

Wilshire



Wilshire Advisors

Executive Summary of Investment Performance

As of September 30, 2023

IMRF Performance Summary

- IMRF market value as of September 2023: \$48.9 billion
- IMRF total fund return for 3Q 2023: -2.47% vs the Total Fund Benchmark return of -1.92%
- U.S. equity markets posted negative returns for the quarter as the Fed's policy of higher rates for longer weighed on markets
- IMRF U.S. Equity Portfolio underperformed the benchmark during the quarter, returning -3.74% versus -3.59%
- International equity markets were down for the quarter, with higher rates still being a concern, coupled with continued economic weakness in China
- IMRF International Equity Portfolio outperformed the benchmark during the quarter, returning -3.04% versus -3.77%
- Fixed income markets were generally negative for the quarter as the ten-year Treasury yield rose to its highest level since 2007
- IMRF Fixed Income Portfolio underperformed the benchmark during the quarter, returning -2.11% versus -2.00%
- 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 down -3.3% for the third quarter and is up 20.5% for the past 12 months. The best performing sectors were energy (+12.9%) and communication services (+2.3%). The worst performing sectors were utilities (-9.3%) and real estate (-8.4%). From a size perspective, large-cap outperformed small-cap by 170 basis points. Growth stocks underperformed value during the third quarter but lead meaningfully for the one-year return.

The bellwether 10-year U.S. Treasury yield has been on a steep upward trend since its COVID-induced historical lows – the minimum being 0.5% in August 2020. The current 10-year yield stands at 4.63%. The 3-month yield is nearly a percent higher at 5.58%, resulting in a level of inversion not seen in decades. The duration of that negative spread is also meaningful as these conditions initially appeared nearly a year ago – arguably the longest curve inversion in more than 40 years. While the current yield level may seem high given the period since the Global Financial Crisis, a longer view reveals what history suggests is possible.

Non-U.S. Equity

The eurozone fell into a mild recession around the start of the new year as real GDP fell during the fourth and first quarters. Recent data suggests that conditions are not improving – and that contraction is spreading. Germany continues to suffer due to a sustained decline in demand for goods and services while weakness is also showing in France. The Bank of England paused interest rate increases as Britain's economy has slowed. The outlook in China is complicated but with signs of improvement.

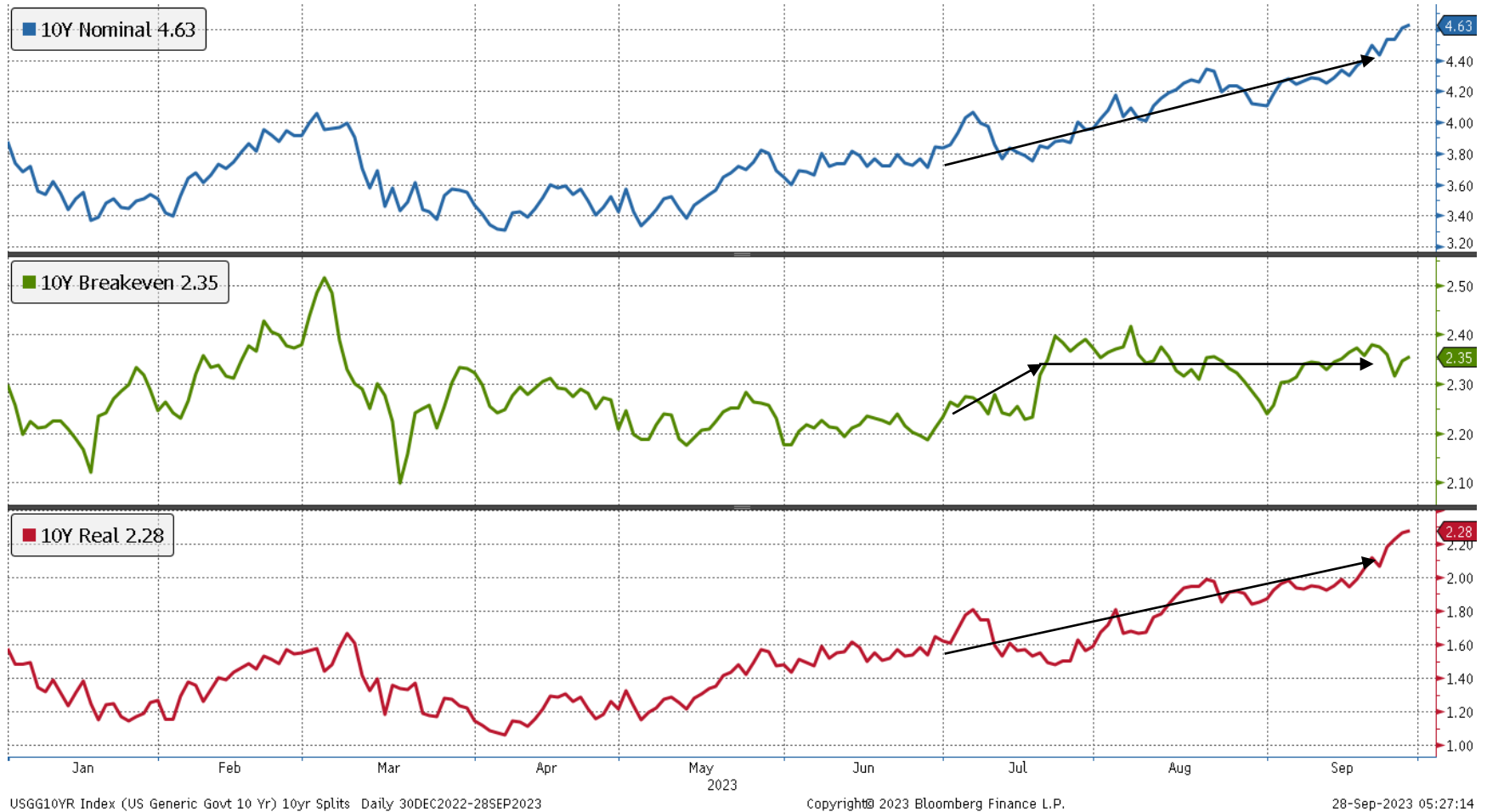
Fixed Income

The U.S. Treasury yield curve was up across the maturity spectrum during the quarter, and to a greater degree in the long end of the curve. Credit spreads were little changed. The FOMC increased the overnight rate by 0.25% in July, targeting a range of 5.25% to 5.50%, before again pausing increases in September. In late September, Fed Chair Jerome Powell said that inflation is currently the central bank's top priority, "the worst thing we can do is to fail to restore price stability, because the record is clear on that."

September 2023 Asset Class Assumptions

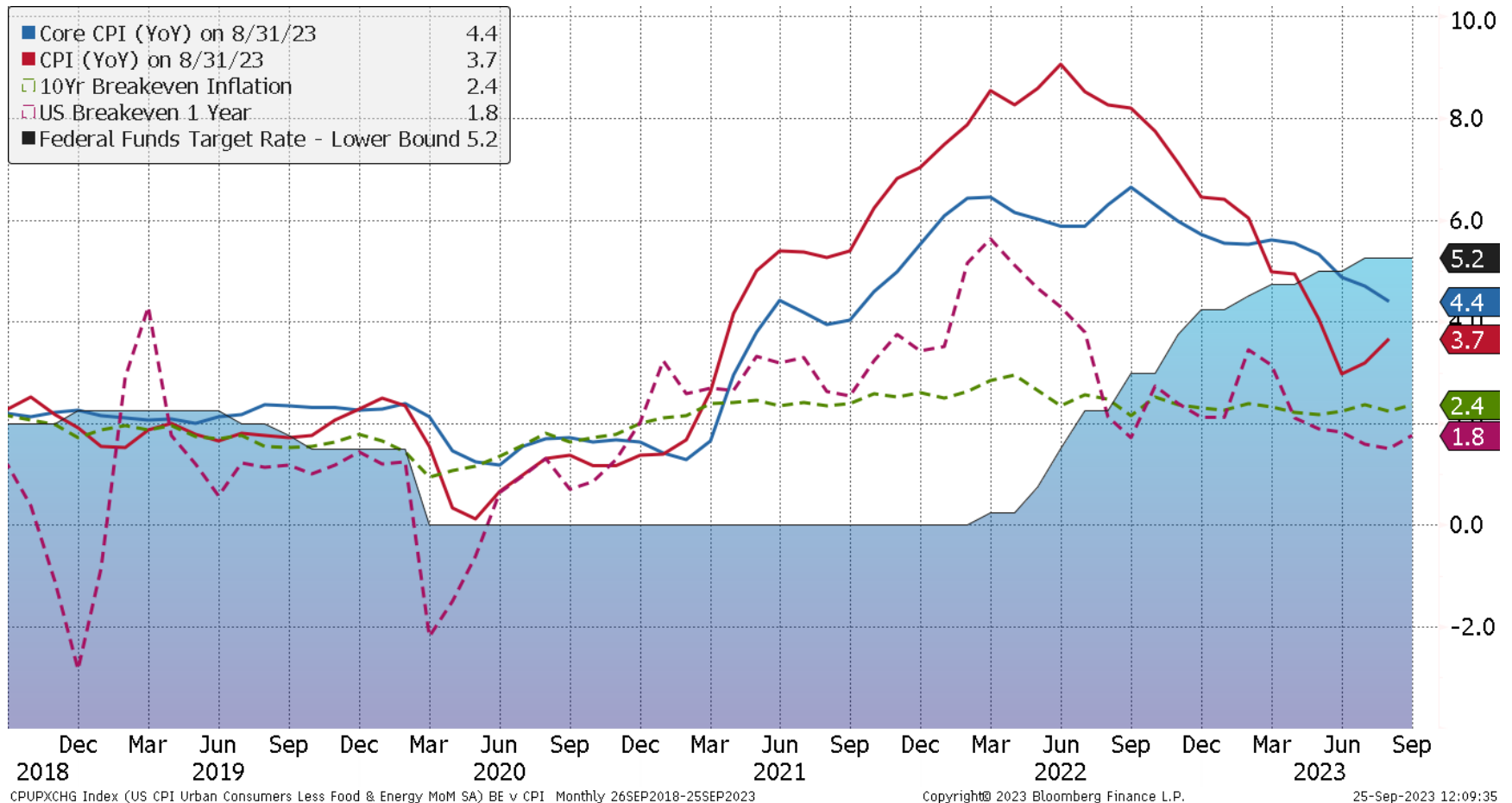
	EQUITY						FIXED INCOME / CREDIT						REAL ASSETS						
	US Stock	Dev ex-US Stock	Emg Stock	Global ex-US Stock	Global Stock	Private Equity	Cash	Core Bond	LT Core Bond	TIPS	High Yield	Private Credit	Dev ex-US Bond (Hdg)	Real Estate US RES	Global RES	Private RE	Cmdty	Real Assets	US CPI
Compound Retrun (%)	6.00	7.00	7.25	7.35	6.65	9.65	4.25	5.60	5.55	4.85	6.85	8.95	3.50	6.20	6.35	6.20	6.60	7.05	2.35
Arithmetic Return (%)	7.30	8.45	10.20	9.00	8.00	13.35	4.25	5.70	6.00	5.00	7.30	9.70	3.60	7.60	7.60	7.10	7.75	7.75	2.35
Risk (%)	17.00	18.00	26.00	19.05	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 (%)	1.60	3.15	2.60	3.00	2.15	0.00	4.25	5.90	5.95	5.15	10.15	5.20	4.45	4.45	4.45	2.30	4.25	3.50	0.00
Growth Factor 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 Factor 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
CORRELATIONS																			
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

2023 Rate Environment



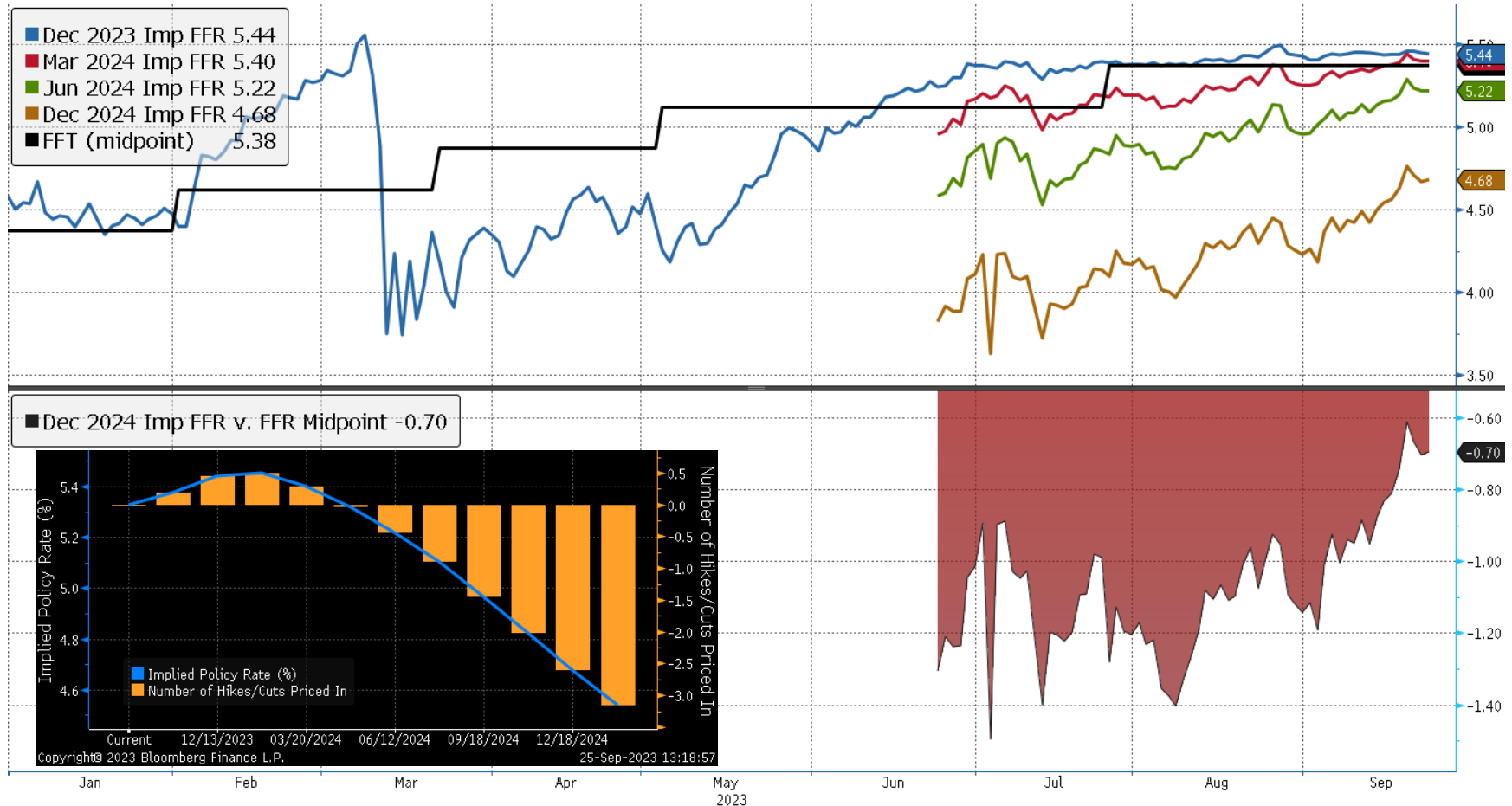
Data Sources: Wilshire, Bloomberg

Inflation Update v. Fed Policy: At/Near the Neutral Rate?



Data Sources: Bloomberg

At/Near Neutral Rate?: The Market Thinks So (and that we'll be Lower Next Year)...



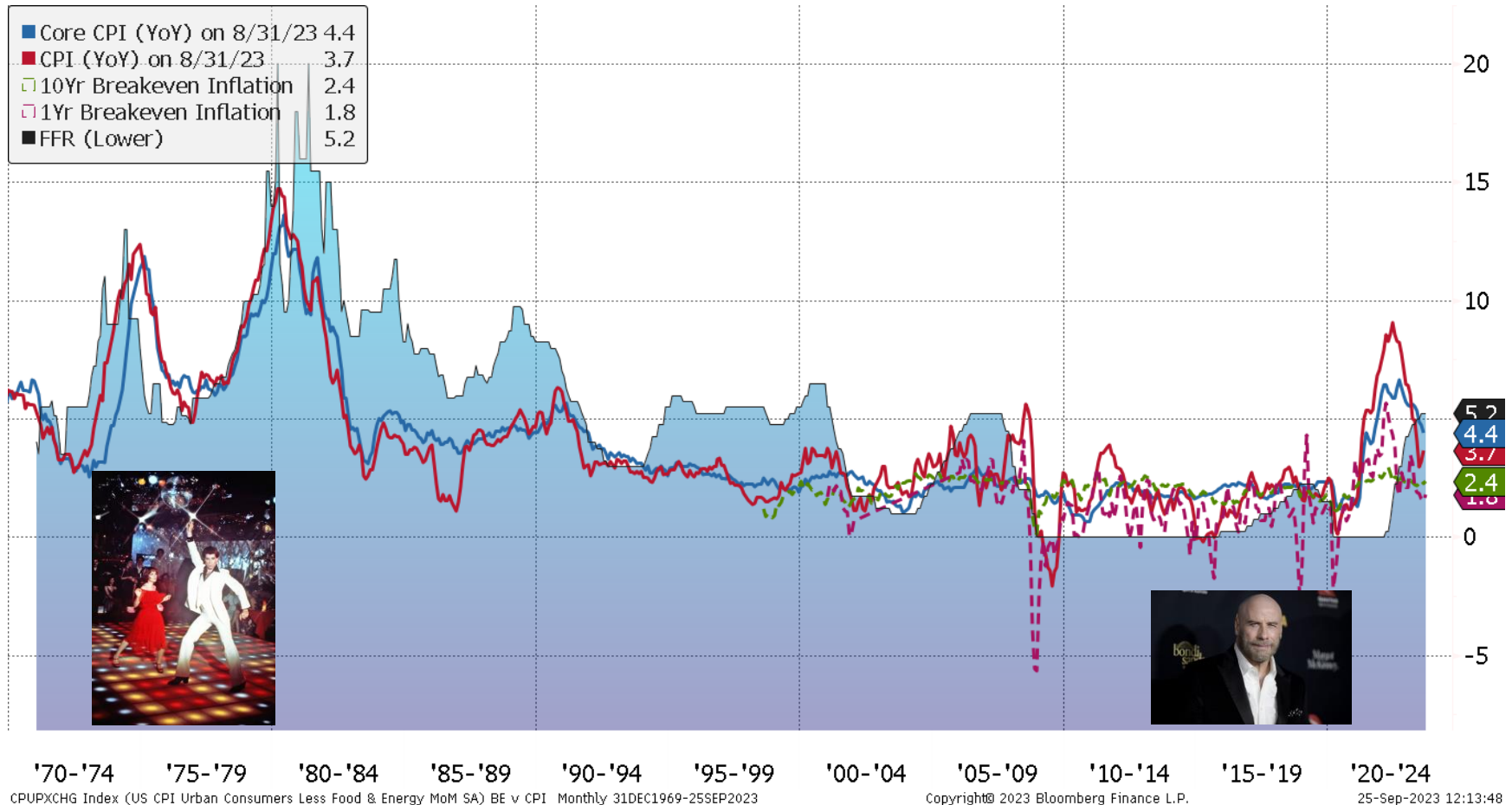
USOAFR DEC2023 Index (WIRP Implied Overnight Rate fo) FFR Implied Daily 30DEC2022-25SEP2023

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Data Sources: Bloomberg

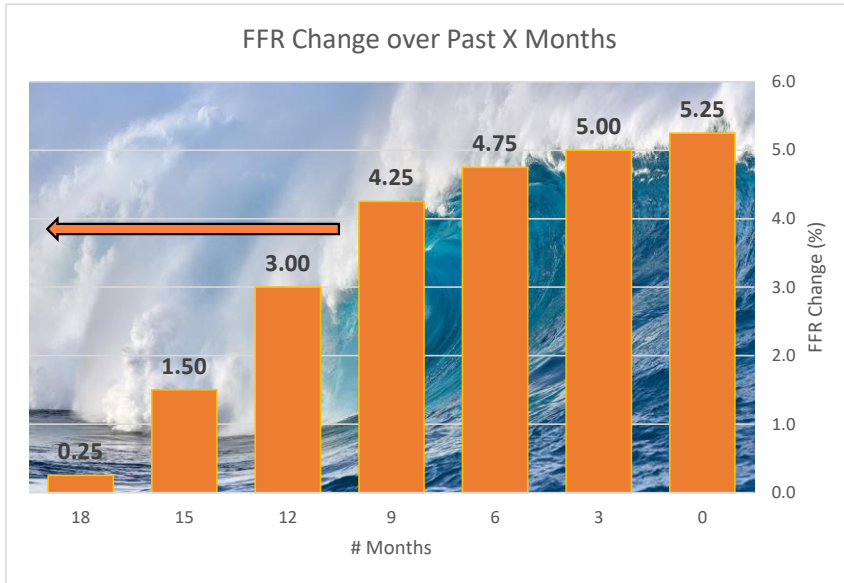
Inflation: I Know, It's Not the 70s, But the Path Back to Target Might Be Bumpy....



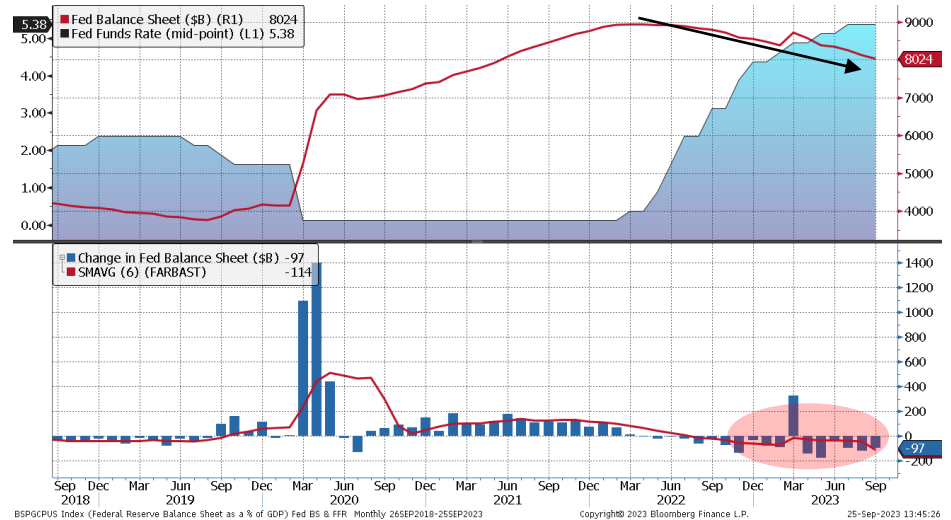
Data Sources: Bloomberg

Tightening Continues, Even If the FFR Target Rate Remains Unchanged

Impact of Fed tightening known to have long & variable lag



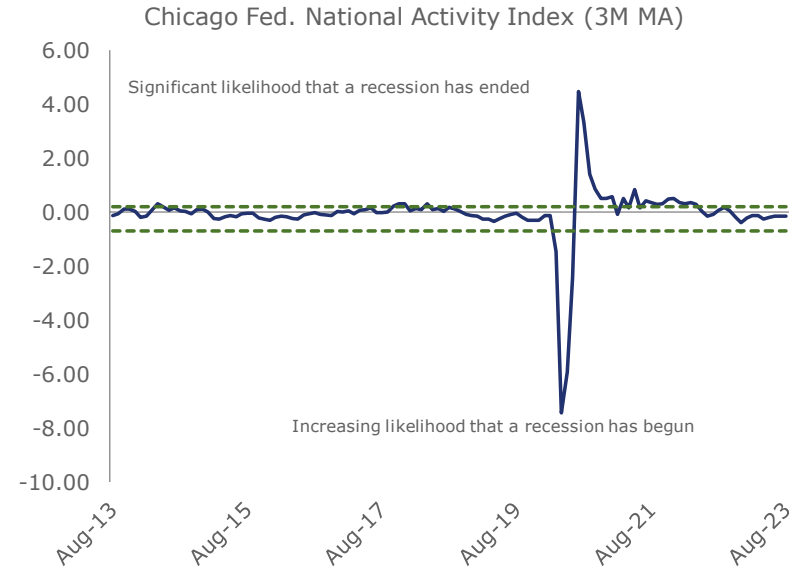
Fed BS run-off (~\$1T/year)



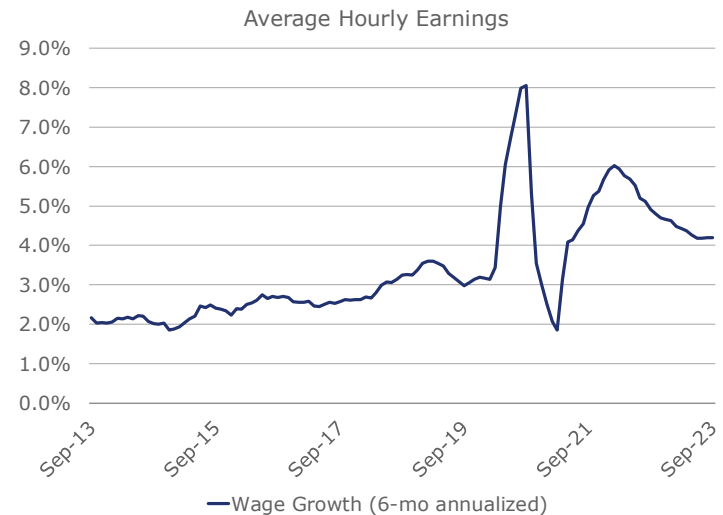
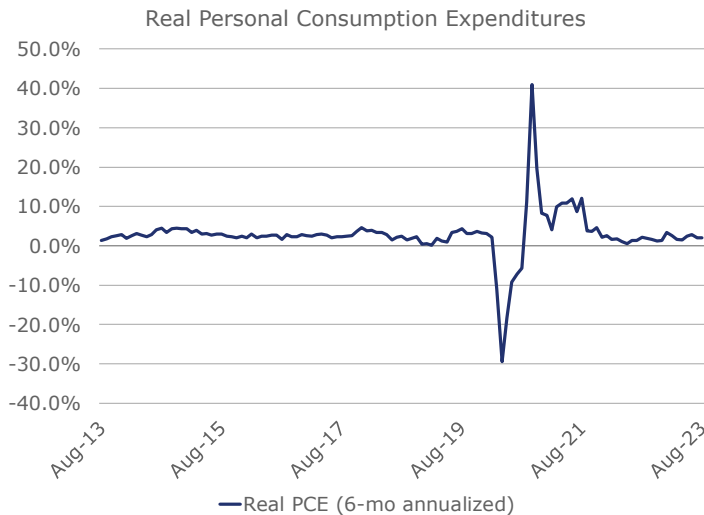
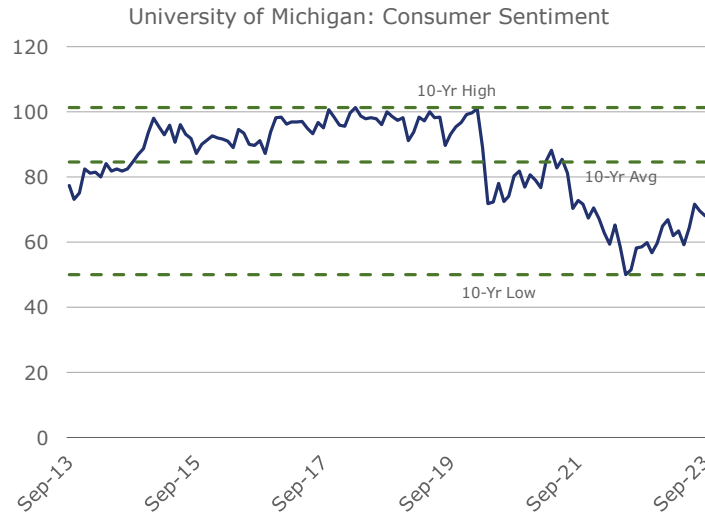
Data Sources: Bloomberg

Economic/Market Activity

Economic Growth

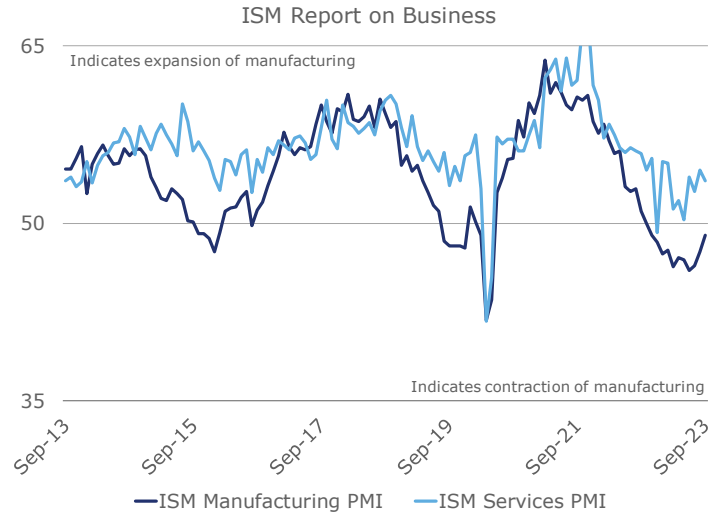


Consumer Activity



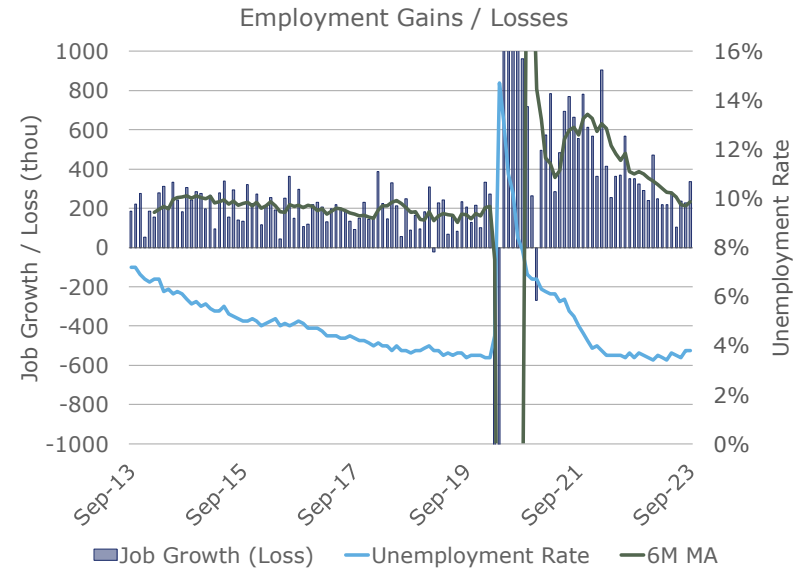
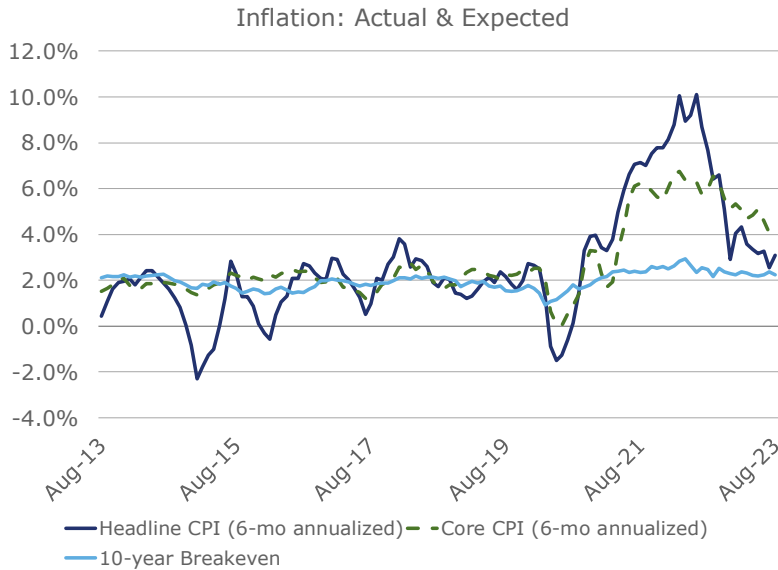
Data Sources: Bloomberg

Business Activity



Data Sources: Bloomberg

Inflation And Employment

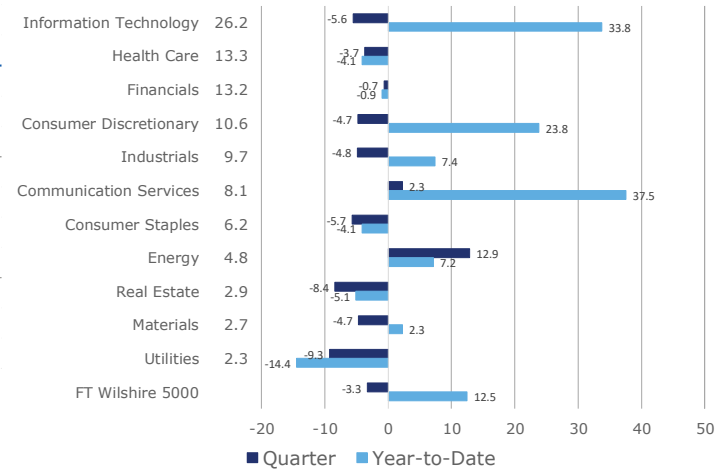


Data Sources: Bloomberg

U.S. Equity Market

As of 9/30/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
FT Wilshire 5000	-3.3	12.5	20.5	9.7	9.4	11.5
Wilshire U.S. Large Cap	-3.2	13.3	21.3	9.8	10.0	11.9
Wilshire U.S. Small Cap	-4.9	3.5	11.7	9.5	3.6	7.4
Wilshire U.S. Large Growth	-3.4	27.6	28.6	9.3	12.1	14.1
Wilshire U.S. Large Value	-2.9	-0.3	13.4	10.1	7.5	9.6
Wilshire U.S. Small Growth	-5.0	7.8	15.4	5.8	4.0	7.6
Wilshire U.S. Small Value	-4.7	-0.4	8.3	13.5	3.2	7.1
Wilshire REIT Index	-6.4	-0.2	3.9	5.7	2.9	6.0
MSCI USA Min. Vol. Index	-2.0	1.9	11.8	6.2	7.0	10.4
FTSE RAFI U.S. 1000 Index	-2.2	4.4	17.4	14.3	8.7	10.4

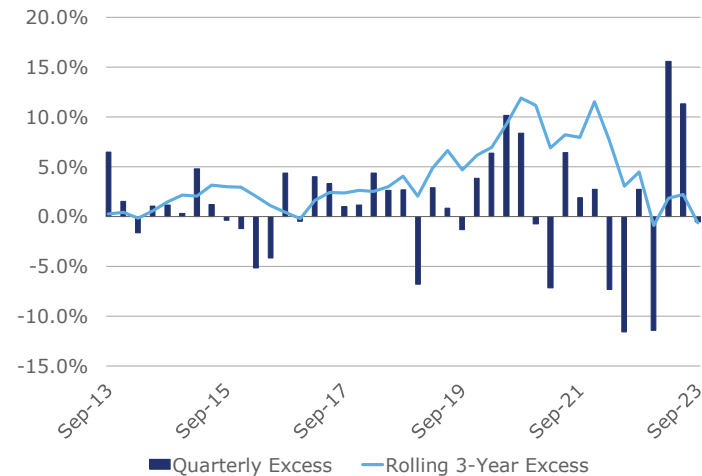
U.S. Sector Weight and Return (%)



Large Cap vs Small Cap



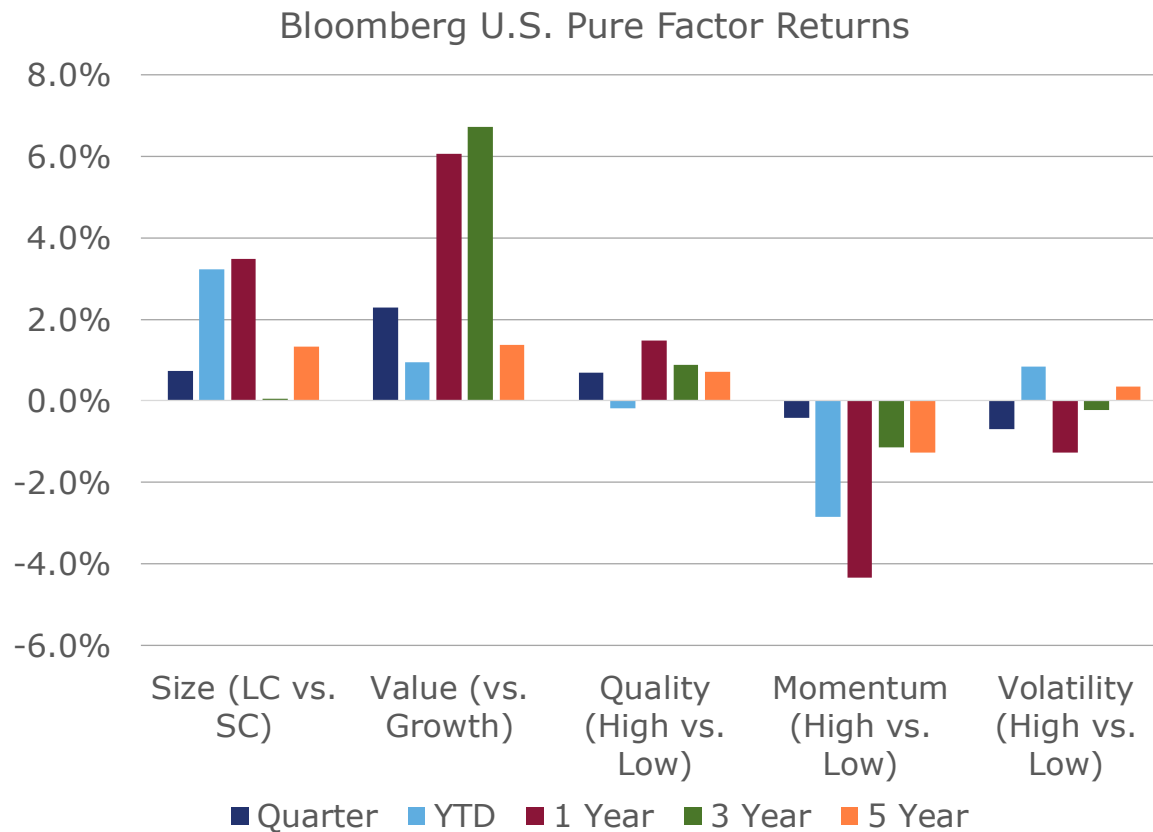
Large Growth vs Large Value



Data Sources: Bloomberg, Wilshire Atlas

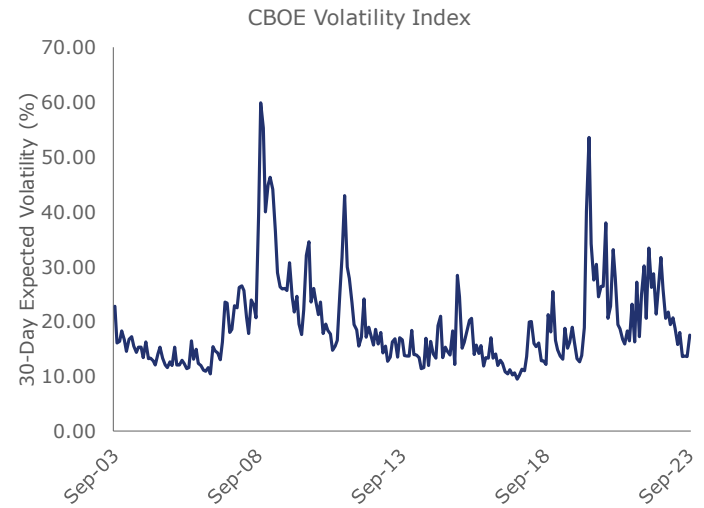
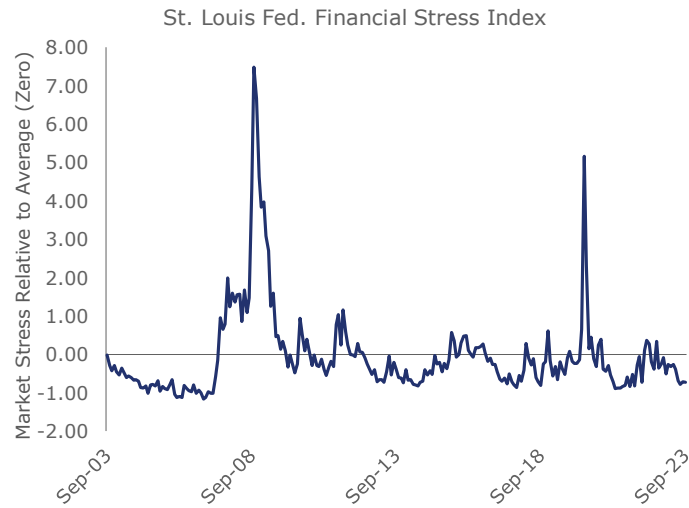
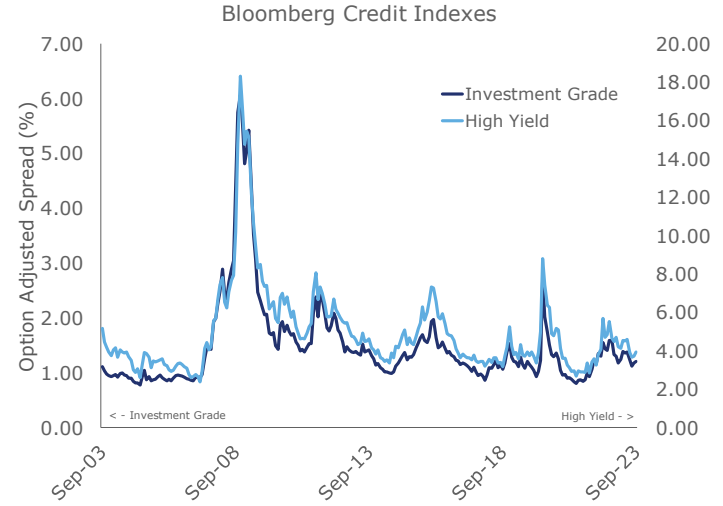
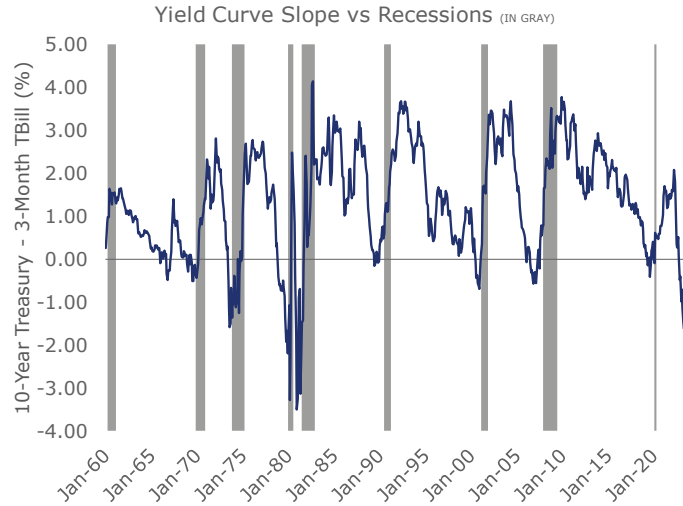
U.S. Factor Returns

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



Data Sources: Bloomberg

Risk Monitor

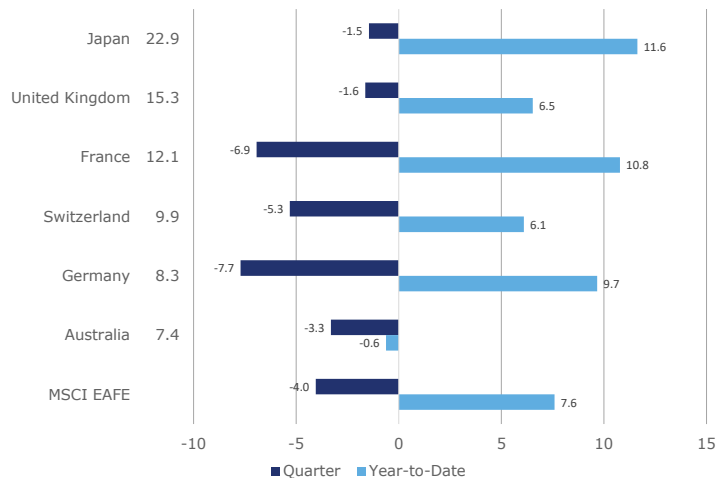


Data Sources: Bloomberg

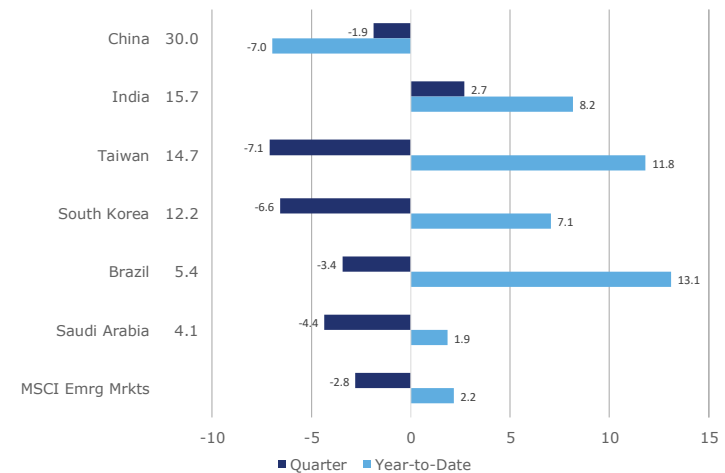
Non-U.S. Equity Market

As of 9/30/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
MSCI ACWI ex-US (\$G)	-3.7	5.8	21.0	4.2	3.1	3.8
MSCI EAFE (\$G)	-4.0	7.6	26.3	6.3	3.7	4.3
MSCI Emerging Markets (\$G)	-2.8	2.2	12.2	-1.3	0.9	2.5
MSCI Frontier Markets (\$G)	-0.2	4.6	14.2	1.8	-0.7	0.3
MSCI ACWI ex-US Growth (\$G)	-7.3	2.9	16.2	-1.6	2.9	4.3
MSCI ACWI ex-US Value (\$G)	0.1	8.6	25.7	10.1	3.0	3.4
MSCI ACWI ex-US Small (\$G)	-1.6	5.5	19.6	4.5	3.0	4.8
MSCI ACWI Minimum Volatility	-2.3	1.7	10.4	3.8	4.3	7.2
MSCI EAFE Minimum Volatility	-2.7	4.8	17.9	1.3	1.1	4.2
FTSE RAFI Developed ex-US	-1.6	8.7	28.6	11.4	3.9	4.2
MSCI EAFE LC (G)	-1.2	11.2	21.0	11.4	6.2	7.3
MSCI Emerging Markets LC (G)	-1.3	4.4	11.3	1.0	3.1	5.3

Developed Markets Weight and Return (%)

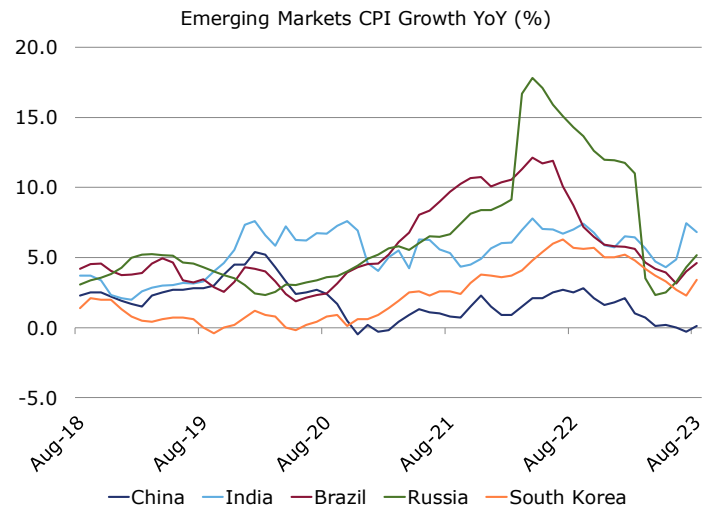
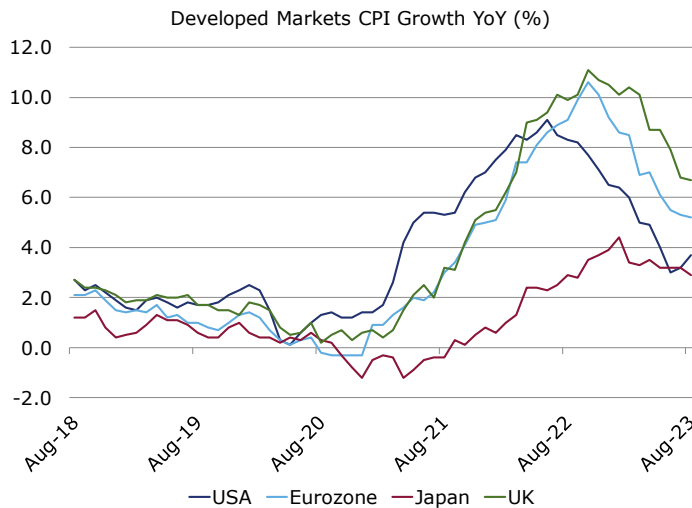
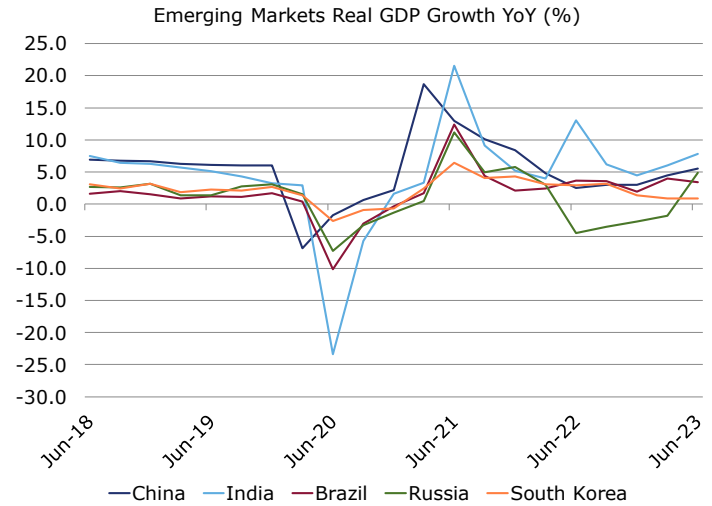
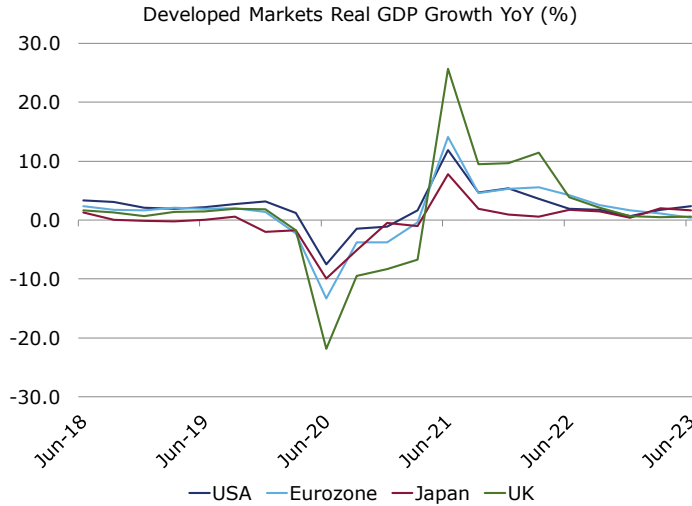


Emerging Markets Weight and Return (%)



Data Sources: Bloomberg

Non-U.S. Growth and Inflation

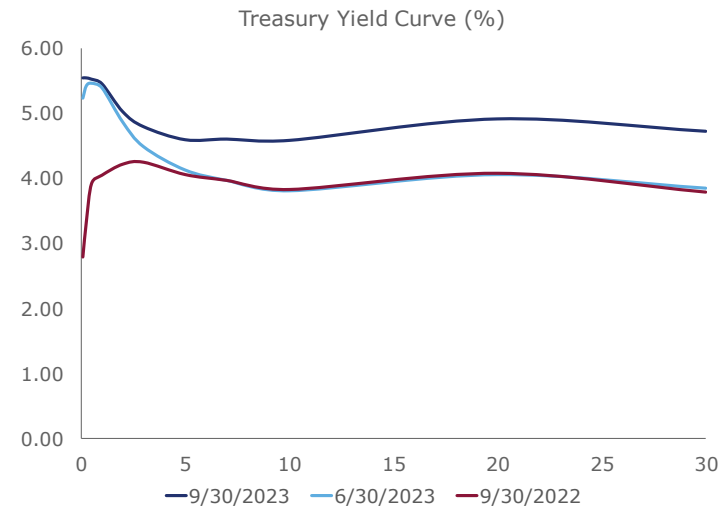
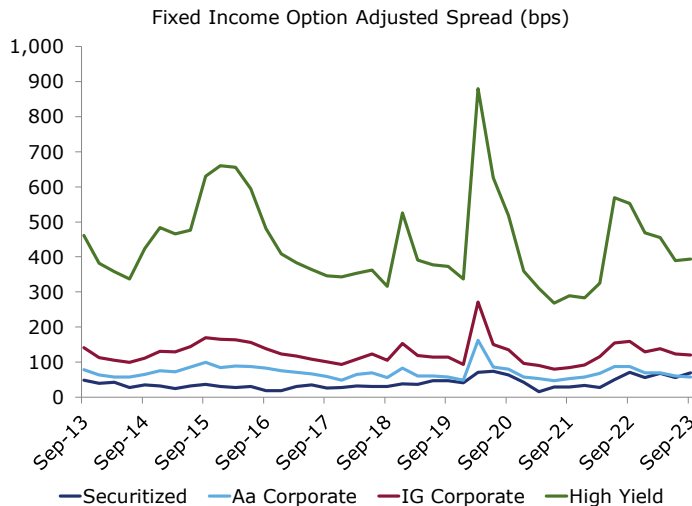


Data Sources: Bloomberg

U.S. Fixed Income

As of 9/30/2023	YTW	DUR.	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg Aggregate	5.4	6.1	-3.2	-1.2	0.6	-5.2	0.1	1.1
Bloomberg Treasury	4.9	5.9	-3.1	-1.5	-0.8	-5.8	-0.1	0.6
Bloomberg Gov't-Rel.	5.4	5.1	-2.0	0.4	2.2	-3.8	0.6	1.4
Bloomberg Securitized	5.6	6.2	-3.8	-2.1	0.0	-4.9	-0.6	0.7
Bloomberg Corporate	6.0	6.8	-3.1	0.0	3.6	-4.9	0.9	2.2
Bloomberg LT Gov't/Credit	5.5	13.7	-9.4	-5.4	-2.9	-11.9	-1.2	1.9
Bloomberg LT Treasury	4.9	15.3	-11.8	-8.6	-9.1	-15.7	-2.8	0.8
Bloomberg LT Gov't-Rel.	6.0	11.3	-7.2	-2.1	2.0	-8.5	-0.6	2.4
Bloomberg LT Corporate	6.1	12.5	-7.2	-2.7	2.6	-9.1	-0.2	2.7
Bloomberg U.S. TIPS *	4.6	7.4	-2.6	-0.8	1.2	-2.0	2.1	1.7
Bloomberg High Yield	8.9	3.5	0.5	5.9	10.3	1.8	3.0	4.2
S&P/LSTA Leveraged Loan	9.5	0.3	3.5	10.2	13.1	6.1	4.5	4.3
Treasury Bills	5.5	0.3	1.3	3.6	4.6	1.7	1.7	1.1

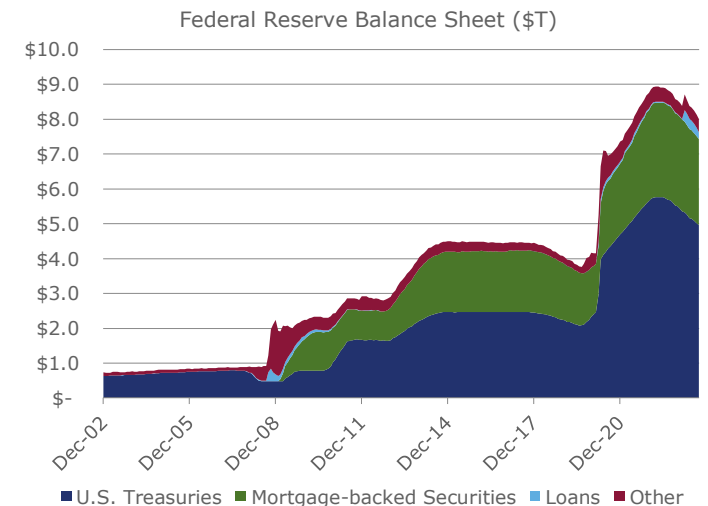
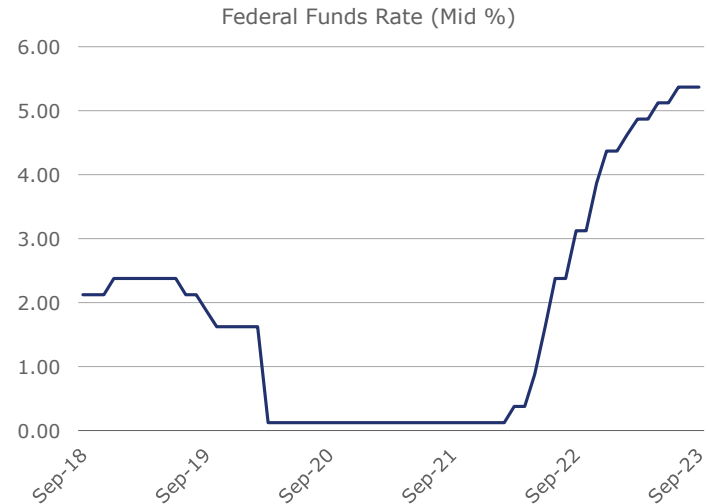
* Yield and Duration statistics are for a proxy index based on similar maturity, the Bloomberg Barclays U.S. Treasury 7-10 Year Index



Data Sources: Bloomberg

Federal Reserve

- The Federal Open Market Committee increased the rate an additional 25 basis points in July before pausing increases in September
- QE4 was larger than the 3 phases of quantitative easing – combined – following the global financial crisis
- The Fed’s balance sheet has begun to shrink again during the past six months

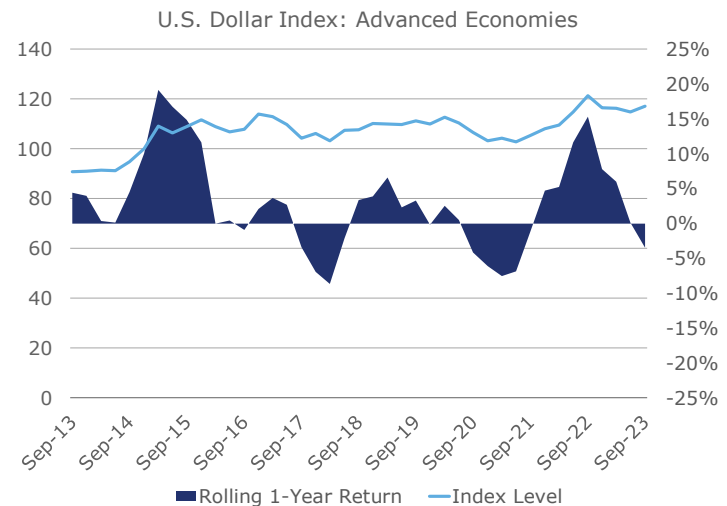
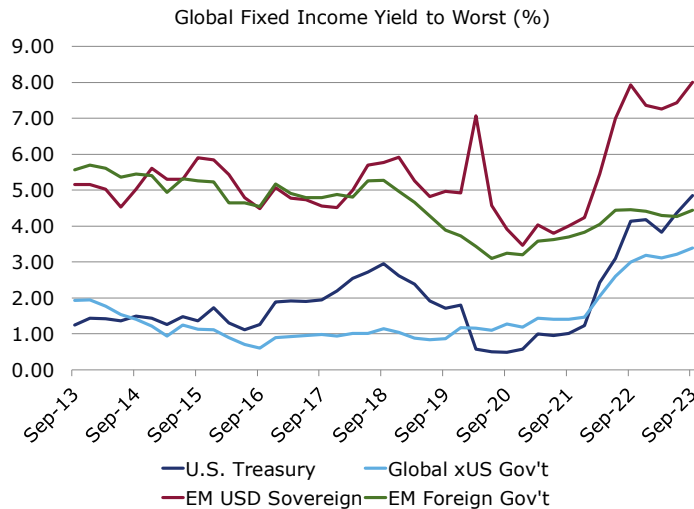


	Announced	Closed	Amount (bil)
QE1	11/25/2008	3/31/2010	\$1,403
QE2	11/3/2010	6/29/2012	\$568
QE3	9/13/2012	10/29/2014	\$1,674
QE4	3/23/2020	3/15/2022	\$4,779

Non-U.S. Fixed Income

As of 9/30/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Developed Markets						
Bloomberg Global Aggregate xUS	-4.0	-3.2	3.4	-8.4	-3.1	-1.7
Bloomberg Global Aggregate xUS *	-0.8	2.8	3.0	-2.6	0.8	2.3
Bloomberg Global Inflation Linked xUS	-7.1	-4.1	1.5	-10.1	-3.8	-1.3
Bloomberg Global Inflation Linked xUS *	-3.5	-2.1	-3.8	-6.2	-0.8	2.5
Emerging Markets (Hard Currency)						
Bloomberg EM USD Aggregate	-2.3	0.9	7.6	-4.2	0.2	2.3
Emerging Markets (Foreign Currency)						
Bloomberg EM Local Currency Gov't	-1.7	0.0	5.8	-1.2	1.3	0.6
Bloomberg EM Local Currency Gov't *	0.2	4.5	6.4	0.4	2.9	2.6
Euro vs. Dollar	-3.1	-1.2	7.9	-3.4	-1.8	-2.4
Yen vs. Dollar	-3.4	-12.2	-3.1	-10.9	-5.3	-4.1
Pound vs. Dollar	-4.0	1.0	9.2	-1.9	-1.3	-2.8

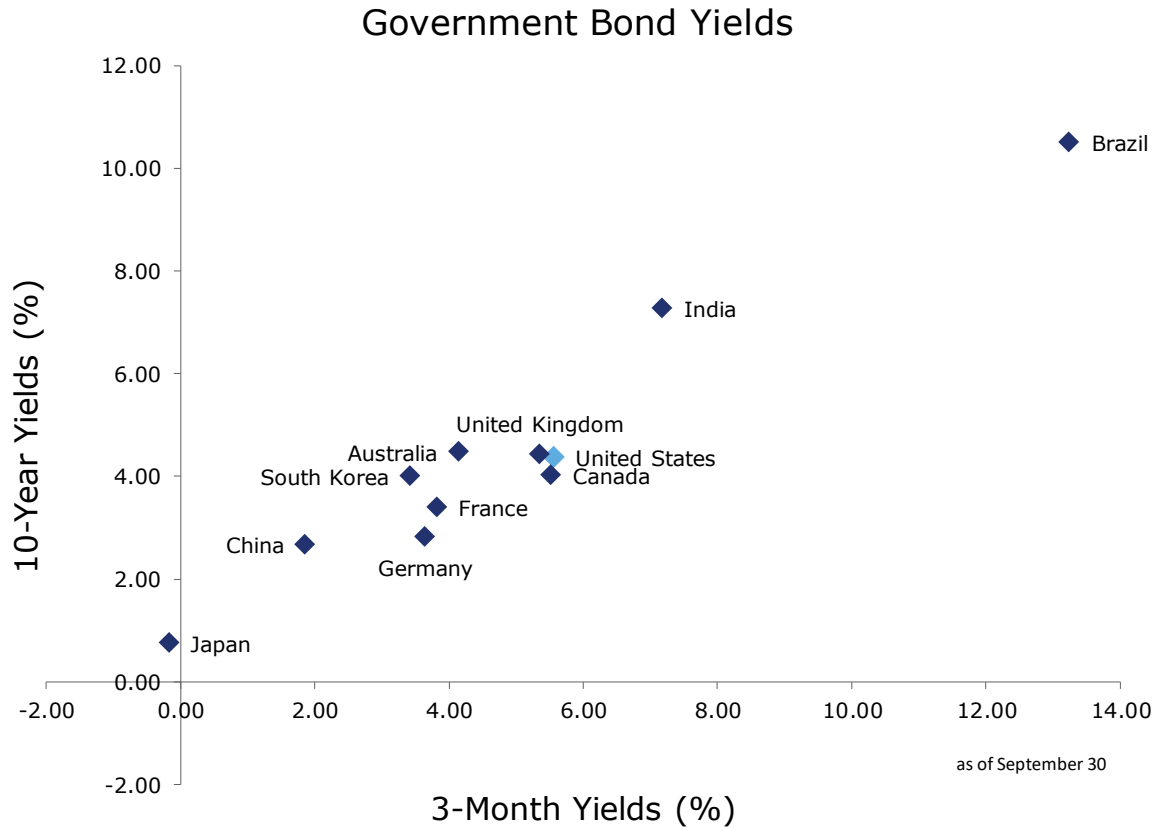
* Returns are reported in terms of local market investors, which removes currency effects.



Data Sources: Bloomberg

Global Interest Rates

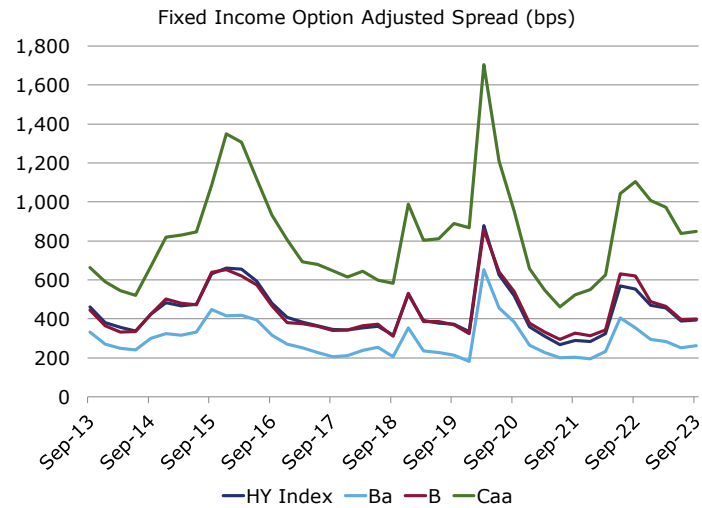
Short-term rates have turned positive in most larger countries; longer-term rates above 4.0% in the U.K. and the U.S.



High Yield Bond Market

As of 9/30/2023

		YTW	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg High Yield		8.9	0.5	5.9	10.3	1.8	3.0	4.2
S&P LSTA Leveraged Loan		9.5	3.1	9.7	13.8	5.2	4.2	3.9
High Yield Quality Distribution	Weight							
Ba U.S. High Yield	47.8%	7.6	-0.4	3.9	8.4	0.8	3.7	4.6
B U.S. High Yield	40.0%	9.0	0.8	6.3	11.6	1.9	2.8	3.9
Caa U.S. High Yield	11.4%	13.3	2.5	12.1	12.7	3.8	0.7	3.7
Ca to D U.S. High Yield	0.9%	15.6	3.0	10.8	26.1	14.4	-2.8	-3.6



Data Sources: Bloomberg

Asset Class Performance

Asset Class Returns - Best to Worst

2018	2019	2020	2021	2022	2023 YTD	Annualized 5-Year as of 9/23
T-Bills 1.9%	U.S. Equity 31.0%	U.S. Equity 20.8%	REITs 46.2%	Commodities 16.1%	U.S. Equity 12.5%	U.S. Equity 9.4%
Core Bond 0.0%	REITs 25.8%	Emrg Mrkts 18.7%	Commodities 27.1%	T-Bills 1.3%	Developed 7.6%	Commodities 6.1%
U.S. TIPS -1.3%	Developed 22.7%	U.S. TIPS 11.0%	U.S. Equity 26.7%	High Yield -11.2%	High Yield 5.9%	Developed 3.7%
High Yield -2.1%	Emrg Mrkts 18.9%	Developed 8.3%	Developed 11.8%	U.S. TIPS -11.8%	T-Bills 3.6%	High Yield 3.0%
REITs -4.8%	High Yield 14.3%	Core Bond 7.5%	U.S. TIPS 6.0%	Core Bond -13.0%	Emrg Mrkts 2.2%	REITs 2.9%
U.S. Equity -5.3%	Core Bond 8.7%	High Yield 7.1%	High Yield 5.3%	Developed -14.0%	REITs -0.2%	U.S. TIPS 2.1%
Commodities -11.2%	U.S. TIPS 8.4%	T-Bills 0.7%	T-Bills 0.0%	U.S. Equity -19.0%	U.S. TIPS -0.8%	T-Bills 1.7%
Developed -13.4%	Commodities 7.7%	Commodities -3.1%	Core Bond -1.5%	Emrg Mrkts -19.7%	Core Bond -1.2%	Emrg Mrkts 0.9%
Emrg Mrkts -14.2%	T-Bills 2.3%	REITs -7.9%	Emrg Mrkts -2.2%	REITs -26.8%	Commodities -3.4%	Core Bond 0.1%

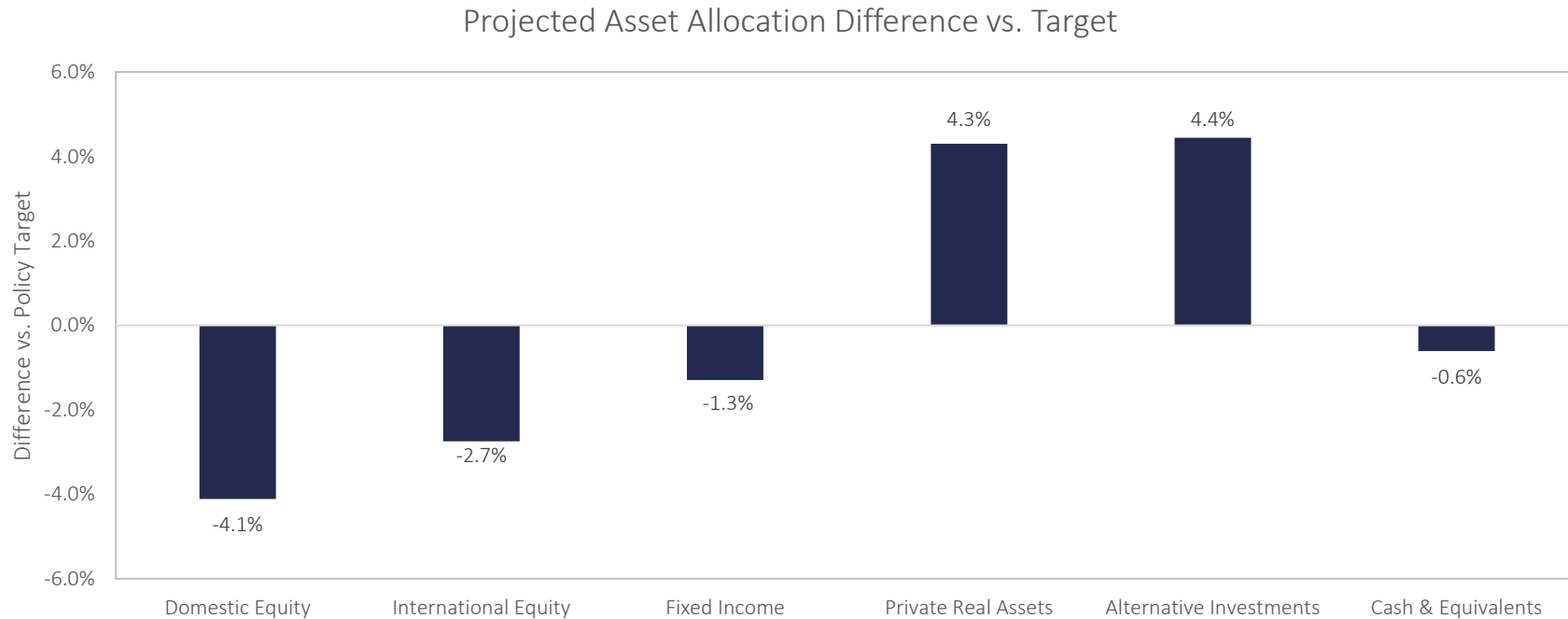
Data Sources: Bloomberg

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

Total Fund

Projected Deviations from the Benchmark

As of September 30, 2023



- Includes committed, but unfunded amounts for Real Assets (\$2.18 billion) and Alternatives (\$2.56 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

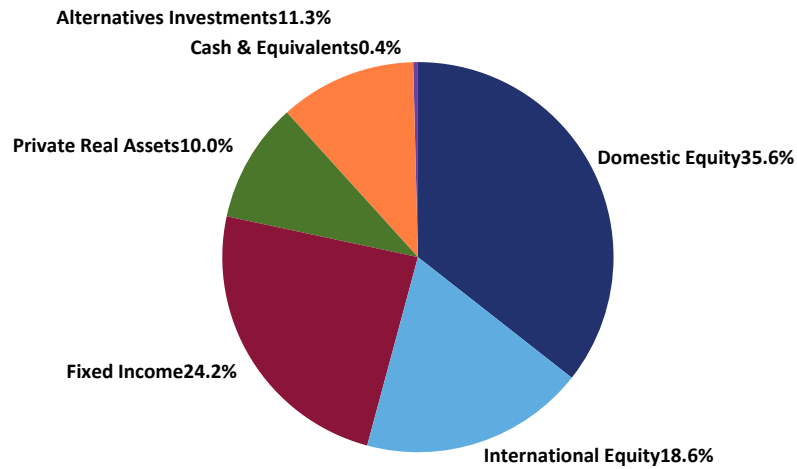
Real Assets Proxy: 50% Domestic Equity, 30% International Equity, 20% Fixed Income

Asset Allocation

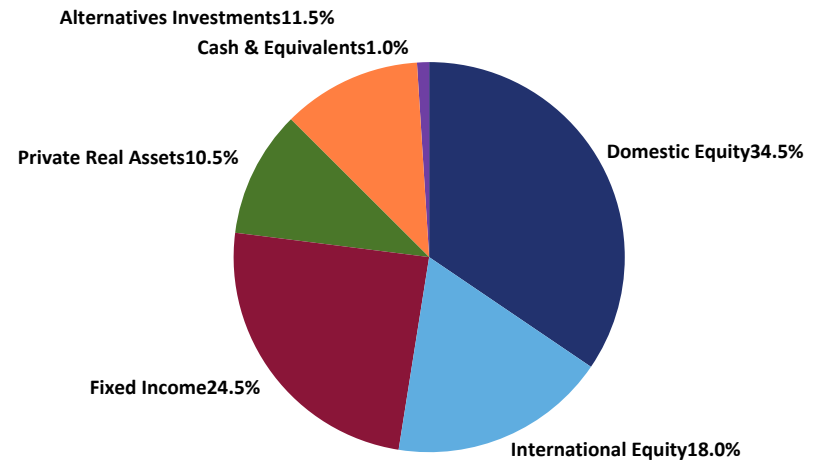
Total Fund

Periods Ended As of September 30, 2023

Actual Allocation



Target Allocation

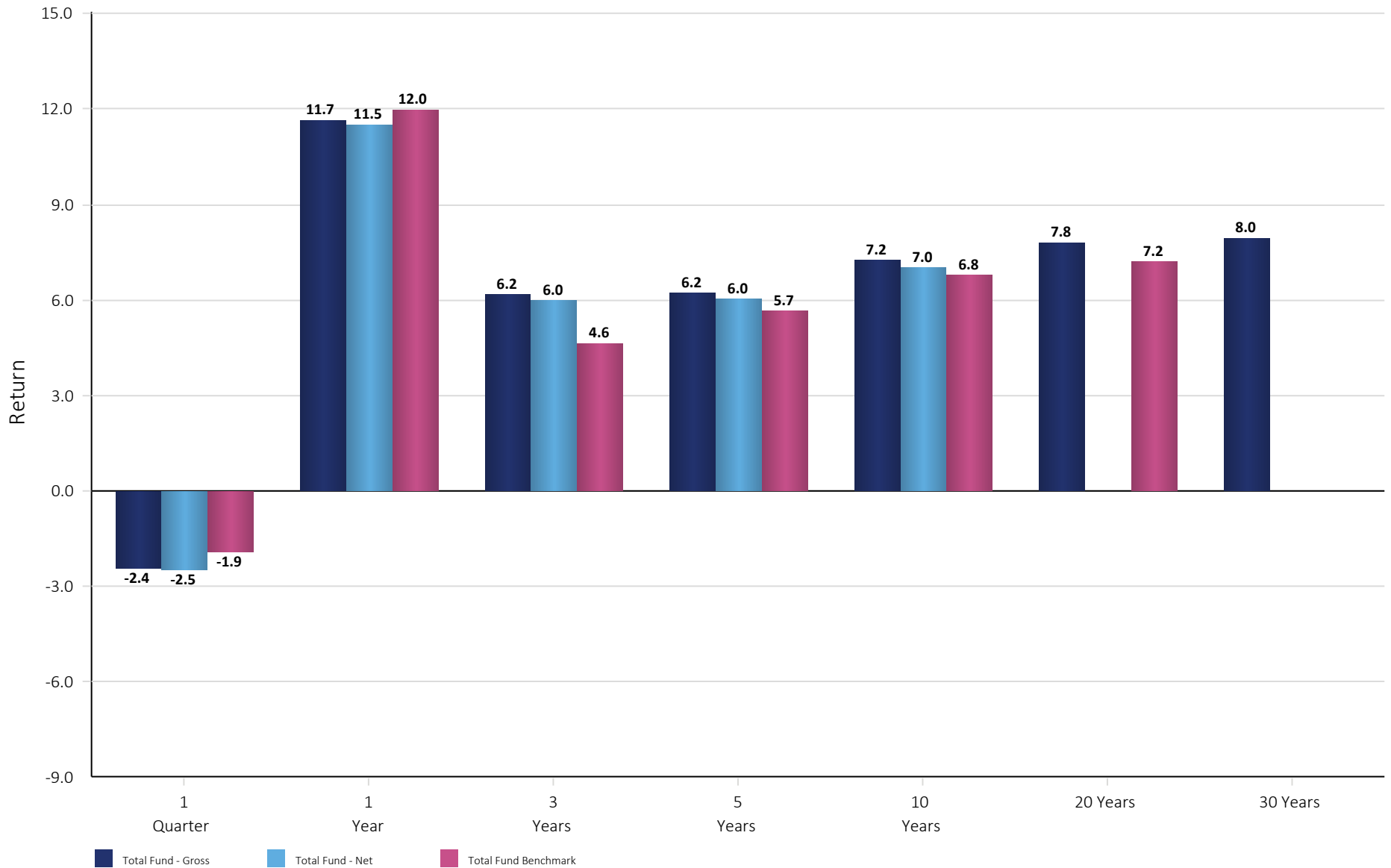


	Actual Allocation \$Millions	Actual Allocation %	Target Allocation %	Differences %	Differences \$Millions
Total Fund	48,922	100.0	100.0	0.0	
Domestic Equity	17,422	35.6	34.5	1.1	544
International Equity	9,087	18.6	18.0	0.6	281
Fixed Income	11,827	24.2	24.5	-0.3	-159
Private Real Assets	4,868	10.0	10.5	-0.5	-268
Alternatives Investments	5,525	11.3	11.5	-0.2	-101
Cash & Equivalents	193	0.4	1.0	-0.6	-297

Comparative Performance

Total Fund - Gross

Periods Ended September 30, 2023

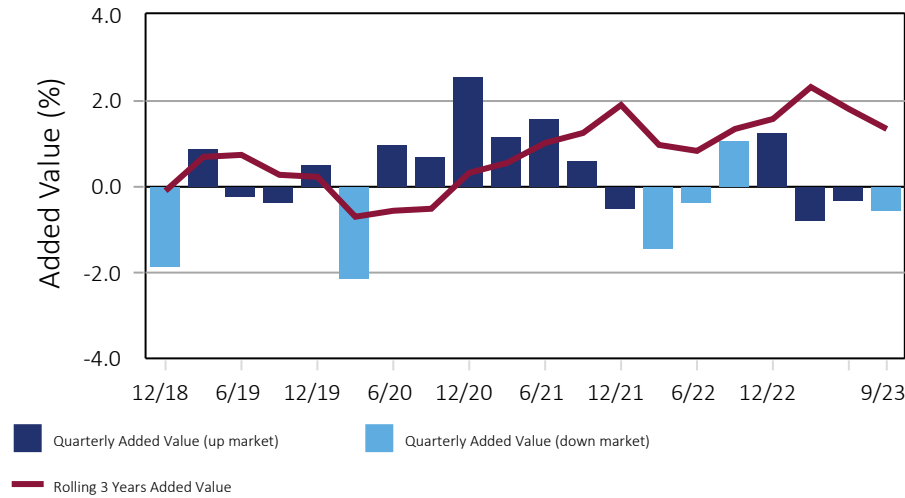


Composite Performance Summary

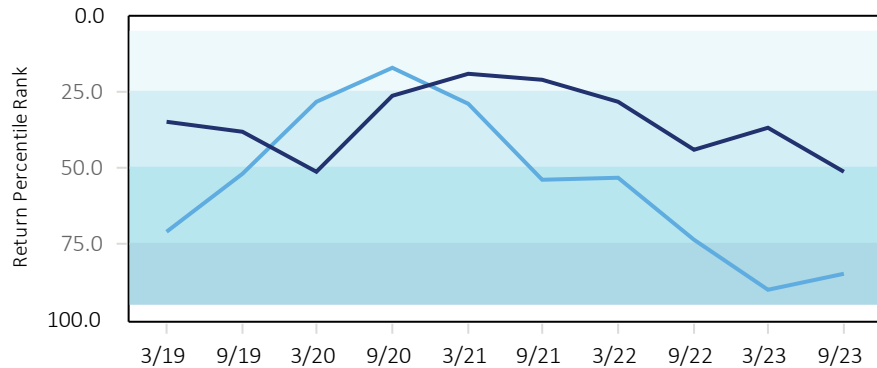
Total Fund

Periods Ended September 30, 2023

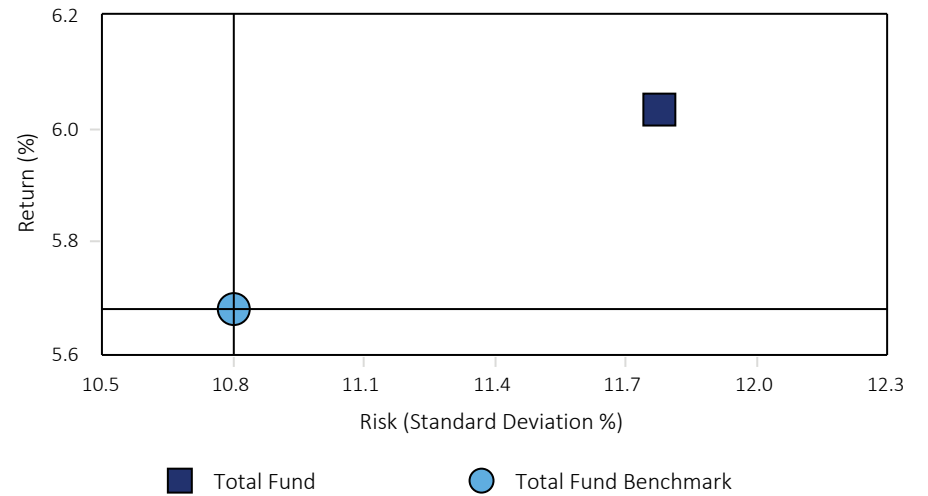
Added Value History



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



Risk and Return 10/01/18 - 09/30/23

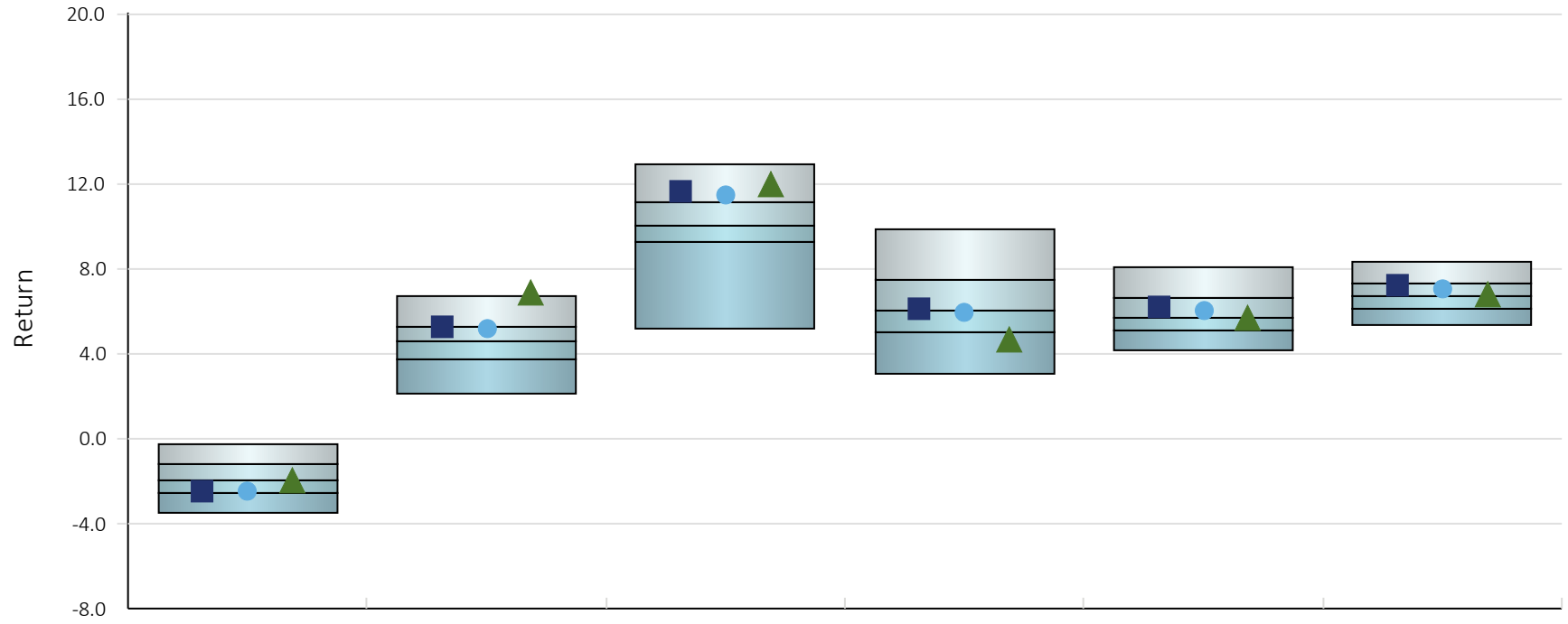


	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
— Total Fund	10	2 (20%)	6 (60%)	2 (20%)	0 (0%)
— Total Fund Benchmark	10	1 (10%)	2 (20%)	5 (50%)	2 (20%)

Plan Sponsor Peer Group Analysis

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

Periods Ended September 30, 2023



	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Total Fund	-2.44 (72)	5.29 (25)	11.67 (19)	6.16 (48)	6.21 (39)	7.23 (34)
● Total Fund - Net	-2.47 (75)	5.17 (28)	11.51 (21)	6.00 (51)	6.04 (41)	7.03 (42)
▲ Total Fund Benchmark	-1.92 (50)	6.90 (5)	11.99 (15)	4.64 (85)	5.68 (51)	6.80 (50)
5th Percentile	-0.24	6.74	12.91	9.83	8.06	8.31
1st Quartile	-1.19	5.24	11.14	7.49	6.67	7.35
Median	-1.94	4.63	10.06	6.01	5.69	6.72
3rd Quartile	-2.52	3.77	9.31	5.05	5.07	6.11
95th Percentile	-3.47	2.14	5.19	3.06	4.13	5.38
Population	126	121	119	111	111	103

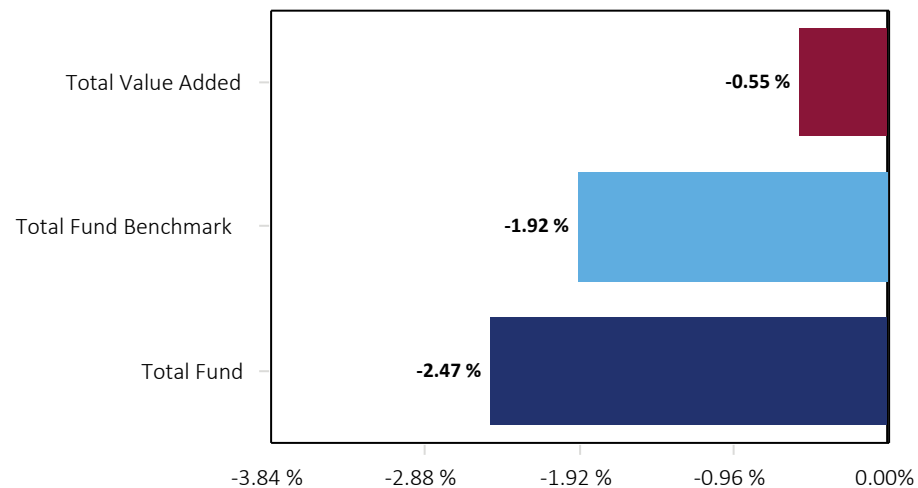
Total Fund Benchmark = 35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18.0% MSCI ACWI ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1.0% 90 Day US Treasury Bill.

Total Fund Attribution

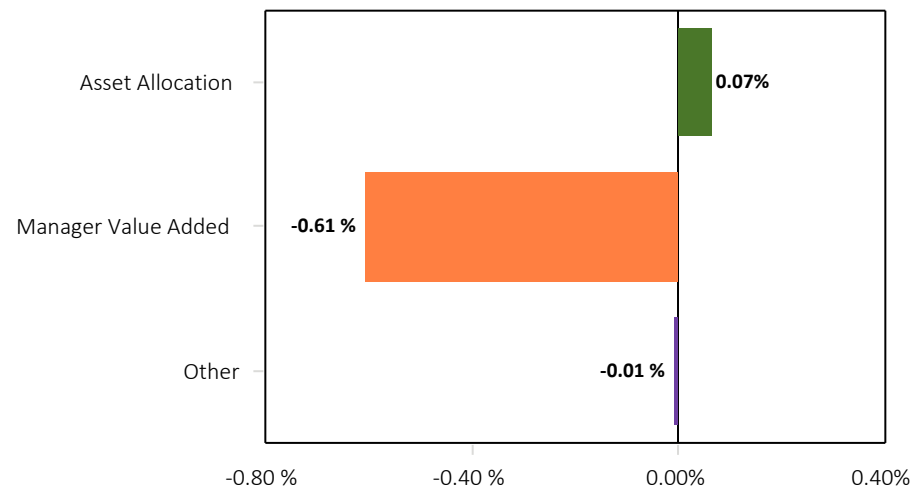
Total Fund

1 Quarter Ending September 30, 2023

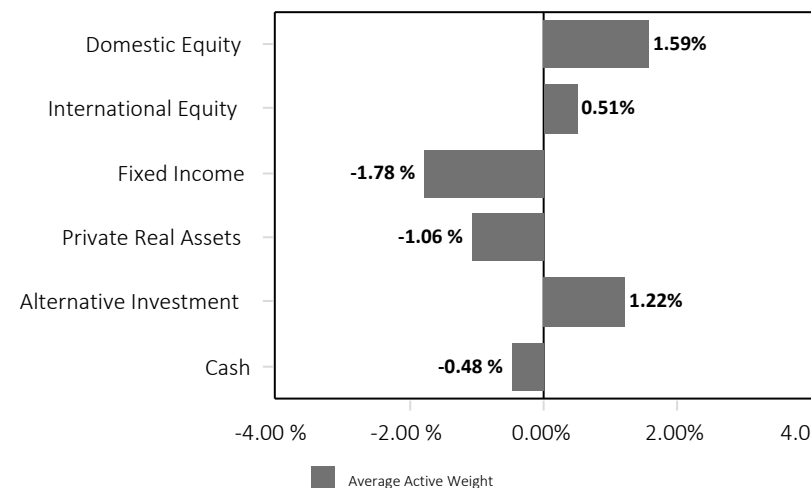
Total Fund Performance



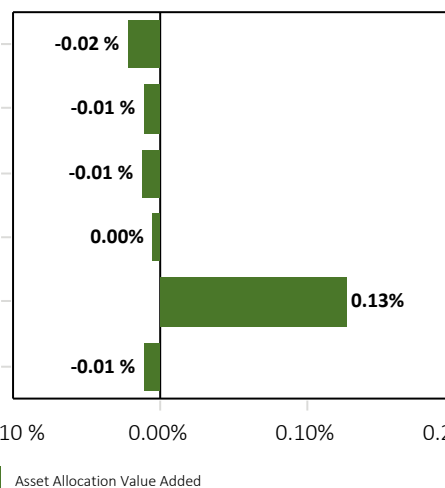
Total Value Added:-0.55 %



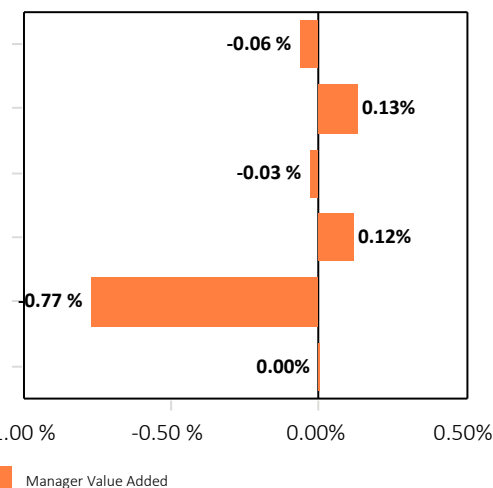
Asset Class Under or Overweighting



Asset Allocation Value Added:0.07%



Total Manager Value Added:-0.61 %



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.

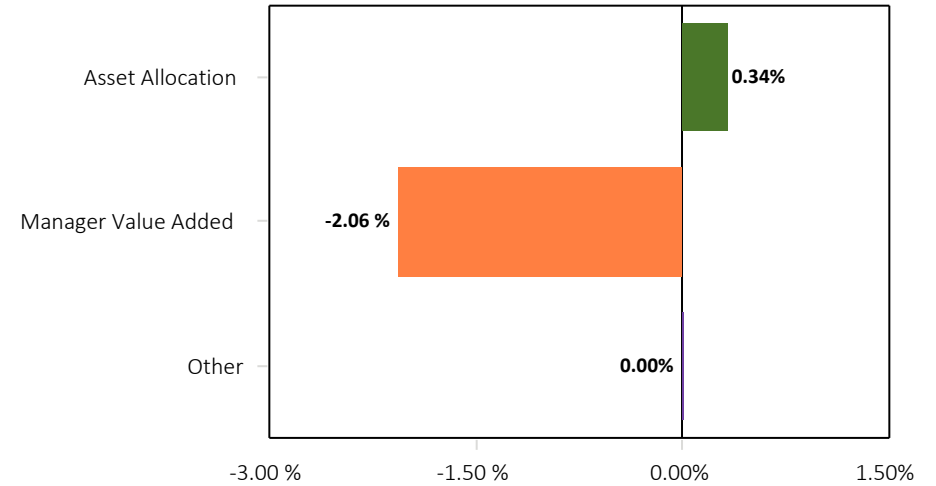
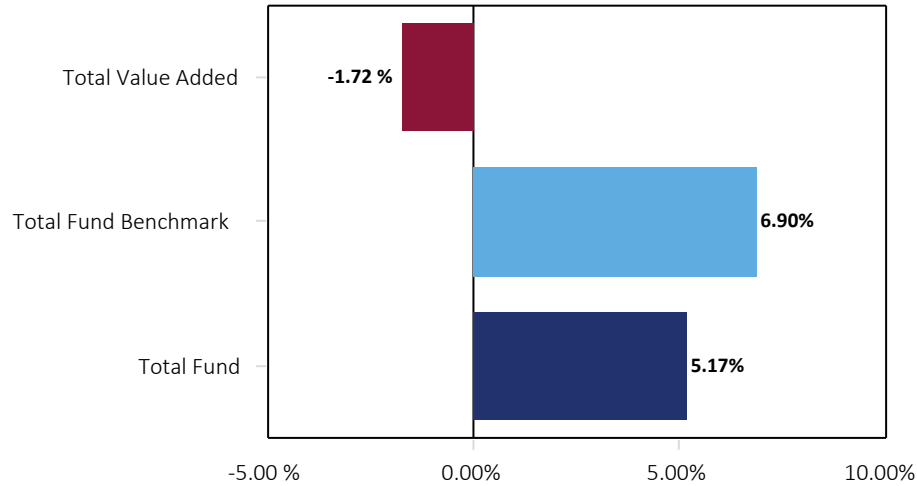
Total Fund Attribution

Total Fund

Year To Date Ending September 30, 2023

Total Fund Performance

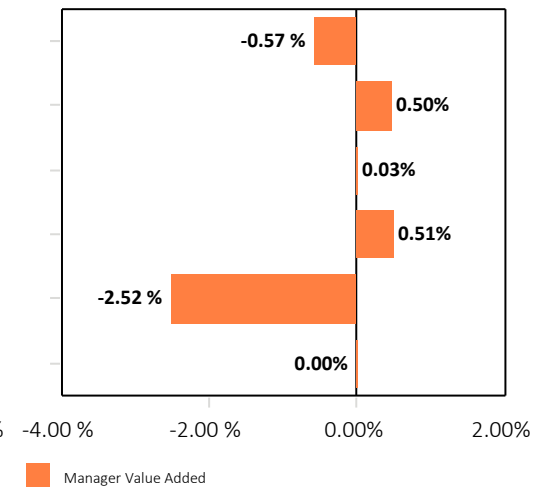
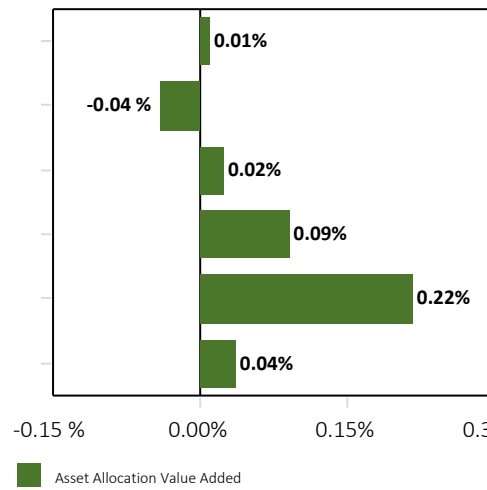
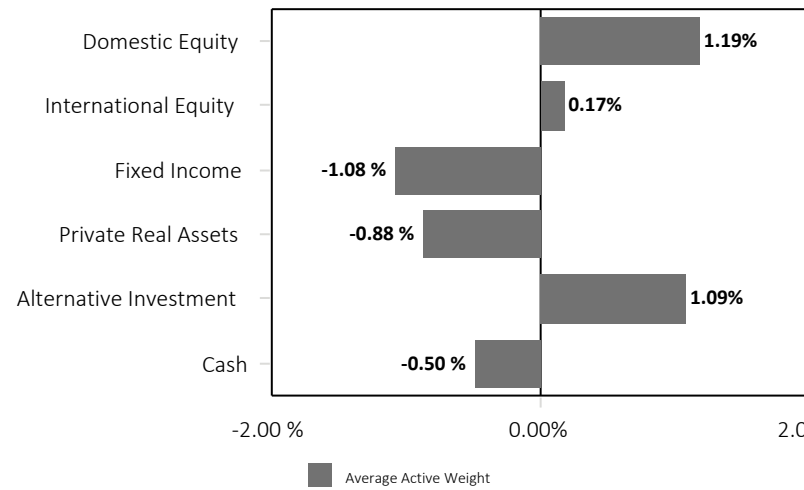
Total Value Added:-1.72 %



Asset Class Under or Overweighting

Asset Allocation Value Added:0.34%

Total Manager Value Added:-2.06 %



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 September 30, 2023

	Performance (%)									
	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
Total Fund	-2.44	5.29	11.67	6.16	6.21	7.23	7.80	7.96	9.52	1/1/1982
Total Fund - Net	-2.47	5.17	11.51	6.00	6.04	7.03				
Total Fund Benchmark	-1.92	6.90	11.99	4.64	5.68	6.80	7.21			
Domestic Equity	-3.71	9.40	19.19	8.95	8.08	10.38	9.72	9.87	11.36	1/1/1982
Domestic Equity - Net	-3.74	9.27	19.00	8.77	7.89	10.16				
Custom Benchmark (U.S. Equity)	-3.59	10.87	18.99	9.19	9.03	11.21	9.76	9.67		
U.S. Equity IMRF Custom Benchmark	-3.81	8.18	17.21	8.66	7.73					
International Equity	-2.98	8.38	24.38	4.96	3.77	4.63	7.05	6.74	7.34	9/1/1986
International Equity - Net	-3.04	8.13	23.99	4.59	3.41	4.28				
MSCI AC World ex USA (Net)	-3.77	5.34	20.39	3.74	2.58	3.35	6.02			
International Equity IMRF Custom Benchmark	-3.51	4.98	19.37	3.25	2.31					
Fixed Income	-2.09	1.11	3.24	-3.35	1.10	2.08	3.81	4.81	7.32	1/1/1982
Fixed Income - Net	-2.11	1.05	3.16	-3.44	1.00	1.95				
Custom Benchmark (Fixed Income)	-2.00	0.93	3.12	-4.01	0.86	1.51	3.04	4.32	6.81	
Fixed Income IMRF Custom Benchmark	-1.99	0.93	3.12	-3.73	0.82					
Private Real Assets	-0.67	-2.52	-3.36						2.67	3/1/2022
Private Real Assets - Net	-0.68	-2.57	-3.43						2.60	
Custom Benchmark (Private Real Assets)	-1.91	-7.44	-11.94						-0.82	
Real Estate	-0.87	-3.24	-4.54	10.70	9.10	9.94	7.92	7.05	5.88	5/1/1985
Real Estate - Net	-0.89	-3.28	-4.60	10.64	9.04	9.90				
Blended Benchmark (Real Estate)	-2.11	-8.14	-12.89	6.19	4.72	7.19	6.92	7.08	7.40	
Agriculture	0.46	2.24	5.02	4.04	2.34	5.39	7.74		6.47	10/1/1997
NCREIF Farmland Index	-0.26	2.63	5.98	7.22	6.16	8.01	12.45		10.98	
Timberland	4.96	5.15	16.33	4.39	3.74	3.71	3.78	6.54	7.04	10/1/1992
NCREIF Timberland Index	1.37	4.90	10.03	9.15	5.87	5.93	7.04	7.34	8.46	

Benchmark definitions on next page.

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

Asset Class Returns

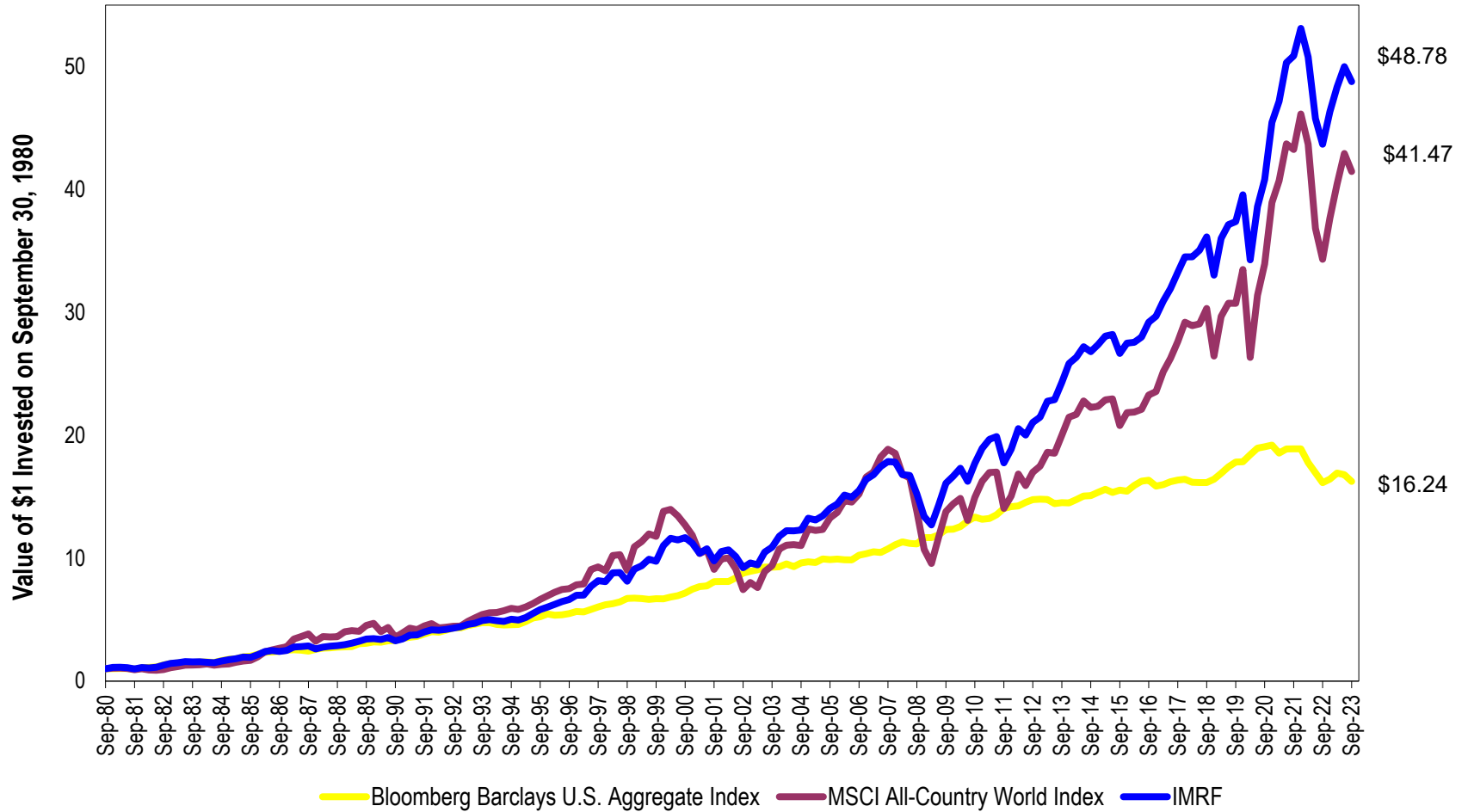
Periods Ended September 30, 2023

	Performance (%)									
	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
Unlisted Infrastructure	1.53	10.86	16.01	14.48	12.20				12.40	4/1/2018
Blended Benchmark (Unlisted Infrastructure)	1.87	6.80	7.85	9.26	9.15				9.14	
Alternatives Investments	0.24	3.34	3.70	19.84	15.68	12.90	10.56	12.85	11.41	2/1/1986
Alternatives Investments - Net	0.24	3.34	3.70	19.83	15.65	12.70				
Custom Benchmark (Alternative Investments)	7.42	28.24	21.85	5.37	6.81	7.90	9.46	11.23	11.98	
Private Equity	0.11	3.20	3.59	22.60	18.19	15.49	13.40	15.52	13.66	2/1/1986
Blended Benchmark (Private Equity)	7.62	29.16	22.07	5.16	6.68	7.83	9.43			
Cash	1.32	3.80	4.78	3.24	3.25	2.06	1.29	3.03	3.76	7/1/1986
90 Day U.S. Treasury Bill	1.31	3.60	4.47	1.70	1.72	1.10	1.37	2.38	3.11	

Benchmark definitions on next page.

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 September 30, 2023



Investment Manager Asset Allocation

Periods Ended September 30, 2023

	Jun-2023		Sep-2023	
	\$	%	\$	%
Domestic Equity	18,683,849,328	36.84	17,421,960,223	35.61
Large Cap Growth	3,864,743,678	7.62	3,671,652,397	7.51
Sands Capital	1,615,952,204	3.19	1,493,207,838	3.05
Xponance Russell 1000 G	2,248,791,474	4.43	2,178,444,558	4.45
Large Cap Value	4,206,310,344	8.29	3,718,608,823	7.60
Dodge & Cox	1,730,066,491	3.41	1,453,210,778	2.97
LSV Asset	1,026,226,539	2.02	881,270,598	1.80
NTGI S&P 500 Value	1,450,017,314	2.86	1,384,127,447	2.83
Large Cap Pass. Core	1,898,287,871	3.74	1,807,388,988	3.69
NTGI MarketCap Idx.	1,898,287,871	3.74	1,807,388,988	3.69
Factor Diversity Strategies	2,685,295,892	5.29	2,600,919,247	5.32
U.S. Large Cap FDP-GSAM	2,685,295,892	5.29	2,600,919,247	5.32
Quantitative Factor Strategies	2,303,432,474	4.54	2,253,058,652	4.61
Quantitative US Equity - SciBeta	2,303,432,474	4.54	2,253,058,652	4.61
Small Cap Multi-Factor Strategies		0.00	525,082,421	1.07
U.S. Small Cap Equity Multi-Factor - S&P		0.00	525,082,421	1.07
Small Cap Growth	841,722,901	1.66	705,095,382	1.44
Frontier Capital	841,722,901	1.66	705,095,382	1.44
Small Cap Value	919,436,545	1.81	847,578,353	1.73
Channing	323,425,737	0.64	311,325,915	0.64
William Blair Small Cap Value	596,010,808	1.18	536,252,438	1.10

Investment Manager Asset Allocation

Periods Ended September 30, 2023

	Jun-2023		Sep-2023	
	\$	%	\$	%
Domestic Equity Transition	1,681,344	0.00		0.00
Transition Account	556,475,648	1.10		0.00
Public Real Assets	1,406,462,630	2.77	1,292,575,962	2.64
Brookfield	402,971,883	0.79	377,521,053	0.77
Cohen & Steers	1,003,490,748	1.98	915,054,909	1.87
International Equity	9,366,888,441	18.47	9,086,988,649	18.57
Intl Large Cap Growth	1,570,803,569	3.10	1,467,600,896	3.00
EARNEST Part. Intl	643,728,886	1.27	621,968,278	1.27
William Blair	927,074,683	1.83	845,632,618	1.73
Intl Large Cap Value	1,456,479,296	2.87	1,451,222,023	2.97
Brandes Investment	667,750,681	1.32	681,964,158	1.39
Mondrian	647,367,602	1.28	635,457,463	1.30
Lazard	141,361,012	0.28	133,800,402	0.27
Intl Large Cap Core	4,520,150,178	8.91	4,402,136,441	9.00
Arrowstreet Capital	1,137,120,203	2.24	1,151,647,418	2.35
Brown Capital	541,566,173	1.07	514,570,302	1.05
GlobeFlex Capital	877,970,542	1.73	847,542,158	1.73
Xponance Intl EQ	99,961,857	0.20	95,100,133	0.19
Transition Account	556,475,648	1.10		0.00
Progress Intl Equity	417,579	0.00	404,313	0.00
NTGI ACWI ex US Index Fund	1,863,113,824	3.67	1,792,872,117	3.66
Intl All Cap Developed	160,502,792	0.32	156,484,142	0.32
Ativo International	160,502,792	0.32	156,484,142	0.32

Investment Manager Asset Allocation

Periods Ended September 30, 2023

	Jun-2023		Sep-2023	
	\$	%	\$	%
International Small Cap	554,388,486	1.09	523,931,467	1.07
Franklin Templeton	218,968,176	0.43	212,710,550	0.43
William Blair IntSC	335,420,310	0.66	311,220,917	0.64
Emerging Mkt Equity	1,104,564,120	2.18	1,085,613,681	2.22
Genesis Investment Management, LLP.	684,671,757	1.35	656,943,512	1.34
Arrowstreet EME	419,892,363	0.83	428,670,168	0.88

Investment Manager Asset Allocation

Periods Ended September 30, 2023

	Jun-2023		Sep-2023	
	\$	%	\$	%
Fixed Income	12,200,296,740	24.06	11,827,497,798	24.18
Domestic Fixed Core	3,761,428,343	7.42	3,598,085,618	7.35
Attucks Fixed Income	88,621,992	0.17	85,715,652	0.18
Brandes FI Core	333,709,384	0.66	321,989,643	0.66
EARNEST Partners	890,826,944	1.76	856,081,884	1.75
Garcia Hamilton	962,097,146	1.90	904,020,901	1.85
Ramirez Asset Management	520,168,547	1.03	499,762,611	1.02
Xponance Yield Advantage Agg.	966,004,331	1.90	930,514,928	1.90
Domestic Fixed Passive Core	2,759,494,500	5.44	2,671,109,907	5.46
NTGI Blmbg Agg.	1,123,647,953	2.22	1,087,683,213	2.22
BlackRock US Debt I	1,635,846,547	3.23	1,583,426,694	3.24
Domestic Fixed Core Plus	2,932,218,665	5.78	2,804,053,279	5.73
LM Capital Group FI	840,319,035	1.66	808,516,661	1.65
Progress Inv. FI	1,189	0.00	1,107	0.00
Loop Capital Management	573,018,580	1.13	550,549,779	1.13
Western Asset	951,852,303	1.88	901,000,896	1.84
Longfellow Core Plus	567,027,559	1.12	543,984,836	1.11
Bank Loans	1,658,891,642	3.27	1,675,840,950	3.43
Barings Global Loan Fund	1,658,891,642	3.27	1,675,840,950	3.43
Emerging Markets Debt	330,600	0.00	306,142	0.00
Standish-Mellon EMD	330,600	0.00	306,142	0.00
High Yield	1,087,932,989	2.15	1,078,101,901	2.20
MacKay Shields	1,087,932,989	2.15	1,078,101,901	2.20

Investment Manager Asset Allocation

Periods Ended September 30, 2023

	Jun-2023		Sep-2023	
	\$	%	\$	%
Private Real Assets	4,822,355,614	9.51	4,868,443,851	9.95
Real Estate	4,386,441,398	8.65	4,415,589,874	9.03
Real Estate Core Cmp	2,249,700,843	4.44	2,223,995,974	4.55
TA Assoc. Buckhead	877,663,980	1.73	893,469,458	1.83
Barings Euro Core Property	136,375,105	0.27	130,429,781	0.27
Blackstone Property Euro	183,444,472	0.36	179,161,923	0.37
INVESCO Core Real Estate	236,783,349	0.47	229,091,981	0.47
INVESCO European real estate	57,564,421	0.11	55,234,684	0.11
AEW Core Property Tr	272,808,442	0.54	260,736,803	0.53
CBRE Core Partners	299,839,946	0.59	299,094,514	0.61
JPM Strategic Property Fund	185,221,128	0.37	176,776,830	0.36
RE Non-Core Cmp	2,136,740,555	4.21	2,191,593,901	4.48
Artemis MWBE Spruce	330,009,659	0.65	350,929,713	0.72
Franklin T. EMREFF	2,544,173	0.01	2,399,442	0.00
Security Capital	94,596,250	0.19	86,284,757	0.18
Dune II	8,033,790	0.02	8,015,136	0.02
Non-Core Real Estate Funds	1,434,160,459	2.83	1,465,007,405	2.99
Non-Core Intl Real Estate	267,322,776	0.53	278,885,547	0.57
Almanac ARS V	73,448	0.00	71,901	0.00
Agriculture	251,973,313	0.50	265,175,062	0.54
Premiere Partners IV	251,973,313	0.50	265,175,062	0.54
Timberland	63,362,832	0.12	63,824,685	0.13
Forest Investment	63,362,832	0.12	63,824,685	0.13
Unlisted Infrastructure	120,578,071	0.24	123,854,230	0.25
Unlisted Infrastructure Funds	120,578,071	0.24	123,854,230	0.25

Investment Manager Asset Allocation

Periods Ended September 30, 2023

	Jun-2023		Sep-2023	
	\$	%	\$	%
Alternatives Investments	5,444,594,844	10.74	5,525,047,421	11.29
Absolute Return	74,710	0.00	70,938	0.00
Aurora Investment	74,710	0.00	70,938	0.00
Private Equity	5,268,512,743	10.39	5,347,119,662	10.93
Abbott S/A Comp.	500,413,456	0.99	502,074,896	1.03
Muller Monroe MPEFF	1	0.00		0.00
Pantheon S/A Comp.	411,522,829	0.81	418,026,500	0.85
Private Equity Fund - Domestic	3,429,742,005	6.76	3,516,042,669	7.19
Private Equity Fund - International	685,928,531	1.35	666,378,302	1.36
Oakbrook Opportunities Fund	240,905,921	0.47	244,597,294	0.50
Private Credit	176,007,391	0.35	177,856,821	0.36
Private Credit Fund - Domestic	176,007,391	0.35	177,856,821	0.36
Cash & Equivalents	199,418,748	0.39	192,527,968	0.39
Total Fund	50,717,403,714	100.00	48,922,465,910	100.00

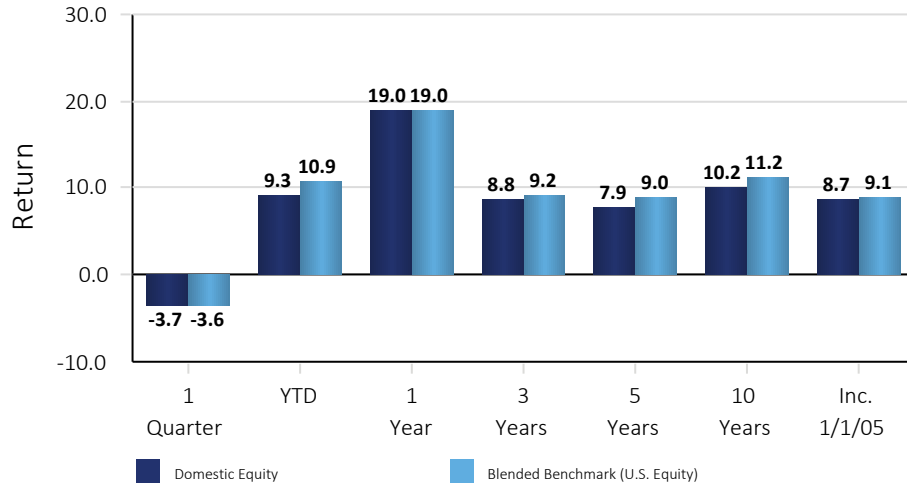
Domestic Equity

Composite Performance Summary

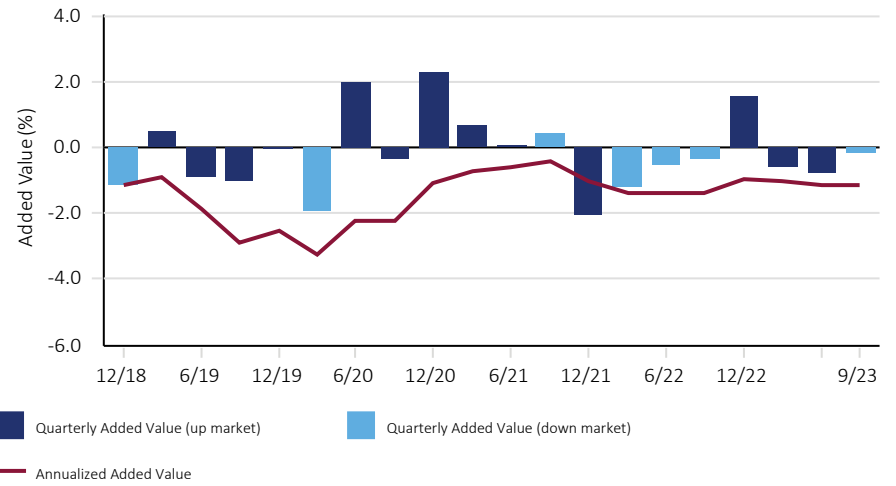
Domestic Equity

Periods Ended September 30, 2023

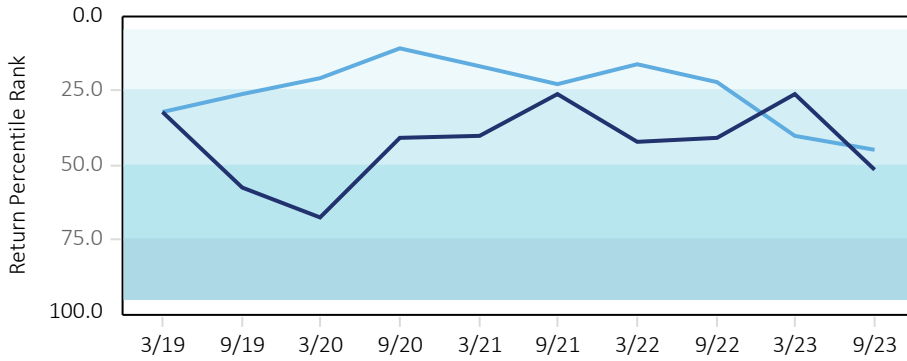
Comparative Performance



Added Value History

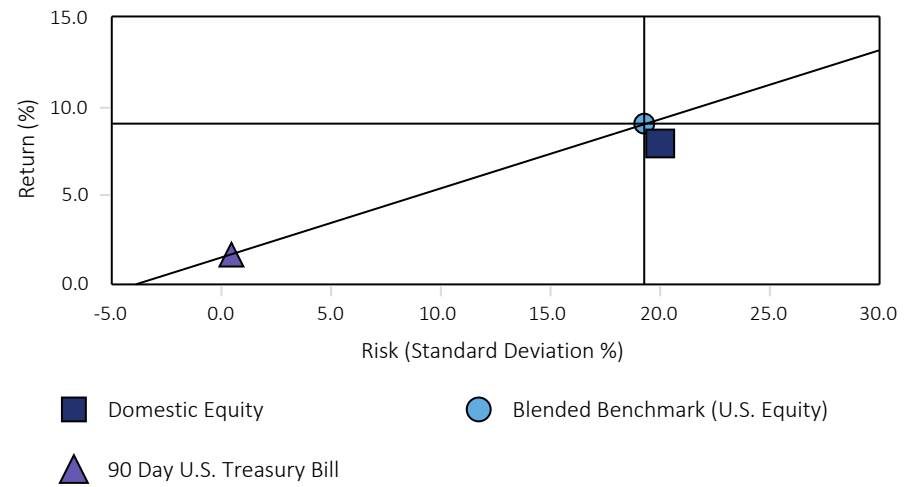


Rolling Percentile Rank: All Public Plans > \$1B-US Equity Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
— Domestic Equity	10	0 (0%)	7 (70%)	3 (30%)	0 (0%)
— Benchmark	10	6 (60%)	4 (40%)	0 (0%)	0 (0%)

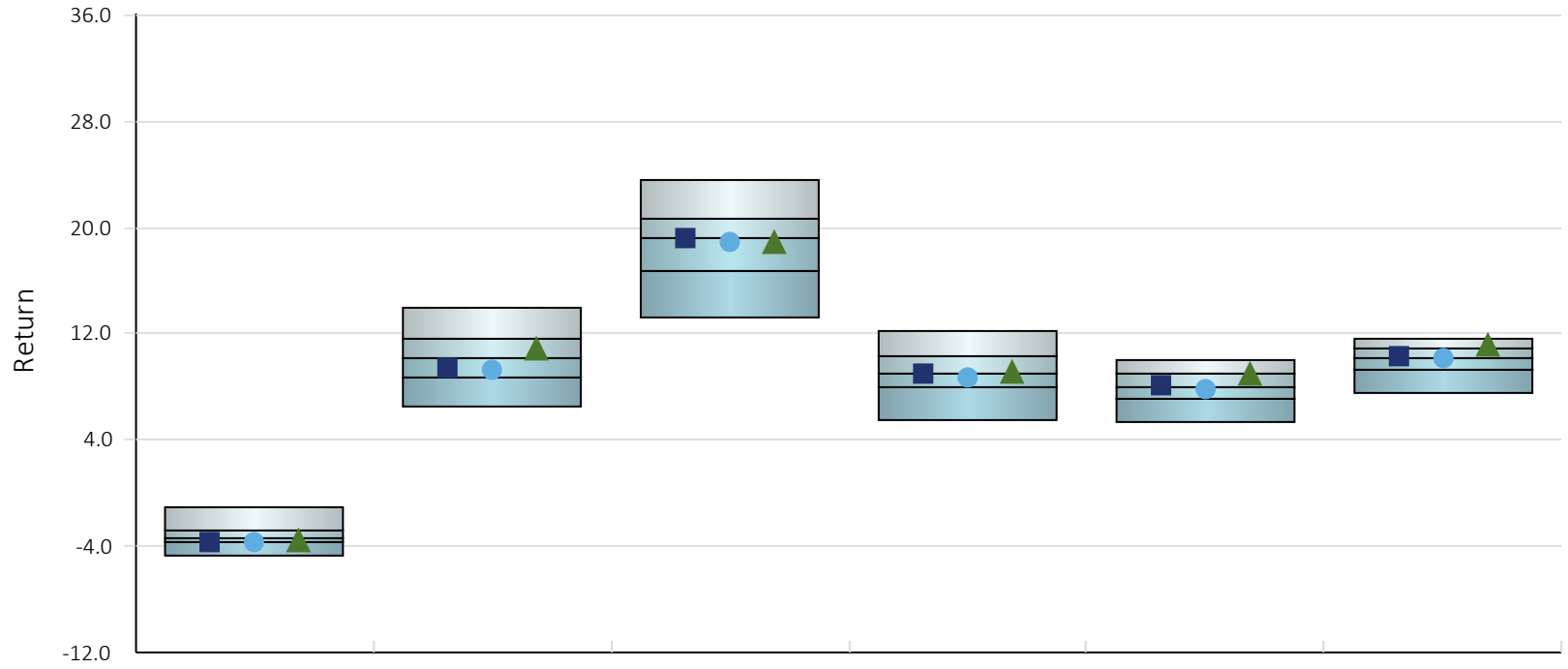
Risk and Return 10/1/18 - 09/30/23



Plan Sponsor Peer Group Analysis

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

Periods Ended September 30, 2023



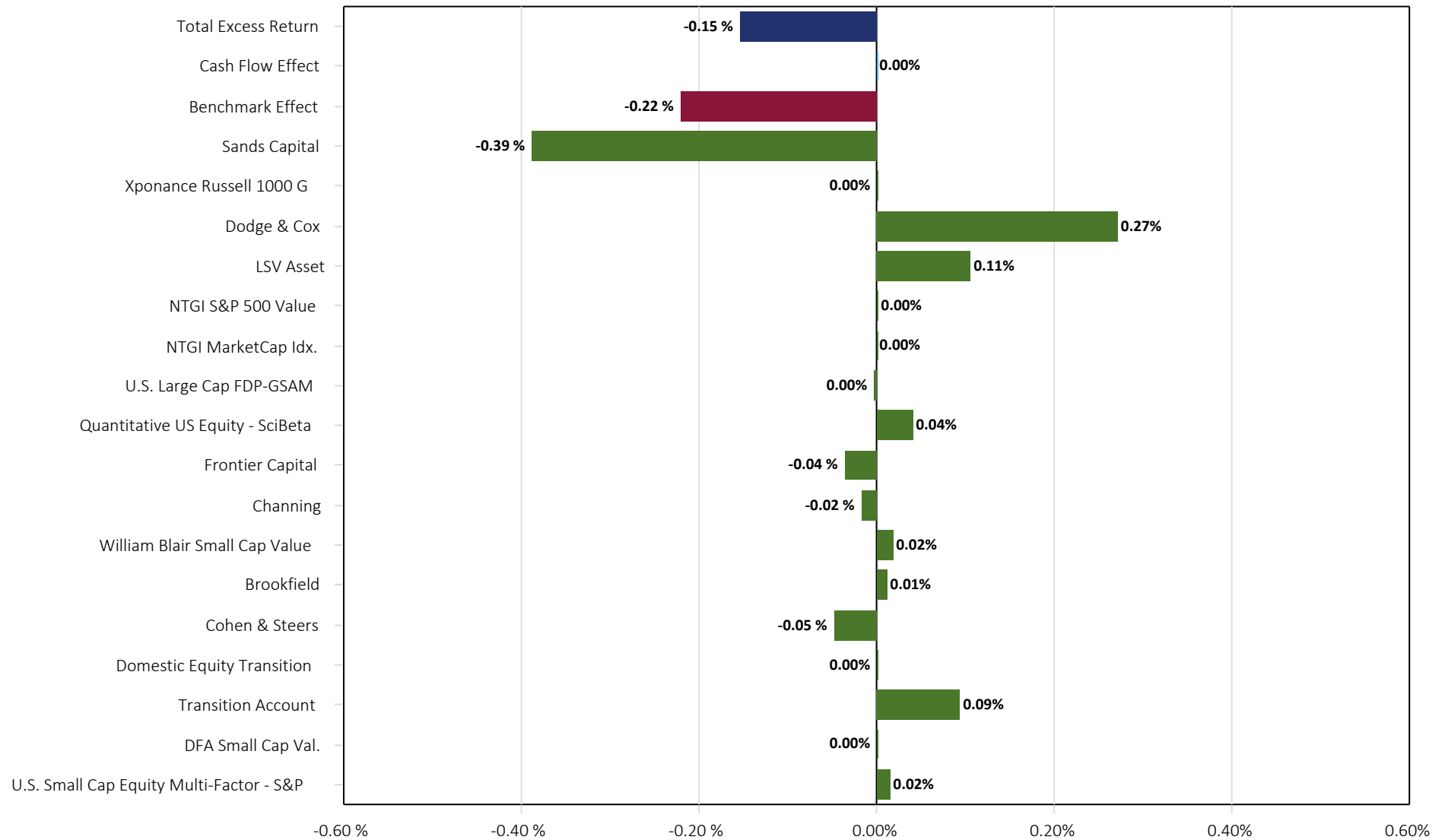
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Domestic Equity	-3.71 (74)	9.40 (62)	19.19 (52)	8.95 (51)	8.08 (44)	10.38 (42)
● Domestic Equity - Net	-3.74 (76)	9.27 (65)	19.00 (54)	8.77 (52)	7.89 (57)	10.16 (50)
▲ Blended Benchmark (U.S. Equity)	-3.59 (67)	10.87 (38)	18.99 (54)	9.19 (45)	9.03 (21)	11.21 (16)
5th Percentile	-1.02	13.98	23.65	12.17	10.10	11.62
1st Quartile	-2.77	11.57	20.69	10.35	8.94	10.91
Median	-3.37	10.16	19.29	9.00	7.99	10.11
3rd Quartile	-3.73	8.67	16.81	7.96	7.07	9.29
95th Percentile	-4.72	6.57	13.30	5.48	5.42	7.60
Population	54	51	50	49	44	38

Asset Class Attribution

Domestic Equity

Periods Ended 1 Quarter Ending September 30, 2023

1 Quarter



Performance

Domestic Equity

Periods Ended September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Domestic Equity	17,421,960,223	-3.71	9.40	19.19	8.95	8.08	10.38	11.36	1/1/1982
Domestic Equity - Net		-3.74	9.27	19.00	8.77	7.89	10.16		
Blended Benchmark (U.S. Equity)		-3.59	10.87	18.99	9.19	9.03	11.21		
Russell 3000 Index		-3.25	12.39	20.46	9.38	9.14	11.28	11.35	
U.S. Equity IMRF Custom Benchmark		-3.81	8.18	17.21	8.66	7.73			
Large Cap Equity	11,798,569,454	-3.27	13.05	22.49	8.32	8.88	11.21	11.13	1/1/1982
Large Cap Equity - Net		-3.30	12.97	22.38	8.23	8.79	11.09		
Russell 1000 Index		-3.15	13.01	21.19	9.53	9.63	11.63	11.52	
Large Cap Growth	3,671,652,397	-5.00	24.71	27.11	4.30	10.54	13.03	11.96	1/1/1982
Large Cap Growth - Net		-5.02	24.61	26.98	4.20	10.44	12.90		
LCG Blended Benchmark*		-3.13	24.98	27.72	7.97	12.42	14.48		
Russell 1000 Growth Index		-3.13	24.98	27.72	7.97	12.42	14.48	11.45	
Xpounce Russell 1000 G	2,178,444,558	-3.13	24.96	27.70	7.97	12.41		12.41	10/1/2018
Xpounce Russell 1000 G - Net		-3.13	24.95	27.68	7.95	12.39		12.39	
Russell 1000 Growth Index		-3.13	24.98	27.72	7.97	12.42		12.42	
Sands Capital	1,493,207,838	-7.60	24.33	26.25	-7.58	4.69	9.95	10.74	11/1/2003
Sands Capital - Net		-7.64	24.14	25.98	-7.79	4.46	9.70		
LCG Blended Benchmark*		-3.13	24.98	27.72	7.97	12.42	14.48	10.81	
Russell 1000 Growth Index		-3.13	24.98	27.72	7.97	12.42	14.48	10.85	
Large Cap Value	3,718,608,823	-1.74	6.27	20.85	14.85	7.71	9.92	10.18	10/1/1982
Large Cap Value - Net		-1.78	6.15	20.67	14.68	7.55	9.75		
LCV Blended Benchmark**		-3.16	1.79	14.44	11.05	6.23	8.45		
Russell 1000 Value Index		-3.16	1.79	14.44	11.05	6.23	8.45	11.30	

* 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 September 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Dodge & Cox	1,453,210,778	-0.05	7.18	21.25	16.57	8.75	10.86	9.75	9/1/2003
Dodge & Cox - Net		-0.12	7.00	20.99	16.32	8.52	10.63		
LCV Blended Benchmark**		-3.16	1.79	14.44	11.05	6.23	8.45	8.00	
Russell 1000 Value Index		-3.16	1.79	14.44	11.05	6.23	8.45	8.13	
LSV Asset	881,270,598	-1.16	3.94	19.18	14.70	6.44	9.40	10.24	2/1/2003
LSV Asset - Net		-1.24	3.76	18.91	14.43	6.18	9.14		
LCV Blended Benchmark**		-3.16	1.79	14.44	11.05	6.23	8.45	8.74	
Russell 1000 Value Index		-3.16	1.79	14.44	11.05	6.23	8.45	8.75	
NTGI S&P 500 Value	1,384,127,447	-4.07	7.64	22.19	13.34	8.44	9.70	6.46	8/1/1999
NTGI S&P 500 Value - Net		-4.07	7.64	22.19	13.34	8.44	9.69		
S&P 500 Value		-4.09	7.56	22.19	13.39	8.41	9.64	6.42	
Large Cap Pass. Core	1,807,388,988	-3.28	12.43	20.50	9.30	9.04	11.26	11.05	1/1/1985
Large Cap Pass. Core - Net		-3.28	12.43	20.50	9.29	9.04	11.25		
Dow Jones U.S. Total Stock Market Index		-3.29	12.42	20.49	9.27	9.01	11.19		
NTGI MarketCap Idx.	1,807,388,988	-3.28	12.43	20.50	9.30	9.04	11.26	10.85	2/1/1985
NTGI MarketCap Idx. - Net		-3.28	12.43	20.50	9.29	9.04	11.25		
Dow Jones U.S. Total Stock Market Index		-3.29	12.42	20.49	9.27	9.01	11.19		
Factor Diversity Strategies	2,600,919,247	-3.14	12.20	21.11	9.71			8.86	8/18/2020
U.S. Large Cap FDP-GSAM	2,600,919,247	-3.14	12.20	21.11	9.71			8.86	8/18/2020
U.S. Large Cap FDP-GSAM - Net		-3.15	12.18	21.08	9.66			8.81	
Solactive GBS U.S. 1000 Index		-3.12	13.19	21.19	9.37			8.75	
GSAM Active Beta US. Large Cap FDC Index		-3.15	12.21	21.11	9.69			8.84	
Quantitative Factor Strategies	2,253,058,652	-2.19	4.54	16.44	9.59			7.59	9/17/2019

* 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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Quantitative US Equity - SciBeta	2,253,058,652	-2.19	4.54	16.44	9.59			7.59	9/17/2019
Quantitative US Equity - SciBeta - Net		-2.20	4.50	16.38	9.51			7.43	
SciBeta US Hi-Fctr-Intst Div Multi-Beta Multi-Strat Index		-2.52	3.34	15.29	8.51			6.53	

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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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Small Cap	2,077,756,156	-5.29	6.76	17.21	15.67	6.55	8.60	11.72	7/1/1988
Small Cap Composite - Net		-5.39	6.22	16.50	14.93	5.90	7.98		
Russell 2000 Index		-5.13	2.54	8.93	7.16	2.40	6.65	8.80	
Small Cap Multi-Factor Strategies	525,082,421							-9.37	8/1/2023
U.S. Small Cap Equity Multi-Factor - S&P	525,082,421							-9.37	8/1/2023
U.S. Small Cap Equity Multi-Factor - S&P								-9.37	
S&P SmallCap 600 QVML Top 90% Multi-Factor Index								-9.38	
S&P SmallCap 600 Index								-9.89	
Small Cap Growth	705,095,382	-7.83	14.22	21.46	11.15	9.17	10.43	12.73	7/1/1988
Small Cap Growth - Net		-7.94	13.15	20.17	9.98	8.19	9.64		
Russell 2000 Growth Index		-7.32	5.24	9.59	1.09	1.55	6.72	7.56	
Frontier Capital	705,095,382	-7.83	14.22	21.46	10.88	9.52	11.23	13.08	8/1/1988
Frontier Capital - Net		-7.94	13.15	20.17	9.72	8.42	10.37		
Russell 2000 Growth Index		-7.32	5.24	9.59	1.09	1.55	6.72	7.64	
Small Cap Value	847,578,353	-2.64	4.41	16.45	18.67	5.70	8.26	11.32	9/1/1989
Small Cap Value - Net		-2.84	3.99	15.89	18.13	5.19	7.73		
Russell 2000 Value Index		-2.96	-0.53	7.84	13.32	2.59	6.19	9.31	
Channing	311,325,915	-3.74	8.89	17.18	14.09	4.82	7.52	9.28	7/1/2011
Channing - Net		-3.85	8.50	16.62	13.54	4.30	7.01	8.71	
Russell 2000 Value Index		-2.96	-0.53	7.84	13.32	2.59	6.19	7.45	
William Blair Small Cap Value	536,252,438	-2.01	0.42	11.33	15.17	4.46	8.42	10.62	5/1/1999
Inv. Couns. Maryland - Net		-2.22	0.00	10.76	14.63	3.93	7.89		
Russell 2000 Value Index		-2.96	-0.53	7.84	13.32	2.59	6.19	8.23	

* 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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Public Real Assets	1,292,575,962	-8.10	-5.99	2.56	5.19	4.60		4.30	8/1/2017
Public Real Assets - Net		-8.17	-6.21	2.24	4.84	4.20		3.91	
Public Real Assets Benchmark***		-7.63	-6.68	1.85	3.95	3.24		2.58	
Brookfield	377,521,053	-6.32	-1.83	6.78	9.43	4.87		3.96	8/1/2017
Brookfield - Net		-6.41	-2.14	6.34	8.93	4.36		3.47	
Dow Jones Brookfield Global Infrastructure Composi		-6.93	-4.46	4.50	5.79	2.97		2.15	
Cohen & Steers	915,054,909	-8.81	-7.61	0.91	3.88	4.73		4.67	8/1/2017
Cohen & Steers - Net		-8.87	-7.79	0.64	3.57	4.37		4.32	
FTSE Global Core Infrastructure 50/50 Index (Net)		-7.98	-7.79	0.51	3.01	3.34		2.77	

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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.

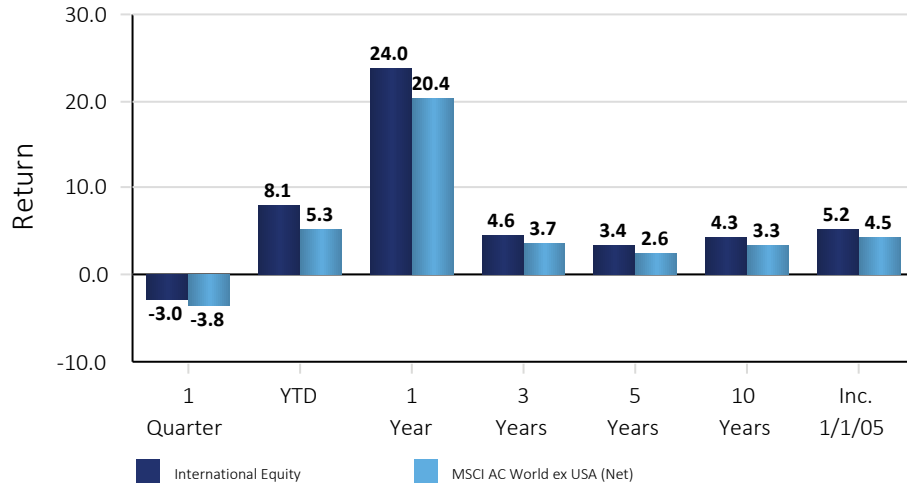
International Equity

Composite Performance Summary

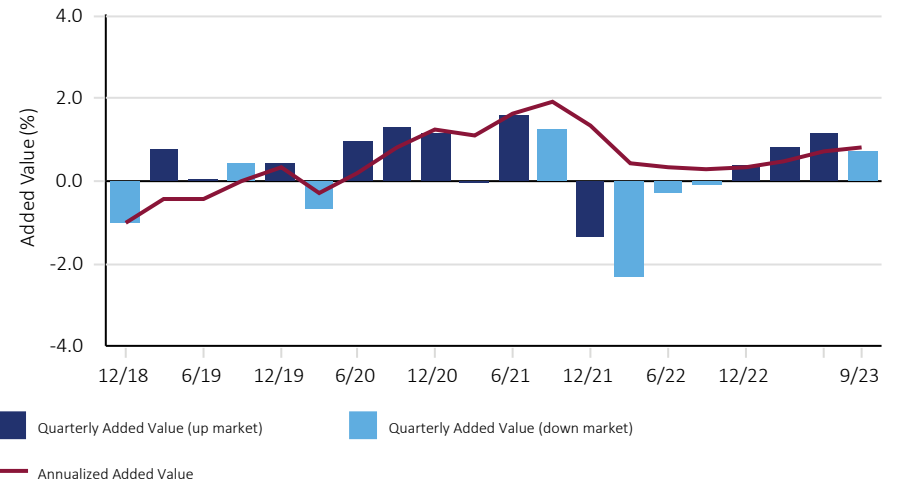
International Equity

Periods Ended September 30, 2023

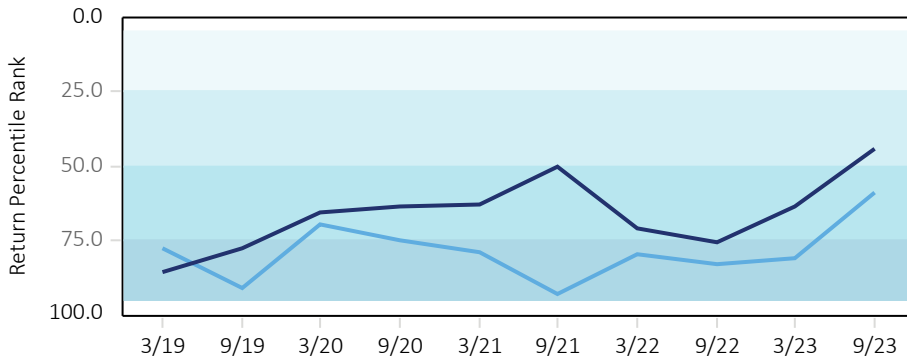
Comparative Performance



Added Value History

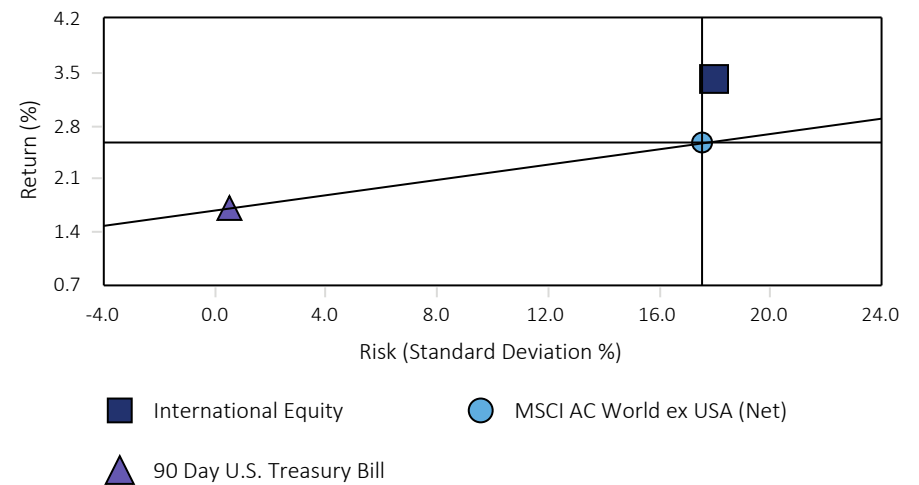


Rolling Percentile Rank: All Public Plans > \$1B-Intl. Equity Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
International Equity	10	0 (0%)	2 (20%)	5 (50%)	3 (30%)
Benchmark	10	0 (0%)	0 (0%)	3 (30%)	7 (70%)

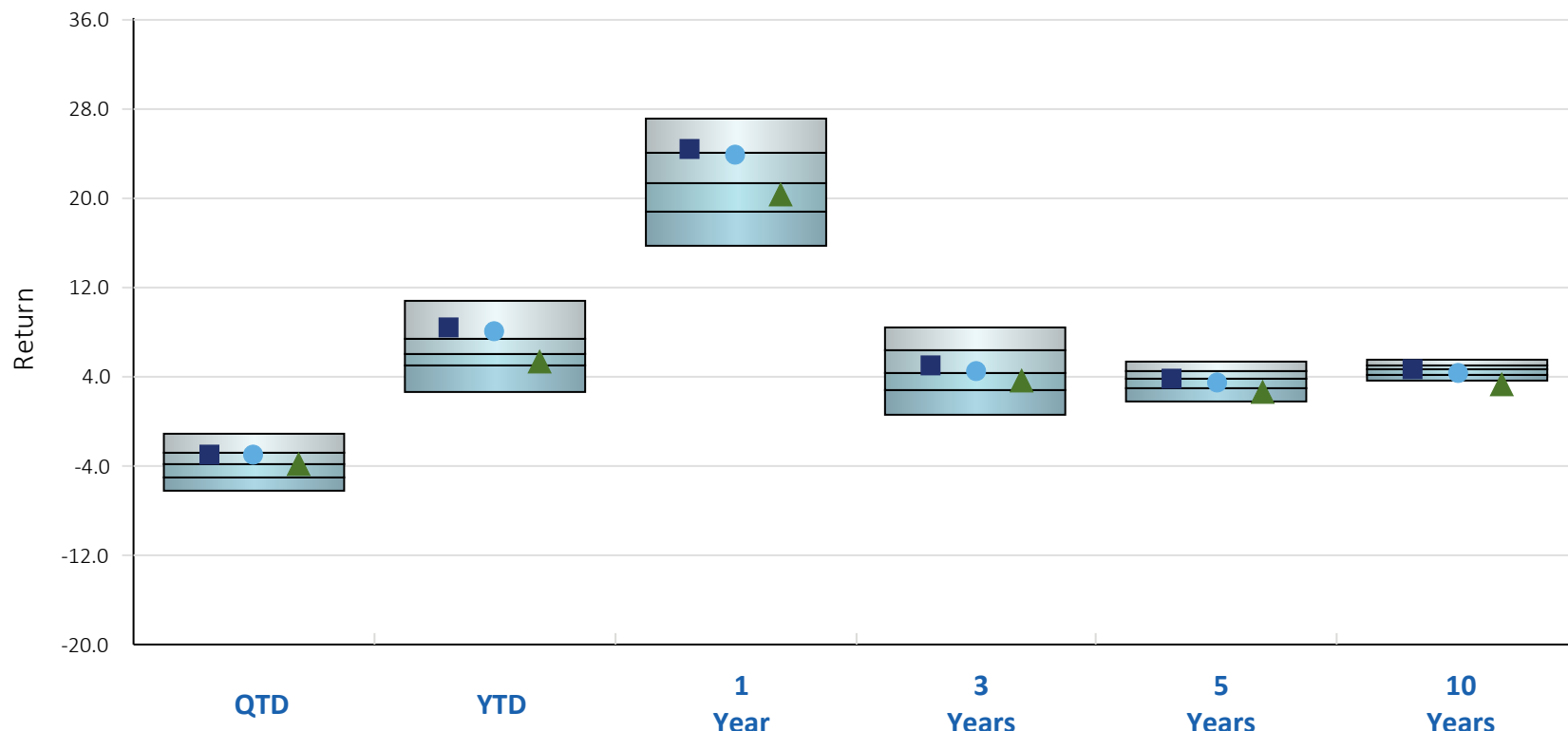
Risk and Return 10/1/18 - 09/30/23



Plan Sponsor Peer Group Analysis

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

Periods Ended September 30, 2023



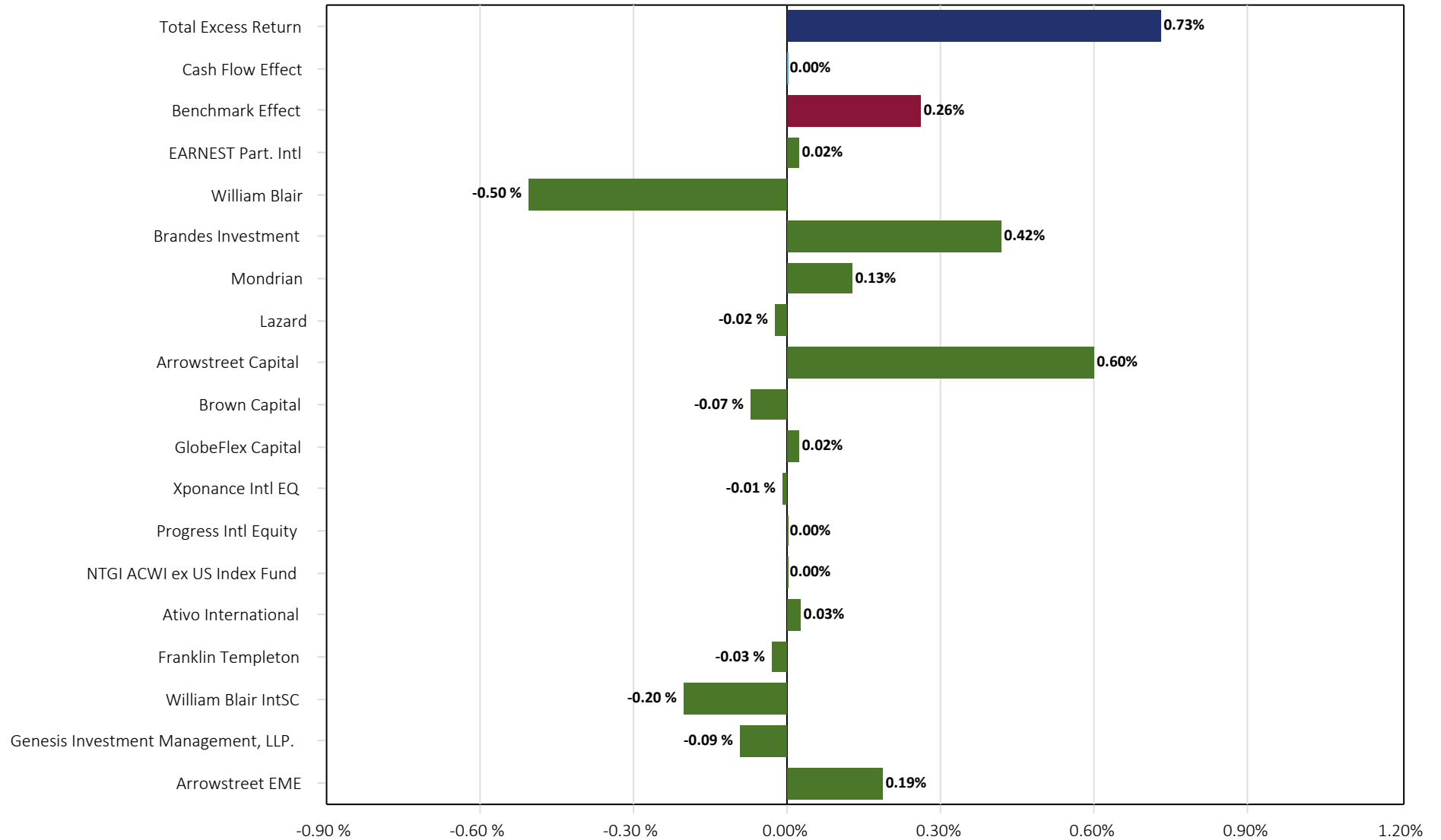
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
International Equity	-2.98 (31)	8.38 (14)	24.38 (19)	4.96 (40)	3.77 (53)	4.63 (58)
International Equity - Net	-3.04 (32)	8.13 (17)	23.99 (27)	4.59 (44)	3.41 (62)	4.28 (65)
MSCI AC World ex USA (Net)	-3.77 (49)	5.34 (70)	20.39 (62)	3.74 (59)	2.58 (84)	3.35 (99)
5th Percentile	-1.08	10.87	27.10	8.38	5.36	5.60
1st Quartile	-2.78	7.43	24.09	6.42	4.55	5.04
Median	-3.87	5.99	21.41	4.33	3.80	4.74
3rd Quartile	-4.97	5.08	18.89	2.76	3.06	4.22
95th Percentile	-6.24	2.65	15.70	0.62	1.81	3.71
Population	55	54	54	52	49	43

Asset Class Attribution

International Equity

Periods Ended 1 Quarter Ending September 30, 2023

1 Quarter



Performance

International Equity

Periods Ended September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
International Equity	9,086,988,649	-2.98	8.38	24.38	4.96	3.77	4.63	7.34	9/1/1986
International Equity - Net		-3.04	8.13	23.99	4.59	3.41	4.28		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35		
International Equity IMRF Custom Benchmark		-3.51	4.98	19.37	3.25	2.31			
Intl Large Cap Equity	7,320,959,360	-3.00	9.14	25.62	6.98	4.46	5.05	7.46	9/1/1986
Intl LargeCap Equity - Net		-3.06	8.94	25.31	6.68	4.18	4.76		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35		
Intl Large Cap Grwth	1,467,600,896	-6.56	5.44	19.40	3.55	4.45	5.00	7.72	9/1/2002
Intl Large Cap Grwth - Net		-6.63	5.22	19.07	3.22	4.16	4.70		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	6.40	
EARNEST Part. Intl	621,968,278	-3.38	9.50	25.38	13.32	5.48	5.02	8.48	10/1/2004
EARNEST Part. Intl - Net		-3.42	9.34	25.14	13.08	5.28	4.82		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	5.21	
MSCI AC World ex USA Growth (Net)		-7.31	2.61	15.84	-1.86	2.54	3.92	5.59	
William Blair	845,632,618	-8.78	2.64	15.36	-1.75	3.82	5.12	8.52	10/1/2002
William Blair - Net		-8.86	2.38	14.96	-2.12	3.44	4.74		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	7.00	
MSCI AC World ex USA Growth (Net)		-7.31	2.61	15.84	-1.86	2.54	3.92	6.95	
Intl Large Cap Val.	1,451,222,023	-0.36	14.51	35.04	11.42	4.34	4.61	8.13	10/1/1995
Intl Large Cap Val. - Net		-0.43	14.27	34.66	11.09	4.02	4.25		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	4.86	
Brandes Investment	681,964,158	2.13	19.39	44.12	15.89	5.26	5.24	8.55	1/1/1996
Brandes Investment - Net		2.08	19.22	43.84	15.65	5.04	5.00		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	4.77	
MSCI AC World ex USA Value		0.07	8.87	26.09	10.30	2.95	3.20		

* 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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Mondrian	635,457,463	-1.84	11.06	28.82	8.60	3.84	4.24	4.89	4/1/2012
Mondrian - Net		-1.93	10.74	28.32	8.20	3.43	3.77	4.42	
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	4.21	
MSCI AC World ex USA Value		0.07	8.87	26.09	10.30	2.95	3.20	4.19	
Lazard	133,800,402	-5.34	7.98	23.73	5.02	3.43	4.04	5.31	4/1/2012
Lazard - Net		-5.40	7.79	23.44	4.78	3.19	3.68	4.88	
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	4.21	
MSCI AC World ex USA Value		0.07	8.87	26.09	10.30	2.95	3.20	4.19	
Intl Large Cap Active Core	2,609,264,324	-1.79	11.21	27.44	8.41	5.87	6.64	5.46	2/1/2008
Intl Large Cap Active Core - Net		-1.88	10.91	26.97	7.88	5.37	6.10		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	2.46	
Arrowstreet Capital	1,151,647,418	1.28	14.88	33.41	14.90	10.29	9.00	6.97	3/1/2008
Arrowstreet Capital - Net		1.17	14.51	32.82	14.38	9.79	8.50	6.48	
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	2.28	
Brown Capital	514,570,302	-4.98	10.88	23.41	-2.47	2.22	4.92	6.72	10/1/2004
Brown Capital - Net		-5.04	10.69	23.11	-3.13	1.70	4.10		
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	5.21	
GlobeFlex Capital	847,542,158	-3.46	7.23	22.77	9.38	4.01	5.58	5.01	3/1/2006
GlobeFlex Capital - Net		-3.53	6.97	22.37	9.01	3.63	5.17	4.57	
MSCI AC World ex USA (Net)		-3.77	5.34	20.39	3.74	2.58	3.35	3.50	
Xponance Intl EQ	95,100,133	-4.86	7.27	24.61				-0.34	2/1/2021
Xponance Intl EQ - Net		-5.01	6.79	23.85				-0.92	
MSCI EAFE (Net)		-4.11	7.08	25.65				1.12	
Progress Intl Equity*	404,313								

* 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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Intl Large Cap Passive Core	1,792,872,117	-3.77	5.30	21.41	4.73	2.82	3.80	3.71	2/1/2000
Intl Large Cap Passive Core - Net		-3.77	5.30	21.41	4.73	2.81	3.80		
International Large Cap Passive Core Benchmark		-3.77	5.34	20.39	4.24	2.35	3.38	3.30	
NTGI ACWI ex US Index Fund	1,792,872,117	-3.77	5.30	21.41				-4.59	10/1/2021
NTGI ACWI ex US Index Fund - Net		-3.77	5.30	21.41				-4.60	
MSCI AC World ex USA (Net)		-3.77	5.34	20.39				-5.08	
Intl All Cap Developed	156,484,142	-2.50	8.32	24.23	3.93			4.22	2/1/2019
Intl All Cap Developed - Net		-2.62	7.93	23.62	3.41			3.74	
MSCI EAFE + Canada (Net)		-4.10	6.73	24.00	6.07			5.21	
Ativo International	156,484,142	-2.50	8.32	24.23	3.92			4.22	2/1/2019
Ativo International - Net		-2.62	7.93	23.62	3.41			3.74	
MSCI EAFE + Canada (Net)		-4.10	6.73	24.00	6.07			5.21	
Intl Small Cap Eqty	523,931,467	-5.47	4.27	19.45	-1.48	1.80	4.02	4.17	12/1/2005
Intl Small Cap Eqty - Net		-5.64	3.71	18.59	-2.21	1.04	3.24		
MSCI AC World ex USA Small Cap (Net)		-1.70	5.03	19.01	4.01	2.58	4.35	5.44	
Custom Benchmark (Intl Small Cap)		-1.70	5.03	19.01	4.01	2.58	4.35	4.88	
Franklin Templeton	212,710,550	-2.86	6.59	22.49	2.20	1.76	4.15	4.88	8/1/2011
Franklin Templeton - Net		-3.02	6.04	21.65	1.48	1.03	3.40	4.14	
MSCI AC World ex USA Small Cap (Net)		-1.70	5.03	19.01	4.01	2.58	4.35	4.29	
William Blair IntSC	311,220,917	-7.17	2.75	17.46	-3.71	1.83	3.91	6.85	9/1/2010
William Blair IntSC - Net		-7.35	2.18	16.59	-4.44	1.05	3.12	6.04	
MSCI AC World ex USA Small Cap (Net)		-1.70	5.03	19.01	4.01	2.58	4.35	5.86	
Custom Benchmark (Intl Small Cap)		-1.70	5.03	19.01	4.01	2.58	4.35	6.08	

* 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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Emerging Mkt Equity	1,085,613,681	-1.64	5.06	18.44	-3.22	1.34	2.56	7.71	2/1/1992
Emerging Mkt Equity - Net		-1.72	4.60	17.77	-3.76	0.77	1.97		
MSCI Emerging Markets Index		-2.79	2.16	12.17	-1.34	0.94	2.45	6.15	
Genesis Investment Management, LLP.**	656,943,512	-3.94	1.16	14.04	-4.44	0.57	2.17	8.29	5/1/2004
Genesis Investment Management, LLP - Net		-4.05	0.59	13.26	-5.00	-0.01	1.58		
MSCI Emerging Markets Index		-2.79	2.16	12.17	-1.34	0.94	2.45	6.96	
Arrowstreet EME	428,670,168	2.09						7.79	3/1/2023
Arrowstreet EME - Net		2.09						7.79	
MSCI Emerging Markets IMI (Net)		-2.12						2.19	

* 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.

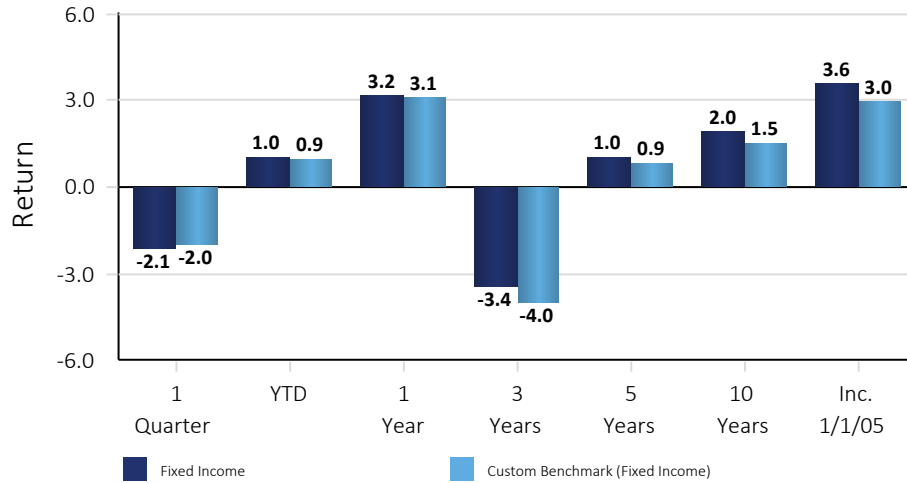
Fixed Income

Composite Performance Summary

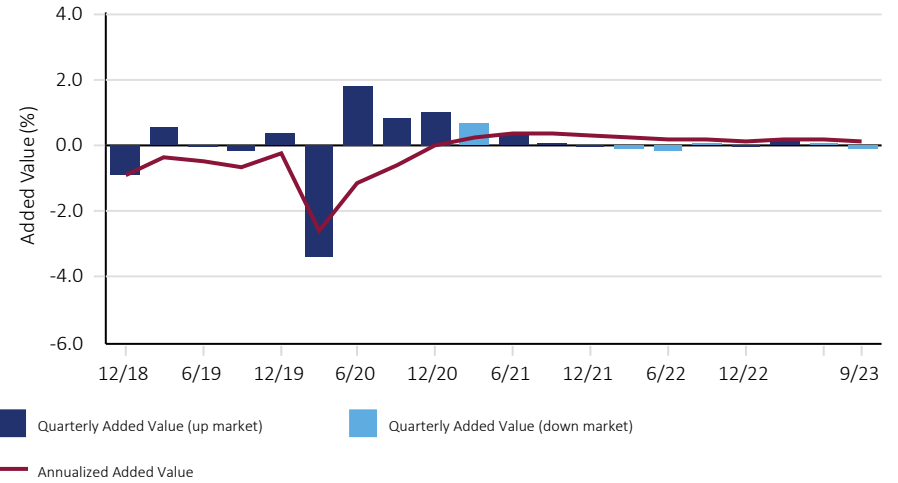
Fixed Income

Periods Ended September 30, 2023

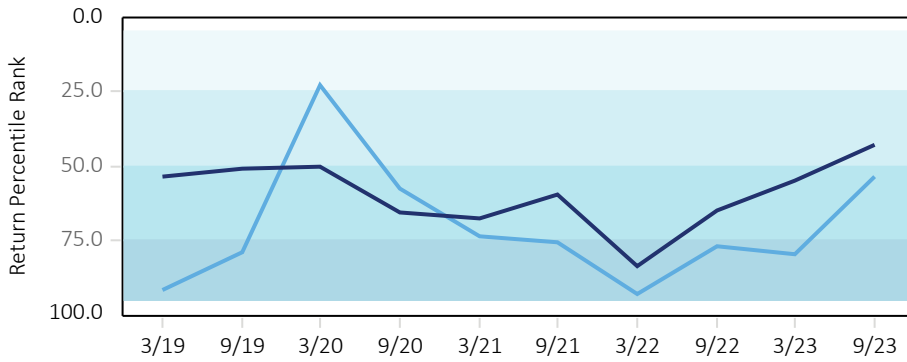
Comparative Performance



Added Value History

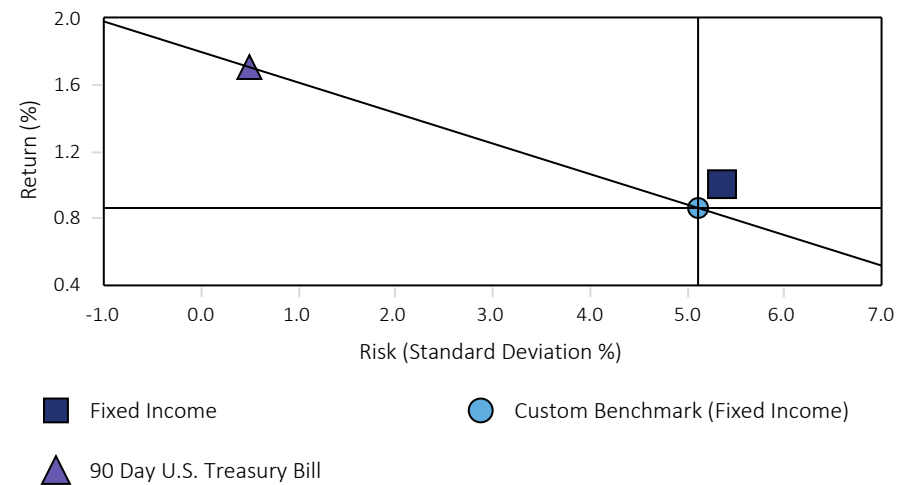


Rolling Percentile Rank: All Public Plans > \$1B-US Fixed Income Segment



	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%)	3 (30%)	6 (60%)

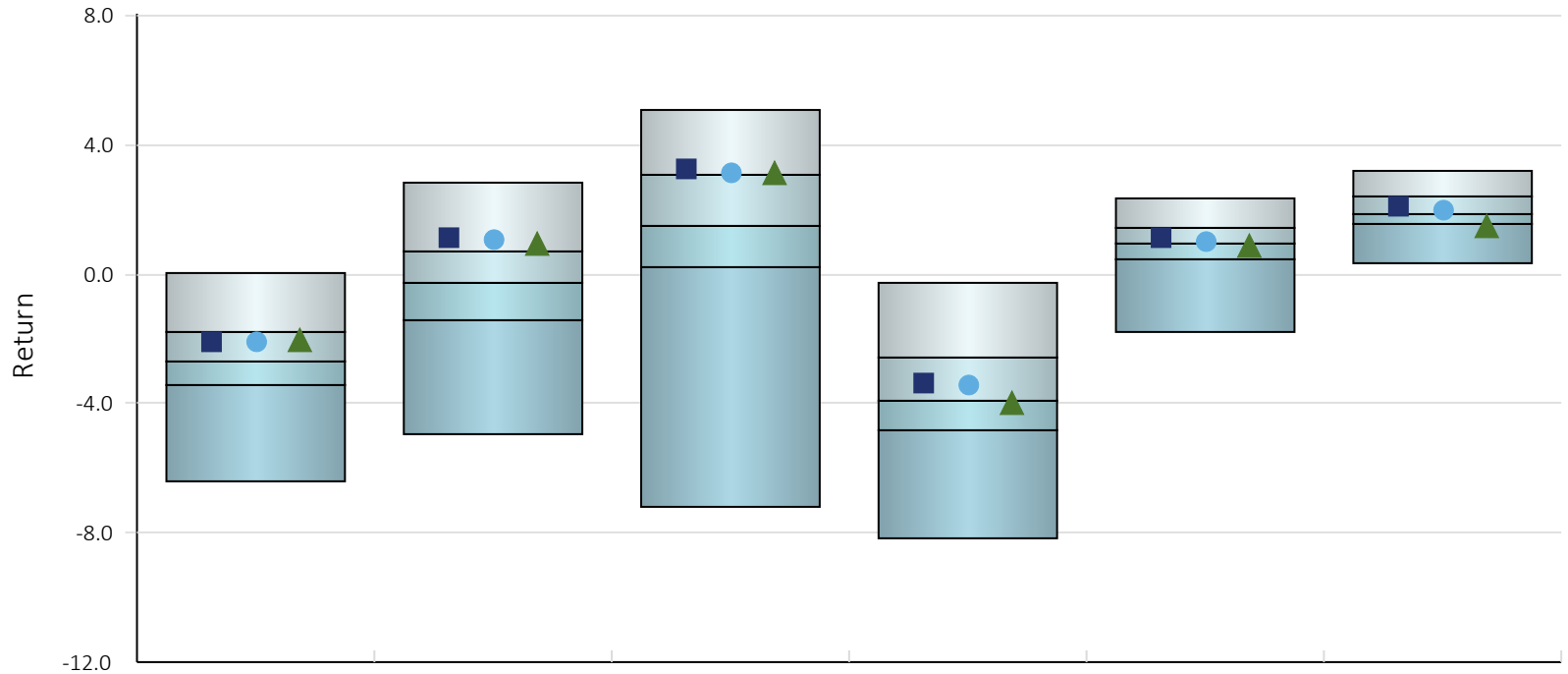
Risk and Return 10/1/18 - 09/30/23



Plan Sponsor Peer Group Analysis

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

Periods Ended September 30, 2023



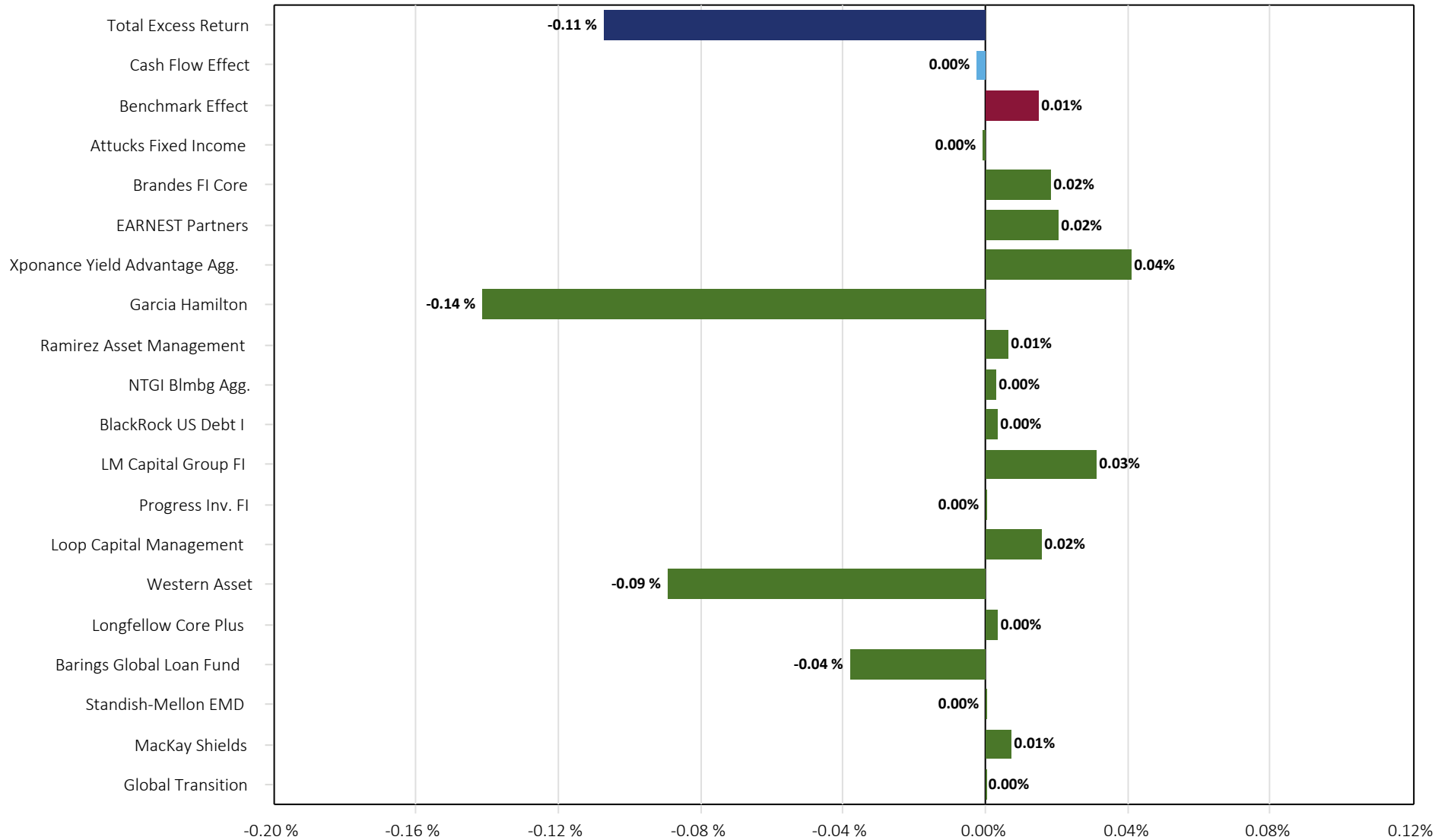
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Fixed Income	-2.09 (32)	1.11 (21)	3.24 (23)	-3.35 (41)	1.10 (43)	2.08 (39)
● Fixed Income - Net	-2.11 (33)	1.05 (22)	3.16 (25)	-3.44 (43)	1.00 (50)	1.95 (47)
▲ Custom Benchmark (Fixed Income)	-2.00 (30)	0.93 (22)	3.12 (25)	-4.01 (54)	0.86 (57)	1.51 (79)
5th Percentile	0.06	2.84	5.09	-0.29	2.36	3.18
1st Quartile	-1.78	0.69	3.09	-2.56	1.46	2.40
Median	-2.72	-0.24	1.50	-3.92	0.97	1.87
3rd Quartile	-3.43	-1.45	0.22	-4.85	0.45	1.57
95th Percentile	-6.39	-4.93	-7.20	-8.15	-1.77	0.35
Population	55	54	54	52	46	42

Asset Class Attribution

Fixed Income

Periods Ended 1 Quarter Ending September 30, 2023

1 Quarter



Performance

Fixed Income

Periods Ended September 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Fixed Income	11,827,497,798	-2.09	1.11	3.24	-3.35	1.10	2.08	7.32	1/1/1982
Fixed Income - Net		-2.11	1.05	3.16	-3.44	1.00	1.95		
Custom Benchmark (Fixed Income)		-2.00	0.93	3.12	-4.01	0.86	1.51	6.81	
Fixed Income IMRF Custom Benchmark		-1.99	0.93	3.12	-3.73	0.82			
Active Fixed Core	3,598,085,618	-3.38	-1.11	0.58	-4.65	0.43	1.56	3.47	4/1/2001
Active Fixed Core - Net		-3.41	-1.20	0.46	-4.75	0.32	1.43		
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	3.38	
Attucks Fixed Income	85,715,652	-3.28	-0.52	0.95				-5.59	2/1/2021
Attucks Fixed Income - Net		-3.36	-0.76	0.62				-5.88	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64				-5.82	
Brandes FI Core	321,989,643	-2.55	-0.31	1.58	-4.17	0.59		0.68	3/1/2016
Brandes FI Core - Net		-2.55	-0.33	1.55	-4.19	0.58		0.67	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10		0.39	
EARNEST Partners	856,081,884	-2.92	-0.90	0.54	-4.53	0.52	1.60	3.23	5/1/2005
EARNEST Partners - Net		-2.95	-1.00	0.40	-4.66	0.39	1.44	3.05	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	2.79	
Xponance Yield Advantage Agg.	930,514,928	-2.68	-0.42	0.95	-4.25	0.69	1.63	3.11	6/1/2005
Xponance Yield Advantage Agg. - Net		-2.72	-0.52	0.81	-4.38	0.56	1.48	2.94	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	2.74	
Garcia Hamilton	904,020,901	-5.00	-2.72	-0.57	-5.34	-0.07		0.77	6/1/2015
Garcia Hamilton - Net		-5.02	-2.78	-0.66	-5.42	-0.14		0.68	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10		0.55	

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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Ramirez Asset Management	499,762,611	-3.05	-0.42	1.40	-4.27			-2.39	5/1/2020
Ramirez Asset Management - Net		-3.08	-0.52	1.26	-4.41			-2.52	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21			-4.11	
Pass. Core Fixed Income	2,671,109,907	-3.20	-1.05	0.70	-5.14	0.17	1.20	4.97	1/1/1990
Pass. Core Fixed Income - Net		-3.20	-1.05	0.70	-5.15	0.16	1.20		
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	4.94	
BlackRock US Debt I	1,583,426,694	-3.20	-0.96	0.72	-5.13	0.19	1.24	1.24	10/1/2013
BlackRock US Debt I - Net		-3.21	-0.96	0.72	-5.13	0.18	1.23	1.23	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	1.13	
NTGI Blmbg Agg.	1,087,683,213	-3.20	-1.18	0.67	-5.16	0.15	1.17	5.01	2/1/1990
NTGI Blmbg Agg. - Net		-3.20	-1.18	0.67	-5.16	0.14	1.16		
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	4.99	
Core Plus Fixed Income	2,804,053,279	-3.36	-0.58	1.85	-4.59	0.69	1.89	7.13	1/1/1982
Core Plus Fixed Income - Net		-3.39	-0.69	1.70	-4.73	0.53	1.72		
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	6.71	
LM Capital Group FI	808,516,661	-2.74	-0.25	2.32	-3.99	1.09	1.94	3.64	5/1/2005
LM Capital Group FI - Net		-2.78	-0.37	2.15	-4.15	0.93	1.78	3.47	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	2.79	
Progress Inv. FI	1,107								
Loop Capital Management	550,549,779	-2.86	0.08	2.85	-4.26	0.57	2.16	3.63	5/1/2005
Loop Capital Management - Net		-2.89	-0.02	2.72	-4.39	0.43	2.03	3.49	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	2.79	

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 September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Western Asset	901,000,896	-4.34	-1.22	1.29	-5.48	0.42	1.93	4.09	11/1/2001
Western Asset - Net		-4.37	-1.33	1.15	-5.61	0.29	1.80		
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21	0.10	1.13	3.13	
Longfellow Core Plus	543,984,836	-3.12	-0.66	1.07	-4.09			-2.58	5/1/2020
Longfellow Core Plus - Net		-3.16	-0.77	0.92	-4.24			-2.72	
Blmbg. U.S. Aggregate Index		-3.23	-1.21	0.64	-5.21			-4.11	
Bank Loans	1,675,840,950	3.20	10.01	11.78	5.65	3.85		4.33	8/1/2014
Bank Loans - Net		3.24	10.10	11.96	5.72	3.83		4.05	
Barings Custom Benchmark		3.52	10.44	13.35	6.09	4.55		4.43	
Barings Global Loan Fund	1,675,840,950	3.20	10.01	11.78	5.65	3.85		4.33	8/1/2014
Barings Global Loan Fund - Net		3.24	10.10	11.96	5.72	3.83		4.05	
Barings Custom Benchmark*		3.52	10.44	13.35	6.09	4.55		4.43	
Emerging Markets Debt	306,142								
Standish-Mellon EMD	306,142								
High Yield	1,078,101,901	0.68	6.12	10.57	2.95	4.49	5.31	8.89	4/1/1986
High Yield - Net		0.61	5.88	10.23	2.64	4.16	4.96		
ICE BofA U.S. High Yield, Cash Pay Index		0.53	5.90	10.21	1.81	2.81	4.15	7.60	
MacKay Shields	1,078,101,901	0.68	6.12	10.57	2.95	4.50	5.33	7.91	11/1/2000
MacKay Shields - Net		0.61	5.88	10.23	2.64	4.17	4.98		
ICE BofA U.S. High Yield, Cash Pay Index		0.53	5.90	10.21	1.81	2.81	4.15	6.56	

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

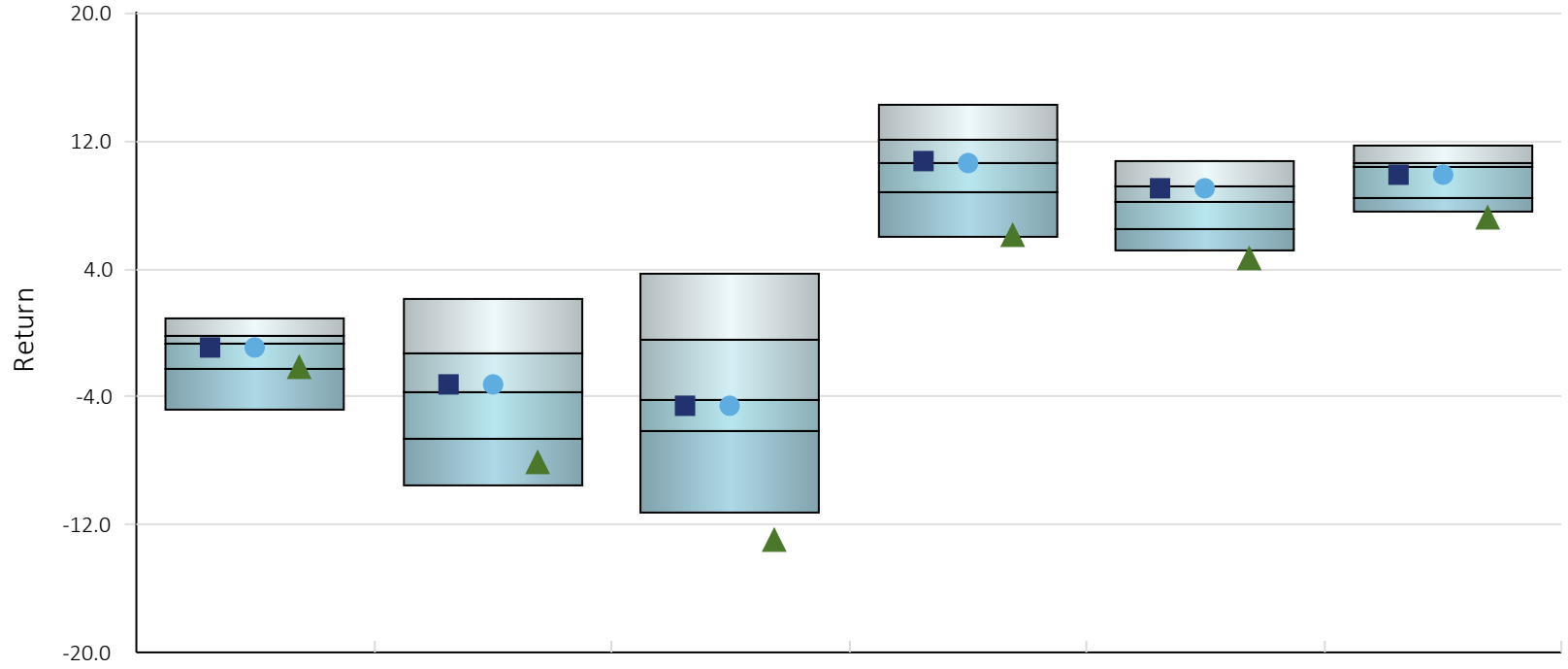
* Custom Benchmark is Credit Suisse US Leveraged Loan Index and the Credit Suisse Western European Leveraged Loan Index, weighted by the portfolio's market value to each sector.

Private Real Assets

Plan Sponsor Peer Group Analysis

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

Periods Ended September 30, 2023



	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Real Estate	-0.87 (54)	-3.24 (44)	-4.54 (63)	10.70 (40)	9.10 (26)	9.94 (63)
● Real Estate - Net	-0.89 (54)	-3.28 (47)	-4.60 (63)	10.64 (45)	9.04 (26)	9.90 (63)
▲ Blended Benchmark (Real Estate)	-2.11 (71)	-8.14 (89)	-12.89 (100)	6.19 (94)	4.72 (100)	7.19 (100)
5th Percentile	0.90	2.12	3.76	14.24	10.80	11.79
1st Quartile	-0.14	-1.26	-0.42	12.10	9.14	10.63
Median	-0.70	-3.70	-4.20	10.58	8.23	10.36
3rd Quartile	-2.27	-6.63	-6.15	8.80	6.56	8.49
95th Percentile	-4.78	-9.49	-11.23	5.97	5.18	7.58
Population	45	42	41	35	24	14

Asset Allocation & Performance

Private Real Assets

Periods Ended September 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Private Real Assets	4,868,443,851	-0.67	-2.52	-3.36				2.67	3/1/2022
Private Real Assets- Net		-0.68	-2.57	-3.43				2.60	
Custom Benchmark (Private Real Assets)		-1.91	-7.44	-11.94				-0.82	
Real Estate	4,415,589,874	-0.87	-3.24	-4.54	10.70	9.10	9.94	5.88	5/1/1985
Real Estate - Net		-0.89	-3.28	-4.60	10.64	9.04	9.90		
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72	7.19	7.40	
Real Estate Core Cmp	2,223,995,974	-0.55	-3.95	-6.09	11.16	10.28	10.27	7.83	4/1/1999
TA Assoc. Buckhead	893,469,458	2.73	1.52	-5.51	18.30	15.89	13.94	11.52	8/1/1995
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72	7.19	7.04	
Barings Euro Core Property	130,429,781	-4.36	-7.73	-0.39	-0.82	8.13		8.28	3/1/2017
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72		5.32	
Blackstone Property Euro	179,161,923	-2.33	-3.07	8.37	8.16	8.20		7.29	12/1/2017
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72		5.15	
INVESCO Core Real Estate	229,091,981	-2.70	-6.98	-10.53	6.54	5.07	7.43	7.92	4/1/2011
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72	7.19	8.35	
INVESCO European real estate	55,234,684	-3.24	-2.08	2.12	-1.52	-0.17		-1.21	4/1/2018
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72		4.98	
AEW Core Property Tr	260,736,803	-3.57	-7.20	-11.28	7.35	5.86	7.41	7.41	10/1/2013
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72	7.19	7.19	
CBRE Core Partners	299,094,514	-0.25	-10.40	-8.97	13.40	10.44		10.25	12/1/2013
Blended Benchmark (Real Estate)		-2.11	-8.14	-12.89	6.19	4.72		7.10	

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 Consumer Price Index + 5%.

Asset Allocation & Performance

Private Real Assets

Periods Ended September 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
JPM Strategic Property Fund Blended Benchmark (Real Estate)	176,776,830	-4.02 -2.11	-8.11 -8.14	-8.04 -12.89				6.37 6.35	1/1/2021
RE Non-Core Cmp	2,191,593,901	-1.20	-2.38	-2.67	10.19	7.76	9.63	10.62	1/1/2010
Artemis MWBE Spruce Blended Benchmark (Real Estate)	350,929,713	-0.02 -2.11	-3.70 -8.14	-3.60 -12.89	7.14 6.19	7.17 4.72		5.24 5.52	6/1/2016
Franklin T. EMREFF Blended Benchmark (Real Estate)	2,399,442	-5.69 -2.11	-16.42 -8.14	-39.31 -12.89	-12.53 6.19	-17.61 4.72	-2.43 7.19	-1.21 8.08	9/1/2011
Security Capital Blended Benchmark (Real Estate)	86,284,757	-7.71 -2.11	-4.17 -8.14	0.65 -12.89	3.69 6.19	4.88 4.72	4.70 7.19		7/1/1997
Dune II Blended Benchmark (Real Estate)	8,015,136	-0.23 -2.11	5.36 -8.14	-0.20 -12.89	7.46 6.19	3.14 4.72	8.24 7.19	5.64 7.21	2/1/2009
Non-Core Real Estate Funds Blended Benchmark (Real Estate)	1,465,007,405	-0.66 -2.11	-1.19 -8.14	-3.01 -12.89	13.49 6.19	9.56 4.72	10.89 7.19	10.68 8.03	10/1/2011
Almanac ARS V	71,901								
Non-Core Intl Real Estate Blended Benchmark (Real Estate)	278,885,547	-3.28 -2.11	-6.58 -8.14	0.01 -12.89	0.30 6.19	1.33 4.72		-1.41 6.84	8/1/2014

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 Consumer Price Index + 5%.

Asset Allocation & Performance

Private Real Assets

Periods Ended September 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Agriculture	265,175,062	0.46	2.24	5.02	4.04	2.34	5.39	6.47	10/1/1997
NCREIF Farmland Index		-0.26	2.63	5.98	7.22	6.16	8.01	10.98	
Premiere Partners IV	265,175,062	0.46	2.24	5.02	4.04	2.34		2.48	3/1/2015
Timberland	63,824,685	4.96	5.15	16.33	4.39	3.74	3.71	7.04	10/1/1992
NCREIF Timberland Index		1.37	4.90	10.03	9.15	5.87	5.93	8.46	
Forest Investment	63,824,685	4.96	5.15	16.33	4.39	3.74	3.79	7.19	10/1/1992
Blended Benchmark (Timberland)		1.87	6.80	7.85	8.22	5.33	5.66	8.37	
Unlisted Infrastructure	123,854,230	1.53	10.86	16.01	14.48	12.20		12.40	4/1/2018
Blended Benchmark (Unlisted Infrastructure)		1.87	6.80	7.85	9.26	9.15		9.14	
Unlisted Infrastructure Funds	123,854,230	1.53	10.86	16.01	14.48	12.20		12.40	4/1/2018
Blended Benchmark (Unlisted Infrastructure)		1.87	6.80	7.85	9.26	9.15		9.14	

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 Consumer Price Index + 5%.

Alternative Investments

Asset Allocation & Performance

Alternatives Investments

Periods Ended September 30, 2023

	Allocation	Performance (%)							
	Market Value \$	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Alternatives Investments	5,525,047,421	0.24	3.34	3.70	19.84	15.68	12.90	11.41	2/1/1986
Custom Benchmark (Alternative Investments)		7.42	28.24	21.85	5.37	6.81	7.90	11.98	
Absolute Return	70,938								
Aurora Investment	70,938								
Private Equity	5,347,119,662	0.11	3.20	3.59	22.60	18.19	15.49	13.66	2/1/1986
Blended Benchmark (Private Equity)		7.62	29.16	22.07	5.16	6.68	7.83		
Abbott S/A Comp.	502,074,896	1.35	2.17	1.18	22.60	17.93	15.78	14.48	6/1/1987
Muller Monroe MPEFF									
Pantheon S/A Comp.	418,026,500	0.32	-0.30	-5.58	23.43	17.13	14.90	11.23	10/1/2000
Private Equity Fund - Domestic	3,516,042,669	0.92	1.57	1.26	22.89	20.01	16.71	14.50	6/1/2012
Private Equity Fund - International	666,378,302	-5.43	17.83	35.21	22.05	15.40		0.55	7/1/2015
Oakbrook Opportunities Fund	244,597,294	1.89	1.76	-4.22	18.92			7.75	6/1/2019
Private Credit	177,856,821	4.20	7.57	6.91	3.75			0.36	10/1/2019
Private Credit Fund - Domestic	177,856,821	4.20	7.57	6.91	3.75			0.36	10/1/2019

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

Manager Watch List

As of September 30, 2023

Organization

Investment Manager	Asset Class	Effective Date	Resolution
Ativo	International Equity - All Cap	August 2023	

Appendix

Asset Class Returns

Periods Ended September 30, 2023

	Performance (%)										
	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Total Fund	5.29	-12.77	16.82	14.98	19.77	-4.23	16.02	8.01	0.53	6.15	20.20
Total Fund - Net	5.17	-12.90	16.63	14.79	19.57	-4.40	15.78	7.77	0.29	5.90	19.94
Total Fund Benchmark	6.90	-13.26	13.48	13.16	18.68	-3.12	14.37	7.89	1.37	7.33	15.84
Domestic Equity	9.40	-19.12	24.89	22.07	29.23	-6.08	19.83	12.62	0.04	9.81	37.65
Domestic Equity - Net	9.27	-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)	10.87	-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	8.18	-18.21	25.68	18.00	29.67	-6.79	18.08	15.43			
International Equity	8.38	-17.86	9.78	13.52	23.76	-14.13	27.95	3.56	-1.90	-2.80	20.24
International Equity - Net	8.13	-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)	5.34	-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	4.98	-16.70	7.30	11.30	21.37	-14.36	27.79	3.92			
Fixed Income	1.11	-11.83	-0.44	7.87	9.50	-0.24	4.82	4.87	0.25	5.97	-0.59
Fixed Income - Net	1.05	-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	-1.21	-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	0.93	-11.98	-0.85	7.29	9.14	-0.08	3.98	3.89			
Private Real Assets	-2.57										
Custom Benchmark (Private Real Assets)	-7.44										
Real Estate	-3.24	11.77	21.95	4.20	9.81	8.36	10.03	8.97	12.54	13.02	10.82
Real Estate - Net	-3.28	11.71	21.88	4.16	9.76	8.36	10.03	8.97	12.46	13.02	10.82
Blended Benchmark (Real Estate)	-8.14	6.54	21.02	0.34	4.39	7.36	6.66	7.79	13.95	11.46	12.90
Agriculture	2.24	3.98	2.69	4.69	-5.82	0.28	-4.58	-0.47	20.18	24.73	25.68
NCREIF Farmland Index	2.63	9.64	7.83	3.08	4.81	6.74	6.19	7.09	10.35	12.63	20.91
Timberland	5.15	11.94	-2.72	4.51	1.00	-3.62	4.68	-4.58	4.99	12.83	9.14
NCREIF Timberland Index	4.90	12.90	9.17	0.81	1.30	3.21	3.63	2.59	4.97	10.48	9.69
Unlisted Infrastruct	10.86	11.76	11.68	15.90	9.65						
Blended Benchmark (Unlisted Infrastructure)	6.80	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 September 30, 2023

	Performance (%)										
	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Alternatives Investments	3.34	4.39	46.46	12.31	9.48	17.32	12.09	5.32	6.90	11.63	12.11
Alternative Investments - Net	3.34	4.38	46.44	12.27	9.43	17.14	11.91	5.00	6.47	11.16	11.86
Custom Benchmark (Alternative Investments)	28.24	-18.08	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Private Equity	3.20	5.36	54.15	14.50	11.78	21.46	15.61	8.60	8.41	13.72	14.13
Blended Benchmark (Private Equity)	29.16	-19.14	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Cash	3.80	3.18	2.44	2.56	3.59	2.36	1.67	0.63	0.29	0.17	0.11
90 Day U.S. Treasury Bill	3.60	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.

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
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
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.