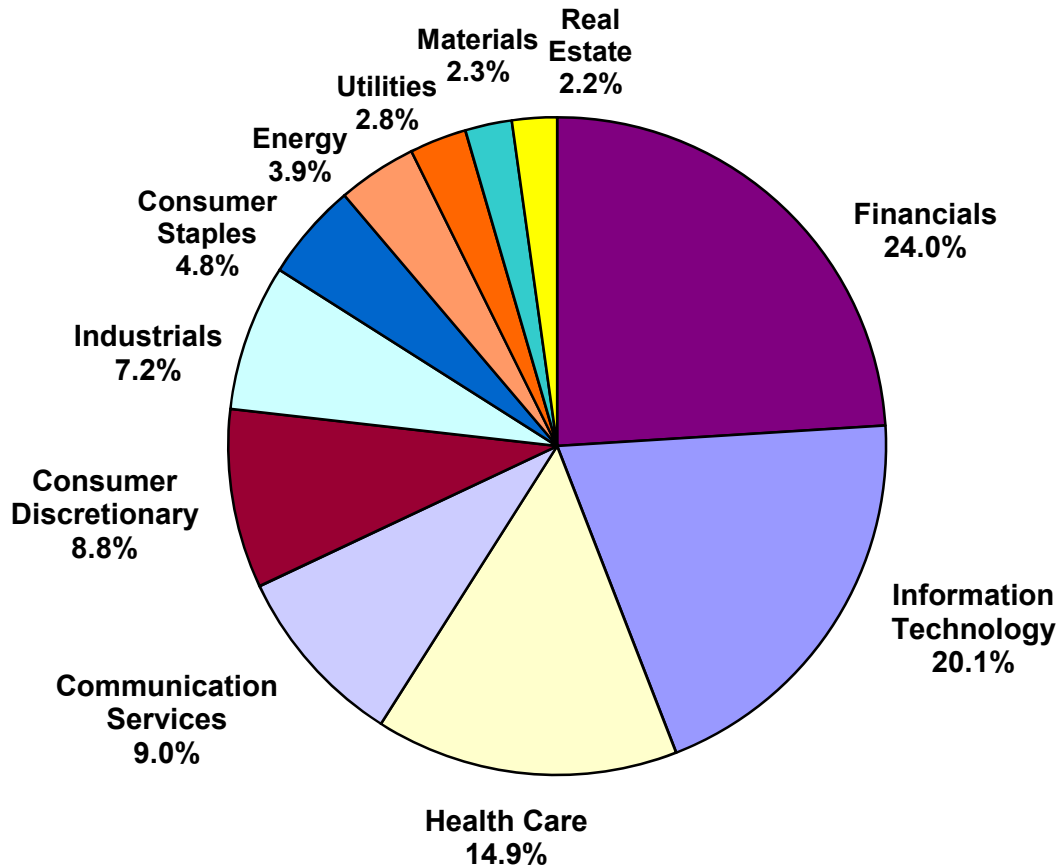
TOP TEN EXPOSURES – Domestic Equities vs S&P 1500 9/30/18

<u>Domestic Equity Portfolio</u>			<u>S&P 1500</u>		
<u>Company Name</u>	<u>Portfolio Weight</u>	<u>FY1 P/E</u>	<u>Company Name</u>	<u>Market Weight</u>	<u>FY1 P/E</u>
SPDR S&P 500 ETF Trust	16.0%	18.0	Apple, Inc.	3.8%	19.2
Berkshire Hathaway, Inc. B	4.3%	14.5	Microsoft Corporation	3.2%	26.8
Apple, Inc.	4.1%	19.2	Amazon.com, Inc.	3.0%	115.1
Facebook, Inc. Class A	3.2%	23.1	Berkshire Hathaway, Inc. B	1.6%	14.5
Microsoft Corporation	2.3%	26.8	Facebook, Inc. Class A	1.5%	23.1
AGNC Investment Corp.	2.2%	7.8	JPMorgan Chase & Co.	1.4%	12.3
Amazon.com, Inc.	2.1%	115.1	Johnson & Johnson	1.4%	17.0
SPDR Port. LT Treasury ETF	2.0%	35.9	Alphabet, Inc., Class C	1.4%	29.5
Gilead Sciences, Inc.	1.7%	11.7	Exxon Mobil Corporation	1.3%	18.2
Alphabet, Inc., Class A	1.6%	29.9	Alphabet, Inc., Class A	1.3%	29.9
TOTAL	<u>39.5%</u>	<u>18.1</u>	TOTAL	<u>19.9%</u>	<u>22.7</u>

SMRS

Domestic Equity By Sector

9/30/18



Market Value in Millions				
9/30/18				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$4,605	24.0%	13.6%	10.4%
Information Technology	3,865	20.1%	20.5%	-0.4%
Health Care	2,872	14.9%	14.6%	0.3%
Communication Services	1,723	9.0%	9.2%	-0.2%
Consumer Discretionary	1,694	8.8%	10.5%	-1.7%
Industrials	1,376	7.2%	10.4%	-3.2%
Consumer Staples	917	4.8%	6.4%	-1.6%
Energy	742	3.9%	5.9%	-2.0%
Utilities	547	2.8%	2.9%	-0.1%
Materials	449	2.3%	2.8%	-0.5%
Real Estate	424	2.2%	3.2%	-1.0%
Total	<u>\$19,214</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: S&P 1500

SMRS

Actively Managed Composite

9/30/18

Date:	<u>9/30/18</u>	<u>6/30/18</u>	<u>3/31/18</u>	<u>12/30/17</u>
Assets (\$ in Millions):	\$10,696	\$9,879	\$9,431	\$9,261
Number of Securities:	1,073	1,053	1,106	999
Active Share:	77%	68%	65%	71%

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

Characteristics	SMRS	S&P 1500	S&P 1500 Value
Market Capitalization (\$ in Billions)	\$233.5	\$222.8	\$123.5
P/E FY1	14.1x	18.0x	15.0x
P/E upside to S&P 1500	28.2%	0.0	20.0%
Price/Book	4.8x	3.3x	2.1x
Return on Equity	32.9%	18.1%	14.1%
Risk Metrics			
Beta	1.24	1.00	0.93
Tracking Error	4.1%	0.0%	3.4%
Projected Returns			
Dividend Yield	3.0%	1.9%	2.6%
Buyback Yield	2.4%	2.4%	2.4%
Reinvestment Rate	8.0%	4.2%	3.6%
Projected Investment Return	<u>13.4%</u>	<u>8.5%</u>	<u>8.6%</u>

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

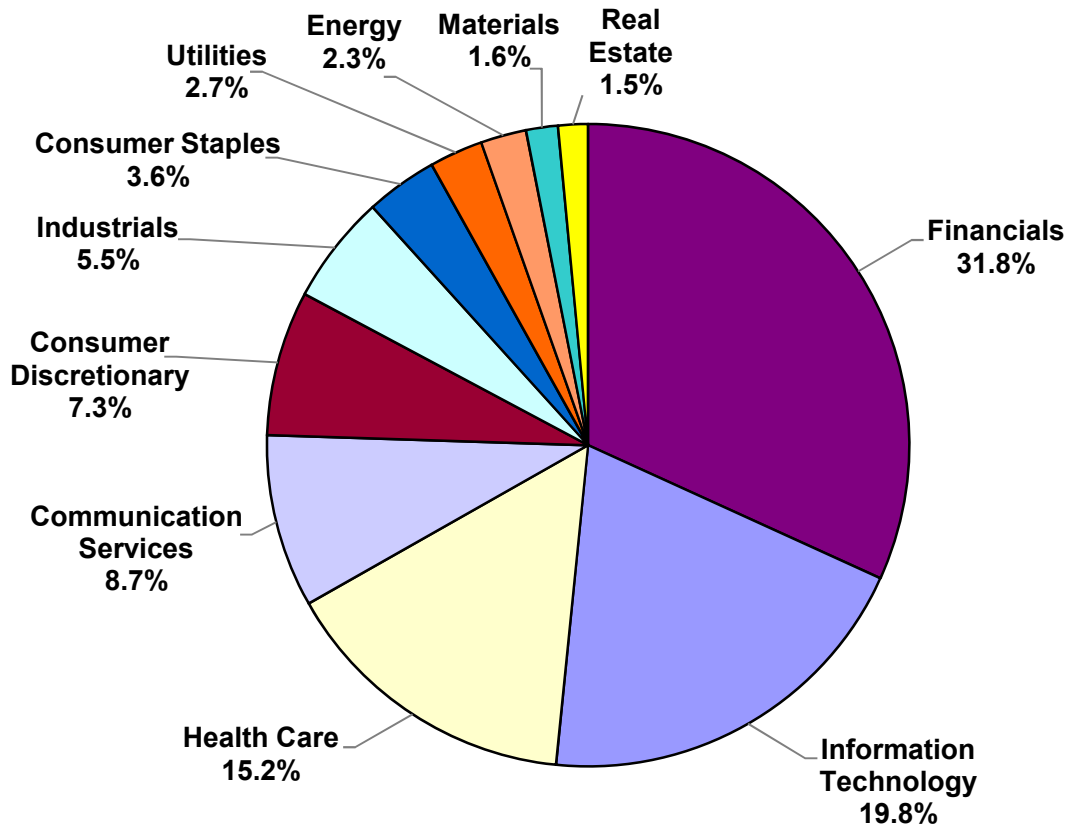
9/30/18

<u>Actively Managed Equity Portfolio</u>			<u>S&P 1500</u>		
<u>Company Name</u>	<u>Portfolio Weight</u>	<u>FY1 P/E</u>	<u>Company Name</u>	<u>Market Weight</u>	<u>FY1 P/E</u>
SPDR S&P 500 ETF Trust	24.6%	18.0	Apple, Inc.	3.8%	19.2
Berkshire Hathaway, Inc. B	6.9%	14.5	Microsoft Corp.	3.2%	26.8
Facebook, Inc. Class A	4.7%	23.1	Amazon.com, Inc.	3.0%	115.1
Apple, Inc.	4.5%	19.2	Berkshire Hathaway, Inc. B	1.6%	14.5
AGNC Investment Corp.	3.9%	7.8	Facebook, Inc. Class A	1.5%	23.1
SPDR Port. LT Treasury ETF	3.6%	35.9	JPMorgan Chase & Co.	1.4%	12.3
Gilead Sciences, Inc.	2.8%	11.7	Johnson & Johnson	1.4%	17.0
Annaly Capital Mgmt., Inc.	2.6%	8.6	Alphabet, Inc., Class C	1.4%	29.5
American Express Co.	2.4%	14.6	Exxon Mobil Corp.	1.3%	18.2
Exelon Corp.	1.9%	14.1	Alphabet, Inc., Class A	1.3%	29.9
TOTAL	<u>57.9%</u>	<u>15.5</u>	TOTAL	<u>19.9%</u>	<u>22.7</u>

SMRS

Active Equity By Sector

9/30/18



Market Value in Millions				
9/30/18				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$3,400	31.8%	13.6%	18.2%
Information Technology	2,119	19.8%	20.5%	-0.7%
Health Care	1,624	15.2%	14.6%	0.6%
Communication Services	934	8.7%	9.2%	-0.5%
Consumer Discretionary	784	7.3%	10.5%	-3.2%
Industrials	587	5.5%	10.4%	-4.9%
Consumer Staples	384	3.6%	6.4%	-2.8%
Utilities	292	2.7%	2.9%	-0.2%
Energy	242	2.3%	5.9%	-3.6%
Materials	175	1.6%	2.8%	-1.2%
Real Estate	155	1.5%	3.2%	-1.7%
Total	<u>\$10,696</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: S&P 1500

Manager Performance - Net of Fees

9/30/18

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
SMRS S&P 500 Index	\$7,768,699,848	17.9%	17.5%	14.1%	17.2%	--	N/A
S&P 500		17.9%	17.3%	13.9%	16.9%	--	
Style & Risk Adjusted Benchmark		17.9%	17.3%	13.9%	16.8%	--	
Lipper Large-Cap Core		16.1%	15.5%	12.3%	15.5%	--	
<i>Excess Return</i>		0.0%	0.2%	0.1%	0.3%	--	
<i>Alpha</i>		0.0%	0.2%	0.2%	0.3%	--	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		32	15	16	15	--	
SMRS Large-Cap Core	2,638,934,486	29.6%	17.3%	15.3%	18.8%	9.6%	8/31/07
S&P 500		17.9%	17.3%	13.9%	16.9%	8.7%	
Style & Risk Adjusted Benchmark		33.4%	16.9%	13.4%	16.5%	9.2%	
Lipper Large-Cap Core		16.1%	15.5%	12.3%	15.5%	7.9%	
<i>Excess Return</i>		11.7%	0.0%	1.4%	1.9%	0.9%	
<i>Alpha</i>		-3.8%	0.4%	1.9%	2.3%	0.4%	
<i>Pct Rank vs Lipper Large-Cap Core</i>		1	17	3	1	7	
SMRS Large-Cap Growth	1,983,709,782	29.8%	18.5%	16.4%	18.2%	10.7%	5/31/05
S&P 500 Growth		25.2%	19.9%	16.6%	18.4%	10.8%	
Style & Risk Adjusted Benchmark		26.7%	21.3%	17.6%	19.7%	11.0%	
Lipper Large-Cap Growth		25.0%	18.9%	15.3%	17.8%	10.5%	
<i>Excess Return</i>		4.6%	-1.4%	-0.1%	-0.3%	-0.1%	
<i>Alpha</i>		3.1%	-2.8%	-1.2%	-1.5%	-0.3%	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		14	63	26	45	36	
SMRS All-Cap Garp	1,217,924,407	16.1%	14.9%	13.1%	17.1%	14.3%	4/30/11
S&P 1500 Super Composite		17.7%	17.3%	13.8%	16.9%	13.3%	
Style & Risk Adjusted Benchmark		19.4%	17.2%	13.9%	17.0%	13.3%	
Lipper Multi-Cap Core		14.0%	14.2%	11.0%	15.0%	11.1%	
<i>Excess Return</i>		-1.5%	-2.4%	-0.7%	0.2%	1.0%	
<i>Alpha</i>		-3.3%	-2.3%	-0.8%	0.1%	1.0%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		34	48	22	10	1	
LA Capital Deep Value	774,479,464	13.1%	14.0%	--	--	9.0%	4/1/15
S&P 1500 Value		10.3%	14.4%	--	--	9.4%	
Style & Risk Adjusted Benchmark		9.3%	14.0%	--	--	9.2%	
Lipper Multi-Cap Value		9.5%	12.8%	--	--	7.9%	
<i>Excess Return</i>		2.8%	-0.4%	--	--	-0.4%	
<i>Alpha</i>		3.8%	0.0%	--	--	-0.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		14	28	--	--	24	
Fisher All-Cap	754,761,989	23.2%	19.9%	16.1%	18.2%	11.6%	10/31/04
S&P 1500		17.7%	17.3%	13.8%	16.9%	9.5%	
Style & Risk Adjusted Benchmark		21.0%	19.8%	15.5%	20.0%	11.7%	
Lipper Multi-Cap Core		14.0%	14.2%	11.0%	15.0%	8.3%	
<i>Excess Return</i>		5.5%	2.6%	2.3%	1.3%	2.1%	
<i>Alpha</i>		2.2%	0.1%	0.6%	-1.8%	-0.1%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		1	1	1	2	1	
SMRS Mid-Cap Index	749,368,169	14.7%	16.5%	12.5%	17.1%	--	N/A
S&P 400		14.2%	15.7%	11.9%	16.3%	--	
Style & Risk Adjusted Benchmark		14.2%	15.6%	11.8%	16.2%	--	
Lipper Mid-Cap Core		11.8%	13.3%	9.9%	14.6%	--	
<i>Excess Return</i>		0.5%	0.8%	0.6%	0.8%	--	
<i>Alpha</i>		0.5%	0.9%	0.7%	0.8%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		21	10	7	6	--	

<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>
Seizert Capital Partners	604,079,286	12.9%	16.3%	10.7%	16.2%	14.5%	11/30/09
S&P 1500 Value		10.3%	14.4%	10.9%	15.3%	13.1%	
Style & Risk Adjusted Benchmark		17.0%	14.7%	11.1%	16.5%	13.3%	
Lipper Multi-Cap Value		9.5%	12.8%	9.6%	14.0%	11.8%	
<i>Excess Return</i>		2.6%	1.9%	-0.2%	0.9%	1.4%	
<i>Alpha</i>		-4.1%	1.6%	-0.4%	-0.3%	1.2%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		15	2	23	6	2	
Mellon US Equity Enhanced	587,567,438	27.4%	--	--	--	31.6%	3/1/17
S&P 500		17.9%	--	--	--	16.4%	
Style & Risk Adjusted Benchmark		31.7%	--	--	--	28.1%	
<i>Lipper Large-Cap Core</i>		16.1%	--	--	--	15.0%	
<i>Excess Return</i>		9.5%	--	--	--	15.2%	
<i>Alpha</i>		-4.2%	--	--	--	3.5%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		1	--	--	--	1	
LA Capital All-Cap Growth	534,676,086	23.3%	18.2%	16.1%	19.2%	12.5%	5/31/05
S&P 1500 Growth		24.6%	19.6%	16.2%	18.3%	10.9%	
Style & Risk Adjusted Benchmark		22.8%	15.7%	13.7%	17.1%	10.6%	
Lipper Multi-Cap Growth		22.9%	17.1%	13.2%	16.6%	10.1%	
<i>Excess Return</i>		-1.3%	-1.4%	-0.1%	0.9%	1.6%	
<i>Alpha</i>		0.4%	2.5%	2.3%	2.1%	1.9%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		46	39	16	11	9	
Ark Investments	510,403,297	44.7%	--	--	--	45.1%	3/1/16
S&P 1500 Growth		24.6%	--	--	--	22.5%	
Style & Risk Adjusted Benchmark		37.6%	--	--	--	34.4%	
Lipper Multi-Cap Growth		22.9%	--	--	--	21.7%	
<i>Excess Return</i>		20.2%	--	--	--	22.6%	
<i>Alpha</i>		7.1%	--	--	--	10.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		3	--	--	--	1	
Clarkston Capital Large-Cap	288,621,047	8.5%	12.4%	--	--	9.4%	4/1/15
S&P 500 Value		10.1%	14.1%	--	--	9.3%	
Style & Risk Adjusted Benchmark		8.6%	10.2%	--	--	6.8%	
Lipper Large-Cap Value		11.4%	13.9%	--	--	9.2%	
<i>Excess Return</i>		-1.6%	-1.8%	--	--	0.1%	
<i>Alpha</i>		-0.1%	2.2%	--	--	2.6%	
<i>Pct. Rank vs. Lipper Large-Cap Value</i>		78	82	--	--	46	
Clarkston Capital Small/Mid-Cap	238,333,752	9.4%	13.0%	--	--	11.9%	1/1/14
S&P 400		15.7%	16.8%	--	--	11.1%	
Style & Risk Adjusted Benchmark		10.1%	13.1%	--	--	8.4%	
Lipper Mid-Cap Core		11.8%	13.3%	--	--	8.5%	
<i>Excess Return</i>		-6.3%	-3.8%	--	--	0.9%	
<i>Alpha</i>		-0.7%	0.0%	--	--	3.5%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		72	58	--	--	3	
Bivium Capital Partners	171,000,802	10.5%	12.6%	9.6%	13.9%	6.6%	11/30/07
S&P 1500 Value		10.3%	14.4%	10.9%	15.3%	6.2%	
Style & Risk Adjusted Benchmark		10.5%	15.3%	11.4%	15.9%	8.7%	
Lipper Multi-Cap Value		9.5%	12.8%	9.6%	14.0%	5.9%	
<i>Excess Return</i>		0.2%	-1.8%	-1.3%	-1.4%	0.4%	
<i>Alpha</i>		0.0%	-2.7%	-1.8%	-2.0%	-2.0%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		38	60	51	63	27	
Attucks Asset Management	163,062,961	14.4%	13.8%	10.1%	14.2%	7.0%	11/30/07
S&P 1500		17.7%	17.3%	13.8%	16.9%	8.4%	
Style & Risk Adjusted Benchmark		9.0%	17.2%	13.9%	17.7%	8.4%	
Lipper Multi-Cap Core		14.0%	14.2%	11.0%	15.0%	6.9%	
<i>Excess Return</i>		-3.3%	-3.5%	-3.7%	-2.8%	-1.4%	
<i>Alpha</i>		5.3%	-3.4%	-3.8%	-3.6%	-1.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Core</i>		51	65	70	71	51	

<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>
Ancora	111,532,097	11.5%	--	--	--	11.5%	10/1/17
S&P 1000		15.7%	--	--	--	15.7%	
Style & Risk Adjusted Benchmark		13.3%	--	--	--	13.3%	
Lipper Mid-Cap Core		11.8%	--	--	--	11.8%	
<i>Excess Return</i>		-4.2%	--	--	--	-4.2%	
<i>Alpha</i>		-1.8%	--	--	--	-1.8%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		56.0%	--	--	--	56	
Large-Cap Consistent Growth	44,173,691	33.6%	19.1%	--	--	15.2%	3/1/15
S&P 500		17.9%	17.3%	--	--	11.8%	
Style & Risk Adjusted Benchmark		16.9%	17.8%	--	--	13.1%	
Lipper Large-Cap Core		16.1%	15.5%	--	--	10.2%	
<i>Excess Return</i>		15.7%	1.8%	--	--	3.4%	
<i>Alpha</i>		16.7%	1.2%	--	--	2.1%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		1	6	--	--	1	
Munder Concentrated SMID Cap	31,794,543	14.1%	10.5%	8.6%	13.2%	15.2%	4/30/09
S&P 1000		15.7%	16.8%	12.3%	17.0%	18.3%	
Style & Risk Adjusted Benchmark		9.9%	17.9%	13.5%	17.7%	16.8%	
Lipper Mid-Cap Core		11.8%	13.3%	9.9%	14.6%	15.9%	
<i>Excess Return</i>		-1.6%	-6.4%	-3.8%	-3.8%	-3.2%	
<i>Alpha</i>		4.3%	-7.4%	-4.9%	-4.5%	-1.7%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		29	83	78	82	64	
NorthPointe All-Cap Core	27,060,945	8.5%	11.1%	8.2%	13.9%	7.3%	10/31/04
S&P 1500 Value		10.3%	14.4%	10.9%	15.3%	8.3%	
Style & Risk Adjusted Benchmark		8.8%	13.6%	9.9%	16.7%	11.1%	
Lipper Multi-Cap Value		9.5%	12.8%	9.6%	14.0%	7.5%	
<i>Excess Return</i>		-1.8%	-3.2%	-2.7%	-1.4%	-0.9%	
<i>Alpha</i>		-0.2%	-2.5%	-1.7%	-2.8%	-3.7%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		58	87	86	62	53	

State of Michigan Retirement Systems

INTERNATIONAL EQUITY REVIEW

State of Michigan Investment Board Meeting

December 11, 2018



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/18)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	1.9%	10.7%	5.6%	8.7%	6.2%
MSCI ACWI ex USA Returns	1.8%	10.0%	4.2%	7.4%	4.8%
Peer Median Returns	2.6%	10.4%	5.1%	8.8%	6.2%
Percentile Rank vs. Peers*	76	34	32	53	44

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

- The International Equity Division (IED) portfolio outperformed the benchmark by 0.1% over the last twelve months. Outperformance was driven by developed market exposures but offset by underperformance in emerging markets, information technology sector, and momentum factor.

Asset Class Goals

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

Strategy

- The International Equity Division has three distinct portfolio strategies.
 - Active investments, 36.9% of assets, to gain specific international stock market exposures.
 - Stock plus investments, 34.6% of assets, to implement a portable alpha strategy onto high-level strategic tilts.
 - Index investments, 28.5% of assets, to gain broad international stock market exposure with minimal tracking risk.
- Current portfolio drivers of risk and return.
 - Tracking error of the portfolio is approximately 0.8% which is below the division's risk budget of 3.0%.
 - Emerging markets, a large contributor to tracking error, is one-sixth of the total tracking error indicating the portfolio is not materially exposed to any one single risk.
 - Future portfolio returns will be driven by the performance of the quality factor, value factor, momentum factor, and emerging markets overweight.
- Quarterly changes to International Equity Division allocation.
 - None.

Market Environment and Outlook

- Global markets remain in a correction phase that began at the end of January 2018. Year-to-date international markets are down -11.0% with events in China, Turkey, South Africa, and Italy weighing on markets.
- Emerging markets have struggled year to date down -15.7%. Valuations remain attractive with wider value spreads relative to developed markets. Forward looking annualized returns for emerging markets are estimated to be 11.4%.
- U.S. and China trade discussions continue to evolve. Talk of a November G-20 meeting between President Trump and President Xi has sparked hope of a breakthrough in negotiations. President Trump has discussed two possible measures should the November meeting not yield positive results. One, pull forward of 25% tariffs on the \$200 billion, currently tariffs are at 10%; two, potential tariffs on all remaining Chinese imports of approximately \$267 billion.
- International stock markets' top line continues to grow, albeit at a slower pace than the first half of the year. Sales grew 2.5% year-over-year through early October 2018 for the MSCI ACWI ex USA which is below the 5.4% twenty-year average. Energy, materials, and real estate were the leading sectors.
- Late September sell-off has reduced the MSCI ACWI ex USA trailing twelve-month normalized price-to-earnings ratio from 18.0 to 16.1. The twenty-year average is 22.3.
- Normalized annual compound rate of return for the MSCI ACWI ex USA index was estimated to be 9.3%. 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 2.0% implies an international equity risk premium of 7.3%.
- In 2019, the ECB will begin tightening monetary policy. The ECB balance sheet represents approximately 40% of the collective European GDP. For point of reference the US Federal Reserve's balance sheet stands at 20% of GDP. ECB tightening will result in higher rates and questions remain if highly levered business will be able to roll financing into a progressively higher interest rate environment. IED expects the equity risk premium to shrink in 2019 assuming stock prices do not fall in kind with rising rates. Growth will need to normalize to mitigate this headwind for the market.

Conclusion

International equity markets continue to offer an attractive equity risk premium relative to international ten-year government bonds. As government bonds yields continue to rise the attractiveness of stocks relative to bonds will decrease. Emerging markets have corrected sharply from their stellar 2017 returns but the go forward returns remain above the broader international market returns. In 2019, the markets will need to exhibit higher levels of growth, more in line with historical averages, to see equity prices move materially higher.

SMRS
International Equity Strategies
9/30/18

Markets	Amount	Total	% of Total
Active (\$ in Millions)			
Los Angeles Capital Management	\$1,364		
Wellington	994		
Marathon-London	748		
SSGA	709		
Effissimo Capital Management	326		
Lazard	247		
Martin Currie	243		
Total Active		\$4,630	36.9%
Stock Plus			
Internal Stock Plus	\$2,570		
PIMCO	1,775		
Total Stock Plus		\$4,345	34.6%
Indexed			
SSGA	\$1,364		
BlackRock	994		
Total Indexed		\$3,583	28.5%

TOTAL

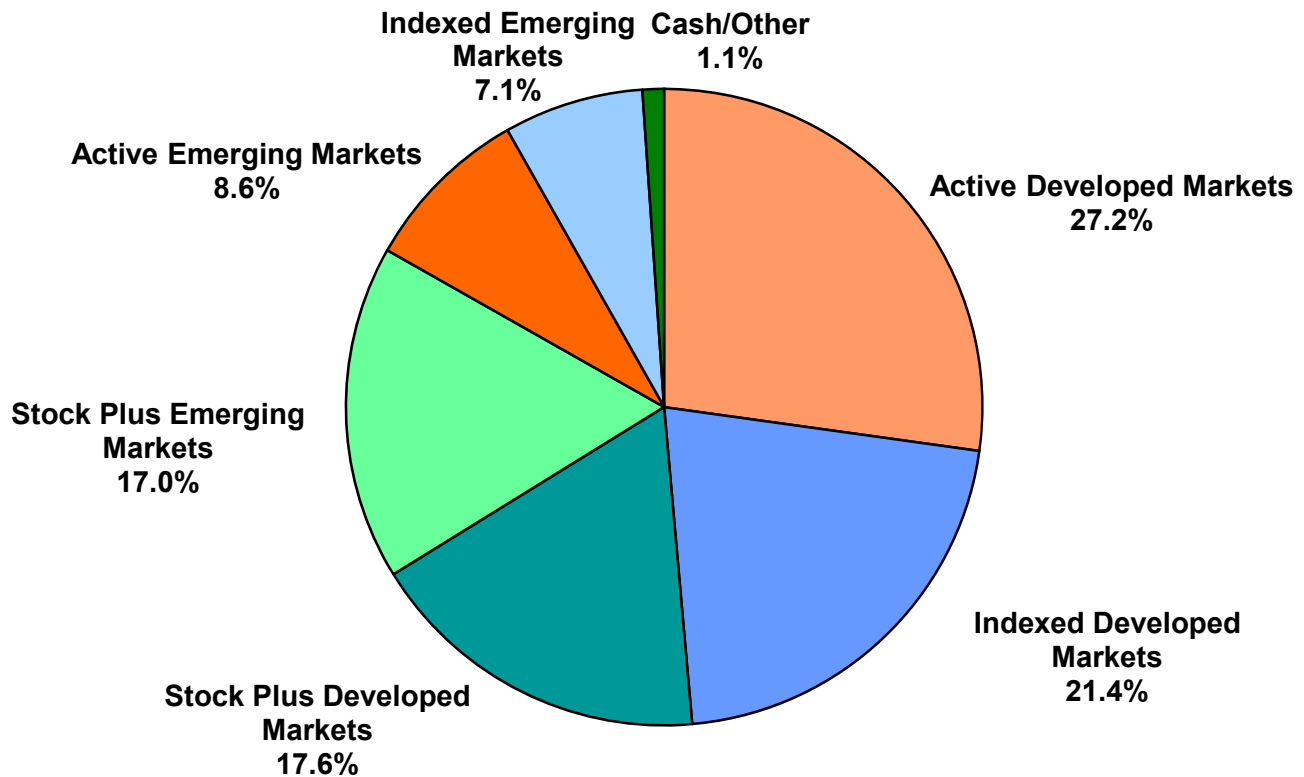
\$12,558

100.0%

SMRS

International Equity Exposure By Category

9/30/18



Market Value in Millions		
	<u>9/30/18</u>	
<u>Active</u>		
Developed Markets	\$3,422	27.2%
Emerging Markets	1,074	8.6%
Cash/Other	134	1.1%
Total Active Equity	\$4,630	36.9%
<u>Stock Plus</u>		
Developed Markets	\$2,216	17.6%
Emerging Markets	2,129	17.0%
Total Stock Plus Equity	\$4,345	34.6%
<u>Indexed</u>		
Developed Markets	\$2,691	21.4%
Emerging Markets	892	7.1%
Total Indexed Equity	\$3,583	28.5%
Total International Equity	<u>\$12,558</u>	<u>100.0%</u>

SMRS

International Equities

9/30/18

Date:	<u>9/30/18</u>	<u>6/30/18</u>	<u>3/31/18</u>	<u>12/31/17</u>
Assets (\$ in Millions):	\$12,558	\$12,491	\$12,901	\$12,990
Number of Securities:	2,669	2,644	2,376	9,225
Active Share:	22%	24%	24%	27%

Benchmark: MSCI ACWI ex USA

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

Portfolio Characteristics:	SMRS		MSCI ACWI ex USA	
	<u>LTM</u>	<u>Normalized</u>	<u>LTM</u>	<u>Normalized</u>
Return:				
Annualized Compound Rate	11.0%	10.0%	10.1%	9.3%
Sustainable Growth Rate	7.6%	7.2%	7.1%	6.9%
Dividend Yield	2.7%	2.4%	2.8%	2.5%
Buyback Yield	0.2%	-0.1%	0.2%	-0.1%
Overlay Yield	0.5%	0.5%	--	--
Risk:				
Beta	1.0	--	1.0	--
Volatility	14.0%	--	13.9%	--
Tracking Error	0.9%	--	0.0%	--
Fundamental:				
Average Capitalization (\$ in Billions)	50.3	--	55.6	--
Price/Earnings	13.5	16.7	13.3	16.1
Price/Book	1.7	2.0	1.6	1.8
ROE	12.5%	11.8%	11.7%	11.3%

TOP TEN HOLDINGS

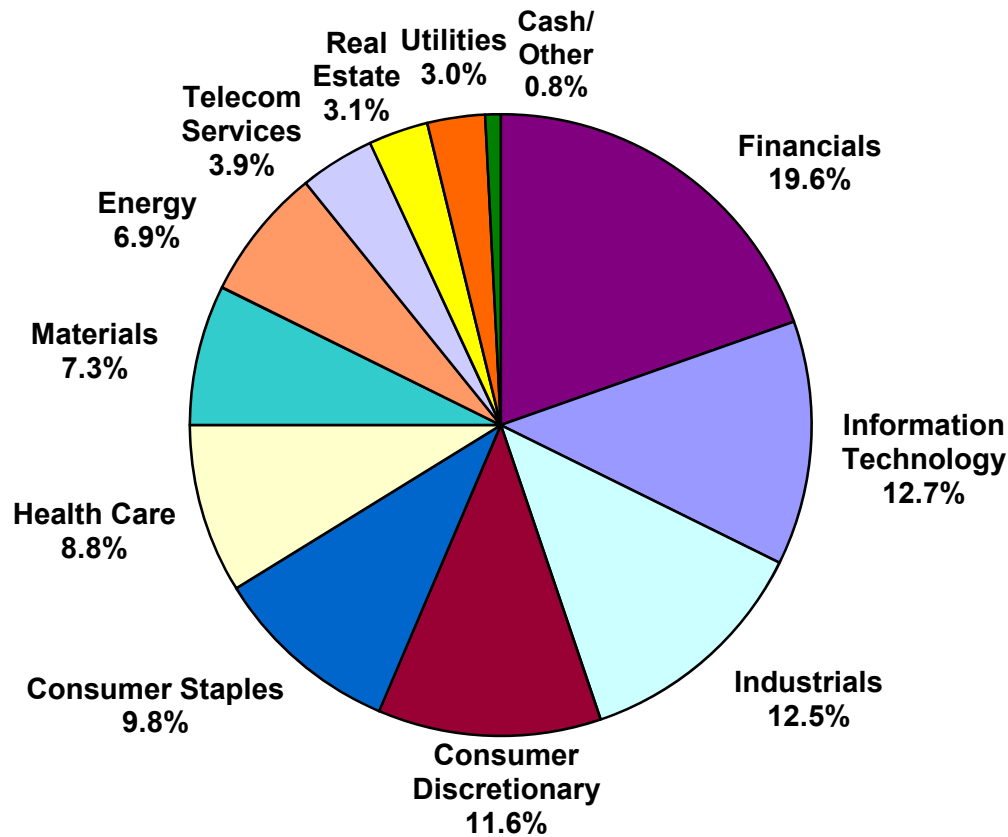
(\$ in Billions* - \$ in Millions**)

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
Tencent Holdings Ltd.	1.4%	\$393.3	33.5	\$178.1
Taiwan Semiconductor Manufacturing Co., Ltd.	1.3%	222.9	19.2	165.1
Samsung Electronics Co.	1.2%	299.6	6.6	147.4
Nestle S.A.	1.0%	256.6	21.1	119.8
Alibaba Group Holding Ltd. Sponsored ADR	0.9%	427.1	29.2	112.2
Novartis AG	0.9%	220.4	16.7	110.8
Roche Holding Ltd. Genusssch	0.8%	210.1	13.5	101.8
Royal Dutch Shell Plc. Class A	0.6%	287.9	12.4	74.0
Total SA	0.6%	172.8	11.9	71.3
China Construction Bank Co.	<u>0.5%</u>	<u>220.3</u>	5.7	<u>64.4</u>
TOTAL	<u>9.1%</u>	<u>\$2,711.0</u>		<u>\$1,144.8</u>

SMRS

International Equity By Sector

9/30/18



Market Value in Millions				
9/30/18				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$2,467	19.6%	22.4%	-2.8%
Information Technology	1,594	12.7%	11.0%	1.7%
Industrials	1,564	12.5%	11.7%	0.8%
Consumer Discretionary	1,459	11.6%	10.6%	1.0%
Consumer Staples	1,231	9.8%	9.9%	-0.1%
Health Care	1,106	8.8%	8.6%	0.2%
Materials	911	7.3%	7.8%	-0.5%
Energy	871	6.9%	7.7%	-0.8%
Telecom Services	490	3.9%	3.9%	0.0%
Real Estate	383	3.1%	3.2%	-0.1%
Utilities	377	3.0%	3.2%	-0.2%
Total Investments	<u>\$12,453</u>	<u>99.2%</u>	<u>100.0%</u>	
Cash/ Other	105	0.8%	0.0%	0.8%
Total	<u>\$12,558</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: MSCI ACWI ex USA

International Equity Performance - Net of Fees

9/30/18

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception	Inception Date
Total International Equity	\$12,558,181,509	1.8%	10.5%	5.4%	8.5%	5.9%	1/1/04
MSCI ACWI ex USA		1.8%	10.0%	4.1%	7.2%	6.2%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	8.0%	5.7%	
<i>Excess Return</i>		0.0%	0.5%	1.3%	1.2%	-0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		53	12	20	38	32	

Total International Active Strategy	\$4,630,234,360	1.6%	9.4%	5.1%	8.4%	5.0%	5/1/05
MSCI ACWI ex USA		1.8%	10.0%	4.1%	7.2%	5.5%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	8.0%	5.1%	
<i>Excess Return</i>		-0.1%	-0.6%	0.9%	1.2%	-0.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		56	44	25	42	43	
LACM World ex USA	991,197,441	0.9%	--	--	--	6.8%	12/1/15
MSCI World ex USA		2.7%	--	--	--	7.7%	
Lipper International Multi-Cap Core		1.7%	--	--	--	7.5%	
<i>Excess Return</i>		-1.8%	--	--	--	-0.9%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		68	--	--	--	73	
Marathon-London International Fund	748,393,227	3.8%	9.8%	6.4%	--	9.4%	2/1/12
MSCI World ex USA		2.7%	9.3%	4.2%	--	6.9%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	--	6.7%	
<i>Excess Return</i>		1.1%	0.4%	2.1%	--	2.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		12	37	5	--	3	
Wellington IRE Fund	724,544,595	4.7%	9.6%	5.5%	8.9%	4.8%	12/1/05
MSCI World ex USA		2.7%	9.3%	4.2%	7.9%	4.5%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	8.0%	4.3%	
<i>Excess Return</i>		2.0%	0.3%	1.2%	1.0%	0.4%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		12	40	20	23	24	
SSGA International Alpha Small Cap	708,868,157	0.6%	10.0%	7.1%	11.6%	4.1%	5/1/07
MSCI World ex USA Small Cap		3.4%	12.2%	7.1%	10.3%	3.6%	
Lipper International Small/Mid-Cap Core		0.7%	9.4%	5.5%	8.5%	2.8%	
<i>Excess Return</i>		-2.8%	-2.3%	0.0%	1.3%	0.5%	
<i>Pct Rank vs. Lipper International Small/Mid-Cap Core</i>		69	53	39	8	1	
LACM Emerging Markets Fund	372,692,851	-1.6%	11.3%	3.4%	5.1%	4.4%	12/8/09
MSCI Emerging Markets		-0.8%	12.4%	3.6%	5.0%	3.6%	
Lipper Emerging Markets		-3.4%	9.9%	2.3%	4.6%	3.3%	
<i>Excess Return</i>		-0.8%	-1.1%	-0.2%	0.1%	0.9%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		33	41	38	42	29	
Effissimo Capital Management Japan	325,635,527	2.5%	--	--	--	9.9%	12/1/15
MSCI Japan		10.2%	--	--	--	9.5%	
Lipper International Small/Mid-Cap Value		-2.3%	--	--	--	8.7%	
<i>Excess Return</i>		-7.7%	--	--	--	0.4%	
<i>Pct Rank vs. Lipper International Small/Mid-Cap Value</i>		1	--	--	--	51	
Wellington Emerging Markets Local Equity	268,908,414	-7.0%	10.4%	5.2%	--	6.3%	12/1/11
MSCI Emerging Markets		-0.8%	12.4%	3.6%	--	4.3%	
Lipper Emerging Markets		-3.4%	9.9%	2.3%	--	3.7%	
<i>Excess Return</i>		-6.2%	-1.9%	1.6%	--	2.0%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		79	51	10	--	11	
Lazard/Wilmington International Equity	246,825,000	2.7%	6.4%	--	--	2.2%	6/1/14
MSCI World ex USA		2.7%	9.3%	--	--	2.7%	
Lipper International Large-Cap Core		1.7%	9.0%	--	--	2.8%	
<i>Excess Return</i>		0.0%	-3.0%	--	--	-0.5%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		28	93	--	--	77	
Martin Currie International Long-term Unconstrained	243,137,620	5.9%	--	--	--	13.7%	2/1/17
MSCI ACWI ex USA		2.7%	--	--	--	10.9%	
Lipper International Multi-Cap Core		1.7%	--	--	--	10.5%	
<i>Excess Return</i>		3.3%	--	--	--	2.8%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		6	--	--	--	1	

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception	Inception Date
Total International Stock Plus Strategy	\$4,344,723,730	2.2%	11.5%	5.9%	9.2%	7.8%	1/1/09
MSCI ACWI ex USA		1.8%	10.0%	4.1%	7.2%	8.1%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	8.0%	8.0%	
<i>Excess Return</i>		0.4%	1.5%	1.8%	2.0%	-0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		44	5	14	21	52	
Internal Stock Plus	2,569,860,049	1.9%	8.4%	5.2%	7.0%	5.8%	9/1/11
MSCI ACWI ex USA		1.8%	10.0%	4.1%	7.2%	5.4%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	8.0%	6.1%	
<i>Excess Return</i>		0.1%	-1.5%	1.0%	-0.2%	0.4%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		48	70	25	84	67	
PIMCO StockPLUS International TR Fund	1,224,269,329	2.6%	11.2%	4.8%	10.1%	6.9%	10/1/10
MSCI World ex USA		2.7%	9.3%	4.2%	7.9%	5.6%	
Lipper International Large-Cap Core		1.7%	9.0%	4.2%	8.0%	5.4%	
<i>Excess Return</i>		-0.1%	1.8%	0.5%	2.2%	1.3%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		37	8	34	7	11	
PIMCO Emerging Markets StockPLUS AR Fund	550,594,352	-1.2%	13.9%	--	--	4.7%	4/1/15
MSCI Emerging Markets		-0.8%	12.4%	--	--	4.7%	
Lipper Emerging Markets		-3.4%	9.9%	--	--	3.3%	
<i>Excess Return</i>		-0.4%	1.5%	--	--	0.0%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		30	11	--	--	19	

Total International Index Strategy	\$3,583,223,419	4.3%	11.4%	5.7%	8.3%	8.4%	7/1/09
MSCI ACWI ex USA		1.8%	10.0%	4.1%	7.2%	7.0%	
Lipper International Multi-Cap Core		1.7%	9.0%	4.2%	8.0%	7.4%	
<i>Excess Return</i>		2.6%	1.4%	1.6%	1.0%	1.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		12	5	14	51	14	
SSGA MSCI ACWI ex USA Index	2,251,801,384	--	--	--	--	0.2%	11/1/17
MSCI ACWI ex USA		--	--	--	--	-0.1%	
Lipper International Large-Cap Core		--	--	--	--	0.1%	
<i>Excess Return</i>		--	--	--	--	0.3%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		--	--	--	--	51	
BlackRock MSCI ACWI ex USA Index	1,331,422,036	--	--	--	--	-3.4%	3/1/18
MSCI ACWI ex USA		--	--	--	--	-3.7%	
Lipper International Large-Cap Core		--	--	--	--	-1.8%	
<i>Excess Return</i>		--	--	--	--	0.3%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		--	--	--	--	78	

State of Michigan Retirement Systems

PRIVATE EQUITY REVIEW

State of Michigan Investment Board Meeting

December 11, 2018



Peter A. Woodford
Senior Investment Manager
Private Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/18)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	19.5%	12.9%	15.1%	13.4%	11.4%
PE Benchmark Returns	17.7%	15.2%	16.7%	16.4%	15.5%
Peer Median Returns	9.9%	9.6%	10.0%	9.7%	7.7%
Percentile Rank vs. Peers*	3	13	8	14	7

*State Street Universe greater than \$1 billion

- It is not unusual for private equity returns to lag the public benchmark return during periods of expansion and lead the public benchmark during periods of contraction. The past nine years have been no exception due to the second longest expansion in U.S. history. Over the past ten years, a full market cycle, the Private Equity Division has underperformed the S&P by 62 basis points (ten-year S&P 500 return 11.97%) and underperformed the benchmark by 4.1%.
- Private Equity returns have been strong relative to peer median returns, ranking in the top 7% of peers over the past ten years. Outperformance to peers is attributable to fund selectivity and strategy.
- For the twelve months ending September 30, 2018, the Private Equity Division returned approximately \$482 million, net of contributions, to the pension fund. Although the pace of distributions continues to slow, distribution activity should remain healthy for as long as the economic expansion continues. General Partners are incentivized to exit investments at current valuations.
- Commitments closed during the quarter include:
 - \$100 million to Riverside Micro-Cap Fund V, a micro-cap buyout fund
 - \$150 million to ASF VIII, a secondary investment fund
 - \$75 million to Vista Equity Partners VII, a technology and software buyout fund
 - \$50 million to Permira Growth Opportunities I, a growth equity fund
 - \$60 million to TI Platform SMRS SMA, a micro-VC separately managed account

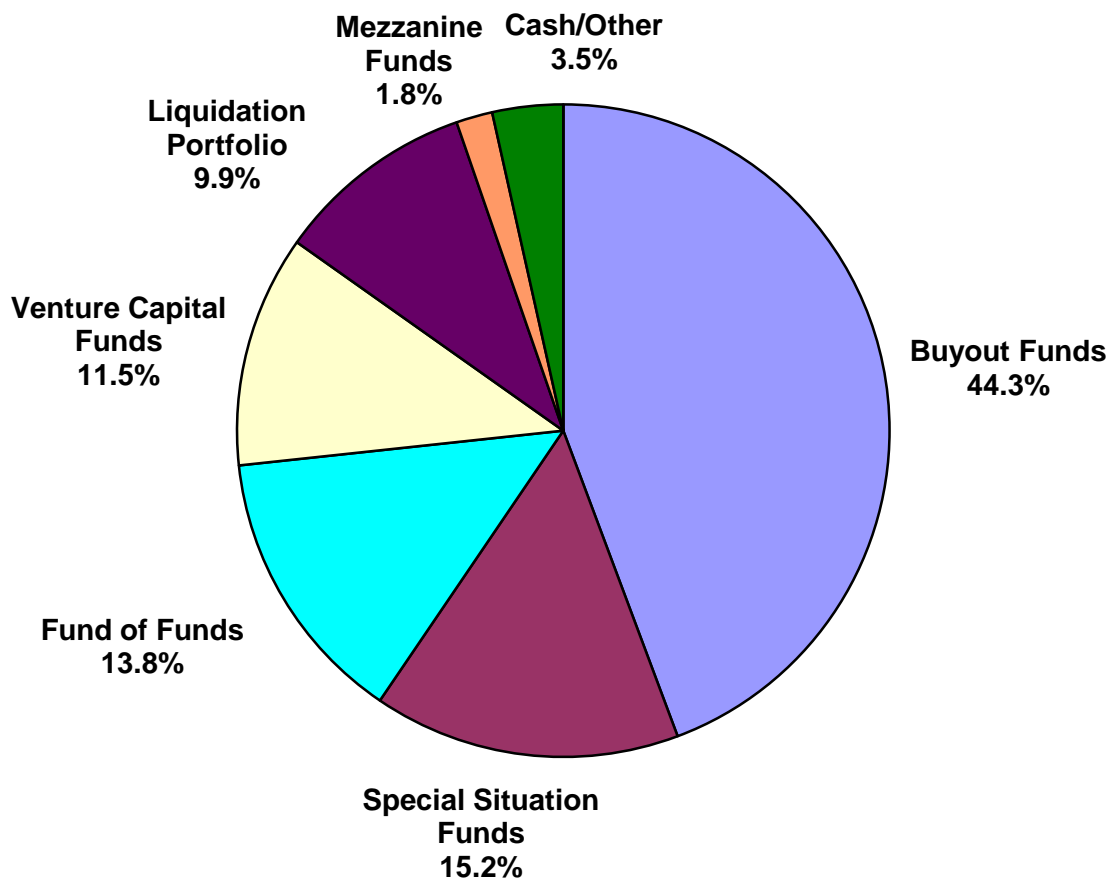
Strategy Update

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

SMRS

Private Equity

9/30/18



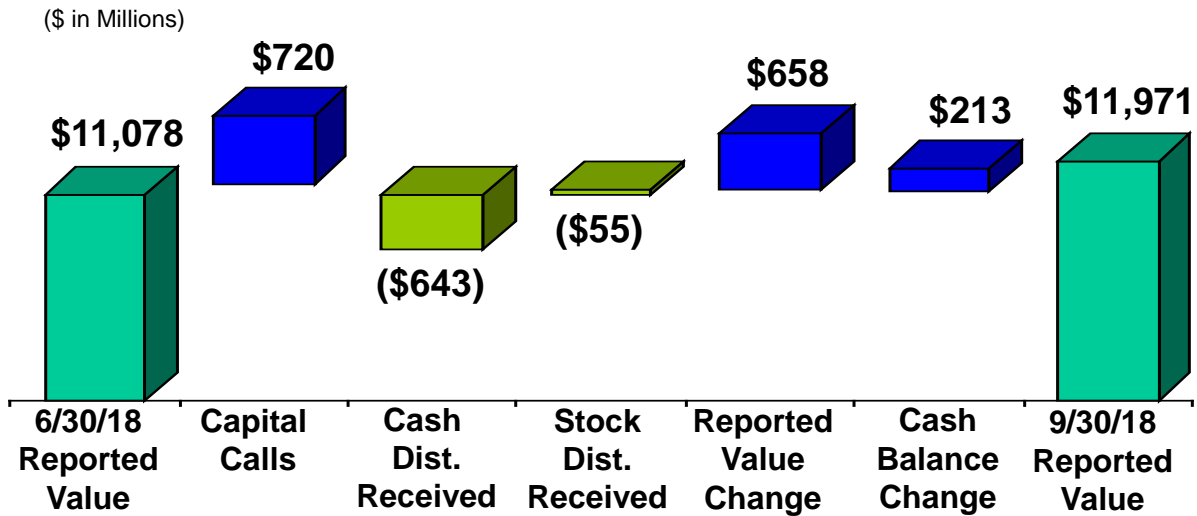
Market Value in Millions				
	<u>9/30/18</u>		<u>9/30/17</u>	
Buyout Funds	\$5,300	44.3%	\$4,791	45.2%
Special Situation Funds	1,814	15.2%	1,703	16.1%
Fund of Funds	1,658	13.8%	1,131	10.7%
Venture Capital Funds	1,380	11.5%	1,061	10.0%
Liquidation Portfolio	1,189	9.9%	1,274	12.0%
Mezzanine Funds	210	1.8%	198	1.9%
Cash/Other	420	3.5%	432	4.1%
Total	<u>\$11,971</u>	<u>100.0%</u>	<u>\$10,590</u>	<u>100.0%</u>

SMRS

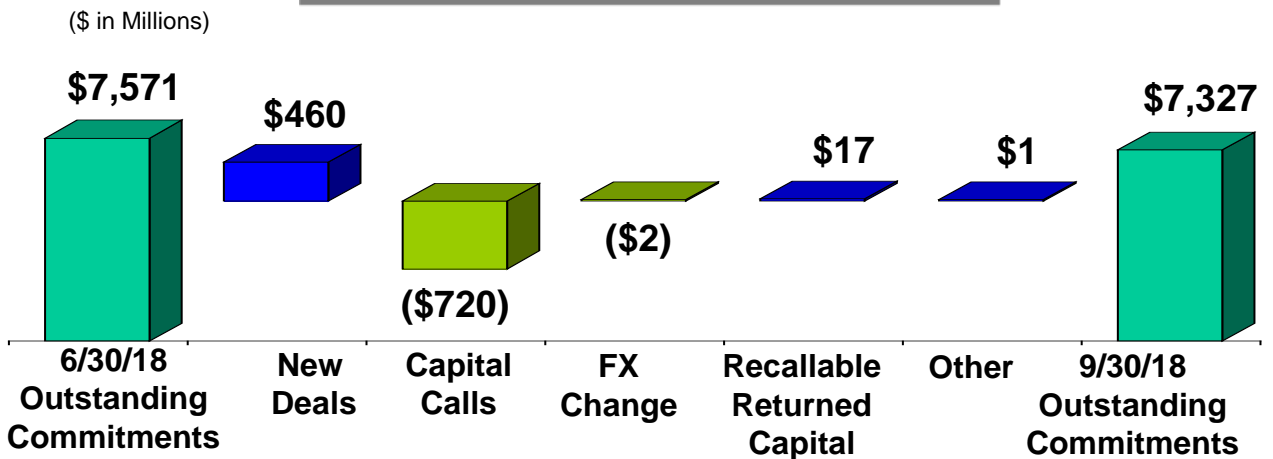
Private Equity

9/30/18

Invested Commitments



Outstanding Commitments

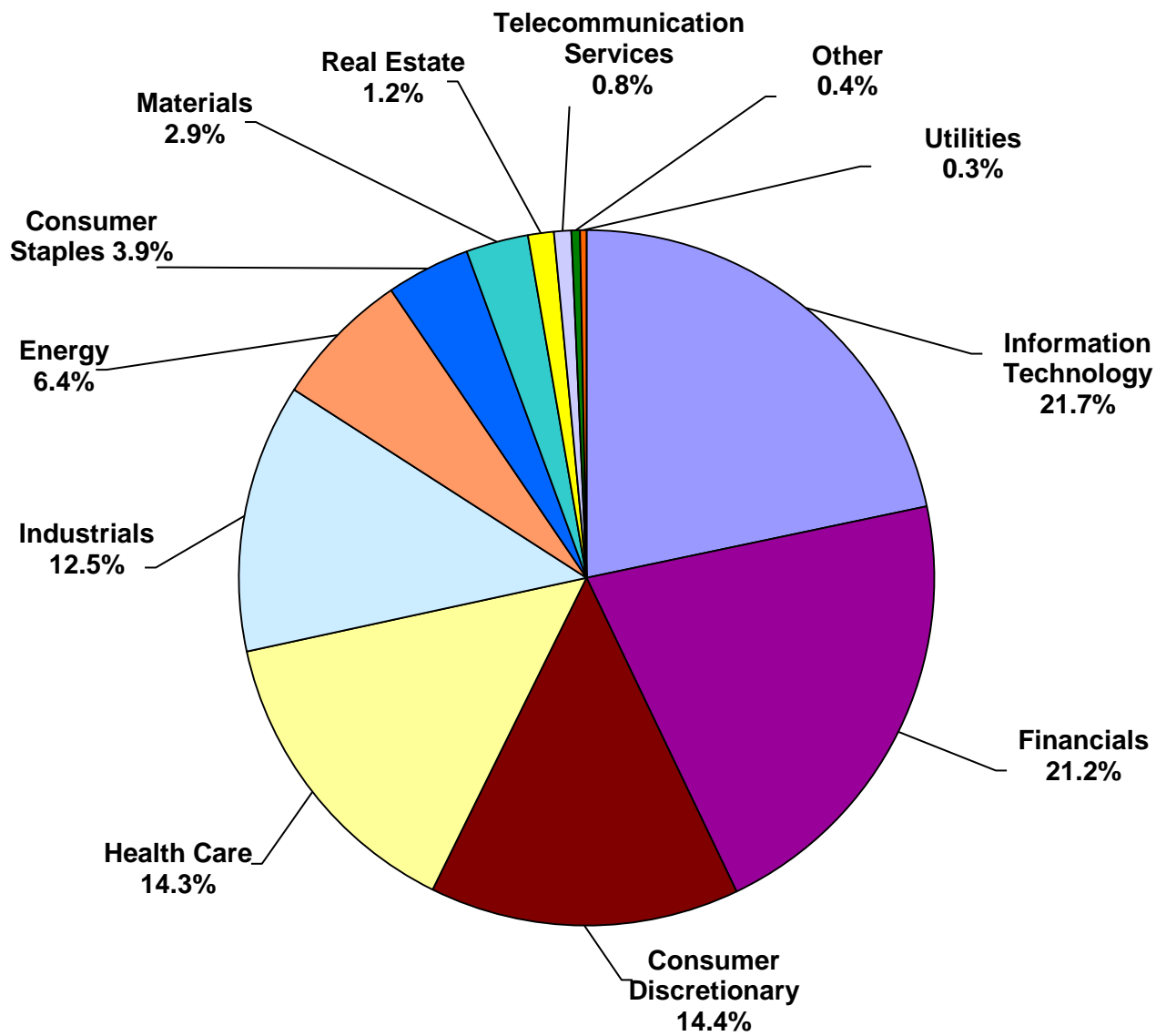


SMRS

Private Equity

9/30/18

Investments by Industry



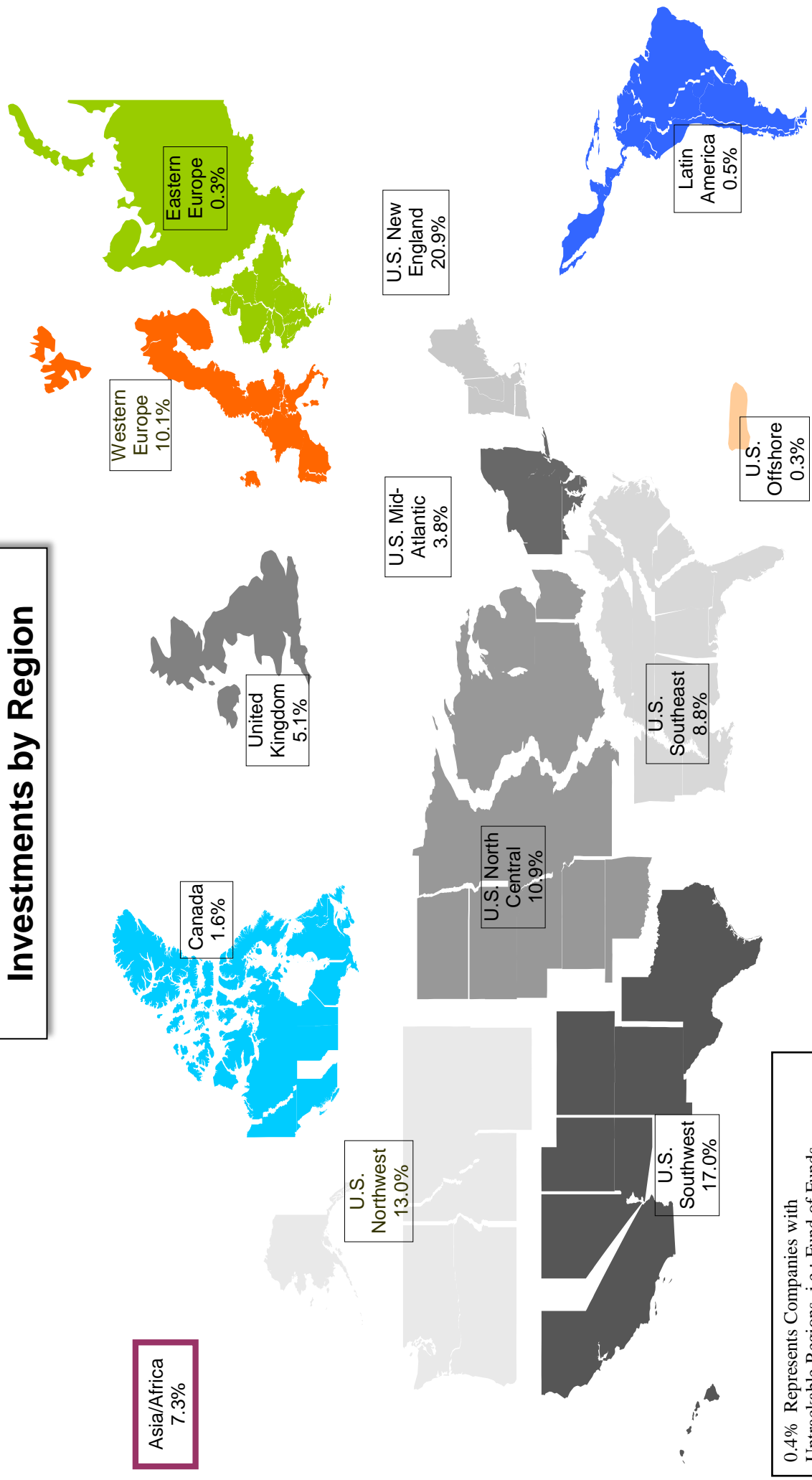
These numbers are based on the most recent available General Partner Data; primarily 6/30/18 and are subject to change.

SMRS

Private Equity

9/30/18

Investments by Region



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

Geographic Report: North America 75%, Europe 16%, Asia 7%, Other 2%

SMRS

Private Equity

9/30/18

Portfolio by Vintage Year

(\$ in Millions)

Asset Vintage	Reported Value	Outstanding Commitment	Total Exposure
1986-98	\$ 2	\$ 2	\$ 4
1999	8	5	13
2000	49	26	75
2001	116	60	176
2002	5	4	9
2003	7	13	20
2004	89	35	124
2005	221	24	245
2006*	605	171	776
2007	530	131	661
2008	717	100	817
2009	41	1	42
2010	252	5	257
2011	692	114	806
2012	1,369	123	1,492
2013	398	144	542
2014	1,363	383	1,746
2015	3,668	1,604	5,272
2016	1,089	1,170	2,259
2017	214	1,440	1,654
2018	115	1,772	1,887
Income Accruals	1	0	1
Cash	415	0	415
Act. Small Cap - Stock Dist	5	0	5
Total	\$ 11,971	\$ 7,327	\$ 19,298

*Liquidation portfolio is 2006 vintage

FX Exposure

(\$ in Millions)

	Reported Value	Outstanding Commitment	Total Exposure	Total (USD)
Euro (\$1.16/ €)	€ 358	€ 395	€ 753	\$875

SMRS

Private Equity

9/30/18

Top 10 Sponsors

(\$ in Millions)

Asset Type	Reported Value	Outstanding Commitment	Total
HarbourVest Partners	\$ 2,364	\$ 875	\$ 3,279
Blackstone Capital Partners	520	349	869
The Carlyle Group	338	521	859
KKR	489	334	823
Warburg Pincus Capital	610	173	783
Grosvenor Capital Management	615	129	744
Advent International	445	113	558
Leonard Green & Partners	417	134	551
TPG	280	220	500
The Riverside Company	213	258	471
Top 10 Total Value	\$ 6,291	\$ 3,106	\$ 9,397

Cash Weighted Rates of Return*

(Net IRR)	Current Qtr.	1-Year	3-Year	5-Year	10-Year
Buyout	0.4%	16.0%	15.6%	15.5%	13.3%
Fund of Funds	-0.1%	12.6%	13.7%	14.3%	9.2%
Mezzanine	0.0%	10.9%	8.6%	7.9%	9.0%
Special Situations	-0.3%	10.3%	10.8%	10.5%	11.6%
Venture Capital	0.0%	22.3%	13.0%	16.7%	18.6%

*These numbers are based on most recent available General Partner reported data; primarily 6/30/18 and are subject to change.

SMRS

Private Equity

9/30/18

Net Market Values by Ownership Entity

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
Accel Europe I, L.P.	\$ 3,470,302	\$ 1
Accel Europe II	17,048,469	3,300,000
Accel Growth Fund II, L.P.	12,399,180	240,000
Accel Growth Fund III, L.P.	13,310,414	1,120,000
Accel Growth Fund IV L.P.	17,155,457	4,290,000
Accel IX, L.P.	5,001,686	3,000,000
Accel Leaders Fund L.P.	5,547,155	330,000
Accel London V L.P.	7,586,678	5,220,000
Accel VI-S	2,231,157	652,611
Accel VI, L.P.	1,005,173	-
Accel VIII, L.P.	-	4,782,499
Accel X, L.P.	16,227,863	-
Accel XI, L.P.	7,291,136	1,680,000
Accel XII, L.P.	7,178,460	1,190,000
Accel XIII, L.P.	3,822,817	5,900,000
Advent Global Private Equity V	7,609,232	8,700,000
Advent International GPE VI-A LP	53,203,135	-
Advent International GPE VII-B, L.P.	208,531,155	12,000,000
Advent International GPE VIII-B, L.P.	157,257,131	78,975,000
Advent Latin American Private Equity Fund VI, L.P.	18,485,149	14,140,000
Affinity Asia Pacific Fund III, L.P.	52,385,788	10,610,708
Affinity Asia Pacific Fund IV, L.P.	106,152,991	38,011,444
Affinity Asia Pacific Fund V L.P.	-	175,000,000
Apax Digital, L.P.	973,268	49,026,732
Apax Europe Fund VI	20,806,877	2,456,338
Apax Europe VII, L.P.	30,175,257	1,729,916
Apax IX, L.P.	71,968,557	85,005,421
Apax US VII	10,768,402	417,509
Apax VIII - B, L.P.	109,335,199	14,285,547
Apollo Investment Fund IX, L.P.	-	100,000,000
Apollo Investment Fund VIII L.P.	86,910,114	22,054,242
Arboretum Ventures II	2,144,224	-
Arboretum Ventures III, L.P.	15,059,471	-
Arboretum Ventures IV, L.P.	18,120,116	16,890,000
Ares Corporate Opportunities Fund II	7,675,394	11,423,773
Ares Corporate Opportunities Fund III, LP	88,150,577	8,712,789
Ares Corporate Opportunities Fund IV, L.P.	90,629,105	18,373,781

	Adjusted Reported Value	Unfunded Commitment
** ASF VIII B	-	150,000,000
AXA ASF Miller Co-Investment	540,281	6,656,684
Axiom Asia Co-Investment Fund I, L.P.	500,000	49,500,000
Axiom Asia IV, L.P.	27,344,824	24,947,811
Axiom Asia Private Capital Fund III, L.P.	44,944,442	8,559,134
Axiom Asia V, L.P.	1,500,000	48,500,000
BC European Capital IX	74,195,727	1,956,355
BC European Capital VII, L.P.	567,637	-
BC European Capital VIII, L.P.	16,136,773	9,055,572
Berkshire Fund IX Coinvestment Fund, L.P.	6,847,688	42,932,166
Berkshire Fund IX, L.P.	61,425,152	111,085,264
Berkshire Fund VI, L.P.	37,729,293	7,554,903
Berkshire Fund VII, L.P.	34,114,221	2,449,845
Berkshire Fund VIII, L.P.	72,835,079	10,250,761
Blackstone Capital Partners IV	16,155,457	4,729,676
Blackstone Capital Partners V	24,995,685	13,069,148
Blackstone Capital Partners V-S	1,665,793	712,476
Blackstone Capital Partners VI, LP	298,977,540	43,809,144
Blackstone Capital Partners VII, L.P.	116,360,752	170,691,486
Bridgepoint Europe IV	39,050,766	6,201,588
Carlyle Europe Partners II	871,820	4,295,163
Carlyle Europe Partners III	13,439,581	6,175,735
Carlyle Europe Partners IV, L.P.	101,895,094	30,353,314
Carlyle Europe Partners V, S.C.SP.	-	145,187,497
Carlyle Partners IV, L.P.	5,641,020	16,009,296
Carlyle Partners V L.P.	50,506,749	54,261,025
Carlyle Partners VI, L.P.	166,015,572	14,218,009
Carlyle Partners VII, L.P.	-	250,000,000
Centerbridge Capital Partners III, LP	39,271,927	42,378,556
Cerberus SMRS Partners, L.P.	51,689,149	23,304,657
Charlesbank Equity Fund IX, L.P.	6,605,652	93,394,348
Charlesbank Fund IX Overage Allocation Program	13,443,270	36,420,456
CM Liquidity Fund, L.P.	-	25,000,000
Coller International Partners V, L.P.	21,185,748	43,600,000
Coller International Partners VI, L.P.	34,258,471	29,723,267
Coller International Partners VII, L.P.	90,044,256	73,111,072
Crescent Mezzanine Partners VI, L.P.	30,926,723	8,496,178
Crescent Mezzanine Partners VII	10,506,547	139,907,775
CVC Capital Partners VII, L.P.	-	174,224,997
DLJ Investment Partners III	-	764,960
Dover Street IX, L.P.	43,765,204	58,000,000
EnCap Energy Capital Fund X, L.P.	33,971,916	11,783,577
Entertainment IP Fund, L.P.	15,680,329	33,718,417
FIMI Opportunity 6, L.P.	16,782,727	34,681,820
FirstMark Capital I, L.P.	82,076,224	196,596
FirstMark Capital IV, L.P.	6,776,287	27,300,000

	Adjusted Reported Value	Unfunded Commitment
FirstMark Capital OF I, L.P.	25,973,741	-
FirstMark Capital OF II, L.P.	14,601,103	20,300,000
FirstMark Capital P2, L.P.	168,082,451	-
Flagship Pioneering VI	16,506,718	60,000,000
Flagship Ventures Fund 2004	6,297,490	-
Flagship Ventures Fund 2007, L.P.	16,538,764	-
Flagship Ventures Fund IV, L.P.	143,994,926	-
Flagship Ventures Fund V	66,920,547	4,200,000
Flagship Ventures Opportunities Fund I, L.P.	27,351,245	28,250,000
Fox Paine Capital Fund II, LP	30,910,929	15,382,699
FS Equity Partners VII, L.P.	76,304,723	36,254,722
G-IV Acquisition Holdings, LLC	13,521,776	-
GCM Grosvenor Fund Investment Program I, L.P.	9,026,904	1,340,800
GCM Grosvenor Fund Investment Program II, L.P.	32,432,300	13,896,317
GCM Grosvenor Fund Investment Program III - 2004	43,522,429	4,966,596
GCM Grosvenor Fund Investment Program III - 2006	54,072,411	7,147,792
GCM Grosvenor Fund Investment Program V, L.P.	66,096,478	9,904,821
GCM Grosvenor Fund Investment Program VI, L.P.	27,307,736	8,137,423
GCM Grosvenor Fund Investment Program VIII, L.P.	68,286,708	31,902,589
GCM Grosvenor SeasPriFIP LP (PIS06-10)	72,768,116	16,998,184
GCM Grosvenor SeasPriFIP LP (PIS14)	201,557,571	21,063,517
GCM Grosvenor SeasPriFIP LP (Seed)	40,020,929	13,769,012
Genstar Capital Partners VIII, L.P.	29,053,499	24,701,063
Genstar VIII Opportunities Fund I, L.P.	44,924,314	8,434,983
Green Equity Investors IV	4,628,642	1,136,036
Green Equity Investors V	192,094,138	25,966,435
Green Equity Investors VI, L.P.	129,737,589	13,451,824
Green Equity Investors VII, L.P.	90,101,855	93,444,271
GSO Capital Opportunities Fund II, L.P.	18,675,477	11,479,647
GSO Capital Opportunities Fund III, L.P.	38,827,084	59,212,540
GSO COF III Co-Investment Fund, L.P.	4,628,090	44,961,537
HarbourVest Dover Street VIII, L.P.	29,442,779	7,425,000
HarbourVest Int'l III Partnership	173,591	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P	78,899,391	30,135,466
HarbourVest Partners Mezzanine Income Fund	56,472,114	52,810,000
HarbourVest V Partnership	200,706	300,000
HarbourVest VI - Direct Fund LP	2,797,077	750,000
HarbourVest VI Partnership	1,199,544	2,000,000
Harvest Partners VII, L.P.	43,301,860	34,449,033
HPS Mezzanine Partners III, L.P.	29,718,725	21,832,945
Insight Venture Partners Growth-Buyout Coinvestment Fu	63,861,581	11,593,979
Insight Venture Partners IX, L.P.	140,643,944	5,053,257
Insight Venture Partners X, L.P.	20,500,472	79,000,000
Kelso Investment Associates IX, L.P.	99,676,618	29,732,329
Kelso Investment Associates VII	2,365,490	4,970,176
Kelso Investment Associates VIII	71,090,829	22,293,453

	Adjusted Reported Value	Unfunded Commitment
Kelso Investment Associates X, L.P.	-	100,000,000
Khosla Ventures III, L.P.	38,269,901	750,000
Khosla Ventures IV, L.P.	85,125,117	950,000
Khosla Ventures Seed D, L.P.	840,000	9,160,000
Khosla Ventures V, L.P.	45,241,237	11,350,000
Khosla Ventures VI, L.P.	4,725,000	70,275,000
KKR 2006 Fund, L.P.	84,767,259	5,043,287
KKR Americas Fund XII, L.P.	28,358,619	171,740,315
KKR Asian	6,611,537	-
KKR Asian Fund II, L.P.	54,416,552	5,231,168
KKR Asian Fund III	12,221,315	85,870,708
KKR China Growth Fund	28,832,958	3,383,656
KKR E2 Investors (Annex) Fund	-	-
KKR European Fund II	1,182,900	-
KKR European Fund III	36,526,319	6,304,200
KKR European Fund IV L.P.	98,689,561	44,902,891
KKR Millennium Fund	199,571	-
KKR North America Fund XI, L.P.	137,629,161	11,549,762
Lead Edge Capital IV, L.P.	8,760,799	16,239,201
Lightspeed Venture Partners VI	450,227	-
Lightspeed Venture Partners VII, L.P.	11,959,517	-
Menlo Ventures IX, L.P.	4,557,179	-
Menlo Ventures X, L.P.	19,108,562	-
Menlo Ventures XI, L.P.	44,683,332	1,000,000
Menlo Ventures XIV, L.P.	2,683,024	4,550,000
MeriTech Capital Partners II, L.P.	1,536,582	1,850,000
Meritech Capital Partners III, L.P.	3,549,211	-
Meritech Capital Partners IV, L.P.	13,502,305	900,000
Meritech Capital Partners V, L.P.	21,112,914	1,450,000
Meritech Capital Partners VI, L.P.	5,670,675	34,262,500
Michigan Growth Capital Partners II, L.P.	193,945,158	12,464,602
Michigan Growth Capital Partners III, L.P.	33,756,741	90,743,123
Michigan Growth Capital Partners, LP	49,919,545	11,957,402
Midtown Fund III, L.P.	-	-
Midtown II Liquidating Trust	2,369,574	-
New Leaf Biopharma Opportunities II, L.P.	48,147,437	55,000,000
New Leaf Growth Fund I, L.P.	212,134,507	-
New Leaf Ventures II, L.P.	13,680,771	-
New Leaf Ventures III, L.P.	38,907,930	9,750,000
New Leaf Ventures IV, L.P.	6,000,000	44,000,000
Nordic Capital VI, L.P.	907,029	1
Nordic Capital VII	5,162,143	3,197,773
Nordic Capital VIII, L.P. (Alpha)	51,545,028	13,805,020
Oak Investment Partners X, L.P.	7,754,420	-
Oak Investments Partners IX, L.P.	650,777	-
Oaktree Opportunities Fund X, L.P.	26,841,633	9,000,000

	Adjusted Reported Value	Unfunded Commitment
Oaktree Opportunities Fund Xb, L.P.	3,491,700	66,500,000
OCM Opportunities Fund IX, L.P.	60,092,848	-
OCM Opportunities Fund VII (B), L.P.	2,643,322	4,999,175
OCM Opportunities Fund VII, L.P.	3,268,623	-
OCM Opportunities Fund VIII B, L.P.	20,839,026	-
OCM Opportunities Fund VIII, L.P.	2,904,045	-
OCM Principal Opportunities Fund IV	1,743,289	5,002,377
Ocqueoc Holdings, LLC	14,499,387	49,837,018
Parthenon Investors II	1,043,203	3,186,779
Parthenon Investors III	30,487,422	2,732,182
Parthenon Investors IV, L.P.	48,671,343	4,480,042
Peninsula Capital Fund IV	2,424,355	2,201,026
Peninsula Fund VI, L.P.	28,678,553	15,882,874
** Permira Growth Opportunities I, L.P.1	-	50,000,000
PPC Fund II	9,396,195	65,108,066
Public Pension Capital, LLC	42,726,816	63,033,679
Rhone Partners V, L.P.	61,347,735	59,879,583
Riverside Capital Appreciation Fund VI, LP	64,199,724	11,792,789
Riverside Capital Appreciation Fund VII, L.P.	-	100,000,000
Riverside Micro Cap Fund I, LP	17,557,405	5,782,975
Riverside Micro-Cap Fund II, L.P.	31,369,516	984,009
Riverside Micro-Cap Fund III, L.P.	57,381,148	2,630,441
Riverside Micro-Cap Fund IV	42,754,689	11,922,843
** Riverside Micro-Cap Fund V, L.P.	-	100,000,000
Science Ventures Fund II, L.P.	8,426,574	11,000,000
Shamrock Growth Capital Fund IV, L.P.	13,518,349	34,297,477
Silver Lake Partners II	1,797,339	3,531,586
Silver Lake Partners III	70,306,306	13,199,137
Silver Lake Partners IV, L.P.	65,170,280	6,235,985
Silver Lake Partners V, L.P.	12,963,861	54,131,583
SK Capital Partners V, L.P.	-	50,000,000
SM/TCP L.P.	32,820,189	7,069,830
SMRS - TOPE LLC	1,259,374,334	448,072,465
SMRS-CAPP LLC	16,792,761	83,300,000
SMRS-NCRP LLC	874,540,097	190,958,521
Sycamore Partners III, L.P.	202,048	97,797,952
TCW Shared Op Fund III	73,223	-
TCW/Crescent Mezzanine Partners III Secondary	268,905	-
TCW/Crescent Mezzanine Partners III, L.P.	2,476,476	29,733,856
TCW/Crescent Mezzanine Partners IV, L.P.	253,821	13,660,773
TCW/Crescent Mezzanine Partners IVB Secondary	225,117	-
TCW/Crescent Mezzanine Partners V, LLC	11,576,174	15,382,013
TCW/Crescent Mezzanine Partners VC Secondary	3,490,064	-
The Huron Fund III, L.P.	8,578,582	4,542,756
The Huron Fund IV, L.P.	26,238,244	3,139,460
The Huron Fund V, L.P.	3,171,881	31,237,500

	Adjusted Reported Value	Unfunded Commitment
The Shansby Group 4	31,967	521,018
The Shansby Group 5 (TSG5)	1,557,634	4,261,291
Thoma Bravo Discover Fund II, L.P.	-	75,000,000
Thoma Bravo Fund XII, L.P.	143,525,722	17,184,726
Thoma Bravo Fund XIII, L.P.	-	125,000,000
TI Platform BOV, L.P.	756,799	14,243,201
TI Platform Fund II, L.P.	668,356	14,331,644
** TI Platform SMRS SMA, L.P.	-	60,000,000
TPG Healthcare Partners, L.P.	-	25,000,000
TPG IV (Texas Pacific Group IV)	2,397,403	211,725
TPG Partners III, LP	768,658	2,087,002
TPG Partners VI, L.P.	110,402,899	10,258,102
TPG Partners VIII, L.P.	-	125,000,000
TPG Partners, VII, L.P.	119,019,101	51,262,349
TPG V (Texas Pacific Group V)	47,248,636	5,841,509
Trilantic Capital Partners V (North America) Fund A, L.P.	32,387,716	6,482,025
Trilantic Capital Partners VI (North America) L.P.	11,184,038	63,247,139
TSG6, L.P.	102,025,766	28,713,233
TSG7 A L.P.	78,228,898	53,115,998
Turnbridge Capital Partners I , LP	72,665,868	34,743,434
Veritas Capital Fund V, L.P.	113,878,994	1,764,130
Veritas Capital Fund VI, L.P.	42,265,511	55,659,330
Veritas V Co-Investors, L.P.	36,510,843	-
Vista Equity Endeavor Fund I, L.P.	24,950,666	24,368,523
Vista Equity Partners Fund V, L.P.	59,637,487	3,838,183
Vista Equity Partners Fund VI, L.P.	72,863,991	6,551,279
** Vista Equity Partners VII, L.P.	-	75,000,000
Vista Foundation Fund III, L.P.	12,087,460	12,557,402
Warburg Pincus China, L.P.	30,158,049	18,877,500
Warburg Pincus Energy MCIP, L.P.	-	10,396,887
Warburg Pincus Energy, L.P.	66,906,833	37,000,000
Warburg Pincus Equity Partners, L.P.	960,691	-
Warburg Pincus Financial Sector, L.P.	6,173,935	38,295,000
Warburg Pincus International Partners	5,918,077	-
Warburg Pincus Private Equity IX	16,887,999	-
Warburg Pincus Private Equity VIII, L.P.	8,277,685	-
Warburg Pincus Private Equity X, L.P.	142,192,255	-
Warburg Pincus Private Equity XI, L.P.	189,295,434	-
Warburg Pincus Private Equity XII Secondary, L.P.	17,827,227	8,575,000
Warburg Pincus Private Equity XII, L.P.	124,968,450	60,025,000
WestAm COREplus Private Equity QP	499,162	2,086,719
WestAm Special Private Equity Partners	735,866	2,317,427
Total Private Equity	\$11,550,554,941	\$ 7,302,279,622

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
Cash	399,819,787	-
Active Small Cap Cash	15,002,935	-
Active Small Cap	4,634,029	-
Income Accruals	753,911	-
Grand Total	<u><u>\$11,970,765,603</u></u>	<u><u>\$ 7,302,279,622</u></u>

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

** New Commitments made during quarter reported

State of Michigan Retirement Systems

REAL, OPPORTUNISTIC, & ABSOLUTE RETURN REVIEW

State of Michigan Investment Board Meeting
December 11, 2018



Jennifer Yeung
Senior Investment Manager
Real, Opportunistic, & Absolute Return Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan	1-Year	3-Years	5-Years	7-Years	10-Years
Absolute Return	6.0%	4.0%	4.7%	5.5%	2.7%
HFRI FOF Conservative	3.7%	2.3%	3.0%	3.0%	1.5%

- The value of the Absolute Return portfolio is \$4.3 billion with a one-year return of 6.0% and 1.0% for the current quarter. The outperformance for the third quarter was driven by overweight exposure to credit strategies as well as manager selection.
- Performance for credit managers was positive for the third quarter; the strategy closed out as the largest overall contributor to performance. Residential mortgage managers continued to build upon their strong 2018 in the third quarter, driven by performance across the non-agency mortgage complex. Legacy RMBS exposure was a notable positive contributor as our managers were able to identify securities with higher quality collateral.
- Equities were the second largest contributor to performance for the quarter, with performance mostly driven by quantitative equity strategies. Models trading in the U.S. performed particularly well while strategies in Asia detracted.

Strategy Update

- The objective of the Absolute Return portfolio is to diversify the total plans' holdings, targeting returns above investment-grade fixed income with lower volatility than the equity portfolio. The portfolio utilizes a diverse mix of managers that invest both long and short to target specific exposures and seek to hedge out unwanted risk.
- No new commitments for the quarter.
- We remain cautious on directional risks and have continued to shift towards diversifying strategies. We have been increasing allocations to special situations and co-investments, which have more idiosyncratic risk and are implemented on a market neutral basis. We also believe that allocations to opportunities in macro and quant equity strategies could be well positioned to take advantage of a rising interest rate and higher volatility environment. Higher interest rates may have caused recent equity market losses due to general risk off behavior, but we do not believe this is a direct risk of the Absolute Return program. The portfolio has low direct correlation and sensitivity to an upward movement in interest rates.

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

Performance

MPSERS Plan	1-Year	3-Years	5-Years	7-Years	10-Years
Real Return and Opport.	14.4%	10.6%	12.6%	10.8%	N/A
Custom Benchmark	7.6%	7.5%	7.3%	7.3%	N/A

- Total Real Return and Opportunistic portfolio value was \$6.7 billion with a total one-year return of 14.4%. Performance for the year was driven by strong income from private credit, natural resource strategies, and media and entertainment holdings, as well as solid returns from asset sales in natural resource, telecom, and transportation funds.

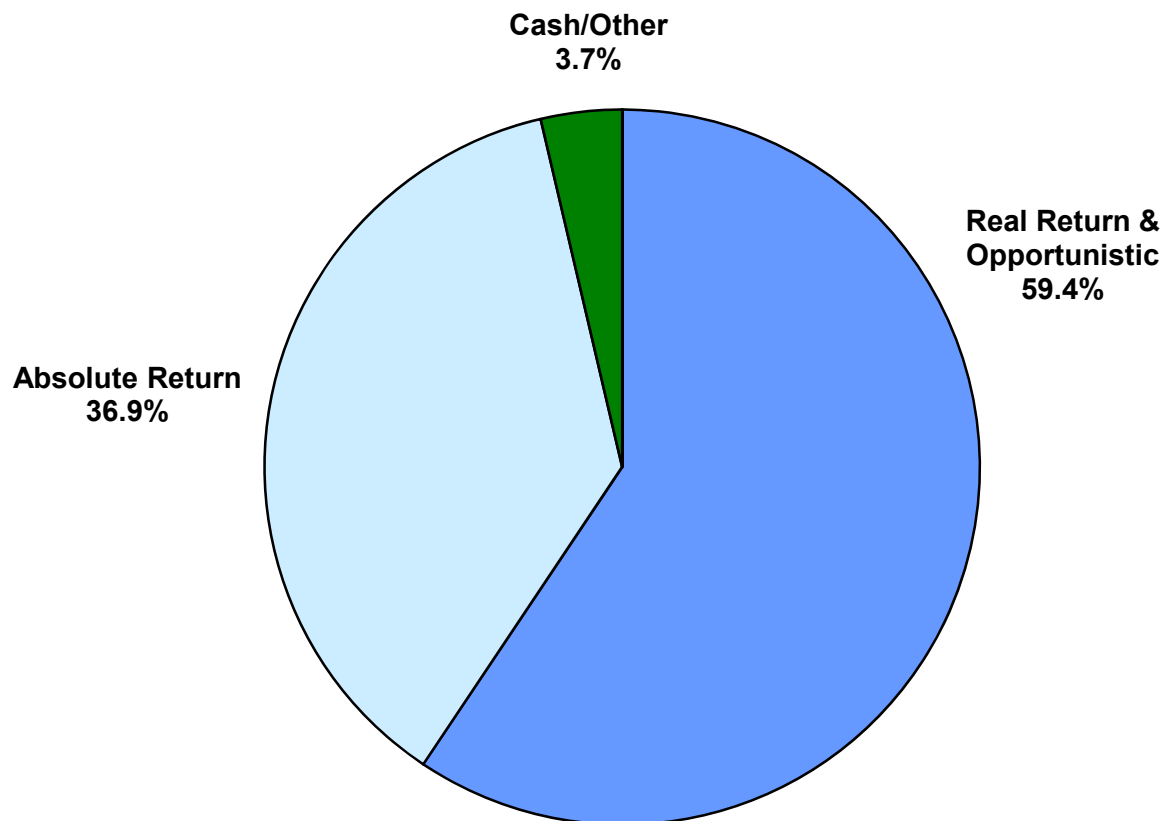
Strategy Update

- The objective of the Real Return & Opportunistic portfolio is to provide an inflation hedge and/or to gain exposure to attractive opportunities that may not fit in another plan portfolio.
- The Real Return & Opportunistic portfolio has approximately \$3.7 billion of unfunded commitments. New commitments closed during the quarter include:
 - \$100 million to Barings Global Real Asset Fund, a commingled fund that will invest in co-investments, secondary funds, and primary funds in the real assets sector.
 - \$100 million to TSSP Opportunities Partners IV (A), L.P, a commingled fund that will invest in corporate dislocations, special situations, and distressed for control opportunities.
 - \$35 million to Kayne Anderson Acquisition Corporation (NASDAQ: KAAC), a publicly traded special purpose acquisition company.
 - \$20 million to SJC Direct Lending Fund III Co-Invest, a co-investment opportunity with an existing SJC Fund III borrower.
- We remain focused on finding differentiated strategies that are additive to the current portfolio mix. The pipeline remains full though many opportunities are priced for perfection.
 - We continue to like insurance-related opportunities, niche strategies with some scalability, and contractual cash flow.
 - Also, we continue to review opportunities in the private energy space. This opportunity has grown as many publicly-traded oil and gas companies have focused on de-levering their balance sheets, operating within cash flows, and look to improve their return metrics. As a result, public companies have continued to sell non-core assets to focus operations on key strategic areas. This has benefited private investors as a strong pipeline of high quality assets are coming to market.

SMRS

Real, Opportunistic, & Absolute Return

9/30/18



Market Value in Millions				
	<u>9/30/18</u>		<u>9/30/17</u>	
Real Return & Opportunistic	\$6,519	59.4%	\$5,994	59.3%
Absolute Return	4,056	36.9%	4,028	39.8%
Cash/Other	402	3.7%	86	0.9%
Total Investments	<u>\$10,977</u>	<u>100.0%</u>	<u>\$10,108</u>	<u>100.0%</u>

SMRS

Absolute Return

9/30/18

Net Market Values by Entity

	Net Market Value
Drawbridge Opportunities Fund	\$ 237,006,494
* EnTrust White Pine Partners, LP	37,550,432
JM IV, LP	79,934,473
MP Securitized Credit Master Fund, LP	77,274,559
Riverside Credit Solutions Fund I, LP	8,440,102
SJC Direct Lending Revolver Fund III, LP	4,059,338
* Tahquamenon Fund, LP	3,611,490,926
Visium Balanced Fund, LP	467,278
Total Absolute Return	\$ 4,056,223,602
Short-Term Investments & Other	250,886,787
Grand Total	\$ 4,307,110,389

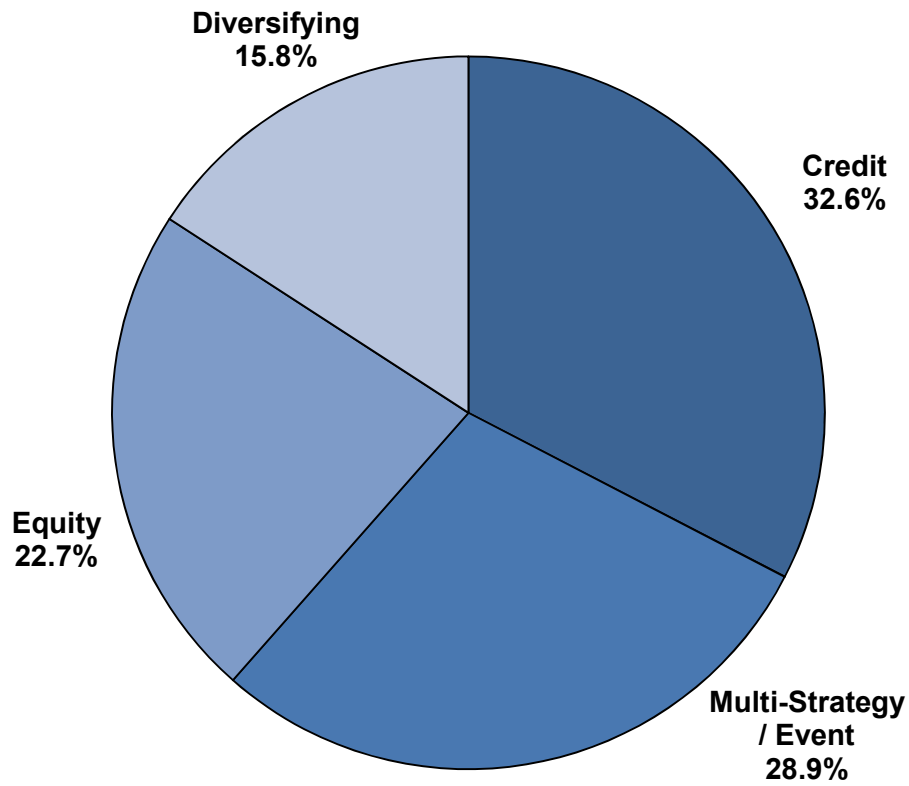
* Fund of Funds

SMRS

Absolute Return

9/30/18

Investments By Strategy



Strategy Breakdown			
Underlying Funds:	81	Median Position Size:	0.5%
Strategies:	4	Average Position Size:	1.2%
Relationships:	8	Largest Position Size:	6.6%

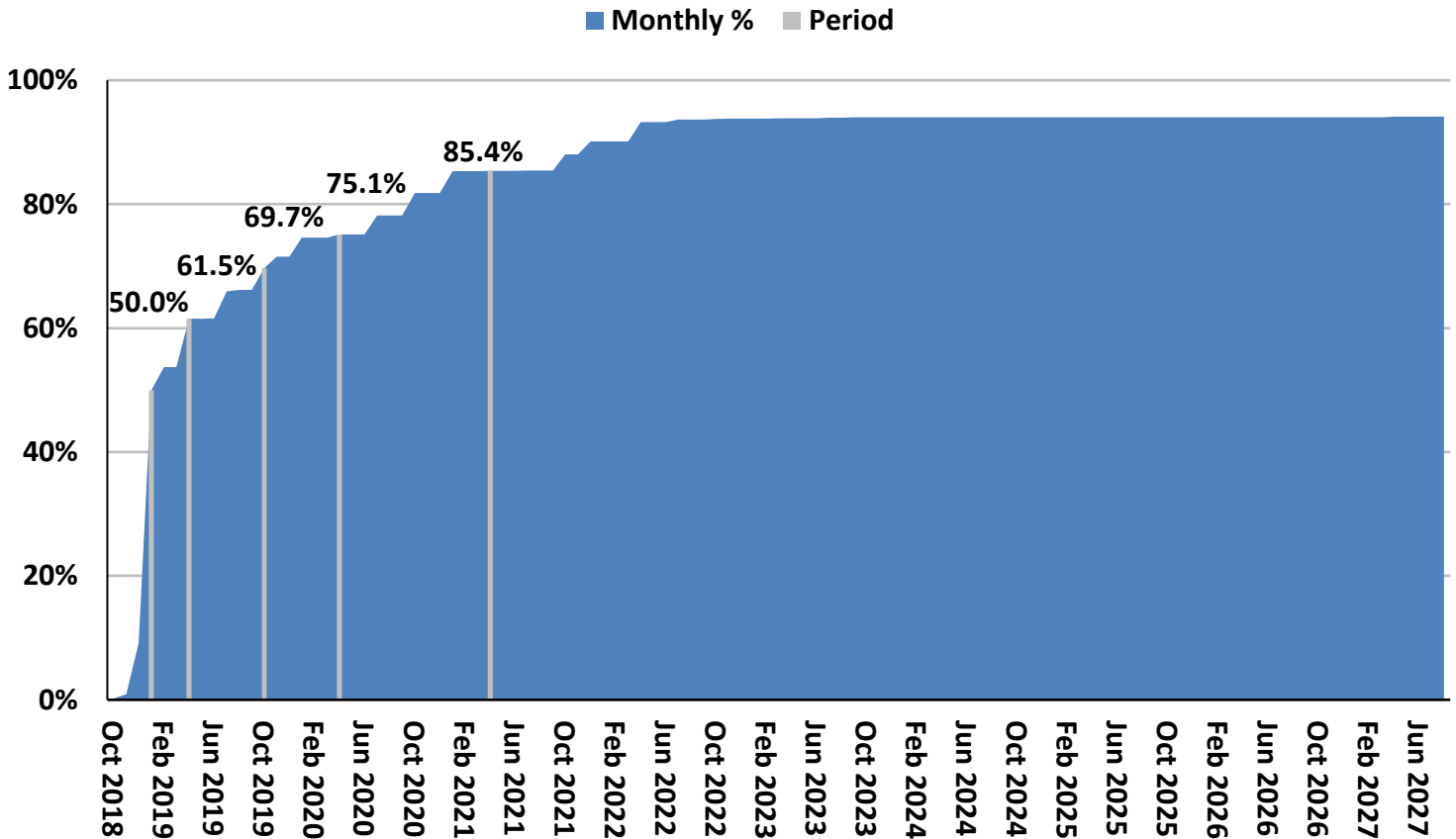
SMRS

Absolute Return

9/30/18

Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 1/1/19	50%	50%
By 4/1/19	11.5%	61.5%
By 10/1/19	8.2%	69.7%
By 4/1/20	5.4%	75.1%
By 4/1/21	10.3%	85.4%
After 1/1/21	8.7%	94.1%
Illiquid	5.9%	100.0%
Total	100.0%	N/A



SMRS

Real Return and Opportunistic

9/30/18

Net Market Value by Entity

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
* Abernathy Fund I, LLC	\$ 246,872,712	\$ 55,664,491
Apollo Credit Opportunities Fund III, LP	35,322,446	23,063,913
Apollo European Principal Finance Fund II	25,524,046	9,227,045
Apollo Financial Credit Investments Fund II	288,869,364	186,797,353
Apollo Financial Credit Investments Fund III	167,477,786	188,130,099
Apollo HK TMS Investments Holdings, LP	9,154,790	
Apollo Offshore Credit Fund Ltd	281,821,736	
Apollo Structured Credit Recovery Fund IV	121,558,896	108,824,136
Axton Holdings	3,481,650	
Barings Asset-Based Income Fund, LP	57,932,939	237,397,292
** Barings Global Real Asset Fund I	42,543,561	56,236,625
Blackstone Strategic Capital Holdings, LP	38,055,040	88,078,294
BroadRiver III, LP	10,132,073	191,210,169
BSCH Parallel (MLG) I, LP	40,849,316	79,323,573
Blue Peninsula Fund, LP	147,802,203	69,014,856
Carlyle Intl Energy Partners, LP	42,876,673	34,521,364
Carlyle Energy Mezzanine Opportunity Fund II	18,154,862	32,317,356
Centerbridge SCP III, LP	21,696,058	12,931,354
* Content Holdings, LLC	414,199,771	42,457,570
Elegantree Fund SPC	10,224,044	4,735,264
Energy Recapitalization and Restructuring Fund, LP	30,077,638	7,456,217
ERR Michigan Holdings, LP	4,343,246	2,269,933
* Fairfield Settlement Partners, LLC	50,391,930	81,078,085
FCO MA MI, LP	143,217,651	80,105,913
Fortress MSR Opportunities Fund I A, LP	84,995,393	
Fortress Transportation & Infrastructure	68,664,460	
GSO Credit Alpha Fund, LP	58,675,784	37,910,064
Highbridge Principal Strategies - Specialty Loan Fund III	45,179,707	6,650,459
Hopen Life Sciences Fund II	4,343,020	1,300,000
HPS Red Cedar Fund	105,590,325	183,851,550
JP Morgan Global Maritime Investment Fund, LP	84,920,466	2,914,854
** KAAC		35,000,000
KANG Fund, LP	621,274	
Kayne Anderson Energy Fund VII, LP	68,220,744	21,841,974
Kayne P.E. Income Fund	107,856,236	50,709,805
Kayne P.E. Income Fund II		150,000,000
Kayne Solutions Fund, LP	69,258,145	180,594,679
KKR EI&G Fund	56,104,971	1,953,202
KKR Lending Partners I, LP	18,711,614	11,930,723
KKR Lending Partners II, LP	56,242,645	14,907,287
Lakewater, LLC, Series 1	138,775,957	1,315,595
Lakewater, LLC, Series 2	247,775,718	11,041,654
Lakewater, LLC, Series 3	581,435,530	9,679,911

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
Lakewater, LLC, Series 4	31,641,571	2,196,174
Lakewater, LLC, Series 5	243,896,051	15,451,336
Marathon CLO Equity Fund, LP	12,000,280	12,045,000
Merit Energy Partners, LP	32,342,891	5,489,893
MidCap FinCo Holdings LTD	302,900,997	482,386
Napier Park Aircraft Leasing Vehicle I, LLC	37,360,060	16,723,900
Napier Park Aircraft Leasing Rollover Fund I, LLC	6,070,697	71,046,255
Nash Co-Investment	21,924,626	66,826
New Fortress Energy HLDGS	503,936,000	
NGP Natural Resources XII	27,587,857	119,517,744
Orion Coinvest III, LP	1,655	2,236,552
Orion Mine Finance Fund 1A, LP	56,894,733	5,016,470
Orion Mine Finance Fund I, LP	105,688,955	7,376,051
Orion Mine Finance II, LP	64,637,247	44,676,656
Orion Mine Finance Co-Fund II, LP	15,145,178	34,927,191
Redding Ridge Holdings, LP	45,393,980	57,102,273
* Renaissance Venture Cap Fund II, LP	23,693,202	5,250,000
* Renaissance Venture Cap Fund III, LP	2,216,776	22,500,000
REOG Fund II Coinvest, LP	30,596,066	7,552,384
Ridgewood Energy Oil & Gas II	115,699,043	24,073,825
Ridgewood Energy Oil & Gas III	51,849,122	188,464,672
RPEP Energy Opp Inst Partner	19,501,564	24,100,819
RPEP SMRS Holdings, LLC	1	1,876,850
SJC Direct Lending Fund I, LP	632,209	15,088,120
SJC Direct Lending Fund IA, LP	210,949	3,764,486
SJC Direct Lending Fund II, LP	90,295,072	38,261,315
SJC Direct Lending Fund III, LP	81,811,933	150,840,231
** SJC Direct Lending Fund III Co-Invest G-III	20,000,000	
* Social Network Holdings, LLC	105,636,309	24,429,952
Specialty Equity Strategy, LP	267,077	19,647,000
Sprott PRL (M), LP	4,536,839	20,717,857
Sprott PRL (M-Co-Invest)	10,105,932	15,000,000
Sprott Private Resource Lending Fund (US), LP	53,926,297	63,630,325
Terra Co-Investment, LLC	32,878,194	14,000,000
TICP CLO Partners II, LP	34,673,541	14,775,413
TSSP Adjacent Opp Partners, LP	128,580,110	180,643,175
** TSSP Opportunities Partners IV, LP		100,000,000
Varo Coinvestment, LP	16,829,733	892,702
Vida Insurance Credit Opportunity Fund II, LP	53,870,311	34,968,809
Warwick Energy Partners III	52,900,187	7,454,932
Warwick (SMRS) Co-Invest, LP	30,991,574	2,732,720
Total Real Return and Opportunistic	\$ 6,519,077,239	\$ 3,687,462,950
Short-Term Investments & Other	150,349,652	-
Grand Total	\$ 6,669,426,891	\$ 3,687,462,950

* Fund of Funds

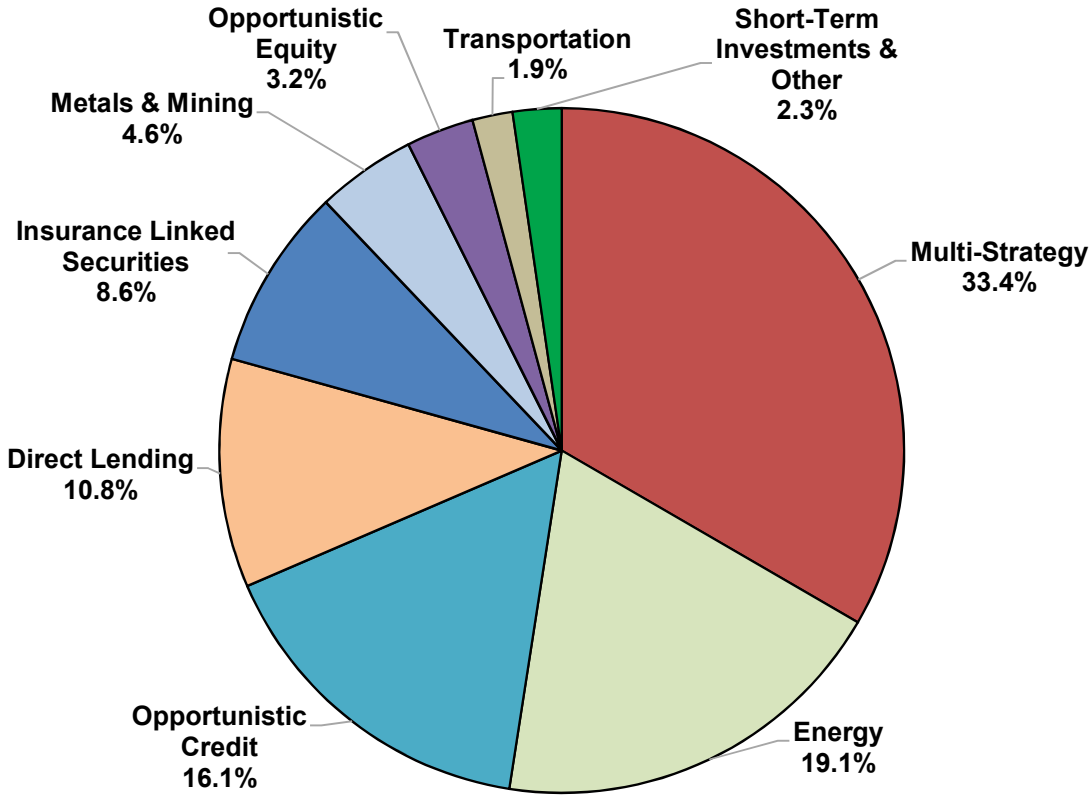
** New Commitment

SMRS

Real Return and Opportunistic

9/30/18

Investments By Strategy



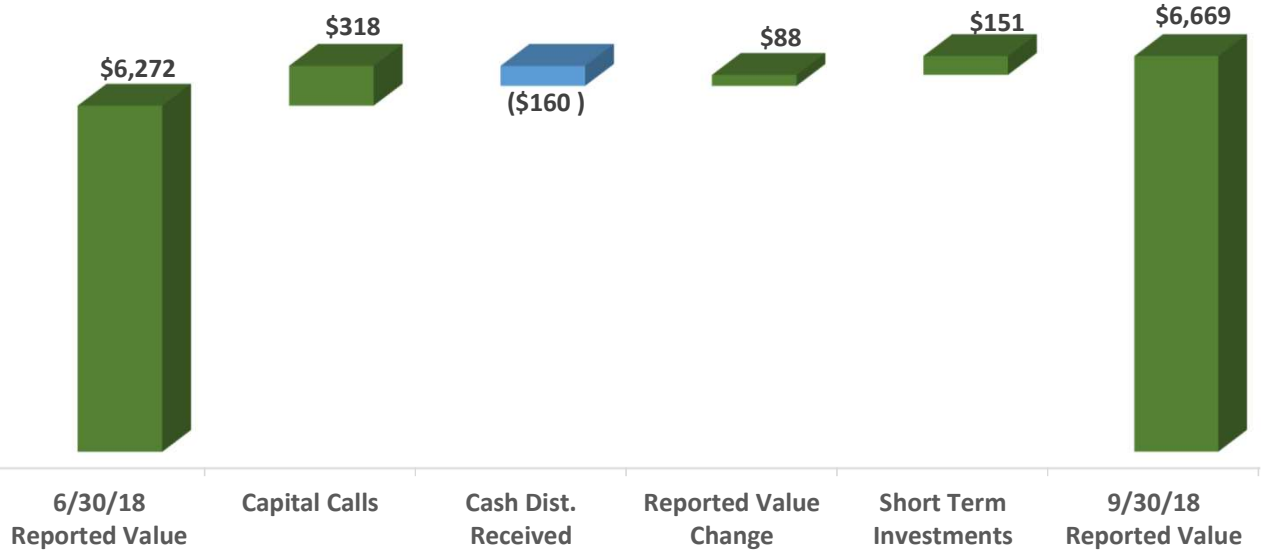
Investment Strategy	
Multi-Strategy	\$ 2,225,022,123
Energy	1,274,447,292
Opportunistic Credit	1,072,942,111
Direct Lending	721,575,450
Insurance Linked Securities	570,741,465
Metals & Mining	310,936,836
Opportunistic Equity	214,793,662
Transportation	128,351,224
Short-Term Investments & Other	150,616,729
Total Market Value	\$ 6,669,426,891

SMRS

Real Return and Opportunistic 9/30/18

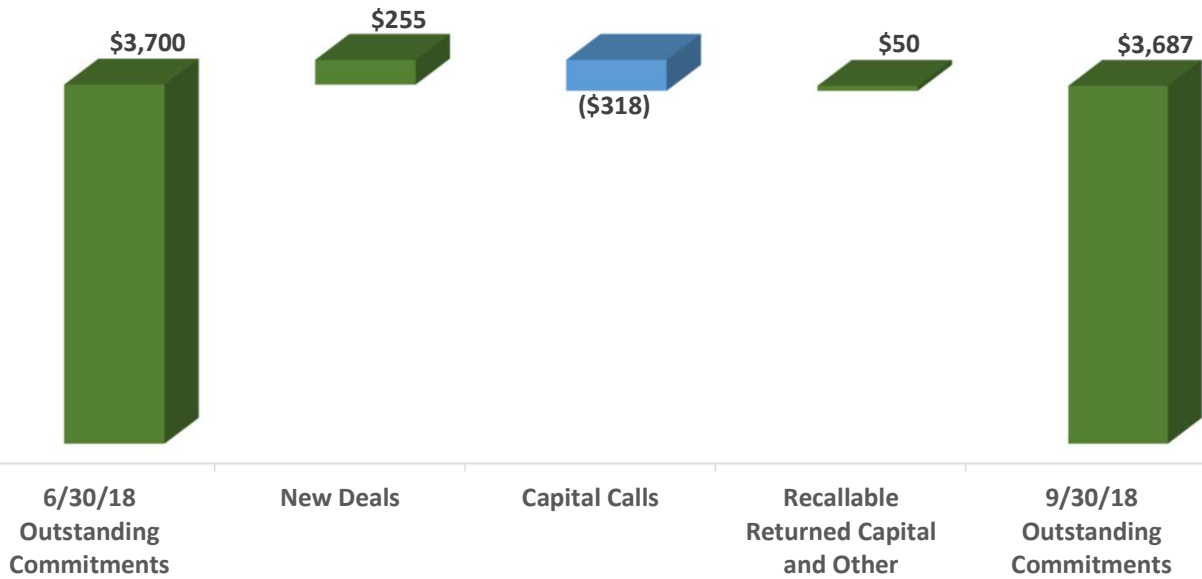
Invested Commitments

\$ Millions



Outstanding Commitments

\$ Millions



SMRS

Real Return and Opportunistic

9/30/18

Top Ten Advisors or Entities

(\$ in Millions)

Advisor or Entity	Market Value
Barings Alternative Investments	\$ 1,344
Apollo Global Management	1,278
Domain Capital Advisors	817
Fortress Investment Group	732
Kayne Anderson Capital Partners	279
Orion Resource Partners	242
Ridgewood Energy	218
Czech Asset Management	193
TPG Sixth Street Partners	163
HPS Investment Partners	151
Total Market Value	\$ 5,417

State of Michigan Retirement Systems

REAL ESTATE AND INFRASTRUCTURE REVIEW

State of Michigan Investment Board Meeting
December 11, 2018



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (9/30/18)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	12.3%	10.2%	12.4%	11.2%	4.7%
NCREIF NPI	5.8%	6.4%	8.2%	8.6%	5.1%
Peer Median Returns	8.8%	9.0%	10.1%	10.3%	4.2%
Percentile Rank vs. Peers*	22	33	22	33	38

*State Street Universe greater than \$1 billion

- Outperformance relative to the one-year benchmark resulted from the Real Estate and Infrastructure Division's (REID) strategy of being underweight in retail, overweight in apartments and hotels, realized gains from asset sales, and appreciation and realized gains in the infrastructure portfolio.

Strategy Update

- The REID is focusing on sourcing off-market opportunities through its extensive network and reducing risk in the portfolio through early income-generating investments including credit strategies that are higher in the capital stack with a shorter projected hold period. The REID has selectively acquired properties where it can add value through management and leasing and has continued to develop properties at attractive risk-adjusted returns. The REID will continue its strategy of assembling portfolios in non-traditional real estate sectors that REID believes will become institutional property types, providing above market appreciation and total returns.
- The REID has been actively managing the portfolio with dispositions resulting in capital returned in excess of \$1.7 billion, and funding new investments of nearly \$2.2 billion over the past 12 months. The REID is also working with its advisors in executing the disposition of properties and realizing gains from the sale of assets at historically low capitalization rates.
- The REID has approximately \$1.3 billion in unfunded commitments. New commitments during the quarter include:
 - \$50 million to TPG Real Estate Partners III, LP, managed by TPG, will focus on developing real estate platforms that will perform various specific real estate strategies.
 - \$50 million to Ridgewood Water & Strategic Infrastructure Fund, managed by Ridgewood Infrastructure, to focus on water related infrastructure investments in North America, primarily the U.S.
 - \$44.4 million to Principal Separate Account, managed by Principal Real Estate Investors, for the joint venture development of a 4-story, 125,000 square foot Class A office building in Sunnyvale, CA.

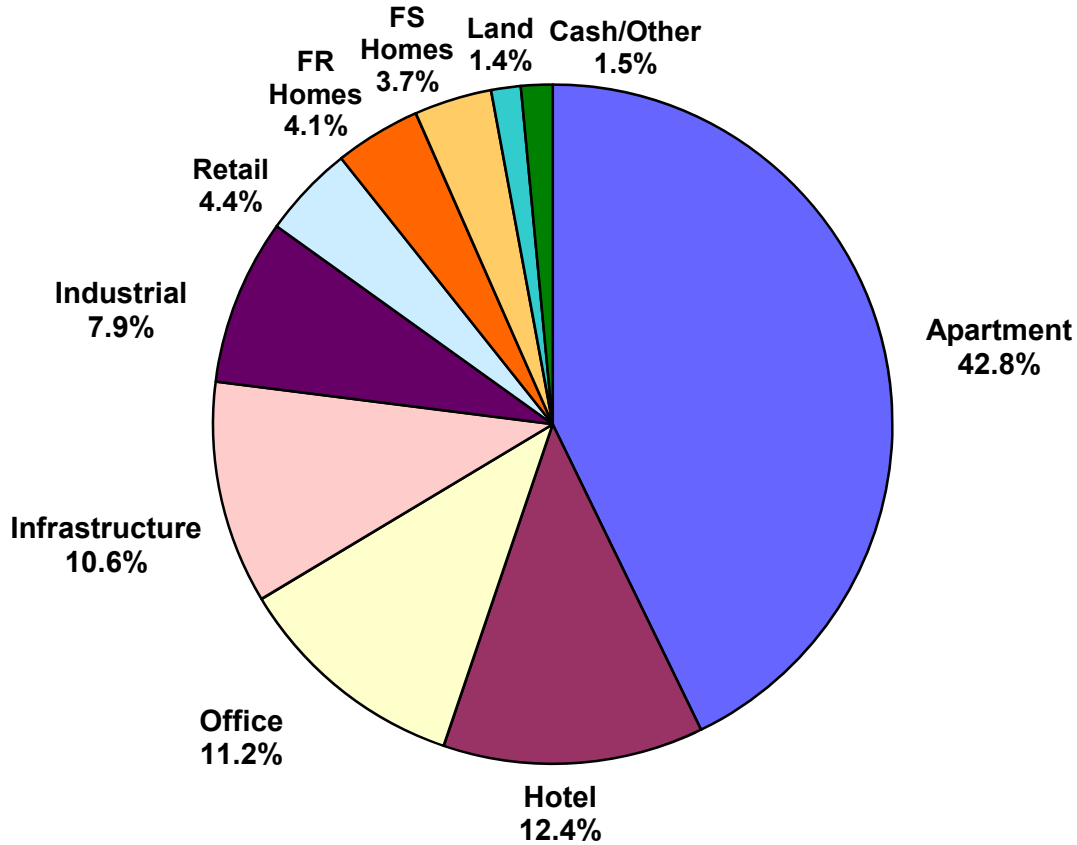
Market Environment

- Investor demand disparities within property types and within real estate markets continue to appear in sales volume and pricing data. Retail properties continue to be less attractive to investors as e-commerce sales continue to grow with investors instead favoring warehouse and apartments. Senior housing, student housing, data centers and medical office once considered niche are attracting more investor attention. Supply of new buildings in all property types, except retail, has increased in many markets and is beginning to raise concern from investors. However, a strong economy has kept demand for space high enough to absorb new supply. Additionally, lenders have become more selective in quality and location of the collateral and have been disciplined in their underwriting standards for construction lending. The cost of new construction in land, labor and materials has steadily increased, making it more difficult for developers to meet return thresholds.
- The passage of the U.S. tax reform bill is generally viewed as favorable to the real estate industry. Economic growth from companies increasing investment in their U.S. business operations would increase demand for office labor and industrial space. Real estate developers will benefit from a lower pass-through tax rate. The increase in the standard deduction could further delay apartment renters from purchasing a home.
- Fund flows to the infrastructure sector continue to remain strong, as investor interest in the asset class continues to grow. Opportunities include North American energy, power generation, European transportation, and emerging market fundamental infrastructure projects. The industry has gained attention from the new Federal Administration's intent on rebuilding U.S. infrastructure; however, details on legal and financial framework of Public Private Partnerships (P3) are limited and will take time to develop. A tight labor market for construction workers and political gridlock in Washington could inhibit timing of funding and completions.
- Tightening lending standards combined with heightened bank regulations after the global financial crisis have worked to constrain lending activity in many instances. Demand for private credit from non-traditional capital providers, particularly when a financial sponsor requires speed and certainty of execution is expected to continue to grow. Real estate credit in the U.S., Europe and Asia in various forms should continue to present opportunities. U.S. private credit has grown from \$159 billion in 2007 to \$415 billion in 2017.

SMRS

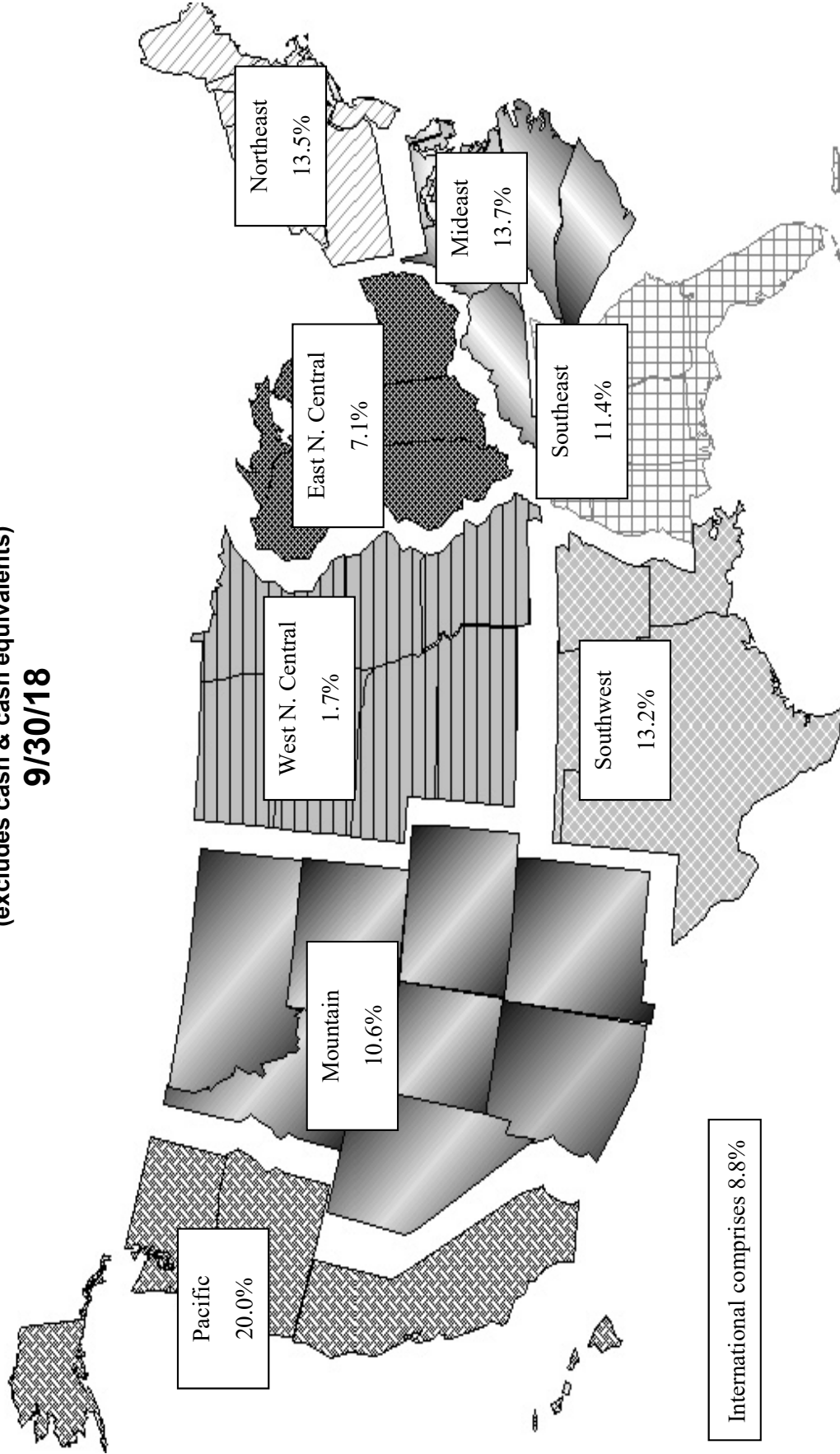
Real Estate and Infrastructure

9/30/18



Market Value in Millions				
	<u>9/30/18</u>		<u>9/30/17</u>	
Apartment	\$3,287	42.8%	\$2,101	32.0%
Hotel	956	12.4%	797	12.2%
Office	857	11.2%	1,131	17.3%
Infrastructure	816	10.6%	776	11.8%
Industrial	607	7.9%	537	8.2%
Retail	339	4.4%	314	4.8%
For Rent Homes	317	4.1%	331	5.1%
For Sale Homes	288	3.7%	374	5.7%
Land	108	1.4%	105	1.6%
	<u>\$7,575</u>	<u>98.5%</u>	<u>\$6,466</u>	<u>98.7%</u>
Cash/Other	113	1.5%	88	1.3%
Total Investments	<u>\$7,688</u>	<u>100.0%</u>	<u>\$6,554</u>	<u>100.0%</u>

SMRS
Real Estate by Region
Based on Market Value
(excludes cash & cash equivalents)
9/30/18



Geographic regions defined by NCREIF, whose property index composition is: Pacific 32.5%, Mountain 6.6%, West N. Central 1.3%, Southwest 10.6%, East N. Central 7.2%, Southeast 9.5%, Northeast 20.7%, Midwest 11.6%

SMRS
Real Estate and Infrastructure
9/30/18

**Top Ten
Advisors or Entity**

<u>Advisor or Entity</u>	<u>Market Value</u>
MWT Holdings LLC	\$ 2,536,681,707
Clarion Partners	670,478,104
Blackstone Group	518,025,621
Five Star Realty Partners LLC	359,125,655
Rialto Capital Management LLC	319,490,259
Principal Real Estate Investors	300,931,604
Domain Capital Advisors Inc	282,908,256
CIM Investment Advisors LLC	249,805,999
Transwestern Investment Management	204,074,598
Heitman Capital Management	202,744,801
	<u>\$ 5,644,266,604</u>

**Occupancy
by Property Type**

	Apartment	Office	Industrial	Retail	Hotel
SMRS Portfolio	94.5%	85.7%	92.3%	91.3%	71.2%
National Average	93.2%	87.0%	92.8%	95.6%	70.2%

SMRS
Market Values by Ownership Entity
9/30/18

REAL ESTATE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
801 Grand Avenue Capital, LLC	\$ 69,490,812	\$ 0
AEW Senior Housing III	2,586,195	2,043,169
Apollo Asia Real Estate Fund	16,908,271	58,186,813
Asana Partners Fund I	17,276,596	9,666,828
Avanath Affordable Housing I, LLC	23,807,575	0
Avanath Affordable Housing II, LLC	33,184,238	0
Avanath II SMRS Co-Investment Fund LLC	15,205,649	0
Avanath Affordable Housing III	26,326,394	33,820,867
Beacon Capital Strategic Ptnrs. IV, LP	19,486	0
Beacon Capital Strategic Ptnrs. V, LP	47,342	0
Blackstone R/E IH3 Co-Inv Partners	317,065,075	0
Blackstone R/E Partners V, LP	8,647,330	0
Blackstone R/E Partners VI, LP	8,963,818	3,680,930
Blackstone R/E Partners VIII, LP	49,189,835	36,352,818
Capri Select Income II	60,744	0
Capri Urban Investors, LLC	8,500,808	0
CIM Fund III, LP	39,537,052	0
CIM Fund VIII, L.P.	95,417,081	21,683,608
CIM Urban REIT, LLC	42,835,977	0
CIM VI (Urban REIT), LLC	30,354,761	0
Clarion Gables Multifamily Trust, LP	30,540,033	0
Columbus Circle Holdings, LLC	145,010,412	139,272,720
Crown Small Cap Real Estate	16,338,292	8,375,000
Domain GVA-1, LLC	69,416,751	4,576,542
Domain Hotel Properties, LLC	428,758,616	0
Gateway Capital Real Estate Fund II, LP	36,850,922	0
Great Lakes Property Group Trust	67,997,313	10,000,000
Heitman Credit	24,830,829	0
IMRF II CoInvest Spiga LP	13,688,341	4,290,943
Invesco Mortgage Recovery Feeder Fund	5,163,476	0
Invesco Mortgage Recovery Fund II, L.P.	37,796,815	14,107,874
IPF II Co-Invest Cayman LP	29,233,135	2,710,897
JBC Funds North LaSalle LLC	18,440,210	0
JBC Opportunity Fund III, LP	495,673	0
JP Morgan India Property Fund II, LLC	33,108,228	3,576,116
KBS/SM Fund III, LP	48,956,772	0
KBS/SM Fund IV	84,095	0
L-A Saturn Acquisition	28,542,772	0
Landmark Real Estate Partners V, LP	9,830,880	0
LaSalle Asia Opportunity Fund II, LP	277,320	0
LaSalle Asia Opportunity Fund III, LP	1,705,280	0
Lion Industrial Trust	204,573,227	0
Lion Mexico Fund, LP	6,606,228	0

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Lombard GVA0016 (former AGL Annuity)	363,558,680	0
Lone Star Fund X LP	95,908,350	109,663,793
Lubert-Adler Real Estate Fund VII, LP	66,782,761	6,222,826
M1 Westgate CoInvest LLC	18,398,066	0
M301W CoInvest LLC	23,263,062	0
MERS Acquisitions Ltd.	163,229,827	27,000,000
MG Alliance, LLC	122,385	0
MIP Holdco LLC	126,876,972	38,300,000
MSREF V - International	2,673,693	0
MSREF VI - International	4,550,493	0
MSRESS Fund III Institutional LP	18,832,284	0
MWT Holdings, LLC	2,536,681,707	0
Northpark Land Associates	32,181,888	6,670,100
Orange Investors LLC	177,004,447	0
Paladin Realty Brazil Investors III (USA), LP	19,284,057	0
Paladin Realty Latin America Investors IV-CI, LP	41,332,771	5,393,701
Paladin Realty TB COINV V LP	10,413,657	0
Penmain Office LLC	36,299,204	0
* Principal Separate Account	231,440,792	92,212,993
Proprium RE Spec. Situations Fund, LP	53,681,039	23,799,884
Rialto Absolute Partnership I	75,231,847	0
Rialto Credit Partshp LP	112,371,051	157,255,036
Rialto Real Estate Fund, LP	20,541,593	0
Rialto Real Estate Fund II, LP	38,924,712	0
Rialto Real Estate Fund III-Debt, LP	29,876,905	26,063,270
Rialto Real Estate Fund III-Property, LP	13,574,604	29,315,069
Rialto Mezzanine Partners Fund	28,969,547	0
SM Brell II LP	29,853,627	0
Stockbridge RE Fund II-C, LP	26,013,310	0
Strategic LP	18,704,521	0
Strategic II LLC	270,000	50,000,000
TPG RE Finance Trust Inc. (TRTX)	96,581,325	0
TPG Real Estate Partners II	27,875,355	15,678,032
* TPG Real Estate Partners III, LP	0	50,000,000
TSP Spartan C-I LLC	2,160,863	0
TSP Spartan C-II LLC	18,514,008	0
TSP Value and Income Fund LP	30,404,758	4,843,982
TSP Value and Income Fund II, LP	26,117,997	7,541,035
True North High Yield Invest. Fund II, LLC	5,718,369	0
True North Real Estate Fund III, LLC	45,816,876	9,348,297
Venture Center, LLC	787,140	0
Western National Realty Fund II, LP	22,226,504	0
	<u>\$ 6,756,721,710</u>	<u>\$ 1,011,653,143</u>
Short-Term Investments and Other	92,359,246	0
Total Real Estate Investments	<u>\$ 6,849,080,956</u>	<u>\$ 1,011,653,143</u>

* New or additional commitment made during the quarter reported

SMRS
Market Values by Ownership Entity
9/30/18

INFRASTRUCTURE

	Market Value	Unfunded Commitment
Arclight Energy Partners VI, LP	\$ 41,762,709	\$ 9,081,559
ASF VI Infrastructure B LP	19,276,803	14,864,229
ASF VII Infrastructure Fund B L.P.	1,562,043	27,892,271
ASF Como Co-Investment LP	5,841,847	13,593,775
Basalt Infrastructure Partners, LP (Balfour Beatty)	46,159,977	2,219,047
Blackstone Energy Partners, LP	54,293,345	4,702,610
Blackstone Energy Partners II, LP	51,101,376	43,063,429
Brookfield Infrastructure Fund II-B, L.P.	52,571,873	5,165,953
Customized Infrastructure Strategies, LP	50,818,086	5,661,912
Dalmore Capital Fund	64,707,821	0
GCM Grosvenor Infrastructure Investment Program, L.P. (CSG)	62,288,661	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	42,114,844	19,238,579
Global E&P Infrastructure Fund II L.P. (formerly First Reserve)	43,856,901	23,567,819
GSO Energy Select Opportunities Fund LP	28,764,842	27,077,307
JPMorgan AIRRO India SideCar Fund US, LLC	86,553,690	3,187,421
JPMorgan Asian Infra. & Rel. Res. Opp Fund II	11,402,235	7,440,094
KKR Eagle CoInvest L.P.	36,422,938	1,853,268
KKR Global Infrastructure Investors, LP	41,949,297	4,182,224
* Ridgewood Water & Strategic Infrastructure Fund LP	0	50,000,000
RPEP SMRS Infra II, LLC	12,470,345	500,000
StonePeak Infrastructure Fund LP	62,452,460	12,661,026
	<u>\$ 816,372,093</u>	<u>\$ 275,952,523</u>
Short-Term Investments and Other	22,865,583	0
Total Infrastructure Investments	<u>\$ 839,237,676</u>	<u>\$ 275,952,523</u>
 TOTAL INVESTMENTS	 <u>\$ 7,688,318,632</u>	 <u>\$ 1,287,605,666</u>

State of Michigan Retirement Systems

BASKET CLAUSE REVIEW

State of Michigan Investment Board Meeting
December 11, 2018



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

SMRS

Basket Clause Investments

9/30/18

<u>Asset Class</u>	<u>Value</u>
Total Absolute Return	\$4,043,724,162
Total Real Return and Opportunistic	937,558,594
Total International Equity	325,635,525
Total Fixed Income	<u>42,194,095</u>
Total Basket Clause Investments	<u>\$5,349,112,376</u>

The basket clause investments at September 30, 2018, were \$5.3 billion or 7.3% of the total portfolio value of \$73.1 billion.

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

Disclaimer



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

State of Michigan Retirement Systems

EXECUTIVE ORDER 2018-10

State of Michigan Investment Board Meeting
December 11, 2018



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments



STATE OF MICHIGAN
EXECUTIVE OFFICE
LANSING

RICK SNYDER
GOVERNOR

BRIAN CALLEY
LT. GOVERNOR

EXECUTIVE ORDER

No. 2018-10

DEPARTMENT OF TREASURY

CREATION OF THE STATE OF MICHIGAN INVESTMENT BOARD

ABOLISHMENT OF THE INVESTMENT ADVISORY COMMITTEE

EXECUTIVE REORGANIZATION

WHEREAS, Article V, Section 1 of the Michigan Constitution of 1963 vests the executive power in the Governor; and

WHEREAS, Article V, Section 2 of the Michigan Constitution of 1963 empowers the Governor to make changes in the organization of the Executive Branch or in the assignment of functions among its units which he considers necessary for efficient administration; and

WHEREAS, Article V, Section 8 of the Michigan Constitution of 1963 provides that each principal department shall be under the supervision of the Governor, unless otherwise provided by the Constitution; and

WHEREAS, there is a continued need to reorganize functions among state departments to ensure efficient administration; and

WHEREAS, Section 91 of the Executive Organization Act of 1965, 1965 PA 380, as amended, MCL 16.191, provides the State Treasurer with investment control over assets of certain public retirement systems in this State and established an investment advisory committee to review and make recommendations to the State Treasurer regarding investments, goals, and objectives of those retirement funds; and

WHEREAS, the State Treasurer is the sole fiduciary of, and has investment authority for, the Michigan Public School Employees' Retirement System, the Michigan State Police Retirement System and the Michigan Judges Retirement System pursuant to the Public School Employees Retirement Act of 1979, 1980 PA 300, as amended, MCL 38.1301 *et seq.*, the State Police Retirement Act of 1986, 1986 PA 182, as

amended, MCL 38.1601 *et seq.*, and the Judges Retirement Act of 1992, 1992 PA 234, as amended, MCL 38.2101 *et seq.*, respectively, and the State Treasurer is the sole custodian of the State Employees' Retirement System, pursuant to the State Employees' Retirement Act, 1943 PA 240, as amended, MCL 38.1 *et seq.*; and

WHEREAS, the State Treasurer is authorized to invest the assets of those retirement systems in accordance with provisions of the Public Employee Retirement System Investment Act, 1965 PA 314, as amended, MCL 38.1132 *et seq.*; and

WHEREAS, the Public Employee Retirement Health Care Funding Act, 2010 PA 77, as amended, MCL 38.2731 *et seq.*, provides that the State Treasurer is the investment fiduciary for the irrevocable trusts that prefund retiree health care benefits for the Tier 1 Plans; and

WHEREAS, the State Treasurer is responsible for the administration and investment of this State's deferred compensation plan under 1976 PA 306, as amended MCL 38.1151; and

WHEREAS, the Public School Employees Retirement Act of 1979, 1980 PA 300, as amended, MCL 38.1301 *et seq.*; the Judges Retirement Act of 1992, 1992 PA 234, as amended, MCL 38.2101 *et seq.*; the State Employees' Retirement Act, 1943 PA 240, as amended, MCL 38.1 *et seq.*; and the Michigan Legislative Retirement System Act, 1957 PA 261, as amended, MCL 38.1001 *et seq.* provide that the State Treasurer is responsible for administering, investing assets, and determining the provisions and procedures of Tier 2 Plans for the Michigan Public School Employees' Retirement System, Michigan Judges Retirement System, State Employees' Retirement System, and the Michigan Legislative Retirement System, respectively; and

WHEREAS, Executive Reorganization Order No. 1996-5, MCL 38.1171, transferred the responsibility for this State's deferred compensation plans to the State Treasurer and Executive Reorganization Order No. 1999-5, MCL 38.2721, transferred certain duties to the Department of Management and Budget while providing the State Treasurer with the responsibility for approving the investment offerings provided in the Tier 2 Plans and this State's deferred compensation plans; and

WHEREAS, it is critical to the best interests of the members of the Retirement System and participating plans that their fiduciaries be held to the highest ethical standards, free of conflicts of interest and political influence; and

WHEREAS, the Investment Advisory Committee, established in 1965, has retained the same structure and governance since its establishment despite the growing

importance that prudent investment plays in providing appropriate funding for retirees and the increasing complexity of investment and financial markets; and

WHEREAS, the creation of the State of Michigan Investment Board will allow the Retirement System to modernize its governance structure to further align with accepted public pension and retirement plan administration best practices to ensure that the assets of the Retirement System are overseen by a fiduciary that is held to the utmost ethical standards, is free of conflicts of interest, operates with discipline, is consistent in its investment strategy and administration, and is able to fulfill its duties to protect the interests of the members of the Retirement System; and

WHEREAS, creating the State of Michigan Investment Board will strengthen fiduciary management and modernize oversight of the Retirement System, thus bolstering accountability and transparency of board members, the fiduciary, and investment staff to the Retirement System.

NOW, THEREFORE, I, Richard D. Snyder, Governor of the state of Michigan, pursuant to the powers vested in me by the Michigan Constitution of 1963 and Michigan law, order the following:

I. DEFINITIONS

As used in this Order:

A. "Act 314" means the Public Employee Retirement System Investment Act, 1965 PA 314, as amended, MCL 38.1132 *et seq.*

B. "Authorizing Statutes" means any public act, resolution, order or agreement which conveys upon the State Treasurer the authority or duty to invest the assets or monies of the Retirement System.

C. "Board" means the State of Michigan Investment Board created in Section II of this Order.

D. "Bureau of Investments" means the bureau within the Department charged with investing the assets of the Retirement System in accordance with Act 314 and the Authorizing Statutes.

E. "Chief Investment Officer" means the individual appointed by the State Treasurer, in consultation with the Board, and shall be part of the classified civil service and manage the day-to-day functions of the Bureau of Investments, including executing investments and delegating authority to execute the proper and efficient investment of funds of this State pursuant to state statutes.

F. "Defined Contribution Plans" or "DC Plans" means the Tier 2 Plans, as defined in this Order, and 457 deferred compensation retirement plans established pursuant to 1976 PA 306, as amended, MCL 38.1151.

G. "Department" means the principal department of state government created as the Department of Treasury by Section 75 of the Executive Organization Act of 1965, 1965 PA 380, MCL 16.175.

H. "Investment Advisory Committee" means the investment advisory committee established pursuant to Section 91 of the Executive Organization Act of 1965, 1965 PA 380, MCL 16.191, as abolished by this Order.

I. "Military Retirement System" means the retirement allowance, pension, or other retirement benefits provided under the Michigan Military Act, 1967 PA 150, as amended, MCL 32.501 *et seq.*, and further governed by Executive Reorganization Order No. 2015-4, MCL 38.1174.

J. "OPEB" means other post-employment benefits, which in this context are the irrevocable trusts that prefund retiree health care benefits for the Tier 1 Plans and in which the State Treasurer is appointed as investment fiduciary pursuant to the Public Employee Retirement Health Care Funding Act, 2010 PA 77, as amended, MCL 38.2731 *et seq.*

K. "Retirement System" means the Tier 1 Plans, Tier 2 Plans, the Military Retirement System, DC Plans, and OPEB, for all of which the State Treasurer is either the fiduciary or has investment authority.

L. "State Budget Director" means the individual appointed by the Governor pursuant to Section 321 of the Management and Budget Act, 1984 PA 431, MCL 18.1321.

M. "State Treasurer" means the individual appointed by the Governor as director of the Department.

N. "Tier 1 Plans" means the defined benefit retirement plans of the Michigan Public School Employees' Retirement System created by the Public School Employees Retirement Act of 1979, 1980 PA 300, as amended, MCL 38.1301 *et seq.*, the State Employees' Retirement System created by the State Employees' Retirement Act, 1943 PA 240, as amended, MCL 38.1 *et seq.*, the Michigan State Police Retirement System, created by the State Police Retirement Act of 1986, 1986 PA 182, as amended, MCL 38.1601 *et seq.*, and the Michigan Judges Retirement System created by the Judges Retirement Act of 1992, 1992 PA 234, as amended, MCL 38.2101 *et seq.*

O. "Tier 2 Plans" means the Tier 2 retirement plans established pursuant to section 401(k) or section 457 of the Internal Revenue Code, and provided for in applicable portions of the Michigan Public School Employees' Retirement System under the Public School Employees Retirement Act of 1979, 1980 PA 300, as amended, MCL 38.1301 *et seq.*, the Michigan Judges Retirement System under the Judges Retirement Act of 1992, 1992 PA 234, as amended, MCL 38.2101 *et seq.*, the State Employees' Retirement System under the State Employees' Retirement Act, 1943 PA 240, as amended, MCL 38.1 *et seq.*, the Michigan Legislative Retirement System under the Michigan Legislative Retirement System Act, 1957 PA 261, as amended, MCL 38.1001 *et seq.*, and on behalf of other eligible state or local entities or authorities as provided for by current and subsequent state law, and for which the State Treasurer has the responsibility of investing assets of and determining the provisions and procedures.

II. CREATION OF THE STATE OF MICHIGAN INVESTMENT BOARD

A. The State of Michigan Investment Board is created within the Department. The Board shall be the investment fiduciary with respect to the investment and function of the Retirement System for which the State Treasurer currently has fiduciary responsibilities or investment authority. All statutory powers, duties, functions, and responsibilities of the State Treasurer created under Act 314 or the Authorizing Statutes are transferred to the Board. All statutory powers, duties, functions, and responsibilities of the Investment Advisory Committee created under Section 91 of 1965 PA 380, MCL 16.191, are transferred to the Board. The Investment Advisory Committee is abolished.

B. The Board consists of the following five individuals:

1. The State Treasurer, who shall serve without designee and shall serve as the Board's chairperson.
2. The State Budget Director who shall serve without designee.
3. Three individuals appointed by the Governor who shall have knowledge or experience in securities investment, pension administration, or pension law, past or current fiduciary oversight experience of investment pools similar to the Retirement System, or extensive professional financial knowledge and experience. An individual appointed to serve on the Board, or such individual's spouse or other immediate family-member, shall not be employed by or otherwise receive compensation directly or indirectly from an entity engaged by the Retirement System or the Bureau of Investments. The appointed members of the Board are subject to all restrictions and limitations with respect to eligibility and appointment described in this Order.

C. The appointed members shall serve a term of four years, except initially, one member shall be appointed to a two-year term, one member shall be appointed to a three-year term, and one member shall be appointed to a four-year term. A member of the Board may be appointed to no more than two consecutive four-year terms, in addition to one partial term. A member may serve until his or her successor is appointed. A member shall not serve more than 10 years.

D. A vacancy in the membership of the Board shall be filled by appointment by the Governor in accordance with this Order for the remainder of the unexpired term. A vacancy automatically occurs by death, resignation, failure of the member to attend three consecutive meetings unless excused by majority vote of the other Board members, or in the event of either a conflict of interest uncured within 30 days or a member's failure to duly execute the ethics policy adopted by the Board.

E. An individual is not eligible for appointment to the Board, and any member currently serving is removed automatically, if any of the following apply to that individual:

1. The individual has been indicted or charged with, convicted of, pleaded guilty or nolo contendere to, or forfeited bail concerning, a felony, or a misdemeanor involving fraud, theft, or dishonesty under the laws of any jurisdiction in the United States;
2. The individual has had a judgment entered against him or her by a court of competent jurisdiction in a civil matter involving a breach of fiduciary duties;
3. The individual has been the subject of an adverse action by the Securities and Exchange Commission which resulted in any settlement, sanction, payment of a fine, injunction, or other negative finding, whether individually, or as a partner, principal member, managing director, or other position of leadership of any entity subject to such penalty or finding;
4. The individual, or their spouse or an immediate family-member, is or becomes employed by a service provider to the Retirement System or Bureau of Investments; or
5. The individual, or their spouse or an immediate family-member: is an endorser or obligor, or provider of surety, for any money loaned to or borrowed from the Retirement System; or, is borrowing any of the money or other assets of the Retirement System.

F. The Board shall conduct its business at public meetings in compliance with the Open Meetings Act, 1976 PA 267, MCL 15.261 *et seq.*

1. Members of the Board may attend and participate in a meeting of the Board using telecommunication or other electronic equipment provided all members of the Board, and the public attending the meeting, are able to hear one another and can communicate effectively and that the members of the Board and the public can actively participate in the open meeting.

2. If the State Treasurer, as chairperson, attends a meeting of the Board through electronic means or is unable to attend a meeting, the State Treasurer shall appoint, from the members physically present at such meeting, a member of the Board to serve as chairperson of that meeting only. This appointment as chairperson shall be limited in scope to allow for the administration of the meeting, surviving only for that particular meeting and terminate immediately upon adjournment.

G. The members of the Board shall serve without compensation but may receive reasonable reimbursement for all actual necessary travel and expenses incurred to attend official Board meetings.

H. The members of the Board shall meet quarterly to:

1. Conduct the official business of the Board, pursuant to its fiduciary duties, Act 314, and this Order;

2. Review investment reports and monitor investment performance;

3. Approve an investment policy statement for the Retirement System, to be signed by the State Treasurer as chairperson, in which the Board delegates appropriate authorities and powers as it deems necessary;

4. As required by this Order, approve the asset allocation targets of the Tier 1 Plans and OPEB approximately every two (2) years; and

5. Review the investment performance of the DC Plans, which information shall be incorporated into the quarterly information.

I. The Board may meet at other times at the request of the State Treasurer as the chairperson of the Board.

J. Members of the Board shall not individually meet with any manager, broker, consultant, investment manager, or other provider of investment related services that has, or reasonably may be in a position to have, business with the Board for the purpose of discussing matters related to official Board business without approval of a majority of members of the Board. However, the State Treasurer, as chairperson, shall be permitted to meet with service providers or potential service providers.

K. Upon approval by the Board, the State Treasurer, as chairperson, may directly or indirectly invest the Retirement System assets.

L. The Board shall approve and adopt a set of ethics rules and code of conduct applicable to its members, with periodic updates to be approved as deemed necessary by the Board, and to be signed by the State Treasurer as chairperson of the Board. The Bureau of Investments' staff shall cause the current approved and adopted ethics rules and code of conduct to be posted to the Bureau of Investments' public website.

M. The Board shall provide each of its members with copies of the Board's ethics rules and code of conduct, current investment policy statement(s), policies and procedures applicable to Board meetings, statutes, administrative rules and expectations governing public meetings in this State, and any other matters that are central to membership on the Board. Each Board member shall, within 14 days of receiving this information, certify and sign an attestation of their receipt and acknowledgement of information presented. The Bureau of Investments' staff shall publish or cause to be published each certification to the Bureau of Investments' public website.

N. When a vacancy occurs in the position of Chief Investment Officer, the State Treasurer, in consultation with the Board, shall appoint a Chief Investment Officer to manage and direct the day-to-day investment and administrative management functions of the Bureau of Investments. The Chief Investment Officer shall be part of the classified civil service.

III. ADDITIONAL RESPONSIBILITIES OF BOARD

A. The Board shall act as the investment fiduciary and custodian of the Retirement System's assets.

B. The Board shall cause the Bureau of Investments to invest, reinvest, assign, reassign, sell, transfer, and manage the investment funds and portfolios of the Retirement System.

C. The Board may solicit proxies in connection with contests for corporate control of corporations in which the Retirement System has made an investment; use nominees to facilitate transfers; and take any other action necessary and prudent in the investment of the Retirement System's assets pursuant to this Order, Act 314, and as may otherwise be authorized under the laws of this State.

D. The Board shall approve any changes to the investment manager lineup of the DC plans based on the recommendation of the Bureau of Investments, working in consultation with the Office of Retirement Services. The Office of Retirement Services shall have the exclusive responsibility to execute or sign any agreement with the DC Plan's investment managers.

E. As it relates to this Order, any authority, duties, and obligations under Act 314 shall be exercised only by the Board.

F. The Board has the exclusive authority, right, duty, or obligation to perform the following:

1. Act in accordance with the fiduciary duties prescribed to the Board as custodian and investment fiduciary of the Retirement System's assets;
2. Cause the investment and reinvestment of the Retirement System's assets, through the Bureau of Investments, in accordance with the provisions and standards of Act 314 and the Authorizing Statutes; and
3. Sue and be sued in its own name and be responsible for instituting or defending against legal proceedings arising out of the investment of the Retirement System's assets.

G. In addition to any other rights, responsibilities, powers, and duties granted by law, the Board shall have the exclusive right to cause the Bureau of Investments to perform the following:

1. Collect the principal and interest or other income and dividends of investments when due and payable, and pay the principal and interest or other income and dividends, when so collected, into the appropriate fund as directed by the applicable Authorizing Statutes;
2. Invest and reinvest the Retirement System's assets in any manner provided for in Act 314 and the Authorizing Statutes;

3. Account for all principal, interest, other income and dividends, and expenses of and related to investment of the Retirement System's assets and other funds that the Board invests;
4. Expend appropriated funds from investment income to support the investment of and accounting for the Retirement System's assets, and for all other support purposes necessary to the activities of the Board; including the payment of professional development and licensing expenses or professional dues for the employees of the Bureau of Investments;
5. Exercise any shareholder or other voting rights arising from an investment;
6. Exercise any other right or action or fulfill any obligations necessary to accomplish the Board's mission or comply with the laws of this State and this Order;
7. Negotiate with, select, and retain: investment managers and service providers; portfolio systems services; consultants; investment information resources; and any other sources of expertise, research, or services necessary to conduct investment activities, protect the assets of the Retirement System, or to otherwise support the management of assets of the Retirement System; and
8. Perform necessary due diligence to source new investment opportunities and monitor existing investments, which may include on-site meetings with current or potential investment managers and investment funds, on-site inspection of physical assets, or on-site investor meetings necessary for the proper management of the assets of the Retirement System.

IV. ADDITIONAL FIDUCIARY RESPONSIBILITIES OF THE BOARD

A. The Board is authorized to invest and to cause the Bureau of Investments to invest the Retirement System's assets, in accordance with the fiduciary duties pursuant to Act 314, and in accordance with state and federal law, rules, and regulations and any applicable resolution, contract, or memorandum of understanding. The authority to invest the assets of the Retirement System includes the exclusive power to execute all contracts, agreements, or other such legal documents necessary to effectuate the investment of funds or implementation of any portfolio management system, and the authority to delegate all applicable powers and duties to the Bureau of

Investments, as the Board deems necessary, to prudently manage the assets of the Retirement System.

B. The Board is the custodian of the assets of the Military Retirement System and is responsible for investing its assets in accordance with state and federal law.

V. ADDITIONAL ADMINISTRATION ISSUES RELATED OF THE BOARD AND BUREAU OF INVESTMENTS

A. In addition to the limitations contained in Section 13e of Act 314, as amended, MCL 38.1133e, the Board shall be prohibited from paying any fees, including contingency fee arrangements, or any other remuneration, directly or indirectly and whether from the Retirement System's assets or otherwise, to service providers if such service provider or a covered associate of a service provider made a contribution in the immediately preceding 36-calendar-month period to an incumbent or candidate of an elected office within the executive branch or a principal department of this State. The Board may implement this limitation through policies, procedures, or otherwise as it deems appropriate. The terms "service provider" and "covered associate of the service provider" shall have the same meanings afforded to each in MCL 38.1133e.

B. The Tier 1 Plans, the Military Retirement System, and OPEB shall be referred to as the "State of Michigan Retirement System" for purposes of any and all investments, agreements, contracts, certificates, or such other documents entered into in conjunction with any transaction or business, or in connection with the exercise of the Board's powers and authority pursuant to the Authorizing Statutes or this Order. Any and all investments, agreements, contracts, certificates, or such other documents executed under the name "State Treasurer of the State of Michigan, Custodian of the Michigan Public School Employees' Retirement System, State Employees' Retirement System, Michigan State Police Retirement System, and Michigan Judges Retirement System" or other similar name associated with the federal tax identification number 38-2836023 are, or shall remain, duly authorized and in force under such name. Nothing in this section shall be construed to transfer any assets of the Tier 1 Plans, the Military Retirement System, or OPEB to any successor trust or trustee.

C. Bureau of Investment staff shall present information to the Board at its regular quarterly meeting, including updated asset allocation targets and ranges for the Tier 1 Plans and OPEB approximately every two years, contingent upon market, regulatory, legal or other applicable circumstances related to the Retirement System's investable assets. Bureau of Investment staff shall also present information related to the quarterly investment performance of the DC Plans to the Board at its regular quarterly meetings.

VI. MISCELLANEOUS


A. All rules, orders, contracts, plans, investments, and agreements relating to the functions transferred by this Order lawfully adopted or executed before the effective date of this Order shall continue to be effective unless and until revised, amended, or rescinded.

B. Any suit, action, or other proceeding lawfully commenced by or against any department identified in Section I of this Order before the effective date of this Order shall not abate by reason of the taking effect of this Order. Any lawfully commenced suit, action, or other proceeding may be maintained by, against, or before the appropriate successor of any entity affected by this Order.

C. The invalidity of any portion of this Order shall not affect the validity of the remainder of the Order, which may be given effect without any invalid portion. Any portion of this Order found invalid by a court or other entity with proper jurisdiction shall be severable from the remaining portions of this Order.

In fulfillment of the requirements of Section 2 of Article V of the Michigan Constitution of 1963, this Order shall be effective 60 days after the filing of this Order.

Given under my hand and the Great Seal of the state of Michigan this 27th day of September, in the Year of our Lord Two Thousand Eighteen


RICHARD D. SNYDER
GOVERNOR

BY THE GOVERNOR:


SECRETARY OF STATE



FILED WITH SECRETARY OF STATE

ON 9/27/18 AT 10:04 A.M.