

INVESTMENT ADVISORY COMMITTEE MEETING

March 8, 2018

State of Michigan Retirement Systems

Quarterly Investment Review



Nick A. Khouri, State Treasurer

Prepared by Bureau of Investments
Michigan Department of Treasury

INVESTMENT ADVISORY COMMITTEE MEETING

MARCH 8, 2018

Agenda



- 9:30 a.m. Call to Order and Opening Remarks
- 9:40 a.m. Approval of the 12/12/17 IAC Meeting Minutes
- 9:45 a.m. Executive Summary & Performance for Periods Ending 12/31/17
- 10:00 a.m. Current Asset Allocation Review
Markets Review and Outlook
- 10:15 a.m. Guest Speaker: *Mike Collins, Senior Portfolio Manager
PGIM Fixed Income*
- 10:45 a.m. Review of Investment Reports
- Fixed Income
 - Real Estate & Infrastructure – *Receive and File*
 - Absolute and Real Return/Opportunistic – *Receive and File*
 - Private Equity – *Receive and File*
 - Domestic Equity – *Receive and File*
 - International Equity – *Receive and File*
- Basket Clause – *Receive and File*
- 11:00 a.m. Closing Remarks ~ Adjournment



2018 Meeting Schedule

Thursday, March 8, 2018
Thursday, June 14, 2018 ~ NEW DATE
Thursday, September 6, 2018
Tuesday, December 11, 2018

All meetings start at 9:30 a.m.

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State of Michigan Retirement Systems

MINUTES

Investment Advisory Committee Meeting

March 8, 2018



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

INVESTMENT ADVISORY COMMITTEE

The Investment Advisory Committee (IAC) held its quarterly meeting on Tuesday, December 12, 2017, at the Bureau of Investments, Great Lakes Conference Room, 2501 Coolidge Road, Suite 400, East Lansing, Michigan.

Members Present:

James Nicholson, Chairman
Reginald G. Sanders
Kerrie Vanden Bosch, ORS
Allan Pohl, LARA
L. Erik Lundberg

In attendance from the Department of Treasury:

Treasurer Nick Khouri
Gregory J. Parker
Jack Behar
Dan Quigley
Ann Stange
Ann Storberg
Semone James Howes
Lori Barrett
Marge McPhee
Matt Hutson

Jon M. Braeutigam
Jim Elkins
Brian Liikala
Travis Haney
Tim Reynolds
Karen Stout
Mark Porrell
Annette Russell
Janet Sudac

Robert Brackenbury
Peter Woodford
Patrick Moraniec
Woody Tyler
Giles Feldpausch
Lee Logan
Barb Becker
Lan Chen
Ryan Rathman

Others in attendance:

Max Kotary
Molly Jason
Todd Sinclair
Cody Collier

Tim McEnery
Dick Holcomb
Joe Curtin

Steve Cummings
Paul Lerg
Jason Diotte

Call to Order

State Treasurer, Nick Khouri called the December 12, 2017, IAC meeting to order at 9:50 a.m., requesting that Mr. Reginald Sanders act as Chair until Mr. James Nicholson arrived. Snowy road conditions caused a number of traffic delays.

Approval of the September 7, 2017, Minutes

- Mr. Sanders asked for a motion to approve the minutes of the September 7, 2017, IAC meeting. Mr. Allan Pohl so moved, the motion was seconded by Ms. Kerrie Vanden Bosch, there were no objections – motion carried.

Executive Summary Tab – Performance Review – Mr. Jon Braeutigam

- Mr. Braeutigam thanked the BOI staff for their daily efforts to generate positive returns. Mr. Braeutigam noted that the excess returns were consistently generated over all time periods, the one, three, five, seven, and ten years.
- Mr. Braeutigam stated that for the one year, the plan was 110 basis points (bps) over peers, the five year approximately 130 bps, and the ten year narrowed a little bit to 50 bps. That 50 bps over the ten years added approximately \$5 billion in value above and beyond what peer returns would have earned.
- Mr. Braeutigam believes that much of the outperformance of the plan was driven by staff selectivity.

Performance and Asset Allocation Tabs – Mr. Greg Parker

- Mr. Parker noted that the performance for the past five and seven years is one of the best rankings against peers. He also noted that over the past three and five years, the plan has the lowest measure of volatility compared to peers, which results in good returns without a lot of risk.
- Mr. Parker explained that across almost all asset classes, the plan is meeting or exceeding the peers as well as the benchmark.
- Mr. Parker mentioned that risk needs to be taken in order for the plan to beat the actuarial rate of return. The two principal risks are equity and liquidity. Liquidity to insure that the net benefit payments are made; and that unfunded commitment obligations are met.
- Mr. Parker explained that within capital markets, the markets are pricing at nearly 100% certainty of an additional December 2017 rate hike with the Federal Reserve. There is also a 70% probability of an additional rate hike in March 2018.
- Mr. Parker further noted that the two-year Treasury is at its highest since 2008.

Fixed Income Review – Mr. Daniel Quigley

- Mr. Quigley stated that on a relative basis, performance has been strong across all time periods.
- Mr. Quigley explained the flattening yield curve, this is when the spread between the two and ten-year Treasury is below 60 bps. He noted that unless the long end starts to increase in rates there will continue to be a flat or averted yield curve.
- Mr. Quigley further noted that there is some transparency from the Feds for their plans should the economy remain strong.

Domestic Equity Review – Mr. Jack Behar

- Mr. Behar stated that domestic equity had a strong twelve months as of September 30, outperforming the S&P 1500 by 130 bps and the State Street Peer Group by 140 bps. This performance is persisting on a year-to-date basis. He further explained that performance has edged ahead of the S&P 1500 on a five-year basis, and performance relative to peers has been strong on a one, three, five, and seven-year basis.
- Mr. Behar discussed the cost structure of the plan noting that the outperformance of the plan is due in part to the low fees paid. Mr. Behar believes in active management at index-like fees and that is how the portfolio is positioned.
- Mr. Behar explained that the externally managed portfolio has been successful over the past year, outperforming the index by 50 bps. The internally managed portfolio outperformed the index by 240 bps.

International Equity Division – Patrick Moraniec

- Mr. Moraniec stated that the International Equity Division portfolio outperformed the benchmark by 1.4% over the last twelve months. The primary drivers of this outperformance include exposure to emerging markets, Japan, and small cap stocks.
- Emerging markets have performed well year-to-date up 32%. Commodity prices are up approximately 43% since the January 2016 low, and the U.S. dollar has weakened 9% through September 2017.
- Small capitalization stocks contributed approximately 30 bps to the performance of the division.
- Effissimo Capital Management has performed well. Effissimo provided a 37% return which is greater than the 21% achieved by the MSCI Japan during that same time period.
- Mr. Moraniec explained that the ten-year blended International government yield of 1.8% implies an international equity risk premium of 7.3%. International bond rates are significantly lower than the U.S. ten-year rate of 2.3%.

Private Equity Division – Mr. Travis Haney

- Mr. Haney explained that the Private Equity Division returned approximately \$233 million, net of contributions, to the pension fund for the twelve months ending September 30 versus \$910 million for the same period one year prior.
- Mr. Haney stated that the five, seven, and ten-year returns looked great relative to peers. Additionally, there is an expectation that over the next twelve to eighteen months the ten-year number should increase as the negative returns roll off from 2008/2009.

- Mr. Haney stated that despite increased activity in software and technology, the Private Equity portfolio remains slightly under-exposed to the tech sector versus the S&P 500. This, in combination with the higher growth, high recurring revenue, low capex, and high free cash flow conversion characteristics of the target companies, is why the Private Equity Division continues to make commitments in the space.

Real Estate and Infrastructure Division – Mr. Brian Liikala

- Mr. Liikala discussed the performance explaining that the total one-year annualized return is 8% while the NCREIF is at 5.5%.
- Mr. Liikala explained the differences between what the plan has implemented and the benchmark, which is the underweight of retail and office, and the overweight of apartments and hotels. These strategies have been positive for the portfolio. The investments made in medical office, industrial warehouse, and credit strategies also contributed to the performance of the plan.
- Mr. Liikala further explained that another factor in the division's positive performance is that staff actively manages the portfolio verse peers. Over the last fiscal year, the Division has had \$2 billion in activity spread near equally between distributions from sales and funding of capital commitments. This \$2 billion is almost one-third of the active portfolio.
- Mr. Liikala explained that staff is reviewing the new tax policy and how it will affect housing and commercial real estate.

Absolute, Real Return and Opportunistic – Mr. James Elkins

- Mr. Elkins stated the Absolute and Real Return performance had a great year and quarter as well. The main drivers of this were primarily long/short equity managers and some of the more active credit strategies. Much of the performance being driven by the short and long side of the portfolio which has been difficult to achieve over the past couple of years.
- Mr. Elkins further discussed new investments within the Division and explained what the driving factors were to invest in these opportunities.
- Mr. Elkins explained that within the current portfolio, some of the equity exposure was shifted to the credit strategies as well as more diversified strategies. The team is also looking at other similar-type structured credit opportunities.
- Mr. Elkins discussed the real return portfolio noting that performance was great again for the year as well as quarter, being driven mainly by the income. He believes that the portfolio is a well-seasoned portfolio.

Basket Clause

- In the spirit of time this report was received and filed.

Closing Remarks

Mr. Lundberg stated that this was his last IAC meeting as he is not accepting the appointment for another three-year term.

Chairman Nicholson thanked everyone for another really fine year, and for staff's continued hard work through the year. He further wished happy holidays to all.

Next Meeting Date and Adjournment

The next IAC Meeting is scheduled for Thursday, March 8, 2018. The meeting was adjourned by Chairman Nicholson at 11:10 a.m.

Approved:

James B. Nicholson, Chair

State of Michigan Retirement Systems

EXECUTIVE SUMMARY

Investment Advisory Committee Meeting

March 8, 2018



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

EXECUTIVE SUMMARY

December 2017

Performance

An overview.

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	16.2%	8.7%	10.7%	9.9%	6.4%
Policy Returns	16.0%	9.3%	10.7%	10.0%	6.8%
Peer Median Returns*	15.2%	7.9%	9.1%	8.5%	5.9%

*State Street Universe greater than \$10 billion.

- Over the past one, three, five, seven, and ten years, the returns are significantly higher than peer median returns. When compared to the State Street Universe of public pension plans greater than \$10 billion, the returns are mostly within the top quartile of returns. As notable, over the past three and five years, the 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 even slightly higher than peer returns on \$69.9 billion of SMRS' assets, significantly adds up over time. For example, the ten-year annualized return of 6.4% compared to the 5.9% peer median return would add approximately \$6 billion of value to SMRS' assets over a ten-year period.
- The returns beat the policy benchmark over the past year by 0.2%. Many of the asset classes posted results in excess of their performance benchmark, however, a slightly defensive allocation offset some of the positive selectivity.
- For the year ending December 2017, returns exceeded the peer median return by 1.0%. The returns of the individual asset classes were better than median returns over this time period and a lower weighting to fixed income also helped to achieve returns higher than peers.

Asset Allocation

A low return environment.

- Given the historically low rates of return available in the capital markets for safe, short-term bonds, and in order for the assets to earn the long-term 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 \$13 billion in illiquid assets, primarily in private equity. In the December 2017 quarter, approximately \$3.0 billion of new commitments were made.
- The combined systems paid out approximately \$2.0 billion net of contributions over the past twelve months ending in December 2017.
- Over the past year, international equity had a net inflow of \$500 million, long-term fixed income of \$230 million, Real Return / Opportunistic received an allocation of approximately \$140 million and the allocation to short-term cash increased by approximately \$500 million. Over the past year in round numbers, the allocation to domestic equity was reduced by \$2.4 billion, private equity by \$460 million, absolute return by \$430 million and real estate by \$90 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.
- At the December IAC meeting, the unusually low volatility environment within the equity markets was noted. Unsurprisingly, within the first quarter of 2018, more normal (perhaps healthy) levels of volatility have been observed.
- Fundamentals supporting equities, both domestic and international are very strong. Analysts currently are estimating 2018 earnings growth of more than 20% in both market segments.
- Effects to the U.S. economy due to the recent tax cuts should begin to be observed in the near term. However, economic growth is occurring globally, and in many countries growth continues to accelerate.

Economic Backdrop

A pretty good U.S. economy.

- The current economic expansion in the U.S. is into its eighth year, ranking it the third longest economic expansion in the past seventy years.
- The Federal Reserve Bank of Atlanta tracks wage growth of individuals and the trend in wage growth is moderating. Its three-month median wage growth hit 2.9% in December 2017. Inflation hawks are looking for an acceleration in labor costs, potentially leading to a compression in corporate profit margins, however, at this time, the fear of such conditions is much greater than actual experiences.
- The jobs market is very healthy. The national unemployment rate is 4.1% and the three-month average figure for initial jobless claims is at its lowest level since March 1973. In December 2017, there were 5.8 million job openings in the U.S. according to the Labor Department, 500,000 more than the year prior, and near an all-time record.

Investment Update
Highlighting the quarter.

(\$ Millions)

NEW COMMITMENTS

October 1 – December 31, 2017

<u>Asset class</u>	<u>Fund Name / (Managed By)</u>	<u>Commitment</u>
Private Equity		
	Carlyle Partners VII, LP (The Carlyle Group)	\$250.0
	Affinity Asia Pacific Fund V, LP (Affinity Equity Partners)	175.0
	Sycamore Partners III, LP (Sycamore Partners)	100.0
	Charlesbank Equity Fund IX, LP (Charlesbank Capital Partners, LLC)	100.0
	Charlesbank Fund IX Overage Allocation Program (Charlesbank Capital Partners, LLC)	50.0
	Berkshire fund IX Coinvestment Fund, LP (Berkshire Partners)	50.0
	Warburg Pincus Financial Sector, LP (Warburg Pincus)	45.0
Real Estate & Infrastructure		
	MWT Holdings, LLC (Domain Capital Advisors)	\$1,450.0
	Principal Separate Account (Principal Real Estate Investors)	244.0
	Alidade Capital Fund IV, LP (Alidade Capital, LLC)	10.0
Absolute and Real Return & Opportunistic		
	Apollo Structured Credit Recovery Fund IV, LP (Apollo Global Management)	\$225.0
	TSSP Adjacent Opportunities Partners, L.P. (TPG)	200.0
	Riverside Credit Solutions Fund I, L.P. (The Riverside Company)	50.0
	Marathon CLO Equity Fund, L.P. (Marathon Asset Management)	25.0
TOTAL		\$2,974.0

State of Michigan Retirement Systems

PERFORMANCE

Investment Advisory Committee Meeting

March 8, 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 Treasurer as fiduciary of the State of Michigan Retirement Systems, and various Michigan trust funds and the State's common cash.

SMRS Goals

Maintain sufficient liquidity to pay benefits.

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

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

Diversify assets to reduce risk.

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

MPSERS PENSION

Time-Weighted Rates of Return

Periods Ending December 31, 2017

	% of Portfolio 12/31/17	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	6.4	25	9.9	8	10.7	9	8.7	15	16.2	33	4.0	27
Median - Greater than \$10 Billion ²		5.9		8.5		9.1		7.9		15.2		3.7	
MPSERS Total Plan Policy		6.8		10.0		10.7		9.3		16.0		4.0	
DOMESTIC EQUITIES	24.4	8.6	35	13.4	32	15.7	35	10.7	53	22.3	33	6.8	12
Median ²		8.4		12.5		14.7		10.8		21.4		5.9	
S&P 1500 Index		8.7		13.7		15.7		11.4		21.1		6.5	
INTERNATIONAL EQUITIES	18.6	2.7	42	6.4	46	8.1	51	9.4	34	28.6	38	5.0	47
Median ²		2.6		6.5		8.2		8.6		27.6		5.0	
International Blended Benchmark ³		1.7		5.2		7.0		7.8		27.2		5.0	
PRIVATE EQUITIES	15.1	9.9	8	14.6	11	14.3	13	12.3	7	17.5	26	5.0	8
Median ²		7.2		10.6		9.9		8.5		13.7		2.9	
Alternative Blended Benchmark ⁴		12.2		17.5		17.4		14.1		22.1		5.2	
BONDS	12.4	5.2	18	4.3	37	3.5	14	4.2	22	5.5	30	0.8	29
Median ²		4.6		4.0		2.5		3.1		4.5		0.6	
Barclays Aggregate		4.0		3.2		2.1		2.2		3.5		0.4	
REAL ESTATE & INFRASTRUCTURE	9.9	4.0	39	11.6	34	11.9	25	9.5	48	8.7	43	2.5	45
Median ²		3.0		10.6		10.9		9.5		8.1		2.2	
NCREIF - Property Blended Index ⁵		4.7		9.4		8.8		8.0		5.6		1.5	
NCREIF Open Fund Index Net		4.1		11.0		10.5		9.4		6.7		1.9	
REAL RETURN AND OPPORTUNISTIC	8.8			9.6		11.4		8.1		12.0		2.2	
50% (CPI +500 bps) + 50% (8% actuarial rate)				7.4		7.3		7.4		7.6		1.5	
ABSOLUTE RETURN	5.7			4.8		5.4		3.3		9.2		1.7	
HFRI FOF Cons 1 month lagged				2.6		3.5		2.1		4.4		1.0	
CASH EQUIVALENTS	5.1			0.5		0.6		0.8		1.2		0.4	
1 Month T-Bill				0.2		0.2		0.3		0.8		0.3	

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.

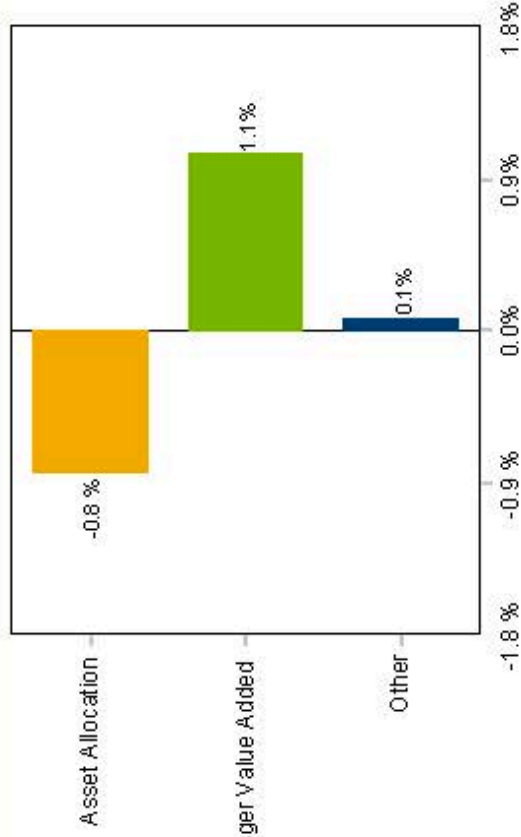
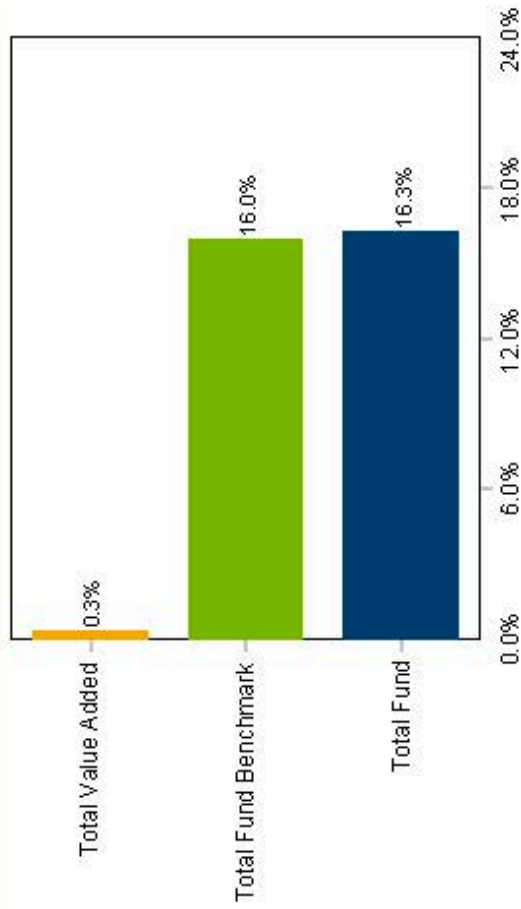
Source: State Street Analytics; the NCREIF - NPI (Property Index) source is NCREIF; the S&P BMI-EPAC Index source is S&P.

Total Fund Attribution

Total Michigan vs. Total Fund Benchmark

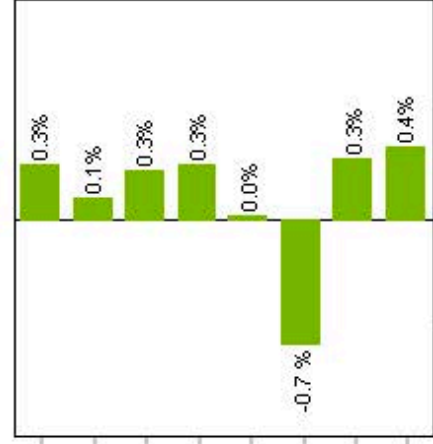
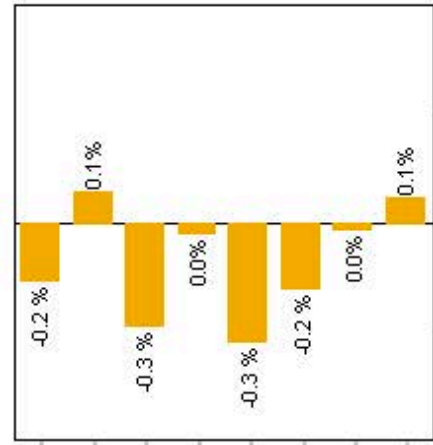
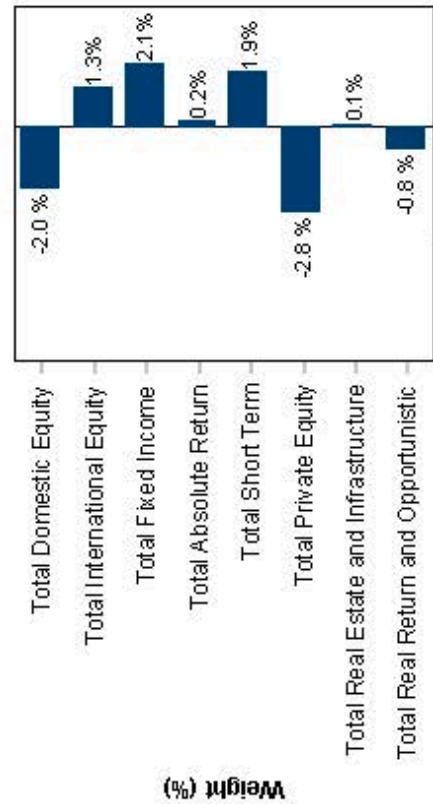
Total Fund Performance

Total Value Added: 0.3%



Total Asset Allocation: -0.8%

Total Manager Value Added: 1.1%



■ Average Active Weight

■ Asset Allocation Value Added

■ Manager Value Added



Cumulative and Consecutive Total Fund Returns

MPRS										
Cumulative For Years Ending 12/31/17										
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MPRS	16.2	11.7	8.7	9.3	10.7	11.0	9.9	10.2	10.4	6.4
Public Plan - Median (> \$10 billion)*	15.2	11.7	7.9	7.7	9.1	9.8	8.5	9.1	9.8	5.9
Rank	33	50	15	4	9	19	8	12	20	25
bp Difference - Median	97	1	76	164	163	118	136	114	61	49
Consecutive For Years Ending										
	12/17	12/16	12/15	12/14	12/13	12/12	12/11	12/10	12/09	12/08
MPRS	16.2	7.4	2.8	11.3	16.4	12.6	3.3	12.7	12.1	-24.2
Public Plan - Median (> \$10 billion)*	15.2	7.9	0.4	7.0	15.4	13.2	1.7	12.7	17.4	-24.8
Rank	33	69	4	5	34	64	12	55	81	39
bp Difference - Median	97	-42	235	430	101	-53	164	-5	-535	60

MSERS										
Cumulative For Years Ending 12/31/17										
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSERS	16.2	11.8	8.7	9.3	10.7	11.0	9.9	10.2	10.4	6.3
Public Plan - Median (> \$1 billion)*	15.1	11.7	7.9	7.5	9.0	9.7	8.4	9.1	9.9	5.8
Rank	36	48	17	3	13	21	10	16	26	33
bp Difference - Median	115	2	83	188	165	135	146	113	52	46
Consecutive For Years Ending										
	12/17	12/16	12/15	12/14	12/13	12/12	12/11	12/10	12/09	12/08
MSERS	16.2	7.5	2.8	11.3	16.3	12.6	3.2	12.5	11.9	-24.4
Public Plan - Median (> \$1 billion)*	15.1	7.8	0.2	6.8	15.6	13.0	1.2	12.9	18.5	-25.0
Rank	36	62	2	3	39	65	18	63	84	37
bp Difference - Median	115	-34	256	451	67	-45	196	-38	-663	53

*State Street Public Funds Universe

Cumulative and Consecutive Total Fund Returns

MSPRS										
Cumulative For Years Ending 12/31/17										
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MSPRS	16.2	11.7	8.7	9.3	10.7	11.0	9.8	10.2	10.3	6.3
Public Plan - Median (> \$1 billion)*	15.1	11.7	7.9	7.5	9.0	9.7	8.4	9.1	9.9	5.8
Rank	35	49	17	4	15	23	10	16	27	33
bp Difference - Median	116	1	82	187	162	131	145	113	48	45
Consecutive For Years Ending										
	12/17	12/16	12/15	12/14	12/13	12/12	12/11	12/10	12/09	12/08
MSPRS	16.2	7.5	2.8	11.3	16.2	12.5	3.3	12.6	11.5	-24.2
Public Plan - Median (> \$1 billion)*	15.1	7.8	0.2	6.8	15.6	13.0	1.2	12.9	18.5	-25.0
Rank	35	63	3	3	40	68	14	62	87	34
bp Difference - Median	116	-37	255	447	59	-52	211	-31	-701	75

MJRS										
Cumulative For Years Ending 12/31/17										
	1 Year	2 Year	3 Year	4 Year	5 Year	6 Year	7 Year	8 Year	9 Year	10 Year
MJRS	16.3	11.8	8.7	9.3	10.5	10.8	9.7	10.0	10.0	6.1
Public Plan - Median (> \$1 billion)*	15.1	11.7	7.9	7.5	9.0	9.7	8.4	9.1	9.9	5.8
Rank	33	48	16	4	21	28	17	21	44	38
bp Difference - Median	124	5	85	183	148	119	130	96	14	30
Consecutive For Years Ending										
	12/17	12/16	12/15	12/14	12/13	12/12	12/11	12/10	12/09	12/08
MJRS	16.3	7.4	2.8	11.0	15.6	12.5	3.1	12.2	9.9	-23.3
Public Plan - Median (> \$1 billion)*	15.1	7.8	0.2	6.8	15.6	13.0	1.2	12.9	18.5	-25.0
Rank	33	64	3	3	50	68	18	70	89	24
bp Difference - Median	124	-38	255	424	2	-56	185	-68	-862	170

*State Street Public Funds Universe

State of Michigan Retirement Systems

ASSET ALLOCATION REVIEW

Investment Advisory Committee Meeting

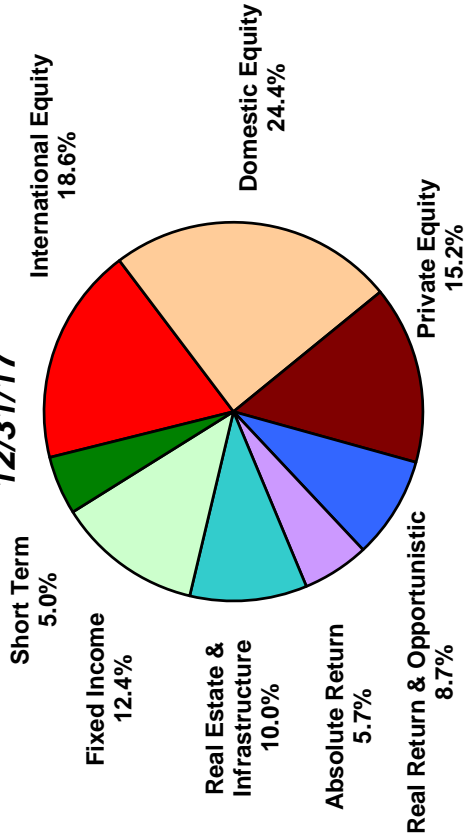
March 8, 2018



Jon M. Braeutigam
Chief Investment Officer
Bureau of Investments

STATE OF MICHIGAN RETIREMENT SYSTEMS PROFILE - DECEMBER 2017

Asset Allocation 12/31/17



Asset Allocation By Market Value (In Millions)

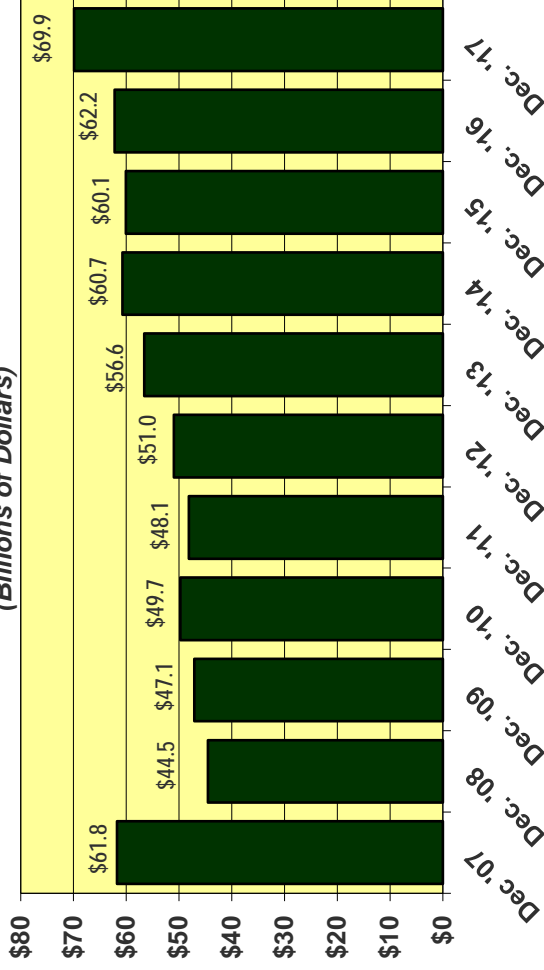
Investment Strategies	12/31/17	12/31/16
Domestic Equity	\$17,051	\$16,059
International Equity	12,990	9,687
Private Equity	10,629	9,563
Fixed Income	8,675	7,971
Real Estate & Infra.	6,964	6,562
Real Return & Opport.	6,103	5,366
Absolute Return	4,002	4,077
Short Term***	3,520	2,955
TOTAL	\$69,934	\$62,240

Short Term Equivalents (in Billions)

Short Term Strategy***	\$3.5
Short Term in Other Inv. Strategies	0.7
TOTAL SHORT TERM	\$4.2

6.0% of Total Funds

Market Value* (Billions of Dollars)



Market Value By Plan ~ 12/31/17 (in Millions)

	Pension Plan Mkt. Value	OPEB** Mkt. Value	Combined Mkt. Value	%
MPERS	\$48,393	\$5,487	\$53,880	77.0%
MSERS - (closed)	12,075	2,118	14,193	20.3%
MSPRS	1,433	158	1,591	2.3%
MJRS - (closed)	269	1	270	0.4%
TOTAL	\$62,170	\$7,764	\$69,934	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.

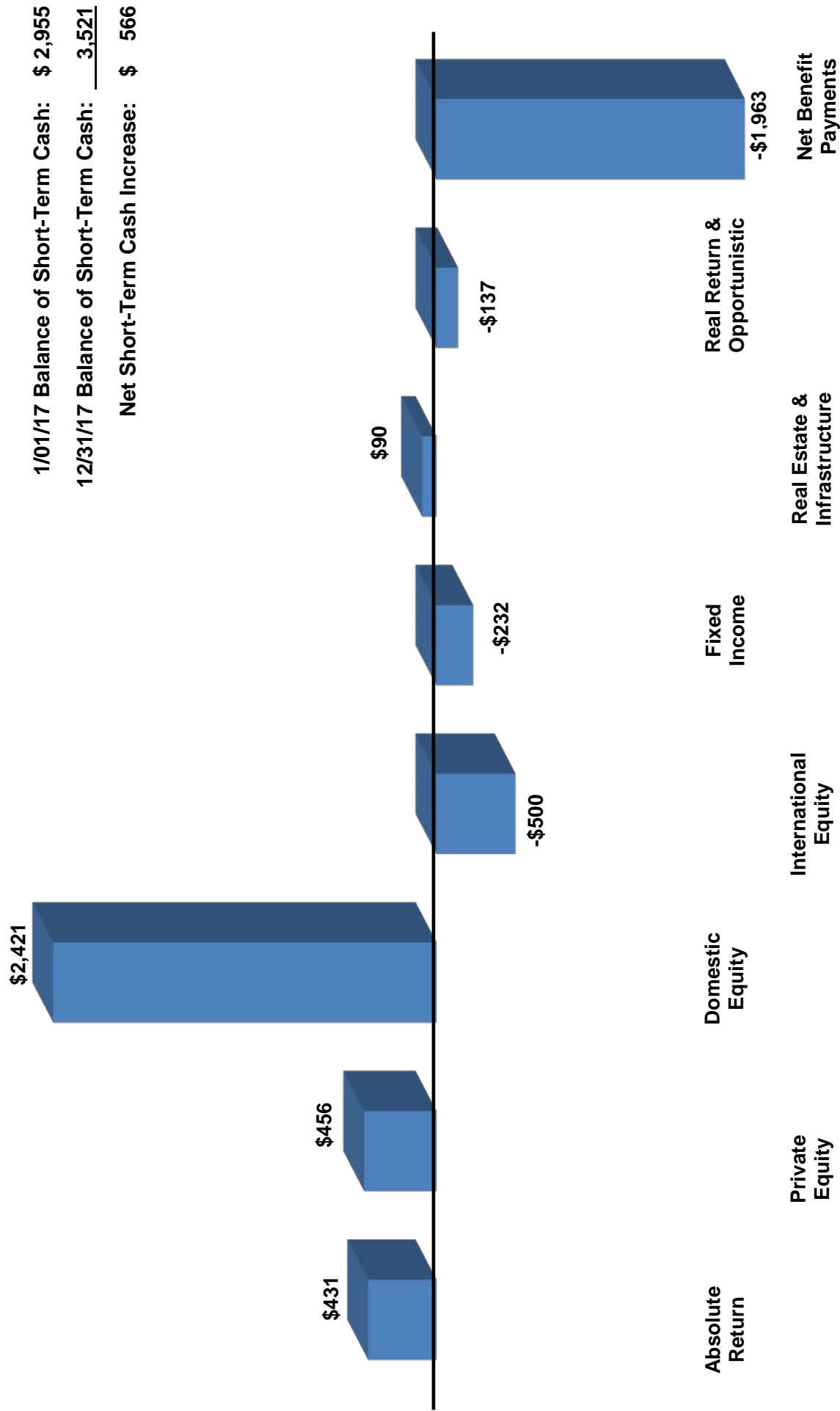
Pensions & Investments Survey - February 5, 2018 Issue

*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

January 2017 ~ December 2017



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 12/31/17

Asset Class	MPERS			MSERS			MSPRS			MJRS			SMRS
	Actual 12/31/17	Target 9/30/18	Target* 9/30/19	Actual 12/31/17	Target 9/30/18	Target* 9/30/19	Actual 12/31/17	Target 9/30/18	Target* 9/30/19	Actual 12/31/17	Target 9/30/18	Target* 9/30/19	Ranges
Broad U.S. Equity	24.4%	26.0%	28.0%	24.4%	26.0%	28.0%	24.4%	26.0%	28.0%	24.5%	26.0%	28.0%	20% - 50%
Private Equity	15.1%	16.5%	18.0%	15.1%	16.5%	18.0%	15.1%	16.5%	18.0%	15.2%	16.5%	18.0%	10% - 25%
Broad Int'l Equity	18.6%	17.5%	16.0%	18.6%	17.5%	16.0%	18.6%	17.5%	16.0%	18.7%	17.5%	16.0%	10% - 20%
U.S. Fixed Income Core	12.4%	11.5%	10.5%	12.4%	11.5%	10.5%	12.4%	11.5%	10.5%	12.4%	11.5%	10.5%	8% - 25%
Real Estate / Infrastructure	9.9%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	10.0%	0% - 15%
Real Return / Opportunistic	8.8%	9.0%	9.5%	8.8%	9.0%	9.5%	8.8%	9.0%	9.5%	8.8%	9.0%	9.5%	0% - 15%
Absolute Return	5.7%	6.0%	6.0%	5.7%	6.0%	6.0%	5.7%	6.0%	6.0%	5.8%	6.0%	6.0%	0% - 12%
Cash	5.1%	3.5%	2.0%	5.0%	3.5%	2.0%	5.0%	3.5%	2.0%	4.6%	3.5%	2.0%	1% - 9%
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.

State of Michigan Retirement Systems

MARKETS REVIEW AND OUTLOOK

Investment Advisory Committee Meeting

March 8, 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	11.0%	24.0%	12.2%	Hold
International Equity	9.4%	19.9%	1.8%	Add
Domestic Equity	7.7%	17.0%	8.7%	Trim
Real Estate (Core)	6.6%	11.5%	4.7%	Hold
Absolute Return	5.6%	9.0%	4.3%	Hold
Real Ret/Opportunistic	8.5%	9.5%	7.3%	Add
Long-Term	2.9%	4.0%	4.0%	Hold
Short-Term	2.5%	1.0%	0.3%	Hold

* Aon Hewitt Investment Consultants 2017 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.
- At the December IAC meeting, the unusually low volatility environment within the equity markets was noted. Unsurprisingly, within the first quarter of 2018, more normal (perhaps healthy) levels of volatility have been observed.
- Fundamentals supporting equities, both domestic and international, are very strong. Analysts are estimating 2018 earnings growth of more than 20% in both market segments.
- Effects to the U.S. economy due to the recent tax cuts should begin to be observed in the near term. However, economic growth is occurring globally, and in many countries, growth continues to accelerate.
- In response to higher expectations for growth and inflation, interest rates are increasing or normalizing. Some are concerned that shorter term interest rates are increasing faster than longer term rates, potentially resulting in an inverted yield curve which sometimes is associated with economic recessions. Historically, an inverted yield curve has occurred approximately a year ahead of an actual economic recession in the U.S. To date, the curve maintains a positive, though slightly below average, spread and based on this metric, concerns for a recession are likely premature.
- Spreads on both investment-grade and high-yield corporates remain tight, near the low end of the range over the past ten years.

International Equity

A compelling case.

- International equities out-returned domestic equities over the year ending December 2017 by 6.6%. However, over the past three, five, seven, and ten years ending December 2017, the international market index, MSCI ACWI ex USA, underperformed the S&P 1500 index by -3.1%, -8.5%, -8.3%, and -6.4% annualized respectively.
- Based on a price-to-earnings valuation multiple, excluding non-earning companies, developed international equity markets trade at approximately a 19% discount to U.S. counterparts, while emerging markets trade at close to a 30% discount.
- Year-over-year earnings growth for international markets is estimated to be over 20% for the year. Earnings in international markets can grow around 50% 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, and seemingly with some relative strength, international equity represents a leveraged play on continued global growth.
- Within international equities, emerging markets have outperformed developed markets over the past one and three years by 10.0%, and 1.2% annualized respectively. Over the past five and seven years, developed has outperformed emerging by 2.6% and 2.5%. The plan is overweight emerging markets, with a weight of 33.7% compared to the benchmark weight of 25.4%.
- International equity small-cap stocks outperformed the broader MSCI ACWI ex USA index over the past one, three, five, seven, and ten years by 4.4%, 4.2%, 3.2%, 1.6% and 2.8% respectively. The plan is overweight international equity small caps by approximately 9.5%. However, this weight is being reduced as valuations within these securities look stretched.
- The plan is underweight international equity against a global benchmark (approximately 43% versus 48% of total public equity) though at a higher allocation than the peer median allocation; 18.6% versus peer median of 17.1%.

Domestic Equity

Large caps outperform.

- The broad U.S. stock market return for the one year ending December 2017 was 21.1%. Growth in earnings plus the dividend yield accounted for roughly 16% of the return, and the rest was due to multiple expansion.
- 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 25%. Actual earnings growth may end up materially different, however, it is likely that gains in the U.S. equity market in 2018 will not rely significantly on an expanding multiple.
- Valuation metrics are very much above average and the absolute returns over the next cycle will not likely be as strong as the historical average of 11 – 12% year-over-year total returns.
- Over the past one, three, five and seven years ending December 2017, small-cap stocks underperformed large-cap stocks by -7.2%, -1.5%, -1.7% and -2.1% annualized respectively. This fact may come as a surprise as it is often assumed small caps consistently outperform large and that a bull-market would benefit small-caps more than large-caps. Over this time period, the plan has maintained an under to neutral-weight allocation to small-cap stocks, primarily due to valuation concerns.

Interest Rates

Rising rates.

- At its December 2017 meeting, the Federal Reserve Board voted to raise its key interest rate for the third time in 2017. The market is currently pricing in a high likelihood of another rate hike in March 2018 with yet more to come in 2018. The Fed has now raised rates five times since 2015, but the policy rate is still 70 bps below inflation, a rate which has been historically an extremely accommodative policy and in actuality, one that is more accommodative than when it started tightening rates in 2015.
- Including tightening monetary policy through setting short-term rates, on the near-term horizon the Fed is looking to adjust the size of its balance sheet. Although the pace and scope of the plan is likely to adjust with the market, unwinding the balance sheet is just as unprecedented as the QE programs were originally, which increases the likelihood for at least some market impacts.
- The 10-year U.S. Treasury ended December 2017 at 2.4%, about where it was one year prior. In 2017, the majority of the rate action was at the shorter end of the curve; the 2-year Treasury is about 77 bps higher than a year prior, in line with the three rate hikes. Although this leaves the curve flatter than average, the flattest it has been over the past ten years, it is not at a level that in the past has signified immediate economic troubles.
- Spreads on both investment-grade and high-yield corporates continue to tighten. Investment-grade spreads were roughly 30 bps below historic averages and high yield spreads are about 140 bps tighter than average as of the end of January 2018. Both measures are at ten-year lows and the plan continues to sell into the credit market strength.
- The Barclays Aggregate Index's sensitivity to changes in interest rates is fairly high. At the end of December 2017, the Index had a modified duration of 6.1 years.
- The ten-year breakeven rates at the end of December 2017 were priced just below 2.0%.

Real Estate

Bond-like behavior.

- The REIT Index is fairly priced compared to bonds, while other valuation metrics indicate that the index remains expensively priced. In other words, real estate is not expected to deliver high absolute returns over the longer term. However stretched the valuations have become, timing of the softer than normal returns is tricky.
- Due to the importance that dividends play with REITS, the index has acted as a proxy for interest rates over the past several years. As rates have increased, and as the prospect for additional rate increases have gone up, these bond substitutes have predictably struggled in terms of price.

Commodities

Weakening dollar.

- Commodities prices broadly have been relatively flat over the year ending December 2017 as measured by the Thomson Reuters CRB Commodity Index, up less than 1%.
- As measured by the DXY index, the dollar lost more than 10% of its value in 2017 versus a basket of foreign currencies.

ECONOMIC OUTLOOK

Select Historic Economic Growth with Forecasts

An eye to 2018.

Real GDP % Growth Actual/Forecasts	2015	2016	2017	2018	2019
World	3.4	3.2	3.7	3.7	3.6
U.S.	2.9	1.5	2.3	2.7	2.3
Developed (G8)	2.1	1.4	2.1	2.2	1.9
Asia	5.0	4.9	4.9	4.9	4.9
EMEA	1.8	1.6	3.4	3.0	2.8
Europe	2.1	1.8	2.4	2.2	1.8
Latin America	-0.2	-1.1	1.2	2.5	2.7
China	6.9	6.7	6.9	6.5	6.3

*Source: Bloomberg

Economic Overview

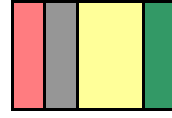
A very healthy jobs market.

- The most recent reading of the annualized U.S. GDP growth was 3.8%, ahead of the consensus estimate of 3.7%. Current estimates for 2018 GDP growth for the U.S. is around 2.7%, however the Atlanta Federal Reserve model is currently forecasting growth of 4%. 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.
- Economic growth is a global phenomenon. Nearly all countries are experiencing economic growth, and for many countries growth is increasing at an accelerating rate.
- The jobs market is very healthy. The national unemployment rate is 4.1% and the three-month average figure for initial jobless claims is at its lowest level since March 1973. In December 2017, there were 5.8 million job openings in the U.S. according to the Labor Department, 500,000 more than the year prior, and near an all-time record.
- The Federal Reserve Bank of Atlanta tracks wage growth of individuals and the trend in wage growth is moderating. Its three-month median wage growth hit 2.9% in December 2017. Inflation hawks are looking for an acceleration in labor costs, potentially leading to a compression in corporate profit margins, however; at this time, the fear of such conditions is much greater than actual experiences.
- Housing prices in the U.S. are high. This is good for household balance sheets but may act as a headwind for household formations. According to the U.S. Bureau of the Census, the median sales price of new houses sold in the U.S. is \$335,400, up over 27% from the 2007 peak. This is an all-time record, despite a rise in interest rates. Low interest rates had made housing relatively affordable, however should rates continue to rise, house prices could become vulnerable.

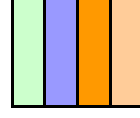
Annual Total Returns of Key Asset Classes 1998 - 2017

	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
Best ↑	U.S. Equity 26.33%	Int'l Equity 26.97%	Gov't Bonds 13.23%	Corp. Bonds 10.40%	Gov't Bonds 11.50%	Int'l Equity 40.82%	Int'l Equity 20.90%	Real Estate 20.06%	Int'l Equity 26.65%	Int'l Equity 16.65%	Gov't Bonds 12.38%	Int'l Equity 41.44%	U.S. Equity 16.38%	Real Estate 14.26%	Int'l Equity 16.83%	U.S. Equity 32.80%	U.S. Equity 13.08%	Real Estate 13.32%	U.S. Equity 11.93%	Int'l Equity 27.19%
	Int'l Equity 19.97%	U.S. Equity 20.27%	Real Estate 12.24%	Real Estate 7.28%	Corp. Bonds 10.52%	U.S. Equity 29.58%	Real Estate 14.48%	Int'l Equity 16.62%	Real Estate 16.59%	Real Estate 15.84%	Cash 2.05%	U.S. Equity 27.24%	Real Estate 13.11%	Gov't Bonds 9.02%	U.S. Equity 16.17%	Int'l Equity 15.29%	Real Estate 11.81%	U.S. Equity 1.01%	Real Estate 7.97%	U.S. Equity 21.13%
	Real Estate 16.24%	Hedge Funds 18.93%	Corp. Bonds 9.40%	Gov't Bonds 7.24%	Hedge Funds 6.74%	Hedge Funds 9.01%	Hedge Funds 5.83%	Hedge Funds 5.65%	Hedge Funds 15.34%	Hedge Funds 8.67%	Inflation 0.10%	Corp. Bonds 16.05%	Corp. Bonds 11.15%	Corp. Bonds 8.35%	Corp. Bonds 10.54%	Hedge Funds 10.99%	Corp. Bonds 7.53%	Gov't Bonds 0.86%	Corp. Bonds 5.63%	Real Estate 6.96%
	Gov't Bonds 9.85%	Real Estate 11.36%	Hedge Funds 6.16%	Hedge Funds 4.43%	Hedge Funds 3.57%	Real Estate 8.99%	Corp. Bonds 5.25%	Inflation 5.13%	Cash 9.21%	U.S. Equity 7.68%	Real Estate -3.07%	Inflation 9.65%	Gov't Bonds 8.46%	U.S. Equity 2.96%	Hedge Funds 9.37%	Inflation 7.70%	Hedge Funds 4.92%	Hedge Funds 0.66%	Inflation 4.50%	Corp. Bonds 6.42%
	Corp. Bonds 8.59%	Cash 4.83%	Hedge Funds 5.77%	Hedge Funds 3.11%	Inflation 2.39%	Corp. Bonds 7.69%	Corp. Bonds 5.25%	Inflation 3.42%	Cash 4.81%	U.S. Equity 5.47%	Real Estate -6.46%	Inflation 2.72%	Gov't Bonds 5.52%	U.S. Equity 1.75%	Hedge Funds 4.22%	Inflation 1.49%	Hedge Funds 3.14%	Hedge Funds 0.37%	Inflation 2.09%	Hedge Funds 3.88%
Worst ↓	Cash 5.24%	Inflation 2.68%	U.S. Equity 3.39%	Inflation 1.55%	Cash 1.79%	Int'l Equity 2.36%	Gov't Bonds 3.48%	Gov't Bonds 3.06%	Corp. Bonds 4.27%	Corp. Bonds 5.10%	Hedge Funds -19.86%	Cash 0.19%	Hedge Funds 5.07%	Cash 0.10%	Gov't Bonds 2.02%	Cash 0.07%	Inflation 0.68%	Corp. Bonds 0.01%	Gov't Bonds 1.89%	Gov't Bonds 2.30%
	Inflation 1.60%	Corp. Bonds -1.94%	U.S. Equity -6.98%	U.S. Equity -10.64%	Int'l Equity -14.95%	Inflation 1.88%	Inflation 3.25%	Gov't Bonds 2.65%	Gov't Bonds 3.46%	Cash 5.03%	U.S. Equity -36.72%	Real Estate -2.19%	Int'l Equity 1.50%	Hedge Funds -3.55%	Int'l Equity 1.70%	Gov't Bonds -2.01%	Int'l Equity 0.04%	Int'l Equity -0.77%	Cash 1.05%	Cash 2.12%
	Hedge Funds -1.61%	Gov't Bonds -2.25%	Int'l Equity -15.31%	Int'l Equity -19.74%	U.S. Equity -21.30%	Cash 1.16%	Cash 1.33%	Corp. Bonds 1.95%	Inflation 2.55%	Inflation 4.06%	Int'l Equity -45.52%	Real Estate -16.86%	Cash 0.13%	Int'l Equity -13.71%	Cash 0.11%	Gov't Bonds -2.60%	Int'l Equity -3.87%	Int'l Equity -5.67%	Cash 0.27%	Cash 0.84%

	Annualized Returns 1998 - 2017			
Return	Cash 1.97%	Infl. 2.16%	Hedge 3.69%	Gov't. 4.57%
Risk	Cash 0.59%	Infl. 1.01%	Hedge 3.86%	Gov't. 4.01%
	Cash 1.97%	Int'l 6.13%	U.S. Eq. 7.51%	R.E. 9.78%
	Cash 0.59%	Int'l 17.13%	U.S. Eq. 15.01%	R.E. 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 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

FIXED INCOME REVIEW

Investment Advisory Committee Meeting

March 8, 2018



Daniel J. Quigley
Senior Investment Manager
Long-Term Fixed Income Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	5.4%	4.2%	3.5%	4.3%	5.2%
Bloomberg Barclays US Agg	3.5%	2.2%	2.1%	3.2%	4.0%
Peer Median Returns	4.5%	3.1%	2.5%	4.0%	4.6%
Percentile Rank vs. Peers*	30	22	14	37	18

*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. Overweight allocations to emerging market debt, corporate credit, and structured securities boosted performance. The portfolio also benefited from an underweight to Treasuries and Agency Residential Mortgage Backed Securities (RMBS).
- The duration positioning of the portfolio was a slight drag on performance due to the underweight to longer-dated bonds. These bonds experienced strong performance as long-term interest rates decreased during the year.
- Externally managed strategies such as High Yield Credit and Structured Fixed Income experienced strong returns in 2017. High Yield had a one year return of 7.0%, while Structured Fixed Income returned 6.6%. Overall, the externally managed portfolio returned 6.4% YOY, accounting for roughly two-thirds of the one-year outperformance.

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 meaningfully having more risk than the U.S. Aggregate Index. The yield-to-maturity of the portfolio is currently 3.4% versus a benchmark yield of 2.7%. In addition to this, the portfolio has an equity beta of 0.0, in line with the U.S. Aggregate equity beta of -0.1.

- The Core-plus strategy implemented to achieve this goal includes:
 - Core: As of December 31, 2017, the allocation to U.S. Treasuries, investment-grade corporate bonds, government-guaranteed U.S. Agency Debentures, RMBS, and Commercial Mortgage Backed Securities (CMBS) was 69.6%. This includes an 18.6% 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 30.4% as of December 31, 2017.

Tactical Update

- The allocation to high-yield strategies was 6.5% at the end of the calendar year, down from a peak of 14.0% in 2016.
- The allocation to securitized credit, primarily in CMBS, non-agency RMBS, and CLO securities, has increased to 20.1% of the portfolio. The combination of high income (often floating rate) and low duration in these investments is desirable at this point in the interest rate cycle.
- 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 15% of portfolio assets and should position the portfolio to outperform in a rising interest rate environment.
- The allocation to U.S. TIPS decreased during the quarter to 5.4% of the fixed income portfolio. The TIPS allocation has outperformed nominal U.S. Treasuries 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 and long-term rates declining. The yield on the 30-year Treasury decreased from 3.1% to 2.7% during the year while two-year Treasury yields rose from 1.2% to 1.9%. Short-term rate increases were driven by tightening from the Federal Reserve. The FOMC has increased the Fed Funds rate by 125 bps since December of 2015, including a 25 bps rate hike during their December meeting to take the Fed Funds rate to 1.5%. As of December 31, the markets expect a 70% chance of an additional 25 bps of tightening in March of 2018.
- Inflation expectations remain below historical averages, with ten-year breakeven inflation expectations ending the year near 2.0%. The portfolio has maintained an allocation to U.S. TIPS as it is believed that these securities will outperform nominal Treasuries should expectations revert to their long-term average.
- Credit markets have experienced strong performance recently with High Yield total returns nearing 25% since the market bottomed in February of 2016. High-yield spreads ended the quarter at 343 bps, almost 500 bps tighter over the previous twenty-two months. Investment-grade spreads are also lower, tightening 123 bps during the same time period. The portfolio has reduced its allocation to corporate credit by roughly 6% YOY as spread levels have moved below their historical averages.
- Global markets were comparatively strong performers in 2017 with returns on the dollar denominated Emerging Markets Index (EMD) of 8.2% and the Global High Yield Index of 10.4%. The spread on the EMD Index ended the year at 226 bps, roughly 100 bps below its five-year average.
- 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 330 bps, down 81 bps during the year.

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

12/31/17

	Amount	Total	% of Total
Core (\$ in Millions)			
LTFID Internal	\$4,514		
Dodge & Cox	242		
PGIM Investment Grade Credit	234		
Domestic Fixed Income Swaps	274		
PIMCO Mortgage Fund	250		
Total Core		\$5,513	63.5%
Tactical			
Pyramis	\$300		
Loomis Core Plus	227		
Total Tactical		\$527	6.1%
Securitized Debt			
Met West Securitized Ops	\$496		
Principal CMBS	625		
Napier Park ABS Income	156		
Napier Park Strategic Loan	55		
Napier Park CLO Debt	206		
TICP CLO Debt	204		
Total Securitized Debt		\$1,742	20.1%
High Yield			
Columbia Management	\$302		
PGIM High Yield	263		
Total High Yield		\$565	6.5%
Global			
T. Rowe Global Multi-Sector	\$228		
PGIM Global Liquid Relative Value	\$100		
Total Global		\$328	3.8%

TOTAL

\$8,676

100.0%

NOTE: Totals may not be exact because of rounding.

SMRS

Fixed Income Holdings Portfolio Characteristics

Benchmark: Barclays Aggregate

12/31/17

<u>Characteristic</u>	<u>Portfolio</u>	<u>Benchmark</u>
Average Maturity (Yrs)	6.9	8.0
Modified Duration (Yrs)	4.6	5.9
Spread Duration (Yrs)	5.4	6.1
Coupon (%)	3.4	3.1
Yield to Maturity (%)	3.4	2.7
Credit Rating	A-	AA
VaR (%)	3.7	4.6
Tracking Error	163 bp	n/a
Beta (vs S&P 500)	0.02	-0.05

Commentary

Objectives

Income:

The coupon of the portfolio is approximately 25 bps higher than the benchmark. Roughly 15% 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.

Liquidity:

18.6% of the portfolio is invested in cash, U.S. Treasuries, and TIPS. These investments can be liquidated via same-day trading.

Principal Preservation:

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

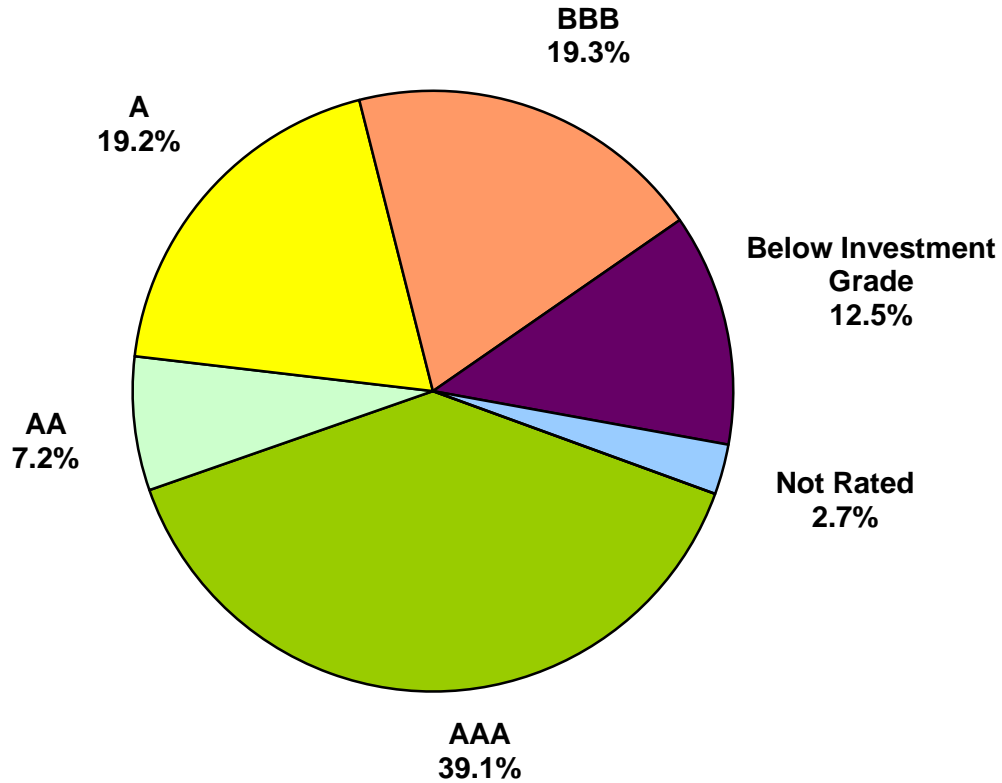
Diversification:

The equity beta of the portfolio is uncorrelated with equity market movements, in line with the bond index.

SMRS

Fixed Income By Rating

Total U.S. Long-Term Fixed Income 12/31/17



Market Value in Millions				
12/31/17				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
AAA	\$3,393	39.1%	71.0%	-31.9%
AA	628	7.2%	4.7%	2.5%
A	1,665	19.2%	11.6%	7.6%
BBB	1,671	19.3%	11.9%	7.4%
Not Rated	235	2.7%	0.8%	1.9%
* Below Investment Grade	1,083	12.5%	0.0%	12.5%
Total Investments	<u>\$8,675</u>	<u>100.0%</u>	<u>100.0%</u>	

* Comprised of approximately 8.9% High Yield Credit and 3.6% High Yield RMBS/ABS

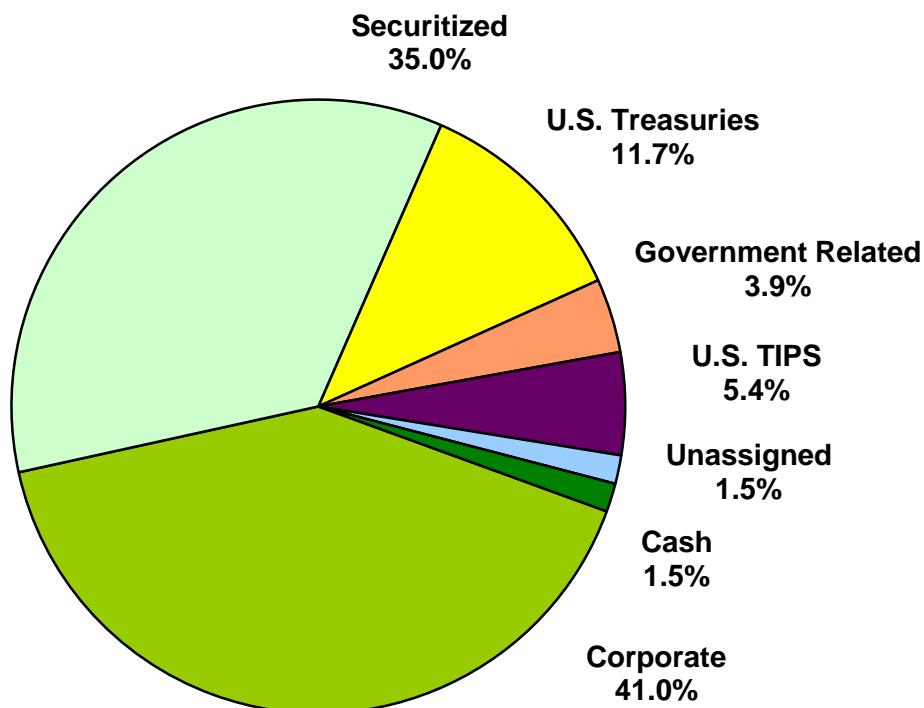
Benchmark: Barclays US Aggregate

SMRS

Fixed Income By Asset Type

Total U.S. Long-Term Fixed Income

12/31/17



Market Value in Millions

12/31/17

	Assets	Percent	Benchmark	Difference
Corporate	\$3,559	41.0%	25.7%	15.3%
Securitized	3,038	35.0%	30.5%	4.5%
U.S. Treasuries	1,011	11.7%	37.0%	-25.3%
Government Related	334	3.9%	6.8%	-2.9%
U.S. TIPS	470	5.4%	0.0%	5.4%
Unassigned	131	1.5%	0.0%	1.5%
Cash	132	1.5%	0.0%	1.5%
Total Investments	\$8,675	100.0%	100.0%	

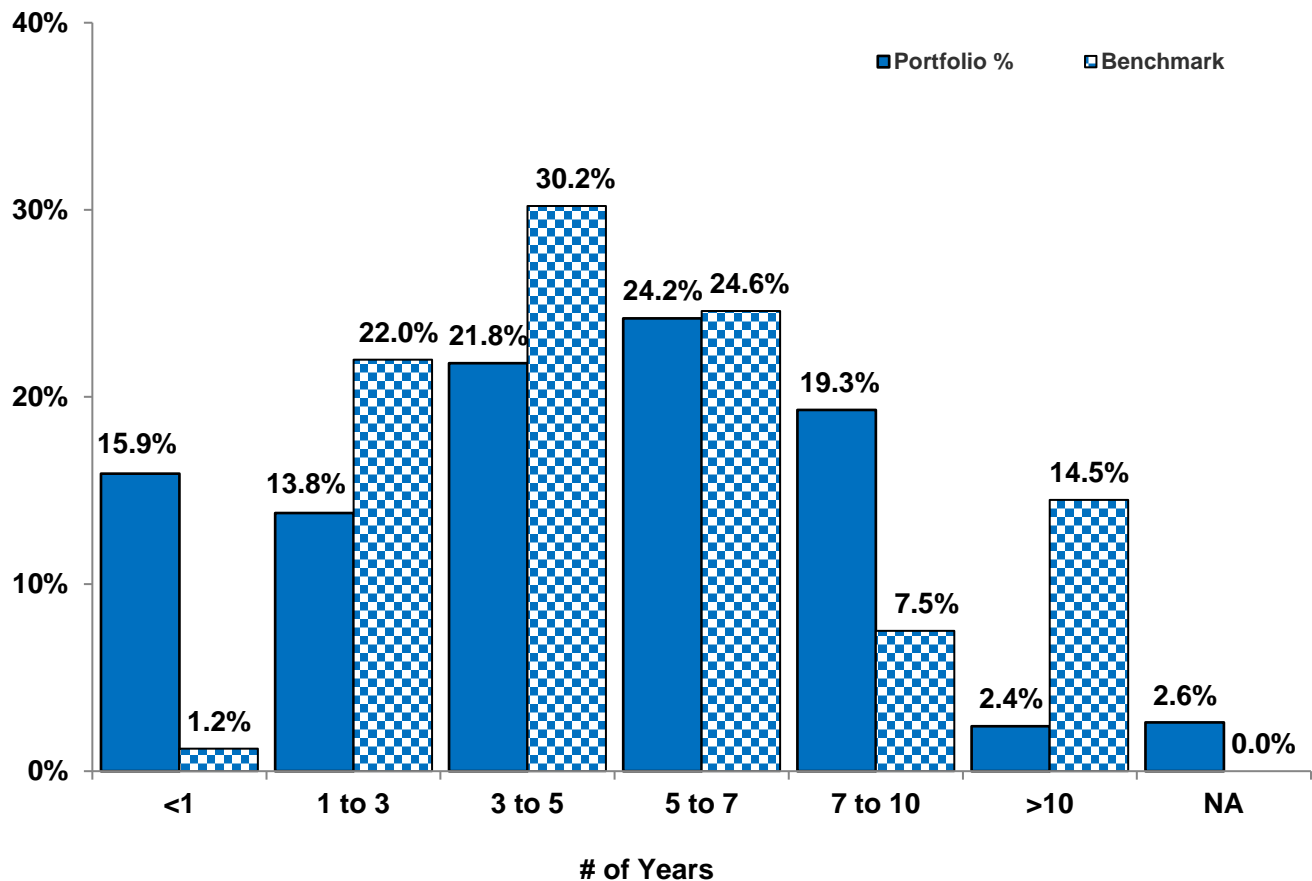
Benchmark: Barclays US Aggregate

SMRS

Duration Distribution

Fixed Income Composite Versus Benchmark

12/31/17



Source: Factset

Market Value in Millions					
Duration	Assets	Portfolio Weight	Benchmark Weight	Portfolio Duration*	Benchmark Duration*
<1	\$1,380	15.9%	1.2%	0.2	1.0
1 to 3	1,199	13.8%	22.0%	2.1	2.0
3 to 5	1,894	21.8%	30.2%	4.1	4.2
5 to 7	2,098	24.2%	24.6%	6.0	5.8
7 to 10	1,674	19.3%	7.5%	7.9	8.0
>10	208	2.4%	14.5%	15.4	15.8
NA	222	2.6%	0.0%	0.0	0.0
Total	\$8,675	100.0%	100.0%	4.9	6.0

* Effective Duration

SMRS Internal/External Manager Performance – Net of Fees

12/31/17

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	\$8,674,810,526	5.3%	4.0%	3.4%	4.2%	5.1%
Internal Fixed Income	\$4,787,254,912	4.6%	3.6%	3.1%	3.8%	4.9%
External Fixed Income	\$3,887,555,614	6.4%	4.6%	3.7%	4.9%	5.3%
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>3.5%</i>	<i>2.2%</i>	<i>2.1%</i>	<i>3.2%</i>	<i>4.0%</i>
Fixed Income Core	\$492,164,483	3.9%	3.1%	2.7%	3.8%	4.7%
Dodge & Cox Core	241,739,431	4.0%	3.2%	3.2%	4.1%	5.1%
PIMCO Mortgage Fund	250,425,053	--	--	--	--	--
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>3.5%</i>	<i>2.2%</i>	<i>2.1%</i>	<i>3.2%</i>	<i>4.0%</i>
Investment Grade Credit	\$233,837,698	6.7%	4.3%	3.8%	5.3%	5.7%
PGIM Investment Grade	233,837,698	6.7%	4.3%	3.9%	5.4%	6.5%
<i>Bloomberg/Barclays Credit Index</i>	<i>N/A</i>	<i>6.2%</i>	<i>3.6%</i>	<i>3.2%</i>	<i>4.8%</i>	<i>5.4%</i>
Tactical Fixed Income	\$526,177,633	5.6%	3.9%	5.3%	7.4%	--
Loomis Sayles CorePlus	226,635,317	5.5%	3.0%	--	--	--
Pyramis Tactical Bond Fund	299,542,316	5.9%	4.8%	--	--	--
<i>Bloomberg/Barclays Aggregate Bond Index</i>	<i>N/A</i>	<i>3.5%</i>	<i>2.2%</i>	<i>2.1%</i>	<i>3.2%</i>	<i>4.0%</i>
High Yield Fixed Income	\$564,828,344	7.0%	6.2%	--	--	--
Columbia Management High Yield	301,630,574	6.7%	6.1%	--	--	--
PGIM High Yield	263,197,771	7.3%	6.3%	--	--	--
<i>Bloomberg/Barclays US HY BA/B 2% Cap</i>	<i>N/A</i>	<i>6.9%</i>	<i>5.9%</i>	<i>--</i>	<i>--</i>	<i>--</i>
Structured Fixed Income	\$1,742,195,101	6.6%	--	--	--	--
Principal CMBS	624,849,874	6.2%	3.8%	5.9%	7.8%	--
MetWest Securitized Opportunities	495,832,467	7.0%	4.0%	--	--	--
Napier Park ABS Income	155,827,499	12.9%	--	--	--	--
Napier Park Strategic Loan LP	55,116,787	3.8%	--	--	--	--
Napier Park CLO Debt	206,088,149	--	--	--	--	--
TICP CLO Debt	204,480,325	--	--	--	--	--
<i>Blended CMBS Benchmark</i>	<i>N/A</i>	<i>3.5%</i>	<i>3.2%</i>	<i>2.8%</i>	<i>5.8%</i>	
Global Fixed Income	328,352,353.57	6.5%	--	--	--	--
T. Rowe Global Multi-Sector	228,352,353.57	6.5%	--	--	--	--
<i>Custom GMS Benchmark</i>	<i>N/A</i>	<i>5.6%</i>				
PGIM Global Liquid Relative Value	100,000,000.00	--	--	--	--	--

State of Michigan Retirement Systems

REAL ESTATE AND INFRASTRUCTURE REVIEW

Investment Advisory Committee Meeting

March 8, 2018



Brian C. Liikala
Senior Investment Manager
Real Estate and Infrastructure Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	8.7%	9.5%	11.9%	11.6%	4.0%
NCREIF NPI	5.6%	8.0%	8.8%	9.4%	4.7%
Peer Median Returns	8.1%	9.5%	10.9%	10.6%	3.0%
Percentile Rank vs. Peers*	43	48	25	34	39

*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 and office, overweight in apartments and hotels, and increased investments in credit strategies. Also adding value over the past year was appreciation in medical office and industrial warehouse properties, and realizing gains from dispositions.

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 assets with a shorter projected hold period. The REID has selectively acquired properties where it can add value through management and leasing and has developed 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, enabling above market appreciation and returns.
- The REID has been actively managing the portfolio with dispositions of assets in excess of \$1 billion, and funding new investments of nearly \$1 billion as of calendar year-end. The REID is also working with its advisors in executing the disposition of properties in secondary markets where illiquidity occurs in periods of slower economic growth, and realizing gains from the sale of assets at historically low capitalization rates.
- The REID has approximately \$3.1 billion in unfunded commitments. New commitments during the quarter include:
 - \$1.45 billion in MWT Holdings, LLC, to purchase a limited partner's nearly 50% interest in Simpson Housing Limited Partnership (SHLP) to combine with SMRS existing nearly 50% interest. SHLP is one of the largest privately-held apartment developer and manager in the nation, operating throughout the U.S. SMRS has a long history with SHLP, having been an investor since 1995. The investment has a base case expected return of approximately the actuarial rate of return, it adds to diversification away from equity risk, and was funded from lower yielding cash in January 2018.
 - \$244 million in Principal Separate Account, to develop and acquire data centers in the U.S., at SMRS's discretion. The separate account is managed by Principal Real Estate Investors.
 - \$10 million in Alidade Capital Fund IV, LP, a commingled fund focused on flex office and industrial properties. The fund will be managed by Alidade Capital, LLC, and reside in Domain GVA-1, LLC.

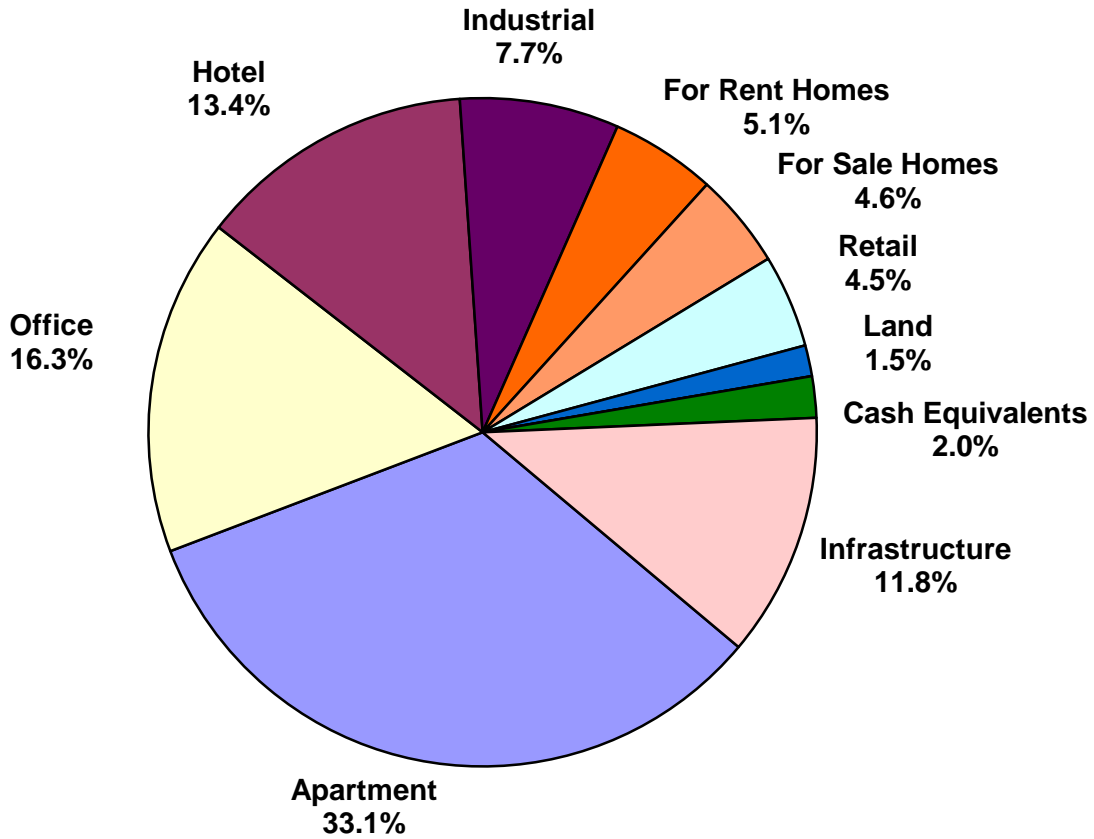
Market Environment

- Disparities in property types and in real estate markets are appearing as we continue through the real estate cycle. The rate of development of condominiums in certain urban markets such as Miami and New York has begun to ease as supply becomes a concern. Industrial warehouse construction fueled by fulfillment centers continues to meet growing demand. Retail properties are less attractive to investors as e-commerce continues to grow. Senior housing and medical office are attracting more investor attention. Lenders have become more selective in quality and location of the collateral and have reduced construction lending in apartments and speculative office buildings. 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 could inhibit timing of completions.
- In the commercial mortgage-backed securities (CMBS) market, spreads over the swap rate for 10-year AAA-rated securities decreased 14 bps from the prior quarter and stand at 76 bps, which is a historic low since late 2012. Spreads continued to tighten after the fourth quarter ended and the demand for higher rate securities remained strong. The lower-rated security spreads remain appropriate for the risk in comparison to debt metrics in the bond market. Commercial Mortgage Alert reported that CMBS issuance for 2017 was \$96 billion. A wave of refinancing for 2007 ten-year vintage loans (in excess of \$100 billion) are finding enough lenders to complete their refinancing and therefore may not pose a problem. Large banks continue to be the low risk A note lender (<40% LTV), allowing private non-bank lenders to fill the funding gap, where the REID's credit strategy has focused its attention.

SMRS

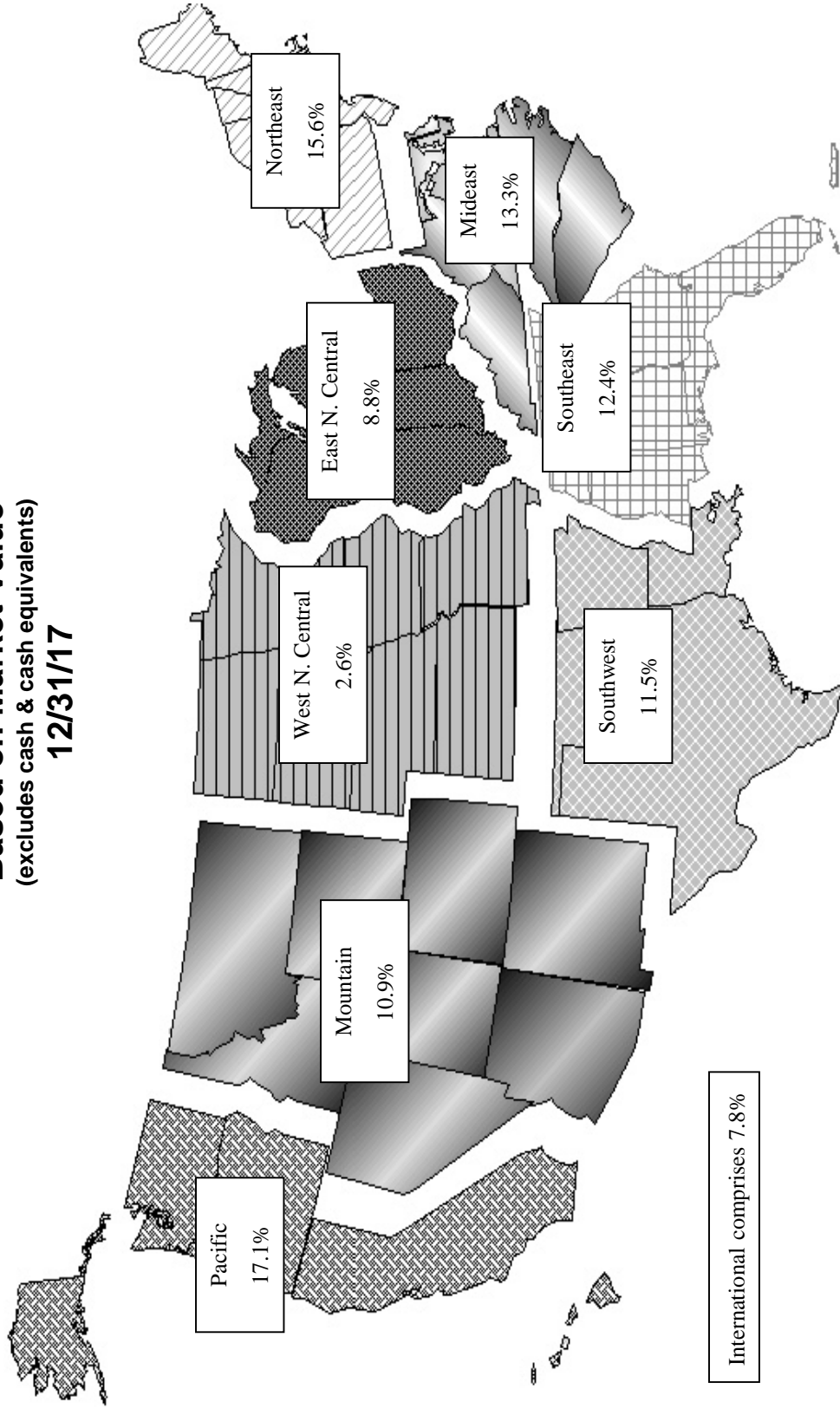
Real Estate and Infrastructure

12/31/17



Market Value in Millions				
	<u>12/31/17</u>		<u>12/31/16</u>	
Apartment	\$2,302	33.1%	\$2,281	34.8%
Office	1,131	16.3%	932	14.2%
Hotel	936	13.4%	918	14.0%
Infrastructure	822	11.8%	649	9.9%
Industrial	538	7.7%	451	6.9%
For Rent Homes	353	5.1%	435	6.6%
For Sale Homes	321	4.6%	341	5.2%
Retail	315	4.5%	355	5.4%
Land	106	1.5%	127	1.9%
	<u>\$6,824</u>	<u>98.0%</u>	<u>\$6,489</u>	<u>98.9%</u>
Cash Equivalents	<u>140</u>	<u>2.0%</u>	<u>73</u>	<u>1.1%</u>
Total Investments	<u>\$6,964</u>	<u>100.0%</u>	<u>\$6,562</u>	<u>100.0%</u>

SMRS
Real Estate by Region
Based on Market Value
 (excludes cash & cash equivalents)
12/31/17



Geographic regions defined by NCREIF, whose property index composition is: Pacific 32.1%, Mountain 6.4%, West N. Central 1.4%, Southwest 10.6%, East N. Central 7.3%, Southeast 9.3%, Northeast 21.2%, Midwest 11.7%

SMRS
Real Estate and Infrastructure
12/31/17

**Top Ten
Advisors or Entity**

<u>Advisor or Entity</u>	<u>Market Value</u>
MWT Holdings LLC (SHLP)	\$ 1,570,511,892
Clarion Partners	649,605,141
Blackstone Group	531,069,123
Five Star Realty Partners LLC	363,221,753
Rialto Capital Management LLC	347,365,029
Domain Capital Advisors Inc	277,878,942
Principal Real Estate Investors	274,289,704
Bentall Kennedy LP	249,407,374
CIM Investment Advisors LLC	221,152,930
Heitman Capital Management	199,030,067
	<u>\$ 4,683,531,955</u>

**Occupancy
by Property Type**

	Apartment	Office	Industrial	Retail	Hotel
SMRS Portfolio	95.2%	88.6%	92.2%	91.5%	76.1%
National Average	93.1%	87.0%	92.6%	95.4%	61.7%

SMRS
Market Values by Ownership Entity
12/31/17

REAL ESTATE

	<u>Market Value</u>	<u>Unfunded Commitment</u>
801 Grand Avenue Capital, LLC	\$ 73,329,243	\$ 0
AEW Senior Housing III	1,732,632	2,831,324
Apollo Asia Real Estate Fund	18,292,867	55,091,461
Asana Partners Fund I	10,364,858	15,502,567
Avanath Affordable Housing I, LLC	23,926,203	1,467,911
Avanath Affordable Housing II, LLC	29,677,039	0
Avanath II SMRS Co-Investment Fund LLC	17,550,326	0
Avanath Affordable Housing III	11,880,830	32,229,501
Beacon Capital Strategic Ptnrs. IV, LP	164,275	0
Beacon Capital Strategic Ptnrs. V, LP	389,399	0
Blackstone R/E IH3 Co-Inv Partners	352,560,429	0
Blackstone R/E Partners V, LP	15,184,924	0
Blackstone R/E Partners VI, LP	14,845,254	3,680,000
Blackstone R/E Partners VIII, LP	40,303,718	43,000,000
Capri Select Income II	59,741	0
Capri Urban Investors, LLC	9,088,877	0
CIM Fund III, LP	38,910,076	0
CIM Fund VIII, L.P.	81,343,052	33,406,364
CIM Urban REIT, LLC	39,510,609	0
CIM VI (Urban REIT), LLC	30,185,711	0
Clarion Gables Multifamily Trust, LP	29,629,963	0
Columbus Circle Holdings, LLC	150,952,480	99,087,711
Crown Small Cap Real Estate	14,774,814	11,000,000
* Domain GVA-1, LLC	62,378,190	59,164,578
Domain Hotel Properties, LLC	424,773,742	0
Gateway Capital Real Estate Fund II, LP	49,079,654	1,275,000
Great Lakes Property Group Trust	105,505,591	10,000,000
IMRF II CoInvest Spiga LP	8,754,558	5,589,874
Invesco Mortgage Recovery Feeder Fund	5,498,689	0
Invesco Mortgage Recovery Fund II, L.P.	30,079,163	44,051,252
IPF II Co-Invest Cayman LP	30,509,859	3,110,896
JBC Funds North LaSalle LLC	17,765,080	0
JBC Opportunity Fund III, LP	495,673	0
JP Morgan India Property Fund II, LLC	37,685,217	4,907,480
KBS/SM Fund III, LP	44,796,852	0
KBS/SM Fund IV	95,248,384	0
L-A Saturn Acquisition	28,824,132	0
Landmark Real Estate Partners V, LP	10,963,076	0
LaSalle Asia Opportunity Fund II, LP	256,982	0
LaSalle Asia Opportunity Fund III, LP	2,284,111	0
Lion Industrial Trust	187,854,603	0
Lion Mexico Fund, LP	7,346,833	0
Lombard GVA0016 (former AGL Annuity)	382,681,586	0
Lone Star Fund X LP	5,812,195	194,187,804

	<u>Market Value</u>	<u>Unfunded Commitment</u>
Lubert-Adler Real Estate Fund VII, LP	77,960,018	3,750,000
M1 Westgate CoInvest LLC	10,303,268	1,280,670
M301W CoInvest LLC	20,900,214	536,308
MERS Acquisitions Ltd.	147,564,368	33,281,617
MG Alliance, LLC	18,739,397	0
MIP Holdco LLC	115,761,302	45,500,000
MSREF V - International	2,642,073	0
MSREF VI - International	7,130,822	0
MSRESS Fund III Institutional LP	23,251,456	0
* MWT Holdings, LLC	1,570,511,892	1,450,000,000
Northpark Land Associates	28,295,766	63,677,836
Orange Investors LLC	134,854,471	0
Paladin Realty Brazil Investors III (USA), LP	26,262,980	0
Paladin Realty Latin America Investors IV-CI, LP	38,427,121	17,000,000
Paladin Realty TB COINV V LP	11,896,017	0
Penmain Office LLC	36,252,507	0
* Principal Separate Account	200,960,461	0
Proprium RE Spec. Situations Fund, LP	36,184,239	36,200,786
Rialto Absolute Partnership I	75,000,000	0
Rialto Credit Partshp LP	140,926,475	98,318,181
Rialto Real Estate Fund, LP	22,697,678	0
Rialto Real Estate Fund II, LP	39,095,583	3,000,000
Rialto Real Estate Fund III-Debt, LP	19,223,990	35,753,339
Rialto Real Estate Fund III-Property, LP	12,569,157	45,753,425
Rialto Mezzanine Partners Fund	37,852,146	0
SM Brell II LP	26,280,802	0
Stockbridge RE Fund II-C, LP	25,829,731	0
Strategic LP	249,407,374	43,600,000
TPG RE Finance Trust Inc. (TRTX)	91,901,810	2,103,426
TPG Real Estate Partners II	27,712,106	22,735,441
TSP Fund II, LP	4,391,509	45,608,491
TSP Spartan C-I LLC	8,577,989	0
TSP Spartan C-II LLC	18,486,089	0
TSP Value and Income Fund LP	41,967,739	0
Trophy Property Development LP	1	0
True North High Yield Invest. Fund II, LLC	11,663,877	5,000,000
True North Real Estate Fund III, LLC	33,509,859	19,320,180
Venture Center, LLC	45,436,199	0
Western National Realty Fund II, LP	16,331,596	0
	<u>\$ 6,000,010,852</u>	<u>\$ 2,592,003,423</u>
Short-Term Investments and Other	130,350,703	0
Total Real Estate Investments	<u>\$ 6,130,361,555</u>	<u>\$ 2,592,003,423</u>

* New or additional commitment made during the quarter reported

SMRS
Market Values by Ownership Entity
12/31/17

INFRASTRUCTURE

	Market Value	Unfunded Commitment
Arclight Energy Partners VI, LP	\$ 37,546,007	\$ 12,559,861
ASF VI Infrastructure B LP	25,212,810	15,953,213
ASF VII Infrastructure Fund B L.P.	2,633,134	26,123,706
ASF Como Co-Investment LP	46,493,432	13,032,074
Basalt Infrastructure Partners, LP (Balfour Beatty)	50,634,634	2,219,047
Blackstone Energy Partners, LP	46,403,709	4,209,834
Blackstone Energy Partners II, LP	42,024,703	48,000,000
Brookfield Infrastructure Fund II-B, L.P.	51,111,746	4,976,583
Customized Infrastructure Strategies, LP	62,726,080	7,338,559
Dalmore Capital Fund	64,892,083	0
GCM Grosvenor Infrastructure Investment Program, L.P. (CSG)	60,278,758	0
GCM Grosvenor Customized Infrastructure Strategies II, L.P.	32,667,096	36,066,887
Global E&P Infrastructure Fund II L.P. (formerly First Reserve)	34,405,926	32,162,733
GSO Energy Select Opportunities Fund LP	19,746,386	33,239,799
JPMorgan AIRRO India SideCar Fund US, LLC	66,196,750	3,835,855
JPMorgan Asian Infra. & Rel. Res. Opp Fund II	11,910,556	7,602,218
KKR Eagle CoInvest L.P.	36,111,163	1,917,282
KKR Global Infrastructure Investors, LP	51,239,908	5,650,133
RPEP SMRS Infra II, LLC	12,500,000	500,000
StonePeak Infrastructure Fund LP	66,902,495	14,352,642
	<u>\$ 821,637,377</u>	<u>\$ 269,740,426</u>
Short-Term Investments and Other	12,028,783	0
Total Infrastructure Investments	<u>\$ 833,666,160</u>	<u>\$ 269,740,426</u>
TOTAL INVESTMENTS	<u>\$ 6,964,027,716</u>	<u>\$ 3,105,743,849</u>

* New or additional commitment made during the quarter reported

State of Michigan Retirement Systems

ABSOLUTE AND REAL RETURN REVIEW

Investment Advisory Committee Meeting

March 8, 2018



James L. Elkins
Director, Private Markets
Short-Term, Absolute and Real Return Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Absolute Returns	9.2%	3.3%	5.4%	4.8%	N/A
HFRI FOF Conservative*	4.4%	2.1%	3.5%	2.6%	0.9%

*One month lag on the index. Information as of November 30, 2017.

- The Absolute Return portfolio outperformed the benchmark by 4.8% for the year. The outperformance for the quarter was driven by overweight exposure to credit and equity strategies.
 - The credit strategy was the largest overall contributor to performance. Managers with meaningful exposure to mortgage securities and loans had a particularly strong year with performance driven by spread tightening and robust performance of the underlying collateral.
 - Equities were the second largest contributor to performance, with trading-oriented managers primarily driving gains. The equity portfolio continues to be managed targeting very little market exposure.

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.
- New commitments for the quarter include:
 - \$50 million to Riverside Credit Solutions Fund I, L.P., a fund focused on direct lending in the lower end of the middle market.
- Although outperformance for the quarter was driven primarily by credit and equity managers, we remain cautious on directional risks and prefer lower net exposures and diversifying strategies. Moving forward we look to:
 - Increase allocations to opportunities which have more idiosyncratic risk and are implemented on a market neutral basis.
 - Target macro and quant strategies that could be well positioned to take advantage of a rising interest rate and higher volatility environment.
 - 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.	12.0%	8.1%	11.4%	9.6%	N/A
Custom Benchmark	7.6%	7.4%	7.3%	7.4%	N/A

- Total Real Return and Opportunistic portfolio value was \$6.1 billion with a total one-year return of 12.0%. Performance for the year was driven by strong income from private credit strategies and media and entertainment holdings, as well as solid returns from asset sales in natural resource funds and private credit strategies.

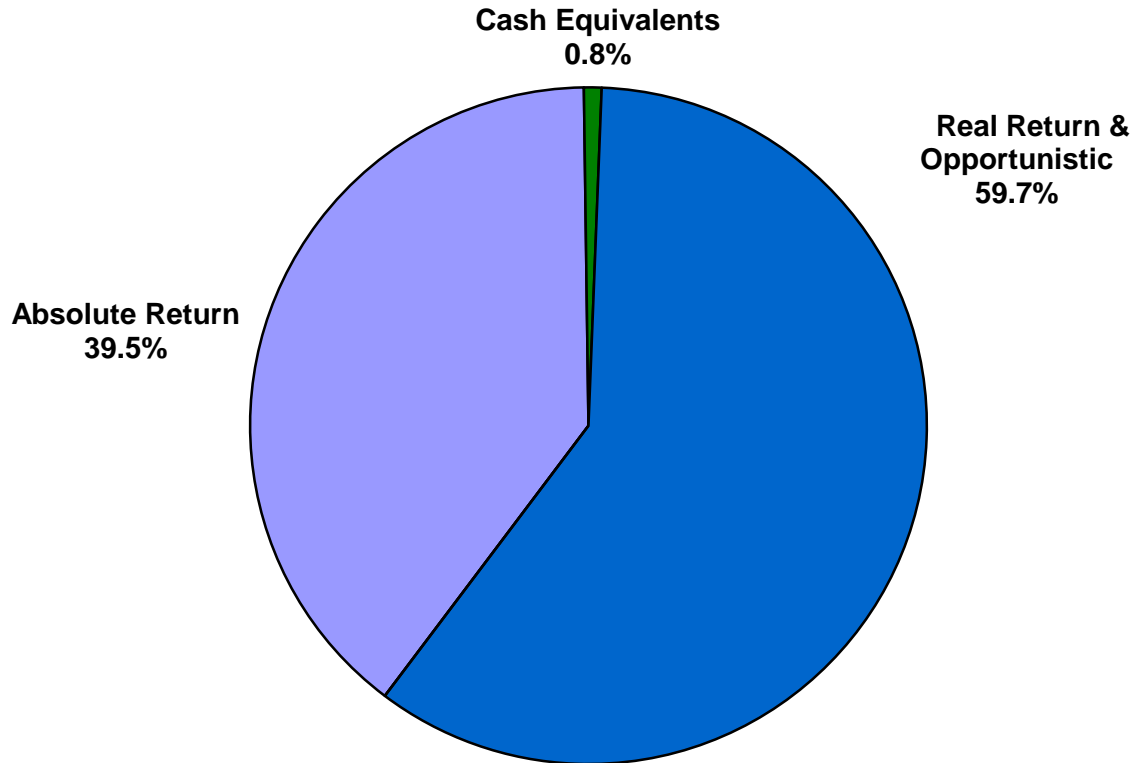
Strategy Update

- The objective of the Real Return & Opportunistic portfolio is to provide an inflation hedge and/or to gain exposure to attractive opportunities that may not fit in another plan portfolio.
- The Real Return & Opportunistic portfolio has approximately \$3.6 billion of unfunded commitments. New commitments closed during the quarter include:
 - \$225 million to Apollo Structured Credit Recovery Fund IV, LP, a commingled credit fund that focuses on structured credit opportunities.
 - \$200 million to TSSP Adjacent Opportunities Partners, L.P., a commingled credit fund that focuses on opportunistic, special situations, and capital solutions.
 - \$25 million to Marathon CLO Equity Fund, L.P., a secondary transaction of a commingled fund that focuses on risk retention capital for collateralized loan obligations.
- The STARR division is 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.

SMRS

Absolute, Real Return and Opportunistic

12/31/17



Market Value in Millions				
	12/31/17		12/31/16	
Absolute Return	\$3,992	39.5%	\$4,067	43.1%
Real Return and Opportunistic	6,028	59.7%	5,271	55.8%
Cash Equivalents	85	0.8%	105	1.1%
Total Investments	\$10,105	100.0%	\$9,443	100.0%

SMRS

Absolute Return

12/31/17

Net Market Values by Entity

	Net Market Value
Apollo Offshore Credit Strategies Fund Ltd.	\$ 7,996,821
Drawbridge Opportunities Fund	221,418,101
* EnTrust White Pine Partners, LP	57,622,596
JM IV, LP	91,466,672
MP Securitized Credit Master Fund, LP	74,721,217
** Riverside Credit Solutions Fund I, LP	-
SJC Direct Lending Revolver Fund III, LP	-
* Tahquamenon Fund, LP	3,536,367,802
Visium Balanced Fund, LP	2,389,559
Total Absolute Return	\$ 3,991,982,768
Short-Term Investments & Other	10,045,868
Grand Total	\$ 4,002,028,636

* Fund of Funds

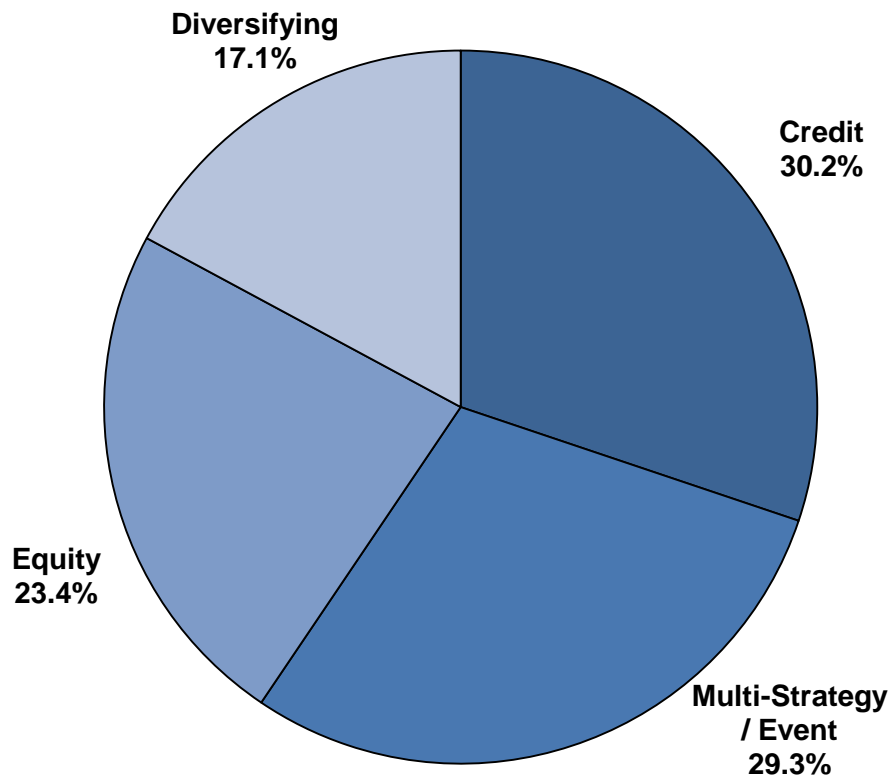
** **New Commitment**

SMRS

Absolute Return

12/31/17

Investments By Strategy



Strategy Breakdown			
Underlying Funds:	80	Median Position Size:	0.5%
Strategies:	4	Average Position Size:	1.2%
Relationships:	7	Largest Position Size:	8.7%

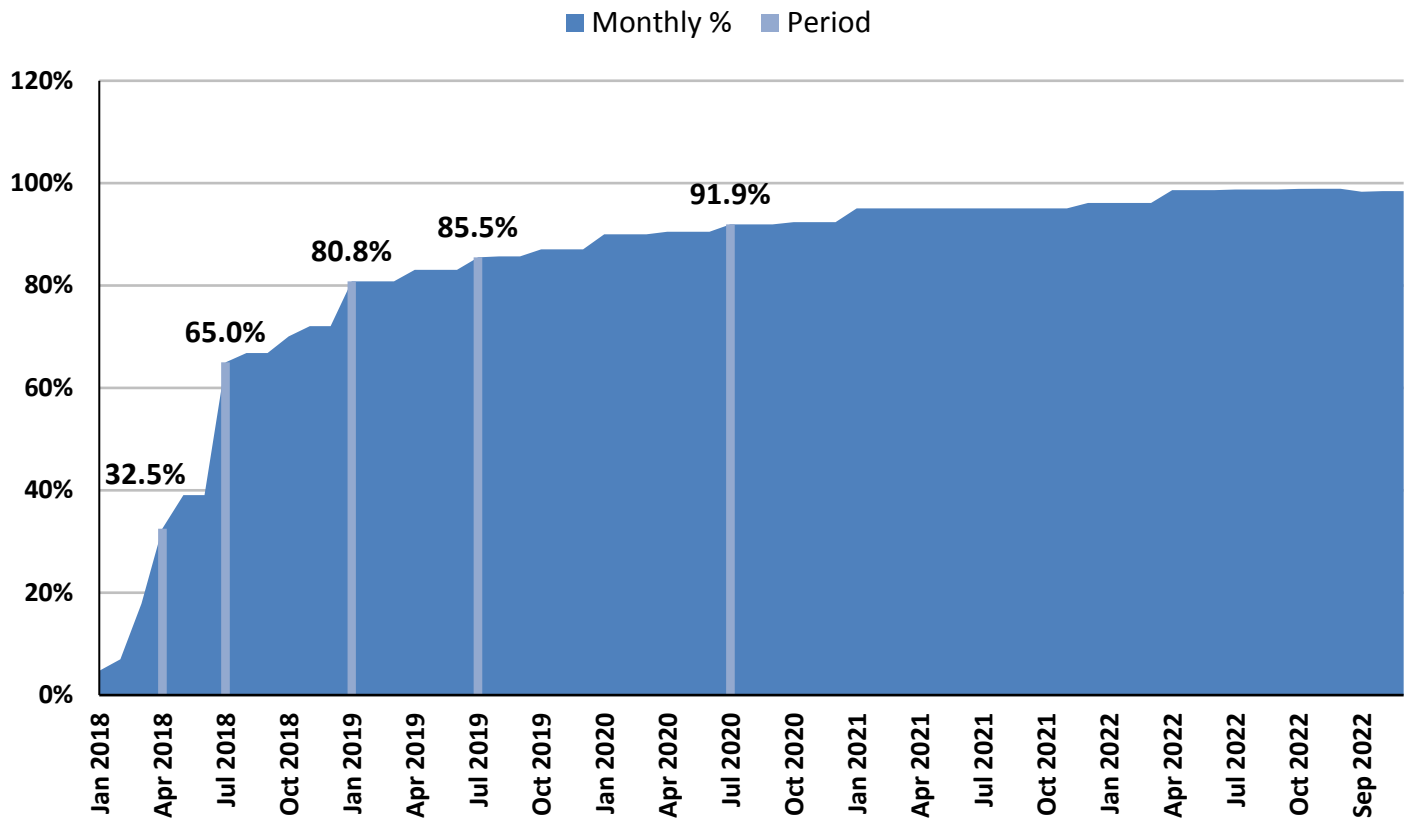
SMRS

Absolute Return

12/31/17

Liquidity Analysis

Redeemable	Marginal Allocation (% each period)	Aggregate Allocation (% since Analysis Date)
By 4/1/18	32.5%	32.5%
By 7/1/18	32.5%	65.0%
By 1/1/19	15.8%	80.8%
By 7/1/19	4.7%	85.5%
By 7/1/20	6.5%	91.9%
After 7/1/20	6.5%	98.4%
Illiquid	1.6%	100.0%
Total	100.0%	N/A



SMRS

Real Return and Opportunistic

12/31/17

Net Market Value by Entity

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
* Abernathy Fund I, LLC	\$ 176,684,844	\$ 65,161,000
Apollo Credit Opportunities Fund III, LP	61,981,685	30,034,742
Apollo European Principal Finance Fund II	41,514,194	8,615,798
Apollo Financial Credit Investments Fund II	296,085,918	196,512,311
Apollo Financial Credit Investments Fund III	140,672,880	142,265,706
Apollo HK TMS Investments Holdings, LP	8,637,961	-
Apollo Offshore Credit Fund Ltd	272,603,856	-
Apollo Offshore Structured Credit Recovery Fund III	5,981	118,580,344
** Apollo Structured Credit Recovery Fund IV	85,614,750	150,336,431
Barings Asset-Based Income Fund, LP	-	300,000,000
Blackstone Strategic Capital Holdings, LP	27,545,389	98,561,931
BSCH Parallel (MLG) I, LP	12,000,000	108,000,000
Blue Peninsula Fund, LP	125,050,240	93,255,973
Carlyle Intl Energy Partners, LP	18,779,236	41,482,158
Carlyle Energy Mezzanine Opportunity Fund	16,047,526	37,829,260
Centerbridge SCP III, LP	15,194,745	15,000,000
* Content Holdings, LLC	480,520,237	47,406,707
Elegantree Fund SPC	17,838,184	4,735,264
Energy Recapitalization and Restructuring Fund, LP	27,512,023	15,648,065
ERR Michigan Holdings, LP	4,820,334	2,335,070
* Fairfield Settlement Partners, LLC	66,336,176	14,608,913
FCO MA MI, LP	98,366,116	105,329,919
Fortress MSR Opportunities Fund I A, LP	90,365,309	-
Fortress Transportation & Infrastructure	75,274,076	-
GSO Credit Alpha Fund, LP	73,697,584	40,021,313
Highbridge Principal Strategies - Specialty Loan Fund III	81,281,332	11,506,136
Hopen Life Sciences Fund II	4,662,084	1,775,000
HPS Red Cedar Fund	97,723,351	213,876,488
JP Morgan Global Maritime Investment Fund, LP	80,466,619	2,914,854
KANG Fund, LP	7,561,371	-
Kayne Anderson Energy Fund VII, LP	56,303,211	24,163,835
Kayne P.E. Income Fund	103,368,644	50,709,805
Kayne Solutions Fund, LP	83,908,622	165,392,069
KKR EI&G Fund	47,910,785	19,453,156
KKR Lending Partners I, LP	36,183,431	11,930,723
KKR Lending Partners II, LP	85,784,318	12,803,972
Lakewater, LLC, Series 1	101,510,059	1,670,438
Lakewater, LLC, Series 2	275,013,494	13,055,859
Lakewater, LLC, Series 3	583,212,969	-

	<u>Net Market Value</u>	<u>Unfunded Commitment</u>
Lakewater, LLC, Series 4	52,072,317	11,688,581
Lakewater, LLC, Series 5	198,643,399	51,679,417
** Marathon CLO Equity Fund, LP	-	25,000,000
Merit Energy Partners, LP	31,408,034	8,583,196
MidCap FinCo Holdings LTD	299,072,008	-
Napier Park Aircraft Leasing Vehicle I, LLC	38,688,318	16,992,551
Napier Park Aircraft Leasing Rollover Fund I, LLC	10,514,651	66,582,608
Nash Co-Investment	14,933,174	-
New Fortress Energy HLDGS	300,000,000	-
Orion Coinvest III, LP	16,541,852	2,236,552
Orion Mine Finance Fund 1A, LP	69,389,454	6,812,977
Orion Mine Finance Fund I, LP	130,284,762	7,376,051
Orion Mine Finance II, LP	47,916,538	53,389,283
Orion Mine Finance Co-Fund II, LP	6,910,474	43,333,333
Redding Ridge Holdings, LP	28,380,328	73,297,377
* Renaissance Venture Cap Fund II, LP	16,567,358	11,215,455
* Renaissance Venture Cap Fund III, LP	750,000	24,250,000
REOG Fund II Coinvest, LP	22,018,777	9,475,056
Ridgewood Energy Oil & Gas II	93,400,774	29,417,498
Ridgewood Energy Oil & Gas III	33,768,668	189,983,422
RPEP Energy Opp Inst Partner	16,578,472	25,714,063
RPEP SMRS Holdings, LLC	77,938,259	1,876,850
SJC Direct Lending Fund I, LP	10,020,277	15,088,120
SJC Direct Lending Fund IA, LP	2,395,357	3,764,486
SJC Direct Lending Fund II, LP	160,021,934	38,261,315
SJC Direct Lending Fund III, LP	67,648,214	180,543,148
* Social Network Holdings, LLC	94,445,818	24,429,952
Specialty Equity Strategy, LP	267,077	19,647,000
Sprott PRL (M), LP	15,772,627	8,492,385
Sprott PRL (M-Co-Invest)	9,883,286	15,000,000
Sprott Private Resource Lending Fund (US), LP	26,573,024	75,832,058
Terra Co-Investment, LLC	33,187,759	14,000,000
TICP CLO Partners II, LP	19,455,080	29,503,086
** TSSP Adjacent Opp Partners, LP	70,388,902	230,635,886
Varo Coinvestment, LP	16,226,536	912,073
Vida Insurance Credit Opportunity Fund II, LP	34,737,822	64,604,235
Warwick Energy Partners III	52,786,201	11,470,665
Warwick (SMRS) Co-Invest, LP	30,181,025	2,732,720
Total Real Return and Opportunistic Short-Term Investments & Other	\$ 6,027,808,091	\$ 3,558,794,638
Grand Total	\$ 6,102,834,332	\$ 3,558,794,638

* Fund of Funds

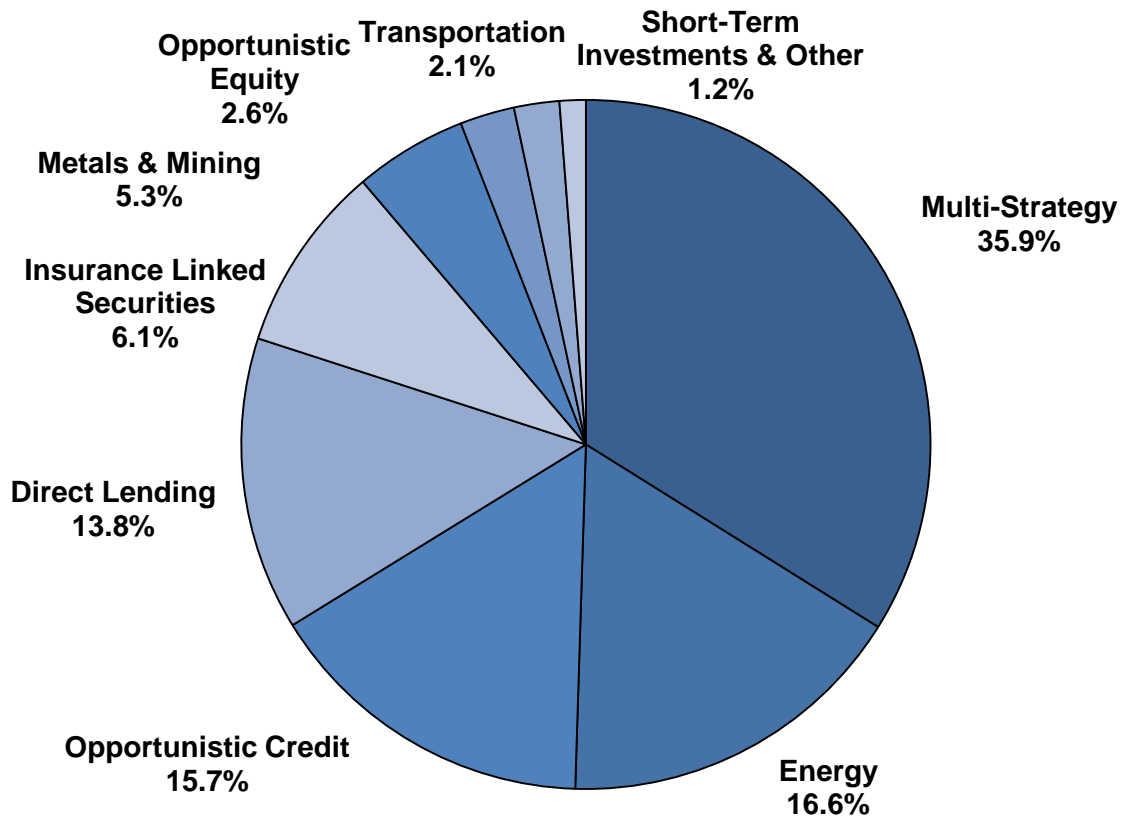
** **New Commitment**

SMRS

Real Return and Opportunistic

12/31/17

Investments By Strategy



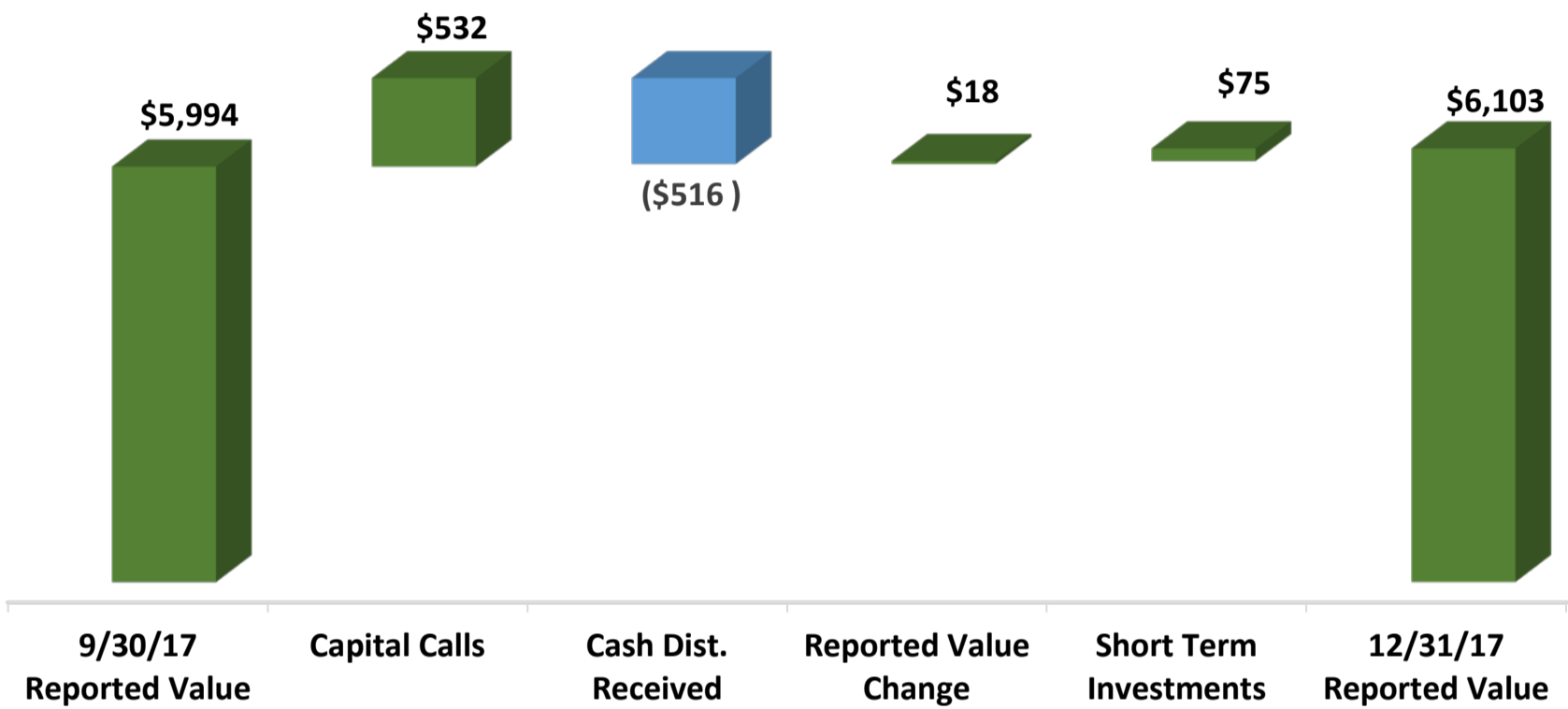
Investment Strategy	
Multi-Strategy	\$ 2,068,248,711
Energy	1,013,368,770
Opportunistic Credit	959,315,337
Direct Lending	840,130,223
Insurance Linked Securities	537,832,796
Metals & Mining	323,272,018
Opportunistic Equity	155,970,648
Transportation	129,669,588
Short-Term Investments & Other	75,026,241
Total Market Value	\$ 6,102,834,332

SMRS

Real Return and Opportunistic 12/31/17

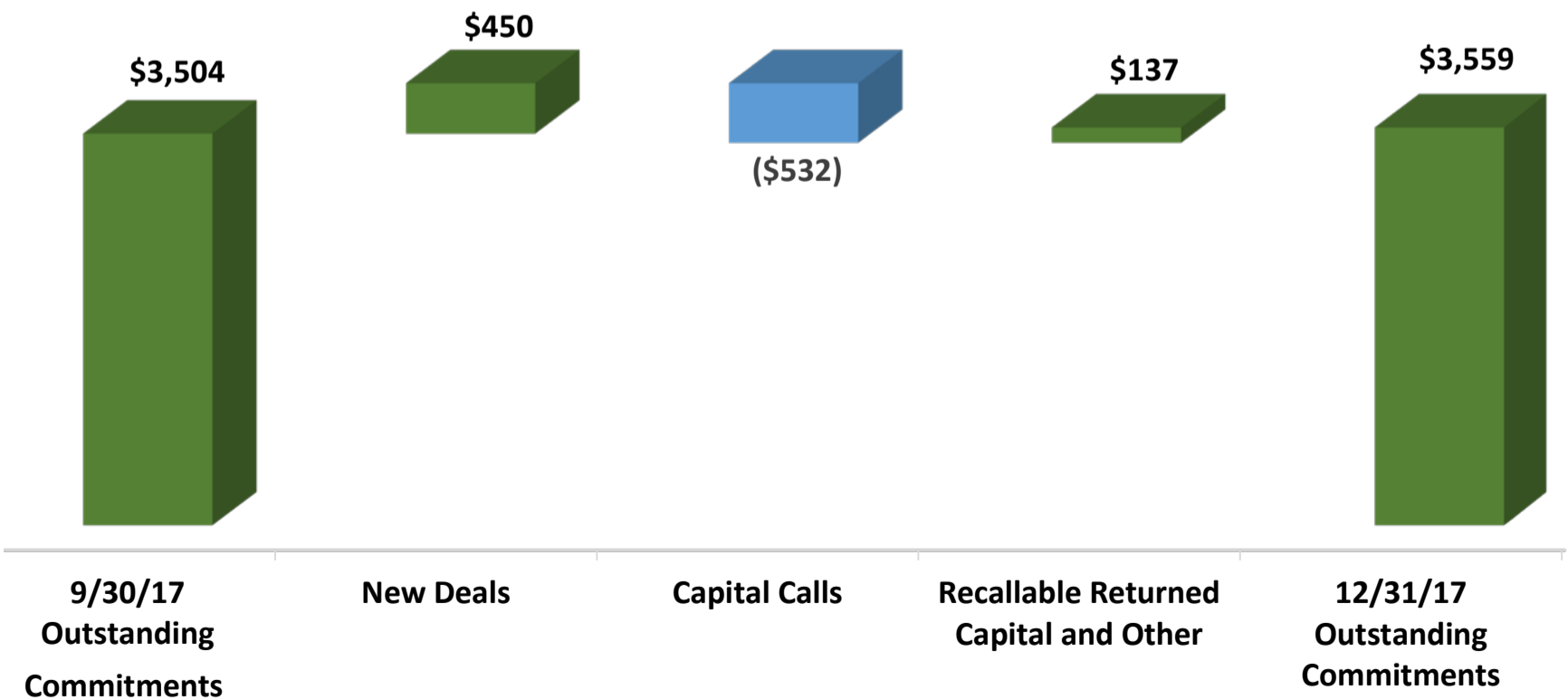
\$ Millions

Invested Commitments



\$ Millions

Outstanding Commitments



SMRS

Real Return and Opportunistic

12/31/17

Top Ten Advisors or Entities

Advisor or Entity	Market Value
Apollo Global Management	\$ 1,234,569,561
Barings Alternative Investments	1,210,452,238
Domain Capital Advisors	817,987,074
Fortress Investment Group	488,731,425
Kayne Anderson Capital Advisors	284,329,607
Orion Resource Partners	271,043,081
Ridgewood Energy	243,704,950
Czech Asset Management	240,085,783
HPS Investment Partners	179,004,683
KKR Asset Management	169,878,534
Total Market Value	\$ 5,139,786,937

State of Michigan Retirement Systems

PRIVATE EQUITY REVIEW

Investment Advisory Committee Meeting

March 8, 2018



Peter A. Woodford
Senior Investment Manager
Private Equity Division

EXECUTIVE SUMMARY

Performance

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	17.5%	12.3%	14.3%	14.6%	9.9%
PE Benchmark Returns	22.1%	14.1%	17.4%	17.5%	12.2%
Peer Median Returns	13.7%	8.5%	9.9%	10.6%	7.2%
Percentile Rank vs. Peers*	26	7	13	11	8

*State Street Universe greater than \$1 billion

- Private Equity returns have been strong relative to peer median returns, ranking in the top 8% of peers over the past ten years. Outperformance to peers is likely attributable to fund selectivity and strategy
- It is not unusual for private equity returns to lag the public market benchmark return in up markets and lead the public market benchmark in down markets. The past eight years have been no exception due to the third longest expansion in U.S. history. Over the past ten years, a full market cycle, the Private Equity Division has delivered 1.4% annualized excess returns over the S&P 500 (ten year S&P 500 return 8.5%), but underperformed the benchmark by 2.3%.
- For the twelve months ending December 31, 2017, the Private Equity Division returned approximately \$456 million, net of contributions, to the pension fund. Although the pace of distributions continues to slow, distribution activity should remain healthy as long as the economic expansion continues. General Partners are incentivized to exit investments at current valuations.
- Commitments closed during the quarter include:
 - \$250 million to Carlyle Partners VII, LP, a buyout fund
 - \$175 million to Affinity Asia Pacific Fund V, LP, a pan-Asia buyout fund
 - \$100 million to Sycamore Partners III, LP, a middle market buyout fund
 - \$100 million to Charlesbank Equity Fund IX, LP, a middle market buyout fund
 - \$50 million to Charlesbank Fund IX Overage Allocation Program, an overage fund
 - \$50 million to Berkshire Fund IX Coinvestment Fund, LP, a co-investment fund
 - \$45 million to Warburg Pincus Financial Sector, LP, a special situations fund

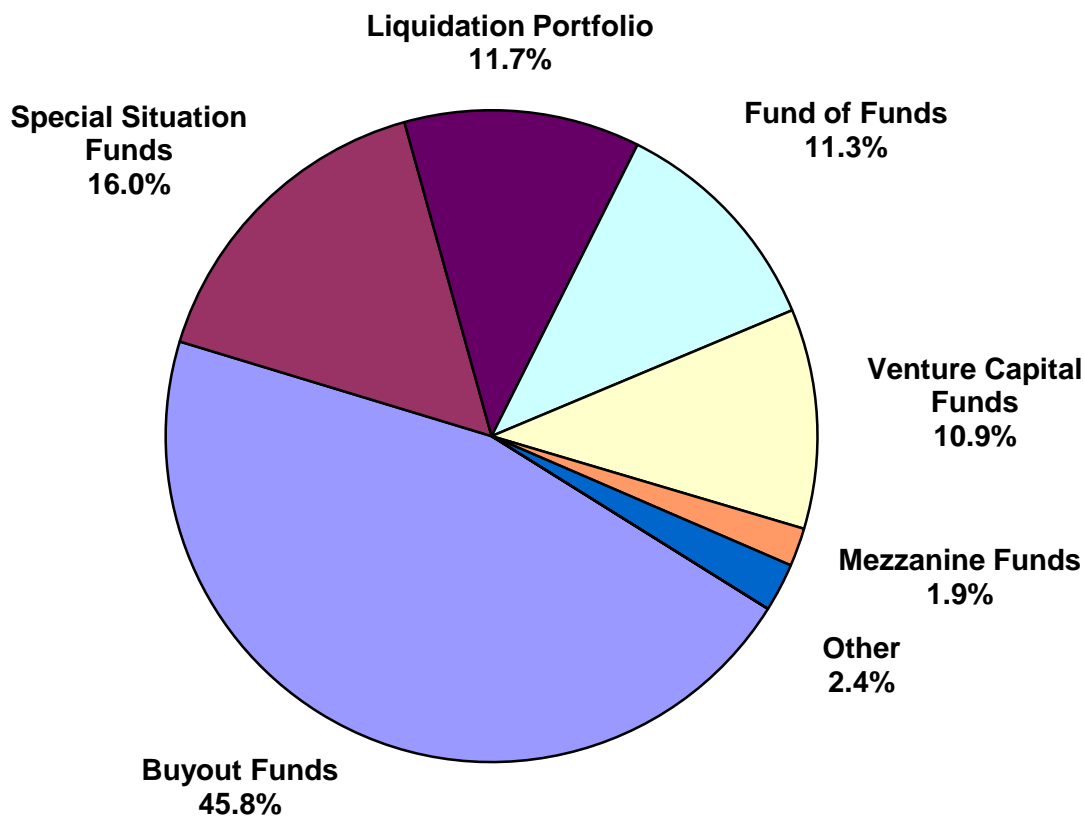
Strategy Update

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

SMRS

Private Equity

12/31/17



Market Value in Millions				
	<u>12/31/17</u>		<u>12/31/16</u>	
Buyout Funds	\$4,872	45.8%	\$4,314	45.1%
Special Situation Funds	1,704	16.0%	1,648	17.2%
Liquidation Portfolio	1,249	11.7%	1,451	15.2%
Fund of Funds	1,196	11.3%	686	7.2%
Venture Capital Funds	1,162	10.9%	1,095	11.4%
Mezzanine Funds	197	1.9%	141	1.5%
Other	249	2.4%	228	2.4%
Total	<u>\$10,629</u>	<u>100.0%</u>	<u>\$9,563</u>	<u>100.0%</u>

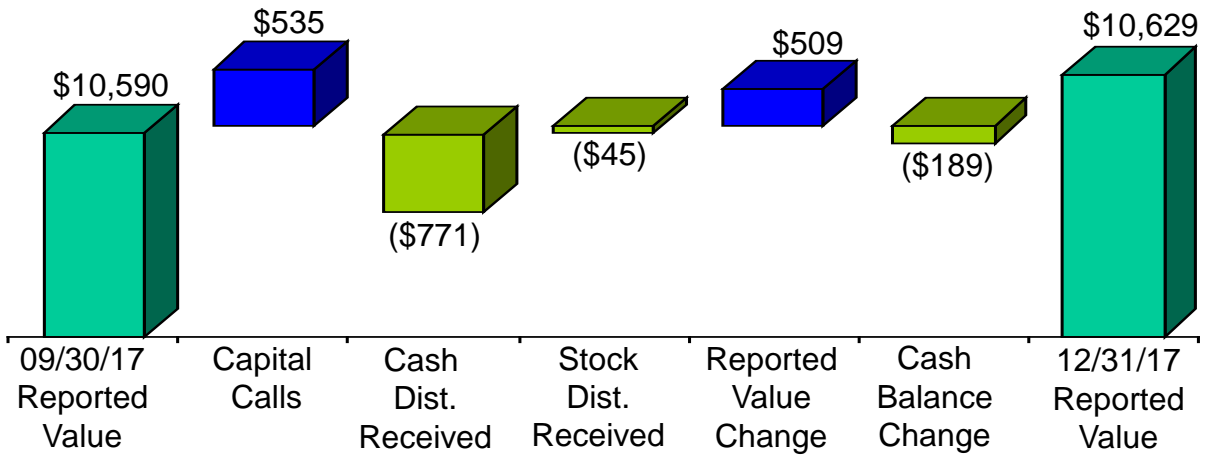
SMRS

Private Equity

12/31/17

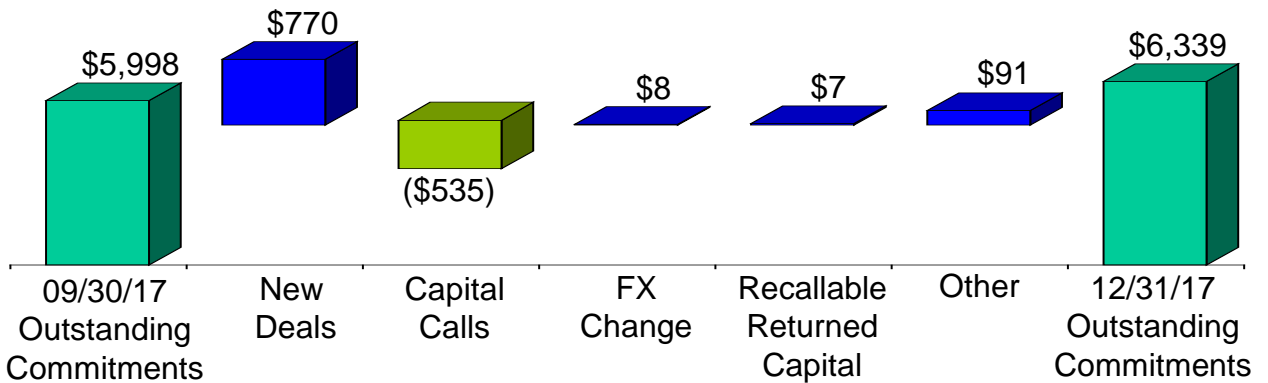
Invested Commitments

(\$ in Millions)



Outstanding Commitments

(\$ in Millions)

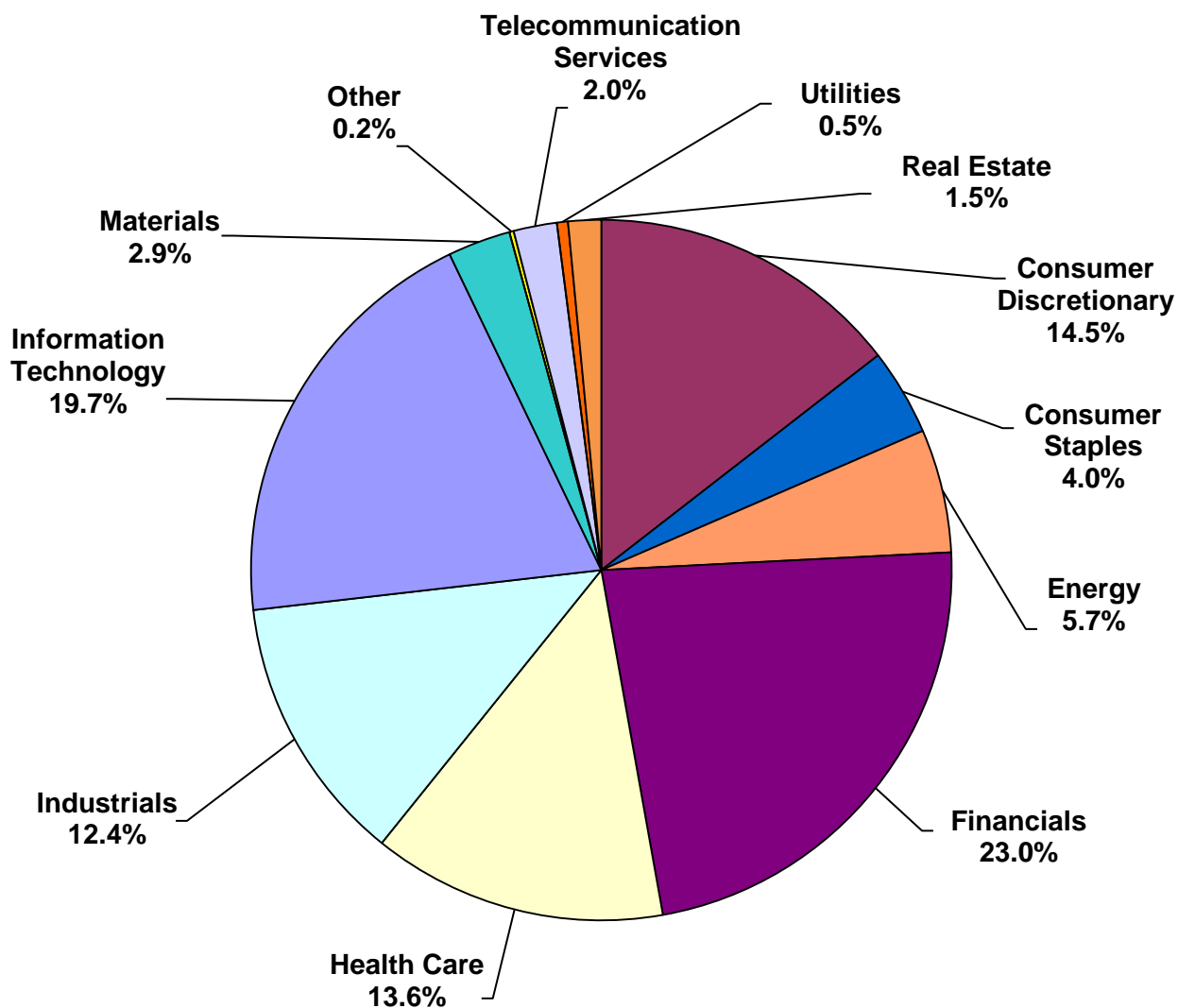


SMRS

Private Equity

12/31/17

Investments by Industry



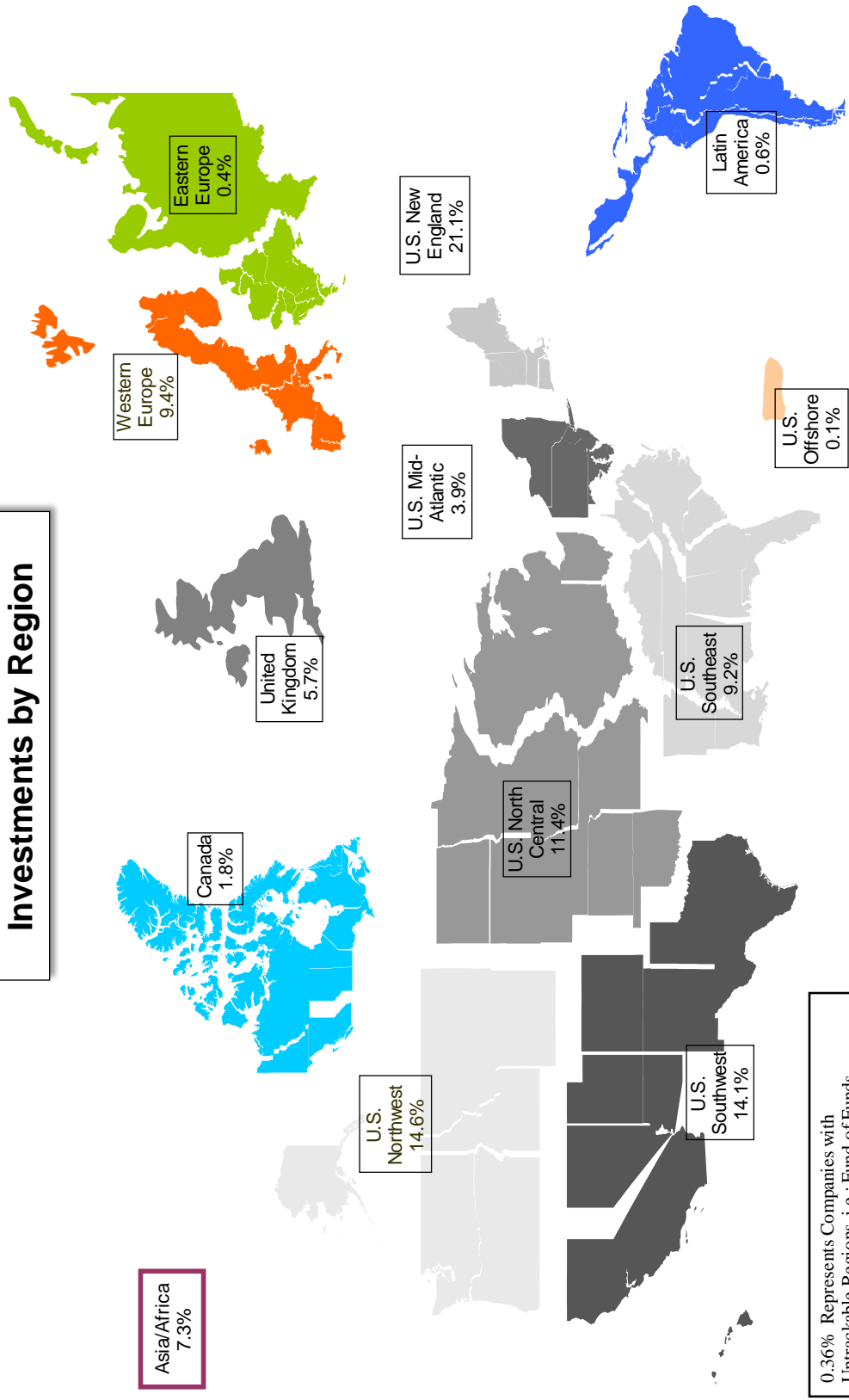
These numbers are based on the most recent available General Partner Data; primarily 12/31/17 and are subject to change.

SMRS

Private Equity

12/31/17

Investments by Region



0.36% Represents Companies with Untrackable Regions, i.e.; Fund of Funds

Geographic Report: North America 74%, Europe 15%, Asia 7%, Other 4%

SMRS

Private Equity

12/31/17

Portfolio by Vintage Year

(\$ in Millions)

Asset Vintage	Reported Value	Outstanding Commitmen	Total Exposure
1986-98	\$ 5	\$ 8	\$ 13
1999	14	10	24
2000	68	26	94
2001	135	61	196
2002	41	9	50
2003	12	18	30
2004	100	48	148
2005	299	24	323
2006*	664	215	879
2007	678	142	820
2008	846	158	1,004
2009	32	1	33
2010	321	15	336
2011	720	110	830
2012	1,330	161	1,491
2013	459	207	666
2014	1,124	480	1,604
2015	2,841	1,464	4,305
2016	644	1,569	2,213
2017	47	1,613	1,660
Income Accruals	1	0	1
Cash	241	0	241
Act. Small Cap - Stock Dist	7	0	7
Total	\$ 10,629	\$ 6,339	\$ 16,968

*Liquidation portfolio is 2006 vintage

FX Exposure

(\$ in Millions)

	Reported Value	Outstanding Commitment	Total Exposure	Total (USD)
Euro (\$1.20/ €)	€ 445	€ 385	€ 830	\$997

SMRS

Private Equity

12/31/17

Top 10 Sponsors

(\$ in Millions)

<u>Asset Type</u>	<u>Reported Value</u>	<u>Outstanding Commitment</u>	<u>Total</u>
HarbourVest Partners	\$ 1,956	\$ 346	\$ 2,302
KKR	524	389	913
Grosvenor Capital Management	420	414	834
Blackstone Capital Partners	593	203	796
Warburg Pincus Capital	523	236	759
Advent International	330	405	735
Leonard Green & Partners	455	165	620
The Carlyle Group	351	187	538
TPG	287	138	425
Berkshire Partners	218	197	415
Top 10 Total Value	<u><u>\$ 5,627</u></u>	<u><u>\$ 2,680</u></u>	<u><u>\$ 8,337</u></u>

Cash Weighted Rates of Return*

<u>(Net IRR)</u>	<u>Current Qtr.</u>	<u>1-Year</u>	<u>3-Year</u>	<u>5-Year</u>	<u>10-Year</u>
Buyout	4.4%	19.9%	14.0%	15.9%	10.2%
Fund of Funds	6.3%	16.6%	12.4%	13.0%	8.2%
Mezzanine	3.7%	14.2%	6.6%	10.4%	7.9%
Special Situations	3.4%	15.1%	8.8%	10.8%	8.5%
Venture Capital	6.5%	14.0%	12.2%	16.1%	16.1%

*These numbers are based on most recent available General Partner reported data; primarily 12/31/17 and are subject to change.

SMRS

Private Equity

12/31/17

Net Market Values by Ownership Entity

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
Accel Europe I, L.P.	\$ 6,520,038	\$ 1
Accel Europe II	16,020,753	3,300,000
Accel Growth Fund II, L.P.	11,637,972	240,000
Accel Growth Fund III, L.P.	12,752,177	1,120,000
Accel Growth Fund IV L.P.	9,767,765	11,880,000
Accel IX, L.P.	4,737,814	3,000,000
Accel Leaders Fund L.P.	2,688,365	2,805,000
Accel London V L.P.	3,438,480	8,220,000
Accel VI-S	2,571,535	652,611
Accel VI, L.P.	1,383,709	0
Accel VII, L.P.	250,638	5,000,000
Accel VIII, L.P.	4,100,094	4,782,499
Accel X, L.P.	16,252,156	400,000
Accel XI, L.P.	6,801,753	1,680,000
Accel XII, L.P.	6,224,741	1,680,000
Accel XIII, L.P.	2,960,636	6,800,000
Advent Global Private Equity III	0	20
Advent Global Private Equity V	8,249,300	8,700,000
Advent International GPE VI-A LP	92,501,573	0
Advent International GPE VII-B, L.P.	234,428,669	14,500,000
Advent International GPE VIII-B, L.P.	105,426,413	123,412,500
Advent Latin American Private Equity Fund VI, L.P.	15,694,077	18,952,500
Affinity Asia Pacific Fund II, L.P.	0	5,288,237
Affinity Asia Pacific Fund III, L.P.	55,630,613	11,784,109
Affinity Asia Pacific Fund IV, L.P.	99,816,216	51,194,675
** Affinity Asia Pacific Fund V L.P.	0	175,000,000
Apax Digital, L.P.	0	50,000,000
Apax Europe Fund VI	20,174,008	2,539,449
Apax Europe V, L.P.	0	0
Apax Europe VII, L.P.	36,451,260	1,788,448
Apax IX, L.P.	68,928,728	80,700,000
Apax US VII	9,713,776	417,509
Apax VIII - B, L.P.	107,293,693	9,245,326
Apollo Investment Fund IX, L.P.	0	100,000,000
Apollo Investment Fund VIII L.P.	79,760,409	30,993,851
Arboretum Ventures II	2,148,460	0
Arboretum Ventures III, L.P.	12,532,389	1,170,000
Arboretum Ventures IV, L.P.	7,567,559	20,160,000
Ares Corporate Opportunities Fund II	7,904,932	11,423,773

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
Accel Europe I, L.P.	\$ 6,520,038	\$ 1
Ares Corporate Opportunities Fund III, LP	93,473,695	8,913,538
Ares Corporate Opportunities Fund IV, L.P.	83,759,878	25,105,219
AXA ASF Miller Co-Investment	0	23,121,187
Axiom Asia IV, L.P.	15,046,337	35,497,811
Axiom Asia Private Capital Fund III, L.P.	33,664,896	10,814,264
BC European Capital IX	80,204,486	3,065,189
BC European Capital VII, L.P.	583,913	0
BC European Capital VIII, L.P.	14,147,992	9,390,256
** Berkshire Fund IX Coinvestment Fund, L.P.	0	50,000,000
Berkshire Fund IX, L.P.	42,223,921	131,360,756
Berkshire Fund VI, L.P.	45,297,552	7,554,903
Berkshire Fund VII, L.P.	39,296,007	2,449,845
Berkshire Fund VIII, L.P.	90,972,255	5,671,350
Blackstone Capital Partners IV	20,544,328	4,792,430
Blackstone Capital Partners V	25,582,725	15,960,493
Blackstone Capital Partners V-S	2,479,529	712,476
Blackstone Capital Partners VI, LP	266,768,640	44,934,674
Blackstone Capital Partners VII, L.P.	53,549,462	218,745,365
Bridgepoint Europe IV	38,484,427	6,411,422
Carlyle Europe Partners II	1,330,455	4,440,494
Carlyle Europe Partners III	22,464,020	6,373,108
Carlyle Europe Partners IV, L.P.	74,318,562	53,825,944
Carlyle Partners IV, L.P.	4,681,521	16,009,296
Carlyle Partners V L.P.	65,152,268	54,261,025
Carlyle Partners VI, L.P.	161,993,434	20,023,837
** Carlyle Partners VII, L.P.	0	250,000,000
Castle Harlan Partners IV	6,932,789	5,286,319
Castle Harlan Partners V	44,703,724	29,635,422
CCMP Capital Investors II	0	10,346,490
CCMP Capital Investors III, L.P.	42,575,042	11,523,484
Centerbridge Capital Partners III, LP	37,448,753	43,469,049
Cerberus SMRS Partners, L.P.	65,537,957	23,304,657
** Charlesbank Equity Fund IX, L.P.	0	100,000,000
** Charlesbank Fund IX Overage Allocation Program	0	50,000,000
CM Liquidity Fund, L.P.	0	25,000,000
Coller International Partners V, L.P.	27,166,155	43,600,000
Coller International Partners VI, L.P.	45,399,556	29,723,267
Coller International Partners VII, L.P.	44,299,250	114,723,288
Crescent Mezzanine Partners VI, L.P.	39,233,886	9,010,645
Crescent Mezzanine Partners VII	6,665,341	145,485,470
CVC Capital Partners VII, L.P.	0	180,119,991
DLJ Investment Partners II	165,586	0
DLJ Investment Partners III	1,362,235	4,737,035
Dover Street IX, L.P.	21,159,616	79,000,000
EDF Ventures III	1,137,456	0
EnCap Energy Capital Fund X, L.P.	28,013,775	17,350,631
Entertainment IP Fund, L.P.	5,068,901	44,015,694

	Adjusted Reported Value	Unfunded Commitment
Accel Europe I, L.P.	\$ 6,520,038	\$ 1
FIMI Opportunity 6, L.P.	10,509,363	40,818,183
FirstMark Capital I, L.P.	79,148,406	196,596
FirstMark Capital IV, L.P.	3,445,694	31,150,000
FirstMark Capital OF I, L.P.	20,357,747	0
FirstMark Capital OF II, L.P.	0	35,000,000
FirstMark Capital P2, L.P.	168,121,041	0
Flagship Pioneering VI	3,000,000	72,000,000
Flagship Ventures Fund 2004	6,002,948	0
Flagship Ventures Fund 2007, L.P.	16,976,379	0
Flagship Ventures Fund IV, L.P.	101,376,914	0
Flagship Ventures Fund V	48,737,251	7,000,000
Flagship Ventures Opportunities Fund I, L.P.	10,817,425	39,000,000
Fox Paine Capital Fund II, LP	33,284,256	15,382,699
FS Equity Partners VII, L.P.	66,265,197	38,073,468
G-IV Acquisition Holdings, LLC	17,921,776	0
GCM Grosvenor Fund Investment Program I, L.P.	10,769,086	1,372,883
GCM Grosvenor Fund Investment Program II, L.P.	36,811,154	15,418,127
GCM Grosvenor Fund Investment Program III - 2004	52,856,699	4,968,096
GCM Grosvenor Fund Investment Program III - 2006	57,045,039	7,434,098
GCM Grosvenor Fund Investment Program V, L.P.	76,849,826	11,133,498
GCM Grosvenor Fund Investment Program VI, L.P.	22,987,868	11,586,621
GCM Grosvenor Fund Investment Program VIII, L.P.	32,106,756	69,892,557
GCM Grosvenor SeasPriFIP LP (PIS06-10)	73,675,077	22,084,557
GCM Grosvenor SeasPriFIP LP (PIS14)	187,627,095	45,309,497
GCM Grosvenor SeasPriFIP LP (Seed)	42,200,100	13,824,219
Genstar Capital Partners VIII, L.P.	4,465,395	44,999,477
Genstar VIII Opportunities Fund I, L.P.	12,869,231	37,130,769
Green Equity Investors IV	6,170,263	1,136,036
Green Equity Investors V	174,570,889	25,966,435
Green Equity Investors VI, L.P.	117,637,965	13,124,686
Green Equity Investors VII, L.P.	52,453,325	146,545,752
GSO Capital Opportunities Fund II, L.P.	20,157,816	11,479,647
GSO Capital Opportunities Fund III, L.P.	25,788,339	72,541,357
GSO COF III Co-Investment Fund, L.P.	4,376,831	45,246,436
HarbourVest Dover Street VIII, L.P.	40,585,660	8,437,500
HarbourVest Int'l III Direct	0	1,000,000
HarbourVest Int'l III Partnership	335,860	1,200,000
Harbourvest Partners Co-Investment Fund IV L.P	53,641,294	52,250,000
HarbourVest Partners Mezzanine Income Fund	43,019,922	60,810,000
HarbourVest V Partnership	212,884	300,000
HarbourVest VI - Direct Fund LP	3,493,046	750,000
HarbourVest VI Partnership	6,115,222	2,000,000
Harvest Partners VII, L.P.	21,748,000	52,154,048
HPS Mezzanine Partners III, L.P.	19,902,152	30,256,521
Insight Venture Partners Growth-Buyout Coinvestment Fund, L.P.	53,721,814	11,500,000
Insight Venture Partners IX, L.P.	99,067,965	17,500,000
Insight Venture Partners X, L.P.	0	100,000,000

	Adjusted Reported Value	Unfunded Commitment
Accel Europe I, L.P.	\$ 6,520,038	\$ 1
Kelso Investment Associates IX, L.P.	80,702,758	41,401,200
Kelso Investment Associates VII	2,444,300	4,970,176
Kelso Investment Associates VIII	81,022,298	22,757,463
Khosla Ventures III, L.P.	25,465,541	1,250,000
Khosla Ventures IV, L.P.	78,009,916	950,000
Khosla Ventures V, L.P.	39,734,111	16,000,000
KKR 2006 Fund, L.P.	101,130,700	5,040,754
KKR Americas Fund XII, L.P.	3,032,916	196,967,084
KKR Asian	16,506,684	0
KKR Asian Fund II, L.P.	55,090,967	7,149,199
KKR Asian Fund III	0	100,000,000
KKR China Growth Fund	36,659,741	1,090,535
KKR E2 Investors (Annex) Fund	142,536	0
KKR European Fund II	1,754,224	0
KKR European Fund III	48,809,415	22,854,187
KKR European Fund IV L.P.	93,938,097	43,874,453
KKR European Fund LP 1	0	0
KKR Millennium Fund	25,970,131	0
KKR North America Fund XI, L.P.	141,168,851	11,764,192
Lightspeed Venture Partners VI	423,376	0
Lightspeed Venture Partners VII, L.P.	26,567,329	0
Lion Capital Fund I (HME II)	100,591	12,178,943
Lion Capital Fund II	10,934,514	4,872,851
Lion Capital Fund III, L.P.	67,562,387	12,383,252
MatlinPatterson Global Opportunities Partners II	2,106,703	0
MatlinPatterson Global Opportunities Partners III	57,100,217	3,213,714
Menlo Ventures IX, L.P.	2,994,033	0
Menlo Ventures X, L.P.	49,203,976	0
Menlo Ventures XI, L.P.	79,528,748	1,000,000
Menlo Ventures XIV, L.P.	350,000	6,650,000
MeriTech Capital Partners II, L.P.	2,515,258	1,850,000
Meritech Capital Partners III, L.P.	9,561,962	0
Meritech Capital Partners IV, L.P.	16,969,368	900,000
Meritech Capital Partners V, L.P.	15,105,142	4,750,000
Michigan Growth Capital Partners II, L.P.	181,306,022	15,856,890
Michigan Growth Capital Partners III, L.P.	14,239,001	85,613,172
Michigan Growth Capital Partners, LP	72,985,373	14,284,471
Midtown Fund III, L.P.	0	0
Midtown II Liquidating Trust	2,337,231	0
New Leaf Growth Fund I, L.P.	165,691,117	0
New Leaf Ventures II, L.P.	15,788,688	0
New Leaf Ventures III, L.P.	20,854,504	16,875,000
Nordic Capital VI, L.P.	3,832,432	0
Nordic Capital VII	46,047,464	3,305,971
Nordic Capital VIII, L.P. (Alpha)	37,925,084	15,322,153
Oak Investment Partners X, L.P.	7,337,569	0
Oak Investments Partners IX, L.P.	658,104	0

	<u>Adjusted Reported Value</u>	<u>Unfunded Commitment</u>
Accel Europe I, L.P.	\$ 6,520,038	\$ 1
Oaktree Opportunities Fund X, L.P.	18,600,689	15,000,000
Oaktree Opportunities Fund Xb, L.P.	0	70,000,000
OCM Opportunities Fund IX, L.P.	57,907,103	0
OCM Opportunities Fund VII (B), L.P.	3,535,447	5,000,000
OCM Opportunities Fund VII, L.P.	4,623,971	0
OCM Opportunities Fund VIII B, L.P.	18,754,939	0
OCM Opportunities Fund VIII, L.P.	6,515,646	0
OCM Principal Opportunities Fund IV	6,131,005	5,002,377
Ocqueoc Holdings, LLC	15,054,952	50,000,000
One Liberty Fund IV	1,239,830	0
One Liberty Ventures 2000	5,387,453	0
Parthenon Investors II	886,139	3,179,849
Parthenon Investors III	36,435,784	2,732,182
Parthenon Investors IV, L.P.	49,777,169	5,869,897
Peninsula Capital Fund IV	6,216,676	2,201,026
Peninsula Fund VI, L.P.	24,170,318	19,064,105
Public Pension Capital, LLC	45,545,488	63,706,139
Questor Partners Fund II	51,303	5,816,186
Rhone Partners V, L.P.	37,360,711	81,093,460
Riverside Capital Appreciation Fund VI, LP	65,011,780	17,844,107
Riverside Micro Cap Fund I, LP	30,121,709	5,782,975
Riverside Micro-Cap Fund II, L.P.	50,783,106	2,735,834
Riverside Micro-Cap Fund III, L.P.	63,651,340	4,483,406
Riverside Micro-Cap Fund IV	26,419,299	27,272,631
Science Ventures Fund II, L.P.	7,000,000	13,000,000
Shamrock Growth Capital Fund IV, L.P.	10,134,074	37,771,469
Silver Lake Partners II	3,825,334	3,531,586
Silver Lake Partners III	56,407,318	13,199,137
Silver Lake Partners IV, L.P.	53,282,985	7,873,120
Silver Lake Partners V, L.P.	0	67,500,000
SM/TCP L.P.	34,549,330	7,139,418
SMRS - TOPE LLC	841,846,756	0
SMRS-NCRP LLC	945,648,484	139,930,389
** Sycamore Partners III, L.P.	0	100,000,000
TCW Shared Op Fund III	102,919	0
TCW/Crescent Mezzanine Partners III Secondary	264,370	0
TCW/Crescent Mezzanine Partners III, L.P.	2,408,455	29,733,856
TCW/Crescent Mezzanine Partners IV, L.P.	903,826	13,660,773
TCW/Crescent Mezzanine Partners IVB Secondary	550,318	0
TCW/Crescent Mezzanine Partners V, LLC	19,882,248	15,382,013
TCW/Crescent Mezzanine Partners VC Secondary	5,863,193	0
The Huron Fund III, L.P.	9,740,575	4,542,756
The Huron Fund IV, L.P.	27,114,127	4,544,456
The Huron Fund V, L.P.	0	35,000,000
The Shansby Group 4	45,179	521,018
The Shansby Group 5 (TSG5)	933,508	4,261,291
Thoma Bravo Fund XII, L.P.	71,943,530	76,910,155

	Adjusted Value	Unfunded Commitment
Accel Europe I, L.P.	\$ 6,520,038	\$ 1
TPG IV (Texas Pacific Group IV)	4,531,274	211,725
TPG Partners III, LP	939,331	2,087,002
TPG Partners VI, L.P.	134,625,529	16,905,811
TPG Partners, VII, L.P.	72,000,647	91,890,686
TPG V (Texas Pacific Group V)	74,796,244	26,611,195
Trilantic Capital Partners V (North America) Fund A, L.P.	38,358,779	10,918,032
TSG6, L.P.	98,722,790	30,776,741
TSG7 A L.P.	41,932,879	81,762,247
Turnbridge Capital Partners I , LP	47,053,817	39,683,894
Veritas Capital Fund V, L.P.	83,941,444	3,364,130
Veritas Capital Fund VI, L.P.	4,434,307	94,980,602
Veritas V Co-Investors, L.P.	12,247,889	15,000,000
Vista Equity Endeavor Fund I, L.P.	13,072,055	36,211,291
Vista Equity Partners Fund V, L.P.	51,299,236	10,878,928
Vista Equity Partners Fund VI, L.P.	54,408,849	20,836,912
Vista Foundation Fund III, L.P.	6,981,389	17,506,476
Warburg Pincus China, L.P.	14,003,871	30,915,000
Warburg Pincus Energy MCIP, L.P.	0	10,396,887
Warburg Pincus Energy, L.P.	53,765,488	40,900,000
Warburg Pincus Equity Partners, L.P.	1,809,625	0
** Warburg Pincus Financial Sector, L.P.	0	45,000,000
Warburg Pincus International Partners	6,873,000	0
Warburg Pincus Private Equity IX	23,558,772	0
Warburg Pincus Private Equity VIII, L.P.	9,237,539	0
Warburg Pincus Private Equity X, L.P.	140,025,707	0
Warburg Pincus Private Equity XI, L.P.	176,999,061	5,800,000
Warburg Pincus Private Equity XII Secondary, L.P.	12,119,250	12,887,500
Warburg Pincus Private Equity XII, L.P.	84,033,813	90,212,500
WestAm COREplus Private Equity QP	2,062,001	2,086,719
WestAm Special Private Equity Partners	3,379,316	2,283,449
Total Private Equity	\$ 10,379,899,663	\$ 6,339,089,592
Cash	223,955,191	-
Active Small Cap Cash	17,173,003	-
Active Small Cap	7,370,558	-
Income Accruals	1,099,852	-
Grand Total	\$ 10,629,498,267	\$ 6,339,089,592

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

** New Commitments made during quarter reported

State of Michigan Retirement Systems

DOMESTIC EQUITY REVIEW

Investment Advisory Committee Meeting

March 8, 2018



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	22.3%	10.7%	15.7%	13.4%	8.6%
S&P 1500	21.1%	11.4%	15.7%	13.7%	8.7%
Peer Median Returns	21.4%	10.8%	14.7%	12.5%	8.4%
Percent Rank vs. Peers *	33	53	35	32	35

*State Street Universe greater than \$1 billion

- Total Domestic Equity performed near the top third of its peer group over one, five, seven, and ten years, while slightly underperforming over the past three years.
- Total Domestic Equity outperformed the S&P 1500 by 110 basis points (bps) over the past year, performed nearly even with the benchmark over five and ten years, and underperformed over three and seven-year periods.
 - Division highlights include the following:
 - Outperformance of SMRS' internally managed portfolios by 170 bps during the past year.
 - Underweight to energy sector.
 - Positive contributions from Apple, Square, Adobe Systems, and Ally Financial.
 - Outperformance of SMRS' externally managed portfolios by 90 bps during the past year and by 10 bps over the past three years.
 - Ark Investments outperforming by 2,500 bps annualized since inception nearly two years ago.
 - Fisher Investments in top 5% of active managers over one, three, and five years.
 - LA Capital All-Cap Growth near top decile of active managers and outperforming benchmark over three and five years.
 - Clarkston Capital Small-Cap in top 2% of peer group since inception four years ago.
 - Significant contribution from Mellon Capital overlay strategy, adding 50 bps of excess return.

Asset Class Goal

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

Strategy Update

- The Domestic Equity Portfolio is overweight the financial sector, defensive stocks and technology companies, while remaining underweighted to commodity related issues.
 - Attractively priced financial and defensive stocks offset each other from an interest rate risk standpoint, paving the way for potential outperformance in any rate environment. Technology companies provide a diversifying source of alpha.
 - Total Domestic Equity's portfolio would outperform the S&P 1500 by ~19% were it to appreciate to the market multiple of 20.4X from where it stands now at 17.5X.
 - As the portfolio is also growing faster than the market alongside a higher dividend yield and a similar return on equity, it is expected for the multiple to at least partially converge with the market over the next five years.
 - If the multiples do not converge we expect outperformance based on faster earnings growth and a higher level of dividends.
- Portfolio beta is 1.15, so a significant downward move in the S&P 1500 would present a modest headwind to performance.
- Committed \$100 million to a new small/mid-cap manager, Ancora, during the past quarter.
 - Portfolio manager Dan Thelen is a value-oriented manager who emphasizes extensive bottom up research.
 - Relaunched strategy after a successful tenure at Loomis Sayles.
 - Significant ongoing personal investment in fund, highly committed to seeing it be successful.

Market Environment and Outlook

- At ~18x forward earnings, equity markets remain rich relative to history, but are reasonably priced for an environment where bond yields are 4% or lower.
- Assuming 4.5% long-term expected earnings growth (roughly in line with nominal GDP), and the market's average long-term return on equity of 14.5%, the S&P 1500 is expected to pay out 70% of its earnings.
 - This equates to a 3.0% total shareholder yield, or 1.2% in share count reductions via buybacks on top of the current 1.8% S&P 1500 dividend yield.
 - The market is thus poised to return an estimated 7.5% (3.0% shareholder yield plus 4.5% earnings growth) in an environment where multiples do not change.
- This compares favorably to the 30-year U.S. Treasury at 2.7%, and unfavorably to the historical compound annual return for the S&P 500 from 1928 – 2016 of 9.5%.

SMRS

Domestic Equity Strategies

12/31/17

Markets	Amount	Total	% of Total
Internal Indexed (\$ in Millions)			
Indexed Portfolios	\$7,790		
Total Indexed		\$7,790	45.7%
Internal Active			
Active Portfolios	\$4,936		
Total Internal Active		\$4,936	28.9%
External Active			
Los Angeles Capital	\$1,201		
Fisher Investments	663		
Seizert Capital Partners	555		
Mellon Capital	520		
Clarkston Capital Partners	511		
ARK Investments	399		
Bivium Capital	165		
Attucks Asset Management	152		
Ancora	104		
Munder Capital Management	29		
Northpointe Capital	26		
Total External Active		\$4,325	25.4%

Total Domestic Equity

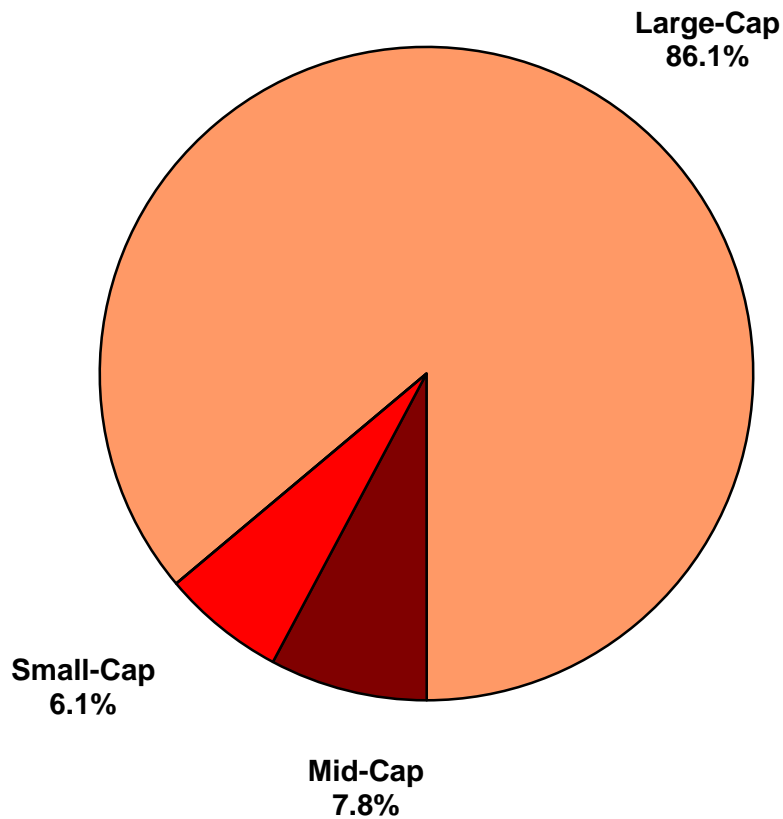
\$17,051

100.0%

SMRS

Domestic Equity Exposure By Market Cap

12/31/17



Market Value in Millions			
	12/31/17		
	<u>Assets</u>	<u>Percent</u>	<u>S&P 1500</u>
Large-Cap (>\$10B)	\$14,681	86.1%	89.3%
Mid-Cap (>\$4 <\$10B)	1,330	7.8%	5.6%
Small-Cap (<\$4B)	1,040	6.1%	5.1%
Total Domestic Equity	<u>\$17,051</u>	<u>100.0%</u>	<u>100.0%</u>

SMRS

Domestic Equities Composite

12/31/17

Date:	<u>12/31/17</u>	<u>9/30/17</u>	<u>6/30/17</u>	<u>3/31/17</u>
Assets (\$ in Millions):	\$17,051	\$16,751	\$17,392	\$16,905
Number of Securities:	1,304	1,271	1,278	1,300
Active Share:	39%	41%	44%	40%

Benchmark: S&P 1500

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

Characteristics:	<u>SMRS</u>	<u>S&P 1500</u>	<u>S&P 1500 Value</u>
Weighted Average Capitalization (\$ in Billions)	\$222.1	\$175.5	\$121.8
P/E FY1	17.5x	20.4x	18.1x
P/E upside to S&P 1500	18.9%	0.0	12.8%
Price/Book	3.0x	3.2x	2.2x
Beta	1.15	1.00	1.00
Tracking Error	1.7%	--	3.2%
Dividend Yield	2.1%	1.8%	2.4%
Buyback Yield	1.4%	1.7%	1.6%
Reinvestment Rate	6.3%	3.6%	4.4%
Return on Equity	16.7%	15.5%	12.1%

TOP TEN WEIGHTED - Domestic Equities

12/31/17

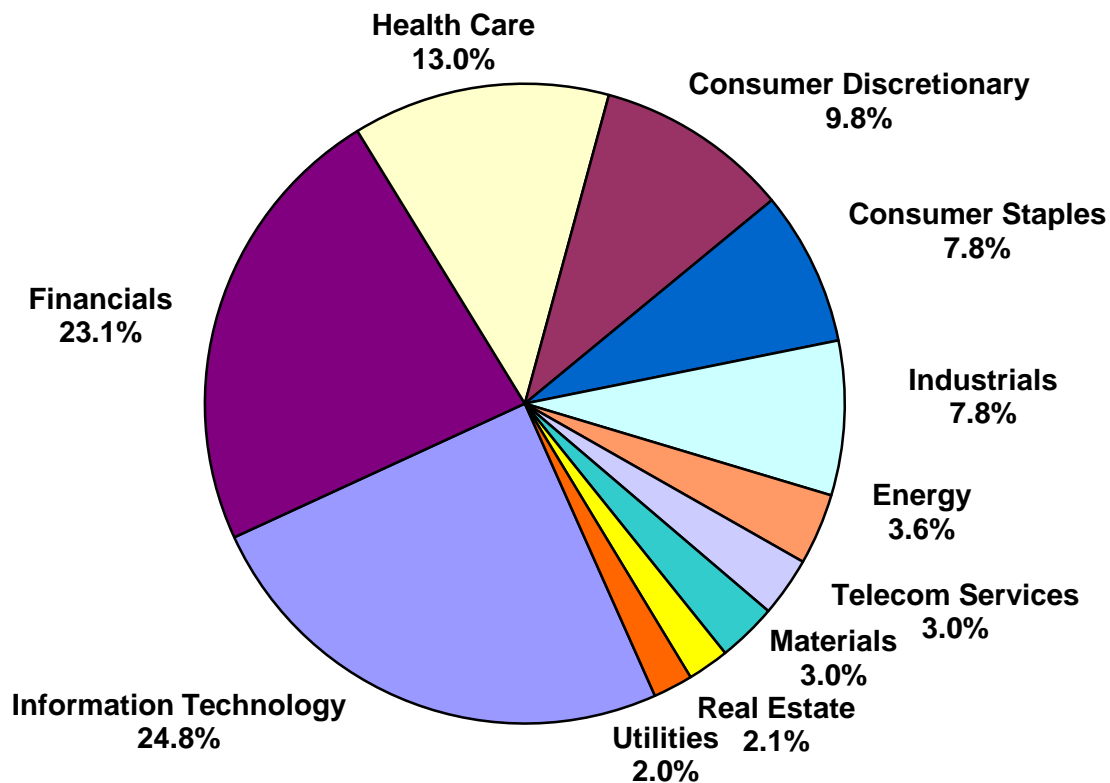
(\$ in Billions* - \$ in Millions**)

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
SPDR S&P 500 ETF Trust	8.2%	\$277.9	20.3	\$1,377.5
Apple Inc.	3.2%	860.0	14.8	527.5
Berkshire Hathaway Inc. Class B	3.1%	489.0	30.9	519.6
Verizon Communications Inc.	2.3%	215.9	14.1	386.1
Microsoft Corporation	1.9%	659.1	25.2	324.8
Facebook, Inc. Class A	1.7%	512.8	30.0	284.5
JPMorgan Chase & Co.	1.7%	366.3	15.5	280.6
Wells Fargo & Company	1.7%	296.8	15.1	275.9
Alphabet Inc. Class A	1.6%	731.9	32.7	260.5
Aflac Incorporated	1.6%	34.3	13.0	258.8
TOTAL	<u>27.0%</u>			<u>\$4,495.8</u>

SMRS

Domestic Equity By Sector

12/31/17



Market Value in Millions				
12/31/17				
	Assets	Percent	Benchmark	Difference
Information Technology	\$4,228	24.8%	23.0%	1.8%
Financials	3,943	23.1%	15.0%	8.1%
Health Care	2,224	13.0%	13.4%	-0.4%
Consumer Discretionary	1,666	9.8%	12.3%	-2.5%
Consumer Staples	1,329	7.8%	7.7%	0.1%
Industrials	1,324	7.8%	10.9%	-3.1%
Energy	609	3.6%	5.9%	-2.3%
Telecom Services	519	3.0%	1.9%	1.1%
Materials	509	3.0%	3.4%	-0.4%
Real Estate	367	2.1%	3.4%	-1.3%
Utilities	333	2.0%	3.1%	-1.1%
Total	\$17,051	100.0%	100.0%	

Benchmark: S&P 1500

SMRS

Actively Managed Composite

12/31/17

Date:	<u>12/31/17</u>	<u>9/30/17</u>	<u>6/30/17</u>	<u>3/31/17</u>
Assets (\$ in Millions):	\$9,261	\$9,126	\$9,455	\$9,181
Number of Securities:	999	950	977	981
Active Share:	71%	75%	78%	72%

Benchmark: S&P 1500

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

Characteristics:	<u>SMRS</u>	<u>S&P 1500</u>	<u>S&P 1500 Value</u>
Weighted Average Capitalization (\$ in Billions)	\$224.2	\$175.5	\$121.8
P/E FY1	15.8x	20.4x	18.1x
P/E upside to S&P 1500	30.3%	0.0	12.8%
Price/Book	2.8x	3.2x	2.2x
Beta	1.26	1.00	1.00
Tracking Error	3.1%	--	3.2%
Dividend Yield	2.5%	1.8%	2.4%
Buyback Yield	1.2%	1.7%	1.6%
Reinvestment Rate	7.3%	3.6%	4.4%
Return on Equity	17.0%	15.5%	12.1%

TOP TEN WEIGHTED - Actively Managed Equities

12/31/17

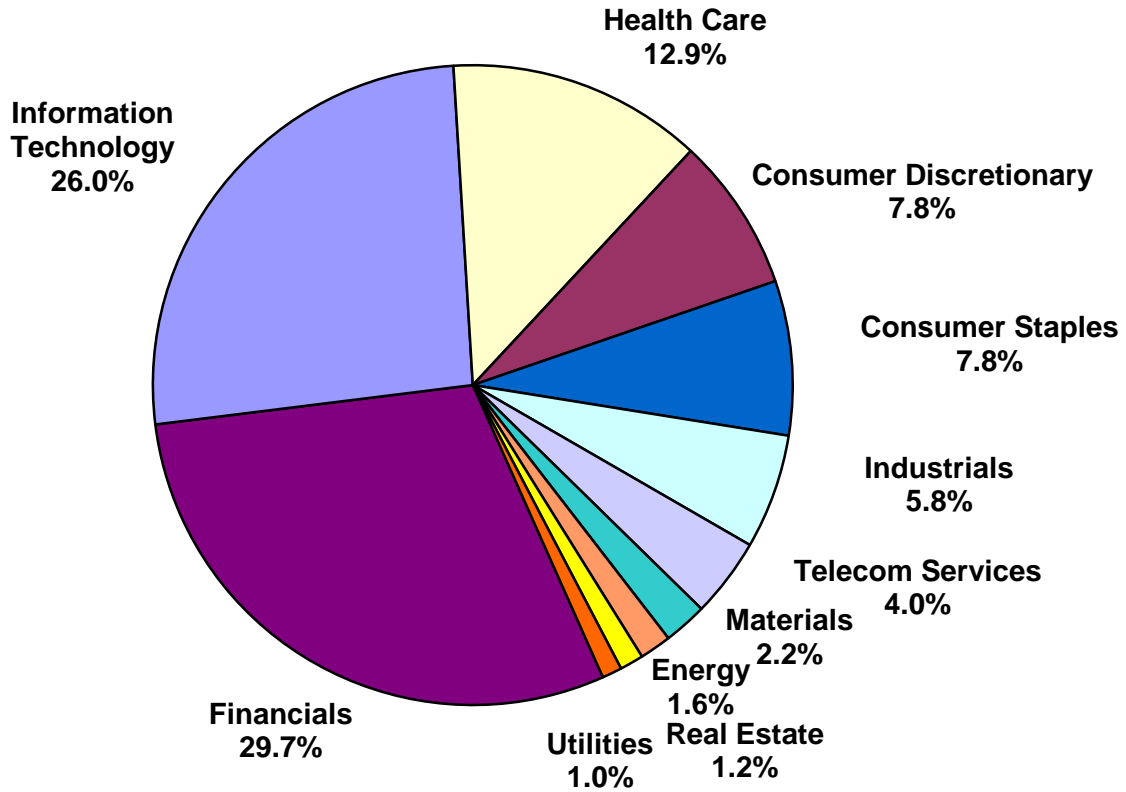
(\$ in Billions* - \$ in Millions**)

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
SPDR S&P 500 ETF Trust	11.1%	\$277.9	20.3	\$997.8
Berkshire Hathaway Inc. Class B	4.9%	489.0	30.9	442.2
Verizon Communications Inc.	3.6%	215.9	14.1	322.8
Apple Inc.	3.1%	860.0	14.8	272.8
Aflac Incorporated	2.8%	34.3	13.0	248.7
CVS Health Corporation	2.5%	73.4	12.3	219.4
Wells Fargo & Company	2.2%	296.8	15.1	197.1
AGNC Investment Corporation	2.2%	7.9	8.0	194.5
Gilead Sciences, Inc.	2.2%	93.6	8.2	193.9
JPMorgan Chase & Co.	1.9%	366.3	15.5	171.8
TOTAL	<u>36.5%</u>			<u>\$3,261.1</u>

SMRS

Active Equity By Sector

12/31/17



Market Value in Millions				
12/31/17				
	Assets	Percent	Benchmark	Difference
Financials	\$2,749	29.7%	15.0%	14.7%
Information Technology	2,409	26.0%	23.0%	3.0%
Health Care	1,198	12.9%	13.4%	-0.5%
Consumer Discretionary	726	7.8%	12.3%	-4.5%
Consumer Staples	721	7.8%	7.7%	0.1%
Industrials	536	5.8%	10.9%	-5.1%
Telecom Services	367	4.0%	1.9%	2.1%
Materials	202	2.2%	3.4%	-1.2%
Energy	150	1.6%	5.9%	-4.3%
Real Estate	109	1.2%	3.4%	-2.2%
Utilities	94	1.0%	3.1%	-2.1%
Total	\$9,261	100.0%	100.0%	

Benchmark: S&P 1500

Manager Performance - Net of Fees
12/31/17

<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	\$7,082,259,212	21.9%	11.6%	16.0%	14.1%	--	N/A
S&P 500		21.8%	11.4%	15.8%	13.8%	--	
Style & Risk Adjusted Benchmark		N/M	11.4%	15.7%	13.7%	--	
Lipper Large-Cap Core		20.9%	9.9%	14.4%	12.5%	--	
<i>Excess Return</i>		0.1%	0.2%	0.2%	0.3%	--	
<i>Alpha</i>		N/M	0.2%	0.3%	0.4%	--	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		37	18	12	10	--	
SMRS Large-Cap Core	2,150,973,101	20.5%	7.4%	15.4%	13.1%	8.2%	8/31/07
S&P 500		21.8%	11.4%	15.8%	13.8%	8.3%	
Style & Risk Adjusted Benchmark		N/M	7.9%	12.5%	11.5%	8.7%	
Lipper Large-Cap Core		20.9%	9.9%	14.4%	12.5%	7.6%	
<i>Excess Return</i>		-1.3%	-4.0%	-0.4%	-0.7%	-0.2%	
<i>Alpha</i>		N/M	-0.5%	2.9%	1.6%	-0.5%	
<i>Pct Rank vs Lipper Large-Cap Core</i>		58	88	27	39	30	
SMRS Large-Cap Growth	1,604,585,483	28.0%	9.6%	15.7%	13.5%	9.5%	5/31/05
S&P 500 Growth Index		27.4%	12.9%	17.0%	14.8%	10.1%	
Style & Risk Adjusted Benchmark		N/M	13.4%	17.9%	15.5%	10.2%	
Lipper Large Growth		29.1%	11.8%	15.9%	13.4%	9.7%	
<i>Excess Return</i>		0.5%	-3.3%	-1.3%	-1.3%	-0.6%	
<i>Alpha</i>		N/M	-3.9%	-2.2%	-2.1%	-0.7%	
<i>Pct Rank vs Lipper Large-Cap Growth</i>		60	86	58	50	51	
SMRS All-Cap Garp	1,126,401,400	21.0%	9.6%	15.1%	--	14.6%	4/30/11
S&P 1500 Super Composite		21.1%	11.4%	15.7%	--	13.2%	
Style & Risk Adjusted Benchmark		N/M	11.1%	15.5%	--	13.0%	
Lipper Multi Core		19.2%	8.9%	13.8%	--	11.1%	
<i>Excess Return</i>		-0.1%	-1.8%	-0.6%	--	1.4%	
<i>Alpha</i>		N/M	-1.5%	-0.4%	--	1.6%	
<i>Pct. Rank vs. Lipper Multi Core</i>		38	49	36	--	2	
LA Capital Deep Value	735,321,602	14.6%	--	--	--	9.6%	4/1/15
S&P 1500 Value		15.0%	--	--	--	10.6%	
Style & Risk Adjusted Benchmark		N/M	--	--	--	10.9%	
Lipper Multi-Cap Value		15.4%	--	--	--	8.8%	
<i>Excess Return</i>		-0.4%	--	--	--	-1.0%	
<i>Alpha</i>		N/M	--	--	--	-1.4%	
<i>Pct. Rank vs. Lipper Multi-Cap Value</i>		59	--	--	--	43	
SMRS Mid-Cap Index	707,422,194	17.0%	11.9%	15.7%	13.7%	--	N/A
S&P 400		16.2%	11.1%	15.0%	12.8%	--	
Style & Risk Adjusted Benchmark		N/M	11.1%	14.9%	12.7%	--	
Lipper Large-Cap Core		16.4%	8.6%	13.5%	11.3%	--	
<i>Excess Return</i>		0.8%	0.8%	0.7%	0.9%	--	
<i>Alpha</i>		N/M	0.9%	0.8%	1.0%	--	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		41	5	10	4	--	
Fisher All-Cap	662,674,875	26.4%	13.3%	16.7%	12.3%	11.2%	10/31/04
S&P 1500/S&P 600 Value Blend		21.1%	11.4%	15.7%	13.0%	9.7%	
Style & Risk Adjusted Benchmark		N/M	12.9%	17.0%	17.2%	11.5%	
Lipper Multi Core		19.2%	8.9%	13.8%	11.7%	8.3%	
<i>Excess Return</i>		5.3%	1.9%	1.0%	-0.7%	1.5%	
<i>Alpha</i>		N/M	0.4%	-0.3%	-4.9%	-0.3%	
<i>Pct. Rank vs. Lipper Multi Core</i>		2	2	4	49	1	
Seizert Capital Partners	554,901,647	14.4%	9.1%	14.1%	12.8%	14.7%	11/30/09
S&P 1500/S&P 400 Value Blend		21.1%	11.4%	15.7%	14.0%	16.6%	
Style & Risk Adjusted Benchmark		N/M	10.2%	14.8%	13.7%	14.1%	
Lipper Multi Core		19.2%	8.9%	13.8%	11.7%	13.2%	
<i>Excess Return</i>		-6.7%	-2.4%	-1.6%	-1.2%	-1.9%	
<i>Alpha</i>		N/M	-1.2%	-0.7%	-0.9%	0.7%	
<i>Pct. Rank vs. Lipper Multi Core</i>		87	61	55	37	17	

<u>Fund Name</u>	<u>Market Value</u>	<u>1-Year</u>	<u>3-Years</u>	<u>5-Years</u>	<u>7-Years</u>	<u>Inception</u>	<u>Inception Date</u>
LA Capital All-Cap Growth	\$465,236,271	21.2%	13.2%	18.2%	14.7%	12.0%	5/31/05
S&P 1500 Growth		26.5%	12.8%	16.8%	14.7%	10.2%	
Style & Risk Adjusted Benchmark		N/M	9.9%	14.9%	13.6%	10.5%	
Lipper Multi-Cap Growth		27.1%	10.4%	14.8%	12.3%	9.7%	
<i>Excess Return</i>		-5.3%	0.3%	1.3%	0.1%	1.8%	
<i>Alpha</i>		N/M	3.3%	3.2%	1.1%	1.5%	
<i>Pct. Rank vs. Lipper Multi-Cap Growth</i>		86	15	8	12	6	
Ark Investments	398,723,957	82.8%	--	--	--	47.7%	3/1/16
S&P 1500 Growth		26.5%	--	--	--	22.4%	
Style & Risk Adjusted Benchmark		N/M	--	--	--	34.4%	
Lipper All-Cap Growth		27.1%	--	--	--	21.9%	
<i>Excess Return</i>		56.3%	--	--	--	25.3%	
<i>Alpha</i>		N/M	--	--	--	13.2%	
<i>Pct. Rank vs. Lipper All-Cap Growth</i>		1	--	--	--	1	
Clarkston Capital Large-Cap	282,155,716	14.2%	--	--	--	11.2%	4/1/15
S&P 500		21.8%	--	--	--	12.1%	
Style & Risk Adjusted Benchmark		N/M	--	--	--	8.8%	
Lipper Large-Cap Core		20.9%	--	--	--	10.5%	
<i>Excess Return</i>		-7.6%	--	--	--	-0.9%	
<i>Alpha</i>		N/M	--	--	--	2.4%	
<i>Pct. Rank vs. Lipper Large-Cap Core</i>		94	--	--	--	38	
Clarkston Capital Small-Cap	228,476,818	13.5%	12.0%	--	--	13.1%	1/1/14
S&P 600		15.3%	11.4%	--	--	10.7%	
Style & Risk Adjusted Benchmark		N/M	9.6%	--	--	8.8%	
Lipper Small-Cap Core		18.6%	8.9%	--	--	8.7%	
<i>Excess Return</i>		-1.9%	0.6%	--	--	2.4%	
<i>Alpha</i>		N/M	2.4%	--	--	4.3%	
<i>Pct. Rank vs. Lipper Small-Cap Core</i>		80	9	--	--	2	
Bivium Capital Partners	165,374,419	19.2%	9.1%	13.3%	11.8%	6.8%	11/30/07
S&P 1500 Value		15.0%	9.5%	14.3%	12.5%	6.3%	
Style & Risk Adjusted Benchmark		N/M	9.9%	16.8%	15.0%	8.3%	
Lipper Multi Cap Value		15.4%	8.3%	13.3%	11.2%	6.4%	
<i>Excess Return</i>		4.2%	-0.5%	-1.0%	-0.8%	0.5%	
<i>Alpha</i>		N/M	-0.8%	-3.5%	-3.3%	-1.4%	
<i>Pct. Rank vs. Lipper Multi Cap Value</i>		17	35	60	49	33	
Attucks Asset Management	152,530,729	17.2%	8.8%	13.3%	11.3%	6.9%	11/30/07
S&P 1500 Super Composite		21.1%	11.4%	15.7%	13.7%	8.0%	
Style & Risk Adjusted Benchmark		N/M	11.8%	16.4%	14.5%	8.1%	
Lipper Multi Core		19.2%	8.9%	13.8%	11.7%	6.7%	
<i>Excess Return</i>		-4.0%	-2.7%	-2.5%	-2.4%	-1.1%	
<i>Alpha</i>		N/M	-3.1%	-3.2%	-3.2%	-1.2%	
<i>Pct. Rank vs. Lipper Multi Core</i>		75	65	66	64	51	
Ancora	103,653,961	--	--	--	--	3.7%	10/1/17
S&P 1000 SMID-Cap		--	--	--	--	5.5%	
Style & Risk Adjusted Benchmark		--	--	--	--	6.5%	
Lipper Mid-Cap Equity		--	--	--	--	5.7%	
<i>Excess Return</i>		--	--	--	--	-1.9%	
<i>Alpha</i>		--	--	--	--	N/M	
<i>Pct. Rank vs. Lipper Mid-Cap</i>		--	--	--	--	92	
Munder Concentrated SMID Cap	29,455,194	13.5%	4.9%	11.6%	10.3%	15.6%	4/30/09
S&P 400 Mid-Cap Growth		19.9%	12.0%	14.9%	12.8%	18.8%	
Style & Risk Adjusted Benchmark		N/M	13.9%	16.9%	13.4%	17.6%	
Lipper Mid-Cap Growth		24.4%	9.6%	13.9%	11.5%	16.7%	
<i>Excess Return</i>		-6.5%	-7.1%	-3.4%	-2.6%	-3.2%	
<i>Alpha</i>		N/M	-9.0%	-5.3%	-3.2%	-2.1%	
<i>Pct. Rank vs. Lipper Mid-Cap Core</i>		98	97	89	73	79	
NorthPointe All-Cap Core	26,454,394	13.6%	8.2%	12.8%	9.3%	7.6%	10/31/04
NorthPointe Blended Benchmark		21.1%	11.4%	15.7%	13.7%	9.3%	
Style & Risk Adjusted Benchmark		N/M	9.1%	13.6%	13.9%	11.2%	
Lipper Multi Core		19.2%	8.9%	13.8%	11.7%	8.3%	
<i>Excess Return</i>		-7.5%	-3.3%	-3.0%	-4.4%	-1.7%	
<i>Alpha</i>		N/M	-1.0%	-0.8%	-4.6%	-3.6%	
<i>Pct. Rank vs. Lipper Multi Core</i>		88	71	73	86	79	

State of Michigan Retirement Systems

INTERNATIONAL EQUITY REVIEW

Investment Advisory Committee Meeting

March 8, 2018



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

EXECUTIVE SUMMARY

Performance

MPSERS Plan (12/31/17)	1-Year	3-Years	5-Years	7-Years	10-Years
Annualized Returns	22.3%	10.7%	15.7%	13.4%	8.6%
S&P 1500	21.1%	11.4%	15.7%	13.7%	8.7%
Peer Median Returns	21.4%	10.8%	14.7%	12.5%	8.4%
Percent Rank vs. Peers *	33	53	35	32	35

*State Street Universe greater than \$1 billion

- Total Domestic Equity performed near the top third of its peer group over one, five, seven, and ten years, while slightly underperforming over the past three years.
- Total Domestic Equity outperformed the S&P 1500 by 110 basis points (bps) over the past year, performed nearly even with the benchmark over five and ten years, and underperformed over three and seven-year periods.
 - Division highlights include the following:
 - Outperformance of SMRS' internally managed portfolios by 170 bps during the past year.
 - Underweight to energy sector.
 - Positive contributions from Apple, Square, Adobe Systems, and Ally Financial.
 - Outperformance of SMRS' externally managed portfolios by 90 bps during the past year and by 10 bps over the past three years.
 - Ark Investments outperforming by 2,500 bps annualized since inception nearly two years ago.
 - Fisher Investments in top 5% of active managers over one, three, and five years.
 - LA Capital All-Cap Growth near top decile of active managers and outperforming benchmark over three and five years.
 - Clarkston Capital Small-Cap in top 2% of peer group since inception four years ago.
 - Significant contribution from Mellon Capital overlay strategy, adding 50 bps of excess return.

Asset Class Goal

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

Strategy Update

- The Domestic Equity Portfolio is overweight the financial sector, defensive stocks and technology companies, while remaining underweighted to commodity related issues.
 - Attractively priced financial and defensive stocks offset each other from an interest rate risk standpoint, paving the way for potential outperformance in any rate environment. Technology companies provide a diversifying source of alpha.
 - Total Domestic Equity's portfolio would outperform the S&P 1500 by ~19% were it to appreciate to the market multiple of 20.4X from where it stands now at 17.5X.
 - As the portfolio is also growing faster than the market alongside a higher dividend yield and a similar return on equity, it is expected for the multiple to at least partially converge with the market over the next five years.
 - If the multiples do not converge we expect outperformance based on faster earnings growth and a higher level of dividends.
- Portfolio beta is 1.15, so a significant downward move in the S&P 1500 would present a modest headwind to performance.
- Committed \$100 million to a new small/mid-cap manager, Ancora, during the past quarter.
 - Portfolio manager Dan Thelen is a value-oriented manager who emphasizes extensive bottom up research.
 - Relaunched strategy after a successful tenure at Loomis Sayles.
 - Significant ongoing personal investment in fund, highly committed to seeing it be successful.

Market Environment and Outlook

- At ~18x forward earnings, equity markets remain rich relative to history, but are reasonably priced for an environment where bond yields are 4% or lower.
- Assuming 4.5% long-term expected earnings growth (roughly in line with nominal GDP), and the market's average long-term return on equity of 14.5%, the S&P 1500 is expected to pay out 70% of its earnings.
 - This equates to a 3.0% total shareholder yield, or 1.2% in share count reductions via buybacks on top of the current 1.8% S&P 1500 dividend yield.
 - The market is thus poised to return an estimated 7.5% (3.0% shareholder yield plus 4.5% earnings growth) in an environment where multiples do not change.
- This compares favorably to the 30-year U.S. Treasury at 2.7%, and unfavorably to the historical compound annual return for the S&P 500 from 1928 – 2016 of 9.5%.

SMRS
International Equity Strategies
12/31/17

Markets	Amount	Total	% of Total
Indexed (\$ in Millions)			
SSgA	\$2,318		
Vanguard	1,361		
Total Indexed		\$3,679	28.3%
Stock Plus			
Internal Swaps	\$2,682		
PIMCO	1,840		
Total Stock Plus		\$4,522	34.8%
Active			
Los Angeles Capital Management	\$1,431		
Wellington	1,045		
Marathon-London	748		
SSgA	738		
Effissimo Capital Management	337		
Lazard	252		
Martin Currie	238		
Total Active		\$4,789	36.9%

TOTAL

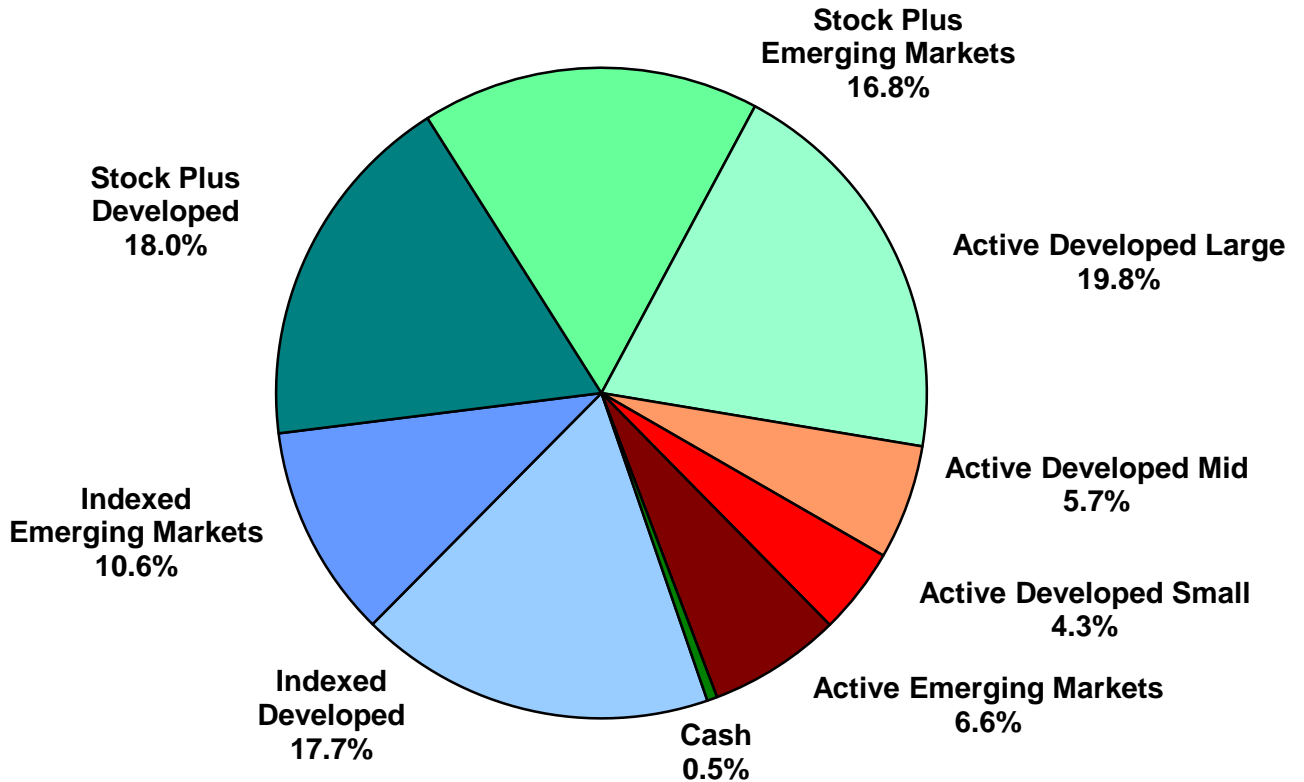
\$12,990

100.0%

SMRS

International Equity Exposure By Category

12/31/17



Market Value in Millions		
	<u>12/31/17</u>	
<u>Indexed</u>		
Developed	\$2,295	17.7%
Emerging Markets	1,384	10.6%
Total Indexed Equity	<u>\$3,679</u>	<u>28.3%</u>
<u>Stock Plus</u>		
Developed	\$2,345	18.0%
Emerging Markets	2,177	16.8%
Total Stock Plus Equity	<u>\$4,522</u>	<u>34.8%</u>
<u>Active</u>		
Developed Large	\$2,573	19.8%
Developed Mid	730	5.7%
Developed Small	561	4.3%
Emerging Markets	856	6.6%
Total Active Equity	<u>\$4,720</u>	<u>36.4%</u>
Cash	\$69	0.5%
Total International Equity	<u>\$12,990</u>	<u>100.0%</u>

SMRS

International Equities

12/31/17

Date:	<u>12/31/17</u>	<u>9/30/17</u>	<u>6/30/17</u>	<u>3/31/17</u>
Assets (\$ in Millions):	\$12,990	\$12,351	\$11,637	\$10,491
Number of Securities:	9,225	9,109	9,529	9,190
Active Share:	27%	33%	34%	35%

Benchmark: MSCI ACWI ex USA

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

Characteristics:	SMRS		MSCI ACWI ex USA	
	<u>LTM</u>	<u>Normalized</u>	<u>LTM</u>	<u>Normalized</u>
Weighted Average Capitalization (\$ in Billions):	\$61.6	--	\$69.5	--
Price/Earnings:	18.0	21.7	18.0	20.5
Price/Book:	1.9	2.3	1.9	2.2
Return on Equity:	10.8%	10.8%	10.3%	11.0%
Beta:	0.99	--	1.00	--
Tracking Error:	1.1%	--	0.0%	--
Dividend Yield:	1.8%	1.9%	1.9%	2.0%
Buyback Yield:	-0.2%	-0.2%	-0.1%	-0.1%
Overlay Yield:	0.5%	0.5%	--	--
Sustainable Growth Rate:	7.6%	6.9%	7.0%	6.8%
Annualized Compound Rate:	9.8%	9.1%	8.8%	8.7%

TOP TEN HOLDINGS

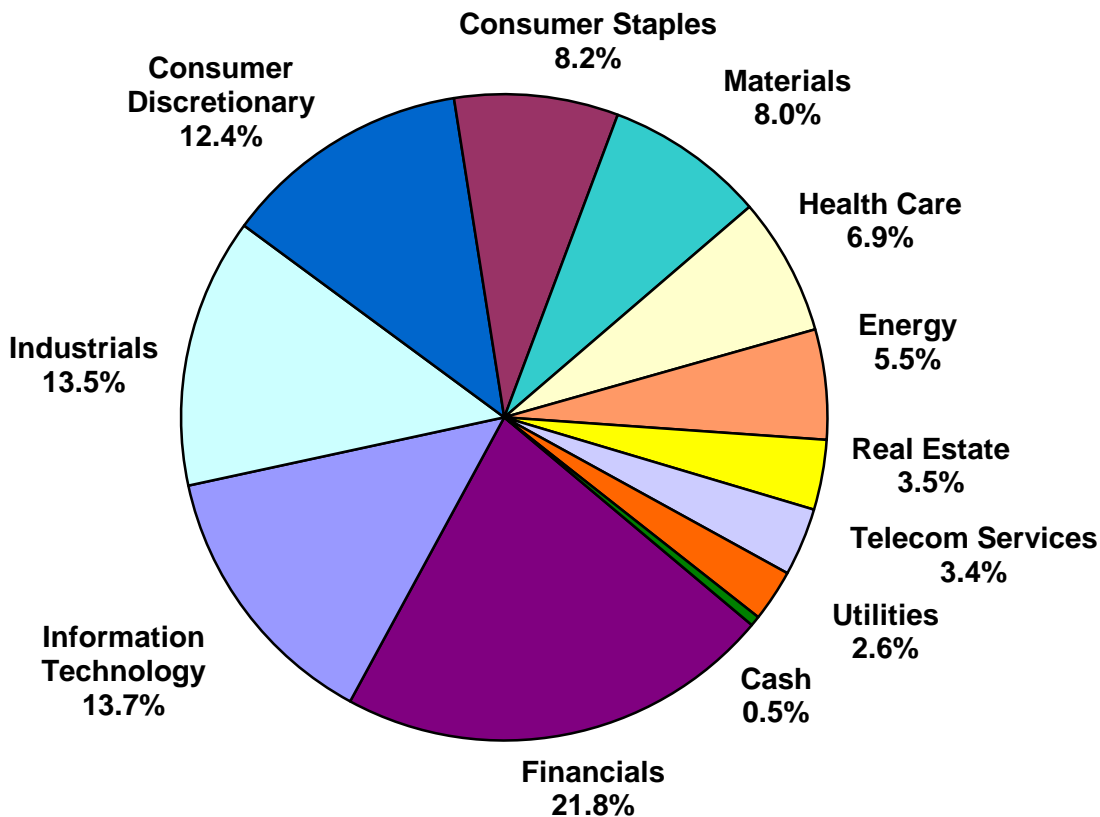
(\$ in Billions* - \$ in Millions**)

	<u>Portfolio Weight</u>	<u>Market Capitalization*</u>	<u>FY1 P/E</u>	<u>Market Value**</u>
Tencent Holdings Ltd.	1.9%	\$535.6	51.1	\$250.5
Taiwan Semiconductor Manufacturing Co., Ltd.	1.3%	223.9	17.1	166.7
Alibaba Group Holding Ltd. Sponsored ADR	1.1%	462.4	34.3	145.2
Samsung Electronics Co., Ltd.	1.0%	317.3	6.7	133.1
Dai-ichi Life Holdings, Inc.	1.0%	25.6	11.5	127.5
Toshiba Corporation	0.9%	18.6	11.9	111.3
Nestle S.A.	0.7%	261.5	22.2	92.9
Naspers Limited Class N	0.7%	113.8	39.1	88.4
Novartis AG	0.7%	227.5	16.2	86.6
China Construction Bank Corporation Class H	<u>0.6%</u>	<u>291.9</u>	7.7	<u>80.9</u>
TOTAL	<u>9.9%</u>	<u>\$2,478.1</u>		<u>\$1,283.0</u>

SMRS

International Equity By Sector

12/31/17



Market Value in Millions				
12/31/17				
	<u>Assets</u>	<u>Percent</u>	<u>Benchmark</u>	<u>Difference</u>
Financials	\$2,834	21.8%	23.7%	-1.9%
Information Technology	1,783	13.7%	11.6%	2.1%
Industrials	1,747	13.5%	11.9%	1.6%
Consumer Discretionary	1,614	12.4%	11.3%	1.1%
Consumer Staples	1,066	8.2%	9.3%	-1.1%
Materials	1,043	8.0%	8.1%	-0.1%
Health Care	896	6.9%	7.5%	-0.6%
Energy	715	5.5%	6.7%	-1.2%
Real Estate	450	3.5%	3.2%	0.3%
Telecom Services	435	3.4%	3.9%	-0.5%
Utilities	338	2.6%	2.8%	-0.2%
Total Investments	<u>\$12,921</u>	<u>99.5%</u>	<u>100.0%</u>	
Cash	69	0.5%	0.0%	0.5%
Total	<u>\$12,990</u>	<u>100.0%</u>	<u>100.0%</u>	

Benchmark: MSCI ACWI ex USA

International Manager Performance - Net of Fees
12/31/17

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception	Inception Date
Total International Equity	\$12,990,664,254	28.3%	9.2%	7.9%	6.3%	6.5%	1/1/04
MSCI ACWI ex USA		27.2%	7.8%	6.8%	4.9%	6.8%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	6.1%	
<i>Excess Return</i>		1.1%	1.4%	1.1%	1.3%	-0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		11	21	42	37	30	

Total International Active Strategy	\$4,789,473,188	27.8%	8.9%	8.1%	6.2%	5.6%	5/1/05
MSCI ACWI ex USA		27.2%	7.8%	6.8%	4.9%	6.1%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	5.5%	
<i>Excess Return</i>		0.7%	1.1%	1.2%	1.2%	-0.5%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		18	25	37	40	43	
LACM World ex USA	1,025,925,023	25.0%	--	--	--	11.2%	12/1/15
MSCI World ex USA		24.2%	--	--	--	11.4%	
Lipper International Multi-Cap Core		24.9%	--	--	--	11.6%	
<i>Excess Return</i>		0.8%	--	--	--	-0.2%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		65	--	--	--	53	
Marathon-London International Fund	747,951,499	23.7%	10.0%	10.4%	--	10.6%	2/1/12
MSCI World ex USA		24.2%	7.4%	7.5%	--	8.1%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	--	8.5%	
<i>Excess Return</i>		-0.5%	2.7%	2.9%	--	2.6%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		75	10	5	--	6	
SSGA International Alpha Small Cap	737,828,105	28.7%	12.3%	12.1%	9.7%	4.8%	5/1/07
MSCI World ex USA Small Cap		31.0%	13.0%	11.4%	7.8%	4.1%	
Lipper International Small/Mid-Cap Core		29.3%	10.6%	8.9%	6.3%	3.9%	
<i>Excess Return</i>		-2.3%	-0.7%	0.7%	1.8%	0.7%	
<i>Pct Rank vs. Lipper International Small/Mid-Cap Core</i>		69	31	14	6	1	
Wellington IRE Fund	727,843,183	27.3%	8.3%	8.7%	6.5%	5.2%	12/1/05
MSCI World ex USA		24.2%	7.4%	7.5%	5.6%	4.9%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	4.8%	
<i>Excess Return</i>		3.1%	1.0%	1.2%	0.9%	0.3%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		27	39	19	31	34	
LACM Emerging Markets Fund	405,367,499	36.2%	8.5%	4.4%	3.5%	5.94%	12/8/09
MSCI Emerging Markets		37.3%	9.1%	4.3%	2.6%	4.9%	
Lipper Emerging Markets		33.5%	7.8%	4.1%	2.4%	5.0%	
<i>Excess Return</i>		-1.1%	-0.6%	0.1%	1.0%	1.0%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		41	51	45	32	35	
Effissimo Capital Management Japan	337,471,174	27.7%	--	--	--	15.6%	12/1/15
MSCI Japan		24.0%	--	--	--	12.3%	
Lipper International Small/Mid-Cap Value		26.2%	--	--	--	15.7%	
<i>Excess Return</i>		3.7%	--	--	--	3.3%	
<i>Pct Rank vs. Lipper International Small/Mid-Cap Value</i>		59	--	--	--	73	
Wellington Emerging Markets Local Equity	316,965,365	46.9%	11.9%	8.1%	--	10.0%	12/1/11
MSCI Emerging Markets		37.3%	9.1%	4.3%	--	6.2%	
Lipper Emerging Markets		33.5%	7.8%	4.1%	--	5.9%	
<i>Excess Return</i>		9.6%	2.8%	3.8%	--	3.8%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		5	11	7	--	8	
Lazard/Wilmington International Equity	252,000,000	23.1%	6.4%	--	--	3.2%	6/1/14
MSCI World ex USA		24.2%	7.4%	--	--	3.7%	
Lipper International Large-Cap Core		24.9%	7.9%	--	--	4.4%	
<i>Excess Return</i>		-1.1%	-1.0%	--	--	-0.5%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		78	88	--	--	86	
Martin Currie International Long-term Unconstrained	238,121,340	--	--	--	--	21.3%	2/1/17
MSCI ACWI ex USA		--	--	--	--	20.6%	
Lipper International Multi-Cap Core		--	--	--	--	21.0%	
<i>Excess Return</i>		--	--	--	--	0.7%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		--	--	--	--	52	

Fund Name	Market Value	1-Year	3-Years	5-Years	7-Years	Inception	Inception Date
Total International Stock Plus Strategy	\$4,522,555,211	27.5%	9.1%	8.5%	7.3%	8.8%	1/1/09
MSCI ACWI ex USA		27.2%	7.8%	6.8%	4.9%	9.2%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	9.1%	
<i>Excess Return</i>		0.4%	1.3%	1.7%	2.3%	-0.4%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		20	24	28	18	55	
Internal Stock Plus	2,682,614,439	28.2%	11.9%	12.5%	9.6%	9.6%	1/1/09
MSCI ACWI ex USA		27.2%	7.8%	6.8%	4.9%	5.7%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	6.3%	
<i>Excess Return</i>		1.0%	4.0%	5.7%	4.7%	3.9%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		13	1	1	3	2	
PIMCO StockPLUS International TR Fund	1,242,003,205	27.1%	8.1%	7.7%	7.6%	7.8%	10/1/10
MSCI World ex USA		24.2%	7.4%	7.5%	5.6%	6.4%	
Lipper International Large-Cap Core		24.9%	7.9%	7.7%	5.8%	6.6%	
<i>Excess Return</i>		2.9%	0.8%	0.2%	2.0%	1.4%	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		31	47	48	11	20	
PIMCO Emerging Markets StockPLUS AR Fund	597,937,567	39.5%	--	--	--	9.3%	4/1/15
MSCI Emerging Markets		37.3%	--	--	--	9.1%	
Lipper Emerging Markets		33.5%	--	--	--	8.1%	
<i>Excess Return</i>		2.2%	--	--	--	0.2%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		25	--	--	--	26	

Total International Index Strategy	\$3,678,604,141	28.7%	9.5%	7.2%	5.3%	9.2%	7/1/09
MSCI ACWI ex USA		27.2%	7.8%	6.8%	4.9%	8.1%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	8.5%	
<i>Excess Return</i>		1.5%	1.7%	0.4%	0.4%	1.1%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		11	17	68	73	26	
SSGA MSCI ACWI EX USA INDEX	2,317,696,605	--	--	--	--	--	11/1/17
MSCI World ex USA		--	--	--	--	--	
Lipper International Large-Cap Core		--	--	--	--	--	
<i>Excess Return</i>		--	--	--	--	--	
<i>Pct Rank vs. Lipper International Large-Cap Core</i>		--	--	--	--	--	
Vanguard Emerging Market Fund	761,042,113	31.5%	7.6%	3.6%	2.0%	7.1%	7/1/09
MSCI Emerging Markets		37.3%	9.1%	4.3%	2.6%	7.6%	
Lipper Emerging Markets		33.5%	7.8%	4.1%	2.4%	7.7%	
<i>Excess Return</i>		-5.8%	-1.5%	-0.8%	-0.5%	-0.5%	
<i>Pct Rank vs. Lipper Emerging Markets</i>		66	62	64	60	63	
Vanguard Developed Markets Index Fund	586,407,423	26.7%	9.0%	8.3%	6.7%	7.0%	4/1/10
MSCI World ex USA		24.2%	7.4%	7.5%	5.6%	6.0%	
Lipper International Multi-Cap Core		24.9%	7.9%	7.7%	5.8%	6.3%	
<i>Excess Return</i>		2.5%	1.6%	0.8%	1.1%	1.0%	
<i>Pct Rank vs. Lipper International Multi-Cap Core</i>		38	24	33	32	37	

State of Michigan Retirement Systems

BASKET CLAUSE REVIEW

Investment Advisory Committee Meeting

December 12, 2017



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

SMRS

Basket Clause Investments

12/31/17

<u>Asset Class</u>	<u>Value</u>
Total Absolute Return	\$3,991,982,768
Total Real Return and Opportunistic	900,801,962
Total International Equity	337,471,170
Total Long-Term Fixed Income	<u>40,266,325</u>
Total Basket Clause Investments	<u>\$5,270,522,225</u>

The basket clause investments at December 31, 2017, were \$5.3 billion or 7.5% of the total portfolio value of \$69.9 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.