



QUARTERLY PERFORMANCE REPORT

CITY OF FRESNO RETIREMENT
SYSTEMS

MARCH 31, 2023

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FIRST QUARTER 2023 SUMMARY

- **The US economy expanded (in real terms) at an annual rate of 2.6% in the first quarter.**
- **The Fed increased rates by 0.50%, and the target Fed Funds rate moved up to 4.75% - 5.00%.**
- **Developed market equities (Japan, Europe, etc.) outperformed U.S. equities.**
- **Fixed income gained during the quarter, and spreads in investment-grade and high-yield credit remained steady.**
- **Total fund performance net of fees over the past 25 years was 6.6% per year, outperforming the Policy Index but underperforming the current 6.75% assumed rate.**
- **Manager selection remains a positive contributor to relative performance long-term.**



FIRST QUARTER 2023 SUMMARY

- **In the one-year ended March 31, 2023, the Total Fund returned -2.3%, outperforming the benchmark (net of fees) and ranking in the first quartile of peers.**
 - Overweight positioning to Public Equities detracted from relative performance.
 - Manager selection benefited relative performance for all asset classes.
 - Private Equity, Private Credit, Private Real Estate, and Midstream Energy performance have contributed to overall plan returns over the trailing 1-year period.
- **Over the most recent quarter, the Total Fund returned 4.6%, outperforming the policy benchmark (net of fees) and ranking in the first quartile of peers.**
 - International Equity, Real Assets, and Midstream Energy contributed to relative performance.
 - Private Equity, Fixed Income, Private Credit, detracted from relative performance.
- **Total Fund volatility remained elevated relative to peers.**



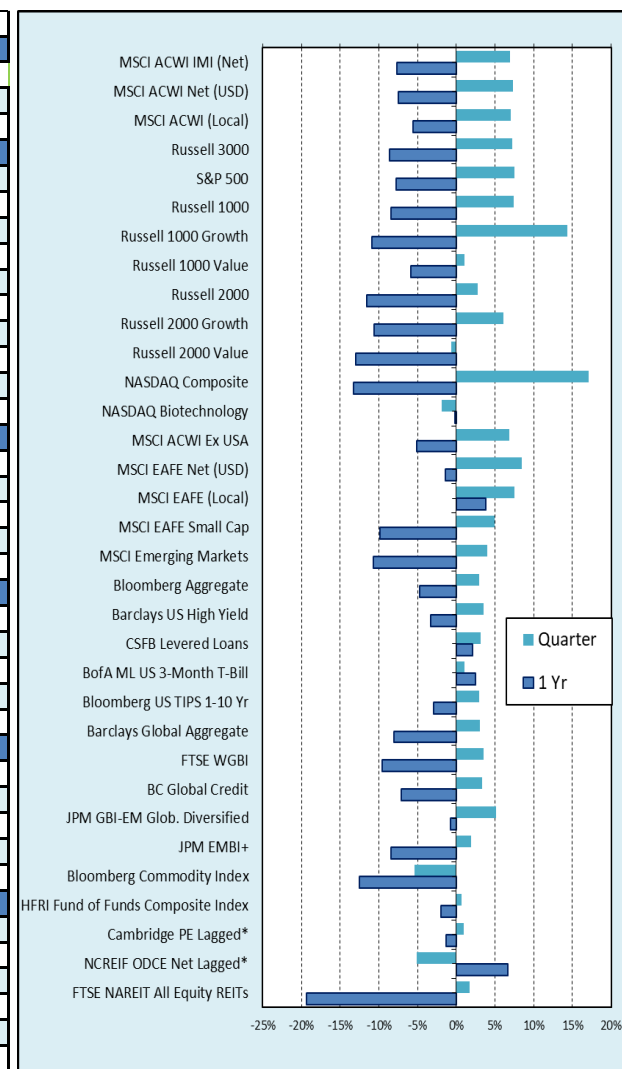
ECONOMIC ENVIRONMENT

- **Q4 Real GDP (third estimate) increased at an annual rate of 2.6%.**
 - Retail sales ended March at +1.0% on a YoY basis. In the same period last year the YoY growth rate was +7.1%.
 - Corporate profits as a percent of GDP ended October 2022 at 10.4%, down from 11.3% in the same period last year and remain elevated relative to historical levels.
 - The inventory-to-sales ratio ended February was 1.36 up from 1.29 one year ago. Levels have remained relatively constant since early 2010 with a spike to 1.7 in April 2020.
 - The U.S. trade deficit narrowed in November as imports decreased more than exports.
- **The unemployment rate was 3.5% ended Q1, flat versus Q4; U-6, a broader measure of unemployment, increased to 6.7% in Q1 from 6.5% in Q4.**
 - The labor force participation rate ended Q1 up to 62.6% up from 62.3% in Q4. Labor force participation declined to 60.2% in April 2020 and is at levels below the 10 year pre-pandemic average of 63.0%.
- **The Case-Shiller Home Price Index (ended February) declined to 293.2 from 294.3 in Q4 and remains at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally-adjusted CPI ended Q1 at 4.59% down from 6.42% in Q4. In the same period last year, it was 8.55%; Capacity Utilization increased to 79.80 in Q1 from 78.91% in Q4.**
- **Fed Funds rate increased in Q1 by 0.50% to a targeted range of 4.75%-to-5.00% up from a targeted range of 4.25%-to-4.50% ended Q4. The 10-year Treasury Yield (constant maturity) finished Q1 at 3.66% up from 3.62% in Q4.**
- **The Fed continues scaling back asset purchases. The Fed continues to reduce the size of its balance sheet after a period of rapid growth post-pandemic.**
- **S&P valuations increased in Q1 to 28.3x from 28.65x in Q4 and are lower than the 10-year average of 29.01x.**
 - Cyclically adjusted Shiller PE ratio remains above the long-term average of 17.01x.

MARKET ENVIRONMENT

Q1 2023 OVERVIEW

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI IMI (Net)	World with Small Cap	6.95%	-7.69%	15.64%	6.58%	7.95%
MSCI ACWI Net (USD)	World W/O Small Cap	7.31%	-7.44%	15.36%	6.93%	8.06%
MSCI ACWI (Local)	World (Local Currency)	7.02%	-5.61%	15.76%	8.07%	9.25%
Domestic Equity Benchmarks						
Russell 3000	Domestic All Cap	7.18%	-8.58%	18.48%	10.45%	11.73%
S&P 500	Large Core	7.50%	-7.73%	18.60%	11.19%	12.24%
Russell 1000	Large Core	7.46%	-8.39%	18.55%	10.87%	12.01%
Russell 1000 Growth	Large Growth	14.37%	-10.90%	18.58%	13.66%	14.59%
Russell 1000 Value	Large Value	1.01%	-5.91%	17.93%	7.50%	9.13%
Russell 2000	Small Core	2.74%	-11.61%	17.51%	4.71%	8.04%
Russell 2000 Growth	Small Growth	6.07%	-10.60%	13.36%	4.26%	8.49%
Russell 2000 Value	Small Value	-0.66%	-12.96%	21.01%	4.55%	7.22%
NASDAQ Composite	Large Growth	17.05%	-13.28%	17.56%	12.60%	15.30%
NASDAQ Biotechnology	Biotech	-1.87%	-0.16%	7.52%	4.91%	10.00%
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	6.87%	-5.07%	11.80%	2.47%	4.17%
MSCI EAFE Net (USD)	Int'l Developed	8.47%	-1.38%	12.98%	3.52%	5.00%
MSCI EAFE (Local)	Int'l Developed (Local Currency)	7.49%	3.84%	14.63%	6.25%	7.34%
MSCI EAFE Small Cap	Small Cap Int'l	4.92%	-9.83%	12.07%	0.87%	5.86%
MSCI Emerging Markets	Emerging Equity	3.96%	-10.70%	7.83%	-0.91%	2.00%
Domestic Fixed Income Benchmarks						
Bloomberg Aggregate	Core Bonds	2.96%	-4.78%	-2.77%	0.90%	1.36%
Barclays US High Yield	High Yield	3.57%	-3.35%	5.91%	3.21%	4.10%
CSFB Levered Loans	Bank Loans	3.11%	2.12%	8.38%	3.55%	3.86%
BofA ML US 3-Month T-Bill	Cash	1.07%	2.50%	0.89%	1.41%	0.87%
Bloomberg US TIPS 1-10 Yr	Inflation	2.94%	-2.93%	2.89%	3.18%	1.55%
Global Fixed Income Benchmarks						
Barclays Global Aggregate	Global Core Bonds	3.01%	-8.07%	-3.43%	-1.34%	0.07%
FTSE WGBI	World Gov. Bonds	3.51%	-9.55%	-5.29%	-2.35%	-0.60%
BC Global Credit	Global Bonds	3.33%	-7.09%	-1.40%	-0.28%	1.06%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local Currency)	5.16%	-0.72%	0.87%	-2.37%	-1.52%
JPM EMBI+	Em. Mkt. Bonds	1.87%	-8.42%	-4.94%	-3.12%	0.17%
Alternative Benchmarks						
Bloomberg Commodity Index	Commodities	-5.36%	-12.49%	20.82%	5.36%	-1.72%
HFRI Fund of Funds Composite Index	Fund of Hedge Funds	0.71%	-1.94%	7.17%	3.10%	3.24%
Cambridge PE Lagged*	Private Equity	1.00%	-1.33%	18.48%	15.94%	14.77%
NCREIF ODCE Net Lagged*	Real Estate	-5.13%	6.67%	9.01%	7.74%	9.12%
FTSE NAREIT All Equity REITs	REIT	1.74%	-19.37%	10.17%	6.25%	6.45%
CPI + 2%	Inflation/Real Assets	1.44%	7.09%	7.46%	5.95%	4.71%



* As of 12/31/2022



EXECUTIVE SUMMARY

	Market Value (\$)	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	15 Yrs (%)	25 Yr (%)	Inception (%)	Inception Date
Total Fund	3,603,957,354	4.6 (9)	-2.3 (12)	13.3 (3)	6.8 (21)	8.2 (17)	7.5 (20)	6.6 (19)	6.6 (32)	8.7	Oct-85
<i>Policy Index</i>		4.0 (35)	-4.6 (64)	11.7 (41)	6.1 (49)	7.6 (52)	7.0 (48)	6.4 (32)	6.4 (41)	9.0	
<i>60 MSCI World (Gross)/40 CITI WGBI</i>		5.9 (1)	-7.8 (100)	7.2 (100)	3.7 (100)	5.5 (100)	5.1 (100)	4.4 (100)	5.3 (95)		
<i>InvMetrics Public DB > \$1 Billion Median</i>		3.7	-4.1	11.3	6.0	7.6	6.9	6.3	6.4		
Population		46	45	44	44	44	41	39	30		

5 Years Ending March 31, 2023

	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	6.8 (21)	11.4 (65)	0.5 (31)	0.7 (31)
<i>Policy Index</i>	6.1 (49)	11.3 (61)	0.5 (60)	0.7 (60)
<i>60 MSCI World (Gross)/40 CITI WGBI</i>	3.7 (100)	12.2 (86)	0.2 (100)	0.3 (100)

7 Years Ending March 31, 2023

	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	8.2 (17)	10.0 (69)	0.7 (35)	1.1 (35)
<i>Policy Index</i>	7.6 (52)	9.9 (63)	0.7 (64)	1.0 (63)
<i>60 MSCI World (Gross)/40 CITI WGBI</i>	5.5 (100)	10.7 (87)	0.4 (100)	0.6 (100)

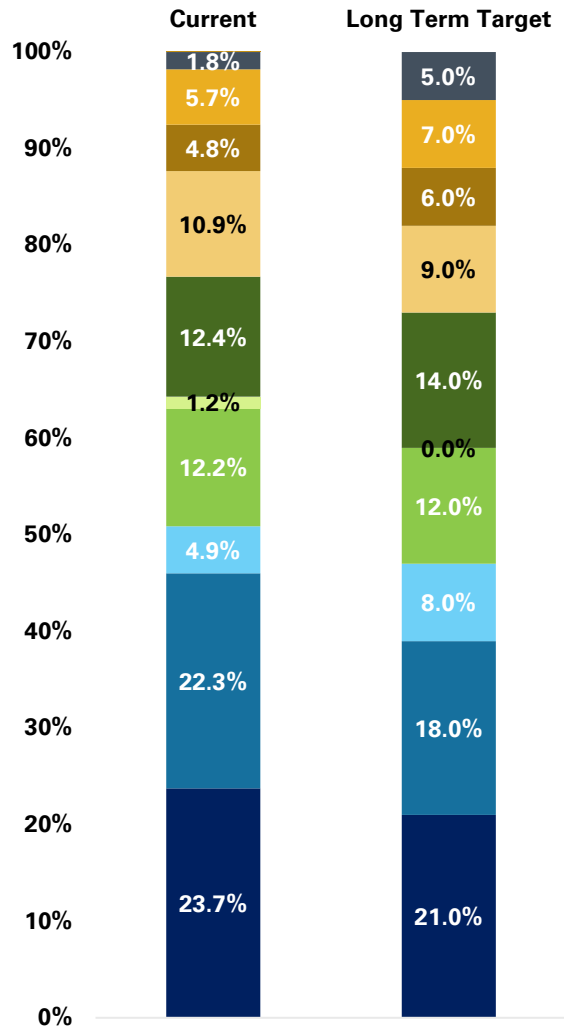
Over the past five years, the Fund returned 6.8% per annum, ranking in the 21st percentile of the Investment Metrics Public Funds > \$1 Billion net of fee universe. The Fund's return outperformed the actuarial rate of return and also outperformed the Policy Index by 0.7%.

The Fund's volatility was 11.4% which ranks in the 65th percentile of its peers. The Fund's risk-adjusted performance, as measured by the Sharpe Ratio, ranks in the 31st percentile of its peers.

Over the past three years, the Fund returned 13.3% per annum, outperforming the Policy Index by 1.6% and ranking in the 3rd percentile of its peer group. Over the past three years, the Fund's Sharpe Ratio of 1.1 ranks in the 19th percentile.

For the year ending March 31, 2023, the Fund returned -2.3%, outperforming the Policy Index by 2.3% and ranking in the 12th percentile among its peers.

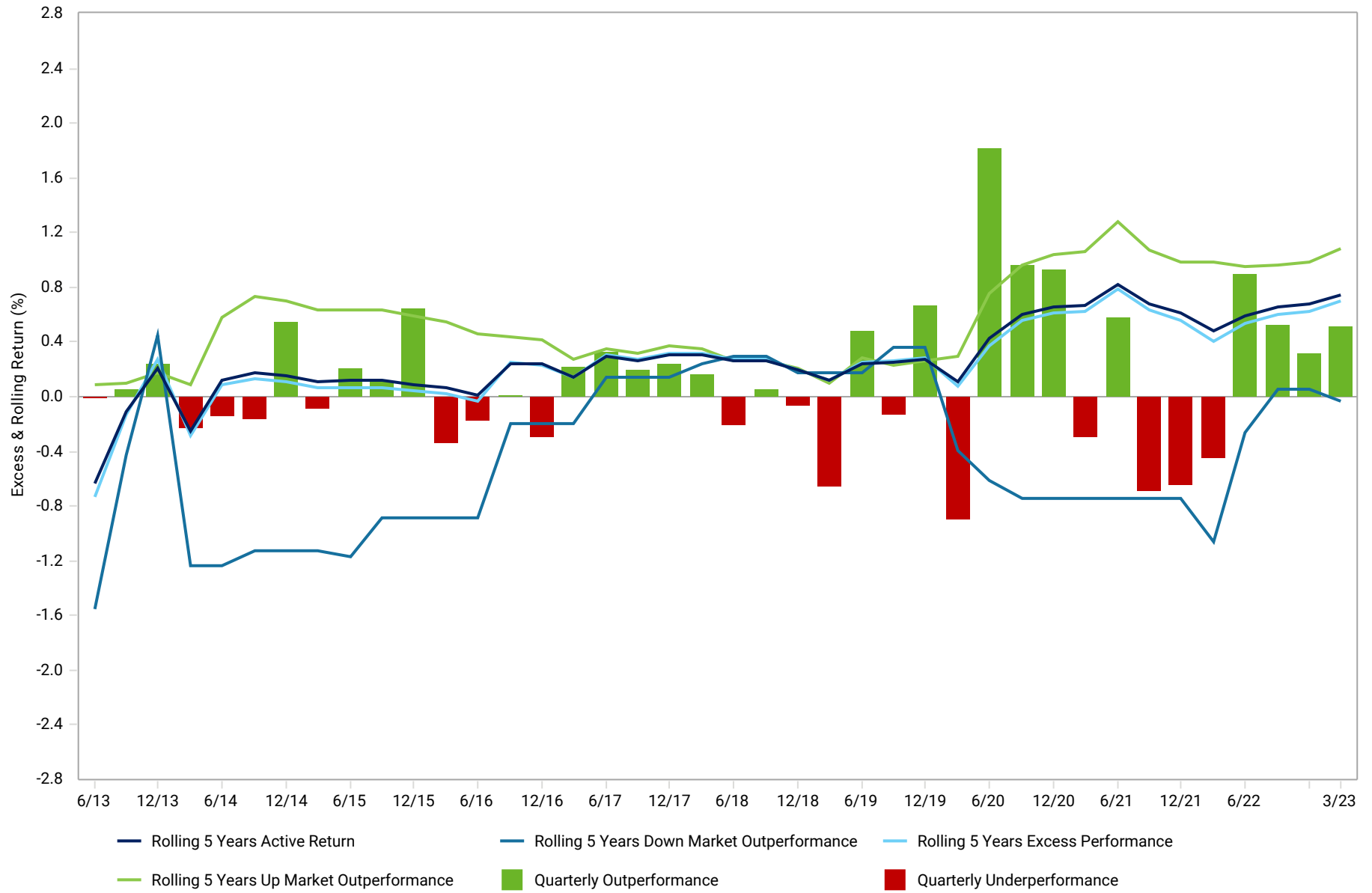
ASSET ALLOCATION VS. POLICY



	Current (\$)	Current (%)	Long Term Target (%)	Difference (%)	Policy Range (%)	Within Range
Domestic Equity	855,329,093	23.7	21.0	2.7	13.0 - 30.0	Yes
International Equity	802,605,557	22.3	18.0	4.3	10.0 - 20.0	No
Private Equity	176,297,056	4.9	8.0	-3.1	0.0 - 10.0	Yes
Core Fixed Income	439,130,514	12.2	12.0	0.2	5.0 - 20.0	Yes
High Yield	43,516,444	1.2	0.0	1.2	0.0 - 5.0	Yes
Private Credit	447,647,943	12.4	14.0	-1.6	5.0 - 20.0	Yes
Core Real Estate	394,131,224	10.9	9.0	1.9	5.0 - 15.0	Yes
Value Add/Oppportunistic Real Estate	173,888,843	4.8	6.0	-1.2	2.0 - 8.0	Yes
Infrastructure	206,091,850	5.7	7.0	-1.3	2.0 - 10.0	Yes
Diversifying/Thematic	64,185,412	1.8	5.0	-3.2	0.0 - 7.0	Yes
Cash	1,133,418	0.0	0.0	0.0	0.0 - 2.0	Yes
Total	3,603,957,354	100.0	100.0	0.0		

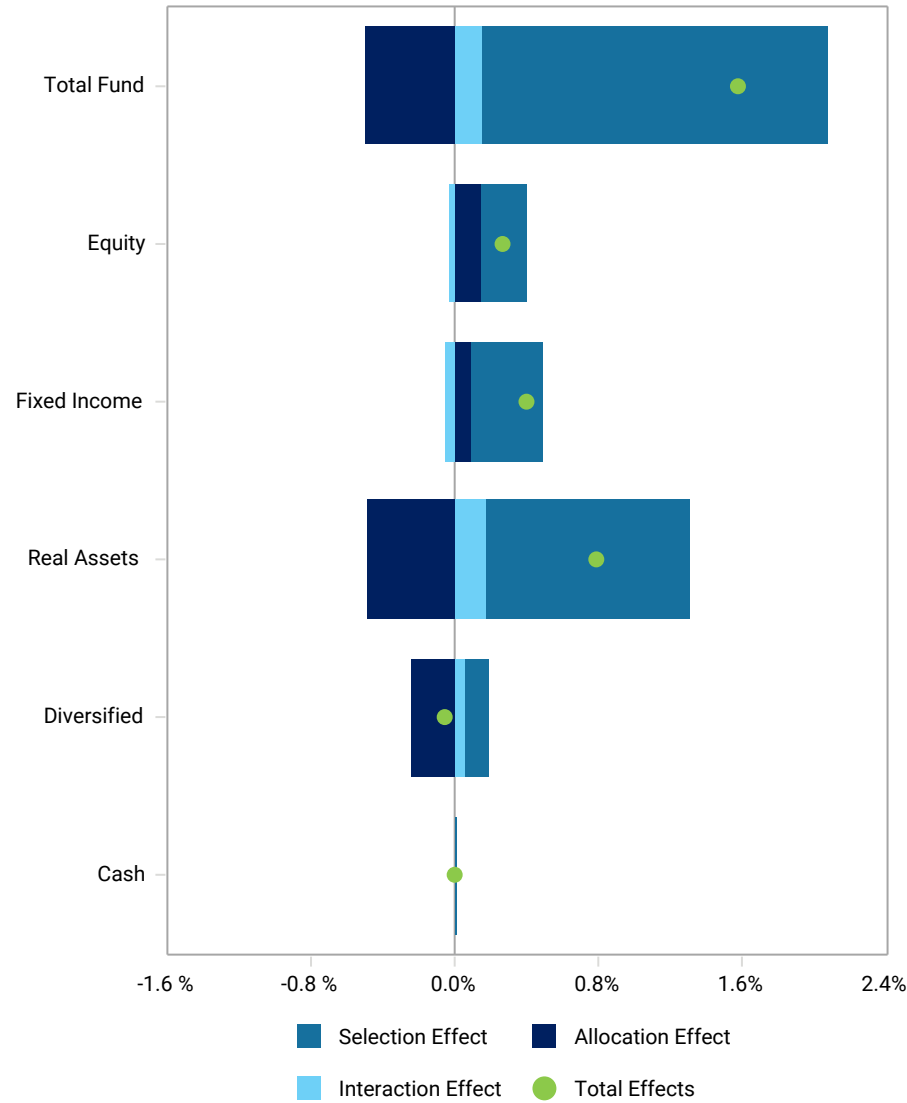


TOTAL FUND VS. POLICY INDEX



ATTRIBUTION ANALYSIS

Attribution Effects
3 Years Ending March 31, 2023



Attribution Summary
3 Years Ending March 31, 2023

	Wtd. Actual Return (%)	Wtd. Index Return (%)	Excess Return (%)	Selection Effect (%)	Allocation Effect (%)	Interaction Effects (%)	Total Effects (%)
Equity	15.7	15.4	0.3	0.3	0.1	0.0	0.3
Fixed Income	4.1	2.8	1.4	0.4	0.1	-0.1	0.4
Real Assets	14.3	7.6	6.7	1.1	-0.5	0.2	0.8
Diversified	5.6	13.0	-7.4	0.1	-0.2	0.1	-0.1
Cash	1.9	0.9	1.1	0.0	0.0	0.0	0.0
Total Fund	13.3	11.7	1.6	1.9	-0.5	0.2	1.6

TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Total Fund	3,603,957,354	100.0	4.6 (9)	-2.3 (12)	13.3 (3)	6.8 (21)	8.2 (17)	7.5 (20)	8.7	Oct-85
<i>Policy Index</i>			<u>4.0</u> (35)	<u>-4.6</u> (64)	<u>11.7</u> (41)	<u>6.1</u> (49)	<u>7.6</u> (52)	<u>7.0</u> (48)	<u>9.0</u>	
Over/Under			0.6	2.3	1.6	0.7	0.6	0.5	-0.3	
<i>60 MSCI World (Gross)/40 CITI WGBI</i>			<u>5.9</u> (1)	<u>-7.8</u> (100)	<u>7.2</u> (100)	<u>3.7</u> (100)	<u>5.5</u> (100)	<u>5.1</u> (100)		
Over/Under			-1.3	5.5	6.1	3.1	2.7	2.4		
<i>InvMetrics Public DB > \$1 Billion Median</i>			3.7	-4.1	11.3	6.0	7.6	6.9		
Total Equity Composite	1,834,231,706	50.9	7.3	-6.5	15.7	6.7	9.5	8.6	8.2	Nov-95
<i>MSCI AC World All Cap Index (Net)</i>			<u>6.9</u>	<u>-7.8</u>	<u>15.7</u>	<u>6.5</u>	<u>9.0</u>	<u>7.9</u>		
Over/Under			0.4	1.3	0.0	0.2	0.5	0.7		
Domestic Equity Composite	855,329,093	23.7	7.2	-8.5	18.8	9.5	11.4	11.1	10.2	Apr-03
<i>Domestic Equity Index</i>			<u>7.2</u>	<u>-8.6</u>	<u>20.0</u>	<u>9.9</u>	<u>11.7</u>	<u>11.4</u>	<u>10.3</u>	
Over/Under			0.0	0.1	-1.2	-0.4	-0.3	-0.3	-0.1	
NTAM Russell 3000	855,329,093	23.7	7.2 (23)	-8.5 (75)	18.1 (41)	10.6 (35)			12.0 (30)	Oct-16
<i>Russell 3000 Index</i>			<u>7.2</u> (23)	<u>-8.6</u> (75)	<u>18.5</u> (34)	<u>10.5</u> (41)			<u>11.8</u> (36)	
Over/Under			0.0	0.1	-0.4	0.1			0.2	
<i>eV US Large Cap Core Equity Median</i>			5.4	-6.8	17.4	9.9			11.2	

Fiscal year end: June 30



TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
International Equity Composite	802,605,557	22.3	9.2	-5.8	10.8	2.8	6.5	5.1		Apr-94
<i>International Equity Index</i>			<u>7.0</u>	<u>-4.6</u>	<u>12.9</u>	<u>3.1</u>	<u>6.5</u>	<u>4.8</u>	<u>5.5</u>	
Over/Under			2.2	-1.2	-2.1	-0.3	0.0	0.3		
Baillie Gifford	236,237,208	6.6	12.8 (5)	-4.6 (51)	9.0 (87)	3.1 (48)	7.3 (31)	6.0 (28)	6.7 (34)	Oct-08
<i>MSCI AC World ex USA index</i>			<u>7.0</u> (63)	<u>-4.6</u> (51)	<u>12.3</u> (59)	<u>3.0</u> (52)	<u>6.4</u> (53)	<u>4.7</u> (68)	<u>5.0</u> (70)	
Over/Under			5.8	0.0	-3.3	0.1	0.9	1.3	1.7	
<i>eV All ACWI ex-US Equity Median</i>			7.8	-4.5	12.9	3.0	6.5	5.3	6.0	
Baillie Gifford Smaller Cos.	57,245,519	1.6	12.1 (7)	-11.7 (68)					-17.8 (89)	Jul-21
<i>MSCI EAFE + Canada Small Cap Index</i>			<u>5.1</u> (71)	<u>-9.7</u> (54)					<u>-8.9</u> (40)	
Over/Under			7.0	-2.0					-8.9	
<i>eV ACWI ex-US Small Cap Equity Median</i>			6.7	-9.2					-11.7	
BlackRock ACWI ex US	277,020,652	7.7	6.7 (69)	-5.5 (61)	11.8 (67)	2.6 (59)	6.0 (59)	4.3 (79)	3.6 (79)	Mar-11
<i>MSCI AC World ex USA index</i>			<u>7.0</u> (63)	<u>-4.6</u> (51)	<u>12.3</u> (59)	<u>3.0</u> (52)	<u>6.4</u> (53)	<u>4.7</u> (68)	<u>4.0</u> (72)	
Over/Under			-0.3	-0.9	-0.5	-0.4	-0.4	-0.4	-0.4	
<i>eV All ACWI ex-US Equity Median</i>			7.8	-4.5	12.9	3.0	6.5	5.3	4.9	
Principal Global	231,820,218	6.4	8.0 (48)	-5.6 (62)	12.2 (60)	3.3 (41)	5.6 (74)	5.4 (49)	5.3 (39)	Sep-08
<i>MSCI AC World ex USA index</i>			<u>7.0</u> (63)	<u>-4.6</u> (51)	<u>12.3</u> (59)	<u>3.0</u> (52)	<u>6.4</u> (53)	<u>4.7</u> (68)	<u>3.9</u> (70)	
Over/Under			1.0	-1.0	-0.1	0.3	-0.8	0.7	1.4	
<i>eV All ACWI ex-US Equity Median</i>			7.8	-4.5	12.9	3.0	6.5	5.3	4.7	
Sanctioned Assets	278,026	0.0	43.4						21.3	Jul-22
<i>MSCI EAFE (Net)</i>			<u>8.5</u>						<u>15.4</u>	
Over/Under			34.9						5.9	

TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							Inception (%)	Inception Date
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)			
Private Equity	176,297,056	4.9	0.1	4.2	18.0					15.6	Apr-19
Ocean Avenue Fund V, L.P.	2,000,000	0.1									Apr-23
Russell 2000 + 3% Over/Under											
Pantheon PE Fund of 1	168,196,897	4.7	0.1	3.7	17.8					15.7	May-19
Private Equity Index			<u>10.3</u>	<u>-17.2</u>	<u>5.5</u>					<u>9.3</u>	
Over/Under			-10.2	20.9	12.3					6.4	
Pantheon Co 2022	6,100,159	0.2	1.3							16.7	Jul-22
Private Equity Index			<u>10.3</u>							<u>-12.7</u>	
Over/Under			-9.0							29.4	
Total Fixed Income Composite	930,294,901	25.8	2.7	-0.8	4.1	4.1	4.4	3.9	5.5	5.5	Nov-95
Fixed Income Index			<u>3.1</u>	<u>-1.1</u>	<u>2.3</u>	<u>3.1</u>	<u>3.4</u>	<u>3.1</u>	<u>5.0</u>		
Over/Under			-0.4	0.3	1.8	1.0	1.0	0.8	0.5		
Core Fixed Composite	439,130,514	12.2	3.0	-4.0	-0.7	1.4	1.8	2.0	3.6	3.6	Apr-03
Blmbg. U.S. Aggregate Index			<u>3.0</u>	<u>-4.8</u>	<u>-2.8</u>	<u>0.9</u>	<u>0.9</u>	<u>1.4</u>	<u>3.2</u>		
Over/Under			0.0	0.8	2.1	0.5	0.9	0.6	0.4		
Dodge & Cox	221,045,692	6.1	3.0 (68)	-2.8 (3)	0.5 (1)	2.3 (1)	2.4 (1)	2.7 (1)	4.1 (4)		Jan-03
Blmbg. U.S. Aggregate Index			<u>3.0 (70)</u>	<u>-4.8 (53)</u>	<u>-2.8 (92)</u>	<u>0.9 (77)</u>	<u>0.9 (83)</u>	<u>1.4 (74)</u>	<u>3.2 (79)</u>		
Over/Under			0.0	2.0	3.3	1.4	1.5	1.3	0.9		
eV US Core Fixed Inc Median			3.1	-4.7	-1.9	1.1	1.2	1.5	3.4		
PGIM	218,084,822	6.1	2.9 (74)	-5.3 (81)	-2.0 (56)	0.9 (80)	0.9 (84)	1.4 (71)	3.3 (57)		Apr-03
Blmbg. U.S. Aggregate Index			<u>3.0 (70)</u>	<u>-4.8 (53)</u>	<u>-2.8 (92)</u>	<u>0.9 (77)</u>	<u>0.9 (83)</u>	<u>1.4 (74)</u>	<u>3.2 (79)</u>		
Over/Under			-0.1	-0.5	0.8	0.0	0.0	0.0	0.1		
eV US Core Fixed Inc Median			3.1	-4.7	-1.9	1.1	1.2	1.5	3.4		
High Yield Composite	43,516,444	1.2	2.2	-6.1	4.8	2.2	4.2	3.5	6.1	6.1	Sep-04
Blmbg. U.S. Corp: High Yield Index			<u>3.6</u>	<u>-3.3</u>	<u>5.9</u>	<u>3.2</u>	<u>5.1</u>	<u>4.1</u>	<u>6.3</u>		
Over/Under			-1.4	-2.8	-1.1	-1.0	-0.9	-0.6	-0.2		
Loomis Sayles	43,516,444	1.2	2.2 (95)	-6.1 (96)	4.8 (72)	2.2 (92)	4.1 (69)	3.5 (64)	6.3 (18)		Sep-04
Blmbg. U.S. Corp: High Yield Index			<u>3.6 (32)</u>	<u>-3.3 (57)</u>	<u>5.9 (41)</u>	<u>3.2 (38)</u>	<u>5.1 (20)</u>	<u>4.1 (29)</u>	<u>6.3 (17)</u>		
Over/Under			-1.4	-2.8	-1.1	-1.0	-1.0	-0.6	0.0		
eV US High Yield Fixed Inc Median			3.3	-2.8	5.6	2.9	4.4	3.8	5.8		



TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							Inception (%)	Inception Date
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)			
Private Credit	447,647,943	12.4	2.5	4.3	9.5	8.9	9.5	8.3	Sep-15		
<i>Private Credit Index</i>			<u>3.4</u>	<u>-0.3</u>	<u>4.6</u>	<u>4.4</u>	<u>5.4</u>	<u>5.6</u>			
Over/Under			-0.9	4.6	4.9	4.5	4.1	2.7			
Crescent Capital	33,193,548	0.9	0.0	4.5	7.4	7.7	8.1	7.0	Sep-15		
<i>Private Credit Index</i>			<u>3.4</u>	<u>-0.3</u>	<u>4.6</u>	<u>4.4</u>	<u>5.4</u>	<u>5.6</u>			
Over/Under			-3.4	4.8	2.8	3.3	2.7	1.4			
Arcmont Euro Private Debt	98,635,997	2.7	4.7	12.4				11.4	Apr-21		
<i>Private Credit Index</i>			<u>3.4</u>	<u>-0.3</u>				<u>0.7</u>			
Over/Under			1.3	12.7				10.7			
Monroe Capital	217,489,180	6.0	2.5	6.5	9.6	8.8	9.6	9.6	Apr-16		
<i>Private Credit Index</i>			<u>3.4</u>	<u>-0.3</u>	<u>4.6</u>	<u>4.4</u>	<u>5.4</u>	<u>5.4</u>			
Over/Under			-0.9	6.8	5.0	4.4	4.2	4.2			
PIMCO COF II	20,052,736	0.6	17.4	12.4	14.4	12.0		12.4	Aug-16		
<i>Private Credit Index</i>			<u>3.4</u>	<u>-0.3</u>	<u>4.6</u>	<u>4.4</u>		<u>5.3</u>			
Over/Under			14.0	12.7	9.8	7.6		7.1			
PIMCO COF III	78,276,482	2.2	-2.2	-10.0				32.9	May-20		
<i>Private Credit Index</i>			<u>3.4</u>	<u>-0.3</u>				<u>3.6</u>			
Over/Under			-5.6	-9.7				29.3			



TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Real Assets	774,111,917	21.5	0.5	4.6	14.3	8.8	7.9	9.6	9.7	Jan-96
Private Real Estate Composite	173,888,843	4.8	0.1	6.3	11.5	10.7	12.6	12.5	10.2	Jan-96
NCREIF ODCE			<u>-3.2</u>	<u>-3.1</u>	<u>8.4</u>	<u>7.5</u>	<u>7.7</u>	<u>9.5</u>	<u>9.0</u>	
Over/Under			3.3	9.4	3.1	3.2	4.9	3.0	1.2	
Oaktree Value Add	10,904,136	0.3	-4.0	-3.6	5.7	9.2			13.4	Dec-16
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>	<u>8.5</u>	<u>7.6</u>			<u>7.9</u>	
Over/Under			-0.9	-0.7	-2.8	1.6			5.5	
PCCP Value Add	24,556,716	0.7	-1.1	9.6	18.0	15.0			17.5	Oct-16
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>	<u>8.5</u>	<u>7.6</u>			<u>7.8</u>	
Over/Under			2.0	12.5	9.5	7.4			9.7	
PIMCO Bravo III	44,407,159	1.2	-0.6	1.7	8.1	8.6			8.9	Nov-16
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>	<u>8.5</u>	<u>7.6</u>			<u>7.8</u>	
Over/Under			2.5	4.6	-0.4	1.0			1.1	
Alidade Capital V	4,977,735	0.1	-2.3	-24.1					-18.7	Dec-21
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>					<u>9.1</u>	
Over/Under			0.8	-21.2					-27.8	
Artemis AREPF III	12,707,263	0.4	-2.4	5.4	26.7				13.3	Jan-19
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>	<u>8.5</u>				<u>7.5</u>	
Over/Under			0.7	8.3	18.2				5.8	
Brookfield SREP III	47,610,772	1.3	2.1	9.5	11.3				7.5	May-19
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>	<u>8.5</u>				<u>7.8</u>	
Over/Under			5.2	12.4	2.8				-0.3	
Blue Vista BVREP V	15,268,594	0.4	0.0	41.6	15.2				14.8	Mar-20
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>	<u>8.5</u>				<u>8.6</u>	
Over/Under			3.1	44.5	6.7				6.2	
Kayne Anderson VI	13,456,468	0.4	5.5	4.9					3.5	Nov-21
NCREIF ODCE + 1%			<u>-3.1</u>	<u>-2.9</u>					<u>8.6</u>	
Over/Under			8.6	7.8					-5.1	
Core Real Estate	394,131,224	10.9	-1.4	3.6	10.0	7.9	7.7	9.1		Jan-96
JP Morgan RE	158,497,453	4.4	-1.9	-4.2	6.5	5.9	6.2	8.0	8.5	Jan-96
NCREIF Fund Index-Open End Diversified Core Equity (VW) (Net)			<u>-3.3</u>	<u>-3.9</u>	<u>7.5</u>	<u>6.6</u>	<u>6.8</u>	<u>8.5</u>	<u>8.0</u>	
Over/Under			1.4	-0.3	-1.0	-0.7	-0.6	-0.5	0.5	
CFRSR-Carlyle CPI Fund	235,633,771	6.5	-1.1	11.4					15.1	Jul-20
NCREIF Fund Index-Open End Diversified Core Equity (VW) (Net)			<u>-3.3</u>	<u>-3.9</u>					<u>8.9</u>	
Over/Under			2.2	15.3					6.2	

TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							Inception Date
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Inception (%)	
Infrastructure	206,091,850	5.7	4.6	4.8	4.7				5.1	Oct-18
CPI + 4% (Unadjusted)			<u>2.7</u>	<u>9.2</u>	<u>9.6</u>				<u>8.2</u>	
Over/Under			1.9	-4.4	-4.9				-3.1	
JP Morgan IIF	108,673,952	3.0	8.1	5.5	5.4				5.7	Oct-18
CPI + 4% (Unadjusted)			<u>2.7</u>	<u>9.2</u>	<u>9.6</u>				<u>8.2</u>	
Over/Under			5.4	-3.7	-4.2				-2.5	
Ullico UIF	97,417,898	2.7	1.0	4.7	4.3				5.0	Dec-18
CPI + 4% (Unadjusted)			<u>2.7</u>	<u>9.2</u>	<u>9.6</u>				<u>8.4</u>	
Over/Under			-1.7	-4.5	-5.3				-3.4	
Multi Asset	64,185,412	1.8	3.4	6.8					25.0	Dec-21
Midstream Energy	47,445,604	1.3	3.9	7.6	38.2				8.3	Jul-19
Harvest	47,445,604	1.3	3.9	8.1	41.6				8.9	Jul-19
Alerian Midstream Energy Index			0.8	-1.2	34.8	9.7	8.5			Jan-00
Alternative Credit	16,739,808	0.5	0.1						-3.4	Jul-22
Sixth Street TAO	16,739,808	0.5	0.1						-3.4	Jul-22

TOTAL FUND PERFORMANCE DETAIL - SHORT - TERM - NET OF FEES

	Allocation		Performance (%)							
	Market Value (\$)	% of Portfolio	3 Mo (%)	1 Yr (%)	3 Yrs (%)	5 Yrs (%)	7 Yrs (%)	10 Yrs (%)	Inception (%)	Inception Date
Cash & Equivalents Composite	1,133,418	0.0	1.2	1.0	1.9	2.0	1.7	1.2	1.7	Oct-03
<i>90 Day U.S. Treasury Bill</i>			<i>1.1</i>	<i>2.5</i>	<i>0.9</i>	<i>1.4</i>	<i>1.2</i>	<i>0.9</i>	<i>1.3</i>	
Over/Under			0.1	-1.5	1.0	0.6	0.5	0.3	0.4	
Payroll Account	517,857	0.0	1.2	1.0	0.6	1.2	1.1	0.8	1.8	Apr-99
<i>90 Day U.S. Treasury Bill</i>			<i>1.1</i>	<i>2.5</i>	<i>0.9</i>	<i>1.4</i>	<i>1.2</i>	<i>0.9</i>	<i>1.7</i>	
Over/Under			0.1	-1.5	-0.3	-0.2	-0.1	-0.1	0.1	
Operating Funds	615,561	0.0	1.2	1.0	0.4	1.1	1.0	0.8	1.3	Oct-03
<i>90 Day U.S. Treasury Bill</i>			<i>1.1</i>	<i>2.5</i>	<i>0.9</i>	<i>1.4</i>	<i>1.2</i>	<i>0.9</i>	<i>1.3</i>	
Over/Under			0.1	-1.5	-0.5	-0.3	-0.2	-0.1	0.0	

Fiscal year end: June 30

Composite rankings are used for Total Equity Composite (InvMetrics Public DB US Eq), Domestic Equity Composite (InvMetrics Public DB Total Eq), International Equity Composite (InvMetrics Public DB ex- US Eq), International Developed Equity Composite (InvMetrics Public DB Dev Mkt ex-US), International Emerging Markets Equity (InvMetrics Public DB Emg Mkt Eq), Total Fixed Income (InvMetrics Public DB Total Fix Inc), Core Fixed Composite (InvMetrics Public DB US Fix Inc), High Yield Composite (InvMetrics Public DB US Fix Inc) and Total Real Estate (InvMetrics Public DB Real Estate Pub+Priv).

Manager rankings are used for Large Cap Equity Composite (eA US Large Cap Equity), Small Cap Equity Composite (eA US Small Cap Equity), ACWi ex US Equity Composite (eA ACWI ex-US Equity), EAFE Equity Composite (eA All EAFE Equity) and Public Real Estate Composite (eA US REIT).





APPENDIX

CALENDAR YEAR INDEX PERFORMANCE

	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	Mar	YTD
S&P 500	32.4%	13.7%	1.4%	12.0%	21.8%	-4.4%	31.5%	18.4%	28.7%	-18.1%	3.7%	7.5%
Russell 1000	33.1%	13.2%	0.9%	12.1%	21.7%	-4.8%	31.4%	21.0%	26.5%	-19.1%	3.2%	7.5%
Russell 2000	38.8%	4.9%	-4.4%	21.3%	14.6%	-11.0%	25.5%	20.0%	14.8%	-20.4%	-4.8%	2.7%
Russell 2500	36.8%	7.1%	-2.9%	17.6%	16.8%	-10.0%	27.8%	20.0%	18.2%	-18.4%	-3.7%	3.4%
MSCI EAFE	22.8%	-4.9%	-0.8%	1.0%	25.0%	-13.8%	22.0%	7.8%	11.3%	-14.5%	2.5%	8.5%
MSCI EM	-2.6%	-2.2%	-14.9%	11.2%	37.3%	-14.6%	18.4%	18.3%	-2.5%	-20.1%	3.0%	4.0%
MSCI ACWI	22.8%	4.2%	-2.4%	7.9%	24.0%	-9.4%	26.6%	16.3%	18.5%	-18.4%	3.1%	7.3%
Private Equity	12.6%	22.3%	14.6%	10.4%	10.3%	21.0%	13.1%	17.2%	45.0%	-9.7%	-	-9.7%
BBG TIPS	-8.6%	3.6%	-1.4%	4.7%	3.0%	-1.3%	8.4%	11.0%	6.0%	-11.8%	2.9%	3.3%
BBG Municipal	-2.6%	9.1%	3.3%	0.2%	5.4%	1.3%	7.5%	5.2%	1.5%	-8.5%	2.2%	2.8%
BBG Muni High Yield	-5.5%	13.8%	1.8%	3.0%	9.7%	4.8%	10.7%	4.9%	7.8%	-13.1%	1.6%	2.7%
BBG US Corporate HY	7.4%	2.5%	-4.5%	17.1%	7.5%	-2.1%	14.3%	7.1%	5.3%	-11.2%	1.1%	3.6%
BBG US Agg Bond	-2.0%	6.0%	0.5%	2.6%	3.5%	0.0%	8.7%	7.5%	-1.5%	-13.0%	2.5%	3.0%
BBG Global Agg	-2.6%	0.6%	-3.2%	2.1%	7.4%	-1.2%	6.8%	9.2%	-4.7%	-16.2%	3.2%	3.0%
BBG Long Treasuries	-12.7%	25.1%	-1.2%	1.3%	8.5%	-1.8%	14.8%	17.7%	-4.6%	-29.3%	4.7%	6.2%
BBG US Long Credit	-6.6%	16.4%	-4.6%	10.2%	12.2%	-6.8%	23.4%	13.3%	-1.2%	-25.3%	4.1%	5.4%
BBG US STRIPS 20+ Yr	-21.0%	46.4%	-3.7%	1.4%	13.7%	-4.1%	20.9%	24.0%	-5.2%	-39.6%	5.4%	8.3%
JPM GBI-EM Global Div	-9.0%	-5.7%	-14.9%	9.9%	15.2%	-6.2%	13.5%	2.7%	-8.7%	-11.7%	4.1%	5.2%
JPM EMBI Glob Div	-5.3%	7.4%	1.2%	10.2%	10.3%	-4.3%	15.0%	5.3%	-1.8%	-17.8%	1.0%	1.9%
CS Hedge Fund	9.7%	4.1%	-0.7%	1.2%	7.1%	-3.2%	9.3%	6.4%	8.2%	1.1%	-	0.9%
BBG Commodity	-9.5%	-17.0%	-24.7%	11.8%	1.7%	-11.2%	7.7%	-3.1%	27.1%	16.1%	-0.2%	-5.4%
Alerian Midstream	-	16.4%	-37.3%	33.8%	-2.4%	-13.3%	24.0%	-23.4%	38.4%	21.5%	-0.1%	0.8%
FTSE NAREIT Equity REITs	2.5%	30.1%	3.2%	8.5%	5.2%	-4.6%	26.0%	-8.0%	43.2%	-24.4%	-2.5%	2.7%

*Private Equity return represents calendar year pooled IRR and is subject to a one quarter lag
Source: FactSet, Barclays, Thomson One



TRAILING ANNUAL INDEX PERFORMANCE

Equity						
	Mar-23	YTD	1 YR	3 YR	5 YR	10 YR
MSCI ACWI	3.1%	7.3%	-7.4%	15.4%	6.9%	8.1%
S&P 500	3.7%	7.5%	-7.7%	18.6%	11.2%	12.2%
Russell 1000	3.2%	7.5%	-8.4%	18.6%	10.9%	12.0%
Russell 2000	-4.8%	2.7%	-11.6%	17.5%	4.7%	8.0%
Russell 2500	-3.7%	3.4%	-10.4%	19.4%	6.6%	9.1%
MSCI EAFE	2.5%	8.5%	-1.4%	13.0%	3.5%	5.0%
MSCI EM	3.0%	4.0%	-10.7%	7.8%	-0.9%	2.0%

Credit						
	Mar-23	YTD	1 YR	3 YR	5 YR	10 YR
BBG Global Agg	3.2%	3.0%	-8.1%	-3.4%	-1.3%	0.1%
BBG US Agg	2.5%	3.0%	-4.8%	-2.8%	0.9%	1.4%
BBG Credit	2.7%	3.5%	-5.3%	-0.7%	1.5%	2.2%
BBG US HY	1.1%	3.6%	-3.3%	5.9%	3.2%	4.1%
BBG Muni	2.2%	2.8%	0.3%	0.3%	2.0%	2.4%
BBG Muni HY	1.6%	2.7%	-4.5%	2.7%	3.1%	3.6%
BBG TIPS	2.9%	3.3%	-6.1%	1.8%	2.9%	1.5%
BBG 20+ STRIPS	5.4%	8.3%	-24.1%	-16.0%	-1.3%	1.9%
BBG Long Treasuries	4.7%	6.2%	-16.0%	-11.3%	-0.4%	1.5%
BBG Long Credit	4.1%	5.4%	-11.3%	-2.6%	1.1%	2.9%
BBG Govt/Credit 1-3 Yr	1.5%	1.5%	0.3%	-0.4%	1.3%	1.0%
JPM EMBI Glob Div	1.0%	1.9%	-6.9%	0.0%	-0.6%	2.0%
JPM GBI-EM Glob Div	4.1%	5.2%	-0.7%	0.9%	-2.4%	-1.5%

Real Assets						
	Mar-23	YTD	1 YR	3 YR	5 YR	10 YR
BBG Commodity	-0.2%	-5.4%	-12.5%	20.8%	5.4%	-1.7%
Alerian Midstream Index	-0.1%	0.8%	-1.2%	34.8%	#N/A	-
NAREIT Composite Index	-2.0%	1.6%	-19.6%	10.4%	5.7%	6.0%

Source: S&P, MSCI, Russell, Bloomberg, JPM, Alerian, FTSE, FactSet



GLOSSARY OF INVESTMENT TERMINOLOGY— RISK STATISTICS

- **Alpha**
 - Measures the relationship between the fund performance and the performance of another fund or benchmark index and equals the excess return while the other fund or benchmark index is zero.
- **Alpha Jensen**
 - The average return on a portfolio over and above that predicted by the capital asset pricing model (CAPM), given the portfolio's beta and the average market return. Also known as the abnormal return or the risk adjusted excess return.
- **Annualized Excess Return over Benchmark**
 - Annualized fund return minus the annualized benchmark return for the calculated return.
- **Annualized Return**
 - A statistical technique whereby returns covering periods greater than one year are converted to cover a 12 month time span.
- **Beta**
 - Measures the volatility or systematic risk and is equal to the change in the fund's performance in relation to the change in the assigned index's performance.
- **Information Ratio**
 - A measure of the risk adjusted return of a financial security, asset, or portfolio.
Formula:
(Annualized Return of Portfolio - Annualized Return of Benchmark) / Annualized Standard Deviation (Period Portfolio Return - Period Benchmark Return). To annualize standard deviation, multiply the deviation by the square root of the number of periods per year where monthly returns per year equals 12 and quarterly returns is four periods per year.
- **R-Squared**
 - Represents the percentage of a fund's movements that can be explained by movements in an index. R-Squared values range from 0 to 100. An R-Squared of 100 denotes that all movements of a fund are completely explained by movements in the index.
- **Sharpe Ratio**
 - A measure of the excess return or risk premium per unit of risk in an investment asset or trading strategy.
Formula:
(Annualized Return of Portfolio - Annualized Return of Risk Free) / Annualized Standard Deviation (Portfolio Returns)
- **Sortino Ratio**
 - A method to differentiate between good and bad volatility in the Sharpe Ratio. The differentiation of up and down volatility allows the calculation to provide a risk adjusted measure of a security or fund's performance without upward price change penalties.
Formula:
*Calculation Average (X-Y) / Downside Deviation (X-Y) * 2*
Where X=Return Series X Y = Return Series Y which is the risk free return (91 day T-bills)
- **Standard Deviation**
 - The standard deviation is a statistical term that describes the distribution of results. It is a commonly used measure of volatility of returns of a portfolio, asset class, or security. The higher the standard deviation the more volatile the returns are.
Formula:
(Annualized Return of Portfolio - Annualized Arithmetic Average of the Portfolio Returns) Squared / The number of periods- 1)

GLOSSARY OF INVESTMENT TERMINOLOGY— RISK STATISTICS

▪ Tracking Error

- Tracking error, also known as residual risk, is a measure of the degree to which a portfolio tracks its benchmark. It is also a measure of consistency of excess returns. Tracking error is computed as the annualized standard deviation of the difference between a portfolio's return and that of its benchmark.

Formula:

*Tracking Error = Standard Deviation (X-Y) * $\sqrt{\text{# of periods per year}}$*
Where X = periods portfolio return and Y = the period's BM return
For monthly returns, the periods per year = 12
For quarterly returns, the periods per year = 4

▪ Treynor Ratio

- A risk-adjusted measure of return based on systematic risk. Similar to the Sharpe ratio with the difference being the Treynor ratio uses beta as the measurement of volatility.

Formula:

(Portfolio Average Return - Average Return of Risk-Free Rate)/Portfolio Beta

▪ Up/Down Capture Ratio

- A measure of what percentage of a market's returns is "captured" by a portfolio. For example, if the market declines 10% over some period, and the manager declines only 9%, then his or her capture ratio is 90%. In down markets, it is advantageous for a manager to have as low a capture ratio as possible. For up markets, the higher the capture ratio the better. Looking at capture ratios can provide insight into how a manager achieves excess returns. A value manager might typically have a lower capture ratio in both up and down markets, achieving excess returns by protecting on the downside, whereas a growth manager might fall more than the overall market in down markets, but achieve above-market returns in a rising market.

Upside Capture:

Total Return (Fund Returns) / Total Returns (BM Return) when Period Benchmark Return is $> = 0$

Downside Capture:

Total Return (Fund Returns) / Total Returns (BM Return) when Benchmark Return < 0

Source: InvestorForce



INFORMATION DISCLAIMER

Past performance is no guarantee of future results.

The goal of this report is to provide a basis for monitoring financial markets. The opinions presented herein represent the good faith views of NEPC as of the date of this report and are subject to change at any time.

Information on market indices was provided by sources external to NEPC. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within.

All investments carry some level of risk. Diversification and other asset allocation techniques do not ensure profit or protect against losses.

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