



# Q4 2021 INVESTMENT SUMMARY: BOARD REPORT

MODOT & PATROL EMPLOYEES'  
RETIREMENT SYSTEM

FEBRUARY 2022

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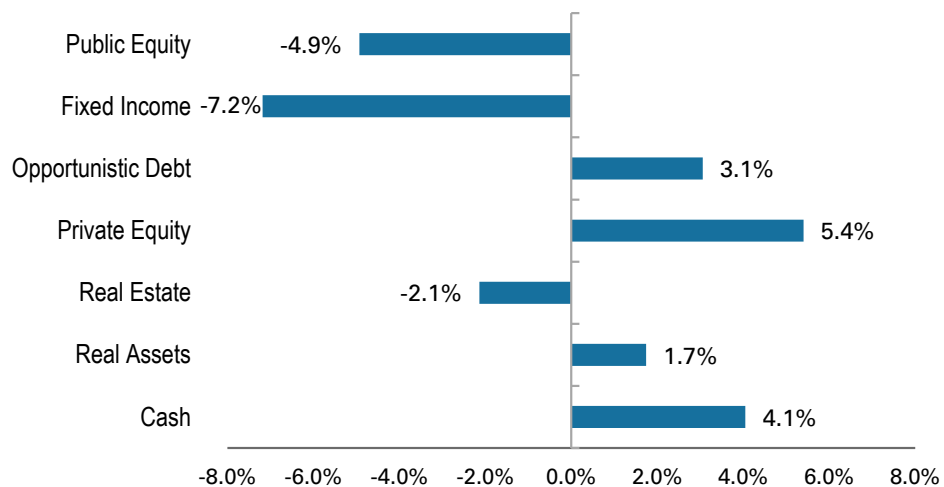
# EXECUTIVE SUMMARY



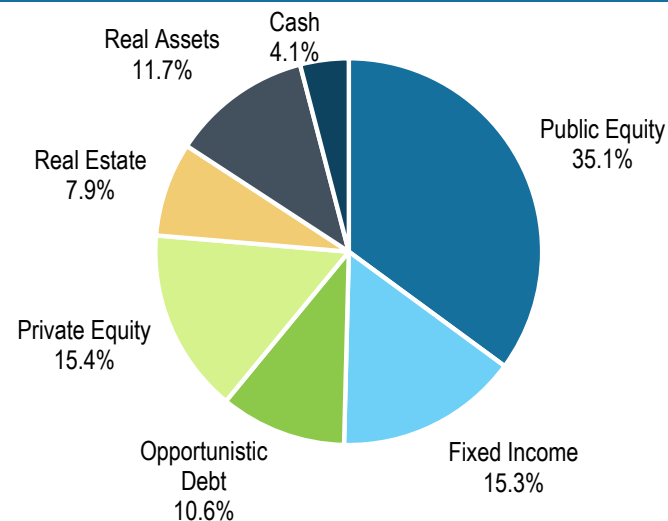
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# ASSET ALLOCATION – CURRENT vs. POLICY

## Current Allocation vs. Policy Allocation



## Current Asset Allocation

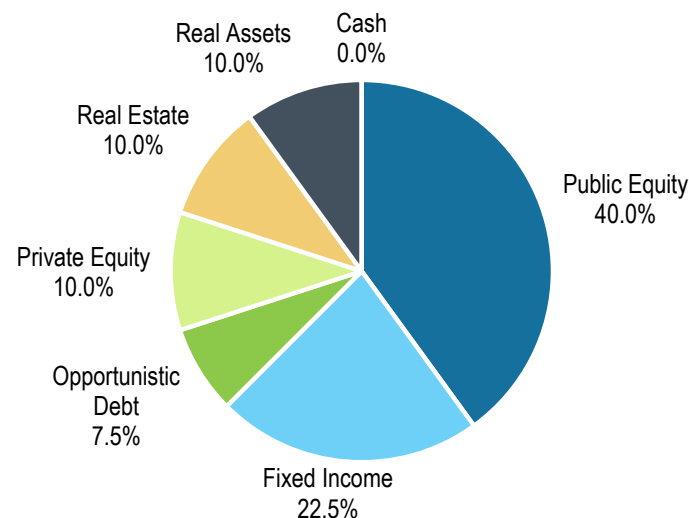


## Current Allocation vs. Policy Allocation

	Current	Policy	Current	Difference*
Public Equity	\$1,130,585,493	40.0%	35.1%	-4.9%
Fixed Income	\$493,766,701	22.5%	15.3%	-7.2%
Opportunistic Debt	\$340,260,929	7.5%	10.6%	3.1%
Private Equity	\$496,445,773	10.0%	15.4%	5.4%
Real Estate	\$253,417,612	10.0%	7.9%	-2.1%
Real Assets	\$378,319,396	10.0%	11.7%	1.7%
Cash	\$130,711,203	--	4.1%	4.6%
<b>Total</b>	<b>\$3,223,507,106</b>	<b>100.0%</b>	<b>100.0%</b>	

\* Difference between Policy and Current Allocation

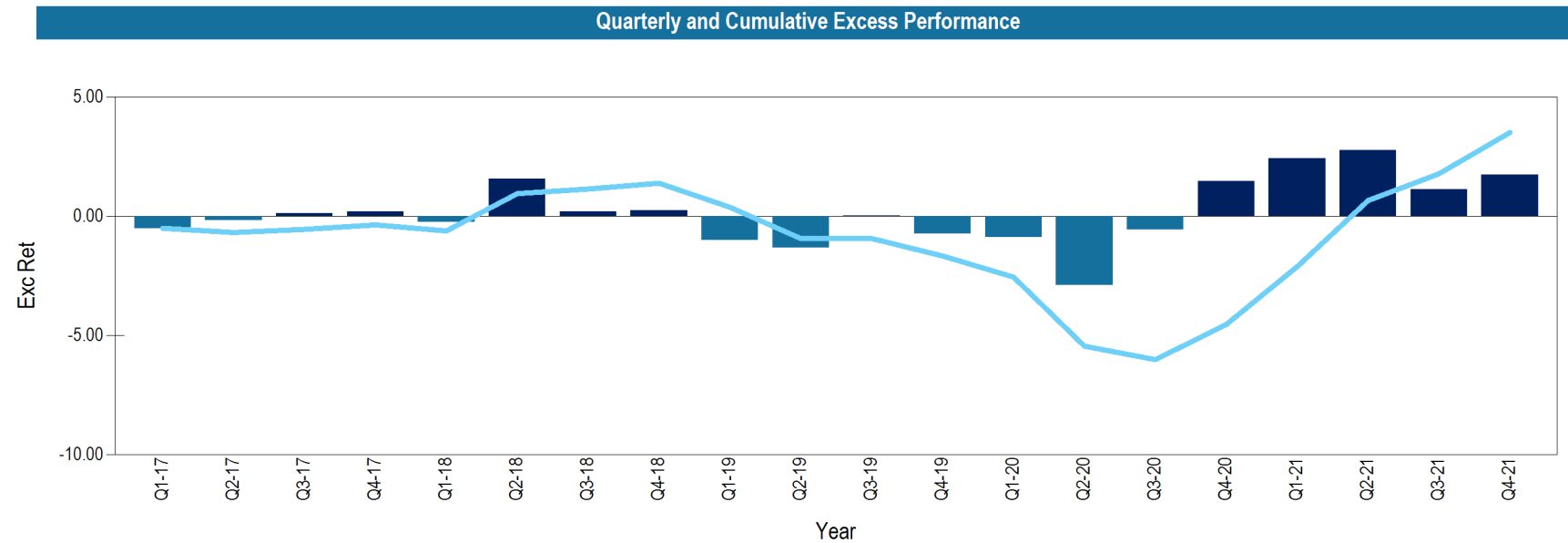
## Policy Asset Allocation



# MPERS

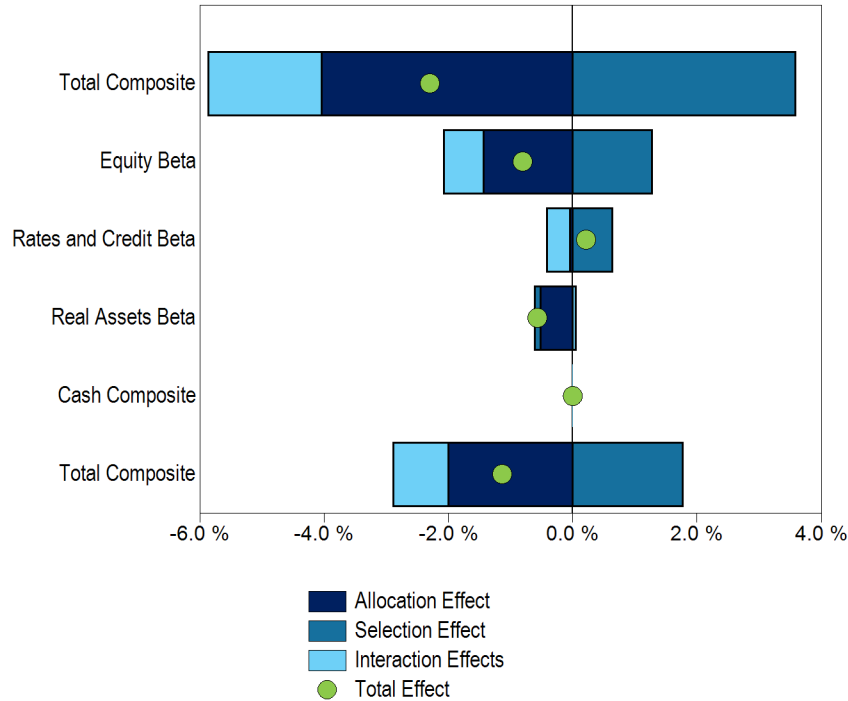
## TOTAL FUND PERFORMANCE SUMMARY

	Market Value	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs
<b>Total Composite</b>	<b>\$3,223,507,106</b>	<b>5.68%</b>	<b>23.02%</b>	<b>14.79%</b>	<b>11.89%</b>	<b>10.76%</b>
<i>Policy Index</i>		3.95%	13.91%	14.08%	11.17%	9.83%
<i>InvMetrics Public DB Net Median</i>		4.36%	13.79%	15.50%	11.22%	9.64%



# MPERS TOTAL FUND ATTRIBUTION ANALYSIS

## Attribution Effects 3 Months Ending December 31, 2021



Attribution Summary 3 Months Ending December 31, 2021							
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Equity Beta	8.2%	5.7%	2.6%	1.3%	0.0%	0.0%	1.3%
Rates and Credit Beta	2.3%	0.3%	2.0%	0.6%	0.2%	-0.1%	0.7%
Real Asset Beta	4.8%	5.0%	-0.2%	-0.1%	0.0%	0.0%	-0.1%
Cash Composite	0.0%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.2%
<b>Total</b>	<b>5.7%</b>	<b>4.0%</b>	<b>1.7%</b>	<b>1.8%</b>	<b>0.0%</b>	<b>-0.1%</b>	<b>1.7%</b>

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

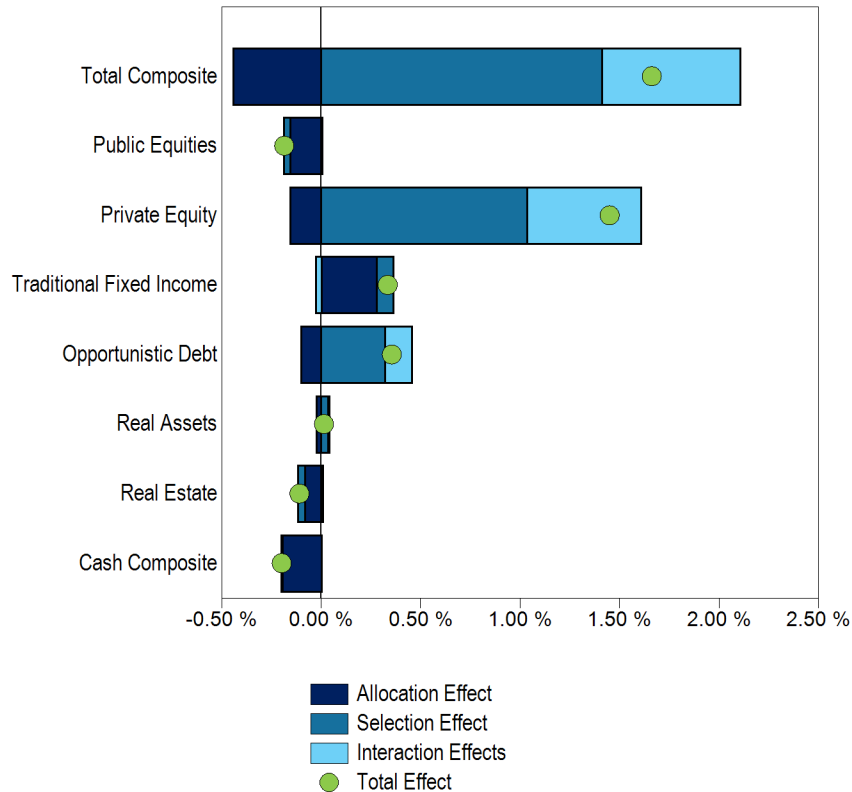
Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects



# MPERS

## TOTAL FUND ATTRIBUTION ANALYSIS

### Attribution Effects 3 Months Ending December 31, 2021



Attribution Summary 3 Months Ending December 31, 2021							
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Public Equities	6.6%	6.7%	-0.1%	0.0%	-0.1%	0.0%	-0.2%
Private Equity	11.9%	1.3%	10.6%	1.0%	-0.1%	0.5%	1.4%
Traditional Fixed Income	0.5%	0.2%	0.4%	0.1%	0.3%	0.0%	0.3%
Opportunistic Debt	5.0%	0.7%	4.3%	0.3%	-0.1%	0.1%	0.4%
Real Assets	3.0%	2.6%	0.3%	0.0%	0.0%	0.0%	0.0%
Real Estate	7.2%	7.4%	-0.2%	0.0%	-0.1%	0.0%	-0.1%
Cash Composite	0.0%	0.0%	0.0%	0.0%	-0.2%	0.0%	-0.2%
<b>Total</b>	<b>5.6%</b>	<b>4.0%</b>	<b>1.7%</b>	<b>1.4%</b>	<b>-0.4%</b>	<b>0.7%</b>	<b>1.7%</b>

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

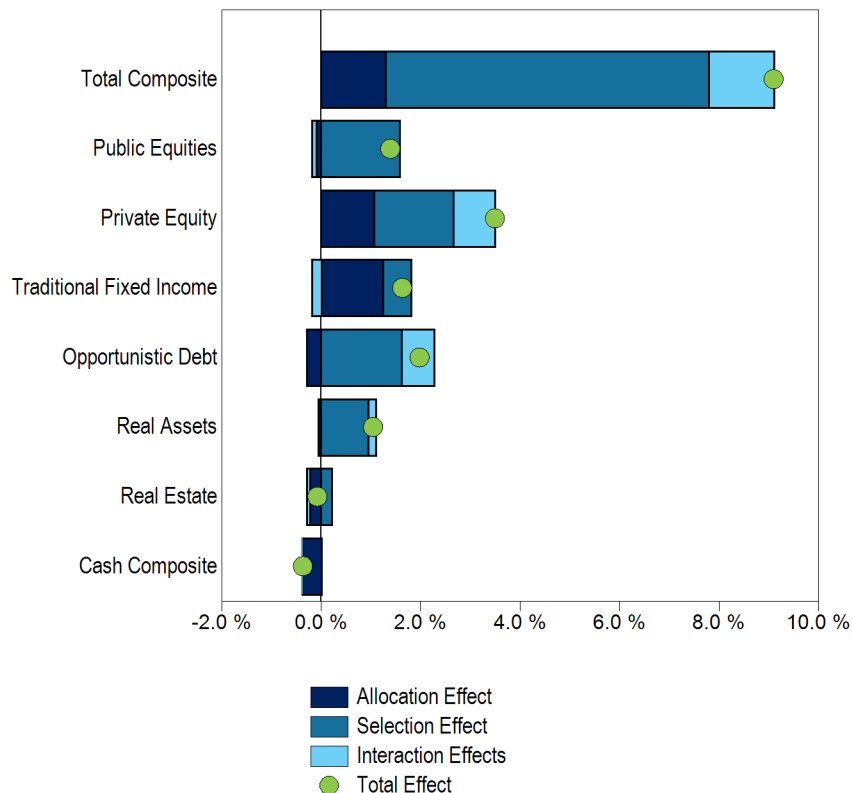
Interaction Effect - The return attributable to the interaction between the Allocation and Selection Effects



# MPERS

## TOTAL FUND ATTRIBUTION ANALYSIS

Attribution Effects Relative to Policy Index  
1 Year Ending December 31, 2021



Attribution Summary 1 Year Ending December 31, 2021							
	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Public Equities	22.6%	18.5%	4.0%	1.6%	-0.1%	-0.1%	1.4%
Private Equity	53.3%	33.8%	19.5%	1.6%	1.1%	0.8%	3.4%
Traditional Fixed Income	0.4%	-1.7%	2.1%	0.6%	1.2%	-0.2%	1.6%
Opportunistic Debt	26.5%	5.3%	21.2%	1.6%	-0.3%	0.6%	2.0%
Real Assets	20.6%	11.3%	9.3%	1.0%	0.0%	0.1%	1.1%
Real Estate	24.3%	21.9%	2.4%	0.2%	-0.2%	-0.1%	-0.1%
Cash Composite	0.0%	0.0%	0.0%	0.0%	-0.4%	0.0%	-0.4%
<b>Total</b>	<b>23.0%</b>	<b>13.9%</b>	<b>9.0%</b>	<b>6.5%</b>	<b>1.3%</b>	<b>1.2%</b>	<b>9.0%</b>

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





# MPERS TOTAL COMPOSITE

	Policy %	% of Portfolio	Market Value (\$)	3 Mo (%)	Rank	YTD (%)	Rank	1 Yr (%)	Rank	3 Yrs (%)	Rank	5 Yrs (%)	Rank	10 Yrs (%)	Rank
<b>Total Composite</b>	<b>100.0</b>	<b>100.0</b>	<b>3,223,507,106</b>	<b>5.68</b>	<b>10</b>	<b>23.02</b>	<b>1</b>	<b>23.02</b>	<b>1</b>	<b>14.79</b>	<b>66</b>	<b>11.89</b>	<b>26</b>	<b>10.76</b>	<b>12</b>
<i>Policy Index</i>				3.95	67	13.91	47	13.91	47	14.08	77	11.17	53	9.83	41
<b>Equity Beta</b>	<b>50.0</b>	<b>50.5</b>	<b>1,627,031,266</b>	<b>8.26</b>	<b>--</b>	<b>31.03</b>	<b>--</b>	<b>31.03</b>	<b>--</b>	<b>21.27</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Public Equities</b>	<b>40.0</b>	<b>35.1</b>	<b>1,130,585,493</b>	<b>6.61</b>	<b>36</b>	<b>22.58</b>	<b>15</b>	<b>22.58</b>	<b>15</b>	<b>19.24</b>	<b>65</b>	<b>12.61</b>	<b>63</b>	<b>11.53</b>	<b>57</b>
<i>MSCI ACWI</i>				6.68	34	18.54	43	18.54	43	20.38	57	14.40	52	11.85	51
<b>Private Equity</b>	<b>10.0</b>	<b>15.4</b>	<b>496,445,773</b>	<b>11.92</b>	<b>--</b>	<b>53.35</b>	<b>--</b>	<b>53.35</b>	<b>--</b>	<b>25.51</b>	<b>--</b>	<b>22.05</b>	<b>--</b>	<b>17.58</b>	<b>--</b>
<i>MO Hwy Priv. Equ. Index - Lagged</i>				1.34	--	33.83	--	33.83	--	19.44	--	20.36	--	20.09	--
<b>Rates and Credit Beta</b>	<b>30.0</b>	<b>25.9</b>	<b>834,027,629</b>	<b>2.33</b>	<b>--</b>	<b>10.28</b>	<b>--</b>	<b>10.28</b>	<b>--</b>	<b>8.80</b>					
<b>Traditional Fixed Income</b>	<b>22.5</b>	<b>15.3</b>	<b>493,766,701</b>	<b>0.54</b>	<b>14</b>	<b>0.35</b>	<b>39</b>	<b>0.35</b>	<b>39</b>	<b>6.80</b>	<b>32</b>	<b>5.33</b>	<b>26</b>	<b>6.08</b>	<b>14</b>
<i>Fixed Income Custom Benchmark</i>				0.18	23	-1.75	60	-1.75	60	5.50	52	3.99	61	3.38	60
<b>Opportunistic Debt</b>	<b>7.5</b>	<b>10.6</b>	<b>340,260,929</b>	<b>4.98</b>	<b>1</b>	<b>26.46</b>	<b>1</b>	<b>26.46</b>	<b>1</b>	<b>11.49</b>	<b>3</b>	<b>11.04</b>	<b>1</b>	<b>--</b>	<b>--</b>
<i>Bloomberg US High Yield TR</i>				0.71	42	5.28	40	5.28	40	8.83	31	6.30	28	6.83	22
<b>Real Assets Beta</b>	<b>20.0</b>	<b>19.6</b>	<b>631,737,008</b>	<b>4.63</b>	<b>--</b>	<b>22.05</b>	<b>--</b>	<b>22.05</b>	<b>--</b>	<b>6.78</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Real Assets</b>	<b>10.0</b>	<b>11.7</b>	<b>378,319,396</b>	<b>3.24</b>	<b>--</b>	<b>20.91</b>	<b>--</b>	<b>20.91</b>	<b>--</b>	<b>3.23</b>	<b>--</b>	<b>5.70</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>CPI + 4% (Unadjusted)</i>				2.63	--	11.29	--	11.29	--	7.81	--	7.12	--	6.26	--
<b>Real Estate</b>	<b>10.0</b>	<b>7.9</b>	<b>253,417,612</b>	<b>7.20</b>	<b>--</b>	<b>24.31</b>	<b>--</b>	<b>24.31</b>	<b>--</b>	<b>12.04</b>	<b>--</b>	<b>11.41</b>	<b>--</b>	<b>12.36</b>	<b>--</b>
<i>MODOT Real Estate Blend</i>				7.38	--	21.88	--	21.88	--	8.90	--	8.18	--	9.70	--
<b>Cash Composite</b>	<b>0.0</b>	<b>4.1</b>	<b>130,711,203</b>	<b>0.00</b>	<b>--</b>	<b>0.03</b>	<b>--</b>	<b>0.03</b>	<b>--</b>	<b>0.89</b>	<b>--</b>	<b>1.03</b>	<b>--</b>	<b>0.57</b>	<b>--</b>
<i>91 Day T-Bills</i>				0.01	--	0.03	--	0.03	--	0.85	--	1.08	--	0.59	--

\* May include the use of derivatives

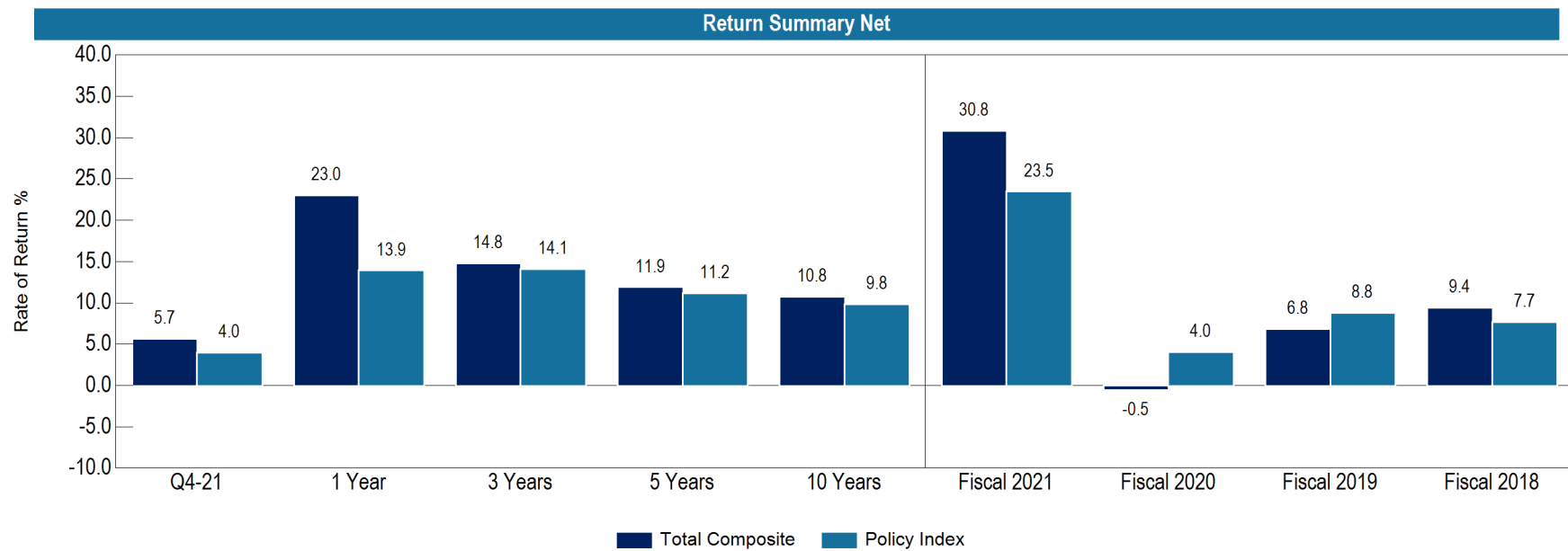
Total Composite is ranked in the IFx Public DB (peer) Net+ Universe

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



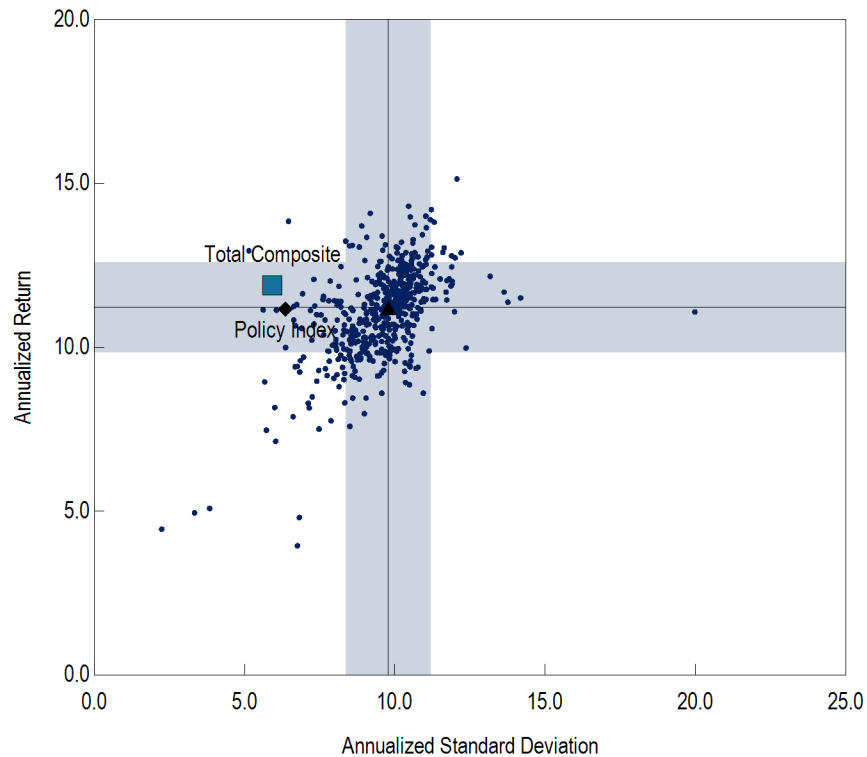
# MPERS TOTAL FUND RETURN SUMMARY



# MPERS

## TOTAL FUND RISK/RETURN - 5 YEARS

5 Years Ending December 31, 2021



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

526 Portfolios

### Statistics Summary

5 Years Ending December 31, 2021

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	11.89%	26	5.93%	2
Policy Index	11.17%	53	6.36%	2

### Statistics Summary

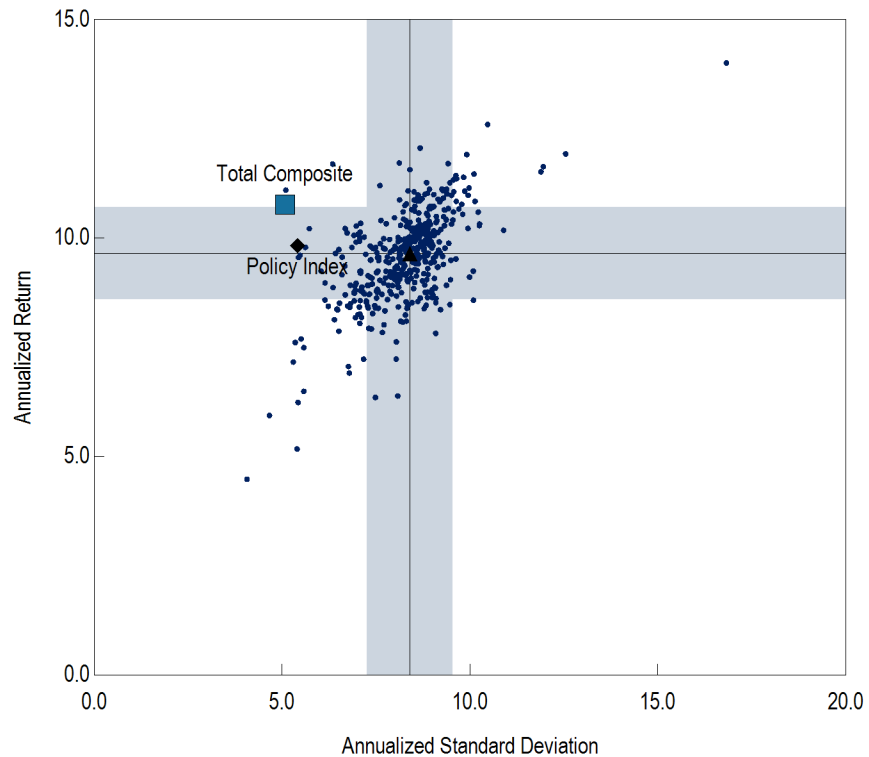
5 Years Ending December 31, 2021

	Sharpe Ratio	Rank
Total Composite	1.82	1
Policy Index	1.59	1



# MPERS TOTAL FUND RISK/RETURN - 10 YEARS

10 Years Ending December 31, 2021



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

442 Portfolios

## Statistics Summary

10 Years Ending December 31, 2021

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	10.76%	12	5.07%	1
Policy Index	9.83%	41	5.41%	2

## Statistics Summary

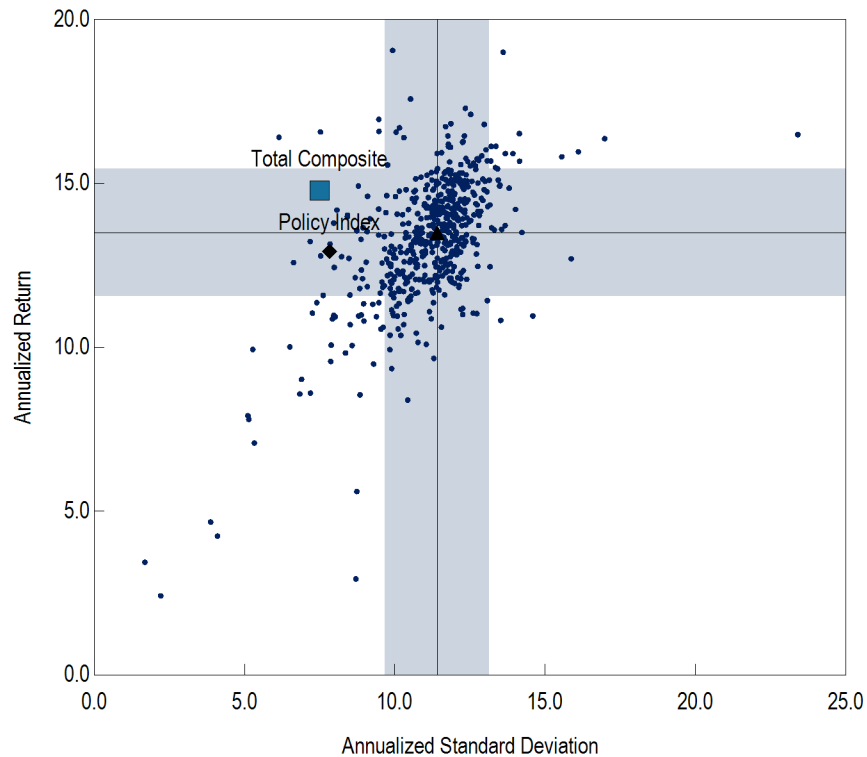
10 Years Ending December 31, 2021

	Sharpe Ratio	Rank
Total Composite	2.01	1
Policy Index	1.71	1



# MPERS TOTAL FUND RISK/RETURN - 15 YEARS

2 Years 6 Months Ending December 31, 2021



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

## Statistics Summary

2 Years 6 Months Ending December 31, 2021

	Anlzd Ret	Rank	Anlzd Std Dev	Rank
Total Composite	14.79%	20	7.49%	4
Policy Index	12.92%	64	7.83%	4

## Statistics Summary

2 Years 6 Months Ending December 31, 2021

	Sharpe Ratio	Rank
Total Composite	1.90	1
Policy Index	1.58	4





# TOTAL FUND PERFORMANCE



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## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
<b>Total Composite</b>	<b>3,223,507,106</b>	<b>100.00</b>	<b>100.00</b>	<b>5.68</b>	<b>23.02</b>	<b>14.79</b>	<b>11.89</b>	<b>10.76</b>
<i>Policy Index</i>				3.95	13.91	14.08	11.17	9.83
<i>Allocation Index</i>				2.65	14.99	13.53	10.70	10.03
<b>Equity Beta</b>	<b>1,627,031,266</b>	<b>50.47</b>	<b>50.00</b>	<b>8.23</b>	<b>31.03</b>	<b>21.27</b>	<b>--</b>	<b>--</b>
<b>Public Equities</b>	<b>1,130,585,493</b>	<b>35.07</b>	<b>40.00</b>	<b>6.61</b>	<b>22.58</b>	<b>19.24</b>	<b>12.61</b>	<b>11.53</b>
<i>MSCI ACWI</i>				6.68	18.54	20.38	14.40	11.85
<b>Global Public Equities</b>	<b>1,130,585,493</b>	<b>35.07</b>	<b>--</b>	<b>6.61</b>	<b>22.13</b>	<b>18.73</b>	<b>13.25</b>	<b>--</b>
<b>Diversified Beta</b>	<b>913,093,042</b>	<b>28.33</b>	<b>--</b>	<b>7.05</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>MSCI ACWI</i>				6.68	18.54	20.38	14.40	11.85
<b>Beta Overlay</b>	<b>239,835,296</b>	<b>7.44</b>	<b>--</b>	<b>29.65</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<i>MSCI ACWI</i>				6.68	18.54	20.38	14.40	11.85
<b>Beta Overlay Offsets</b>	<b>-665,883,816</b>	<b>-20.66</b>	<b>--</b>	<b>0.00</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Futures Offset	0	0.00		0.00	--	--	--	--
Swap Offset	-665,883,816	-20.66		0.00	--	--	--	--
<b>Beta Overlay Assets</b>	<b>905,719,113</b>	<b>28.10</b>	<b>--</b>	<b>7.81</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Futures Asset	0	0.00		8.70	--	--	--	--
Other Assets	238,627,126	7.40		9.85	--	--	--	--
Swap Asset	667,091,986	20.69		6.42	--	--	--	--
<i>MSCI ACWI</i>				6.68	18.54	20.38	14.40	11.85
<b>Collateral Pool</b>	<b>673,257,746</b>	<b>20.89</b>	<b>--</b>	<b>-0.29</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
<b>Return Seeking Collateral</b>	<b>400,311,737</b>	<b>12.42</b>	<b>--</b>	<b>-0.31</b>	<b>2.59</b>	<b>12.04</b>	<b>9.85</b>	<b>8.87</b>
Alpstone Capital	0	0.00		-3.01	-13.20	-4.04	--	--
Bridgewater Pure Alpha	19,986,867	0.62		3.64	8.24	-1.91	1.89	2.68
Indus Pacific Opp. Fund	18,351,387	0.57		-7.12	1.39	16.74	9.51	--
Internal Bond Portfolio	129,571,626	4.02		0.10	1.81	13.60	10.65	--
<i>S&amp;P 500</i>				11.03	28.70	26.07	18.47	16.55
Metacapital	251,542	0.01		-0.24	8.69	-15.17	-8.62	--
Millenium USA LP	20,558,959	0.64		3.32	19.26	16.27	12.37	--
MPERS - MP STONE OVERLAY	197,894,537	6.14		-1.05	--	--	--	--
Pentwater	13,696,819	0.42		3.56	10.58	9.81	11.53	--
<b>Cash Collateral</b>	<b>272,946,009</b>	<b>8.47</b>	<b>--</b>	<b>-0.37</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>
Cash & Other Assets	256,995,245	7.97		0.01	--	--	--	--
Cash & Other Assets	15,950,764	0.49		-1.61	--	--	--	--



# MPERS

## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
<b>Active Managers</b>	<b>217,492,451</b>	<b>6.75</b>	<b>--</b>	<b>5.81</b>	<b>22.75</b>	<b>16.17</b>	<b>11.32</b>	<b>9.60</b>
<i>MSCI ACWI ex USA</i>				1.82	7.82	13.18	9.61	7.28
Acadian Int'l Small Cap	60,799,643	1.89		3.17	19.71	18.57	13.16	--
<i>MSCI ACWI ex US Small Cap</i>				0.62	12.93	16.45	11.21	9.46
Acadian Non-US Microcap	50,418,499	1.56		4.00	23.90	23.50	--	--
Kennedy Capital	54,037,111	1.68		9.51	29.77	22.56	13.85	--
<i>Russell Microcap</i>				-2.66	19.34	20.90	11.69	13.62
Kennedy Small-Cap Banking	51,284,643	1.59		8.74	53.93	22.85	--	--
<i>Russell 2000 Value</i>				4.36	28.27	17.99	9.07	12.03
Silchester	25,034	0.00		1.69	13.79	9.94	7.71	8.91
<i>MSCI EAFE</i>				2.69	11.26	13.54	9.55	8.03
Transition Account	927,522	0.03		-10.73	-8.36	-9.64	-5.66	-9.03
<b>Private Equity</b>	<b>496,445,773</b>	<b>15.40</b>	<b>10.00</b>	<b>11.92</b>	<b>53.35</b>	<b>25.51</b>	<b>22.05</b>	<b>17.58</b>
<i>MO Hwy Priv. Equ. Index - Lagged</i>				1.34	33.83	19.44	20.36	20.09
<b>PE Fund of Funds</b>	<b>240,036,332</b>	<b>7.45</b>	<b>--</b>	<b>21.16</b>	<b>61.71</b>	<b>26.82</b>	<b>22.50</b>	<b>17.57</b>
Grove Street - MP Ventures	79,447,454	2.46		30.69	82.99	35.83	25.60	18.61
Grove Street - MP Ventures II	155,749,024	4.83		17.27	52.30	22.54	21.00	16.66
Vectis H & L II	4,839,854	0.15		9.94	78.84	41.34	36.48	25.44
<b>PE Direct Funds</b>	<b>256,409,441</b>	<b>7.95</b>	<b>--</b>	<b>4.11</b>	<b>46.01</b>	<b>25.56</b>	<b>24.57</b>	<b>21.38</b>
Abry Partners VI	142,684	0.00		-1.91	-12.25	1.79	18.73	26.25
Abry Partners VII	1,735,865	0.05		2.12	39.63	2.85	6.87	10.49
Aisling	14,647,544	0.45		-16.98	20.86	17.50	16.83	--
Arrowroot Capital III	12,739,955	0.40		-3.74	-14.06	-4.45	--	--
Arrowroot Capital IV	17,511,253	0.54		16.89	39.10	22.86	--	--
Blackstone Asia	25,670,192	0.80		-1.24	196.25	75.33	--	--
DC Capital Partners	12,377,776	0.38		4.91	17.90	35.38	20.15	--
Drive Overdrive I	17,223,009	0.53		-2.59	63.88	--	--	--
Drive III	8,044,278	0.25		0.84	21.12	--	--	--
DYAL IV	15,214,356	0.47		27.28	240.08	54.80	--	--





# MPERS

## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Heartwood Partners II	11,526,807	0.36		10.34	30.00	10.66	17.74	--
Heartwood Partners III	12,119,511	0.38		10.73	41.41	14.78	--	--
KPS IV	5,234,344	0.16		28.83	58.15	24.12	--	--
KPS Mid Cap	4,266,530	0.13		-0.16	11.49	--	--	--
KPS V	5,108,288	0.16		0.06	1.15	--	--	--
Long Ridge II	13,411,661	0.42		22.37	67.76	64.57	43.49	--
Long Ridge III	3,168,167	0.10		6.31	--	--	--	--
Monomoy Capital Partners III	8,640,335	0.27		14.80	84.58	50.71	--	--
Newquest Fund	7,898,226	0.25		-3.81	32.99	13.86	-2.22	--
Nexus	5,771,977	0.18		-7.08	45.22	49.58	--	--
Nexus Special Sits III	3,020,636	0.09		-4.70	-14.37	--	--	--
Opengate Capital II	8,964,481	0.28		6.82	53.74	--	--	--
Opengate Capital Partners	9,778,817	0.30		-2.01	22.09	13.31	21.26	--
Pfingsten Fund V	10,346,493	0.32		16.39	40.57	16.66	6.26	--
Shore Capital Partners GP I LP	19,706,615	0.61		-0.03	37.45	37.29	43.47	--
Shoreline China Valu III	2,139,641	0.07		-7.63	4.79	1.47	3.98	--
<b>Rates and Credit Beta</b>	<b>834,027,629</b>	<b>25.87</b>	<b>30.00</b>	<b>2.33</b>	<b>10.28</b>	<b>8.80</b>	<b>--</b>	<b>--</b>
<b>Traditional Fixed Income</b>	<b>493,766,701</b>	<b>15.32</b>	<b>22.50</b>	<b>0.54</b>	<b>0.35</b>	<b>6.80</b>	<b>5.33</b>	<b>6.08</b>
<i>Fixed Income Custom Benchmark</i>				0.18	-1.75	5.50	3.99	3.38
<b>Core Fixed Income</b>	<b>312,418,209</b>	<b>9.69</b>	<b>10.00</b>	<b>-0.15</b>	<b>1.57</b>	<b>4.21</b>	<b>3.64</b>	<b>3.73</b>
<i>Bloomberg US Govt/Credit TR</i>				0.18	-1.75	5.50	3.99	3.13
Aberdeen	294,893	0.01		0.18	5.86	5.46	5.99	6.03
<i>Bloomberg US Aggregate TR</i>				0.01	-1.54	4.79	3.57	2.90
Internal Fixed - Core	266,161,129	8.26		-0.21	0.84	3.91	3.22	3.12
<i>Bloomberg US Govt/Credit TR</i>				0.18	-1.75	5.50	3.99	3.13
Octagon Senior Debt	29,327,158	0.91		0.39	4.28	4.42	3.26	--
<i>Bloomberg US Aggregate TR</i>				0.01	-1.54	4.79	3.57	2.90
Principal CMBS Fixed	16,635,029	0.52		0.40	3.85	4.28	4.35	--
<i>Bloomberg US CMBS Investment Grade</i>				-0.65	-0.90	4.91	3.84	3.78

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.



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## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
<b>Long Duration</b>	<b>156,261,237</b>	<b>4.85</b>	<b>7.50</b>	<b>1.32</b>	<b>-1.78</b>	<b>8.11</b>	<b>6.56</b>	<b>5.58</b>
<i>Bloomberg US Govt Long TR</i>				3.05	-4.57	8.78	6.53	4.53
Internal Fixed - Long Duration	156,261,237	4.85		1.32	-1.78	8.11	6.56	5.60
<i>Bloomberg US Aggregate TR</i>				0.01	-1.54	4.79	3.57	2.90
<b>US TIPS</b>	<b>25,087,254</b>	<b>0.78</b>	<b>5.00</b>	<b>3.85</b>	<b>6.49</b>	<b>8.93</b>	<b>5.69</b>	<b>3.47</b>
<i>Bloomberg US TIPS TR</i>				2.36	5.96	8.44	5.34	3.09
Internal US TIPS	25,087,254	0.78		3.85	6.49	8.93	5.69	3.47
<i>Bloomberg US TIPS TR</i>				2.36	5.96	8.44	5.34	3.09
<b>Opportunistic Debt</b>	<b>340,260,929</b>	<b>10.56</b>	<b>7.50</b>	<b>4.98</b>	<b>26.46</b>	<b>11.49</b>	<b>11.04</b>	<b>--</b>
<i>Bloomberg US High Yield TR</i>				0.71	5.28	8.83	6.30	6.83
<b>Direct Lending</b>	<b>157,000,427</b>	<b>4.87</b>	<b>--</b>	<b>3.43</b>	<b>19.63</b>	<b>9.20</b>	<b>--</b>	<b>--</b>
<b>Core Direct Lending</b>	<b>82,441,763</b>	<b>2.56</b>	<b>--</b>	<b>3.66</b>	<b>22.70</b>	<b>12.45</b>	<b>--</b>	<b>--</b>
Ares BDC	42,229,827	1.31		2.48	30.04	--	--	--
Internal Fixed - Nonrated	14,658,010	0.45		1.44	13.05	8.36	7.49	--
<i>Bloomberg US High Yield TR</i>				0.71	5.28	8.83	6.30	6.83
M&G III	1,005,373	0.03		1.68	5.05	6.97	8.16	--
MGG	12,977,662	0.40		3.96	13.88	10.67	--	--
Owl Rock	11,570,892	0.36		9.73	23.00	12.35	11.23	--
<b>Opportunistic Direct Lending</b>	<b>74,558,664</b>	<b>2.31</b>	<b>--</b>	<b>3.15</b>	<b>16.79</b>	<b>6.24</b>	<b>--</b>	<b>--</b>
GSO Energy II	2,268,528	0.07		10.18	35.83	--	--	--
GSO Energy Select Opps	3,793,693	0.12		5.85	40.70	5.95	7.95	--
GSO I	211,756	0.01		-4.07	12.62	-12.12	-15.13	-1.54
GSO II	1,717,148	0.05		4.38	26.12	2.99	5.52	9.96
GSO III	9,185,454	0.28		-0.08	17.20	10.05	10.18	--
Northern Shipping II	1,448,423	0.04		6.04	27.24	6.85	7.93	--
Northern Shipping III	3,388,731	0.11		2.59	9.73	8.77	7.45	--
OCP Asia	27,535,388	0.85		0.11	9.85	6.59	9.62	--
OCP Asia IV	5,941,683	0.18		0.00	--	--	--	--
Riverstone Credit Partners	8,331,839	0.26		6.76	19.98	-0.31	5.40	--
Riverstone Credit Partners II	10,736,021	0.33		10.68	24.32	6.93	--	--
<b>Distressed /Special Sits</b>	<b>143,009,525</b>	<b>4.44</b>	<b>--</b>	<b>7.06</b>	<b>34.13</b>	<b>15.53</b>	<b>--</b>	<b>--</b>
Anchorage Capital III	822,378	0.03		35.14	44.15	-6.57	0.80	--
Anchorage Illiquid Opps V	18,654,996	0.58		15.41	77.13	26.68	18.51	--
Banner Ridge III	25,068,063	0.78		8.08	63.25	--	--	--
Banner Ridge IV	9,497,125	0.29		8.14	--	--	--	--



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## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
CVI Credit Value	64,918	0.00		-0.95	-1.71	5.98	7.62	15.97
CVI Credit Value Fund III	4,273,831	0.13		2.03	7.64	5.13	6.20	--
CVI Global Value	12,142	0.00		-4.27	21.85	10.68	8.07	9.89
Fortress Credit Opps. Fund	6,927,555	0.21		4.57	13.12	--	--	--
FP Credit Partners	9,890,283	0.31		5.46	21.67	--	--	--
Longford II	10,495,543	0.33		5.14	9.66	10.47	--	--
Longford III	2,784,359	0.09		9.25	-5.36	--	--	--
Miravast ILS Credit Opp	17,124,487	0.53		2.07	6.56	12.17	--	--
Silver Point Distressed	21,433,641	0.66		6.35	59.38	--	--	--
Varde Asia Credit Fund	15,960,204	0.50		3.60	9.91	7.19	--	--
<b>Liquid Credit</b>	<b>40,250,976</b>	<b>1.25</b>	<b>--</b>	<b>4.41</b>	<b>30.37</b>	<b>10.54</b>	<b>--</b>	<b>--</b>
ABRY ASF	60,505	0.00		-25.85	-32.34	-15.62	-14.39	4.66
Anchorage Structured Credit	21,841,149	0.68		4.22	34.76	--	--	--
GSO Credit Alpha Fund	7,401,779	0.23		8.68	22.63	6.40	6.59	--
Och-Ziff Struct Products II	261,743	0.01		6.86	17.55	9.86	14.47	--
Octagon Opportunistic	10,685,800	0.33		2.25	32.21	12.54	9.45	--
<b>Real Assets Beta</b>	<b>631,737,008</b>	<b>19.60</b>	<b>20.00</b>	<b>4.63</b>	<b>22.05</b>	<b>6.78</b>	<b>--</b>	<b>--</b>
<b>Real Assets</b>	<b>378,319,396</b>	<b>11.74</b>	<b>10.00</b>	<b>3.24</b>	<b>20.91</b>	<b>3.23</b>	<b>5.70</b>	<b>--</b>
<i>CPI + 4% (Unadjusted)</i>				2.63	11.29	7.81	7.12	6.26
<b>Natural Resources</b>	<b>215,058,333</b>	<b>6.67</b>	<b>--</b>	<b>3.99</b>	<b>25.72</b>	<b>1.51</b>	<b>6.35</b>	<b>--</b>
Ares Energy	9,574,757	0.30		-3.77	13.39	-14.23	--	--
Blue Road	15,916,455	0.49		3.76	16.49	12.35	13.01	--
EMG I	5,169,335	0.16		0.03	42.82	8.37	3.08	--
EMG II	10,620,666	0.33		1.28	18.68	5.61	8.68	--
EMG III	12,919,419	0.40		6.53	7.30	-16.62	-5.89	--
EMG IV	22,070,557	0.68		7.08	18.14	-1.19	9.68	--
EMG V	14,449,109	0.45		3.24	41.38	--	--	--
Grey Rock Energy Fund II	9,896,080	0.31		6.36	38.66	7.11	7.63	--
Grey Rock Energy Fund III	25,591,657	0.79		22.69	75.67	22.41	--	--
NGP IX	1	0.00		-20.91	31.82	9.48	33.68	--
NGP X	1,162,662	0.04		8.05	-2.32	-29.07	-15.38	--
NGP XI	11,160,680	0.35		6.86	28.18	-5.86	3.30	--



# MPERS

## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
Orion II	16,213,592	0.50		-3.19	-0.22	19.68	--	--
Orion III	7,344,193	0.23		-6.13	-1.47	--	--	--
Orion Mine Finance Fund I	7,037,227	0.22		1.42	13.86	-1.29	3.62	--
Orion Mineral Royalty	1,975,065	0.06		-18.81	-1.60	--	--	--
Quantum VII	12,908,641	0.40		-9.12	88.19	15.64	--	--
Ridgewood Energy	7,938,755	0.25		0.21	36.11	-8.88	2.00	--
Ridgewood III	9,433,118	0.29		2.29	12.92	4.13	9.55	--
Ridgewood IV	6,848,564	0.21		33.84	41.41	--	--	--
Turnbridge Capital Partners I	6,827,800	0.21		-1.32	-0.76	-15.33	-6.66	--
<b>Infrastructure &amp; Transport</b>	<b>73,518,087</b>	<b>2.28</b>	<b>--</b>	<b>4.48</b>	<b>13.16</b>	<b>7.44</b>	<b>8.35</b>	<b>--</b>
American Infrastructure I MLP	5,397,108	0.17		-1.56	-3.26	3.30	5.40	--
American Infrastructure II MLP	1,143,850	0.04		33.69	62.81	32.14	23.14	--
Apollo Aviation III	1,842,439	0.06		-2.97	-5.76	10.03	16.27	--
CBRE Caledon's Global	21,183,346	0.66		6.44	8.71	--	--	--
CIM INFRA FUND II	19,190,794	0.60		0.49	16.35	11.57	--	--
Columbia Spectrum IV-A	0	0.00		--	--	--	--	--
Corrum Capital Aviation	17,784,513	0.55		0.55	-5.24	0.04	--	--
EIF - US Power III	1,572,072	0.05		14.46	80.33	4.92	0.41	--
Sciens Marine Investments	5,403,965	0.17		24.86	136.69	7.09	19.02	--
<b>Timber</b>	<b>89,742,976</b>	<b>2.78</b>	<b>--</b>	<b>0.54</b>	<b>13.69</b>	<b>4.23</b>	<b>2.63</b>	<b>--</b>
MP Timber	35,134,179	1.09		1.94	14.62	5.01	3.87	--
<i>NCREIF Timberland 1 Qtr. Lag</i>				1.89	5.02	2.41	2.90	4.90
MPATC	26,819,640	0.83		-0.91	-2.73	-3.40	--	--
<i>NCREIF Timberland 1 Qtr. Lag</i>				1.89	5.02	2.41	2.90	4.90
MPCTT	1,353,126	0.04		4.89	47.44	50.78	--	--
<i>NCREIF Timberland 1 Qtr. Lag</i>				1.89	5.02	2.41	2.90	4.90
MPMCB	25,552,799	0.79		0.00	31.26	9.99	--	--
<i>NCREIF Timberland 1 Qtr. Lag</i>				1.89	5.02	2.41	2.90	4.90
Russellville Land Timber	883,232	0.03		-0.16	-1.53	-1.19	--	--



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## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
<b>Real Estate</b>	<b>253,417,612</b>	<b>7.86</b>	<b>10.00</b>	<b>7.20</b>	<b>24.31</b>	<b>12.04</b>	<b>11.41</b>	<b>12.36</b>
<i>MODOT Real Estate Blend</i>				7.38	21.88	8.90	8.18	9.70
<b>REITS</b>	<b>11,423,344</b>	<b>0.35</b>	<b>--</b>	<b>13.63</b>	<b>35.00</b>	<b>16.28</b>	<b>9.89</b>	<b>8.39</b>
CBRE Investors	11,423,344	0.35		13.63	35.00	16.28	9.89	8.39
<i>FTSE NAREIT Developed TR USD</i>				10.16	26.09	11.82	7.81	8.64
<b>Core</b>	<b>66,449,799</b>	<b>2.06</b>	<b>--</b>	<b>13.70</b>	<b>25.65</b>	<b>10.73</b>	<b>10.32</b>	<b>12.69</b>
Principal CMBS	1,075,897	0.03		-0.78	-1.07	8.22	10.26	16.02
Principal Enhanced Property	64,459,409	2.00		14.08	26.03	10.69	11.00	13.09
Principal U.S. Property Fund	914,493	0.03		10.02	22.54	9.59	9.00	10.52
<b>Non-Core</b>	<b>175,544,470</b>	<b>5.45</b>	<b>--</b>	<b>4.61</b>	<b>24.10</b>	<b>13.12</b>	<b>13.36</b>	<b>12.11</b>
<b>Value-Add</b>	<b>137,304,431</b>	<b>4.26</b>	<b>--</b>	<b>5.47</b>	<b>26.58</b>	<b>13.45</b>	<b>13.97</b>	<b>12.51</b>
Centersquare III	5,070,457	0.16		13.52	53.49	26.59	21.51	--
Centersquare IV	39,428,807	1.22		3.59	24.08	8.01	--	--
Centersquare V	23,007,817	0.71		4.81	--	--	--	--
M&G II	520,361	0.02		2.71	26.62	15.76	14.49	--
New Mountain	12,088,221	0.38		3.91	25.24	20.47	--	--
Oak Street IV	9,726,431	0.30		1.89	51.03	20.45	--	--
Och Ziff RE Credit FD LP	8,695,105	0.27		2.32	18.21	11.07	10.79	--
Torchlight Debt Opp II	58,319	0.00		0.00	-1.80	164.62	93.28	--
Torchlight Debt Opp III	35,616	0.00		0.00	-1.83	-8.44	-4.27	--
Torchlight Debt Opps V	2,763,103	0.09		4.27	14.32	6.47	9.99	--
Tristan EPISO	360,160	0.01		-5.34	-21.04	-25.02	-17.25	-4.67
Tristan EPISO 3	3,853,604	0.12		-1.91	4.76	-8.28	8.53	--
Tristan EPISO 4	15,487,692	0.48		1.00	12.36	11.33	10.38	--
Tristan EPISO 5	16,208,738	0.50		10.35	11.45	--	--	--



# MPERS

## TOTAL FUND PERFORMANCE DETAIL

	Market Value (\$)	% of Portfolio	Policy %	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	10 Yrs (%)
<b>Opportunistic</b>	<b>38,240,039</b>	<b>1.19</b>	<b>--</b>	<b>-0.35</b>	<b>9.00</b>	<b>13.56</b>	<b>12.91</b>	<b>11.93</b>
AEW Partners V	1	0.00						
Apollo European III	112,112	0.00		17.79	17.18	-1.30	-18.01	-8.50
Apollo Real Estate	17,646	0.00		0.00	0.38	39.01	27.04	21.13
Clarion Part Lion Mexico Fund	816,133	0.03		-1.74	-12.81	-14.51	-16.48	-13.54
Colony Capital VIII	12,561	0.00		0.00	10.97	-8.32	-3.46	1.04
Och-Ziff RE III	2,447,630	0.08		3.64	23.17	15.22	19.91	--
Sculptor IV	4,967,817	0.15		5.60	21.79	--	--	--
Stockdale I-A	24,881,695	0.77		-2.66	7.16	--	--	--
MPERS - BR CO-INVEST	4,984,444	0.15		--	--	--	--	--
<b>Cash Composite</b>	<b>130,711,203</b>	<b>4.05</b>	<b>0.00</b>	<b>0.00</b>	<b>0.03</b>	<b>0.89</b>	<b>1.03</b>	<b>0.57</b>
Cash Account	130,711,203	4.05		0.01	0.04	0.89	1.03	0.58
<i>91 Day T-Bills</i>				<i>0.01</i>	<i>0.03</i>	<i>0.85</i>	<i>1.08</i>	<i>0.59</i>





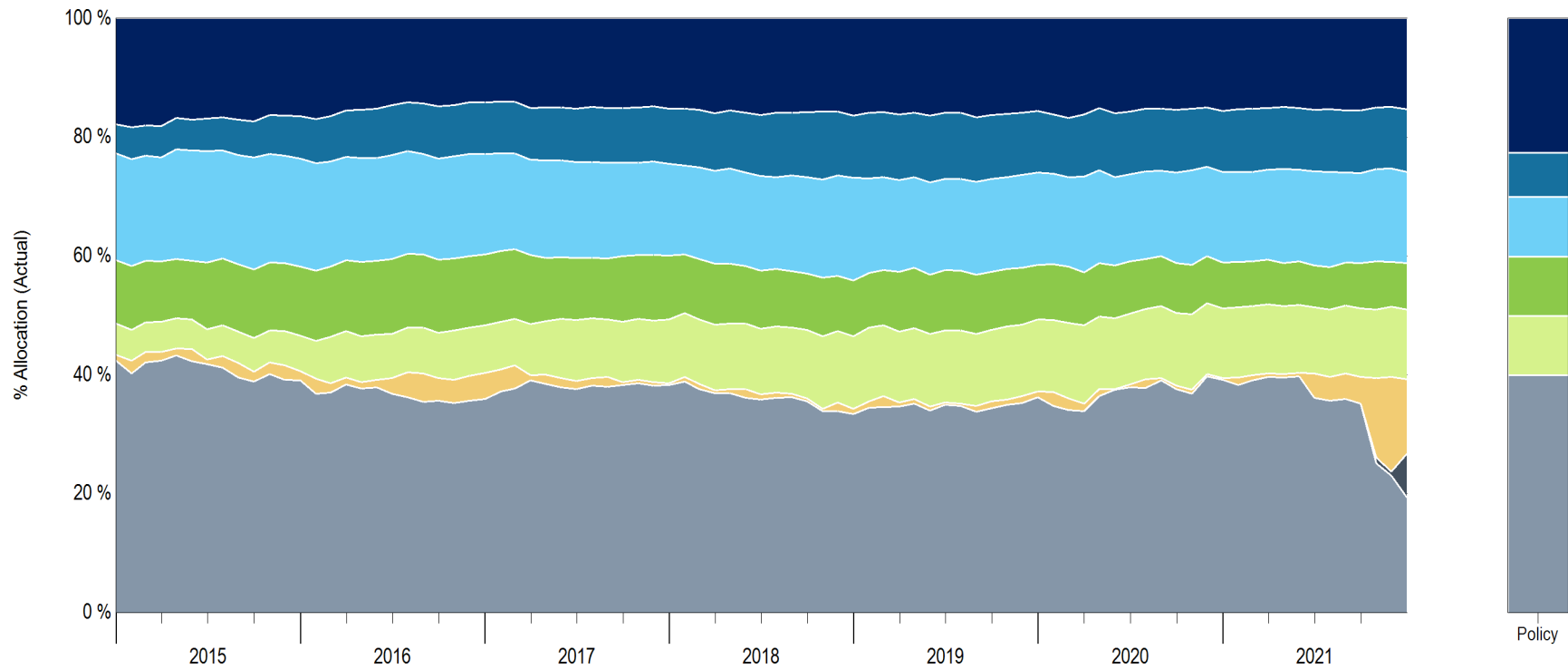
# APPENDIX



PROPRIETARY & CONFIDENTIAL

# MPERS TOTAL FUND ASSET ALLOCATION HISTORY

Asset Allocation History



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

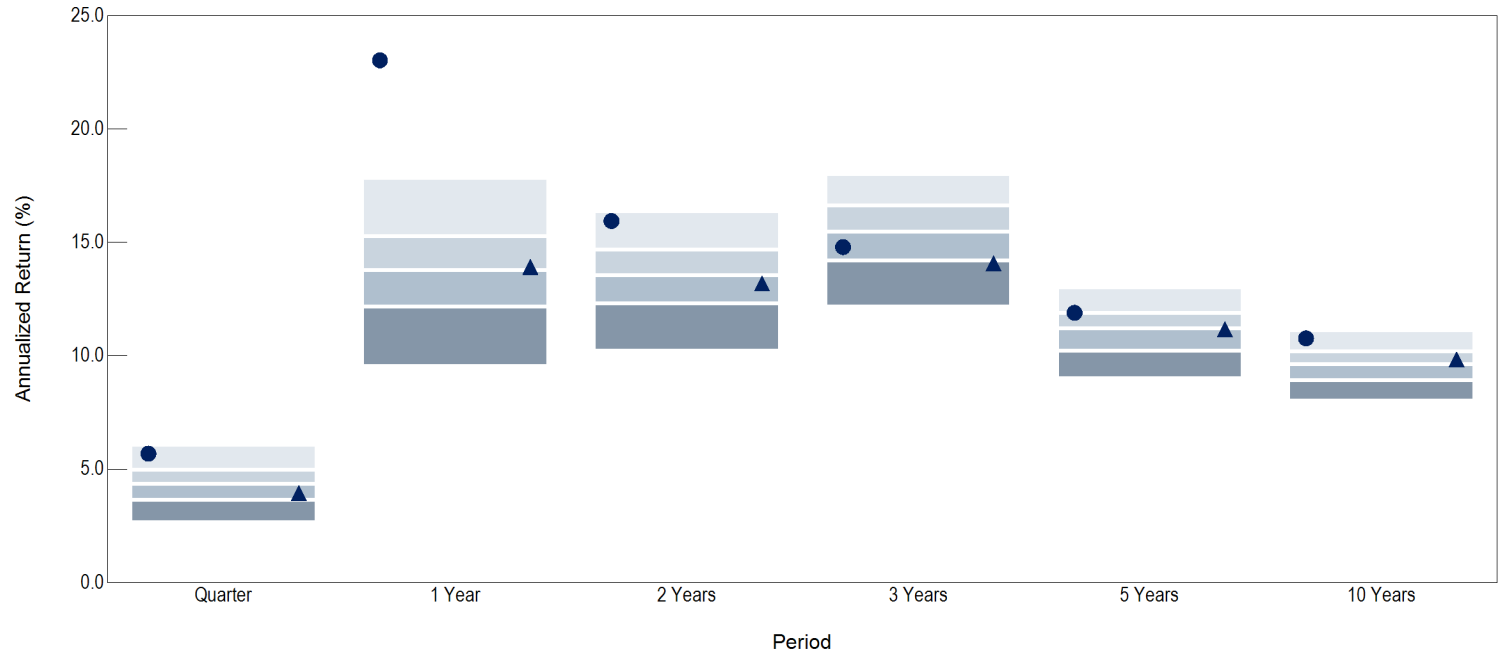




# MPERS

## TOTAL FUND RETURN SUMMARY VS. PEER UNIVERSE

Total Composite vs. InvMetrics Public DB Net



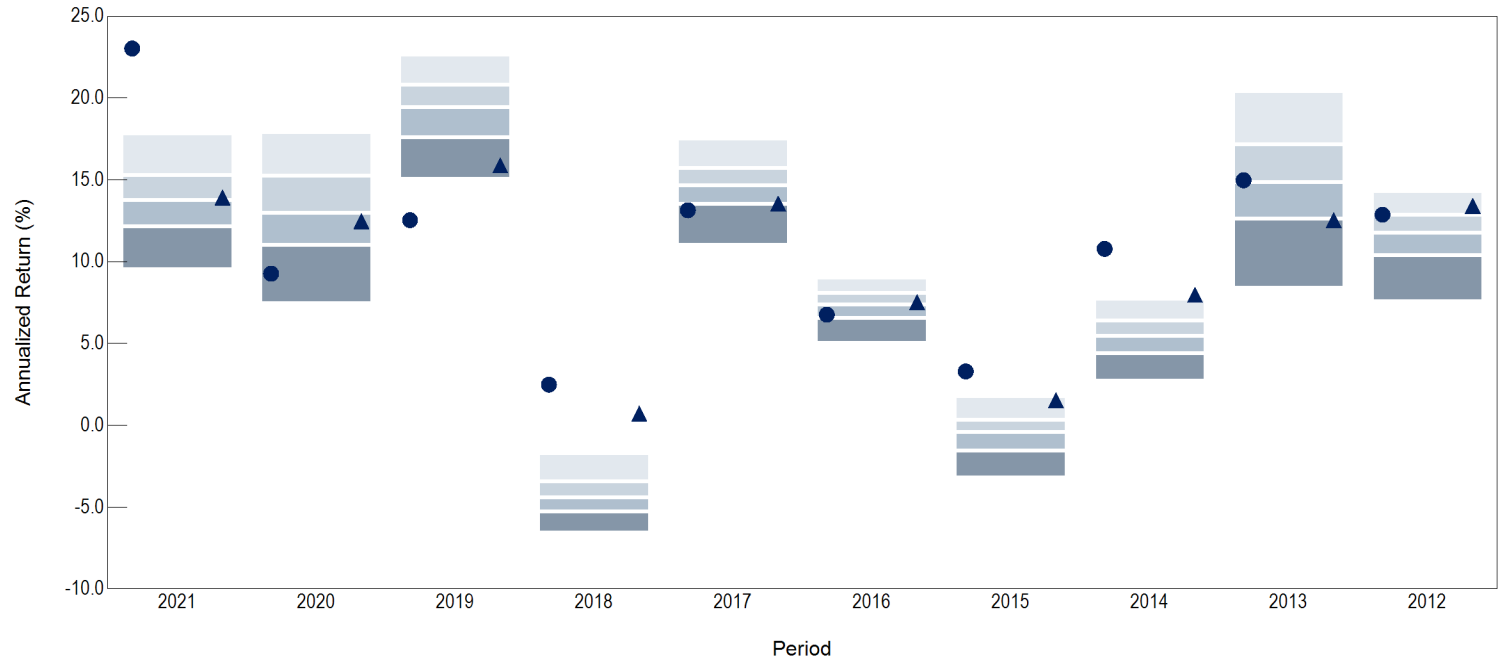
	Quarter		1 Year		2 Years		3 Years		5 Years		10 Years	
<b>Return (Rank)</b>												
5th Percentile	6.1		17.8		16.4		18.0		13.0		11.1	
25th Percentile	5.0		15.3		14.7		16.6		11.9		10.2	
Median	4.4		13.8		13.6		15.5		11.2		9.6	
75th Percentile	3.7		12.2		12.3		14.2		10.2		8.9	
95th Percentile	2.7		9.6		10.2		12.2		9.0		8.0	
# of Portfolios	565		559		554		546		526		442	
● Total Composite	5.7	(10)	23.0	(1)	15.9	(8)	14.8	(66)	11.9	(26)	10.8	(12)
▲ Policy Index	4.0	(67)	13.9	(47)	13.2	(59)	14.1	(77)	11.2	(53)	9.8	(41)



# MPERS

## TOTAL FUND RETURN SUMMARY VS. PEER UNIVERSE

Total Composite vs. InvMetrics Public DB Net



	Return (Rank)									
	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
5th Percentile	17.8	17.9	22.6	-1.7	17.5	9.0	1.7	7.7	20.4	14.3
25th Percentile	15.3	15.3	20.8	-3.4	15.8	8.1	0.4	6.4	17.2	12.9
Median	13.8	13.0	19.5	-4.4	14.7	7.4	-0.4	5.5	14.9	11.8
75th Percentile	12.2	11.0	17.6	-5.2	13.6	6.6	-1.5	4.4	12.7	10.4
95th Percentile	9.6	7.5	15.1	-6.5	11.1	5.0	-3.2	2.7	8.4	7.6
# of Portfolios	559	596	550	496	269	269	262	210	191	159
● Total Composite	23.0 (1)	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)
▲ Policy Index	13.9 (47)	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)

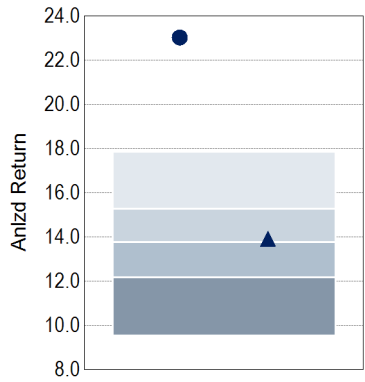


# MPERS

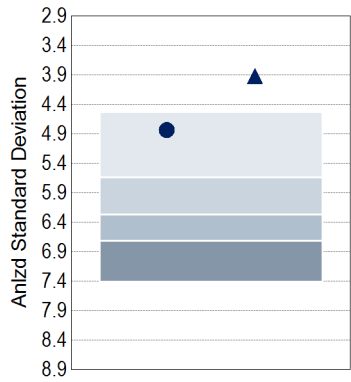
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

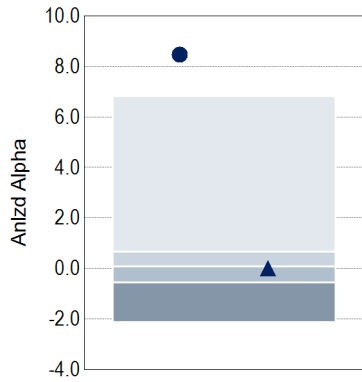
Anlzd Return



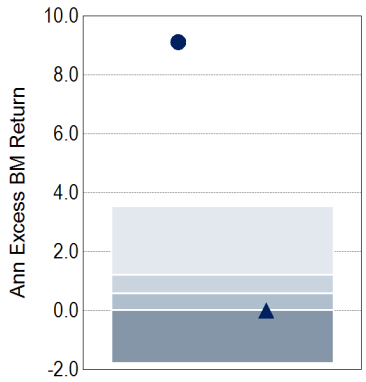
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	23.02
Rank	1
▲ Policy Index	
Value	13.91
Rank	47
Universe	
5th %tile	17.83
25th %tile	15.29
Median	13.79
75th %tile	12.19
95th %tile	9.56

● Total Composite	
Value	4.84
Rank	9
▲ Policy Index	
Value	3.92
Rank	2
Universe	
5th %tile	4.53
25th %tile	5.64
Median	6.26
75th %tile	6.71
95th %tile	7.40

● Total Composite	
Value	8.46
Rank	4
▲ Policy Index	
Value	0.00
Rank	55
Universe	
5th %tile	6.83
25th %tile	0.69
Median	0.11
75th %tile	-0.54
95th %tile	-2.10

● Total Composite	
Value	9.11
Rank	1
▲ Policy Index	
Value	0.00
Rank	77
Universe	
5th %tile	3.54
25th %tile	1.23
Median	0.61
75th %tile	0.04
95th %tile	-1.76

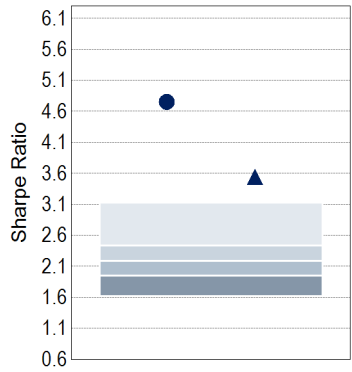


# MPERS

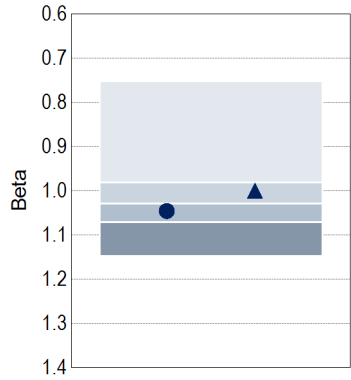
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

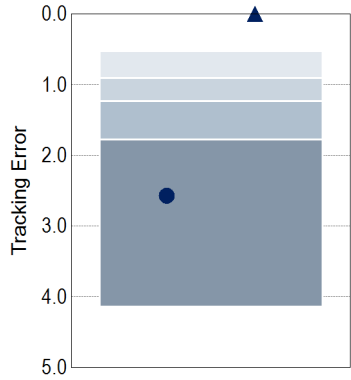
### Sharpe Ratio



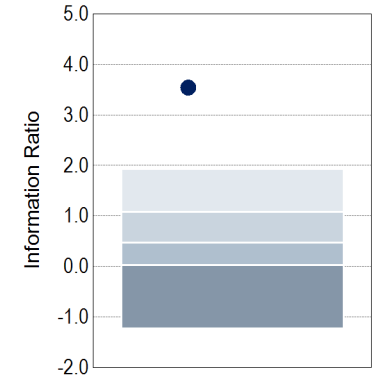
### Beta



### Tracking Error



### Information Ratio



● Total Composite	
Value	4.75
Rank	1
▲ Policy Index	
Value	3.54
Rank	3
Universe	
5th %tile	3.12
25th %tile	2.45
Median	2.20
75th %tile	1.96
95th %tile	1.63

● Total Composite	
Value	1.05
Rank	58
▲ Policy Index	
Value	1.00
Rank	31
Universe	
5th %tile	0.75
25th %tile	0.98
Median	1.03
75th %tile	1.07
95th %tile	1.15

● Total Composite	
Value	2.57
Rank	87
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.52
25th %tile	0.90
Median	1.23
75th %tile	1.77
95th %tile	4.14

● Total Composite	
Value	3.54
Rank	1
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	1.93
25th %tile	1.09
Median	0.48
75th %tile	0.03
95th %tile	-1.22

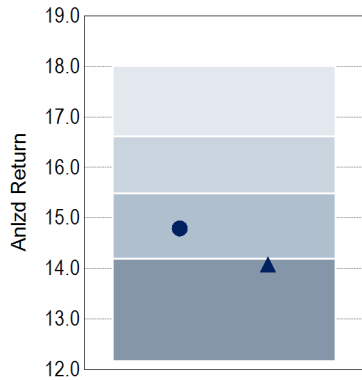


# MPERS

## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

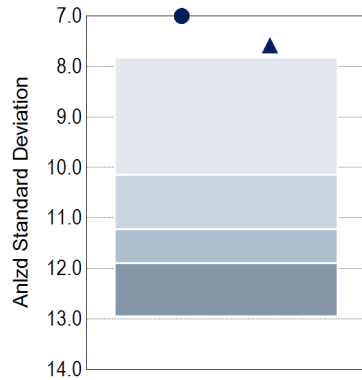
**Total Composite vs. IFx Public DB Net + (USD)**  
3 Years

**Anlzd Return**



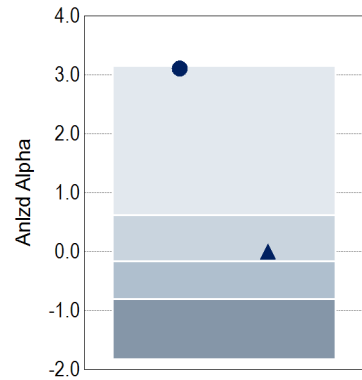
● Total Composite	
Value	14.79
Rank	66
▲ Policy Index	
Value	14.08
Rank	77
Universe	
5th %tile	18.00
25th %tile	16.63
Median	15.50
75th %tile	14.21
95th %tile	12.17

**Anlzd Standard Deviation**



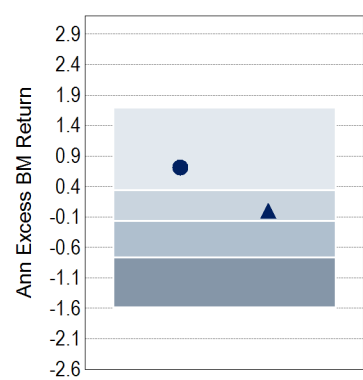
● Total Composite	
Value	7.00
Rank	3
▲ Policy Index	
Value	7.58
Rank	4
Universe	
5th %tile	7.83
25th %tile	10.14
Median	11.21
75th %tile	11.88
95th %tile	12.94

**Anlzd Alpha**



● Total Composite	
Value	3.11
Rank	6
▲ Policy Index	
Value	0.00
Rank	43
Universe	
5th %tile	3.15
25th %tile	0.63
Median	-0.16
75th %tile	-0.80
95th %tile	-1.82

**Ann Excess BM Return**



● Total Composite	
Value	0.71
Rank	16
▲ Policy Index	
Value	0.00
Rank	41
Universe	
5th %tile	1.70
25th %tile	0.35
Median	-0.16
75th %tile	-0.76
95th %tile	-1.58

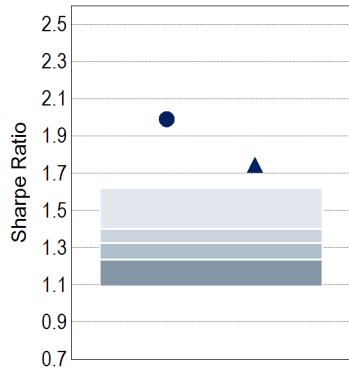


# MPERS

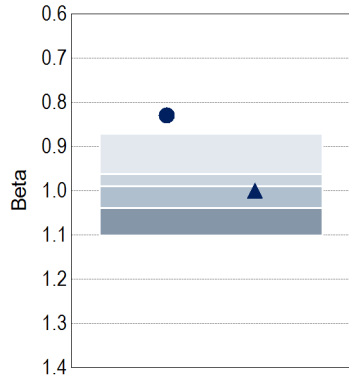
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

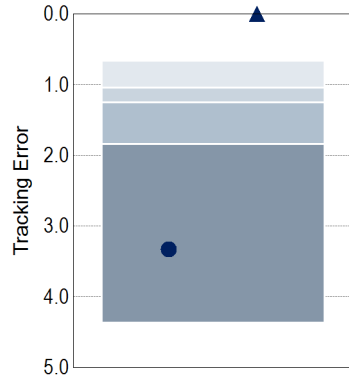
Sharpe Ratio



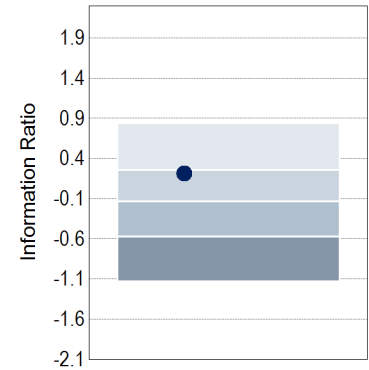
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.99
Rank	1
▲ Policy Index	
Value	1.74
Rank	4
Universe	
5th %tile	1.62
25th %tile	1.40
Median	1.33
75th %tile	1.24
95th %tile	1.10

● Total Composite	
Value	0.83
Rank	4
▲ Policy Index	
Value	1.00
Rank	55
Universe	
5th %tile	0.87
25th %tile	0.96
Median	0.99
75th %tile	1.04
95th %tile	1.10

● Total Composite	
Value	3.33
Rank	93
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.67
25th %tile	1.03
Median	1.24
75th %tile	1.83
95th %tile	4.36

● Total Composite	
Value	0.21
Rank	28
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.84
25th %tile	0.27
Median	-0.13
75th %tile	-0.56
95th %tile	-1.12

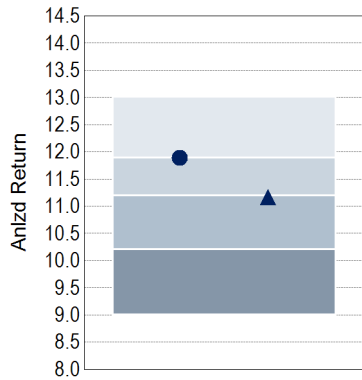


# MPERS

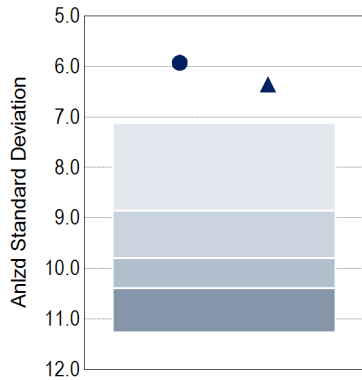
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

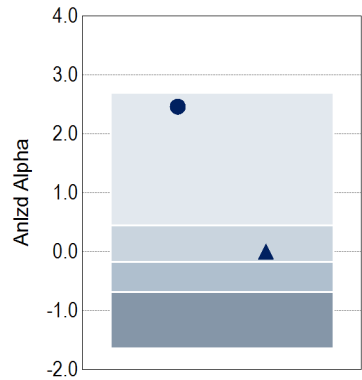
Anlzd Return



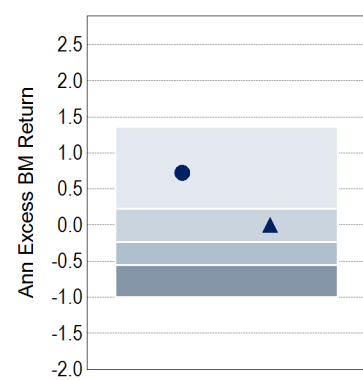
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	11.89
Rank	26
▲ Policy Index	
Value	11.17
Rank	53
Universe	
5th %tile	13.01
25th %tile	11.91
Median	11.22
75th %tile	10.23
95th %tile	9.02

● Total Composite	
Value	5.93
Rank	2
▲ Policy Index	
Value	6.36
Rank	2
Universe	
5th %tile	7.12
25th %tile	8.84
Median	9.78
75th %tile	10.38
95th %tile	11.26

● Total Composite	
Value	2.46
Rank	6
▲ Policy Index	
Value	0.00
Rank	42
Universe	
5th %tile	2.70
25th %tile	0.45
Median	-0.16
75th %tile	-0.68
95th %tile	-1.63

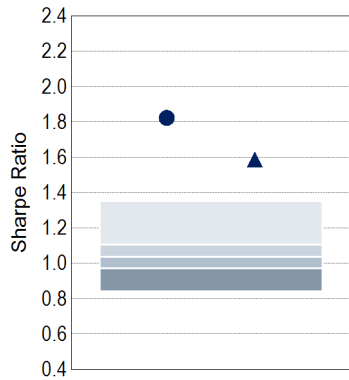
● Total Composite	
Value	0.72
Rank	15
▲ Policy Index	
Value	0.00
Rank	38
Universe	
5th %tile	1.36
25th %tile	0.24
Median	-0.23
75th %tile	-0.55
95th %tile	-0.99



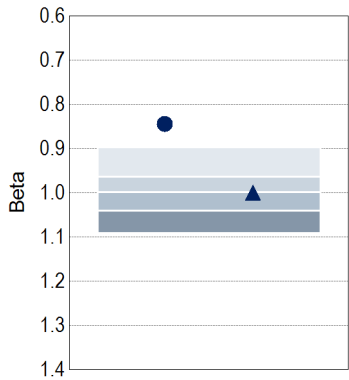
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

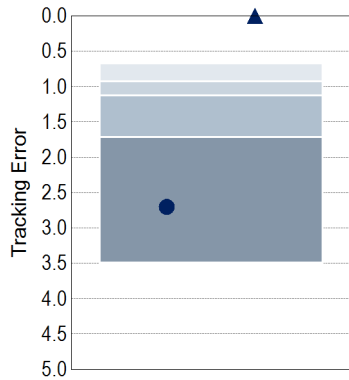
Sharpe Ratio



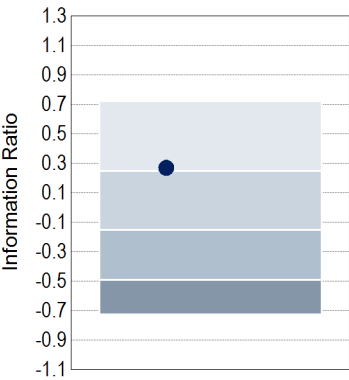
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.82
Rank	1
▲ Policy Index	
Value	1.59
Rank	1
Universe	
5th %tile	1.35
25th %tile	1.11
Median	1.04
75th %tile	0.97
95th %tile	0.85

● Total Composite	
Value	0.84
Rank	4
▲ Policy Index	
Value	1.00
Rank	52
Universe	
5th %tile	0.90
25th %tile	0.96
Median	1.00
75th %tile	1.04
95th %tile	1.09

● Total Composite	
Value	2.70
Rank	93
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.67
25th %tile	0.91
Median	1.12
75th %tile	1.71
95th %tile	3.48

● Total Composite	
Value	0.27
Rank	23
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.72
25th %tile	0.25
Median	-0.15
75th %tile	-0.49
95th %tile	-0.72



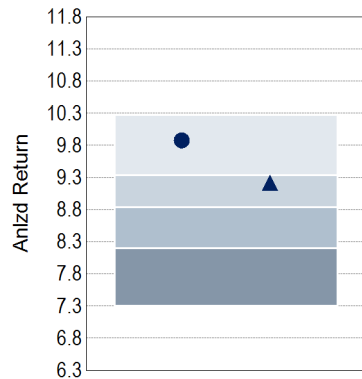


# MPERS

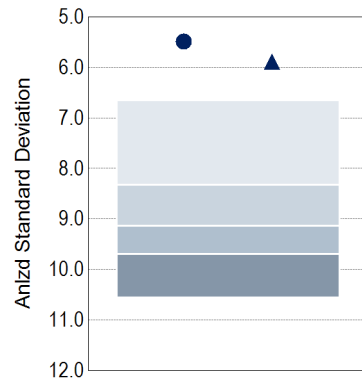
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

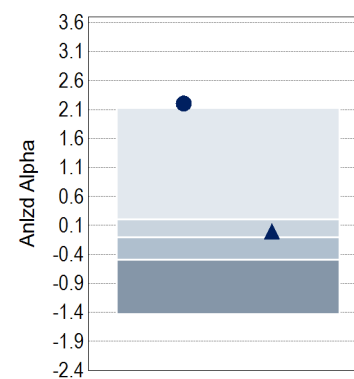
Anlzd Return



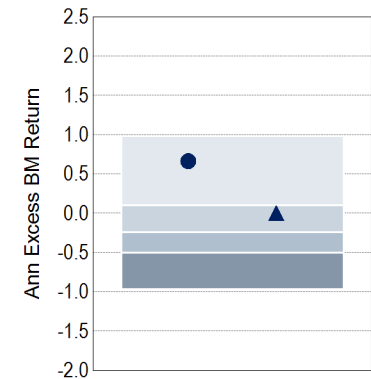
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	9.88
Rank	12
▲ Policy Index	
Value	9.22
Rank	32
Universe	
5th %tile	10.28
25th %tile	9.35
Median	8.84
75th %tile	8.21
95th %tile	7.31

● Total Composite	
Value	5.49
Rank	2
▲ Policy Index	
Value	5.89
Rank	2
Universe	
5th %tile	6.66
25th %tile	8.32
Median	9.13
75th %tile	9.69
95th %tile	10.54

● Total Composite	
Value	2.20
Rank	5
▲ Policy Index	
Value	0.00
Rank	40
Universe	
5th %tile	2.12
25th %tile	0.21
Median	-0.10
75th %tile	-0.48
95th %tile	-1.42

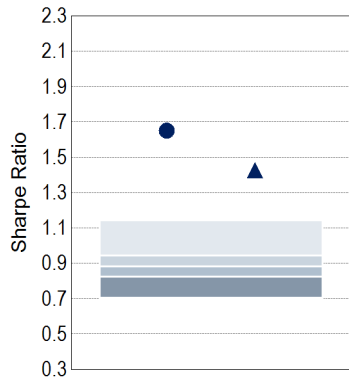
● Total Composite	
Value	0.66
Rank	9
▲ Policy Index	
Value	0.00
Rank	32
Universe	
5th %tile	0.98
25th %tile	0.11
Median	-0.23
75th %tile	-0.50
95th %tile	-0.96



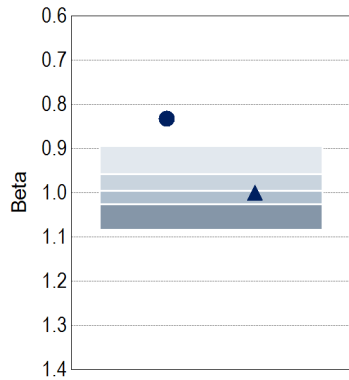
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

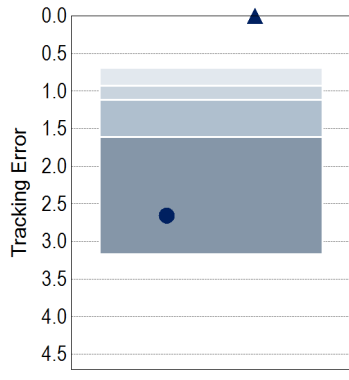
**Sharpe Ratio**



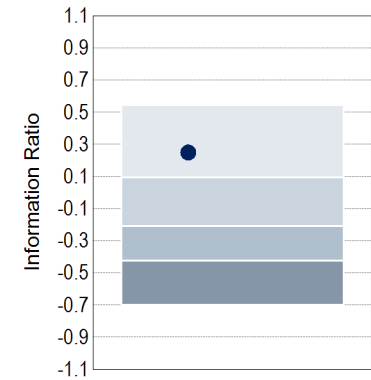
**Beta**



**Tracking Error**



**Information Ratio**



● Total Composite	
Value	1.65
Rank	1
▲ Policy Index	
Value	1.43
Rank	1
Universe	
5th %tile	1.14
25th %tile	0.95
Median	0.88
75th %tile	0.83
95th %tile	0.71

● Total Composite	
Value	0.83
Rank	4
▲ Policy Index	
Value	1.00
Rank	57
Universe	
5th %tile	0.89
25th %tile	0.96
Median	0.99
75th %tile	1.03
95th %tile	1.08

● Total Composite	
Value	2.66
Rank	94
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.69
25th %tile	0.92
Median	1.11
75th %tile	1.60
95th %tile	3.16

● Total Composite	
Value	0.25
Rank	18
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.55
25th %tile	0.10
Median	-0.20
75th %tile	-0.42
95th %tile	-0.69

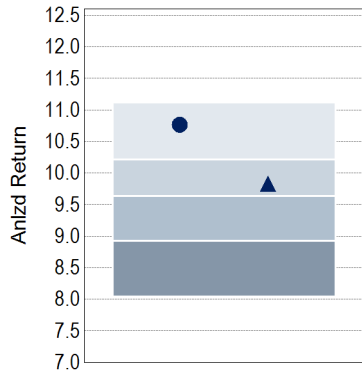


# MPERS

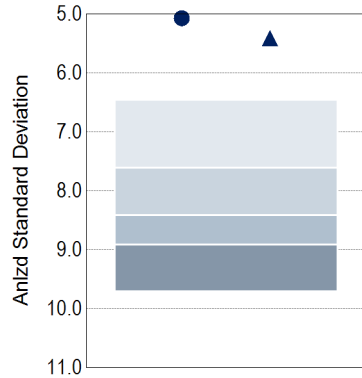
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

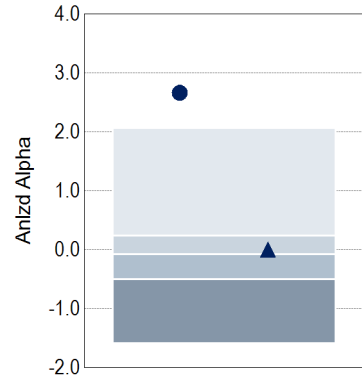
Anlzd Return



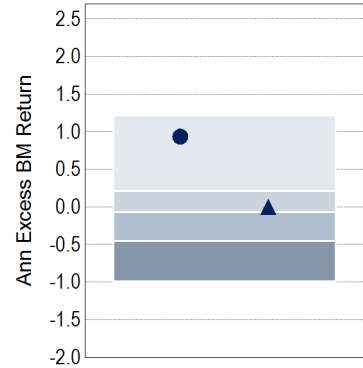
Anlzd Standard Deviation



Anlzd Alpha



Ann Excess BM Return



● Total Composite	
Value	10.76
Rank	12
▲ Policy Index	
Value	9.83
Rank	41
Universe	
5th %tile	11.12
25th %tile	10.22
Median	9.64
75th %tile	8.93
95th %tile	8.05

● Total Composite	
Value	5.07
Rank	1
▲ Policy Index	
Value	5.41
Rank	2
Universe	
5th %tile	6.46
25th %tile	7.60
Median	8.40
75th %tile	8.91
95th %tile	9.70

● Total Composite	
Value	2.66
Rank	4
▲ Policy Index	
Value	0.00
Rank	45
Universe	
5th %tile	2.06
25th %tile	0.24
Median	-0.07
75th %tile	-0.49
95th %tile	-1.59

● Total Composite	
Value	0.93
Rank	7
▲ Policy Index	
Value	0.00
Rank	40
Universe	
5th %tile	1.21
25th %tile	0.22
Median	-0.06
75th %tile	-0.44
95th %tile	-0.98

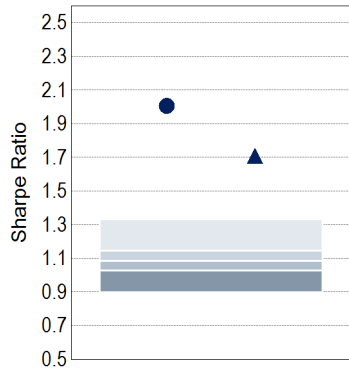


# MPERS

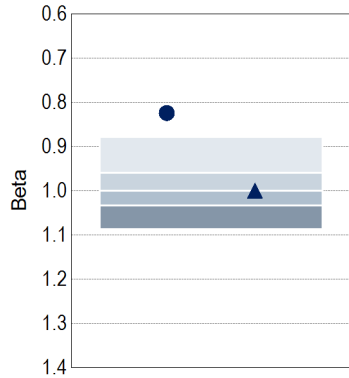
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

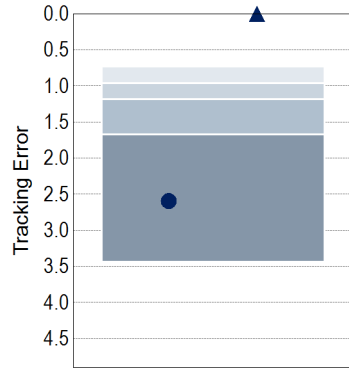
Sharpe Ratio



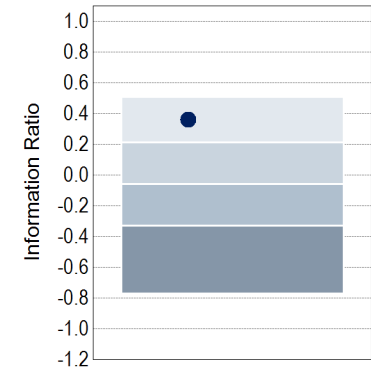
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	2.01
Rank	1
▲ Policy Index	
Value	1.71
Rank	1
Universe	
5th %tile	1.33
25th %tile	1.15
Median	1.09
75th %tile	1.03
95th %tile	0.90

● Total Composite	
Value	0.82
Rank	4
▲ Policy Index	
Value	1.00
Rank	51
Universe	
5th %tile	0.88
25th %tile	0.96
Median	1.00
75th %tile	1.03
95th %tile	1.09

● Total Composite	
Value	2.60
Rank	92
▲ Policy Index	
Value	0.00
Rank	1
Universe	
5th %tile	0.73
25th %tile	0.95
Median	1.17
75th %tile	1.66
95th %tile	3.43

● Total Composite	
Value	0.36
Rank	13
▲ Policy Index	
Value	--
Rank	--
Universe	
5th %tile	0.51
25th %tile	0.22
Median	-0.05
75th %tile	-0.33
95th %tile	-0.77

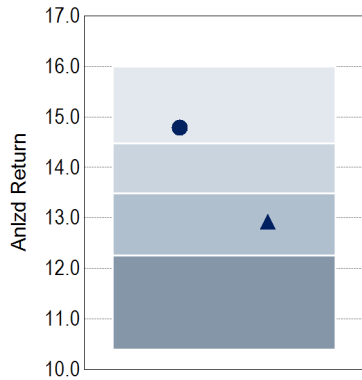


# MPERS

## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

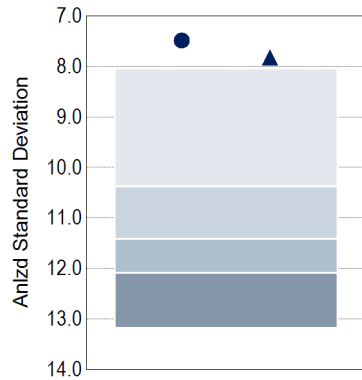
Total Composite vs. IFx Public DB Net + (USD)  
15 Years

**Anlzd Return**



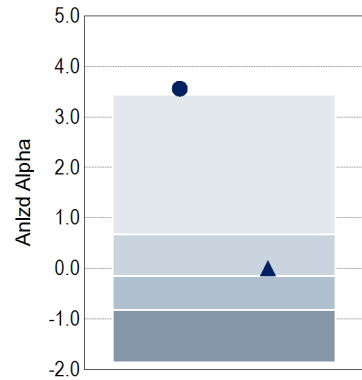
● Total Composite	
Value	14.79
Rank	20
▲ Policy Index	
Value	12.92
Rank	64
Universe	
5th %tile	16.00
25th %tile	14.48
Median	13.50
75th %tile	12.27
95th %tile	10.40

**Anlzd Standard Deviation**



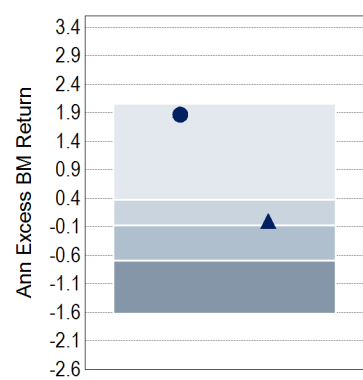
● Total Composite	
Value	7.49
Rank	4
▲ Policy Index	
Value	7.83
Rank	4
Universe	
5th %tile	8.04
25th %tile	10.36
Median	11.41
75th %tile	12.07
95th %tile	13.16

**Anlzd Alpha**



● Total Composite	
Value	3.56
Rank	5
▲ Policy Index	
Value	0.00
Rank	45
Universe	
5th %tile	3.44
25th %tile	0.68
Median	-0.14
75th %tile	-0.81
95th %tile	-1.85

**Ann Excess BM Return**



● Total Composite	
Value	1.87
Rank	7
▲ Policy Index	
Value	0.00
Rank	45
Universe	
5th %tile	2.06
25th %tile	0.39
Median	-0.07
75th %tile	-0.69
95th %tile	-1.62

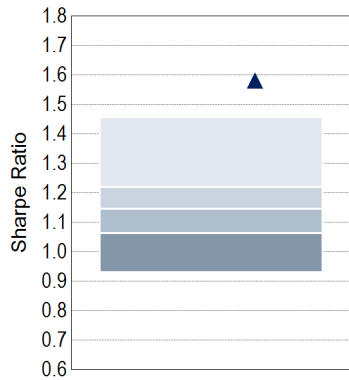


# MPERS

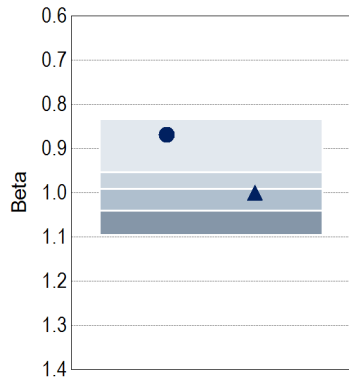
## TOTAL FUND RISK STATISTICS VS. PEER UNIVERSE

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

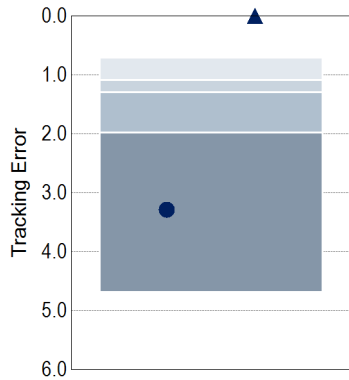
Sharpe Ratio



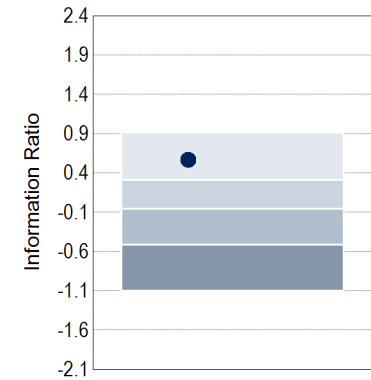
Beta



Tracking Error



Information Ratio



● Total Composite	
Value	1.90
Rank	1
▲ Policy Index	
Value	1.58
Rank	4

● Total Composite	
Value	0.87
Rank	8
▲ Policy Index	
Value	1.00
Rank	55

● Total Composite	
Value	3.29
Rank	90
▲ Policy Index	
Value	0.00
Rank	1

● Total Composite	
Value	0.57
Rank	14
▲ Policy Index	
Value	--
Rank	--

Universe	
5th %tile	1.46
25th %tile	1.22
Median	1.15
75th %tile	1.06
95th %tile	0.93

Universe	
5th %tile	0.83
25th %tile	0.95
Median	0.99
75th %tile	1.04
95th %tile	1.09

Universe	
5th %tile	0.70
25th %tile	1.07
Median	1.29
75th %tile	1.97
95th %tile	4.68

Universe	
5th %tile	0.91
25th %tile	0.32
Median	-0.05
75th %tile	-0.50
95th %tile	-1.09



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