



Q3 2021 INVESTMENT SUMMARY: BOARD REPORT

MODOT & PATROL EMPLOYEES'
RETIREMENT SYSTEM

NOVEMBER 2021

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MARKET UPDATE



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MARKET OVERVIEW - TRAILING ANNUAL INDEX PERFORMANCE

Equity							
	Sep-21	QTD	YTD	1 YR	3 YR	5 YR	10 YR
MSCI ACWI	-4.1%	-1.1%	11.1%	27.4%	12.6%	13.2%	11.9%
S&P 500	-4.7%	0.6%	15.9%	30.0%	16.0%	16.9%	16.6%
Russell 1000	-4.6%	0.2%	15.2%	31.0%	16.4%	17.1%	16.8%
Russell 2000	-2.9%	-4.4%	12.4%	47.7%	10.5%	13.5%	14.6%
Russell 2500	-3.1%	-2.7%	13.8%	45.0%	12.5%	14.3%	15.3%
MSCI EAFE	-2.9%	-0.4%	8.3%	25.7%	7.6%	8.8%	8.1%
MSCI EM	-4.0%	-8.1%	-1.2%	18.2%	8.6%	9.2%	6.1%

Credit							
	Sep-21	QTD	YTD	1 YR	3 YR	5 YR	10 YR
BBG Global Agg	-1.8%	-0.9%	-4.1%	-0.9%	4.2%	2.0%	1.9%
BBG US Agg	-0.9%	0.1%	-1.6%	-0.9%	5.4%	2.9%	3.0%
BBG Credit	-1.1%	0.0%	-1.3%	1.4%	7.1%	4.4%	4.6%
BBG US HY	0.0%	0.9%	4.5%	11.3%	6.9%	6.5%	7.4%
BBG Muni	-0.7%	-0.3%	0.8%	2.6%	5.1%	3.3%	3.9%
BBG Muni HY	-0.7%	0.4%	6.5%	11.3%	7.4%	6.0%	6.7%
BBG TIPS	-0.7%	1.8%	3.5%	5.2%	7.4%	4.3%	3.1%
BBG 20+ STRIPS	-3.8%	0.7%	-10.1%	-13.5%	12.1%	4.1%	5.7%
BBG Long Treasuries	-2.9%	0.5%	-7.5%	-10.3%	9.2%	3.3%	4.4%
BBG Long Credit	-2.0%	-0.2%	-2.7%	2.1%	10.2%	6.1%	6.6%
BBG Govt/Credit 1-3 Yr	-0.1%	0.1%	0.1%	0.3%	2.9%	1.9%	1.5%
JPM EMBI Glob Div	-2.1%	-0.7%	-1.4%	4.4%	5.7%	3.9%	5.8%
JPM GBI-EM Glob Div	-3.4%	-3.1%	-6.4%	2.6%	3.7%	2.1%	1.1%

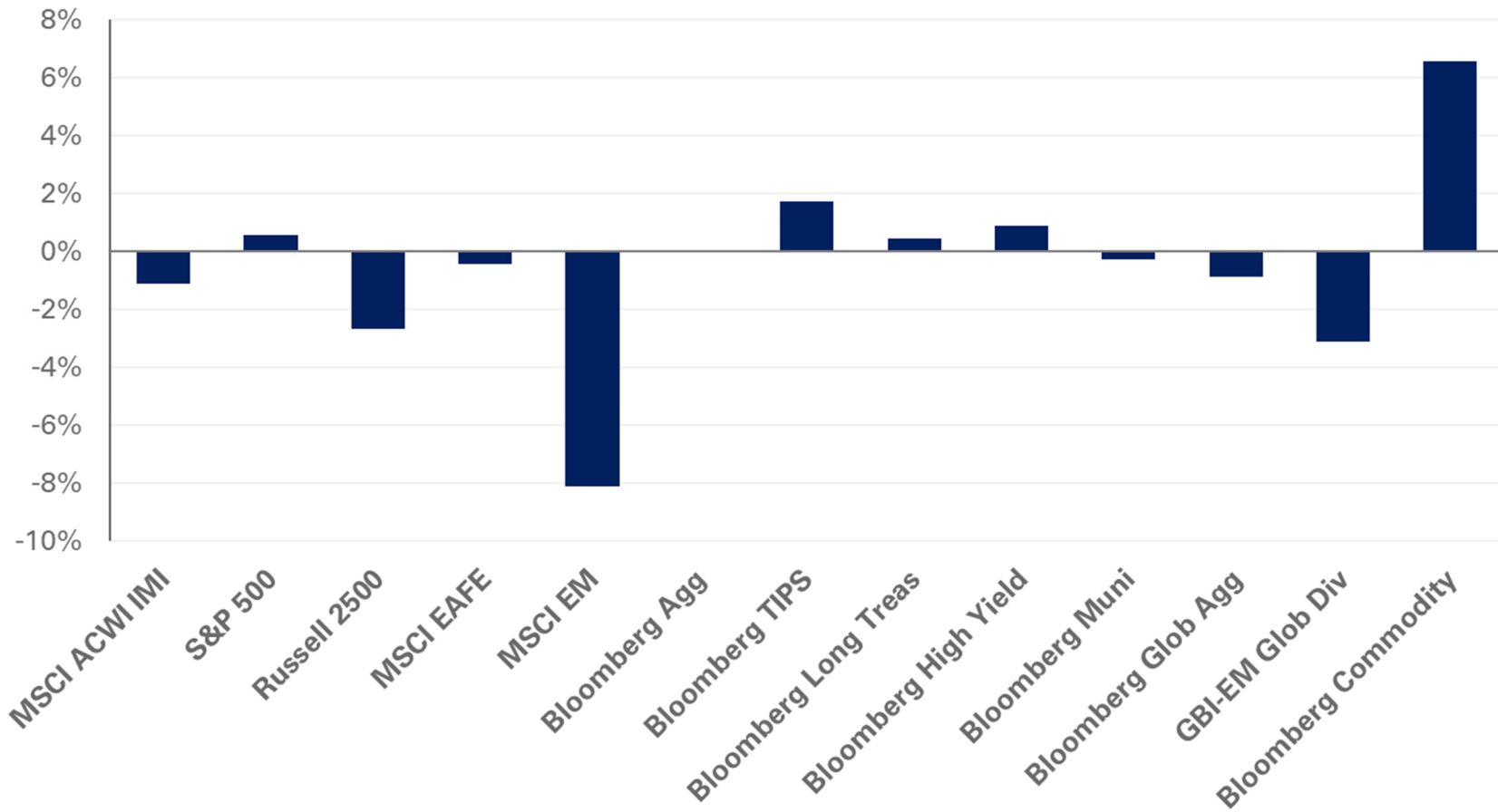
Real Assets							
	Sep-21	QTD	YTD	1 YR	3 YR	5 YR	10 YR
BBG Commodity	5.0%	6.6%	29.1%	42.3%	6.9%	4.5%	-2.7%
Alerian Midstream Index	4.1%	-1.3%	38.9%	66.9%	3.9%	2.4%	-
FTSE NAREIT Equity REITs	-5.4%	1.0%	23.1%	37.4%	10.0%	6.8%	11.3%



Source: S&P, MSCI, Russell, Bloomberg, JPM, Alerian, FTSE, FactSet

EMERGING MARKETS UNDERPERFORMED

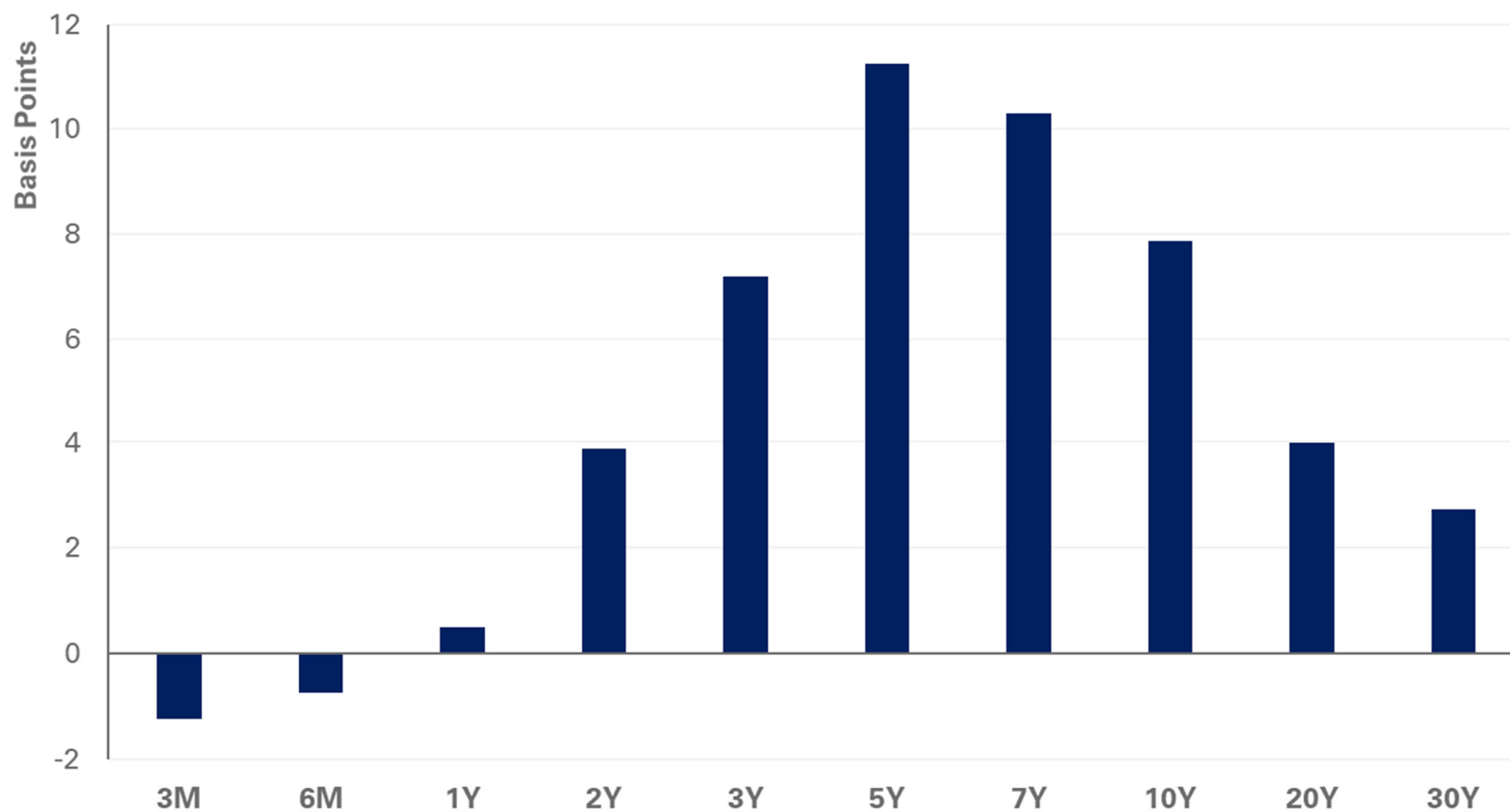
QUARTERLY TOTAL RETURNS



Source: MSCI, S&P, Russell, MSCI, Bloomberg, JPM, FactSet

U.S. TREASURY YIELDS SHIFTED HIGHER

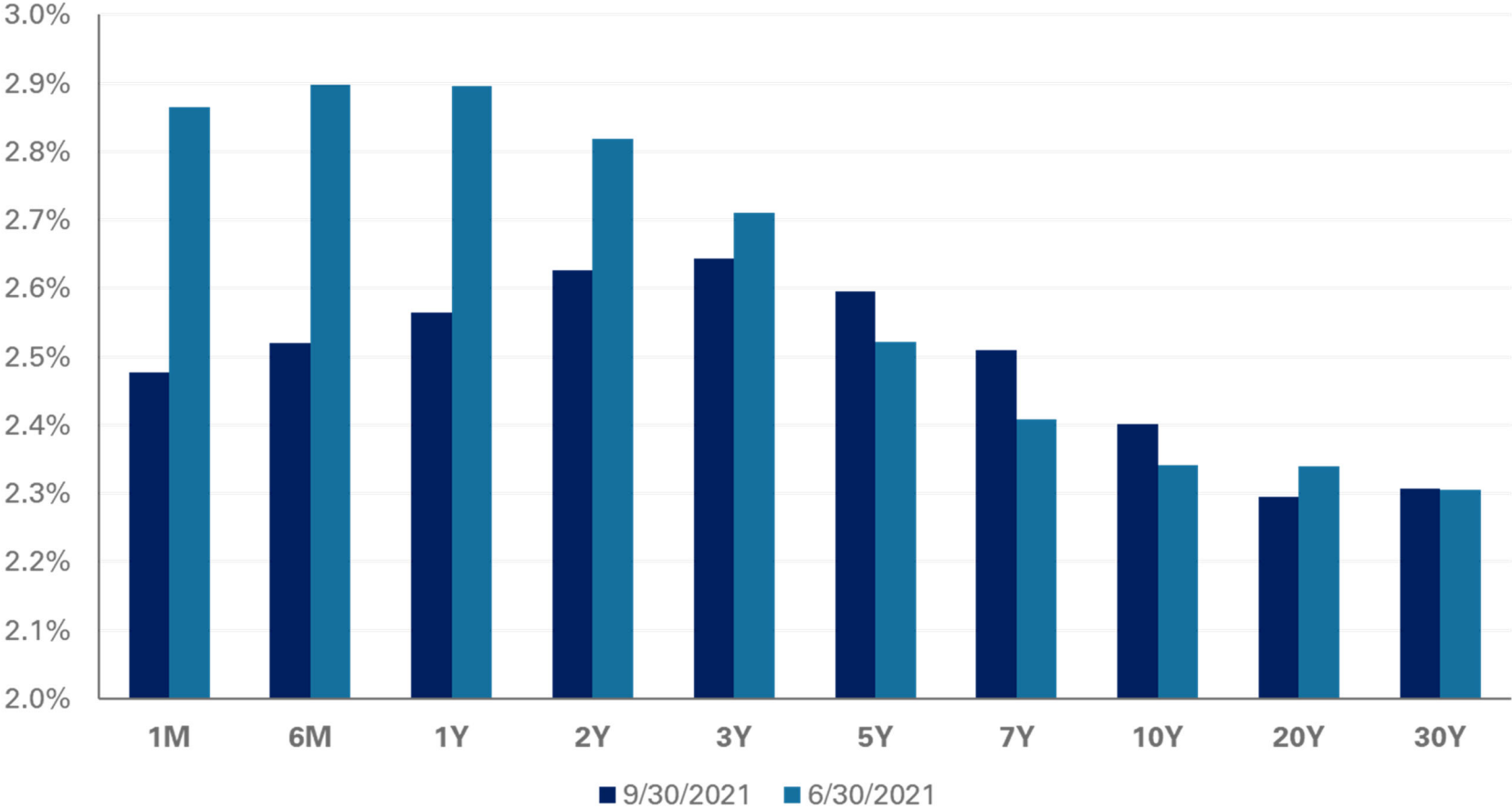
QUARTERLY CHANGE IN U.S. TREASURY YIELDS



Source: FactSet

NEAR-TERM INFLATION EXPECTATIONS SOFTENED

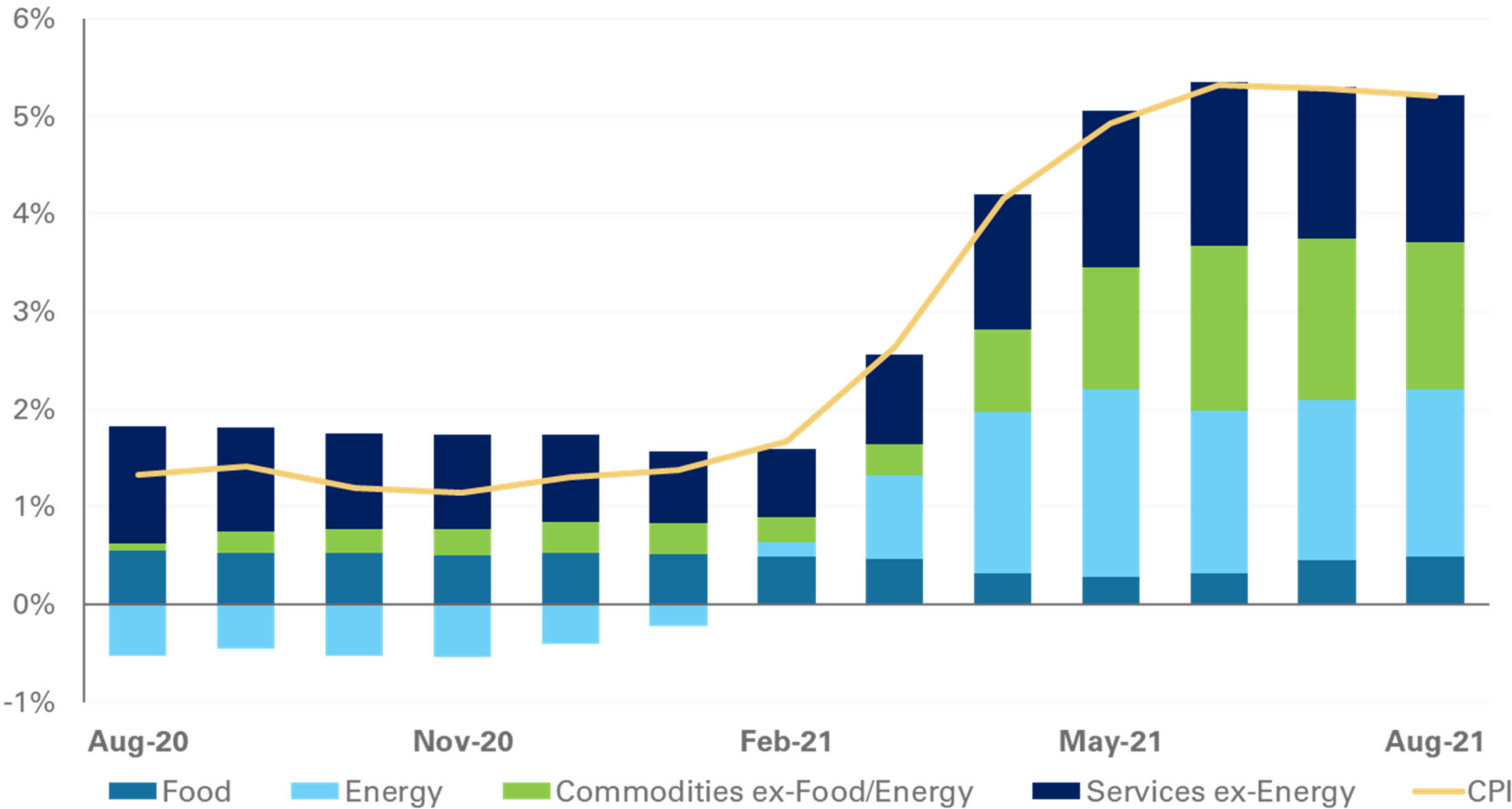
BREAKEVEN INFLATION CURVE



Source: FactSet

HEADLINE INFLATION REMAINED ELEVATED

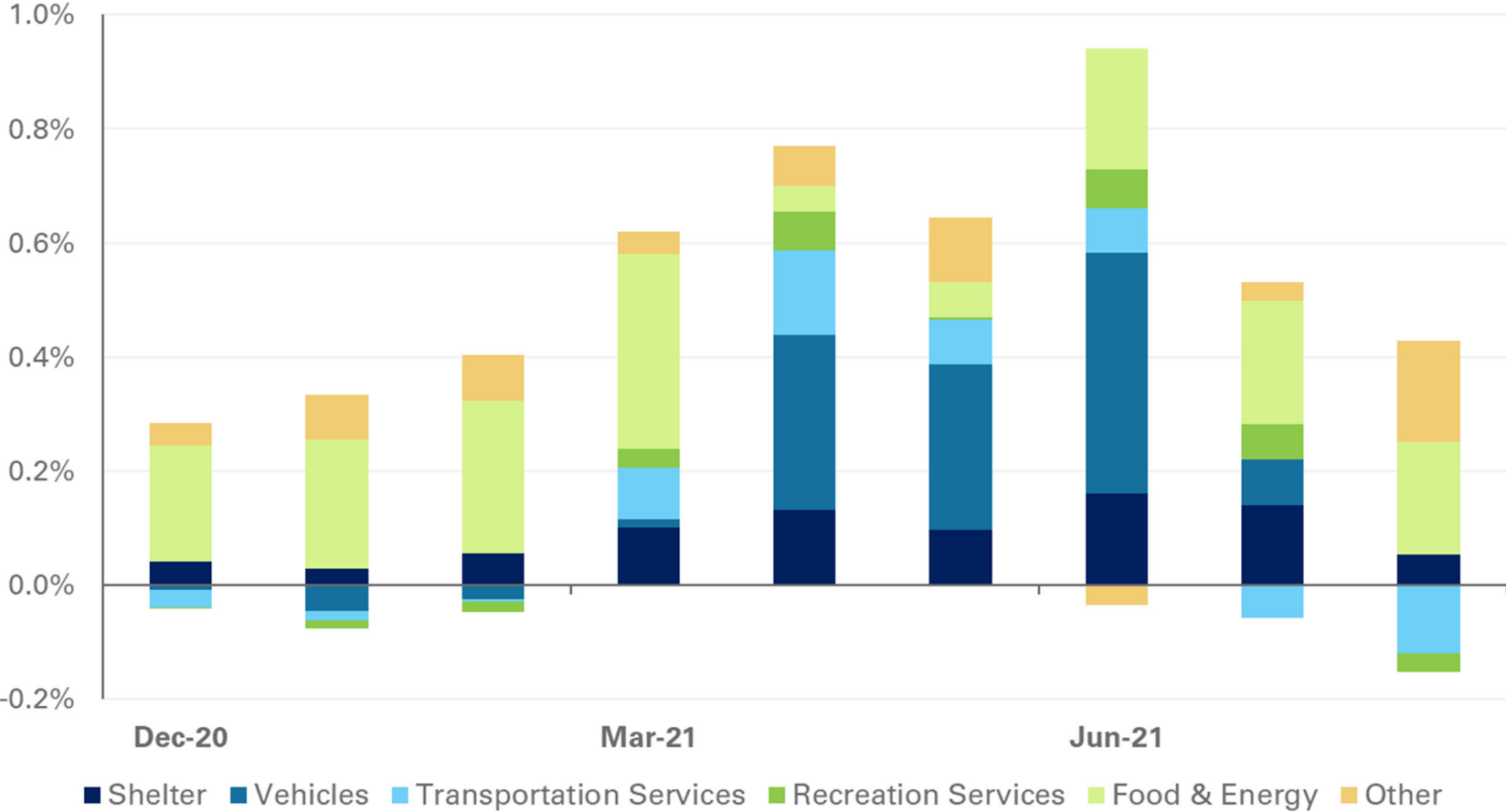
CONTRIBUTION TO YEAR-OVER-YEAR U.S. CPI-U



Source: FactSet

FOOD AND ENERGY PRICES TRENDED HIGHER

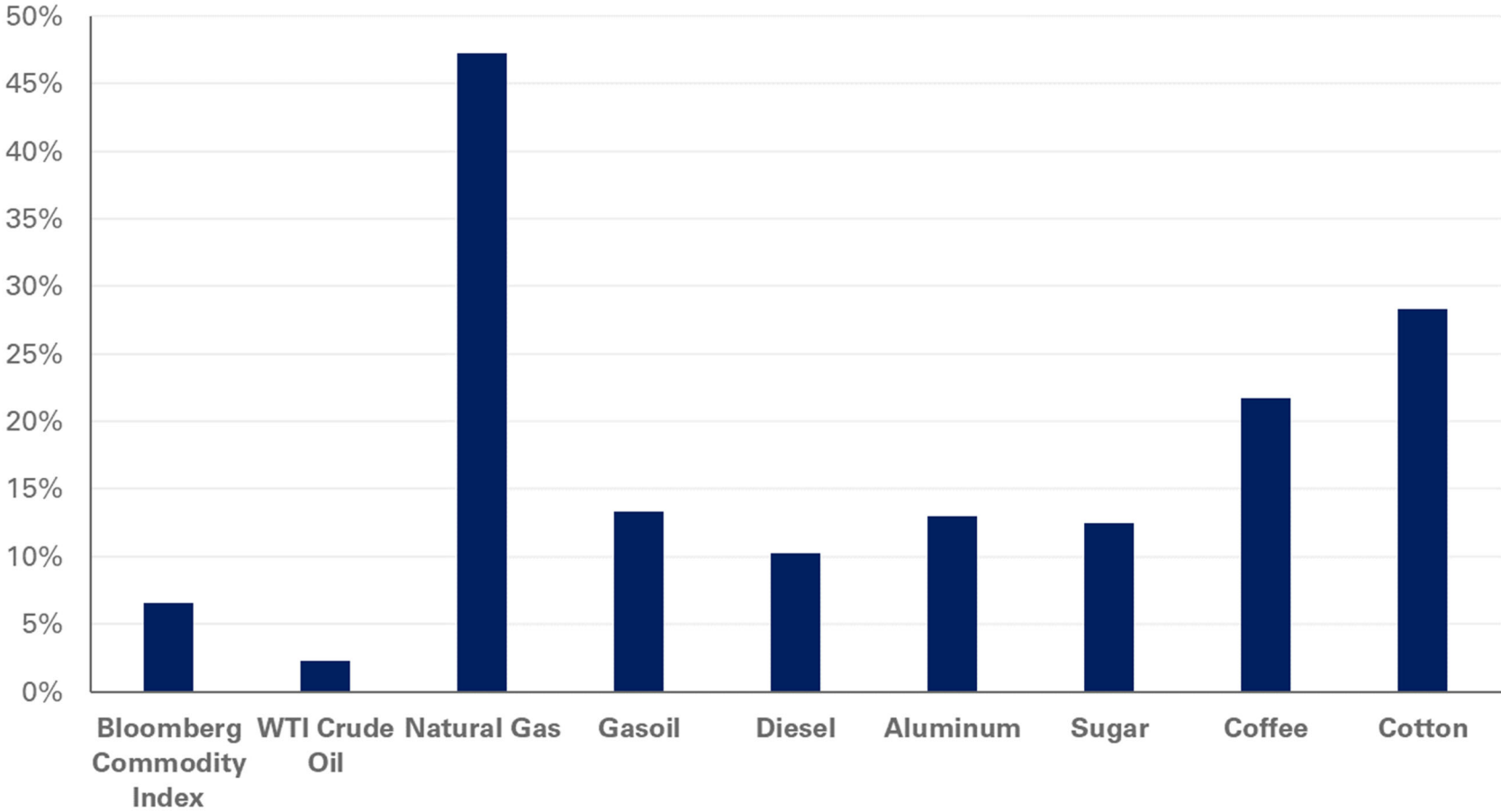
CONTRIBUTION TO MONTH-OVER-MONTH U.S. CPI-U



Source: FactSet

COMMODITY PRICES INCREASED

QUARTERLY CHANGES IN SPOT PRICE



Source: Bloomberg, FactSet



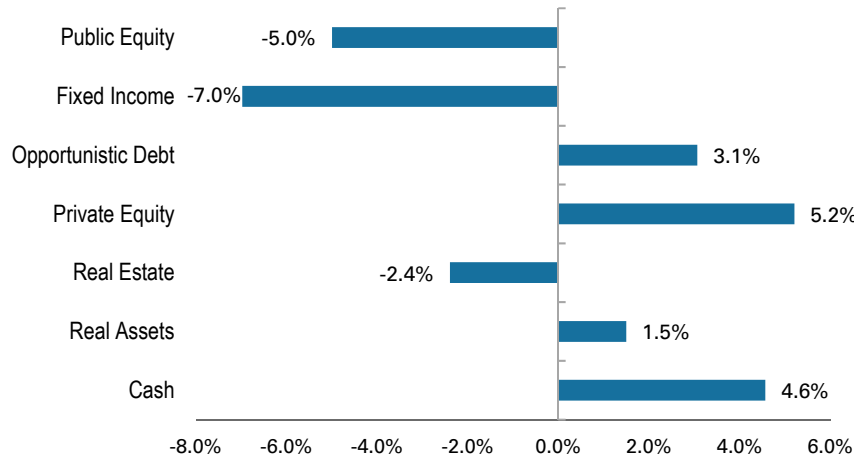
EXECUTIVE SUMMARY



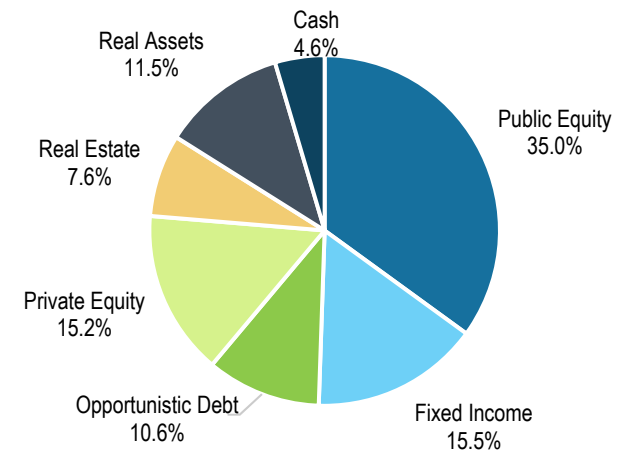
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ASSET ALLOCATION – CURRENT vs. POLICY

Current Allocation vs. Policy Allocation



Current Asset Allocation

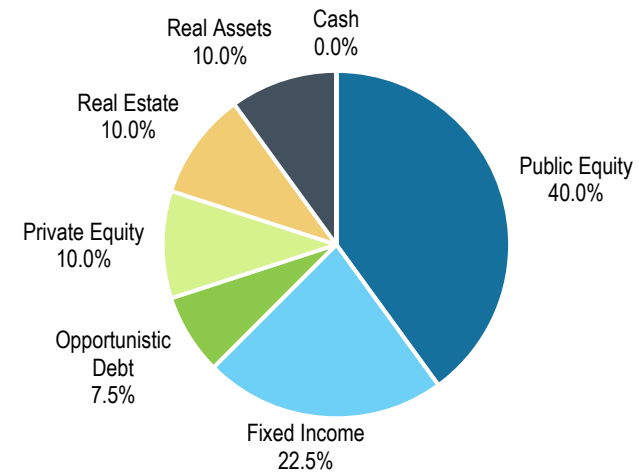


Current Allocation vs. Policy Allocation

	Current	Policy	Current	Difference*
Public Equity	\$1,072,395,338	40.0%	35.0%	-5.0%
Fixed Income	\$475,839,433	22.5%	15.5%	-7.0%
Opportunistic Debt	\$323,746,797	7.5%	10.6%	3.1%
Private Equity	\$465,956,527	10.0%	15.2%	5.2%
Real Estate	\$232,957,072	10.0%	7.6%	-2.4%
Real Assets	\$352,266,644	10.0%	11.5%	1.5%
Cash	\$140,002,587	--	4.6%	4.6%
Total	\$3,063,164,398	100.0%	100.0%	

* Difference between Policy and Current Allocation

Policy Asset Allocation

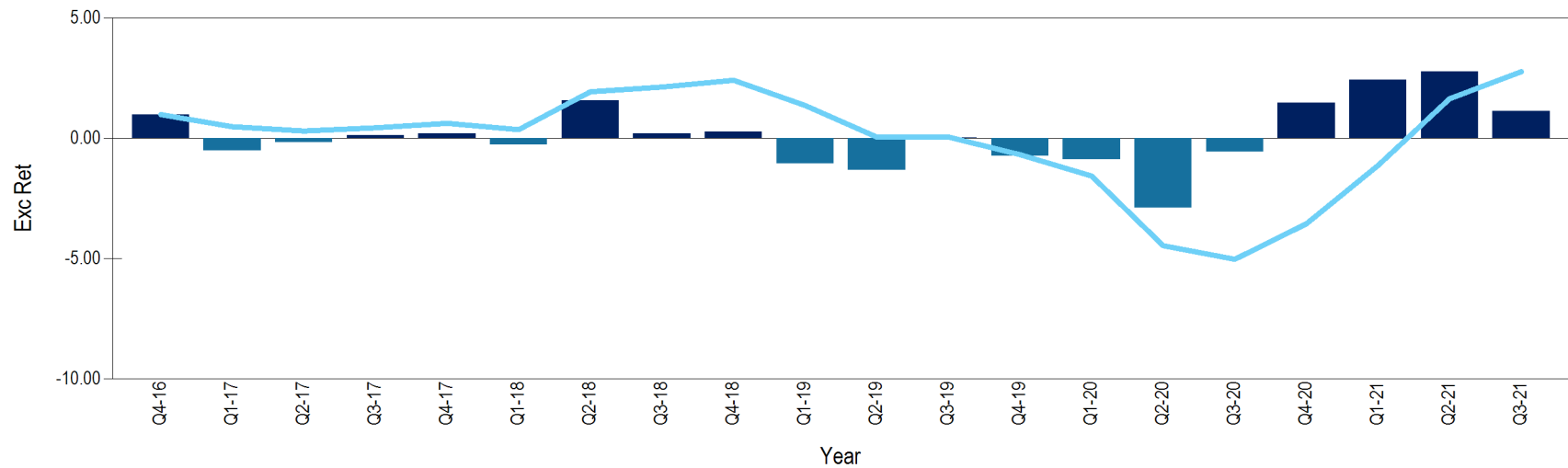


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TOTAL FUND PERFORMANCE SUMMARY

	Market Value	3 Mo	YTD	1 Yr	3 Yrs	5 Yrs	10 Yrs
Total Composite	\$3,063,164,398	2.60%	16.41%	27.15%	11.63%	11.05%	10.45%
<i>Policy Index</i>		1.47%	9.58%	18.08%	11.46%	10.48%	9.50%
<i>InvMetrics Public DB Net Median</i>		-0.23%	8.67%	19.91%	10.57%	10.35%	9.83%

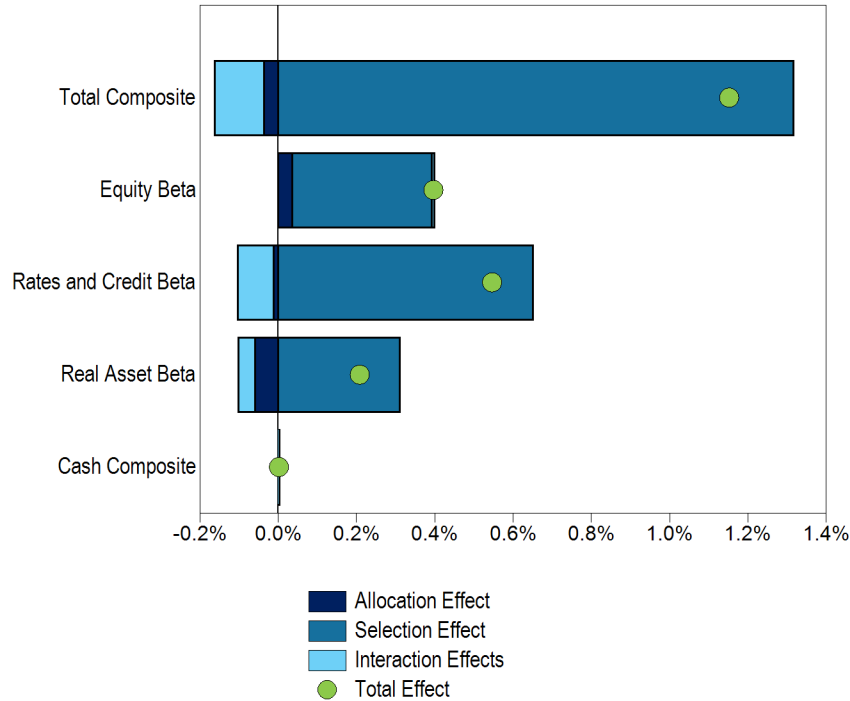
Quarterly and Cumulative Excess Performance



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TOTAL FUND ATTRIBUTION ANALYSIS

Attribution Effects 3 Months Ending September 30, 2021



Attribution Summary 3 Months Ending September 30, 2021							
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Equity Beta	1.8%	1.0%	0.8%	0.4%	0.0%	0.0%	0.4%
Rates and Credit Beta	2.4%	0.3%	2.2%	0.6%	0.1%	-0.1%	0.6%
Real Asset Beta	6.0%	4.4%	1.6%	0.3%	0.0%	0.0%	0.2%
Cash Composite	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.1%
Total	2.6%	1.5%	1.2%	1.3%	0.0%	-0.1%	1.2%

Note: Plan attribution calculations are returns based and the results shown reflect the composites shown. As a result, the total returns shown may vary from the calculated return shown on the performance summary.

The target return shown for each composite is a custom index, based on aggregated policy indices. This policy index asset weights the underlying policy indices of each option in the plan and the respective benchmark return.

The allocation, selection, and interaction effects are calculated using the custom index described above along with the policy or target weight of each composite.

May not add due to rounding

Allocation Effect - The return attributable to the asset allocation of the portfolio

Selection Effect - The return attributable to the managers' security selection

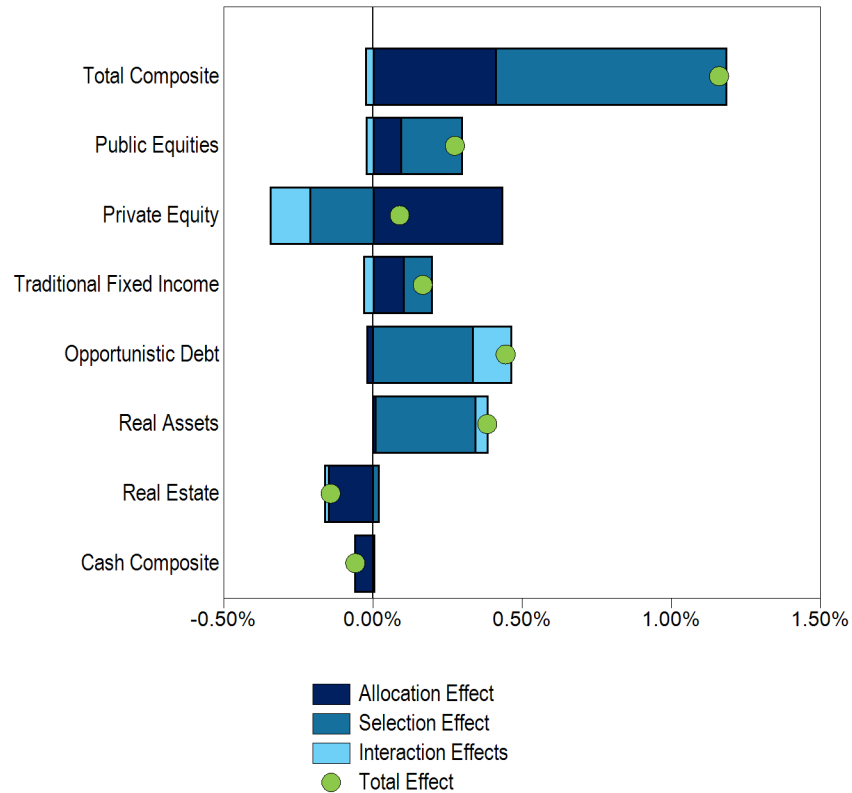
Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects



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TOTAL FUND ATTRIBUTION ANALYSIS

Attribution Effects 3 Months Ending September 30, 2021



Attribution Summary 3 Months Ending September 30, 2021							
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Public Equities	-0.5%	-1.1%	0.5%	0.2%	0.1%	0.0%	0.3%
Private Equity	7.1%	9.3%	-2.2%	-0.2%	0.4%	-0.1%	0.1%
Traditional Fixed Income	0.4%	0.0%	0.4%	0.1%	0.1%	0.0%	0.2%
Opportunistic Debt	5.4%	0.9%	4.5%	0.3%	0.0%	0.1%	0.4%
Real Assets	5.3%	2.0%	3.4%	0.3%	0.0%	0.0%	0.4%
Real Estate	7.0%	6.7%	0.3%	0.0%	-0.1%	0.0%	-0.1%
Cash Composite	0.0%	0.0%	0.0%	0.0%	-0.1%	0.0%	-0.1%
Total	2.6%	1.5%	1.1%	0.8%	0.4%	0.0%	1.1%

Note: Plan attribution calculations are returns based and the results shown reflect the composites shown. As a result, the total returns shown may vary from the calculated return shown on the performance summary.

The target return shown for each composite is a custom index, based on aggregated policy indices. This policy index asset weights the underlying policy indices of each option in the plan and the respective benchmark return.

The allocation, selection, and interaction effects are calculated using the custom index described above along with the policy or target weight of each composite.

May not add due to rounding

Allocation Effect - The return attributable to the asset allocation of the portfolio

Selection Effect - The return attributable to the managers' security selection

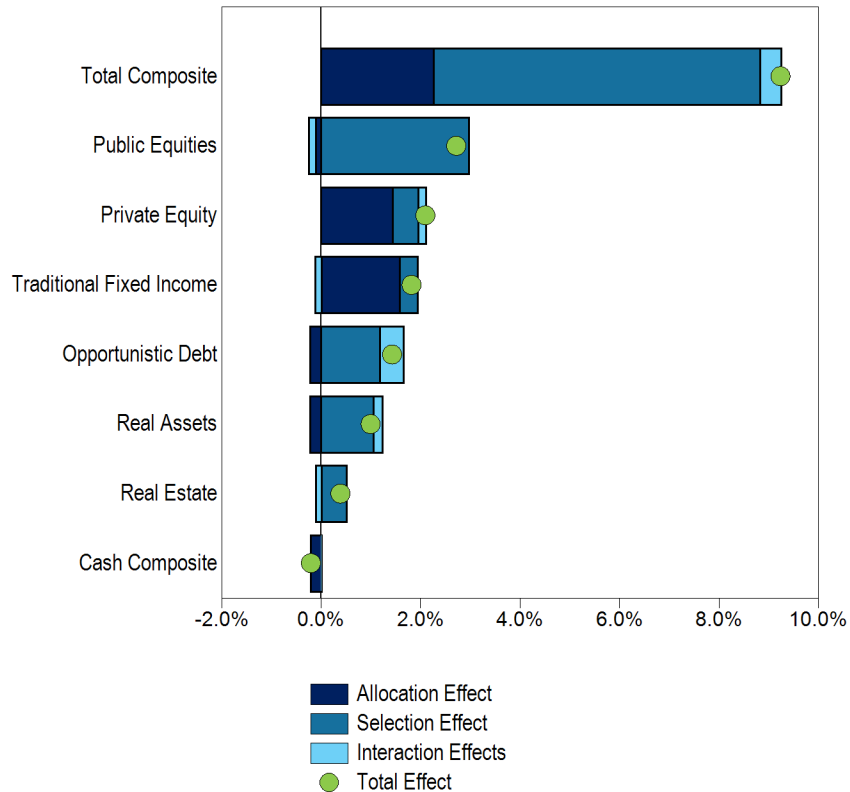
Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects



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TOTAL FUND ATTRIBUTION ANALYSIS

Attribution Effects Relative to Policy Index
1 Year Ending September 30, 2021



Attribution Summary 1 Year Ending September 30, 2021							
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Public Equities	35.2%	27.4%	7.8%	3.0%	-0.1%	-0.1%	2.7%
Private Equity	51.3%	44.9%	6.4%	0.5%	1.4%	0.1%	2.0%
Traditional Fixed Income	0.2%	-1.1%	1.3%	0.4%	1.5%	-0.1%	1.8%
Opportunistic Debt	26.5%	11.3%	15.2%	1.2%	-0.2%	0.5%	1.4%
Real Assets	19.4%	9.6%	9.8%	1.1%	-0.2%	0.2%	1.0%
Real Estate	19.7%	14.8%	4.9%	0.5%	0.0%	-0.1%	0.4%
Cash Composite	0.0%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.2%
Total	27.2%	18.1%	9.1%	6.6%	2.1%	0.4%	9.1%

Note: Plan attribution calculations are returns based and the results shown reflect the composites shown. As a result, the total returns shown may vary from the calculated return shown on the performance summary.

The target return shown for each composite is a custom index, based on aggregated policy indices. This policy index asset weights the underlying policy indices of each option in the plan and the respective benchmark return.

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May not add due to rounding

Allocation Effect - The return attributable to the asset allocation of the portfolio

Selection Effect - The return attributable to the managers' security selection

Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects



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TOTAL COMPOSITE

	Policy %	% of Portfolio	Market Value (\$)	3 Mo (%)	Rank	YTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank
Total Composite	100.0	100.0	3,063,164,398	2.60	1	16.41	1	27.15	2	11.63	21	11.05	28	10.45	24
<i>Policy Index</i>				1.47	2	9.58	25	18.08	77	11.46	25	10.48	46	9.50	62
Equity Beta	50.0	50.2	1,538,351,865	1.75		21.06		39.84							
Public Equities*	40.0	35.0	1,072,395,338	-0.53	43	14.98	20	35.23	23	11.74	64	11.78	64	11.76	57
<i>MSCI ACWI</i>				-1.05	58	11.12	47	27.43	57	12.58	56	13.20	53	11.90	55
Private Equity	10.0	15.2	465,956,527	7.13		37.17		51.34		22.31		20.02	--	16.01	--
<i>MO Hwy Priv. Equ. Index - Lagged</i>				9.33		32.07		44.90		22.19		21.13	--	18.25	--
Rates and Credit Beta	30.0	26.1	799,586,230	2.40		7.78		10.17							
Traditional Fixed Income	22.5	15.5	475,839,433	0.45	23	-0.17	47	0.18	79	7.41	9	5.13	28	6.20	16
<i>Fixed Income Custom Benchmark</i>				0.04	46	-1.93	65	-1.13	88	5.94	38	3.40	62	3.51	59
Opportunistic Debt	7.5	10.6	323,746,797	5.37	1	20.45	1	26.51	1	9.87	1				
<i>Bloomberg US High Yield TR</i>				0.89	30	4.53	42	11.28	34	6.91	30	6.51	29	7.42	19
Real Assets Beta	20.0	19.1	585,223,716	5.97		16.68		19.51							
Real Assets	10.0	11.5	352,266,644	5.32		17.12		19.38		3.43		6.03			
<i>CPI + 4% (Unadjusted)</i>				1.95		8.44		9.59		7.06		6.77		6.03	
Real Estate	10.0	7.6	232,957,072	7.00		15.97		19.68		10.17		9.86		11.68	
<i>MODOT Real Estate Blend</i>				6.75		13.51		14.82		6.84		7.07		9.22	
Cash Composite	0.0	4.6	140,002,587	0.03		0.03		0.04		1.08		1.04		0.57	
<i>91 Day T-Bills</i>				0.01		0.02		0.04		1.04		1.10		0.59	

* May include the use of derivatives

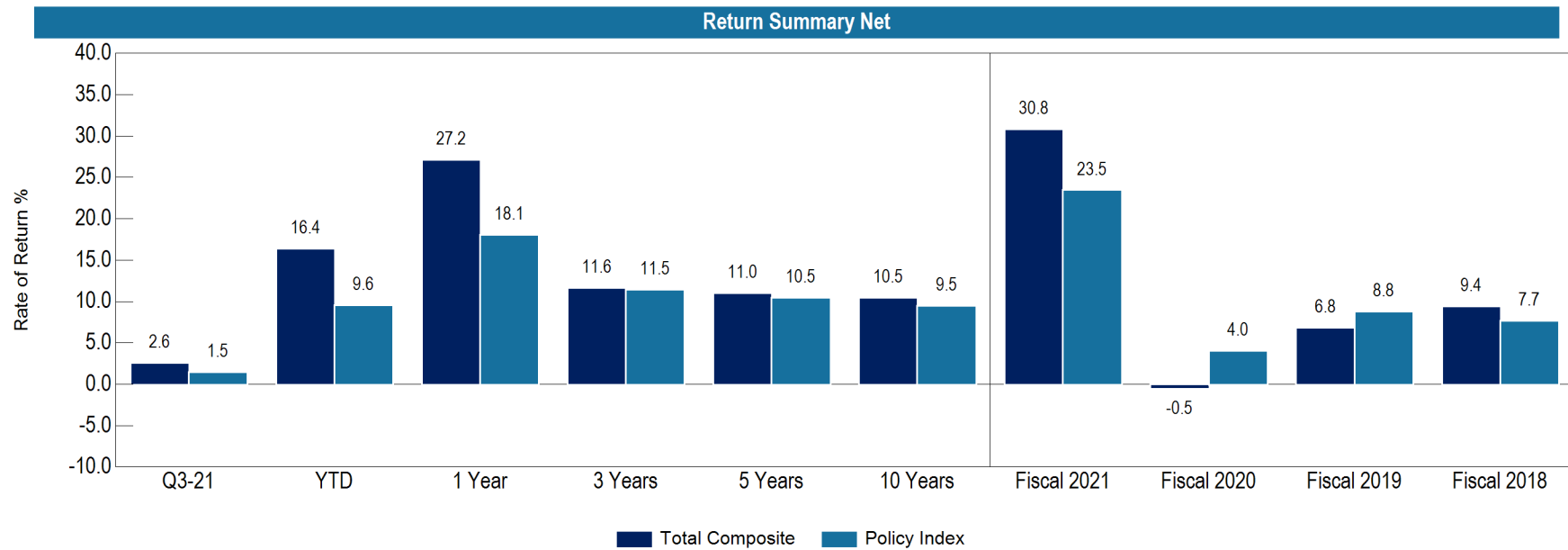
Total Composite is ranked in the IFx Public DB (peer) Net+ Universe

Public Equities Composite is ranked in the eV Global All Cap Equity Net Universe Fixed Income Composite is ranked in the eV All Global

Fixed Inc Net Universe Opportunistic Debt Composite is ranked in the eV US High Yield Fixed Inc Net Universe

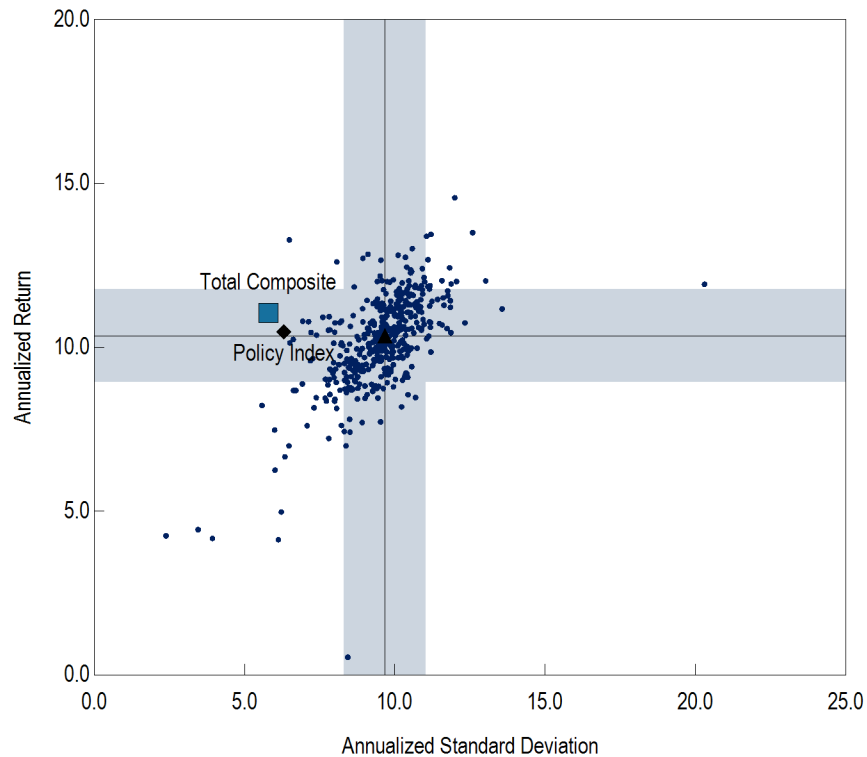


MPERS TOTAL FUND RETURN SUMMARY



MPERS TOTAL FUND RISK/RETURN - 5 YEARS

5 Years Ending September 30, 2021



- Total Composite
- ◆ Policy Index
- ▲ Universe Median
- 68% Confidence Interval
- InvMetrics Public DB Net

Statistics Summary

5 Years Ending September 30, 2021

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	11.05%	28	5.78%	1
Policy Index	10.48%	46	6.30%	2

Statistics Summary

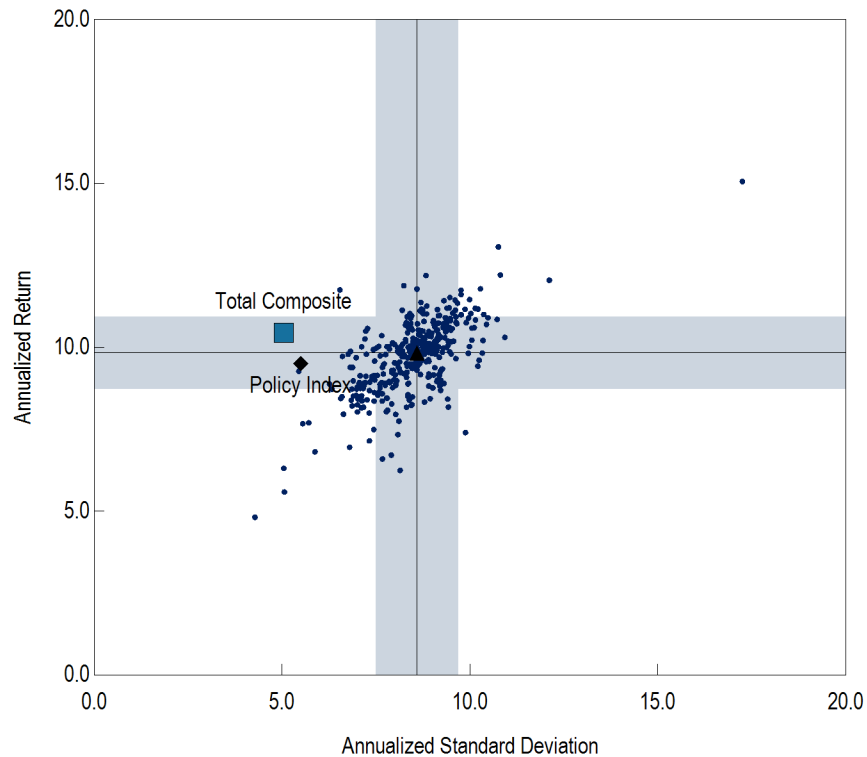
5 Years Ending September 30, 2021

	Sharpe Ratio	Rank
Total Composite	1.72	1
Policy Index	1.49	1



MPERS TOTAL FUND RISK/RETURN - 10 YEARS

10 Years Ending September 30, 2021



- Total Composite
- ◆ Policy Index
- ▲ Universe Median
- 68% Confidence Interval
- InvMetrics Public DB Net

Statistics Summary

10 Years Ending September 30, 2021

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	10.45%	24	5.04%	1
Policy Index	9.50%	62	5.49%	1

Statistics Summary

10 Years Ending September 30, 2021

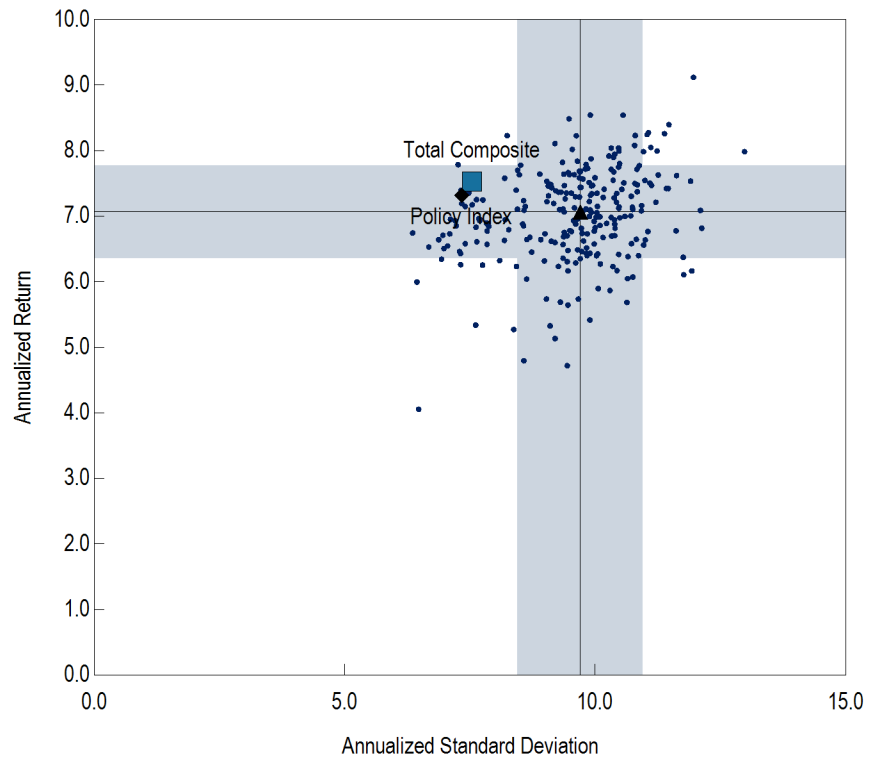
	Sharpe Ratio	Rank
Total Composite	1.96	1
Policy Index	1.62	1



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TOTAL FUND RISK/RETURN - 15 YEARS

15 Years Ending September 30, 2021



- Total Composite
- ◆ Policy Index
- ▲ Universe Median
- 68% Confidence Interval
- InvMetrics Public DB Net

Statistics Summary

15 Years Ending September 30, 2021

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	7.53%	23	7.54%	10
Policy Index	7.32%	36	7.33%	7

Statistics Summary

15 Years Ending September 30, 2021

	Sharpe Ratio	Rank
Total Composite	0.88	2
Policy Index	0.88	2





TOTAL FUND PERFORMANCE



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TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Total Composite	3,063,164,398	100.00	100.00	2.60	16.41	27.15	11.63	11.05	10.45
Policy Index				1.47	9.58	18.08	11.46	10.48	9.50
Allocation Index				2.20	12.02	20.80	11.29	10.38	9.85
Equity Beta	1,538,351,865	50.22	50.00	1.75	21.06	39.84	--	--	--
Public Equities	1,072,395,338	35.01	40.00	-0.53	14.98	35.23	11.74	11.78	11.76
MSCI ACWI				-1.05	11.12	27.43	12.58	13.20	11.90
Global Public Equities w/ MLPs	839,984,015	27.42	--	-0.72	14.55	34.90	11.37	12.04	11.99
MLPS	--	--	--	--	--	--	--	--	--
Global Public Equities	839,984,015	27.42	--	-0.72	14.55	34.90	11.89	12.92	--
MSCI ACWI				-1.05	11.12	27.43	12.58	13.20	11.90
International Public Equities	218,162,939	7.12	--	-1.17	13.95	31.31	8.18	9.75	8.81
MSCI ACWI ex USA				-2.99	5.90	23.91	8.03	8.94	7.48
Acadian Int'l Small Cap	58,928,852	1.92		-0.97	16.02	33.76	10.05	11.80	--
MSCI ACWI ex US Small Cap				0.00	12.23	33.06	10.33	10.28	9.44
Acadian Non-US Microcap	48,481,577	1.58		-1.98	19.14	38.03	15.24	--	--
MSCI EAFE Small Cap				0.89	10.02	29.02	9.05	10.38	10.73
Silchester	109,712,936	3.58		-1.01	11.90	28.89	5.18	7.86	8.92
MSCI EAFE				-0.45	8.35	25.73	7.62	8.81	8.10
Transition Account	1,039,574	0.03		5.21	2.65	0.27	-6.14	-3.73	-8.21
Domestic Public Equities	621,821,076	20.30	--	-0.46	14.88	36.30	13.54	14.55	15.78
Russell 3000				-0.10	14.99	31.87	16.00	16.85	16.60
Large Cap US Public Equities	525,485,848	17.15	--	-1.06	13.14	32.33	13.86	14.75	15.59
Cash Overlay *	285,039,088	9.31		0.25	1.70	13.92	8.31	11.36	--
S&P 500				0.58	15.92	30.00	15.99	16.89	16.63
Parametric Overlay	240,446,760	7.85		-2.49	19.31	--	--	--	--
Small Cap US Public Equities	96,335,228	3.14	--	3.52	28.63	74.86	11.88	13.56	15.23
Russell 2000				-4.36	12.41	47.68	10.54	13.45	14.63
Kennedy Capital	49,344,376	1.61		0.82	18.50	56.48	12.36	14.67	--
Russell Microcap				-4.98	22.59	61.07	12.23	14.47	15.42
Kennedy Small-Cap Banking	46,990,852	1.53		6.52	41.57	100.46	11.12	--	--
Russell 2000 Value				-2.98	22.92	63.92	8.58	11.03	13.22

* May include the use of derivatives



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TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Hedge Equity *	232,411,323	7.59	0.00	0.84	18.29	38.04	13.60	10.95	7.41
Beta Overlay *	45,702,089	1.49	--	1.06	48.95	115.89	--	--	--
<i>HFRI Fund of Funds Composite Index</i>				<i>0.74</i>	<i>5.73</i>	<i>14.31</i>	<i>6.50</i>	<i>5.80</i>	<i>4.46</i>
Equity Oriented Hedge Funds	45,702,089	1.49		1.06	48.95	115.89	--	--	--
Equity Hedge Funds	186,709,234	6.10	--	0.25	6.27	16.84	4.38	5.47	4.73
Alpstone Capital	10,454,736	0.34		-1.61	-10.50	-12.78	-1.95	--	--
Bridgewater Pure Alpha	19,284,572	0.63		1.74	4.43	15.48	0.60	3.89	2.32
Indus Pacific Opp. Fund	19,758,406	0.65		0.34	9.16	22.55	11.79	10.80	--
Metacapital	252,158	0.01		0.46	8.96	16.15	-15.97	-8.56	--
Millenium USA LP	19,898,830	0.65		2.71	15.43	21.30	13.59	11.81	--
MPERS - MP STONE OVERLAY	100,000,000	3.26		--	--	--	--	--	--
<i>HFRI Fund of Funds Composite Index</i>				<i>0.74</i>	<i>5.73</i>	<i>14.31</i>	<i>6.50</i>	<i>5.80</i>	<i>4.46</i>
Pentwater	17,060,532	0.56		-2.38	6.78	25.01	8.13	11.21	--
Private Equity	465,956,527	15.21	10.00	7.13	37.17	51.34	22.31	20.02	16.01
<i>MO Hwy Priv. Equ. Index - Lagged</i>				<i>9.33</i>	<i>32.07</i>	<i>44.90</i>	<i>22.19</i>	<i>21.13</i>	<i>18.25</i>
PE Fund of Funds	212,617,325	6.94	--	0.79	33.47	48.58	20.38	18.53	15.11
Grove Street - MP Ventures	64,478,753	2.10		-0.03	40.02	60.58	27.41	19.39	15.30
Grove Street - MP Ventures II	142,961,896	4.67		-0.10	29.87	42.17	16.85	18.07	14.44
Vectis H & L II	5,176,676	0.17		50.18	62.67	92.44	40.23	34.14	23.51
PE Direct Funds	253,339,202	8.27	--	13.36	40.24	53.52	24.99	24.54	20.82
Abry Partners VI	145,462	0.00		3.08	-10.55	-6.09	1.31	22.94	26.48
Abry Partners VII	1,755,886	0.06		12.03	36.73	37.76	-0.43	6.82	9.45
Aisling	17,996,584	0.59		-2.51	45.57	54.71	25.86	24.78	--
Arrowroot Capital III	13,234,625	0.43		-12.29	-10.73	-7.13	-3.32	--	--
Arrowroot Capital IV	15,339,834	0.50		-2.71	19.00	77.88	--	--	--
Blackstone Asia	27,847,477	0.91		46.20	199.96	250.31	72.21	--	--
DC Capital Partners	11,089,728	0.36		3.71	12.38	12.03	32.69	16.60	--
Drive Overdrive I	17,556,982	0.57		49.29	68.24	146.45	--	--	--
Drive III	5,685,607	0.19		10.06	20.11	40.44	--	--	--
DYAL IV	10,747,079	0.35		42.39	167.20	140.83	41.69	--	--
Heartwood Partners II	10,615,682	0.35		8.11	17.82	20.06	8.87	15.68	--
Heartwood Partners III	10,856,853	0.35		8.73	27.70	35.52	11.58	--	--
KPS IV	6,493,962	0.21		4.81	22.76	36.95	16.76	--	--

* May include the use of derivatives



MPERS

TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
KPS Mid Cap	4,910,741	0.16		1.53	11.67	9.78	--	--	--
KPS V	5,105,389	0.17		0.59	1.09	2.21	--	--	--
Long Ridge II	18,870,957	0.62		8.56	37.09	48.64	57.22	37.82	--
Long Ridge III	1,480,259	0.05		-9.89	--	--	--	--	--
<i>MO Hwy Priv. Equ. Index - Lagged</i>				9.33	32.07	44.90	22.19	21.13	18.25
Monomoy Capital Partners III	7,346,135	0.24		47.98	60.78	87.74	31.74	--	--
Newquest Fund	9,004,168	0.29		7.61	38.26	39.31	24.32	-2.17	--
Nexus	5,507,176	0.18		35.76	56.29	65.65	38.38	--	--
Nexus Special Sits III	2,543,058	0.08		0.15	-10.15	--	--	--	--
Opengate Capital II	7,764,498	0.25		12.45	43.92	50.40	--	--	--
Opengate Capital Partners	10,152,495	0.33		11.47	24.60	35.09	17.15	22.85	--
Pfingsten Fund V	9,076,913	0.30		4.51	20.78	47.93	9.07	2.20	--
Shore Capital Partners GP I LP	19,713,287	0.64		10.28	37.50	37.61	37.26	43.12	--
Shoreline China Valu III	2,498,365	0.08		4.87	13.44	11.93	3.89	6.55	--
<i>MO Hwy Priv. Equ. Index - Lagged</i>				9.33	32.07	44.90	22.19	21.13	18.25
Rates and Credit Beta	799,586,230	26.10	30.00	2.40	7.78	10.17	--	--	--
Traditional Fixed Income	475,839,433	15.53	22.50	0.45	-0.17	0.18	7.41	5.13	6.20
<i>Fixed Income Custom Benchmark</i>				0.04	-1.93	-1.13	5.94	3.40	3.51
Core Fixed Income	297,457,008	9.71	10.00	0.46	1.72	2.91	4.69	3.61	3.96
<i>Bloomberg US Govt/Credit TR</i>				0.04	-1.93	-1.13	5.94	3.24	3.24
Aberdeen	7,084,923	0.23		1.61	5.67	7.03	5.26	6.24	6.38
<i>Bloomberg US Aggregate TR</i>				0.05	-1.55	-0.90	5.36	2.94	3.01
Internal Fixed - Core	242,614,964	7.92		0.35	1.05	1.91	4.82	3.04	--
<i>Bloomberg US Govt/Credit TR</i>				0.04	-1.93	-1.13	5.94	3.24	3.24
Octagon Senior Debt	31,188,263	1.02		0.59	3.88	5.88	3.30	3.39	--
<i>Bloomberg US Aggregate TR</i>				0.05	-1.55	-0.90	5.36	2.94	3.01
Principal CMBS Fixed	16,568,857	0.54		1.14	3.43	5.66	4.75	4.17	--
<i>Bloomberg US CMBS Investment Grade</i>				-0.03	-0.25	0.99	5.71	3.36	4.16
Long Duration	154,226,119	5.03	7.50	0.08	-3.06	-3.78	9.01	4.59	5.63
<i>Bloomberg US Govt Long TR</i>				0.46	-7.40	-10.13	9.17	3.34	4.40
Internal Fixed - Long Duration	154,226,119	5.03		0.08	-3.06	-3.78	9.01	4.59	5.65
<i>Bloomberg US Aggregate TR</i>				0.05	-1.55	-0.90	5.36	2.94	3.01

Fixed Income Custom Benchmark was Bloomberg US Universal TR preceding 01/01/2017. As of 01/01/2017 the benchmark is Bloomberg US Agg Govt/Credit.



MPERS

TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
US TIPS	24,156,306	0.79	5.00	2.28	2.54	3.57	7.20	4.54	3.34
Internal US TIPS	24,156,306	0.79		2.28	2.54	3.57	7.20	4.54	3.34
<i>Bloomberg US TIPS TR</i>				1.75	3.51	5.19	7.45	4.34	3.12
Opportunistic Debt	323,746,797	10.57	7.50	5.37	20.45	26.51	9.87	--	--
<i>Bloomberg US High Yield TR</i>				0.89	4.53	11.28	6.91	6.51	7.42
Direct Lending	156,060,266	5.09	--	3.04	15.64	21.39	--	--	--
Core Direct Lending	79,365,951	2.59	--	3.14	18.36	29.84	--	--	--
Ares BDC	41,166,125	1.34		3.56	26.90	45.62	--	--	--
Internal Fixed - Nonrated	14,843,839	0.48		1.29	11.44	11.79	8.90	6.99	--
M&G III	1,127,183	0.04		-2.39	3.31	7.52	6.16	7.09	--
MGG	11,237,272	0.37		1.33	9.54	13.05	9.66	--	--
Owl Rock	10,991,532	0.36		6.70	12.10	25.92	9.43	--	--
Opportunistic Direct Lending	76,694,314	2.50	--	3.00	13.20	14.38	--	--	--
GSO Energy II	2,319,990	0.08		4.22	23.28	35.56	--	--	--
GSO Energy Select Opps	3,727,698	0.12		6.14	32.92	37.50	5.72	8.30	--
GSO I	220,736	0.01		-0.62	17.40	29.87	-15.22	-14.62	-0.68
GSO II	2,014,784	0.07		2.74	20.83	28.49	-0.22	5.72	--
GSO III	9,791,380	0.32		5.80	17.29	20.47	11.12	9.95	--
Northern Shipping II	1,771,313	0.06		2.28	19.99	19.88	4.86	6.23	--
Northern Shipping III	4,628,146	0.15		2.13	6.95	9.25	8.57	7.90	--
OCP Asia	27,843,982	0.91		2.78	9.73	11.37	7.13	10.60	--
OCP Asia IV	5,941,683	0.19		1.33	--	--	--	--	--
Riverstone Credit Partners	8,583,531	0.28		1.62	12.39	8.27	-1.29	4.64	--
Riverstone Credit Partners II	9,851,071	0.32		2.01	12.32	11.81	6.29	--	--
Distressed /Special Sits	126,275,182	4.12	--	8.66	25.28	30.01	--	--	--
Anchorage Capital III	608,526	0.02		7.72	6.66	6.66	-16.79	-5.75	--
Anchorage Illiquid Opps V	19,246,186	0.63		33.66	53.48	53.48	20.21	15.94	--
Banner Ridge III	21,900,373	0.71		6.56	51.05	59.50	--	--	--
Banner Ridge IV	1	0.00		0.00	--	--	--	--	--
CVI Credit Value	65,540	0.00		1.33	-0.77	-0.94	6.89	8.55	16.24
CVI Credit Value Fund III	4,438,162	0.14		2.07	5.50	7.47	3.58	6.69	--
CVI Global Value	12,683	0.00		1.56	27.28	23.89	13.72	9.17	10.50
Fortress Credit Opps. Fund	4,021,732	0.13		6.18	8.17	--	--	--	--
FP Credit Partners	8,097,923	0.26		5.53	15.37	24.21	--	--	--
Longford II	10,193,701	0.33		-1.95	4.31	9.14	--	--	--



MPERS

TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Longford III	2,211,562	0.07		2.46	-13.38	-18.66	--	--	--
Miravast ILS Credit Opp	18,157,521	0.59		1.82	4.41	9.72	--	--	--
Silver Point Distressed	21,915,914	0.72		13.18	49.86	61.10	--	--	--
Varde Asia Credit Fund	15,405,358	0.50		1.80	6.09	8.64	3.79	--	--
Liquid Credit	41,411,349	1.35	--	4.70	24.87	34.73	--	--	--
ABRY ASF	81,602	0.00		-15.17	-8.75	-14.90	-14.99	-8.47	6.13
Anchorage Structured Credit	20,957,317	0.68		4.74	29.30	29.30	--	--	--
GSO Credit Alpha Fund	7,158,423	0.23		2.28	12.84	29.94	3.25	6.35	--
Och-Ziff Struct Products II	244,943	0.01		4.28	10.01	19.98	5.79	17.87	--
Octagon Opportunistic	12,969,064	0.42		6.52	29.31	49.19	8.87	10.23	--
Real Assets Beta	585,223,716	19.11	20.00	5.97	16.68	19.51	--	--	--
Real Assets	352,266,644	11.50	10.00	5.32	17.12	19.38	3.43	6.03	--
<i>CPI + 4% (Unadjusted)</i>				1.95	8.44	9.59	7.06	6.77	6.03
Natural Resources	204,700,246	6.68	--	7.40	20.89	22.38	2.17	6.48	--
Ares Energy	9,949,625	0.32		4.87	17.83	12.78	--	--	--
Blue Road	14,731,370	0.48		1.65	12.27	15.46	14.29	10.07	--
EMG I	5,167,571	0.17		0.03	42.77	45.35	8.55	4.34	--
EMG II	10,486,270	0.34		-0.35	17.17	19.56	6.98	8.78	--
EMG III	12,184,915	0.40		4.82	0.72	0.03	-15.38	-9.17	--
EMG IV	20,722,889	0.68		3.96	10.33	11.81	1.43	10.95	--
EMG V	14,826,975	0.48		3.47	36.93	40.32	--	--	--
Grey Rock Energy Fund II	9,505,467	0.31		11.02	30.36	23.28	7.55	4.69	--
Grey Rock Energy Fund III	19,492,103	0.64		17.99	43.18	51.14	13.69	--	--
NGP IX	352,237	0.01		-10.00	66.67	56.14	25.14	38.67	--
NGP X	1,285,129	0.04		6.70	-9.60	-16.40	-31.73	-14.44	--
NGP XI	10,864,594	0.35		6.25	19.95	16.30	-7.17	5.52	--
Orion II	18,355,866	0.60		6.33	3.08	7.02	20.98	--	--
Orion III	4,711,233	0.15		1.59	4.96	6.43	--	--	--
Orion Mine Finance Fund I	6,938,921	0.23		4.52	12.27	12.47	-3.01	5.52	--
Orion Mineral Royalty	2,300,855	0.08		-4.68	21.19	23.84	--	--	--
Quantum VII	14,406,661	0.47		43.18	107.08	107.30	20.06	--	--
Ridgewood Energy	8,164,755	0.27		16.45	35.83	45.09	-5.98	4.20	--
Ridgewood III	8,683,612	0.28		4.74	10.39	26.72	3.09	13.68	--
Ridgewood IV	5,117,051	0.17		5.66	5.66	--	--	--	--
Turnbridge Capital Partners I	6,452,147	0.21		-0.53	0.57	-6.02	-15.65	-7.11	--



MPERS

TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Infrastructure & Transport	59,449,204	1.94	--	4.36	8.31	14.23	6.87	7.78	--
American Infrastructure I MLP	5,957,403	0.19		-0.04	-1.73	0.18	4.27	6.08	--
American Infrastructure II MLP	1,433,780	0.05		12.17	21.78	44.04	21.59	15.59	--
Apollo Aviation III	1,898,829	0.06		3.30	-2.87	7.90	13.51	16.43	--
CBRE Caledon's Global	13,383,660	0.44		-0.13	2.13	--	--	--	--
CIM INFRA FUND II	13,698,005	0.45		2.59	15.78	24.15	13.12	--	--
Columbia Spectrum IV-A	1	0.00		0.00	-99.77	--	--	--	--
Corrum Capital Aviation	16,961,778	0.55		1.84	-5.76	-7.82	0.40	--	--
EIF - US Power III	1,787,593	0.06		20.58	57.54	56.87	0.67	-0.34	--
Sciens Marine Investments	4,328,155	0.14		31.62	89.57	105.60	0.75	13.87	--
<i>CPI + 4% (Unadjusted)</i>				1.95	8.44	9.59	6.91	6.68	5.99
Timber	88,117,194	2.88	--	1.29	13.09	14.94	4.40	4.41	--
MP Timber	33,781,973	1.10		5.75	12.44	15.51	5.16	5.06	--
MPATC	26,571,689	0.87		-2.52	-1.84	-2.72	-3.11	--	--
MPCTT	1,327,501	0.04		-0.10	40.56	86.51	48.32	--	--
MPMCB	25,552,799	0.83		0.00	31.26	33.52	9.91	--	--
Russellville Land Timber	883,232	0.03		-0.04	-1.37	-2.79	-1.14	--	--
<i>NCREIF Timberland 1 Qtr. Lag</i>				1.70	3.07	3.11	2.12	2.65	4.67
Real Estate	232,957,072	7.61	10.00	7.00	15.97	19.68	10.17	9.86	11.68
<i>MODOT Real Estate Blend</i>				6.75	13.51	14.82	6.84	7.07	9.22
REITS	10,041,004	0.33	--	0.22	18.81	34.26	9.10	5.58	7.52
CBRE Investors	10,041,004	0.33		0.22	18.81	34.26	9.10	5.58	7.52
<i>FTSE NAREIT Developed TR USD</i>				-0.90	14.46	29.64	6.18	4.53	8.34
Core	64,862,798	2.12	--	3.23	10.51	12.64	7.12	7.72	11.50
Clarion Partners Lion Prop Fd	5,950,422	0.19		5.81	13.56	15.56	7.46	8.14	9.71
Principal CMBS	1,073,266	0.04		-0.26	-0.29	1.75	18.14	10.75	16.08
Principal Enhanced Property	57,007,887	1.86		3.01	10.47	12.68	6.48	8.12	12.16
Principal U.S. Property Fund	831,222	0.03		4.98	11.38	13.21	6.60	7.46	9.70



MPERS

TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	YTD (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Non-Core	158,053,270	5.16	--	9.38	18.62	22.59	12.18	12.12	11.22
Value-Add	139,251,044	4.55	--	10.44	20.00	24.32	12.17	12.56	11.11
Centersquare III	24,854,084	0.81		29.12	35.21	37.72	21.35	18.38	--
Centersquare IV	34,651,086	1.13		10.61	19.77	23.88	6.78	--	--
Centersquare V	15,842,662	0.52		15.17	--	--	--	--	--
M&G II	669,212	0.02		-0.36	23.28	30.86	14.72	13.25	--
New Mountain	10,132,408	0.33		6.19	20.53	31.91	19.80	--	--
Oak Street IV	9,694,484	0.32		3.99	48.23	52.87	20.76	--	--
Och Ziff RE Credit FD LP	8,390,999	0.27		4.29	15.54	18.23	10.57	9.99	--
Torchlight Debt Opp II	58,319	0.00							
Torchlight Debt Opp III	35,616	0.00		0.00	-1.83	-1.83	-8.72	-3.26	--
Torchlight Debt Opps V	2,964,134	0.10		3.17	9.63	10.36	6.47	10.50	--
Tristan EPISO	941,186	0.03		51.99	-16.59	-10.30	-27.44	-16.67	-4.85
Tristan EPISO 3	3,928,827	0.13		0.79	6.81	12.64	-7.07	7.46	--
Tristan EPISO 4	16,069,072	0.52		1.25	11.24	18.02	11.57	8.75	--
Tristan EPISO 5	11,018,955	0.36		6.17	0.99	4.23	--	--	--
<i>NCREIF Property Index</i>				5.23	10.89	12.16	6.72	6.84	8.99
Opportunistic	18,802,226	0.61	--	1.87	9.39	10.12	15.98	12.96	11.63
AEW Partners V	1	0.00							
Apollo European III	95,183	0.00		-2.92	-0.52	0.62	-20.58	-21.62	-10.18
Apollo Real Estate	17,646	0.00		0.00	0.38	2.56	43.39	26.54	21.05
Clarion Part Lion Mexico Fund	830,618	0.03		-2.71	-11.26	-14.78	-14.33	-16.74	-13.39
Colony Capital VIII	185,100	0.01		-1.80	10.97	5.65	-8.38	-2.42	-2.86
Och-Ziff RE III	2,574,895	0.08		9.74	18.84	23.86	14.87	19.47	--
Sculptor IV	3,093,519	0.10		7.28	15.34	20.30	--	--	--
Stockdale I-A	12,005,264	0.39		-1.56	10.08	7.39	--	--	--
<i>NCREIF Property Index</i>				5.23	10.89	12.16	6.72	6.84	8.99
Cash Composite *	140,002,587	4.57	0.00	0.03	0.03	0.04	1.08	1.04	0.57
<i>91 Day T-Bills</i>				0.01	0.02	0.04	1.04	1.10	0.59

* May include the use of derivatives





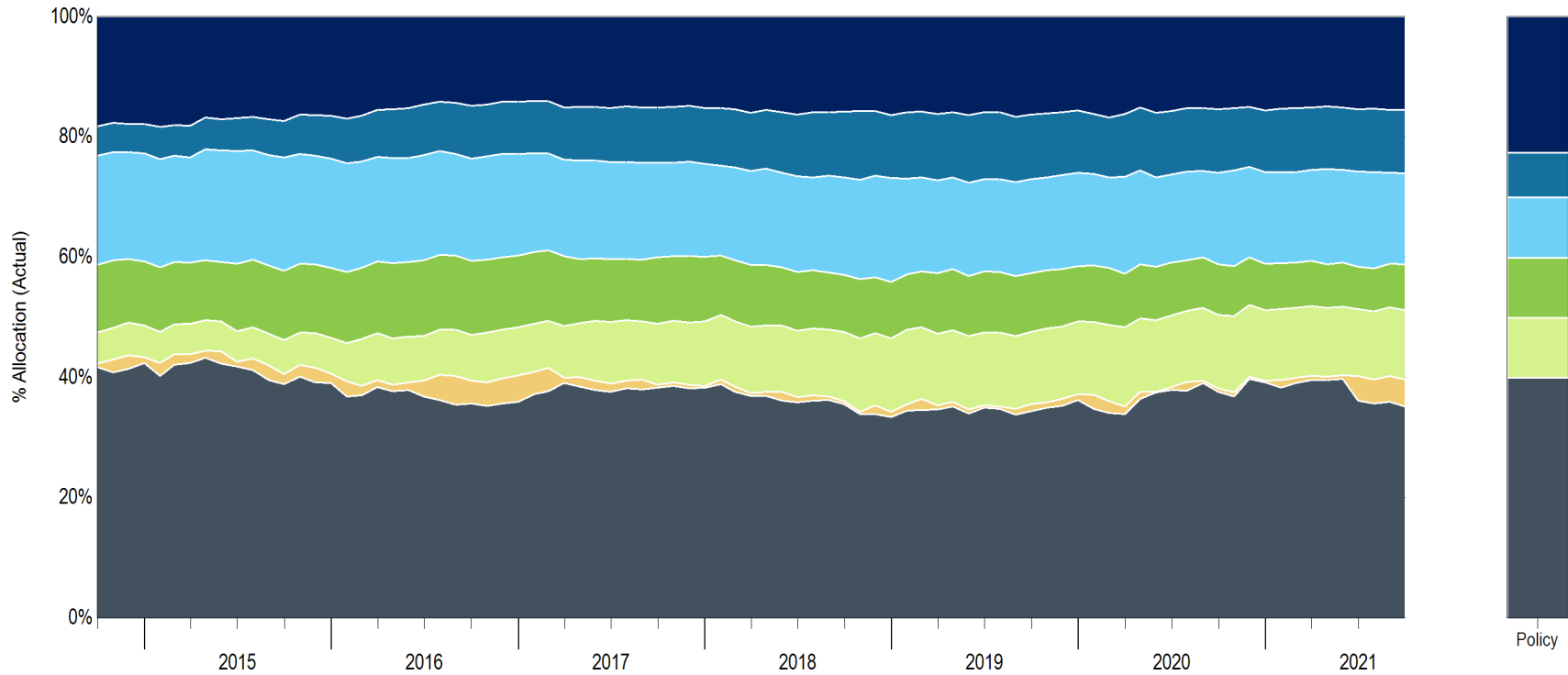
APPENDIX



PROPRIETARY & CONFIDENTIAL

MPERS TOTAL FUND ASSET ALLOCATION HISTORY

Asset Allocation History



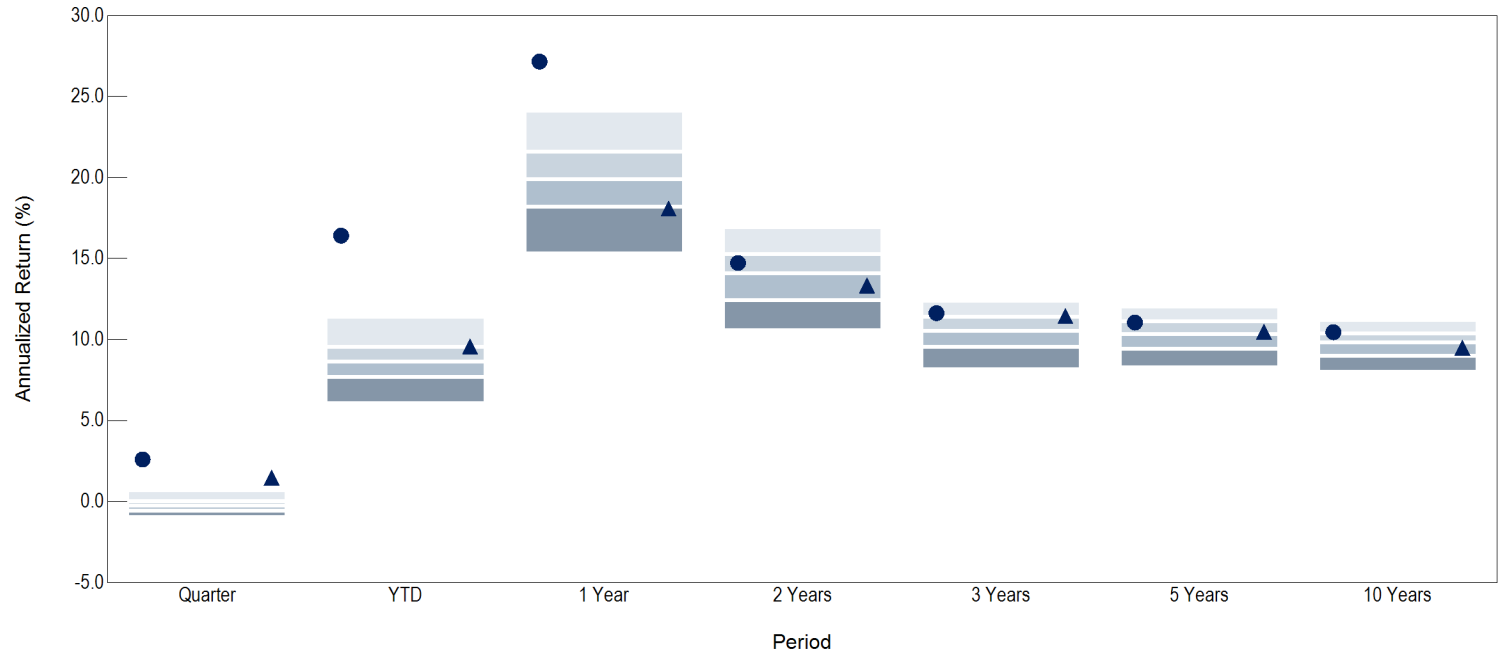
- Fixed Income
- Opportunistic Fixed Income
- Private Equity
- Real Assets
- Cash
- Real Estate
- Policy
- Public Equity



MPERS

TOTAL FUND RETURN SUMMARY VS. PEER UNIVERSE

Total Composite vs. InvMetrics Public DB Net



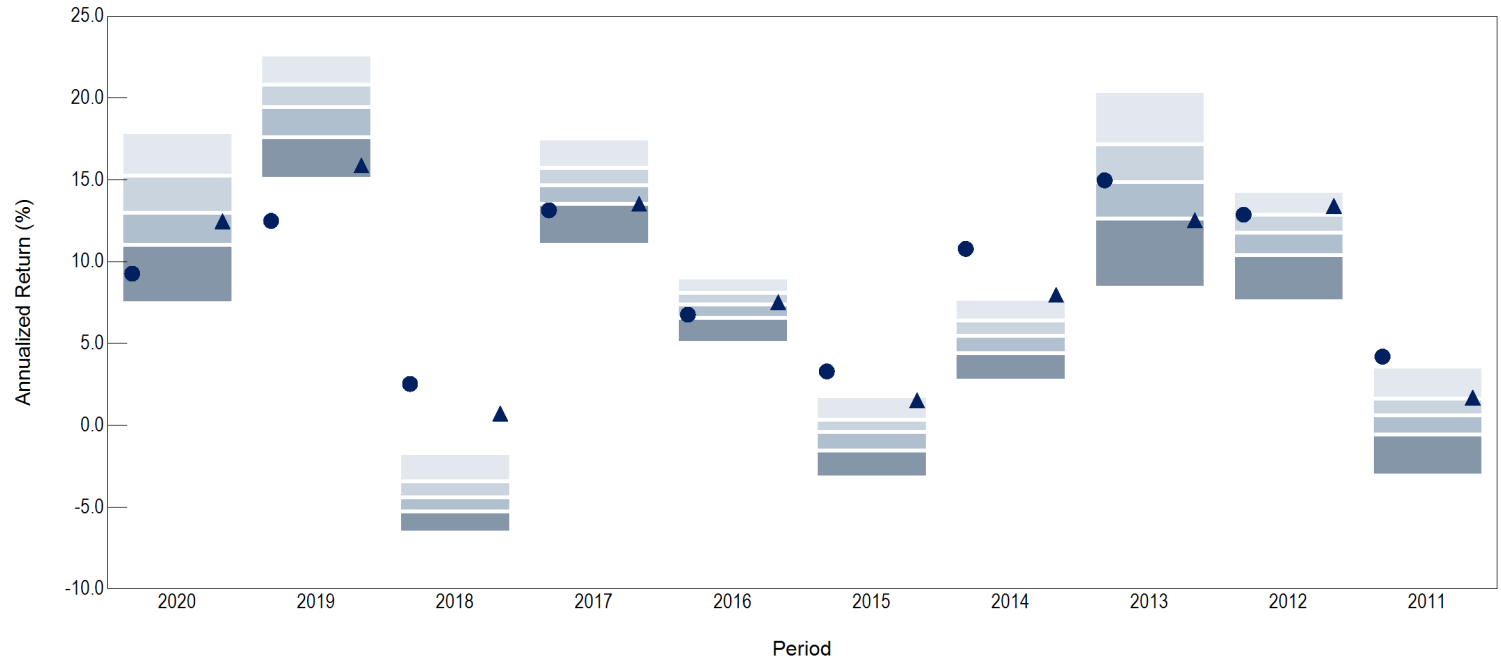
	Return (Rank)													
5th Percentile	0.7		11.4		24.1		16.9		12.4		12.0		11.2	
25th Percentile	0.1		9.6		21.6		15.3		11.4		11.1		10.4	
Median	-0.2		8.7		19.9		14.1		10.6		10.4		9.8	
75th Percentile	-0.5		7.7		18.2		12.4		9.6		9.5		9.0	
95th Percentile	-0.9		6.1		15.4		10.6		8.2		8.3		8.0	
# of Portfolios	488		484		483		477		471		454		381	
● Total Composite	2.6	(1)	16.4	(1)	27.2	(2)	14.7	(37)	11.6	(21)	11.0	(28)	10.5	(24)
▲ Policy Index	1.5	(2)	9.6	(25)	18.1	(77)	13.3	(64)	11.5	(25)	10.5	(46)	9.5	(62)



MPERS

TOTAL FUND RETURN SUMMARY VS. PEER UNIVERSE

Total Composite vs. InvMetrics Public DB Net



	Return (Rank)																			
5th Percentile	17.9	22.6	-1.7	17.5	9.0	1.7	7.7	20.4	14.3	3.6										
25th Percentile	15.3	20.8	-3.4	15.8	8.1	0.4	6.4	17.2	12.9	1.6										
Median	13.0	19.5	-4.4	14.7	7.4	-0.4	5.5	14.9	11.8	0.6										
75th Percentile	11.0	17.6	-5.2	13.6	6.6	-1.5	4.4	12.7	10.4	-0.5										
95th Percentile	7.5	15.1	-6.5	11.1	5.0	-3.2	2.7	8.4	7.6	-3.1										
# of Portfolios	596	550	496	269	269	262	210	191	159	137										
● Total Composite	9.3	(89)	12.5	(99)	2.5	(1)	13.1	(83)	6.8	(70)	3.3	(1)	10.8	(1)	15.0	(49)	12.9	(26)	4.2	(3)
▲ Policy Index	12.5	(57)	15.9	(92)	0.7	(1)	13.5	(76)	7.5	(47)	1.5	(7)	8.0	(4)	12.5	(76)	13.4	(15)	1.7	(24)

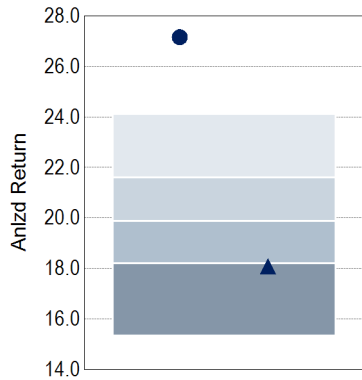


MPERS

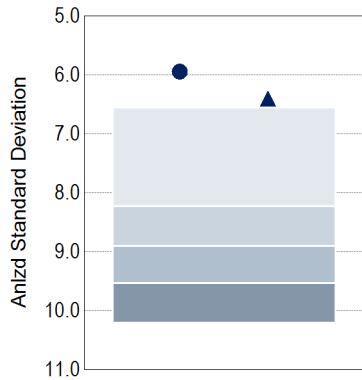
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
1 Year

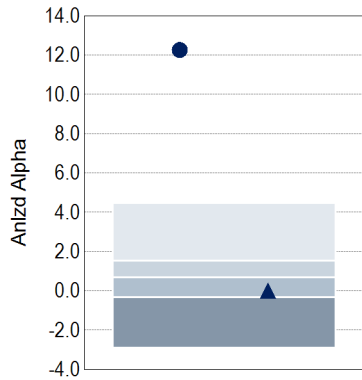
Anlzd Return



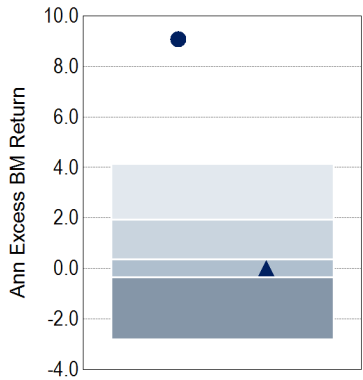
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	27.15
Rank	2
▲ Policy Index	
Value	18.08
Rank	77
Universe	
5th %tile	24.12
25th %tile	21.63
Median	19.91
75th %tile	18.23
95th %tile	15.35

● Total Composite	
Value	5.95
Rank	3
▲ Policy Index	
Value	6.41
Rank	5
Universe	
5th %tile	6.56
25th %tile	8.22
Median	8.89
75th %tile	9.52
95th %tile	10.20

● Total Composite	
Value	12.26
Rank	2
▲ Policy Index	
Value	0.00
Rank	66
Universe	
5th %tile	4.47
25th %tile	1.58
Median	0.71
75th %tile	-0.29
95th %tile	-2.87

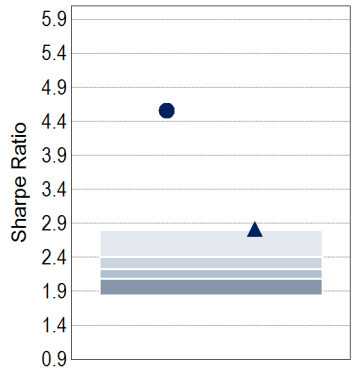
● Total Composite	
Value	9.07
Rank	2
▲ Policy Index	
Value	0.00
Rank	67
Universe	
5th %tile	4.14
25th %tile	1.96
Median	0.37
75th %tile	-0.34
95th %tile	-2.79



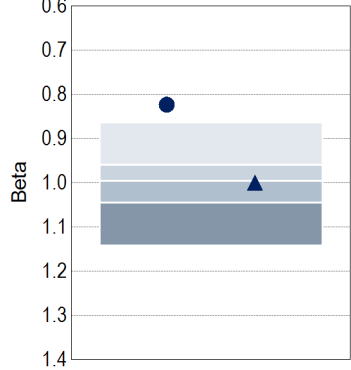
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
1 Year

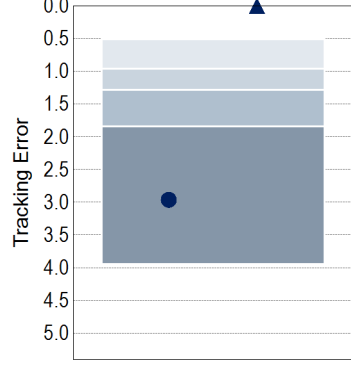
Sharpe Ratio



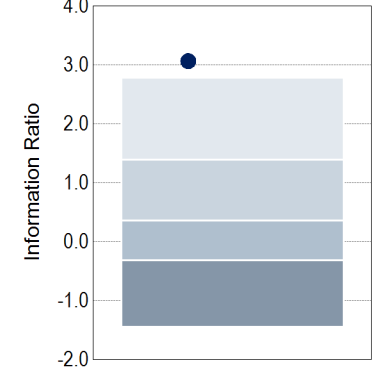
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	4.56
Rank	1
▲ Policy Index	
Value	2.81
Rank	5
Universe	
5th %tile	2.80
25th %tile	2.41
Median	2.23
75th %tile	2.10
95th %tile	1.85

● Total Composite	
Value	0.82
Rank	4
▲ Policy Index	
Value	1.00
Rank	54
Universe	
5th %tile	0.86
25th %tile	0.96
Median	0.99
75th %tile	1.04
95th %tile	1.14

● Total Composite	
Value	2.96
Rank	92
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.51
25th %tile	0.95
Median	1.27
75th %tile	1.83
95th %tile	3.94

● Total Composite	
Value	3.06
Rank	4
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	2.78
25th %tile	1.39
Median	0.36
75th %tile	-0.31
95th %tile	-1.44

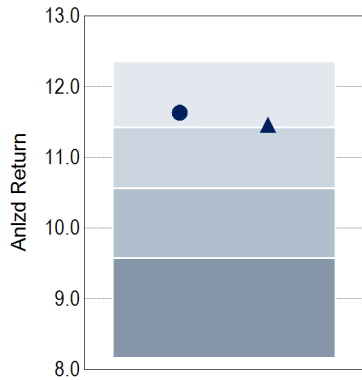


MPERS

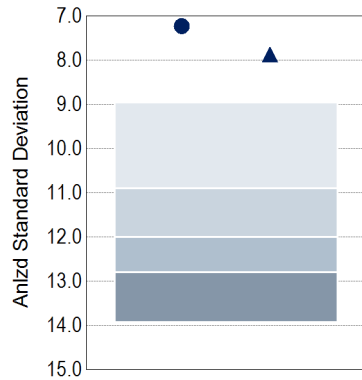
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
3 Years

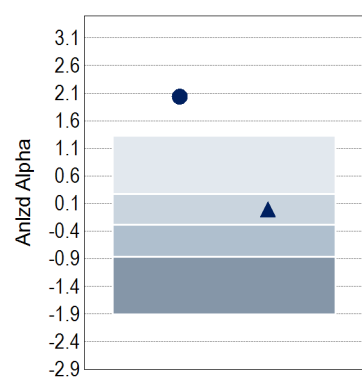
Anlzd Return



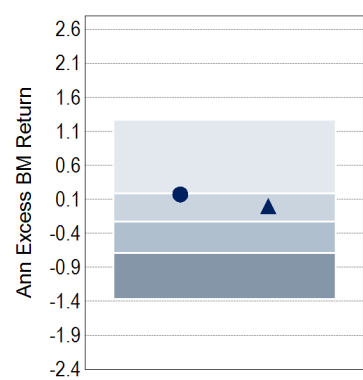
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	11.63
Rank	21
▲ Policy Index	
Value	11.46
Rank	25
Universe	
5th %tile	12.36
25th %tile	11.43
Median	10.57
75th %tile	9.58
95th %tile	8.16

● Total Composite	
Value	7.23
Rank	2
▲ Policy Index	
Value	7.88
Rank	2
Universe	
5th %tile	8.96
25th %tile	10.88
Median	11.99
75th %tile	12.79
95th %tile	13.92

● Total Composite	
Value	2.04
Rank	4
▲ Policy Index	
Value	0.00
Rank	34
Universe	
5th %tile	1.33
25th %tile	0.28
Median	-0.27
75th %tile	-0.85
95th %tile	-1.90

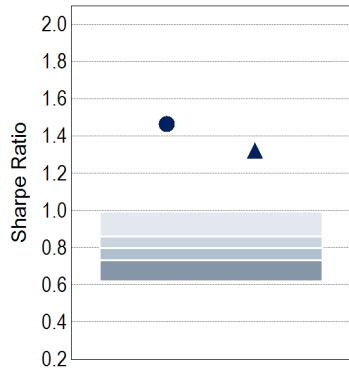
● Total Composite	
Value	0.17
Rank	27
▲ Policy Index	
Value	0.00
Rank	34
Universe	
5th %tile	1.27
25th %tile	0.20
Median	-0.22
75th %tile	-0.68
95th %tile	-1.36



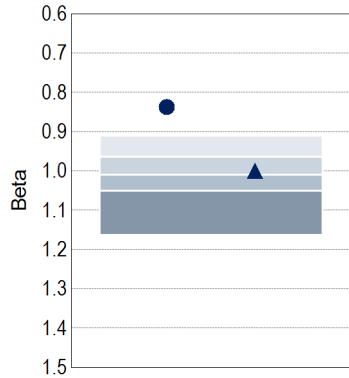
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
3 Years

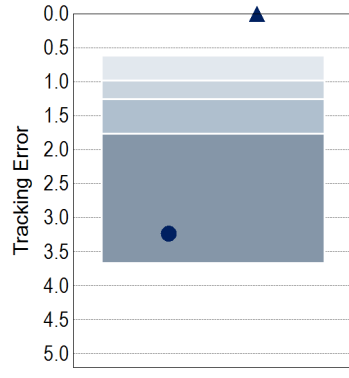
Sharpe Ratio



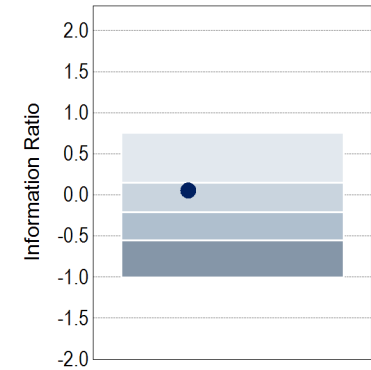
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.46
Rank	1
▲ Policy Index	
Value	1.32
Rank	1
Universe	
5th %tile	0.99
25th %tile	0.86
Median	0.80
75th %tile	0.74
95th %tile	0.62

● Total Composite	
Value	0.84
Rank	4
▲ Policy Index	
Value	1.00
Rank	47
Universe	
5th %tile	0.91
25th %tile	0.96
Median	1.01
75th %tile	1.05
95th %tile	1.16

● Total Composite	
Value	3.23
Rank	93
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.61
25th %tile	0.97
Median	1.25
75th %tile	1.75
95th %tile	3.66

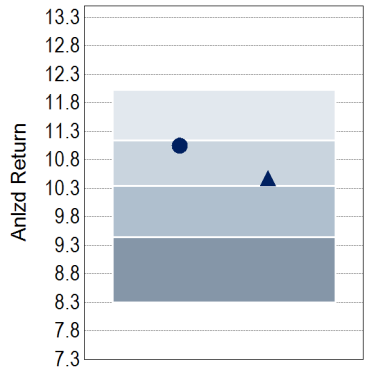
● Total Composite	
Value	0.05
Rank	30
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.76
25th %tile	0.15
Median	-0.20
75th %tile	-0.54
95th %tile	-1.00



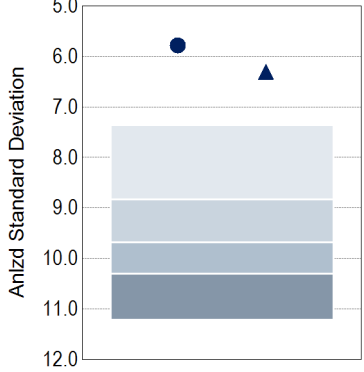
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
5 Years

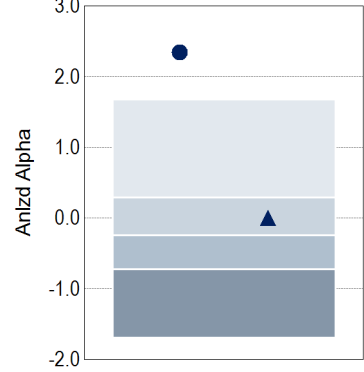
Anlzd Return



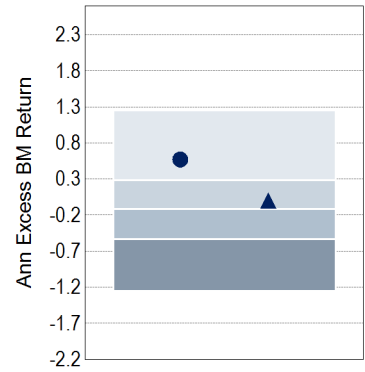
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	11.05
Rank	28
▲ Policy Index	
Value	10.48
Rank	46
Universe	
5th %tile	12.03
25th %tile	11.14
Median	10.35
75th %tile	9.45
95th %tile	8.31

● Total Composite	
Value	5.78
Rank	1
▲ Policy Index	
Value	6.30
Rank	2
Universe	
5th %tile	7.36
25th %tile	8.83
Median	9.67
75th %tile	10.30
95th %tile	11.20

● Total Composite	
Value	2.34
Rank	5
▲ Policy Index	
Value	0.00
Rank	42
Universe	
5th %tile	1.68
25th %tile	0.30
Median	-0.24
75th %tile	-0.71
95th %tile	-1.69

● Total Composite	
Value	0.57
Rank	16
▲ Policy Index	
Value	0.00
Rank	41
Universe	
5th %tile	1.25
25th %tile	0.29
Median	-0.11
75th %tile	-0.53
95th %tile	-1.24

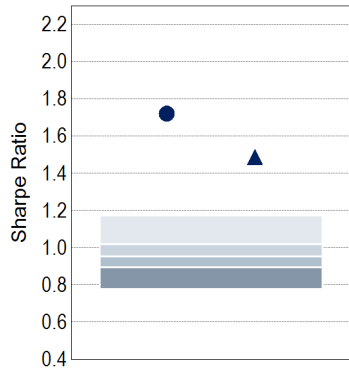


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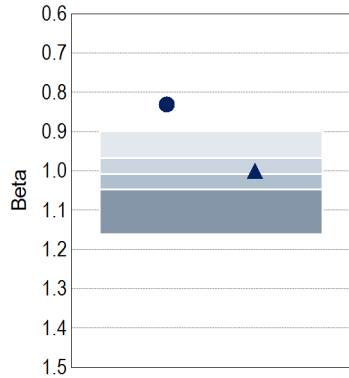
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
5 Years

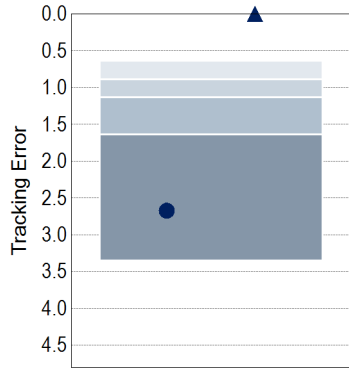
Sharpe Ratio



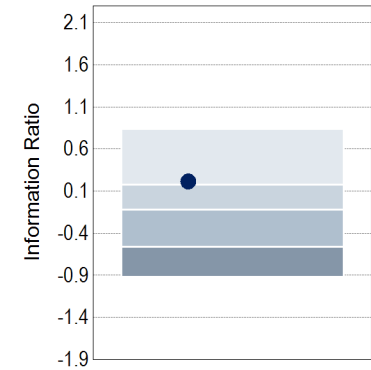
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.72
Rank	1
▲ Policy Index	
Value	1.49
Rank	1
Universe	
5th %tile	1.17
25th %tile	1.02
Median	0.96
75th %tile	0.90
95th %tile	0.78

● Total Composite	
Value	0.83
Rank	4
▲ Policy Index	
Value	1.00
Rank	47
Universe	
5th %tile	0.90
25th %tile	0.97
Median	1.01
75th %tile	1.04
95th %tile	1.16

● Total Composite	
Value	2.67
Rank	94
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.64
25th %tile	0.88
Median	1.13
75th %tile	1.63
95th %tile	3.34

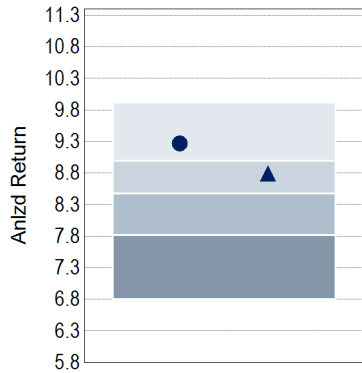
● Total Composite	
Value	0.21
Rank	25
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.84
25th %tile	0.19
Median	-0.11
75th %tile	-0.56
95th %tile	-0.92



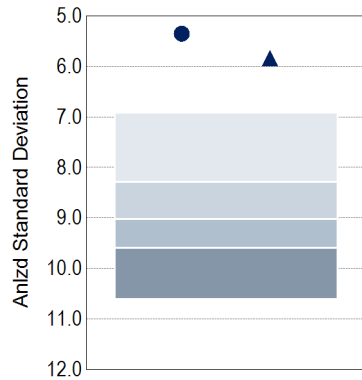
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
7 Years

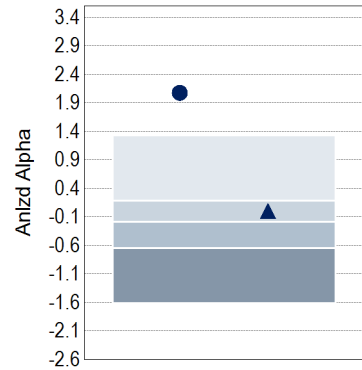
Anlzd Return



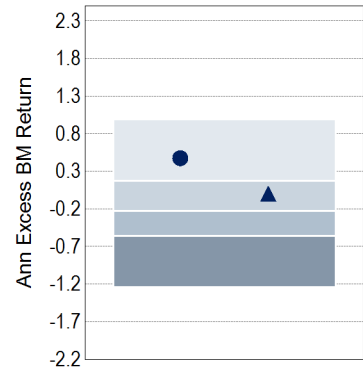
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	9.27
Rank	17
▲ Policy Index	
Value	8.79
Rank	36
Universe	
5th %tile	9.92
25th %tile	9.00
Median	8.48
75th %tile	7.82
95th %tile	6.82

● Total Composite	
Value	5.35
Rank	1
▲ Policy Index	
Value	5.84
Rank	2
Universe	
5th %tile	6.92
25th %tile	8.27
Median	9.01
75th %tile	9.58
95th %tile	10.60

● Total Composite	
Value	2.07
Rank	4
▲ Policy Index	
Value	0.00
Rank	33
Universe	
5th %tile	1.33
25th %tile	0.19
Median	-0.18
75th %tile	-0.64
95th %tile	-1.60

● Total Composite	
Value	0.47
Rank	13
▲ Policy Index	
Value	0.00
Rank	31
Universe	
5th %tile	0.99
25th %tile	0.18
Median	-0.22
75th %tile	-0.55
95th %tile	-1.23

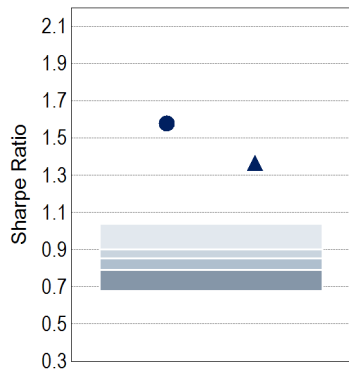


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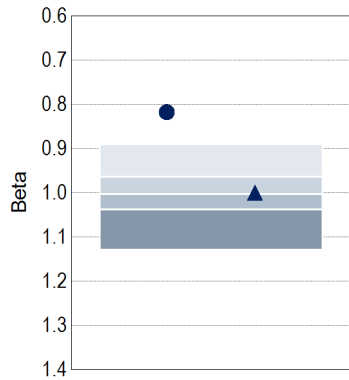
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
7 Years

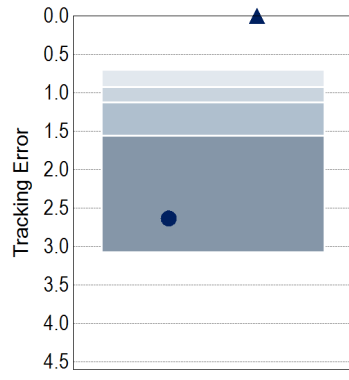
Sharpe Ratio



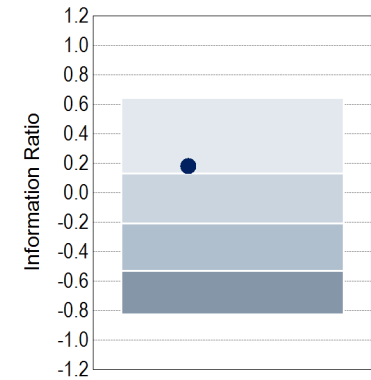
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.58
Rank	1
▲ Policy Index	
Value	1.37
Rank	1
Universe	
5th %tile	1.04
25th %tile	0.91
Median	0.85
75th %tile	0.80
95th %tile	0.68

● Total Composite	
Value	0.82
Rank	4
▲ Policy Index	
Value	1.00
Rank	49
Universe	
5th %tile	0.89
25th %tile	0.96
Median	1.00
75th %tile	1.04
95th %tile	1.13

● Total Composite	
Value	2.64
Rank	94
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.70
25th %tile	0.91
Median	1.12
75th %tile	1.55
95th %tile	3.07

● Total Composite	
Value	0.18
Rank	23
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.64
25th %tile	0.13
Median	-0.21
75th %tile	-0.53
95th %tile	-0.83

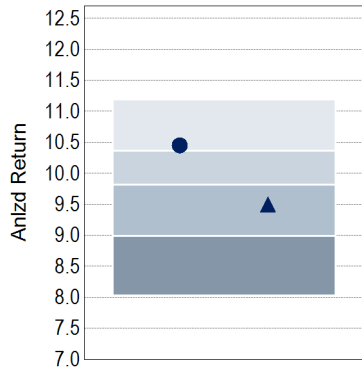


MPERS

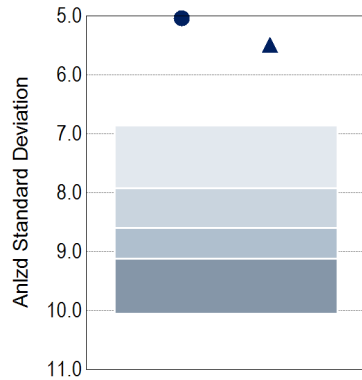
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
10 Years

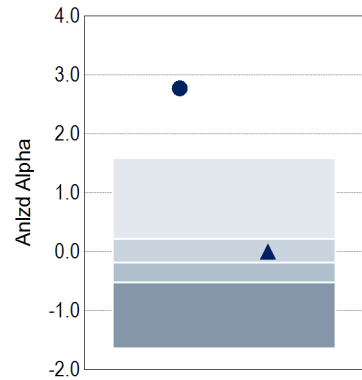
Anlzd Return



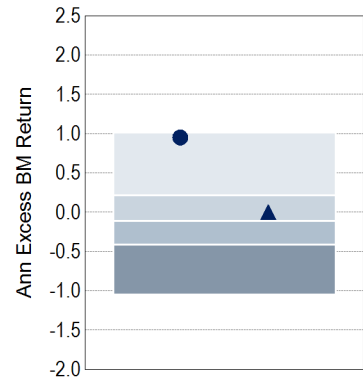
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	10.45
Rank	24
▲ Policy Index	
Value	9.50
Rank	62
Universe	
5th %tile	11.19
25th %tile	10.38
Median	9.83
75th %tile	9.00
95th %tile	8.03

● Total Composite	
Value	5.04
Rank	1
▲ Policy Index	
Value	5.49
Rank	1
Universe	
5th %tile	6.86
25th %tile	7.92
Median	8.59
75th %tile	9.12
95th %tile	10.05

● Total Composite	
Value	2.77
Rank	3
▲ Policy Index	
Value	0.00
Rank	42
Universe	
5th %tile	1.58
25th %tile	0.23
Median	-0.18
75th %tile	-0.52
95th %tile	-1.64

● Total Composite	
Value	0.95
Rank	6
▲ Policy Index	
Value	0.00
Rank	38
Universe	
5th %tile	1.01
25th %tile	0.23
Median	-0.11
75th %tile	-0.41
95th %tile	-1.04

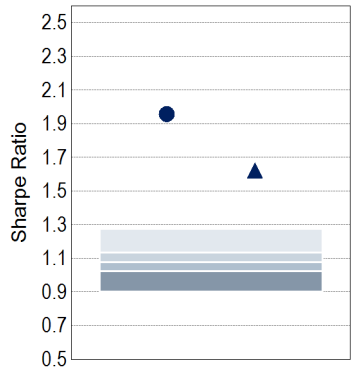


MPERS

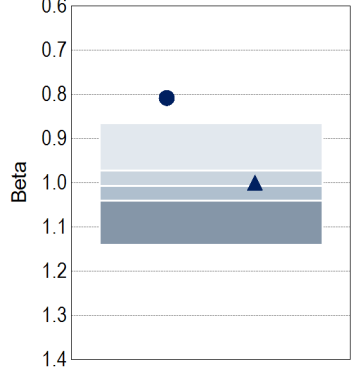
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
10 Years

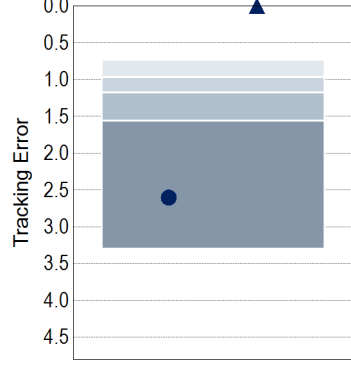
Sharpe Ratio



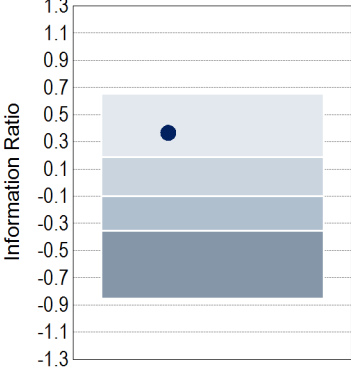
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.96
Rank	1
▲ Policy Index	
Value	1.62
Rank	1
Universe	
5th %tile	1.28
25th %tile	1.14
Median	1.08
75th %tile	1.03
95th %tile	0.90

● Total Composite	
Value	0.81
Rank	3
▲ Policy Index	
Value	1.00
Rank	46
Universe	
5th %tile	0.87
25th %tile	0.97
Median	1.01
75th %tile	1.04
95th %tile	1.14

● Total Composite	
Value	2.60
Rank	92
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.73
25th %tile	0.96
Median	1.17
75th %tile	1.55
95th %tile	3.29

● Total Composite	
Value	0.37
Rank	14
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.66
25th %tile	0.19
Median	-0.09
75th %tile	-0.35
95th %tile	-0.85

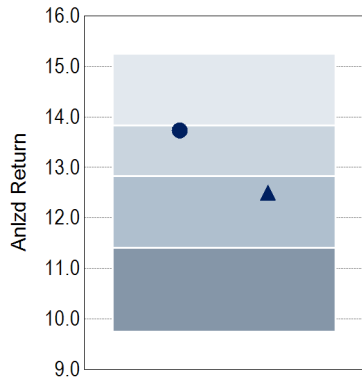


MPERS

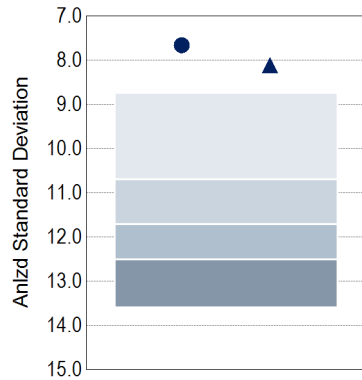
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
15 Years

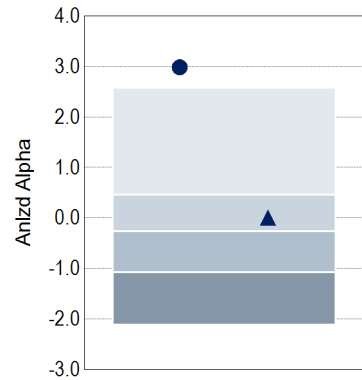
Anlzd Return



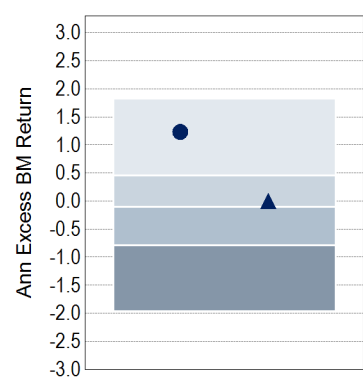
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	13.73
Rank	30
▲ Policy Index	
Value	12.50
Rank	58
Universe	
5th %tile	15.24
25th %tile	13.84
Median	12.83
75th %tile	11.42
95th %tile	9.76

● Total Composite	
Value	7.67
Rank	3
▲ Policy Index	
Value	8.12
Rank	4
Universe	
5th %tile	8.74
25th %tile	10.69
Median	11.70
75th %tile	12.50
95th %tile	13.59

● Total Composite	
Value	2.98
Rank	5
▲ Policy Index	
Value	0.00
Rank	41
Universe	
5th %tile	2.57
25th %tile	0.47
Median	-0.26
75th %tile	-1.07
95th %tile	-2.10

● Total Composite	
Value	1.23
Rank	12
▲ Policy Index	
Value	0.00
Rank	46
Universe	
5th %tile	1.82
25th %tile	0.47
Median	-0.09
75th %tile	-0.77
95th %tile	-1.96

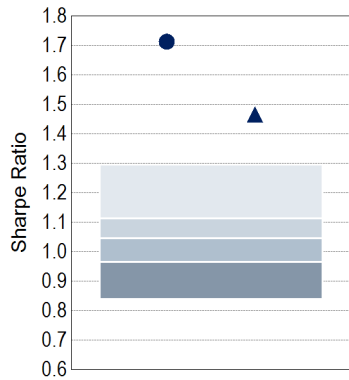


MPERS

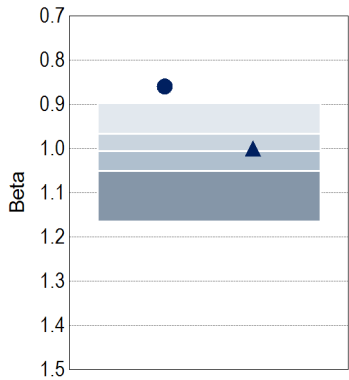
TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

Total Composite vs. IFx Public DB Net + (USD)
15 Years

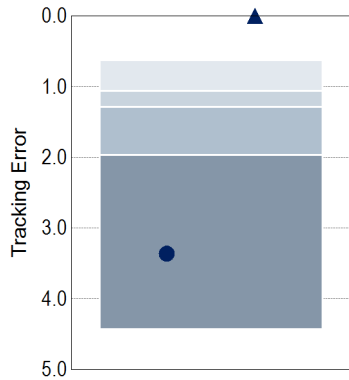
Sharpe Ratio



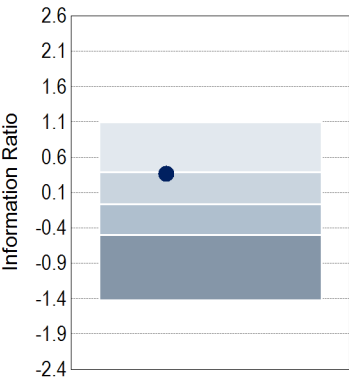
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.71
Rank	1
▲ Policy Index	
Value	1.47
Rank	3
Universe	
5th %tile	1.29
25th %tile	1.12
Median	1.05
75th %tile	0.97
95th %tile	0.84

● Total Composite	
Value	0.86
Rank	5
▲ Policy Index	
Value	1.00
Rank	47
Universe	
5th %tile	0.90
25th %tile	0.97
Median	1.00
75th %tile	1.05
95th %tile	1.16

● Total Composite	
Value	3.36
Rank	93
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.63
25th %tile	1.05
Median	1.28
75th %tile	1.96
95th %tile	4.42

● Total Composite	
Value	0.37
Rank	26
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	1.09
25th %tile	0.40
Median	-0.05
75th %tile	-0.49
95th %tile	-1.42



2021 THIRD QUARTER INSIGHTS FROM NEPC

General Research

- [NEPC's June 2021 Market Commentary](#)
- [Quarterly Asset Class Review: Q2 2021](#)
- [Reframing Inflation Expectations: Q2 Quarterly Market Webinar](#)
- [NEPC's July 2021 Market Commentary](#)
- [NEPC Market Outlook: Taking Profits in a Period of Market Strength](#)
- [NEPC's August 2021 Market Commentary](#)

Practice Teams

- [Taxes and After-Tax Alpha: Are You Missing Out?](#)
- [Inflation: The Real Effect on Returns and Tax Rates](#)
- [Investment Vehicles: A Critical Choice for Private Clients and Family Offices](#)
- [Taking Stock: NEPC Q2 2021 Pension Monitor](#)
- [Taking Stock: NEPC July 2021 Pension Monitor](#)
- [Taking Stock: NEPC August 2021 Pension Monitor](#)
- [Taking Stock: One Corporate Plan's Journey of Terminating Its Pension \(Part 3\)](#)



DIVERSITY, EQUITY AND INCLUSION AT NEPC

- This quarter, during the annual Equitable Manager Participation Workshop, NEPC announced the Explorer Program, a platform to identify, meaningfully explore and engage with diverse-owned and -led investment management firms who are not currently 1- or 2-rated by NEPC. The Explorer Program eases the path for diverse managers to be evaluated by NEPC's Research team for potential inclusion in client portfolios and for future inclusion on the firm's Focused Placement Lists (FPL).
- You can read more in FundFire, Alternatives Watch, and PLANSPONSOR, and learn more at [NEPC.com](https://www.nepc.com).



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A “since inception” return, if reported, begins with the first full month after funding, although actual inception dates (e.g. the middle of a month) and the timing of cash flows are taken into account in Composite return calculations.

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All investments carry some level of risk. Diversification and other asset allocation techniques are not guaranteed to ensure profit or protect against losses.

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Source of private fund performance benchmark data: Cambridge Associates, via Refinitiv

