



Board Presentation/Executive Summary

Texas Municipal Retirement System

Period Ended: March 31, 2019



RVK Honored to Receive 2ND Greenwich *Quality Leader* Award

- In 2018, Greenwich Associates* conducted interviews with 1,128 senior professionals of large plan sponsors and ranked opinions of their investment consulting relationships on a series of key metrics, including, but not limited to:
 - Understanding of Client Goals and Objectives
 - Advice on Long-term Asset Allocation and Liability Issues
 - Proactive Advice and Innovative Ideas
 - Credibility with Boards and/or Investment Committees
 - Knowledge of Investment Managers
 - Advice on DC Plan Structure and Design
 - Client Satisfaction with Manager Recommendations
 - Responsiveness to Client Requests and Needs
 - Competitive Fees
- For a 2nd consecutive year, RVK is 1 of 3 firms among large US consultants to receive this award.



**As a valued client, we are humbled by your continued confidence and thankful for your support.
From all of us here at RVK, thank you for the opportunity to serve you!**

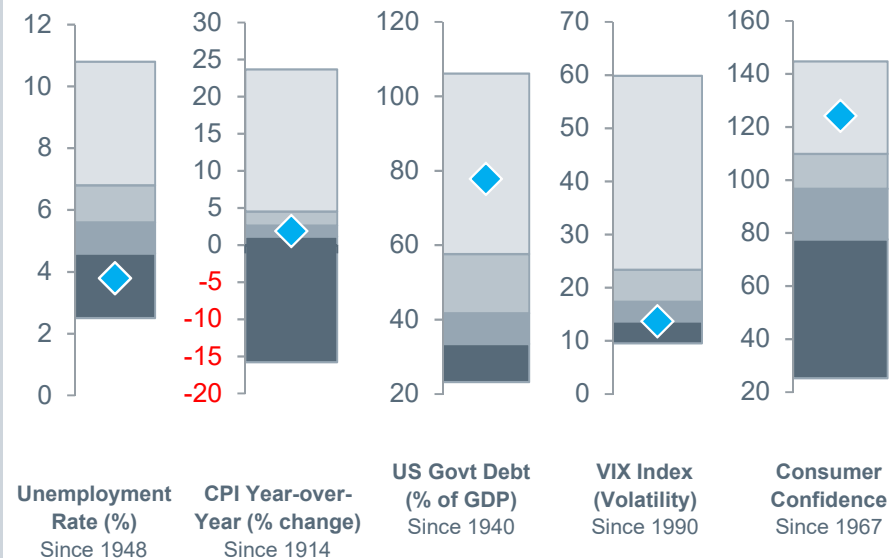
*Greenwich Associates is the leading provider of global market intelligence and advisory services to the financial services industry. They conduct an annual survey of institutional investors whereby approx. 1,100 respondents rank their respective investment consulting relationships on key metrics on a scale from 1 (poor) to 5 (excellent). The award is based upon Greenwich Associates' 2018 US Institutional Investors study.

First Quarter Economic Environment

Key Economic Indicators

Risk assets and fixed income markets performed well over the first quarter, largely driven by a more accommodative stance by the Federal Open Market Committee ("FOMC"). The global equity market, as represented by the MSCI All Country World Index, rose over 12% during the quarter, while fixed income markets benefited from the shift in interest rate expectations. Volatility markets also declined back to record low levels on the message of greater accommodation by the FOMC. Positive returns were generated despite declining growth forecasts in Asia and Europe, weak global inflation, market uncertainty caused by geopolitical risks, such as Brexit, and global markets destabilized by ongoing trade wars. At its March meeting, the FOMC maintained policy rates in the range of 2.25% to 2.50%. Interest rates declined notably over the period amidst signs of weakness in economic growth and a continued lack of inflationary pressure. During the quarter, the 10-year nominal Treasury yield fell to 2.39%, a level not seen since 2017, while the yield curve continued to flatten and even invert across certain maturities. However, the labor market hasn't reflected recessionary fears as US employment remains at record levels.

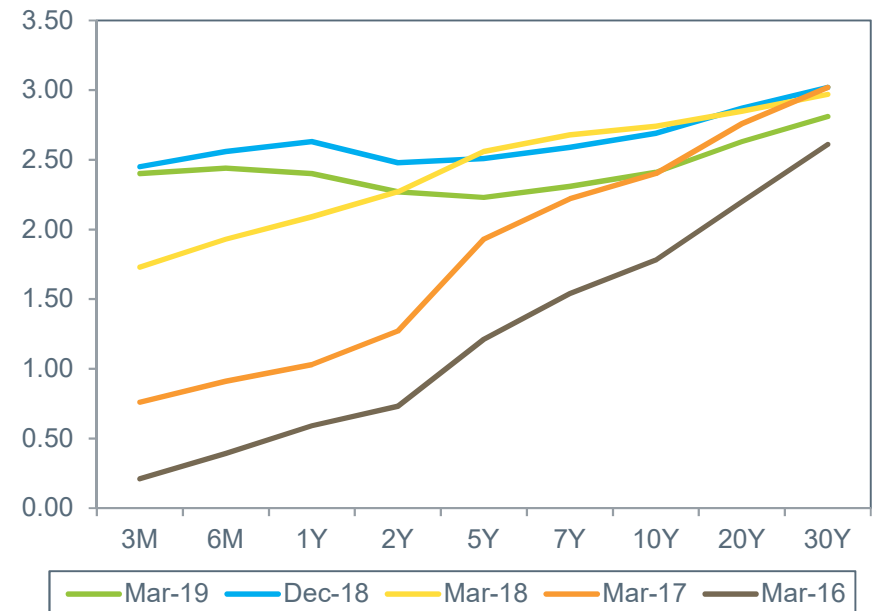
Key Economic Indicators



Economic Indicators	Mar-19	Dec-18	Mar-18	Mar-16	20 Yr
Federal Funds Rate (%)	2.43 ▲	2.40	1.68	0.25	1.91
Breakeven Infl. - 5 Yr (%)	1.79 ▲	1.49	2.04	1.51	1.86
Breakeven Infl. - 10 Yr (%)	1.87 ▲	1.71	2.06	1.63	2.03
CPI YoY (Headline) (%)	1.9 —	1.9	2.4	0.9	2.2
Unemployment Rate (%)	3.8 ▼	3.9	4.0	5.0	5.9
Real GDP YoY (%)	3.2 ▲	3.0	2.6	1.6	2.2
PMI - Manufacturing	55.3 ▲	54.3	59.3	51.2	52.8
USD Total Wtd Idx	92.07 ▲	91.79	86.37	89.72	86.26
WTI Crude Oil per Barrel (\$)	60.1 ▲	45.4	64.9	38.3	60.6
Gold Spot per Oz (\$)	1,292 ▲	1,282	1,326	1,233	892

Market Performance (%)	QTD	CYTD	1 Yr	5 Yr	10 Yr
S&P 500 (Cap Wtd)	13.65	13.65	9.50	10.91	15.92
Russell 2000	14.58	14.58	2.05	7.05	15.36
MSCI EAFE (Net)	9.98	9.98	-3.71	2.33	8.96
MSCI EAFE SC (Net)	10.65	10.65	-9.36	4.47	12.76
MSCI Emg Mkts (Net)	9.93	9.93	-7.41	3.68	8.95
Bloomberg US Agg Bond	2.94	2.94	4.48	2.74	3.77
ICE BofAML 3 Mo US T-Bill	0.60	0.60	2.12	0.74	0.43
NCREIF ODCE (Gross)	1.42	1.42	7.52	10.18	8.74
FTSE NAREIT Eq REIT (TR)	16.33	16.33	20.86	9.12	18.28
HFRI FOF Comp	4.63	4.63	0.15	2.20	3.55
Bloomberg Cmtty (TR)	6.32	6.32	-5.25	-8.92	-2.56

Treasury Yield Curve (%)



TMRS Total Fund



TMRS Asset Allocation and Performance

As of March 31, 2019



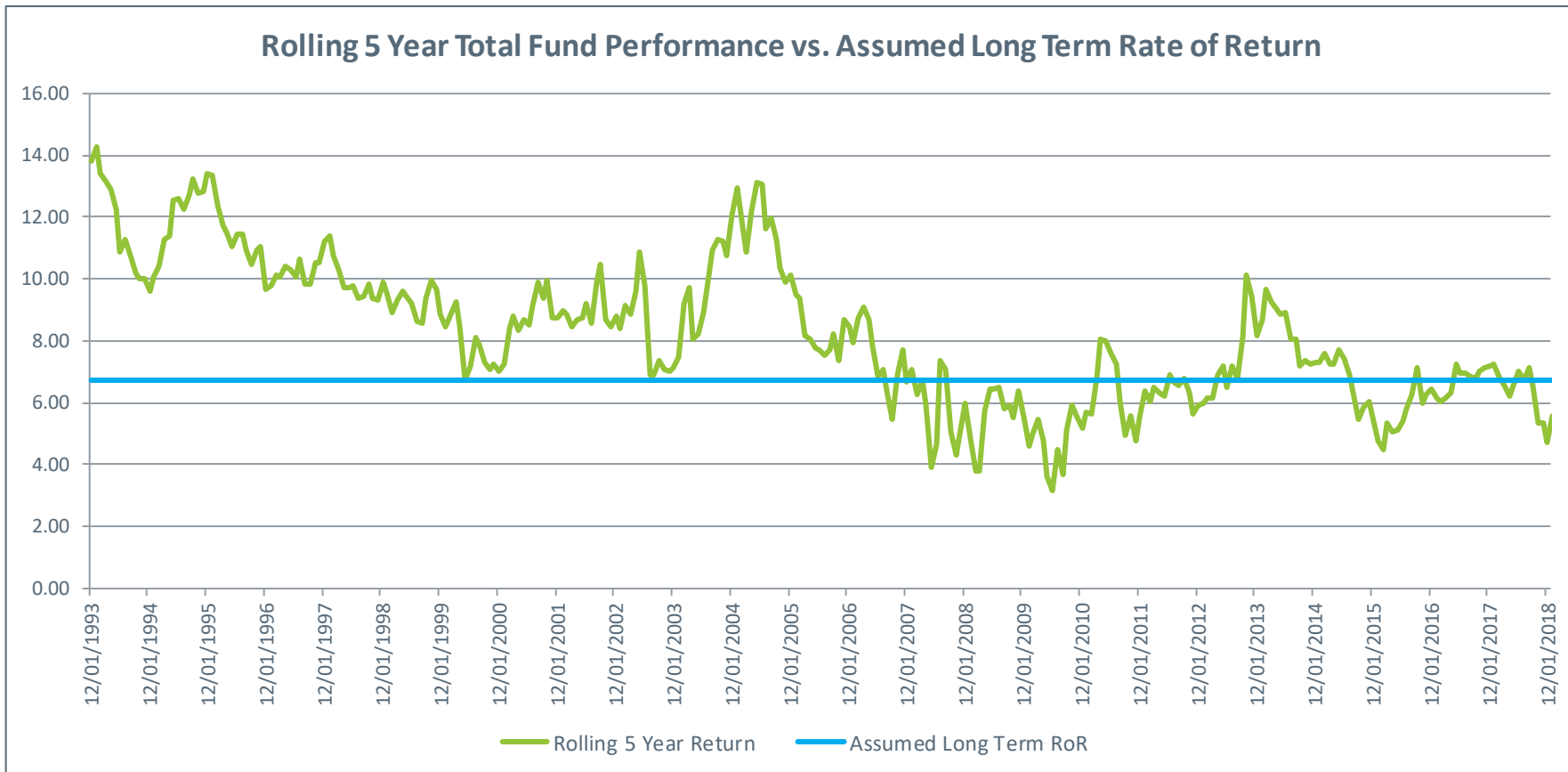
Performance shown is net of fees and provided by State Street. Performance is annualized for periods greater than one year. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions.



Total Fund Objectives and Performance

As of March 31, 2019

Total Fund Return Objectives				
Objective #1:	Achieve a total rate of return over rolling five-year periods consistent with the assumed long term rate of return on TMRS assets established by the actuary.			
Objective #2:	Exceed an appropriate benchmark reflective of asset class participation over rolling five-year periods.			
TMRS Composite	5 Year Total Fund Return	5 Year Benchmark Return	Benchmark Description	Meets Rank Objective
Total Fund Composite (Net)	5.61	6.75	Assumed Long Term Rate of Return	✗
Total Fund Composite (Net)	5.61	5.37	Actual Allocation Benchmark	✓
Total Fund Composite (Net)	5.61	6.11	Policy Index	✗

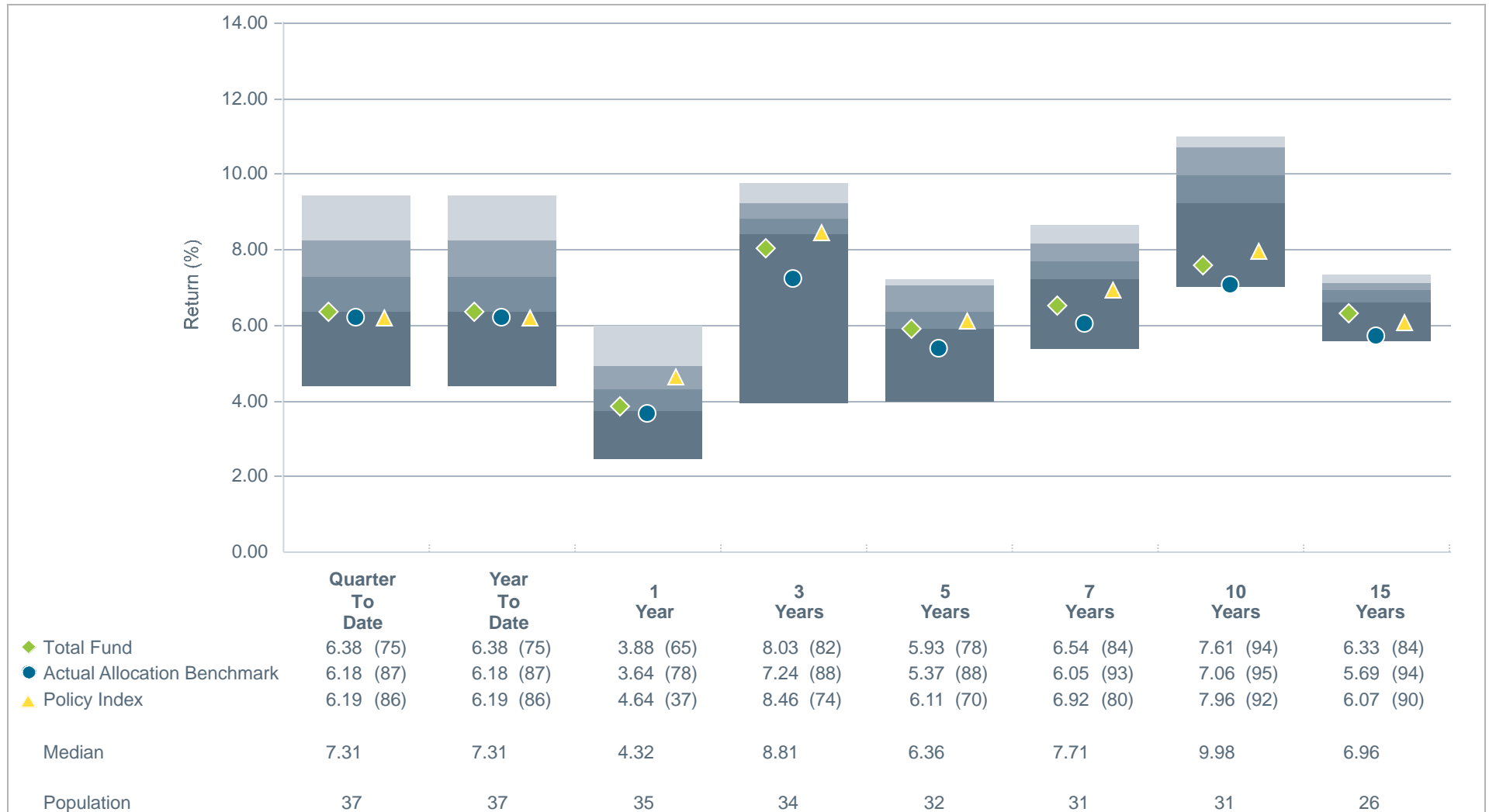


Performance shown is net of fees.

Total Fund Performance vs. Peers

As of March 31, 2019

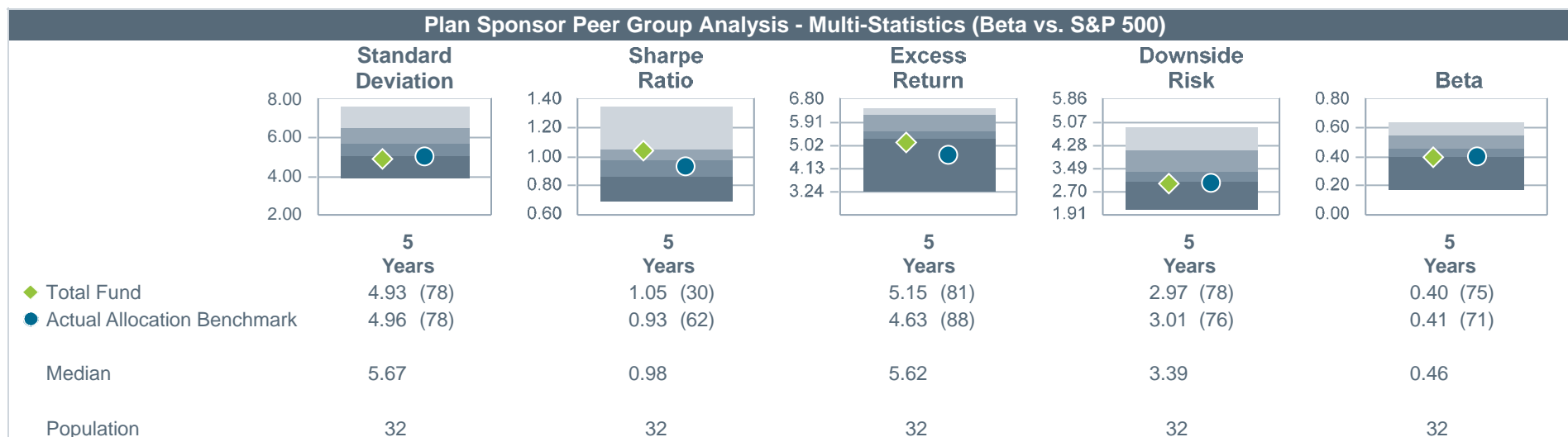
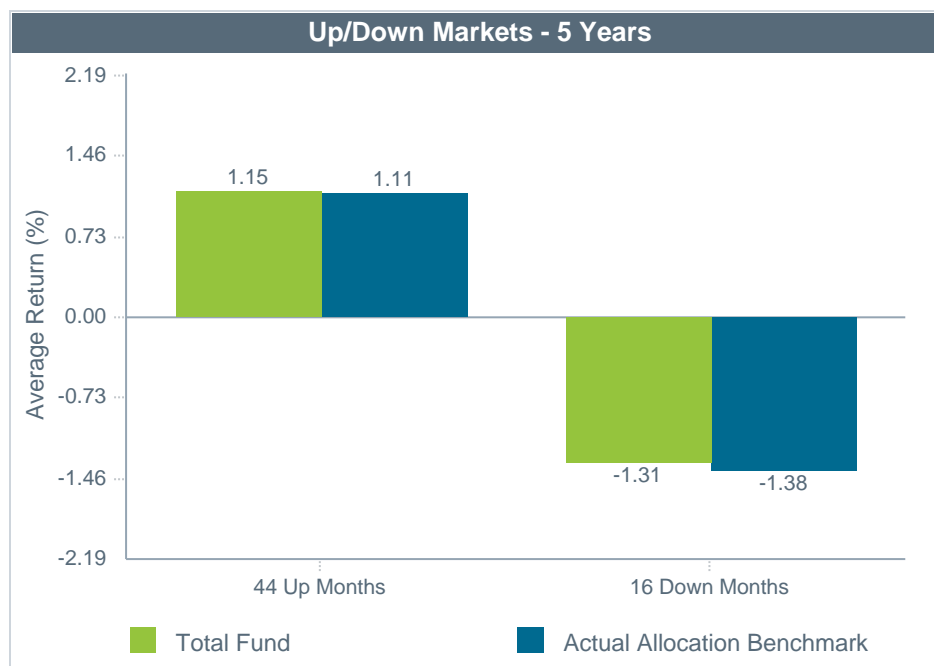
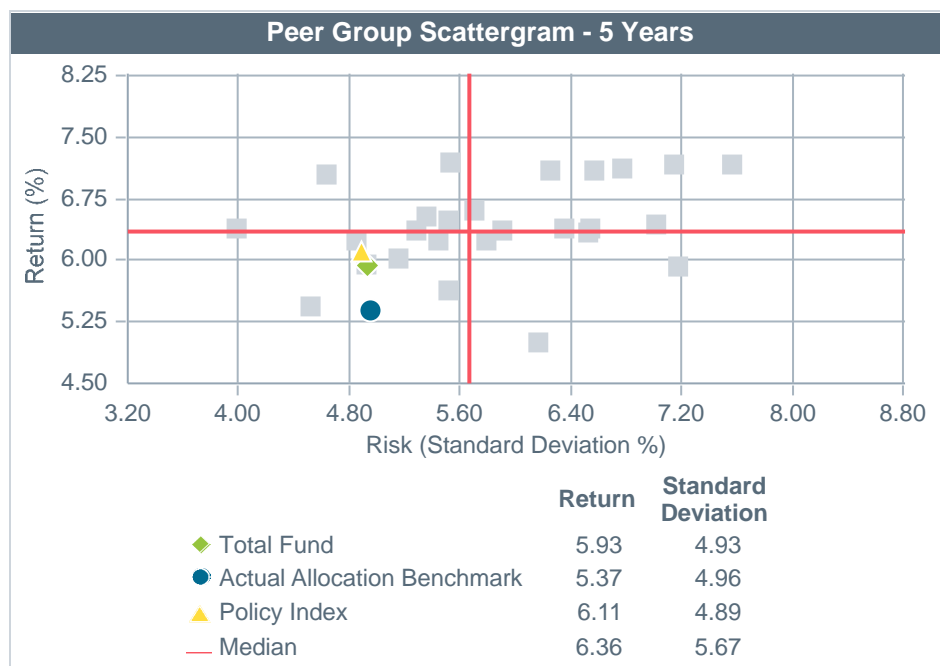
While performance relative to other systems is not an objective of the TMRS fund given the wide range in investment objectives and different benefit plan structures, it is generally of interest to be aware of the performance of other public pension systems.



The Total Fund is ranked against a universe of Public Plans > \$10B. Performance shown is gross of fees, as of 03/31/2019. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions.

Total Fund vs. All Public Funds > \$10B-Total Fund

As of March 31, 2019



Performance shown is gross of fees. Calculations based on monthly periodicity. Parenthesis contain percentile ranks. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions.

Asset Class Composite Performance (Net)

As of March 31, 2019

	Allocation		Performance (%)									
	Market Value (\$)	%	Quarter	CYTD	1 Year	3 Years	5 Years	7 Years	10 Years	15 Years	Since Incep.	Inception Date
Total Fund	29,264,820,023	100.00	6.32	6.32	3.57	7.64	5.61	6.28	7.41	6.20	8.40	01/01/1989
Actual Allocation Benchmark			6.18	6.18	3.64	7.24	5.37	6.05	7.06	5.69	7.85	
Difference			0.14	0.14	-0.07	0.40	0.24	0.23	0.35	0.51	0.55	
Total Equity	10,415,700,305	35.59	12.37	12.37	1.05	10.72	6.91	9.12	12.48	N/A	5.61	02/01/2008
Total Equity Benchmark			12.29	12.29	2.28	11.03	6.99	9.16	12.49	N/A	5.60	
Difference			0.08	0.08	-1.23	-0.31	-0.08	-0.04	-0.01	N/A	0.01	
Core Fixed Income	4,135,347,765	14.13	3.29	3.29	4.83	2.35	2.90	2.65	4.18	4.36	7.47	01/01/1989
Fixed Income Benchmark			2.94	2.94	4.48	2.03	2.74	2.48	3.87	3.89	6.93	
Difference			0.35	0.35	0.35	0.32	0.16	0.17	0.31	0.47	0.54	
Non-Core Fixed Income	5,405,843,277	18.47	2.65	2.65	3.64	6.18	N/A	N/A	N/A	N/A	4.25	10/01/2014
Non-Core Fixed Income Benchmark			2.09	2.09	3.63	5.69	N/A	N/A	N/A	N/A	3.86	
Difference			0.56	0.56	0.01	0.49	N/A	N/A	N/A	N/A	0.39	
Real Return	3,201,495,341	10.94	7.60	7.60	4.91	4.37	2.67	2.70	N/A	N/A	3.51	02/01/2011
Real Return Benchmark			7.46	7.46	5.08	5.02	3.23	2.57	4.80	4.41	3.72	
Difference			0.14	0.14	-0.17	-0.65	-0.56	0.13	N/A	N/A	-0.21	
Real Estate	2,634,163,551	9.00	1.92	1.92	9.90	10.42	11.77	11.70	N/A	N/A	11.28	01/01/2012
Real Estate Benchmark			1.75	1.75	8.32	8.23	10.40	10.98	6.99	8.23	11.03	
Difference			0.17	0.17	1.58	2.19	1.37	0.72	N/A	N/A	0.25	
Absolute Return	2,352,996,447	8.04	1.71	1.71	1.82	6.55	N/A	N/A	N/A	N/A	4.05	08/01/2014
Absolute Return Benchmark			1.96	1.96	-0.44	3.49	1.88	3.03	3.45	2.83	1.82	
Difference			-0.25	-0.25	2.26	3.06	N/A	N/A	N/A	N/A	2.23	
Private Equity	609,504,764	2.08	1.63	1.63	26.55	18.85	N/A	N/A	N/A	N/A	18.19	01/01/2016
Private Equity Benchmark			1.63	1.63	26.55	18.85	N/A	N/A	N/A	N/A	18.19	
Difference			0.00	0.00	0.00	0.00	N/A	N/A	N/A	N/A	0.00	
TMRs Unallocated Cash	509,768,574	1.74	0.58	0.58	2.00	1.05	0.91	0.68	0.50	N/A	0.56	06/01/2008
FTSE 30 Day T-Bill Index			0.60	0.60	2.08	1.13	0.69	0.50	0.37	1.22	0.40	
Difference			-0.02	-0.02	-0.08	-0.08	0.22	0.18	0.13	N/A	0.16	

Performance shown is net of fees and provided by State Street. Performance is annualized for periods greater than one year. Market value for the Total Equity Composite includes assets held in the Transition Account. Real Estate and Private Equity fund returns are calculated by Private Edge. Private Real Estate fund returns are lagged 1 quarter. Inception dates shown for Real Estate and Private Equity composite represent the first full quarter following initial funding. Inception dates for all other composites represents the first full month following initial funding. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions.

TMRS Composites Objectives and Performance

As of March 31, 2019

TMRS Composites Objective			
Objective: Exceed its benchmark performance net of fees over rolling five year periods.			
TMRS Composites	5 Year Composite Return	5 Year Benchmark Return	Meets Objective
Total Equity	6.91	6.99	✗
Core Fixed Income	2.90	2.74	✓
Non-Core Fixed Income	N/A	N/A	N/A
Real Return	2.67	3.23	✗
Real Estate	11.77	10.40	✓
Absolute Return	N/A	1.88	N/A
Private Equity	N/A	N/A	N/A

TMRS Asset Class Composites

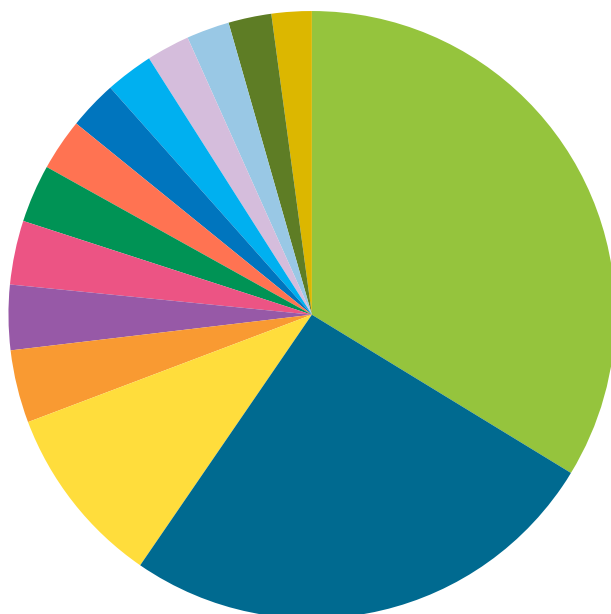


Total Equity Performance & Allocation

As of March 31, 2019

Asset Allocation by Manager

\$10,415,700,305



	Market Value (\$)	Allocation (%)
NT Collective Russell 3000 Index NL (CF)	3,512,138,480	33.72
NT Daily Collective ACW Ex US IMI NL (CF)	2,692,894,895	25.85
UBS US Equity Min Volatility Index (CF)	1,007,884,217	9.68
State Street Russell Fndmtl US Index NL (CF)	403,480,837	3.87
Wellington US Small Cap Opp (SA)	360,870,389	3.46
Champlain Mid-Cap Core (SA)	354,623,407	3.40
UBS World Ex US Min Volatility NL (CF)	322,057,683	3.09
Wasatch International Small Cap Growth (SA)	286,996,596	2.76
State Street Russell RAFI GI Ex US Index NL (CF)	270,435,935	2.60
Wellington International Small Cap Opp (SA)	264,733,245	2.54
Acadian Emerging Markets (SA)	239,808,786	2.30
William Blair Emerging Markets (SA)	238,245,090	2.29
Wellington International Horizons (SA)	238,243,600	2.29
Lazard International Equity Plus (SA)	223,267,693	2.14
The Boston Company Small Cap Opp Value (SA)	12,813	0.00
The Boston Company Mid Cap Opp Value (SA)	6,305	0.00

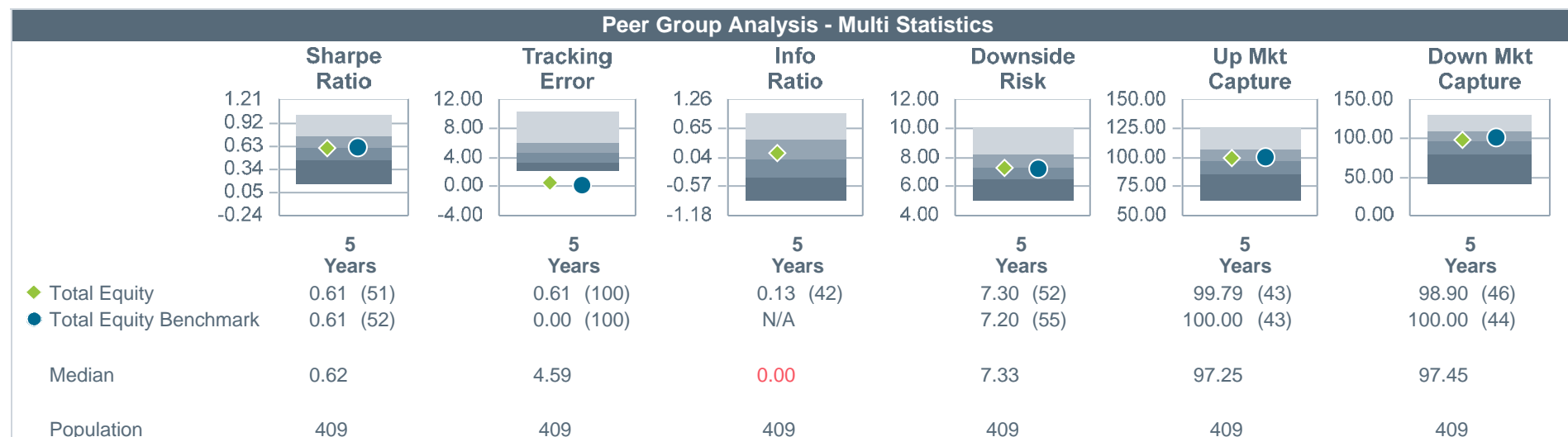
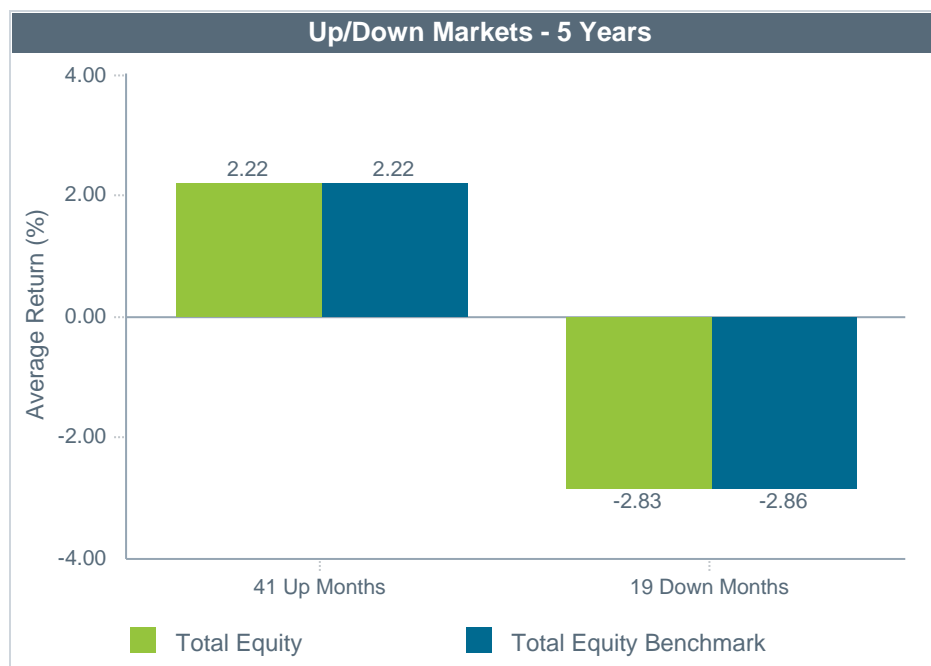
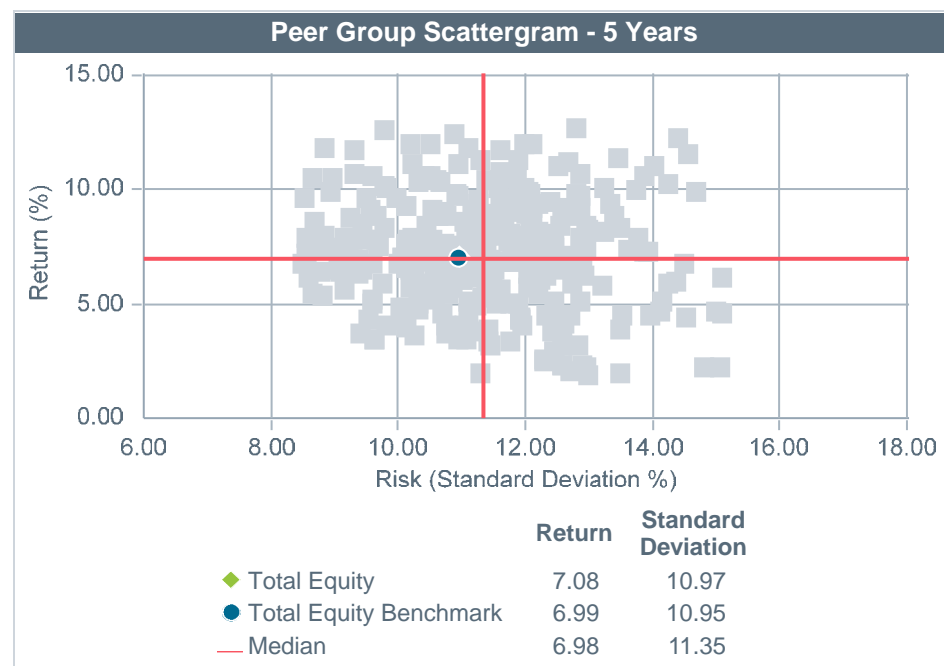
Comparative Performance

	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Total Equity	12.37	12.37	1.05	10.72	6.91	12.48	-10.28	23.97	9.39	-1.47	5.33	5.61	02/01/2008
Total Equity Benchmark	12.29	12.29	2.28	11.03	6.99	12.49	-9.69	23.84	9.54	-1.47	4.95	5.60	
Difference	0.08	0.08	-1.23	-0.31	-0.08	-0.01	-0.59	0.13	-0.15	0.00	0.38	0.01	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. In December 2018, Sasco U.S. Contrarian Value (SA), Epoch U.S. Choice (SA), The Boston Company Mid Cap Opp Value (SA), and The Boston Company Small Cap Opp Value (SA) were terminated.

Total Equity vs. IM Global Equity

As of March 31, 2019



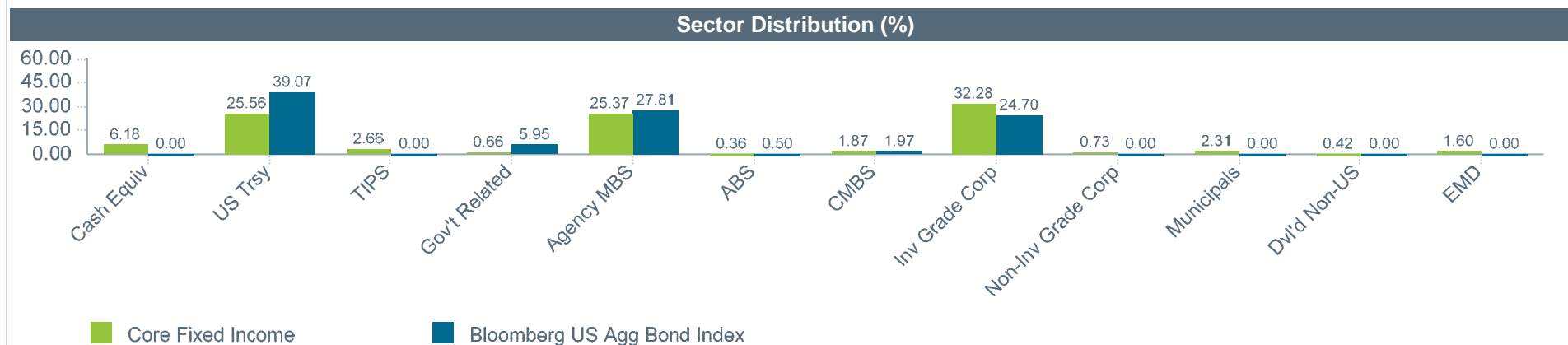
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Core Fixed Income Performance and Allocation

As of March 31, 2019

Asset Allocation by Manager		
	Market Value (\$)	Allocation (%)
BlackRock, Inc. Core (SA)	2,972,574,734	71.88
PIMCO Core Plus Fixed Income (SA)	1,162,773,031	28.12
Total Core Fixed Income	4,135,347,765	100.00

Portfolio Characteristics		
	Portfolio	Benchmark
Effective Duration	5.34	5.82
Spread Duration	3.44	6.00
Convexity	0.23	0.13
Avg. Maturity	7.60	8.07
Avg. Quality	Aa3	Aa1/Aa2
Yield To Maturity (%)	3.10	2.94
Coupon Rate (%)	3.45	3.23
Current Yield (%)	3.34	N/A

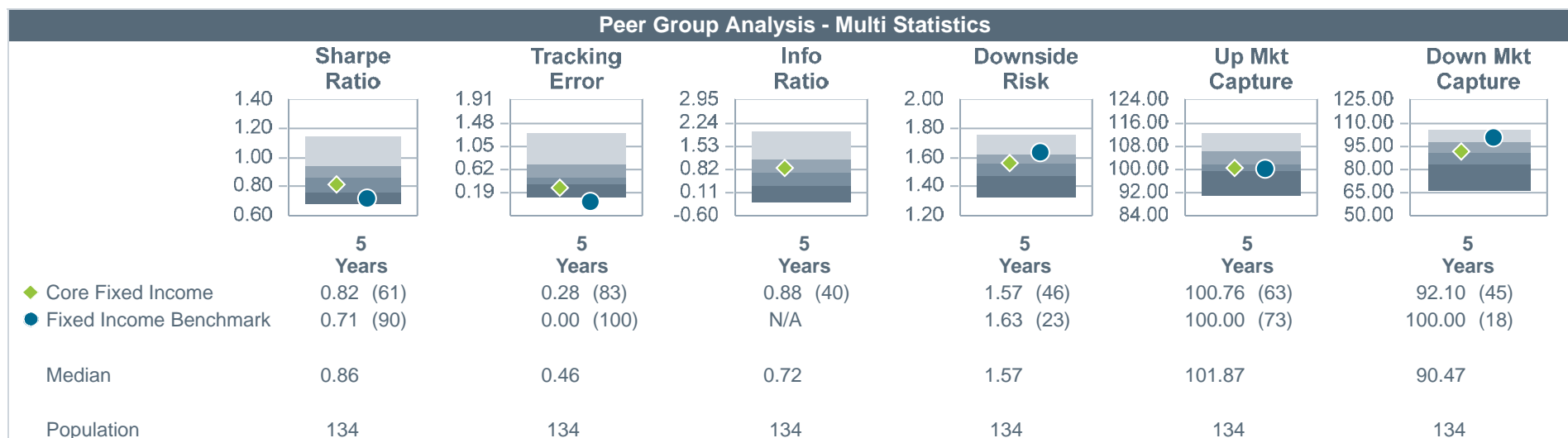
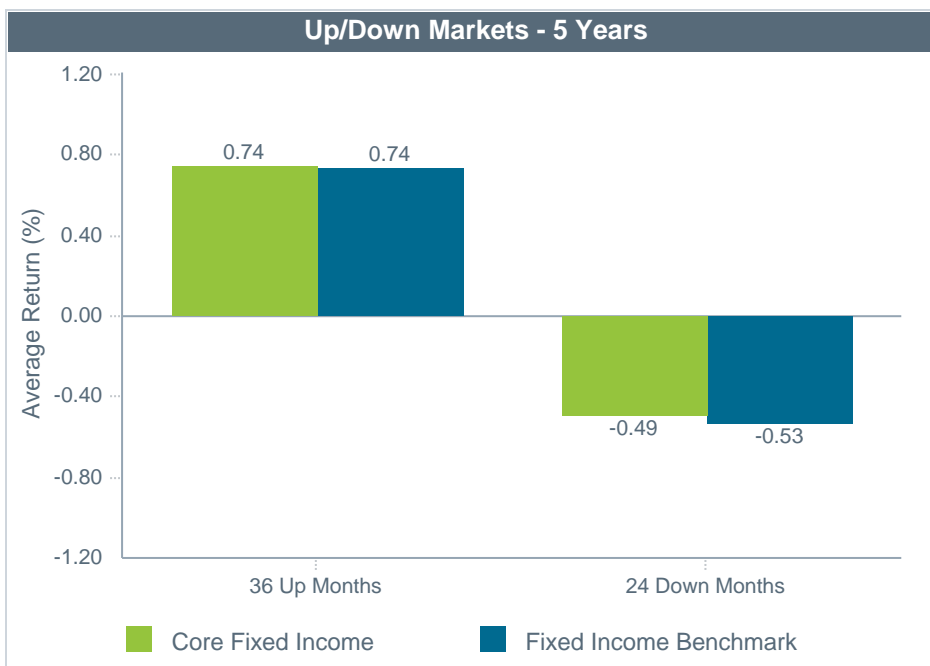
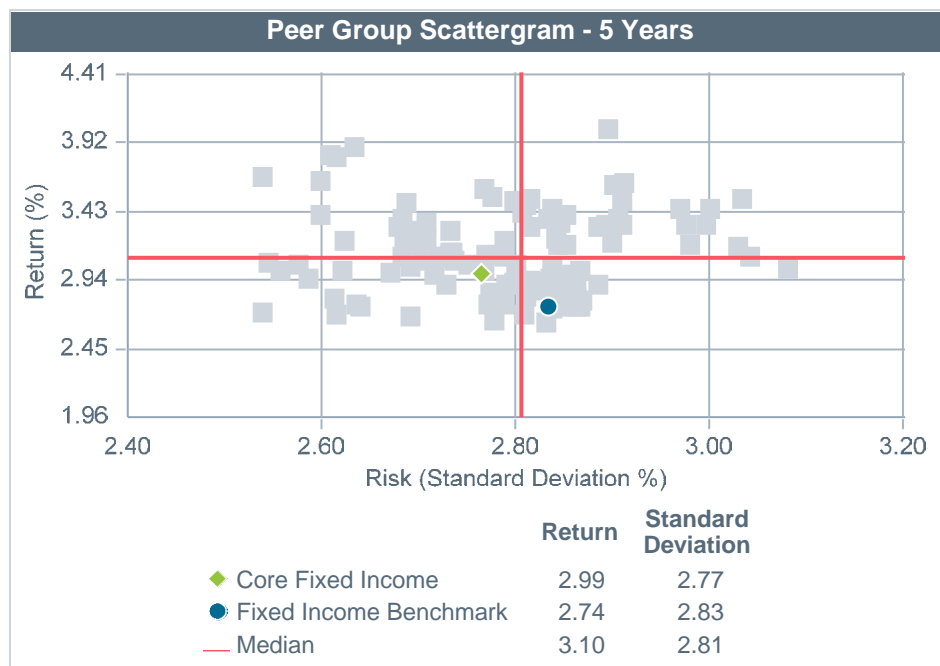


Comparative Performance													
	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Core Fixed Income	3.29	3.29	4.83	2.35	2.90	4.18	0.02	3.83	2.89	0.72	5.69	7.47	01/01/1989
Fixed Income Benchmark	2.94	2.94	4.48	2.03	2.74	3.87	0.01	3.54	2.65	0.55	5.97	6.93	
Difference	0.35	0.35	0.35	0.32	0.16	0.31	0.01	0.29	0.24	0.17	-0.28	0.54	

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Core Fixed Income vs. IM U.S. Broad Market Core Fixed Income

As of March 31, 2019



Performance shown is gross of fees. Calculations based on monthly periodicity. Parenthesis contain percentile ranks. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions.

Non-Core Fixed Income Performance & Allocation

As of March 31, 2019

Asset Allocation by Manager													
Manager	Strategy			Market Value (\$)		% of Composite		Allocated/Committed		Drawn/Invested			
Public Securities													
Alliance Bernstein Emerging Mkt Debt (SA)	EMD			376,721,899		6.97%							
BlueBay Emerging Mkt Debt (SA)	EMD			377,970,436		6.99%							
Columbia Management Investment Advisers, LLC	High Yield			329,943,885		6.10%							
Ellington RMBS/CMBS (SA)	Structured Credit			461,899,939		8.54%							
GSO Capital Advisors	Bank Loans and CLO			465,927,059		8.62%							
Neuberger Berman Investment Advisers, LLC	High Yield			318,866,280		5.90%							
Octagon Credit Advisors	Bank Loans and CLO			443,357,229		8.20%							
GoldenTree Guadalupe Fund, LP	Opportunistic			212,262,400		3.93%							
Bain Capital Credit Managed Account (Blanco), LP	Opportunistic			103,673,400		1.92%							
Beach Point Total Return Fund II, LP	Opportunistic			223,368,600		4.13%							
Waterfall Eden Fund, LP	Structured Credit			227,385,200		4.21%							
Voya RMBS/CMBS (SA)	Structured Credit			463,142,152		8.57%							
Public Securities Total				4,004,518,479									
Private Investments													
Adams Street Private Credit Fund-A, LP	Direct Lending			72,748,149		1.35%		200,000,000		83,833,284			
AG Direct Lending Fund III (Unlevered), LP	Direct Lending			102,366,079		1.89%		250,000,000		101,250,000			
BlackRock Global Credit Opportunities, LP	Opportunistic			140,699,909		2.60%		300,000,000		98,871,375			
Golub Capital PEARLS Direct Lending Program, LP	Direct Lending			37,273,429		0.69%		300,000,000		107,044,300			
H.I.G. Whitehorse Trinity, LP	Direct Lending			129,605,907		2.40%		300,000,000		140,661,549			
Marathon CLO Equity Fund, LP	Opportunistic			27,601,134		0.51%		50,000,000		25,910,000			
Marathon European Credit Opportunity Fund III, LP	Opportunistic			75,791,309		1.40%		100,000,000		62,402,760			
Marathon Structure Product Strategies Fund, LP	Opportunistic			173,863,800		3.22%		150,000,000		194,743,061			
PIMCO Corporate Opportunities Fund II Onshore Feeder, LP	Opportunistic			118,696,591		2.20%		200,000,000		87,597,018			
TCW Brazos Fund, LLC	Direct Lending			252,944,928		4.68%		300,000,000		418,275,000			
Varde Private Debt Opportunities Fund (Onshore), LP	Opportunistic			65,023,211		1.20%		200,000,000		10,000,000			
White Oak Summit Fund, LP	Direct Lending			204,710,353		3.79%		200,000,000		232,754,993			
Private Investments Total				1,401,324,798				2,550,000,000		1,563,343,340			
Comparative Performance													
	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Non-Core Fixed Income	2.65	2.65	3.64	6.18	N/A	N/A	2.37	7.51	5.60	0.37	N/A	4.25	10/01/2014
Non-Core Fixed Income Benchmark	2.09	2.09	3.63	5.69	N/A	N/A	2.65	5.90	6.99	-0.87	N/A	3.86	
Difference	0.56	0.56	0.01	0.49	N/A	N/A	-0.28	1.61	-1.39	1.24	N/A	0.39	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Market values shown are as of 03/31/2019. Commitment and drawdown information shown is as of 12/31/2018. Drawn/Invested values include called capital that was later returned to TMRS. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions.

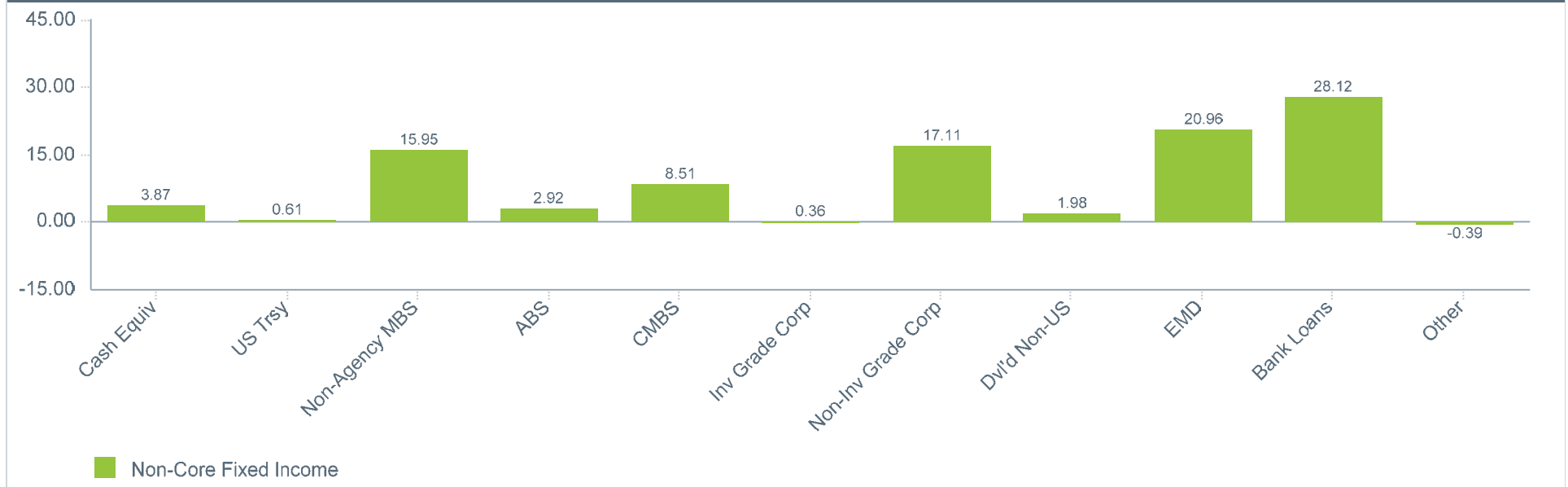
Non-Core Fixed Income

As of March 31, 2019

Portfolio Characteristics

	Portfolio
Effective Duration	2.81
Spread Duration	2.67
Avg. Maturity	8.53
Avg. Quality	Ba3
Yield To Maturity (%)	6.40
Coupon Rate (%)	5.32
Current Yield (%)	5.61

Sector Distribution (%)



Bond characteristics exclude Private and Opportunistic Credit. Allocation to "Other" consists of interest rate derivatives, derivative offsets, accrued interest, unsettled trades, and accrued fees.

Real Return Performance and Allocation

As of March 31, 2019

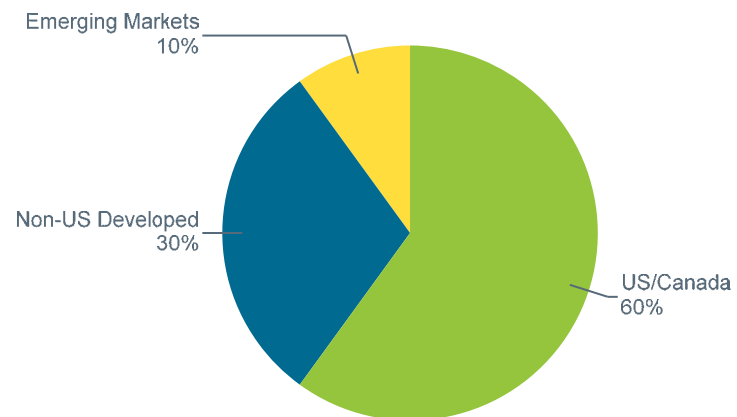
Asset Allocation by Manager													
Manager	Strategy			Market Value (\$)			% of Composite		Allocated/Committed		Drawn/Invested		
Public Securities													
Chickasaw Capital Management	Real Return Public Security			257,594,963		8.05%							
Cohen & Steers	Real Return Public Security			812,184,466		25.37%							
Nuveen Real Asset Income Fund	Real Return Public Security			874,471,360		27.31%							
Colchester Global Investors Limited	Real Return Public Security			705,534,932		22.04%							
Public Securities Total				2,649,785,721									
Private Investments													
Actis Energy IV, LP	Infrastructure			39,229,997		1.23%		75,000,000		33,800,869			
Amerra Agriculture Fund III	Agriculture			65,292,870		2.04%		100,000,000		73,248,669			
Blue Sky Strategic Australian Agriculture Fund, LP	Agriculture			42,167,816		1.32%		66,000,000		56,100,000			
Brookfield Infrastructure Fund III-B	Infrastructure			99,006,749		3.09%		150,000,000		95,165,657			
I Squared Global Infrastructure Fund II, LP	Infrastructure			38,956,038		1.22%		150,000,000		38,633,080			
MTP Energy Opportunities Fund II, LP	Energy			73,552,679		2.30%		100,000,000		53,154,759			
*MTP Energy Opportunities Fund III, LP	Energy			-		0.00%		125,000,000		-			
Orion Mine Finance Fund II	Mining			80,592,046		2.52%		100,000,000		70,180,862			
Orion Mineral Royalty Fund	Mining			6,456,268		0.20%		50,000,000		-			
Sprott Resource Lending Fund LP	Mining			46,706,245		1.46%		70,000,000		42,499,581			
Stonepeak Infrastructure Fund III LP	Infrastructure			15,937,949		0.50%		150,000,000		14,712,582			
Orion Mine Finance Co-Fund II, LP	Mining			6,839,146		0.21%		25,000,000		6,316,489			
NGP Natural Resources XII	Energy			36,971,816		1.15%		125,000,000		41,097,335			
*InstarAGF Essential Infrastructure Fund II	Infrastructure			-		0.00%		100,000,000		-			
*InstarAGF Essential Infrastructure Co-Fund II	Infrastructure			-		0.00%		50,000,000		-			
*GIP Capital Solutions	Infrastructure			-		0.00%		75,000,000		-			
*GIP Capital Solutions Co-Invest	Infrastructure			-		0.00%		50,000,000		-			
*GIP Spectrum Fund	Infrastructure			-		0.00%		75,000,000		-			
*Sprott Resource Lending II	Mining			-		0.00%		100,000,000		-			
Private Investments Total				551,709,620				1,736,000,000		524,909,883			
Comparative Performance													
	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Real Return	7.60	7.60	4.91	4.37	2.67	N/A	-4.30	8.04	6.95	-5.71	4.28	3.51	02/01/2011
Real Return Benchmark	7.46	7.46	5.08	5.02	3.23	4.80	-3.97	9.64	7.25	-4.70	4.08	3.72	
Difference	0.14	0.14	-0.17	-0.65	-0.56	N/A	-0.33	-1.60	-0.30	-1.01	0.20	-0.21	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Market values shown are as of 03/31/2019. Commitment and drawdown information shown is as of 12/31/2018 and is provided by TMRS staff. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions. *Represents approved investments that have not been funded and/or are pending legal documents.

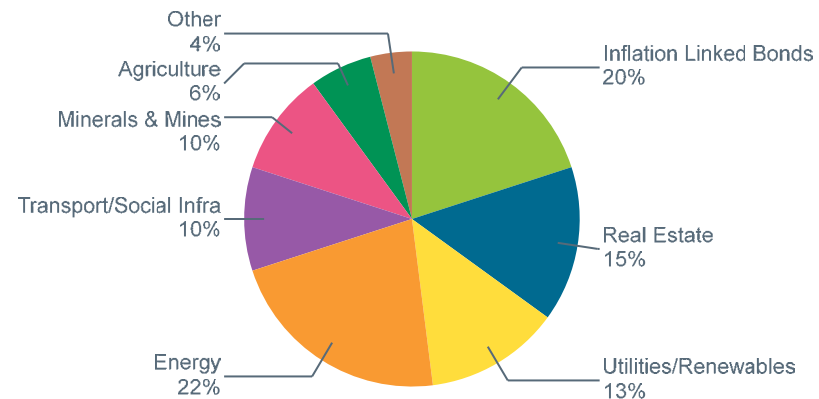
Real Return Portfolio Diversification

As of March 31, 2019

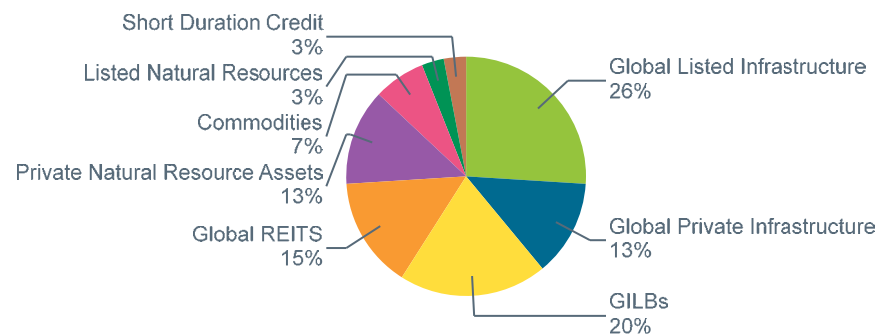
Portfolio Exposure by Geography



Portfolio Exposure by Sector



Portfolio Exposure by Asset Type



Allocations may not sum up to 100% exactly due to rounding. Allocation information is provided by TMRS and is as of 12/31/2018.

Real Estate Performance and Allocation

As of March 31, 2019

Asset Allocation by Manager

Manager	Strategy	Market Value (\$)	% of Composite	Allocated/Committed	Drawn/Invested
Abacus Core Income Fund, LP	Core	79,377,346	3.01%	75,000,000	66,015,441
Blackstone Property Partners	Core	358,175,074	13.60%	300,000,000	300,000,000
H/2 CP Core RE Debt Fund, LP	Core	72,180,365	2.74%	75,000,000	75,000,000
H/2 CP, LP	Core	71,383,389	2.71%	125,000,000	50,732,119
Harrison St. Real Estate	Core	269,768,269	10.24%	150,000,000	150,000,000
INVESCO Advisers, Inc.	Core	239,209,516	9.08%	150,000,000	150,000,000
Stockbridge Smart Markets Fund, LP	Core	361,903,802	13.74%	200,000,000	200,000,000
*Transwestern Core	Core	-	0.00%	45,000,000	-
USAA Eagle Real Estate Fund, LP	Core	282,491,250	10.72%	250,000,000	250,000,000
Walton St Real Estate Debt Fund	Core	56,931,480	2.16%	100,000,000	55,521,793
Abacus Multi-Family Partners II, LP	Value Add	86,217	0.00%	50,000,000	47,455,082
Abacus Multi-Family Partners III, LP	Value Add	33,726,766	1.28%	75,000,000	67,945,457
Abacus Multi-Family Partners IV, LP	Value Add	19,277,040	0.73%	75,000,000	17,707,663
Alcion RE Part Fund III-B, LP	Value Add	40,088,793	1.52%	50,000,000	36,935,541
DivcoWest V	Value Add	37,880,799	1.44%	75,000,000	36,898,919
Greenfield Acquisition Partners VI, LP	Value Add	8,342,601	0.32%	75,000,000	71,948,697
Greenfield Acquisition Partners VII, LP	Value Add	85,181,500	3.23%	100,000,000	56,594,379
IC Berkeley Partners IV, LP	Value Add	20,141,281	0.76%	50,000,000	19,236,364
Madison Realty Capital Debt Fund IV, LP	Value Add	82,473,964	3.13%	100,000,000	75,149,722
Miller Global Fund VII	Value Add	4,565,038	0.17%	75,000,000	60,068,315
Rubenstein Properties Fund II	Value Add	61,376,156	2.33%	75,000,000	69,356,796
Rubenstein Properties Fund III	Value Add	43,937,014	1.67%	75,000,000	42,743,363
Stockbridge Value Fund, LLC	Value Add	-	0.00%	75,000,000	58,983,571
Stockbridge Value Fund II, LP	Value Add	38,549,480	1.46%	75,000,000	64,188,767
Stockbridge Value Fund III, LP	Value Add	14,595,767	0.55%	50,000,000	15,816,901
Torchlight Debt Opp Fund V, LP	Value Add	57,886,763	2.20%	75,000,000	52,500,000
Torchlight Debt Opp Fund VI, LP	Value Add	3,507,518	0.13%	75,000,000	3,777,870
*Transwestern Core Plus	Value Add	-	0.00%	50,000,000	-
*TSP Value and Income Fund II Co-Invest	Value Add	-	0.00%	30,000,000	-
Kildare European Partners II	Opportunistic	12,530,108	0.48%	100,000,000	15,816,211
Lubert-Adler Fund VII	Opportunistic	84,570,990	3.21%	100,000,000	91,281,785
Moorfield Real Estate III	Opportunistic	50,962,149	1.93%	€ 50,000,000	€ 50,000,000
TPG Real Estate Part II, LP	Opportunistic	59,446,710	2.26%	100,000,000	69,728,544
*TPG Real Estate Part III, LP	Opportunistic	-	0.00%	100,000,000	-
European Property Inv Special	Opportunistic	24,780,130	0.94%	€ 30,000,000	€ 19,714,832
*Transwestern Development	Opportunistic	-	0.00%	50,000,000	-
Tristan European Property Inv Sp Opp 5	Opportunistic	498,110	0.02%	€ 60,000,000	€ 443,612
Walton St Real Estate Fund VII	Opportunistic	38,546,734	1.46%	75,000,000	14,281,519
Transwestern Strategic Relationship	Multi-Strat	19,791,433	0.75%	75,000,000	19,534,072
Total		2,634,163,551		3,515,000,000	2,375,377,334

Comparative Performance

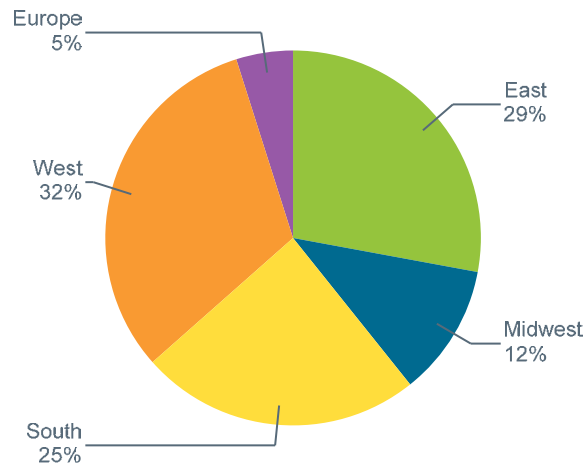
	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Real Estate	1.92	1.92	9.90	10.42	11.77	N/A	10.62	10.56	12.33	12.97	18.36	11.28	01/01/2012
Real Estate Benchmark	1.75	1.75	8.32	8.23	10.40	6.99	8.67	7.65	9.97	15.00	12.40	11.03	
Difference	0.17	0.17	1.58	2.19	1.37	N/A	1.95	2.91	2.36	-2.03	5.96	0.25	

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Market values shown are as of 03/31/2019. Commitment and drawdown information shown is as of 12/31/2018 and is provided by TMRS staff. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions. Market values for Abacus Multi-Family Partners II, LP and Stockbridge Value Fund, LLC represent residual assets in liquidation. *Represents approved investments that have not been funded and/or are pending legal documents.

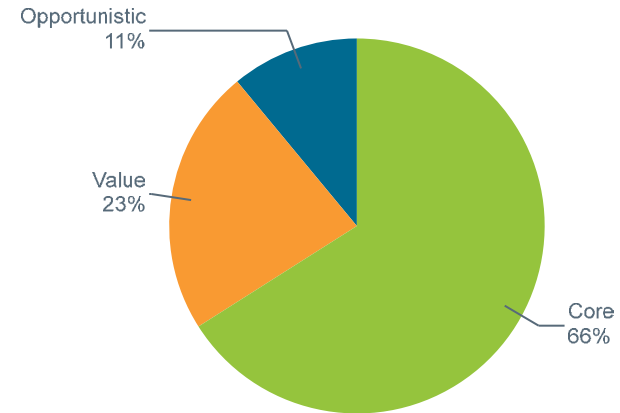
Real Estate Portfolio Diversification

As of March 31, 2019

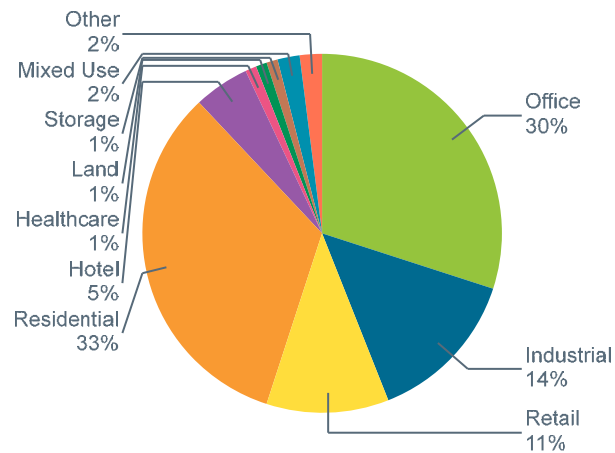
Portfolio Exposure by Geography



Portfolio Exposure by Sector



Portfolio Exposure by Property Type



Allocations may not sum up to 100% exactly due to rounding. Allocation information is provided by TMRS on a 3 month lag and is as of 12/31/2018.

Absolute Return Performance and Allocation

As of March 31, 2019

Asset Allocation by Manager					
Manager	Strategy	Market Value (\$)	% of Composite	Allocated/Committed	Drawn/Invested
Blackstone Treaty Oak Fund		37,814,726	1.61%	1,535,000,000	1,535,000,000
L/S Equity Manager 1	L/S Equity	127,039,660	5.40%	110,000,000	110,000,000
L/S Equity Manager 2	L/S Equity	113,496,390	4.82%	90,000,000	90,000,000
L/S Equity Manager 3	L/S Equity	116,445,920	4.95%	80,000,000	80,000,000
L/S Equity Manager 4	L/S Equity	119,494,315	5.08%	115,000,000	115,000,000
Credit Manager 1	Credit	153,277,080	6.51%	120,000,000	120,000,000
Credit Manager 2	Credit	130,401,120	5.54%	120,000,000	120,000,000
Credit Manager 3	Credit	152,034,600	6.46%	115,000,000	115,000,000
Credit Manager 4	Credit	4,411,834	0.19%	50,000,000	4,392,418
Credit Manager 5	Credit	46,761,499	1.99%	46,486,900	46,486,900
Credit Manager 6	Credit	21,661,560	0.92%	24,008,388	24,008,388
Relative Value Manager 1	Relative Value	5,116,342	0.22%	100,000,000	100,000,000
Relative Value Manager 2	Relative Value	166,459,800	7.07%	150,000,000	150,000,000
Relative Value Manager 3	Relative Value	92,248,782	3.92%	73,214,733	73,214,733
Relative Value Manager 4	Relative Value	98,757,000	4.20%	90,000,000	90,000,000
Relative Value Manager 5	Relative Value	138,478,815	5.89%	135,000,000	135,000,000
Event Driven Manager 1	Event Driven	6,101,144	0.26%	60,000,000	60,000,000
Global Macro Manager 1	Global Macro	133,605,500	5.68%	125,000,000	125,000,000
Global Macro Manager 2	Global Macro	157,679,400	6.70%	150,000,000	150,000,000
Global Macro Manager 3	Global Macro	139,158,600	5.91%	100,000,000	100,000,000
Global Macro Manager 4	Global Macro	98,364,780	4.18%	90,000,000	90,000,000
Global Macro Manager 5	Global Macro	24,064,063	1.02%	23,816,420	23,816,420
Multi-Strat Manager 1	Multi-Strat	110,948,300	4.72%	100,000,000	100,000,000
Multi-Strat Manager 2	Multi-Strat	97,790,671	4.16%	100,000,000	100,000,000
Multi-Strat Manager 3	Multi-Strat	61,384,547	2.61%	250,000,000	54,102,207
*Multi-Strat Manager 4	Multi-Strat	-	0.00%	100,000,000	-
Total		2,352,996,447		4,052,526,441	3,711,021,067

Comparative Performance													
	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Absolute Return	1.71	1.71	1.82	6.55	N/A	N/A	1.51	11.72	0.22	3.34	N/A	4.05	08/01/2014
Absolute Return Benchmark	1.96	1.96	-0.44	3.49	1.88	3.45	-0.93	7.11	-1.34	0.79	4.72	1.82	
Difference	-0.25	-0.25	2.26	3.06	N/A	N/A	2.44	4.61	1.56	2.55	N/A	2.23	
Absolute Return Direct Composite	1.72	1.72	1.22	6.36	N/A	N/A	1.07	12.51	0.35	N/A	N/A	4.69	01/01/2016
Absolute Return Benchmark	1.96	1.96	-0.44	3.49	1.88	3.45	-0.93	7.11	-1.34	0.79	4.72	2.03	
Difference	-0.24	-0.24	1.66	2.87	N/A	N/A	2.00	5.40	1.69	N/A	N/A	2.66	

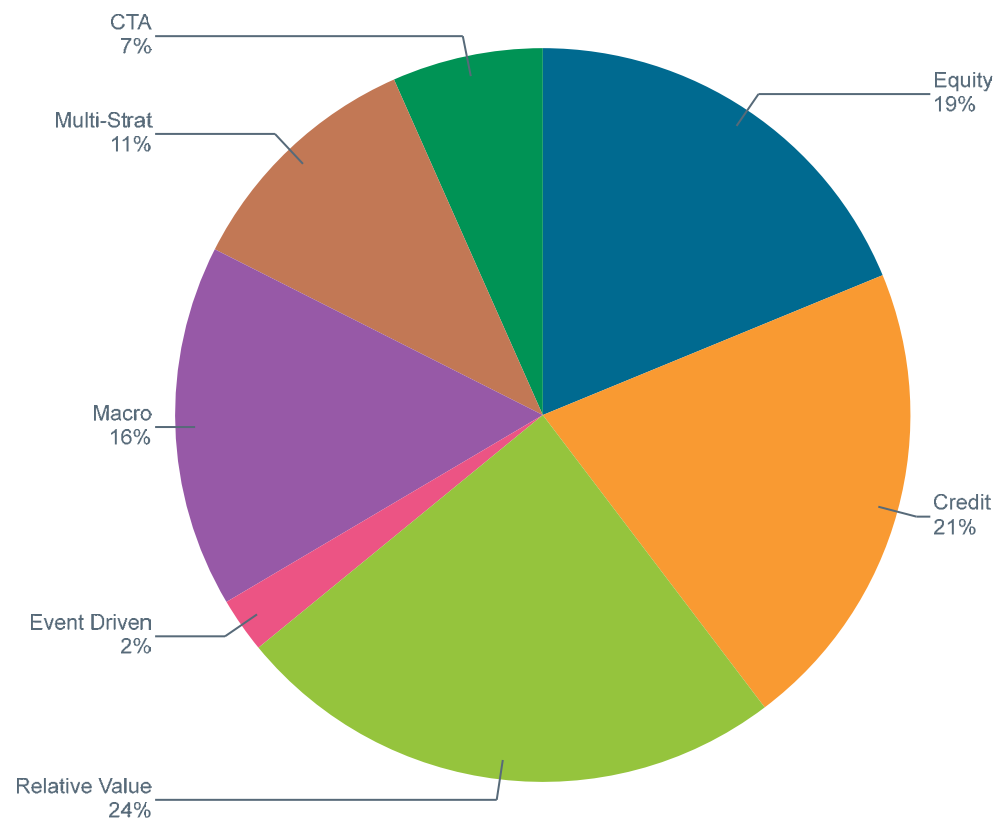
Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Market values shown are as of 03/31/2019. Commitment and drawdown information shown is as of 12/31/2018 and is provided by TMRS staff. Please see Board Presentation/Executive Summary Report Addendum for custom benchmark definitions. *Represents approved investments that have not been funded and/or are pending legal documents.



Absolute Return Strategy Exposures

As of March 31, 2019

Direct Portfolio Manager Exposures



Allocations shown may not sum up to 100% exactly due to rounding. Allocation information is provided by TMRS on a 3 month lag and is as of 12/31/2018. The BlackStone Treaty Oak Fund is in the process of winding down the portfolio.

Private Equity Performance and Allocation

As of March 31, 2019

Asset Allocation by Manager

Manager	Strategy	Market Value (\$)	% of Composite	Allocated/Committed	Drawn/Invested
Altaris Constellation Partners IV, LP	Buy-out	4,579,335	0.75%	12,500,000	3,851,071
Altaris Health Partners IV, LP	Buy-out	15,005,980	2.46%	50,000,000	13,180,078
*Arcline Capital Partners	Buy-out	-	0.00%	50,000,000	-
Capital Partners Private Equity Income Fund III, LP	Buy-out	12,069,329	1.98%	58,000,000	13,223,705
*CapVest Equity Partners IV SCSp	Buy-out	-	0.00%	46,600,000	-
Dunes Point Capital Fund II, LP	Buy-out	11,153,312	1.83%	50,000,000	11,153,312
GTCR Fund XII, LP	Buy-out	6,964,962	1.14%	50,000,000	10,705,000
Harvest Partners VII	Buy-out	11,725,951	1.92%	20,000,000	10,988,141
H.I.G. Capella	Buy-out	26,261,895	4.31%	-	26,351,648
H.I.G. Strategic Partners Fund	Buy-out	5,490,237	0.90%	300,000,000	5,490,237
Incline Equity Partner IV, LP	Buy-out	15,885,797	2.61%	40,000,000	15,186,722
Kainos Capital Partners II, LP	Buy-out	18,532,262	3.04%	35,000,000	21,072,032
Marlin Equity V, LP	Buy-out	11,446,075	1.88%	57,000,000	11,431,730
Marlin Heritage II, LP	Buy-out	6,097,688	1.00%	14,250,000	6,477,338
One Rock Capital Partners II, LP	Buy-out	13,192,030	2.16%	45,000,000	14,014,350
*Providence Equity Partners VIII, LP	Buy-out	-	0.00%	55,000,000	-
Reverence Capital Partners II	Buy-out	5,195,755	0.85%	50,000,000	5,195,755
Searchlight Capital II	Buy-out	32,616,433	5.35%	47,000,000	26,670,317
*Searchlight Capital III	Buy-out	-	0.00%	50,000,000	-
Tritium I, LP	Buy-out	42,513,072	6.98%	50,000,000	33,899,849
*Tritium II, LP	Buy-out	-	0.00%	60,000,000	-
*FGN 2018 Partner Fund	Venture/Growth	-	0.00%	100,000,000	-
Foundry Group Next Fund, LP	Venture/Growth	26,559,563	4.36%	30,000,000	22,500,000
Foundry Group 2018	Venture/Growth	5,580,554	0.92%	45,000,000	4,556,250
FTV V, LP	Venture/Growth	31,578,833	5.18%	46,000,000	30,360,000
*Main Post Growth Capital II, LP	Venture/Growth	-	0.00%	40,000,000	-
Mercato Partners Growth, LP	Venture/Growth	26,600,306	4.36%	40,000,000	22,200,000
Providence Strategic Growth II, LP	Venture/Growth	63,354,242	10.39%	60,000,000	39,262,247
Providence Strategic Growth III, LP	Venture/Growth	33,059,193	5.42%	70,000,000	28,153,622
*Providence Strategic Growth IV, LP	Venture/Growth	-	0.00%	50,000,000	-
Updata Partners V, LP	Venture/Growth	50,715,755	8.32%	50,000,000	34,125,000
*Updata Partners VI, LP	Venture/Growth	-	0.00%	50,000,000	-
Carlyle Energy Mezzanine Fund II	Special Situations	24,894,383	4.08%	65,000,000	24,944,701
GSO Capital Opportunities Fund III, LP	Special Situations	33,913,603	5.56%	75,000,000	33,000,094
GSO COF III Co-investment Fund, LP	Special Situations	5,033,279	0.83%	18,750,000	5,208,494
H.I.G. Bayside Fund IV	Special Situations	20,047,683	3.29%	60,000,000	24,192,686
LightBay Investment Partners, LP	Special Situations	1,239,289	0.20%	40,000,000	2,752,483
TPG Opportunities Partners IV, LP	Special Situations	1,259,183	0.21%	25,000,000	1,284,637
TSSP Adjacent Opportunities Fund III	Special Situations	46,903,626	7.70%	75,000,000	38,489,342
TSSP Adjacent Opportunities (D), LP	Special Situations	35,159	0.01%	50,000,000	-
Total		609,504,764		2,130,100,000	539,920,840

Comparative Performance

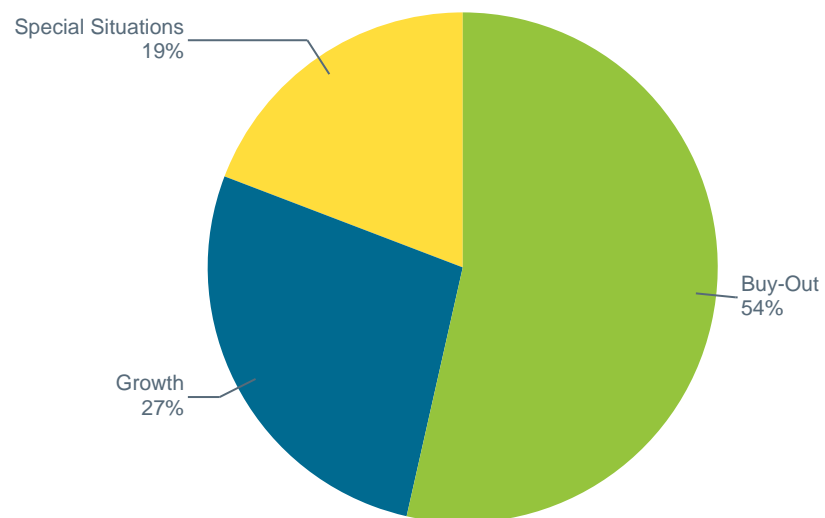
	1 Quarter	CYTD	1 Year	3 Years	5 Years	10 Years	2018	2017	2016	2015	2014	Since Incep.	Inception Date
Private Equity	1.63	1.63	26.55	18.85	N/A	N/A	39.18	19.69	1.68	N/A	N/A	18.19	01/01/2016
Private Equity - Buy Out	-11.02	-11.02	-0.60	10.91	N/A	N/A	26.96	7.09	23.91	N/A	N/A	13.26	01/01/2016
Private Equity - Venture/Growth	12.95	12.95	60.46	N/A	N/A	N/A	58.25	34.71	N/A	N/A	N/A	29.88	07/01/2016
Private Equity - Special Situations	-3.19	-3.19	4.10	8.35	N/A	N/A	15.17	12.52	N/A	N/A	N/A	8.35	04/01/2016

Performance shown is net of fees. Allocations shown may not sum up to 100% exactly due to rounding. Market values shown are as of 03/31/2019. Drawn/Invested values are as of 03/31/2019 and is provided by TMRS staff. Commitment information shown is as of 12/31/2018 and is provided by TMRS staff. *Represents approved investments that have not been funded and/or are pending legal documents.

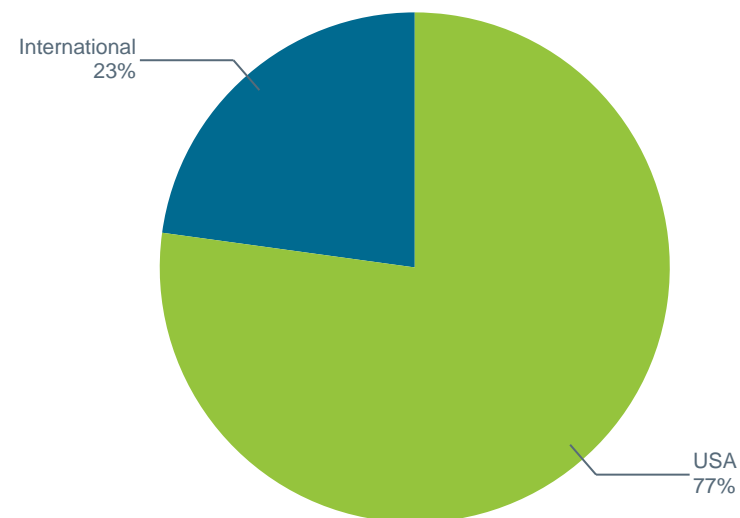
Private Equity Strategic Allocation

As of March 31, 2019

Private Equity Strategy Diversification by Commitment



Private Equity Geographic Diversification by Commitment



Policy Strategy Ranges

Control/Buy-out	40% to 75%
Venture/Growth/Minority	10% to 40%
Special Situations/Opportunistic	5% to 35%

Policy Geography Ranges

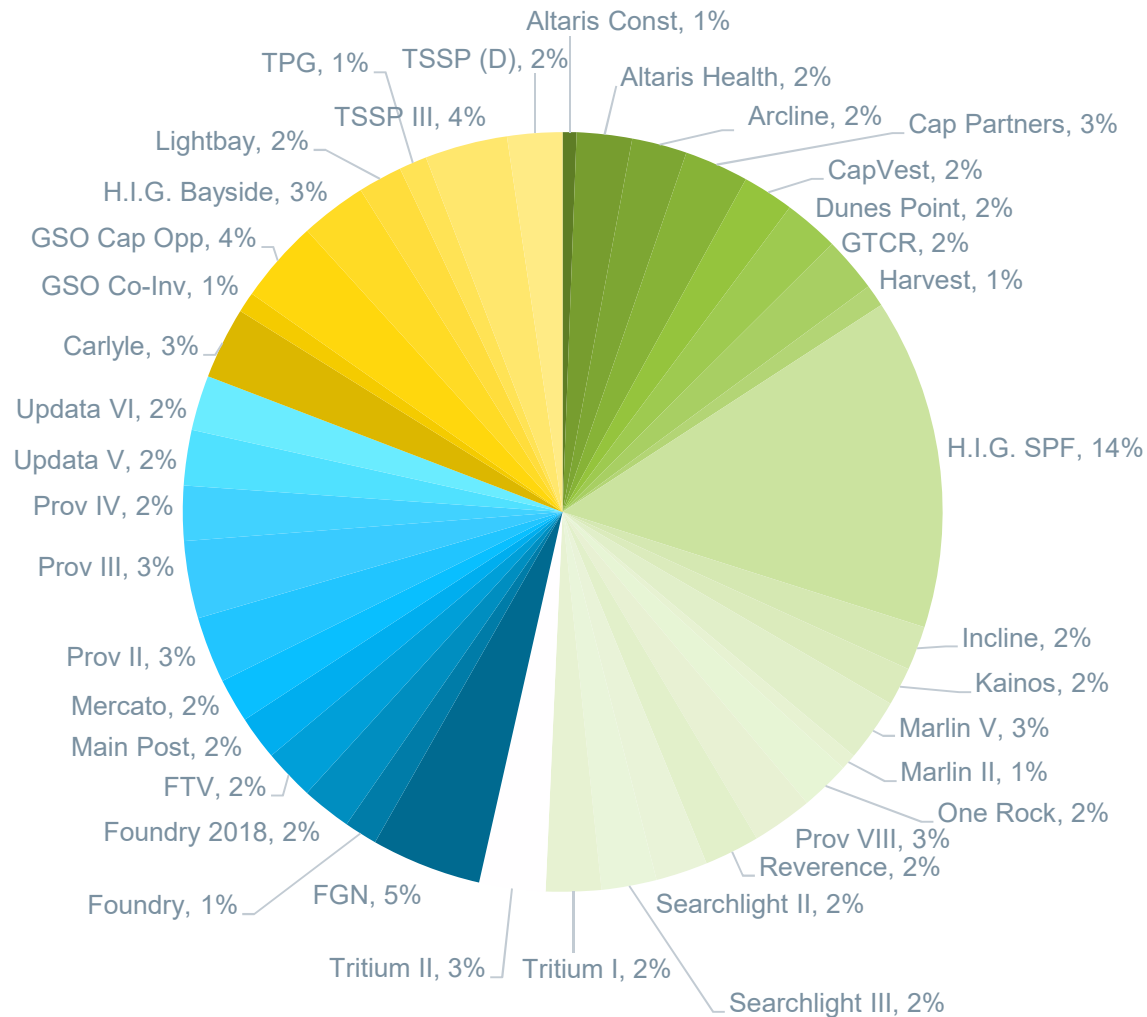
No less than 75% in USA
No more than 25% in International

Allocations may not sum up to 100% exactly due to rounding. Allocation information is provided by TMRS on a 3 month lag and is as of 12/31/2018.

Private Equity Strategic Allocation

As of March 31, 2019

Private Equity Manager Diversification by Commitment



Policy Guidelines

No more than 35% with any one investment manager; No more than 25% in any one investment vehicle.

Additional Information

- For additional information on investment managers, please see the RVK quarterly performance report, or materials provided by a specialty consultant.

Composite Benchmark Comments

The **Actual Allocation Benchmark** is calculated monthly using beginning of month asset class weights applied to each corresponding benchmark return and currently consists of the following:

- Total Equity Benchmark
- Fixed Income Benchmark
- Non-Core Fixed Income Benchmark
- Real Return Benchmark
- Real Estate Benchmark
- Absolute Return Benchmark
- Private Equity Benchmark
- FTSE 30 Day T-Bill Index

Asset Class Composite Benchmarks:

The **Total Equity Benchmark** is calculated monthly and consists of 50% Russell 3000 Index and 50% MSCI EAFE Index (USD) (Net) through 07/31/2010; a blend of the Russell 3000 Index, MSCI ACW Ex US IM Index (USD) (Net) and MSCI EAFE Index (USD) (Net) at beginning of month investment weights through 11/30/2012; and a blend of the Russell 3000 Index and MSCI ACW Ex US IM Index (USD) (Net) at beginning of the month weights through 12/31/2018; and MSCI ACW IM Index (USD) (Net) thereafter.

The **Fixed Income Benchmark** is calculated monthly and consists of the Bloomberg US Gov't Crdt Lng Trm Bond Index through 06/30/2009; Bloomberg US Agg Bond Index thereafter.

The **Non-Core Fixed Income Benchmark** is calculated monthly using beginning of the month sub-asset class weights within the Non-Core Fixed Income Composite applied to each sub-asset class primary benchmark return.

The **Real Return Benchmark** is calculated monthly using beginning of the month sub-asset class weights within the Real Return Composite applied to each sub-asset class primary benchmark return.

The **Real Estate Benchmark** is calculated monthly and consists of the NCREIF ODCE Index (AWA) (Gross); interim months assume a 0.00% return. The return is composed of lagged and un-lagged returns in the same proportion as the market value of managers whose returns are being reported on a lagged versus non-lagged basis.

The **Absolute Return Benchmark** is calculated monthly and consists of the HFRI FOF: Dvf'd Index (1 Mo Lag).

The **Private Equity Benchmark** is set equal to the Composite return.

Real Estate Performance Comments

"Privately held real estate fund returns are one-quarter lagged and are provided by Private Edge. Quarterly returns are incorporated in the last month of that particular quarter. The returns for the first two months are zero.

Market values are previous quarter-end values as reported, rolled forward with current cash flows. Returns and market values provided by Private Edge are rolled into their respective Real Estate composite and the Total Plan composite.

Publicly traded real estate fund performance is non-lagged, reflecting monthly fluctuations. Detailed information regarding methodology can be found in the internal TMRS Performance Reporting Policy statement" (State Street Performance Team).

H/2 CP, LP is a publicly traded real estate fund, previously classified as non-public. Performance from 10/2015 - 12/2015 is revised to reflect the change in calculation methodology.

Glossary

Active Return - The difference between the investment manager/composite performance relative to the performance of an appropriate market benchmark.

Active Share - Measures the degree to which the holdings of a fund differ from the holdings of the benchmark. Active share is calculated by taking the sum of the absolute value of the differences of the weight of each holding in the fund versus the weight of each holding in the benchmark and dividing by two.

Alpha - A measure of the difference between a portfolio's actual returns and its expected performance, given its level of risk as measured by beta. It is a measure of the portfolio's historical performance not explained by movements of the market or a portfolio's non-systematic return.

Alpha Ratio - A measure of a portfolio's non-systematic return per unit of downside risk. It is measured by dividing the alpha of a portfolio by the downside risk. The non-systematic return is a measure of a portfolio's historical performance not explained by movements of the market.

Average Quality - Bond quality ratings are reported using the investment managers' and the index providers' preferred rating agency. *Average Quality for managers unable to provide this statistic is instead provided by Morningstar; if unavailable on Morningstar, it has been estimated using a credit quality distribution provided by the manager.* There are two primary rating agencies in the US. *Moody's* assigns ratings on a system that employs up to four symbols (consisting of letters and numbers) such as, Aaa, Aa2, etc., with Aaa being the highest or safest rating. *Standard & Poor's (S&P)* employs a system that uses + and - along with letters such as AAA, AA+, etc. The two rating agencies' systems are summarized below:

<u>S&P</u>	<u>Moody's</u>	<u>Explanation</u>	<u>S&P</u>	<u>Moody's</u>	<u>Explanation</u>
Higher Credit Quality – Investment Grade			Lower Credit Quality – Below Investment Grade		
AAA	Aaa	Prime/Highest credit quality	BB+	Ba1	Speculative/Low credit quality
AA+	Aa1	High credit quality	BB	Ba2	
AA	Aa2		BB-	Ba3	
AA-	Aa3		B+	B1	Highly speculative
A+	A1	Upper-medium credit quality	B	B2	
A	A2		B-	B3	
A-	A3		CCC+	Caa1	Substantial credit/default risk
BBB+	Baa1	Lower-medium credit quality	CCC	Caa2	Extremely speculative
BBB	Baa2		CCC-	Caa3	
BBB-	Baa3		CC	Ca	Vulnerable to default
			C	Ca	
			D	C	In default

Benchmark Effect - The difference between the blended return of each respective managers' benchmark within a composite and the composite's benchmark return.

Beta - A measure of the sensitivity of a portfolio to the movements in the market. It is a measure of a portfolio's non-diversifiable or systematic risk.

Box Plots - A graphical representation of the distribution of observations. From top to bottom, the four boxes represent the spread between the maximum value and the minimum value in each quartile. A quartile represents the values that divide the observations into four quarters (i.e., 1st quartile, 2nd quartile, 3rd quartile, and 4th quartile). The median observation is where the 2nd quartile and 3rd quartile meet.

Buy and Hold Attribution - At the beginning of the time period under analysis, the manager and benchmark portfolios are broken down into segments (i.e., styles, sectors, countries, and regions) based on the desired type of attribution. The formula assumes zero turn-over to the manager and benchmark portfolios throughout the period and calculates the segment returns ("buy and hold returns") to arrive at performance attribution. Due to portfolio turnover, buy and hold attribution may not accurately represent quarterly performance relative to the benchmark. Country, region, sector, and style allocations are as of the date one quarter prior to the reporting date, and the returns shown are for those segments throughout the quarter reported. Due to disclosure guidelines set by each investment manager, equity characteristics shown are as of the most recent date available. The following is the methodology for segment classification:

Sector - Attribution is calculated using the Global Industry Classification Standard (GICS) which is a detailed and comprehensive structure for sector and industry analysis. Stocks are classified by their primary sector, as defined by S&P Capital IQ data.

Country/Region - Attribution is calculated using the Morgan Stanley Capital International (MSCI) region standards. Stocks are classified by their domicile country/region, as defined by S&P Capital IQ data.

Style - Stocks are classified into the following style boxes: large/mid/small vs. growth/neutral/value. Stocks are classified along large/mid/small categories at the time of the Russell index rebalancing, using the index market cap boundaries as cutoff points. Stocks are classified along growth/neutral/value categories at the time of the Russell index rebalancing, using the price/book ratio as supplied by S&P Capital IQ. Stocks in the Russell 3000 Index portfolio are sorted by price/book ratio; names with the highest price/book ratio that make up 1/3 of the total market capitalization are assigned to the growth category, names that make up the subsequent 1/3 of the total market capitalization are assigned to the neutral category, while the balance of the names are assigned to the value category.

Portfolio Characteristics and Buy and Hold Attribution reports utilize product-specific data for all mutual funds and commingled funds.

Capital Markets Review -

Breakeven Inflation - Measures the expected inflation rate at each stated maturity by taking the difference between the real yield of the inflation-linked maturity curve and the yield of the closest nominal Treasury maturity.

Consumer Confidence - Measures domestic consumer confidence as defined by the degree of optimism on the state of the economy that consumers express through saving and spending.

Consumer Price Index (CPI) - Measures the change in the price level of consumer goods and services.

Federal Funds Rate - The interest rate at which a depository institution lends funds maintained at the Federal Reserve to another depository institution overnight. It is one of the most influential interest rates in the US economy, since it affects monetary and financial conditions, which in turn have a bearing on key aspects of the broad economy including employment, growth and inflation.

Option-Adjusted Spread - Measures the flat spread of an index or bond to the Treasury yield curve after removing the effect of any embedded options.



Glossary

- Purchasing Managers Index (PMI)** - Measures economic activity by surveying purchasing managers on a monthly basis as to whether business conditions have improved, worsened, or stayed the same.
- Real Gross Domestic Product (Real GDP)** - An inflation-adjusted measure that reflects the value of all goods and services produced by an economy in a given year.
- US Dollar Total Weighted Index** - Measures the value of the US Dollar relative to a basket of other world currencies. It is calculated as the weighted geometric mean of the dollar's value versus the EUR, GBP, CAD, SEK, CHF, and JPY.
- Unemployment Rate** - The percentage of the total labor force that is unemployed but actively seeking employment.
- VIX** - Measures the implied volatility of S&P 500 Index options by looking at the market's expectation of the S&P 500 Index volatility over the next 30 day period. Commonly referred to as the "fear index" or the "fear gauge."
- Cash Flow Effect** - The composite's active return minus the sum of each managers' active return minus the benchmark effect.
- Consistency** - The percentage of quarters that a product achieved a rate of return higher than that of its benchmark. The higher the consistency figure, the more value a manager has contributed to the product's performance.
- Convexity** - A measure of the shape of the curve that describes the relationship between bond prices and bond yields.
- Correlation** - A statistical measure of the relationship between asset class returns. A value of 1.00 is a perfect correlation; that is, the asset classes always move in the same direction. A value of -1.00 indicates a perfect negative correlation, in which the asset classes always move in opposite directions of each other. A value of 0 indicates there is no relationship between the direction of returns of the two asset classes. Correlation calculations only consider the direction of changes relative to two variables and not the magnitude of those changes.
- Coupon Rate** - The percentage rate of interest paid on a bond or fixed income security; it is typically paid twice per year.
- Current Yield** - The annual income of a security divided by the security's current price.
- Down Market Capture** - Down market by definition is negative benchmark return and down market capture represents the ratio in % terms of the average portfolios return over the benchmark during the down market period. The lower the value of the down market capture the better the product's performance.
- Downside Risk** - A measure similar to standard deviation, but focuses only on the negative movements of the return series. It is calculated by taking the standard deviation of the negative monthly returns. The higher the factor, the riskier the product.
- Earnings Per Share** - It is backward looking, calculated using the one year current EPS divided by the one year EPS five years ago.
- Effective Duration** - The approximate percentage change in a bond's price for a 100 basis point change in yield.
- Excess Return vs. Market** - Average of the monthly arithmetic difference between the manager's return and the benchmark return over a specified time period, shown on an annualized basis.
- Excess Return vs. Risk Free** - Average of the monthly arithmetic difference between the manager's return and the risk-free return (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise) over a specified time period, shown on an annualized basis.
- Excess Risk** - A measure of the standard deviation of a portfolio's performance relative to the risk free return.
- Expense Ratios** - Morningstar is the source for mutual fund expense ratios.
- Gain/Loss** - The net increase or decrease in the market value of a portfolio excluding its Net Cash Flow for a given period.
- Indices** - All indices and related information are considered intellectual property and are licensed by each index provider. The indices may not be copied, used or distributed without the index provider's prior written approval. Index providers make no warranties and bear no liability with respect to the indices, any related data, their quality, accuracy, suitability and/or completeness.
- Information Ratio** - Measured by dividing the active rate of return by the tracking error. The higher the information ratio, the more value-added contribution by the manager.
- Liability Driven Investing (LDI)** - A method to optimally structure asset investments relative to liabilities. The change in liabilities is estimated by the Ryan Labs Generic PPA Index of appropriate duration for that Plan. This benchmark is based on generic data and is therefore an approximation. RVK is not an actuarial firm, and does not have actuarial expertise.
- Estimated Funded Status** - The estimated ratio of a Plan's assets relative to its future liabilities. This is calculated by dividing the Plan's asset market value by the estimated present value of its liabilities. The higher the estimated funded status, the better the Plan's ability to cover its projected benefit obligations. An estimated funded status of 100% indicates a Plan that is fully funded.
- Estimated PV of Liabilities** - An estimate of a Plan's future liabilities in present value terms. The beginning of the period liability is provided by the Plan's actuary. The period-end present value liability estimate provided in this report is derived by applying the estimated percentage change generated using the Ryan Labs Generic PPA Index with duration similar to that reported on the most recent actuarial valuation report.
- Duration of Liabilities** - The sensitivity of the value of a Plan's liabilities to changes in interest rates, as calculated by the Plan's actuary.
- Duration of Assets** - The dollar-weighted average duration of all the individual Plan assets.
- Estimated Plan Hedge Ratio** - The estimate of how well a Plan's investment portfolio is hedged against changes in interest rates - a primary driver of funded status movements. This is calculated by dividing the dollar-weighted values of both the Plan asset duration by the liability duration and multiplying by the estimated funded status. An estimated plan hedge ratio of zero indicates that the Plan's liabilities have not been hedged, whereas a value of one indicates fully hedged.
- Modified Duration** - The approximate percentage change in a bond's price for a 100 basis point change in yield, assuming the bonds' expected cash flows do not change.

Glossary

Mutual Fund Performance - Whenever possible, manager performance is extended for any share class that does not have 10 years of history. Using Morningstar's methodology, a single ticker within the same fund family (often the oldest share class) is chosen to append historical performance.

Net Cash Flow - The sum, in dollars, of a portfolio's contributions and withdrawals. This includes all management fees and expenses only when performance shown is gross of fees.

Peer Groups -

Plan Sponsor Peer Groups - RVK utilizes the Mellon Analytical Solutions Trust Universe along with the Investment Metrics Plan Sponsor Universe. The combined Mellon Analytical Solutions Trust Universe and Investment Metrics Plan Sponsor Universe is used for comparison of total fund composite results and utilizes actual client performance compiled from consultant and custodian data. The Plan Sponsor Peer Group database includes performance and other quantitative data for over 2,100 plans which include corporate, endowment, foundation, public, and Taft Hartley plans. Plan Sponsor Peer Groups are gross of fees.

Investment Manager Peer Groups - RVK utilizes Investment Metrics' Peer Groups for investment manager peer comparison and ranking. The Investment Metrics Peer Group database includes performance and other quantitative data for over 840 investment management firms and 29,000 investments products, across more than 160 standard peer groups. Mutual Fund Peer Groups are net of fees. For more information on Peer Groups, visit <https://www.invmetrics.com/style-peer-groups>.

Percentile Rankings - Percentile rank compares an individual fund's performance with those of other funds within a defined peer group of managers possessing a similar investment style. Percentile rank identifies the percentage of a fund's peer group that has a higher return (or other comparative measurement) than the fund being ranked. Conversely, 100 minus the individual fund's ranking will identify the percentage of funds within the peer group that have a lower return than the fund being ranked.

1 - Highest Statistical Value

100 - Lowest Statistical Value

Example: American Funds AMCP;R-4 (RAFEX) is ranked in the 4th percentile within the IM US Equity Large-Cap Growth Funds (MF) Peer Group for the Sharpe Ratio. Within the IM US Equity Large-Cap Growth Funds peer group, 4% of the other funds performed better than American Funds AMCP;R-4 (RAFEX), while 96% of the funds performed worse.

Performance Methodology - RVK calculates performance for investment managers and composites using different methodologies.

Investment Managers - Performance is calculated for interim periods between all large external cash flows for a given month and geometrically linked to calculate period returns. An external cash flow is defined as cash, securities, or assets that enter or exit a portfolio. RVK defines a "large cash flow" as a net aggregate cash flow of $\geq 10\%$ of the beginning-period portfolio market value or any cash flow that causes RVK calculated performance to deviate from manager/custodian reported performance in excess of 5 basis points for a given month.

Composites - The Modified Dietz methodology is utilized to calculate asset class, sub-asset class, and total fund composite performance. The Modified Dietz method calculates a time-weighted total rate of return that considers the timing of external cash flows; however, it does not utilize interim period performance to mitigate the impact of significant cash in- and outflows to the composite.

RVK calculates performance beginning with the first full month following inception. Since inception performance may vary from manager reported performance due to RVK using the first full month of returns as the inception date. Performance for both managers and composites is annualized for periods greater than one year.

Portfolio Characteristics - Due to disclosure guidelines set by each investment manager, portfolio characteristics shown are as of the most recent date available.

Price to Earnings Ratio - The ratio of a company's share price to its per-share earnings

Private Equity Quartile Ranks - Private Equity quartile ranks are generated using vintage year peer group data provided by Thomson Reuters, and are based on each fund's annualized, since inception internal rate of return (IRR). Three Private Equity peer groups are available via Thomson Reuters: Buyout, Venture, and All Private Equity. Ranks are available quarterly, at a one-quarter lag.

Return - Compounded rate of return for the period.

% Return - The time-weighted rate of return of a portfolio for a given period.

R-Squared - The percentage of a portfolio's performance explained by the behavior of the appropriate benchmark. High R-Squared means a higher correlation of the portfolio's performance to the appropriate benchmark.

Risk Free Benchmark - ICE BofAML 3 Mo US T-Bill Index unless specified otherwise.

Glossary

RVK Liquidity Rating - A qualitative method for determining the relative amount of liquidity in a portfolio. The characteristics considered when determining relative liquidity include trading volume, gates for redemption, leverage, nature of transactions, and pricing mechanisms. The RVK Liquidity Rating is calculated using beginning of month investment weights applied to each corresponding asset class liquidity rating.

<u>Asset Class</u>	<u>RVK Liquidity Rating</u>	<u>Asset Class</u>	<u>RVK Liquidity Rating</u>
<u>Liquid Investments</u>		<u>Less Liquid Investments</u>	
T-Bills and Treasuries	100	Fixed Income Plus Sector	50
Cash Equivalents	98	Bank Loans	50
TIPS	95	Stable Value (Plan Sponsor Directed)	50
US Large Cap Equity	95	Absolute Return Strategies	35
Diversified Real Return	93		
Stable Value (Participant Directed)	91		
Non-US Large Cap Equity	90	<u>Not Liquid Investments</u>	
Global Tactical Asset Allocation	88	Core Real Estate	25
US Small Cap Equity	85	Core Plus Real Estate	15
REITS	85	Non-Core Real Estate	5
Non-US Small Cap Equity	85	Private Equity Funds of Funds	5
Emerging Markets Equity	85		
Core Fixed Income	85		
Core Plus Fixed Income	80		

Sector Allocation - Negative fixed income sector allocation reflects manager's use of derivatives, short selling, or interest rate swaps.

Sharpe Ratio - Represents the excess rate of return over the risk-free return (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise), divided by the standard deviation of the excess return to the risk free asset. The result is the absolute rate of return per unit of risk. The higher the value, the better the product's historical risk-adjusted performance.

Simple Alpha - The difference between the manager's return and the benchmark's return.

Spread Duration - The approximate percentage change in a bond's price for a 100 basis point change in its spread over a Treasury of the same maturity.

Standard Deviation - A statistical measure of the range of a portfolio's performance. The variability of a return around its average return over a specified time period.

Time Period Abbreviations - **QTD** - Quarter-to-Date. **CYTD** - Calendar Year-to-Date. **FYTD** - Fiscal Year-to-Date. **YOY** - Year Over Year.

Thematic Classification - Represents dedicated manager allocations; as such, thematic allocations are approximations. RVK categorizes the following asset classes as Alpha, Capital Appreciation, Capital Preservation, and Inflation:

<u>Alpha</u>	<u>Capital Appreciation</u>	<u>Capital Preservation</u>	<u>Inflation</u>
Absolute Return Strategies	Public Equity	Core Fixed Income	TIPS
Currency Overlay	Private Equity	CMBS Fixed Income	Bank Loans
	Preferred Securities	Asset Backed Fixed Income	Core Real Estate
	High Yield	Domestic Core Plus Fixed Income	Real Return
	Convertible Fixed Income	Mortgage Backed Fixed Income	Inflation Hedges
	TALF Funds	International Developed Fixed Income	REITS
	Distressed Debt	Cash Equivalents	Commodities
	Emerging Market Fixed Income	Stable Value	
	Value Added Real Estate		
	Opportunistic Real Estate		

Total Fund Attribution - The Investment Decision Process (IDP) model provides an approach to evaluating investment performance that applies to all asset classes and investment styles. The IDP model is based on a top-down hierarchy framework of investment decisions, with each decision contributing to the overall profit or loss. The IDP approach starts from the strategic asset allocation and follows the flow of the investments down to the manager's skill.

Strategic Asset Allocation (SAA) - The percentage return gained or lost from the long-term strategic asset allocation decision, the most significant determinant of long-term performance. SAA is the product of the target asset allocation multiplied by the corresponding benchmark returns.

Tactical Asset Allocation (TAA) - The percentage return gained or lost from not having been precisely allocated at the target asset allocation mix, whether by deviations that are tactical in nature or a by-product of moving towards the target mix. TAA is the product of the actual asset allocation multiplied by the broad asset class benchmarks, less the SAA.

Style Selection (SS) - The percentage return gained or lost from intentional style biases within each asset class (e.g. value rather than core or overweight to emerging markets relative to benchmark). SS is the product of the actual manager allocation within each asset class multiplied by their specific benchmark, less TAA.

Manager's Skill (MS) - The percentage return gained or lost from manager value added relative to their specific benchmark. MS is the product of the actual manager allocation multiplied by their achieved excess return.

Total Fund Beta - Total Fund Beta is calculated using the S&P 500 as the benchmark. It represents a measure of the sensitivity of the total fund to movements in the S&P 500 and is a measure of the Total Fund's non-diversifiable or systematic risk.

Tracking Error - A measure of the standard deviation of a portfolio's performance relative to the performance of an appropriate market benchmark.

Glossary

Treynor Ratio - Similar to Sharpe ratio, but focuses on beta rather than excess risk (standard deviation). Treynor ratio represents the excess rate of return over the risk-free rate (i.e., ICE BofAML 3 Mo US T-Bill Index unless specified otherwise) divided by the beta. The result is the absolute rate of return per unit of risk. The higher the value, the better historical risk-adjusted performance.

Unit Value - The dollar value of a portfolio, assuming an initial nominal investment of \$100, growing at the compounded rate of %Return for a given period.

Up Market Capture - Up market by definition is positive benchmark return and up market capture represents the ratio in % terms of the average portfolios return over the benchmark during the up market period. The higher the value of the up market capture the better the product's performance.

Yield to Maturity - The rate of return achieved on a bond or other fixed income security assuming the security is bought and held to maturity and that the coupon interest paid over the life of the bond will be reinvested at the same rate of return. The 30-Day SEC Yield is similar to the Yield to Maturity and is reported for mutual funds.

Yield to Worst - The bond yield calculated by using the worst possible yield taking into consideration all call, put, and optional sink dates.

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