



QUARTERLY PERFORMANCE REPORT

CITY OF FRESNO RETIREMENT
SYSTEMS

MARCH 31, 2021

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FIRST QUARTER 2022 SUMMARY

- **The US economy contracted (in real terms) at an annual rate of 1.4% in the first quarter**
- **The Fed increased rates by 0.25%, and the target Fed Funds rate moved up to 0.25% - 0.50%**
- **US stocks outperformed Non-US stocks with Emerging Market stocks lagging Developed Markets**
- **US bonds were negative during the quarter as yields increased**
- **Net performance over the last 25 years is 7.2%, ahead of the assumed rate of 7.00%**
 - Performance lags the policy index over the last 25 years and trails since inception
- **Manager selection remains a positive contributor to relative performance long-term**



FIRST QUARTER 2022 SUMMARY

- **In the one-year ended March 31, 2022, the Total Fund returned 7.1%, underperforming the benchmark (net of fees) and ranking at the median of peers**
 - Underweight positioning to Private Real Estate detracted from relative performance
 - International Equity manager selection detracted from relative performance
 - Midstream Energy and Private Equity performance have contributed to overall plan returns over the trailing 1-year period

- **Over the most recent quarter, the Total Fund returned -3.0%, underperforming the policy benchmark (net of fees) and ranking in the second quartile of peers**
 - International Equity manager selection detracted from relative performance
 - Underweight positioning to Private Real Estate detracted from relative performance

- **Total fund volatility remained elevated relative to peers**



ECONOMIC ENVIRONMENT

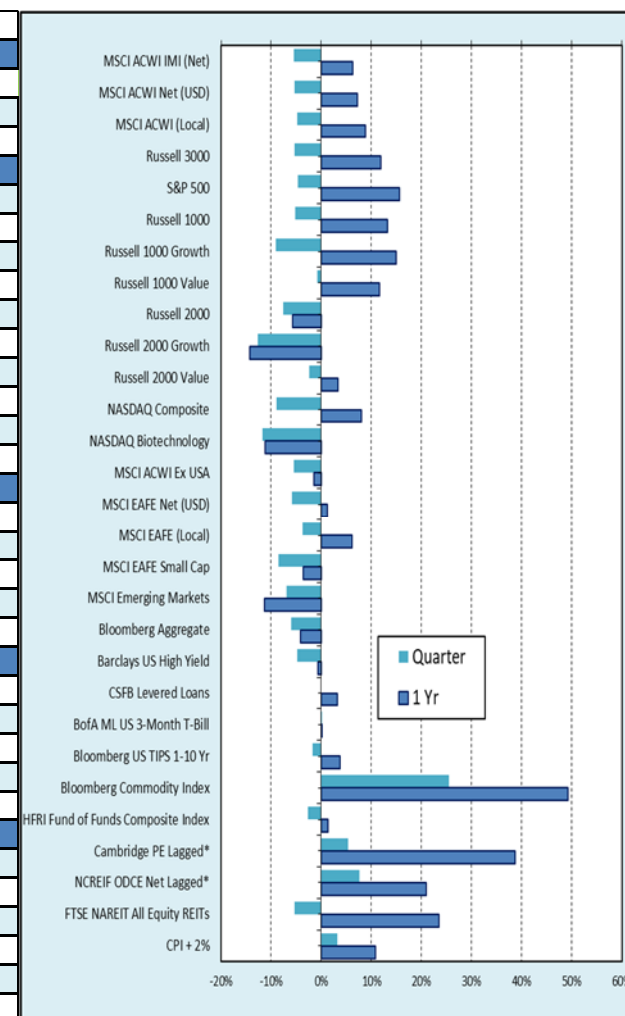
- **Q1 Real GDP (advance estimate) decreased at an annual rate of -1.4%.**
 - Retail sales ended February at +5.0% on a YoY basis. In the same period last year the YoY growth rate was +16.3%.
 - Corporate profits as a percent of GDP ended Q3 2021 at 11.3%, up from 10.1% on a YoY basis and remain elevated relative to historical levels.
 - The inventory-to-sales ratio ended February was 1.3. Levels have remained relatively constant since early 2010 with a spike to 1.7 in April 2020.
 - The U.S. trade deficit remains close to record levels.
- **The unemployment rate was 3.6% in Q1, down from 3.9% in Q4; U-6, a broader measure of unemployment, decreased to 6.9% in Q1 from 7.3% in Q4.**
 - The labor force participation rate ended Q1 at 62.4% up from 61.9% in Q4, after declining 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) increased to 286.7 from 278.5 (in December) and remains at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally-adjusted CPI spiked to 8.67% in Q1, up from 7.12% in Q4. In the same period last year, it was 2.73%; Capacity Utilization increased to 78.3% in Q1 from 76.5% in Q4.**
- **Fed Funds rate was increased 0.25% to a targeted range of 0.25%-to-0.50% from 0.00%-to-0.25%. The 10-year Treasury Yield (constant maturity) finished Q1 at 2.1%, up from 1.5% in Q4.**
- **The Fed continues scaling back asset purchases. The Fed's balance sheet is beginning to stabilize after a period of rapid growth post-pandemic.**
- **S&P valuations decreased in Q1 to 34.6 from 38.3 in Q4 and remain higher than the 10-year average of 28.3x.**
 - Cyclically adjusted Shiller PE ratio remains above the long-term average of 16.9x.



MARKET ENVIRONMENT

Q1 2022 OVERVIEW

		Qtr.	1 Yr.	3 Yr.	5 Yr.	10 Yr.
World Equity Benchmarks						
MSCI ACWI IMI (Net)	World with Small Cap	-5.47%	6.30%	13.49%	11.37%	9.95%
MSCI ACWI Net (USD)	World W/O Small Cap	-5.36%	7.28%	13.75%	11.64%	10.00%
MSCI ACWI (Local)	World (Local Currency)	-4.75%	8.79%	13.99%	11.56%	11.18%
Domestic Equity Benchmarks						
Russell 3000	Domestic All Cap	-5.28%	11.92%	18.24%	15.40%	14.28%
S&P 500	Large Core	-4.60%	15.65%	18.92%	15.99%	14.64%
Russell 1000	Large Core	-5.13%	13.27%	18.71%	15.82%	14.53%
Russell 1000 Growth	Large Growth	-9.04%	14.98%	23.60%	20.88%	17.04%
Russell 1000 Value	Large Value	-0.74%	11.67%	13.02%	10.29%	11.70%
Russell 2000	Small Core	-7.53%	-5.79%	11.74%	9.74%	11.04%
Russell 2000 Growth	Small Growth	-12.63%	-14.33%	9.88%	10.33%	11.21%
Russell 2000 Value	Small Value	-2.40%	3.32%	12.73%	8.57%	10.54%
NASDAQ Composite	Large Growth	-8.95%	8.06%	23.57%	20.31%	17.77%
NASDAQ Biotechnology	Biotech	-11.67%	-11.16%	6.54%	6.93%	12.97%
International Equity Benchmarks						
MSCI ACWI Ex USA	World ex-US	-5.44%	-1.49%	7.51%	6.76%	5.55%
MSCI EAFE Net (USD)	Int'l Developed	-5.91%	1.16%	7.78%	6.72%	6.27%
MSCI EAFE (Local)	Int'l Developed (Local Currency)	-3.73%	6.21%	8.23%	6.55%	8.61%
MSCI EAFE Small Cap	Small Cap Int'l	-8.53%	-3.63%	8.51%	7.42%	8.30%
MSCI Emerging Markets	Emerging Equity	-6.98%	-11.37%	4.94%	5.98%	3.36%
Domestic Fixed Income Benchmarks						
Bloomberg Aggregate	Core Bonds	-5.93%	-4.15%	1.69%	2.14%	2.24%
Barclays US High Yield	High Yield	-4.84%	-0.66%	4.58%	4.69%	5.75%
CSFB Levered Loans	Bank Loans	-0.10%	3.22%	4.10%	4.05%	4.47%
BofA ML US 3-Month T-Bill	Cash	0.04%	0.06%	0.81%	1.13%	0.63%
Bloomberg US TIPS 1-10 Yr	Inflation	-1.75%	3.78%	5.45%	3.88%	2.24%
Alternative Benchmarks						
Bloomberg Commodity Index	Commodities	25.55%	49.25%	16.12%	9.00%	-0.70%
HFRI Fund of Funds Composite Index	Fund of Hedge Funds	-2.64%	1.32%	5.90%	4.65%	3.93%
Cambridge PE Lagged*	Private Equity	5.38%	38.73%	24.18%	19.98%	16.42%
NCREIF ODCE Net Lagged*	Real Estate	7.66%	21.02%	8.23%	7.74%	9.44%
FTSE NAREIT All Equity REITs	REIT	-5.29%	23.54%	11.71%	10.68%	10.50%
CPI + 2%	Inflation/Real Assets	3.21%	10.84%	6.34%	5.47%	4.37%



* As of 12/31/2021

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	3,781,250,684	-3.0 (40)	7.1 (50)	11.3 (28)	9.6 (35)	8.4 (27)	8.8 (26)	6.6 (41)	7.8 (7)	9.0	Oct-85
<i>Policy Index</i>		-1.4 (6)	7.5 (44)	10.4 (57)	9.2 (46)	8.0 (46)	8.5 (40)	6.7 (36)	7.7 (13)	9.4	
<i>60 MSCI World (Gross)/40 CITI WGBI</i>		-5.7 (97)	1.4 (100)	8.7 (92)	8.0 (86)	6.8 (91)	6.6 (98)	5.5 (91)	6.4 (98)		
<i>InvMetrics Public DB > \$1 Billion Median</i>		-3.6	7.1	10.7	9.0	7.9	8.3	6.4	7.3		

5 Years Ending March 31, 2022

	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	9.6 (35)	10.1 (82)	0.8 (54)	1.3 (54)
<i>Policy Index</i>	9.2 (46)	9.6 (67)	0.8 (55)	1.3 (55)
<i>60 MSCI World (Gross)/40 CITI WGBI</i>	8.0 (86)	9.6 (66)	0.7 (85)	1.2 (70)

7 Years Ending March 31, 2022

	Return	Standard Deviation	Sharpe Ratio	Sortino Ratio
Total Fund	8.4 (27)	9.6 (84)	0.8 (55)	1.2 (53)
<i>Policy Index</i>	8.0 (46)	9.2 (75)	0.8 (57)	1.2 (54)
<i>60 MSCI World (Gross)/40 CITI WGBI</i>	6.8 (91)	9.1 (70)	0.7 (88)	1.1 (78)

Over the past five years, the Fund returned 9.6% per annum, ranking in the 35th percentile of the Investment Metrics Public Funds > \$1 Billion net of fee universe. The Fund's return outperformed the actuarial rate of 7.0% and outperformed the policy index by 0.4%. The Fund's volatility was 10.1%, which ranks in the 82nd percentile of its peers over this period. The Fund's risk-adjusted performance, as measured by the Sharpe Ratio, ranks in the 54th percentile of its peers.

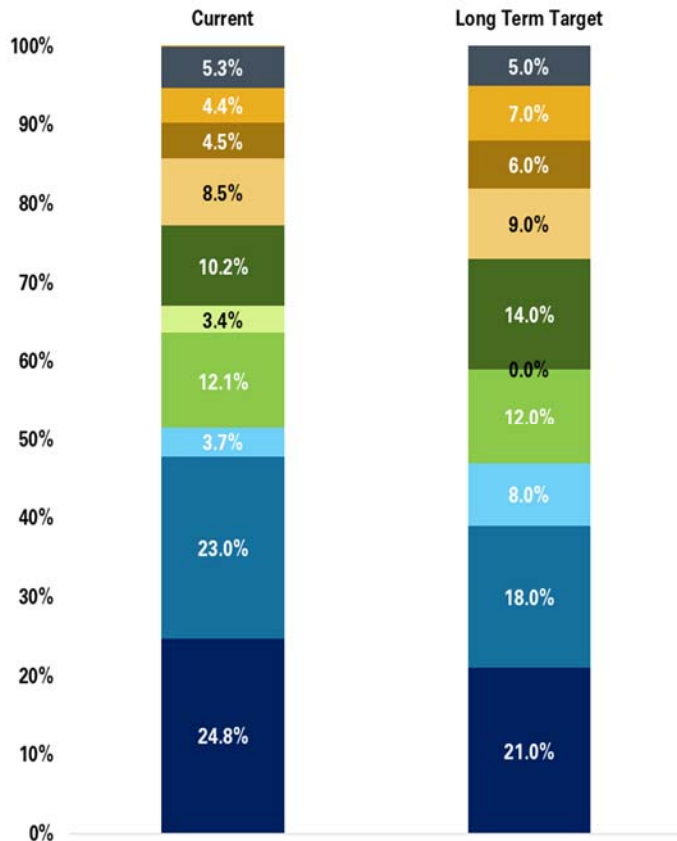
Over the past three years, the Fund returned 11.3% per annum, outperforming the policy index by 0.9% and ranking in the 28th percentile of its peer group. Over the past three years, the Fund's Sharpe Ratio of 0.9 ranks in the 52nd percentile.

For the year ending March 31, 2022, the Fund returned 7.1%, underperforming the policy index by 0.4% and ranking in the 50th percentile of its peers.



CITY OF FRESNO RETIREMENT SYSTEMS

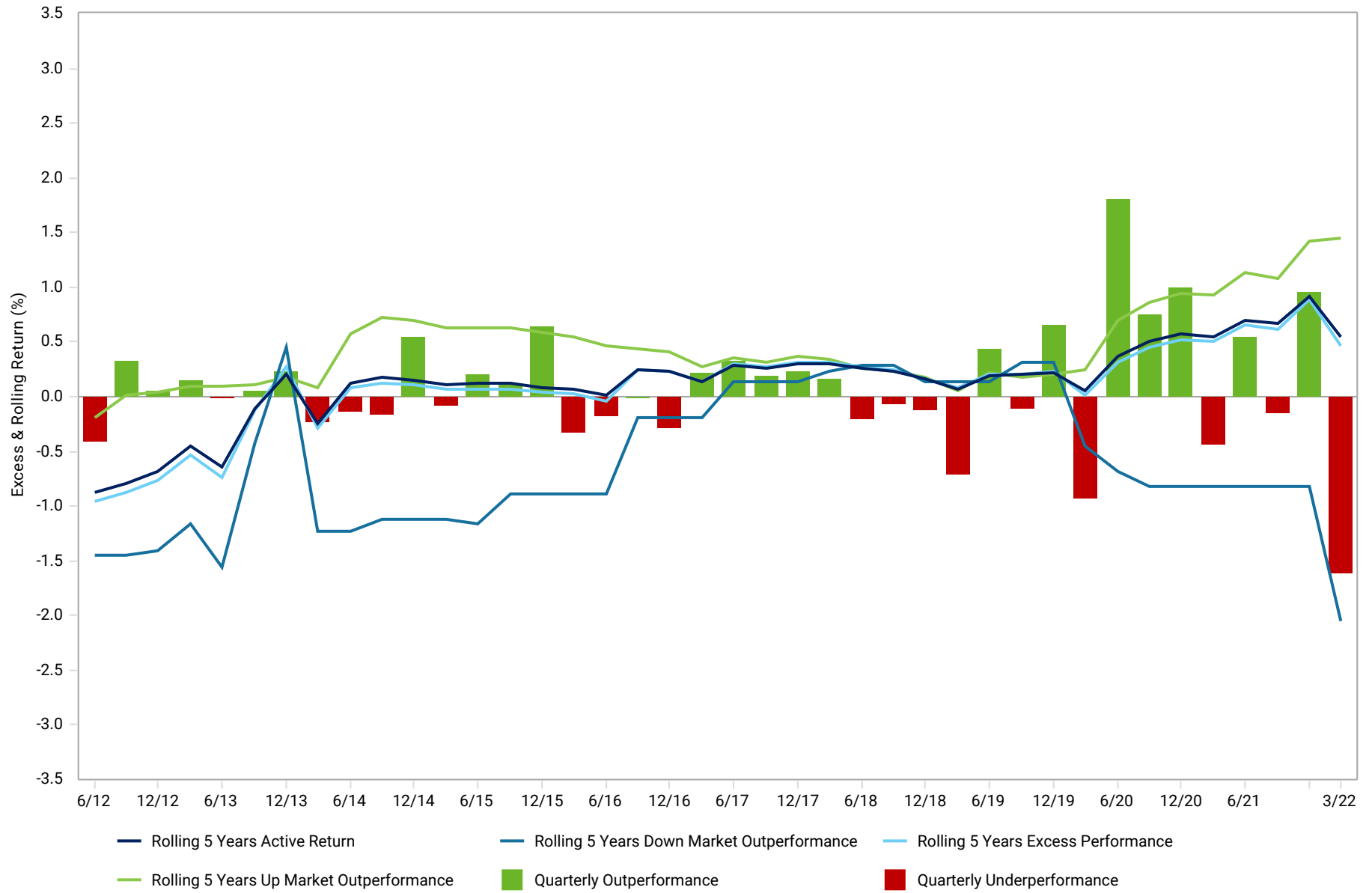
ASSET ALLOCATION VS. POLICY



	Current (\$)	Current (%)	Long Term Target (%)	Difference (%)	Policy Range (%)	Within Range
Domestic Equity	936,688,530	24.8	21.0	3.8	13.0 - 30.0	Yes
International Equity	870,016,606	23.0	18.0	5.0	10.0 - 20.0	No
Private Equity	141,146,577	3.7	8.0	-4.3	0.0 - 10.0	Yes
Core Fixed Income	456,858,317	12.1	12.0	0.1	5.0 - 20.0	Yes
High Yield	129,198,835	3.4	0.0	3.4	0.0 - 5.0	Yes
Private Debt	386,093,045	10.2	14.0	-3.8	5.0 - 20.0	Yes
Core Real Estate	322,233,679	8.5	9.0	-0.5	5.0 - 15.0	Yes
Value Add/Opportunistic Real Estate	170,354,218	4.5	6.0	-1.5	2.0 - 8.0	Yes
Infrastructure	168,010,629	4.4	7.0	-2.6	2.0 - 10.0	Yes
Diversifying/Thematic	199,916,224	5.3	5.0	0.3	0.0 - 7.0	Yes
Cash	734,023	0.0	0.0	0.0	0.0 - 2.0	Yes
Total	3,781,250,684	100.0	100.0	0.0		



TOTAL FUND VS. POLICY INDEX

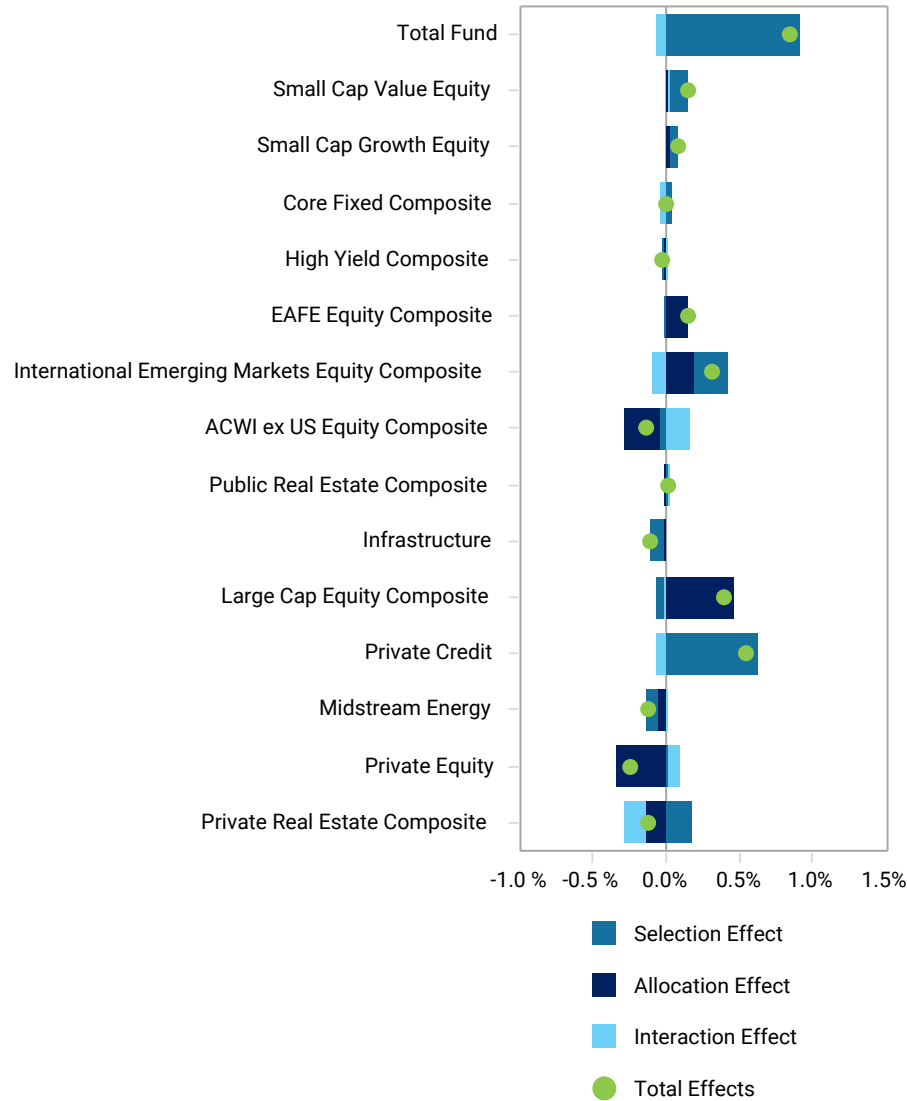


City of Fresno Retirement Systems

ATTRIBUTION ANALYSIS

March 31, 2022

Attribution Effects 3 Years Ending March 31, 2022



Attribution Summary 3 Years Ending March 31, 2022

	Wtd. Actual Return (%)	Wtd. Index Return (%)	Excess Return (%)	Selection Effect (%)	Allocation Effect (%)	Interaction Effects (%)	Total Effects (%)
Small Cap Value Equity	16.3	12.7	3.6	0.2	0.0	0.0	0.2
Small Cap Growth Equity	11.6	9.9	1.7	0.1	0.0	0.0	0.1
Core Fixed Composite	2.2	1.7	0.5	0.0	0.0	0.0	0.0
High Yield Composite	4.2	4.6	-0.3	0.0	0.0	0.0	0.0
EAFE Equity Composite	3.6	-0.3	3.9	0.0	0.2	0.0	0.1
International Emerging Markets Equity Composite	8.4	5.3	3.1	0.1	0.2	-0.1	0.3
ACWI ex US Equity Composite	8.7	8.0	0.7	0.1	-0.3	0.2	-0.1
Public Real Estate Composite	1.0	0.5	0.4	0.0	0.0	0.0	0.0
Infrastructure	5.5	8.4	-2.9	-0.1	0.0	0.0	-0.1
Large Cap Equity Composite	18.4	18.7	-0.4	-0.1	0.5	0.0	0.4
Private Credit	11.3	5.3	5.9	0.5	0.0	-0.1	0.5
Midstream Energy	7.8	9.4	-1.6	-0.1	-0.1	0.0	-0.1
Private Equity	19.5	18.9	0.6	0.1	-0.3	0.1	-0.2
Private Real Estate Composite	11.6	10.6	1.0	0.0	-0.1	-0.2	-0.1
Total Fund	11.3	10.4	0.8	0.9	0.0	-0.1	0.8



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	3,781,250,684	100.0	-3.0 (41)	7.1 (50)	11.3 (28)	9.6 (36)	8.4 (28)	8.8 (28)	9.0 (19)	Oct-85
Policy Index			<u>-1.4</u> (6)	<u>7.5</u> (45)	<u>10.4</u> (57)	<u>9.2</u> (47)	<u>8.0</u> (47)	<u>8.5</u> (41)	<u>9.4</u> (6)	
Over/Under			-1.6	-0.4	0.9	0.4	0.4	0.3	-0.4	
60 MSCI World (Gross)/40 CITI WGBI			<u>-5.7</u> (98)	<u>1.4</u> (100)	<u>8.7</u> (92)	<u>8.0</u> (86)	<u>6.8</u> (92)	<u>6.6</u> (98)		
Over/Under			2.7	5.7	2.6	1.6	1.6	2.2		
InvMetrics Public DB > \$1 Billion Median			-3.5	7.1	10.7	9.0	7.9	8.3	8.3	
Total Equity Composite	1,947,851,713	51.5	-7.9	2.3	13.6	11.6	10.0	10.6	8.8	Nov-95
MSCI AC World All Cap Index (Net)			<u>-5.5</u>	<u>6.2</u>	<u>13.5</u>	<u>11.3</u>	<u>9.5</u>	<u>9.9</u>		
Over/Under			-2.4	-3.9	0.1	0.3	0.5	0.7		
Domestic Equity Composite	936,688,530	24.8	-6.5	9.0	17.1	14.3	12.7	13.6	11.3	Apr-03
Domestic Equity Index			<u>-5.9</u>	<u>7.1</u>	<u>16.5</u>	<u>13.9</u>	<u>12.4</u>	<u>13.5</u>	<u>11.3</u>	
Over/Under			-0.6	1.9	0.6	0.4	0.3	0.1	0.0	
NTAM Russell 3000	936,478,597	24.8	-6.0 (67)	12.2 (58)	18.4 (27)	15.7 (26)			16.2 (20)	Oct-16
Russell 3000 Index			<u>-5.3</u> (54)	<u>11.9</u> (61)	<u>18.2</u> (27)	<u>15.4</u> (30)	<u>13.4</u> (23)	<u>14.3</u> (19)	<u>15.9</u> (25)	
Over/Under			-0.7	0.3	0.2	0.3			0.3	
eV US Large Cap Core Equity Median			-5.1	13.0	16.6	14.1	12.1	13.3	14.6	
Eagle Asset Management	72,362	0.0	-12.9	-10.4	11.6	12.9	11.4	12.1	13.0	Nov-10
Kennedy Capital Mgmt	137,571	0.0	-4.5	10.2	16.0	9.8	9.9	11.5	12.0	May-03
Private Equity	141,146,577	3.7	0.0	43.0	19.6				19.6	Apr-19
Pantheon PE Fund of 1	141,146,577	3.7	0.0	43.0					20.2	May-19
Private Equity Index			<u>6.5</u>	<u>20.0</u>	<u>22.9</u>	<u>17.0</u>	<u>14.4</u>	<u>16.7</u>	<u>20.2</u>	
Over/Under			-6.5	23.0					0.0	

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	870,016,606	23.0	-10.5	-8.3	8.5	7.8	6.3	6.7		Apr-94
<i>International Equity Index</i>			<u>-5.8</u>	<u>-3.8</u>	<u>7.5</u>	<u>6.8</u>	<u>5.4</u>	<u>5.9</u>	<u>5.6</u>	
Over/Under			-4.7	-4.5	1.0	1.0	0.9	0.8		
ACWI ex US Equity Composite	823,022,350	21.8	-10.8 (63)	-8.1 (81)	8.7 (52)	8.2 (47)	6.7 (40)	6.9 (61)	6.7 (51)	Oct-08
<i>MSCI AC World ex USA index</i>			<u>-5.3 (24)</u>	<u>-1.0 (27)</u>	<u>8.0 (57)</u>	<u>7.3 (61)</u>	<u>5.7 (60)</u>	<u>6.0 (73)</u>	<u>5.8 (68)</u>	
Over/Under			-5.5	-7.1	0.7	0.9	1.0	0.9	0.9	
<i>eV ACWI ex-US All Cap Equity Median</i>			-9.6	-3.8	8.9	7.8	6.3	7.2	6.7	
Baillie Gifford	246,547,103	6.5	-14.7 (82)	-16.0 (94)	8.2 (56)	8.4 (40)	7.3 (33)	7.6 (39)	7.5 (35)	Oct-08
<i>MSCI AC World ex USA index</i>			<u>-5.3 (26)</u>	<u>-1.0 (34)</u>	<u>8.0 (57)</u>	<u>7.3 (56)</u>	<u>5.7 (61)</u>	<u>6.0 (72)</u>	<u>5.8 (72)</u>	
Over/Under			-9.4	-15.0	0.2	1.1	1.6	1.6	1.7	
<i>eV All ACWI ex-US Equity Median</i>			-8.5	-3.0	8.8	7.6	6.2	7.1	6.8	
Baillie Gifford Smaller Cos.	64,397,460	1.7	-21.8 (97)						-19.7 (93)	Jul-21
<i>MSCI EAFE + Canada Small Cap Index</i>			<u>-7.1 (39)</u>	<u>-1.3 (36)</u>	<u>10.0 (49)</u>	<u>8.2 (52)</u>	<u>7.9 (55)</u>	<u>8.2 (68)</u>	<u>-6.0 (25)</u>	
Over/Under			-14.7						-13.7	
<i>eV ACWI ex-US Small Cap Equity Median</i>			-10.6	-3.1	9.9	8.3	8.0	8.9	-10.9	
BlackRock ACWI ex US	239,269,075	6.3	-5.5 (28)	-1.2 (35)	7.8 (60)	7.0 (59)	5.5 (65)	5.8 (77)	4.5 (79)	Mar-11
<i>MSCI AC World ex USA index</i>			<u>-5.3 (26)</u>	<u>-1.0 (34)</u>	<u>8.0 (57)</u>	<u>7.3 (56)</u>	<u>5.7 (61)</u>	<u>6.0 (72)</u>	<u>4.8 (71)</u>	
Over/Under			-0.2	-0.2	-0.2	-0.3	-0.2	-0.2	-0.3	
<i>eV All ACWI ex-US Equity Median</i>			-8.5	-3.0	8.8	7.6	6.2	7.1	5.9	
Principal Global	272,808,712	7.2	-8.5 (51)	-3.7 (56)	9.0 (49)	7.6 (49)	5.8 (59)	7.4 (42)	6.1 (38)	Sep-08
<i>MSCI AC World ex USA index</i>			<u>-5.3 (26)</u>	<u>-1.0 (34)</u>	<u>8.0 (57)</u>	<u>7.3 (56)</u>	<u>5.7 (61)</u>	<u>6.0 (72)</u>	<u>4.5 (70)</u>	
Over/Under			-3.2	-2.7	1.0	0.3	0.1	1.4	1.6	
<i>eV All ACWI ex-US Equity Median</i>			-8.5	-3.0	8.8	7.6	6.2	7.1	5.6	

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
International Emerging Markets Equity Composite	46,994,255	1.2	-5.8	-7.5	9.1	7.9	6.8	4.5	8.3	Apr-99
<i>MSCI Emerging Markets Index</i>			<u>-6.9</u>	<u>-11.1</u>	<u>5.3</u>	<u>6.4</u>	<u>5.1</u>	<u>3.7</u>	<u>8.3</u>	
Over/Under			1.1	3.6	3.8	1.5	1.7	0.8	0.0	
Acadian Emerging Market	25,938,913	0.7	-2.1 (14)	-1.6 (23)	10.2 (16)	8.0 (22)	7.5 (10)		5.8 (14)	Aug-14
<i>MSCI Emerging Markets Index</i>			<u>-6.9 (42)</u>	<u>-11.1 (52)</u>	<u>5.3 (56)</u>	<u>6.4 (44)</u>	<u>5.1 (48)</u>	<u>3.7 (53)</u>	<u>3.6 (48)</u>	
Over/Under			4.8	9.5	4.9	1.6	2.4		2.2	
<i>eV Emg Mkts Equity Median</i>			-8.0	-10.4	5.7	5.9	5.0	3.8	3.5	
Axiom Intl Investors	21,055,342	0.6	-9.9 (64)	-13.9 (65)	7.5 (35)	7.7 (26)	5.9 (31)		4.9 (25)	Aug-14
<i>MSCI Emerging Markets Index</i>			<u>-6.9 (42)</u>	<u>-11.1 (52)</u>	<u>5.3 (56)</u>	<u>6.4 (44)</u>	<u>5.1 (48)</u>	<u>3.7 (53)</u>	<u>3.6 (48)</u>	
Over/Under			-3.0	-2.8	2.2	1.3	0.8		1.3	
<i>eV Emg Mkts Equity Median</i>			-8.0	-10.4	5.7	5.9	5.0	3.8	3.5	

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 Fixed Income Composite	972,150,197	25.7	-2.0	2.2	5.5	5.1	4.6	4.7	5.8	Nov-95
Fixed Income Index			<u>-3.0</u>	<u>0.0</u>	<u>3.8</u>	<u>3.8</u>	<u>3.6</u>	<u>3.8</u>	<u>5.2</u>	
Over/Under			1.0	2.2	1.7	1.3	1.0	0.9	0.6	
Core Fixed Composite	456,858,317	12.1	-6.0	-4.1	2.2	2.8	2.6	2.9	4.0	Apr-03
Blmbg. U.S. Aggregate Index			<u>-5.9</u>	<u>-4.2</u>	<u>1.7</u>	<u>2.1</u>	<u>1.9</u>	<u>2.2</u>	<u>3.6</u>	
Over/Under			-0.1	0.1	0.5	0.7	0.7	0.7	0.4	
Dodge & Cox	226,960,370	6.0	-5.5 (21)	-3.8 (36)	3.2 (2)	3.3 (2)	3.1 (1)	3.5 (3)	4.5 (6)	Jan-03
Blmbg. U.S. Aggregate Index			<u>-5.9 (61)</u>	<u>-4.2 (64)</u>	<u>1.7 (81)</u>	<u>2.1 (80)</u>	<u>1.9 (80)</u>	<u>2.2 (79)</u>	<u>3.6 (71)</u>	
Over/Under			0.4	0.4	1.5	1.2	1.2	1.3	0.9	
eV US Core Fixed Inc Median			-5.8	-4.0	2.0	2.4	2.2	2.6	3.9	
PGIM	229,897,947	6.1	-6.4 (95)	-4.3 (78)	1.8 (73)	2.2 (70)	2.0 (70)	2.3 (70)	3.8 (50)	Apr-03
Blmbg. U.S. Aggregate Index			<u>-5.9 (61)</u>	<u>-4.2 (64)</u>	<u>1.7 (81)</u>	<u>2.1 (80)</u>	<u>1.9 (80)</u>	<u>2.2 (79)</u>	<u>3.6 (71)</u>	
Over/Under			-0.5	-0.1	0.1	0.1	0.1	0.1	0.2	
eV US Core Fixed Inc Median			-5.8	-4.0	2.0	2.4	2.2	2.6	3.8	
High Yield Composite	129,198,835	3.4	-5.2	-2.5	4.2	4.3	4.6	5.4	6.9	Sep-04
Blmbg. U.S. Corp: High Yield Index			<u>-4.8</u>	<u>-0.7</u>	<u>4.6</u>	<u>4.7</u>	<u>5.0</u>	<u>5.7</u>	<u>6.9</u>	
Over/Under			-0.4	-1.8	-0.4	-0.4	-0.4	-0.3	0.0	
Loomis Sayles	129,198,835	3.4	-5.2 (95)	-2.6 (99)	4.2 (58)	4.3 (57)	4.5 (57)	5.6 (35)	7.0 (13)	Sep-04
Blmbg. U.S. Corp: High Yield Index			<u>-4.8 (90)</u>	<u>-0.7 (75)</u>	<u>4.6 (44)</u>	<u>4.7 (32)</u>	<u>5.0 (29)</u>	<u>5.7 (27)</u>	<u>6.9 (15)</u>	
Over/Under			-0.4	-1.9	-0.4	-0.4	-0.5	-0.1	0.1	
eV US High Yield Fixed Inc Median			-3.9	0.0	4.4	4.4	4.6	5.4	6.4	

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 (%)		
Private Credit	386,093,045	10.2	4.9	15.1	11.3	9.9			8.9	Sep-15
<i>Private Credit Index</i>			<u>-5.1</u>	<u>-1.4</u>	<u>4.3</u>	<u>5.5</u>			<u>6.0</u>	
Over/Under			10.0	16.5	7.0	4.4			2.9	
Crescent Capital	43,953,103	1.2	5.2	13.1	8.8	8.4			7.4	Sep-15
<i>Private Credit Index</i>			<u>-5.1</u>	<u>-1.4</u>	<u>4.3</u>	<u>5.5</u>			<u>6.0</u>	
Over/Under			10.3	14.5	4.5	2.9			1.4	
Arcmont Euro Private Debt	60,917,063	1.6	4.4	10.4					10.4	Apr-21
<i>Private Credit Index</i>			<u>-5.1</u>	<u>-1.4</u>	<u>4.3</u>	<u>5.5</u>			<u>-1.4</u>	
Over/Under			9.5	11.8					11.8	
Monroe Capital	178,770,582	4.7	1.4	12.4	10.0	9.3			10.1	Apr-16
<i>Private Credit Index</i>			<u>-5.1</u>	<u>-1.4</u>	<u>4.3</u>	<u>5.5</u>			<u>5.8</u>	
Over/Under			6.5	13.8	5.7	3.8			4.3	
PIMCO COF II	22,831,559	0.6	11.8	24.3	14.8	12.1			12.4	Aug-16
<i>Private Credit Index</i>			<u>-5.1</u>	<u>-1.4</u>	<u>4.3</u>	<u>5.5</u>			<u>5.7</u>	
Over/Under			16.9	25.7	10.5	6.6			6.7	
PIMCO COF III	79,620,737	2.1	11.7	31.1					62.8	May-20
<i>Private Credit Index</i>			<u>-5.1</u>	<u>-1.4</u>	<u>4.3</u>	<u>5.5</u>			<u>4.0</u>	
Over/Under			16.8	32.5					58.8	

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	660,598,526	17.5	5.8	26.0	9.7	8.9	8.7	10.4	9.9	Jan-96
JP Morgan RE	164,094,947	4.3	6.3	25.2	9.7	8.2	8.6	9.7	9.0	Jan-96
<i>NCREIF Fund Index-Open End Diversified Core Equity (VW) (Net)</i>			<u>7.2</u>	<u>27.3</u>	<u>10.3</u>	<u>8.9</u>	<u>9.2</u>	<u>9.9</u>	<u>8.5</u>	
Over/Under			-0.9	-2.1	-0.6	-0.7	-0.6	-0.2	0.5	
CFRSR-Carlyle CPI Fund	158,138,732	4.2	9.7	31.0					17.3	Jul-20
<i>NCREIF Fund Index-Open End Diversified Core Equity (VW) (Net)</i>			<u>7.2</u>	<u>27.3</u>	<u>10.3</u>	<u>8.9</u>	<u>9.2</u>	<u>9.9</u>	<u>16.9</u>	
Over/Under			2.5	3.7				0.4		
Private Real Estate Composite	170,354,218	4.5	6.5	27.4	11.6	13.1	13.4	13.1	10.3	Jan-96
<i>NCREIF ODCE</i>			<u>7.4</u>	<u>28.5</u>	<u>11.3</u>	<u>9.9</u>	<u>10.2</u>	<u>10.9</u>	<u>9.5</u>	
Over/Under			-0.9	-1.1	0.3	3.2	3.2	2.2	0.8	
Oaktree Value Add	11,307,852	0.3	6.3	26.3	11.3	17.6			16.8	Dec-16
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>10.1</u>	
Over/Under			-1.1	-2.3	-0.1	7.6			6.7	
PCCP Value Add	24,095,617	0.6	8.0	40.1	16.2	16.0			19.0	Oct-16
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>9.8</u>	
Over/Under			0.6	11.5	4.8	6.0			9.2	
PIMCO Bravo III	50,106,966	1.3	4.8	22.7	10.7	11.6			10.3	Nov-16
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>10.0</u>	
Over/Under			-2.6	-5.9	-0.7	1.6			0.3	
Alidade Capital V	7,431,493	0.2	0.0						0.0	Dec-21
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>15.8</u>	
Over/Under			-7.4						-15.8	
Artemis AREPF III	15,084,672	0.4	18.7	64.3	27.0				15.9	Jan-19
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>11.0</u>	
Over/Under			11.3	35.7	15.6				4.9	
Brookfield SREP III	43,061,741	1.1	8.0	19.8					6.9	May-19
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>11.7</u>	
Over/Under			0.6	-8.8					-4.8	
Blue Vista BVREP V	10,711,824	0.3	0.0	35.0					3.8	Mar-20
<i>NCREIF ODCE + 1%</i>			<u>7.4</u>	<u>28.6</u>	<u>11.4</u>	<u>10.0</u>	<u>10.3</u>	<u>11.0</u>	<u>14.6</u>	
Over/Under			-7.4	6.4					-10.8	
Kayne Anderson VI	8,554,053	0.2	0.0						0.0	Nov-21
<i>NCREIF ODCE + 1%</i>										
Over/Under										

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	168,010,629	4.4	1.5	4.6	5.9				5.2	Oct-18
CPI + 4% (Unadjusted)			<u>4.1</u>	<u>12.9</u>	<u>8.4</u>	<u>7.5</u>	<u>7.0</u>	<u>6.4</u>	<u>7.9</u>	
Over/Under			-2.6	-8.3	-2.5				-2.7	
JP Morgan IIF	103,048,623	2.7	0.0	2.0	6.3				5.7	Oct-18
CPI + 4% (Unadjusted)			<u>4.1</u>	<u>12.9</u>	<u>8.4</u>	<u>7.5</u>	<u>7.0</u>	<u>6.4</u>	<u>7.9</u>	
Over/Under			-4.1	-10.9	-2.1				-2.2	
Ullico UIF	64,962,006	1.7	3.9	8.6	5.6				5.1	Dec-18
CPI + 4% (Unadjusted)			<u>4.1</u>	<u>12.9</u>	<u>8.4</u>	<u>7.5</u>	<u>7.0</u>	<u>6.4</u>	<u>8.2</u>	
Over/Under			-0.2	-4.3	-2.8				-3.1	
Midstream Energy	199,916,224	5.3	24.2	48.5					8.6	Jul-19
Alerian Midstream Energy Index			<u>24.0</u>	<u>41.9</u>	<u>10.1</u>	<u>6.1</u>	<u>3.7</u>		<u>10.6</u>	
Over/Under			0.2	6.6					-2.0	
Tortoise	90,732,442	2.4	23.7	46.7					8.3	Aug-19
Alerian Midstream Energy Index			<u>24.0</u>	<u>41.9</u>	<u>10.1</u>	<u>6.1</u>	<u>3.7</u>		<u>11.6</u>	
Over/Under			-0.3	4.8					-3.3	
Harvest	109,183,782	2.9	24.7	50.0					9.2	Jul-19
Alerian Midstream Energy Index			<u>24.0</u>	<u>41.9</u>	<u>10.1</u>	<u>6.1</u>	<u>3.7</u>		<u>10.6</u>	
Over/Under			0.7	8.1					-1.4	

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
Cash & Equivalents Composite	734,023	0.0	0.1	4.7	2.2	2.0	1.5	1.1	1.7	Oct-03
<i>90 Day U.S. Treasury Bill</i>			<u>0.0</u>	<u>0.1</u>	<u>0.8</u>	<u>1.1</u>	<u>0.9</u>	<u>0.6</u>	<u>1.2</u>	
Over/Under			0.1	4.6	1.4	0.9	0.6	0.5	0.5	
Payroll Account	208,190	0.0	0.1	0.6	0.9	1.2	1.0	0.7	1.9	Apr-99
<i>90 Day U.S. Treasury Bill</i>			<u>0.0</u>	<u>0.1</u>	<u>0.8</u>	<u>1.1</u>	<u>0.9</u>	<u>0.6</u>	<u>1.7</u>	
Over/Under			0.1	0.5	0.1	0.1	0.1	0.1	0.2	
Operating Funds	525,833	0.0	0.1	0.1	0.7	1.1	0.9	0.7	1.4	Oct-03
<i>90 Day U.S. Treasury Bill</i>			<u>0.0</u>	<u>0.1</u>	<u>0.8</u>	<u>1.1</u>	<u>0.9</u>	<u>0.6</u>	<u>1.2</u>	
Over/Under			0.1	0.0	-0.1	0.0	0.0	0.1	0.2	

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

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	Mar	YTD
S&P 500	16.0%	32.4%	13.7%	1.4%	12.0%	21.8%	-4.4%	31.5%	18.4%	28.7%	3.7%	-4.6%
Russell 1000	16.4%	33.1%	13.2%	0.9%	12.1%	21.7%	-4.8%	31.4%	21.0%	26.5%	3.4%	-5.1%
Russell 2000	16.3%	38.8%	4.9%	-4.4%	21.3%	14.6%	-11.0%	25.5%	20.0%	14.8%	1.2%	-7.5%
Russell 2500	17.9%	36.8%	7.1%	-2.9%	17.6%	16.8%	-10.0%	27.8%	20.0%	18.2%	1.6%	-5.8%
MSCI EAFE	17.3%	22.8%	-4.9%	-0.8%	1.0%	25.0%	-13.8%	22.0%	7.8%	11.3%	0.6%	-5.9%
MSCI EM	18.2%	-2.6%	-2.2%	-14.9%	11.2%	37.3%	-14.6%	18.4%	18.3%	-2.5%	-2.3%	-7.0%
MSCI ACWI	16.1%	22.8%	4.2%	-2.4%	7.9%	24.0%	-9.4%	26.6%	16.3%	18.5%	2.2%	-5.4%
Private Equity	9.5%	12.6%	22.3%	14.6%	10.4%	10.3%	21.0%	13.1%	17.2%	29.8%	-	-
BBG TIPS	7.0%	-8.6%	3.6%	-1.4%	4.7%	3.0%	-1.3%	8.4%	11.0%	6.0%	-1.9%	-3.0%
BBG Municipal	6.8%	-2.6%	9.1%	3.3%	0.2%	5.4%	1.3%	7.5%	5.2%	1.5%	-3.2%	-6.2%
BBG Muni High Yield	18.1%	-5.5%	13.8%	1.8%	3.0%	9.7%	4.8%	10.7%	4.9%	7.8%	-3.6%	-6.5%
BBG US Corporate HY	15.8%	7.4%	2.5%	-4.5%	17.1%	7.5%	-2.1%	14.3%	7.1%	5.3%	-1.1%	-4.8%
BBG US Agg Bond	4.2%	-2.0%	6.0%	0.5%	2.6%	3.5%	0.0%	8.7%	7.5%	-1.5%	-2.8%	-5.9%
BBG Global Agg	4.3%	-2.6%	0.6%	-3.2%	2.1%	7.4%	-1.2%	6.8%	9.2%	-4.7%	-3.0%	-6.2%
BBG Long Treasuries	3.6%	-12.7%	25.1%	-1.2%	1.3%	8.5%	-1.8%	14.8%	17.7%	-4.6%	-5.3%	-10.6%
BBG US Long Credit	12.7%	-6.6%	16.4%	-4.6%	10.2%	12.2%	-6.8%	23.4%	13.3%	-1.2%	-2.8%	-11.2%
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%	-6.5%	-13.8%
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%	-1.5%	-6.5%
JPM EMBI Glob Div	17.4%	-5.3%	7.4%	1.2%	10.2%	10.3%	-4.3%	15.0%	5.3%	-1.8%	-0.9%	-10.0%
CS Hedge Fund	7.7%	9.7%	4.1%	-0.7%	1.2%	7.1%	-3.2%	9.3%	6.4%	8.2%	-	-0.3%
BBG Commodity	-1.1%	-9.5%	-17.0%	-24.7%	11.8%	1.7%	-11.2%	7.7%	-3.1%	27.1%	8.6%	25.5%
Alerian Midstream	-	-	16.4%	-37.3%	33.8%	-2.4%	-13.3%	24.0%	-23.4%	38.4%	7.0%	24.0%
FTSE NAREIT Equity REITs	18.1%	2.5%	30.1%	3.2%	8.5%	5.2%	-4.6%	26.0%	-8.0%	43.2%	6.5%	-3.9%

*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-22	YTD	1 YR	3 YR	5 YR	10 YR
MSCI ACWI	2.2%	-5.4%	7.3%	13.8%	11.6%	10.0%
S&P 500	3.7%	-4.6%	15.6%	18.9%	16.0%	14.6%
Russell 1000	3.4%	-5.1%	13.3%	18.7%	15.8%	14.5%
Russell 2000	1.2%	-7.5%	-5.8%	11.7%	9.7%	11.0%
Russell 2500	1.6%	-5.8%	0.3%	13.8%	11.6%	12.1%
MSCI EAFE	0.6%	-5.9%	1.2%	7.8%	6.7%	6.3%
MSCI EM	-2.3%	-7.0%	-11.4%	4.9%	6.0%	3.4%

Credit						
	Mar-22	YTD	1 YR	3 YR	5 YR	10 YR
BBG Global Agg	-3.0%	-6.2%	-6.4%	0.7%	1.7%	1.0%
BBG US Agg	-2.8%	-5.9%	-4.2%	1.7%	2.1%	2.2%
BBG Credit	-2.5%	-7.4%	-4.2%	2.8%	3.2%	3.4%
BBG US HY	-1.1%	-4.8%	-0.7%	4.6%	4.7%	5.7%
BBG Muni	-3.2%	-6.2%	-4.5%	1.5%	2.5%	2.9%
BBG Muni HY	-3.6%	-6.5%	-1.3%	4.0%	5.2%	5.4%
BBG TIPS	-1.9%	-3.0%	4.3%	6.2%	4.4%	2.7%
BBG 20+ STRIPS	-6.5%	-13.8%	0.3%	4.8%	5.6%	5.8%
BBG Long Treasuries	-5.3%	-10.6%	-1.4%	3.3%	3.9%	4.0%
BBG Long Credit	-2.8%	-11.2%	-4.2%	4.4%	4.8%	5.1%
BBG Govt/Credit 1-3 Yr	-1.4%	-2.5%	-2.9%	1.0%	1.3%	1.1%
JPM EMBI Glob Div	-0.9%	-10.0%	-7.4%	0.0%	1.7%	3.7%
JPM GBI-EM Glob Div	-1.5%	-6.5%	-8.5%	-1.1%	0.2%	-0.7%

Real Assets						
	Mar-22	YTD	1 YR	3 YR	5 YR	10 YR
BBG Commodity	8.6%	25.5%	49.3%	16.1%	9.0%	-0.7%
Alerian Midstream Index	7.0%	24.0%	41.9%	10.1%	6.1%	-
FTSE NAREIT Equity REITs	6.5%	-3.9%	26.5%	11.1%	9.6%	9.8%



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

City of Fresno Retirement Systems

TOTAL FUND PERFORMANCE NOTES

Policy Index consists of 15.8% Russell 1000, 3.6% Russell 2000 Growth, 3.6% Russell 2000 Value, 19% MSCI ACWI ex USA Gross, 6% MSCI Emerging Markets Gross, 10% BBgBarc US Aggregate TR, 5% BBgBarc US High Yield TR, 8% 50% BBgBarc US Agg / 50% BBgBarc US High Yield + 1%, 11% NCREIF ODCE Net, 4% NCREIF ODCE + 1%, 5% Alerian Midstream Energy Index, 5% Private Equity Index, 4% CPI + 4% (Unadjusted).

Domestic Equity Index consists of 15.65% Russell 2000 Value, 15.65% Russell 2000 Growth, 68.7% Russell 1000.

Large Cap Equity Index consists of 100% Russell 1000.

International Equity Index consists of 73.08% MSCI ACWI ex USA Gross and 26.92% MSCI Emerging Markets Gross.

Fixed Income Index consists of 64.71% BBgBarc US Aggregate TR and 35.29% BBgBarc US High Yield TR.

Alternatives Index consists of 36.4% 50% BBgBarc US Agg / 50% BBgBarc US High Yield + 1%, 22.7% Private Equity Index, 22.7% Alerian Midstream Energy Index, 18.4% CPI + 4% (Unadjusted).

Private Credit Index consists of 100% 50% BBgBarc US Agg / 50% BBgBarc US High Yield + 1%.

Private Equity Index consists of ACWI IMI + 150 quarter lag.



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



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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.

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