

Wilshire



Wilshire Advisors

Executive Summary of Investment Performance

As of June 30, 2023

IMRF Performance Summary

- IMRF market value as of June 2023 : \$50.7 billion
- IMRF total fund return for 2Q 2023: 3.39% vs the Total Fund Benchmark return of 3.70%
- U.S. equity markets posted strong returns for the quarter, being supported by the steady growth of the average consumer's ability to spend
- IMRF U.S. Equity Portfolio underperformed the benchmark during the quarter, returning 7.00% versus 7.77%
- International equity markets slowed down this quarter, with inflation still being a concern in most regions and China falling short of several economic indicators
- IMRF International Equity Portfolio outperformed the benchmark during the quarter, returning 3.57% versus 2.44%
- Fixed income markets were generally positive for the quarter with credit spreads being noticeably down
- IMRF Fixed Income Portfolio outperformed the benchmark during the quarter, returning -0.01% versus -0.08%
- 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 8.43% for the second quarter and is up 19.03% for the past 12 months. The best performing sectors were information technology (+16.8%), consumer discretionary (+12.9) and communication services (+12.2%). The worst performing sector was utilities (-2.7%). From a size perspective, large-cap outperformed small-cap by 360 basis points. Growth stocks vastly outperformed value for the second straight quarter and now lead meaningfully for the one-year return.

Large-cap growth stocks are outperforming value stocks by an astonishing margin this year. While growth tends to lead during bull markets, the current 6-month return difference is the largest in 25 years at +29.4%. This can be dissected further to find that just a few stocks are contributing a vast majority of the overall market return through June. Additionally, most of these names are technology sector stocks – Amazon, Apple, Google and Meta. It is worth noting that these companies are highly dependent on the consumer's ability to spend. U.S. real personal consumption's steady growth during the past 1.5 years will need to continue to support not just economic growth but also current stock prices.

Non-U.S. Equity

Economic growth within the United Kingdom has been positive enough this year to barely escape a technical recession. Inflation has been trending downward within Britain but at a much slower pace versus other regions, with annual changes being twice as high in the U.K. as in the U.S., as of the end of May. In China, several economic indicators have fallen short of expectations during the past few weeks, including measurements of industrial production, retail sales and trade.

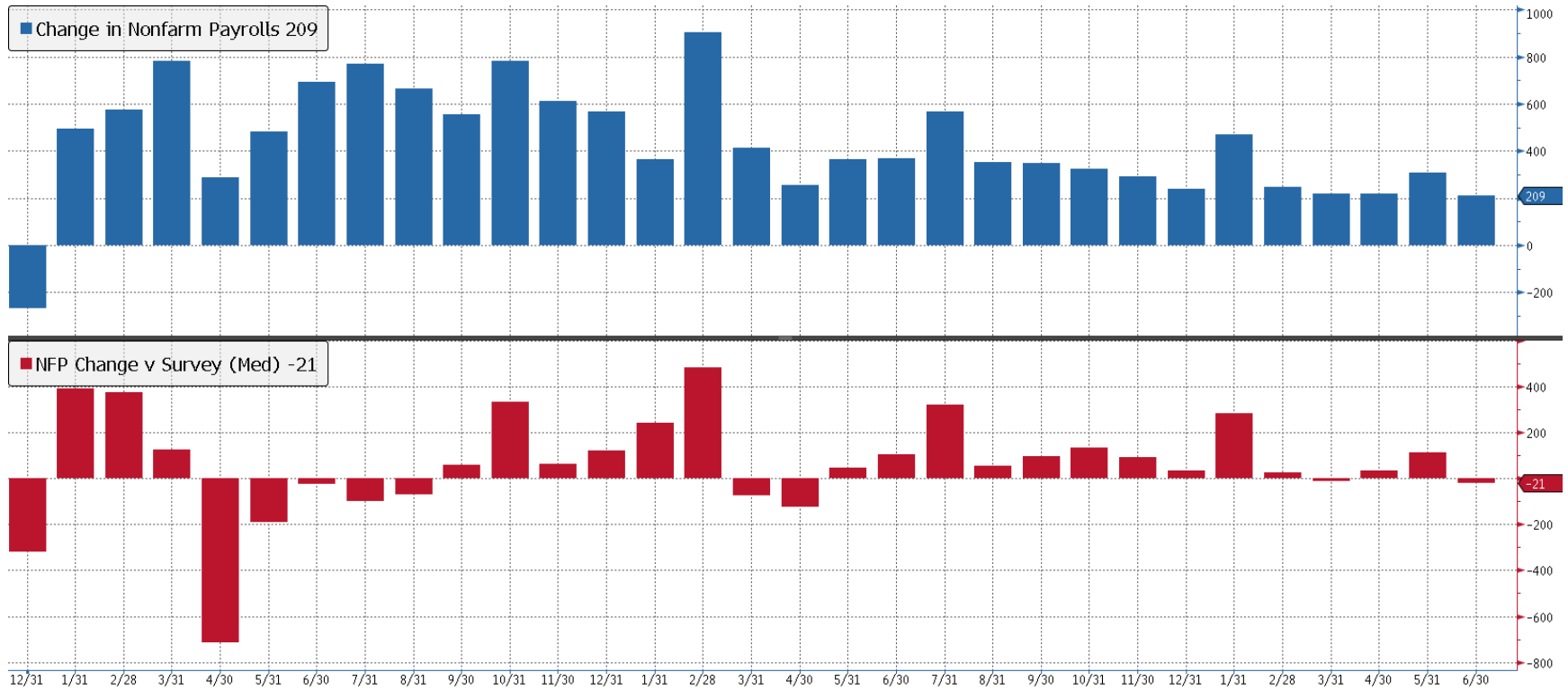
Fixed Income

The 10-year Treasury yield ended the quarter at 3.84%, up 37 basis points. Credit spreads were noticeably down during the quarter with high yield spreads down 69 basis points. The FOMC increased the overnight rate by 0.25% in May, targeting a range of 5.00% to 5.25%, before pausing increases in June. The Fed's "dot plot" is messaging that the current expectation is for another 50 basis point in increases before the end of 2023. In late June, Fed Chair Jerome Powell said that central bank policy "may not be restrictive enough and it has not been restrictive for long enough.

June 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 (%)	5.50	6.50	6.75	6.85	6.15	9.00	3.85	4.85	4.80	4.05	6.20	8.35	3.05	5.75	5.90	6.00	6.10	6.60	2.25
Expected 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 (%)	1.50	3.10	2.60	2.95	2.05	0.00	3.85	4.95	5.15	4.35	9.40	5.00	3.60	4.05	4.05	2.30	3.85	3.25	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
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

Job Market Looks Strong (and exceeding expectations)...



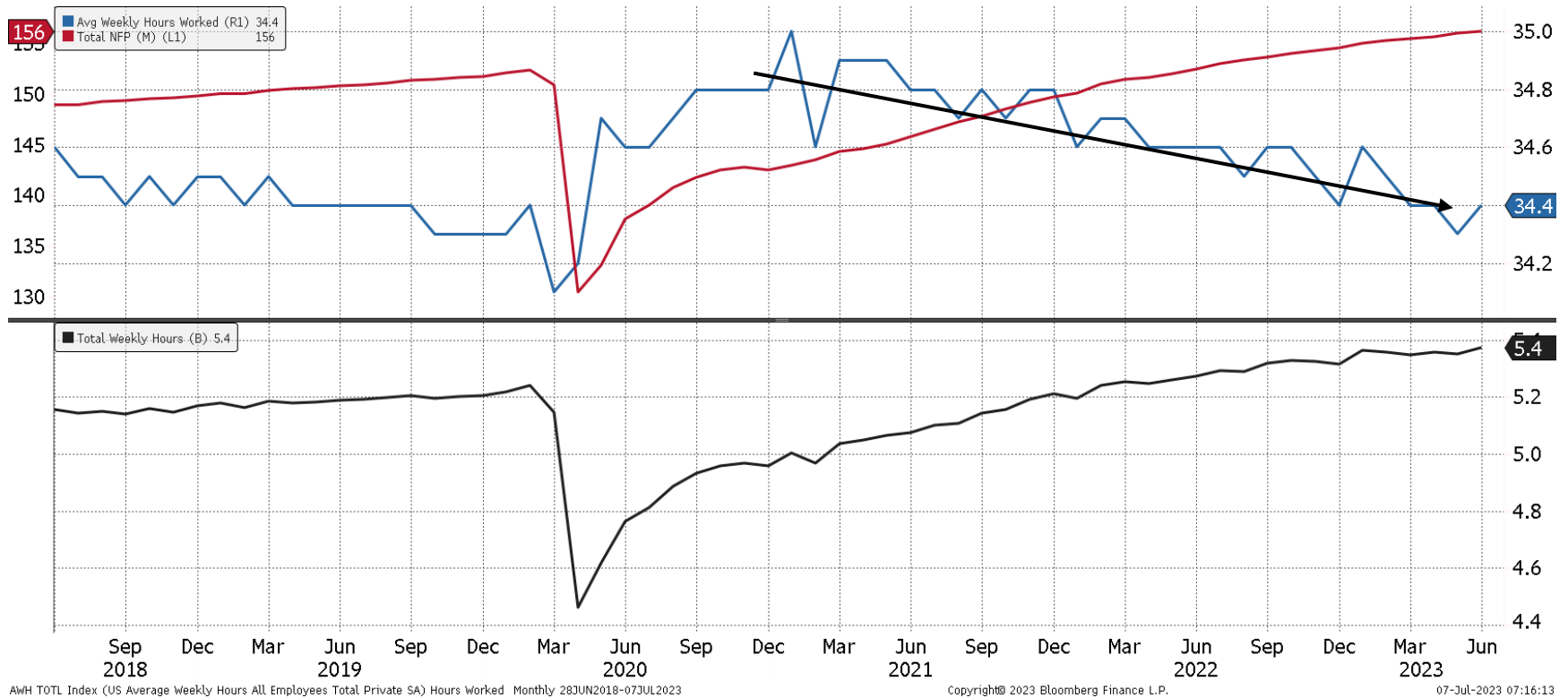
NFP TCH Index (US Employees on Nonfarm Payrolls Total MoM Net Change SA) NFP v Survey Daily 31DEC2020-30JUN2023

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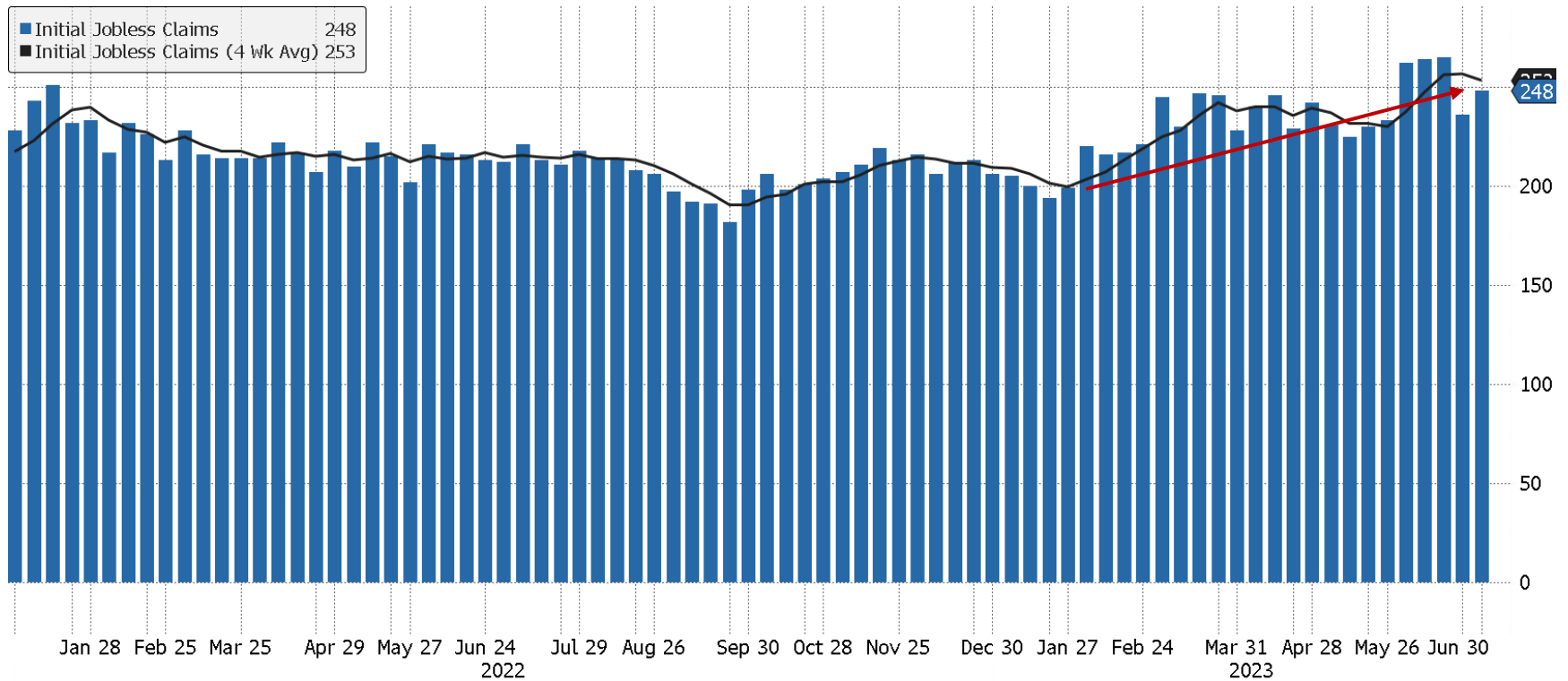
Data Source: Bloomberg

Early Signs of Slowing: Plateau in Hours Worked



Data Source: Bloomberg

Early Signs of Slowing: Increase in Claims



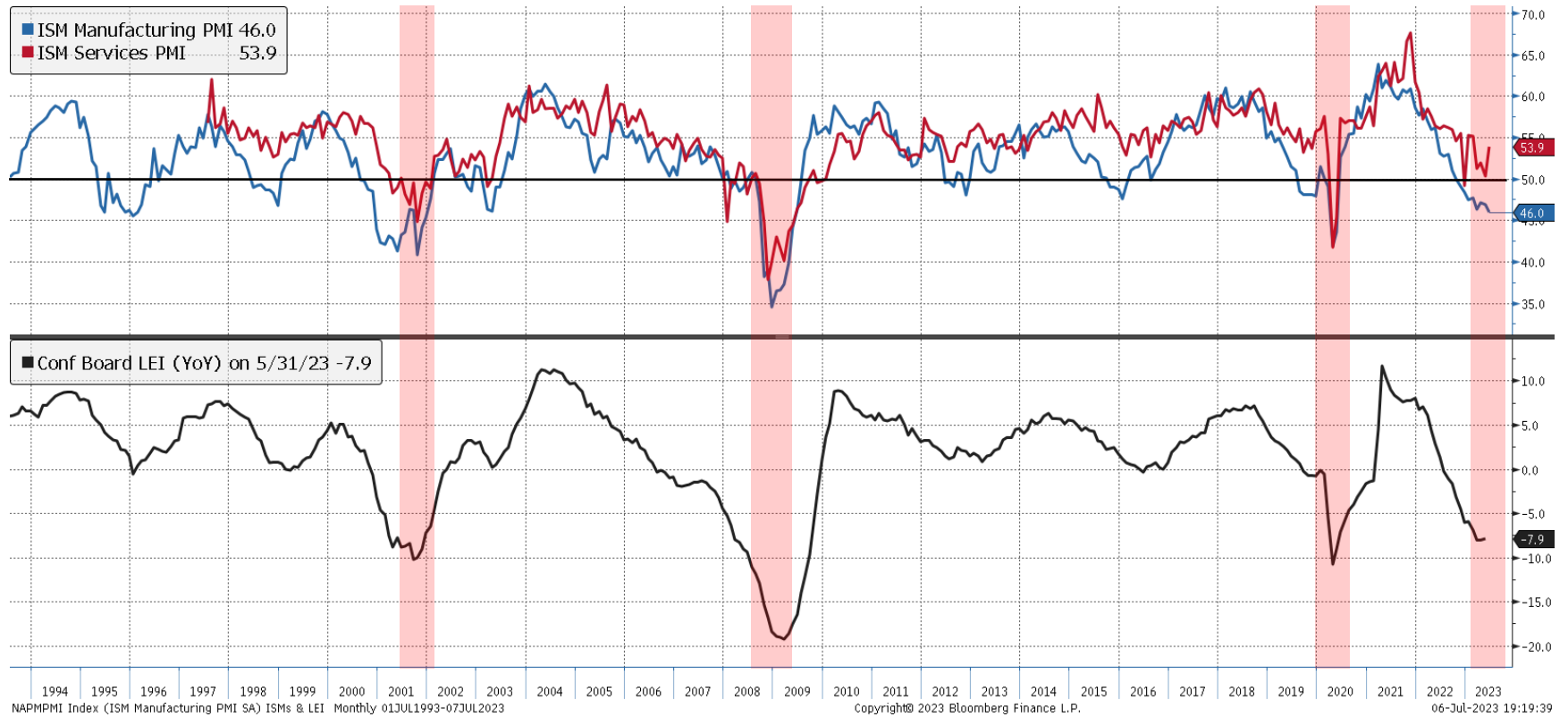
INJCJC Index (US Initial Jobless Claims SA) Claims Daily 31DEC2021-07JUL2023

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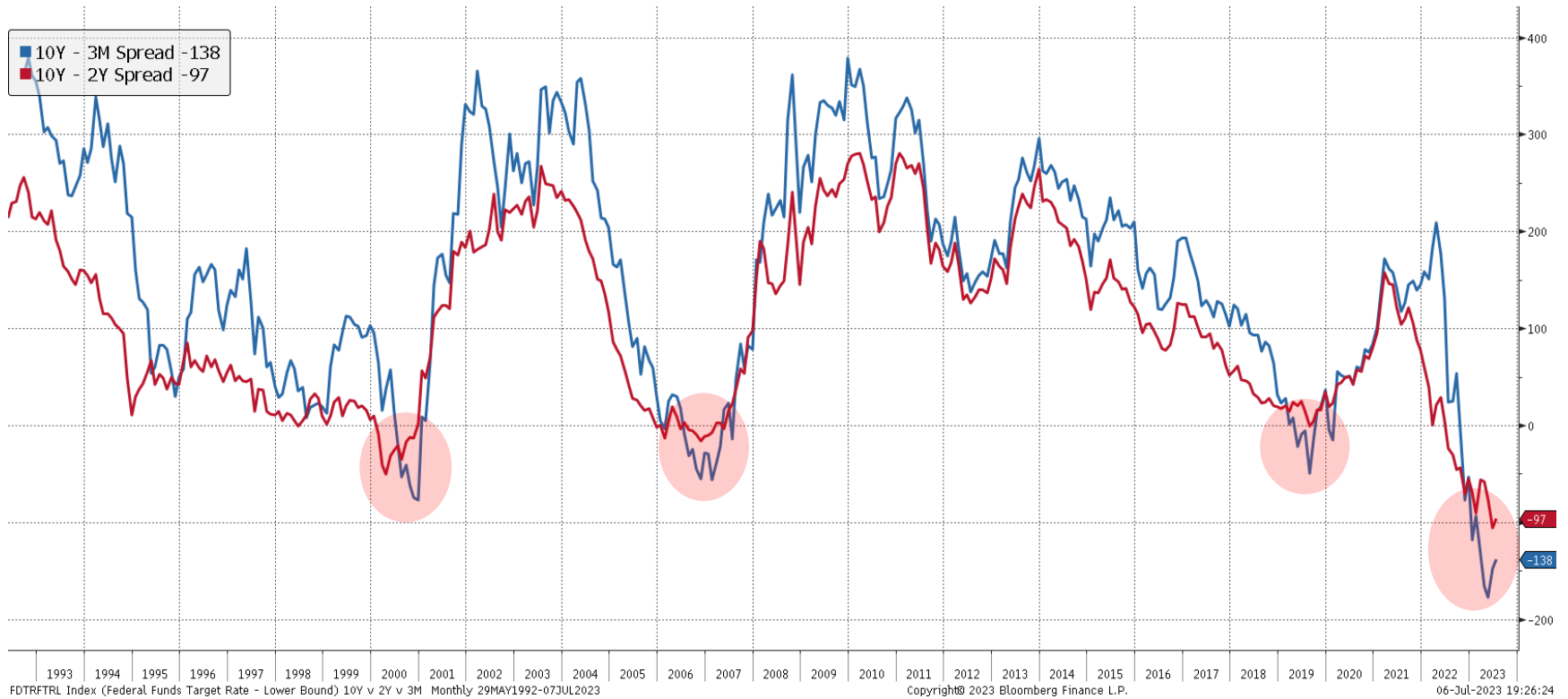
Data Source: Bloomberg

ISM Surveys & Leading Indicators Pointing Down...



Data Source: Bloomberg

Yield Curve Flashing Red



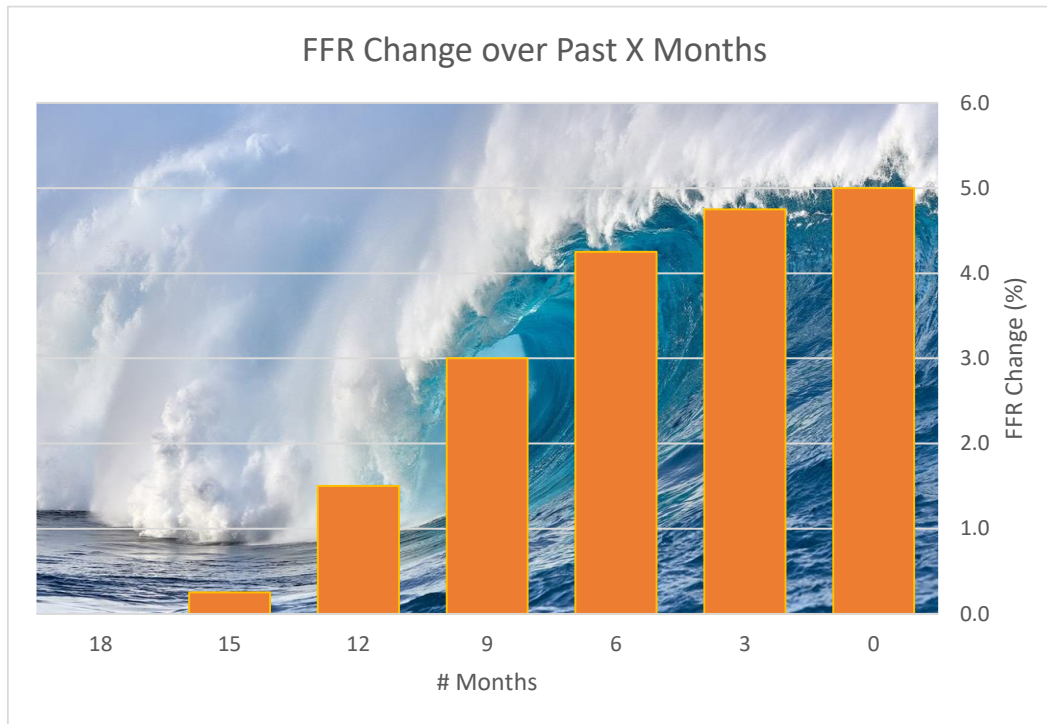
Data Source: Bloomberg

Are We There Yet?: Fed Journey Towards the “Neutral Rate”



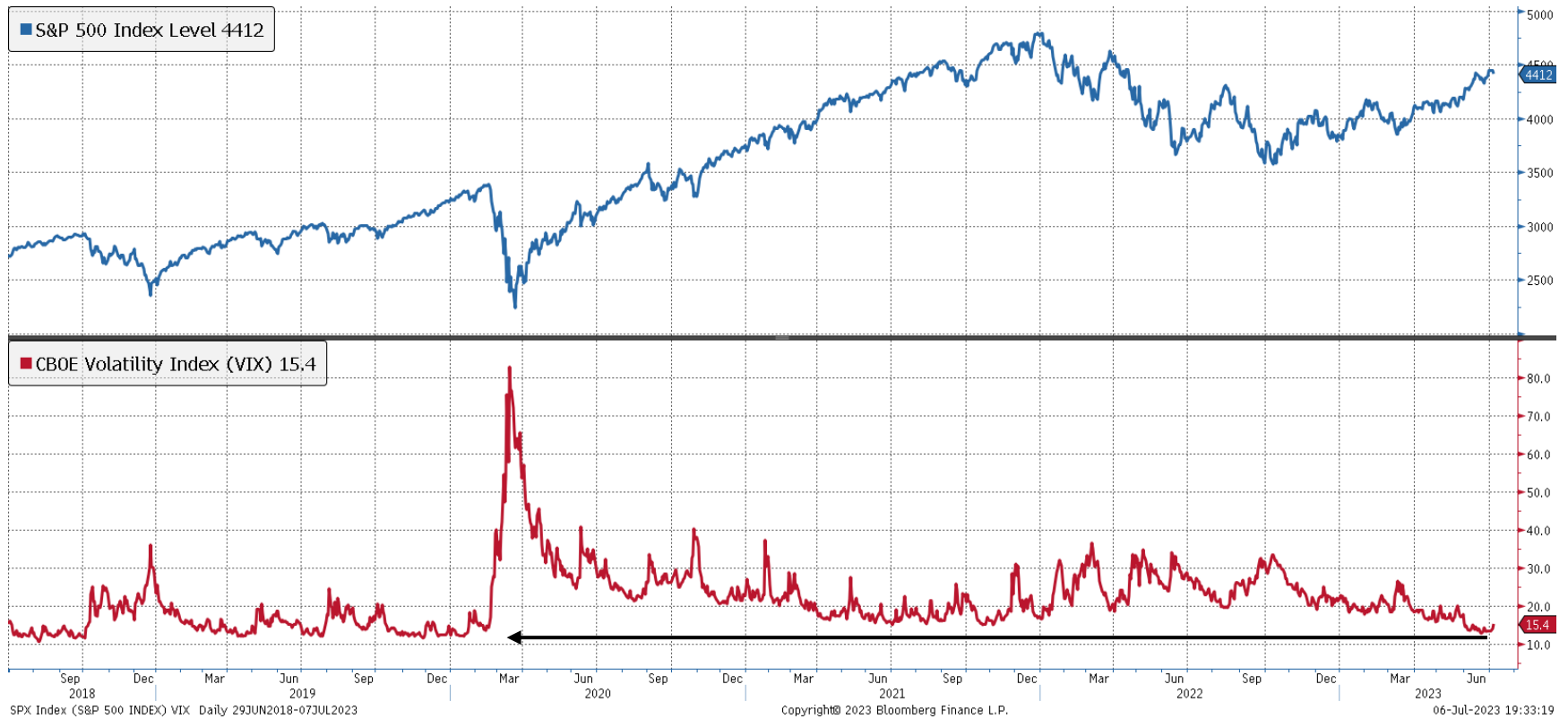
Data Source: Bloomberg

The Tightening Wave: Unpredictable but Building



Arguably less than a year since the overnight rate has been meaningfully higher, with a sizeable lag between rate changes and when they hit the real economy

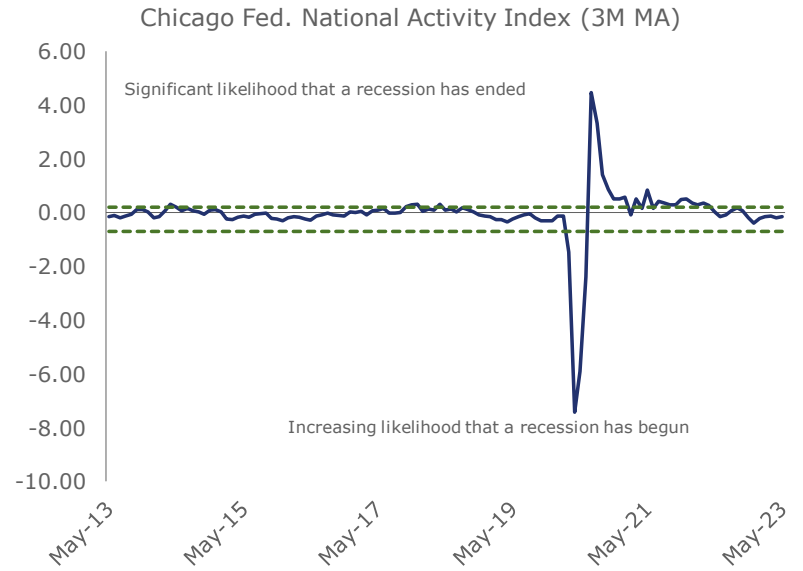
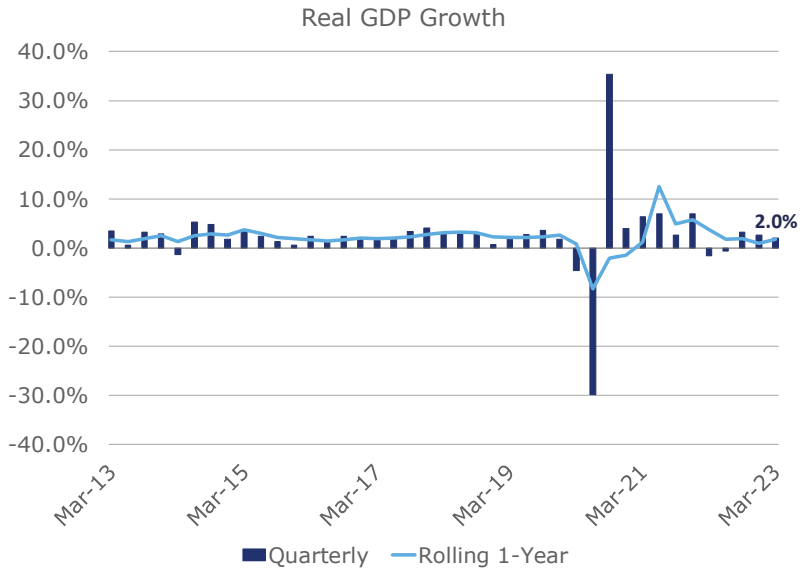
U.S. Stock Markets Showing No Fear...



Data Source: Bloomberg

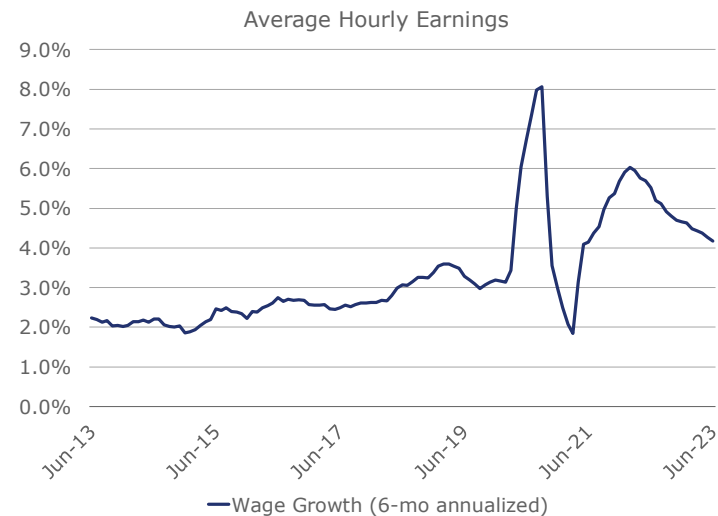
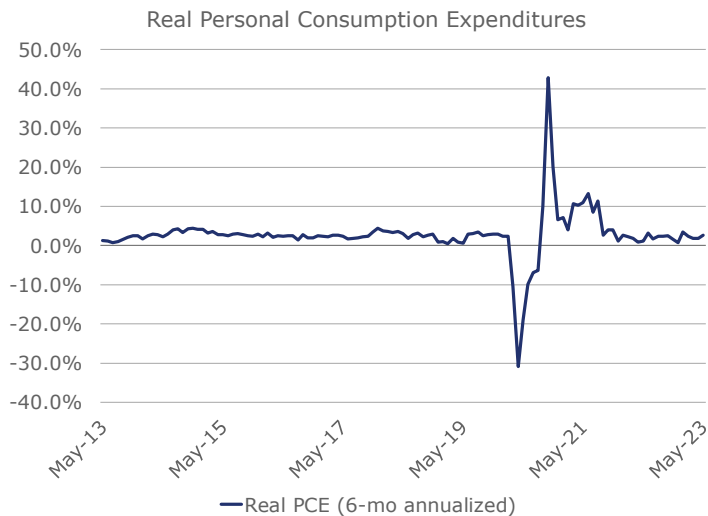
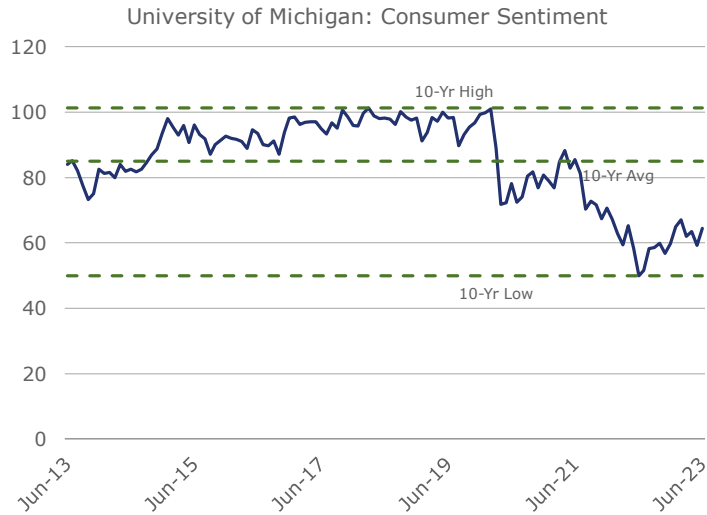
Economic/Market Activity

Economic Growth



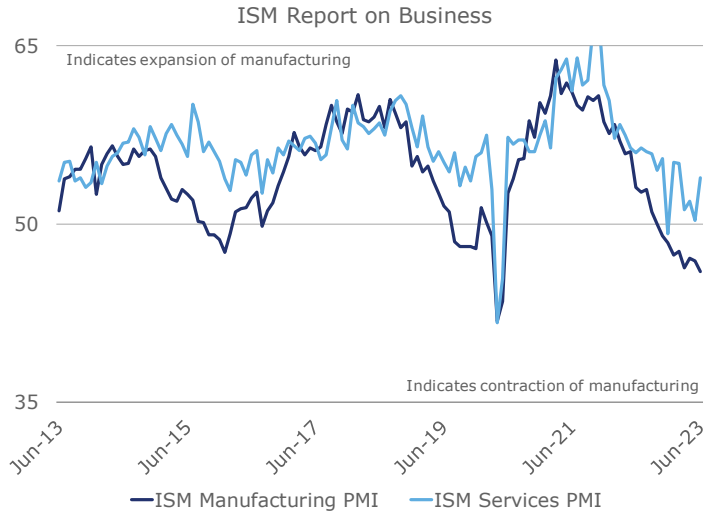
Data Sources: Bloomberg

Consumer Activity



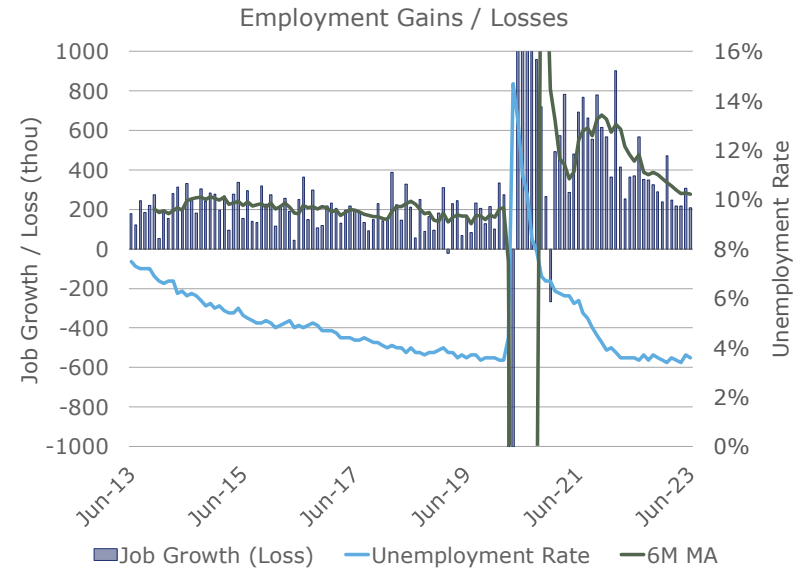
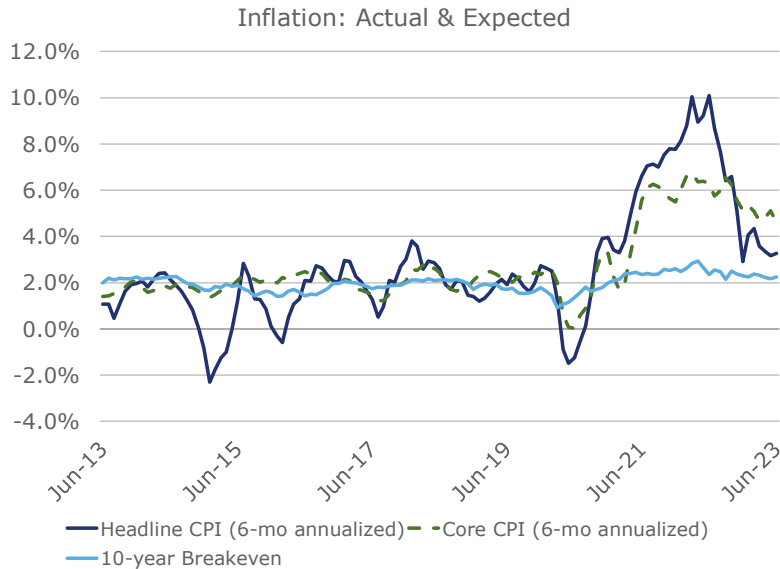
Data Sources: Bloomberg

Business Activity



Data Sources: Bloomberg

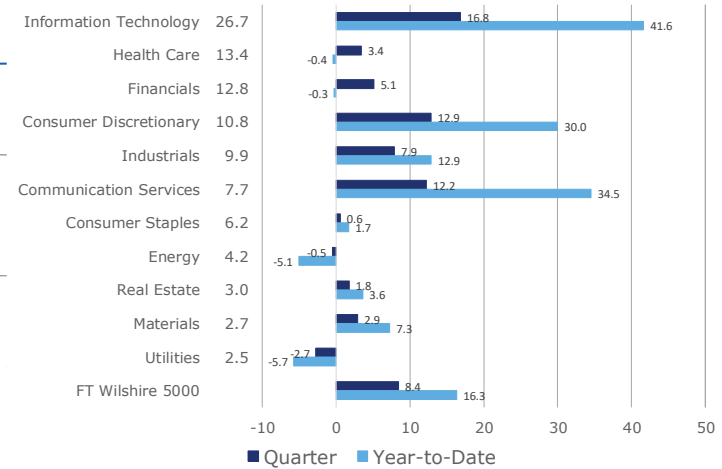
Inflation and Employment



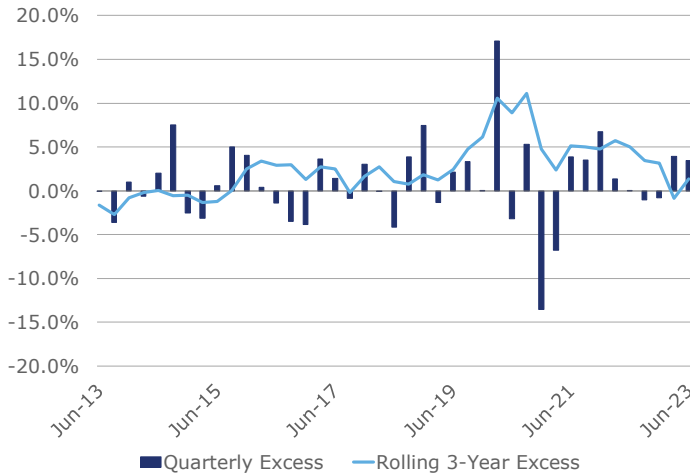
U.S. Equity Market

As of 6/30/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
FT Wilshire 5000	8.4	16.3	19.0	14.2	11.7	12.5
Wilshire U.S. Large Cap	8.7	17.0	19.6	14.4	12.3	12.9
Wilshire U.S. Small Cap	5.1	8.8	13.3	12.9	5.4	8.9
Wilshire U.S. Large Growth	14.2	32.1	28.7	15.5	14.9	15.5
Wilshire U.S. Large Value	2.6	2.7	9.9	12.9	9.5	10.2
Wilshire U.S. Small Growth	6.7	13.5	19.1	10.1	6.2	9.4
Wilshire U.S. Small Value	3.5	4.6	8.2	15.7	4.7	8.4
Wilshire REIT Index	3.3	6.7	-0.3	8.5	4.4	6.4
MSCI USA Min. Vol. Index	2.6	4.0	8.0	8.9	9.1	10.9
FTSE RAFI U.S. 1000 Index	5.0	6.7	13.2	17.4	10.4	11.2

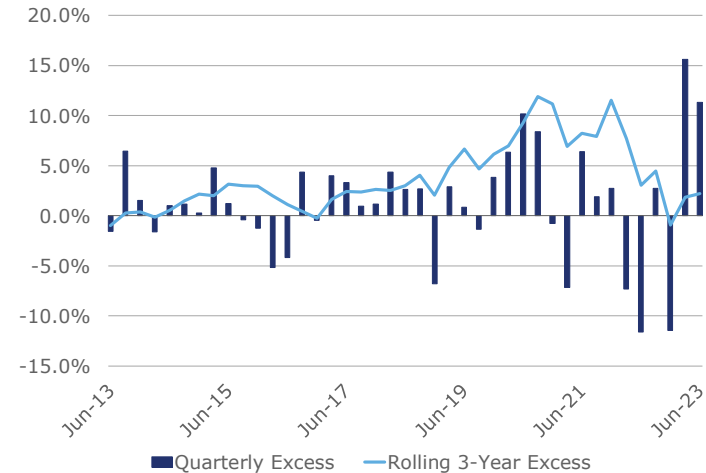
U.S. Sector Weight and Return (%)



Large Cap vs Small Cap



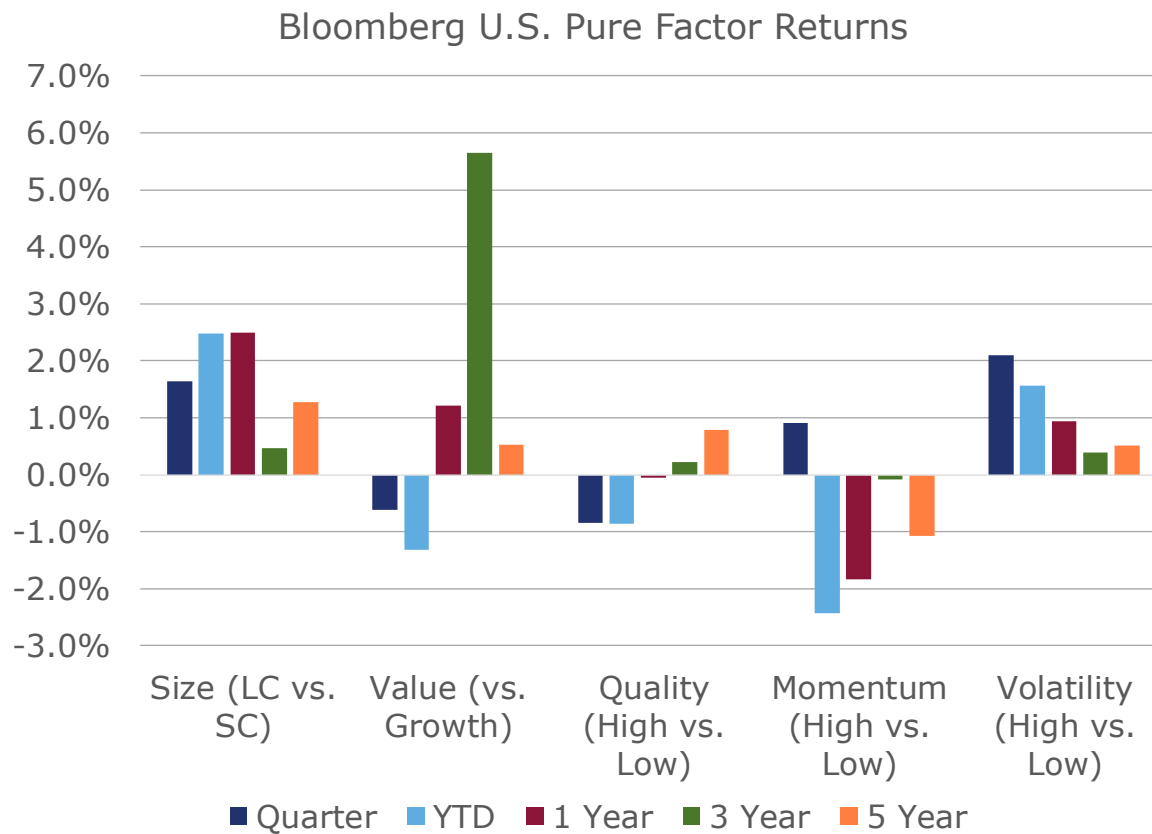
Large Growth vs Large Value



Data Sources: Bloomberg, Wilshire Atlas

U.S. Factor Returns

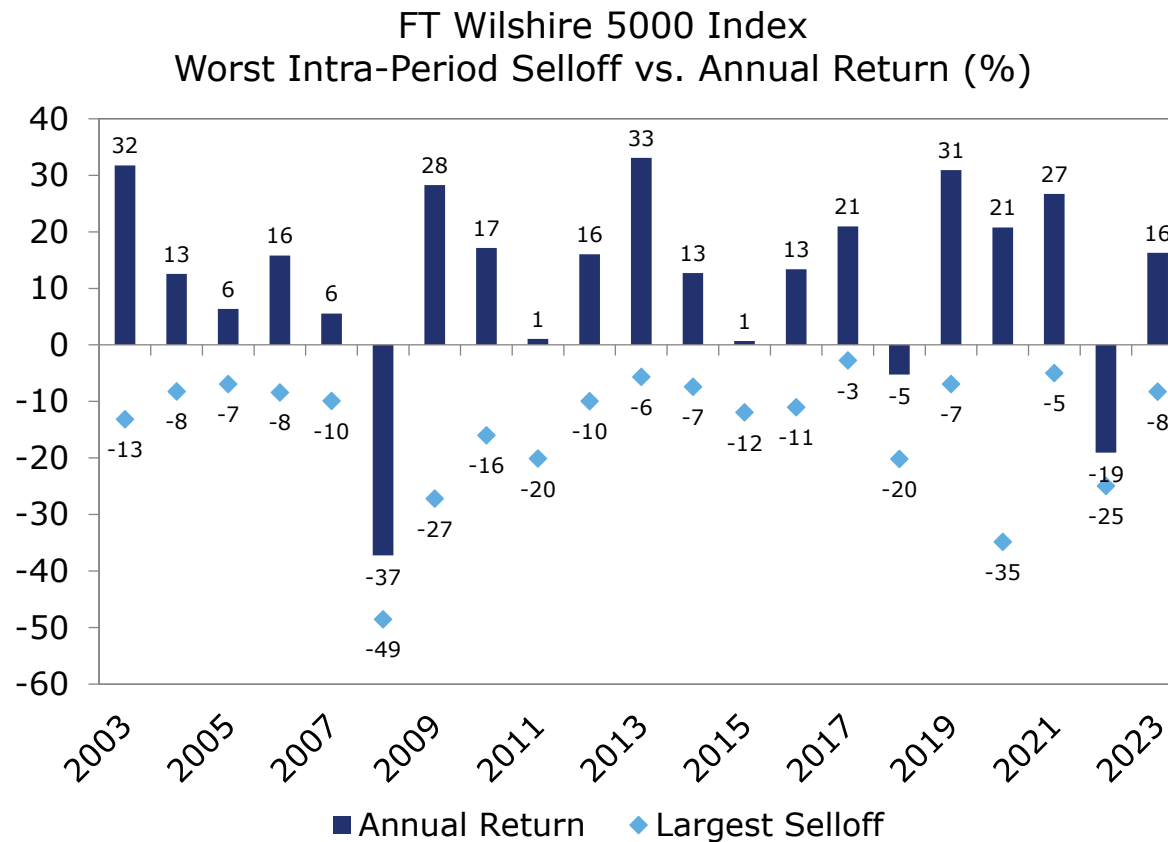
- Factor returns represent the contribution from large cap, value, etc. stocks within Bloomberg’s Portfolio & Risk Analytics module
- Large cap and high volatility have mostly outperformed this year



Data Sources: Bloomberg

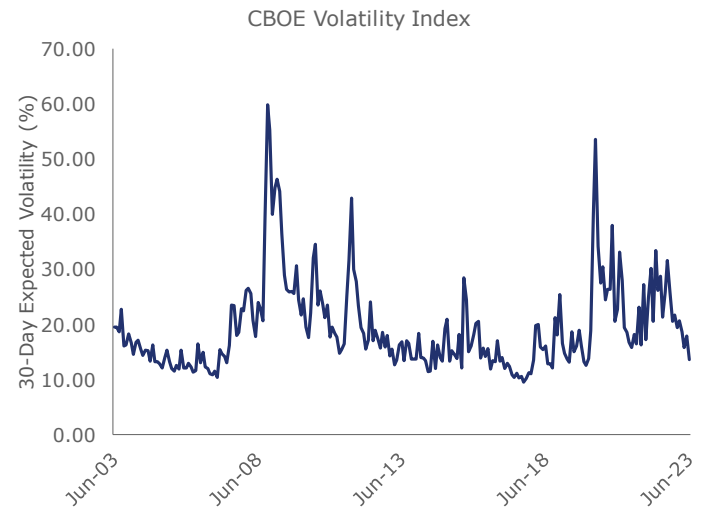
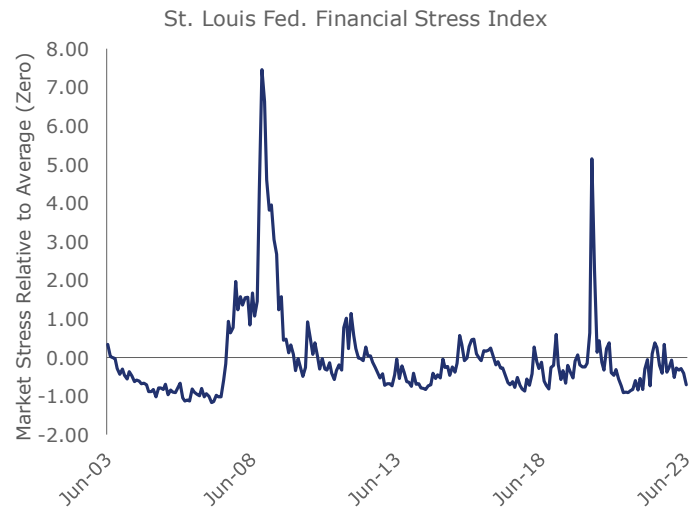
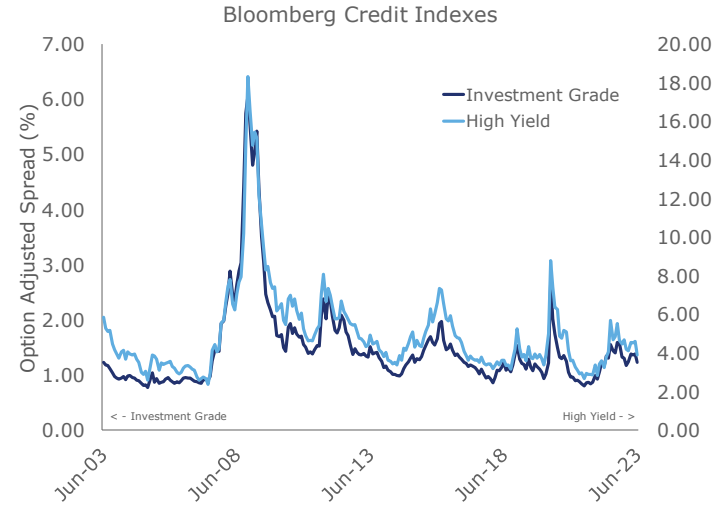
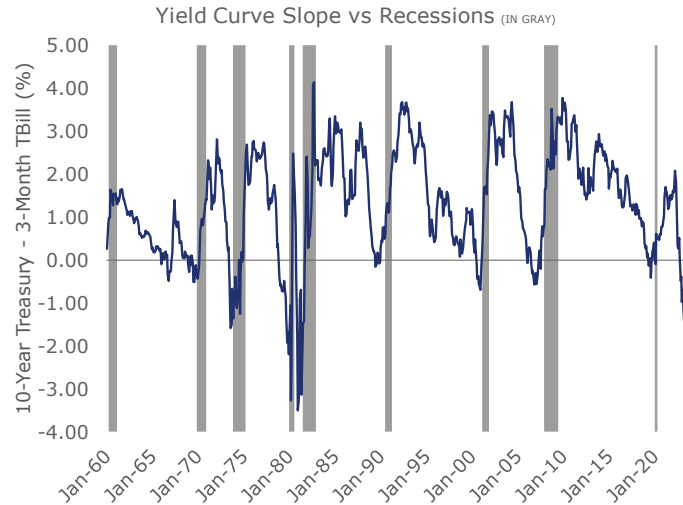
Annual Equity Market Selloffs

- U.S. equity suffered a meaningful selloff in Feb.-Mar. but is generally rebounding from 2022



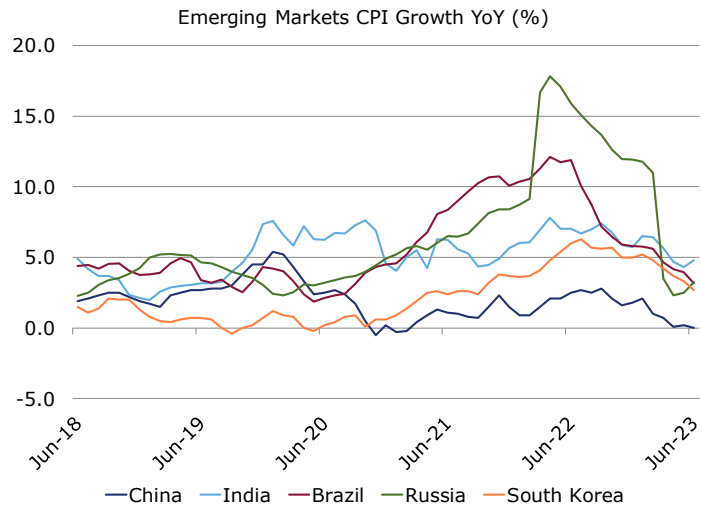
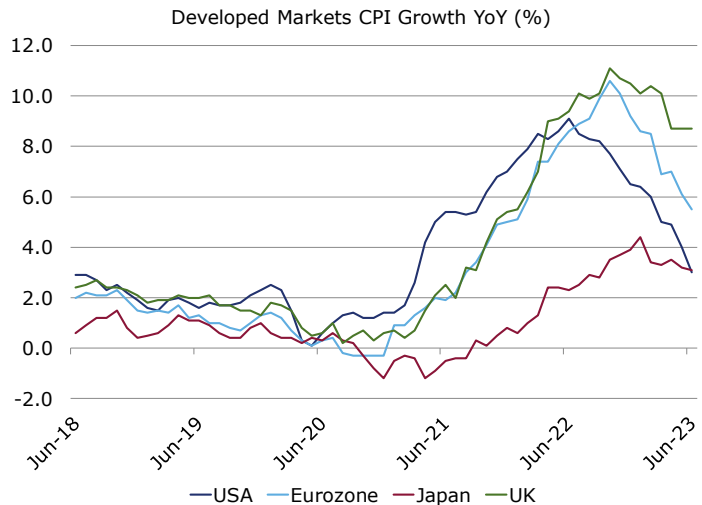
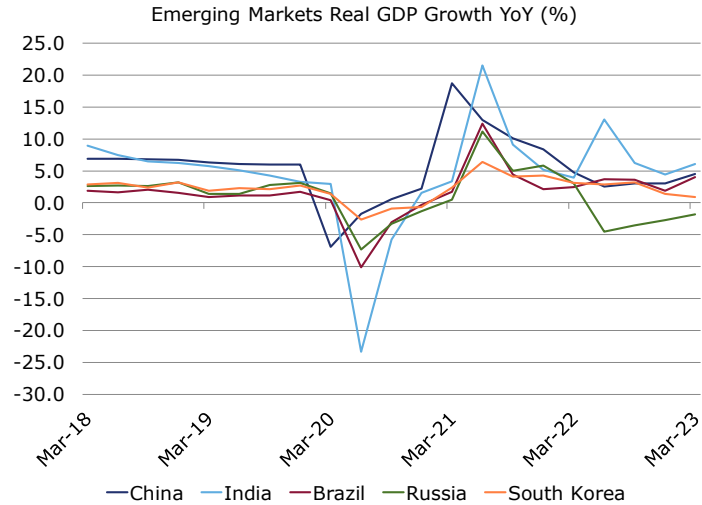
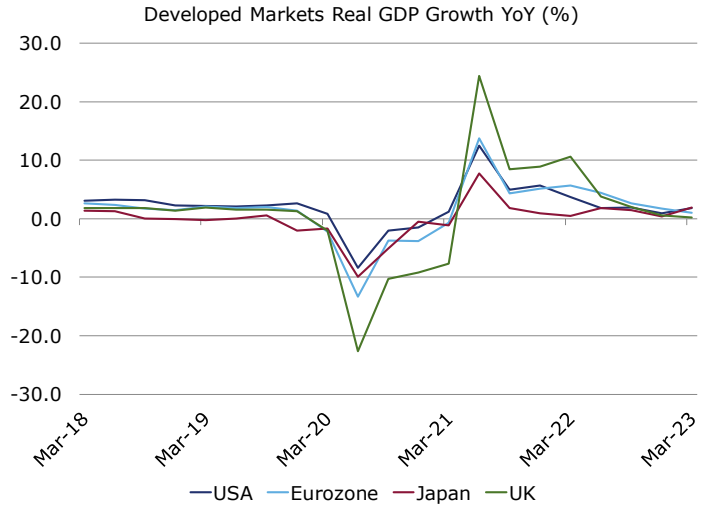
Data Sources: Wilshire Web, Bloomberg

Risk Monitor



Data Sources: Bloomberg

Non-U.S. Growth and Inflation

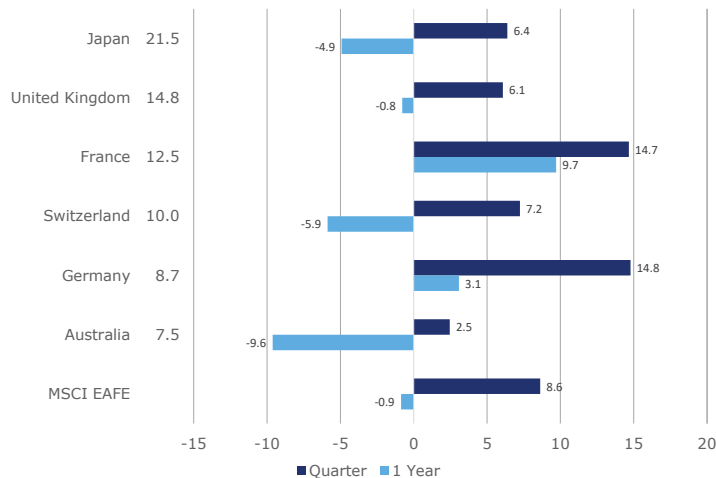


Data Sources: Bloomberg

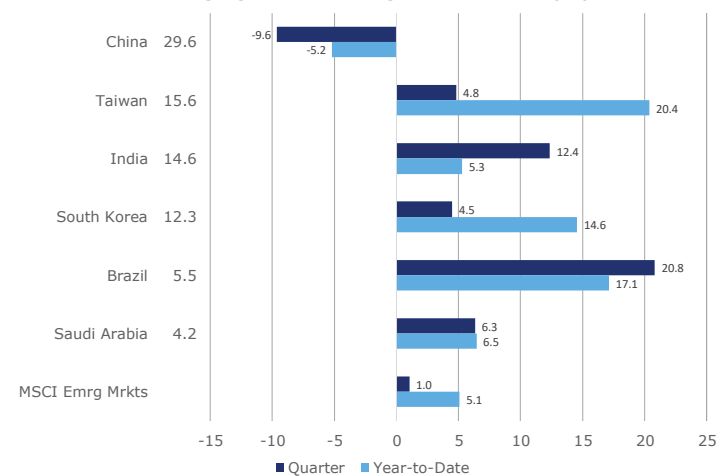
Non-U.S. Equity Market

As of 6/30/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
MSCI ACWI ex-US (\$G)	2.7	9.9	13.3	7.7	4.0	5.2
MSCI EAFE (\$G)	3.2	12.1	19.4	9.5	4.9	5.9
MSCI Emerging Markets (\$G)	1.0	5.1	2.2	2.7	1.3	3.3
MSCI Frontier Markets (\$G)	2.2	4.8	4.6	3.4	-1.0	0.8
MSCI ACWI ex-US Growth (\$G)	2.1	11.0	13.7	4.3	4.4	6.0
MSCI ACWI ex-US Value (\$G)	3.2	8.5	12.9	11.2	3.3	4.5
MSCI ACWI ex-US Small (\$G)	2.2	7.2	11.5	8.6	3.1	6.2
MSCI ACWI Minimum Volatility	2.4	4.1	6.4	6.3	6.0	7.9
MSCI EAFE Minimum Volatility	1.8	7.7	9.9	3.4	2.1	5.2
FTSE RAFI Developed ex-US	3.4	10.4	17.4	13.2	4.5	5.7
MSCI EAFE LC (G)	4.6	12.6	18.1	12.3	6.9	8.2
MSCI Emerging Markets LC (G)	1.8	5.8	3.8	4.3	3.4	6.1

Developed Markets Weight and Return (%)



Emerging Markets Weight and Return (%)

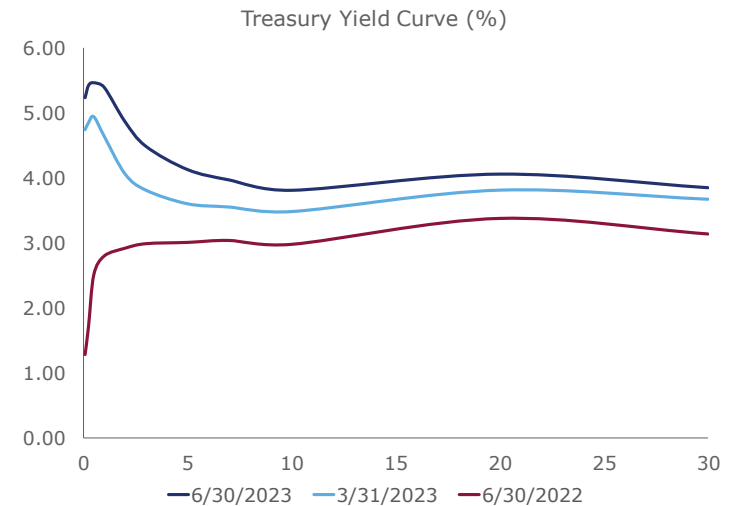
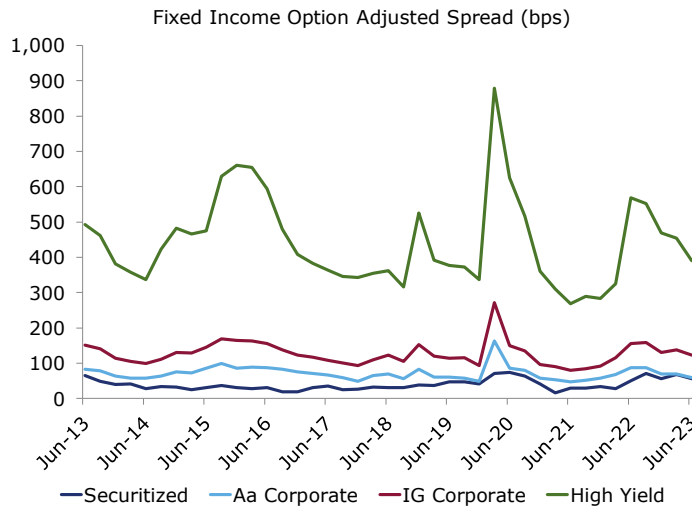


Data Sources: Bloomberg

U.S. Fixed Income

As of 6/30/2023	YTW	DUR.	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg Aggregate	4.8	6.3	-0.8	2.1	-0.9	-4.0	0.8	1.5
Bloomberg Treasury	4.4	6.2	-1.4	1.6	-2.1	-4.8	0.4	1.0
Bloomberg Gov't-Rel.	4.9	5.3	-0.5	2.4	0.2	-2.9	1.1	1.7
Bloomberg Securitized	4.8	5.9	-0.6	1.8	-1.5	-3.6	0.1	1.2
Bloomberg Corporate	5.5	7.1	-0.3	3.2	1.5	-3.4	1.8	2.6
Bloomberg LT Gov't/Credit	4.8	14.3	-1.3	4.4	-2.6	-8.6	0.7	2.9
Bloomberg LT Treasury	4.0	16.0	-2.3	3.7	-6.8	-12.1	-0.9	1.8
Bloomberg LT Gov't-Rel.	5.2	11.8	0.3	5.5	1.2	-5.5	1.0	3.2
Bloomberg LT Corporate	5.4	13.0	-0.5	4.9	1.0	-6.2	1.6	3.5
Bloomberg U.S. TIPS *	3.8	7.4	-1.4	1.9	-1.4	-0.1	2.5	2.1
Bloomberg High Yield	8.5	3.5	1.7	5.4	9.1	3.1	3.4	4.4
S&P/LSTA Leveraged Loan	9.6	0.3	3.1	6.5	10.7	6.3	4.1	4.1
Treasury Bills	5.3	0.3	1.2	2.3	3.6	1.2	1.5	1.0

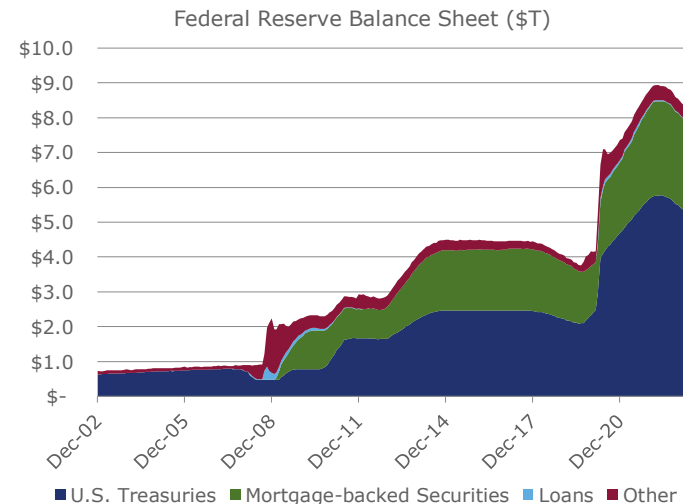
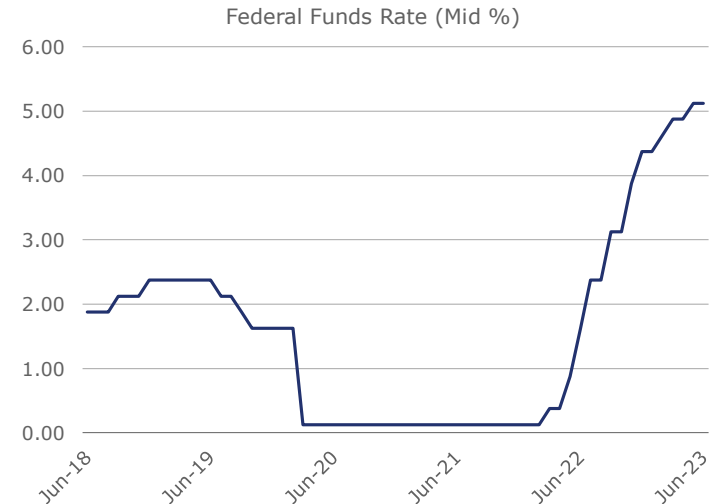
* Yield and Duration statistics are for a proxy index based on similar maturity, the Bloomberg Barclays U.S. Treasury 7-10 Year Index



Data Sources: Bloomberg

Federal Reserve

- The Federal Open Market Committee increased the rate an additional 25 basis points in May before pausing increases in June
- 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 quarter

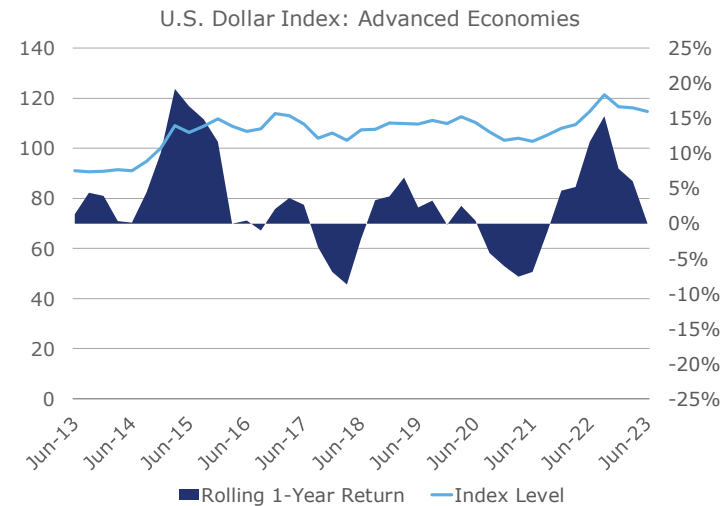
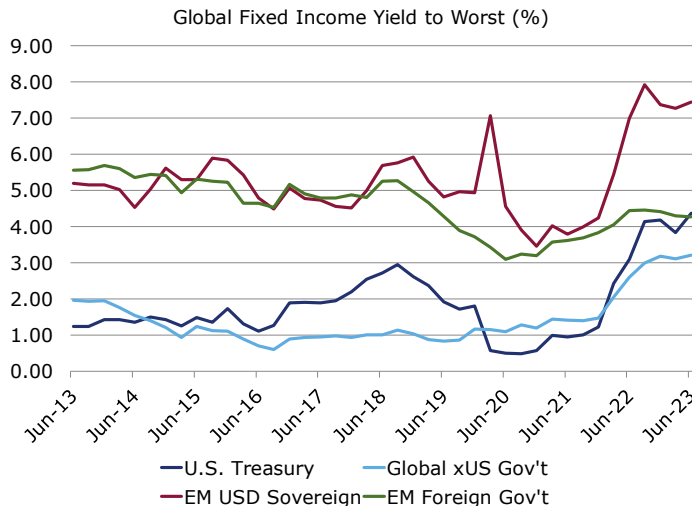


	Announced	Closed	Amount (bil)
QE1	11/25/2008	3/31/2010	\$1,403
QE2	11/3/2010	6/29/2012	\$568
QE3	9/13/2012	10/29/2014	\$1,674
QE4	3/23/2020	3/15/2022	\$4,779

Non-U.S. Fixed Income

As of 6/30/2023	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Developed Markets						
Bloomberg Global Aggregate xUS	-2.2	0.8	-1.8	-5.9	-2.7	-0.9
Bloomberg Global Aggregate xUS *	0.7	3.6	1.5	-2.1	1.0	2.5
Bloomberg Global Inflation Linked xUS	-2.0	3.3	-5.4	-6.6	-2.8	0.1
Bloomberg Global Inflation Linked xUS *	-2.5	1.4	-6.2	-5.1	-0.2	2.9
Emerging Markets (Hard Currency)						
Bloomberg EM USD Aggregate	1.1	3.3	5.6	-2.7	1.0	2.7
Emerging Markets (Foreign Currency)						
Bloomberg EM Local Currency Gov't	-1.4	1.7	2.3	0.0	1.6	1.0
Bloomberg EM Local Currency Gov't *	2.0	4.2	6.9	0.1	2.9	2.5
Euro vs. Dollar	0.6	1.9	4.1	-1.0	-1.4	-1.7
Yen vs. Dollar	-7.9	-9.1	-6.0	-9.2	-5.2	-3.7
Pound vs. Dollar	3.0	5.1	4.3	0.8	-0.8	-1.8

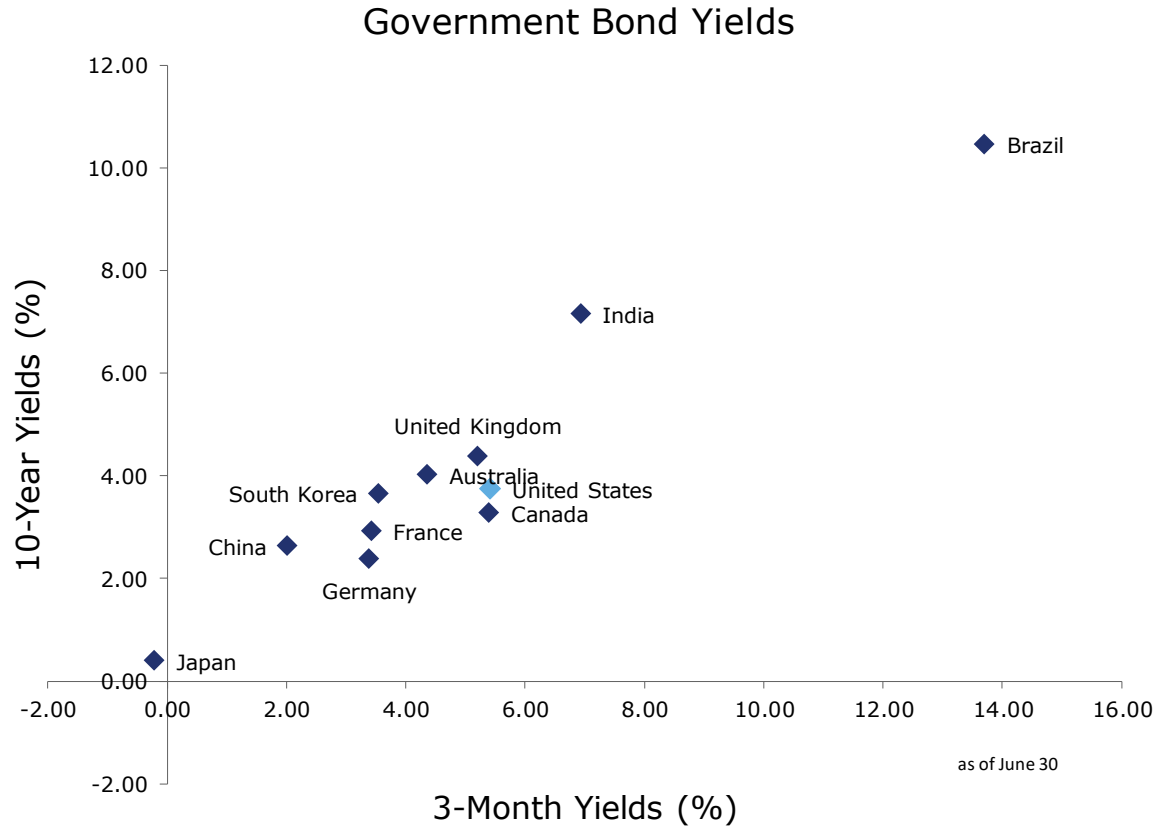
* Returns are reported in terms of local market investors, which removes currency effects.



Data Sources: Bloomberg

Global Interest Rates

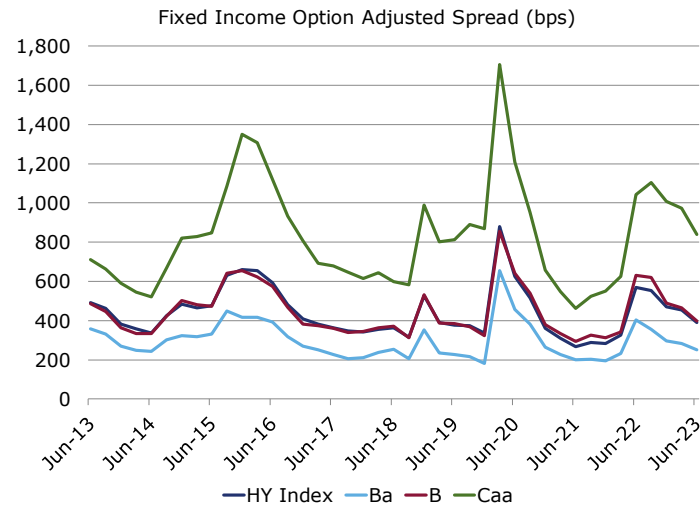
Short-term rates have turned positive in most larger countries; longer-term rates around 4.0% in the U.K. and the U.S.



High Yield Bond Market

As of 6/30/2023

	YTW	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg High Yield	8.5	1.7	5.4	9.1	3.1	3.4	4.4
S&P LSTA Leveraged Loan	9.1	3.3	6.4	11.8	5.4	4.0	3.7
High Yield Quality Distribution	Weight						
Ba U.S. High Yield	47.9%	7.1	0.9	4.4	8.1	2.3	4.8
B U.S. High Yield	39.9%	8.7	1.9	5.4	9.9	3.1	4.0
Caa U.S. High Yield	11.2%	12.9	4.2	9.3	9.4	5.5	3.9
Ca to D U.S. High Yield	0.9%	22.2	11.5	7.5	18.7	15.7	-4.4



Data Sources: Bloomberg

Asset Class Performance

Asset Class Returns - Best to Worst

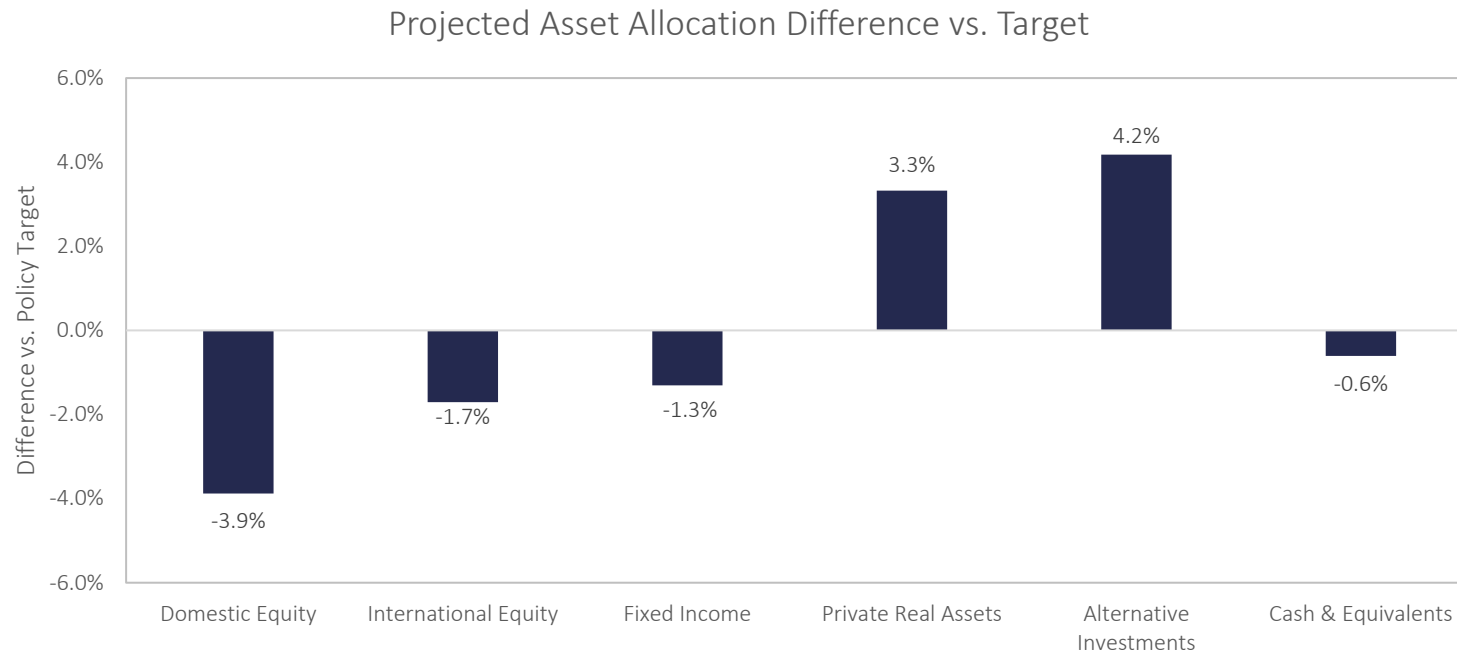
2018	2019	2020	2021	2022	2023 YTD	Annualized 5-Year as of 6/23
T-Bills 1.9%	U.S. Equity 31.0%	U.S. Equity 20.8%	REITs 46.2%	Commodities 16.1%	U.S. Equity 16.3%	U.S. Equity 11.7%
Core Bond 0.0%	REITs 25.8%	Emrg Mrkts 18.7%	Commodities 27.1%	T-Bills 1.3%	Developed 12.1%	Developed 4.9%
U.S. TIPS -1.3%	Developed 22.7%	U.S. TIPS 11.0%	U.S. Equity 26.7%	High Yield -11.2%	REITs 6.7%	Commodities 4.7%
High Yield -2.1%	Emrg Mrkts 18.9%	Developed 8.3%	Developed 11.8%	U.S. TIPS -11.8%	High Yield 5.4%	REITs 4.4%
REITs -4.8%	High Yield 14.3%	Core Bond 7.5%	U.S. TIPS 6.0%	Core Bond -13.0%	Emrg Mrkts 5.1%	High Yield 3.4%
U.S. Equity -5.3%	Core Bond 8.7%	High Yield 7.1%	High Yield 5.3%	Developed -14.0%	T-Bills 2.3%	U.S. TIPS 2.5%
Commodities -11.2%	U.S. TIPS 8.4%	T-Bills 0.7%	T-Bills 0.0%	U.S. Equity -19.0%	Core Bond 2.1%	T-Bills 1.5%
Developed -13.4%	Commodities 7.7%	Commodities -3.1%	Core Bond -1.5%	Emrg Mrkts -19.7%	U.S. TIPS 1.9%	Emrg Mrkts 1.3%
Emrg Mrkts -14.2%	T-Bills 2.3%	REITs -7.9%	Emrg Mrkts -2.2%	REITs -26.8%	Commodities -7.8%	Core Bond 0.8%

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 June 30, 2023



- Includes committed, but unfunded amounts for Real Assets (\$2.19 billion) and Alternatives (\$2.51 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

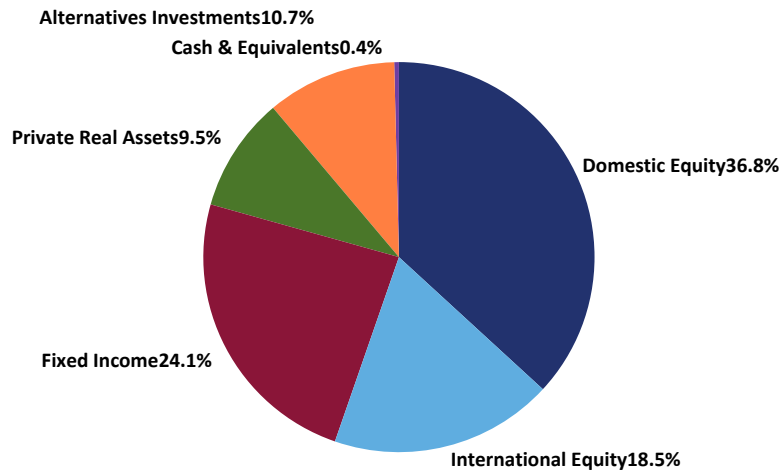
Real Assets Proxy: 50% Domestic Equity, 30% International Equity, 20% Fixed Income

Asset Allocation

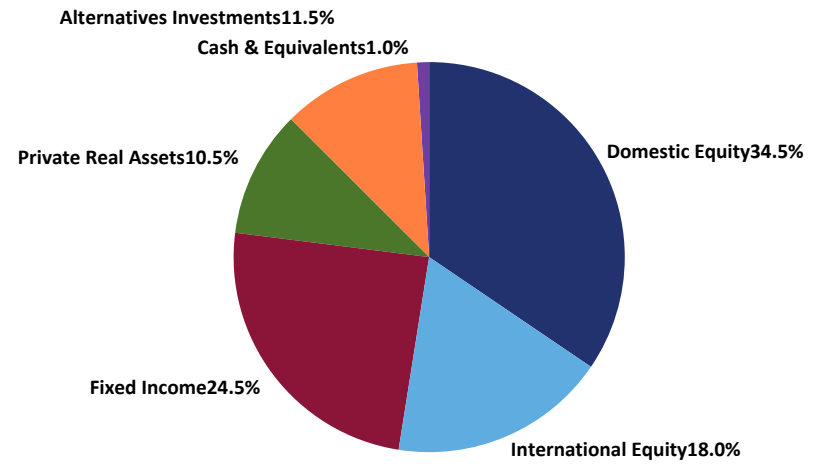
Total Fund

Periods Ended As of June 30, 2023

Actual Allocation



Target Allocation



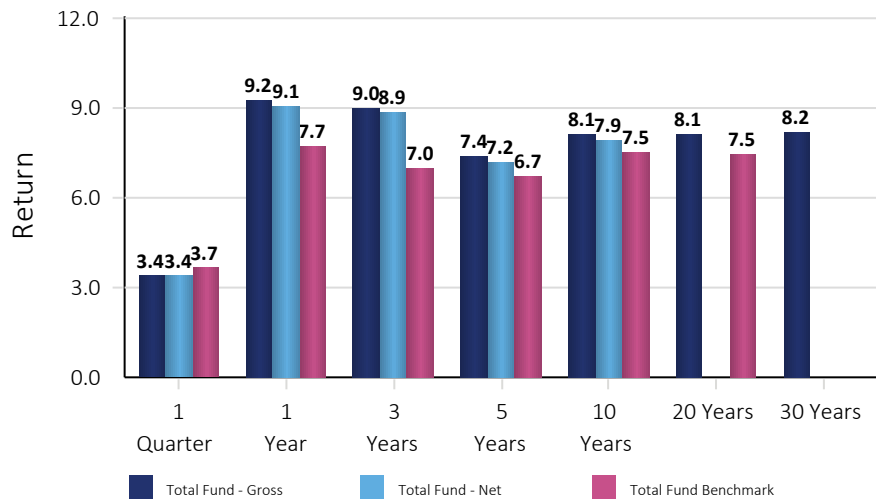
	Actual Allocation \$Millions	Actual Allocation %	Target Allocation %	Differences %	Differences \$Millions
Total Fund	50,717	100.0	100.0	0.0	
Domestic Equity	18,684	36.8	34.5	2.3	1,186
International Equity	9,367	18.5	18.0	0.5	238
Fixed Income	12,200	24.1	24.5	-0.4	-225
Private Real Assets	4,822	9.5	10.5	-1.0	-503
Alternatives Investments	5,445	10.7	11.5	-0.8	-388
Cash & Equivalents	199	0.4	1.0	-0.6	-308

Composite Performance Summary

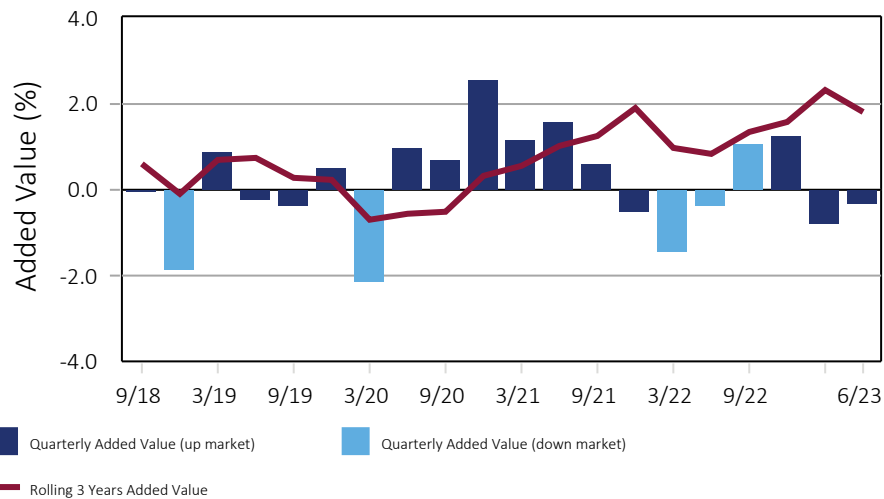
Total Fund

Periods Ended June 30, 2023

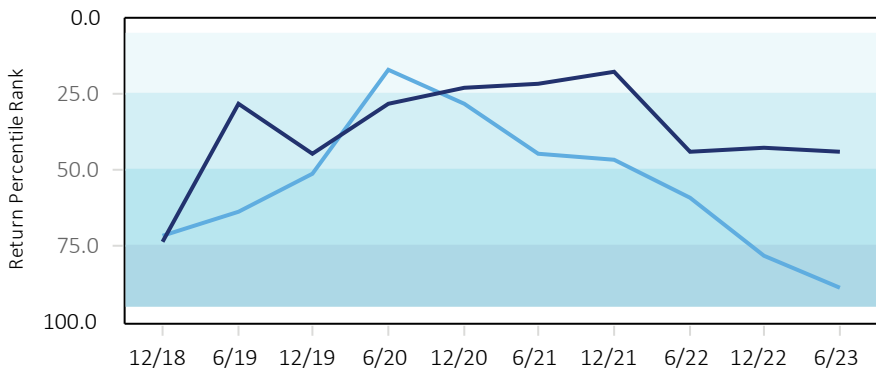
Comparative Performance



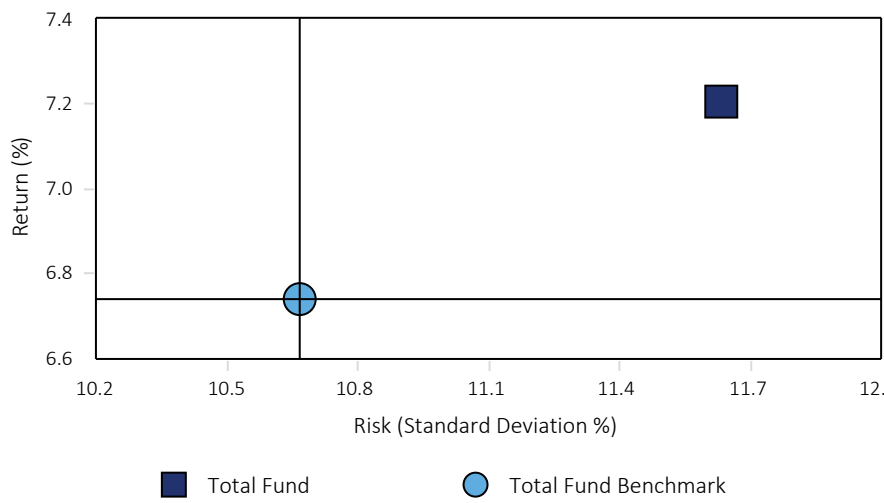
Added Value History



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



Risk and Return 07/01/18 - 06/30/23

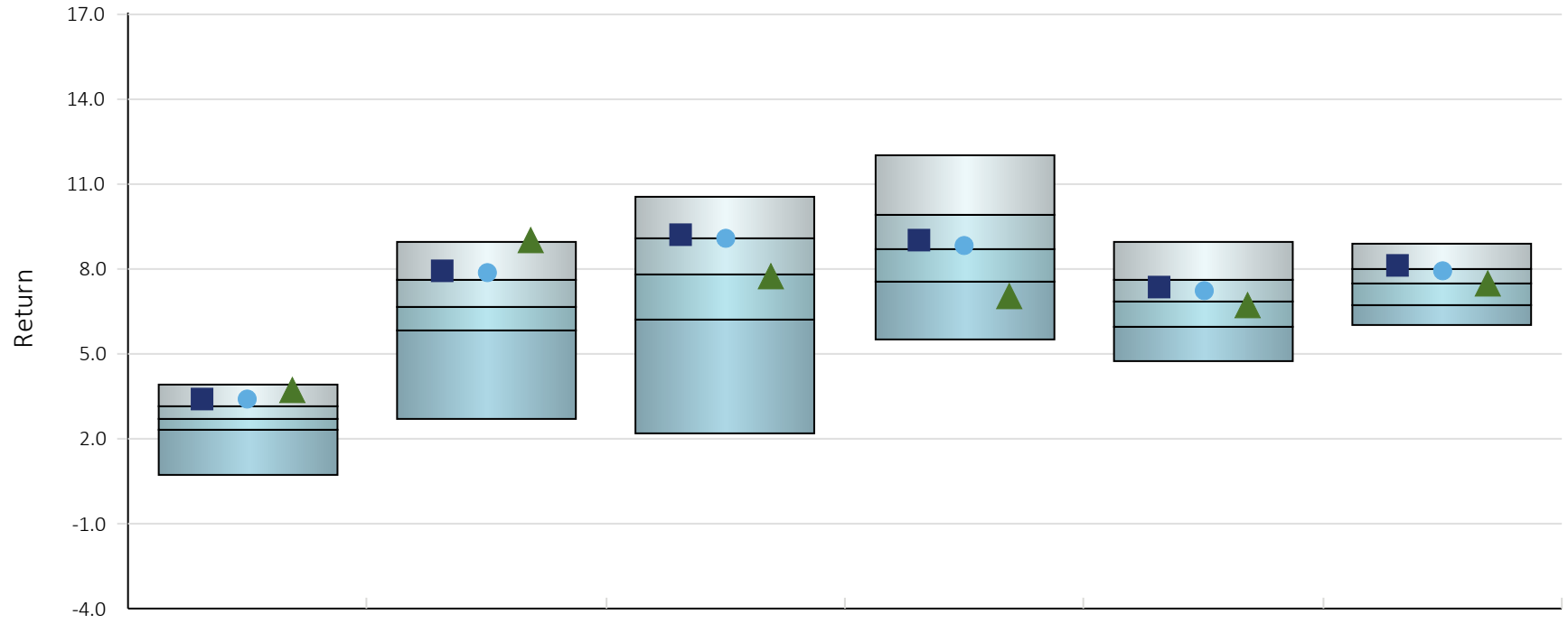


	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
Total Fund	10	3 (30%)	6 (60%)	1 (10%)	0 (0%)
Total Fund Benchmark	10	1 (10%)	3 (30%)	4 (40%)	2 (20%)

Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2023



	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Total Fund	3.43 (17)	7.93 (18)	9.23 (21)	9.03 (41)	7.38 (35)	8.14 (22)
● Total Fund - Net	3.39 (18)	7.84 (18)	9.08 (25)	8.85 (44)	7.21 (40)	7.93 (32)
▲ Total Fund Benchmark	3.70 (9)	9.00 (5)	7.72 (54)	7.02 (89)	6.74 (53)	7.51 (50)
5th Percentile	3.89	8.93	10.55	12.05	8.93	8.89
1st Quartile	3.13	7.59	9.06	9.89	7.63	8.03
Median	2.70	6.69	7.79	8.71	6.82	7.50
3rd Quartile	2.32	5.82	6.24	7.56	5.96	6.75
95th Percentile	0.73	2.67	2.18	5.49	4.71	5.99
Population	112	111	108	101	100	95

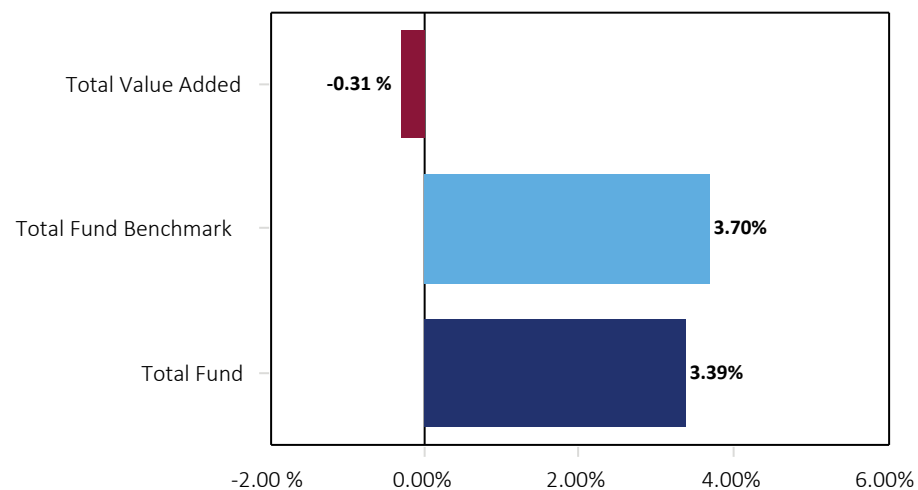
Total Fund Benchmark = 35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18.0% MSCI ACWI ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1.0% 90 Day US Treasury Bill.

Total Fund Attribution

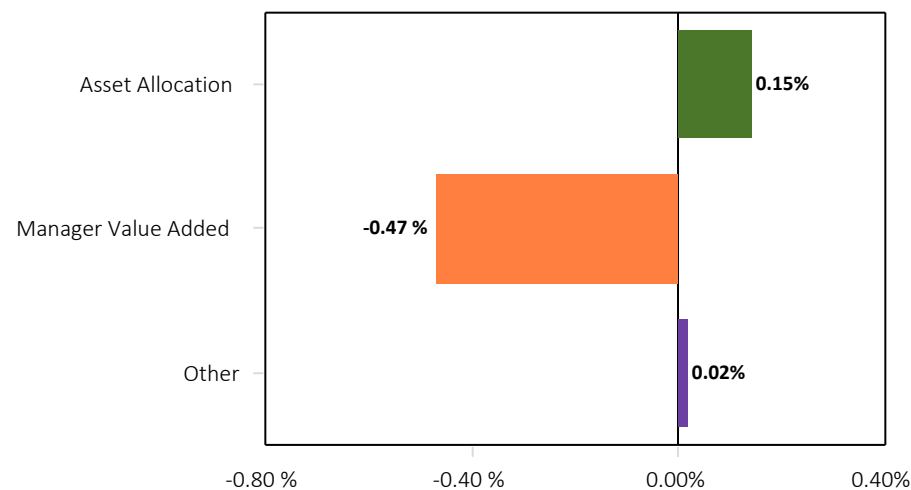
Total Fund

1 Quarter Ending June 30, 2023

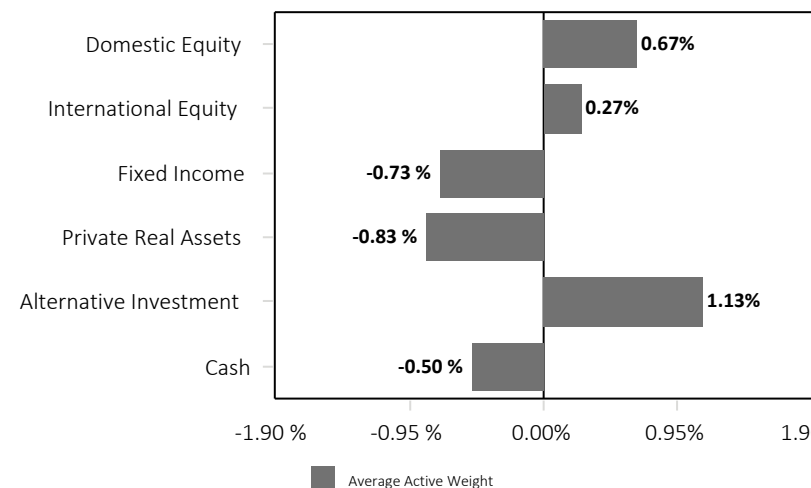
Total Fund Performance



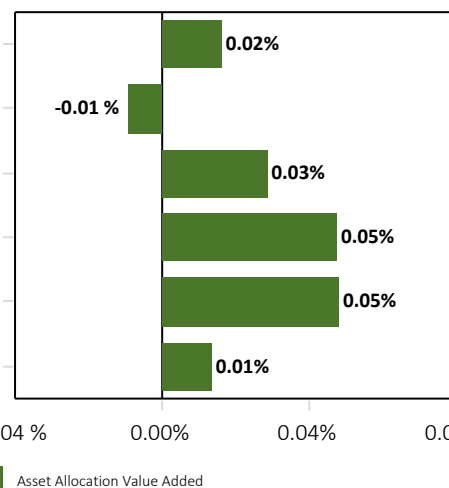
Total Value Added:-0.31 %



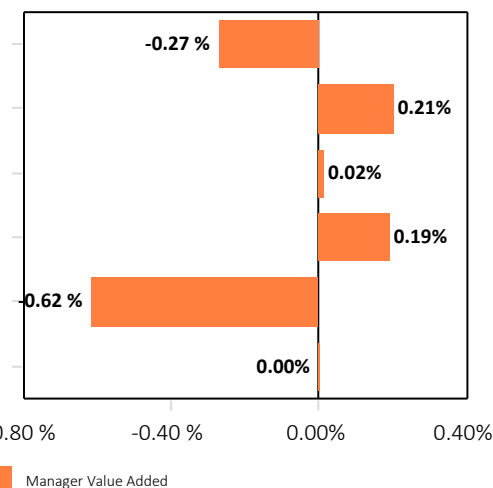
Asset Class Under or Overweighting



Asset Allocation Value Added:0.15%



Total Manager Value Added:-0.47 %



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 June 30, 2023

	Performance (%)									
	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
Total Fund	3.43	7.93	9.23	9.03	7.38	8.14	8.13	8.20	9.64	1/1/1982
Total Fund - Net	3.39	7.84	9.08	8.85	7.21	7.93				
Total Fund Benchmark	3.70	9.00	7.72	7.02	6.74	7.51	7.47			
Domestic Equity	7.03	13.62	17.46	13.52	10.15	11.69	10.16	10.19	11.54	1/1/1982
Domestic Equity - Net	7.00	13.51	17.27	13.33	9.96	11.46				
Custom Benchmark (U.S. Equity)	7.77	15.00	17.52	13.82	11.35	12.29	10.16	9.95		
U.S. Equity IMRF Custom Benchmark	6.61	12.47	15.78	13.11	9.87					
International Equity	3.65	11.71	15.48	8.65	4.50	5.99	7.75	7.15	7.48	9/1/1986
International Equity - Net	3.57	11.52	15.11	8.27	4.14	5.63				
MSCI AC World ex USA (Net)	2.44	9.47	12.72	7.22	3.52	4.75	6.67			
International Equity IMRF Custom Benchmark	2.29	8.80	11.36	6.74	3.16					
Fixed Income	0.01	3.27	1.73	-2.19	1.60	2.38	3.94	5.00	7.42	1/1/1982
Fixed Income - Net	-0.01	3.23	1.65	-2.28	1.50	2.25				
Custom Benchmark (Fixed Income)	-0.08	3.00	1.45	-3.16	1.27	1.77	3.14	4.48	6.91	
Fixed Income IMRF Custom Benchmark	-0.09	2.98	1.37	-2.75	1.28					
Private Real Assets	-0.62	-1.87	-1.79						3.70	3/1/2022
Private Real Assets - Net	-0.64	-1.90	-1.85						3.63	
Custom Benchmark (Private Real Assets)	-2.64	-5.63	-9.91						0.47	
Real Estate	-0.79	-2.38	-2.68	11.27	9.92	10.28	8.00	7.09	5.94	5/1/1985
Real Estate - Net	-0.80	-2.42	-2.74	11.20	9.87	10.24				
Blended Benchmark (Real Estate)	-2.88	-6.16	-10.74	7.04	5.56	7.77	7.13	7.21	7.51	
Agriculture	0.10	1.77	4.53	2.98	2.02	5.19	7.72		6.52	10/1/1997
NCREIF Farmland Index	0.80	2.90	8.36	7.66	6.49	8.35	12.52		11.10	
Timberland	1.25	0.18	13.99	3.07	2.33	3.59	3.44	6.55	6.93	10/1/1992
NCREIF Timberland Index	1.71	3.49	11.13	8.67	5.80	5.90	7.04	7.33	8.48	

Benchmark definitions on next page.

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

Asset Class Returns

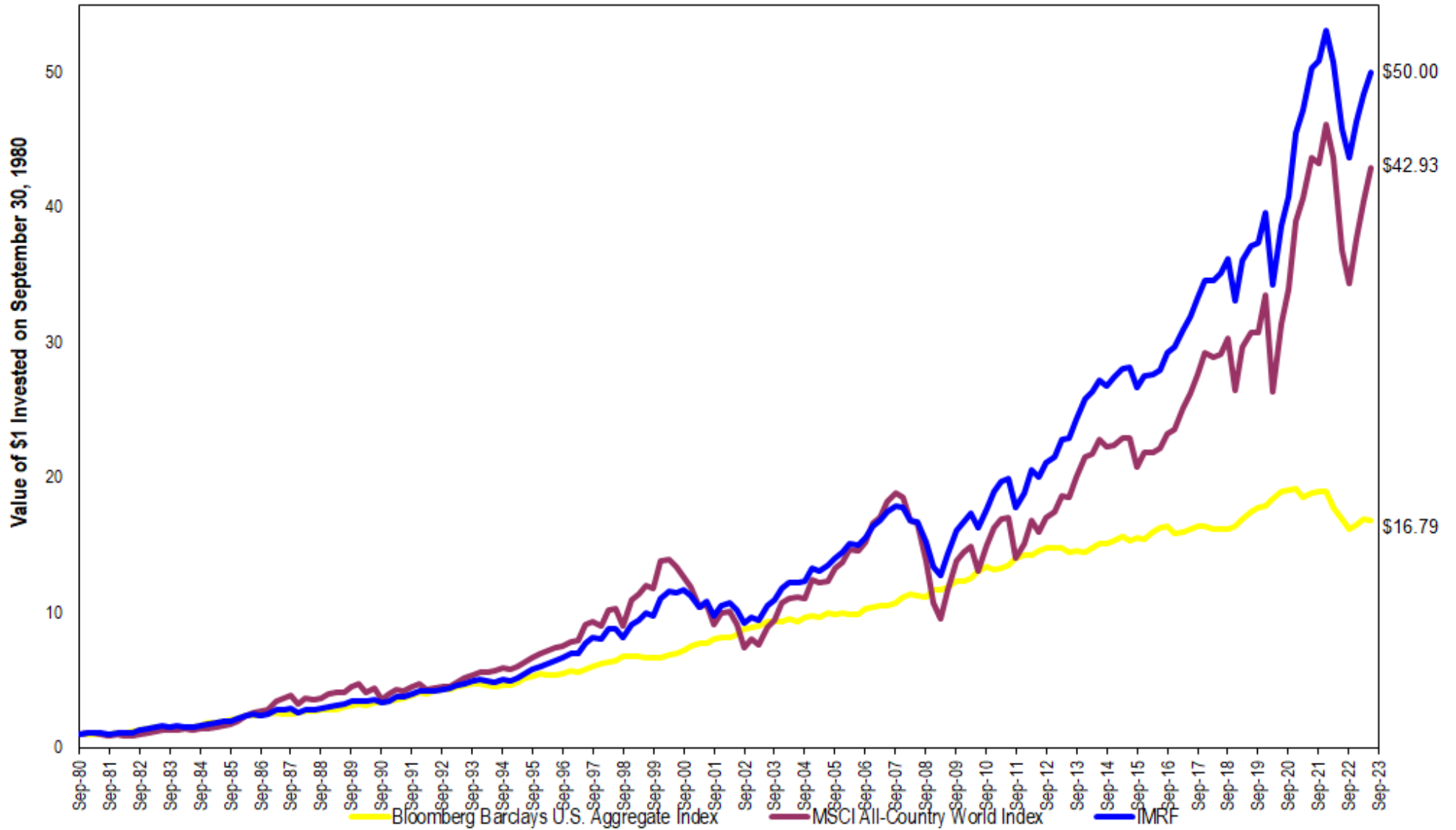
Periods Ended June 30, 2023

	Performance (%)									
	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
Unlisted Infrastructure	3.09	9.19	12.07	17.02	13.06				12.70	4/1/2018
Blended Benchmark (Unlisted Infrastructure)	2.08	4.84	7.09	9.37	9.22				9.21	
Alternatives Investments	2.54	3.09	1.09	21.66	16.53	13.01	10.76	12.87	11.49	2/1/1986
Alternatives Investments - Net	2.53	3.09	1.09	21.64	16.48	12.82				
Custom Benchmark (Alternative Investments)	8.30	19.38	-3.29	3.63	5.75	7.36	9.23	11.09	11.85	
Private Equity	2.56	3.08	1.42	24.66	19.31	15.86	13.69	15.56	13.75	2/1/1986
Blended Benchmark (Private Equity)	8.53	20.01	-4.23	3.36	5.58	7.28	9.19			
Cash	1.24	2.45	4.05	3.00	3.12	1.93	1.29	3.03	3.75	7/1/1986
90 Day U.S. Treasury Bill	1.17	2.25	3.59	1.27	1.55	0.97	1.32	2.36	3.10	

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 June 30, 2023



Investment Manager Asset Allocation

Periods Ended June 30, 2023

	Mar-2023		Jun-2023	
	\$	%	\$	%
Domestic Equity	18,037,864,656	36.45	18,683,849,328	36.84
Large Cap Growth	3,411,535,102	6.89	3,864,743,678	7.62
Sands Capital	1,417,919,641	2.87	1,615,952,204	3.19
Xponance Russell 1000 G	1,993,615,462	4.03	2,248,791,474	4.43
Large Cap Value	4,371,812,163	8.83	4,206,310,344	8.29
Dodge & Cox	1,747,504,129	3.53	1,730,066,491	3.41
LSV Asset	1,257,641,452	2.54	1,026,226,539	2.02
NTGI S&P 500 Value	1,366,666,582	2.76	1,450,017,314	2.86
Large Cap Pass. Core	1,986,032,436	4.01	1,898,287,871	3.74
NTGI MarketCap Idx.	1,986,032,436	4.01	1,898,287,871	3.74
Factor Diversity Strategies	2,484,085,458	5.02	2,685,295,892	5.29
U.S. Large Cap FDP-GSAM	2,484,085,458	5.02	2,685,295,892	5.29
Quantitative Factor Strategies	2,224,054,962	4.49	2,303,432,474	4.54
Quantitative US Equity - SciBeta	2,224,054,962	4.49	2,303,432,474	4.54
Small Cap Growth	734,171,475	1.48	841,722,901	1.66
Frontier Capital	734,171,475	1.48	841,722,901	1.66
Small Cap Value	1,427,016,424	2.88	919,436,545	1.81
Channing	296,972,560	0.60	323,425,737	0.64
DFA Small Cap Val.	536,804,731	1.08		0.00
William Blair Small Cap Value	593,239,133	1.20	596,010,808	1.18
Domestic Equity Transition		0.00	1,681,344	0.00
Transition Account	69,599	0.00	556,475,648	1.10

Investment Manager Asset Allocation

Periods Ended June 30, 2023

	Mar-2023		Jun-2023	
	\$	%	\$	%
Public Real Assets	1,399,156,635	2.83	1,406,462,630	2.77
Brookfield	398,861,484	0.81	402,971,883	0.79
Cohen & Steers	1,000,295,151	2.02	1,003,490,748	1.98
International Equity	9,038,362,962	18.26	9,366,888,441	18.47
Intl Large Cap Growth	1,508,036,352	3.05	1,570,803,569	3.10
EARNEST Part. Intl	609,641,109	1.23	643,728,886	1.27
William Blair	898,395,243	1.82	927,074,683	1.83
Intl Large Cap Value	1,395,967,617	2.82	1,456,479,296	2.87
Brandes Investment	635,988,594	1.29	667,750,681	1.32
Mondrian	623,129,087	1.26	647,367,602	1.28
Lazard	136,849,936	0.28	141,361,012	0.28
Intl Large Cap Core	4,346,698,640	8.78	4,520,150,178	8.91
Arrowstreet Capital	1,072,670,685	2.17	1,137,120,203	2.24
Brown Capital	513,762,612	1.04	541,566,173	1.07
GlobeFlex Capital	841,043,484	1.70	877,970,542	1.73
Xponance Intl EQ	97,014,762	0.20	99,961,857	0.20
Transition Account	69,599	0.00	556,475,648	1.10
Progress Intl Equity	599,172	0.00	417,579	0.00
NTGI ACWI ex US Index Fund	1,821,538,327	3.68	1,863,113,824	3.67
Intl All Cap Developed	155,475,320	0.31	160,502,792	0.32
Ativo International	155,475,320	0.31	160,502,792	0.32
International Small Cap	542,865,440	1.10	554,388,486	1.09

Investment Manager Asset Allocation

Periods Ended June 30, 2023

	Mar-2023		Jun-2023	
	\$	%	\$	%
Franklin Templeton	215,855,333	0.44	218,968,176	0.43
William Blair IntSC	327,010,107	0.66	335,420,310	0.66
Emerging Mkt Equity	1,089,319,592	2.20	1,104,564,120	2.18
Genesis Investment Management, LLP.	683,979,442	1.38	684,671,757	1.35
Arrowstreet EME	405,340,151	0.82	419,892,363	0.83

Investment Manager Asset Allocation

Periods Ended June 30, 2023

	Mar-2023		Jun-2023	
	\$	%	\$	%
Fixed Income	12,309,642,246	24.87	12,200,296,740	24.06
Domestic Fixed Core	3,822,644,684	7.72	3,761,428,343	7.42
Attucks Fixed Income	89,026,673	0.18	88,621,992	0.17
Brandes FI Core	339,521,154	0.69	333,709,384	0.66
EARNEST Partners	906,895,810	1.83	890,826,944	1.76
Garcia Hamilton	980,726,152	1.98	962,097,146	1.90
Ramirez Asset Management	529,455,223	1.07	520,168,547	1.03
Xponance Yield Advantage Agg.	977,019,672	1.97	966,004,331	1.90
Domestic Fixed Passive Core	2,782,322,635	5.62	2,759,494,500	5.44
NTGI Blmbg Agg.	1,132,899,530	2.29	1,123,647,953	2.22
BlackRock US Debt I	1,649,423,105	3.33	1,635,846,547	3.23
Domestic Fixed Core Plus	2,971,071,147	6.00	2,932,218,665	5.78
LM Capital Group FI	852,931,652	1.72	840,319,035	1.66
Progress Inv. FI	1,121	0.00	1,189	0.00
Loop Capital Management	580,170,820	1.17	573,018,580	1.13
Western Asset	962,326,994	1.94	951,852,303	1.88
Longfellow Core Plus	575,640,560	1.16	567,027,559	1.12
Bank Loans	1,643,191,238	3.32	1,658,891,642	3.27
Barings Global Loan Fund	1,643,191,238	3.32	1,658,891,642	3.27
Emerging Markets Debt	362,578	0.00	330,600	0.00
Standish-Mellon EMD	362,578	0.00	330,600	0.00
High Yield	1,090,049,964	2.20	1,087,932,989	2.15
MacKay Shields	1,090,049,964	2.20	1,087,932,989	2.15

Investment Manager Asset Allocation

Periods Ended June 30, 2023

	Mar-2023		Jun-2023	
	\$	%	\$	%
Private Real Assets	4,799,850,715	9.70	4,822,355,614	9.51
Real Estate	4,372,373,550	8.84	4,386,441,398	8.65
Real Estate Core Cmp	2,289,223,276	4.63	2,249,700,843	4.44
TA Assoc. Buckhead	886,346,978	1.79	877,663,980	1.73
Barings Euro Core Property	137,906,644	0.28	136,375,105	0.27
Blackstone Property Euro	183,870,646	0.37	183,444,472	0.36
INVESCO Core Real Estate	248,625,899	0.50	236,783,349	0.47
INVESCO European real estate	57,897,583	0.12	57,564,421	0.11
AEW Core Property Tr	286,024,825	0.58	272,808,442	0.54
CBRE Core Partners	303,329,032	0.61	299,839,946	0.59
JPM Strategic Property Fund	185,221,668	0.37	185,221,128	0.37
RE Non-Core Cmp	2,083,150,275	4.21	2,136,740,555	4.21
Artemis MWBE Spruce	317,844,239	0.64	330,009,659	0.65
Franklin T. EMREFF	2,771,341	0.01	2,544,173	0.01
Security Capital	90,360,245	0.18	94,596,250	0.19
Dune II	7,650,902	0.02	8,033,790	0.02
Non-Core Real Estate Funds	1,407,253,987	2.84	1,434,160,459	2.83
Non-Core Intl Real Estate	257,192,826	0.52	267,322,776	0.53
Almanac ARS V	76,735	0.00	73,448	0.00
Agriculture	251,723,757	0.51	251,973,313	0.50
Premiere Partners IV	251,723,757	0.51	251,973,313	0.50
Timberland	62,682,276	0.13	63,362,832	0.12
Forest Investment	62,682,276	0.13	63,362,832	0.12
Unlisted Infrastructure	113,071,132	0.23	120,578,071	0.24
Unlisted Infrastructure Funds	113,071,132	0.23	120,578,071	0.24

Investment Manager Asset Allocation

Periods Ended June 30, 2023

	Mar-2023		Jun-2023	
	\$	%	\$	%
Alternatives Investments	5,203,863,529	10.52	5,444,594,844	10.74
Absolute Return	77,994	0.00	74,710	0.00
Aurora Investment	77,994	0.00	74,710	0.00
Private Equity	5,023,846,983	10.15	5,268,512,743	10.39
Abbott S/A Comp.	497,863,913	1.01	500,413,456	0.99
Muller Monroe MPEFF	1	0.00	1	0.00
Pantheon S/A Comp.	408,891,982	0.83	411,522,829	0.81
Private Equity Fund - Domestic	3,309,737,538	6.69	3,429,742,005	6.76
Private Equity Fund - International	585,413,600	1.18	685,928,531	1.35
Oakbrook Opportunities Fund	221,939,948	0.45	240,905,921	0.47
Private Credit	179,938,552	0.36	176,007,391	0.35
Private Credit Fund - Domestic	179,938,552	0.36	176,007,391	0.35
Cash & Equivalents	97,300,539	0.20	199,418,748	0.39
Total Fund	49,486,884,647	100.00	50,717,403,714	100.00

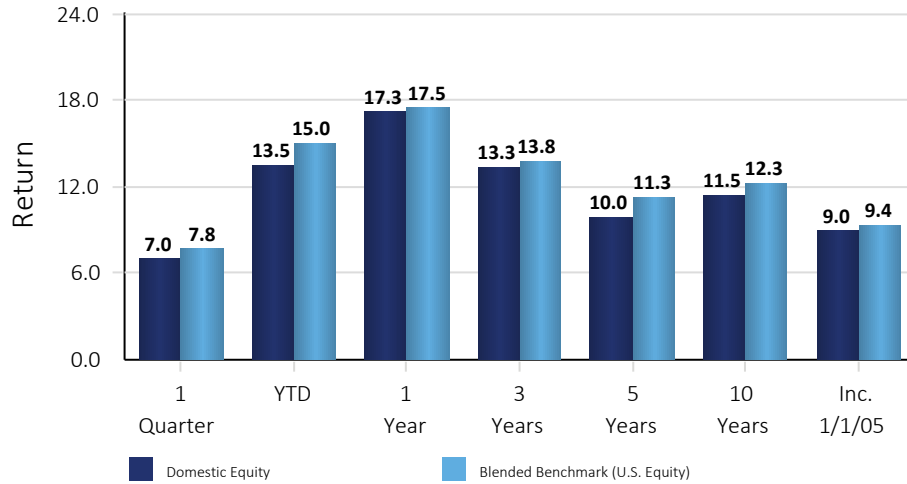
Domestic Equity

Composite Performance Summary

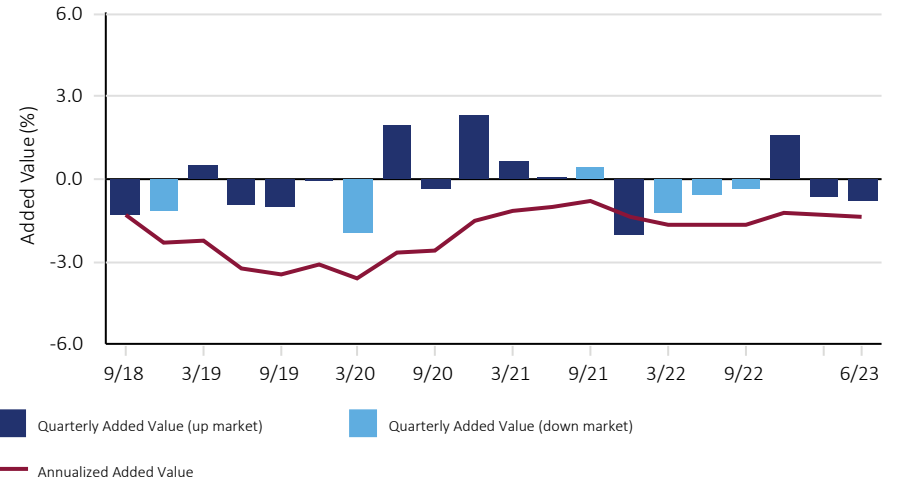
Domestic Equity

Periods Ended June 30, 2023

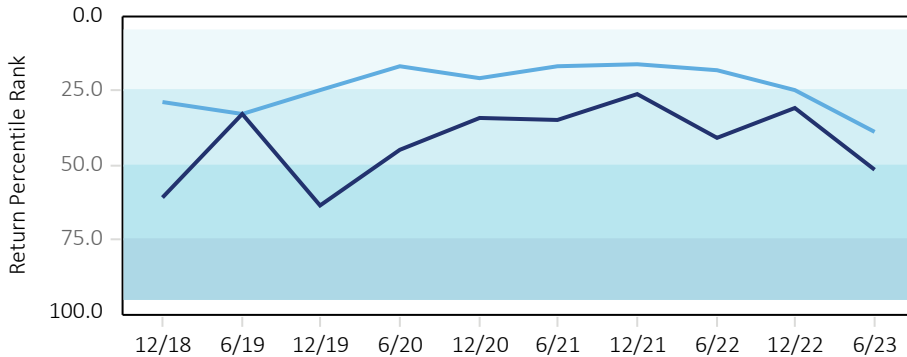
Comparative Performance



Added Value History

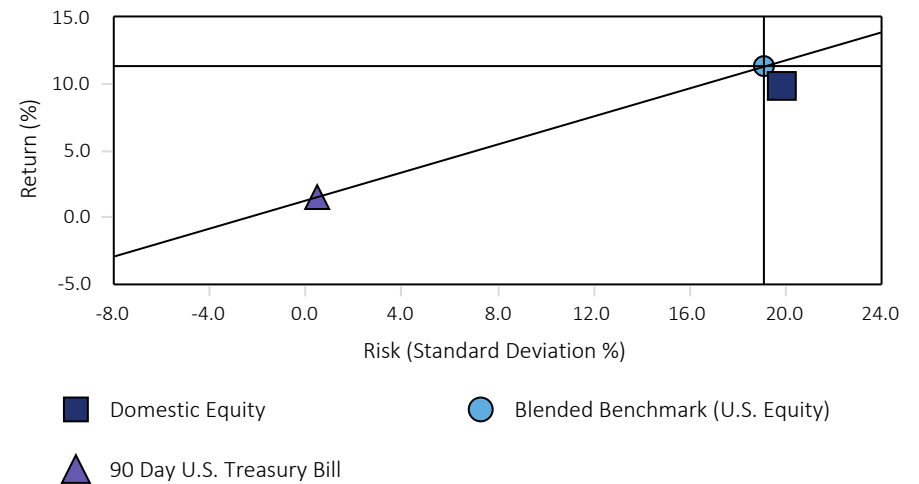


Rolling Percentile Rank: All Public Plans > \$1B-US Equity Segment



	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	7 (70%)	3 (30%)	0 (0%)	0 (0%)

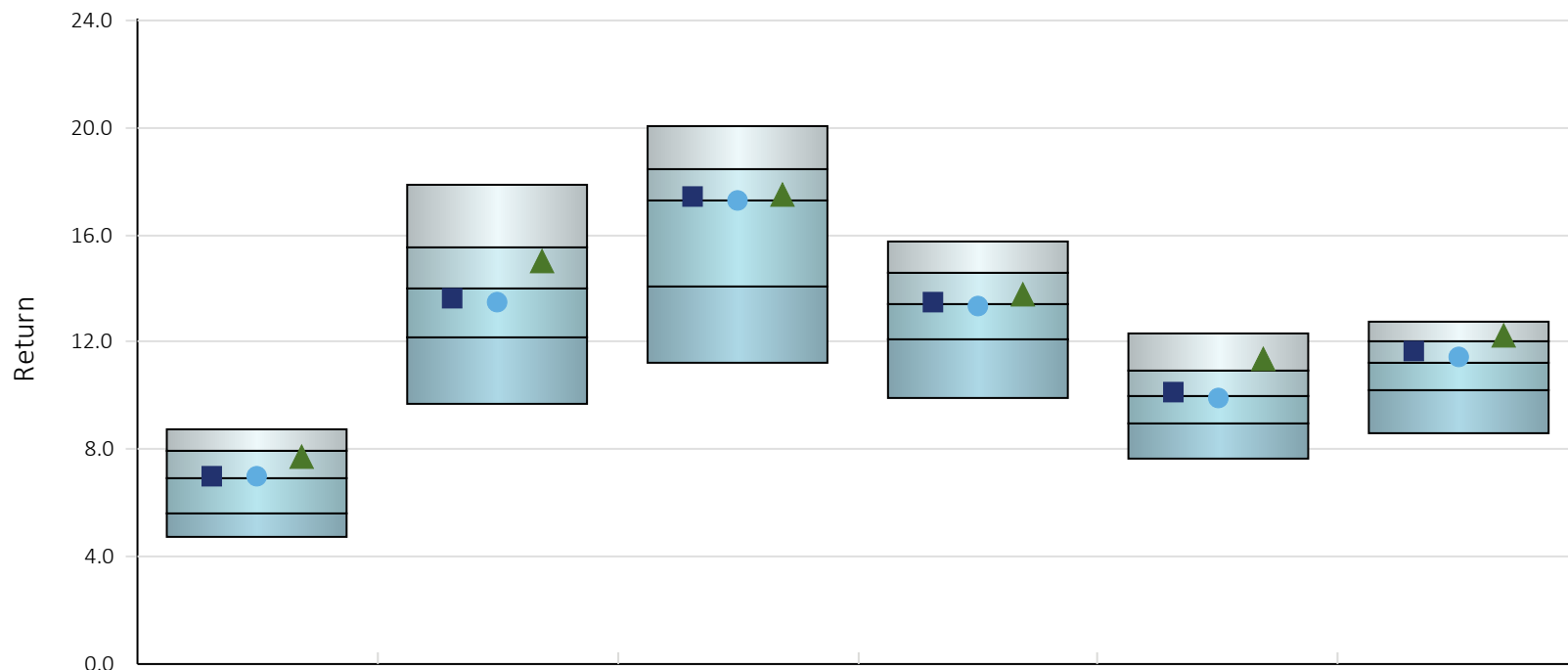
Risk and Return 07/1/18 - 06/30/23



Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2023



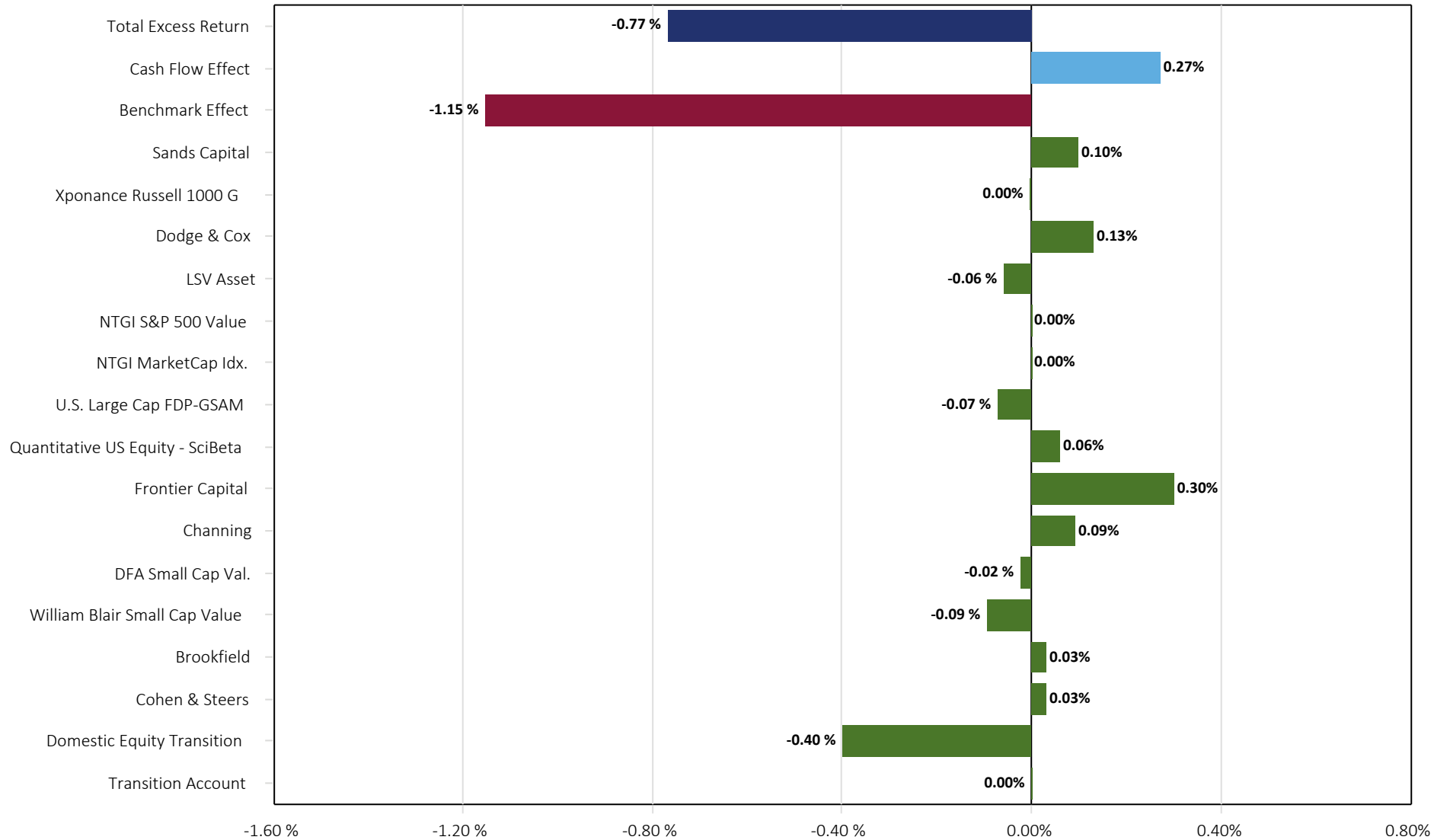
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Domestic Equity	7.03 (46)	13.62 (56)	17.46 (49)	13.52 (46)	10.15 (45)	11.69 (31)
● Domestic Equity - Net	7.00 (47)	13.51 (59)	17.27 (51)	13.33 (52)	9.96 (52)	11.46 (42)
▲ Blended Benchmark (U.S. Equity)	7.77 (34)	15.00 (37)	17.52 (49)	13.82 (39)	11.35 (17)	12.29 (16)
5th Percentile	8.75	17.89	20.08	15.78	12.33	12.76
1st Quartile	7.97	15.54	18.49	14.60	10.96	12.04
Median	6.93	14.01	17.29	13.41	10.03	11.26
3rd Quartile	5.62	12.18	14.11	12.13	8.94	10.21
95th Percentile	4.77	9.71	11.20	9.92	7.63	8.62
Population	50	49	47	44	41	37

Asset Class Attribution

Domestic Equity

Periods Ended 1 Quarter Ending June 30, 2023

1 Quarter



Performance

Domestic Equity

Periods Ended June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Domestic Equity	18,683,849,328	7.03	13.62	17.46	13.52	10.15	11.69	11.54	1/1/1982
Domestic Equity - Net		7.00	13.51	17.27	13.33	9.96	11.46		
Blended Benchmark (U.S. Equity)		7.77	15.00	17.52	13.82	11.35	12.29		
Russell 3000 Index		8.39	16.17	18.95	13.89	11.39	12.34	11.51	
U.S. Equity IMRF Custom Benchmark		6.61	12.47	15.78	13.11	9.87			
Large Cap Equity	12,654,637,786	8.62	16.87	20.37	13.02	11.05	12.39	11.29	1/1/1982
Large Cap Equity - Net		8.61	16.82	20.27	12.92	10.95	12.26		
Russell 1000 Index		8.58	16.68	19.36	14.09	11.92	12.64	11.68	
Large Cap Growth	3,864,743,678	13.29	31.26	29.40	10.68	13.42	14.78	12.17	1/1/1982
Large Cap Growth - Net		13.26	31.20	29.26	10.58	13.32	14.64		
LCG Blended Benchmark*		12.81	29.02	27.11	13.73	15.14	15.74		
Russell 1000 Growth Index		12.81	29.02	27.11	13.73	15.14	15.74	11.60	
Xpounce Russell 1000 G	2,248,791,474	12.80	29.00	27.09	13.73			13.86	10/1/2018
Xpounce Russell 1000 G - Net		12.79	28.99	27.07	13.71			13.84	
Russell 1000 Growth Index		12.81	29.02	27.11	13.73			13.87	
Sands Capital	1,615,952,204	13.97	34.55	32.75	-0.47	7.79	12.77	11.33	11/1/2003
Sands Capital - Net		13.91	34.41	32.46	-0.70	7.55	12.52		
LCG Blended Benchmark*		12.81	29.02	27.11	13.73	15.14	15.74	11.13	
Russell 1000 Growth Index		12.81	29.02	27.11	13.73	15.14	15.74	11.17	
Large Cap Value	4,206,310,344	5.30	8.15	15.00	17.27	9.26	10.69	10.29	10/1/1982
Large Cap Value - Net		5.27	8.08	14.84	17.10	9.10	10.51		
LCV Blended Benchmark**		4.07	5.12	11.54	14.30	8.11	9.22		
Russell 1000 Value Index		4.07	5.12	11.54	14.30	8.11	9.22	11.46	

* 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 June 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Dodge & Cox	1,730,066,491	5.60	7.24	12.77	18.32	10.12	11.59	9.89	9/1/2003
Dodge & Cox - Net		5.54	7.13	12.53	18.07	9.89	11.36		
LCV Blended Benchmark**		4.07	5.12	11.54	14.30	8.11	9.22	8.28	
Russell 1000 Value Index		4.07	5.12	11.54	14.30	8.11	9.22	8.41	
LSV Asset	1,026,226,539	3.61	5.15	12.69	16.69	7.62	10.09	10.43	2/1/2003
LSV Asset - Net		3.59	5.07	12.47	16.43	7.37	9.83		
LCV Blended Benchmark**		4.07	5.12	11.54	14.30	8.11	9.22	9.03	
Russell 1000 Value Index		4.07	5.12	11.54	14.30	8.11	9.22	9.04	
NTGI S&P 500 Value	1,450,017,314	6.66	12.21	19.99	16.75	10.61	10.58	6.71	8/1/1999
NTGI S&P 500 Value - Net		6.66	12.21	19.99	16.74	10.60	10.58		
S&P 500 Value		6.64	12.15	19.99	16.79	10.58	10.51	6.68	
Large Cap Pass. Core	1,898,287,871	8.40	16.24	18.91	13.76	11.29	12.30	11.22	1/1/1985
Large Cap Pass. Core - Net		8.40	16.24	18.91	13.75	11.28	12.29		
Dow Jones U.S. Total Stock Market Index		8.39	16.24	18.90	13.74	11.26	12.24		
NTGI MarketCap Idx.	1,898,287,871	8.40	16.24	18.91	13.76	11.29	12.30	11.02	2/1/1985
NTGI MarketCap Idx. - Net		8.40	16.24	18.91	13.75	11.28	12.29		
Dow Jones U.S. Total Stock Market Index		8.39	16.24	18.90	13.74	11.26	12.24		
Factor Diversity Strategies	2,685,295,892	8.10	15.84	19.45				10.86	8/18/2020
U.S. Large Cap FDP-GSAM	2,685,295,892	8.10	15.84	19.45				10.86	8/18/2020
U.S. Large Cap FDP-GSAM - Net		8.09	15.82	19.41				10.81	
Solactive GBS U.S. 1000 Index		8.59	16.84	19.47				10.73	
GSAM Active Beta US. Large Cap FDC Index		8.08	15.86	19.42				10.84	
Quantitative Factor Strategies	2,303,432,474	3.57	6.88	12.98	12.65			8.73	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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Quantitative US Equity - SciBeta	2,303,432,474	3.57	6.88	12.98	12.65			8.73	9/17/2019
Quantitative US Equity - SciBeta - Net		3.56	6.85	12.92	12.53			8.56	
SciBeta US Hi-Fctr-Intst Div Multi-Beta Multi-Strat Index		3.07	6.01	11.76	11.72			7.68	

* 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 June 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Small Cap	1,761,159,446	8.45	12.72	18.67	19.92	8.38	10.32	11.99	7/1/1988
Small Cap Composite - Net		8.33	12.27	17.93	19.13	7.71	9.69		
Russell 2000 Index		5.21	8.09	12.31	10.82	4.21	8.26	9.02	
Small Cap Growth	841,722,901	14.65	23.93	28.34	18.08	11.99	12.63	13.09	7/1/1988
Small Cap Growth - Net		14.51	22.91	26.97	16.83	10.98	11.82		
Russell 2000 Growth Index		7.05	13.55	18.53	6.10	4.22	8.83	7.85	
Frontier Capital	841,722,901	14.65	23.93	28.34	18.13	12.98	13.57	13.44	8/1/1988
Frontier Capital - Net		14.51	22.91	26.97	16.89	11.85	12.69		
Russell 2000 Growth Index		7.05	13.55	18.53	6.10	4.22	8.83	7.93	
Small Cap Value	919,436,545	5.20	7.23	13.81	20.93	6.57	9.54	11.50	9/1/1989
Small Cap Value - Net		5.09	7.03	13.34	20.40	6.08	9.02		
Russell 2000 Value Index		3.18	2.50	6.01	15.43	3.54	7.29	9.48	
Channing	323,425,737	8.91	13.13	12.89	16.90	6.31	9.22	9.84	7/1/2011
Channing - Net		8.76	12.84	12.33	16.34	5.79	8.69	9.26	
Russell 2000 Value Index		3.18	2.50	6.01	15.43	3.54	7.29	7.88	
DFA Small Cap Val.		2.53	3.38	14.57	25.61	7.30	9.56	11.81	2/1/1996
DFA Small Cap Val. - Net		2.45	3.23	14.27	25.15	6.85	9.06		
Russell 2000 Value Index		3.18	2.50	6.01	15.43	3.54	7.29	8.92	
William Blair Small Cap Value	596,010,808	0.47	2.47	7.93	16.88	5.17	9.72	10.83	5/1/1999
Inv. Couns. Maryland - Net		0.36	2.27	7.40	16.31	4.65	9.20		
Russell 2000 Value Index		3.18	2.50	6.01	15.43	3.54	7.29	8.45	

* 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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Public Real Assets	1,406,462,630	0.52	2.29	2.69	8.66	6.73		5.99	8/1/2017
Public Real Assets - Net		0.45	2.13	2.38	8.29	6.32		5.58	
Public Real Assets Benchmark***		-0.37	1.03	-0.13	6.91	4.97		4.08	
Brookfield	402,971,883	1.03	4.78	6.66	11.28	6.45		5.29	8/1/2017
Brookfield - Net		0.93	4.57	6.23	10.77	5.93		4.79	
Dow Jones Brookfield Global Infrastructure Composi		-0.43	2.66	0.80	7.45	4.49		3.49	
Cohen & Steers	1,003,490,748	0.32	1.32	1.18	7.89	7.10		6.52	8/1/2017
Cohen & Steers - Net		0.25	1.19	0.92	7.56	6.73		6.16	
FTSE Global Core Infrastructure 50/50 Index (Net)		-0.35	0.20	-0.62	6.61	5.18		4.34	

* 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.

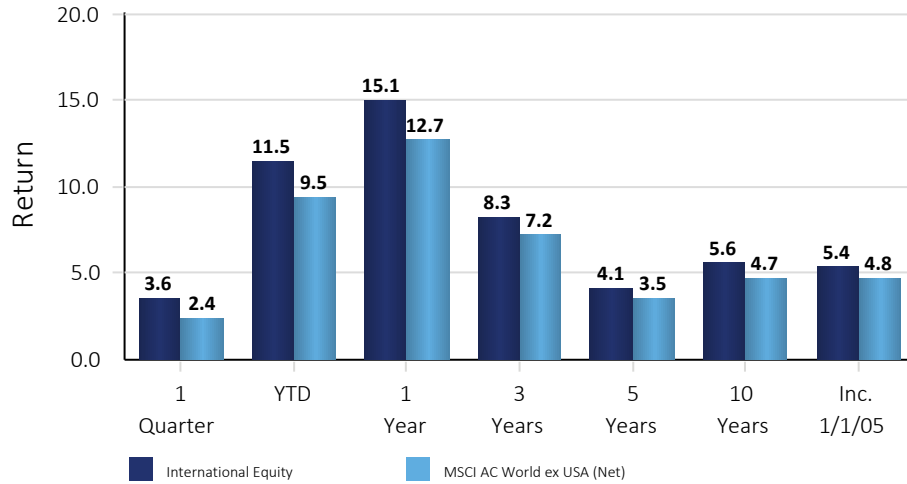
International Equity

Composite Performance Summary

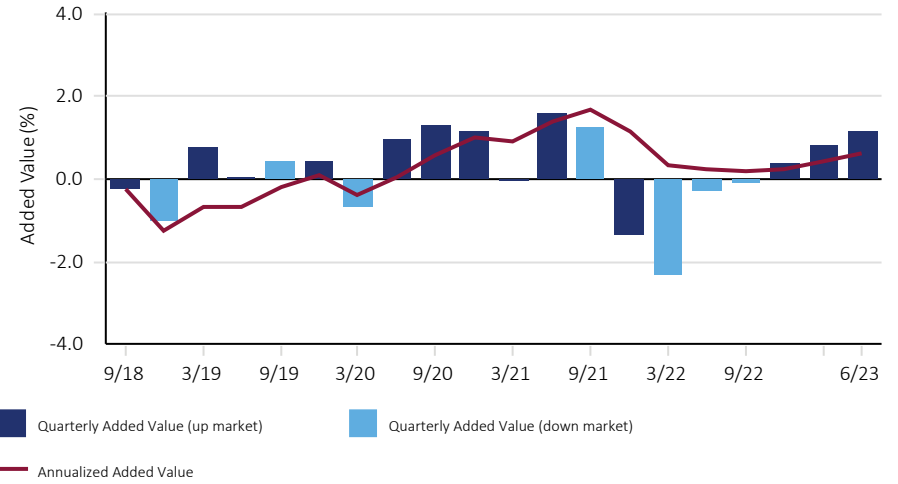
International Equity

Periods Ended June 30, 2023

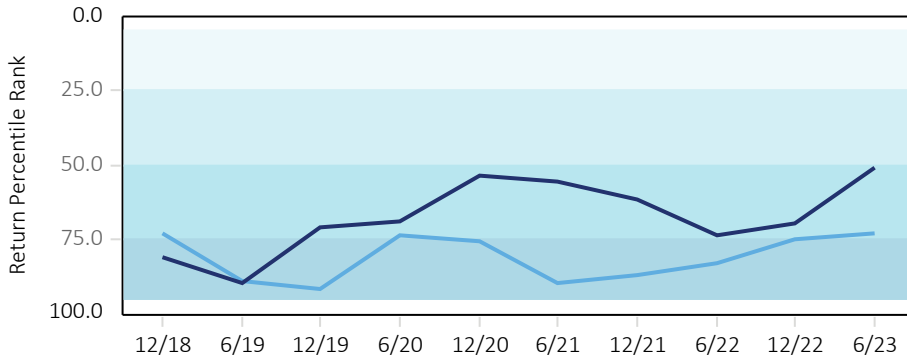
Comparative Performance



Added Value History

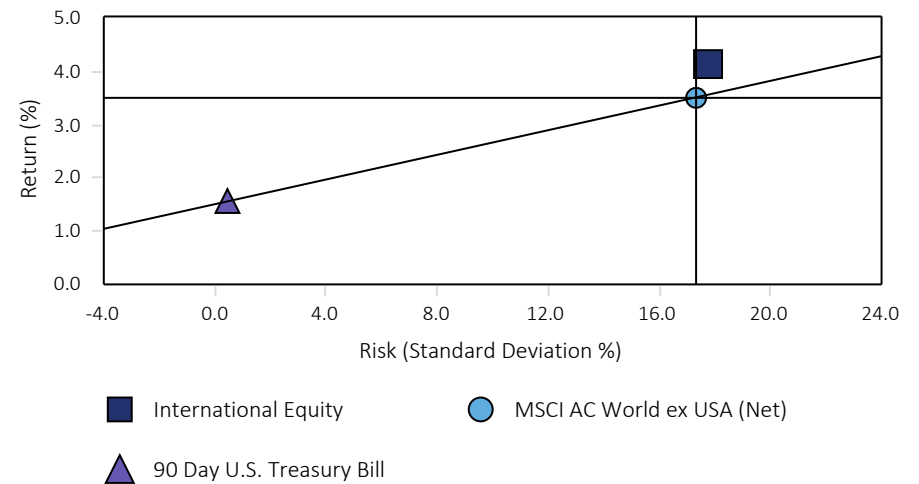


Rolling Percentile Rank: All Public Plans > \$1B-Intl. Equity Segment



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

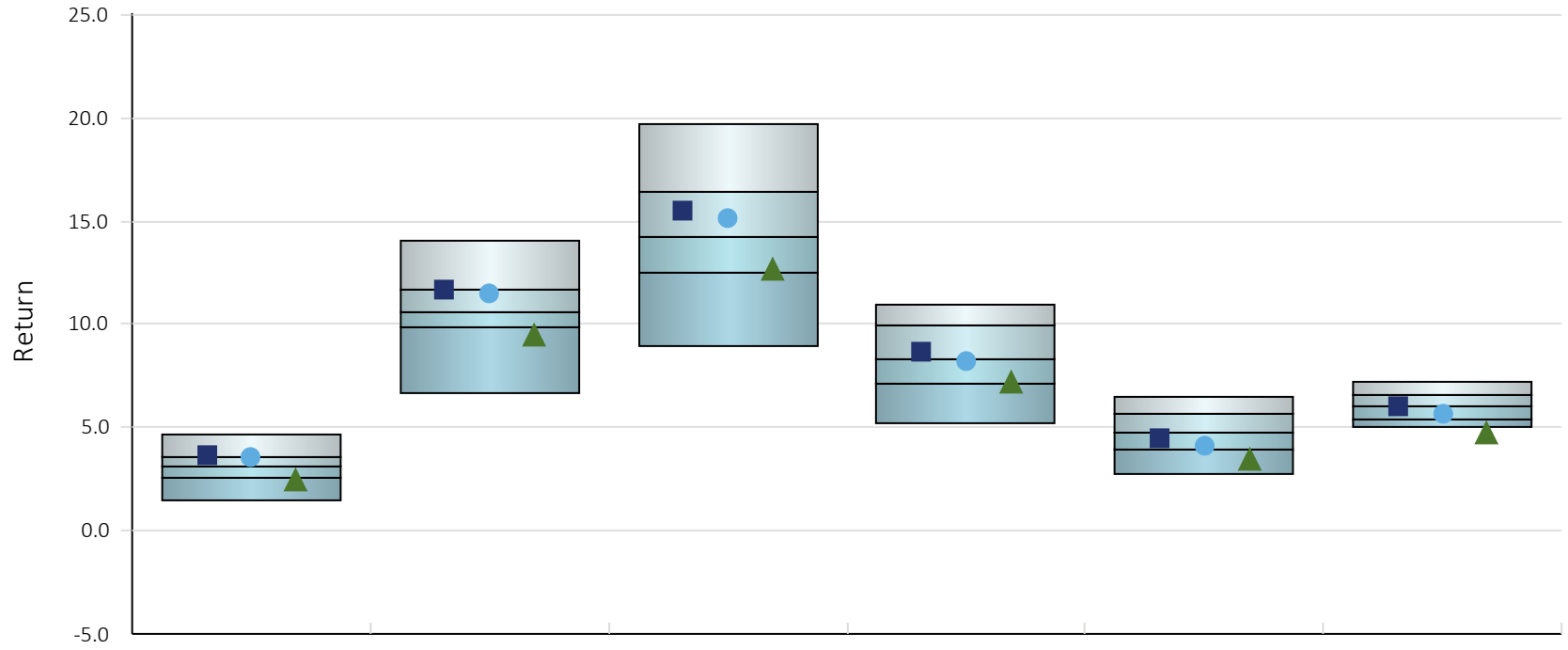
Risk and Return 07/1/18 - 06/30/23



Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2023



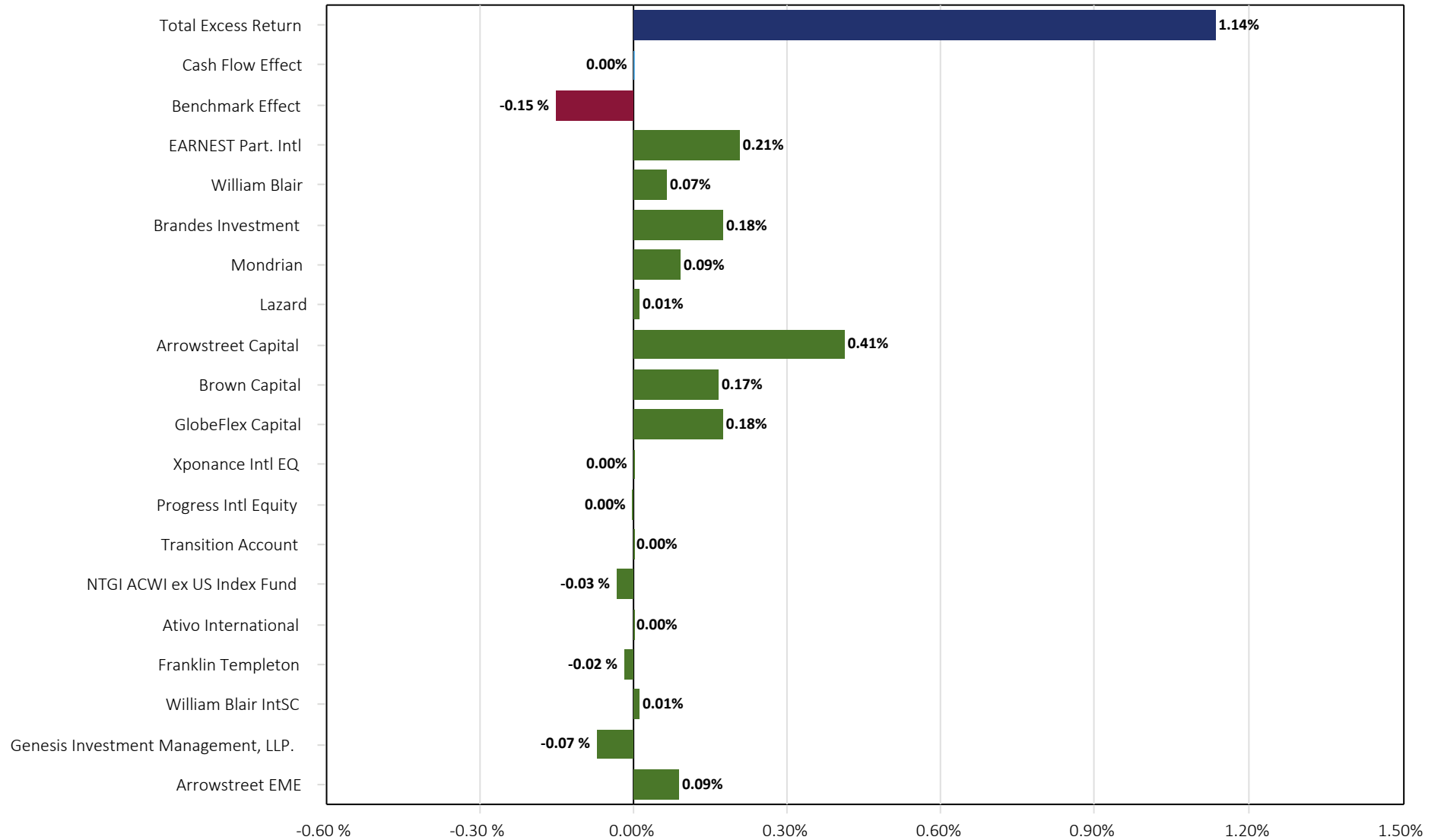
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ International Equity	3.65 (20)	11.71 (25)	15.48 (40)	8.65 (46)	4.50 (60)	5.99 (52)
● International Equity - Net	3.57 (24)	11.52 (29)	15.11 (41)	8.27 (51)	4.14 (69)	5.63 (67)
▲ MSCI AC World ex USA (Net)	2.44 (79)	9.47 (81)	12.72 (72)	7.22 (73)	3.52 (87)	4.75 (99)
5th Percentile	4.63	14.07	19.67	10.95	6.53	7.19
1st Quartile	3.54	11.69	16.46	9.92	5.70	6.59
Median	3.14	10.57	14.20	8.30	4.78	6.01
3rd Quartile	2.52	9.87	12.51	7.16	3.97	5.38
95th Percentile	1.50	6.69	8.97	5.20	2.71	5.00
Population	51	51	50	46	45	42

Asset Class Attribution

International Equity

Periods Ended 1 Quarter Ending June 30, 2023

1 Quarter



Performance

International Equity

Periods Ended June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
International Equity	9,366,888,441	3.65	11.71	15.48	8.65	4.50	5.99	7.48	9/1/1986
International Equity - Net		3.57	11.52	15.11	8.27	4.14	5.63		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75		
International Equity IMRF Custom Benchmark		2.29	8.80	11.36	6.74	3.16			
Intl Large Cap Equity	7,547,433,043	4.10	12.51	17.01	10.42	5.35	6.45	7.60	9/1/1986
Intl LargeCap Equity - Net		4.03	12.38	16.72	10.11	5.06	6.15		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75		
Intl Large Cap Grwth	1,570,803,569	4.16	12.85	18.11	9.60	5.95	6.66	8.17	9/1/2002
Intl Large Cap Grwth - Net		4.09	12.69	17.77	9.26	5.66	6.35		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	6.68	
EARNEST Part. Intl	643,728,886	5.59	13.32	19.23	16.50	6.35	6.35	8.79	10/1/2004
EARNEST Part. Intl - Net		5.54	13.22	18.99	16.25	6.15	6.14		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	5.50	
MSCI AC World ex USA Growth (Net)		1.94	10.70	13.26	3.96	4.06	5.61	6.10	
William Blair	927,074,683	3.19	12.52	17.34	5.70	5.75	7.01	9.11	10/1/2002
William Blair - Net		3.10	12.33	16.93	5.31	5.37	6.62		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	7.28	
MSCI AC World ex USA Growth (Net)		1.94	10.70	13.26	3.96	4.06	5.61	7.42	
Intl Large Cap Val.	1,456,479,296	4.34	14.93	18.13	12.82	4.63	5.68	8.22	10/1/1995
Intl Large Cap Val. - Net		4.26	14.76	17.78	12.48	4.31	5.31		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	5.05	
Brandes Investment	667,750,681	4.99	16.90	22.84	16.21	5.05	6.34	8.55	1/1/1996
Brandes Investment - Net		4.94	16.79	22.59	15.97	4.83	6.10		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	4.96	
MSCI AC World ex USA Value		3.28	8.79	13.03	11.16	3.31	4.32		

* 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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Mondrian	647,367,602	3.89	13.14	13.70	10.36	4.45	5.14	5.18	4/1/2012
Mondrian - Net		3.79	12.92	13.25	9.96	4.03	4.67	4.70	
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	4.66	
MSCI AC World ex USA Value		3.28	8.79	13.03	11.16	3.31	4.32	4.28	
Lazard	141,361,012	3.30	14.07	17.74	9.51	4.69	5.54	5.94	4/1/2012
Lazard - Net		3.23	13.94	17.45	9.27	4.45	5.08	5.51	
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	4.66	
MSCI AC World ex USA Value		3.28	8.79	13.03	11.16	3.31	4.32	4.28	
Intl Large Cap Active Core	2,657,036,354	5.23	13.24	18.87	11.76	6.64	7.93	5.67	2/1/2008
Intl Large Cap Active Core - Net		5.13	13.04	18.42	11.22	6.13	7.38		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	2.75	
Arrowstreet Capital	1,137,120,203	6.01	13.43	20.99	17.04	10.61	10.07	7.00	3/1/2008
Arrowstreet Capital - Net		5.90	13.19	20.44	16.51	10.10	9.56	6.50	
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	2.58	
Brown Capital	541,566,173	5.41	16.70	18.46	2.60	3.80	6.52	7.11	10/1/2004
Brown Capital - Net		5.35	16.56	18.17	1.90	3.27	5.69		
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	5.50	
GlobeFlex Capital	877,970,542	4.41	11.07	16.45	12.87	4.87	6.94	5.29	3/1/2006
GlobeFlex Capital - Net		4.32	10.89	16.06	12.48	4.47	6.53	4.86	
MSCI AC World ex USA (Net)		2.44	9.47	12.72	7.22	3.52	4.75	3.78	
Xponance Intl EQ	99,961,857	3.04	12.76	19.42				1.70	2/1/2021
Xponance Intl EQ - Net		2.88	12.42	18.68				1.11	
MSCI EAFE (Net)		2.95	11.67	18.77				3.01	
Progress Intl Equity*	417,579								

* 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 June 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	1,863,113,824	2.28	9.43	12.79	7.77	3.87	5.35	3.92	2/1/2000
Intl Large Cap Passive Core - Net		2.28	9.43	12.79	7.76	3.87	5.35		
International Large Cap Passive Core Benchmark		2.44	9.47	12.72	7.25	3.42	4.92	3.51	
NTGI ACWI ex US Index Fund	1,863,113,824	2.28	9.43	12.79				-3.13	10/1/2021
NTGI ACWI ex US Index Fund - Net		2.28	9.43	12.79				-3.13	
MSCI AC World ex USA (Net)		2.44	9.47	12.72				-3.70	
Intl All Cap Developed	160,502,792	3.23	11.10	15.04	7.54			5.07	2/1/2019
Intl All Cap Developed - Net		3.10	10.83	14.46	7.01			4.58	
MSCI EAFE + Canada (Net)		3.03	11.29	17.41	9.30			6.51	
Ativo International	160,502,792	3.23	11.10	15.03	7.53			5.07	2/1/2019
Ativo International - Net		3.10	10.83	14.46	7.01			4.58	
MSCI EAFE + Canada (Net)		3.03	11.29	17.41	9.30			6.51	
Intl Small Cap Eqty	554,388,486	2.13	10.30	15.81	4.75	2.44	5.75	4.57	12/1/2005
Intl Small Cap Eqty - Net		1.94	9.91	14.95	3.98	1.67	4.96		
MSCI AC World ex USA Small Cap (Net)		2.05	6.84	10.93	8.15	2.62	5.75	5.63	
Custom Benchmark (Intl Small Cap)		2.05	6.84	10.93	8.15	2.62	5.75	5.05	
Franklin Templeton	218,968,176	1.44	9.72	12.13	7.53	1.82	5.47	5.24	8/1/2011
Franklin Templeton - Net		1.27	9.34	11.35	6.77	1.08	4.70	4.49	
MSCI AC World ex USA Small Cap (Net)		2.05	6.84	10.93	8.15	2.62	5.75	4.53	
William Blair IntSC	335,420,310	2.57	10.69	18.33	3.08	2.87	5.95	7.61	9/1/2010
William Blair IntSC - Net		2.38	10.28	17.44	2.30	2.08	5.14	6.80	
MSCI AC World ex USA Small Cap (Net)		2.05	6.84	10.93	8.15	2.62	5.75	6.12	
Custom Benchmark (Intl Small Cap)		2.05	6.84	10.93	8.15	2.62	5.75	6.35	

* 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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Emerging Mkt Equity	1,104,564,120	1.47	6.82	5.55	0.49	0.96	3.34	7.83	2/1/1992
Emerging Mkt Equity - Net		1.40	6.42	4.89	-0.09	0.37	2.75		
MSCI Emerging Markets Index		1.04	5.10	2.22	2.72	1.32	3.33	6.30	
Genesis Investment Management, LLP.**	684,671,757	0.22	5.31	4.06	0.01	0.67	3.19	8.63	5/1/2004
Genesis Investment Management, LLP - Net		0.10	4.84	3.33	-0.59	0.07	2.59		
MSCI Emerging Markets Index		1.04	5.10	2.22	2.72	1.32	3.33	7.22	
Arrowstreet EME	419,892,363	3.59						5.58	3/1/2023
Arrowstreet EME - Net		3.59						5.58	
MSCI Emerging Markets Index		1.04						4.14	

* 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.

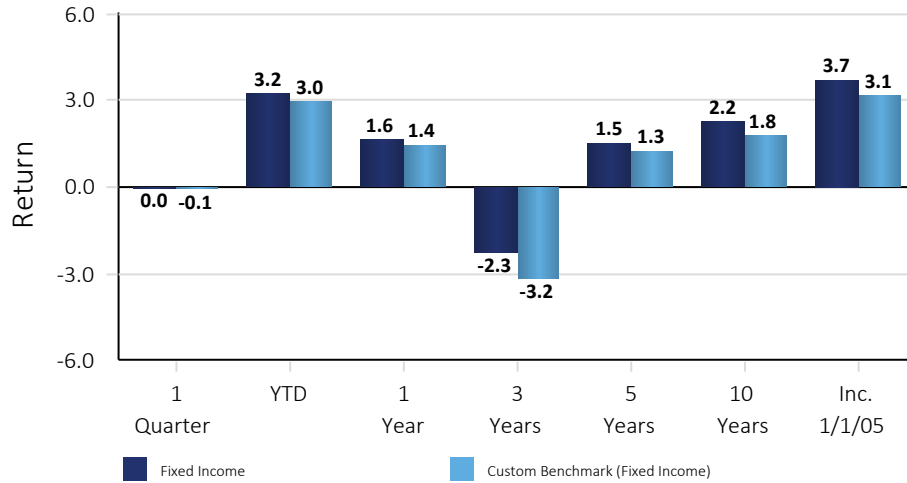
Fixed Income

Composite Performance Summary

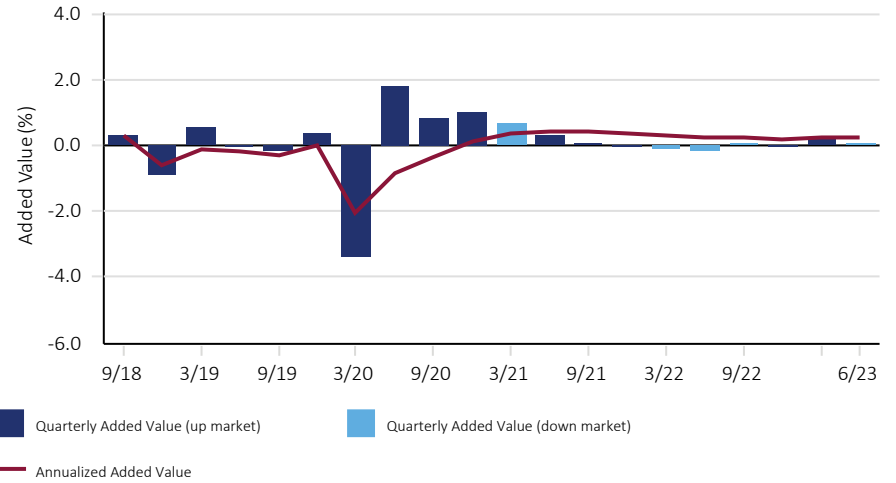
Fixed Income

Periods Ended June 30, 2023

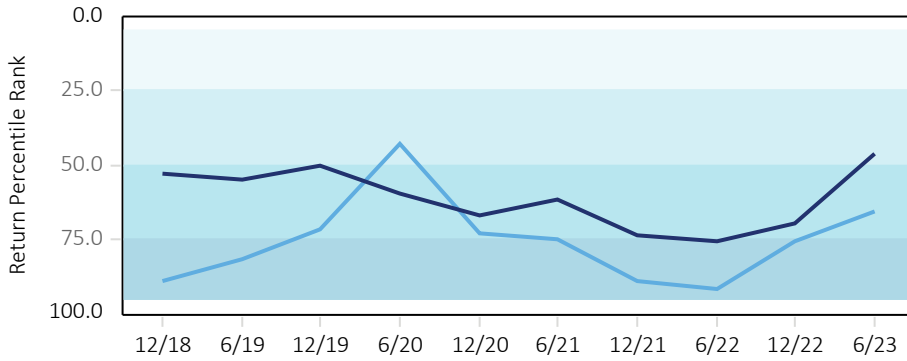
Comparative Performance



Added Value History

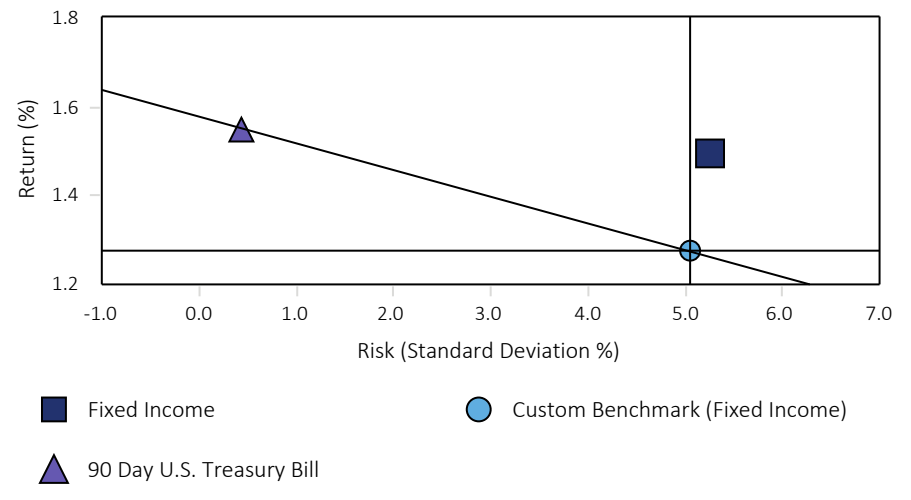


Rolling Percentile Rank: All Public Plans > \$1B-US Fixed Income Segment



	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	0 (0%)	1 (10%)	4 (40%)	5 (50%)

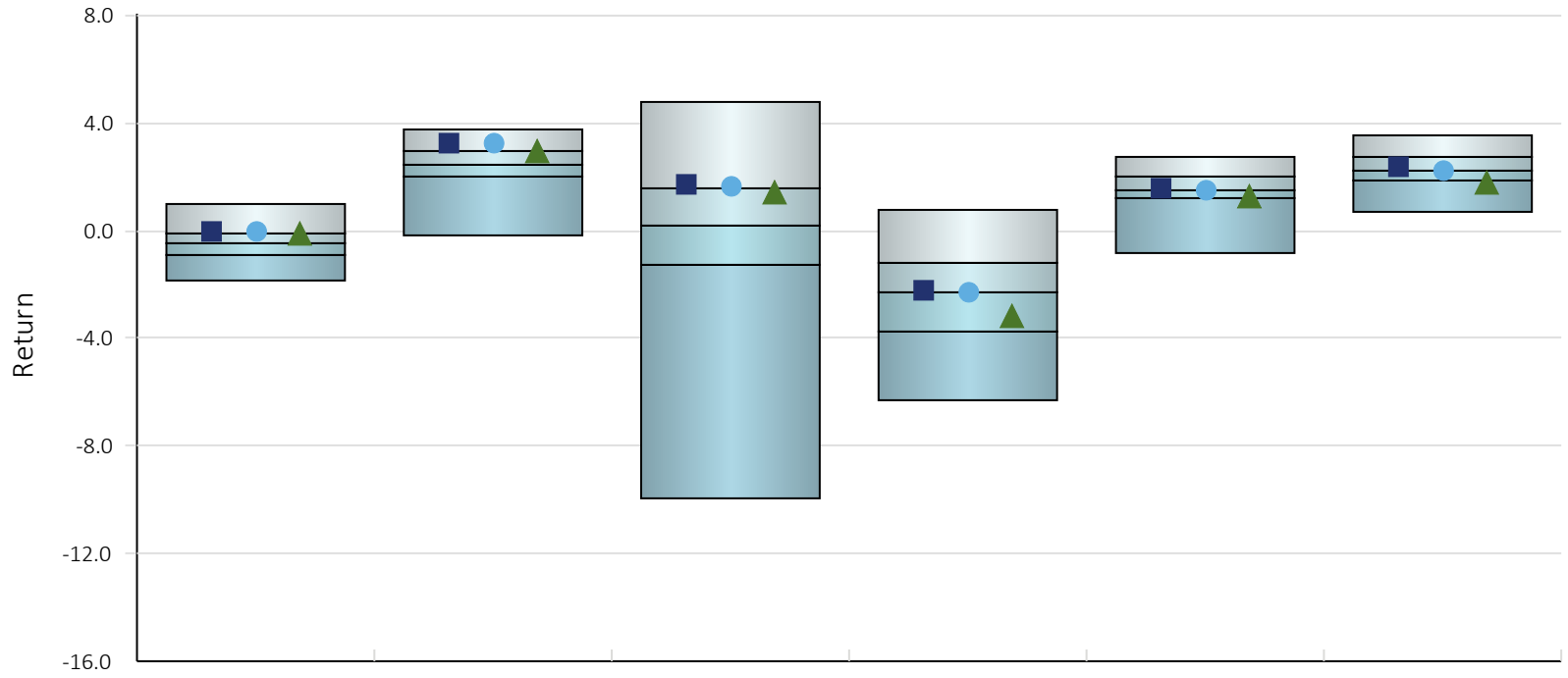
Risk and Return 07/1/18 - 06/30/23



Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2023



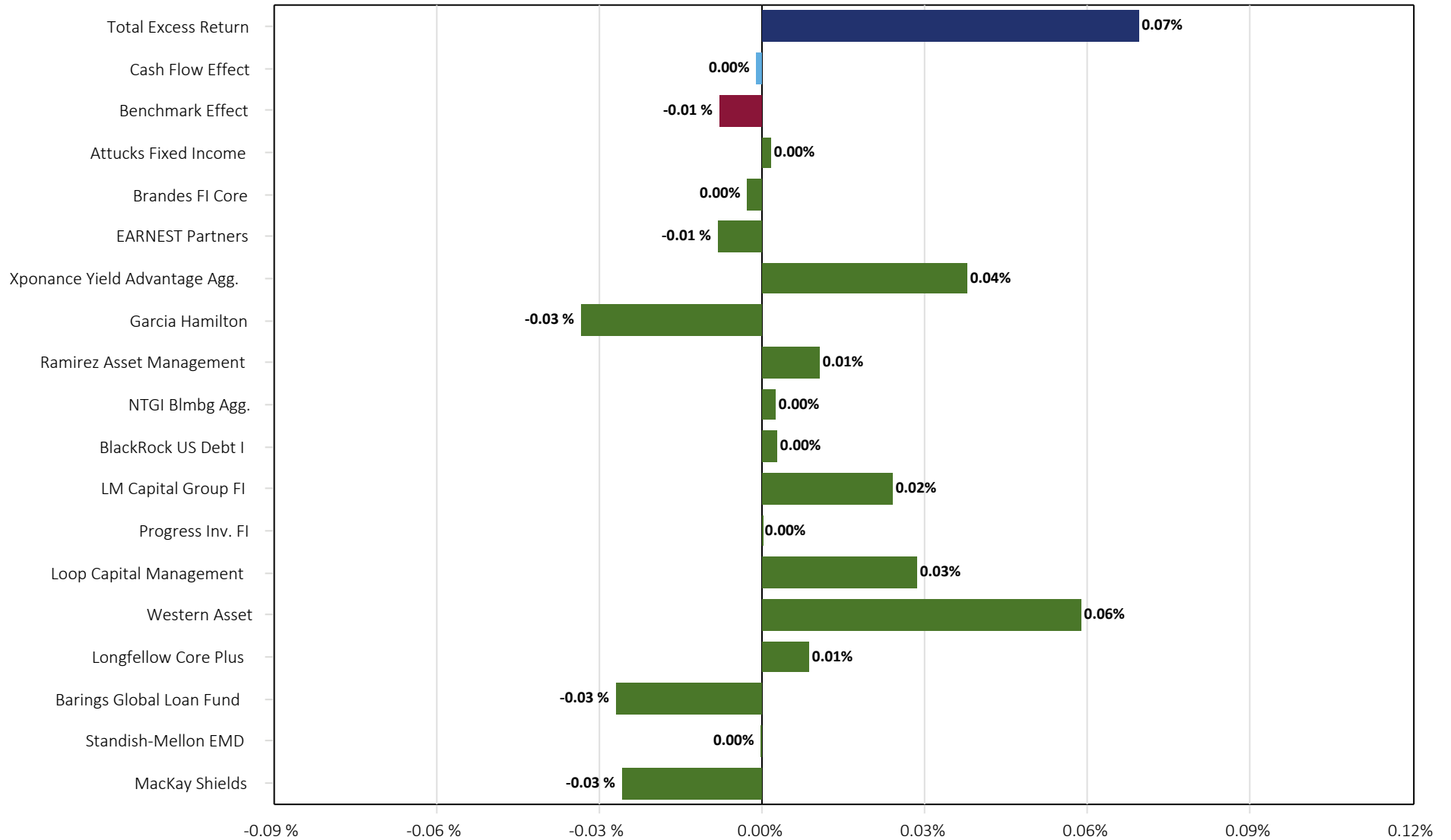
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Fixed Income	0.01 (21)	3.27 (12)	1.73 (22)	-2.19 (44)	1.60 (47)	2.38 (40)
● Fixed Income - Net	-0.01 (22)	3.23 (12)	1.65 (25)	-2.28 (46)	1.50 (54)	2.25 (49)
▲ Custom Benchmark (Fixed Income)	-0.08 (28)	3.00 (18)	1.45 (29)	-3.16 (66)	1.27 (74)	1.77 (83)
5th Percentile	0.96	3.77	4.78	0.75	2.72	3.54
1st Quartile	-0.07	2.93	1.62	-1.19	2.01	2.72
Median	-0.48	2.46	0.18	-2.32	1.52	2.20
3rd Quartile	-0.88	1.98	-1.30	-3.74	1.21	1.88
95th Percentile	-1.86	-0.19	-9.93	-6.29	-0.82	0.71
Population	53	53	52	47	43	41

Asset Class Attribution

Fixed Income

Periods Ended 1 Quarter Ending June 30, 2023

1 Quarter



Performance

Fixed Income

Periods Ended June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Fixed Income	12,200,296,740	0.01	3.27	1.73	-2.19	1.60	2.38	7.42	1/1/1982
Fixed Income - Net		-0.01	3.23	1.65	-2.28	1.50	2.25		
Custom Benchmark (Fixed Income)		-0.08	3.00	1.45	-3.16	1.27	1.77	6.91	
Fixed Income IMRF Custom Benchmark		-0.09	2.98	1.37	-2.75	1.28			
Active Fixed Core	3,761,428,343	-0.79	2.35	-0.50	-3.17	1.07	1.95	3.67	4/1/2001
Active Fixed Core - Net		-0.83	2.29	-0.62	-3.28	0.96	1.82		
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	3.57	
Attucks Fixed Income	88,621,992	-0.46	2.86	-0.31				-4.85	2/1/2021
Attucks Fixed Income - Net		-0.62	2.69	-0.64				-5.14	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94				-5.12	
Brandes FI Core	333,709,384	-0.93	2.30	0.56	-2.97	1.10		1.06	3/1/2016
Brandes FI Core - Net		-0.94	2.28	0.53	-2.99	1.09		1.05	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77		0.85	
EARNEST Partners	890,826,944	-0.92	2.08	-0.68	-3.20	1.10	1.91	3.45	5/1/2005
EARNEST Partners - Net		-0.96	2.01	-0.81	-3.33	0.97	1.75	3.27	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	3.02	
Xponance Yield Advantage Agg.	966,004,331	-0.34	2.33	-0.65	-2.90	1.14	1.97	3.31	6/1/2005
Xponance Yield Advantage Agg. - Net		-0.37	2.26	-0.78	-3.03	1.01	1.83	3.14	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	2.97	
Garcia Hamilton	962,097,146	-1.24	2.39	-0.81	-3.46	0.91		1.43	6/1/2015
Garcia Hamilton - Net		-1.26	2.35	-0.89	-3.54	0.83		1.35	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77		0.97	

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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Ramirez Asset Management	520,168,547	-0.56	2.71	-0.08	-2.72			-1.62	5/1/2020
Ramirez Asset Management - Net		-0.60	2.64	-0.22	-2.85			-1.75	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97			-3.43	
Pass. Core Fixed Income	2,759,494,500	-0.82	2.22	-0.87	-3.91	0.83	1.58	5.11	1/1/1990
Pass. Core Fixed Income - Net		-0.82	2.22	-0.87	-3.91	0.83	1.57		
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	5.08	
BlackRock US Debt I	1,635,846,547	-0.82	2.32	-0.87	-3.88	0.86		1.61	10/1/2013
BlackRock US Debt I - Net		-0.82	2.32	-0.87	-3.89	0.85		1.60	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77		1.50	
NTGI Blmbg Agg.	1,123,647,953	-0.82	2.09	-0.87	-3.93	0.81	1.55	5.15	2/1/1990
NTGI Blmbg Agg. - Net		-0.82	2.09	-0.88	-3.94	0.80	1.55		
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	5.13	
Core Plus Fixed Income	2,932,218,665	-0.31	2.87	0.78	-2.98	1.46	2.32	7.26	1/1/1982
Core Plus Fixed Income - Net		-0.35	2.80	0.63	-3.12	1.29	2.15		
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	6.84	
LM Capital Group FI	840,319,035	-0.46	2.56	0.38	-2.46	1.75	2.33	3.85	5/1/2005
LM Capital Group FI - Net		-0.50	2.48	0.22	-2.61	1.59	2.17	3.68	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	3.02	
Progress Inv. FI	1,189								
Loop Capital Management	573,018,580	-0.21	3.03	1.61	-3.00	1.29	2.51	3.84	5/1/2005
Loop Capital Management - Net		-0.24	2.96	1.48	-3.14	1.15	2.38	3.71	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	3.02	

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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Western Asset	951,852,303	-0.05	3.26	1.16	-3.50	1.34	2.45	4.35	11/1/2001
Western Asset - Net		-0.09	3.18	1.02	-3.63	1.21	2.32		
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97	0.77	1.52	3.32	
Longfellow Core Plus	567,027,559	-0.62	2.54	-0.12	-2.55			-1.80	5/1/2020
Longfellow Core Plus - Net		-0.66	2.47	-0.27	-2.70			-1.95	
Blmbg. U.S. Aggregate Index		-0.84	2.09	-0.94	-3.97			-3.43	
Bank Loans	1,658,891,642	2.97	6.60	8.78	5.96	3.60		4.08	8/1/2014
Bank Loans - Net		3.01	6.65	8.95	6.02	3.56		3.79	
Barings Custom Benchmark		3.23	6.68	10.86	6.21	4.24		4.15	
Barings Global Loan Fund	1,658,891,642	2.97	6.60	8.78	5.96	3.60		4.08	8/1/2014
Barings Global Loan Fund - Net		3.01	6.65	8.95	6.02	3.56		3.79	
Barings Custom Benchmark*		3.23	6.68	10.86	6.21	4.24		4.15	
Emerging Markets Debt	330,600								
Standish-Mellon EMD	330,600								
High Yield	1,087,932,989	1.47	5.40	9.54	4.28	4.81	5.40	8.94	4/1/1986
High Yield - Net		1.31	5.24	9.21	3.93	4.48	5.05		
ICE BofA U.S. High Yield, Cash Pay Index		1.60	5.34	8.88	3.20	3.19	4.33	7.64	
MacKay Shields	1,087,932,989	1.47	5.40	9.54	4.28	4.81	5.48	7.97	11/1/2000
MacKay Shields - Net		1.31	5.24	9.21	3.94	4.48	5.13		
ICE BofA U.S. High Yield, Cash Pay Index		1.60	5.34	8.88	3.20	3.19	4.33	6.61	

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

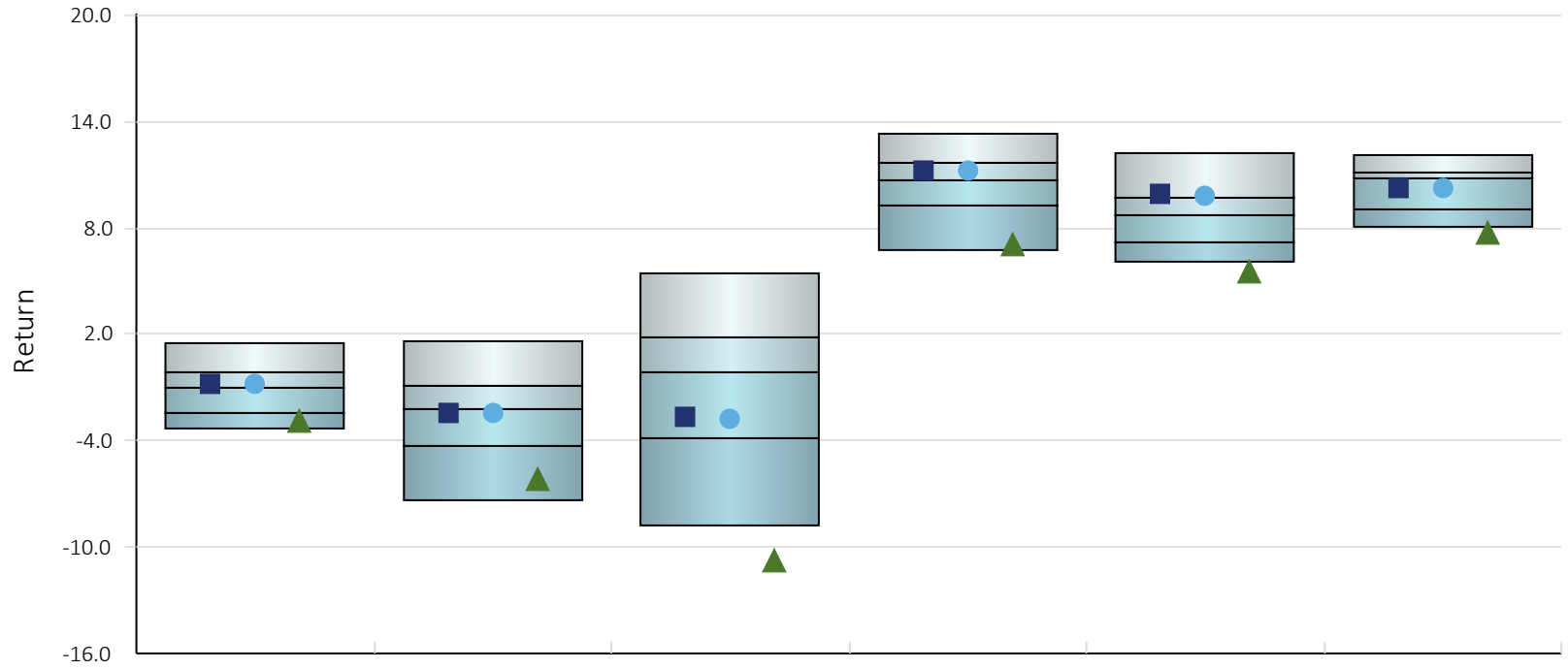
* Custom Benchmark is Credit Suisse US Leveraged Loan Index and the Credit Suisse Western European Leveraged Loan Index, weighted by the portfolio's market value to each sector

Private Real Assets

Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2023



	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Real Estate	-0.79 (42)	-2.38 (53)	-2.68 (68)	11.27 (43)	9.92 (20)	10.28 (62)
● Real Estate - Net	-0.80 (42)	-2.42 (53)	-2.74 (69)	11.20 (44)	9.87 (21)	10.24 (62)
▲ Blended Benchmark (Real Estate)	-2.88 (89)	-6.16 (90)	-10.74 (100)	7.04 (93)	5.56 (100)	7.77 (100)
5th Percentile	1.49	1.63	5.50	13.33	12.22	12.14
1st Quartile	-0.14	-0.90	1.80	11.66	9.68	11.15
Median	-1.02	-2.22	-0.09	10.73	8.78	10.85
3rd Quartile	-2.39	-4.24	-3.89	9.26	7.25	9.03
95th Percentile	-3.36	-7.36	-8.83	6.74	6.08	8.04
Population	44	40	38	31	23	14

Asset Allocation & Performance

Private Real Assets

Periods Ended June 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Private Real Assets	4,822,355,614	-0.62	-1.87	-1.79				3.70	3/1/2022
Private Real Assets- Net		-0.64	-1.90	-1.85				3.63	
Custom Benchmark (Private Real Assets)		-2.64	-5.63	-9.91				0.47	
Real Estate	4,386,441,398	-0.79	-2.38	-2.68	11.27	9.92	10.28	5.94	5/1/1985
Real Estate - Net		-0.80	-2.42	-2.74	11.20	9.87	10.24		
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	7.51	
Real Estate Core Cmp	2,249,700,843	-1.27	-3.42	-0.23	11.67	11.20	10.62	7.94	4/1/1999
TA Assoc. Buckhead	877,663,980	-0.23	-1.18	3.15	18.24	17.05	13.84	11.52	8/1/1995
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	7.18	
Barings Euro Core Property	136,375,105	-1.11	-3.53	-2.23	1.59	8.99		9.39	3/1/2017
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		5.89	
Blackstone Property Euro	183,444,472	-0.23	-0.76	8.25	10.52	9.06		8.08	12/1/2017
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		5.79	
INVESCO Core Real Estate	236,783,349	-4.21	-4.40	-3.73	5.85	6.00	8.21	8.33	4/1/2011
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	8.72	
INVESCO European real estate	57,564,421	-0.58	1.20	1.01	0.13	0.41		-0.65	4/1/2018
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		5.65	
AEW Core Property Tr	272,808,442	-3.77	-3.77	-4.67	8.61	7.08		8.01	10/1/2013
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		7.61	
CBRE Core Partners	299,839,946	-1.15	-10.18	-4.40	13.03	10.96		10.56	12/1/2013
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		7.53	

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 June 30, 2023

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
JPM Strategic Property Fund	185,221,128	0.00	-4.27	-4.19				8.80	1/1/2021
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74				7.92	
RE Non-Core Cmp	2,136,740,555	-0.26	-1.20	-5.55	10.79	8.45	9.94	10.93	1/1/2010
Artemis MWBE Spruce	330,009,659	0.47	-3.67	-1.34	7.85	7.47		5.43	6/1/2016
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		6.04	
Franklin T. EMREFF	2,544,173	-8.20	-11.37	-38.22	-21.41	-15.97	-1.43	-0.75	9/1/2011
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	8.45	
Security Capital	94,596,250	5.98	3.84	1.06	9.18	7.40	5.27		7/1/1997
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	7.15	
Dune II	8,033,790	5.00	5.60	8.88	6.63	3.78	8.80	5.76	2/1/2009
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	7.50	
Non-Core Real Estate Funds	1,434,160,459	-0.41	-0.53	-7.07	13.68	10.20	11.13	10.98	10/1/2011
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56	7.77	8.41	
Almanac ARS V	73,448								
Non-Core Intl Real Estate	267,322,776	-2.48	-3.42	-2.57	1.97	2.05		-1.08	8/1/2014
Blended Benchmark (Real Estate)		-2.88	-6.16	-10.74	7.04	5.56		7.29	

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 June 30, 2023

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Agriculture	251,973,313	0.10	1.77	4.53	2.98	2.02	5.19	6.52	10/1/1997
NCREIF Farmland Index		0.80	2.90	8.36	7.66	6.49	8.35	11.10	
Premiere Partners IV	251,973,313	0.10	1.77	4.53	2.98	2.02		2.50	3/1/2015
Timberland	63,362,832	1.25	0.18	13.99	3.07	2.33	3.59	6.93	10/1/1992
NCREIF Timberland Index		1.71	3.49	11.13	8.67	5.80	5.90	8.48	
Forest Investment	63,362,832	1.25	0.18	14.00	3.07	2.33	3.69	7.08	10/1/1992
Blended Benchmark (Timberland)		2.08	4.84	7.09	7.57	5.15	5.58	8.38	
Unlisted Infrastructure	120,578,071	3.09	9.19	12.07	17.02	13.06		12.70	4/1/2018
Blended Benchmark (Unlisted Infrastructure)		2.08	4.84	7.09	9.37	9.22		9.21	
Unlisted Infrastructure Funds	120,578,071	3.09	9.19	12.07	17.02	13.06		12.70	4/1/2018
Blended Benchmark (Unlisted Infrastructure)		2.08	4.84	7.09	9.37	9.22		9.21	

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 June 30, 2023

	Allocation	Performance (%)							
	Market Value \$	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Alternatives Investments	5,444,594,844	2.54	3.09	1.09	21.66	16.53	13.01	11.49	2/1/1986
Custom Benchmark (Alternative Investments)		8.30	19.38	-3.29	3.63	5.75	7.36	11.85	
Absolute Return	74,710								
Aurora Investment	74,710								
Private Equity	5,268,512,743	2.56	3.08	1.42	24.66	19.31	15.86	13.75	2/1/1986
Blended Benchmark (Private Equity)		8.53	20.01	-4.23	3.36	5.58	7.28		
Abbott S/A Comp.	500,413,456	1.57	0.81	-3.84	25.31	19.07	16.05	14.54	6/1/1987
Muller Monroe MPEFF	1								
Pantheon S/A Comp.	411,522,829	0.91	-0.62	-2.49	19.89	19.23	15.32	11.35	10/1/2000
Private Equity Fund - Domestic	3,429,742,005	1.01	0.64	-0.94	25.38	20.62	16.86	14.76	6/1/2012
Private Equity Fund - International	685,928,531	14.23	24.60	28.68	26.92	16.62		1.27	7/1/2015
Oakbrook Opportunities Fund	240,905,921	0.00	-0.13	-6.01	18.16			7.75	6/1/2019
Private Credit	176,007,391	1.96	3.24	-7.54	6.26			-0.71	10/1/2019
Private Credit Fund - Domestic	176,007,391	1.96	3.24	-7.54	6.26			-0.71	10/1/2019

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 June 30, 2023

Organization			
Investment Manager	Asset Class	Effective Date	Resolution
Genesis	Emerging Markets Equity	July 2022	
Ativo	International Equity - All Cap	August 2023	

Appendix

Asset Class Returns

Periods Ended June 30, 2023

	Performance (%)										
	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Total Fund	7.93	-12.77	16.82	14.98	19.77	-4.23	16.02	8.01	0.53	6.15	20.20
Total Fund - Net	7.84	-12.90	16.63	14.79	19.57	-4.40	15.78	7.77	0.29	5.90	19.94
Total Fund Benchmark	9.00	-13.26	13.48	13.16	18.68	-3.12	14.37	7.89	1.37	7.33	15.84
Domestic Equity	13.62	-19.12	24.89	22.07	29.23	-6.08	19.83	12.62	0.04	9.81	37.65
Domestic Equity - Net	13.51	-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)	15.00	-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	12.47	-18.21	25.68	18.00	29.67	-6.79	18.08	15.43			
International Equity	11.71	-17.86	9.78	13.52	23.76	-14.13	27.95	3.56	-1.90	-2.80	20.24
International Equity - Net	11.52	-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)	9.47	-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	8.80	-16.70	7.30	11.30	21.37	-14.36	27.79	3.92			
Fixed Income	3.27	-11.83	-0.44	7.87	9.50	-0.24	4.82	4.87	0.25	5.97	-0.59
Fixed Income - Net	3.23	-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	2.09	-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	2.98	-11.98	-0.85	7.29	9.14	-0.08	3.98	3.89			
Private Real Assets	-1.90										
Custom Benchmark (Private Real Assets)	-5.63										
Real Estate	-2.38	11.77	21.95	4.20	9.81	8.36	10.03	8.97	12.54	13.02	10.82
Real Estate - Net	-2.42	11.71	21.88	4.16	9.76	8.36	10.03	8.97	12.46	13.02	10.82
Blended Benchmark (Real Estate)	-6.16	6.54	21.02	0.34	4.39	7.36	6.66	7.79	13.95	11.46	12.90
Agriculture	1.77	3.98	2.69	4.69	-5.82	0.28	-4.58	-0.47	20.18	24.73	25.68
NCREIF Farmland Index	2.90	9.64	7.83	3.08	4.81	6.74	6.19	7.09	10.35	12.63	20.91
Timberland	0.18	11.94	-2.72	4.51	1.00	-3.62	4.68	-4.58	4.99	12.83	9.14
NCREIF Timberland Index	3.49	12.90	9.17	0.81	1.30	3.21	3.63	2.59	4.97	10.48	9.69
Unlisted Infrastruct	9.19	11.76	11.68	15.90	9.65						
Blended Benchmark (Unlisted Infrastructure)	4.84	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 June 30, 2023

	Performance (%)										
	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014	2013
Alternatives Investments	3.09	4.39	46.46	12.31	9.48	17.32	12.09	5.32	6.90	11.63	12.11
Alternative Investments - Net	3.09	4.38	46.44	12.27	9.43	17.14	11.91	5.00	6.47	11.16	11.86
Custom Benchmark (Alternative Investments)	19.38	-18.08	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Private Equity	3.08	5.36	54.15	14.50	11.78	21.46	15.61	8.60	8.41	13.72	14.13
Blended Benchmark (Private Equity)	20.01	-19.14	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Cash	2.45	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	2.25	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
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.