

Wilshire



Wilshire Advisors

Executive Summary of Investment Performance

As of June 30, 2022

IMRF Performance Summary

- IMRF market value as of June 2022 : \$48.4 billion
- IMRF total fund return for 2Q 2022: -9.89% vs the Total Fund Benchmark return of -9.53%
- U.S. equity markets saw its worst quarter since early 2020 from impact of high inflation on economic growth
- IMRF U.S. Equity Portfolio underperformed the benchmark during the quarter, returning -16.64% versus -16.08%
- International stocks also struggling due to European growth slowing and China's zero COVID policy
- IMRF International Equity Portfolio underperformed the benchmark during the quarter, returning -14.01% versus -13.73%
- Challenging fixed income environment driven by aggressive Fed tightening
- IMRF Fixed Income Portfolio underperformed the benchmark during the quarter, returning -5.29% versus -5.10%
- 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 down -16.8% for the second quarter, the largest quarterly drop since the global COVID shutdown in early 2020. Every sector was in negative territory, with Consumer Discretionary (-26.3%), Information Technology (-21.1%) and Communication Services (-21.0%) representing the worst performing sectors. Large and small-cap performed similarly while growth stocks underperformed value.

Rising inflation, which began in late 2020-early 2021, continues to accelerate this year, reaching levels not seen in four decades. While energy is far and away the leading expenditure category in terms of price increases (up 35% for the 12-months ending May), surging prices can be found in nearly every segment of the overall CPI. The largest component of the index, shelter, is up 5.5% with the next largest segment, food, up 10% during the past year. Finally, transportation costs have accelerated with new and used vehicles up in the double-digits and transportation services up 8%. With such widespread inflationary pressures, the ability for the Federal Reserve to achieve a “soft landing” is quickly dissipating.

Non-U.S. Equity

High inflation has become a global issue with rates in Europe approaching U.S. levels. In Germany, economic growth is slowing on both inflation and falling exports. While economic indicators in the U.K. are still in the expansion range, measures of new orders have fallen while business confidence levels have slumped. In China, new COVID controls were imposed in some areas but have since been lifted – although early economic indicators are not yet registering a strong return of growth.

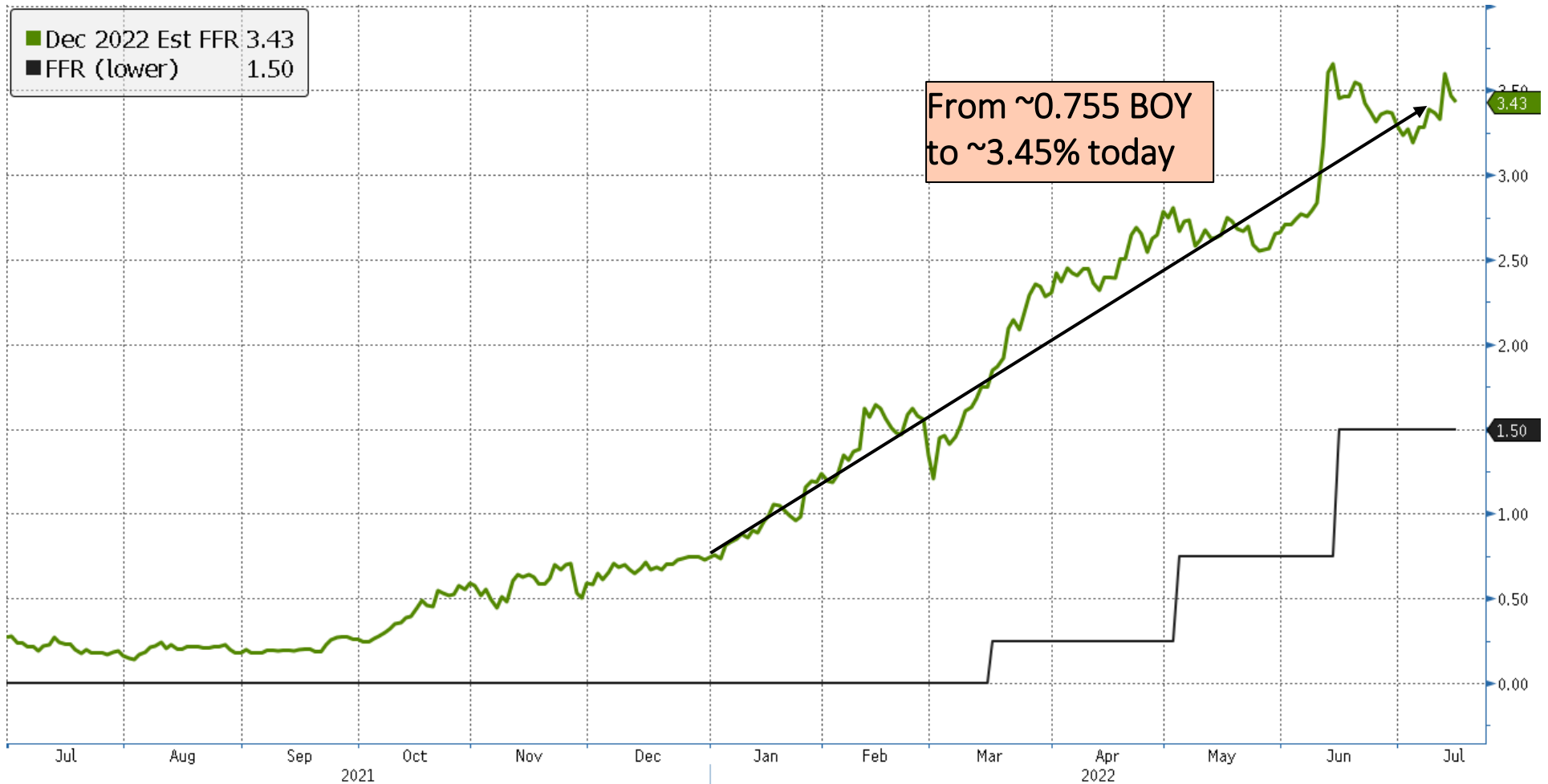
Fixed Income

The U.S. Treasury yield curve was up across all maturities with the 10-year at 3.02%, up 68 basis points from March. The FOMC increased their overnight rate by 0.50% in May and 0.75% in June; targeting a range of 1.50% to 1.75%. Public statements from the Federal Reserve grew more pessimistic during the quarter as Fed chair Jerome Powell stated after the June meeting that controlling inflation at their 2% target, in exchange for a higher unemployment rate, would be a “successful outcome.”

June 2022 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	Dev ex-US Bond (Hdg)	US RES	Global RES	Private RE	Cmdty	Real Assets	US CPI
Compound Return (%)	6.00	7.00	7.00	7.25	6.60	10.05	3.15	4.05	4.30	3.15	6.25	2.20	5.20	5.35	6.50	5.50	6.75	2.35
Expected Risk (%)	17.00	18.00	26.00	19.10	17.10	28.00	0.75	4.25	8.90	6.00	10.00	4.25	17.50	16.45	14.00	16.00	10.35	1.75
Cash Yield (%)	1.65	3.30	2.60	3.10	2.20	0.00	3.15	4.55	4.60	3.80	9.10	2.95	3.45	3.45	2.30	3.15	2.50	0.00
Growth Exposure	8.00	8.00	8.00	8.00	8.00	13.50	0.00	-0.85	-2.25	-3.00	4.00	-1.00	6.00	6.00	3.50	0.00	1.80	0.00
Inflation Exposure	-3.00	0.00	5.00	1.50	-1.25	-3.80	0.00	-2.50	-6.70	2.50	-1.00	-3.00	1.00	1.80	1.00	12.00	4.85	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	0.83	0.96	0.87	1.00														
Global Stock	0.95	0.92	0.83	0.94	1.00													
Private Equity	0.74	0.64	0.62	0.67	0.74	1.00												
Cash Equivalents	-0.05	-0.09	-0.05	-0.08	-0.07	0.00	1.00											
Core Bond	0.28	0.13	0.00	0.09	0.20	0.31	0.19	1.00										
LT Core Bond	0.31	0.16	0.01	0.12	0.23	0.32	0.11	0.92	1.00									
TIPS	-0.05	0.00	0.15	0.05	0.00	-0.03	0.20	0.59	0.47	1.00								
High Yield Bond	0.54	0.39	0.49	0.45	0.51	0.34	-0.10	0.25	0.32	0.05	1.00							
Dev ex-US Bond (Hdg)	0.16	0.25	-0.01	0.17	0.18	0.26	0.10	0.66	0.65	0.39	0.26	1.00						
US RE Securities	0.58	0.47	0.44	0.49	0.56	0.50	-0.05	0.17	0.23	0.10	0.56	0.05	1.00					
Global RE Securities	0.64	0.58	0.56	0.61	0.65	0.58	-0.05	0.17	0.22	0.11	0.61	0.03	0.96	1.00				
Private Real Estate	0.54	0.44	0.44	0.47	0.52	0.51	-0.05	0.19	0.25	0.09	0.57	0.05	0.77	0.75	1.00			
Commodities	0.25	0.34	0.39	0.38	0.32	0.27	0.00	-0.02	-0.02	0.25	0.29	-0.10	0.25	0.28	0.25	1.00		
Real Assets	0.48	0.51	0.58	0.57	0.54	0.47	-0.02	0.23	0.25	0.39	0.56	0.05	0.70	0.75	0.70	0.65	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	-0.08	0.05	0.03	0.05	0.44	0.26	1.00

How Quickly Discounting Can Change...



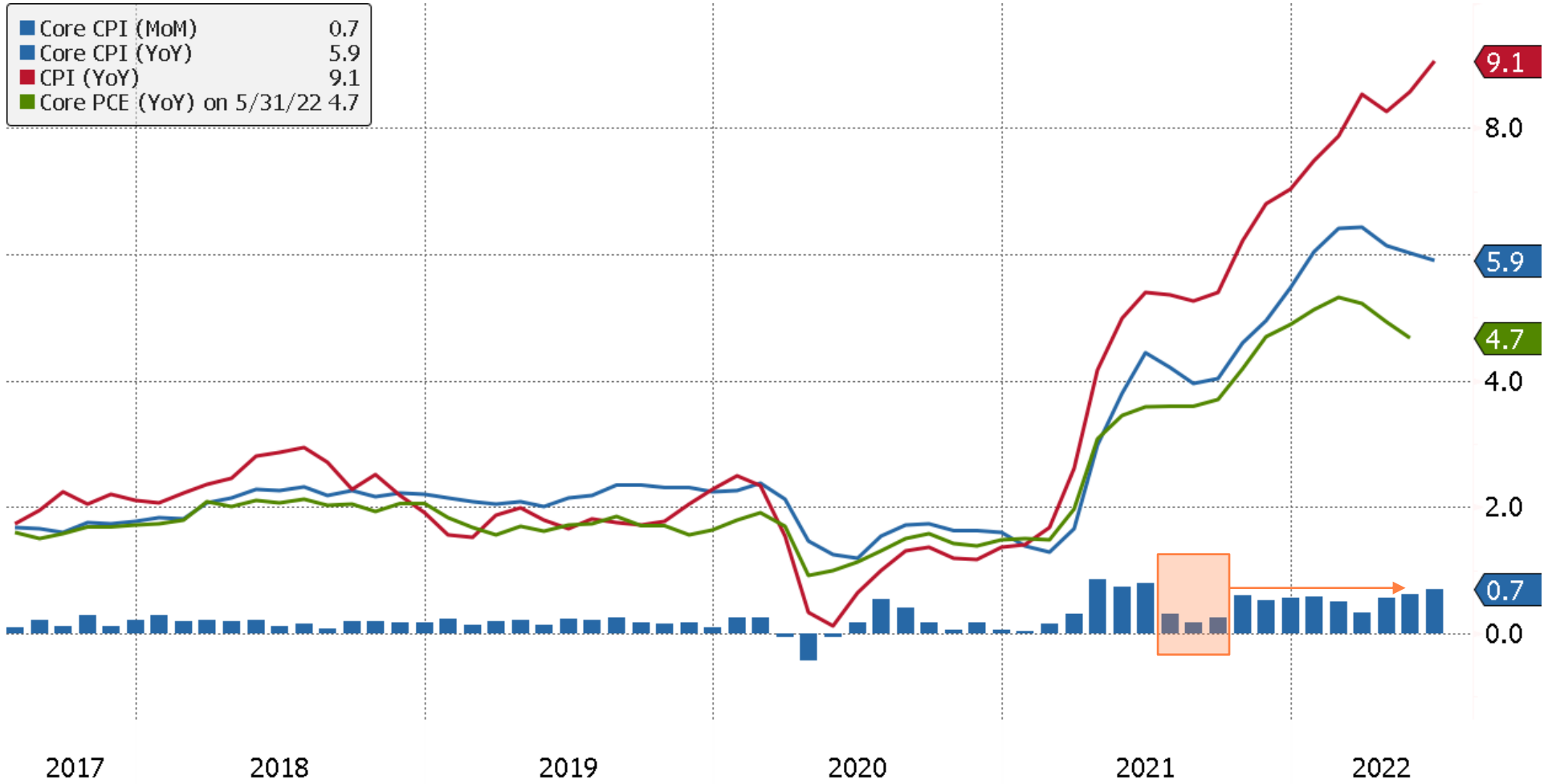
US0ACH JUN2022 Index (WIRP Est Change from Current R) Fed Fut Imp Rate Daily 30JUN2021-15JUL2022

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Data Source: Bloomberg

Any Signs of Inflation Slowing?



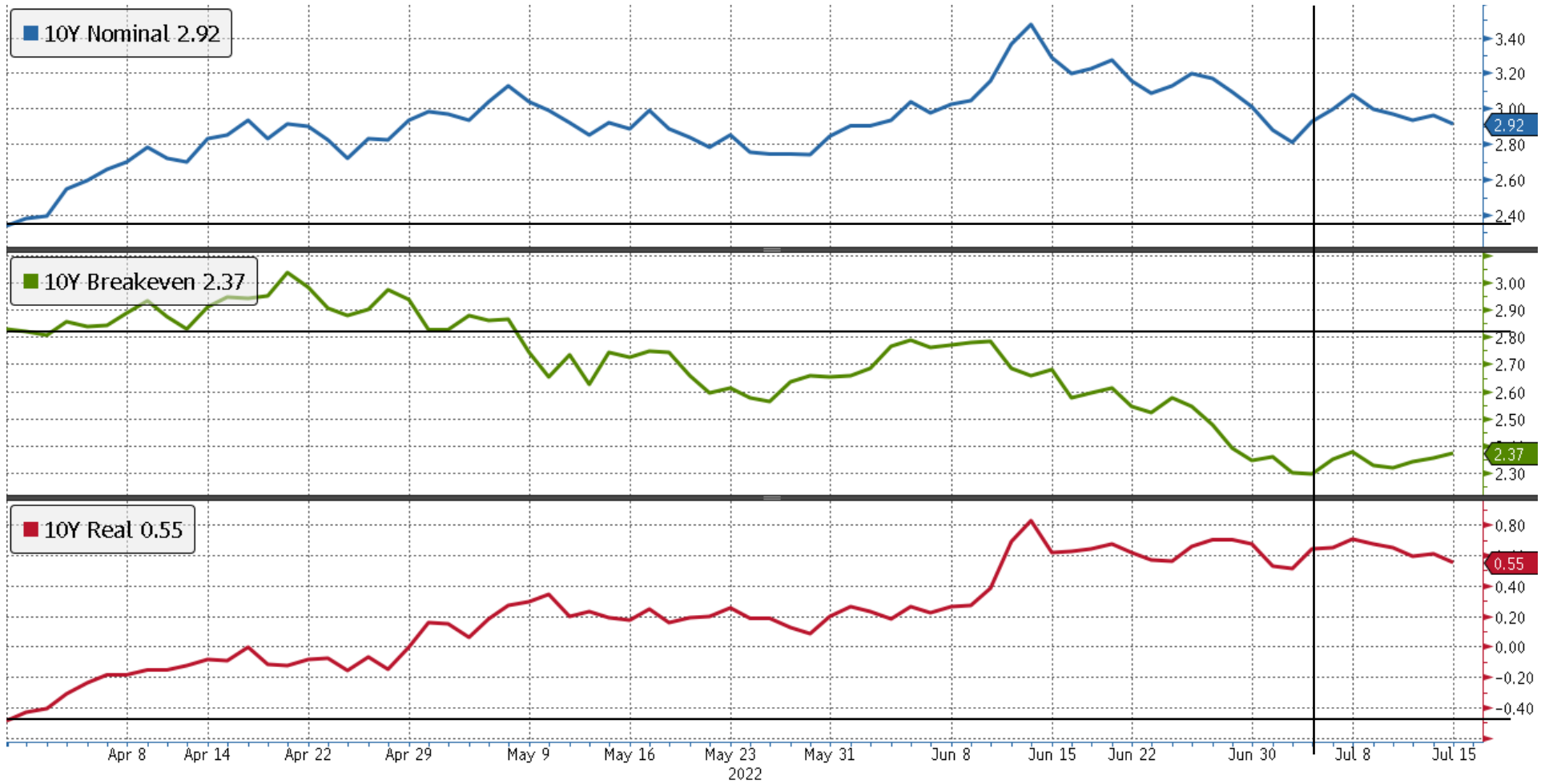
CPUPXCHG Index (US CPI Urban Consumers Less Food & Energy MoM SA) CPI & PCE Monthly 18JUL2017-17JUL2022

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17-Jul-2022 08:33:04

Data Source: Bloomberg

Quarterly Rate Moves (10Y Nominal, Real & BEI)



USGG10YR Index (US Generic Govt 10 Yr) 10yr Splits Daily 31MAR2022-15JUL2022

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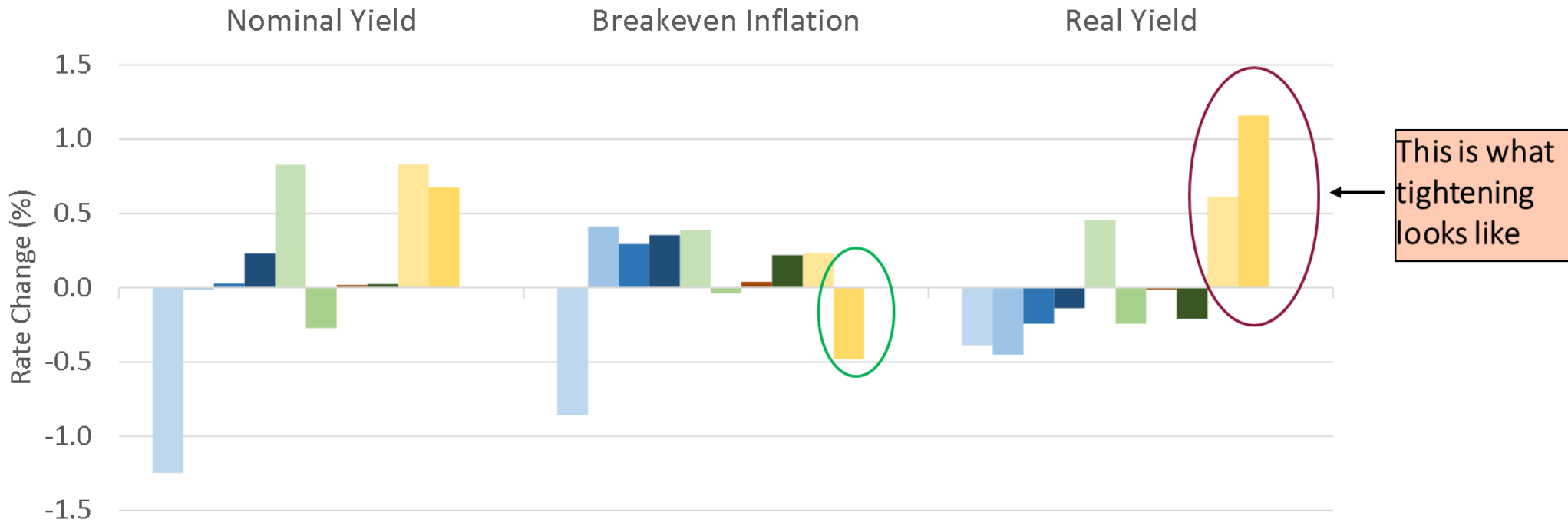
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Data Source: Bloomberg

Rate Changes (2020 – YTD 2022)

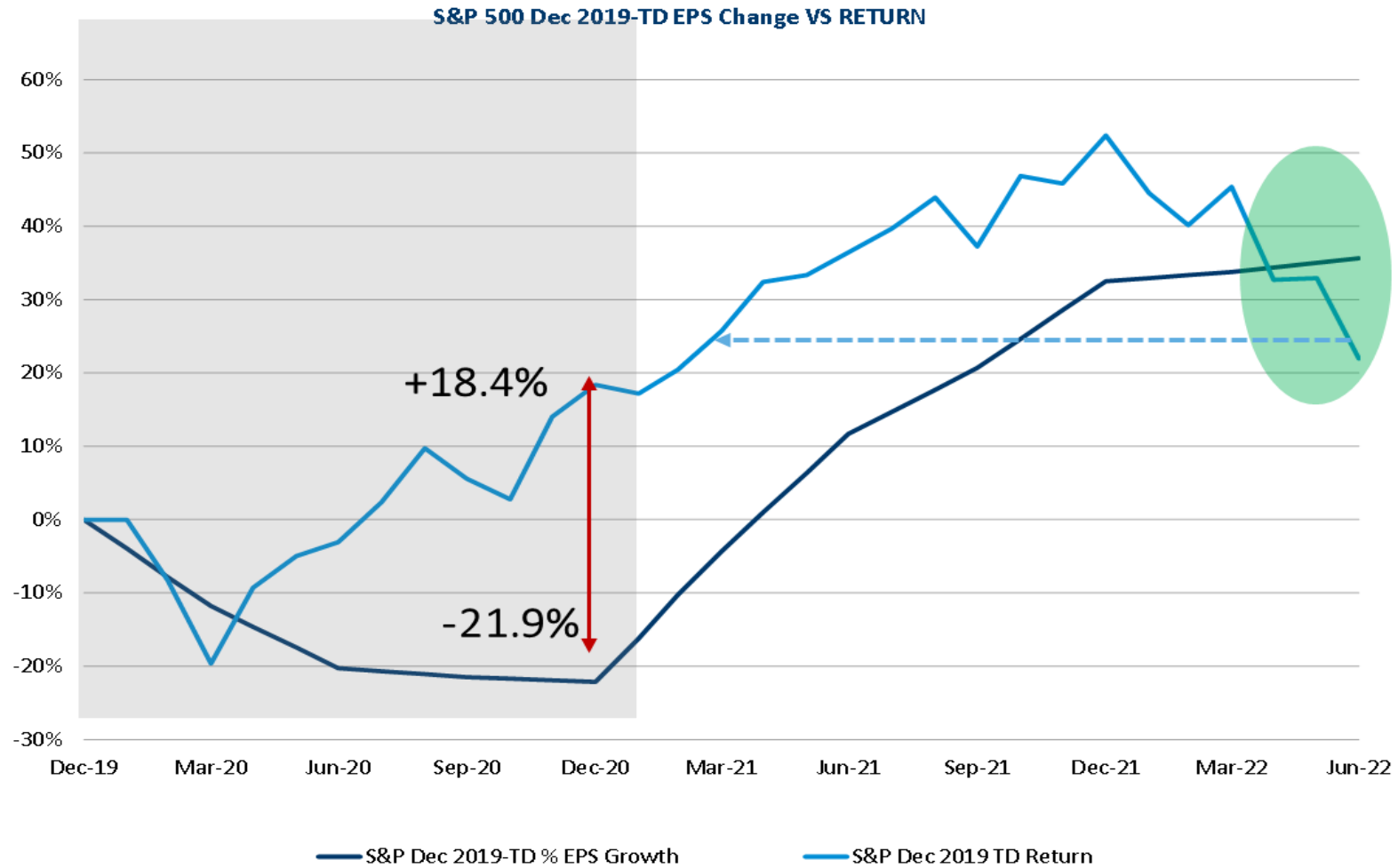
Quarterly Rate Changes

- Q1 2020
- Q2 2020
- Q3 2020
- Q4 2020
- Q1 2021
- Q2 2021
- Q3 2021
- Q4 2021
- Q1 2022
- Q2 2022
- QTD (7/17)



Data Source: Bloomberg

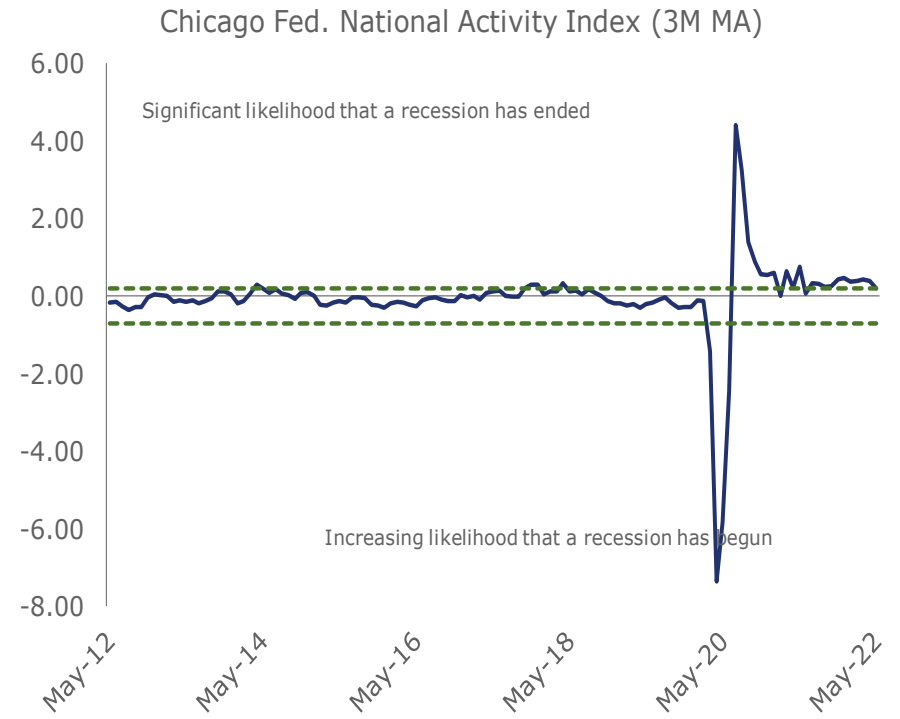
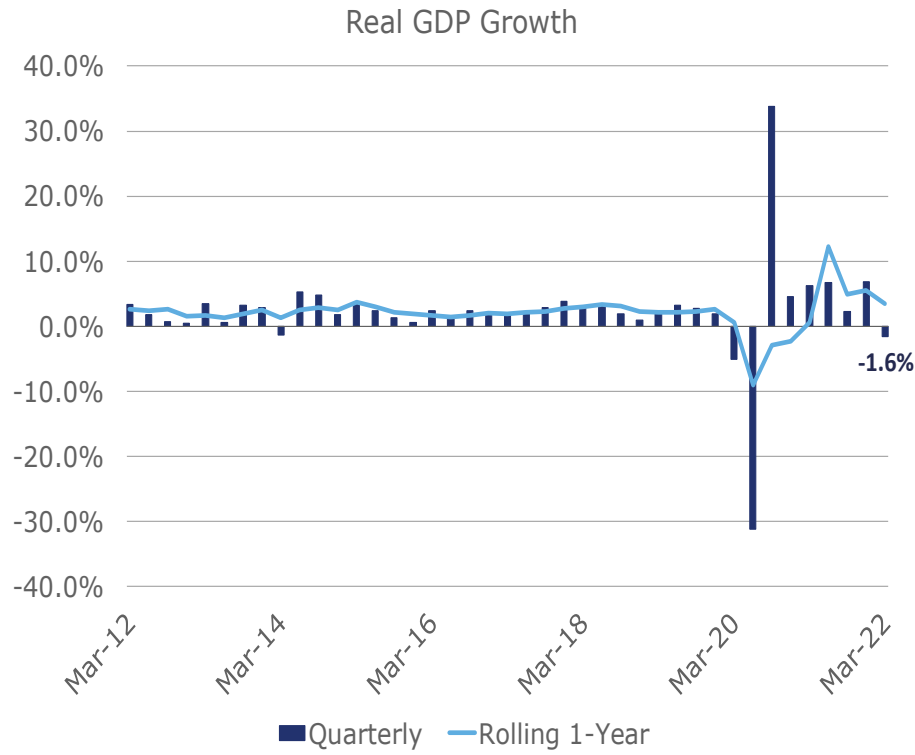
Another call back (this time from Jan 2021): EPS say...



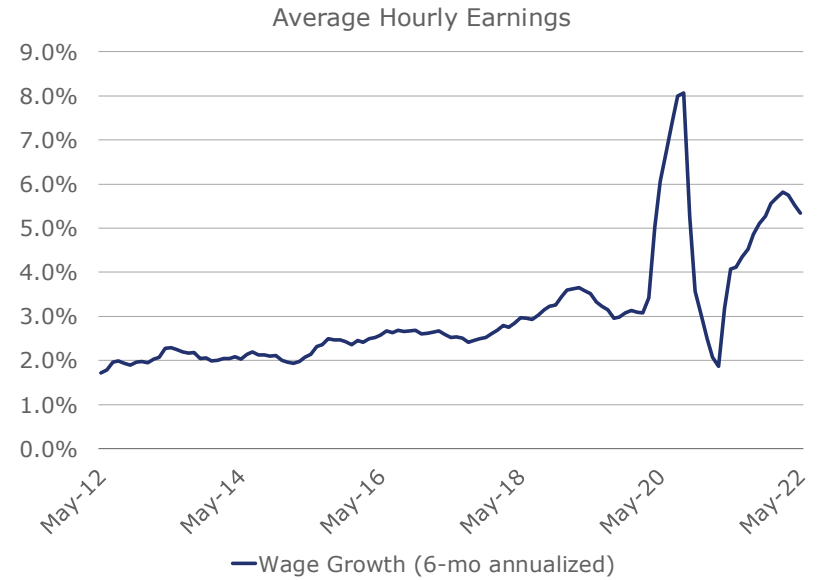
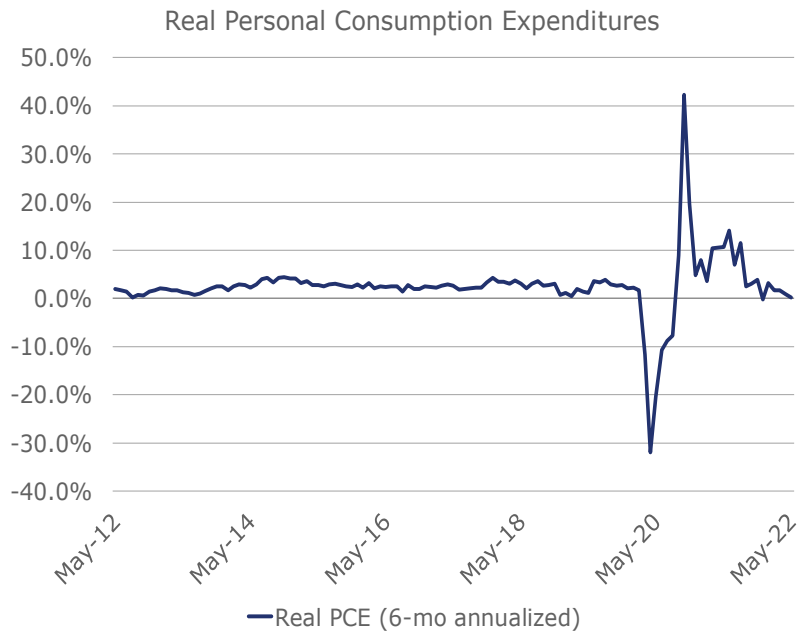
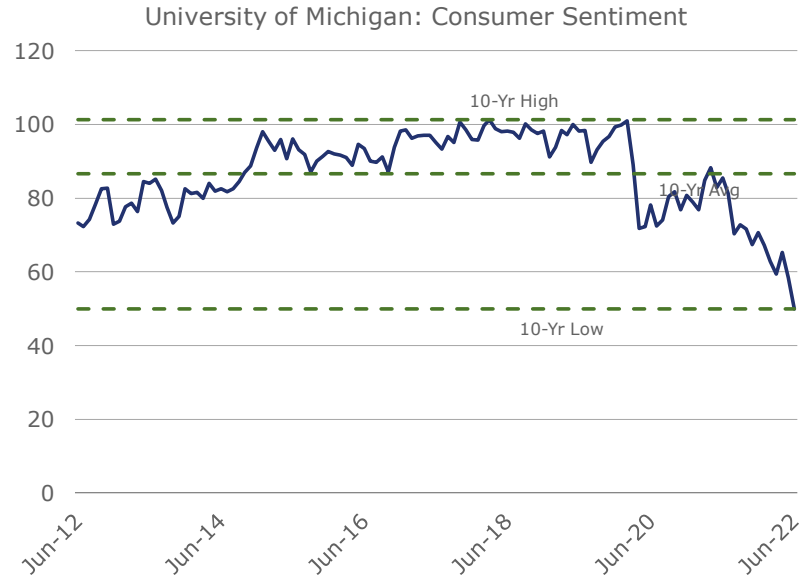
Data Source: S&P, Bloomberg

Economic/Market Activity

Economic Growth

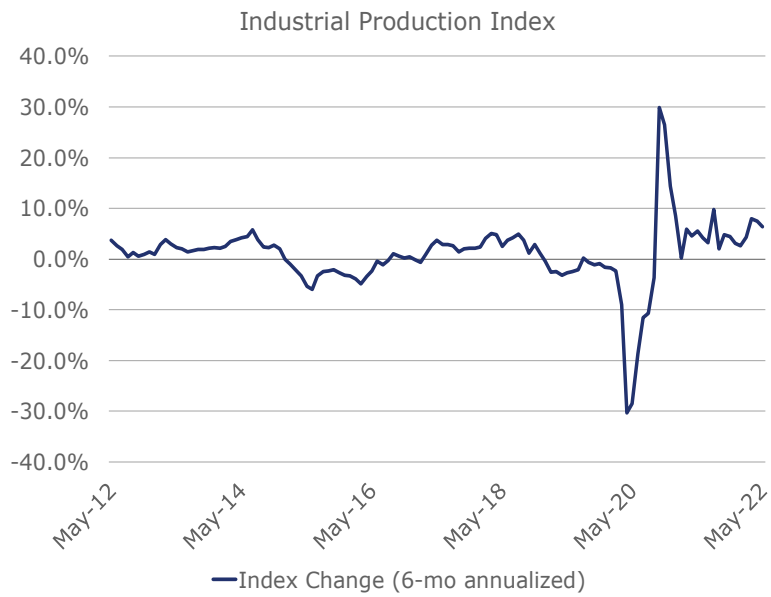
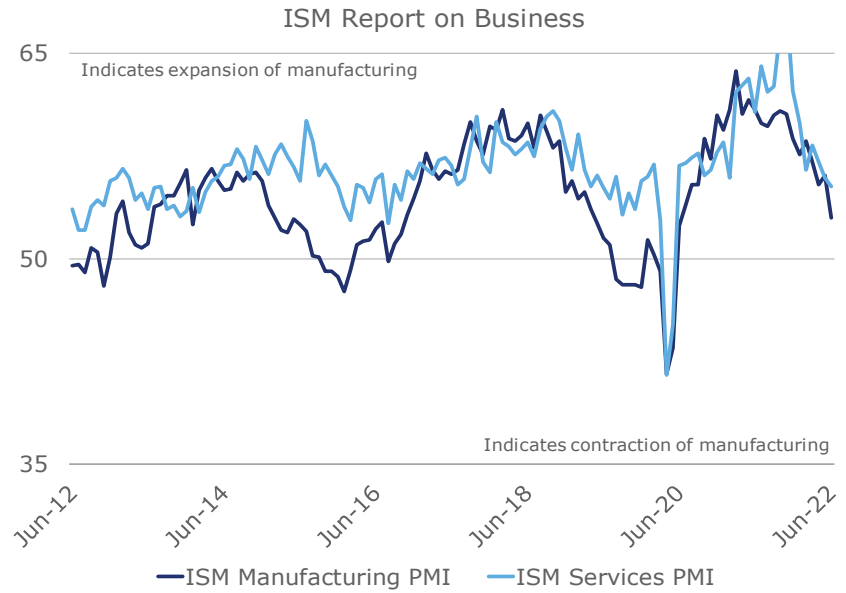


Consumer Activity

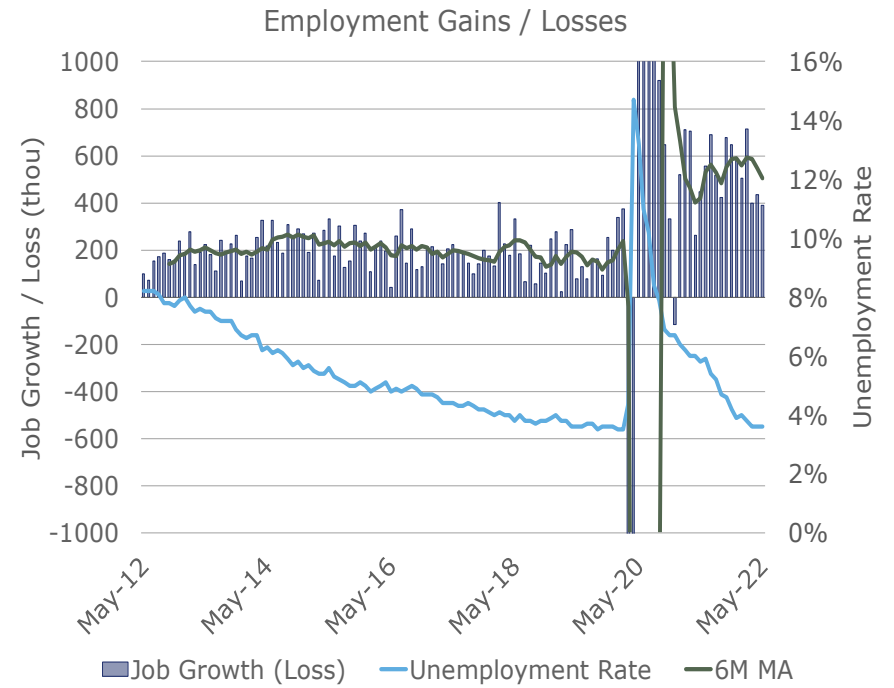
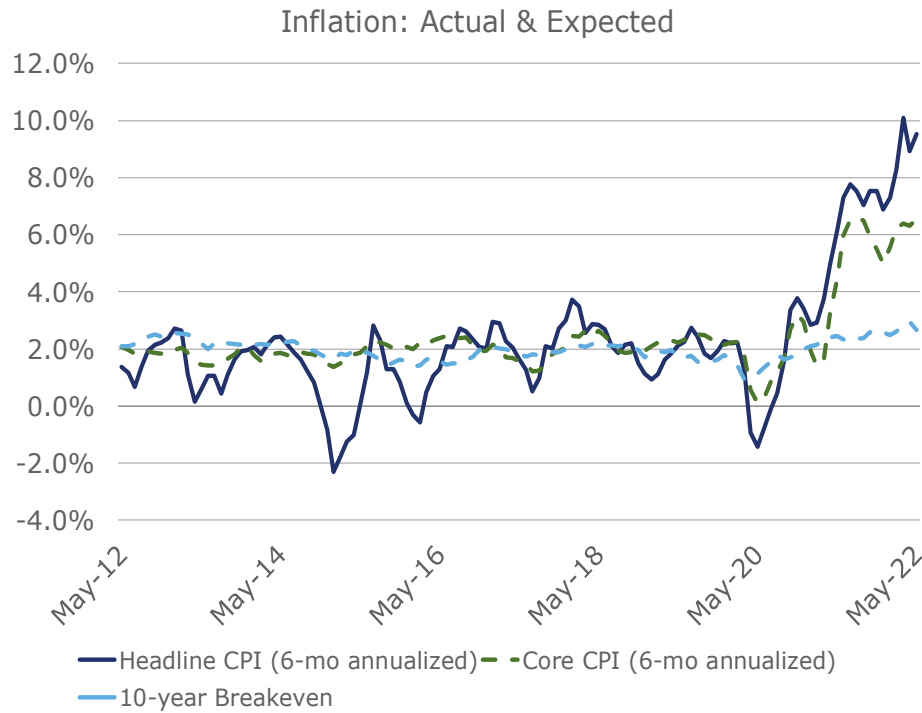


Data Sources: Bloomberg

Business Activity



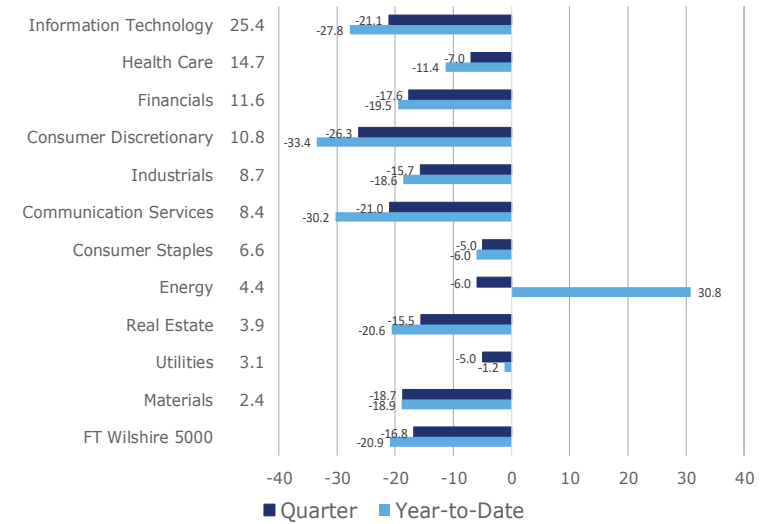
Inflation and Employment



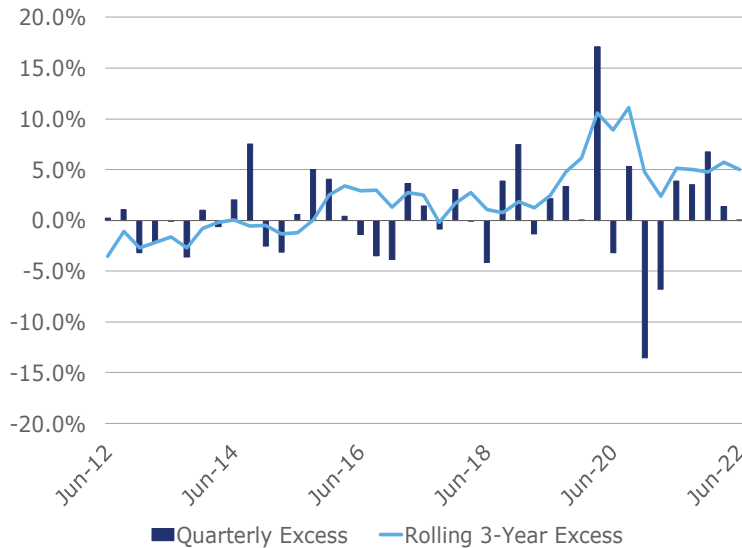
U.S. Equity Market

As of 6/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
FT Wilshire 5000	-16.8	-20.9	-13.2	10.2	10.8	12.7
Wilshire U.S. Large Cap	-16.8	-20.8	-12.3	10.7	11.3	13.0
Wilshire U.S. Small Cap	-16.8	-21.8	-21.7	5.4	6.1	10.1
Wilshire U.S. Large Growth	-21.4	-27.7	-18.3	12.2	13.2	14.5
Wilshire U.S. Large Value	-11.2	-11.8	-4.8	8.9	9.3	11.5
Wilshire U.S. Small Growth	-18.2	-26.7	-28.2	3.9	6.3	10.1
Wilshire U.S. Small Value	-15.5	-17.0	-14.6	6.8	5.7	10.0
Wilshire REIT Index	-18.5	-21.6	-6.7	4.0	5.3	7.3
MSCI USA Min. Vol. Index	-9.1	-12.6	-3.2	6.3	9.6	11.7
FTSE RAFI U.S. 1000 Index	-12.7	-12.7	-5.6	11.0	10.1	12.4

U.S. Sector Weight and Return (%)



Large Cap vs Small Cap



Large Growth vs Large Value

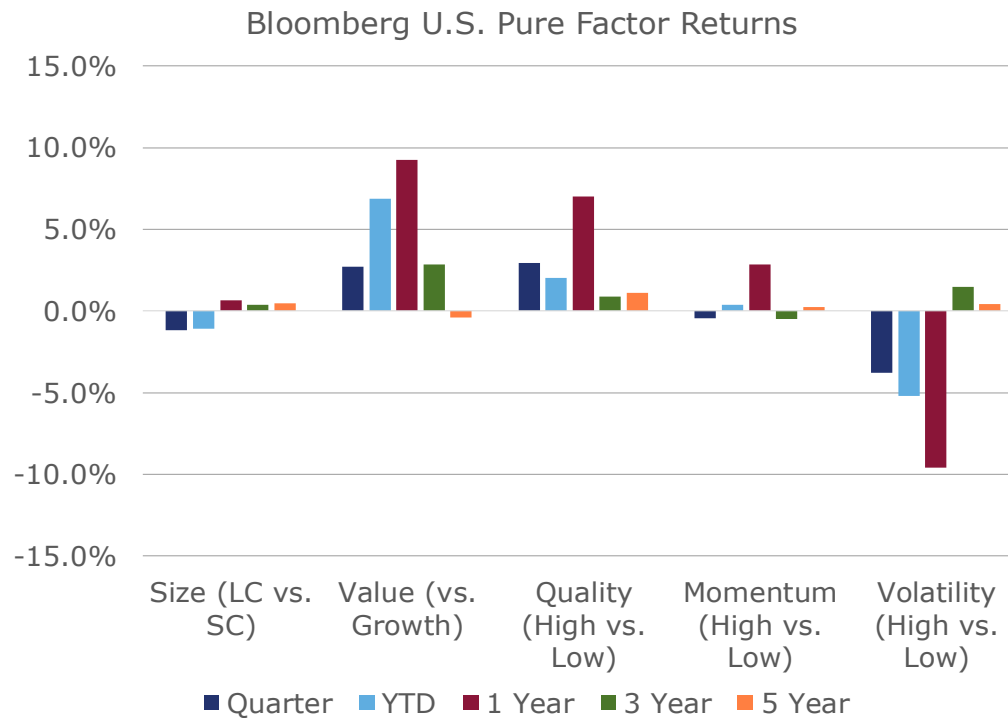


Data Sources: Bloomberg, Wilshire Atlas

U.S. Factor Returns

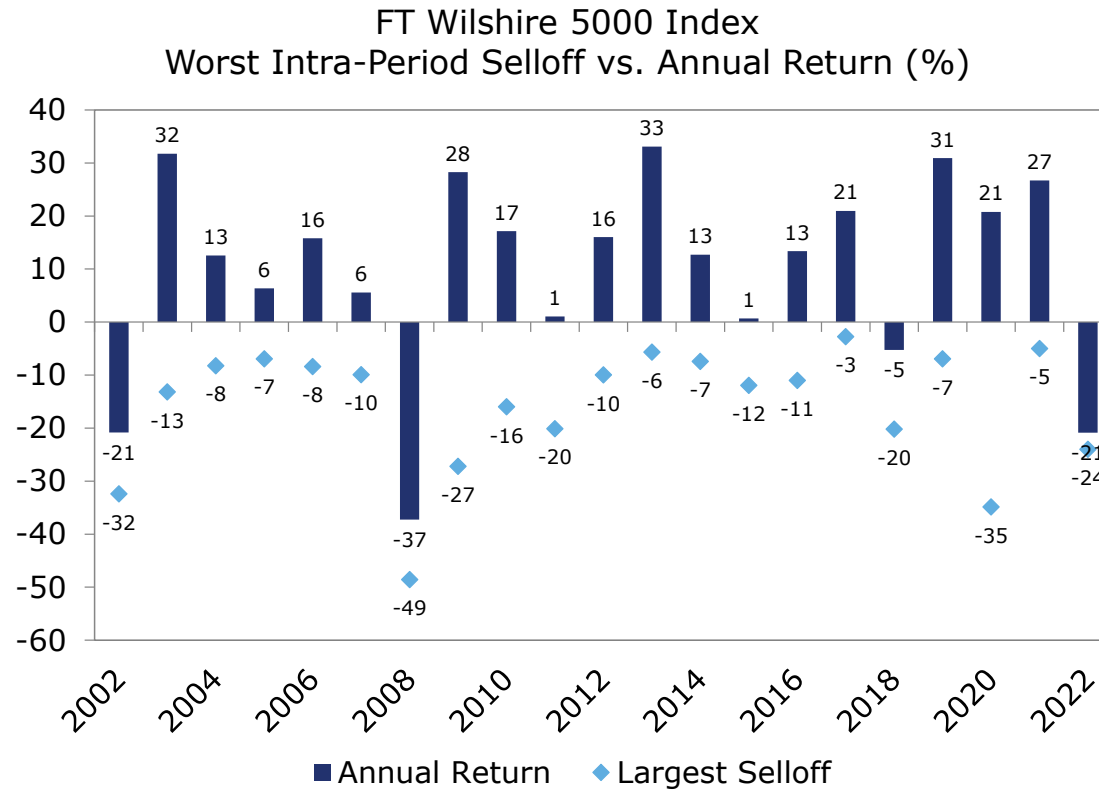
Factor returns represent the contribution from large cap, value, etc. stocks within Bloomberg's Portfolio & Risk Analytics module

Value stocks have rebounded during the past year



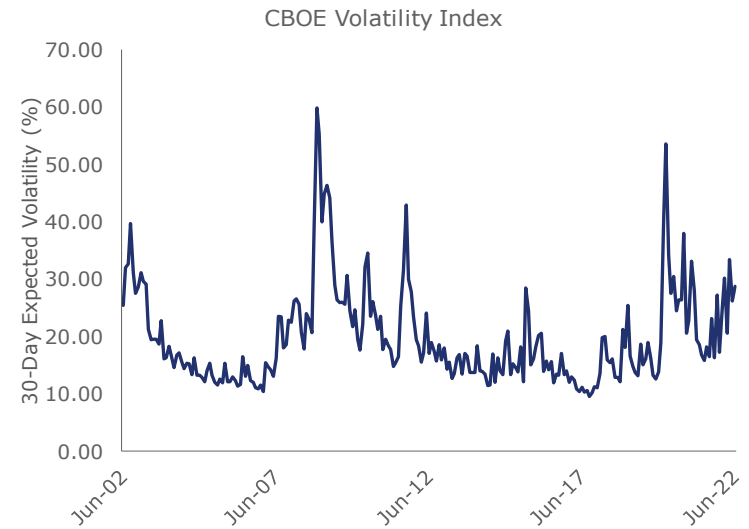
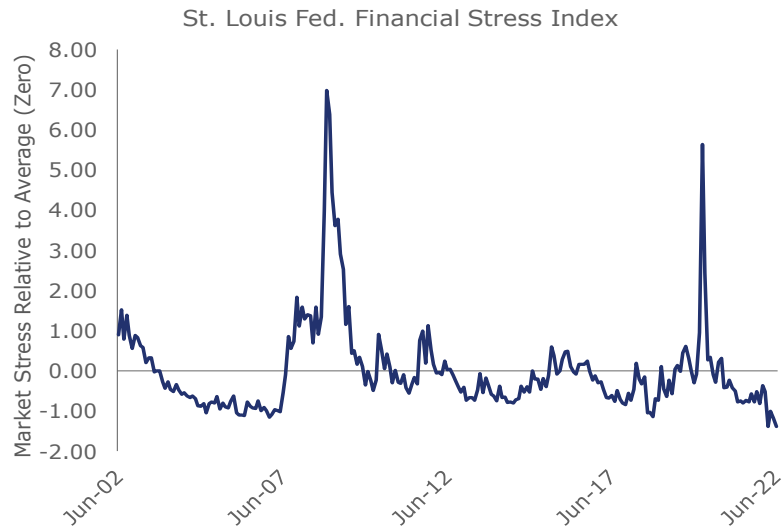
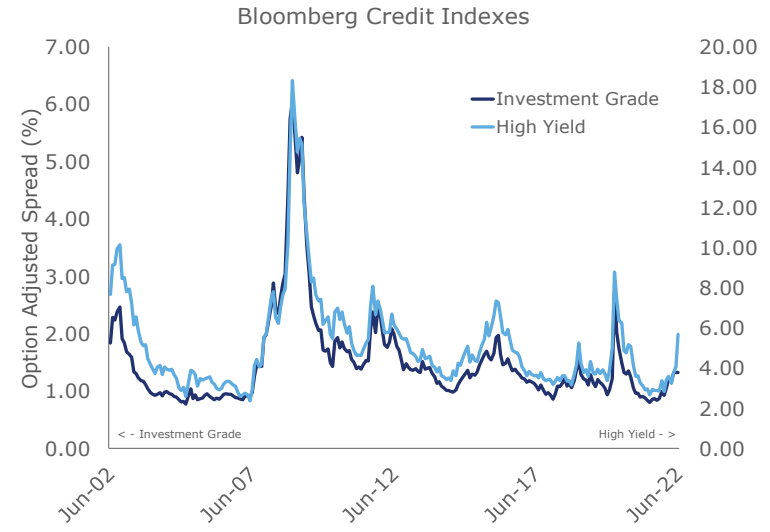
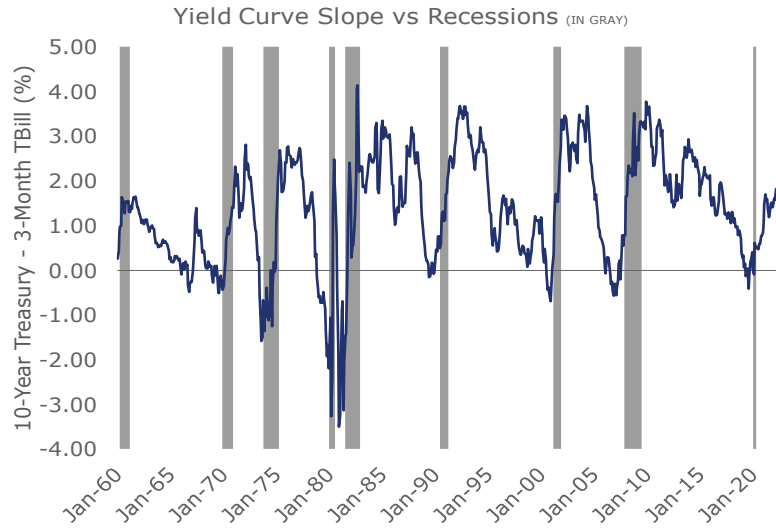
Annual Equity Market Selloffs

U.S. equity has been selling-off all year, hitting its last market high on January 3rd

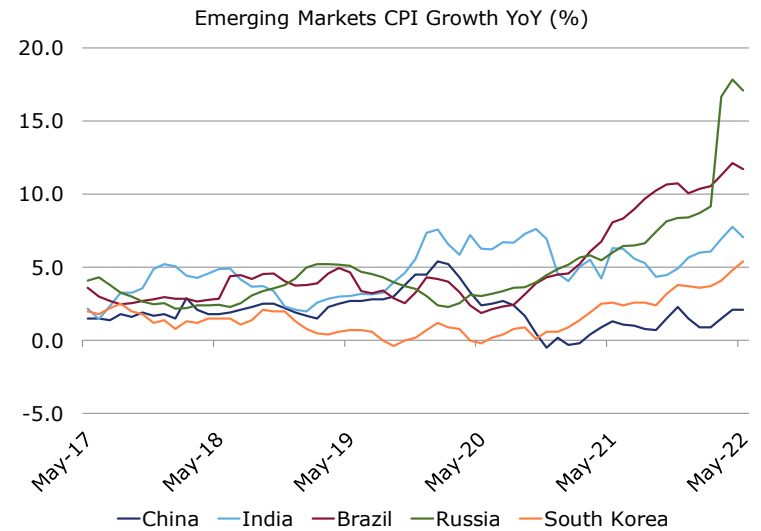
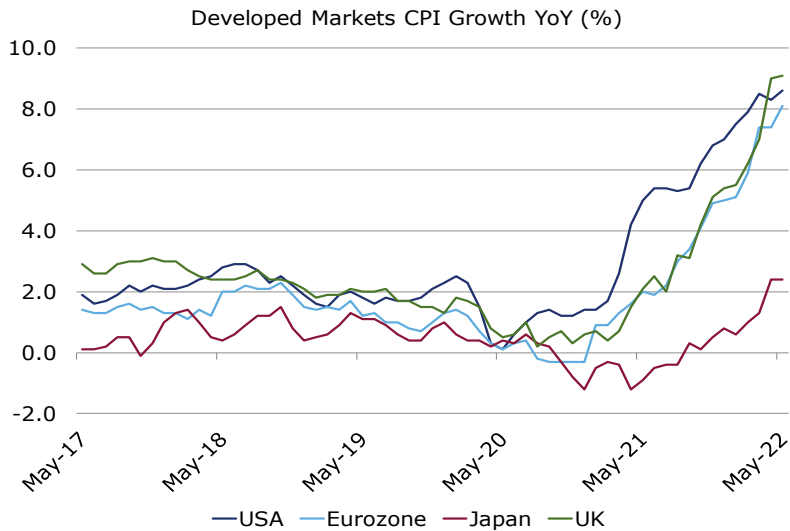
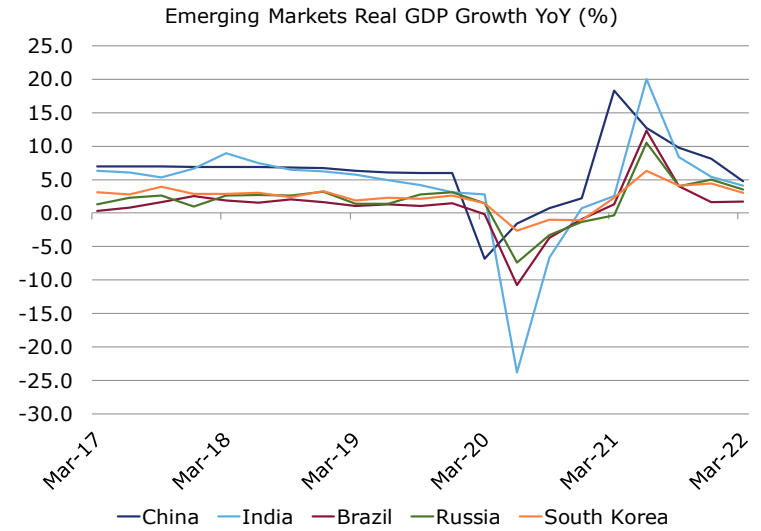
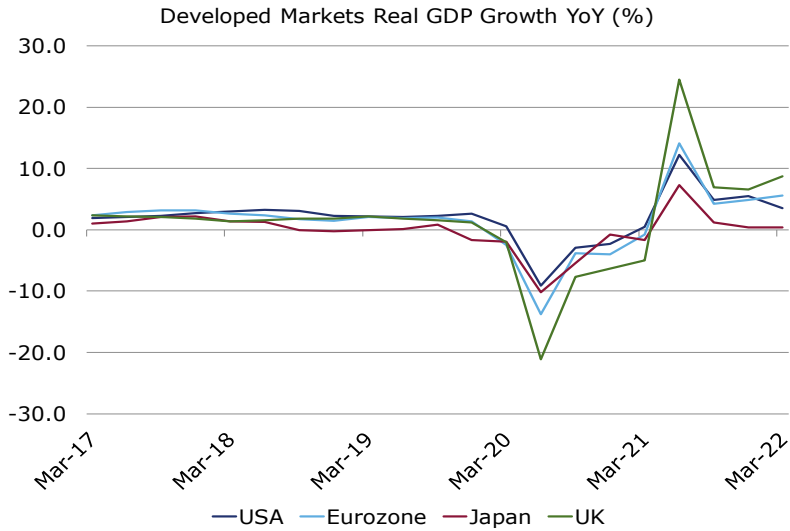


Data Sources: Wilshire Web, Bloomberg

Risk Monitor



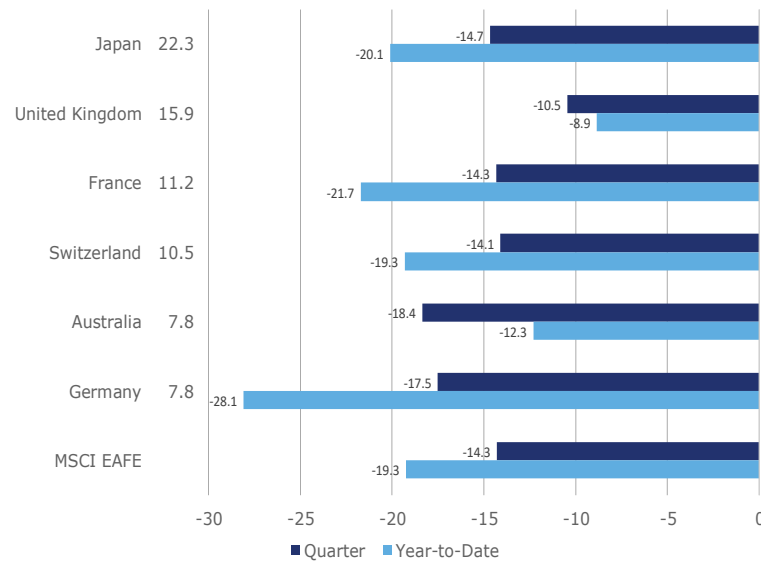
Non-U.S. Growth and Inflation



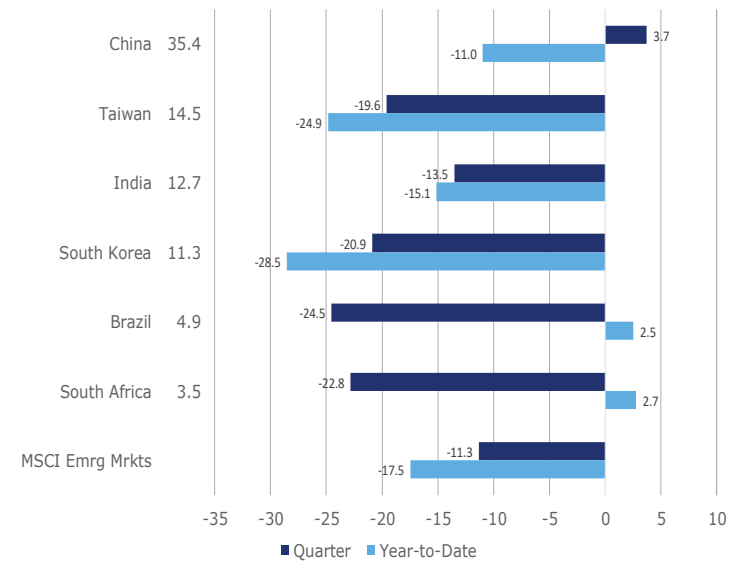
Non-U.S. Equity Market

As of 6/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
MSCI ACWI ex-US (\$G)	-13.5	-18.2	-19.0	1.8	3.0	5.3
MSCI EAFE (\$G)	-14.3	-19.3	-17.3	1.5	2.7	5.9
MSCI Emerging Markets (\$G)	-11.3	-17.5	-25.0	0.9	2.5	3.4
MSCI Frontier Markets (\$G)	-18.2	-17.7	-14.7	-5.7	-1.7	1.3
MSCI ACWI ex-US Growth (\$G)	-15.6	-24.6	-25.6	1.9	3.8	6.1
MSCI ACWI ex-US Value (\$G)	-12.2	-12.3	-12.9	1.4	1.9	4.6
MSCI ACWI ex-US Small (\$G)	-17.4	-22.7	-22.1	3.4	3.0	6.6
MSCI ACWI Minimum Volatility	-9.1	-11.8	-5.9	3.5	6.3	8.6
MSCI EAFE Minimum Volatility	-11.6	-16.3	-14.0	-1.5	1.4	5.7
FTSE RAFI Developed ex-US	-13.4	-14.5	-13.2	2.8	2.6	5.8
MSCI EAFE LC (G)	-7.6	-10.9	-6.1	4.9	4.8	8.8
MSCI Emerging Markets LC (G)	-8.0	-13.5	-19.9	3.6	4.7	6.3

Developed Markets Weight and Return (%)



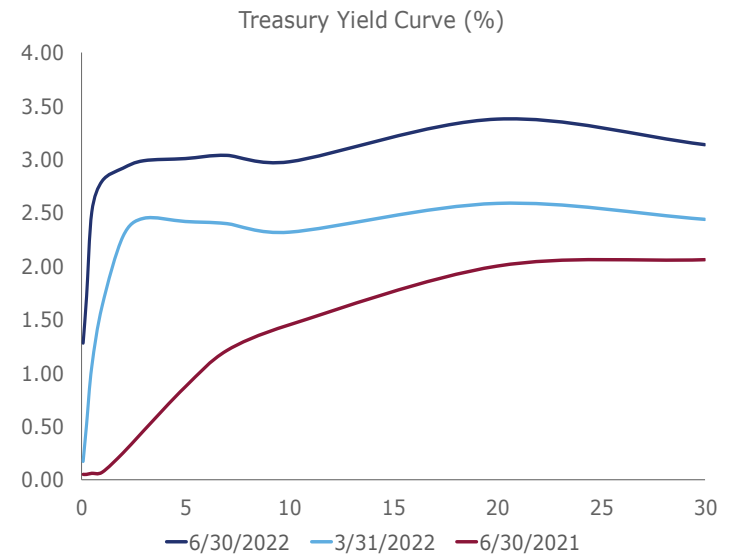
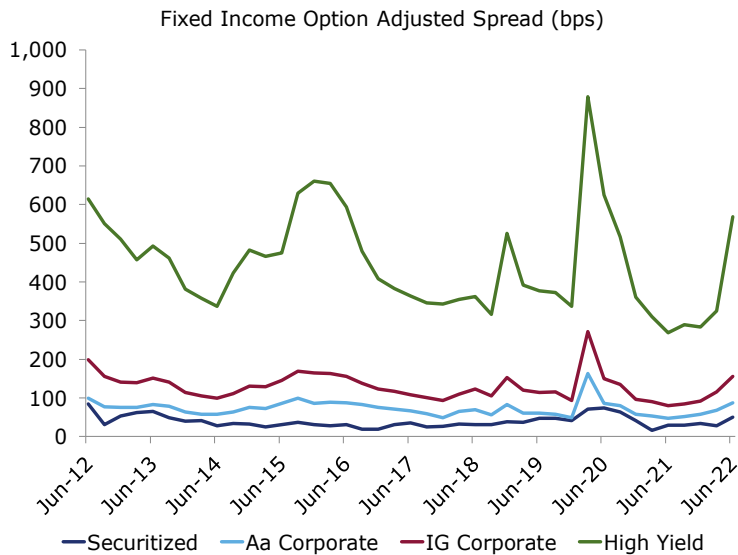
Emerging Markets Weight and Return (%)



U.S. Fixed Income

As of 6/30/2022	YTW	DUR.	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg Aggregate	3.7	6.4	-4.7	-10.3	-10.3	-0.9	0.9	1.5
Bloomberg Treasury	3.1	6.4	-3.8	-9.1	-8.9	-0.9	0.7	1.0
Bloomberg Gov't-Rel.	3.7	5.4	-4.0	-9.2	-9.3	-0.8	1.0	1.6
Bloomberg Securitized	3.8	5.8	-3.9	-8.7	-9.0	-1.3	0.5	1.3
Bloomberg Corporate	4.7	7.6	-7.3	-14.4	-14.2	-1.0	1.3	2.6
Bloomberg LT Gov't/Credit	4.3	15.1	-12.3	-21.9	-20.1	-2.3	1.0	2.6
Bloomberg LT Treasury	3.3	17.2	-11.9	-21.3	-18.5	-2.9	0.5	1.6
Bloomberg LT Gov't-Rel.	4.8	12.2	-10.7	-19.4	-18.3	-2.8	1.0	2.6
Bloomberg LT Corporate	5.1	13.5	-12.8	-22.7	-21.7	-2.3	1.1	3.3
Bloomberg U.S. TIPS *	3.0	8.0	-6.1	-8.9	-5.1	3.0	3.2	1.7
Bloomberg High Yield	8.9	4.3	-9.8	-14.2	-12.8	0.2	2.1	4.5
S&P/LSTA Leveraged Loan	6.9	0.3	-4.5	-4.6	-2.8	2.1	2.9	3.7
Treasury Bills	1.8	0.3	0.1	0.0	0.0	0.6	1.1	0.6

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

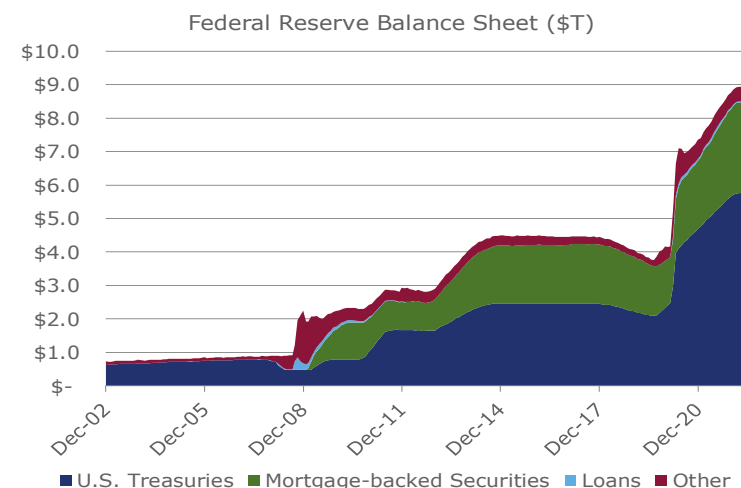
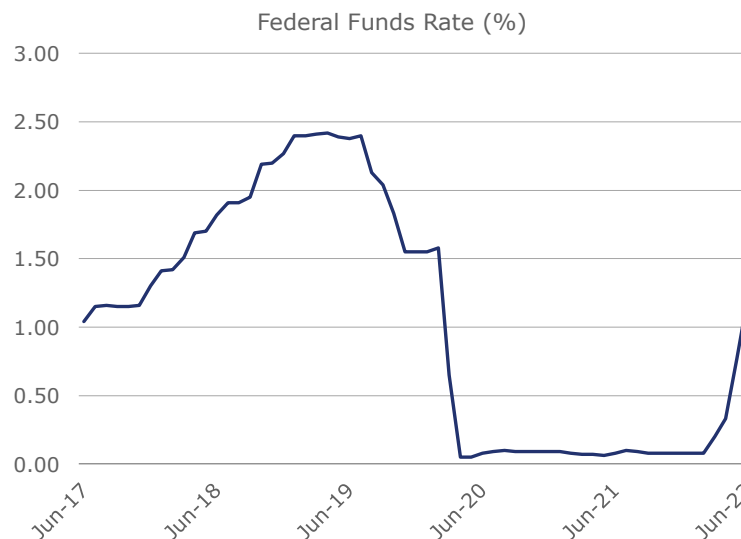


Federal Reserve

After 150 basis point increase in the Fed-funds rate since the start of the year, current FOMC expectation is for another 175 basis point increase by the end of 2022

Federal Reserve has added more than \$4.5 trillion in assets to their balance sheet during the past two years

QE4 is now larger than the 3 phases of quantitative easing – combined – following the global financial crisis

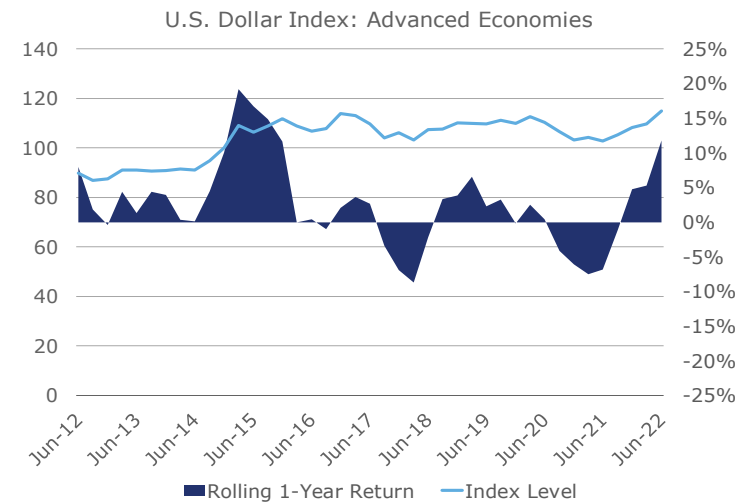
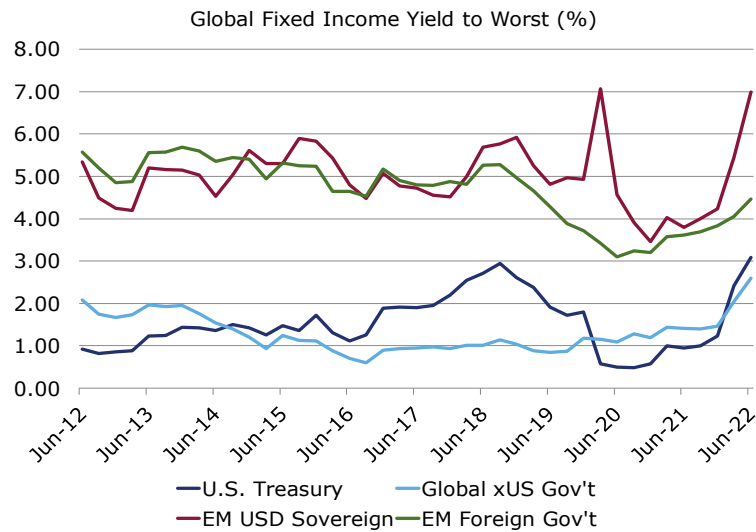


	Announced	Closed	Amount (bil)
QE1	11/25/2008	3/31/2010	\$1,403
QE2	11/3/2010	6/29/2012	\$568
QE3	9/13/2012	10/29/2014	\$1,674
QE4	3/23/2020	3/15/2022	\$4,779

Non-U.S. Fixed Income

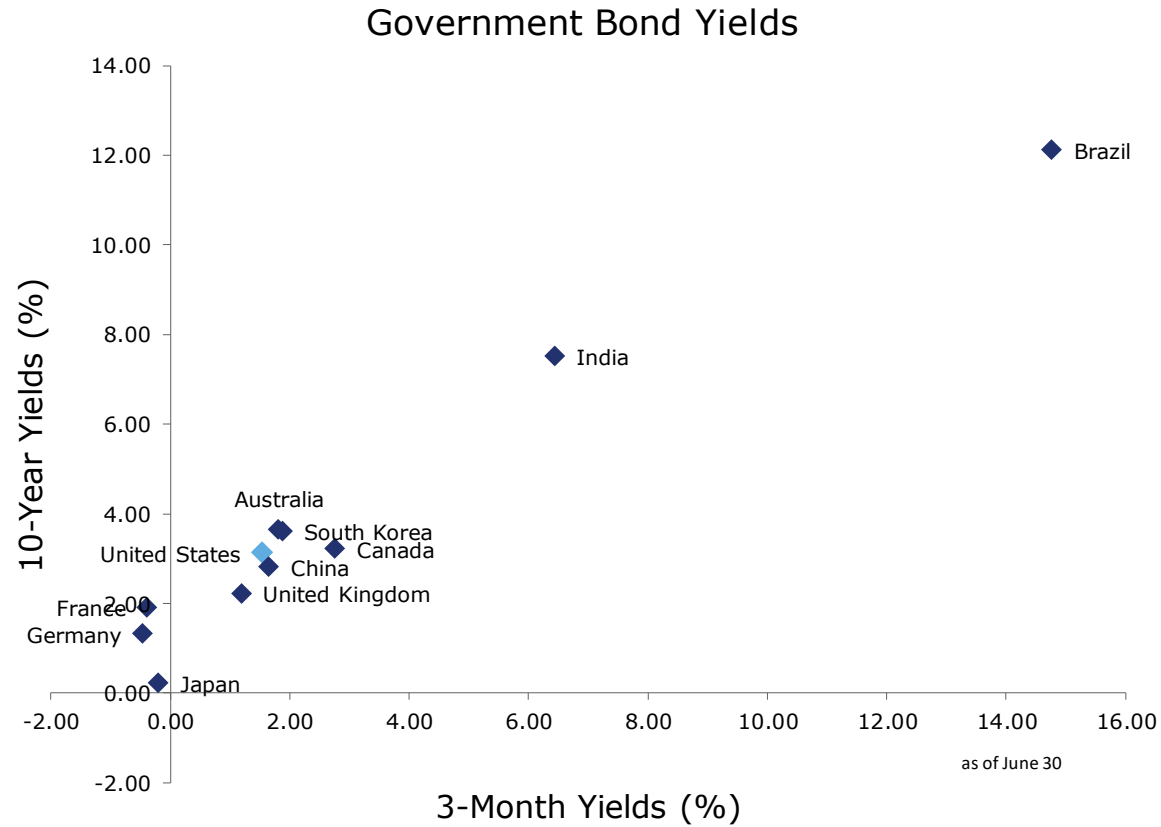
As of 6/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Developed Markets						
Bloomberg Global Aggregate xUS	-11.0	-16.5	-18.8	-5.1	-1.8	-1.1
Bloomberg Global Aggregate xUS *	-4.0	-7.9	-7.7	-1.4	1.3	2.7
Bloomberg Global Inflation Linked xUS	-18.9	-23.2	-21.0	-3.8	-0.9	0.8
Bloomberg Global Inflation Linked xUS *	-12.2	-14.7	-9.6	-0.8	1.9	4.0
Emerging Markets (Hard Currency)						
Bloomberg EM USD Aggregate	-8.7	-17.1	-18.0	-3.5	-0.3	2.5
Emerging Markets (Foreign Currency)						
Bloomberg EM Local Currency Gov't	-7.0	-9.0	-9.6	-0.8	0.9	1.0
Bloomberg EM Local Currency Gov't *	-1.6	-5.1	-5.2	-0.1	1.7	2.0
Euro vs. Dollar	-5.3	-7.8	-11.6	-2.7	-1.7	-1.9
Yen vs. Dollar	-10.3	-15.2	-18.1	-7.4	-3.7	-5.2
Pound vs. Dollar	-7.3	-10.0	-12.0	-1.4	-1.3	-2.5

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



Global Interest Rates

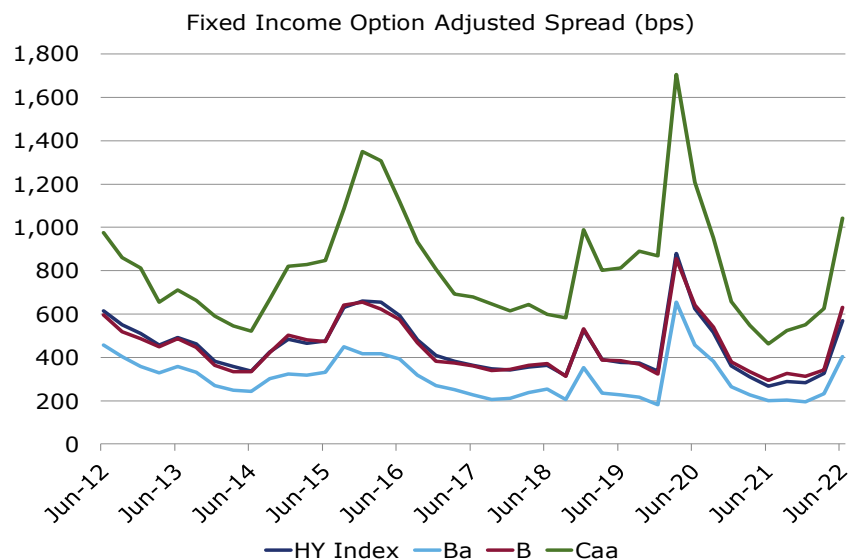
Negative rates found in Germany and France; higher rates, and at similar levels, in the U.S., Australia and in the U.K.



High Yield Bond Market

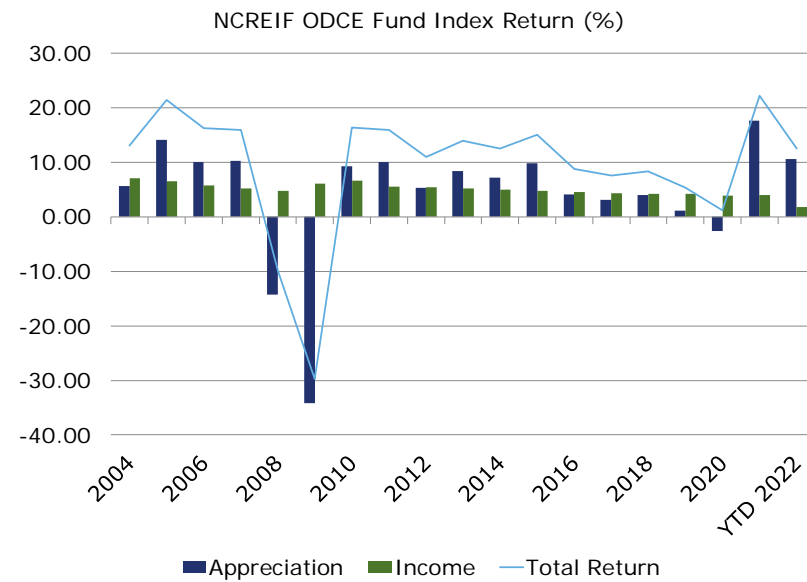
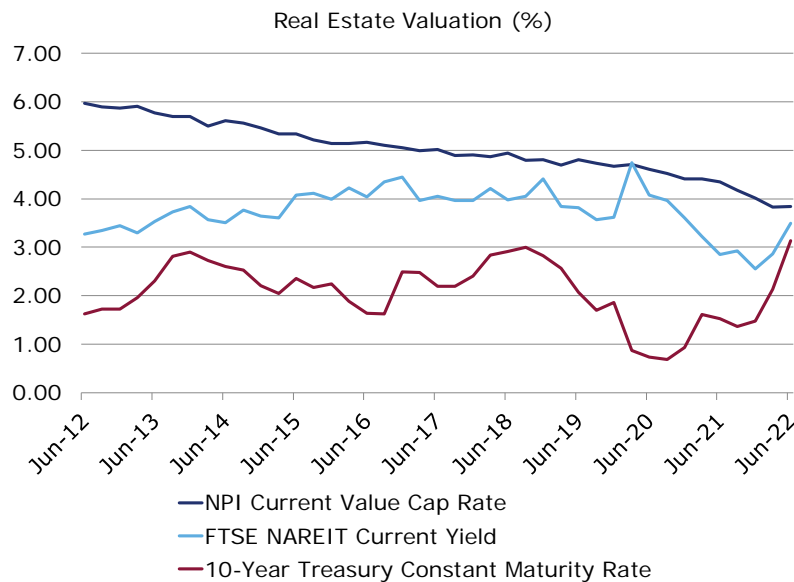
As of 6/30/2022

		YTW	QTR	YTD	1 YR	3 YR	5 YR	10 YR
Bloomberg High Yield		8.9	-9.8	-14.2	-12.8	0.2	2.1	4.5
S&P LSTA Leveraged Loan		4.4	-5.3	-5.5	-4.2	1.4	2.4	3.3
High Yield Quality Distribution	Weight							
Ba U.S. High Yield	52.3%	7.2	-8.4	-13.9	-12.3	1.2	2.8	4.8
B U.S. High Yield	36.1%	9.5	-10.8	-13.9	-12.7	-0.5	1.8	4.0
Caa U.S. High Yield	11.4%	13.6	-13.0	-16.4	-15.3	-1.8	0.3	4.3
Ca to D U.S. High Yield	0.3%	42.3	-15.7	-18.9	-29.2	-6.8	-1.2	-4.5



Real Assets

As of 6/30/2022	Quarter	YTD	1 Year	3 Year	5 Year	10 Year
Bloomberg U.S. TIPS	-6.1	-8.9	-5.1	3.0	3.2	1.7
Bloomberg Commodity Index	-5.7	18.4	24.3	14.3	8.4	-0.8
Bloomberg Gold Index	-7.6	-1.5	1.3	6.9	6.6	0.3
Wilshire Global RESI Index	-18.0	-20.5	-9.7	1.3	3.7	6.3
NCREIF ODCE Fund Index	4.8	12.5	29.5	12.7	10.5	11.2
NCREIF Timberland Index	1.9	5.1	12.0	5.0	4.3	5.7
FTSE Global Core Infrastructure 50/50	-7.3	-3.7	3.7	4.7	6.7	8.7
Alerian Midstream Energy	-8.6	13.2	11.4	6.4	5.2	n.a.
Bitcoin	-59.1	-59.6	-45.8	18.0	49.6	121.3



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

Asset Class Performance

Asset Class Returns - Best to Worst

2017	2018	2019	2020	2021	2022 YTD	Annualized 5-Year as of 6/22
Emrg Mrkts 37.7%	T-Bills 1.9%	U.S. Equity 31.0%	U.S. Equity 20.8%	REITs 46.2%	Commodities 18.4%	U.S. Equity 10.8%
Developed 25.6%	Core Bond 0.0%	REITs 25.8%	Emrg Mrkts 18.7%	Commodities 27.1%	T-Bills 0.0%	Commodities 8.4%
U.S. Equity 21.0%	U.S. TIPS -1.3%	Developed 22.7%	U.S. TIPS 11.0%	U.S. Equity 26.7%	U.S. TIPS -8.9%	REITs 5.3%
High Yield 7.5%	High Yield -2.1%	Emrg Mrkts 18.9%	Developed 8.3%	Developed 11.8%	Core Bond -10.3%	U.S. TIPS 3.2%
REITs 4.2%	REITs -4.8%	High Yield 14.3%	Core Bond 7.5%	U.S. TIPS 6.0%	High Yield -14.2%	Developed 2.7%
Core Bond 3.6%	U.S. Equity -5.3%	Core Bond 8.7%	High Yield 7.1%	High Yield 5.3%	Emrg Mrkts -17.5%	Emrg Mrkts 2.5%
U.S. TIPS 3.0%	Commodities -11.2%	U.S. TIPS 8.4%	T-Bills 0.7%	T-Bills 0.0%	Developed -19.3%	High Yield 2.1%
Commodities 1.7%	Developed -13.4%	Commodities 7.7%	Commodities -3.1%	Core Bond -1.5%	U.S. Equity -20.9%	T-Bills 1.1%
T-Bills 0.8%	Emrg Mrkts -14.2%	T-Bills 2.3%	REITs -7.9%	Emrg Mrkts -2.2%	REITs -21.6%	Core Bond 0.9%

Data Sources: Bloomberg

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

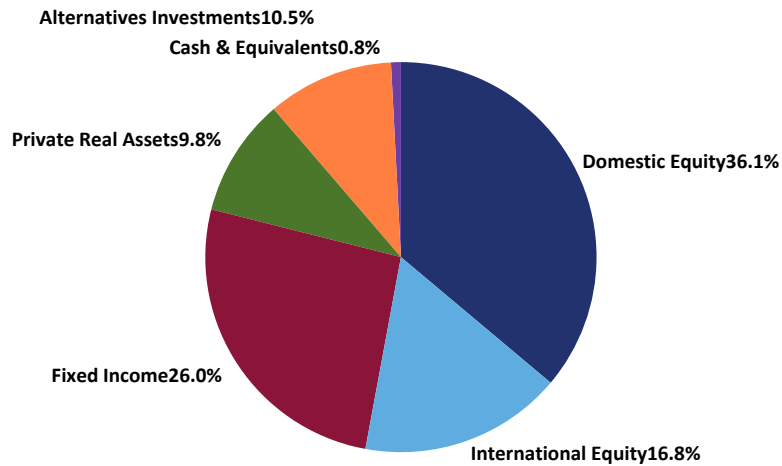
Total Fund

Asset Allocation

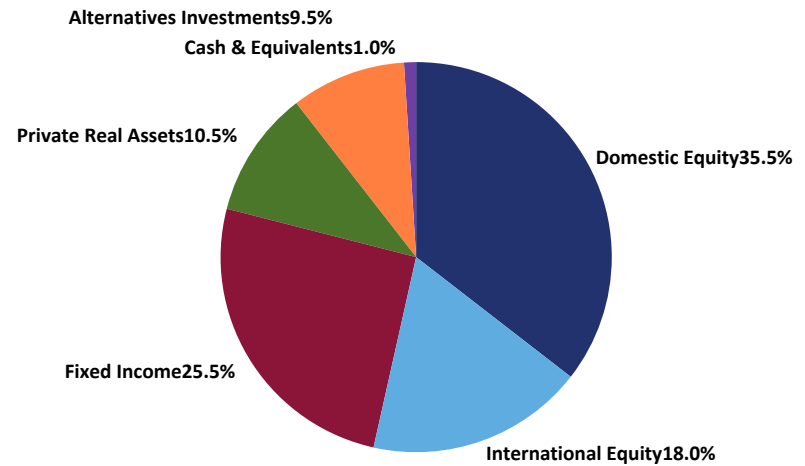
Total Fund

Periods Ended As of June 30, 2022

Actual Allocation



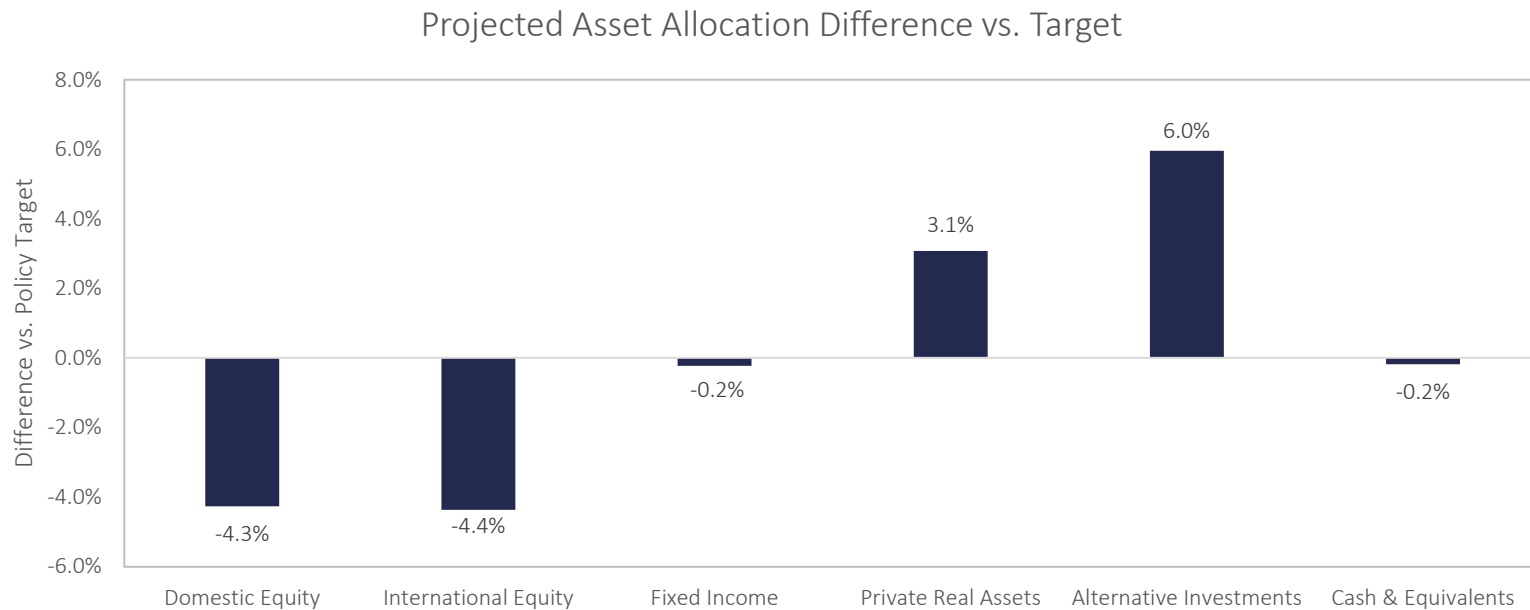
Target Allocation



	Actual Allocation \$Millions	Actual Allocation %	Target Allocation %	Differences %	Differences \$Millions
Total Fund	48,374	100.0	100.0	0.0	
Domestic Equity	17,479	36.1	35.5	0.6	306
International Equity	8,116	16.8	18.0	-1.2	-591
Fixed Income	12,595	26.0	25.5	0.5	260
Private Real Assets	4,732	9.8	10.5	-0.7	-347
Alternatives Investments	5,056	10.5	9.5	1.0	460
Cash & Equivalents	397	0.8	1.0	-0.2	-86

Projected Deviations from the Benchmark

As of June 30, 2022



- Includes committed, but unfunded amounts for Real Assets (\$1.84 billion) and Alternatives (\$2.42 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

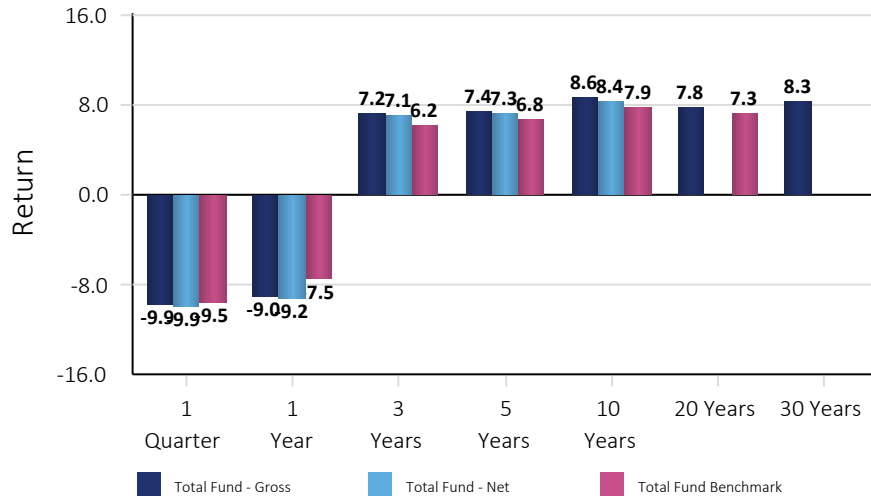
Real Assets Proxy: 50% Domestic Equity, 30% International Equity, 20% Fixed Income

Composite Performance Summary

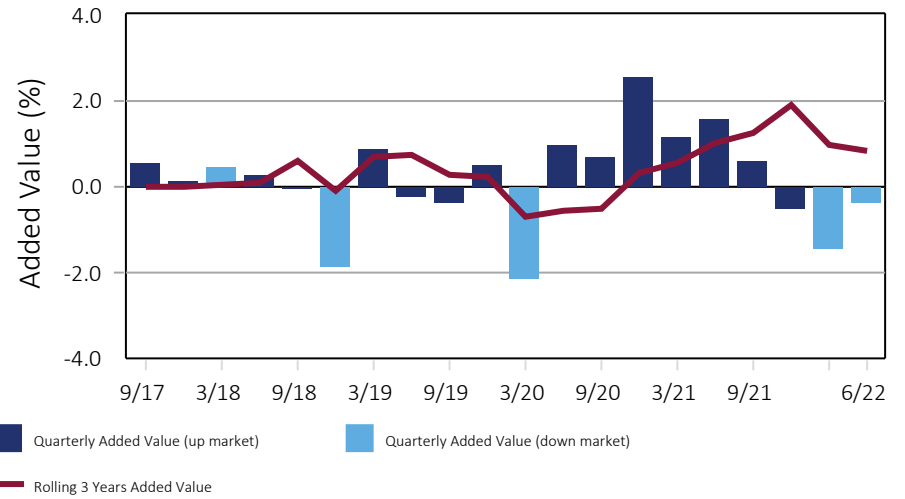
Total Fund

Periods Ended June 30, 2022

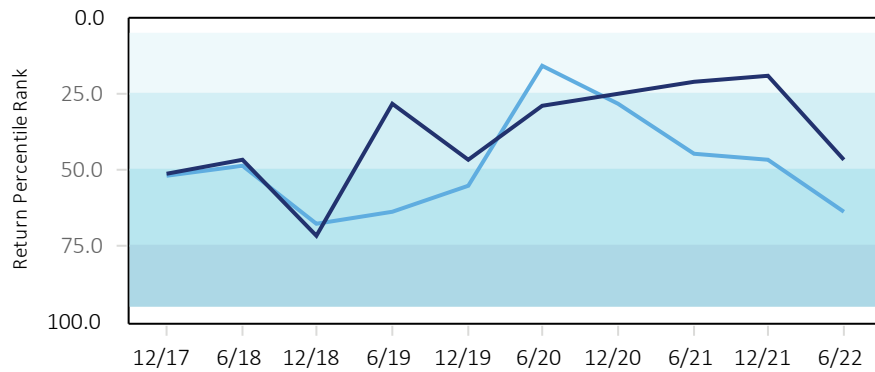
Comparative Performance



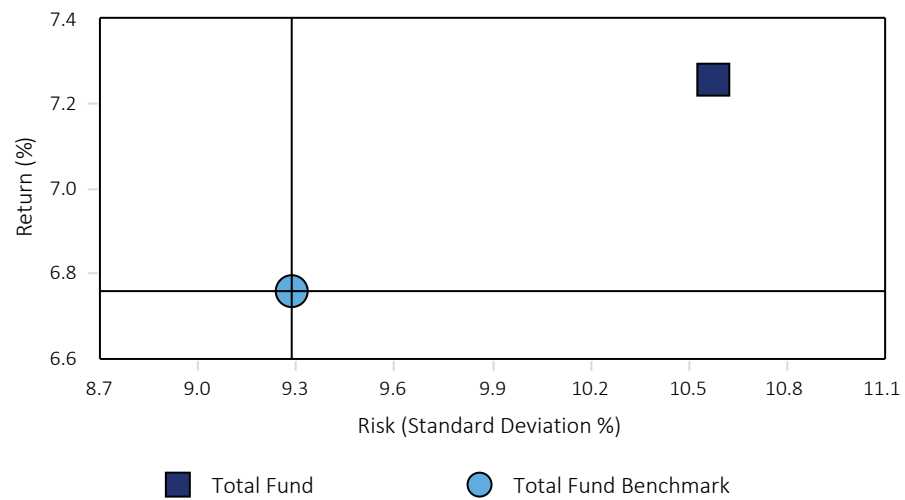
Added Value History



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



Risk and Return 07/01/17 - 06/30/22

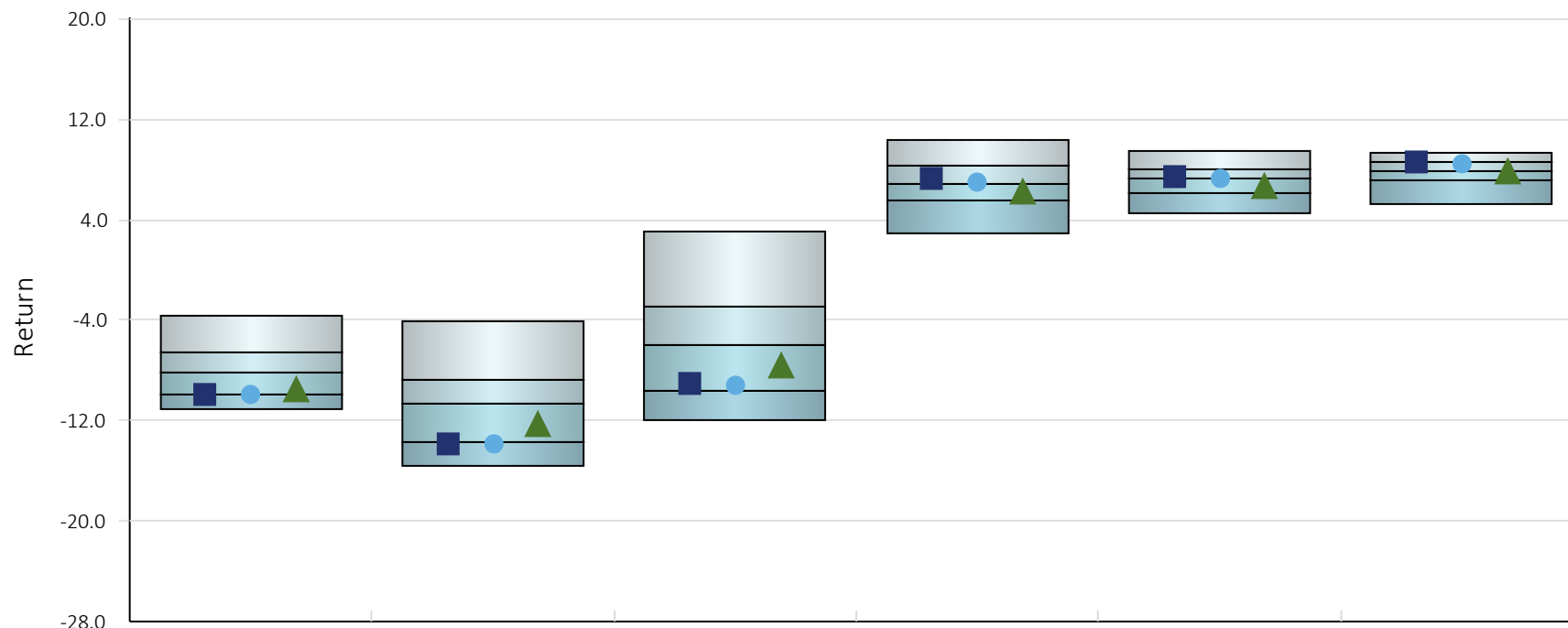


	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
Total Fund	10	3 (30%)	5 (50%)	2 (20%)	0 (0%)
Total Fund Benchmark	10	1 (10%)	4 (40%)	5 (50%)	0 (0%)

Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2022



	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Total Fund	-9.86 (72)	-13.82 (77)	-9.05 (72)	7.25 (41)	7.45 (39)	8.64 (26)
● Total Fund - Net	-9.89 (75)	-13.88 (78)	-9.20 (73)	7.07 (47)	7.26 (48)	8.42 (34)
▲ Total Fund Benchmark	-9.53 (71)	-12.23 (60)	-7.55 (59)	6.22 (64)	6.76 (62)	7.91 (50)
5th Percentile	-3.69	-4.01	3.05	10.31	9.47	9.34
1st Quartile	-6.49	-8.73	-2.90	8.30	8.02	8.64
Median	-8.15	-10.66	-5.94	6.87	7.24	7.88
3rd Quartile	-9.97	-13.69	-9.64	5.58	6.16	7.22
95th Percentile	-11.03	-15.56	-11.93	2.94	4.53	5.30
Population	78	78	78	78	78	77

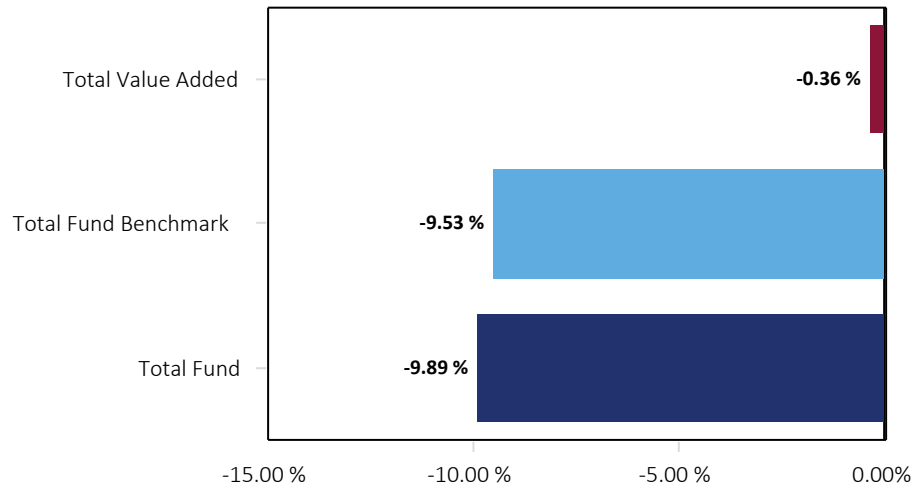
Total Fund Benchmark = 35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18.0% MSCI ACWI ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1.0% 90 Day US Treasury Bill.

Total Fund Attribution

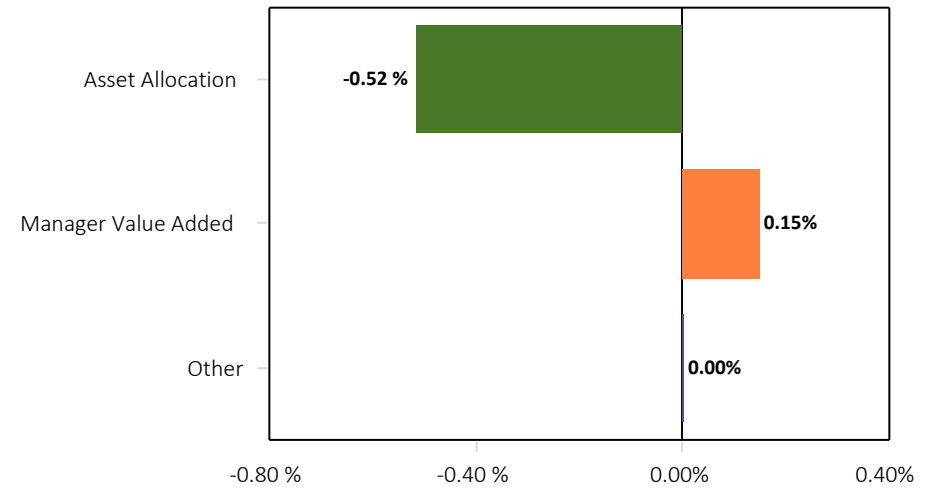
Total Fund

1 Quarter Ending June 30, 2022

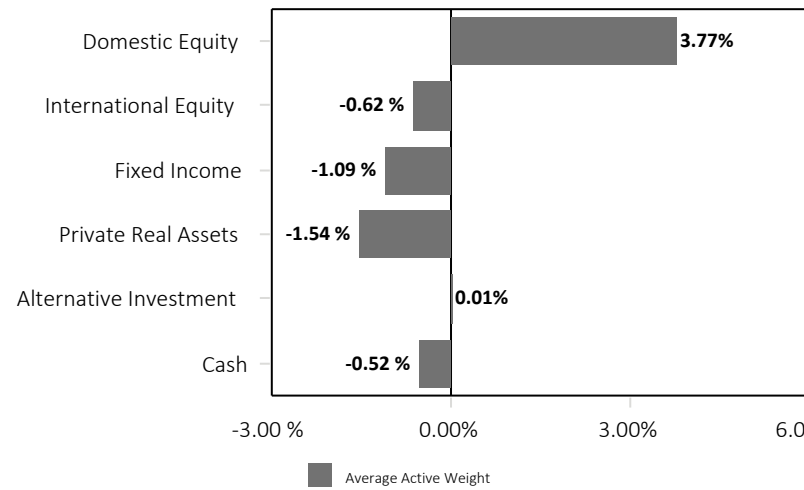
Total Fund Performance



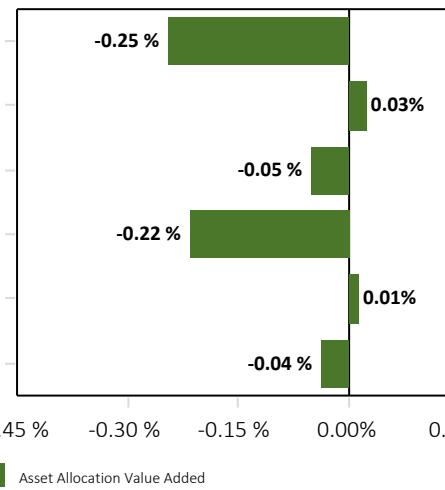
Total Value Added: -0.36 %



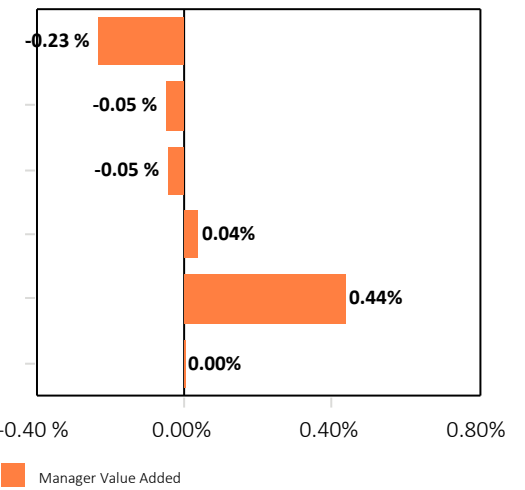
Asset Class Under or Overweighting



Asset Allocation Value Added: -0.52 %



Total Manager Value Added: 0.15 %



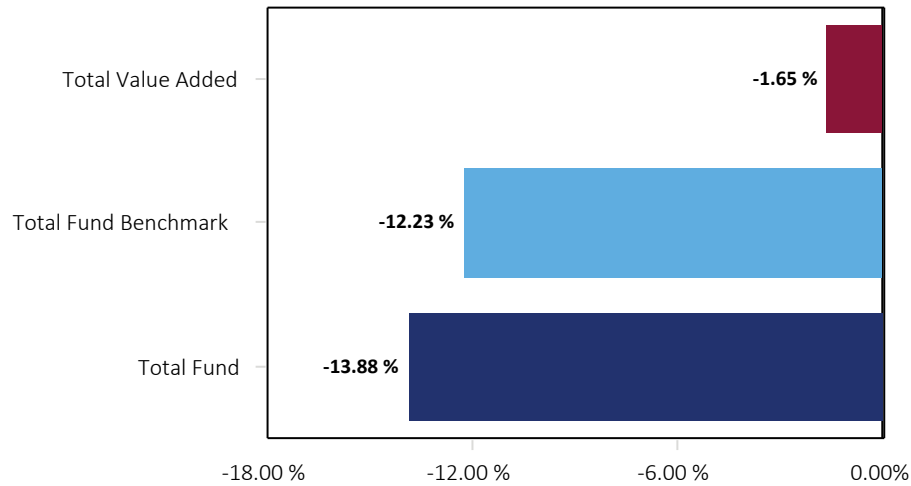
Total Fund Benchmark = 35.5% Domestic Equity Custom Benchmark, 25.5% Fixed Income Custom Benchmark, 18.0% MSCI ACWI ex USA (Net), 10.5% Private Real Assets Custom Benchmark, 9.5% Alternatives Custom Benchmark, 1.0% 90 Day US Treasury Bill.

Total Fund Attribution

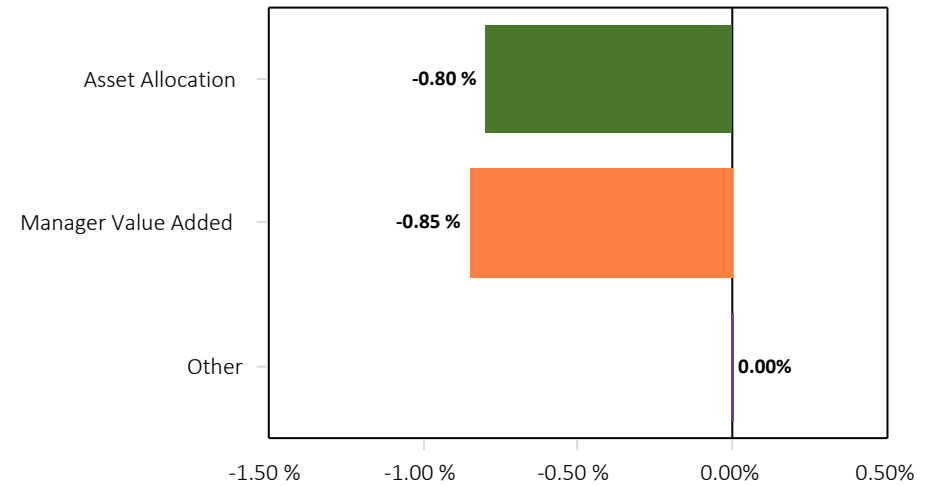
Total Fund

Year To Date Ending June 30, 2022

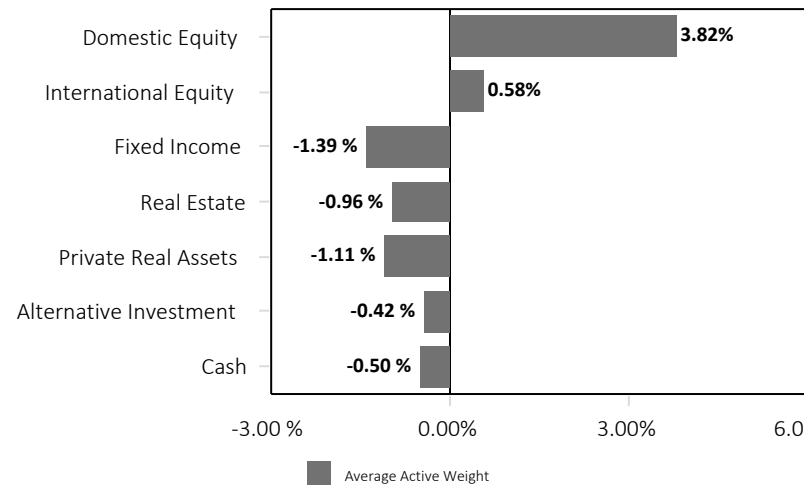
Total Fund Performance



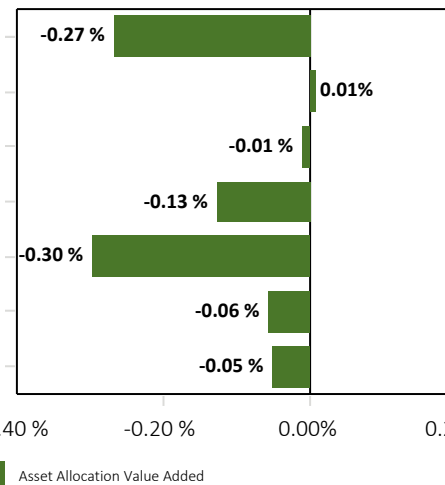
Total Value Added:-1.65 %



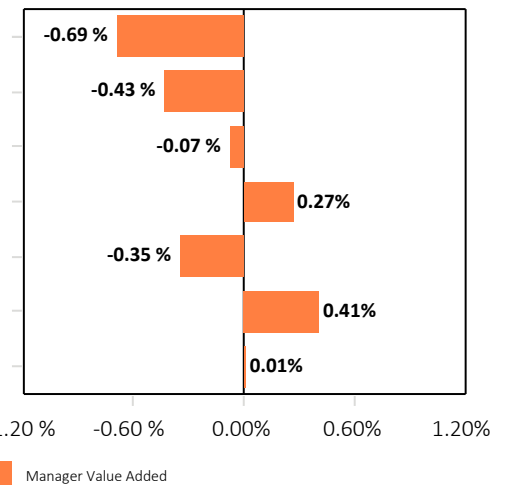
Asset Class Under or Overweighting



Asset Allocation Value Added:-0.80 %



Total Manager Value Added:-0.85 %



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, 2022

	Performance (%)									
	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
Total Fund	-9.86	-13.82	-9.05	7.25	7.45	8.64	7.85	8.29	9.65	1/1/1982
Total Fund - Net	-9.89	-13.88	-9.20	7.07	7.26	8.42				
Total Fund Benchmark	-9.53	-12.23	-7.55	6.22	6.76	7.91	7.33			
Domestic Equity	-16.62	-21.76	-15.77	9.23	9.93	12.26	9.25	10.18	11.39	1/1/1982
Domestic Equity - Net	-16.64	-21.83	-15.91	9.04	9.73	12.02				
Custom Benchmark (U.S. Equity)	-16.08	-20.28	-12.97	10.15	10.83	12.66	9.34	9.91		
U.S. Equity IMRF Custom Benchmark	-16.16	-20.55	-13.28	8.95	9.42					
International Equity	-13.94	-20.55	-21.38	2.26	3.23	6.21	6.74	6.93	7.27	9/1/1986
International Equity - Net	-14.01	-20.69	-21.69	1.89	2.87	5.85				
MSCI AC World ex USA (Net)	-13.73	-18.42	-19.42	1.35	2.50	4.83	5.78			
International Equity IMRF Custom Benchmark	-13.69	-18.62	-19.94	1.37	2.43					
Fixed Income	-5.27	-10.49	-10.35	-0.44	1.34	2.36	4.46	5.41	7.57	1/1/1982
Fixed Income - Net	-5.29	-10.53	-10.44	-0.54	1.22	2.22				
Custom Benchmark (Fixed Income)	-5.10	-10.23	-10.17	-0.89	0.90	1.56	3.57	4.82	7.04	
Fixed Income IMRF Custom Benchmark	-5.32	-10.59	-10.42	-0.82	1.02					
Private Real Assets	5.24								6.87	3/1/2022
Private Real Assets - Net	5.22								6.85	
Custom Benchmark (Private Real Assets)	4.52								11.69	
Real Estate	5.67	12.11	28.36	14.21	12.39	11.78	8.36	6.72	6.18	5/1/1985
Real Estate - Net	5.66	12.08	28.28	14.15	12.35	11.75				
Blended Benchmark (Real Estate)	4.54	12.00	28.31	11.66	9.55	10.23	8.11	7.89	8.05	
Agriculture	-0.19	1.24	5.96	1.64	-0.27	7.38	7.25		6.60	10/1/1997
NCREIF Farmland Index	1.45	4.11	9.71	6.14	6.13	9.47	12.48		11.21	
Timberland	1.77	-1.63	3.30	0.20	0.18	1.89	2.77		6.70	10/1/1992
NCREIF Timberland Index	1.87	5.13	12.01	5.03	4.32	5.73	6.66		8.40	

Benchmark definitions are available in the appendix.

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

Asset Class Returns

Periods Ended June 30, 2022

	Performance (%)									
	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	20 Years	30 Years	Since Inception	Inception Date
Unlisted Infrastruct	2.47	8.89	14.02	14.41					12.84	4/1/2018
Blended Benchmark (Unlisted Infrastructure)	4.08	7.34	12.07	10.01					9.71	
Alternatives Investments	0.85	6.45	27.13	22.74	18.77	13.81	10.44	13.12	11.79	2/1/1986
Alternatives Investments - Net	0.85	6.44	27.11	22.71	18.69	13.60				
Custom Benchmark (Alternative Investments)	-4.46	1.12	5.57	7.84	8.30	8.65	10.14	11.73	12.30	
Private Equity	0.94	7.09	30.13	26.41	22.32	16.42	12.75	15.87	14.11	2/1/1986
Blended Benchmark (Private Equity)	-4.45	1.32	5.79	7.92	8.35	8.67	10.15			
Cash	0.65	1.59	3.07	2.85	2.69	1.55	1.37	3.01	3.74	7/1/1986
90 Day US Treasury Bill	0.11	0.15	0.17	0.63	1.11	0.63	1.21	2.35	3.08	

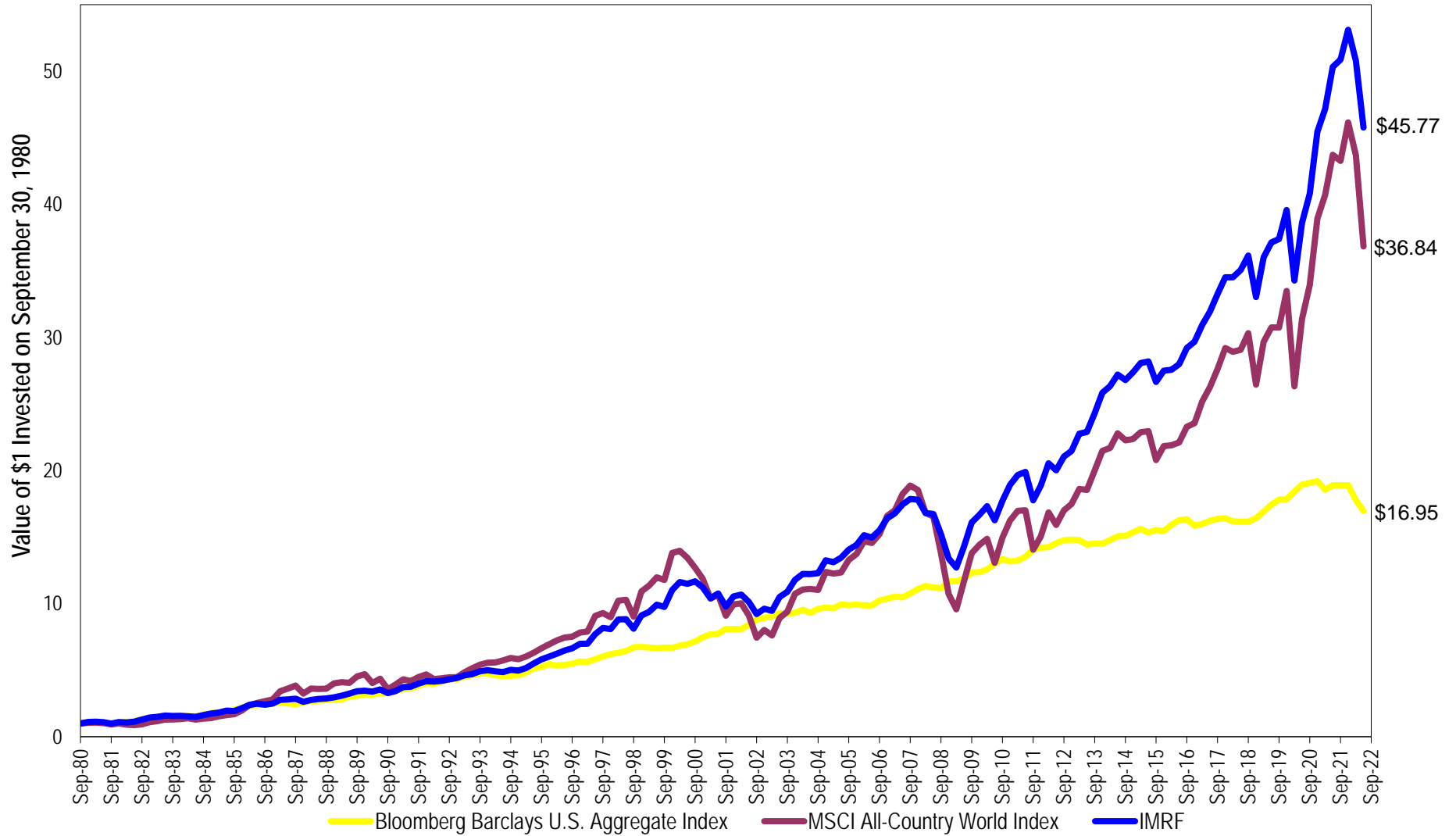
Benchmark definitions are available in the appendix.

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

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

Total Fund Growth of a Dollar

Growth of a Dollar - As of June 30, 2022



Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
Domestic Equity	22,397,947,137	41.41	17,478,524,266	36.13
Large Cap Growth	7,534,804,251	13.93	2,986,752,178	6.17
NTGI S&P 500 Growth	3,453,552,109	6.39	24	0.00
Sands Capital	1,843,848,163	3.41	1,217,313,205	2.52
Xponance Russell 1000 G	2,237,403,980	4.14	1,769,438,949	3.66
Large Cap Value	5,019,576,663	9.28	4,410,505,368	9.12
Dodge & Cox	1,906,842,354	3.53	1,661,399,212	3.43
LSV Asset	1,519,183,210	2.81	1,343,852,447	2.78
NTGI S&P 500 Value	1,593,551,100	2.95	1,405,253,710	2.90
Large Cap Pass. Core	3,079,794,923	5.69	2,449,927,491	5.06
NTGI MarketCap Idx.	3,079,794,923	5.69	2,449,927,491	5.06
Factor Diversity Strategies	1,583,425,819	2.93	2,248,069,124	4.65
U.S. Large Cap FDP-GSAM	1,583,425,819	2.93	2,248,069,124	4.65
Quantitative Factor Strategies	1,815,612,829	3.36	2,038,744,701	4.21
Quantitative US Equity - SciBeta	1,815,612,829	3.36	2,038,744,701	4.21
Small Cap Growth	789,461,182	1.46	655,839,282	1.36
Frontier Capital	789,461,182	1.46	655,839,282	1.36
Small Cap Value	1,508,746,381	2.79	1,319,100,426	2.73
Channing	338,698,999	0.63	286,506,929	0.59
DFA Small Cap Val.	546,646,562	1.01	480,376,940	0.99
William Blair Small Cap Value	623,400,820	1.15	552,216,557	1.14

Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
Public Real Assets	1,066,525,086	1.97	1,369,585,697	2.83
Brookfield	208,310,698	0.39	377,827,136	0.78
Cohen & Steers	858,214,388	1.59	991,758,561	2.05
International Equity	9,426,493,695	17.43	8,115,909,029	16.78
Intl Large Cap Growth	1,613,458,917	2.98	1,330,080,566	2.75
EARNEST Part. Intl	634,339,683	1.17	539,979,699	1.12
William Blair	979,119,234	1.81	790,100,866	1.63
Intl Large Cap Value	1,366,997,412	2.53	1,233,039,325	2.55
Brandes Investment	596,775,229	1.10	543,601,392	1.12
Mondrian	631,847,525	1.17	569,367,070	1.18
Lazard	138,374,658	0.26	120,070,863	0.25
Intl Large Cap Core	4,493,473,193	8.31	3,887,729,559	8.04
Arrowstreet Capital	1,064,663,946	1.97	940,008,487	1.94
Brown Capital	560,794,246	1.04	457,201,092	0.95
GlobeFlex Capital	876,851,825	1.62	754,194,029	1.56
Xponance Intl EQ	98,508,960	0.18	83,708,989	0.17
Transition Account	119,717	0.00	185,688	0.00
Progress Intl Equity	659,544	0.00	612,099	0.00
NTGI ACWI ex US Index Fund	1,891,874,955	3.50	1,651,819,175	3.41
Intl All Cap Developed	165,796,869	0.31	139,527,682	0.29
Ativo International	165,796,869	0.31	139,527,682	0.29
Internationall Small Cap	600,108,570	1.11	478,840,480	0.99
Franklin Templeton	226,459,614	0.42	195,292,848	0.40

Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
William Blair IntSC	373,648,956	0.69	283,547,632	0.59
Emerging Mkt Equity	1,186,658,735	2.19	1,046,691,417	2.16
Genesis Asset Mngrs.	1,186,658,735	2.19	1,046,691,417	2.16

Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
Fixed Income	12,427,070,915	22.98	12,595,053,298	26.04
Global Bonds Transition	210,263	0.00	282,523	0.00
Domestic Fixed Core	4,064,715,748	7.52	3,879,734,948	8.02
Attucks Fixed Income	93,716,240	0.17	88,901,719	0.18
Brandes FI Core	354,946,090	0.66	340,436,090	0.70
EARNEST Partners	965,774,469	1.79	922,163,170	1.91
Garcia Hamilton	1,035,544,810	1.91	992,828,121	2.05
Ramirez Asset Management	563,847,708	1.04	538,104,493	1.11
Xponance Yield Advantage Agg.	1,050,886,430	1.94	997,301,354	2.06
Domestic Fixed Passive Core	3,439,948,286	6.36	3,047,806,463	6.30
NTGI Blmbg Agg.	1,709,083,276	3.16	1,397,657,603	2.89
BlackRock US Debt I	1,730,865,010	3.20	1,650,148,860	3.41
Domestic Fixed Core Plus	3,184,087,542	5.89	2,999,398,798	6.20
LM Capital Group FI	908,230,733	1.68	863,978,557	1.79
Progress Inv. FI	1,159	0.00	1,074	0.00
Loop Capital Management	619,953,817	1.15	581,034,022	1.20
Western Asset	1,039,857,546	1.92	970,642,799	2.01
Longfellow Core Plus	616,044,287	1.14	583,742,346	1.21
Bank Loans	726,116,001	1.34	1,624,457,781	3.36
Barings Global Loan Fund	726,116,001	1.34	1,624,457,781	3.36
Emerging Markets Debt	199,893,049	0.37	2,490,747	0.01
Standish-Mellon EMD	199,893,049	0.37	2,490,747	0.01

Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
High Yield	812,100,026	1.50	1,040,882,038	2.15
MacKay Shields	812,100,023	1.50	1,040,882,038	2.15
FIAM High Yield	3	0.00		0.00

Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
Private Real Assets	4,597,883,654	8.50	4,732,017,175	9.78
Real Estate	4,182,789,262	7.73	4,318,598,041	8.93
Real Estate Core Cmp	2,241,122,737	4.14	2,310,739,338	4.78
TA Assoc. Buckhead	894,660,982	1.65	890,447,166	1.84
Barings Euro Core Property	145,674,226	0.27	140,031,894	0.29
Blackstone Property Euro	160,735,892	0.30	169,481,160	0.35
INVESCO Core Real Estate	237,766,430	0.44	251,394,301	0.52
INVESCO European real estate	58,016,963	0.11	56,988,468	0.12
AEW Core Property Tr	272,951,247	0.50	295,441,657	0.61
CBRE Core Partners	282,528,121	0.52	313,630,690	0.65
JPM Strategic Property Fund	188,788,876	0.35	193,324,002	0.40
RE Non-Core Cmp	1,941,666,525	3.59	2,007,858,703	4.15
Artemis MWBE Spruce	355,210,635	0.66	311,478,164	0.64
Franklin T. EMREFF	4,639,964	0.01	4,439,375	0.01
Security Capital	61,777,751	0.11	49,230,813	0.10
Dune II	9,412,963	0.02	7,378,667	0.02
Non-Core Real Estate Funds	1,265,156,738	2.34	1,407,127,015	2.91
Non-Core Intl Real Estate	245,382,878	0.45	228,121,679	0.47
Almanac ARS V	85,596	0.00	82,990	0.00
Agriculture	231,475,704	0.43	231,046,869	0.48
Premiere Partners IV	231,475,704	0.43	231,046,869	0.48
Timberland	63,091,285	0.12	62,951,641	0.13
Forest Investment	63,091,285	0.12	62,951,641	0.13
Unlisted Infrastructure	120,527,403	0.22	119,420,624	0.25
Unlisted Infrastructure Funds	120,527,403	0.22	119,420,624	0.25

Investment Manager Asset Allocation

Periods Ended June 30, 2022

	Mar-2022		Jun-2022	
	\$	%	\$	%
Alternatives Investments	4,914,673,500	9.09	5,055,633,051	10.45
Absolute Return	78,878	0.00	82,440	0.00
Aurora Investment	78,878	0.00	82,440	0.00
Private Equity	4,731,189,165	8.75	4,866,475,640	10.06
Abbott S/A Comp.	536,150,189	0.99	543,658,783	1.12
Muller Monroe MPEFF	517,859	0.00	552,890	0.00
Pantheon S/A Comp.	419,526,411	0.78	426,436,147	0.88
Private Equity Fund - Domestic	3,068,429,292	5.67	3,167,078,982	6.55
Private Equity Fund - International	551,353,095	1.02	536,172,977	1.11
Oakbrook Opportunities Fund	155,212,320	0.29	192,575,861	0.40
Private Credit	183,405,457	0.34	189,074,971	0.39
Private Credit Fund - Domestic	183,405,457	0.34	189,074,971	0.39
Cash & Equivalents	320,935,546	0.59	397,316,070	0.82
Total Fund	54,085,004,446	100.00	48,374,452,889	100.00

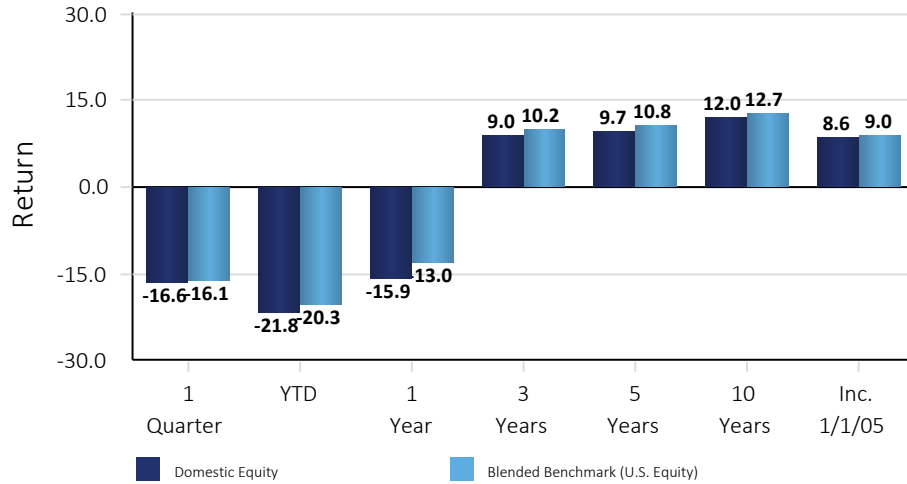
Domestic Equity

Composite Performance Summary

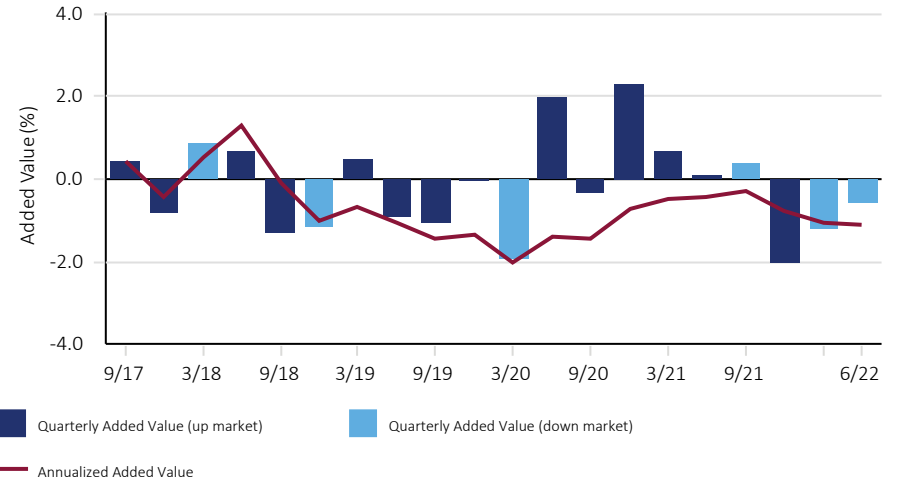
Domestic Equity

Periods Ended June 30, 2022

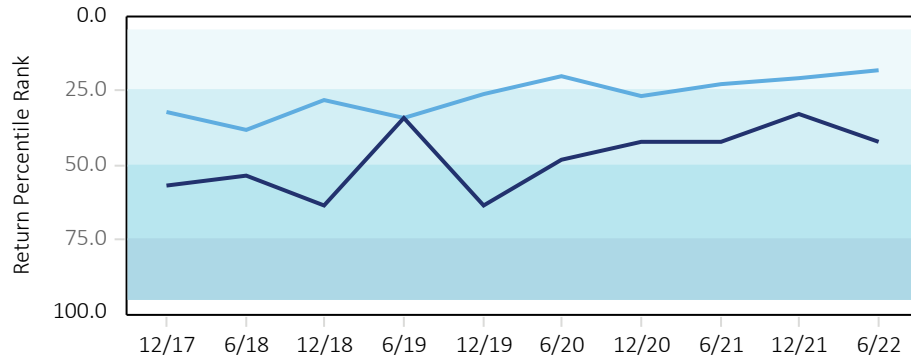
Comparative Performance



Added Value History

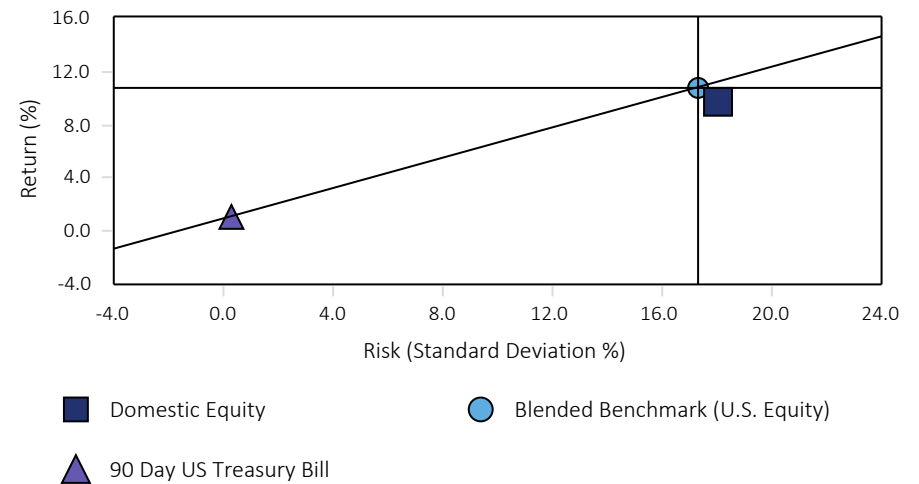


Rolling Percentile Rank: All Public Plans > \$1B-US Equity Segment



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

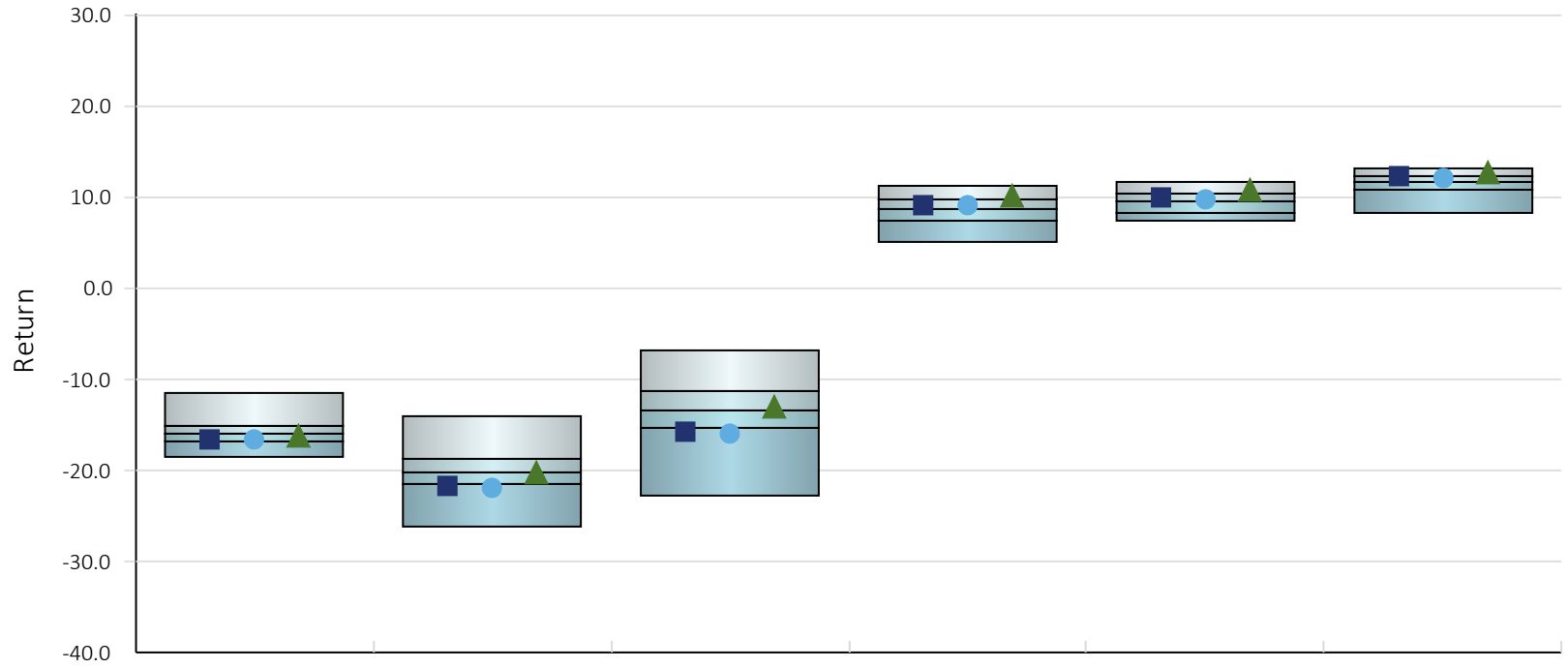
Risk and Return 07/1/17 - 06/30/22



Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2022



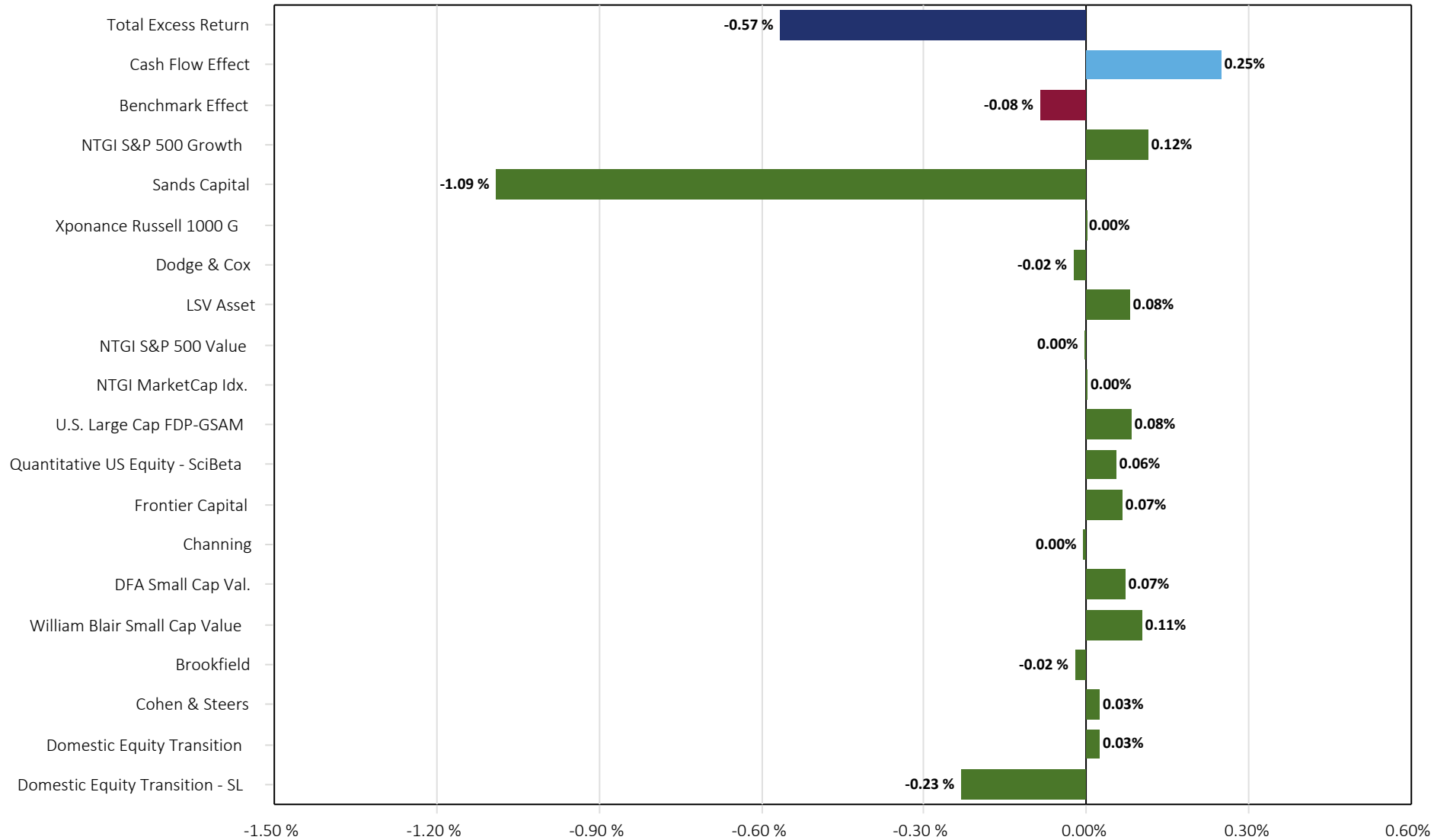
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Domestic Equity	-16.62 (73)	-21.76 (80)	-15.77 (84)	9.23 (35)	9.93 (41)	12.26 (33)
● Domestic Equity - Net	-16.64 (74)	-21.83 (81)	-15.91 (85)	9.04 (42)	9.73 (43)	12.02 (41)
▲ Blended Benchmark (U.S. Equity)	-16.08 (53)	-20.28 (51)	-12.97 (43)	10.15 (18)	10.83 (18)	12.66 (20)
5th Percentile	-11.58	-13.96	-6.85	11.28	11.69	13.15
1st Quartile	-15.11	-18.81	-11.21	9.79	10.36	12.38
Median	-15.97	-20.17	-13.42	8.72	9.49	11.76
3rd Quartile	-16.71	-21.40	-15.30	7.48	8.25	10.85
95th Percentile	-18.44	-26.23	-22.69	5.08	7.38	8.21
Population	44	44	43	36	34	26

Asset Class Attribution

Domestic Equity

Periods Ended 1 Quarter Ending June 30, 2022

1 Quarter



Performance

Domestic Equity

Periods Ended June 30, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Domestic Equity	17,478,524,266	-16.62	-21.76	-15.77	9.23	9.93	12.26	11.39	1/1/1982
Domestic Equity - Net		-16.64	-21.83	-15.91	9.04	9.73	12.02		
Blended Benchmark (U.S. Equity)		-16.08	-20.28	-12.97	10.15	10.83	12.66		
Russell 3000 Index		-16.70	-21.10	-13.87	9.77	10.60	12.57	11.33	
U.S. Equity IMRF Custom Benchmark		-16.16	-20.55	-13.28	8.95	9.42			
Large Cap Equity	12,095,254,161	-18.06	-23.97	-17.60	9.13	10.28	12.56	11.08	1/1/1982
Large Cap Equity - Net		-18.08	-24.00	-17.67	9.04	10.18	12.44		
Russell 1000 Index		-16.67	-20.94	-13.04	10.17	11.00	12.82	11.49	
Large Cap Growth	2,986,752,178	-24.49	-33.66	-27.49	9.18	12.87	13.62	11.78	1/1/1982
Large Cap Growth - Net		-24.51	-33.69	-27.55	9.08	12.76	13.47		
LCG Blended Benchmark*		-20.92	-28.07	-18.77	12.58	14.29	14.80		
Russell 1000 Growth Index		-20.92	-28.07	-18.77	12.58	14.29	14.80	11.25	
NTGI S&P 500 Growth	24								
Xponance Russell 1000 G	1,769,438,949	-20.92	-28.06	-18.76	12.57			10.57	10/1/2018
Xponance Russell 1000 G - Net		-20.92	-28.07	-18.78	12.55			10.55	
Russell 1000 Growth Index		-20.92	-28.07	-18.77	12.58			10.58	
Sands Capital	1,217,313,205	-33.98	-48.25	-49.81	-0.79	8.11	11.38	10.28	11/1/2003
Sands Capital - Net		-34.03	-48.32	-49.94	-1.01	7.87	11.13		
LCG Blended Benchmark*		-20.92	-28.07	-18.77	12.58	14.29	14.80	10.33	
Russell 1000 Growth Index		-20.92	-28.07	-18.77	12.58	14.29	14.80	10.38	

* 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, 2022

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Large Cap Value	4,410,505,368	-11.58	-11.56	-6.66	8.96	8.42	11.93	10.17	10/1/1982
Large Cap Value - Net		-11.61	-11.63	-6.80	8.80	8.26	11.74		
LCV Blended Benchmark**		-12.21	-12.86	-6.82	6.87	7.17	10.50		
Russell 1000 Value Index		-12.21	-12.86	-6.82	6.87	7.17	10.50	11.46	
Dodge & Cox	1,661,399,212	-12.38	-11.49	-7.24	11.37	9.98	13.24	9.74	9/1/2003
Dodge & Cox - Net		-12.43	-11.58	-7.43	11.14	9.76	13.00		
LCV Blended Benchmark**		-12.21	-12.86	-6.82	6.87	7.17	10.50	8.11	
Russell 1000 Value Index		-12.21	-12.86	-6.82	6.87	7.17	10.50	8.25	
LSV Asset	1,343,852,447	-10.84	-11.69	-7.69	7.73	7.44	11.91	10.32	2/1/2003
LSV Asset - Net		-10.89	-11.79	-7.91	7.48	7.19	11.64		
LCV Blended Benchmark**		-12.21	-12.86	-6.82	6.87	7.17	10.50	8.90	
Russell 1000 Value Index		-12.21	-12.86	-6.82	6.87	7.17	10.50	8.91	
NTGI S&P 500 Value	1,405,253,710	-11.32	-11.51	-4.93	8.27	8.24	11.04	6.17	8/1/1999
NTGI S&P 500 Value - Net		-11.33	-11.52	-4.93	8.27	8.23	11.04		
S&P 500 Value		-11.27	-11.41	-4.86	8.23	8.19	10.97	6.13	
Large Cap Pass. Core	2,449,927,491	-16.82	-21.31	-14.18	9.63	10.52	12.55	11.02	1/1/1985
Large Cap Pass. Core - Net		-16.82	-21.31	-14.19	9.62	10.51	12.54		
Dow Jones US Total Stock Market Index		-16.84	-21.33	-14.24	9.61	10.48	12.47		
NTGI MarketCap Idx.	2,449,927,491	-16.82	-21.31	-14.18	9.63	10.52	12.55	10.81	2/1/1985
NTGI MarketCap Idx. - Net		-16.82	-21.31	-14.19	9.62	10.51	12.54		
Dow Jones US Total Stock Market Index		-16.84	-21.33	-14.24	9.61	10.48	12.47		
Factor Diversity Strategies	2,248,069,124	-15.85	-20.93	-13.10				6.63	8/18/2020

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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 June 30, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
U.S. Large Cap FDP-GSAM	2,248,069,124	-15.85	-20.93	-13.10				6.63	8/18/2020
U.S. Large Cap FDP-GSAM - Net		-15.86	-20.94	-13.14				6.57	
Solactive GBS U.S. 1000 Index		-16.84	-21.34	-13.57				6.43	
GSAM Active Beta US. Large Cap FDC Index		-15.81	-20.89	-13.02				6.61	
Quantitative Factor Strategies	2,038,744,701	-12.16	-15.85	-8.29				7.26	9/17/2019
Quantitative US Equity - SciBeta	2,038,744,701	-12.16	-15.85	-8.29				7.26	9/17/2019
Quantitative US Equity - SciBeta - Net		-12.16	-15.87	-8.34				7.06	
SciBeta US Hi-Fctr-Intst Div Multi-Beta Multi-Strat Index		-12.77	-16.50	-9.26				6.28	

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*** 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, 2022

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Small Cap	1,974,939,708	-14.07	-17.44	-15.01	9.25	8.28	11.13	11.80	7/1/1988
Small Cap Composite - Net		-14.16	-17.83	-15.65	8.54	7.65	10.51		
Russell 2000 Index		-17.20	-23.43	-25.20	4.21	5.17	9.35	8.93	
Small Cap Growth	655,839,282	-16.93	-23.76	-23.22	10.07	10.55	12.45	12.67	7/1/1988
Small Cap Growth - Net		-17.04	-24.50	-24.23	8.98	9.71	11.72		
Russell 2000 Growth Index		-19.25	-29.45	-33.43	1.40	4.80	9.30	7.55	
Frontier Capital	655,839,282	-16.93	-23.76	-24.08	11.20	13.44	13.27	13.03	8/1/1988
Frontier Capital - Net		-17.04	-24.50	-25.02	10.03	12.43	12.46		
Russell 2000 Growth Index		-19.25	-29.45	-33.43	1.40	4.80	9.30	7.63	
Small Cap Value	1,319,100,426	-12.57	-13.90	-10.16	9.13	7.10	10.86	11.43	9/1/1989
Small Cap Value - Net		-12.66	-14.08	-10.56	8.61	6.57	10.32		
Russell 2000 Value Index		-15.28	-17.31	-16.28	6.18	4.89	9.05	9.59	
Channing	286,506,929	-15.41	-16.44	-13.97	7.82	6.15	11.15	9.56	7/1/2011
Channing - Net		-15.52	-16.65	-14.41	7.30	5.63	10.59	8.99	
Russell 2000 Value Index		-15.28	-17.31	-16.28	6.18	4.89	9.05	8.06	
DFA Small Cap Val.	480,376,940	-12.12	-11.23	-5.94	11.68	7.50	11.21	11.71	2/1/1996
DFA Small Cap Val. - Net		-12.20	-11.39	-6.33	11.17	6.98	10.68		
Russell 2000 Value Index		-15.28	-17.31	-16.28	6.18	4.89	9.05	9.03	
William Blair Small Cap Value	552,216,557	-11.42	-14.78	-11.61	7.75	7.29	11.21	10.96	5/1/1999
Inv. Couns. Maryland - Net		-11.51	-14.95	-11.99	7.21	6.74	10.69		
Russell 2000 Value Index		-15.28	-17.31	-16.28	6.18	4.89	9.05	8.56	

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*** 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, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Public Real Assets	1,369,585,697	-7.60	-3.79	3.77	5.23			6.67	8/1/2017
Public Real Assets - Net		-7.67	-3.94	3.43	4.83			6.25	
Public Real Assets Benchmark***		-7.41	-3.76	2.55	3.79			4.95	
Brookfield	377,827,136	-8.69	-1.87	4.54	4.35			5.01	8/1/2017
Brookfield - Net		-8.76	-2.07	4.06	3.82			4.50	
Dow Jones Brookfield Global Infrastructure Composi		-7.21	-3.16	1.83	3.51			4.04	
Cohen & Steers	991,758,561	-7.04	-3.93	3.95	5.93			7.64	8/1/2017
Cohen & Steers - Net		-7.10	-4.07	3.64	5.56			7.25	
FTSE GLOBAL CORE INFRASTRUCTURE 50/50 INDEX (Net)		-7.52	-4.08	2.90	3.90			5.38	

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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.

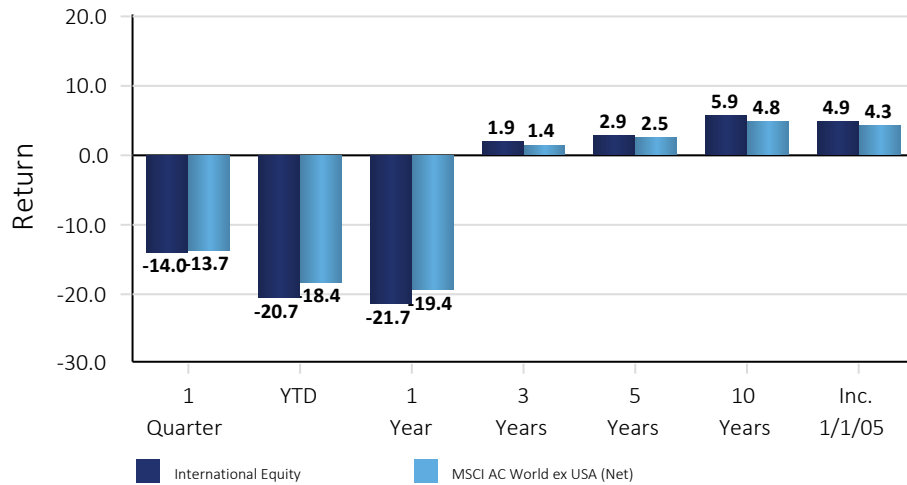
International Equity

Composite Performance Summary

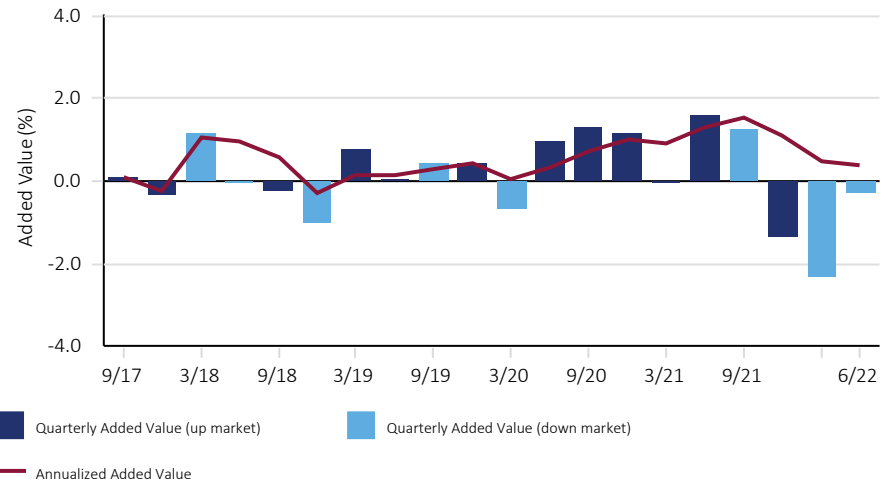
International Equity

Periods Ended June 30, 2022

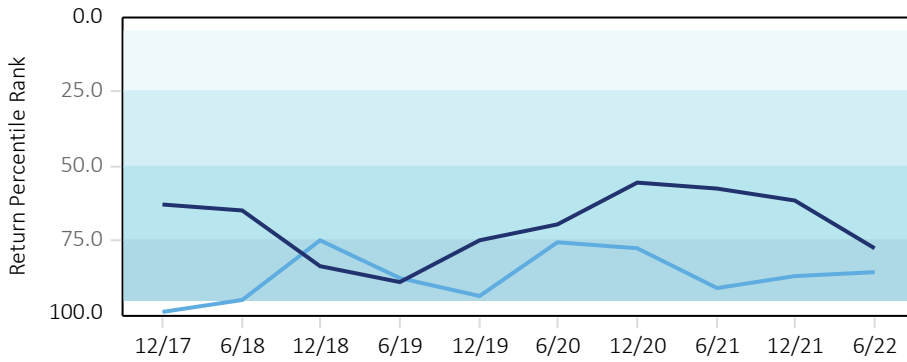
Comparative Performance



Added Value History

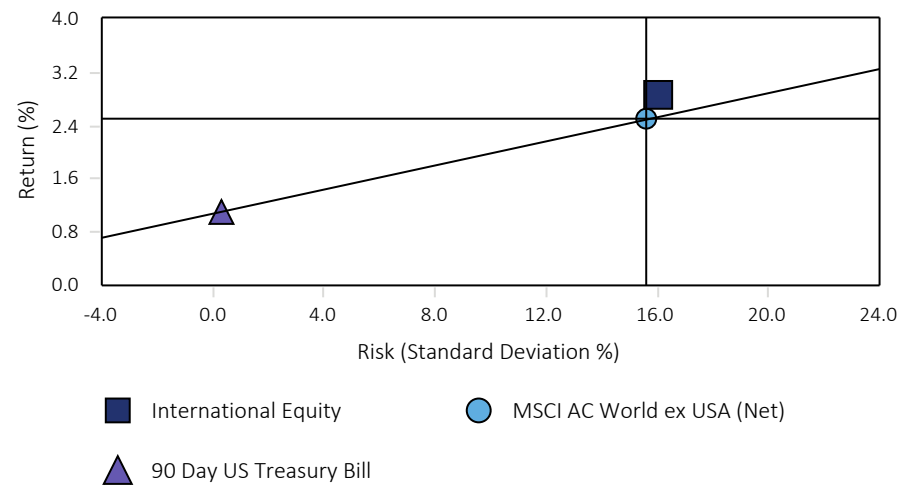


Rolling Percentile Rank: All Public Plans > \$1B-Intl. Equity Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
International Equity	10	0 (0%)	0 (0%)	7 (70%)	3 (30%)
Benchmark	10	0 (0%)	0 (0%)	1 (10%)	9 (90%)

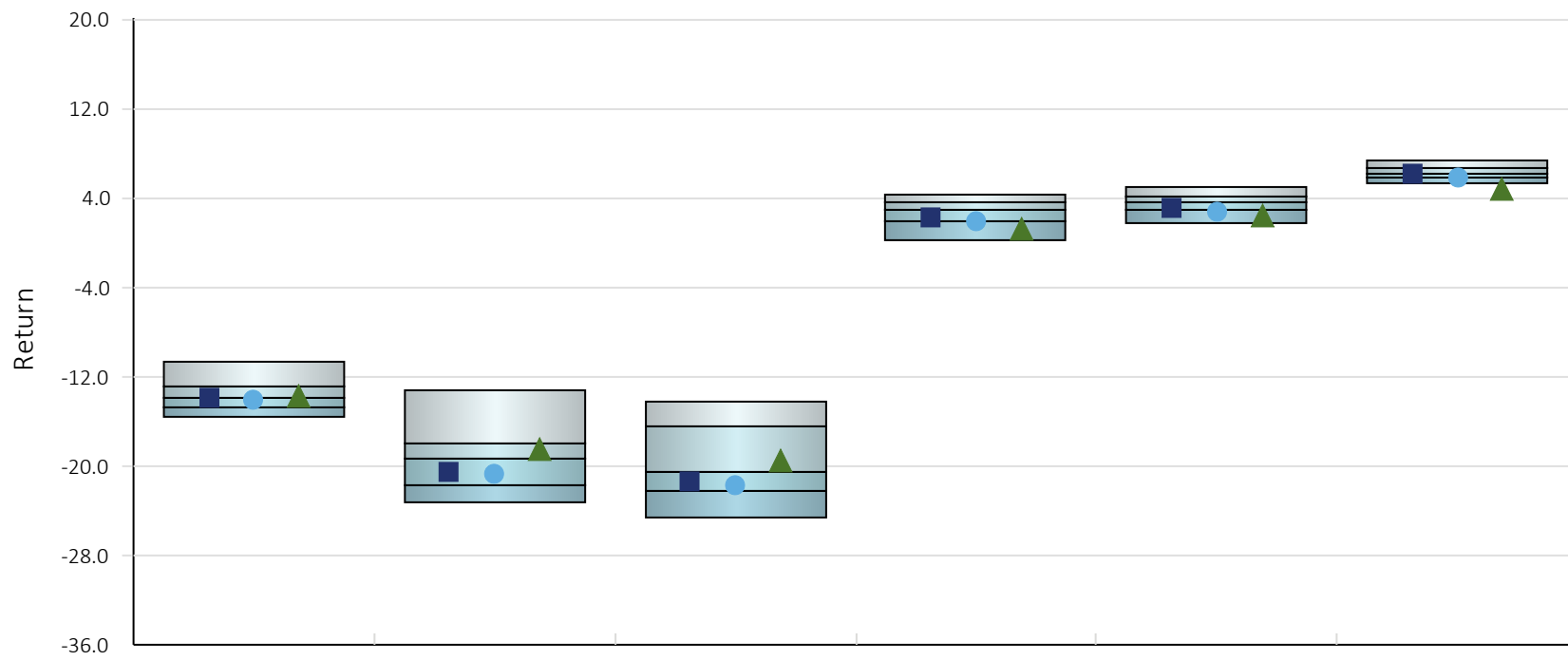
Risk and Return 07/1/17 - 06/30/22



Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2022



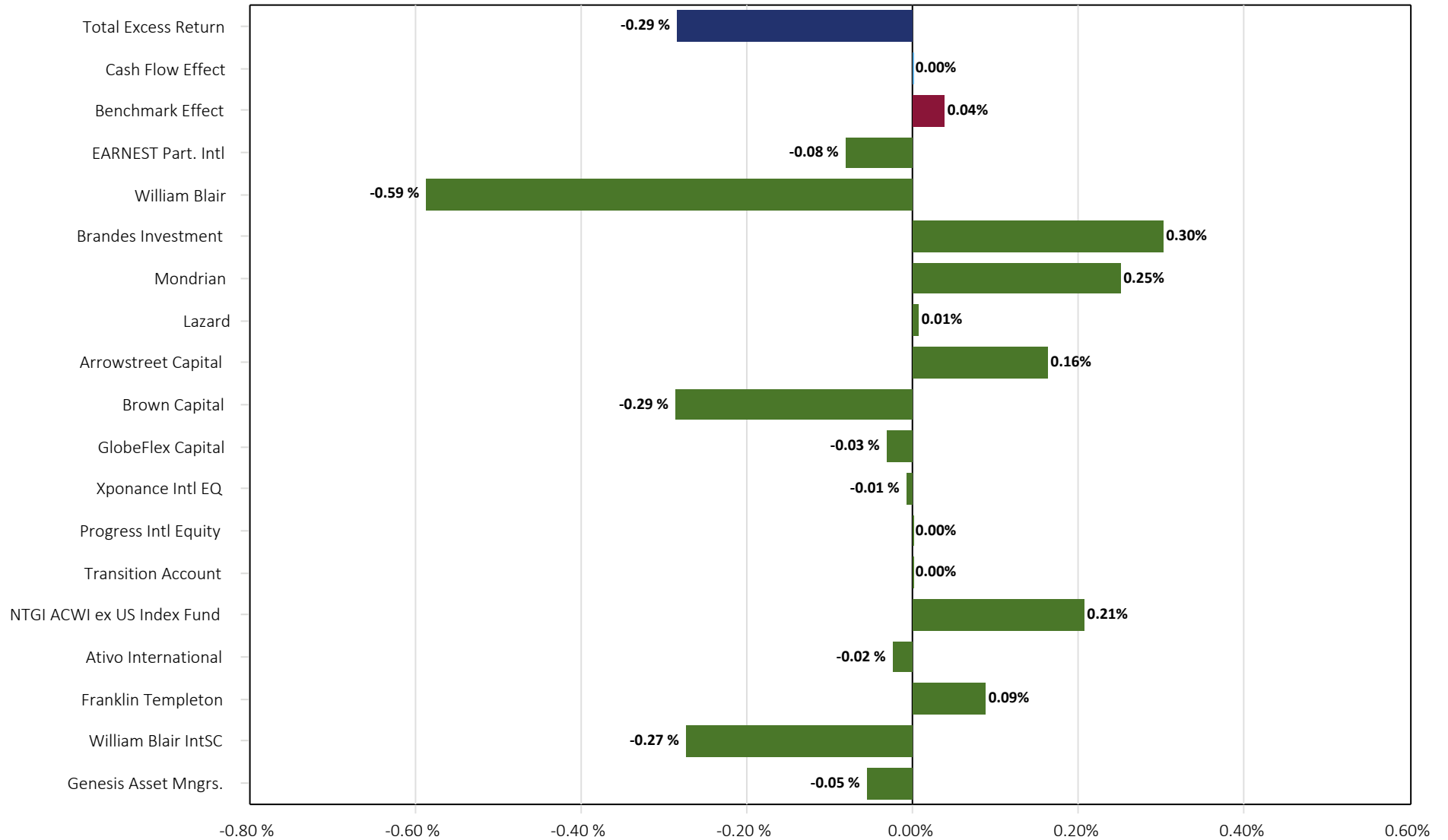
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ International Equity	-13.94 (50)	-20.55 (67)	-21.38 (64)	2.26 (60)	3.23 (64)	6.21 (47)
● International Equity - Net	-14.01 (51)	-20.69 (70)	-21.69 (69)	1.89 (78)	2.87 (84)	5.85 (76)
▲ MSCI AC World ex USA (Net)	-13.73 (46)	-18.42 (29)	-19.42 (45)	1.35 (86)	2.50 (89)	4.83 (100)
5th Percentile	-10.65	-13.27	-14.29	4.42	5.09	7.39
1st Quartile	-12.90	-17.98	-16.38	3.65	4.18	6.71
Median	-13.95	-19.25	-20.58	3.06	3.69	6.14
3rd Quartile	-14.77	-21.75	-22.18	1.94	3.00	5.86
95th Percentile	-15.63	-23.30	-24.62	0.33	1.85	5.41
Population	45	45	45	40	40	32

Asset Class Attribution

International Equity

Periods Ended 1 Quarter Ending June 30, 2022

1 Quarter



Performance

International Equity

Periods Ended June 30, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
International Equity	8,115,909,029	-13.94	-20.55	-21.38	2.26	3.23	6.21	7.27	9/1/1986
International Equity - Net		-14.01	-20.69	-21.69	1.89	2.87	5.85		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83		
International Equity IMRF Custom Benchmark		-13.69	-18.62	-19.94	1.37	2.43			
Intl Large Cap Equity	6,450,849,449	-13.76	-18.97	-18.46	3.26	3.74	6.59	7.35	9/1/1986
Intl LargeCap Equity - Net		-13.81	-19.08	-18.73	2.95	3.45	6.29		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83		
Intl Large Cap Grwth	1,330,080,566	-17.56	-25.10	-24.01	4.12	4.47	6.65	7.69	9/1/2002
Intl Large Cap Grwth - Net		-17.63	-25.21	-24.29	3.80	4.18	6.33		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	6.38	
EARNEST Part. Intl	539,979,699	-14.87	-14.72	-13.98	4.70	4.13	6.21	8.23	10/1/2004
EARNEST Part. Intl - Net		-14.92	-14.81	-14.15	4.49	3.93	5.97		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	5.11	
MSCI AC World ex USA Growth (Net)		-15.71	-24.79	-25.80	1.62	3.43	5.71	5.71	
William Blair	790,100,866	-19.30	-30.85	-29.66	3.75	4.89	7.10	8.70	10/1/2002
William Blair - Net		-19.38	-30.98	-29.98	3.36	4.50	6.71		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	7.02	
MSCI AC World ex USA Growth (Net)		-15.71	-24.79	-25.80	1.62	3.43	5.71	7.14	
Intl Large Cap Val.	1,233,039,325	-9.79	-11.35	-12.84	2.00	2.56	5.50	7.86	10/1/1995
Intl Large Cap Val. - Net		-9.86	-11.49	-13.11	1.69	2.23	5.12		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	4.77	
Brandes Investment	543,601,392	-8.90	-10.41	-11.60	2.77	2.58	5.90	8.04	1/1/1996
Brandes Investment - Net		-8.96	-10.50	-11.79	2.55	2.36	5.66		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	4.68	
MSCI AC World ex USA Value		-11.65	-11.41	-12.14	1.17	1.85	4.36		

* 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, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Mondrian	569,367,070	-9.88	-11.29	-13.12	1.67	2.67	5.18	4.38	4/1/2012
Mondrian - Net		-9.97	-11.38	-13.39	1.29	2.23	4.69	3.91	
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	3.91	
MSCI AC World ex USA Value		-11.65	-11.41	-12.14	1.17	1.85	4.36	3.47	
Lazard	120,070,863	-13.21	-15.68	-16.83	0.82	2.84	5.58	4.86	4/1/2012
Lazard - Net		-13.26	-15.73	-16.99	0.59	2.60	5.12	4.41	
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	3.91	
MSCI AC World ex USA Value		-11.65	-11.41	-12.14	1.17	1.85	4.36	3.47	
Intl Large Cap Active Core	2,235,910,384	-14.25	-19.59	-19.40	4.70	4.85	8.04	4.81	2/1/2008
Intl Large Cap Active Core - Net		-14.34	-19.75	-19.85	4.15	4.34	7.48		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	2.09	
Arrowstreet Capital	940,008,487	-12.18	-15.66	-16.91	10.02	8.27	10.07	6.09	3/1/2008
Arrowstreet Capital - Net		-12.29	-15.86	-17.30	9.52	7.77	9.56	5.59	
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	1.91	
Brown Capital	457,201,092	-18.47	-31.52	-29.72	-0.47	2.04	7.19	6.50	10/1/2004
Brown Capital - Net		-18.53	-31.62	-30.39	-1.16	1.40	6.34		
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	5.11	
GlobeFlex Capital	754,194,029	-13.98	-15.10	-14.64	3.83	3.45	6.93	4.65	3/1/2006
GlobeFlex Capital - Net		-14.06	-15.23	-14.92	3.44	3.06	6.51	4.21	
MSCI AC World ex USA (Net)		-13.73	-18.42	-19.42	1.35	2.50	4.83	3.25	
Xponance Intl EQ	83,708,989	-15.07	-23.17	-22.16				-9.20	2/1/2021
Xponance Intl EQ - Net		-15.22	-23.42	-22.66				-9.70	
MSCI EAFE Index (Net)		-14.51	-19.57	-17.77				-6.84	
Progress Intl Equity*	612,099								

* 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, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Intl Large Cap Passive Core	1,651,819,175	-12.69	-17.98	-16.35	1.91	2.84	5.93	3.54	2/1/2000
Intl Large Cap Passive Core - Net		-12.69	-17.98	-16.36	1.90	2.84	5.92		
International Large Cap Passive Core Benchmark		-13.73	-18.42	-17.31	1.26	2.32	5.45	3.12	
NTGI ACWI ex US Index Fund	1,651,819,175	-12.69	-17.98					-16.13	10/1/2021
NTGI ACWI ex US Index Fund - Net		-12.69	-17.98					-16.14	
MSCI AC World ex USA (Net)		-13.73	-18.42					-16.94	
Intl All Cap Developed	139,527,682	-15.84	-21.95	-17.93	0.00			2.32	2/1/2019
Intl All Cap Developed - Net		-15.95	-22.15	-18.34	-0.49			1.85	
MSCI EAFE + Canada (Net)		-14.66	-18.76	-16.76	1.70			3.52	
Ativo International	139,527,682	-15.84	-21.95	-17.93	0.00			2.32	2/1/2019
Ativo International - Net		-15.95	-22.15	-18.34	-0.49			1.85	
MSCI EAFE + Canada (Net)		-14.66	-18.76	-16.76	1.70			3.52	
Intl Small Cap Eqty	478,840,480	-20.16	-33.61	-32.19	0.71	1.54	6.38	3.93	12/1/2005
Intl Small Cap Eqty - Net		-20.33	-33.89	-32.72	-0.04	0.79	5.58		
MSCI AC World ex USA Small Cap (Net)		-17.55	-22.92	-22.45	2.94	2.55	6.22	5.31	
Custom Benchmark (Intl Small Cap)		-17.55	-22.92	-22.45	2.94	2.55	6.22	4.71	
Franklin Templeton	195,292,848	-13.76	-24.04	-24.79	0.62	1.69	6.41	4.64	8/1/2011
Franklin Templeton - Net		-13.93	-24.32	-25.34	-0.10	0.96	5.64	3.89	
MSCI AC World ex USA Small Cap (Net)		-17.55	-22.92	-22.45	2.94	2.55	6.22	3.96	
William Blair IntSC	283,547,632	-24.05	-38.92	-36.49	0.77	1.46	6.37	6.75	9/1/2010
William Blair IntSC - Net		-24.21	-39.19	-37.00	0.00	0.68	5.56	5.94	
MSCI AC World ex USA Small Cap (Net)		-17.55	-22.92	-22.45	2.94	2.55	6.22	5.72	
Custom Benchmark (Intl Small Cap)		-17.55	-22.92	-22.45	2.94	2.55	6.22	5.97	

* 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, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Emerging Mkt Equity	1,046,691,417	-11.67	-22.68	-31.91	-2.14	1.76	3.55	7.91	2/1/1992
Emerging Mkt Equity - Net		-11.80	-22.89	-32.29	-2.70	1.18	2.96		
MSCI Emerging Markets Index		-11.34	-17.47	-25.00	0.92	2.55	3.43	6.43	
Genesis Asset Mngrs.**	1,046,691,417	-11.67	-22.68	-31.91	-2.14	1.76	3.55	8.88	5/1/2004
Genesis Asset Mngrs. - Net		-11.80	-22.89	-32.29	-2.70	1.18	2.96		
MSCI Emerging Markets Index		-11.34	-17.47	-25.00	0.92	2.55	3.43	7.50	

* 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.

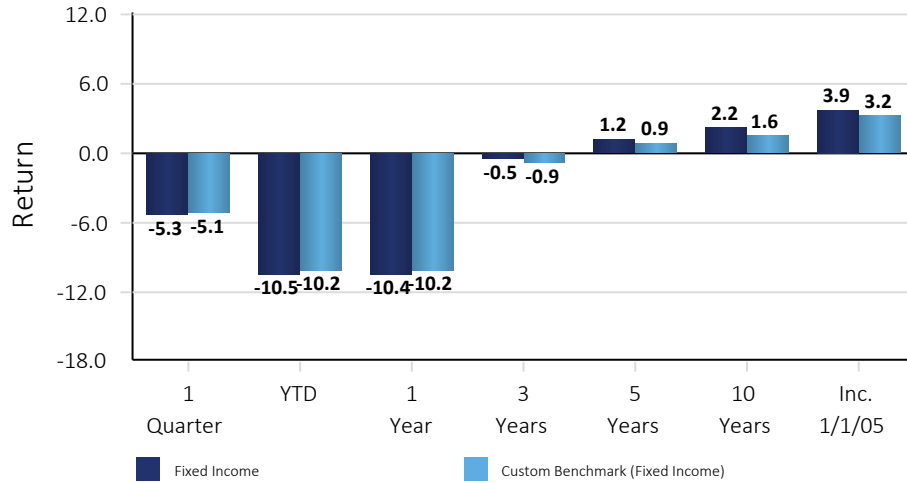
Fixed Income

Composite Performance Summary

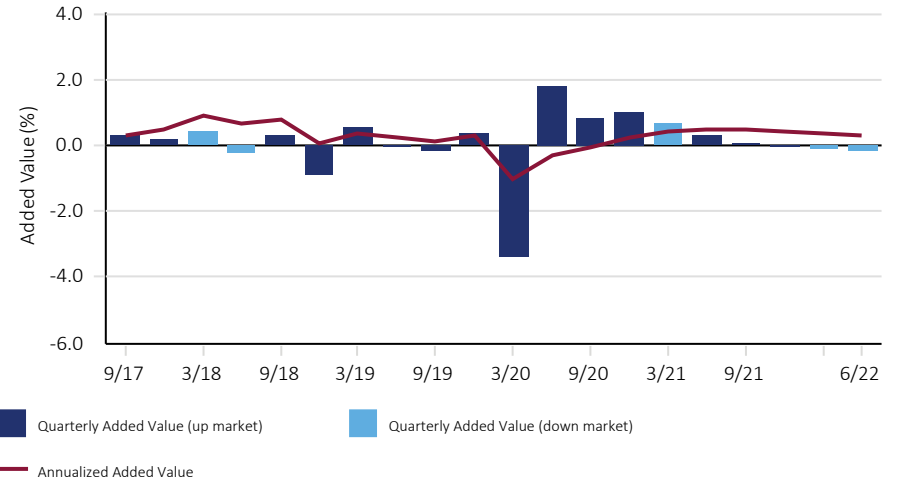
Fixed Income

Periods Ended June 30, 2022

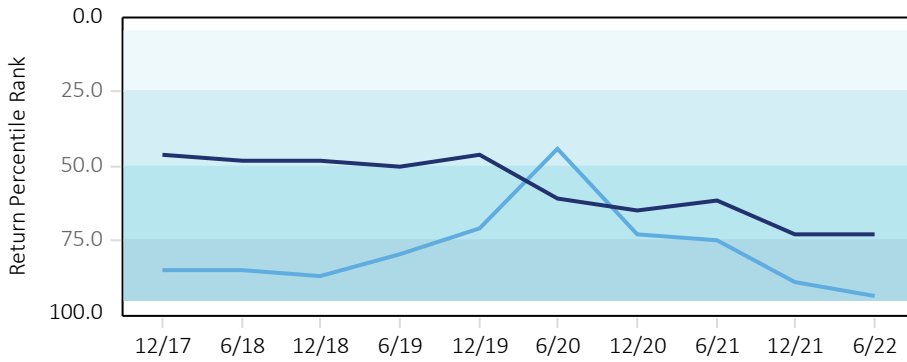
Comparative Performance



Added Value History

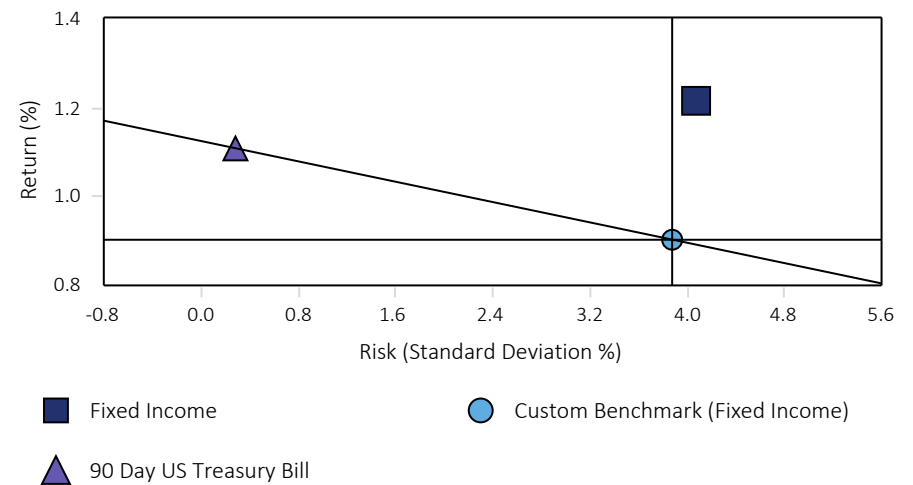


Rolling Percentile Rank: All Public Plans > \$1B-US Fixed Income Segment



	Total Period	5-25 Count	25-Median Count	Median-75 Count	75-95 Count
Fixed Income	10	0 (0%)	5 (50%)	5 (50%)	0 (0%)
Benchmark	10	0 (0%)	1 (10%)	3 (30%)	6 (60%)

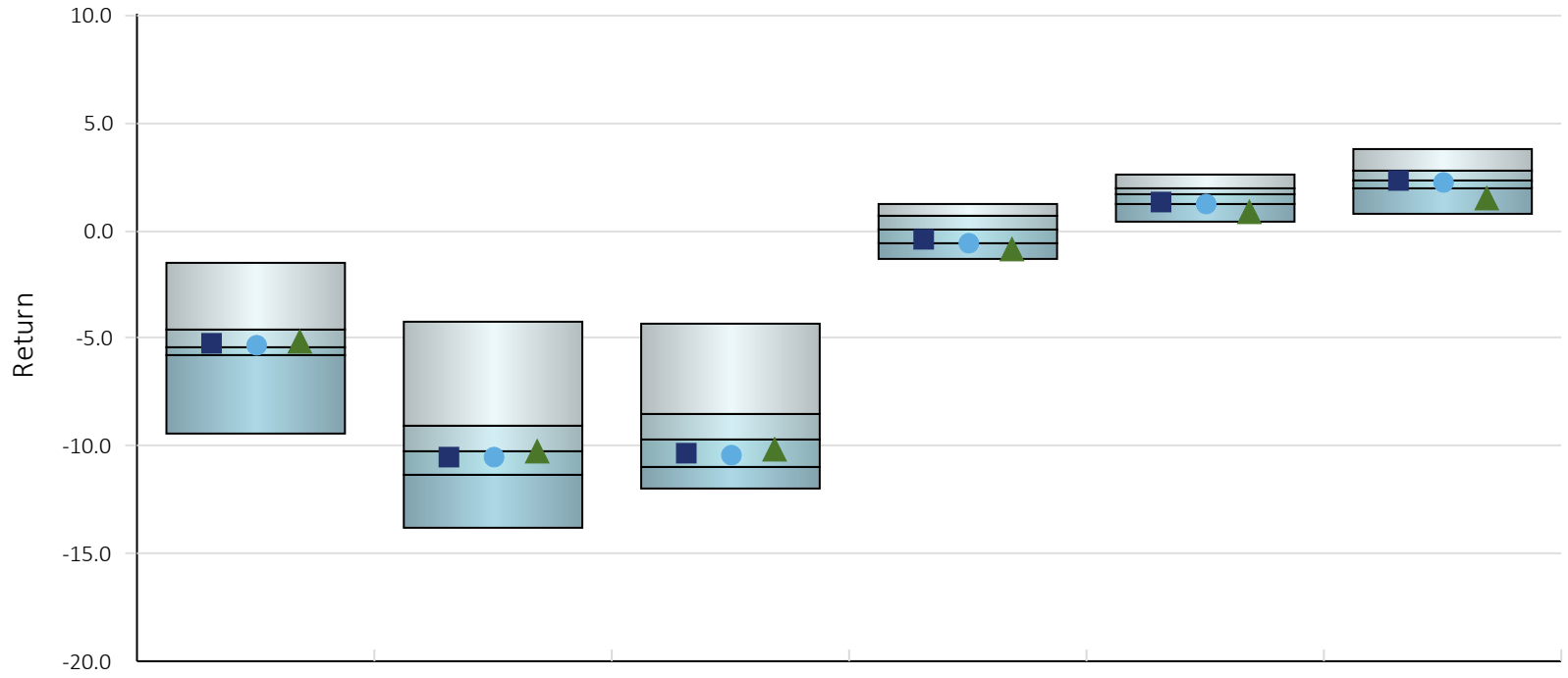
Risk and Return 07/1/17 - 06/30/22



Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2022



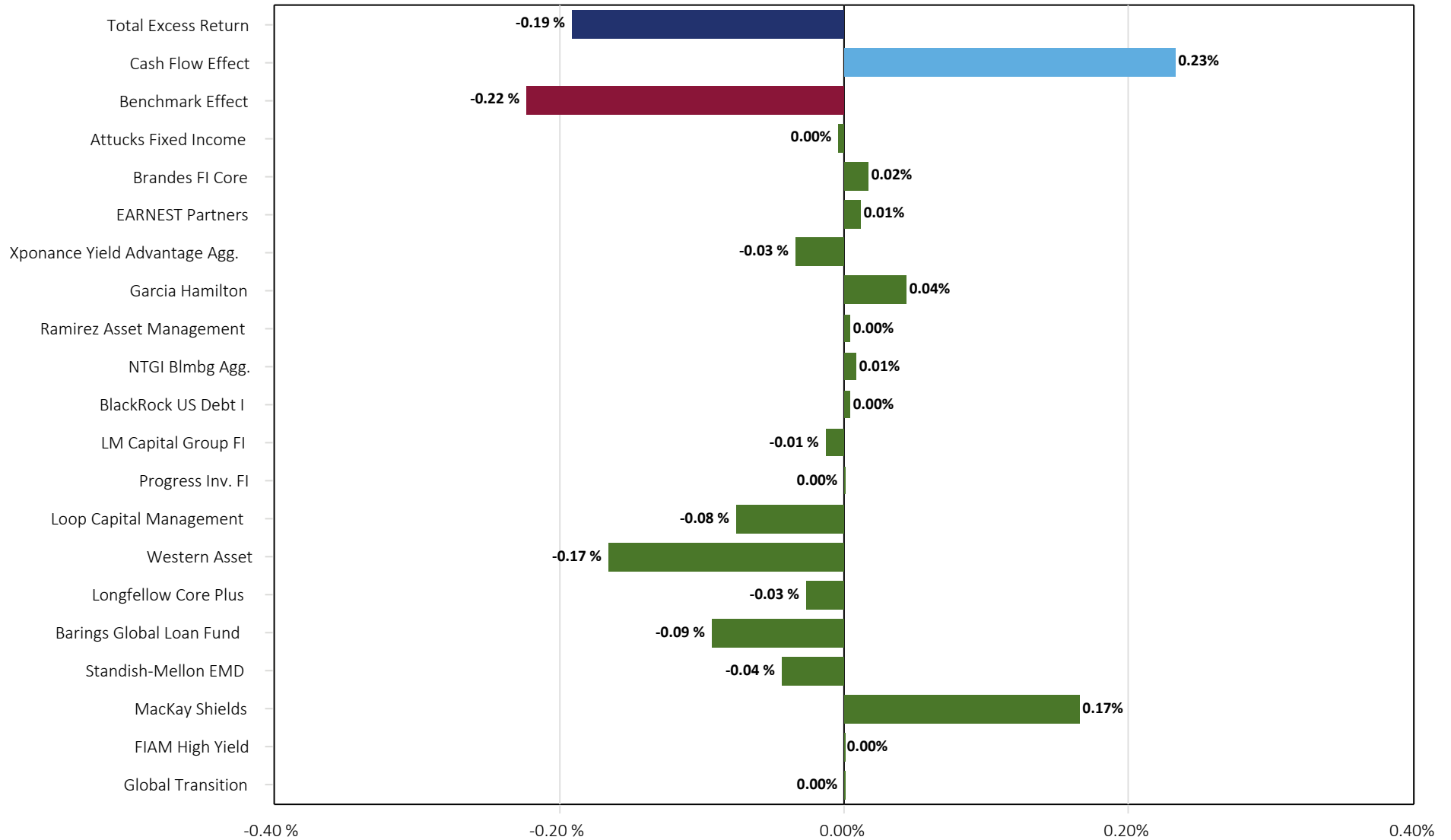
	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Fixed Income	-5.27 (41)	-10.49 (60)	-10.35 (66)	-0.44 (71)	1.34 (69)	2.36 (52)
● Fixed Income - Net	-5.29 (42)	-10.53 (61)	-10.44 (70)	-0.54 (73)	1.22 (81)	2.22 (55)
▲ Custom Benchmark (Fixed Income)	-5.10 (32)	-10.23 (51)	-10.17 (65)	-0.89 (94)	0.90 (90)	1.56 (92)
5th Percentile	-1.50	-4.19	-4.33	1.26	2.61	3.79
1st Quartile	-4.63	-9.06	-8.47	0.73	1.97	2.79
Median	-5.42	-10.21	-9.72	0.07	1.66	2.38
3rd Quartile	-5.76	-11.31	-10.94	-0.55	1.28	1.98
95th Percentile	-9.39	-13.81	-11.98	-1.29	0.41	0.81
Population	55	55	54	47	43	36

Asset Class Attribution

Fixed Income

Periods Ended 1 Quarter Ending June 30, 2022

1 Quarter



Performance

Fixed Income

Periods Ended June 30, 2022

	Market Value \$	Performance (%)							Inception Date
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	
Fixed Income	12,595,053,298	-5.27	-10.49	-10.35	-0.44	1.34	2.36	7.57	1/1/1982
Fixed Income - Net		-5.29	-10.53	-10.44	-0.54	1.22	2.22		
Custom Benchmark (Fixed Income)		-5.10	-10.23	-10.17	-0.89	0.90	1.56	7.04	
Fixed Income IMRF Custom Benchmark		-5.32	-10.59	-10.42	-0.82	1.02			
Active Fixed Core	3,879,734,948	-4.55	-9.77	-9.68	-0.39	1.29	2.05	3.87	4/1/2001
Active Fixed Core - Net		-4.58	-9.83	-9.78	-0.49	1.19	1.91		
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	3.78	
Attucks Fixed Income	88,901,719	-5.14	-10.90	-10.78				-7.93	2/1/2021
Attucks Fixed Income - Net		-5.22	-11.05	-11.07				-8.19	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29				-7.97	
Brandes FI Core	340,436,090	-4.09	-9.06	-8.90	-0.56	0.96		1.14	3/1/2016
Brandes FI Core - Net		-4.10	-9.08	-8.92	-0.57	0.95		1.13	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88		1.13	
EARNEST Partners	922,163,170	-4.52	-9.94	-10.03	-0.55	1.29	2.04	3.69	5/1/2005
EARNEST Partners - Net		-4.55	-10.01	-10.15	-0.68	1.15	1.87	3.51	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	3.25	
Xponance Yield Advantage Agg.	997,301,354	-5.10	-10.41	-10.09	-0.21	1.31	2.08	3.55	6/1/2005
Xponance Yield Advantage Agg. - Net		-5.13	-10.47	-10.21	-0.34	1.17	1.93	3.38	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	3.20	
Garcia Hamilton	992,828,121	-4.12	-8.76	-8.66	-0.30	1.34		1.75	6/1/2015
Garcia Hamilton - Net		-4.14	-8.80	-8.73	-0.37	1.26		1.67	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88		1.25	

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, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Ramirez Asset Management	538,104,493	-4.57	-10.39	-10.42				-2.32	5/1/2020
Ramirez Asset Management - Net		-4.60	-10.45	-10.53				-2.45	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29				-4.56	
Pass. Core Fixed Income	3,047,806,463	-4.65	-10.26	-10.22	-0.87	0.94	1.59	5.29	1/1/1990
Pass. Core Fixed Income - Net		-4.65	-10.26	-10.23	-0.88	0.93	1.59		
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	5.27	
BlackRock US Debt I	1,650,148,860	-4.66	-10.22	-10.19	-0.84	0.97		1.90	10/1/2013
BlackRock US Debt I - Net		-4.66	-10.22	-10.20	-0.85	0.96		1.89	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88		1.78	
NTGI Blmbg Agg.	1,397,657,603	-4.63	-10.29	-10.25	-0.91	0.91	1.57	5.34	2/1/1990
NTGI Blmbg Agg. - Net		-4.63	-10.30	-10.26	-0.91	0.90	1.56		
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	5.33	
Core Plus Fixed Income	2,999,398,798	-5.83	-11.97	-11.98	-0.52	1.26	2.35	7.42	1/1/1982
Core Plus Fixed Income - Net		-5.86	-12.04	-12.11	-0.68	1.09	2.18		
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	7.04	
LM Capital Group FI	863,978,557	-4.87	-9.91	-10.39	0.24	1.53	2.37	4.05	5/1/2005
LM Capital Group FI - Net		-4.91	-9.98	-10.54	0.08	1.37	2.20	3.88	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	3.25	
Progress Inv. FI	1,074								
Loop Capital Management	581,034,022	-6.28	-12.22	-12.02	-0.92	1.09	2.52	3.97	5/1/2005
Loop Capital Management - Net		-6.31	-12.29	-12.14	-1.05	0.95	2.38	3.84	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	3.25	

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, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Western Asset	970,642,799	-6.74	-14.18	-14.05	-1.17	0.98	2.50	4.50	11/1/2001
Western Asset - Net		-6.78	-14.25	-14.20	-1.30	0.86	2.36		
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29	-0.94	0.88	1.54	3.54	
Longfellow Core Plus	583,742,346	-5.24	-10.92	-10.30				-2.57	5/1/2020
Longfellow Core Plus - Net		-5.28	-10.98	-10.42				-2.71	
Blmbg. U.S. Aggregate		-4.69	-10.35	-10.29				-4.56	
Bank Loans	1,624,457,781	-5.54	-5.70	-3.91	1.85	2.86		3.50	8/1/2014
Bank Loans - Net		-5.56	-5.69	-3.88	1.85	2.66		3.16	
Barings Custom Benchmark		-4.70	-4.83	-3.00	2.04	3.05		3.33	
Barings Global Loan Fund	1,624,457,781	-5.54	-5.70	-3.91	1.85	2.86		3.50	8/1/2014
Barings Global Loan Fund - Net		-5.56	-5.69	-3.88	1.85	2.66		3.16	
Barings Custom Benchmark*		-4.70	-4.83	-3.00	2.04	3.05		3.33	
Emerging Markets Debt	2,490,747								
Standish-Mellon EMD	2,490,747								
High Yield	1,040,882,038	-7.71	-10.76	-9.14	1.85	3.59	5.37	8.92	4/1/1986
High Yield - Net		-7.76	-10.89	-9.50	1.52	3.25	5.01		
ICE BofAML US High Yield, Cash Pay Index		-9.93	-14.01	-12.60	-0.05	1.95	4.38	7.61	
MacKay Shields	1,040,882,038	-7.71	-10.74	-9.14	1.85	3.58	5.43	7.89	11/1/2000
MacKay Shields - Net		-7.76	-10.87	-9.50	1.53	3.24	5.07		
ICE BofAML US High Yield, Cash Pay Index		-9.93	-14.01	-12.60	-0.05	1.95	4.38	6.51	

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

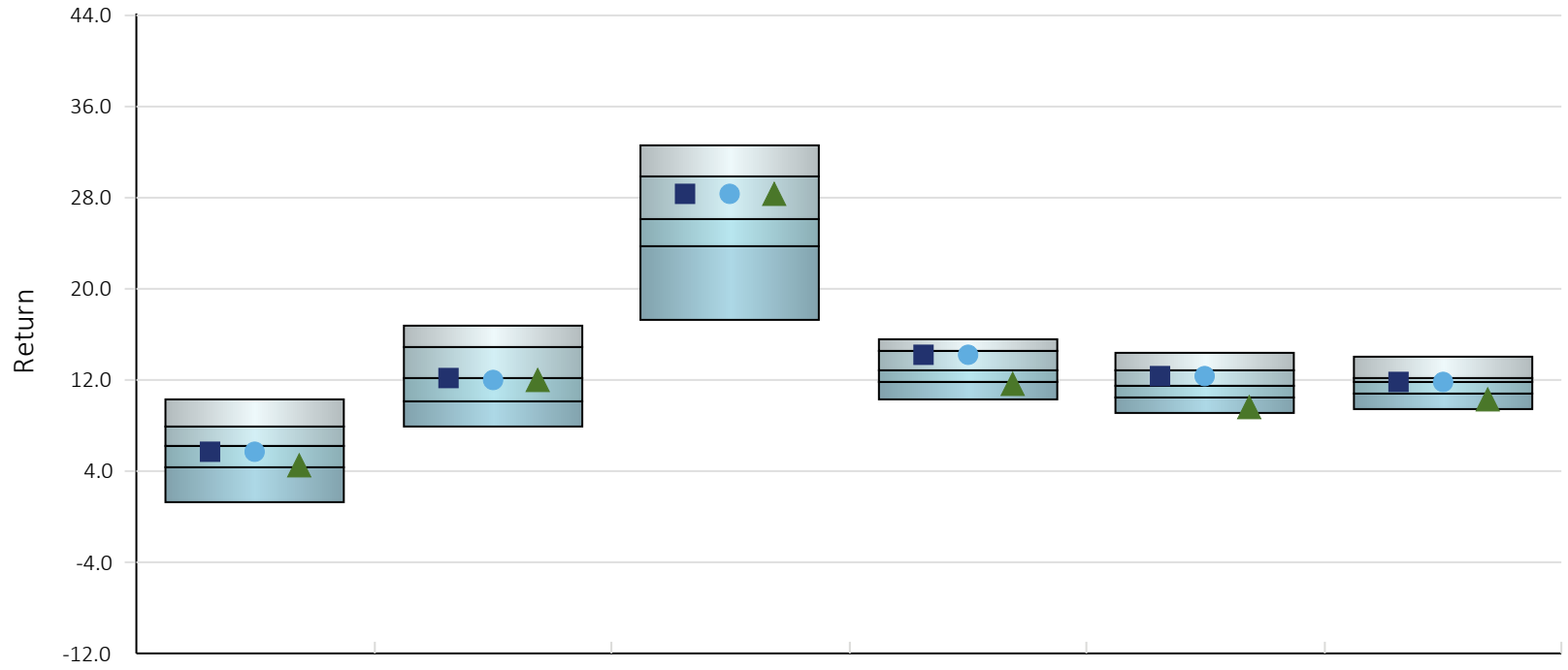
* Custom Benchmark is Credit Suisse US Leveraged Loan Index and the Credit Suisse Western European Leveraged Loan Index, weighted by the portfolio's market value to each sector.

Private Real Assets

Plan Sponsor Peer Group Analysis

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

Periods Ended June 30, 2022



	QTD	YTD	1 Year	3 Years	5 Years	10 Years
■ Real Estate	5.67 (56)	12.11 (51)	28.36 (31)	14.21 (30)	12.39 (29)	11.78 (67)
● Real Estate - Net	5.66 (56)	12.08 (51)	28.28 (32)	14.15 (30)	12.35 (30)	11.75 (67)
▲ Blended Benchmark (Real Estate)	4.54 (74)	12.00 (52)	28.31 (31)	11.66 (82)	9.55 (86)	10.23 (81)
5th Percentile	10.30	16.71	32.66	15.56	14.41	14.02
1st Quartile	7.87	14.86	29.82	14.52	12.77	12.21
Median	6.28	12.13	26.06	12.89	11.49	11.87
3rd Quartile	4.28	10.10	23.70	11.81	10.42	10.77
95th Percentile	1.29	7.84	17.36	10.30	9.09	9.50
Population	39	37	36	25	22	13

Asset Allocation & Performance

Private Real Assets

Periods Ended June 30, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Private Real Assets	4,732,017,175	5.22						6.85	3/1/2022
Custom Benchmark (Private Real Assets)		4.52						11.69	
Real Estate	4,318,598,041	5.67	12.11	28.36	14.21	12.39	11.78	6.18	5/1/1985
Real Estate - Net		5.66	12.08	28.28	14.15	12.35	11.75		
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66	9.55	10.23	8.05	
Real Estate Core Cmp	2,310,739,338	3.46	9.32	27.05	14.63	12.74	11.69	8.30	4/1/1999
TA Assoc. Buckhead	890,447,166	0.00	9.68	35.99	21.68	18.12	14.71	11.85	8/1/1995
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66	9.55	10.23	7.91	
Barings Euro Core Property	140,031,894	-3.87	-3.73	-1.19	4.55	10.46		11.72	3/1/2017
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66	9.55		9.33	
Blackstone Property Euro	169,481,160	5.44	4.56	6.78	10.04			8.05	12/1/2017
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66			9.78	
INVESCO Core Real Estate	251,394,301	6.35	6.14	26.19	9.08	7.95	9.33	9.48	4/1/2011
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66	9.55	10.23	10.64	
INVESCO European real estate	56,988,468	-1.77	-1.95	-10.03	-0.10			-1.03	4/1/2018
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66			9.92	
AEW Core Property Tr	295,441,657	9.06	18.74	29.64	11.36	9.52		9.56	10/1/2013
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66	9.55		9.94	
CBRE Core Partners	313,630,690	11.01	11.01	44.16	17.46	14.01		12.45	12/1/2013
Blended Benchmark (Real Estate)		4.54	12.00	28.31	11.66	9.55		9.89	

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

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

Asset Allocation & Performance

Private Real Assets

Periods Ended June 30, 2022

	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)	193,324,002	2.40 4.54	14.72 12.00	23.84 28.31				18.43 22.48	1/1/2021
RE Non-Core Cmp	2,007,858,703	8.36	15.50	29.95	13.78	12.02	12.01	12.36	1/1/2010
Artemis MWBE Spruce Blended Benchmark (Real Estate)	311,478,164	1.81 4.54	11.61 12.00	20.81 28.31	11.95 11.66	9.07 9.55		6.59 9.09	6/1/2016
Franklin T. EMREFF Blended Benchmark (Real Estate)	4,439,375	-4.32 4.54	-7.07 12.00	-10.03 28.31	-14.28 11.66	-5.26 9.55	5.36 10.23	3.69 10.42	9/1/2011
Security Capital Blended Benchmark (Real Estate)	49,230,813	-19.58 4.54	-14.52 12.00	-9.42 28.31	7.06 11.66	8.30 9.55	6.29 10.23		7/1/1997
Dune II Blended Benchmark (Real Estate)	7,378,667	-2.79 4.54	-1.40 12.00	19.89 28.31	1.46 11.66	4.45 9.55	10.62 10.23	5.53 9.00	2/1/2009
Non-Core Real Estate Funds Blended Benchmark (Real Estate)	1,407,127,015	13.68 4.54	20.79 12.00	40.40 28.31	17.09 11.66	14.63 9.55	12.82 10.23	12.83 10.38	10/1/2011
Almanac ARS V	82,990								
Non-Core Intl Real Estate Blended Benchmark (Real Estate)	228,121,679	-2.93 4.54	1.47 12.00	4.10 28.31	3.07 11.66	3.39 9.55		-0.89 9.81	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 the Consumer Price Index + 5%.

Asset Allocation & Performance

Private Real Assets

Periods Ended June 30, 2022

	Market Value \$	Performance (%)							
		1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Agriculture	231,046,869	-0.19	1.24	5.96	1.64	-0.27	7.38	7.08	1/1/2010
NCREIF Farmland Index		1.45	4.11	9.71	6.14	6.13	9.47	9.99	
Premiere Partners IV	231,046,869	-0.19	1.24	5.96	1.64	-0.27		2.23	3/1/2015
Timberland	62,951,641	1.57	-2.02	2.50	-0.46	-0.41	1.29	1.58	1/1/2010
NCREIF Timberland Index		1.87	5.13	12.01	5.03	4.32	5.73	4.76	
Forest Investment	62,951,641	1.57	-2.02	2.50	-0.46	-0.41	1.29	1.58	1/1/2010
Blended Benchmark (Timberland)		4.08	5.81	12.73	5.26	4.45	5.80	4.81	
Unlisted Infrastructure	119,420,624	2.47	8.89	14.02	14.41			12.84	4/1/2018
Blended Benchmark (Unlisted Infrastructure)		4.08	7.34	12.07	10.01			9.71	
Unlisted Infrastructure Funds	119,420,624	2.47	8.89	14.02	14.41			12.84	4/1/2018
Blended Benchmark (Unlisted Infrastructure)		4.08	7.34	12.07	10.01			9.71	

Alternative Investments

Asset Allocation & Performance

Alternatives Investments

Periods Ended June 30, 2022

	Allocation	Performance (%)							
	Market Value \$	1 Quarter	YTD	1 Year	3 Years	5 Years	10 Years	Since Inception	Inception Date
Alternatives Investments	5,055,633,051	0.85	6.45	27.13	22.74	18.77	13.81	11.79	2/1/1986
Custom Benchmark (Alternative Investments)		-4.46	1.12	5.57	7.84	8.30	8.65	12.30	
Absolute Return	82,440	4.52	4.68	15.55	-22.20	-17.11	-4.25	0.09	1/1/2002
Aurora Investment	82,440								11/1/2001
Private Equity	4,866,475,640	0.94	7.09	30.13	26.41	22.32	16.42	14.11	2/1/1986
Blended Benchmark (Private Equity)		-4.45	1.32	5.79	7.92	8.35	8.67		
Abbott S/A Comp.	543,658,783	2.80	6.02	29.47	31.21	24.34	17.25	15.11	6/1/1987
Muller Monroe MPEFF	552,890								5/1/2008
Pantheon S/A Comp.	426,436,147	1.28	1.28	35.05	26.90	22.10	16.40	12.03	10/1/2000
Private Equity Fund - Domestic	3,167,078,982	0.84	9.70	34.62	28.28	23.94	16.79	16.45	6/1/2012
Private Equity Fund - International	536,172,977	-2.36	-0.67	5.68	13.96	16.36		-2.13	7/1/2015
Oakbrook Opportunities Fund	192,575,861	6.95	6.93	48.33	13.01			12.64	6/1/2019
Private Credit	189,074,971	-1.75	-6.07	2.20				1.89	10/1/2019
Private Credit Fund - Domestic	189,074,971	-1.75	-6.07	2.20				1.89	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, 2022

Organization

Investment Manager	Asset Class	Effective Date	Resolution
Genesis	Equity Emerging Markets	July 2022	Increase oversight/ diligence

Appendix

Asset Class Returns

Periods Ended June 30, 2022

	Performance (%)										
	YTD	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Total Fund	-13.82	16.82	14.98	19.77	-4.23	16.02	8.01	0.53	6.15	20.20	13.84
Total Fund - Net	-13.88	16.63	14.79	19.57	-4.40	15.78	7.77	0.29	5.90	19.94	13.58
Total Fund Benchmark	-12.23	13.48	13.16	18.68	-3.12	14.37	7.89	1.37	7.33	15.84	12.19
Domestic Equity	-21.76	24.89	22.07	29.23	-6.08	19.83	12.62	0.04	9.81	37.65	17.39
Domestic Equity - Net	-21.83	24.69	21.86	29.00	-6.25	19.59	12.35	-0.22	9.54	37.32	17.09
Blended Benchmark (U.S. Equity)	-20.28	25.66	20.89	31.02	-5.24	21.13	12.74	0.48	12.47	33.47	16.38
U.S. Equity IMRF Custom Benchmark	-20.55	25.68	18.00	29.67	-6.79	18.08	15.43				
International Equity	-20.55	9.78	13.52	23.76	-14.13	27.95	3.56	-1.90	-2.80	20.24	19.11
International Equity - Net	-20.69	9.37	13.08	23.39	-14.41	27.52	3.21	-2.23	-3.10	19.87	18.70
MSCI AC World ex USA (Net)	-18.42	7.82	10.65	21.51	-14.20	27.19	4.50	-5.66	-3.87	15.29	16.83
International Equity IMRF Custom Benchmark	-18.62	7.30	11.30	21.37	-14.36	27.79	3.92				
Fixed Income	-10.49	-0.44	7.87	9.50	-0.24	4.82	4.87	0.25	5.97	-0.59	7.41
Fixed Income - Net	-10.53	-0.53	7.75	9.37	-0.39	4.66	4.71	0.10	5.81	-0.75	7.24
Blmbg. U.S. Aggregate	-10.35	-1.55	7.51	8.72	0.01	3.54	2.65	0.55	5.97	-2.02	4.21
Fixed Income IMRF Custom Benchmark	-10.59	-0.85	7.29	9.14	-0.08	3.98	3.89				
Private Real Assets											
Custom Benchmark (Private Real Assets)											
Real Estate	12.11	21.95	4.20	9.81	8.36	10.03	8.97	12.54	13.02	10.82	12.85
Real Estate - Net	12.08	21.88	4.16	9.76	8.36	10.03	8.97	12.46	13.02	10.82	12.85
Blended Benchmark (Real Estate)	12.00	21.02	0.34	4.39	7.36	6.66	7.79	13.95	11.46	12.90	11.54
Agriculture	1.24	2.69	4.69	-5.82	0.28	-4.58	-0.47	20.18	24.73	25.68	13.55
NCREIF Farmland Index	4.11	7.83	3.08	4.81	6.74	6.19	7.09	10.35	12.63	20.91	18.58
Timberland	-1.63	-2.72	4.51	1.00	-3.62	4.68	-4.58	4.99	12.83	9.14	-3.59
NCREIF Timberland Index	5.13	9.17	0.81	1.30	3.21	3.63	2.59	4.97	10.48	9.69	7.75
Unlisted Infrastruct	8.89	11.68	15.90	9.65							
Blended Benchmark (Unlisted Infrastructure)	7.34	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, 2022

	Performance (%)										
	YTD	2021	2020	2019	2018	2017	2016	2015	2014	2013	2012
Alternatives Investments	6.45	46.46	12.31	9.48	17.32	12.09	5.32	6.90	11.63	12.11	6.24
Alternative Investments - Net	6.44	46.44	12.27	9.43	17.14	11.91	5.00	6.47	11.16	11.86	6.00
Custom Benchmark (Alternative Investments)	1.12	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Private Equity	7.09	54.15	14.50	11.78	21.46	15.61	8.60	8.41	13.72	14.13	5.61
Blended Benchmark (Private Equity)	1.32	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
Cash	1.59	2.44	2.56	3.59	2.36	1.67	0.63	0.29	0.17	0.11	0.23
90 Day US Treasury Bill	0.15	0.05	0.67	2.28	1.87	0.86	0.25	0.03	0.04	0.05	0.08

Benchmark definitions are on the following pages.

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

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

Benchmark Definitions

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

**ODCE returns are updated quarterly.

Benchmark Definitions

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

**ODCE returns are updated quarterly.

Benchmark Definitions

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