

Wilshire



# Wilshire Advisors

## Executive Summary of Investment Performance

As of March 31, 2023

## IMRF Performance Summary

- IMRF market value as of March 2023 : \$49.49 billion
- IMRF total fund return for 1Q 2023: 4.30% vs the Total Fund Benchmark return of 5.11%
- U.S. equity markets posted strong returns for the quarter on the back of positive inflation and employment data
- IMRF U.S. Equity Portfolio underperformed the benchmark during the quarter, returning 6.09% versus 6.71%
- International equity markets advanced in the first quarter of the year despite increased volatility in the global banking sector
- IMRF International Equity Portfolio outperformed the benchmark during the quarter, returning 7.68% versus 6.87%
- Fixed income markets were largely positive for the quarter as rates fell, and the collapse of SVB and Credit Suisse resulted in a flight-to-quality
- IMRF Fixed Income Portfolio outperformed the benchmark during the quarter, returning 3.24% versus 3.08%
- All asset class allocations remain within the rebalancing range in the Investment Policy

Performance referenced above is Net of Fees.

# Market Commentary

## U.S. Equity

The U.S. stock market was up 7.3% for the first quarter but is down -8.6% for the past 12 months. The best performing sectors were IT (+21.2%) and Communication Services (+19.8%). The worst performing were Financials (-5.2%) and Energy (-4.6%). From a size perspective, large-cap outperformed small-cap by 400 basis points. Growth stocks vastly outperformed value for the quarter but still trail meaningfully for the one-year return.

The yield curve inversion that began during the third quarter of last year worsened during the first quarter of 2023. The spread between the 10-year Treasury and 3-month T-Bill, arguably the strongest predictor of a pending recession, is at a level not seen since the early 1980's. The Federal Reserve's aggressive action has pushed the short-term rate to a spread of 1.37% above the benchmark ten-year. The probability of a recession in the next 12 months, according to the Federal Reserve Bank of New York, currently stands at 62%. The short end of the curve had been rising this quarter until early March when the FDIC announced that they had closed the failing Silicon Valley Bank. Market action quickly pushed the curve mostly below year-end 2022 levels.

## Non-U.S. Equity

Banking weakness appeared in Europe as the Swiss bank, Credit Suisse, saw billions in depositor outflows in one day due to concerns of instability within the organization. Swiss authorities quickly pressed a plan for rival UBS to acquire the smaller bank at a reduced price, with Credit Suisse investors and creditors losing nearly everything. China is quickly seeing benefits from its relaxed COVID-related restrictions as a key index measuring their services sector jumped in March to its highest level in more than a decade.

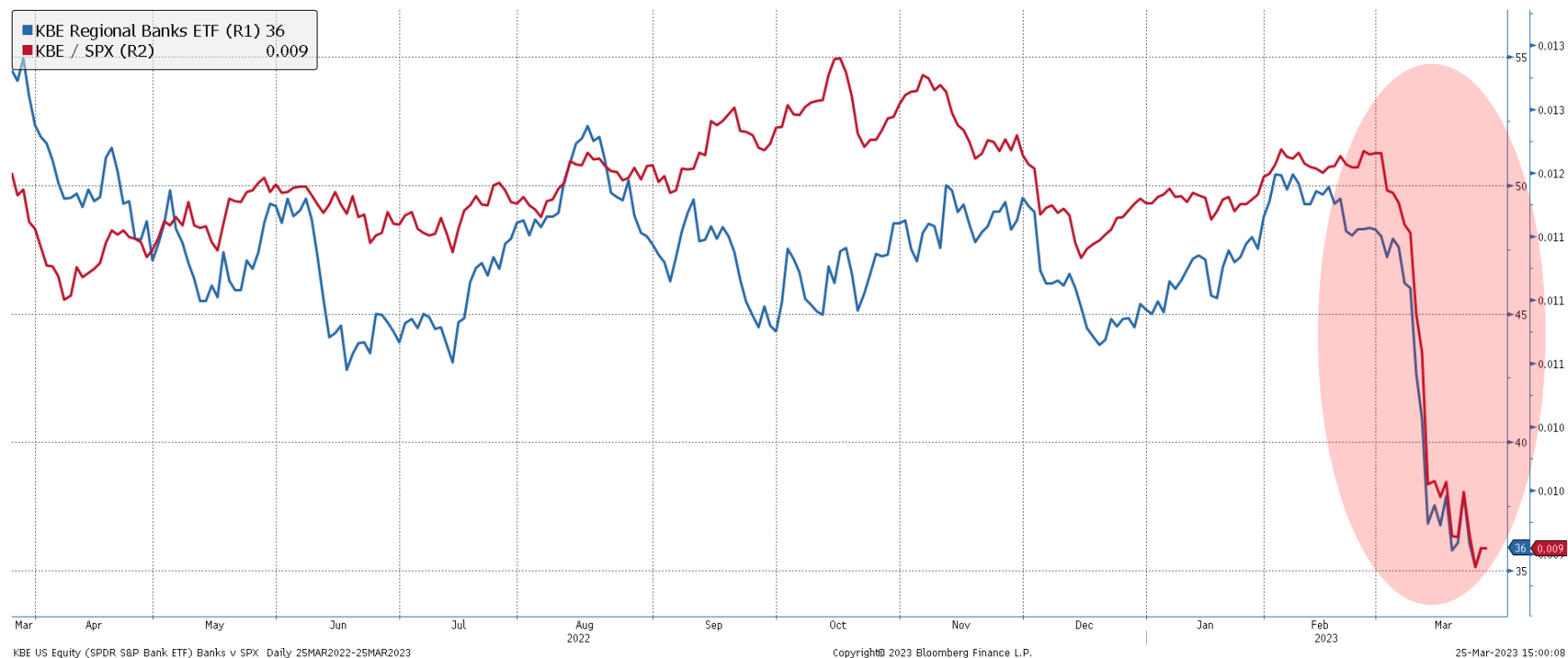
## Fixed Income

The U.S. Treasury yield curve was up in the short-end (below 1-year) but fell across the remainder of the curve. The 10-year Treasury yield ended the quarter at 3.47%, down 41 basis points from December. The FOMC increased the overnight rate by 0.25% in both January and March, targeting a range of 4.75% to 5.00%. The Fed's "dot plot" is messaging that the current expectation is for another 25 basis point increase before the end of 2023 while markets are pricing a year-end rate that would be approximately 50 basis points lower than the current rate.

## March 2023 Asset Class Assumptions

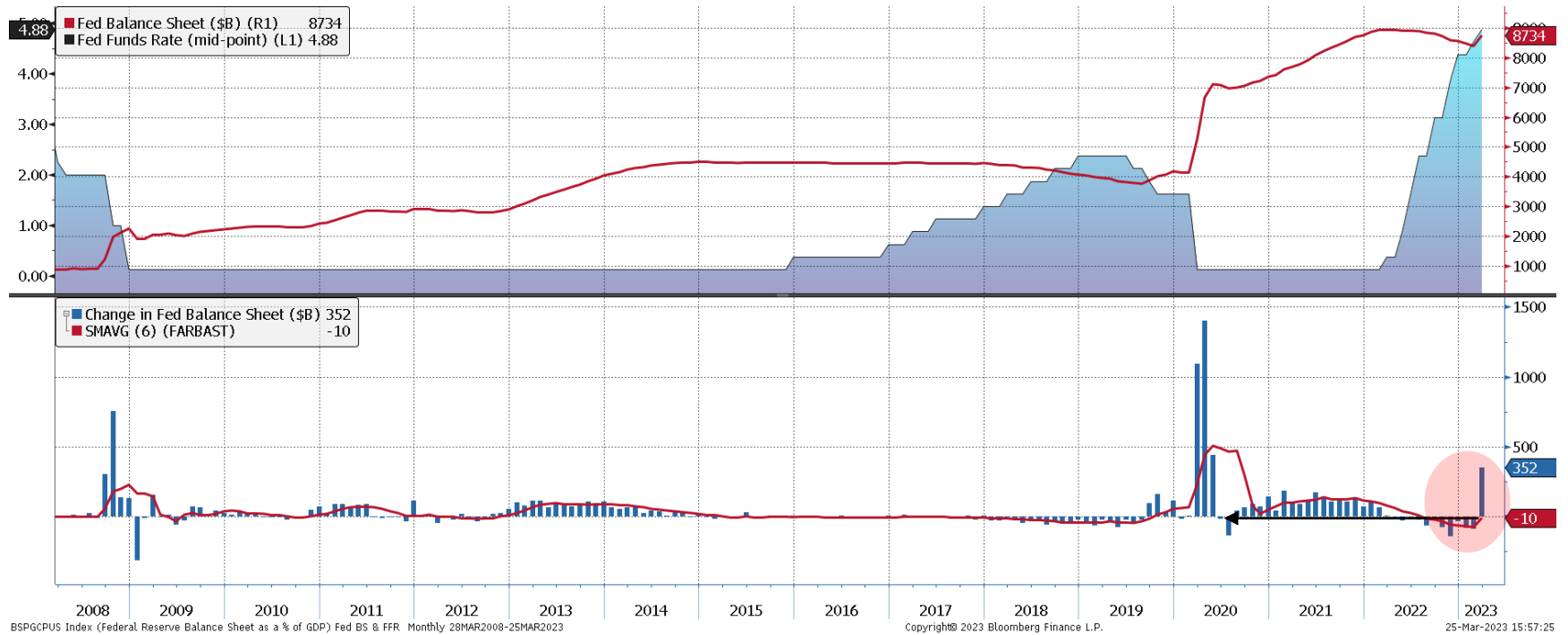
	Equity						Fixed Income						Real Assets						
	US Stock	Dev ex-US Stock	Emg Stock	Global ex-US Stock	Global Stock	Private Equity	Cash	Core Bond	LT Core Bond	TIPS	High Yield	Private Credit	Dev ex-US Bond (Hdg)	US RES	Global RES	Private RE	Cmdty	Real Assets	US CPI
Compound Return (%)	6.15	6.90	7.15	7.25	6.70	9.60	3.65	4.60	4.60	3.65	6.25	8.55	2.85	5.75	5.90	6.25	5.90	6.65	2.25
Expected Risk (%)	17.00	18.00	26.00	19.10	17.10	29.65	0.75	4.70	9.85	6.00	10.00	12.75	4.00	17.50	16.45	13.90	16.00	12.35	1.75
Cash Yield (%)	1.65	3.15	2.75	3.05	2.20	0.00	3.65	4.90	4.95	4.25	9.35	4.90	3.45	4.05	4.05	2.25	3.65	3.15	0.00
Growth Exposure	8.00	8.00	8.00	8.00	8.00	14.00	0.00	-0.95	-2.40	-3.00	4.00	5.10	-1.00	6.00	6.00	3.50	0.00	2.70	0.00
Inflation Exposure	-3.00	0.00	5.00	1.45	-1.30	-3.75	0.00	-2.50	-6.80	2.50	-1.00	-1.50	-3.00	1.00	1.80	1.00	12.00	5.25	1.00
<b>Correlations</b>																			
US Stock	1.00																		
Dev ex-US Stock (USD)	0.81	1.00																	
Emerging Mkt Stock	0.74	0.74	1.00																
Global ex-US Stock	0.84	0.95	0.89	1.00															
Global Stock	0.95	0.91	0.84	0.94	1.00														
Private Equity	0.72	0.63	0.61	0.67	0.73	1.00													
Cash Equivalents	-0.05	-0.09	-0.05	-0.08	-0.06	0.00	1.00												
Core Bond	0.28	0.13	0.00	0.08	0.20	0.30	0.18	1.00											
LT Core Bond	0.31	0.15	0.01	0.11	0.24	0.31	0.11	0.94	1.00										
TIPS	-0.05	0.00	0.15	0.06	-0.01	-0.03	0.20	0.60	0.48	1.00									
High Yield Bond	0.54	0.39	0.49	0.46	0.53	0.31	-0.10	0.24	0.32	0.05	1.00								
Private Credit	0.68	0.55	0.58	0.60	0.68	0.44	0.00	0.24	0.30	0.00	0.76	1.00							
Dev ex-US Bond (Hdg)	0.16	0.25	-0.01	0.16	0.17	0.26	0.10	0.68	0.66	0.39	0.26	0.22	1.00						
US RE Securities	0.58	0.47	0.44	0.49	0.57	0.49	-0.05	0.17	0.22	0.10	0.56	0.62	0.05	1.00					
Global RE Securities	0.64	0.57	0.54	0.60	0.65	0.55	-0.05	0.17	0.21	0.11	0.61	0.68	0.04	0.96	1.00				
Private Real Estate	0.55	0.45	0.45	0.49	0.54	0.50	-0.05	0.19	0.25	0.09	0.58	0.63	0.05	0.79	0.78	1.00			
Commodities	0.25	0.34	0.39	0.38	0.32	0.28	0.00	-0.03	-0.03	0.25	0.29	0.29	-0.10	0.25	0.28	0.25	1.00		
Real Assets	0.62	0.63	0.65	0.69	0.67	0.57	-0.03	0.22	0.24	0.30	0.64	0.69	0.04	0.78	0.84	0.76	0.64	1.00	
Inflation (CPI)	-0.10	-0.15	-0.13	-0.15	-0.13	-0.10	0.10	-0.12	-0.12	0.15	-0.08	0.00	-0.08	0.05	0.04	0.05	0.44	0.22	1.00

# Regional Banks Under Stress



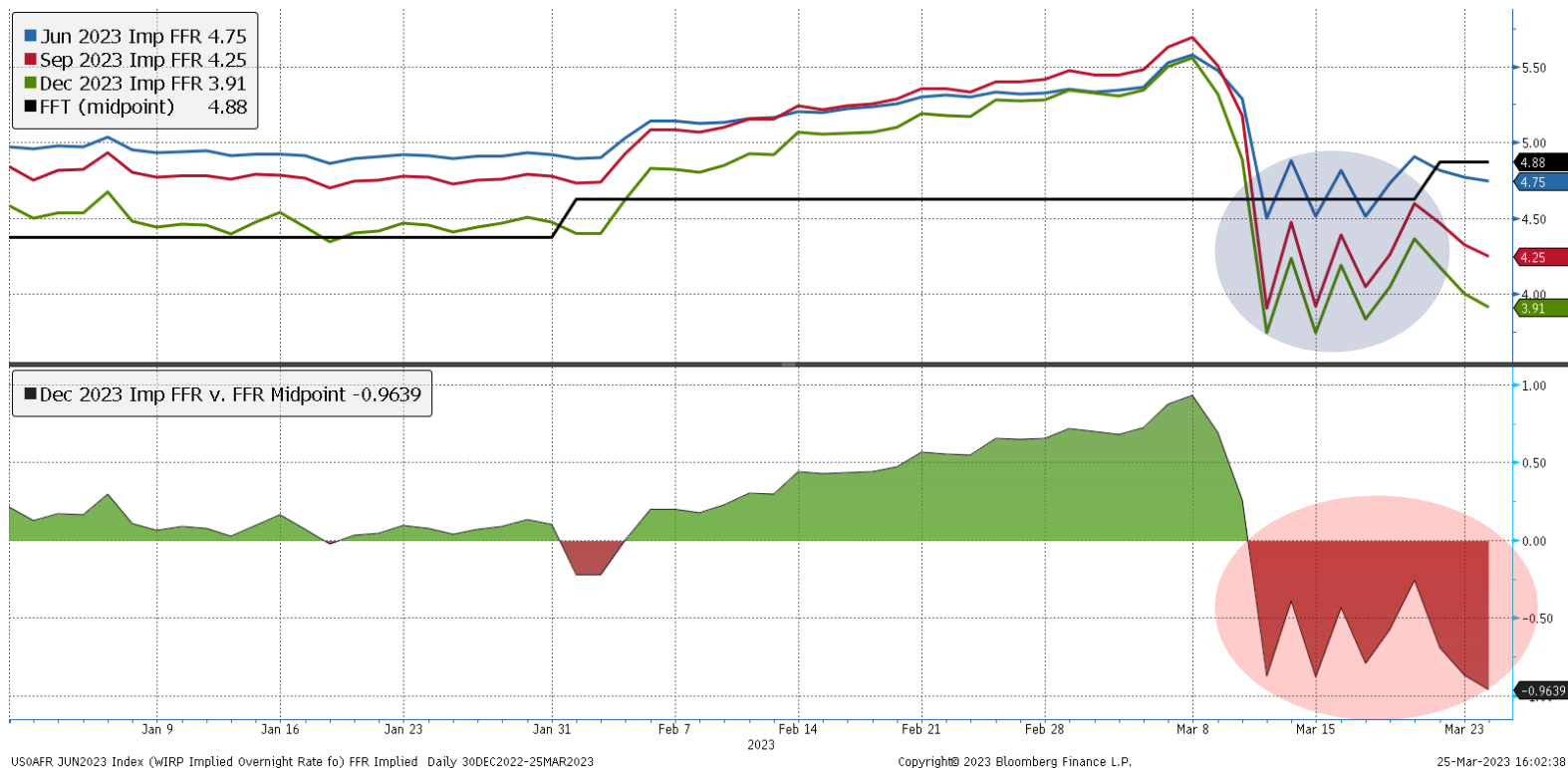
Data Source: Bloomberg

# Fed Response: "Dovish Hike" - End of QT?



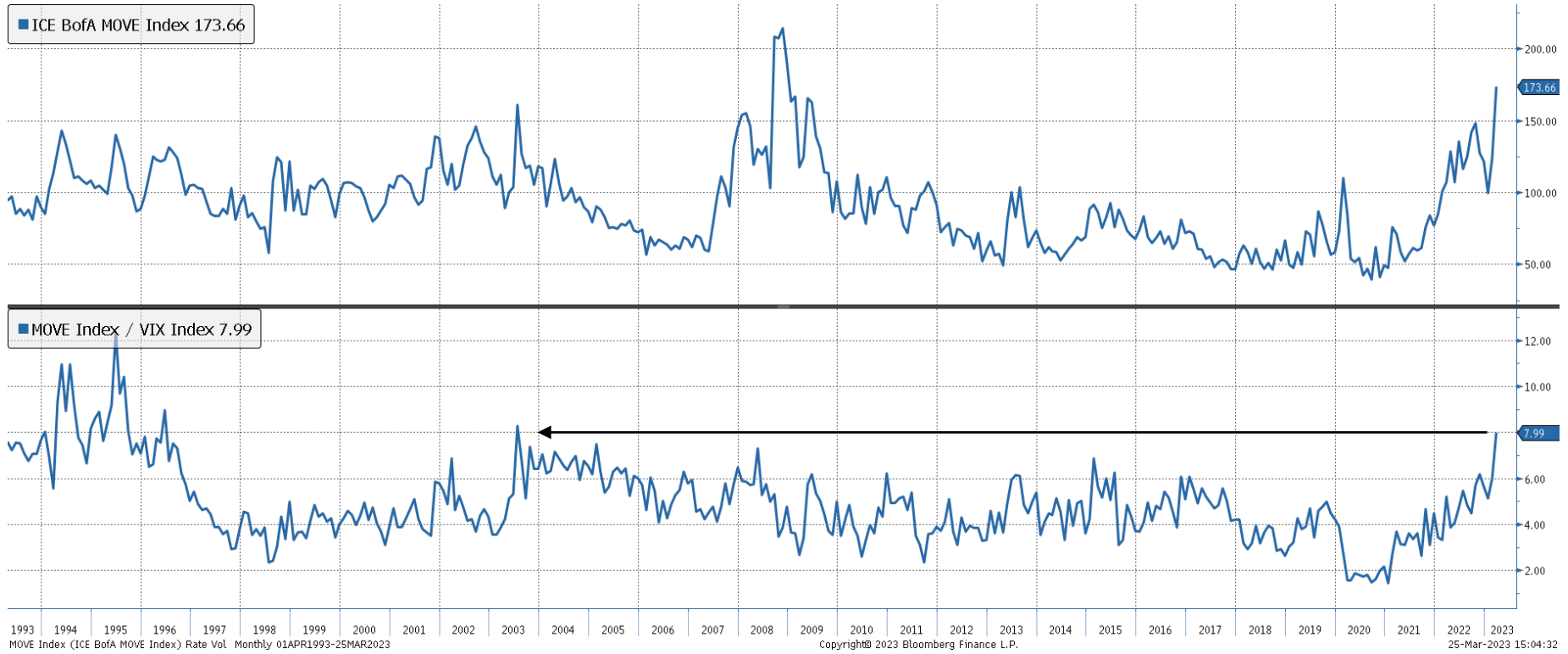
Data Source: Bloomberg

# Fed Funds Discounting Goes into “Charlie Brown” Mode



Data Source: Bloomberg

## Extreme Interest Rate Volatility



Data Source: Bloomberg

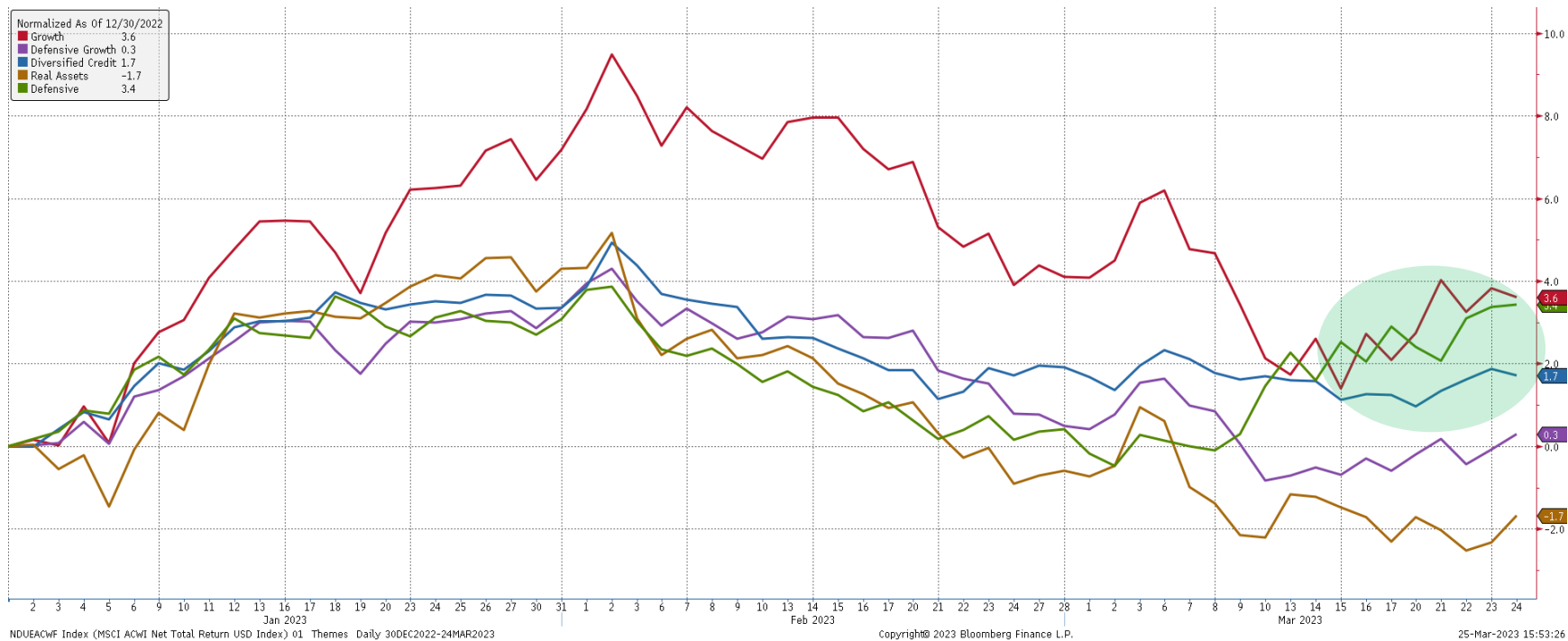


# Credit Spreads Widen (but remain below Sept '22 levels)



Data Source: Bloomberg

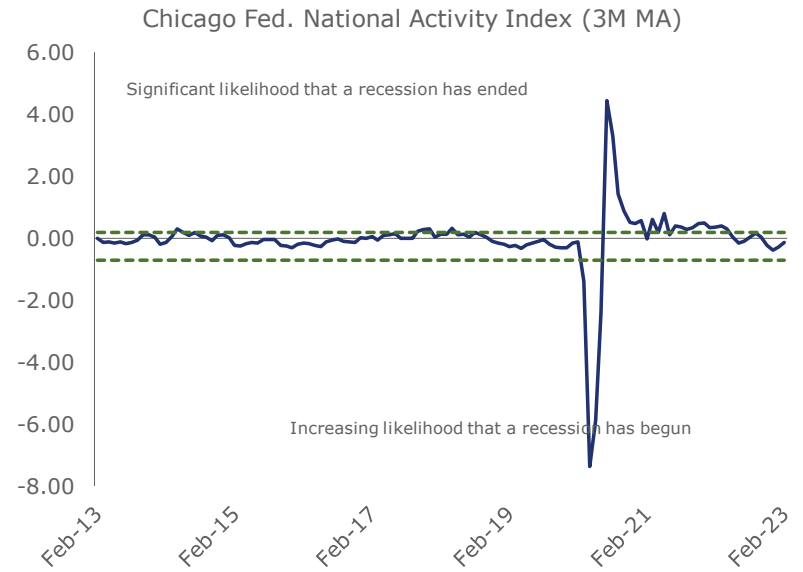
# Many Risk-Assets Showing Resilience



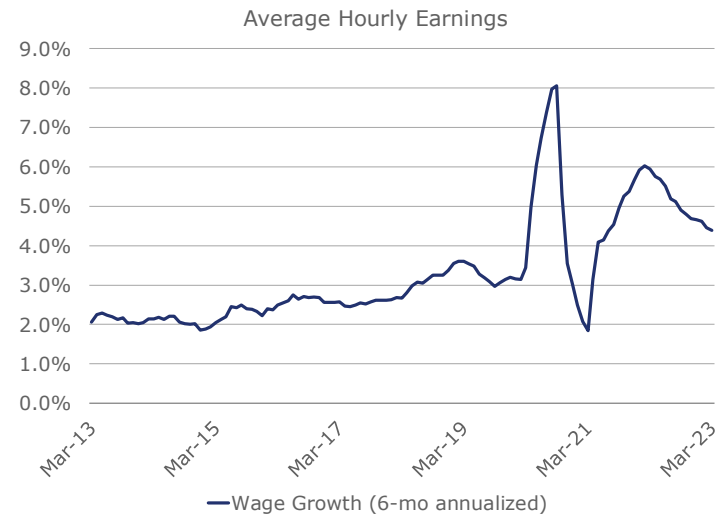
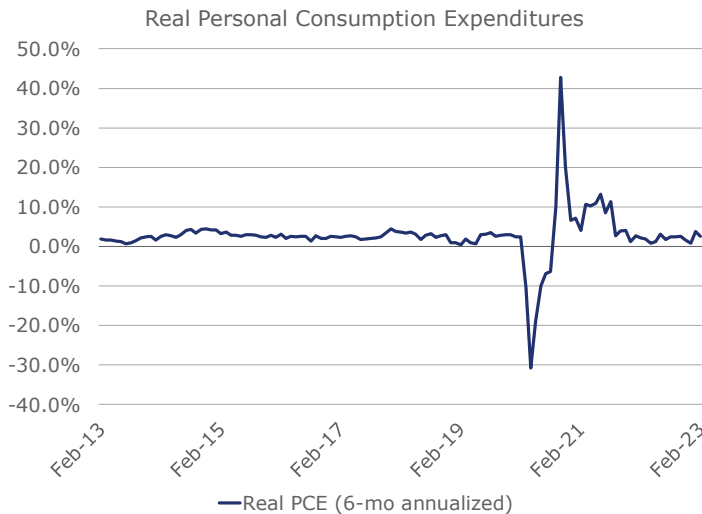
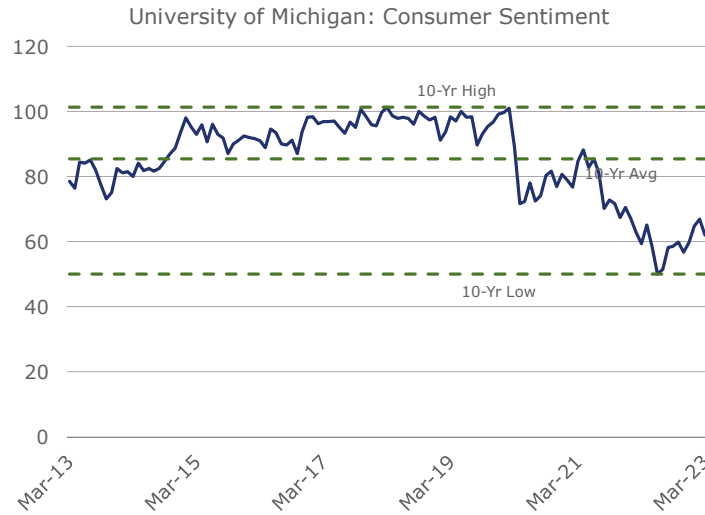
Data Source: Bloomberg

# Economic/Market Activity

## Economic Growth

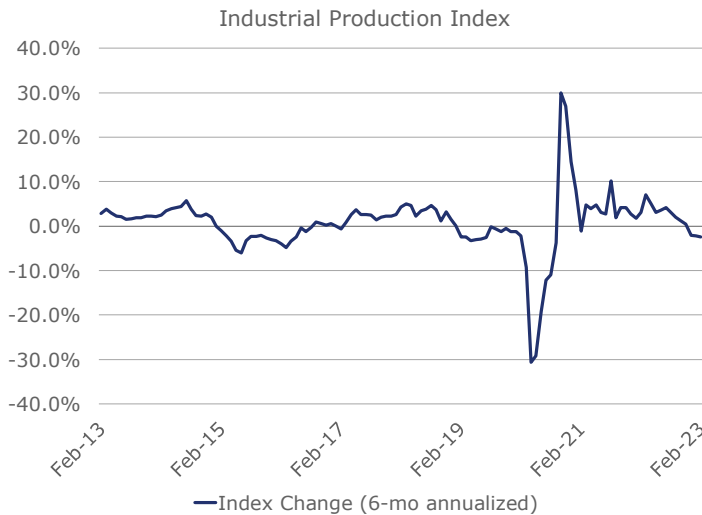
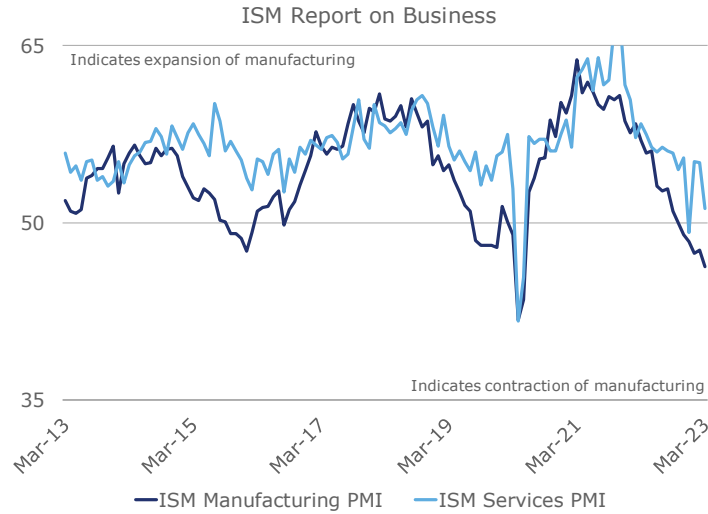


# Consumer Activity

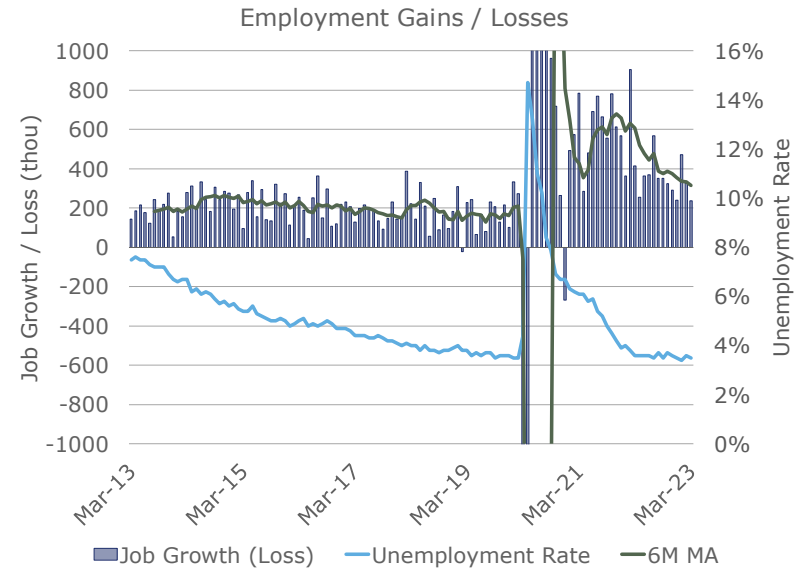
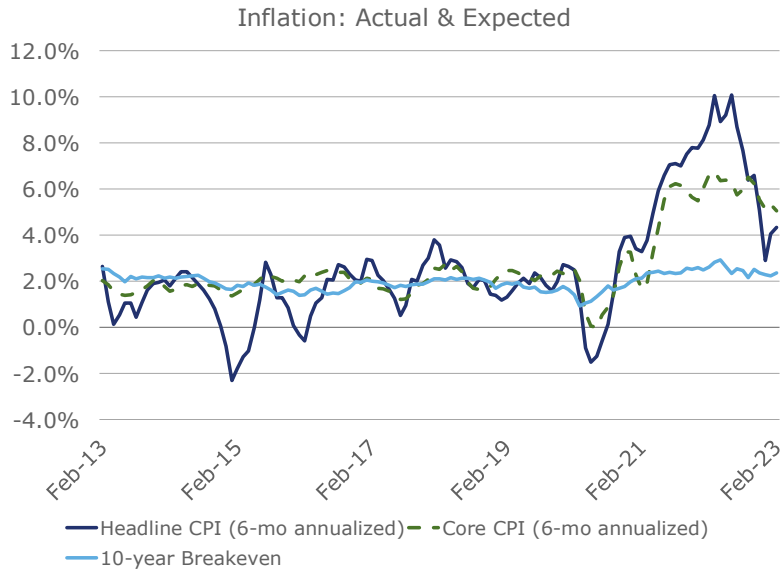


Data Sources: Bloomberg

## Business Activity



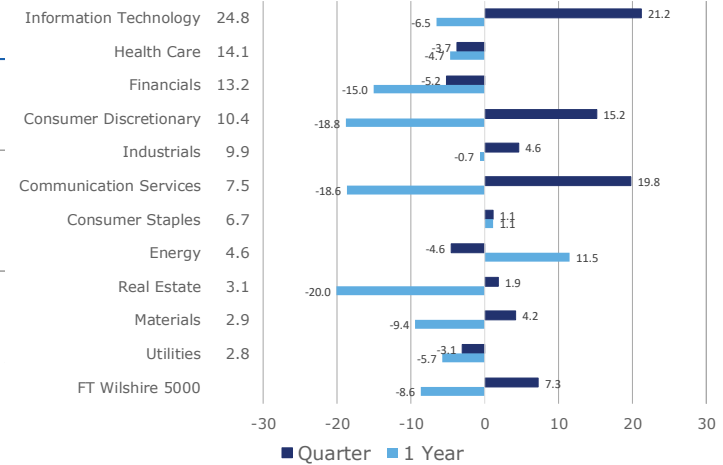
# Inflation and Employment



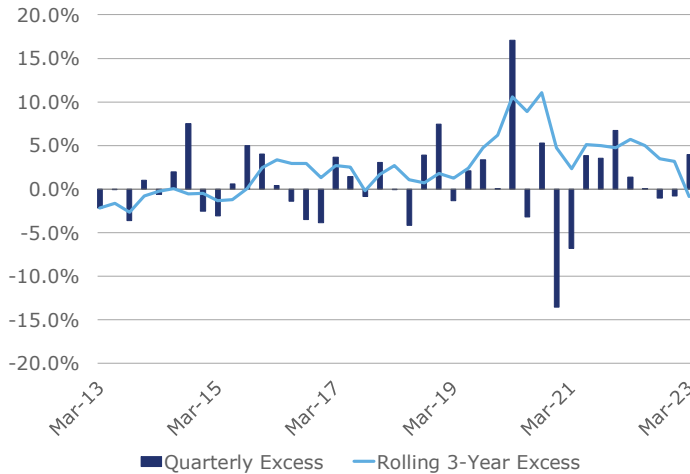
## U.S. Equity Market

As of 3/31/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
FT Wilshire 5000	7.3	7.3	-8.6	18.8	10.7	11.9
Wilshire U.S. Large Cap	7.6	7.6	-8.4	18.8	11.2	12.3
Wilshire U.S. Small Cap	3.6	3.6	-10.3	19.8	6.0	8.7
Wilshire U.S. Large Growth	15.7	15.7	-11.4	19.7	12.9	14.2
Wilshire U.S. Large Value	0.1	0.1	-4.8	17.5	9.4	10.3
Wilshire U.S. Small Growth	6.3	6.3	-8.7	17.6	6.1	9.2
Wilshire U.S. Small Value	1.0	1.0	-11.7	22.0	5.8	8.1
Wilshire REIT Index	3.2	3.2	-21.3	11.0	5.7	5.9
MSCI USA Min. Vol. Index	1.3	1.3	-4.4	12.4	9.1	10.6
FTSE RAFI U.S. 1000 Index	1.7	1.7	-5.9	22.1	10.0	11.0

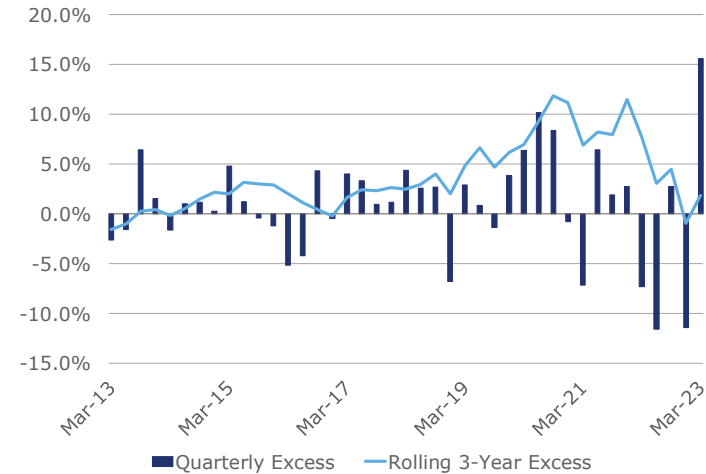
U.S. Sector Weight and Return (%)



Large Cap vs Small Cap



Large Growth vs Large Value

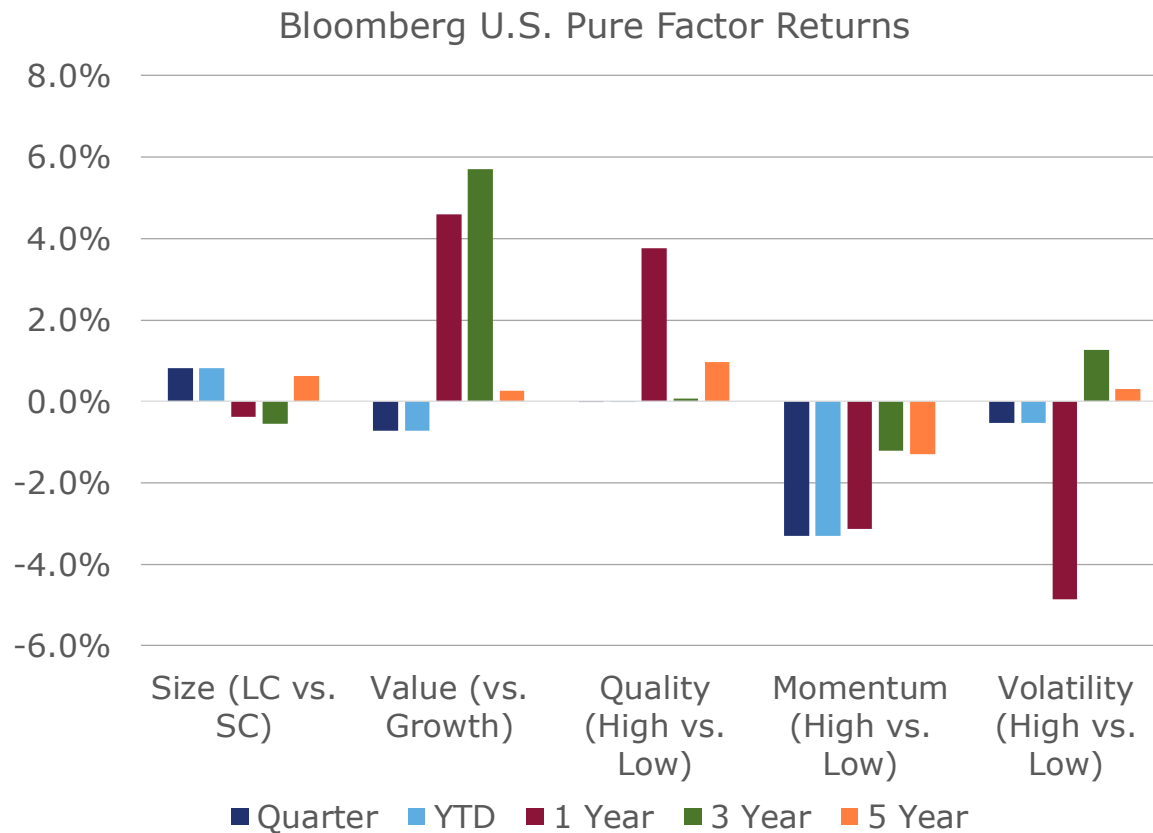


Data Sources: Bloomberg, Wilshire Atlas



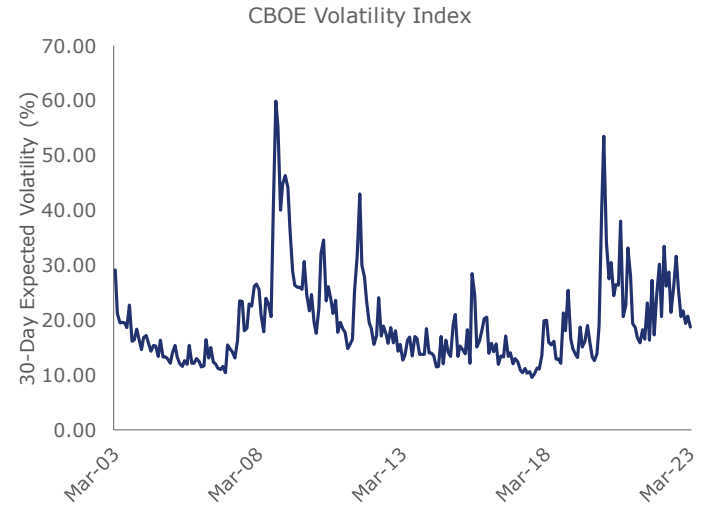
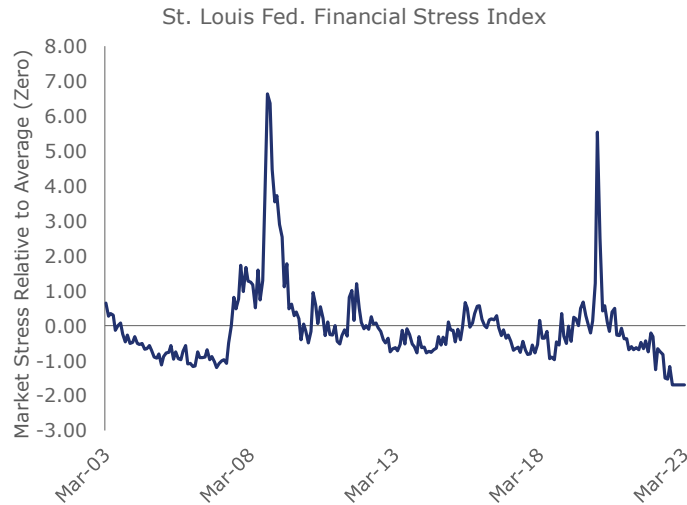
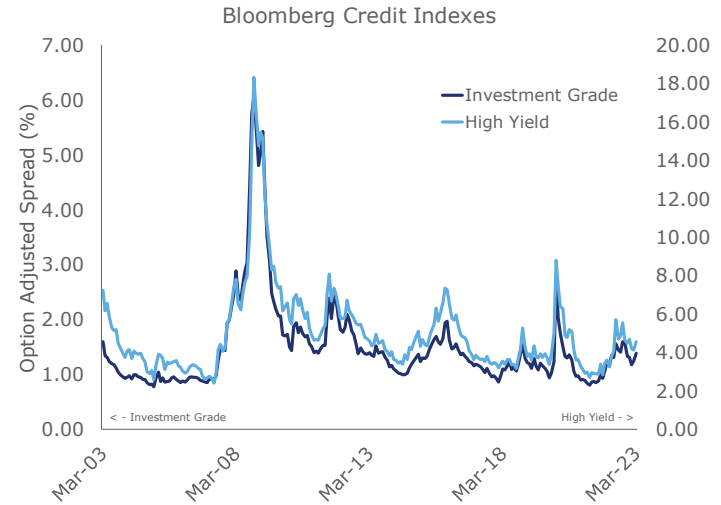
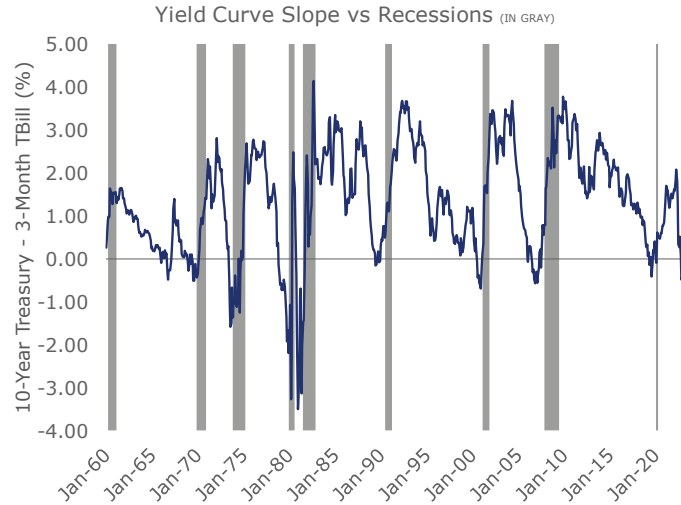
# U.S. Factor Returns

- Factor returns represent the contribution from large cap, value, etc. stocks within Bloomberg’s Portfolio & Risk Analytics module
- Value and low volatility have mostly outperformed this year



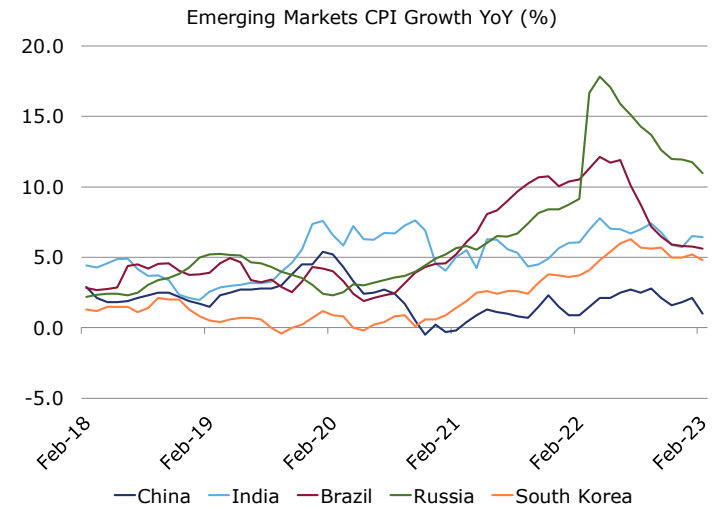
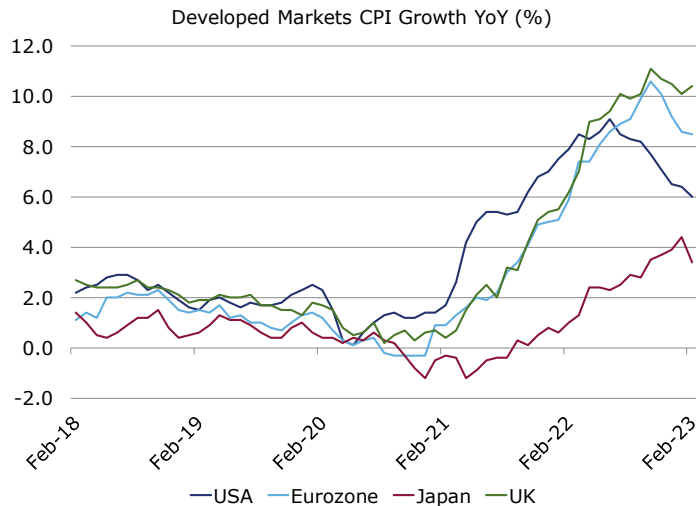
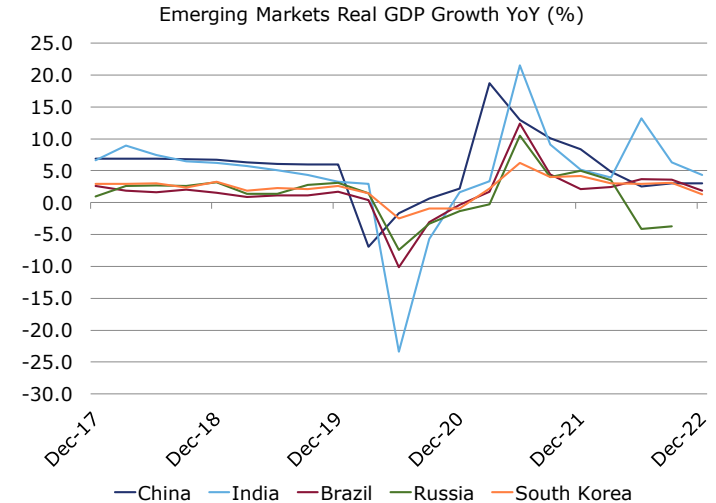
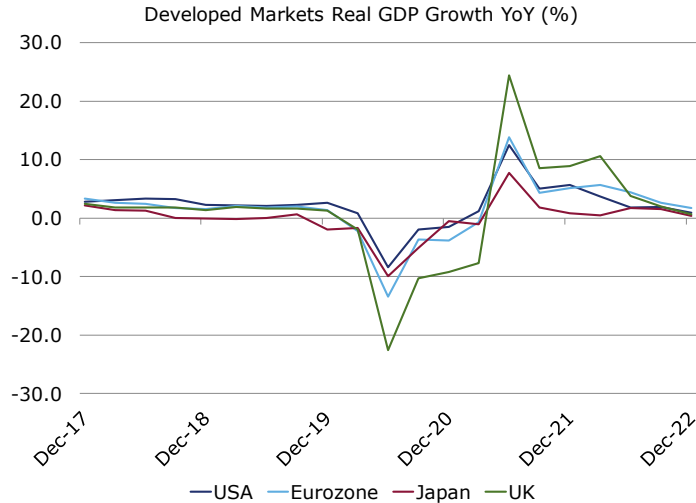
Data Sources: Bloomberg

## Risk Monitor



Data Sources: Bloomberg

## Non-U.S. Growth and Inflation

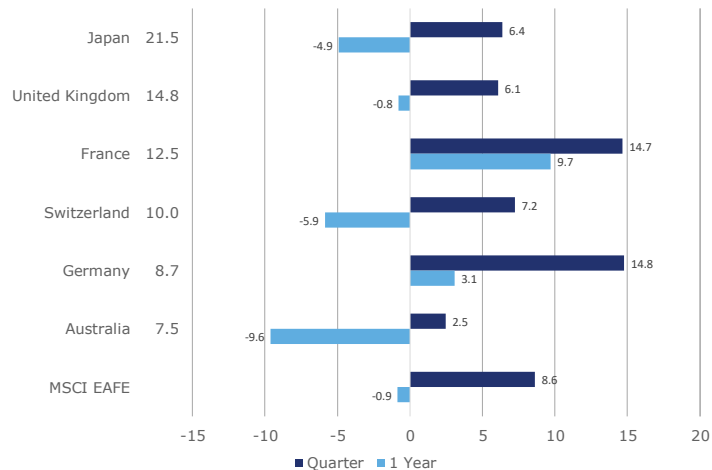


Data Sources: Bloomberg

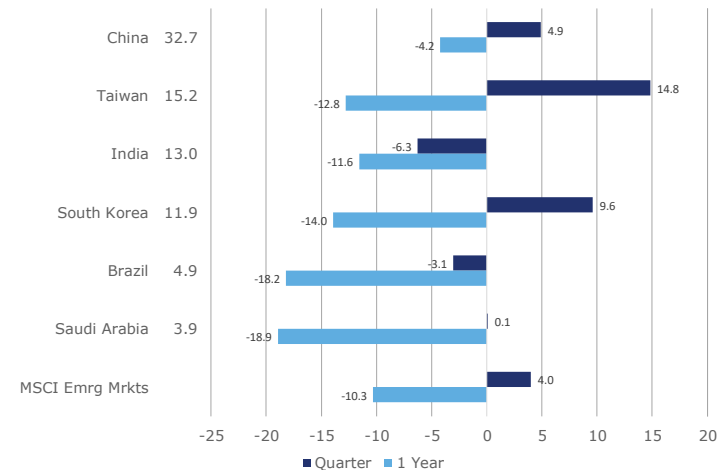
## Non-U.S. Equity Market

As of 3/31/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
MSCI ACWI ex-US (\$G)	7.0	7.0	-4.6	12.3	3.0	4.7
MSCI EAFE (\$G)	8.6	8.6	-0.9	13.5	4.0	5.5
MSCI Emerging Markets (\$G)	4.0	4.0	-10.3	8.2	-0.5	2.4
MSCI Frontier Markets (\$G)	2.5	2.5	-16.3	7.9	-3.7	0.0
MSCI ACWI ex-US Growth (\$G)	8.7	8.7	-6.0	9.8	3.7	5.4
MSCI ACWI ex-US Value (\$G)	5.1	5.1	-3.9	14.9	1.9	3.9
MSCI ACWI ex-US Small (\$G)	4.8	4.8	-9.9	15.5	2.1	5.5
MSCI ACWI Minimum Volatility	1.7	1.7	-5.5	8.9	5.7	7.4
MSCI EAFE Minimum Volatility	5.8	5.8	-4.6	5.3	1.6	4.7
FTSE RAFI Developed ex-US	6.7	6.7	-1.6	16.8	3.4	5.3
MSCI EAFE LC (G)	7.7	7.7	4.4	15.2	6.8	7.9
MSCI Emerging Markets LC (G)	3.8	3.8	-6.2	9.2	2.3	5.4

Developed Markets Weight and Return (%)



Emerging Markets Weight and Return (%)

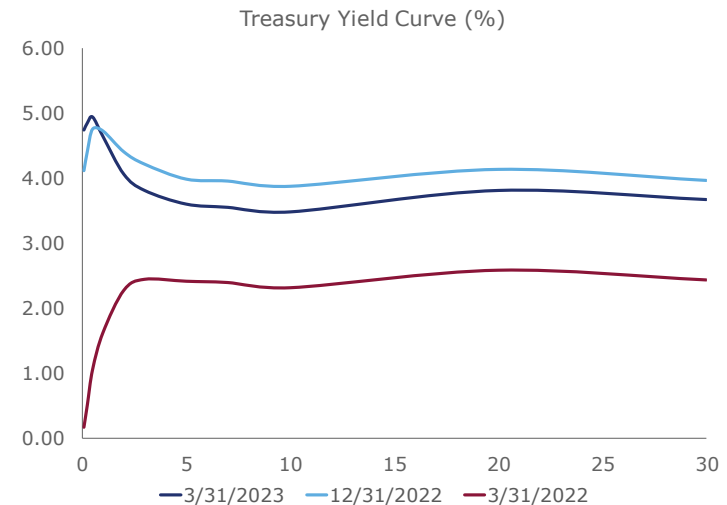
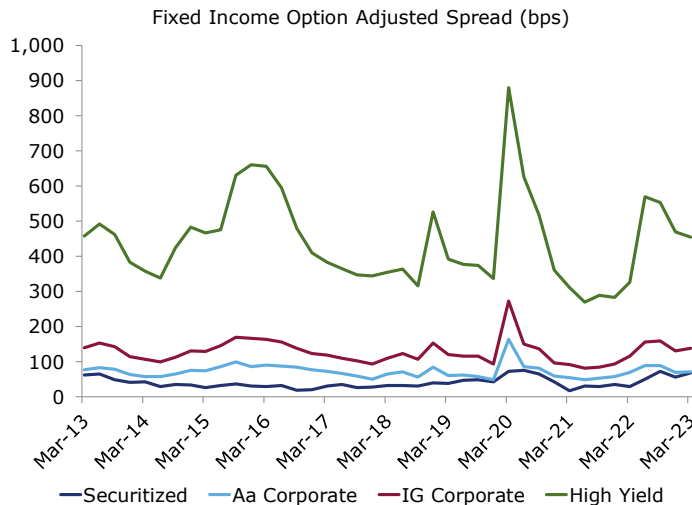


Data Sources: Bloomberg

## U.S. Fixed Income

As of 3/31/2023	YTW	DUR.	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg Aggregate	4.4	6.3	3.0	3.0	-4.8	-2.8	0.9	1.4
Bloomberg Treasury	3.8	6.3	3.0	3.0	-4.5	-4.2	0.7	0.9
Bloomberg Gov't-Rel.	4.4	5.4	2.9	2.9	-3.3	-1.6	1.1	1.4
Bloomberg Securitized	4.6	5.8	2.5	2.5	-4.7	-3.1	0.3	1.0
Bloomberg Corporate	5.2	7.2	3.5	3.5	-5.6	-0.5	1.6	2.3
Bloomberg LT Gov't/Credit	4.6	14.6	5.8	5.8	-13.4	-6.3	0.6	2.3
Bloomberg LT Treasury	3.8	16.4	6.2	6.2	-16.0	-11.3	-0.4	1.5
Bloomberg LT Gov't-Rel.	5.1	11.7	5.2	5.2	-9.9	-3.1	0.6	2.3
Bloomberg LT Corporate	5.3	13.2	5.4	5.4	-11.5	-2.6	1.1	3.0
Bloomberg U.S. TIPS *	3.5	7.6	3.3	3.3	-6.1	1.8	2.9	1.5
Bloomberg High Yield	8.5	3.7	3.6	3.6	-3.3	5.9	3.2	4.1
S&P/LSTA Leveraged Loan	9.4	0.3	3.2	3.2	2.5	8.5	3.6	3.8
Treasury Bills	4.7	0.3	1.1	1.1	2.5	0.8	1.4	0.9

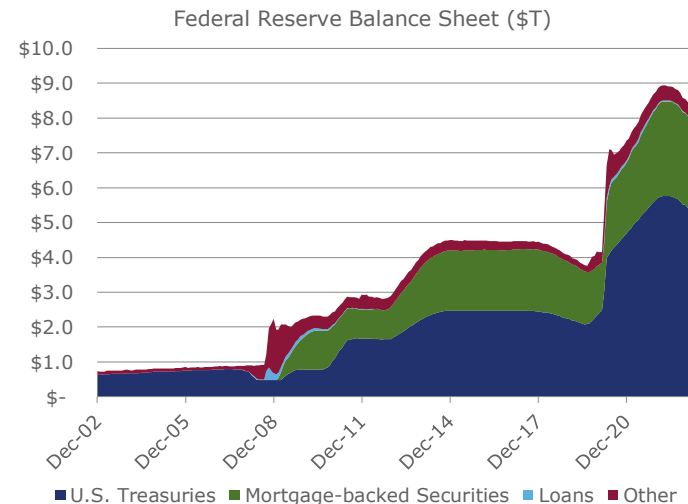
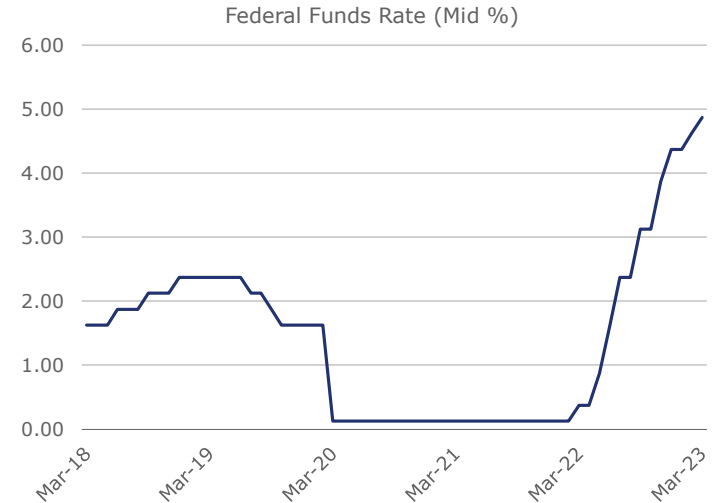
\* Yield and Duration statistics are for a proxy index based on similar maturity, the Bloomberg Barclays U.S. Treasury 7-10 Year Index



Data Sources: Bloomberg

## Federal Reserve

- After total increases of 425 basis points in the Fed-funds rate last year, the FOMC increased the rate an additional 50 basis points during Q1
- QE4 was larger than the 3 phases of quantitative easing – combined – following the global financial crisis
- After a steady decline in the Fed’s balance sheet during 2022, total assets moved higher in March

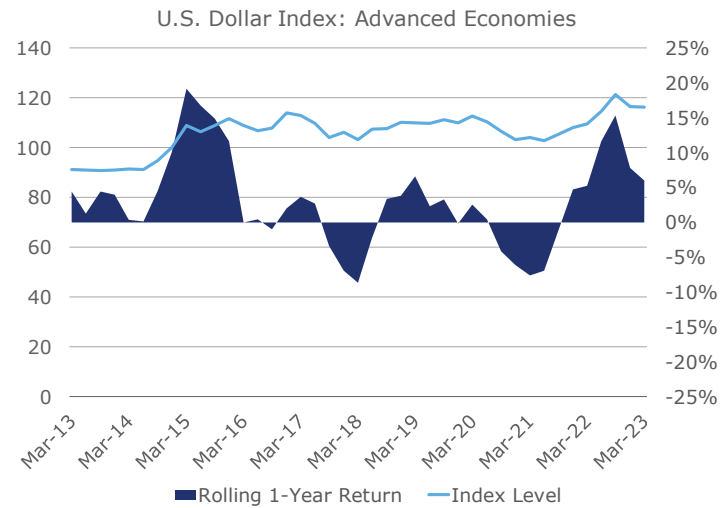
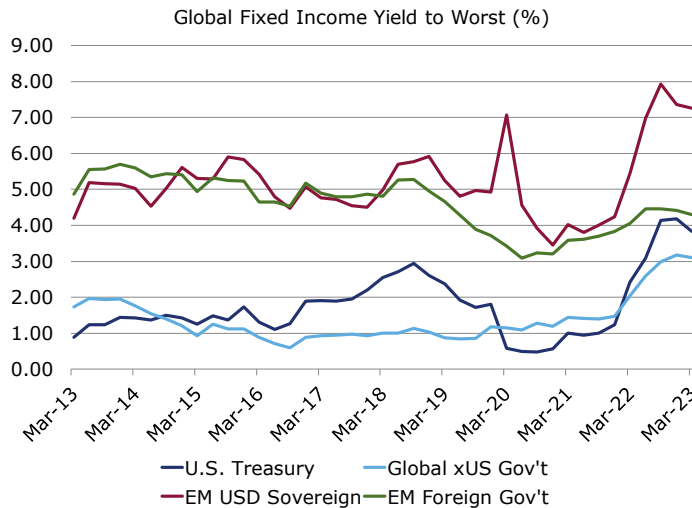


	Announced	Closed	Amount (bil)
QE1	11/25/2008	3/31/2010	\$1,403
QE2	11/3/2010	6/29/2012	\$568
QE3	9/13/2012	10/29/2014	\$1,674
QE4	3/23/2020	3/15/2022	\$4,779

## Non-U.S. Fixed Income

As of 3/31/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
<b>Developed Markets</b>						
Bloomberg Global Aggregate xUS	3.1	3.1	-10.7	-4.1	-3.2	-1.0
Bloomberg Global Aggregate xUS *	2.9	2.9	-3.3	-1.8	0.9	2.3
Bloomberg Global Inflation Linked xUS	5.4	5.4	-21.7	-3.4	-3.6	-0.2
Bloomberg Global Inflation Linked xUS *	4.0	4.0	-15.6	-2.0	0.3	2.7
<b>Emerging Markets (Hard Currency)</b>						
Bloomberg EM USD Aggregate	2.1	2.1	-4.6	0.1	0.3	2.1
<b>Emerging Markets (Foreign Currency)</b>						
Bloomberg EM Local Currency Gov't	3.1	3.1	-3.5	1.9	0.1	0.5
Bloomberg EM Local Currency Gov't *	2.2	2.2	3.1	0.2	2.2	2.0
Euro vs. Dollar	1.3	1.3	-2.1	-0.6	-2.5	-1.7
Yen vs. Dollar	-1.3	-1.3	-8.4	-6.8	-4.4	-3.4
Pound vs. Dollar	2.1	2.1	-6.1	-0.2	-2.5	-2.1

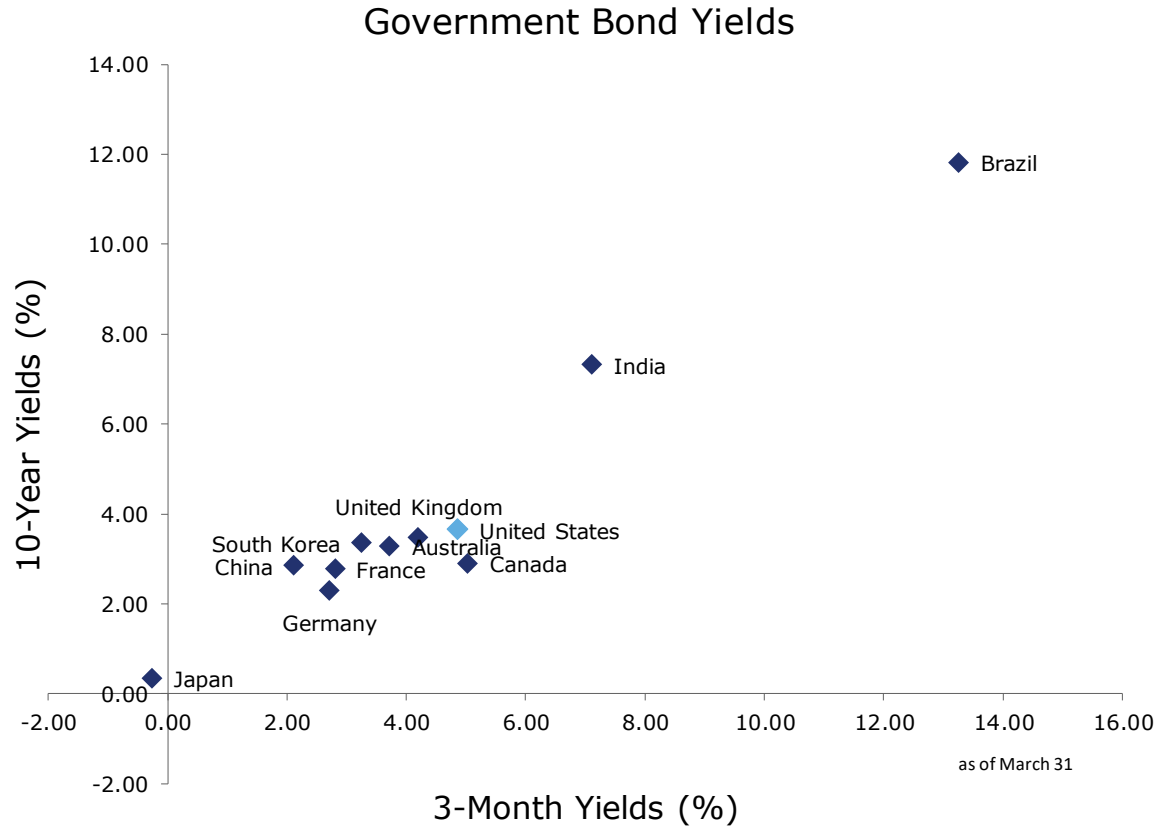
\* Returns are reported in terms of local market investors, which removes currency effects.



Data Sources: Bloomberg

# Global Interest Rates

Short-term rates have turned positive in most larger countries; longer-term rates around 3.5% in the U.K. and the U.S.

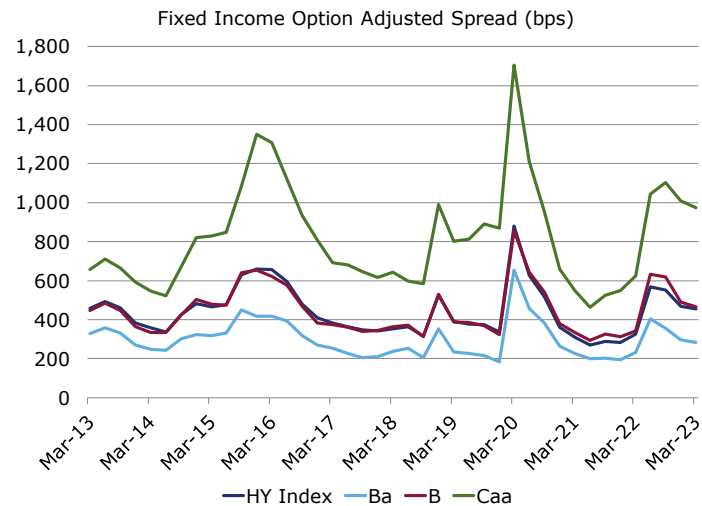




## High Yield Bond Market

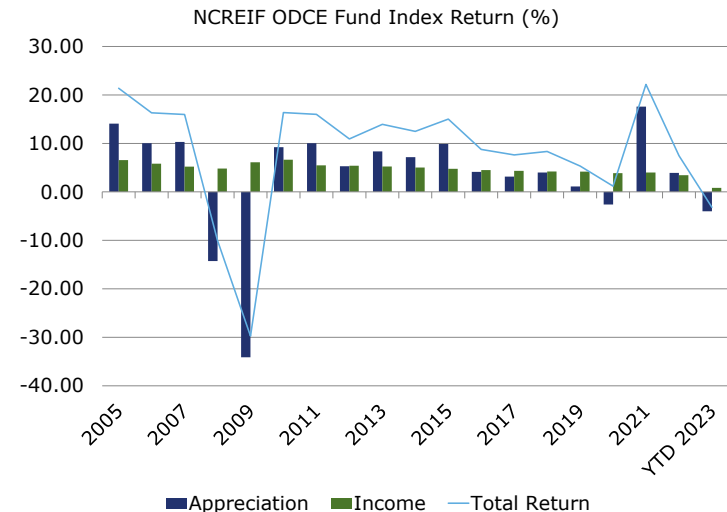
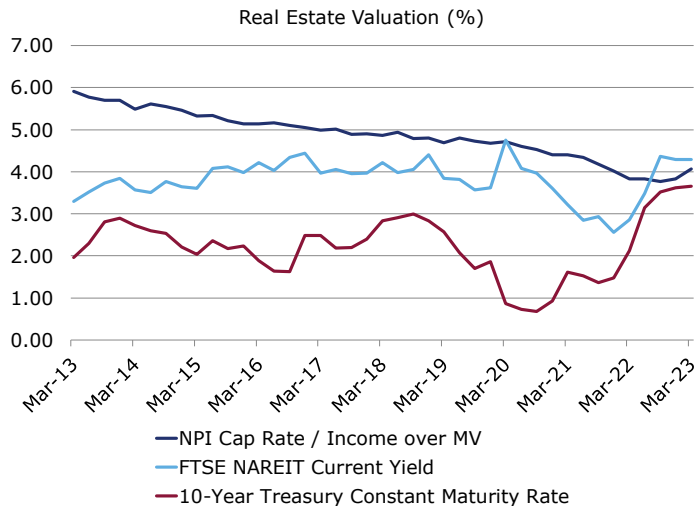
As of 3/31/2023

		YTW	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg High Yield		8.5	3.6	3.6	-3.3	5.9	3.2	4.1
S&P LSTA Leveraged Loan		9.1	2.9	2.9	2.4	6.5	3.4	3.3
<b>High Yield Quality Distribution</b>	<b>Weight</b>							
Ba U.S. High Yield	48.8%	6.8	3.4	3.4	-1.9	5.8	4.0	4.5
B U.S. High Yield	39.6%	8.7	3.5	3.5	-3.7	5.4	3.0	3.7
Caa U.S. High Yield	10.7%	13.4	5.0	5.0	-8.6	7.1	0.5	3.4
Ca to D U.S. High Yield	0.9%	35.1	-3.6	-3.6	-10.3	12.4	-0.8	-5.3



## Real Assets

As of 3/31/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Bloomberg U.S. TIPS	3.3	3.3	-6.1	1.8	2.9	1.5
Bloomberg Commodity Index	-5.4	-5.4	-12.5	20.8	5.4	-1.7
Bloomberg Gold Index	8.1	8.1	0.7	5.9	7.1	1.3
Wilshire Global RESI Index	2.3	2.3	-20.8	9.0	3.2	4.3
NCREIF ODCE Fund Index	-3.2	-3.2	-3.1	8.4	7.5	9.5
NCREIF Timberland Index	1.8	1.8	11.3	8.1	5.5	5.8
FTSE Global Core Infrastructure 50/50	0.7	0.7	-7.1	11.1	6.6	7.1
Alerian Midstream Energy	0.8	0.8	-1.2	34.8	9.7	n.a.
Bitcoin	71.7	71.7	-38.0	63.6	32.9	77.7



Data Sources: Bloomberg, National Council of Real Estate Investment Fiduciaries

## Asset Class Performance

### Asset Class Returns - Best to Worst

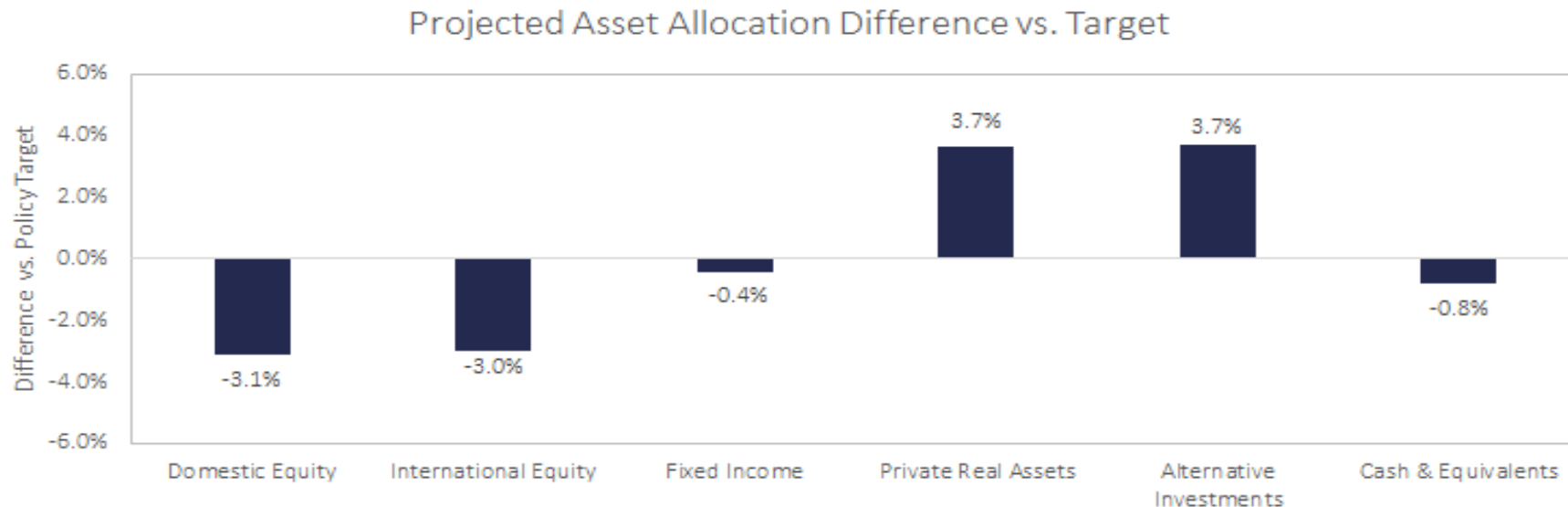
2018	2019	2020	2021	2022	2023 YTD	Annualized 5-Year as of 3/23
T-Bills 1.9%	U.S. Equity 31.0%	U.S. Equity 20.8%	REITs 46.2%	Commodities 16.1%	Developed 8.6%	U.S. Equity 10.7%
Core Bond 0.0%	REITs 25.8%	Emrg Mrkts 18.7%	Commodities 27.1%	T-Bills 1.3%	U.S. Equity 7.3%	REITs 5.7%
U.S. TIPS -1.3%	Developed 22.7%	U.S. TIPS 11.0%	U.S. Equity 26.7%	High Yield -11.2%	Emrg Mrkts 4.0%	Commodities 5.4%
High Yield -2.1%	Emrg Mrkts 18.9%	Developed 8.3%	Developed 11.8%	U.S. TIPS -11.8%	High Yield 3.6%	Developed 4.0%
REITs -4.8%	High Yield 14.3%	Core Bond 7.5%	U.S. TIPS 6.0%	Core Bond -13.0%	U.S. TIPS 3.3%	High Yield 3.2%
U.S. Equity -5.3%	Core Bond 8.7%	High Yield 7.1%	High Yield 5.3%	Developed -14.0%	REITs 3.2%	U.S. TIPS 2.9%
Commodities -11.2%	U.S. TIPS 8.4%	T-Bills 0.7%	T-Bills 0.0%	U.S. Equity -19.0%	Core Bond 3.0%	T-Bills 1.4%
Developed -13.4%	Commodities 7.7%	Commodities -3.1%	Core Bond -1.5%	Emrg Mrkts -19.7%	T-Bills 1.1%	Core Bond 0.9%
Emrg Mrkts -14.2%	T-Bills 2.3%	REITs -7.9%	Emrg Mrkts -2.2%	REITs -26.8%	Commodities -5.4%	Emrg Mrkts -0.5%

Data Sources: Bloomberg Note: Developed asset class is developed equity markets ex-U.S., ex-Canada

# Total Fund

# Projected Deviations from the Benchmark

As of March 31, 2023



- Includes committed, but unfunded amounts for Real Assets (\$2.19 billion) and Alternatives (\$2.46 billion). Assumes Real Assets and Alternatives allocations are fully funded as of month-end.
- Assumes that outstanding commitments are funded from a basket of public markets asset classes (Domestic Equity, International Equity and/or Fixed Income) that best reflects the expectations of risk, yield and regional allocations of the asset class.

Alternatives Proxy: 60% Domestic Equity, 40% International Equity

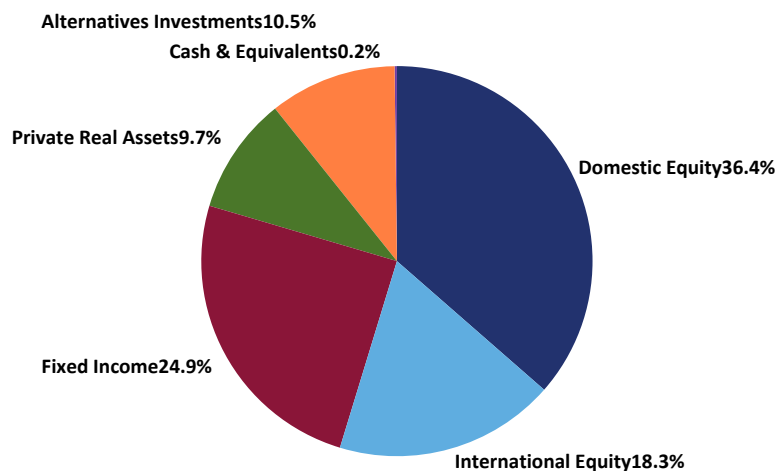
Real Assets Proxy: 50% Domestic Equity, 30% International Equity, 20% Fixed Income

# Asset Allocation

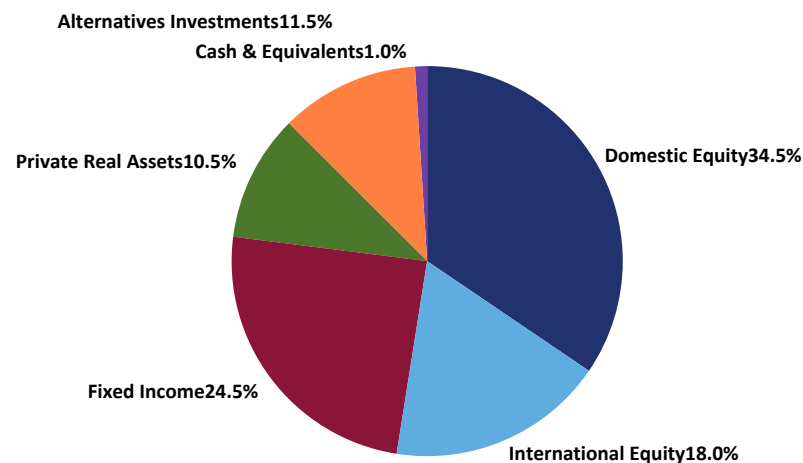
Total Fund

Periods Ended As of March 31, 2023

Actual Allocation



Target Allocation



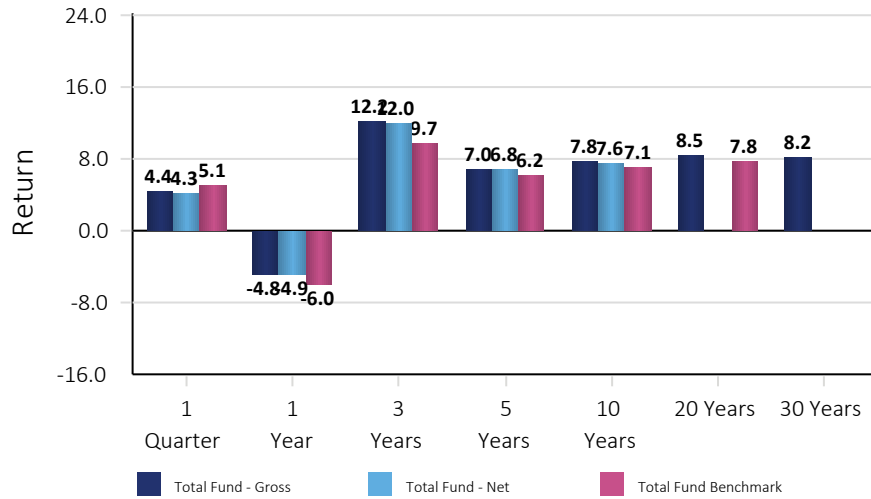
	Actual Allocation \$Millions	Actual Allocation %	Target Allocation %	Differences %	Differences \$Millions
Total Fund	49,487	100.0	100.0	0.0	
Domestic Equity	18,038	36.4	34.5	1.9	965
International Equity	9,038	18.3	18.0	0.3	131
Fixed Income	12,310	24.9	24.5	0.4	185
Private Real Assets	4,800	9.7	10.5	-0.8	-396
Alternatives Investments	5,204	10.5	11.5	-1.0	-487
Cash & Equivalents	97	0.2	1.0	-0.8	-398

# Composite Performance Summary

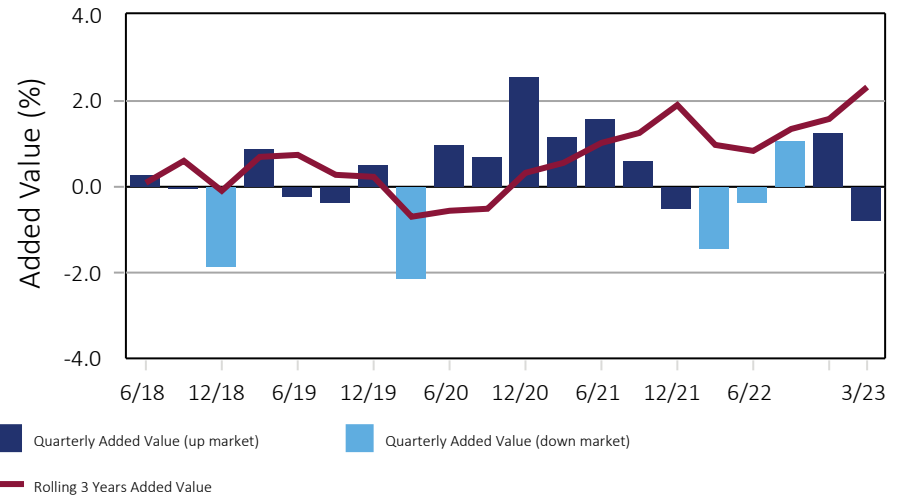
## Total Fund

Periods Ended March 31, 2023

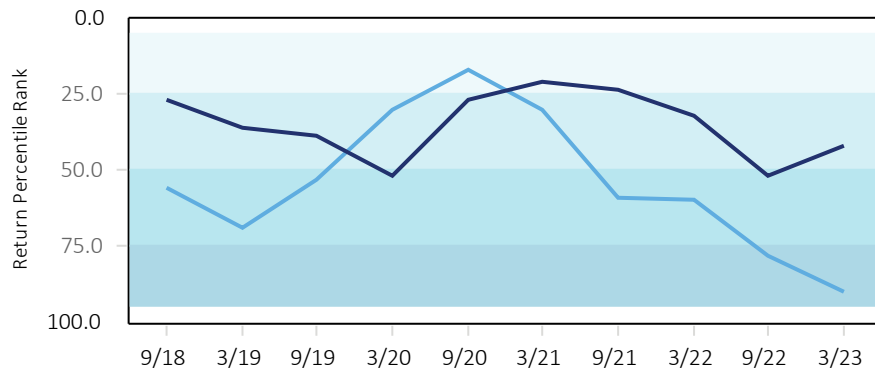
### Comparative Performance



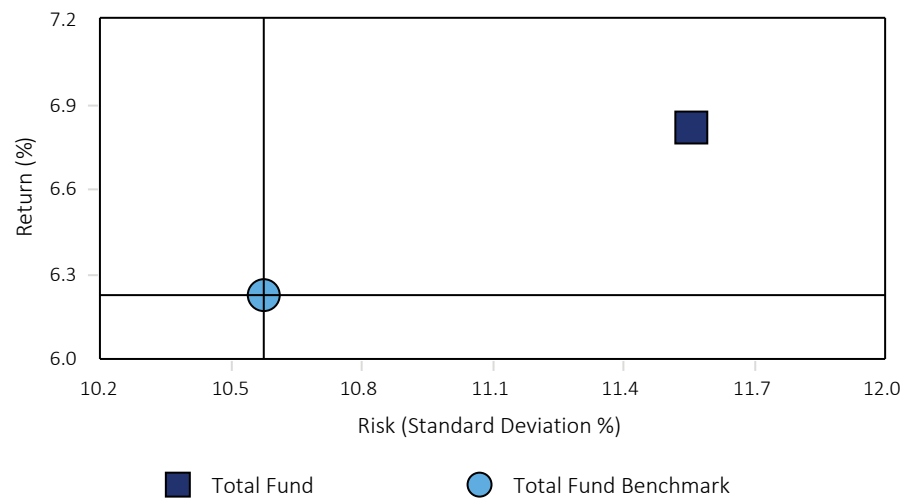
### Added Value History



### Rolling Percentile Rank : All Public Plans > \$1B - Total Fund



### Risk and Return 04/01/18 - 03/31/23

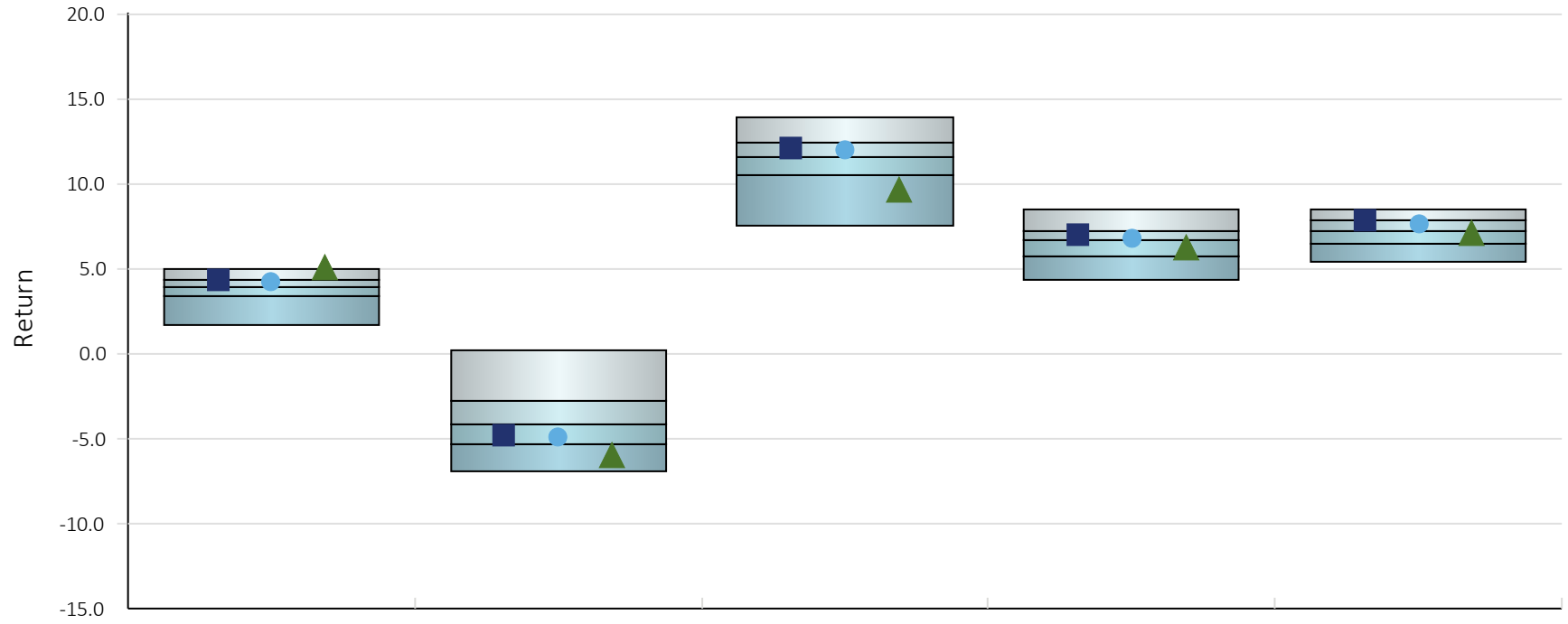


	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
— Total Fund	10	2 (20%)	6 (60%)	2 (20%)	0 (0%)
— Total Fund Benchmark	10	1 (10%)	2 (20%)	5 (50%)	2 (20%)

# Plan Sponsor Peer Group Analysis

Total Fund vs All Public Plans > \$1B-Total Fund(Gross)

Periods Ended March 31, 2023



	QTD	1 Year	3 Years	5 Years	10 Years
■ Total Fund	4.35 (29)	-4.79 (63)	12.18 (36)	7.00 (31)	7.84 (26)
● Total Fund - Net	4.30 (31)	-4.93 (65)	12.00 (42)	6.82 (44)	7.63 (33)
▲ Total Fund Benchmark	5.11 (4)	-6.01 (90)	9.69 (90)	6.23 (64)	7.14 (56)
5th Percentile	5.02	0.17	13.93	8.54	8.49
1st Quartile	4.41	-2.78	12.50	7.19	7.84
Median	3.89	-4.11	11.61	6.72	7.22
3rd Quartile	3.35	-5.30	10.56	5.72	6.49
95th Percentile	1.71	-6.88	7.60	4.35	5.40
Population	105	98	96	95	89

Total Fund Benchmark = 35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18.0% MSCI ACWI ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1.0% 90 Day US Treasury Bill

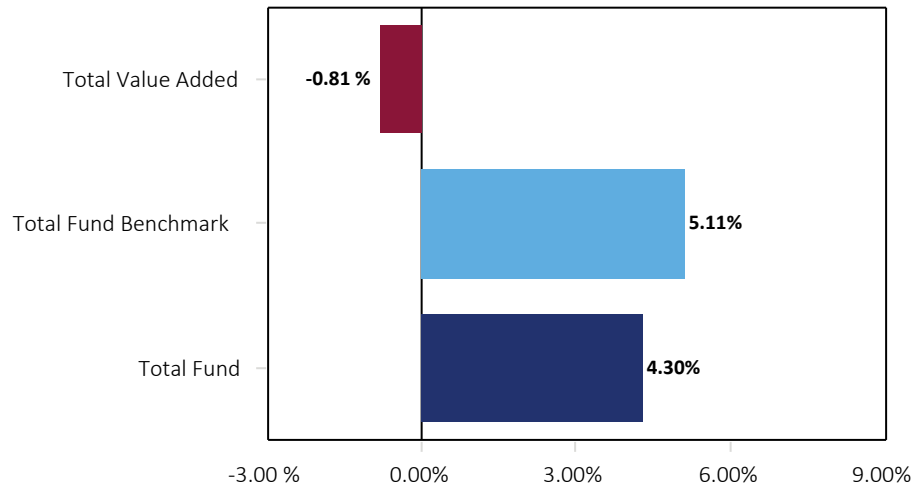


# Total Fund Attribution

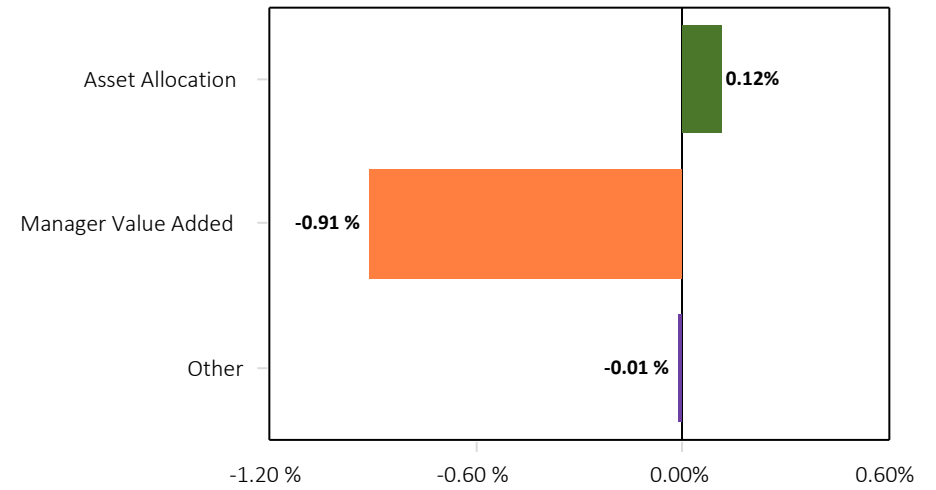
Total Fund

1 Quarter Ending March 31, 2023

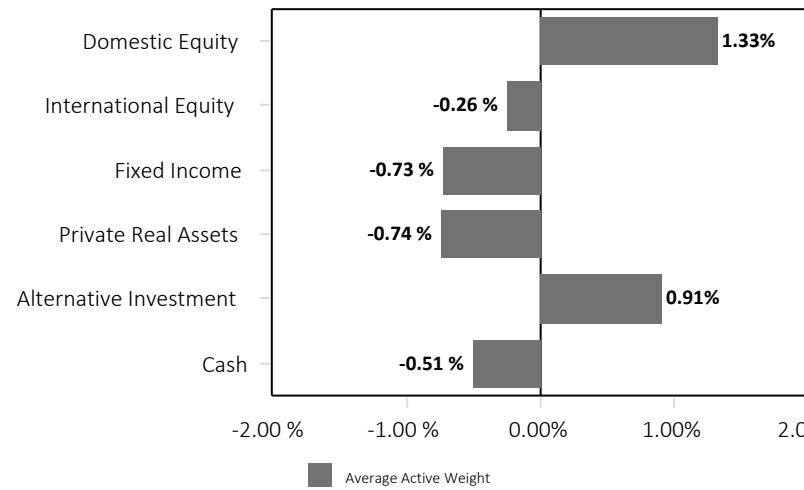
## Total Fund Performance



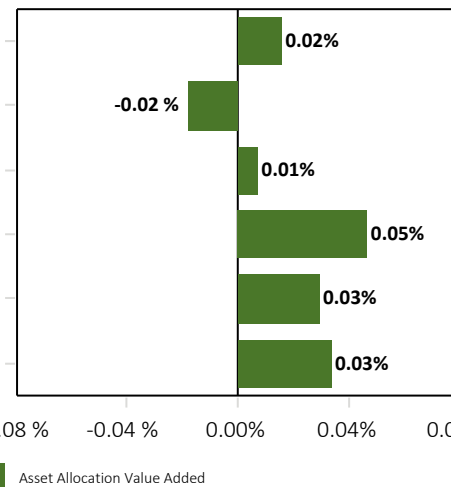
## Total Value Added: -0.81 %



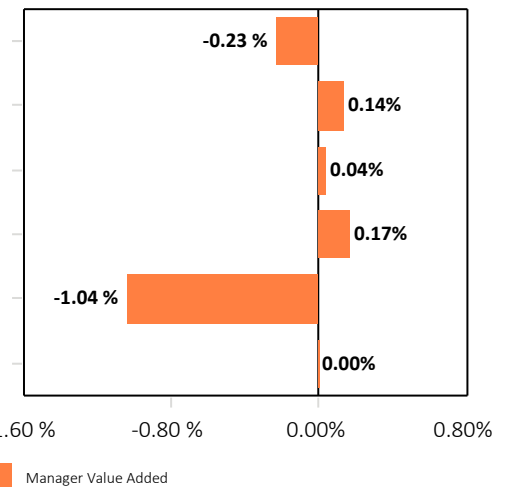
## Asset Class Under or Overweighting



## Asset Allocation Value Added: 0.12 %



## Total Manager Value Added: -0.91 %



Total Fund Benchmark = 35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18.0% MSCI ACWI ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1.0% 90 Day US Treasury Bill.

# Asset Class Returns

*Periods Ended March 31, 2023*

	Performance (%)								
	1 Quarter	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
<b>Total Fund</b>	<b>4.35</b>	<b>-4.79</b>	<b>12.18</b>	<b>7.00</b>	<b>7.84</b>	<b>8.51</b>	<b>8.16</b>	<b>9.62</b>	<b>1/1/1982</b>
Total Fund - Net	4.30	-4.93	12.00	6.82	7.63				
Total Fund Benchmark	5.11	-6.01	9.69	6.23	7.14	7.83			
<b>Domestic Equity</b>	<b>6.15</b>	<b>-8.50</b>	<b>19.24</b>	<b>9.65</b>	<b>11.29</b>	<b>10.65</b>	<b>9.96</b>	<b>11.43</b>	<b>1/1/1982</b>
Domestic Equity - Net	6.09	-8.65	19.04	9.45	11.06				
Custom Benchmark (U.S. Equity)	6.71	-8.48	18.63	10.54	11.76	10.59	9.70		
U.S. Equity IMRF Custom Benchmark	5.50	-8.95	18.12	9.37					
<b>International Equity</b>	<b>7.77</b>	<b>-4.11</b>	<b>13.20</b>	<b>3.22</b>	<b>5.45</b>	<b>8.63</b>	<b>7.24</b>	<b>7.43</b>	<b>9/1/1986</b>
International Equity - Net	7.68	-4.44	12.79	2.86	5.09				
MSCI AC World ex USA (Net)	6.87	-5.07	11.80	2.47	4.17	7.50			
International Equity IMRF Custom Benchmark	6.37	-6.04	11.46	2.12					
<b>Fixed Income</b>	<b>3.26</b>	<b>-3.64</b>	<b>-0.67</b>	<b>1.53</b>	<b>2.12</b>	<b>4.14</b>	<b>5.11</b>	<b>7.47</b>	<b>1/1/1982</b>
Fixed Income - Net	3.24	-3.72	-0.76	1.42	1.99				
Custom Benchmark (Fixed Income)	3.08	-3.64	-2.20	1.26	1.54	3.27	4.57	6.95	
Fixed Income IMRF Custom Benchmark	3.07	-3.94	-1.54	1.27					
<b>Private Real Assets</b>	<b>-1.25</b>	<b>4.00</b>						<b>5.17</b>	<b>3/1/2022</b>
Private Real Assets - Net	-1.27	3.94						5.11	
Custom Benchmark (Private Real Assets)	-3.03	-3.24						3.14	
<b>Real Estate</b>	<b>-1.61</b>	<b>3.66</b>	<b>11.05</b>	<b>10.41</b>	<b>10.60</b>	<b>8.21</b>	<b>7.11</b>	<b>6.00</b>	<b>5/1/1985</b>
Real Estate - Net	-1.63	3.59	10.98	10.37	10.57				
Blended Benchmark (Real Estate)	-3.33	-3.87	7.47	6.57	8.48	7.34	7.39	7.65	
<b>Agriculture</b>	<b>1.67</b>	<b>4.24</b>	<b>2.77</b>	<b>1.54</b>	<b>5.19</b>	<b>7.71</b>		<b>6.58</b>	<b>10/1/1997</b>
NCREIF Farmland Index	2.08	9.05	7.59	6.56	8.48	12.57		11.18	

Benchmark definitions are on the following pages.

Real Estate, Private Equity, Agriculture, Timberland, Unlisted Infrastructure returns shown are gross of fees

# Asset Class Returns

*Periods Ended March 31, 2023*

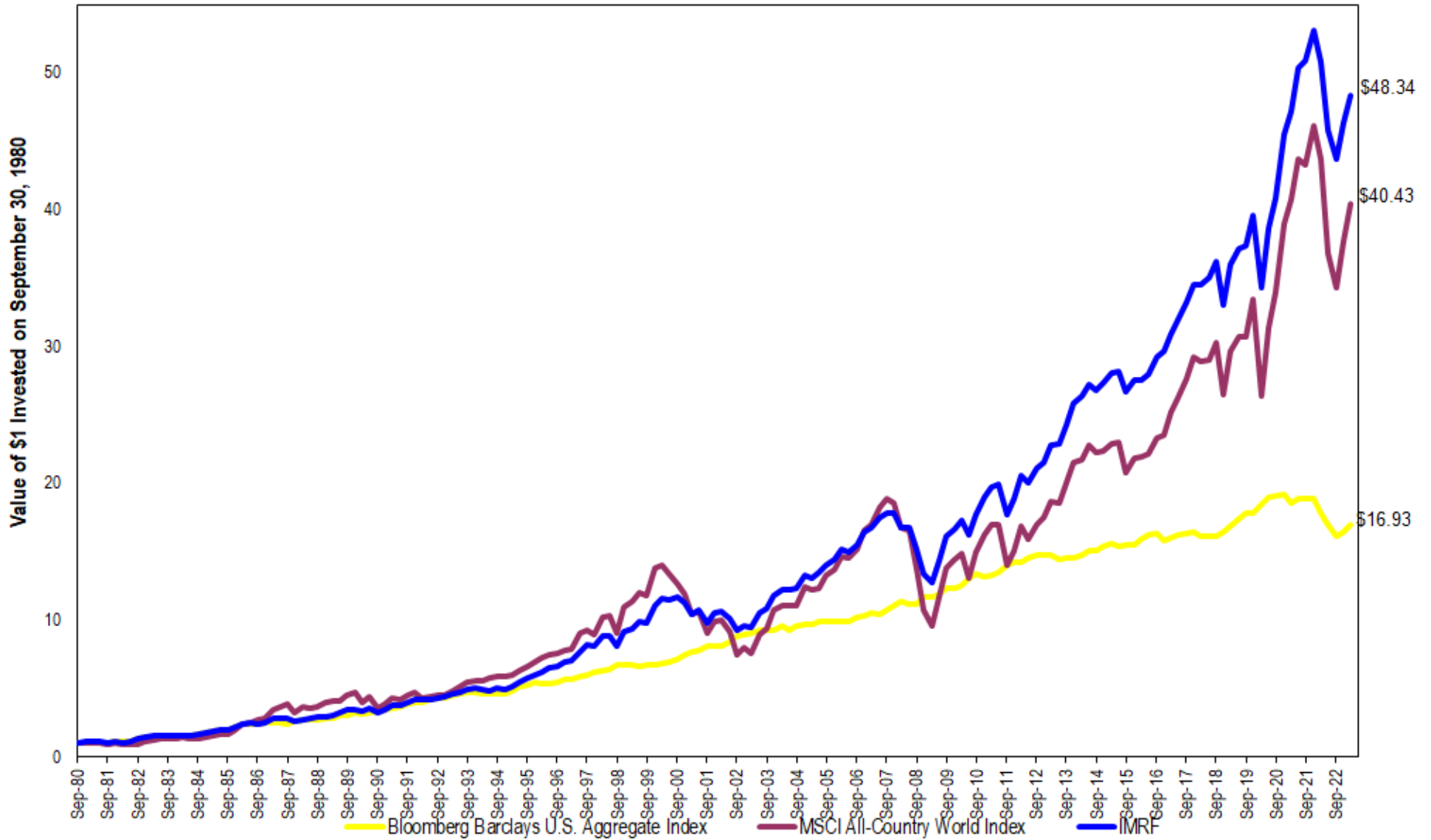
	Performance (%)								
	1 Quarter	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
<b>Timberland</b>	-1.05	14.59	2.84	1.89	3.56	3.44	6.84	6.95	10/1/1992
NCREIF Timberland Index	1.75	11.31	8.09	5.54	5.82	7.04	7.85	8.50	
<b>Unlisted Infrastructure</b>	5.92	11.39	15.42	12.68				12.68	4/1/2018
Blended Benchmark (Unlisted Infrastructure)	2.70	9.18	9.40	9.24				9.24	
<b>Alternatives Investments</b>	0.54	-0.57	19.25	16.76	12.95	10.71	12.82	11.49	2/1/1986
Alternatives Investments - Net	0.54	-0.57	19.23	16.70	12.76				
Custom Benchmark (Alternative Investments)	10.23	-14.68	1.64	4.52	6.74	8.97	10.92	11.70	
<b>Private Equity</b>	0.52	-0.18	22.56	19.82	15.99	13.50	15.49	13.77	2/1/1986
Blended Benchmark (Private Equity)	10.58	-15.69	1.30	4.31	6.63	8.91			
<b>Cash</b>	1.20	3.44	2.86	2.97	1.81	1.38	3.02	3.74	7/1/1986
90 Day U.S. Treasury Bill	1.07	2.50	0.89	1.41	0.86	1.27	2.35	3.09	

Benchmark definitions are on the following pages.

Real Estate, Private Equity, Agriculture, Timberland, Unlisted Infrastructure returns shown are gross of fees.

Private Equity and Blended Benchmark (Private Equity) returns are 1 quarter lagged.

Growth of a Dollar - As of March 31, 2023



# Investment Manager Asset Allocation

*Periods Ended March 31, 2023*

	Dec-2022		Mar-2023	
	\$	%	\$	%
<b>Domestic Equity</b>	<b>17,448,903,100</b>	<b>36.45</b>	<b>18,037,864,656</b>	<b>36.45</b>
<b>Large Cap Growth</b>	<b>2,944,288,673</b>	<b>6.15</b>	<b>3,411,535,102</b>	<b>6.89</b>
Sands Capital	1,201,012,297	2.51	1,417,919,641	2.87
Xponance Russell 1000 G	1,743,276,376	3.64	1,993,615,462	4.03
<b>Large Cap Value</b>	<b>4,631,558,697</b>	<b>9.67</b>	<b>4,371,812,163</b>	<b>8.83</b>
Dodge & Cox	1,728,993,204	3.61	1,747,504,129	3.53
LSV Asset	1,418,302,933	2.96	1,257,641,452	2.54
NTGI S&P 500 Value	1,484,262,560	3.10	1,366,666,582	2.76
<b>Large Cap Pass. Core</b>	<b>1,945,750,947</b>	<b>4.06</b>	<b>1,986,032,436</b>	<b>4.01</b>
NTGI MarketCap Idx.	1,945,750,947	4.06	1,986,032,436	4.01
<b>Factor Diversity Strategies</b>	<b>2,318,030,533</b>	<b>4.84</b>	<b>2,484,085,458</b>	<b>5.02</b>
U.S. Large Cap FDP-GSAM	2,318,030,533	4.84	2,484,085,458	5.02
<b>Quantitative Factor Strategies</b>	<b>2,155,151,638</b>	<b>4.50</b>	<b>2,224,054,962</b>	<b>4.49</b>
Quantitative US Equity - SciBeta	2,155,151,638	4.50	2,224,054,962	4.49
<b>Small Cap Growth</b>	<b>679,167,546</b>	<b>1.42</b>	<b>734,171,475</b>	<b>1.48</b>
Frontier Capital	679,167,546	1.42	734,171,475	1.48
<b>Small Cap Value</b>	<b>1,399,941,970</b>	<b>2.92</b>	<b>1,427,016,424</b>	<b>2.88</b>
Channing	285,902,968	0.60	296,972,560	0.60
DFA Small Cap Val.	532,395,280	1.11	536,804,731	1.08
William Blair Small Cap Value	581,643,721	1.21	593,239,133	1.20

# Investment Manager Asset Allocation

*Periods Ended March 31, 2023*

	Dec-2022		Mar-2023	
	\$	%	\$	%
<b>Public Real Assets</b>	<b>1,375,013,095</b>	<b>2.87</b>	<b>1,399,156,635</b>	<b>2.83</b>
Brookfield	384,584,077	0.80	398,861,484	0.81
Cohen & Steers	990,429,018	2.07	1,000,295,151	2.02
<b>International Equity</b>	<b>8,387,346,009</b>	<b>17.52</b>	<b>9,038,362,962</b>	<b>18.26</b>
<b>Intl Large Cap Growth</b>	<b>1,392,016,238</b>	<b>2.91</b>	<b>1,508,036,352</b>	<b>3.05</b>
EARNEST Part. Intl	568,088,257	1.19	609,641,109	1.23
William Blair	823,927,981	1.72	898,395,243	1.82
<b>Intl Large Cap Value</b>	<b>1,267,341,613</b>	<b>2.65</b>	<b>1,395,967,617</b>	<b>2.82</b>
Brandes Investment	571,218,749	1.19	635,988,594	1.29
Mondrian	572,193,568	1.20	623,129,087	1.26
Lazard	123,929,296	0.26	136,849,936	0.28
<b>Intl Large Cap Core</b>	<b>4,049,262,218</b>	<b>8.46</b>	<b>4,346,698,640</b>	<b>8.78</b>
Arrowstreet Capital	1,002,514,846	2.09	1,072,670,685	2.17
Brown Capital	464,085,668	0.97	513,762,612	1.04
GlobeFlex Capital	790,620,542	1.65	841,043,484	1.70
Xponance Intl EQ	88,657,644	0.19	97,014,762	0.20
Transition Account	188,525	0.00	69,599	0.00
Progress Intl Equity	592,962	0.00	599,172	0.00
NTGI ACWI ex US Index Fund	1,702,602,031	3.56	1,821,538,327	3.68
<b>Intl All Cap Developed</b>	<b>144,466,592</b>	<b>0.30</b>	<b>155,475,320</b>	<b>0.31</b>
Ativo International	144,466,592	0.30	155,475,320	0.31
<b>Internationall Small Cap</b>	<b>502,629,501</b>	<b>1.05</b>	<b>542,865,440</b>	<b>1.10</b>
Franklin Templeton	199,582,016	0.42	215,855,333	0.44

# Investment Manager Asset Allocation

*Periods Ended March 31, 2023*

	<b>Dec-2022</b>		<b>Mar-2023</b>	
	<b>\$</b>	<b>%</b>	<b>\$</b>	<b>%</b>
William Blair IntSC	303,047,485	0.63	327,010,107	0.66
<b>Emerging Mkt Equity</b>	<b>1,031,629,847</b>	<b>2.15</b>	<b>1,089,319,592</b>	<b>2.20</b>
Genesis Investment Management, LLP.	1,031,629,847	2.15	683,979,442	1.38
Arrowstreet EME		0.00	405,340,151	0.82

# Investment Manager Asset Allocation

*Periods Ended March 31, 2023*

	Dec-2022		Mar-2023	
	\$	%	\$	%
<b>Fixed Income</b>	<b>12,027,573,713</b>	<b>25.12</b>	<b>12,309,642,246</b>	<b>24.87</b>
<b>Domestic Fixed Core</b>	<b>3,738,475,455</b>	<b>7.81</b>	<b>3,822,644,684</b>	<b>7.72</b>
Attucks Fixed Income	86,159,511	0.18	89,026,673	0.18
Brandes FI Core	332,122,012	0.69	339,521,154	0.69
EARNEST Partners	888,905,464	1.86	906,895,810	1.83
Garcia Hamilton	954,134,051	1.99	980,726,152	1.98
Ramirez Asset Management	517,063,703	1.08	529,455,223	1.07
Xponance Yield Advantage Agg.	960,090,715	2.01	977,019,672	1.97
<b>Domestic Fixed Passive Core</b>	<b>2,699,434,195</b>	<b>5.64</b>	<b>2,782,322,635</b>	<b>5.62</b>
NTGI Blmbg Agg.	1,100,651,759	2.30	1,132,899,530	2.29
BlackRock US Debt I	1,598,782,435	3.34	1,649,423,105	3.33
<b>Domestic Fixed Core Plus</b>	<b>2,908,690,745</b>	<b>6.08</b>	<b>2,971,071,147</b>	<b>6.00</b>
LM Capital Group FI	836,206,981	1.75	852,931,652	1.72
Progress Inv. FI	1,101	0.00	1,121	0.00
Loop Capital Management	567,833,210	1.19	580,170,820	1.17
Western Asset	941,743,453	1.97	962,326,994	1.94
Longfellow Core Plus	562,906,000	1.18	575,640,560	1.16
<b>Bank Loans</b>	<b>1,616,072,322</b>	<b>3.38</b>	<b>1,643,191,238</b>	<b>3.32</b>
Barings Global Loan Fund	1,616,072,322	3.38	1,643,191,238	3.32
<b>Emerging Markets Debt</b>	<b>413,942</b>	<b>0.00</b>	<b>362,578</b>	<b>0.00</b>
Standish-Mellon EMD	413,942	0.00	362,578	0.00
<b>High Yield</b>	<b>1,064,487,054</b>	<b>2.22</b>	<b>1,090,049,964</b>	<b>2.20</b>
MacKay Shields	1,064,487,054	2.22	1,090,049,964	2.20



# Investment Manager Asset Allocation

*Periods Ended March 31, 2023*

	Dec-2022		Mar-2023	
	\$	%	\$	%
<b>Private Real Assets</b>	<b>4,791,842,770</b>	<b>10.01</b>	<b>4,799,850,715</b>	<b>9.70</b>
<b>Real Estate</b>	<b>4,362,776,353</b>	<b>9.11</b>	<b>4,372,373,550</b>	<b>8.84</b>
<b>Real Estate Core Cmp</b>	<b>2,350,380,042</b>	<b>4.91</b>	<b>2,289,223,276</b>	<b>4.63</b>
TA Assoc. Buckhead	900,720,750	1.88	886,346,978	1.79
Barings Euro Core Property	141,907,419	0.30	137,906,644	0.28
Blackstone Property Euro	184,852,309	0.39	183,870,646	0.37
INVESCO Core Real Estate	250,478,467	0.52	248,625,899	0.50
INVESCO European real estate	56,881,071	0.12	57,897,583	0.12
AEW Core Property Tr	288,235,321	0.60	286,024,825	0.58
CBRE Core Partners	333,822,479	0.70	303,329,032	0.61
JPM Strategic Property Fund	193,482,226	0.40	185,221,668	0.37
<b>RE Non-Core Cmp</b>	<b>2,012,396,311</b>	<b>4.20</b>	<b>2,083,150,275</b>	<b>4.21</b>
Artemis MWBE Spruce	327,294,956	0.68	317,844,239	0.64
Franklin T. EMREFF	2,870,680	0.01	2,771,341	0.01
Security Capital	93,311,385	0.19	90,360,245	0.18
Dune II	7,607,645	0.02	7,650,902	0.02
Non-Core Real Estate Funds	1,340,145,446	2.80	1,407,253,987	2.84
Non-Core Intl Real Estate	241,086,483	0.50	257,192,826	0.52
Almanac ARS V	79,717	0.00	76,735	0.00
<b>Agriculture</b>	<b>247,585,848</b>	<b>0.52</b>	<b>251,723,757</b>	<b>0.51</b>
Premiere Partners IV	247,585,848	0.52	251,723,757	0.51
<b>Timberland</b>	<b>63,349,367</b>	<b>0.13</b>	<b>62,682,276</b>	<b>0.13</b>
Forest Investment	63,349,367	0.13	62,682,276	0.13
<b>Unlisted Infrastructure</b>	<b>118,131,202</b>	<b>0.25</b>	<b>113,071,132</b>	<b>0.23</b>
Unlisted Infrastructure Funds	118,131,202	0.25	113,071,132	0.23

# Investment Manager Asset Allocation

*Periods Ended March 31, 2023*

	Dec-2022		Mar-2023	
	\$	%	\$	%
<b>Alternatives Investments</b>	<b>5,097,683,692</b>	<b>10.65</b>	<b>5,203,863,529</b>	<b>10.52</b>
<b>Absolute Return</b>	<b>75,952</b>	<b>0.00</b>	<b>77,994</b>	<b>0.00</b>
Aurora Investment	75,952	0.00	77,994	0.00
<b>Private Equity</b>	<b>4,924,786,019</b>	<b>10.29</b>	<b>5,023,846,983</b>	<b>10.15</b>
<b>Abbott S/A Comp.</b>	<b>507,256,863</b>	<b>1.06</b>	<b>497,863,913</b>	<b>1.01</b>
Muller Monroe MPEFF	1	0.00	1	0.00
<b>Pantheon S/A Comp.</b>	<b>416,250,559</b>	<b>0.87</b>	<b>408,891,982</b>	<b>0.83</b>
Private Equity Fund - Domestic	3,255,891,125	6.80	3,309,737,538	6.69
Private Equity Fund - International	536,451,555	1.12	585,413,600	1.18
Oakbrook Opportunities Fund	208,935,917	0.44	221,939,948	0.45
<b>Private Credit</b>	<b>172,821,721</b>	<b>0.36</b>	<b>179,938,552</b>	<b>0.36</b>
Private Credit Fund - Domestic	172,821,721	0.36	179,938,552	0.36
<b>Cash &amp; Equivalents</b>	<b>121,363,972</b>	<b>0.25</b>	<b>97,300,539</b>	<b>0.20</b>
<b>Total Fund</b>	<b>47,874,713,254</b>	<b>100.00</b>	<b>49,486,884,647</b>	<b>100.00</b>

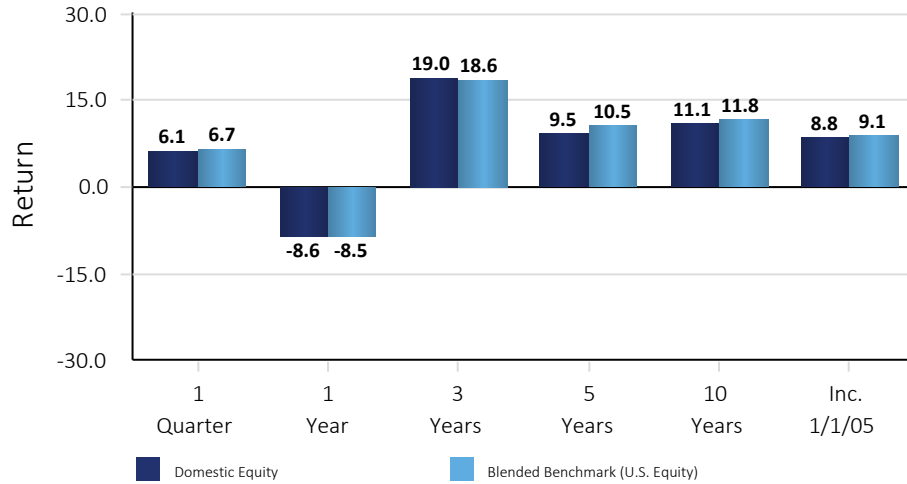
# Domestic Equity

# Composite Performance Summary

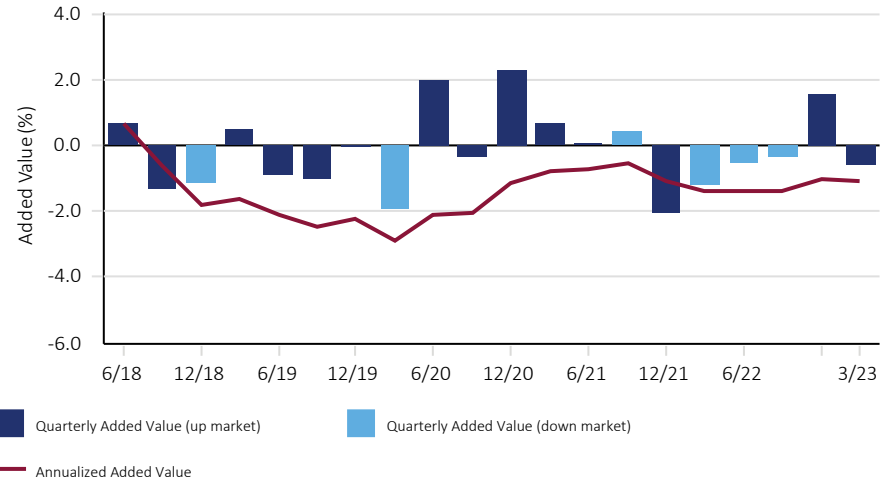
## Domestic Equity

Periods Ended March 31, 2023

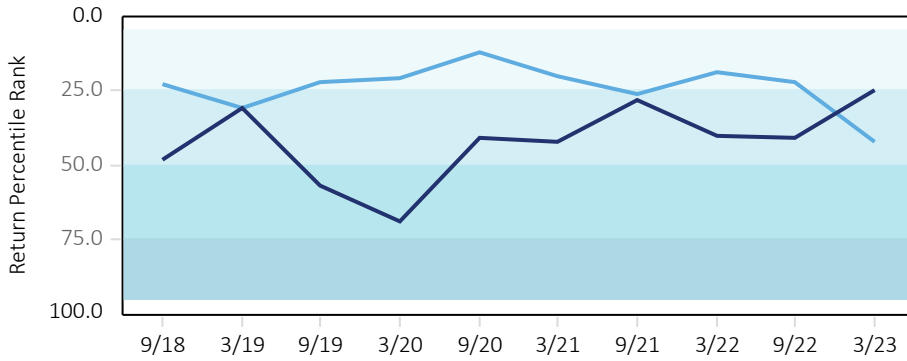
### Comparative Performance



### Added Value History

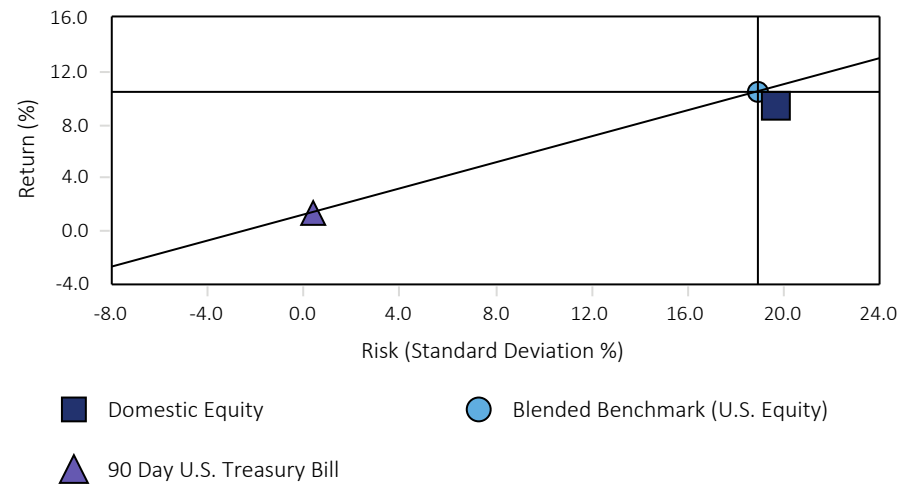


### Rolling Percentile Rank: All Public Plans > \$1B-US Equity Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
— Domestic Equity	10	1 (10%)	7 (70%)	2 (20%)	0 (0%)
— Benchmark	10	7 (70%)	3 (30%)	0 (0%)	0 (0%)

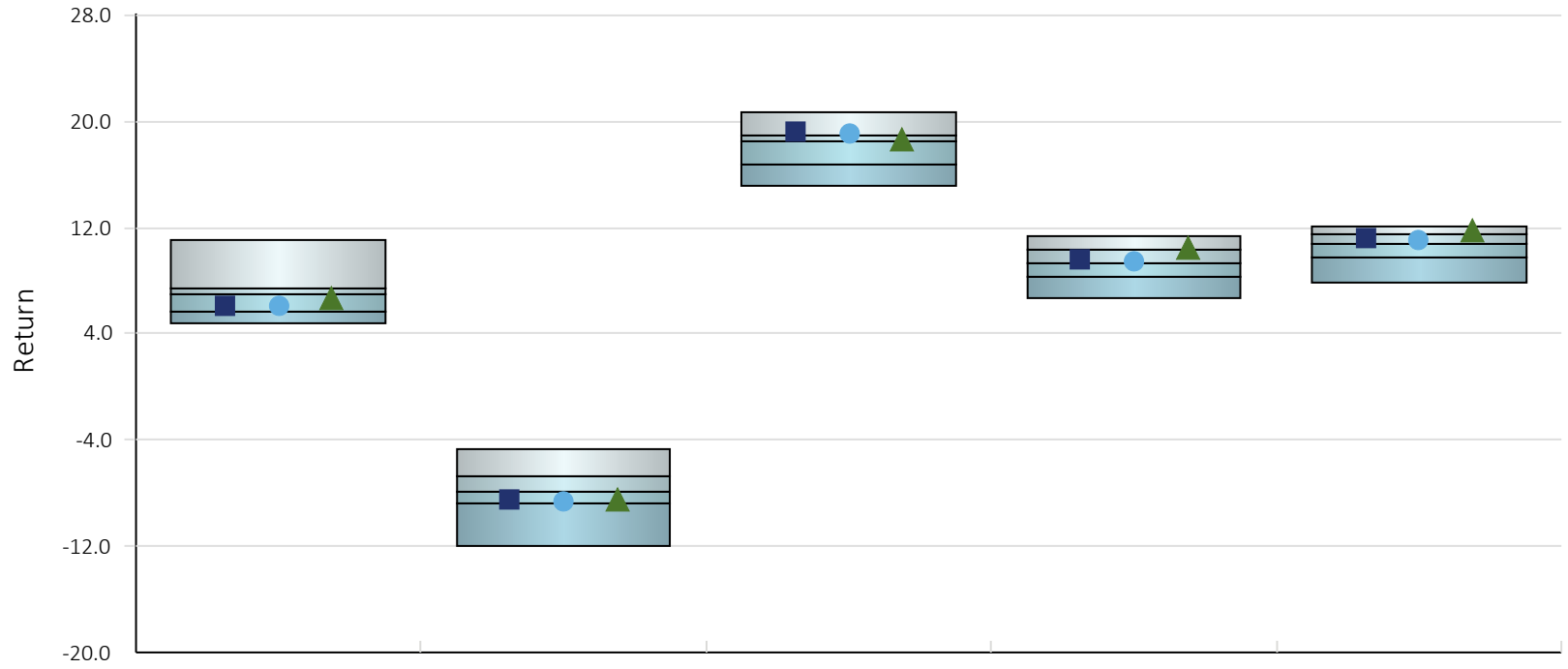
### Risk and Return 04/1/18 - 03/31/23



# Plan Sponsor Peer Group Analysis

Domestic Equity vs All Public Plans > \$1B-US Equity Segment(Gross)

Periods Ended March 31, 2023



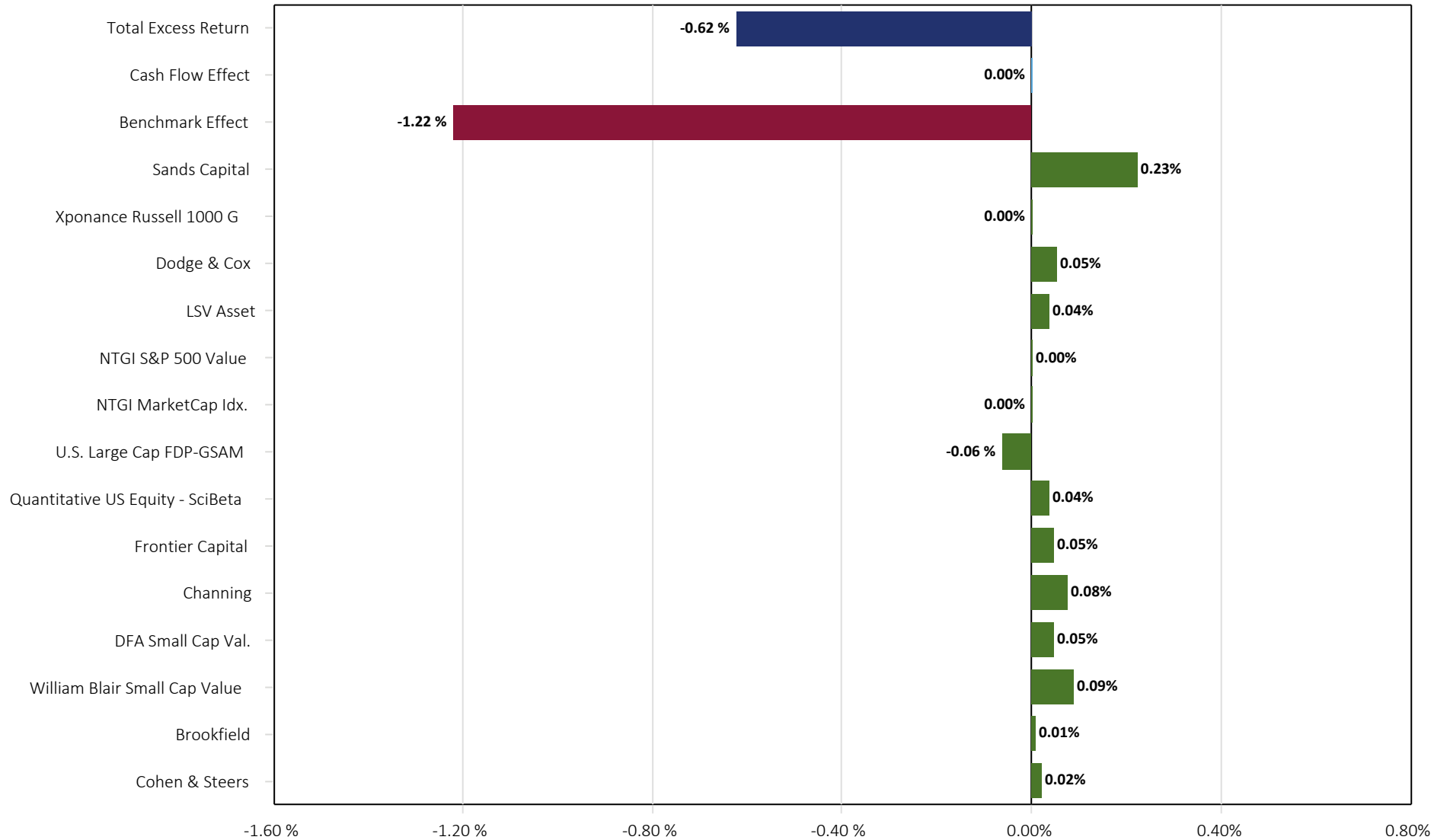
	QTD	1 Year	3 Years	5 Years	10 Years
Domestic Equity	6.15 (67)	-8.50 (66)	19.24 (24)	9.65 (41)	11.29 (35)
Domestic Equity - Net	6.09 (70)	-8.65 (70)	19.04 (25)	9.45 (45)	11.06 (43)
Blended Benchmark (U.S. Equity)	6.71 (53)	-8.48 (66)	18.63 (42)	10.54 (18)	11.76 (17)
5th Percentile	11.08	-4.64	20.66	11.38	12.09
1st Quartile	7.41	-6.74	19.01	10.28	11.45
Median	6.96	-7.91	18.45	9.32	10.76
3rd Quartile	5.71	-8.81	16.81	8.29	9.82
95th Percentile	4.86	-11.97	15.09	6.67	7.88
Population	46	43	38	37	28

# Asset Class Attribution

## Domestic Equity

Periods Ended 1 Quarter Ending March 31, 2023

### 1 Quarter



# Performance

## Domestic Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Domestic Equity</b>	<b>18,037,864,656</b>	<b>6.15</b>	<b>-8.50</b>	<b>19.24</b>	<b>9.65</b>	<b>11.29</b>	<b>11.43</b>	<b>1/1/1982</b>
Domestic Equity - Net		6.09	-8.65	19.04	9.45	11.06		
Blended Benchmark (U.S. Equity)		6.71	-8.48	18.63	10.54	11.76		
Russell 3000 Index		7.18	-8.58	18.48	10.45	11.73	11.37	
U.S. Equity IMRF Custom Benchmark		5.50	-8.95	18.12	9.37			
<b>Large Cap Equity</b>	<b>12,253,465,159</b>	<b>7.59</b>	<b>-9.20</b>	<b>18.23</b>	<b>10.05</b>	<b>11.78</b>	<b>11.14</b>	<b>1/1/1982</b>
Large Cap Equity - Net		7.57	-9.28	18.13	9.95	11.66		
Russell 1000 Index		7.46	-8.39	18.55	10.87	12.01	11.53	
<b>Large Cap Growth</b>	<b>3,411,535,102</b>	<b>15.87</b>	<b>-13.75</b>	<b>16.27</b>	<b>12.34</b>	<b>13.59</b>	<b>11.91</b>	<b>1/1/1982</b>
Large Cap Growth - Net		15.84	-13.84	16.17	12.24	13.45		
LCG Blended Benchmark*		14.37	-10.90	18.58	13.66	14.59		
Russell 1000 Growth Index		14.37	-10.90	18.58	13.66	14.59	11.35	
<b>Xponance Russell 1000 G</b>	<b>1,993,615,462</b>	<b>14.36</b>	<b>-10.90</b>	<b>18.57</b>			<b>11.66</b>	<b>10/1/2018</b>
Xponance Russell 1000 G - Net		14.35	-10.91	18.55			11.64	
Russell 1000 Growth Index		14.37	-10.90	18.58			11.66	
<b>Sands Capital</b>	<b>1,417,919,641</b>	<b>18.06</b>	<b>-23.10</b>	<b>6.14</b>	<b>7.19</b>	<b>11.48</b>	<b>10.73</b>	<b>11/1/2003</b>
Sands Capital - Net		18.00	-23.28	5.90	6.95	11.24		
LCG Blended Benchmark*		14.37	-10.90	18.58	13.66	14.59	10.59	
Russell 1000 Growth Index		14.37	-10.90	18.58	13.66	14.59	10.63	

\* The LCG Blended Benchmark is currently the Russell 1000 Growth Index. Returns prior to January 1, 2006, reflect those the S&P 500/Citigroup Growth Index.

\*\* The LCV Blended Benchmark is currently the Russell 1000 Value Index. Returns prior to January 1, 2006, reflect those of the S&P 500/Citigroup Value Index.

\*\*\* Public Real Assets benchmark is 1/3 Dow Jones Global Infrastructure Composite Index + 2/3 FTSE Global Core Infrastructure 50/50 Net Tax Index.

# Performance

## Domestic Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Large Cap Value</b>	<b>4,371,812,163</b>	<b>2.70</b>	<b>-3.44</b>	<b>21.18</b>	<b>8.36</b>	<b>10.54</b>	<b>10.22</b>	<b>10/1/1982</b>
Large Cap Value - Net		2.67	-3.58	21.01	8.19	10.36		
LCV Blended Benchmark**		1.01	-5.91	17.93	7.50	9.13		
Russell 1000 Value Index		1.01	-5.91	17.93	7.50	9.13	11.43	
<b>Dodge &amp; Cox</b>	<b>1,747,504,129</b>	<b>1.55</b>	<b>-6.43</b>	<b>23.05</b>	<b>9.50</b>	<b>11.52</b>	<b>9.71</b>	<b>9/1/2003</b>
Dodge & Cox - Net		1.50	-6.63	22.80	9.27	11.29		
LCV Blended Benchmark**		1.01	-5.91	17.93	7.50	9.13	8.17	
Russell 1000 Value Index		1.01	-5.91	17.93	7.50	9.13	8.30	
<b>LSV Asset</b>	<b>1,257,641,452</b>	<b>1.49</b>	<b>-3.03</b>	<b>21.31</b>	<b>6.76</b>	<b>10.26</b>	<b>10.37</b>	<b>2/1/2003</b>
LSV Asset - Net		1.43	-3.26	21.02	6.51	10.00		
LCV Blended Benchmark**		1.01	-5.91	17.93	7.50	9.13	8.93	
Russell 1000 Value Index		1.01	-5.91	17.93	7.50	9.13	8.94	
<b>NTGI S&amp;P 500 Value</b>	<b>1,366,666,582</b>	<b>5.21</b>	<b>-0.24</b>	<b>19.12</b>	<b>9.50</b>	<b>10.24</b>	<b>6.49</b>	<b>8/1/1999</b>
NTGI S&P 500 Value - Net		5.20	-0.24	19.11	9.49	10.23		
S&P 500 Value		5.17	-0.16	19.12	9.47	10.17	6.46	
<b>Large Cap Pass. Core</b>	<b>1,986,032,436</b>	<b>7.23</b>	<b>-8.76</b>	<b>18.35</b>	<b>10.35</b>	<b>11.71</b>	<b>11.06</b>	<b>1/1/1985</b>
Large Cap Pass. Core - Net		7.23	-8.76	18.34	10.34	11.70		
Dow Jones U.S. Total Stock Market Index		7.24	-8.77	18.34	10.32	11.64		
<b>NTGI MarketCap Idx.</b>	<b>1,986,032,436</b>	<b>7.23</b>	<b>-8.76</b>	<b>18.35</b>	<b>10.35</b>	<b>11.71</b>	<b>10.86</b>	<b>2/1/1985</b>
NTGI MarketCap Idx. - Net		7.23	-8.76	18.34	10.34	11.70		
Dow Jones U.S. Total Stock Market Index		7.24	-8.77	18.34	10.32	11.64		

\* The LCG Blended Benchmark is currently the Russell 1000 Growth Index. Returns prior to January 1, 2006, reflect those the S&P 500/Citigroup Growth Index.

\*\* The LCV Blended Benchmark is currently the Russell 1000 Value Index. Returns prior to January 1, 2006, reflect those of the S&P 500/Citigroup Value Index.

\*\*\* Public Real Assets benchmark is 1/3 Dow Jones Global Infrastructure Composite Index + 2/3 FTSE Global Core Infrastructure 50/50 Net Tax Index.



# Performance

## Domestic Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>Factor Diversity Strategies</b>	2,484,085,458	7.16	-7.02				8.72	8/18/2020
<b>U.S. Large Cap FDP-GSAM</b>	2,484,085,458	7.16	-7.02				8.72	8/18/2020
U.S. Large Cap FDP-GSAM - Net		7.15	-7.05				8.66	
Solactive GBS U.S. 1000 Index		7.60	-8.51				8.39	
GSAM Active Beta US. Large Cap FDC Index		7.20	-6.98				8.70	
<b>Quantitative Factor Strategies</b>	2,224,054,962	3.20	-4.18	18.08			8.30	9/17/2019
<b>Quantitative US Equity - SciBeta</b>	2,224,054,962	3.20	-4.18	18.08			8.30	9/17/2019
Quantitative US Equity - SciBeta - Net		3.18	-4.23	17.91			8.12	
SciBeta US Hi-Fctr-Intst Div Multi-Beta Multi-Strat Index		2.86	-5.41	16.90			7.33	

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\*\* The LCV Blended Benchmark is currently the Russell 1000 Value Index. Returns prior to January 1, 2006, reflect those of the S&P 500/Citigroup Value Index.

\*\*\* Public Real Assets benchmark is 1/3 Dow Jones Global Infrastructure Composite Index + 2/3 FTSE Global Core Infrastructure 50/50 Net Tax Index.

# Performance

## Domestic Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>Small Cap</b>	<b>2,161,187,899</b>	<b>3.94</b>	<b>-5.97</b>	<b>26.32</b>	<b>8.23</b>	<b>9.89</b>	<b>11.82</b>	<b>7/1/1988</b>
Small Cap Composite - Net		3.64	-6.56	25.49	7.56	9.26		
Russell 2000 Index		2.74	-11.61	17.51	4.71	8.04	8.93	
<b>Small Cap Growth</b>	<b>734,171,475</b>	<b>8.09</b>	<b>-7.01</b>	<b>25.44</b>	<b>10.54</b>	<b>11.52</b>	<b>12.74</b>	<b>7/1/1988</b>
Small Cap Growth - Net		7.34	-8.01	24.13	9.53	10.72		
Russell 2000 Growth Index		6.07	-10.60	13.36	4.26	8.49	7.70	
<b>Frontier Capital</b>	<b>734,171,475</b>	<b>8.09</b>	<b>-7.01</b>	<b>26.66</b>	<b>12.46</b>	<b>12.55</b>	<b>13.10</b>	<b>8/1/1988</b>
Frontier Capital - Net		7.34	-8.01	25.32	11.33	11.68		
Russell 2000 Growth Index		6.07	-10.60	13.36	4.26	8.49	7.77	
<b>Small Cap Value</b>	<b>1,427,016,424</b>	<b>1.93</b>	<b>-5.41</b>	<b>27.06</b>	<b>7.13</b>	<b>9.30</b>	<b>11.42</b>	<b>9/1/1989</b>
Small Cap Value - Net		1.85	-5.80	26.50	6.62	8.78		
Russell 2000 Value Index		-0.66	-12.96	21.01	4.55	7.22	9.45	
<b>Channing</b>	<b>296,972,560</b>	<b>3.87</b>	<b>-12.32</b>	<b>22.69</b>	<b>5.48</b>	<b>8.48</b>	<b>9.26</b>	<b>7/1/2011</b>
Channing - Net		3.75	-12.75	22.10	4.96	7.95	8.69	
Russell 2000 Value Index		-0.66	-12.96	21.01	4.55	7.22	7.77	
<b>DFA Small Cap Val.</b>	<b>536,804,731</b>	<b>0.83</b>	<b>-1.80</b>	<b>33.53</b>	<b>8.42</b>	<b>9.69</b>	<b>11.83</b>	<b>2/1/1996</b>
DFA Small Cap Val. - Net		0.76	-2.07	33.02	7.95	9.19		
Russell 2000 Value Index		-0.66	-12.96	21.01	4.55	7.22	8.88	
<b>William Blair Small Cap Value</b>	<b>593,239,133</b>	<b>1.99</b>	<b>-4.84</b>	<b>23.95</b>	<b>6.91</b>	<b>9.86</b>	<b>10.93</b>	<b>5/1/1999</b>
Inv. Couns. Maryland - Net		1.90	-5.30	23.36	6.38	9.33		
Russell 2000 Value Index		-0.66	-12.96	21.01	4.55	7.22	8.40	

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\*\* The LCV Blended Benchmark is currently the Russell 1000 Value Index. Returns prior to January 1, 2006, reflect those of the S&P 500/Citigroup Value Index.

\*\*\* Public Real Assets benchmark is 1/3 Dow Jones Global Infrastructure Composite Index + 2/3 FTSE Global Core Infrastructure 50/50 Net Tax Index.

# Performance

## Domestic Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>Public Real Assets</b>	<b>1,399,156,635</b>	<b>1.76</b>	<b>-5.60</b>	<b>12.06</b>	<b>7.45</b>		<b>6.16</b>	<b>8/1/2017</b>
Public Real Assets - Net		1.68	-5.89	11.67	7.03		5.75	
Public Real Assets Benchmark***		1.41	-7.18	10.93	5.78		4.33	
<b>Brookfield</b>	<b>398,861,484</b>	<b>3.71</b>	<b>-3.61</b>	<b>15.32</b>	<b>7.37</b>		<b>5.34</b>	<b>8/1/2017</b>
Brookfield - Net		3.61	-3.97	14.78	6.84		4.83	
Dow Jones Brookfield Global Infrastructure Composi		3.10	-6.05	12.18	5.64		3.72	
<b>Cohen &amp; Steers</b>	<b>1,000,295,151</b>	<b>1.00</b>	<b>-6.24</b>	<b>11.05</b>	<b>7.72</b>		<b>6.76</b>	<b>8/1/2017</b>
Cohen & Steers - Net		0.93	-6.48	10.70	7.34		6.39	
FTSE Global Core Infrastructure 50/50 Index (Net)		0.55	-7.77	10.27	5.81		4.60	

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\*\* The LCV Blended Benchmark is currently the Russell 1000 Value Index. Returns prior to January 1, 2006, reflect those of the S&P 500/Citigroup Value Index.

\*\*\* Public Real Assets benchmark is 1/3 Dow Jones Global Infrastructure Composite Index + 2/3 FTSE Global Core Infrastructure 50/50 Net Tax Index.

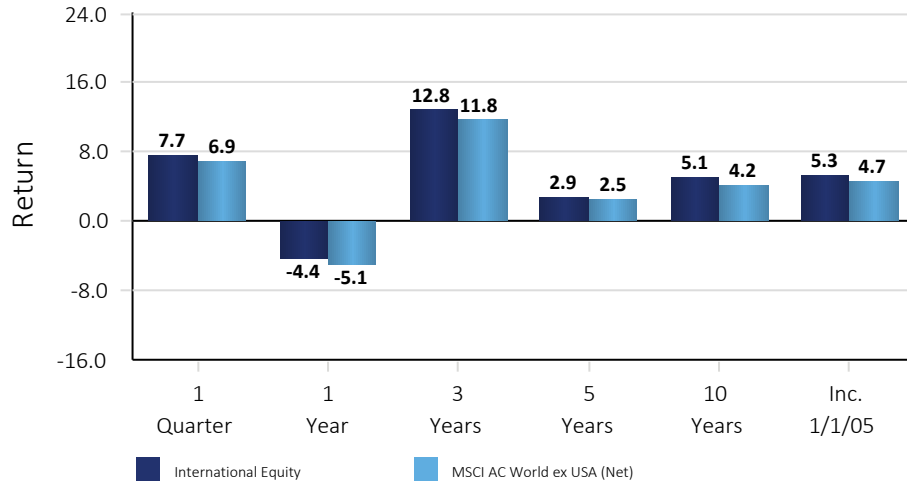
# International Equity

# Composite Performance Summary

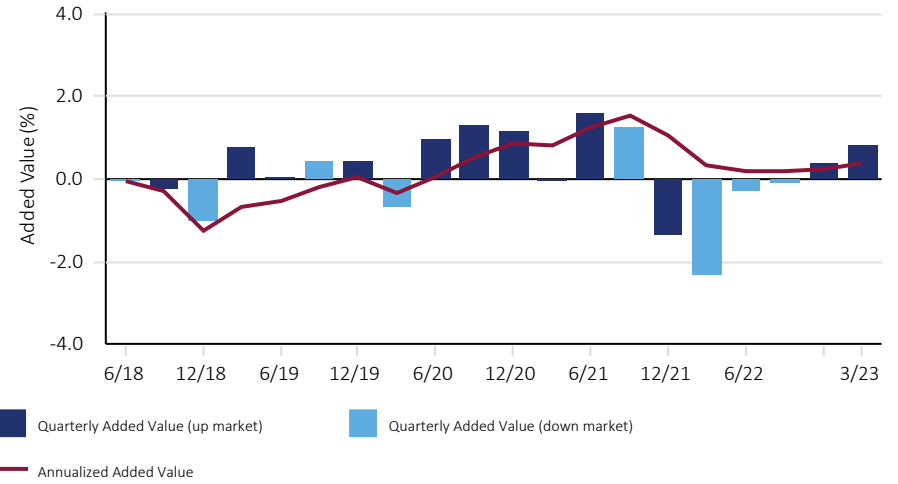
## International Equity

Periods Ended March 31, 2023

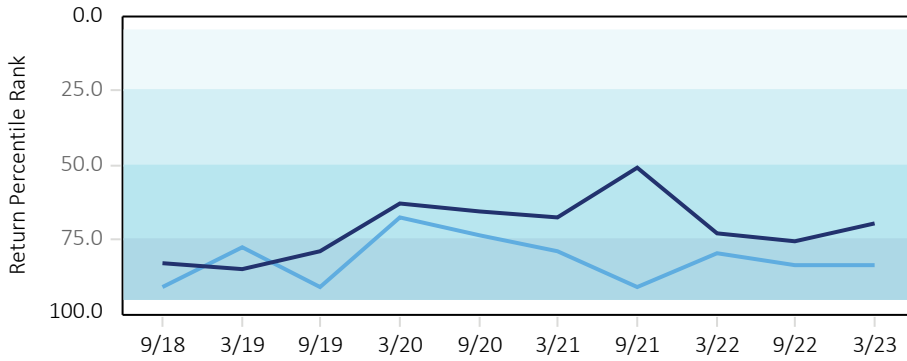
### Comparative Performance



### Added Value History

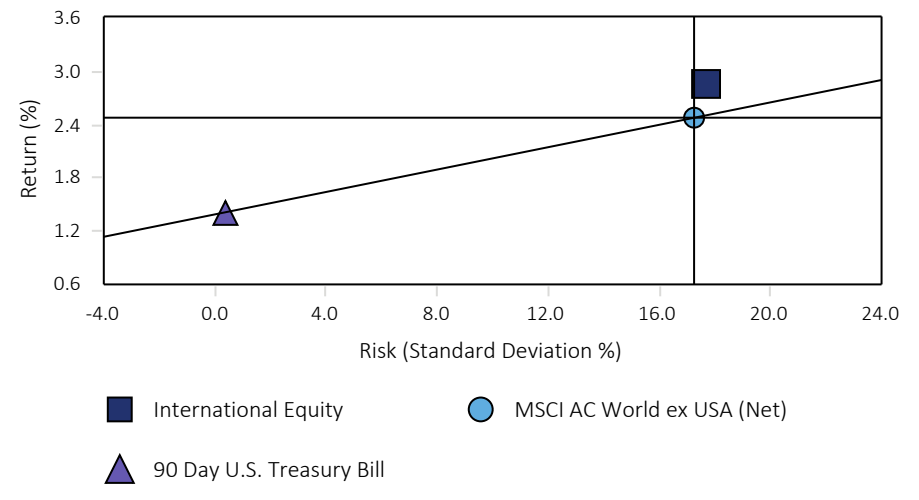


### Rolling Percentile Rank: All Public Plans > \$1B-Intl. Equity Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
International Equity	10	0 (0%)	0 (0%)	6 (60%)	4 (40%)
Benchmark	10	0 (0%)	0 (0%)	2 (20%)	8 (80%)

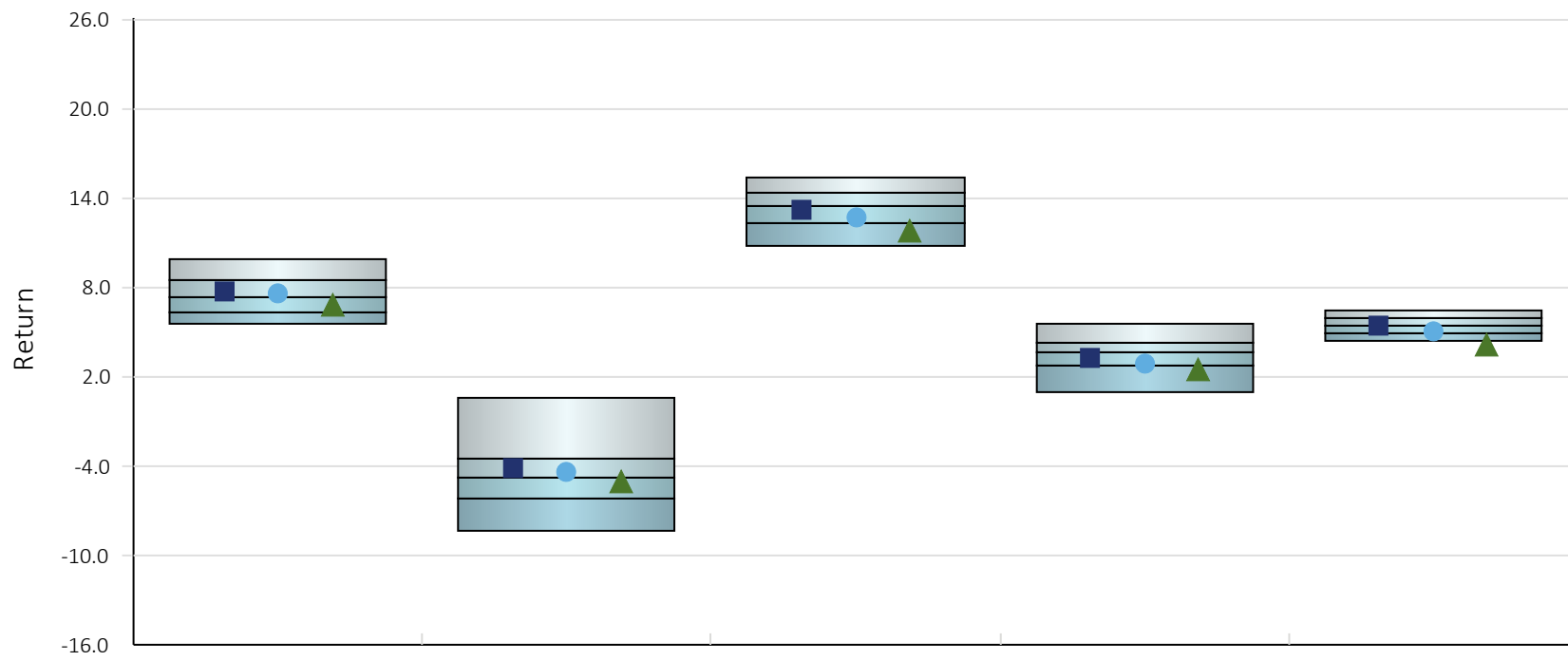
### Risk and Return 04/1/18 - 03/31/23



# Plan Sponsor Peer Group Analysis

International Equity vs All Public Plans > \$1B-Intl. Equity Segment(Gross)

Periods Ended March 31, 2023



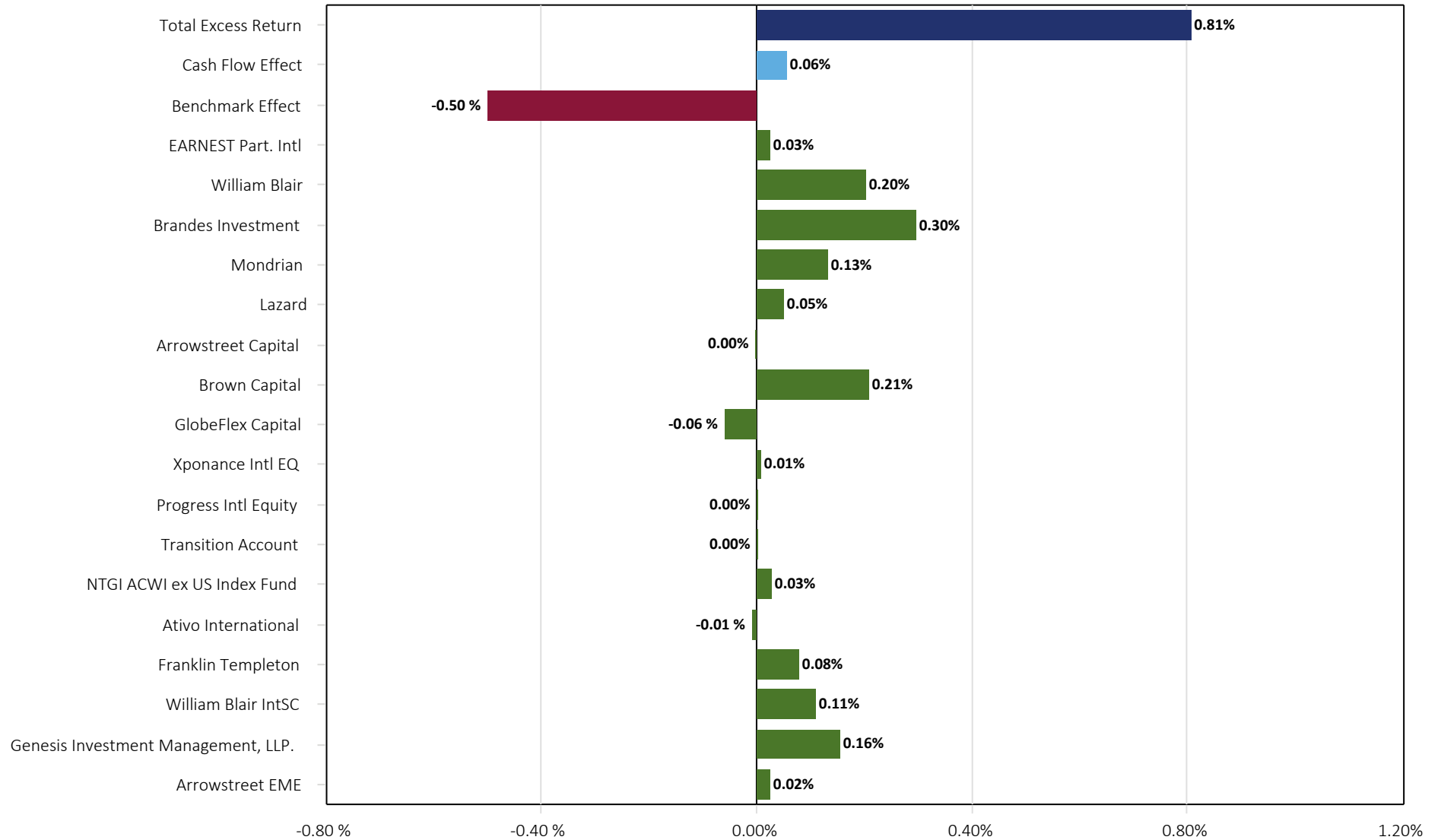
	QTD	1 Year	3 Years	5 Years	10 Years
■ International Equity	7.77 (36)	-4.11 (38)	13.20 (57)	3.22 (60)	5.45 (51)
● International Equity - Net	7.68 (37)	-4.44 (41)	12.79 (70)	2.86 (64)	5.09 (68)
▲ MSCI AC World ex USA (Net)	6.87 (63)	-5.07 (61)	11.80 (84)	2.47 (82)	4.17 (100)
5th Percentile	9.86	0.61	15.41	5.60	6.50
1st Quartile	8.50	-3.47	14.37	4.25	6.00
Median	7.34	-4.74	13.49	3.72	5.45
3rd Quartile	6.28	-6.16	12.39	2.74	4.89
95th Percentile	5.56	-8.35	10.80	1.02	4.43
Population	45	45	41	40	32

# Asset Class Attribution

## International Equity

Periods Ended 1 Quarter Ending March 31, 2023

### 1 Quarter



# Performance

## International Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>International Equity</b>	<b>9,038,362,962</b>	<b>7.77</b>	<b>-4.11</b>	<b>13.20</b>	<b>3.22</b>	<b>5.45</b>	<b>7.43</b>	<b>9/1/1986</b>
International Equity - Net		7.68	-4.44	12.79	2.86	5.09		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17		
International Equity IMRF Custom Benchmark		6.37	-6.04	11.46	2.12			
<b>Intl Large Cap Equity</b>	<b>7,250,702,609</b>	<b>8.08</b>	<b>-3.05</b>	<b>14.54</b>	<b>4.07</b>	<b>5.90</b>	<b>7.54</b>	<b>9/1/1986</b>
Intl LargeCap Equity - Net		8.02	-3.30	14.21	3.79	5.61		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17		
<b>Intl Large Cap Grwth</b>	<b>1,508,036,352</b>	<b>8.34</b>	<b>-6.53</b>	<b>15.37</b>	<b>4.65</b>	<b>5.90</b>	<b>8.06</b>	<b>9/1/2002</b>
Intl Large Cap Grwth - Net		8.26	-6.80	15.01	4.36	5.60		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	6.64	
<b>EARNEST Part. Intl</b>	<b>609,641,109</b>	<b>7.32</b>	<b>-3.88</b>	<b>19.83</b>	<b>4.62</b>	<b>5.33</b>	<b>8.60</b>	<b>10/1/2004</b>
EARNEST Part. Intl - Net		7.27	-4.07	19.57	4.42	5.12		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	5.44	
MSCI AC World ex USA Growth (Net)		8.59	-6.35	9.49	3.36	5.08	6.07	
<b>William Blair</b>	<b>898,395,243</b>	<b>9.04</b>	<b>-8.24</b>	<b>12.67</b>	<b>4.77</b>	<b>6.48</b>	<b>9.05</b>	<b>10/1/2002</b>
William Blair - Net		8.95	-8.57	12.25	4.39	6.09		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	7.25	
MSCI AC World ex USA Growth (Net)		8.59	-6.35	9.49	3.36	5.08	7.42	
<b>Intl Large Cap Val.</b>	<b>1,395,967,617</b>	<b>10.15</b>	<b>2.14</b>	<b>15.50</b>	<b>3.25</b>	<b>5.25</b>	<b>8.13</b>	<b>10/1/1995</b>
Intl Large Cap Val. - Net		10.08	1.83	15.15	2.93	4.87		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	5.00	

\* Custom benchmark is calculated as a weighted average of each funds respective benchmark until 12/2017. After 12/2017 the benchmark is MSCI ACWI ex US - Net.

\*\* Genesis is NOF NAV commingled fund.



# Performance

## International Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Brandes Investment</b>	<b>635,988,594</b>	<b>11.34</b>	<b>6.58</b>	<b>18.84</b>	<b>3.86</b>	<b>6.04</b>	<b>8.43</b>	<b>1/1/1996</b>
Brandes Investment - Net		11.29	6.36	18.59	3.64	5.80		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	4.92	
MSCI AC World ex USA Value		5.33	-3.32	14.54	1.90	3.67		
<b>Mondrian</b>	<b>623,129,087</b>	<b>8.90</b>	<b>-1.36</b>	<b>12.82</b>	<b>2.85</b>	<b>4.61</b>	<b>4.93</b>	<b>4/1/2012</b>
Mondrian - Net		8.80	-1.76	12.40	2.43	4.14	4.46	
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	4.54	
MSCI AC World ex USA Value		5.33	-3.32	14.54	1.90	3.67	4.07	
<b>Lazard</b>	<b>136,849,936</b>	<b>10.43</b>	<b>-1.07</b>	<b>13.51</b>	<b>3.21</b>	<b>4.94</b>	<b>5.77</b>	<b>4/1/2012</b>
Lazard - Net		10.37	-1.32	13.25	2.96	4.48	5.33	
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	4.54	
MSCI AC World ex USA Value		5.33	-3.32	14.54	1.90	3.67	4.07	
<b>Intl Large Cap Active Core</b>	<b>2,525,160,313</b>	<b>7.61</b>	<b>-3.14</b>	<b>15.60</b>	<b>4.99</b>	<b>7.26</b>	<b>5.41</b>	<b>2/1/2008</b>
Intl Large Cap Active Core - Net		7.52	-3.52	15.03	4.49	6.72		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	2.64	
<b>Arrowstreet Capital</b>	<b>1,072,670,685</b>	<b>7.00</b>	<b>0.22</b>	<b>21.75</b>	<b>8.51</b>	<b>9.37</b>	<b>6.71</b>	<b>3/1/2008</b>
Arrowstreet Capital - Net		6.88	-0.24	21.19	8.01	8.87	6.21	
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	2.46	
<b>Brown Capital</b>	<b>513,762,612</b>	<b>10.71</b>	<b>-8.38</b>	<b>6.81</b>	<b>3.04</b>	<b>6.01</b>	<b>6.90</b>	<b>10/1/2004</b>
Brown Capital - Net		10.64	-8.62	6.09	2.50	5.18		
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	5.44	

\* Custom benchmark is calculated as a weighted average of each funds respective benchmark until 12/2017. After 12/2017 the benchmark is MSCI ACWI ex US - Net.

\*\* Genesis is NOF NAV commingled fund.

# Performance

## International Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>GlobeFlex Capital</b>	<b>841,043,484</b>	<b>6.38</b>	<b>-4.06</b>	<b>16.86</b>	<b>3.10</b>	<b>6.22</b>	<b>5.11</b>	<b>3/1/2006</b>
GlobeFlex Capital - Net		6.30	-4.39	16.45	2.72	5.81	4.67	
MSCI AC World ex USA (Net)		6.87	-5.07	11.80	2.47	4.17	3.69	
<b>Xponance Intl EQ</b>	<b>97,014,762</b>	<b>9.43</b>	<b>-1.57</b>				<b>0.50</b>	<b>2/1/2021</b>
Xponance Intl EQ - Net		9.27	-2.20				-0.08	
MSCI EAFE (Net)		8.47	-1.38				1.99	
<b>Progress Intl Equity*</b>	<b>599,172</b>							
<b>Intl Large Cap Passive Core</b>	<b>1,821,538,327</b>	<b>6.99</b>	<b>-3.72</b>	<b>12.05</b>	<b>3.13</b>	<b>5.04</b>	<b>3.86</b>	<b>2/1/2000</b>
Intl Large Cap Passive Core - Net		6.98	-3.73	12.04	3.13	5.03		
International Large Cap Passive Core Benchmark		6.87	-5.07	11.43	2.66	4.56	3.44	
<b>NTGI ACWI ex US Index Fund</b>	<b>1,821,538,327</b>	<b>6.99</b>	<b>-3.72</b>				<b>-5.08</b>	<b>10/1/2021</b>
NTGI ACWI ex US Index Fund - Net		6.98	-3.73				-5.08	
MSCI AC World ex USA (Net)		6.87	-5.07				-5.82	
<b>Intl All Cap Developed</b>	<b>155,475,320</b>	<b>7.62</b>	<b>-6.22</b>	<b>11.95</b>			<b>4.58</b>	<b>2/1/2019</b>
Intl All Cap Developed - Net		7.50	-6.70	11.39			4.09	
MSCI EAFE + Canada (Net)		8.02	-2.74	13.49			6.16	
<b>Ativo International</b>	<b>155,475,320</b>	<b>7.62</b>	<b>-6.22</b>	<b>11.95</b>			<b>4.58</b>	<b>2/1/2019</b>
Ativo International - Net		7.50	-6.70	11.39			4.09	
MSCI EAFE + Canada (Net)		8.02	-2.74	13.49			6.16	
<b>Intl Small Cap Eqty</b>	<b>542,865,440</b>	<b>8.01</b>	<b>-9.47</b>	<b>12.50</b>	<b>1.39</b>	<b>5.44</b>	<b>4.51</b>	<b>12/1/2005</b>
Intl Small Cap Eqty - Net		7.82	-10.16	11.67	0.63	4.65		
MSCI AC World ex USA Small Cap (Net)		4.70	-10.37	15.04	1.67	5.06	5.58	
Custom Benchmark (Intl Small Cap)		4.70	-10.37	15.04	1.67	5.06	5.00	

\* Custom benchmark is calculated as a weighted average of each funds respective benchmark until 12/2017. After 12/2017 the benchmark is MSCI ACWI ex US - Net.

\*\* Genesis is NOF NAV commingled fund.

# Performance

## International Equity

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Franklin Templeton</b>	<b>215,855,333</b>	<b>8.16</b>	<b>-4.68</b>	<b>14.59</b>	<b>0.98</b>	<b>5.19</b>	<b>5.23</b>	<b>8/1/2011</b>
Franklin Templeton - Net		7.98	-5.36	13.78	0.25	4.42	4.48	
MSCI AC World ex USA Small Cap (Net)		4.70	-10.37	15.04	1.67	5.06	4.44	
<b>William Blair IntSC</b>	<b>327,010,107</b>	<b>7.91</b>	<b>-12.38</b>	<b>11.21</b>	<b>1.68</b>	<b>5.63</b>	<b>7.55</b>	<b>9/1/2010</b>
William Blair IntSC - Net		7.72	-13.07	10.37	0.90	4.82	6.74	
MSCI AC World ex USA Small Cap (Net)		4.70	-10.37	15.04	1.67	5.06	6.07	
Custom Benchmark (Intl Small Cap)		4.70	-10.37	15.04	1.67	5.06	6.31	
<b>Emerging Mkt Equity</b>	<b>1,089,319,592</b>	<b>5.27</b>	<b>-8.12</b>	<b>6.11</b>	<b>-0.71</b>	<b>2.45</b>	<b>7.84</b>	<b>2/1/1992</b>
Emerging Mkt Equity - Net		4.95	-8.76	5.45	-1.30	1.86		
MSCI Emerging Markets Index		4.02	-10.30	8.23	-0.53	2.37	6.31	
<b>Genesis Investment Management, LLP.**</b>	<b>683,979,442</b>	<b>5.08</b>	<b>-8.29</b>	<b>6.04</b>	<b>-0.74</b>	<b>2.44</b>	<b>8.73</b>	<b>5/1/2004</b>
Genesis Investment Management, LLP - Net		4.73	-8.95	5.38	-1.34	1.84		
MSCI Emerging Markets Index		4.02	-10.30	8.23	-0.53	2.37	7.26	
<b>Arrowstreet EME</b>	<b>405,340,151</b>							

\* Custom benchmark is calculated as a weighted average of each funds respective benchmark until 12/2017. After 12/2017 the benchmark is MSCI ACWI ex US - Net.

\*\* Genesis is NOF NAV commingled fund.

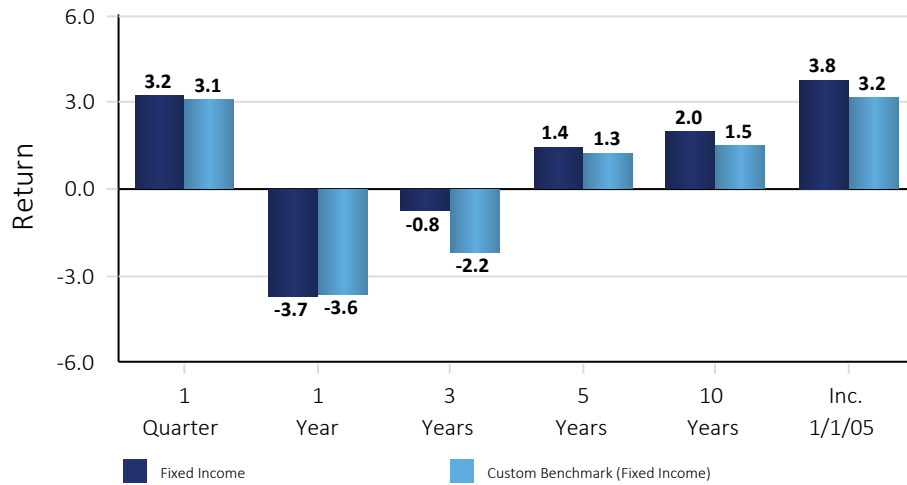
# Fixed Income

# Composite Performance Summary

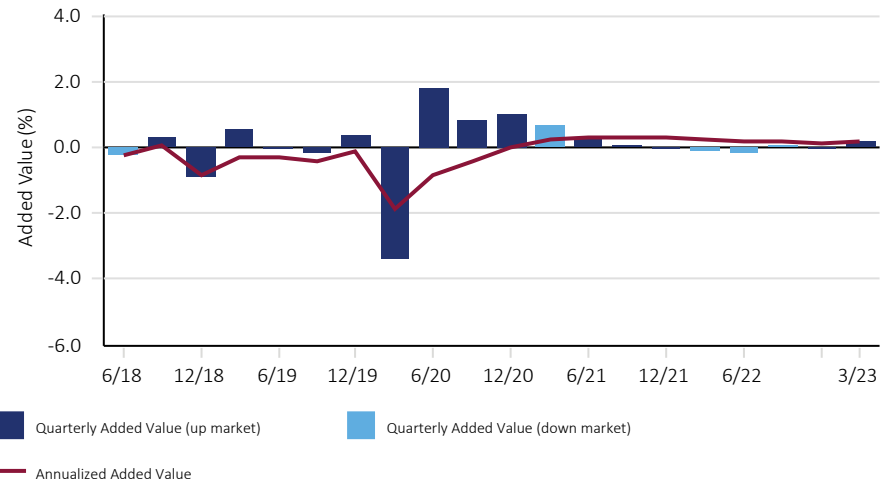
## Fixed Income

Periods Ended March 31, 2023

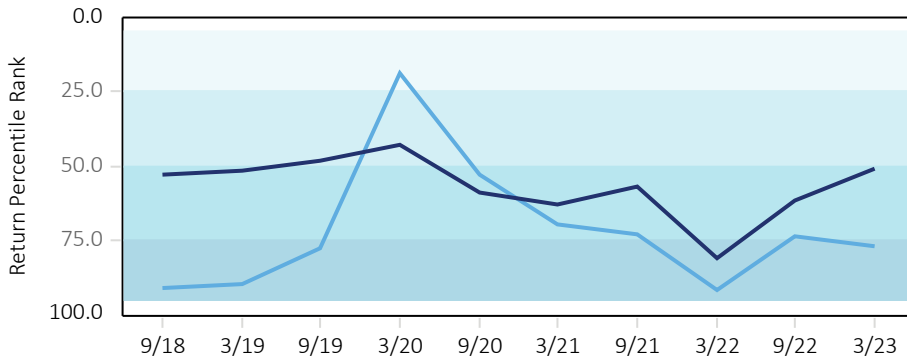
### Comparative Performance



### Added Value History

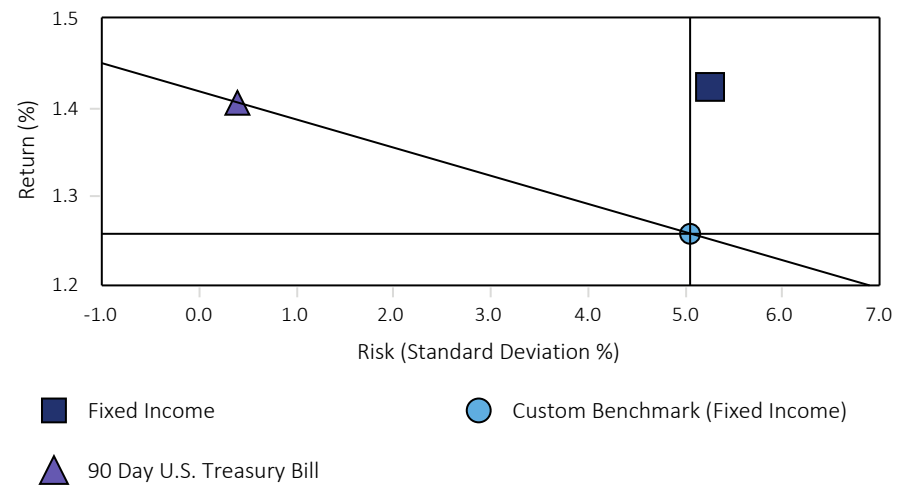


### Rolling Percentile Rank: All Public Plans > \$1B-US Fixed Income Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
Fixed Income	10	0 (0%)	2 (20%)	7 (70%)	1 (10%)
Benchmark	10	1 (10%)	0 (0%)	4 (40%)	5 (50%)

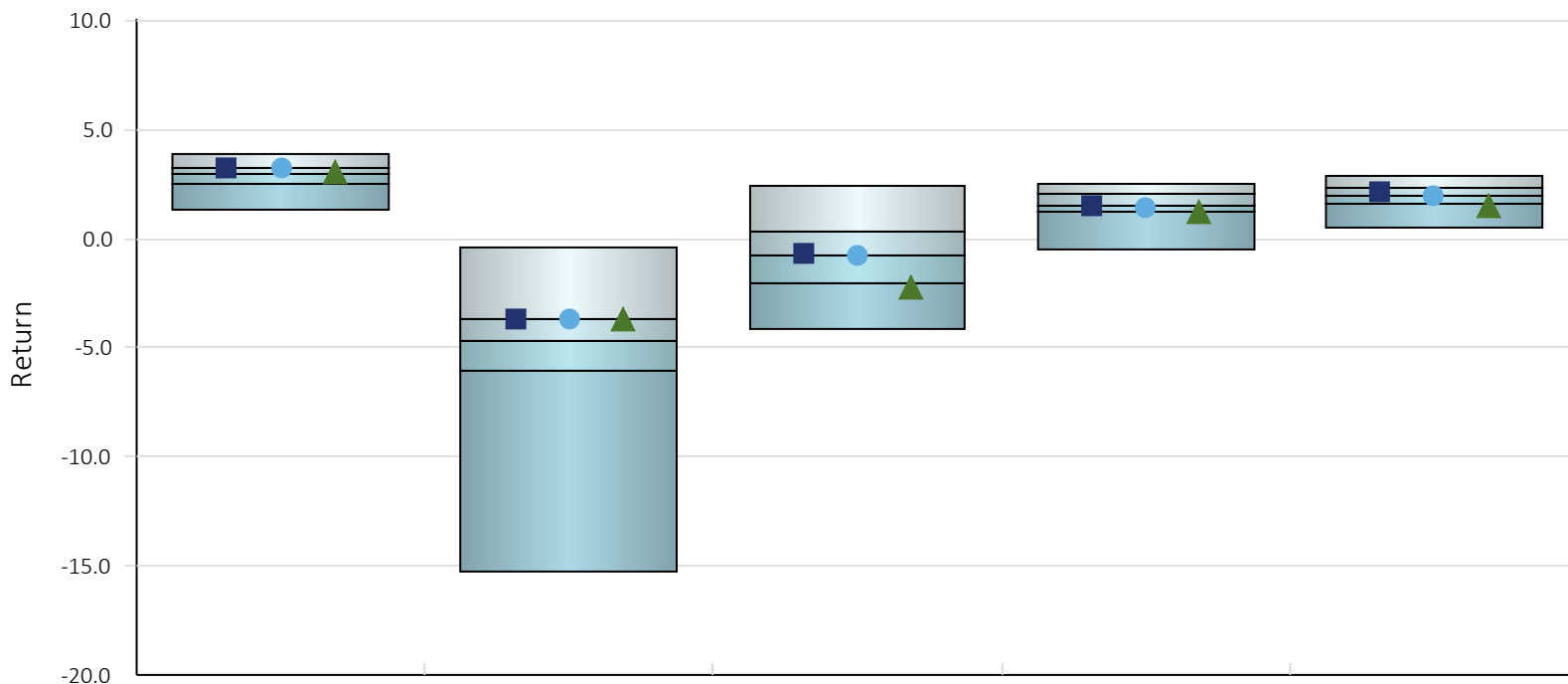
### Risk and Return 04/1/18 - 03/31/23



# Plan Sponsor Peer Group Analysis

Fixed Income vs All Public Plans > \$1B-US Fixed Income Segment(Gross)

Periods Ended March 31, 2023



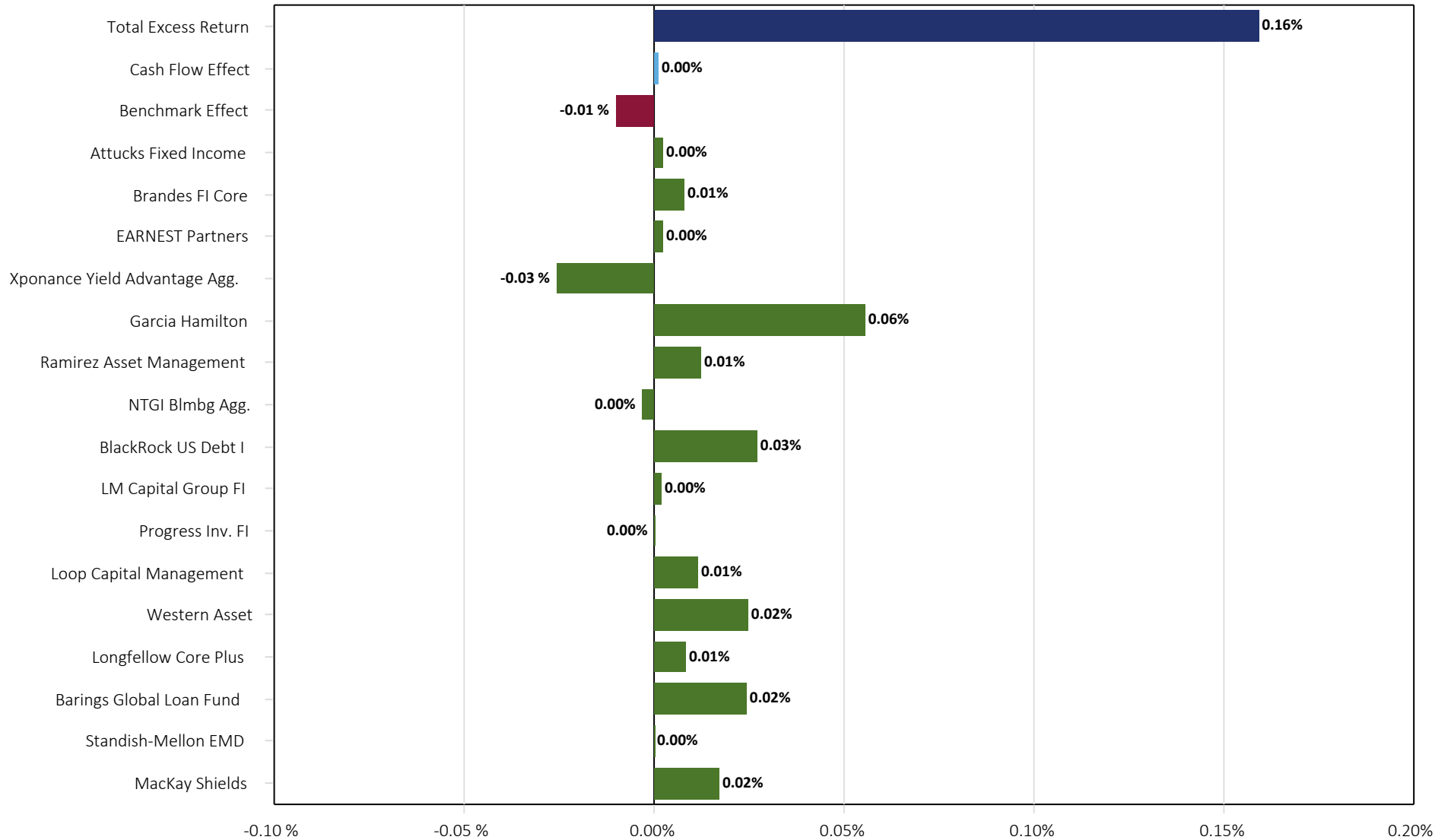
	<b>QTD</b>	<b>1 Year</b>	<b>3 Years</b>	<b>5 Years</b>	<b>10 Years</b>
■ Fixed Income	3.26 (28)	-3.64 (25)	-0.67 (46)	1.53 (51)	2.12 (33)
● Fixed Income - Net	3.24 (30)	-3.72 (27)	-0.76 (51)	1.42 (59)	1.99 (45)
▲ Custom Benchmark (Fixed Income)	3.08 (37)	-3.64 (25)	-2.20 (77)	1.26 (71)	1.54 (86)
5th Percentile	3.89	-0.38	2.47	2.48	2.91
1st Quartile	3.27	-3.65	0.34	2.03	2.37
Median	2.97	-4.65	-0.76	1.53	1.96
3rd Quartile	2.55	-6.06	-2.06	1.23	1.63
95th Percentile	1.36	-15.23	-4.17	-0.47	0.48
Population	49	49	42	40	34

# Asset Class Attribution

## Fixed Income

Periods Ended 1 Quarter Ending March 31, 2023

### 1 Quarter



# Performance

## Fixed Income

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Fixed Income</b>	<b>12,309,642,246</b>	<b>3.26</b>	<b>-3.64</b>	<b>-0.67</b>	<b>1.53</b>	<b>2.12</b>	<b>7.47</b>	<b>1/1/1982</b>
Fixed Income - Net		3.24	-3.72	-0.76	1.42	1.99		
Custom Benchmark (Fixed Income)		3.08	-3.64	-2.20	1.26	1.54	6.95	
Fixed Income IMRF Custom Benchmark		3.07	-3.94	-1.54	1.27			
<b>Active Fixed Core</b>	<b>3,822,644,684</b>	<b>3.17</b>	<b>-4.27</b>	<b>-1.69</b>	<b>1.24</b>	<b>1.77</b>	<b>3.75</b>	<b>4/1/2001</b>
Active Fixed Core - Net		3.14	-4.38	-1.79	1.14	1.64		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	3.65	
<b>Attucks Fixed Income</b>	<b>89,026,673</b>	<b>3.33</b>	<b>-5.00</b>				<b>-5.19</b>	<b>2/1/2021</b>
Attucks Fixed Income - Net		3.33	-5.24				-5.45	
Blmbg. U.S. Aggregate Index		2.96	-4.78				-5.32	
<b>Brandes FI Core</b>	<b>339,521,154</b>	<b>3.26</b>	<b>-2.64</b>	<b>-2.04</b>	<b>1.34</b>		<b>1.23</b>	<b>3/1/2016</b>
Brandes FI Core - Net		3.25	-2.67	-2.06	1.33		1.22	
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90		1.00	
<b>EARNEST Partners</b>	<b>906,895,810</b>	<b>3.03</b>	<b>-4.28</b>	<b>-1.85</b>	<b>1.27</b>	<b>1.77</b>	<b>3.55</b>	<b>5/1/2005</b>
EARNEST Partners - Net		3.00	-4.41	-1.98	1.13	1.60	3.37	
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	3.11	
<b>Xponance Yield Advantage Agg.</b>	<b>977,019,672</b>	<b>2.67</b>	<b>-5.40</b>	<b>-1.33</b>	<b>1.17</b>	<b>1.73</b>	<b>3.38</b>	<b>6/1/2005</b>
Xponance Yield Advantage Agg. - Net		2.64	-5.53	-1.46	1.03	1.58	3.21	
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	3.06	
<b>Garcia Hamilton</b>	<b>980,726,152</b>	<b>3.68</b>	<b>-3.70</b>	<b>-1.75</b>	<b>1.25</b>		<b>1.64</b>	<b>6/1/2015</b>
Garcia Hamilton - Net		3.66	-3.78	-1.83	1.17		1.56	
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90		1.11	

Taplin, Canada, Habacht switched from core to core plus effective 10/01/2010.

\* Custom Benchmark is Credit Suisse US Leveraged Loan Index and the Credit Suisse Western European Leveraged Loan Index, weighted by the portfolio's market value to each sector.



# Performance

## Fixed Income

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>Ramirez Asset Management</b>	<b>529,455,223</b>	<b>3.29</b>	<b>-4.11</b>					
Ramirez Asset Management - Net		3.25	-4.24				-1.57	5/1/2020
Blmbg. U.S. Aggregate Index		2.96	-4.78				-1.70	
							-3.44	
<b>Pass. Core Fixed Income</b>	<b>2,782,322,635</b>	<b>3.07</b>	<b>-4.69</b>	<b>-2.72</b>	<b>0.97</b>	<b>1.42</b>	<b>5.17</b>	<b>1/1/1990</b>
Pass. Core Fixed Income - Net		3.07	-4.69	-2.73	0.97	1.41		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	5.15	
<b>BlackRock US Debt I</b>	<b>1,649,423,105</b>	<b>3.17</b>	<b>-4.71</b>	<b>-2.67</b>	<b>1.00</b>		<b>1.74</b>	<b>10/1/2013</b>
BlackRock US Debt I - Net		3.17	-4.71	-2.68	0.99		1.74	
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90		1.63	
<b>NTGI Blmbg Agg.</b>	<b>1,132,899,530</b>	<b>2.93</b>	<b>-4.68</b>	<b>-2.78</b>	<b>0.94</b>	<b>1.39</b>	<b>5.21</b>	<b>2/1/1990</b>
NTGI Blmbg Agg. - Net		2.93	-4.69	-2.78	0.94	1.39		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	5.20	
<b>Core Plus Fixed Income</b>	<b>2,971,071,147</b>	<b>3.19</b>	<b>-4.80</b>	<b>-1.15</b>	<b>1.39</b>	<b>2.07</b>	<b>7.31</b>	<b>1/1/1982</b>
Core Plus Fixed Income - Net		3.16	-4.95	-1.30	1.22	1.89		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	6.91	
<b>LM Capital Group FI</b>	<b>852,931,652</b>	<b>3.03</b>	<b>-4.07</b>	<b>-0.94</b>	<b>1.72</b>	<b>2.06</b>	<b>3.93</b>	<b>5/1/2005</b>
LM Capital Group FI - Net		2.99	-4.22	-1.10	1.56	1.90		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	3.76	
							3.11	
<b>Progress Inv. FI</b>	<b>1,121</b>							
<b>Loop Capital Management</b>	<b>580,170,820</b>	<b>3.24</b>	<b>-4.57</b>	<b>-1.61</b>	<b>1.26</b>	<b>2.19</b>	<b>3.91</b>	<b>5/1/2005</b>
Loop Capital Management - Net		3.21	-4.70	-1.74	1.12	2.06		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	3.78	
							3.11	

Taplin, Canada, Habacht switched from core to core plus effective 10/01/2010.

\* Custom Benchmark is Credit Suisse US Leveraged Loan Index and the Credit Suisse Western European Leveraged Loan Index, weighted by the portfolio's market value to each sector.

# Performance

## Fixed Income

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Western Asset</b>	<b>962,326,994</b>	<b>3.31</b>	<b>-5.60</b>	<b>-1.12</b>	<b>1.07</b>	<b>2.17</b>	<b>4.40</b>	<b>11/1/2001</b>
Western Asset - Net		3.28	-5.74	-1.25	0.94	2.04		
Blmbg. U.S. Aggregate Index		2.96	-4.78	-2.77	0.90	1.36	3.40	
<b>Longfellow Core Plus</b>	<b>575,640,560</b>	<b>3.18</b>	<b>-4.77</b>				<b>-1.74</b>	<b>5/1/2020</b>
Longfellow Core Plus - Net		3.14	-4.91				-1.89	
Blmbg. U.S. Aggregate Index		2.96	-4.78				-3.44	
<b>Bank Loans</b>	<b>1,643,191,238</b>	<b>3.53</b>	<b>-0.21</b>	<b>8.21</b>	<b>3.17</b>		<b>3.85</b>	<b>8/1/2014</b>
Bank Loans - Net		3.53	-0.12	8.26	3.09		3.55	
Barings Custom Benchmark		3.35	2.35	8.57	3.74		3.89	
<b>Barings Global Loan Fund</b>	<b>1,643,191,238</b>	<b>3.53</b>	<b>-0.21</b>	<b>8.21</b>	<b>3.17</b>		<b>3.85</b>	<b>8/1/2014</b>
Barings Global Loan Fund - Net		3.53	-0.12	8.26	3.09		3.55	
Barings Custom Benchmark*		3.35	2.35	8.57	3.74		3.89	
<b>Emerging Markets Debt</b>	<b>362,578</b>							
<b>Standish-Mellon EMD</b>	<b>362,578</b>							
<b>High Yield</b>	<b>1,090,049,964</b>	<b>3.88</b>	<b>-0.36</b>	<b>7.25</b>	<b>4.57</b>	<b>5.11</b>	<b>8.96</b>	<b>4/1/1986</b>
High Yield - Net		3.88	-0.57	6.95	4.25	4.76		
ICE BofA US High Yield, Cash Pay Index		3.68	-3.50	5.82	3.06	4.02	7.65	
<b>MacKay Shields</b>	<b>1,090,049,964</b>	<b>3.88</b>	<b>-0.36</b>	<b>7.26</b>	<b>4.57</b>	<b>5.21</b>	<b>7.99</b>	<b>11/1/2000</b>
MacKay Shields - Net		3.88	-0.57	6.95	4.25	4.87		
ICE BofA US High Yield, Cash Pay Index		3.68	-3.50	5.82	3.06	4.02	6.61	

Taplin, Canada, Habacht switched from core to core plus effective 10/01/2010.

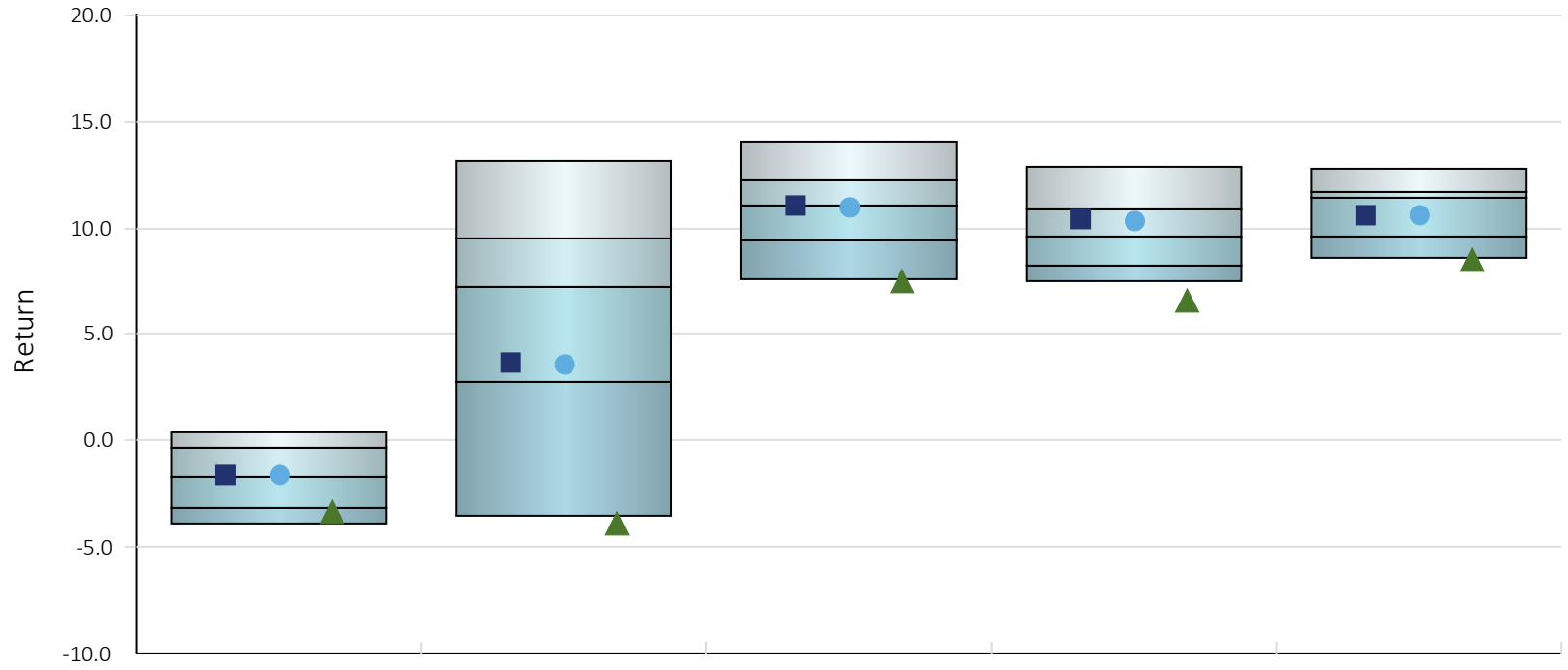
\* Custom Benchmark is Credit Suisse US Leveraged Loan Index and the Credit Suisse Western European Leveraged Loan Index, weighted by the portfolio's market value to each sector.

# Private Real Assets

# Plan Sponsor Peer Group Analysis

Real Estate vs All Public Plans > \$1B-Real Estate Segment(Gross)

Periods Ended March 31, 2023



	QTD	1 Year	3 Years	5 Years	10 Years
■ Real Estate	-1.61 (49)	3.66 (73)	11.05 (50)	10.41 (43)	10.60 (63)
● Real Estate - Net	-1.63 (49)	3.59 (73)	10.98 (52)	10.37 (44)	10.57 (64)
▲ Blended Benchmark (Real Estate)	-3.33 (89)	-3.87 (97)	7.47 (100)	6.57 (100)	8.48 (100)
5th Percentile	0.39	13.16	14.06	12.90	12.80
1st Quartile	-0.37	9.56	12.27	10.84	11.74
Median	-1.67	7.27	11.03	9.59	11.41
3rd Quartile	-3.17	2.75	9.47	8.24	9.56
95th Percentile	-3.93	-3.54	7.60	7.49	8.58
Population	38	36	28	23	13

# Asset Allocation & Performance

## Private Real Assets

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>Private Real Assets</b>	<b>4,799,850,715</b>	<b>-1.25</b>	<b>4.00</b>				<b>5.17</b>	<b>3/1/2022</b>
Private Real Assets- Net		-1.27	3.94				5.11	
Custom Benchmark (Private Real Assets)		-3.03	-3.24				3.14	
<b>Real Estate</b>	<b>4,372,373,550</b>	<b>-1.61</b>	<b>3.66</b>	<b>11.05</b>	<b>10.41</b>	<b>10.60</b>	<b>6.00</b>	<b>5/1/1985</b>
Real Estate - Net		-1.63	3.59	10.98	10.37	10.57		
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	7.65	
<b>Real Estate Core Cmp</b>	<b>2,289,223,276</b>	<b>-2.18</b>	<b>4.55</b>	<b>12.60</b>	<b>11.71</b>	<b>10.89</b>	<b>8.08</b>	<b>4/1/1999</b>
<b>TA Assoc. Buckhead</b>	<b>886,346,978</b>	<b>-0.95</b>	<b>3.38</b>	<b>18.69</b>	<b>17.41</b>	<b>14.01</b>	<b>11.64</b>	<b>8/1/1995</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	7.36	
<b>Barings Euro Core Property</b>	<b>137,906,644</b>	<b>-2.44</b>	<b>-4.96</b>	<b>3.73</b>	<b>8.10</b>		<b>10.00</b>	<b>3/1/2017</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		6.66	
<b>Blackstone Property Euro</b>	<b>183,870,646</b>	<b>-0.53</b>	<b>14.41</b>	<b>11.74</b>	<b>8.46</b>		<b>8.53</b>	<b>12/1/2017</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		6.66	
<b>INVESCO Core Real Estate</b>	<b>248,625,899</b>	<b>-0.20</b>	<b>6.89</b>	<b>7.57</b>	<b>7.39</b>	<b>9.00</b>	<b>8.90</b>	<b>4/1/2011</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	9.18	
<b>INVESCO European real estate</b>	<b>57,897,583</b>	<b>1.79</b>	<b>-0.21</b>	<b>0.93</b>	<b>-0.56</b>		<b>-0.56</b>	<b>4/1/2018</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		6.57	
<b>AEW Core Property Tr</b>	<b>286,024,825</b>	<b>0.00</b>	<b>8.05</b>	<b>9.63</b>	<b>8.22</b>		<b>8.66</b>	<b>10/1/2013</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		8.16	
<b>CBRE Core Partners</b>	<b>303,329,032</b>	<b>-9.13</b>	<b>7.36</b>	<b>14.02</b>	<b>11.81</b>		<b>10.99</b>	<b>12/1/2013</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		8.09	

Returns are time-weighted and are reported net of fee for all real estate managers.

The Blended Benchmark (Real Estate) is currently the NCREIF ODCE VW Net Index. Prior to January 1, 2013, it was the NCREIF Property Index + 1%. Returns prior to January, 2007, reflect those of the Consumer Price Index + 5%.

# Asset Allocation & Performance

## Private Real Assets

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						Inception Date
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	
<b>JPM Strategic Property Fund</b>	<b>185,221,668</b>	<b>-4.27</b>	<b>-1.89</b>				<b>9.83</b>	<b>1/1/2021</b>
Blended Benchmark (Real Estate)		-3.33	-3.87				10.29	
<b>RE Non-Core Cmp</b>	<b>2,083,150,275</b>	<b>-0.95</b>	<b>2.61</b>	<b>9.30</b>	<b>8.95</b>	<b>10.37</b>	<b>11.16</b>	<b>1/1/2010</b>
<b>Artemis MWBE Spruce</b>	<b>317,844,239</b>	<b>-4.12</b>	<b>-0.02</b>	<b>8.28</b>	<b>7.49</b>		<b>5.57</b>	<b>6/1/2016</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		6.73	
<b>Franklin T. EMREFF</b>	<b>2,771,341</b>	<b>-3.46</b>	<b>-35.61</b>	<b>-19.51</b>	<b>-13.82</b>	<b>-0.12</b>	<b>-0.03</b>	<b>9/1/2011</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	8.92	
<b>Security Capital</b>	<b>90,360,245</b>	<b>-2.01</b>	<b>-23.31</b>	<b>4.27</b>	<b>8.58</b>	<b>4.82</b>		<b>7/1/1997</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	7.35	
<b>Dune II</b>	<b>7,650,902</b>	<b>0.57</b>	<b>0.80</b>	<b>1.41</b>	<b>3.33</b>	<b>8.66</b>	<b>5.50</b>	<b>2/1/2009</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	7.87	
<b>Non-Core Real Estate Funds</b>	<b>1,407,253,987</b>	<b>-0.13</b>	<b>6.08</b>	<b>11.55</b>	<b>10.91</b>	<b>11.72</b>	<b>11.27</b>	<b>10/1/2011</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57	8.48	8.88	
<b>Almanac ARS V</b>	<b>76,735</b>							
<b>Non-Core Intl Real Estate</b>	<b>257,192,826</b>	<b>-0.96</b>	<b>-3.03</b>	<b>2.30</b>	<b>0.75</b>		<b>-0.83</b>	<b>8/1/2014</b>
Blended Benchmark (Real Estate)		-3.33	-3.87	7.47	6.57		7.88	

Returns are time-weighted and are reported net of fee for all real estate managers.

The Blended Benchmark (Real Estate) is currently the NCREIF ODCE VW Net Index. Prior to January 1, 2013, it was the NCREIF Property Index + 1%. Returns prior to January, 2007, reflect those of the Consumer Price Index + 5%.

# Asset Allocation & Performance

## Private Real Assets

Periods Ended March 31, 2023

	Market Value \$	Performance (%)						
		1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>Agriculture</b>	<b>251,723,757</b>	<b>1.67</b>	<b>4.24</b>	<b>2.77</b>	<b>1.54</b>	<b>5.19</b>	<b>6.58</b>	<b>10/1/1997</b>
NCREIF Farmland Index		2.08	9.05	7.59	6.56	8.48	11.18	
<b>Premiere Partners IV</b>	<b>251,723,757</b>	<b>1.67</b>	<b>4.24</b>	<b>2.77</b>	<b>1.54</b>		<b>2.57</b>	<b>3/1/2015</b>
<b>Timberland</b>	<b>62,682,276</b>	<b>-1.05</b>	<b>14.59</b>	<b>2.84</b>	<b>1.89</b>	<b>3.56</b>	<b>6.95</b>	<b>10/1/1992</b>
NCREIF Timberland Index		1.75	11.31	8.09	5.54	5.82	8.50	
<b>Forest Investment</b>	<b>62,682,276</b>	<b>-1.05</b>	<b>14.59</b>	<b>2.84</b>	<b>1.89</b>	<b>3.69</b>	<b>7.09</b>	<b>10/1/1992</b>
Blended Benchmark (Timberland)		2.70	9.18	6.86	4.82	5.46	8.37	
<b>Unlisted Infrastructure</b>	<b>113,071,132</b>	<b>5.92</b>	<b>11.39</b>	<b>15.42</b>	<b>12.68</b>		<b>12.68</b>	<b>4/1/2018</b>
Blended Benchmark (Unlisted Infrastructure)		2.70	9.18	9.40	9.24		9.24	
<b>Unlisted Infrastructure Funds</b>	<b>113,071,132</b>	<b>5.92</b>	<b>11.39</b>	<b>15.42</b>	<b>12.68</b>		<b>12.68</b>	<b>4/1/2018</b>
Blended Benchmark (Unlisted Infrastructure)		2.70	9.18	9.40	9.24		9.24	

Returns are time-weighted and are reported net of fee for all real estate managers.

The Blended Benchmark (Real Estate) is currently the NCREIF ODCE VW Net Index. Prior to January 1, 2013, it was the NCREIF Property Index + 1%. Returns prior to January, 2007, reflect those of the Consumer Price Index + 5%.

# Alternative Investments



# Asset Allocation & Performance

## Alternatives Investments

Periods Ended March 31, 2023

	Allocation	Performance (%)						
	Market Value \$	1 Quarter	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
<b>Alternatives Investments</b>	<b>5,203,863,529</b>	<b>0.54</b>	<b>-0.57</b>	<b>19.25</b>	<b>16.76</b>	<b>12.95</b>	<b>11.49</b>	<b>2/1/1986</b>
Custom Benchmark (Alternative Investments)		10.23	-14.68	1.64	4.52	6.74	11.70	
<b>Absolute Return</b>	<b>77,994</b>							
<b>Aurora Investment</b>	<b>77,994</b>							
<b>Private Equity</b>	<b>5,023,846,983</b>	<b>0.52</b>	<b>-0.18</b>	<b>22.56</b>	<b>19.82</b>	<b>15.99</b>	<b>13.77</b>	<b>2/1/1986</b>
Blended Benchmark (Private Equity)		10.58	-15.69	1.30	4.31	6.63		
<b>Abbott S/A Comp.</b>	<b>497,863,913</b>	<b>-0.75</b>	<b>-2.67</b>	<b>24.19</b>	<b>20.51</b>	<b>16.24</b>	<b>14.60</b>	<b>6/1/1987</b>
<b>Muller Monroe MPEFF</b>	<b>1</b>							
<b>Pantheon S/A Comp.</b>	<b>408,891,982</b>	<b>-1.52</b>	<b>-2.13</b>	<b>21.32</b>	<b>19.08</b>	<b>15.75</b>	<b>11.43</b>	<b>10/1/2000</b>
<b>Private Equity Fund - Domestic</b>	<b>3,309,737,538</b>	<b>-0.37</b>	<b>-1.12</b>	<b>23.20</b>	<b>21.85</b>	<b>17.07</b>	<b>15.02</b>	<b>6/1/2012</b>
<b>Private Equity Fund - International</b>	<b>585,413,600</b>	<b>9.08</b>	<b>10.00</b>	<b>19.88</b>	<b>12.42</b>		<b>-0.41</b>	<b>7/1/2015</b>
<b>Oakbrook Opportunities Fund</b>	<b>221,939,948</b>	<b>-0.13</b>	<b>0.52</b>	<b>15.60</b>			<b>8.28</b>	<b>6/1/2019</b>
<b>Private Credit</b>	<b>179,938,552</b>	<b>1.26</b>	<b>-10.90</b>	<b>-2.48</b>			<b>-1.31</b>	<b>10/1/2019</b>
<b>Private Credit Fund - Domestic</b>	<b>179,938,552</b>	<b>1.26</b>	<b>-10.90</b>	<b>-2.48</b>			<b>-1.31</b>	<b>10/1/2019</b>

The Alternatives Custom Benchmark is 95% MSCI World Index 1 Qtr Lagged +3%, 5% S&P LSTA Leveraged Loan Index +2%. Prior to March 1, 2022, it was based on an annualized return of 9%. Prior to July 1, 2010, it was based on an annual return of 12%. Prior to 2004, it was based on an annualized return of 13%. Prior to 2003, it was based on an annual return of 15%. Private Equity and Blended Benchmark (Private Equity) returns are 1 quarter lagged

# Manager Watch List

As of March 31, 2023

## Organization

Investment Manager	Asset Class	Effective Date	Resolution
Genesis	Equity Emerging Markets	July 2022	

# Appendix

# Asset Class Returns

*Periods Ended March 31, 2023*

	Performance (%)										
	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
<b>Total Fund</b>	<b>4.35</b>	<b>-12.77</b>	<b>16.82</b>	<b>14.98</b>	<b>19.77</b>	<b>-4.23</b>	<b>16.02</b>	<b>8.01</b>	<b>0.53</b>	<b>6.15</b>	<b>20.20</b>
Total Fund - Net	4.30	-12.90	16.63	14.79	19.57	-4.40	15.78	7.77	0.29	5.90	19.94
Total Fund Benchmark	5.11	-13.26	13.48	13.16	18.68	-3.12	14.37	7.89	1.37	7.33	15.84
<b>Domestic Equity</b>	<b>6.15</b>	<b>-19.12</b>	<b>24.89</b>	<b>22.07</b>	<b>29.23</b>	<b>-6.08</b>	<b>19.83</b>	<b>12.62</b>	<b>0.04</b>	<b>9.81</b>	<b>37.65</b>
Domestic Equity - Net	6.09	-19.25	24.69	21.86	29.00	-6.25	19.59	12.35	-0.22	9.54	37.32
Blended Benchmark (U.S. Equity)	6.71	-18.53	25.66	20.89	31.02	-5.24	21.13	12.74	0.48	12.47	33.47
U.S. Equity IMRF Custom Benchmark	5.50	-18.21	25.68	18.00	29.67	-6.79	18.08	15.43			
<b>International Equity</b>	<b>7.77</b>	<b>-17.86</b>	<b>9.78</b>	<b>13.52</b>	<b>23.76</b>	<b>-14.13</b>	<b>27.95</b>	<b>3.56</b>	<b>-1.90</b>	<b>-2.80</b>	<b>20.24</b>
International Equity - Net	7.68	-18.14	9.37	13.08	23.39	-14.41	27.52	3.21	-2.23	-3.10	19.87
MSCI AC World ex USA (Net)	6.87	-16.00	7.82	10.65	21.51	-14.20	27.19	4.50	-5.66	-3.87	15.29
International Equity IMRF Custom Benchmark	6.37	-16.70	7.30	11.30	21.37	-14.36	27.79	3.92			
<b>Fixed Income</b>	<b>3.26</b>	<b>-11.83</b>	<b>-0.44</b>	<b>7.87</b>	<b>9.50</b>	<b>-0.24</b>	<b>4.82</b>	<b>4.87</b>	<b>0.25</b>	<b>5.97</b>	<b>-0.59</b>
Fixed Income - Net	3.24	-11.90	-0.53	7.75	9.37	-0.39	4.66	4.71	0.10	5.81	-0.75
Blmbg. U.S. Aggregate Index	2.96	-13.01	-1.55	7.51	8.72	0.01	3.54	2.65	0.55	5.97	-2.02
Fixed Income IMRF Custom Benchmark	3.07	-11.99	-0.85	7.29	9.14	-0.08	3.98	3.89			
<b>Private Real Assets</b>	<b>-1.27</b>										
Custom Benchmark (Private Real Assets)	-3.03										
<b>Real Estate</b>	<b>-1.61</b>	<b>11.77</b>	<b>21.95</b>	<b>4.20</b>	<b>9.81</b>	<b>8.36</b>	<b>10.03</b>	<b>8.97</b>	<b>12.54</b>	<b>13.02</b>	<b>10.82</b>
Real Estate - Net	-1.63	11.71	21.88	4.16	9.76	8.36	10.03	8.97	12.46	13.02	10.82
Blended Benchmark (Real Estate)	-3.33	6.54	21.02	0.34	4.39	7.36	6.66	7.79	13.95	11.46	12.90
<b>Agriculture</b>	<b>1.67</b>	<b>3.98</b>	<b>2.69</b>	<b>4.69</b>	<b>-5.82</b>	<b>0.28</b>	<b>-4.58</b>	<b>-0.47</b>	<b>20.18</b>	<b>24.73</b>	<b>25.68</b>
NCREIF Farmland Index	2.08	9.64	7.83	3.08	4.81	6.74	6.19	7.09	10.35	12.63	20.91
<b>Timberland</b>	<b>-1.05</b>	<b>11.94</b>	<b>-2.72</b>	<b>4.51</b>	<b>1.00</b>	<b>-3.62</b>	<b>4.68</b>	<b>-4.58</b>	<b>4.99</b>	<b>12.83</b>	<b>9.14</b>
NCREIF Timberland Index	1.75	12.90	9.17	0.81	1.30	3.21	3.63	2.59	4.97	10.48	9.69
<b>Unlisted Infrastruct</b>	<b>5.92</b>	<b>11.76</b>	<b>11.68</b>	<b>15.90</b>	<b>9.65</b>						
Blended Benchmark (Unlisted Infrastructure)	2.70	9.65	9.00	9.00	9.00						

Benchmark definitions are on the following pages.

Private Equity, Agriculture, Timberland, Unlisted Infrastructure returns shown are gross of fees.

# Asset Class Returns

*Periods Ended March 31, 2023*

	Performance (%)										
	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
<b>Alternatives Investments</b>	<b>0.54</b>	<b>4.39</b>	<b>46.46</b>	<b>12.31</b>	<b>9.48</b>	<b>17.32</b>	<b>12.09</b>	<b>5.32</b>	<b>6.90</b>	<b>11.63</b>	<b>12.11</b>
Alternative Investments - Net	0.54	4.38	46.44	12.27	9.43	17.14	11.91	5.00	6.47	11.16	11.86
Custom Benchmark (Alternative Investments)	10.23	-18.08	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
<b>Private Equity</b>	<b>0.52</b>	<b>5.36</b>	<b>54.15</b>	<b>14.50</b>	<b>11.78</b>	<b>21.46</b>	<b>15.61</b>	<b>8.60</b>	<b>8.41</b>	<b>13.72</b>	<b>14.13</b>
Blended Benchmark (Private Equity)	10.58	-19.14	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
<b>Cash</b>	<b>1.20</b>	<b>3.18</b>	<b>2.44</b>	<b>2.56</b>	<b>3.59</b>	<b>2.36</b>	<b>1.67</b>	<b>0.63</b>	<b>0.29</b>	<b>0.17</b>	<b>0.11</b>
90 Day U.S. Treasury Bill	1.07	1.46	0.05	0.67	2.28	1.87	0.86	0.25	0.03	0.04	0.05

Benchmark definitions are on the following pages.

Private Equity, Agriculture, Timberland, Unlisted Infrastructure returns shown are gross of fees.

Private Equity and Blended Benchmark (Private Equity) returns are 1 quarter lagged.

## Benchmark Definitions

Account Name	From Date	To Date	Benchmark
Domestic Equity Custom	3/1/2022	Present	93% Russell 3000 Index, 7% FTSE Global Core Infrastructure 50/50 Index (Net)
Benchmark	1/1/2015	2/28/2022	100% Russell 3000 Index
	1/1/1982	12/31/2014	100% Dow Jones US Total Stock Market Index
Real Estate Blended	1/1/2013	Present	100% NCREIF Fund Index-ODCE (VW) (Net)**
Benchmark	1/1/2007	12/31/2012	100% NPI + 1%
	1/1/2005	12/31/2016	100% Consumer Price Index + 5%
Alternatives Custom	3/1/2022	Present	95% MSCI World World Index (Net) 1 Qtr Lagged +3%, 5% S&P LSTA Leveraged Loan 100 Index +2%
Benchmark	7/1/2010	2/28/2022	100% Annualized rate of 9.0%
	1/1/2004	6/30/2010	100% Annualized rate of 12.0%
	1/1/2003	12/31/2003	100% Annualized rate of 13.0%
	2/1/1986	12/31/2002	100% Annualized rate of 15.0%
U.S. Equity IMRF Custom Benchmark			Blend of the U.S. Equity Style benchmarks returns, dollar weighted by the actual allocation at pervious month end.
International Equity IMRF Custom Benchmark			Blend of the the International Equity Style benchmarks returns, dollar weighted by the actual allocation at previous month end.
Fixed Income IMRF Custom Benchmark			Blend of the the Fixed Income Style benchmarks returns, dollar weighted by the actual allocation at previous month end.

\*\*ODCE returns are updated quarterly.

## Benchmark Definitions

Account Name	From Date	To Date	Benchmark
Fixed Income Custom Benchmark	3/1/2022	Present	78% Bloomberg U.S. Aggregate, 14% Custom Barings Global Loan Benchmark, 8% ICE BofAML U.S. High Yield Cash Pay Index
	1/1/1976	2/28/2022	100% Bloomberg U.S. Aggregate
Private Real Assets Custom Benchmark	3/1/2022	Present	95% NCREIF Fund Index-ODCE (VW) (Net)**, 5% Consumer Price Index +4%
Unlisted Infrastructure Blended Benchmark	3/1/2022	Present	100% Consumer Price Index +4%
	4/1/2018	2/28/2022	100% Alternatives Custom Benchmark
Private Equity Blended Benchmark	3/1/2022	Present	100% MSCI World World Index (Net) 1 Qtr Lagged +3%
	2/1/1996	2/28/2022	100% Alternatives Custom Benchmark

\*\*ODCE returns are updated quarterly.

# Benchmark Definitions

Account Name	From Date	To Date	Benchmark
Total Fund Benchmark			The total fund benchmark is a blend of the asset class benchmark returns weighted by the target allocation for each asset class:
	3/1/2022	Present	35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18% MSCI AC World ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1% 90 Day US Treasury Bill.
	1/1/2021	2/28/2022	39% Russell 3000 Index, 25% Blmbg. Barc. U.S. Aggregate, 15% MSCI AC World ex USA (Net), 10% NCREIF Fund Index-ODCE (VW) (Net), 10% Alternatives Custom Benchmark, 1% 90 Day US Treasury Bill.
	3/1/2018	12/31/2020	37% Russell 3000 Index, 28% Blmbg. Barc. U.S. Aggregate, 18% MSCI AC World ex USA (Net), 9% NCREIF Fund Index-ODCE (VW) (Net), 7% Alternatives Custom Benchmark, 1% 90 Day US Treasury Bill.