



QUARTERLY PERFORMANCE REPORT

CITY OF FRESNO RETIREMENT
SYSTEMS

DECEMBER 31, 2023

Sam Austin, Partner

Dan Hennessy, CFA, CAIA, Senior Consultant

Michael Miranda, CFA, Senior Consulting Specialist



FOURTH QUARTER 2022 SUMMARY

- **The US economy expanded (in real terms) at an annual rate of 2.9% in the fourth quarter**
- **The Fed increased rates by 1.25%, and the target Fed Funds rate moved up to 4.25% - 4.50%**
- **US stocks underperformed Non-US stocks with Emerging Market stocks underperforming Developed Markets**
- **US bonds were positive during the quarter despite yields increasing as credit spreads tightened**
- **Net performance over the last 25 years is 6.8%, ahead of the assumed rate of 6.75%**
 - Performance is ahead of the policy index over the last 25 years and trails since inception
- **Manager selection remains a positive contributor to relative performance long-term**



FOURTH QUARTER 2022 SUMMARY

- **In the one-year ended December 31, 2022, the Total Fund returned -9.4%, outperforming the benchmark (net of fees) and ranking in the second quartile of peers**
 - Overweight positioning to Public Equities detracted from relative performance
 - Public Equity manager selection detracted from relative performance while Fixed Income, Real Assets and Multi-Assets managers outperformed
 - Private Equity, Private Credit, Real Estate, Midstream Energy and Infrastructure performance have contributed to overall plan returns over the trailing 1-year period
- **Over the most recent quarter, the Total Fund returned 5.1%, outperforming the policy benchmark (net of fees) and ranking in the third quartile of peers**
 - Private Equity detracted from relative performance
 - Private Real Estate contributed to relative performance
- **Total fund volatility remained elevated relative to peers**



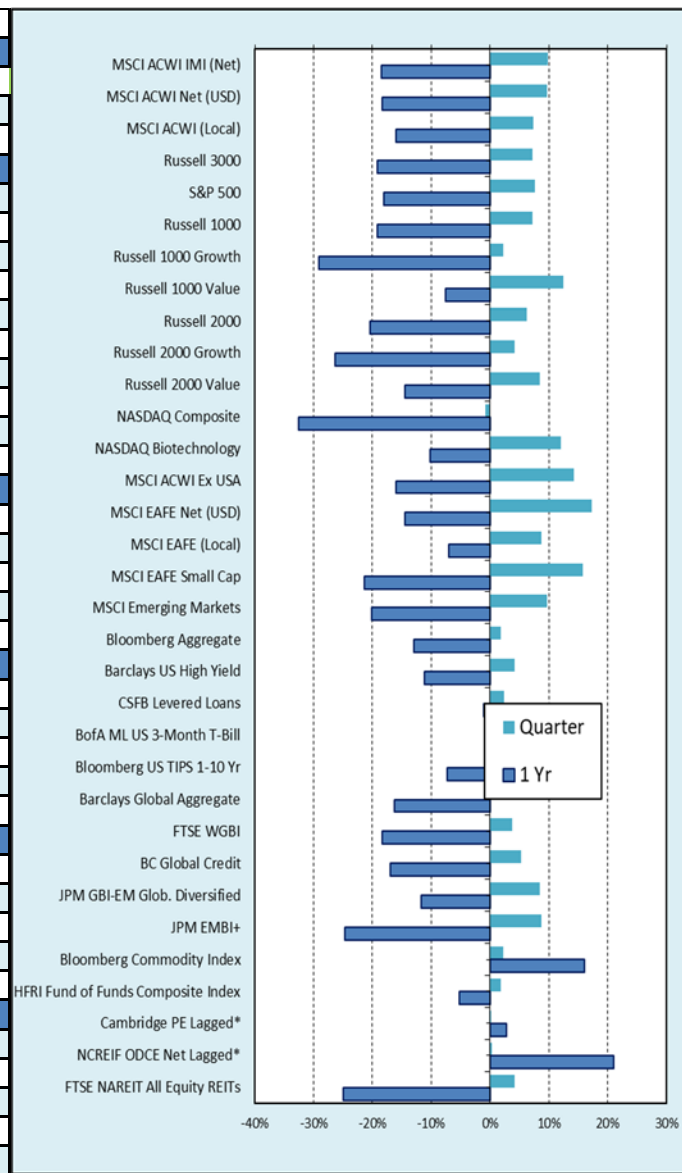
ECONOMIC ENVIRONMENT

- **Q4 Real GDP (advance estimate) increased at an annual rate of 2.9%.**
 - Retail sales ended October at +6.4% on a YoY basis. In the same period last year the YoY growth rate was +16.0%.
 - Corporate profits as a percent of GDP ended June 2022 at 11.2%, down from 12.0% in the same period last year and remain elevated relative to historical levels.
 - The inventory-to-sales ratio ended October was 1.35 up from 1.26 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 Q4, down from 3.7% in Q3; U-6, a broader measure of unemployment, decreased to 6.5% in Q4 from 6.7% in Q3.**
 - The labor force participation rate ended Q4 unchanged from Q3 at 62.3%. 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 October) declined to 298.99 from 300.59 in September and remains at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally-adjusted CPI ended Q4 at 6.42% down from Q3 at 8.2%. In the same period last year, it was 7.09%; Capacity Utilization decreased to 78.75% in Q4 from 80.07% in Q3.**
- **Fed Funds rate increased in Q4 by 1.25% to a targeted range of 4.25%-to-4.50% up from a targeted range of 3.00%-to-3.25% ended Q3. The 10-year Treasury Yield (constant maturity) finished Q4 at 3.62% up from 3.52% in Q3.**
- **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 decreased in Q4 to 27.96 from 28.42x in Q3 and are lower than the 10-year average of 28.99x.**
 - Cyclically adjusted Shiller PE ratio remains above the long-term average of 16.99x.

MARKET ENVIRONMENT

Q4 2022 OVERVIEW

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI IMI (Net)	World with Small Cap	9.84%	-18.40%	3.89%	4.96%	7.94%
MSCI ACWI Net (USD)	World W/O Small Cap	9.76%	-18.36%	4.00%	5.23%	7.98%
MSCI ACWI (Local)	World (Local Currency)	7.36%	-15.98%	5.07%	6.10%	9.33%
Domestic Equity Benchmarks						
Russell 3000	Domestic All Cap	7.18%	-19.21%	7.07%	8.79%	12.13%
S&P 500	Large Core	7.56%	-18.11%	7.66%	9.42%	12.56%
Russell 1000	Large Core	7.24%	-19.13%	7.35%	9.13%	12.37%
Russell 1000 Growth	Large Growth	2.20%	-29.14%	7.79%	10.96%	14.10%
Russell 1000 Value	Large Value	12.42%	-7.54%	5.96%	6.67%	10.29%
Russell 2000	Small Core	6.23%	-20.44%	3.10%	4.13%	9.01%
Russell 2000 Growth	Small Growth	4.13%	-26.36%	0.65%	3.51%	9.20%
Russell 2000 Value	Small Value	8.42%	-14.48%	4.70%	4.13%	8.48%
NASDAQ Composite	Large Growth	-0.79%	-32.54%	6.10%	9.67%	14.43%
NASDAQ Biotechnology	Biotech	12.01%	-10.12%	4.36%	5.32%	11.92%
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	14.28%	-16.00%	0.07%	0.88%	3.80%
MSCI EAFE Net (USD)	Int'l Developed	17.34%	-14.45%	0.87%	1.54%	4.67%
MSCI EAFE (Local)	Int'l Developed (Local Currency)	8.72%	-7.00%	3.64%	3.81%	7.56%
MSCI EAFE Small Cap	Small Cap Int'l	15.79%	-21.39%	-0.93%	-0.05%	6.21%
MSCI Emerging Markets	Emerging Equity	9.70%	-20.09%	-2.69%	-1.40%	1.44%
Domestic Fixed Income Benchmarks						
Bloomberg Aggregate	Core Bonds	1.87%	-13.01%	-2.71%	0.02%	1.06%
Barclays US High Yield	High Yield	4.17%	-11.19%	0.05%	2.31%	4.03%
CSFB Levered Loans	Bank Loans	2.33%	-1.06%	2.34%	3.24%	3.78%
BofA ML US 3-Month T-Bill	Cash	0.84%	1.46%	0.72%	1.26%	0.76%
Bloomberg US TIPS 1-10 Yr	Inflation	1.64%	-7.34%	2.01%	2.50%	1.29%
Global Fixed Income Benchmarks						
Barclays Global Aggregate	Global Core Bonds	4.55%	-16.25%	-4.48%	-1.66%	-0.44%
FTSE WGBI	World Gov. Bonds	3.82%	-18.26%	-5.75%	-2.54%	-1.22%
BC Global Credit	Global Bonds	5.28%	-16.96%	-4.01%	-1.06%	0.60%
JPM GBI-EM Glob. Diversified	Em. Mkt. Bonds (Local Currency)	8.45%	-11.69%	-6.11%	-2.51%	-2.03%
JPM EMBI+	Em. Mkt. Bonds	8.70%	-24.67%	-8.34%	-3.87%	-0.35%
Alternative Benchmarks						
Bloomberg Commodity Index	Commodities	2.22%	16.09%	12.65%	6.44%	-1.28%
HFRI Fund of Funds Composite Index	Fund of Hedge Funds	1.79%	-5.25%	3.71%	3.02%	3.51%
Cambridge PE Lagged*	Private Equity	0.08%	2.86%	19.37%	16.75%	15.02%
NCREIF ODCE Net Lagged*	Real Estate	0.35%	21.05%	11.41%	9.28%	9.92%
FTSE NAREIT All Equity REITs	REIT	4.14%	-24.95%	0.20%	4.43%	7.10%



* As of 9/30/2022



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	3,468,831,018	5.1 (52)	-9.4 (35)	5.6 (26)	5.7 (33)	7.6 (23)	7.6 (26)	5.8 (30)	6.8 (11)	8.6	Oct-85
<i>Policy Index</i>		4.8 (66)	-10.6 (47)	4.6 (45)	5.1 (56)	7.2 (48)	7.1 (49)	5.8 (31)	6.6 (33)	9.0	
<i>60 MSCI World (Gross)/40 CITI WGBI</i>		7.5 (4)	-17.9 (100)	0.6 (100)	2.7 (100)	5.1 (100)	4.8 (100)	3.9 (100)	5.4 (95)		
<i>InvMetrics Public DB > \$1 Billion Median</i>		5.1	-11.1	4.5	5.3	7.0	7.0	5.6	6.4		
Population		65	65	63	62	62	59	52	41		

5 Years Ending December 31, 2022

	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	5.7 (33)	11.5 (70)	0.4 (45)	0.6 (43)
<i>Policy Index</i>	5.1 (56)	11.7 (80)	0.4 (68)	0.5 (68)
<i>60 MSCI World (Gross)/40 CITI WGBI</i>	2.7 (100)	12.0 (82)	0.2 (100)	0.2 (100)

7 Years Ending December 31, 2022

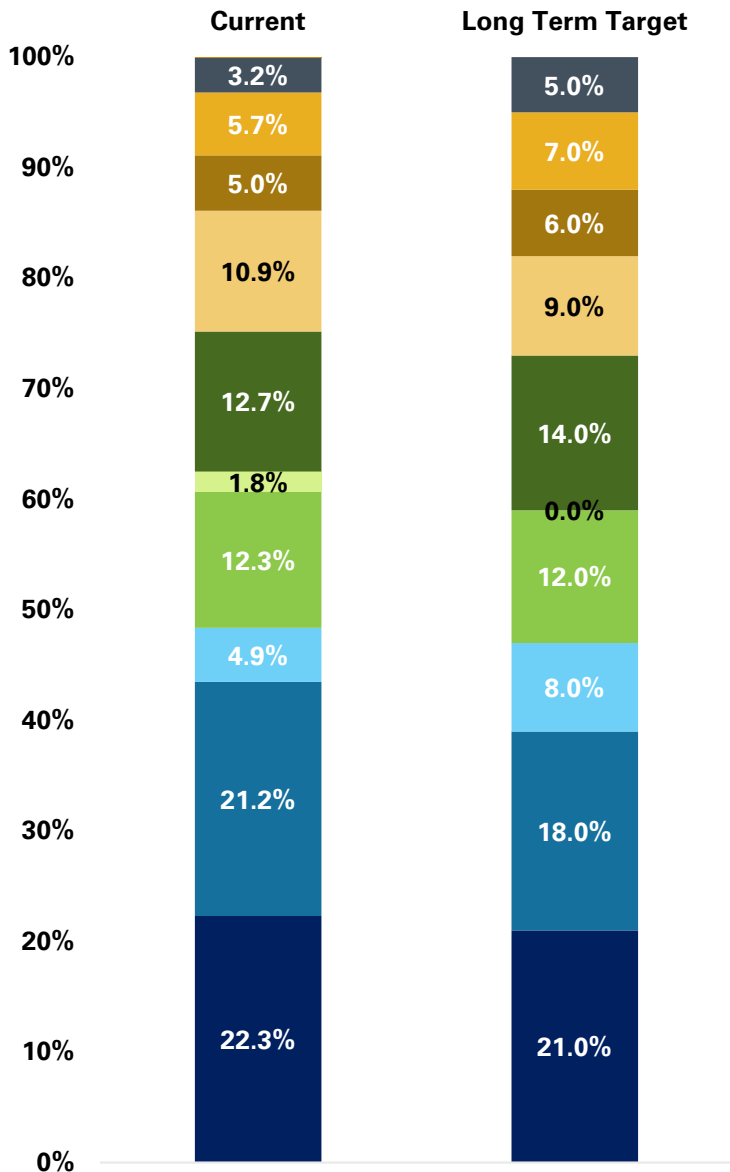
	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	7.6 (23)	10.2 (80)	0.7 (46)	1.0 (45)
<i>Policy Index</i>	7.2 (48)	10.4 (81)	0.6 (61)	0.9 (61)
<i>60 MSCI World (Gross)/40 CITI WGBI</i>	5.1 (100)	10.7 (83)	0.4 (100)	0.6 (100)

Over the past five years, the Fund returned 5.7% per annum, ranking in the 33RD percentile of the Investment Metrics Public Funds > \$1 Billion net of fee universe. The Fund's return underperformed the actuarial rate of return and outperformed the policy index by 0.6%. The Fund's volatility was 11.5%, which ranks in the 70th percentile of its peers over this period. The Fund's risk-adjusted performance, as measured by the Sharpe Ratio, ranks in the 45th percentile of its peers.

Over the past three years, the Fund returned 5.6% per annum, outperforming the policy index by 1.0% and ranking in the 26th percentile of its peer group. Over the past three years, the Fund's Sharpe Ratio of 0.4 ranks in the 33rd percentile.

For the year ending December 31, 2022, the Fund returned -9.4%, outperforming the policy index by 1.2% and ranking in the 35th percentile of its peers.

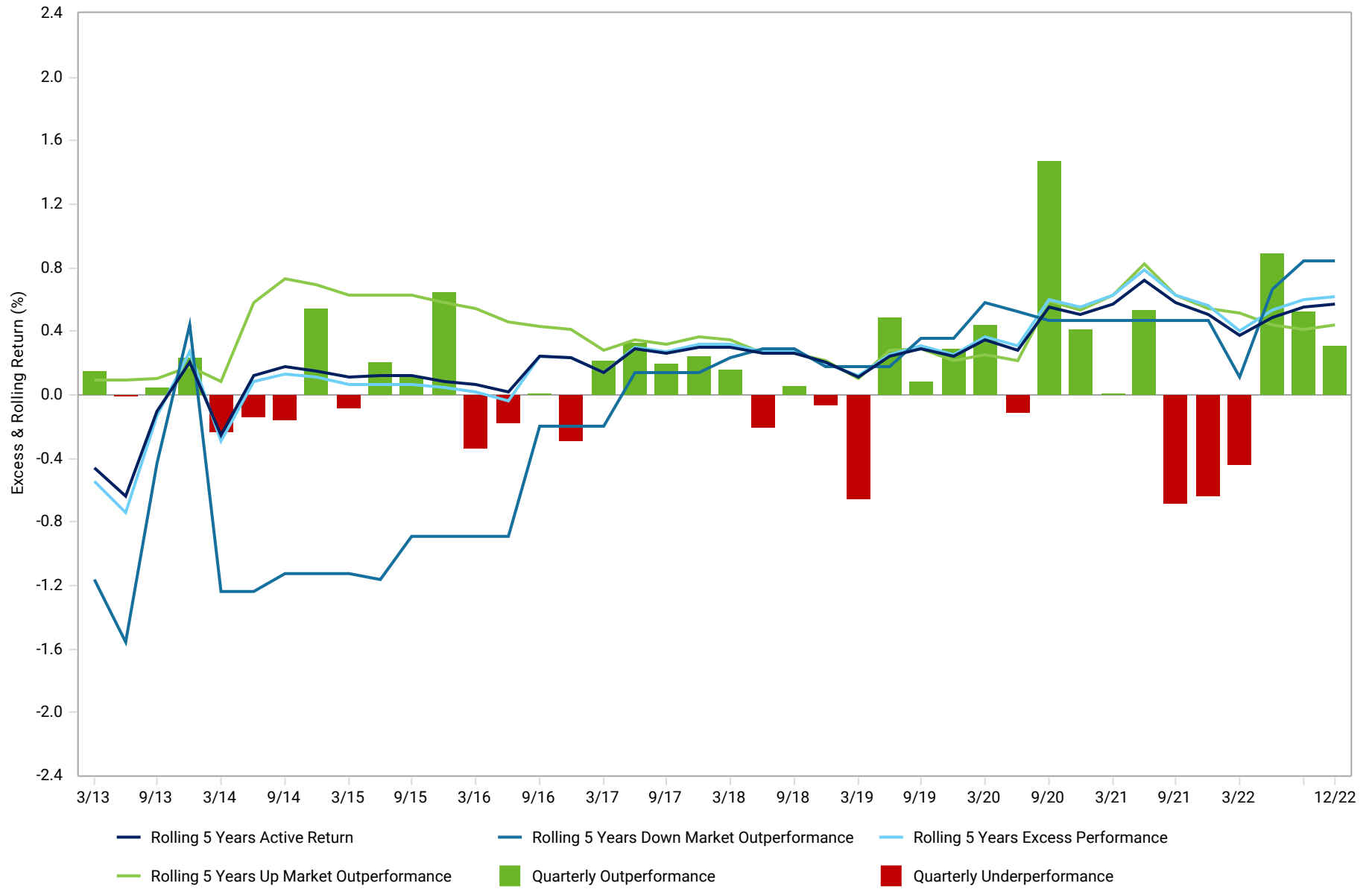
ASSET ALLOCATION VS. POLICY



	Current (\$)	Current (%)	Long Term Target (%)	Difference (%)	Policy Range (%)	Within Range
Domestic Equity	773,787,567	22.3	21.0	1.3	13.0 - 30.0	Yes
International Equity	734,516,516	21.2	18.0	3.2	10.0 - 20.0	No
Private Equity	169,717,672	4.9	8.0	-3.1	0.0 - 10.0	Yes
Core Fixed Income	426,355,163	12.3	12.0	0.3	5.0 - 20.0	Yes
High Yield	64,074,833	1.8	0.0	1.8	0.0 - 5.0	Yes
Private Debt	439,296,922	12.7	14.0	-1.3	5.0 - 20.0	Yes
Core Real Estate	379,434,369	10.9	9.0	1.9	5.0 - 15.0	Yes
Value Add/Oppportunistic Real Estate	173,167,328	5.0	6.0	-1.0	2.0 - 8.0	Yes
Infrastructure	197,241,856	5.7	7.0	-1.3	2.0 - 10.0	Yes
Diversifying/Thematic	110,187,107	3.2	5.0	-1.8	0.0 - 7.0	Yes
Cash	1,051,683	0.0	0.0	0.0	0.0 - 2.0	Yes
Total	3,468,831,018	100.0	100.0	0.0		

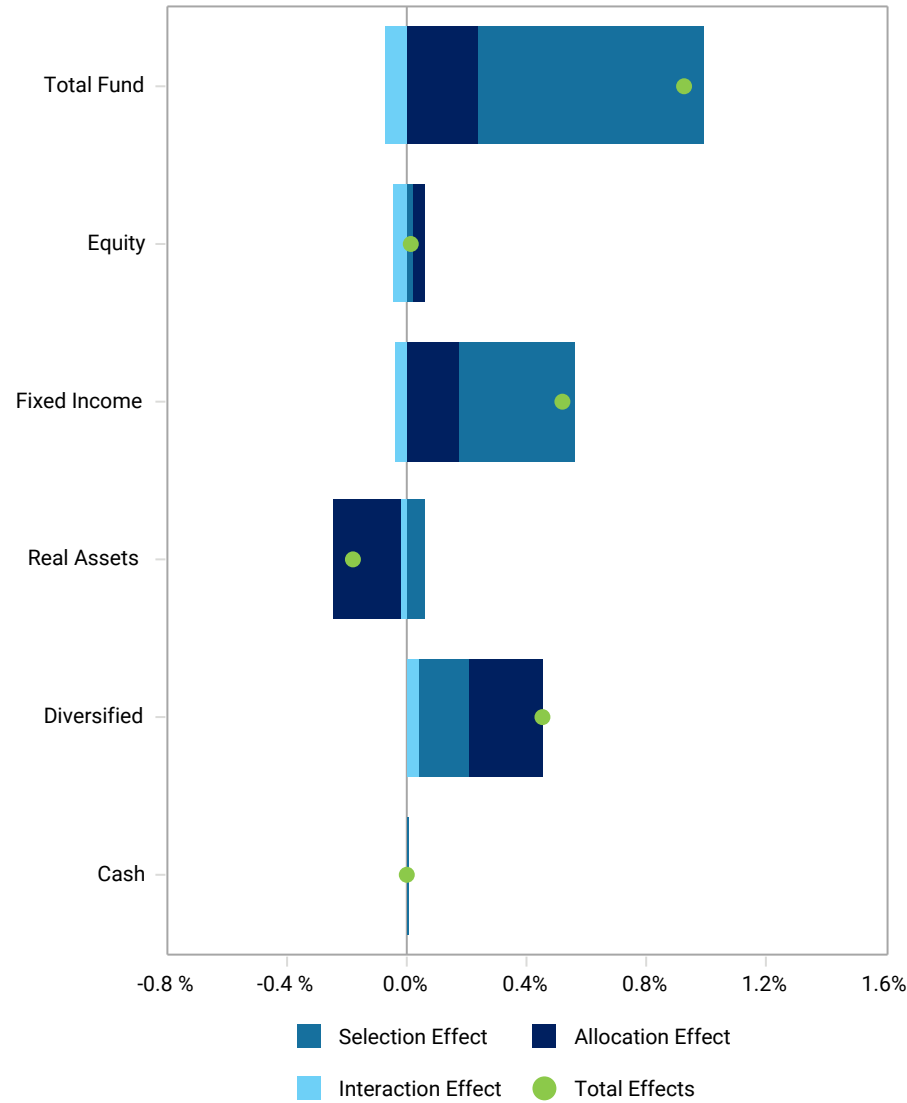


TOTAL FUND VS. POLICY INDEX



ATTRIBUTION ANALYSIS

**Attribution Effects
3 Years Ending December 31, 2022**



**Attribution Summary
3 Years Ending December 31, 2022**

	Wtd. Actual Return (%)	Wtd. Index Return (%)	Excess Return (%)	Selection Effect (%)	Allocation Effect (%)	Interaction Effects (%)	Total Effects (%)
Equity	4.2	4.2	0.0	0.0	0.0	0.0	0.0
Fixed Income	2.3	0.7	1.6	0.4	0.2	0.0	0.5
Real Assets	9.4	8.7	0.6	0.0	-0.2	0.0	-0.2
Diversified	4.4	-0.5	4.9	0.2	0.3	0.0	0.5
Cash	1.7	0.7	0.9	0.0	0.0	0.0	0.0
Total Fund	5.6	4.6	0.9	0.6	0.2	-0.1	0.9

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	3,468,831,018	100.0	5.1 (52)	-9.4 (35)	5.6 (26)	5.7 (33)	7.6 (23)	7.6 (26)	8.6	Oct-85
<i>Policy Index</i>			<u>4.8</u> (66)	<u>-10.6</u> (47)	<u>4.6</u> (45)	<u>5.1</u> (56)	<u>7.2</u> (48)	<u>7.1</u> (49)	<u>9.0</u>	
Over/Under			0.3	1.2	1.0	0.6	0.4	0.5	-0.4	
<i>60 MSCI World (Gross)/40 CITI WGBI</i>			<u>7.5</u> (4)	<u>-17.9</u> (100)	<u>0.6</u> (100)	<u>2.7</u> (100)	<u>5.1</u> (100)	<u>4.8</u> (100)		
Over/Under			-2.4	8.5	5.0	3.0	2.5	2.8		
<i>InvMetrics Public DB > \$1 Billion Median</i>			5.1	-11.1	4.5	5.3	7.0	7.0		
Total Equity Composite	1,678,021,755	48.4	9.1	-19.8	4.2	5.1	8.4	8.6	8.0	Nov-95
<i>MSCI AC World All Cap Index (Net)</i>			<u>9.8</u>	<u>-18.4</u>	<u>3.9</u>	<u>4.9</u>	<u>8.0</u>	<u>7.9</u>		
Over/Under			-0.7	-1.4	0.3	0.2	0.4	0.7		
Domestic Equity Composite	773,787,567	22.3	7.2	-20.2	6.7	7.9	10.4	11.6	10.0	Apr-03
<i>Domestic Equity Index</i>			<u>7.2</u>	<u>-19.2</u>	<u>7.2</u>	<u>8.2</u>	<u>10.7</u>	<u>11.8</u>	<u>10.0</u>	
Over/Under			0.0	-1.0	-0.5	-0.3	-0.3	-0.2	0.0	
NTAM Russell 3000	773,787,567	22.3	7.2 (73)	-19.8 (79)	7.1 (52)	9.0 (42)			11.2 (38)	Oct-16
<i>Russell 3000 Index</i>			<u>7.2</u> (74)	<u>-19.2</u> (76)	<u>7.1</u> (52)	<u>8.8</u> (45)	<u>11.0</u> (37)	<u>12.1</u> (35)	<u>11.0</u> (43)	
Over/Under			0.0	-0.6	0.0	0.2			0.2	
<i>eV US Large Cap Core Equity Median</i>			8.5	-16.5	7.1	8.6	10.5	11.7	10.8	

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	734,516,516	21.2	13.6	-22.8	-0.8	0.8	5.1	4.5		Apr-94
<i>International Equity Index</i>			<u>14.4</u>	<u>-15.6</u>	<u>1.1</u>	<u>1.5</u>	<u>5.4</u>	<u>4.4</u>	<u>5.3</u>	
Over/Under			-0.8	-7.2	-1.9	-0.7	-0.3	0.1		
Baillie Gifford	209,152,797	6.0	14.1 (60)	-27.9 (82)	-2.7 (89)	0.5 (70)	5.5 (41)	5.1 (47)	5.9 (38)	Oct-08
<i>MSCI AC World ex USA index</i>			<u>14.4</u> (54)	<u>-15.6</u> (34)	<u>0.5</u> (55)	<u>1.4</u> (51)	<u>5.3</u> (46)	<u>4.3</u> (71)	<u>4.6</u> (70)	
Over/Under			-0.3	-12.3	-3.2	-0.9	0.2	0.8	1.3	
<i>eV All ACWI ex-US Equity Median</i>			14.5	-18.7	0.8	1.4	5.1	5.0	5.4	
Baillie Gifford Smaller Cos.	50,998,757	1.5	14.7 (48)	-38.4 (94)					-26.3 (92)	Jul-21
<i>MSCI EAFE + Canada Small Cap Index</i>			<u>15.3</u> (38)	<u>-20.2</u> (41)	<u>0.3</u> (56)	<u>0.9</u> (50)	<u>5.3</u> (58)	<u>6.2</u> (56)	<u>-13.3</u> (37)	
Over/Under			-0.6	-18.2					-13.0	
<i>eV ACWI ex-US Small Cap Equity Median</i>			14.5	-24.0	0.7	0.8	5.7	6.3	-16.7	
BlackRock ACWI ex US	259,689,800	7.5	14.2 (58)	-16.3 (38)	0.2 (62)	1.1 (59)	5.0 (53)	4.0 (79)	3.2 (79)	Mar-11
<i>MSCI AC World ex USA index</i>			<u>14.4</u> (54)	<u>-15.6</u> (34)	<u>0.5</u> (55)	<u>1.4</u> (51)	<u>5.3</u> (46)	<u>4.3</u> (71)	<u>3.4</u> (70)	
Over/Under			-0.2	-0.7	-0.3	-0.3	-0.3	-0.3	-0.2	
<i>eV All ACWI ex-US Equity Median</i>			14.5	-18.7	0.8	1.4	5.1	5.0	4.3	
Principal Global	214,480,801	6.2	12.1 (83)	-20.0 (57)	0.6 (54)	1.3 (52)	3.9 (80)	5.2 (41)	4.8 (38)	Sep-08
<i>MSCI AC World ex USA index</i>			<u>14.4</u> (54)	<u>-15.6</u> (34)	<u>0.5</u> (55)	<u>1.4</u> (51)	<u>5.3</u> (46)	<u>4.3</u> (71)	<u>3.4</u> (69)	
Over/Under			-2.3	-4.4	0.1	-0.1	-1.4	0.9	1.4	
<i>eV All ACWI ex-US Equity Median</i>			14.5	-18.7	0.8	1.4	5.1	5.0	4.2	
Sanctioned Assets	193,910	0.0	8.8						-15.4	Jul-22
<i>MSCI EAFE (Net)</i>			<u>17.3</u>	<u>-14.5</u>	<u>0.9</u>	<u>1.5</u>	<u>4.5</u>	<u>4.7</u>	<u>6.4</u>	
Over/Under			-8.5						-21.8	

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 Equity	169,717,672	4.9	0.0	4.1	19.1					16.7	Apr-19
Pantheon PE Fund of 1	163,395,899	4.7	-0.5	3.6	18.9					16.9	May-19
Private Equity Index			<u>-6.3</u>	<u>-20.0</u>	<u>5.2</u>	<u>7.4</u>	<u>10.5</u>	<u>11.6</u>	<u>7.0</u>		
Over/Under			5.8	23.6	13.7				9.9		
Pantheon Co 2022	6,321,773	0.2	15.2							15.2	Jul-22
Private Equity Index			<u>-6.3</u>	<u>-20.0</u>	<u>5.2</u>	<u>7.4</u>	<u>10.5</u>	<u>11.6</u>	<u>-20.8</u>		
Over/Under			21.5						36.0		
Total Fixed Income Composite	929,726,918	26.8	2.9	-5.4	2.3	3.5	4.4	3.7	5.5	5.5	Nov-95
Fixed Income Index			<u>2.3</u>	<u>-6.9</u>	<u>0.4</u>	<u>2.3</u>	<u>3.4</u>	<u>2.8</u>	<u>4.9</u>		
Over/Under			0.6	1.5	1.9	1.2	1.0	0.9	0.6		
Core Fixed Composite	426,355,163	12.3	2.7	-12.4	-2.0	0.6	1.7	1.8	3.5	3.5	Apr-03
Blmbg. U.S. Aggregate Index			<u>1.9</u>	<u>-13.0</u>	<u>-2.7</u>	<u>0.0</u>	<u>0.9</u>	<u>1.1</u>	<u>3.1</u>		
Over/Under			0.8	0.6	0.7	0.6	0.8	0.7	0.4		
Dodge & Cox	214,559,611	6.2	3.1 (1)	-10.8 (7)	-0.8 (1)	1.5 (1)	2.4 (1)	2.4 (1)	4.0 (4)	4.0 (4)	Jan-03
Blmbg. U.S. Aggregate Index			<u>1.9</u> (43)	<u>-13.0</u> (45)	<u>-2.7</u> (80)	<u>0.0</u> (75)	<u>0.9</u> (78)	<u>1.1</u> (74)	<u>3.1</u> (77)		
Over/Under			1.2	2.2	1.9	1.5	1.5	1.3	0.9		
eV US Core Fixed Inc Median			1.8	-13.1	-2.4	0.2	1.1	1.3	3.3		
PGIM	211,795,552	6.1	2.3 (8)	-13.9 (86)	-2.8 (83)	0.0 (77)	0.9 (78)	1.1 (70)	3.2 (54)	3.2 (54)	Apr-03
Blmbg. U.S. Aggregate Index			<u>1.9</u> (43)	<u>-13.0</u> (45)	<u>-2.7</u> (80)	<u>0.0</u> (75)	<u>0.9</u> (78)	<u>1.1</u> (74)	<u>3.1</u> (77)		
Over/Under			0.4	-0.9	-0.1	0.0	0.0	0.0	0.1		
eV US Core Fixed Inc Median			1.8	-13.1	-2.4	0.2	1.1	1.3	3.3		
High Yield Composite	64,074,833	1.8	4.3	-12.8	-0.2	1.6	4.2	3.6	6.1	6.1	Sep-04
Blmbg. U.S. Corp: High Yield Index			<u>4.2</u>	<u>-11.2</u>	<u>0.0</u>	<u>2.3</u>	<u>5.0</u>	<u>4.0</u>	<u>6.2</u>		
Over/Under			0.1	-1.6	-0.2	-0.7	-0.8	-0.4	-0.1		
Loomis Sayles	64,074,833	1.8	4.3 (27)	-12.8 (96)	-0.3 (69)	1.6 (86)	4.2 (60)	3.6 (56)	6.2 (17)	6.2 (17)	Sep-04
Blmbg. U.S. Corp: High Yield Index			<u>4.2</u> (34)	<u>-11.2</u> (76)	<u>0.0</u> (57)	<u>2.3</u> (46)	<u>5.0</u> (21)	<u>4.0</u> (30)	<u>6.2</u> (19)		
Over/Under			0.1	-1.6	-0.3	-0.7	-0.8	-0.4	0.0		
eV US High Yield Fixed Inc Median			3.9	-10.1	0.3	2.2	4.4	3.7	5.7		

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	439,296,922	12.7	2.7	6.7	9.3	8.7	9.2	8.2	Sep-15		
<i>Private Credit Index</i>			3.7	-5.0	2.3	4.5	5.5	5.6			
Over/Under			-1.0	11.7	7.0	4.2	3.7	2.6			
Crescent Capital	35,817,221	1.0	-0.9	9.9	7.4	7.7	8.1	7.2	Sep-15		
<i>Private Credit Index</i>			3.7	-5.0	2.3	4.5	5.5	5.6			
Over/Under			-4.6	14.9	5.1	3.2	2.6	1.6			
Arcmont Euro Private Debt	94,171,908	2.7	6.4	12.0				10.1	Apr-21		
<i>Private Credit Index</i>			3.7	-5.0				5.3			
Over/Under			2.7	17.0				4.8			
Monroe Capital	212,187,290	6.1	1.7	5.3	9.5	8.9		9.6	Apr-16		
<i>Private Credit Index</i>			3.7	-5.0	2.3	4.5		5.4			
Over/Under			-2.0	10.3	7.2	4.4		4.2			
PIMCO COF II	17,080,429	0.5	7.8	7.0	10.1	9.0		10.1	Aug-16		
<i>Private Credit Index</i>			3.7	-5.0	2.3	4.5		4.0			
Over/Under			4.1	12.0	7.8	4.5		6.1			
PIMCO COF III	80,040,074	2.3	2.1	2.9				37.6	May-20		
<i>Private Credit Index</i>			3.7	-5.0				3.2			
Over/Under			-1.6	7.9				34.4			



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	749,843,553	21.6	-1.3	10.2	9.4	8.6	8.4	10.0	9.8	Jan-96
Private Real Estate Composite	173,167,328	5.0	-0.4	13.0	12.1	12.6	12.8	12.9	10.2	Jan-96
NCREIF ODCE			<u>-5.0</u>	<u>7.5</u>	<u>9.9</u>	<u>8.7</u>	<u>8.5</u>	<u>10.1</u>	<u>9.2</u>	
Over/Under			4.6	5.5	2.2	3.9	4.3	2.8	1.0	
Oaktree Value Add	11,356,931	0.3	-0.9	6.8	8.8	13.4			14.7	Dec-16
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>8.8</u>	
Over/Under			4.0	-0.8	-1.3	4.6			5.9	
PCCP Value Add	24,836,261	0.7	-1.2	19.8	19.7	17.6			18.5	Oct-16
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>8.6</u>	
Over/Under			3.7	12.2	9.6	8.8			9.9	
PIMCO Bravo III	46,022,072	1.3	0.4	7.3	8.8	9.7			9.4	Nov-16
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>8.7</u>	
Over/Under			5.3	-0.3	-1.3	0.9			0.7	
Alidade Capital V	5,094,892	0.1	-22.1	-22.3					-20.8	Dec-21
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>14.6</u>	
Over/Under			-17.2	-29.9					-35.4	
Artemis AREPF III	14,162,195	0.4	-2.2	28.2	30.6				14.9	Jan-19
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>8.9</u>	
Over/Under			2.7	20.6	20.5				6.0	
Brookfield SREP III	45,260,817	1.3	3.6	15.8	10.0				7.4	May-19
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>9.3</u>	
Over/Under			8.5	8.2	-0.1				-1.9	
Blue Vista BVREP V	13,678,262	0.4	-3.3	41.6					16.2	Mar-20
NCREIF ODCE + 1%			<u>-4.9</u>	<u>7.6</u>	<u>10.1</u>	<u>8.8</u>	<u>8.7</u>	<u>10.2</u>	<u>10.6</u>	
Over/Under			1.6	34.0					5.6	
Kayne Anderson VI	12,755,898	0.4	3.9	-0.5					-0.4	Nov-21
NCREIF ODCE + 1%										
Over/Under										
Core Real Estate	379,434,369	10.9	-1.9	13.4	11.0	8.7	8.2	9.6		Jan-96
JP Morgan RE	161,210,274	4.6	-5.2	3.8	7.7	6.7	6.8	8.6	8.7	Jan-96
NCREIF Fund Index-Open End Diversified Core Equity (VW) (Net)			<u>-5.2</u>	<u>6.5</u>	<u>9.0</u>	<u>7.7</u>	<u>7.6</u>	<u>9.1</u>	<u>8.2</u>	
Over/Under			0.0	-2.7	-1.3	-1.0	-0.8	-0.5	0.5	
CFRSR-Carlyle CPI Fund	218,224,095	6.3	1.1	23.5					17.2	Jul-20
NCREIF Fund Index-Open End Diversified Core Equity (VW) (Net)			<u>-5.2</u>	<u>6.5</u>	<u>9.0</u>	<u>7.7</u>	<u>7.6</u>	<u>9.1</u>	<u>11.3</u>	
Over/Under			6.3	17.0					5.9	

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
Infrastructure	197,241,856	5.7	-0.9	1.6	4.2				4.3	Oct-18
CPI + 4% (Unadjusted)			1.0	10.7	9.1	7.9	7.4	6.7	8.0	
Over/Under			-1.9	-9.1	-4.9				-3.7	
JP Morgan IIF	100,529,906	2.9	-1.8	-2.4	4.2				4.1	Oct-18
CPI + 4% (Unadjusted)			1.0	10.7	9.1	7.9	7.4	6.7	8.0	
Over/Under			-2.8	-13.1	-4.9				-3.9	
Ullico UIF	96,711,950	2.8	0.1	7.6	4.6				5.0	Dec-18
CPI + 4% (Unadjusted)			1.0	10.7	9.1	7.9	7.4	6.7	8.2	
Over/Under			-0.9	-3.1	-4.5				-3.2	
Multi Asset	110,187,107	3.2	7.1	28.3					27.6	Dec-21
Midstream Energy	94,875,204	2.7	7.3	28.7	10.8				7.7	Jul-19
Harvest	94,846,726	2.7	7.1	29.8	11.7				8.4	Jul-19
Alerian Midstream Energy Index			8.4	21.5	8.8	6.8	8.9			Jan-00
Tortoise	28,478	0.0	6.3	26.0	9.1				7.0	Aug-19
Alerian Midstream Energy Index			8.4	21.5	8.8	6.8	8.9			Jan-00
Alternative Credit	15,311,903	0.4	-0.3						-3.5	Jul-22
Sixth Street TAO	15,311,903	0.4	-0.3						-3.5	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	1,051,683	0.0	0.9	-0.1	1.7	1.8	1.5	1.1	1.6	Oct-03
<i>90 Day U.S. Treasury Bill</i>			<u>0.8</u>	<u>1.5</u>	<u>0.7</u>	<u>1.3</u>	<u>1.1</u>	<u>0.8</u>	<u>1.2</u>	
Over/Under			0.1	-1.6	1.0	0.5	0.4	0.3	0.4	
Payroll Account	534,794	0.0	0.9	-0.1	0.3	1.0	0.9	0.7	1.8	Apr-99
<i>90 Day U.S. Treasury Bill</i>			<u>0.8</u>	<u>1.5</u>	<u>0.7</u>	<u>1.3</u>	<u>1.1</u>	<u>0.8</u>	<u>1.7</u>	
Over/Under			0.1	-1.6	-0.4	-0.3	-0.2	-0.1	0.1	
Operating Funds	516,889	0.0	0.9	-0.1	0.2	0.9	0.9	0.7	1.3	Oct-03
<i>90 Day U.S. Treasury Bill</i>			<u>0.8</u>	<u>1.5</u>	<u>0.7</u>	<u>1.3</u>	<u>1.1</u>	<u>0.8</u>	<u>1.2</u>	
Over/Under			0.1	-1.6	-0.5	-0.4	-0.2	-0.1	0.1	

Fiscal year end: June 30

Composite rankings are used for Total Equity Composite (InvMetrics Public DB Total Eq), Domestic Equity Composite (InvMetrics Public DB US Eq), International Equity Composite (InvMetrics Public DB ex- US 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).





APPENDIX

CALENDAR YEAR INDEX PERFORMANCE

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Dec	QTD	YTD
S&P 500	16.0%	32.4%	13.7%	1.4%	12.0%	21.8%	-4.4%	31.5%	18.4%	28.7%	-5.8%	7.6%	-18.1%
Russell 1000	16.4%	33.1%	13.2%	0.9%	12.1%	21.7%	-4.8%	31.4%	21.0%	26.5%	-5.8%	7.2%	-19.1%
Russell 2000	16.3%	38.8%	4.9%	-4.4%	21.3%	14.6%	-11.0%	25.5%	20.0%	14.8%	-6.5%	6.2%	-20.4%
Russell 2500	17.9%	36.8%	7.1%	-2.9%	17.6%	16.8%	-10.0%	27.8%	20.0%	18.2%	-5.9%	7.4%	-18.4%
MSCI EAFE	17.3%	22.8%	-4.9%	-0.8%	1.0%	25.0%	-13.8%	22.0%	7.8%	11.3%	0.1%	17.3%	-14.5%
MSCI EM	18.2%	-2.6%	-2.2%	-14.9%	11.2%	37.3%	-14.6%	18.4%	18.3%	-2.5%	-1.4%	9.7%	-20.1%
MSCI ACWI	16.1%	22.8%	4.2%	-2.4%	7.9%	24.0%	-9.4%	26.6%	16.3%	18.5%	-3.9%	9.8%	-18.4%
Private Equity	9.5%	12.6%	22.3%	14.6%	10.4%	10.3%	21.0%	13.1%	17.2%	45.0%	-	-	-7.8%
BBG TIPS	7.0%	-8.6%	3.6%	-1.4%	4.7%	3.0%	-1.3%	8.4%	11.0%	6.0%	-1.0%	2.0%	-11.8%
BBG Municipal	6.8%	-2.6%	9.1%	3.3%	0.2%	5.4%	1.3%	7.5%	5.2%	1.5%	0.3%	4.1%	-8.5%
BBG Muni High Yield	18.1%	-5.5%	13.8%	1.8%	3.0%	9.7%	4.8%	10.7%	4.9%	7.8%	-0.2%	3.5%	-13.1%
BBG US Corporate HY	15.8%	7.4%	2.5%	-4.5%	17.1%	7.5%	-2.1%	14.3%	7.1%	5.3%	-0.6%	4.2%	-11.2%
BBG US Agg Bond	4.2%	-2.0%	6.0%	0.5%	2.6%	3.5%	0.0%	8.7%	7.5%	-1.5%	-0.5%	1.9%	-13.0%
BBG Global Agg	4.3%	-2.6%	0.6%	-3.2%	2.1%	7.4%	-1.2%	6.8%	9.2%	-4.7%	0.5%	4.5%	-16.2%
BBG Long Treasuries	3.6%	-12.7%	25.1%	-1.2%	1.3%	8.5%	-1.8%	14.8%	17.7%	-4.6%	-1.7%	-0.6%	-29.3%
BBG US Long Credit	12.7%	-6.6%	16.4%	-4.6%	10.2%	12.2%	-6.8%	23.4%	13.3%	-1.2%	-1.1%	5.3%	-25.3%
BBG US STRIPS 20+ Yr	3.0%	-21.0%	46.4%	-3.7%	1.4%	13.7%	-4.1%	20.9%	24.0%	-5.2%	-2.3%	-2.3%	-39.6%
JPM GBI-EM Global Div	16.8%	-9.0%	-5.7%	-14.9%	9.9%	15.2%	-6.2%	13.5%	2.7%	-8.7%	2.2%	8.5%	-11.7%
JPM EMBI Glob Div	17.4%	-5.3%	7.4%	1.2%	10.2%	10.3%	-4.3%	15.0%	5.3%	-1.8%	0.3%	8.1%	-17.8%
CS Hedge Fund	7.7%	9.7%	4.1%	-0.7%	1.2%	7.1%	-3.2%	9.3%	6.4%	8.2%	-	0.8%	1.0%
BBG Commodity	-1.1%	-9.5%	-17.0%	-24.7%	11.8%	1.7%	-11.2%	7.7%	-3.1%	27.1%	-2.4%	2.2%	16.1%
Alerian Midstream	-	-	16.4%	-37.3%	33.8%	-2.4%	-13.3%	24.0%	-23.4%	38.4%	-6.0%	8.4%	21.5%
FTSE NAREIT Equity REITs	18.1%	2.5%	30.1%	3.2%	8.5%	5.2%	-4.6%	26.0%	-8.0%	43.2%	-5.1%	5.2%	-24.4%

*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							
	Dec-22	QTD	YTD	1 YR	3 YR	5 YR	10 YR
MSCI ACWI	-3.9%	9.8%	-18.4%	-18.4%	4.0%	5.2%	8.0%
S&P 500	-5.8%	7.6%	-18.1%	-18.1%	7.7%	9.4%	12.6%
Russell 1000	-5.8%	7.2%	-19.1%	-19.1%	7.3%	9.1%	12.4%
Russell 2000	-6.5%	6.2%	-20.4%	-20.4%	3.1%	4.1%	9.0%
Russell 2500	-5.9%	7.4%	-18.4%	-18.4%	5.0%	5.9%	10.0%
MSCI EAFE	0.1%	17.3%	-14.5%	-14.5%	0.9%	1.5%	4.7%
MSCI EM	-1.4%	9.7%	-20.1%	-20.1%	-2.7%	-1.4%	1.4%

Credit							
	Dec-22	QTD	YTD	1 YR	3 YR	5 YR	10 YR
BBG Global Agg	0.5%	4.5%	-16.2%	-16.2%	-4.5%	-1.7%	-0.4%
BBG US Agg	-0.5%	1.9%	-13.0%	-13.0%	-2.7%	0.0%	1.1%
BBG Credit	-0.4%	3.4%	-15.3%	-15.3%	-2.9%	0.4%	1.8%
BBG US HY	-0.6%	4.2%	-11.2%	-11.2%	0.0%	2.3%	4.0%
BBG Muni	0.3%	4.1%	-8.5%	-8.5%	-0.8%	1.3%	2.1%
BBG Muni HY	-0.2%	3.5%	-13.1%	-13.1%	-0.6%	2.6%	3.5%
BBG TIPS	-1.0%	2.0%	-11.8%	-11.8%	1.2%	2.1%	1.1%
BBG 20+ STRIPS	-2.3%	-2.3%	-39.6%	-39.6%	-10.8%	-3.8%	0.6%
BBG Long Treasuries	-1.7%	-0.6%	-29.3%	-29.3%	-7.4%	-2.2%	0.6%
BBG Long Credit	-1.1%	5.3%	-25.3%	-25.3%	-5.8%	-0.8%	2.1%
BBG Govt/Credit 1-3 Yr	0.2%	0.9%	-3.7%	-3.7%	-0.3%	0.9%	0.9%
JPM EMBI Glob Div	0.3%	8.1%	-17.8%	-17.8%	-5.3%	-1.3%	1.6%
JPM GBI-EM Glob Div	2.2%	8.5%	-11.7%	-11.7%	-6.1%	-2.5%	-2.0%

Real Assets							
	Dec-22	QTD	YTD	1 YR	3 YR	5 YR	10 YR
BBG Commodity	-2.4%	2.2%	16.1%	16.1%	12.7%	6.4%	-1.3%
Alerian Midstream Index	-6.0%	8.4%	21.5%	21.5%	#N/A	#N/A	-
NAREIT Composite Index	-5.0%	4.5%	-25.0%	-25.0%	-0.4%	4.0%	6.8%



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)



Source: InvestorForce

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



DISCLAIMERS & DISCLOSURES

Past performance is no guarantee of future results.

Returns for pooled funds, e.g. mutual funds and collective investment trusts, are collected from third parties; they are not generally calculated by NEPC. Returns for separate accounts, with some exceptions, are calculated by NEPC. Returns are reported net of manager fees unless otherwise noted.

A “since inception” return, if reported, begins with the first full month after funding, although actual inception dates (e.g. the middle of a month) and the timing of cash flows are taken into account in Composite return calculations.

NEPC’s preferred data source is the plan’s custodian bank or record-keeper. If data cannot be obtained from one of the preferred data sources, data provided by investment managers may be used. Information on market indices and security characteristics is received from additional providers. While NEPC has exercised reasonable professional care in preparing this report, we cannot guarantee the accuracy of all source information contained within. In addition, some index returns displayed in this report or used in calculation of a policy index, allocation index or other custom benchmark may be preliminary and subject to change.

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

The opinions presented herein represent the good faith views of NEPC as of the date of this presentation and are subject to change at any time. Neither fund performance nor universe rankings contained in this report should be considered a recommendation by NEPC.

This report may contain confidential or proprietary information and may not be copied or redistributed to any party not legally entitled to receive it.

Source of private fund performance benchmark data: Cambridge Associates, via Refinitiv