



QUARTERLY PERFORMANCE REPORT

CITY OF FRESNO RETIREMENT
SYSTEMS

SEPTEMBER 30, 2021

Don Stracke, CFA, CAIA, Senior Consultant
Michael Miranda, CFA, Senior Consulting Specialist



PROPRIETARY & CONFIDENTIAL

THIRD QUARTER 2021 SUMMARY

- **The US economy expanded at an annual rate of 2.0% in the second quarter**
- **The Fed kept rates unchanged, and the target Fed Funds rate remains 0.00% - 0.25%**
- **US stocks outperformed Non-US stocks with Emerging Market stocks lagging Developed Markets**
- **US bonds were relatively flat during the quarter as yields rose modestly**
- **Net performance over the last 25 years is 7.9%, ahead of the assumed rate of 7.25%**
 - Performance is just above the policy index over the last 25 years but trails since inception
- **Manager selection remains a positive contributor to relative performance long-term**



THIRD QUARTER 2021 SUMMARY

- **In the one-year ended September 30, 2021, the Total Fund returned 23.6%, outperforming the benchmark (net of fees) and ranking in the first quartile of peers**
 - Overweight positioning to Large Cap Equity and along with underweight positioning to Private Real Estate and Private Credit contributed to relative performance
 - Private Credit and Private Real Estate manager selection contributed to relative performance
 - Public Equity, Midstream Energy, and Private Equity performance has contributed to overall plan returns over the trailing 1-year period
- **Over the most recent quarter, the Total Fund returned 0.0%, underperforming the policy benchmark (net of fees) and ranking in the third quartile of peers**
 - Overweight positioning to International Equity and underweight positioning to Private Equity detracted from relative performance
 - Small Cap Equity and Private Credit outperformance contributed to relative performance
- **Total fund volatility remained elevated relative to peers**



ECONOMIC ENVIRONMENT

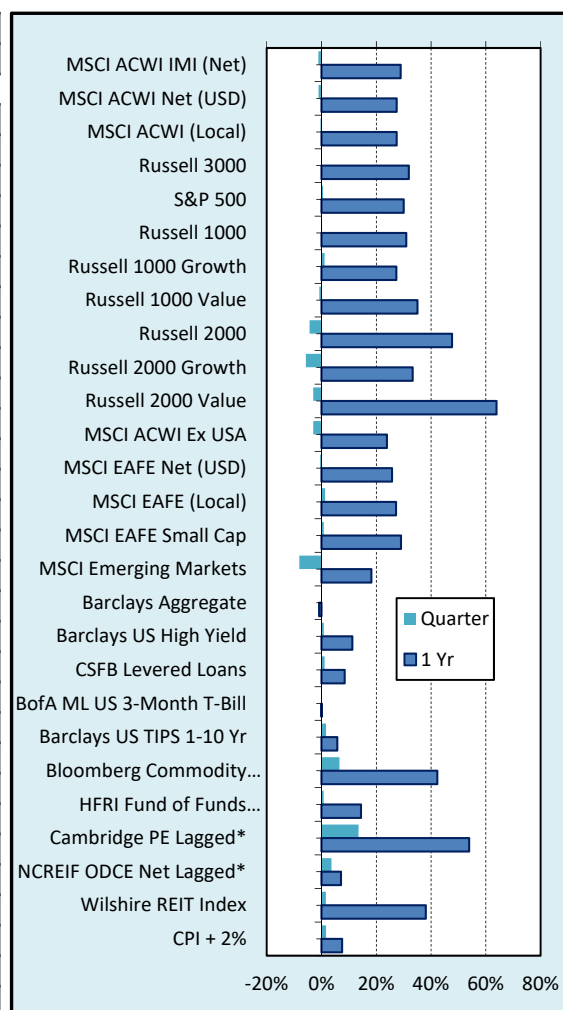
- **Q3 Real GDP (advance estimate) grew at an annual rate of +2.0%.**
 - Retail sales ended August at +11.95% on a YoY basis. In the same period last year the YoY growth rate was +8.22%.
 - Corporate profits as a percent of GDP ended Q1 2021 at 11.83%, up from 8.1% on a YoY basis and remain elevated relative to historical levels.
 - The inventory-to-sales ratio ended August 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 widened by 4.2 % (ended August).
- **The unemployment rate was 4.8% in Q3, down from 5.4% in Q2; U-6, a broader measure of unemployment, decreased to 8.5% in Q3 from 9.8% in Q2.**
 - The labor force participation rate ended Q3 at 61.6% and flat against Q2 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 August) increased to 268.62 from 261.06 in Q2 and remains at levels higher than that of pre-financial crisis levels of 150.9.**
- **Rolling 12-month seasonally-adjusted CPI was 5.44% in Q3, in the same period last year it was 1.41%; Capacity Utilization decreased to 75.2% in Q3 from 75.6% in Q2.**
- **Fed Funds rate remains at a targeted range of 0.00%-to-0.25%. The 10-year Treasury Yield (constant maturity) finished Q3 at 1.4% down from 1.5% in Q2.**
- **The Fed has begun to signal that it may be time to begin tapering of asset purchases. The Fed's balance sheet continues to grow in the wake of the pandemic.**
- **S&P valuations decreased in Q3 to 37.12 from 37.44 in Q2 and remains higher than the 10-year average of 27.7x.**
 - Cyclically adjusted Shiller PE ratio remains above the long-term average of 16.9x



MARKET ENVIRONMENT

Q3 2021 OVERVIEW

| | | Qtr. | 1 Yr. | 3 Yr. | 5 Yr. | 10 Yr. |
|---|----------------------------------|--------|--------|--------|--------|--------|
| World Equity Benchmarks | | | | | | |
| MSCI ACWI IMI (Net) | World with Small Cap | -1.11% | 28.92% | 12.38% | 13.06% | 11.96% |
| MSCI ACWI Net (USD) | World W/O Small Cap | -1.05% | 27.44% | 12.58% | 13.20% | 11.90% |
| MSCI ACWI (Local) | World (Local Currency) | -0.36% | 27.45% | 12.33% | 13.27% | 12.94% |
| Domestic Equity Benchmarks | | | | | | |
| Russell 3000 | Domestic All Cap | -0.10% | 31.87% | 16.00% | 16.85% | 16.60% |
| S&P 500 | Large Core | 0.58% | 30.00% | 15.99% | 16.89% | 16.63% |
| Russell 1000 | Large Core | 0.21% | 30.96% | 16.43% | 17.11% | 16.76% |
| Russell 1000 Growth | Large Growth | 1.16% | 27.32% | 22.00% | 22.84% | 19.68% |
| Russell 1000 Value | Large Value | -0.78% | 35.01% | 10.07% | 10.94% | 13.51% |
| Russell 2000 | Small Core | -4.36% | 47.68% | 10.54% | 13.45% | 14.63% |
| Russell 2000 Growth | Small Growth | -5.65% | 33.26% | 11.70% | 15.34% | 15.74% |
| Russell 2000 Value | Small Value | -2.98% | 63.92% | 8.58% | 11.03% | 13.22% |
| International Equity Benchmarks | | | | | | |
| MSCI ACWI Ex USA | World ex-US | -2.99% | 23.91% | 8.03% | 8.94% | 7.48% |
| MSCI EAFE Net (USD) | Int'l Developed | -0.45% | 25.73% | 7.62% | 8.81% | 8.10% |
| MSCI EAFE (Local) | Int'l Developed (Local Currency) | 1.32% | 27.20% | 7.16% | 9.01% | 10.10% |
| MSCI EAFE Small Cap | Small Cap Int'l | 0.89% | 29.02% | 9.05% | 10.38% | 10.73% |
| MSCI Emerging Markets | Emerging Equity | -8.09% | 18.20% | 8.58% | 9.23% | 6.09% |
| Domestic Fixed Income Benchmarks | | | | | | |
| Barclays Aggregate | Core Bonds | 0.05% | -0.90% | 5.36% | 2.94% | 3.01% |
| Barclays US High Yield | High Yield | 0.89% | 11.28% | 6.91% | 6.52% | 7.42% |
| CSFB Levered Loans | Bank Loans | 1.13% | 8.46% | 4.09% | 4.64% | 5.04% |
| BofA ML US 3-Month T-Bill | Cash | 0.01% | 0.07% | 1.18% | 1.16% | 0.63% |
| Barclays US TIPS 1-10 Yr | Inflation | 1.68% | 5.75% | 6.41% | 3.84% | 2.58% |
| Alternative Benchmarks | | | | | | |
| Bloomberg Commodity Index | Commodities | 6.59% | 42.29% | 6.86% | 4.54% | -2.66% |
| HFRI Fund of Funds Composite Index | Fund of Hedge Funds | 0.78% | 14.35% | 6.51% | 5.81% | 4.47% |
| Cambridge PE Lagged* | Private Equity | 13.54% | 53.92% | 20.79% | 19.47% | 15.31% |
| NCREIF ODCE Net Lagged* | Real Estate | 3.68% | 7.09% | 4.60% | 5.62% | 8.60% |
| Wilshire REIT Index | REIT | 1.64% | 38.06% | 10.39% | 6.97% | 11.30% |
| CPI + 2% | Inflation/Real Assets | 1.67% | 7.54% | 4.94% | 4.68% | 3.97% |



* As of 6/30/2021

City of Fresno Retirement Systems

TOTAL FUND PERFORMANCE SUMMARY - NET OF FEES

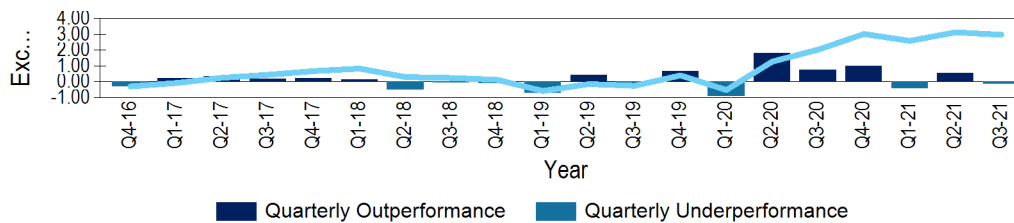
| | Market Value | 3 Mo Rank | YTD Rank | 1 Yr Rank | 3 Yrs Rank | 5 Yrs Rank | 7 Yrs Rank | 10 Yrs Rank | 15 Yrs Rank | 20 Yrs Rank | 25 Yrs Rank | Inception | Inception Date | | | | | | | | | | |
|--|------------------------|--------------|-----------|--------------|------------|--------------|------------|--------------|-------------|--------------|-------------|-------------|----------------|--------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|---------------|
| Total Fund | \$3,777,865,810 | 0.0% | 60 | 10.2% | 44 | 23.6% | 19 | 10.6% | 37 | 10.6% | 30 | 9.0% | 21 | 10.3% | 19 | 7.1% | 39 | 7.7% | 29 | 7.9% | 24 | 9.1% | Oct-85 |
| <i>Policy Index</i> | | <i>0.2%</i> | <i>50</i> | <i>10.3%</i> | <i>41</i> | <i>22.5%</i> | <i>39</i> | <i>9.8%</i> | <i>57</i> | <i>10.0%</i> | <i>45</i> | <i>8.4%</i> | <i>39</i> | <i>9.9%</i> | <i>36</i> | <i>7.1%</i> | <i>35</i> | <i>7.9%</i> | <i>23</i> | <i>7.8%</i> | <i>26</i> | <i>9.5%</i> | <i>Oct-85</i> |
| <i>60% MSCI ACWI (Gross)/40% FTSE WGBI</i> | | <i>-1.1%</i> | <i>99</i> | <i>4.3%</i> | <i>99</i> | <i>14.7%</i> | <i>99</i> | <i>9.7%</i> | <i>59</i> | <i>8.9%</i> | <i>85</i> | <i>7.2%</i> | <i>90</i> | <i>8.0%</i> | <i>93</i> | <i>6.2%</i> | <i>81</i> | <i>7.2%</i> | <i>57</i> | <i>6.6%</i> | <i>91</i> | <i>--</i> | <i>Oct-85</i> |
| <i>InvMetrics Public DB > \$1B Net Median</i> | | <i>0.2%</i> | | <i>9.6%</i> | | <i>21.2%</i> | | <i>10.1%</i> | | <i>9.9%</i> | | <i>8.1%</i> | | <i>9.6%</i> | | <i>6.8%</i> | | <i>7.3%</i> | | <i>7.4%</i> | | <i>8.8%</i> | <i>Oct-85</i> |

Over the past five years, the Fund returned 10.56% per annum, ranking in the 30th percentile of the Investment Metrics Public Funds > \$1 Billion net of fee universe. The Fund's return outperformed the actuarial rate of 7.25% and outperformed the policy index by 54 basis points. The Fund's volatility was 9.98%, which ranks in the 88th percentile of its peers over this period. The Fund's risk-adjusted performance, as measured by the Sharpe Ratio, ranks in the 65th percentile of its peers.

Over the past three years, the Fund returned 10.61% per annum, outperforming the policy index by 82 basis points and ranking in the 37th percentile of its peer group. Over the past three years, the Fund's Sharpe Ratio of 0.77 ranks in the 67th percentile.

For the year ending September 30, 2021, the Fund returned 23.55%, outperforming the policy index by 102 basis points and ranking in the 19th percentile of its peers.

Quarterly and Cumulative Excess Performance



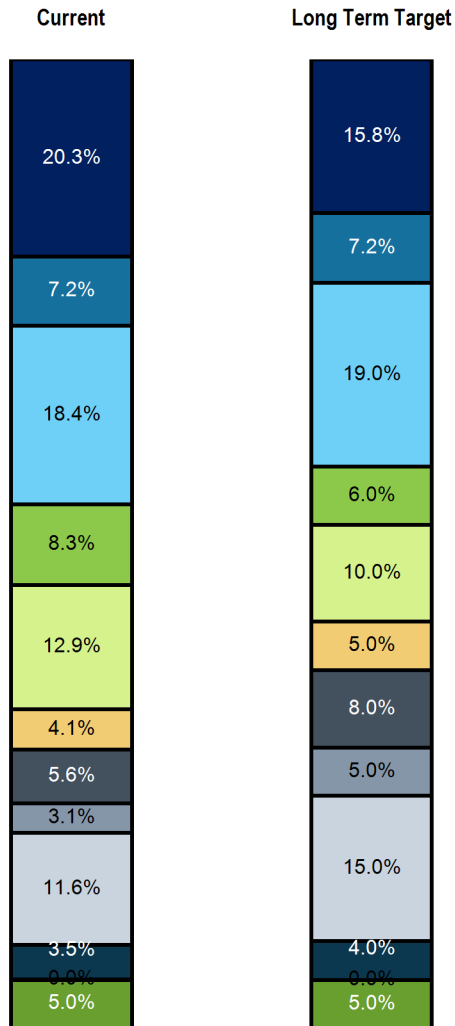
| 5 Years Ending September 30, 2021 | | | | | | | | |
|-----------------------------------|-----------|------|---------------|------|--------------|------|---------------|------|
| | Anlzd Ret | Rank | Anlzd Std Dev | Rank | Sharpe Ratio | Rank | Sortino Ratio | Rank |
| Total Fund | 10.6% | 30 | 10.0% | 88 | 0.9 | 65 | 1.1 | 63 |
| Policy Index | 10.0% | 45 | 9.5% | 81 | 0.9 | 66 | 1.1 | 68 |

| 7 Years Ending September 30, 2021 | | | | | | | | |
|-----------------------------------|-----------|------|---------------|------|--------------|------|---------------|------|
| | Anlzd Ret | Rank | Anlzd Std Dev | Rank | Sharpe Ratio | Rank | Sortino Ratio | Rank |
| Total Fund | 9.0% | 21 | 9.5% | 91 | 0.9 | 57 | 1.1 | 55 |
| Policy Index | 8.4% | 39 | 9.2% | 83 | 0.8 | 62 | 1.1 | 58 |



City of Fresno Retirement Systems

TOTAL FUND ASSET ALLOCATION VS. POLICY TARGETS



| Asset Allocation vs. Target | | | | | | | |
|--------------------------------|------------------------|---------------|---------------|-------------|---------------|--------------|--|
| | Current | Current | Policy | Difference* | Policy Range | Within Range | |
| Large Cap Equity | \$765,441,325 | 20.3% | 15.8% | 4.5% | 10.0% - 26.0% | Yes | |
| Small Cap Equity | \$271,188,808 | 7.2% | 7.2% | 0.0% | 2.0% - 12.0% | Yes | |
| Developed International Equity | \$696,475,629 | 18.4% | 19.0% | -0.6% | 14.0% - 24.0% | Yes | |
| Emerging Markets Equity | \$314,123,498 | 8.3% | 7.0% | 1.3% | 3.0% - 9.0% | Yes | |
| Core Fixed Income | \$486,278,576 | 12.9% | 10.0% | 2.9% | 6.0% - 15.0% | Yes | |
| High Yield | \$155,479,579 | 4.1% | 5.0% | -0.9% | 2.0% - 8.0% | Yes | |
| Private Credit | \$211,356,481 | 5.6% | 8.0% | -2.4% | 4.0% - 12.0% | Yes | |
| Private Equity | \$115,409,267 | 3.1% | 4.0% | -0.9% | 0.0% - 10.0% | Yes | |
| Real Estate - Private | \$437,439,082 | 11.6% | 15.0% | -3.4% | 9.0% - 24.0% | Yes | |
| Infrastructure | \$132,836,184 | 3.5% | 4.0% | -0.5% | 2.0% - 6.0% | Yes | |
| Cash | \$1,137,893 | 0.0% | 0.0% | 0.0% | 0.0% - 2.0% | Yes | |
| Energy Infrastructure | \$190,699,488 | 5.0% | 5.0% | 0.0% | 2.0% - 8.0% | Yes | |
| Total | \$3,777,865,810 | 100.0% | 100.0% | | | | |

*Difference between Current and Current Allocation

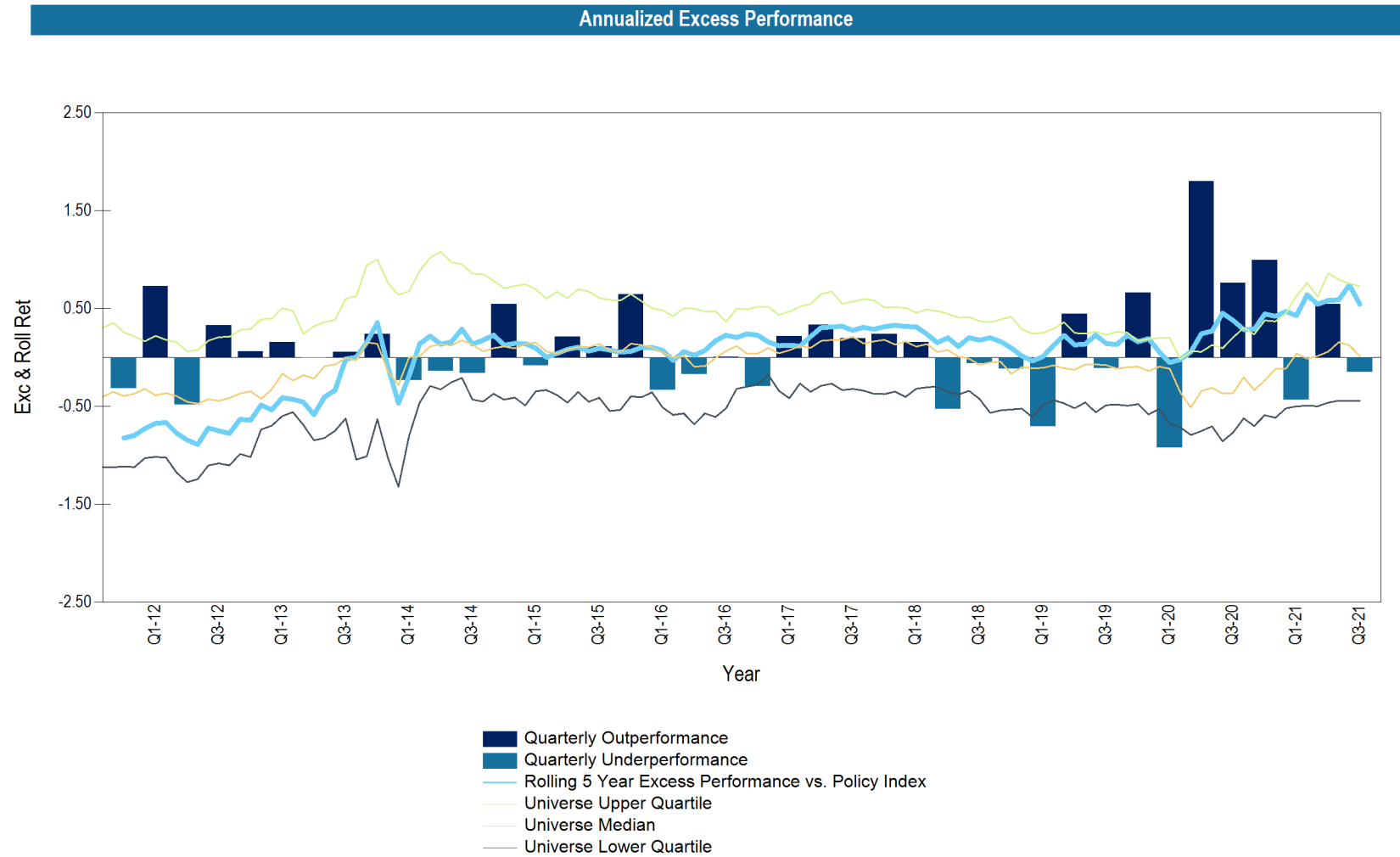
*Policy column reflects targets in the Policy Index.

**Does not include HY Bonds in Core Fixed income mandates.



City of Fresno Retirement Systems

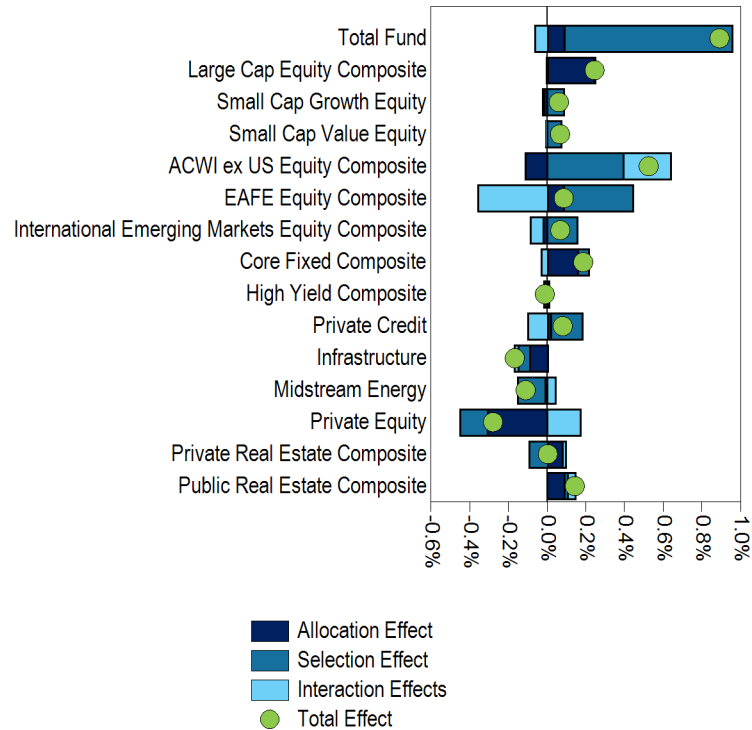
ROLLING 5 YEAR EXCESS RETURNS- NET OF FEES



City of Fresno Retirement Systems

TOTAL FUND ATTRIBUTION ANALYSIS

Attribution Effects
3 Years Ending September 30, 2021



Attribution Summary
3 Years Ending September 30, 2021

| | Wtd. Actual Return | Wtd. Index Return | Excess Return | Selection Effect | Allocation Effect | Interaction Effects | Total Effects |
|---|--------------------|-------------------|---------------|------------------|-------------------|---------------------|---------------|
| Large Cap Equity Composite | 16.4% | 16.4% | 0.0% | 0.0% | 0.3% | 0.0% | 0.3% |
| Small Cap Growth Equity | 14.3% | 11.7% | 2.6% | 0.1% | 0.0% | 0.0% | 0.1% |
| Small Cap Value Equity | 10.2% | 8.6% | 1.7% | 0.1% | 0.0% | 0.0% | 0.1% |
| ACWI ex US Equity Composite | 11.5% | 8.5% | 3.0% | 0.4% | -0.2% | 0.3% | 0.5% |
| EAFE Equity Composite | -- | -4.0% | -- | 0.4% | 0.1% | -0.4% | 0.1% |
| International Emerging Markets Equity Composite | 11.5% | 9.0% | 2.5% | 0.2% | 0.0% | -0.1% | 0.1% |
| Core Fixed Composite | 5.9% | 5.4% | 0.5% | 0.1% | 0.2% | 0.0% | 0.2% |
| High Yield Composite | 7.0% | 6.9% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% |
| Private Credit | 9.2% | 7.3% | 1.9% | 0.2% | 0.0% | -0.1% | 0.1% |
| Infrastructure | 4.9% | 6.9% | -2.0% | -0.1% | -0.1% | 0.0% | -0.1% |
| Midstream Energy | -- | 2.0% | -- | -0.1% | 0.0% | 0.0% | -0.1% |
| Private Equity | -- | 16.8% | -- | -0.1% | -0.3% | 0.2% | -0.3% |
| Private Real Estate Composite | 6.0% | 6.4% | -0.4% | -0.1% | 0.1% | 0.0% | 0.0% |
| Public Real Estate Composite | -- | -0.9% | -- | 0.0% | 0.1% | 0.0% | 0.1% |
| Total | 10.7% | 9.8% | 0.9% | 0.9% | 0.1% | -0.1% | 0.9% |

Totals may be off slightly due to rounding.



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|--|----------------------|----------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|---------------|----------------|
| Total Fund | 3,777,865,810 | 100.0 | 0.0 | 60 | 10.2 | 44 | 23.6 | 19 | 10.6 | 37 | 10.6 | 30 | 10.3 | 19 | 9.1 | Oct-85 |
| <i>Policy Index</i> | | | <i>0.2</i> | <i>50</i> | <i>10.3</i> | <i>41</i> | <i>22.5</i> | <i>39</i> | <i>9.8</i> | <i>57</i> | <i>10.0</i> | <i>45</i> | <i>9.9</i> | <i>36</i> | <i>9.5</i> | <i>Oct-85</i> |
| <i>Over/Under</i> | | | <i>-0.2</i> | | <i>-0.1</i> | | <i>1.1</i> | | <i>0.8</i> | | <i>0.6</i> | | <i>0.4</i> | | <i>-0.4</i> | |
| <i>60% MSCI ACWI (Gross)/40% FTSE WGBI</i> | | | <i>-1.1</i> | <i>99</i> | <i>4.3</i> | <i>99</i> | <i>14.7</i> | <i>99</i> | <i>9.7</i> | <i>59</i> | <i>8.9</i> | <i>85</i> | <i>8.0</i> | <i>93</i> | <i>--</i> | <i>Oct-85</i> |
| <i>InvMetrics Public DB > \$1B Net Median</i> | | | <i>0.2</i> | | <i>9.6</i> | | <i>21.2</i> | | <i>10.1</i> | | <i>9.9</i> | | <i>9.6</i> | | <i>8.8</i> | <i>Oct-85</i> |
| Total Equity Composite | 2,047,229,429 | 54.2 | -2.0 | 85 | 9.3 | 84 | 27.9 | 32 | 13.0 | 14 | 13.7 | 3 | 12.8 | 38 | 8.7 | Oct-95 |
| <i>MSCI ACWI</i> | | | <i>-1.1</i> | <i>24</i> | <i>11.1</i> | <i>68</i> | <i>27.4</i> | <i>60</i> | <i>12.6</i> | <i>37</i> | <i>13.2</i> | <i>14</i> | <i>11.9</i> | <i>56</i> | <i>7.6</i> | <i>Oct-95</i> |
| <i>Over/Under</i> | | | <i>-0.9</i> | | <i>-1.8</i> | | <i>0.5</i> | | <i>0.4</i> | | <i>0.5</i> | | <i>0.9</i> | | <i>1.1</i> | |
| <i>InvMetrics Public DB Gbl Eq Net Median</i> | | | <i>-1.2</i> | | <i>11.8</i> | | <i>27.7</i> | | <i>12.0</i> | | <i>12.3</i> | | <i>12.5</i> | | <i>--</i> | <i>Oct-95</i> |
| Domestic Equity Composite | 1,036,630,235 | 27.4 | -0.4 | 73 | 14.8 | 70 | 34.4 | 30 | 14.8 | 42 | 16.4 | 31 | 16.2 | 28 | -- | Nov-95 |
| <i>Domestic Equity Index</i> | | | <i>-1.2</i> | <i>97</i> | <i>14.5</i> | <i>77</i> | <i>36.4</i> | <i>13</i> | <i>14.5</i> | <i>60</i> | <i>16.0</i> | <i>39</i> | <i>16.1</i> | <i>33</i> | <i>10.1</i> | <i>Nov-95</i> |
| <i>Over/Under</i> | | | <i>0.8</i> | | <i>0.3</i> | | <i>-2.0</i> | | <i>0.3</i> | | <i>0.4</i> | | <i>0.1</i> | | | |
| <i>InvMetrics Public DB US Eq Net Median</i> | | | <i>-0.1</i> | | <i>15.5</i> | | <i>33.5</i> | | <i>14.7</i> | | <i>15.7</i> | | <i>15.8</i> | | <i>9.7</i> | <i>Nov-95</i> |
| Large Cap Equity Composite | 765,441,339 | 20.3 | 0.2 | 41 | 15.2 | 50 | 31.0 | 41 | 16.4 | 35 | 17.2 | 32 | 16.8 | 29 | 9.9 | Oct-95 |
| <i>Large Cap Equity Index</i> | | | <i>0.2</i> | <i>41</i> | <i>15.2</i> | <i>50</i> | <i>31.0</i> | <i>41</i> | <i>16.4</i> | <i>35</i> | <i>17.1</i> | <i>32</i> | <i>16.7</i> | <i>29</i> | <i>10.1</i> | <i>Oct-95</i> |
| <i>Over/Under</i> | | | <i>0.0</i> | | <i>0.0</i> | | <i>0.0</i> | | <i>0.0</i> | | <i>0.1</i> | | <i>0.1</i> | | <i>-0.2</i> | |
| <i>eV US Large Cap Equity Net Median</i> | | | <i>-0.1</i> | | <i>15.1</i> | | <i>29.4</i> | | <i>14.0</i> | | <i>15.0</i> | | <i>15.1</i> | | <i>10.3</i> | <i>Oct-95</i> |
| NTAM Russell 1000 Index Fund | 765,441,339 | 20.3 | 0.2 | 47 | 15.2 | 48 | 31.0 | 29 | 16.4 | 18 | 17.2 | 12 | -- | -- | 17.2 | Oct-16 |
| <i>Russell 1000</i> | | | <i>0.2</i> | <i>47</i> | <i>15.2</i> | <i>48</i> | <i>31.0</i> | <i>29</i> | <i>16.4</i> | <i>18</i> | <i>17.1</i> | <i>14</i> | <i>16.8</i> | <i>12</i> | <i>17.1</i> | <i>Oct-16</i> |
| <i>Over/Under</i> | | | <i>0.0</i> | | <i>0.0</i> | | <i>0.0</i> | | <i>0.0</i> | | <i>0.1</i> | | <i>0.1</i> | | <i>0.1</i> | |
| <i>eV US Large Cap Core Equity Net Median</i> | | | <i>0.1</i> | | <i>14.9</i> | | <i>28.7</i> | | <i>14.0</i> | | <i>15.2</i> | | <i>15.3</i> | | <i>15.2</i> | <i>Oct-16</i> |

Fiscal year end: June 30



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|---|--------------------|----------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|---------------|----------------|
| Small Cap Equity Composite | 271,188,896 | 7.2 | -2.0 | 56 | 13.9 | 63 | 45.8 | 62 | 12.7 | 39 | 15.6 | 36 | 15.3 | 41 | 9.4 | Oct-95 |
| <i>Russell 2000</i> | | | <i>-4.4</i> | <i>89</i> | <i>12.4</i> | <i>71</i> | <i>47.7</i> | <i>58</i> | <i>10.5</i> | <i>54</i> | <i>13.4</i> | <i>53</i> | <i>14.6</i> | <i>52</i> | <i>9.5</i> | <i>Oct-95</i> |
| Over/Under | | | 2.4 | | 1.5 | | -1.9 | | 2.2 | | 2.2 | | 0.7 | | -0.1 | |
| <i>eV US Small Cap Equity Net Median</i> | | | <i>-1.8</i> | | <i>16.8</i> | | <i>49.7</i> | | <i>11.0</i> | | <i>13.7</i> | | <i>14.7</i> | | <i>11.7</i> | <i>Oct-95</i> |
| Eagle Asset Management | 129,982,160 | 3.4 | -2.7 | 64 | 2.1 | 89 | 28.9 | 86 | 14.3 | 67 | 19.0 | 53 | 16.9 | 67 | 15.2 | Nov-10 |
| <i>Russell 2000 Growth</i> | | | <i>-5.7</i> | <i>90</i> | <i>2.8</i> | <i>89</i> | <i>33.3</i> | <i>75</i> | <i>11.7</i> | <i>84</i> | <i>15.3</i> | <i>85</i> | <i>15.7</i> | <i>83</i> | <i>13.8</i> | <i>Nov-10</i> |
| Over/Under | | | 3.0 | | -0.7 | | -4.4 | | 2.6 | | 3.7 | | 1.2 | | 1.4 | |
| <i>eV US Small Cap Growth Equity Net Median</i> | | | <i>-1.9</i> | | <i>9.6</i> | | <i>38.8</i> | | <i>17.1</i> | | <i>19.8</i> | | <i>17.7</i> | | <i>15.6</i> | <i>Nov-10</i> |
| Kennedy Capital Mgmt | 141,206,736 | 3.7 | -1.4 | 39 | 26.8 | 21 | 65.2 | 29 | 10.2 | 31 | 11.6 | 38 | 14.2 | 30 | 12.0 | May-03 |
| <i>Russell 2000 Value</i> | | | <i>-3.0</i> | <i>73</i> | <i>22.9</i> | <i>46</i> | <i>63.9</i> | <i>33</i> | <i>8.6</i> | <i>51</i> | <i>11.0</i> | <i>46</i> | <i>13.2</i> | <i>51</i> | <i>10.2</i> | <i>May-03</i> |
| Over/Under | | | 1.6 | | 3.9 | | 1.3 | | 1.6 | | 0.6 | | 1.0 | | 1.8 | |
| <i>eV US Small Cap Value Equity Net Median</i> | | | <i>-2.0</i> | | <i>22.0</i> | | <i>58.0</i> | | <i>8.6</i> | | <i>10.9</i> | | <i>13.2</i> | | <i>11.1</i> | <i>May-03</i> |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|---|----------------------|----------------|-------------|-----------|------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|------------|-----------|---------------|----------------|
| International Equity Composite | 1,010,599,194 | 26.8 | -3.6 | 81 | 3.9 | 94 | 21.5 | 89 | 11.1 | 10 | 11.2 | 12 | 9.4 | 13 | -- | Apr-94 |
| International Equity Index | | | -4.3 | 92 | 4.3 | 87 | 22.9 | 76 | 8.7 | 53 | 9.3 | 45 | 8.0 | 64 | 5.9 | Apr-94 |
| Over/Under | | | 0.7 | | -0.4 | | -1.4 | | 2.4 | | 1.9 | | 1.4 | | | |
| InvMetrics Public DB ex-US Eq Net Median | | | -2.7 | | 6.2 | | 24.6 | | 8.8 | | 9.2 | | 8.4 | | 6.3 | Apr-94 |
| ACWI ex US Equity Composite | 918,039,141 | 24.3 | -3.0 | 75 | 4.3 | 79 | 21.3 | 68 | 11.5 | 50 | 11.5 | 46 | 9.7 | 63 | 7.8 | Sep-08 |
| MSCI ACWI ex USA Gross | | | -2.9 | 74 | 6.3 | 59 | 24.4 | 54 | 8.5 | 74 | 9.4 | 75 | 8.0 | 87 | 6.3 | Sep-08 |
| Over/Under | | | -0.1 | | -2.0 | | -3.1 | | 3.0 | | 2.1 | | 1.7 | | 1.5 | |
| eV ACWI ex-US All Cap Equity Net Median | | | -1.8 | | 7.1 | | 24.6 | | 11.5 | | 11.3 | | 10.3 | | 8.1 | Sep-08 |
| Baillie Gifford | 290,710,082 | 7.7 | -5.0 | 95 | 0.5 | 95 | 15.8 | 94 | 13.6 | 26 | 13.2 | 26 | 11.3 | 28 | 9.2 | Oct-08 |
| MSCI ACWI ex USA Gross | | | -2.9 | 77 | 6.3 | 69 | 24.4 | 61 | 8.5 | 64 | 9.4 | 66 | 8.0 | 78 | 6.3 | Oct-08 |
| Over/Under | | | -2.1 | | -5.8 | | -8.6 | | 5.1 | | 3.8 | | 3.3 | | 2.9 | |
| MSCI ACWI ex USA | | | -3.0 | 78 | 5.9 | 71 | 23.9 | 64 | 8.0 | 70 | 8.9 | 72 | 7.5 | 84 | 5.8 | Oct-08 |
| eV All ACWI ex-US Equity Net Median | | | -1.6 | | 8.1 | | 26.2 | | 10.7 | | 11.1 | | 9.8 | | 7.6 | Oct-08 |
| Baillie Gifford Smaller Cos. | 80,578,487 | 2.1 | 0.7 | 42 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 0.7 | Jul-21 |
| MSCI World ex USA Small Cap Gross USD | | | 0.8 | 41 | 11.0 | 58 | 30.6 | 53 | 9.9 | 60 | 10.8 | 66 | 10.4 | 76 | 0.8 | Jul-21 |
| Over/Under | | | -0.1 | | | | | | | | | | | | -0.1 | |
| eV ACWI ex-US Small Cap Equity Net Median | | | 0.2 | | 12.1 | | 30.8 | | 11.7 | | 12.5 | | 12.2 | | 0.2 | Jul-21 |
| BlackRock ACWI ex US | 258,085,862 | 6.8 | -2.6 | 72 | 6.5 | 67 | 24.7 | 59 | 8.4 | 64 | 9.3 | 69 | 7.8 | 81 | 5.1 | Mar-11 |
| MSCI ACWI ex USA Gross | | | -2.9 | 77 | 6.3 | 69 | 24.4 | 61 | 8.5 | 64 | 9.4 | 66 | 8.0 | 78 | 5.3 | Mar-11 |
| Over/Under | | | 0.3 | | 0.2 | | 0.3 | | -0.1 | | -0.1 | | -0.2 | | -0.2 | |
| MSCI ACWI ex USA | | | -3.0 | 78 | 5.9 | 71 | 23.9 | 64 | 8.0 | 70 | 8.9 | 72 | 7.5 | 84 | 4.9 | Mar-11 |
| eV All ACWI ex-US Equity Net Median | | | -1.6 | | 8.1 | | 26.2 | | 10.7 | | 11.1 | | 9.8 | | 7.0 | Mar-11 |
| Principal Global | 288,664,710 | 7.6 | -2.4 | 68 | 5.6 | 74 | 24.0 | 64 | 9.1 | 60 | 9.8 | 62 | 9.5 | 56 | 6.8 | Sep-08 |
| MSCI ACWI ex USA Gross | | | -2.9 | 77 | 6.3 | 69 | 24.4 | 61 | 8.5 | 64 | 9.4 | 66 | 8.0 | 78 | 5.0 | Sep-08 |
| Over/Under | | | 0.5 | | -0.7 | | -0.4 | | 0.6 | | 0.4 | | 1.5 | | 1.8 | |
| MSCI EAFE | | | -0.4 | 33 | 8.3 | 47 | 25.7 | 53 | 7.6 | 73 | 8.8 | 74 | 8.1 | 76 | 4.6 | Sep-08 |
| eV All ACWI ex-US Equity Net Median | | | -1.6 | | 8.1 | | 26.2 | | 10.7 | | 11.1 | | 9.8 | | 6.3 | Sep-08 |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|--|-------------------|----------------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|-------------|-----------|------------|-----------|---------------|----------------|
| International Emerging Markets Equity Composite | 92,560,051 | 2.5 | -6.9 | 63 | 1.8 | 56 | 22.6 | 56 | 11.5 | 26 | 11.1 | 21 | 7.0 | 23 | 8.8 | Apr-99 |
| <i>MSCI Emerging Markets Gross</i> | | | <u>-8.0</u> | 77 | <u>-1.0</u> | 84 | <u>18.6</u> | 81 | <u>9.0</u> | 50 | <u>9.6</u> | 37 | <u>6.5</u> | 35 | <u>8.9</u> | <i>Apr-99</i> |
| Over/Under | | | 1.1 | | 2.8 | | 4.0 | | 2.5 | | 1.5 | | 0.5 | | -0.1 | |
| <i>InvMetrics Public DB Emg Mkt Eq Net Median</i> | | | -6.6 | | 2.4 | | 23.5 | | 8.9 | | 8.7 | | 5.3 | | -- | <i>Apr-99</i> |
| Acadian Emerging Market | 51,620,977 | 1.4 | -5.8 | 37 | 6.5 | 30 | 28.6 | 29 | 10.2 | 44 | 10.8 | 34 | -- | -- | 6.5 | Aug-14 |
| <i>MSCI Emerging Markets Gross</i> | | | <u>-8.0</u> | 64 | <u>-1.0</u> | 64 | <u>18.6</u> | 64 | <u>9.0</u> | 59 | <u>9.6</u> | 48 | <u>6.5</u> | 57 | <u>5.1</u> | <i>Aug-14</i> |
| Over/Under | | | 2.2 | | 7.5 | | 10.0 | | 1.2 | | 1.2 | | 1.4 | | 1.4 | |
| <i>MSCI Emerging Markets</i> | | | -8.1 | 65 | -1.2 | 66 | 18.2 | 67 | 8.6 | 63 | 9.2 | 54 | 6.1 | 70 | 4.7 | <i>Aug-14</i> |
| <i>eV Emg Mkts Equity Net Median</i> | | | -6.8 | | 1.4 | | 21.4 | | 9.7 | | 9.5 | | 6.7 | | 5.4 | <i>Aug-14</i> |
| Axiom Intl Investors | 40,939,075 | 1.1 | -7.9 | 64 | -2.8 | 74 | 16.8 | 72 | 12.7 | 30 | 11.4 | 27 | -- | -- | 7.2 | Aug-14 |
| <i>MSCI Emerging Markets Gross</i> | | | <u>-8.0</u> | 64 | <u>-1.0</u> | 64 | <u>18.6</u> | 64 | <u>9.0</u> | 59 | <u>9.6</u> | 48 | <u>6.5</u> | 57 | <u>5.1</u> | <i>Aug-14</i> |
| Over/Under | | | 0.1 | | -1.8 | | -1.8 | | 3.7 | | 1.8 | | 2.1 | | 2.1 | |
| <i>MSCI Emerging Markets</i> | | | -8.1 | 65 | -1.2 | 66 | 18.2 | 67 | 8.6 | 63 | 9.2 | 54 | 6.1 | 70 | 4.7 | <i>Aug-14</i> |
| <i>eV Emg Mkts Equity Net Median</i> | | | -6.8 | | 1.4 | | 21.4 | | 9.7 | | 9.5 | | 6.7 | | 5.4 | <i>Aug-14</i> |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|---|--------------------|----------------|-------------|-----------|-------------|-----------|-------------|-----------|------------|-----------|-------------|-----------|-------------|-----------|---------------|----------------|
| Total Fixed Income Composite | 641,758,103 | 17.0 | 0.0 | 72 | 0.6 | 20 | 4.6 | 20 | 6.5 | 13 | 5.0 | 8 | 4.9 | 15 | -- | Nov-95 |
| Fixed Income Index | | | <u>0.3</u> | 13 | <u>0.6</u> | 23 | <u>3.3</u> | 28 | <u>6.0</u> | 28 | <u>4.4</u> | 26 | <u>4.4</u> | 30 | <u>5.4</u> | Nov-95 |
| Over/Under | | | -0.3 | | 0.0 | | 1.3 | | 0.5 | | 0.6 | | 0.5 | | | |
| Bloomberg US Aggregate TR | | | <u>0.1</u> | 58 | <u>-1.6</u> | 92 | <u>-0.9</u> | 95 | <u>5.4</u> | 59 | <u>2.9</u> | 70 | <u>3.0</u> | 80 | <u>5.0</u> | Nov-95 |
| InvMetrics Public DB Total Fix Inc Net Median | | | <u>0.1</u> | | <u>-0.6</u> | | <u>1.6</u> | | <u>5.5</u> | | <u>3.6</u> | | <u>4.1</u> | | <u>5.2</u> | Nov-95 |
| Core Fixed Composite | 486,278,491 | 12.9 | 0.0 | 66 | -0.9 | 56 | 1.2 | 33 | 5.9 | 24 | 4.0 | 16 | 3.9 | 27 | -- | Apr-94 |
| Bloomberg US Aggregate TR | | | <u>0.1</u> | 56 | <u>-1.6</u> | 91 | <u>-0.9</u> | 90 | <u>5.4</u> | 43 | <u>2.9</u> | 55 | <u>3.0</u> | 56 | <u>5.3</u> | Apr-94 |
| Over/Under | | | -0.1 | | 0.7 | | 2.1 | | 0.5 | | 1.1 | | 0.9 | | | |
| InvMetrics Public DB US Fix Inc Net Median | | | <u>0.1</u> | | <u>-0.9</u> | | <u>-0.1</u> | | <u>5.1</u> | | <u>3.0</u> | | <u>3.3</u> | | <u>5.5</u> | Apr-94 |
| Dodge & Cox | 240,756,486 | 6.4 | 0.0 | 47 | -0.4 | 9 | 2.4 | 3 | 6.7 | 3 | 4.4 | 3 | 4.6 | 3 | 5.0 | Jan-03 |
| Bloomberg US Aggregate TR | | | <u>0.1</u> | 38 | <u>-1.6</u> | 65 | <u>-0.9</u> | 70 | <u>5.4</u> | 76 | <u>2.9</u> | 78 | <u>3.0</u> | 82 | <u>4.1</u> | Jan-03 |
| Over/Under | | | -0.1 | | 1.2 | | 3.3 | | 1.3 | | 1.5 | | 1.6 | | 0.9 | |
| eV US Core Fixed Inc Net Median | | | <u>0.0</u> | | <u>-1.3</u> | | <u>-0.4</u> | | <u>5.6</u> | | <u>3.2</u> | | <u>3.4</u> | | <u>4.3</u> | Jan-03 |
| PGIM | 245,522,005 | 6.5 | 0.0 | 58 | -1.5 | 57 | 0.0 | 41 | 5.6 | 50 | 3.1 | 59 | 3.2 | 68 | 4.3 | Apr-03 |
| Bloomberg US Aggregate TR | | | <u>0.1</u> | 38 | <u>-1.6</u> | 65 | <u>-0.9</u> | 70 | <u>5.4</u> | 76 | <u>2.9</u> | 78 | <u>3.0</u> | 82 | <u>4.1</u> | Apr-03 |
| Over/Under | | | -0.1 | | 0.1 | | 0.9 | | 0.2 | | 0.2 | | 0.2 | | 0.2 | |
| eV US Core Fixed Inc Net Median | | | <u>0.0</u> | | <u>-1.3</u> | | <u>-0.4</u> | | <u>5.6</u> | | <u>3.2</u> | | <u>3.4</u> | | <u>4.3</u> | Apr-03 |
| High Yield Composite | 155,479,612 | 4.1 | 0.2 | 25 | 3.7 | 2 | 11.4 | 1 | 7.0 | 4 | 6.2 | 1 | 7.1 | 1 | 7.4 | Aug-04 |
| Bloomberg US High Yield TR | | | <u>0.9</u> | 2 | <u>4.5</u> | 1 | <u>11.3</u> | 1 | <u>6.9</u> | 5 | <u>6.5</u> | 1 | <u>7.4</u> | 1 | <u>7.4</u> | Aug-04 |
| Over/Under | | | -0.7 | | -0.8 | | 0.1 | | 0.1 | | -0.3 | | -0.3 | | 0.0 | |
| InvMetrics Public DB US Fix Inc Net Median | | | <u>0.1</u> | | <u>-0.9</u> | | <u>-0.1</u> | | <u>5.1</u> | | <u>3.0</u> | | <u>3.3</u> | | <u>4.0</u> | Aug-04 |
| Loomis Sayles | 155,479,612 | 4.1 | 0.2 | 94 | 3.7 | 69 | 11.4 | 33 | 7.0 | 29 | 6.2 | 40 | 7.4 | 22 | 7.6 | Aug-04 |
| Bloomberg US High Yield TR | | | <u>0.9</u> | 30 | <u>4.5</u> | 42 | <u>11.3</u> | 34 | <u>6.9</u> | 30 | <u>6.5</u> | 29 | <u>7.4</u> | 19 | <u>7.4</u> | Aug-04 |
| Over/Under | | | -0.7 | | -0.8 | | 0.1 | | 0.1 | | -0.3 | | 0.0 | | 0.2 | |
| eV US High Yield Fixed Inc Net Median | | | <u>0.8</u> | | <u>4.2</u> | | <u>10.4</u> | | <u>6.4</u> | | <u>6.0</u> | | <u>6.8</u> | | <u>6.8</u> | Aug-04 |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|-----------------------------|--------------------|----------------|------------|------|-------------|------|-------------|------|------------|------|------------|------|------------|------|---------------|----------------|
| Alternatives | 650,301,499 | 17.2 | 2.2 | -- | 20.6 | -- | 31.0 | -- | 7.3 | -- | -- | -- | -- | -- | 7.9 | Apr-18 |
| <i>Alternatives Index</i> | | | <u>1.9</u> | -- | <u>17.6</u> | -- | <u>27.1</u> | -- | <u>9.2</u> | -- | -- | -- | -- | -- | <u>10.5</u> | <i>Apr-18</i> |
| Over/Under | | | 0.3 | | 3.0 | | 3.9 | | -1.9 | | | | | | -2.6 | |
| Private Credit | 211,356,608 | 5.6 | 2.9 | -- | 12.9 | -- | 18.1 | -- | 9.2 | -- | 9.4 | -- | -- | -- | 8.5 | Aug-15 |
| <i>Private Credit Index</i> | | | <u>0.7</u> | -- | <u>2.2</u> | -- | <u>6.1</u> | -- | <u>7.3</u> | -- | <u>7.3</u> | -- | -- | -- | <u>7.4</u> | <i>Aug-15</i> |
| Over/Under | | | 2.2 | | 10.7 | | 12.0 | | 1.9 | | 2.1 | | | | 1.1 | |
| Crescent Capital | 51,384,043 | 1.4 | 1.2 | -- | 7.8 | -- | 11.5 | -- | 7.8 | -- | 7.9 | -- | -- | -- | 7.1 | Sep-15 |
| <i>Private Credit Index</i> | | | <u>0.7</u> | -- | <u>2.2</u> | -- | <u>6.1</u> | -- | <u>7.3</u> | -- | <u>7.3</u> | -- | -- | -- | <u>7.4</u> | <i>Sep-15</i> |
| Over/Under | | | 0.5 | | 5.6 | | 5.4 | | 0.5 | | 0.6 | | | | -0.3 | |
| Arcmont Euro Private Debt | 36,034,241 | 1.0 | 1.3 | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | -- | 5.8 | Apr-21 |
| <i>Private Credit Index</i> | | | <u>0.7</u> | -- | <u>2.2</u> | -- | <u>6.1</u> | -- | <u>7.3</u> | -- | <u>7.3</u> | -- | -- | -- | <u>3.3</u> | <i>Apr-21</i> |
| Over/Under | | | 0.6 | | | | | | | | | | | | 2.5 | |
| Monroe Capital | 77,868,135 | 2.1 | 4.4 | -- | 12.1 | -- | 16.8 | -- | 9.4 | -- | 9.8 | -- | -- | -- | 10.3 | Apr-16 |
| <i>Private Credit Index</i> | | | <u>0.7</u> | -- | <u>2.2</u> | -- | <u>6.1</u> | -- | <u>7.3</u> | -- | <u>7.3</u> | -- | -- | -- | <u>7.4</u> | <i>Apr-16</i> |
| Over/Under | | | 3.7 | | 9.9 | | 10.7 | | 2.1 | | 2.5 | | | | 2.9 | |
| PIMCO COF | 46,070,190 | 1.2 | 2.7 | -- | 25.4 | -- | 35.4 | -- | 12.1 | -- | -- | -- | -- | -- | -- | Aug-16 |
| <i>Private Credit Index</i> | | | <u>0.7</u> | -- | <u>2.2</u> | -- | <u>6.1</u> | -- | <u>7.3</u> | -- | <u>7.3</u> | -- | -- | -- | <u>7.4</u> | <i>Aug-16</i> |
| Over/Under | | | 2.0 | | 23.2 | | 29.3 | | 4.8 | | | | | | | |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|--------------------------------|--------------------|----------------|-------------|------|-------------|------|-------------|------|-------------|------|------------|------|------------|------|---------------|----------------|
| Infrastructure | 132,836,176 | 3.5 | 0.6 | -- | 3.9 | -- | 6.6 | -- | 4.8 | -- | -- | -- | -- | -- | 4.8 | Oct-18 |
| CPI + 4% (Unadjusted) | | | <u>2.0</u> | -- | <u>8.4</u> | -- | <u>9.6</u> | -- | <u>6.9</u> | -- | <u>6.7</u> | -- | <u>6.0</u> | -- | <u>6.9</u> | Oct-18 |
| Over/Under | | | -1.4 | | -4.5 | | -3.0 | | -2.1 | | | | | | -2.1 | |
| JP Morgan IIF | 71,169,871 | 1.9 | 0.0 | -- | 4.8 | -- | 8.9 | -- | 5.9 | -- | -- | -- | -- | -- | 5.9 | Oct-18 |
| CPI + 4% (Unadjusted) | | | <u>2.0</u> | -- | <u>8.4</u> | -- | <u>9.6</u> | -- | <u>6.9</u> | -- | <u>6.7</u> | -- | <u>6.0</u> | -- | <u>6.9</u> | Oct-18 |
| Over/Under | | | -2.0 | | -3.6 | | -0.7 | | -1.0 | | | | | | -1.0 | |
| Ullico UIF | 61,666,305 | 1.6 | 1.2 | -- | 2.9 | -- | 4.1 | -- | -- | -- | -- | -- | -- | -- | 3.9 | Dec-18 |
| CPI + 4% (Unadjusted) | | | <u>2.0</u> | -- | <u>8.4</u> | -- | <u>9.6</u> | -- | <u>6.9</u> | -- | <u>6.7</u> | -- | <u>6.0</u> | -- | <u>7.1</u> | Dec-18 |
| Over/Under | | | -0.8 | | -5.5 | | -5.5 | | | | | | | | -3.2 | |
| Midstream Energy | 190,699,474 | 5.0 | -0.5 | -- | 38.5 | -- | 69.5 | -- | -- | -- | -- | -- | -- | -- | -0.4 | Jul-19 |
| Alerian Midstream Energy Index | | | <u>-1.9</u> | -- | <u>38.0</u> | -- | <u>65.8</u> | -- | <u>3.7</u> | -- | <u>2.2</u> | -- | -- | -- | <u>2.6</u> | Jul-19 |
| Over/Under | | | 1.4 | | 0.5 | | 3.7 | | | | | | | | -3.0 | |
| Harvest | 118,491,399 | 3.1 | -0.4 | -- | 39.3 | -- | 70.9 | -- | -- | -- | -- | -- | -- | -- | -0.1 | Jul-19 |
| Alerian Midstream Energy Index | | | <u>-1.9</u> | -- | <u>38.0</u> | -- | <u>65.8</u> | -- | <u>3.7</u> | -- | <u>2.2</u> | -- | -- | -- | <u>2.6</u> | Jul-19 |
| Over/Under | | | 1.5 | | 1.3 | | 5.1 | | | | | | | | -2.7 | |
| Tortoise | 72,208,075 | 1.9 | -0.7 | -- | 37.2 | -- | 67.2 | -- | -- | -- | -- | -- | -- | -- | -0.7 | Aug-19 |
| Alerian Midstream Energy Index | | | <u>-1.9</u> | -- | <u>38.0</u> | -- | <u>65.8</u> | -- | <u>3.7</u> | -- | <u>2.2</u> | -- | -- | -- | <u>3.5</u> | Aug-19 |
| Over/Under | | | 1.2 | | -0.8 | | 1.4 | | | | | | | | -4.2 | |
| Private Equity | 115,409,240 | 3.1 | | | | | | | | | | | | | | |
| Pantheon PE Fund of 1 | 115,409,240 | 3.1 | 8.4 | -- | 35.2 | -- | 46.6 | -- | -- | -- | -- | -- | -- | -- | 19.1 | Apr-19 |
| Private Equity Index | | | <u>7.6</u> | -- | <u>31.8</u> | -- | <u>43.0</u> | -- | <u>16.2</u> | -- | -- | -- | -- | -- | <u>19.2</u> | Apr-19 |
| Over/Under | | | 0.8 | | 3.4 | | 3.6 | | | | | | | | -0.1 | |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|--|--------------------|----------------|------------|-----------|-------------|-----------|-------------|-----------|------------|-----------|-------------|-----------|-------------|-----------|---------------|----------------|
| Real Estate Composite | 437,438,948 | 11.6 | 5.9 | 24 | 11.7 | 44 | 14.4 | 39 | 6.7 | 36 | 6.4 | 72 | 10.0 | 38 | 9.0 | Jan-96 |
| Real Estate Index | | | 6.5 | 10 | 12.6 | 38 | 14.0 | 41 | 6.9 | 29 | 6.2 | 79 | 10.1 | 34 | 9.4 | Jan-96 |
| Over/Under | | | -0.6 | | -0.9 | | 0.4 | | -0.2 | | 0.2 | | -0.1 | | -0.4 | |
| InvMetrics Public DB Real Estate Pub+Priv Net Median | | | 4.9 | | 11.4 | | 13.2 | | 6.3 | | 7.2 | | 9.7 | | 8.7 | Jan-96 |
| Private Real Estate Composite | 132,812,654 | 3.5 | 4.2 | -- | 13.7 | -- | 18.5 | -- | 7.7 | -- | 12.5 | -- | 12.0 | -- | 9.9 | Jan-96 |
| NCREIF ODCE | | | 6.6 | -- | 13.1 | -- | 14.6 | -- | 7.1 | -- | 7.5 | -- | 9.9 | -- | 9.1 | Jan-96 |
| Over/Under | | | -2.4 | | 0.6 | | 3.9 | | 0.6 | | 5.0 | | 2.1 | | 0.8 | |
| Oaktree Value Add | 9,827,876 | 0.3 | 7.0 | -- | 8.4 | -- | 5.7 | -- | 9.9 | -- | -- | -- | -- | -- | 15.3 | Dec-16 |
| NCREIF ODCE + 1% | | | 6.7 | -- | 13.3 | -- | 14.8 | -- | 7.2 | -- | 7.6 | -- | 10.0 | -- | 7.9 | Dec-16 |
| Over/Under | | | 0.3 | | -4.9 | | -9.1 | | 2.7 | | | | | | 7.4 | |
| PCCP Value Add | 23,079,556 | 0.6 | 6.2 | -- | 16.4 | -- | 28.0 | -- | 11.4 | -- | 16.4 | -- | -- | -- | 16.4 | Oct-16 |
| NCREIF ODCE + 1% | | | 6.7 | -- | 13.3 | -- | 14.8 | -- | 7.2 | -- | 7.6 | -- | 10.0 | -- | 7.6 | Oct-16 |
| Over/Under | | | -0.5 | | 3.1 | | 13.2 | | 4.2 | | 8.8 | | | | 8.8 | |
| PIMCO Bravo III | 46,348,953 | 1.2 | 2.7 | -- | 10.6 | -- | 15.4 | -- | 6.0 | -- | -- | -- | -- | -- | 8.3 | Nov-16 |
| NCREIF ODCE + 1% | | | 6.7 | -- | 13.3 | -- | 14.8 | -- | 7.2 | -- | 7.6 | -- | 10.0 | -- | 7.7 | Nov-16 |
| Over/Under | | | -4.0 | | -2.7 | | 0.6 | | -1.2 | | | | | | 0.6 | |
| Artemis AREPF III | 10,252,526 | 0.3 | 14.4 | -- | 22.8 | -- | 43.0 | -- | -- | -- | -- | -- | -- | -- | 6.6 | Jan-19 |
| NCREIF ODCE + 1% | | | 6.7 | -- | 13.3 | -- | 14.8 | -- | 7.2 | -- | 7.6 | -- | 10.0 | -- | 7.2 | Jan-19 |
| Over/Under | | | 7.7 | | 9.5 | | 28.2 | | | | | | | | -0.6 | |
| Brookfield SREP III | 35,910,082 | 1.0 | 1.5 | -- | 14.6 | -- | 16.5 | -- | -- | -- | -- | -- | -- | -- | 3.2 | Apr-19 |
| NCREIF ODCE + 1% | | | 6.7 | -- | 13.3 | -- | 14.8 | -- | 7.2 | -- | 7.6 | -- | 10.0 | -- | 7.5 | Apr-19 |
| Over/Under | | | -5.2 | | 1.3 | | 1.7 | | | | | | | | -4.3 | |
| Blue Vista BVREP V | 7,393,661 | 0.2 | 6.2 | -- | 22.7 | -- | 25.7 | -- | -- | -- | -- | -- | -- | -- | -1.2 | Mar-20 |
| NCREIF ODCE + 1% | | | 6.7 | -- | 13.3 | -- | 14.8 | -- | 7.2 | -- | 7.6 | -- | 10.0 | -- | 9.0 | Mar-20 |
| Over/Under | | | -0.5 | | 9.4 | | 10.9 | | | | | | | | -10.2 | |



City of Fresno Retirement Systems

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

| | Market Value (\$) | % of Portfolio | 3 Mo (%) | Rank | YTD (%) | Rank | 1 Yr (%) | Rank | 3 Yrs (%) | Rank | 5 Yrs (%) | Rank | 10 Yrs (%) | Rank | Inception (%) | Inception Date |
|---|--------------------|----------------|------------|------|-------------|------|-------------|------|------------|------|------------|------|------------|------|---------------|----------------|
| Core Real Estate | 304,626,294 | 8.1 | 6.6 | -- | 10.8 | -- | 12.4 | -- | 5.3 | -- | 5.9 | -- | 8.7 | -- | -- | Jan-96 |
| NCREIF ODCE Net | | | 6.4 | -- | 12.4 | -- | 13.7 | -- | 6.1 | -- | 6.6 | -- | 8.9 | -- | 8.0 | Jan-96 |
| Over/Under | | | 0.2 | | -1.6 | | -1.3 | | -0.8 | | -0.7 | | -0.2 | | | |
| CFRSR-Carlyle CPI Fund | 132,132,517 | 3.5 | 7.0 | -- | 10.3 | -- | 10.5 | -- | -- | -- | -- | -- | -- | -- | 8.3 | Jul-20 |
| NCREIF ODCE Net | | | 6.4 | -- | 12.4 | -- | 13.7 | -- | 6.1 | -- | 6.6 | -- | 8.9 | -- | 11.0 | Jul-20 |
| Over/Under | | | 0.6 | | -2.1 | | -3.2 | | | | | | | | -2.7 | |
| JP Morgan RE | 172,493,777 | 4.6 | 6.2 | -- | 10.9 | -- | 12.8 | -- | 5.4 | -- | 6.0 | -- | 8.8 | -- | 8.6 | Jan-96 |
| NCREIF ODCE Net | | | 6.4 | -- | 12.4 | -- | 13.7 | -- | 6.1 | -- | 6.6 | -- | 8.9 | -- | 8.0 | Jan-96 |
| Over/Under | | | -0.2 | | -1.5 | | -0.9 | | -0.7 | | -0.6 | | -0.1 | | 0.6 | |
| Cash & Equivalents Composite | 1,137,832 | 0.0 | 0.0 | -- | 0.4 | -- | 0.4 | -- | 1.2 | -- | 1.2 | -- | 0.7 | -- | 1.5 | Sep-03 |
| 91 Day T-Bills | | | 0.0 | -- | 0.0 | -- | 0.0 | -- | 1.0 | -- | 1.1 | -- | 0.6 | -- | 1.2 | Sep-03 |
| Over/Under | | | 0.0 | | 0.4 | | 0.4 | | 0.2 | | 0.1 | | 0.1 | | 0.3 | |
| Payroll Account | 466,463 | 0.0 | 0.0 | -- | 0.5 | -- | 0.6 | -- | 1.2 | -- | 1.3 | -- | 0.7 | -- | 1.9 | Apr-99 |
| 91 Day T-Bills | | | 0.0 | -- | 0.0 | -- | 0.0 | -- | 1.0 | -- | 1.1 | -- | 0.6 | -- | 1.6 | Apr-99 |
| Over/Under | | | 0.0 | | 0.5 | | 0.6 | | 0.2 | | 0.2 | | 0.1 | | 0.3 | |
| Operating Funds | 671,369 | 0.0 | 0.0 | -- | 0.0 | -- | 0.1 | -- | 1.1 | -- | 1.2 | -- | 0.7 | -- | 1.4 | Oct-03 |
| 91 Day T-Bills | | | 0.0 | -- | 0.0 | -- | 0.0 | -- | 1.0 | -- | 1.1 | -- | 0.6 | -- | 1.2 | Oct-03 |
| Over/Under | | | 0.0 | | 0.0 | | 0.1 | | 0.1 | | 0.1 | | 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

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | Sep | YTD |
|---------------------------------|--------|-------|--------|--------|--------|-------|-------|--------|-------|--------|-------|--------|
| S&P 500 | 2.1% | 16.0% | 32.4% | 13.7% | 1.4% | 12.0% | 21.8% | -4.4% | 31.5% | 18.4% | -4.7% | 15.9% |
| Russell 1000 | 1.5% | 16.4% | 33.1% | 13.2% | 0.9% | 12.1% | 21.7% | -4.8% | 31.4% | 21.0% | -4.6% | 15.2% |
| Russell 2000 | -4.2% | 16.3% | 38.8% | 4.9% | -4.4% | 21.3% | 14.6% | -11.0% | 25.5% | 20.0% | -2.9% | 12.4% |
| Russell 2500 | -2.5% | 17.9% | 36.8% | 7.1% | -2.9% | 17.6% | 16.8% | -10.0% | 27.8% | 20.0% | -3.1% | 13.8% |
| MSCI EAFE | -12.1% | 17.3% | 22.8% | -4.9% | -0.8% | 1.0% | 25.0% | -13.8% | 22.0% | 7.8% | -2.9% | 8.3% |
| MSCI EM | -18.4% | 18.2% | -2.6% | -2.2% | -14.9% | 11.2% | 37.3% | -14.6% | 18.4% | 18.3% | -4.0% | -1.2% |
| MSCI ACWI | -7.3% | 16.1% | 22.8% | 4.2% | -2.4% | 7.9% | 24.0% | -9.4% | 26.6% | 16.3% | -4.1% | 11.1% |
| Private Equity | 9.5% | 12.6% | 22.3% | 14.6% | 10.4% | 10.3% | 21.0% | 13.1% | 17.2% | 38.2% | - | 9.7% |
| BBG TIPS | 13.6% | 7.0% | -8.6% | 3.6% | -1.4% | 4.7% | 3.0% | -1.3% | 8.4% | 11.0% | -0.7% | 3.5% |
| BBG Municipal | 10.7% | 6.8% | -2.6% | 9.1% | 3.3% | 0.2% | 5.4% | 1.3% | 7.5% | 5.2% | -0.7% | 0.8% |
| BBG Muni High Yield | 9.2% | 18.1% | -5.5% | 13.8% | 1.8% | 3.0% | 9.7% | 4.8% | 10.7% | 4.9% | -0.7% | 6.5% |
| BBG US Corporate HY | 5.0% | 15.8% | 7.4% | 2.5% | -4.5% | 17.1% | 7.5% | -2.1% | 14.3% | 7.1% | 0.0% | 4.5% |
| BBG US Agg Bond | 7.8% | 4.2% | -2.0% | 6.0% | 0.5% | 2.6% | 3.5% | 0.0% | 8.7% | 7.5% | -0.9% | -1.6% |
| BBG Global Agg | 5.6% | 4.3% | -2.6% | 0.6% | -3.2% | 2.1% | 7.4% | -1.2% | 6.8% | 9.2% | -1.8% | -4.1% |
| BBG Long Treasuries | 29.9% | 3.6% | -12.7% | 25.1% | -1.2% | 1.3% | 8.5% | -1.8% | 14.8% | 17.7% | -2.9% | -7.5% |
| BBG US Long Credit | 17.1% | 12.7% | -6.6% | 16.4% | -4.6% | 10.2% | 12.2% | -6.8% | 23.4% | 13.3% | -2.0% | -2.7% |
| BBG US STRIPS 20+ Yr | 58.5% | 3.0% | -21.0% | 46.4% | -3.7% | 1.4% | 13.7% | -4.1% | 20.9% | 24.0% | -3.8% | -10.1% |
| JPM GBI-EM Global Div | -1.8% | 16.8% | -9.0% | -5.7% | -14.9% | 9.9% | 15.2% | -6.2% | 13.5% | 2.7% | -3.4% | -6.4% |
| JPM EMBI Glob Div | 7.3% | 17.4% | -5.3% | 7.4% | 1.2% | 10.2% | 10.3% | -4.3% | 15.0% | 5.3% | -2.1% | -1.4% |
| CS Hedge Fund | 0.5% | 5.9% | 10.0% | 5.4% | 0.2% | -0.6% | 7.2% | -1.1% | 6.3% | 4.1% | 0.9% | 11.3% |
| BBG Commodity | -13.3% | -1.1% | -9.5% | -17.0% | -24.7% | 11.8% | 1.7% | -11.2% | 7.7% | -3.1% | 5.0% | 29.1% |
| Alerian Midstream | - | - | - | 16.4% | -37.3% | 33.8% | -2.4% | -13.3% | 24.0% | -23.4% | 4.1% | 38.9% |
| FTSE NAREIT Equity REITs | 8.3% | 18.1% | 2.5% | 30.1% | 3.2% | 8.5% | 5.2% | -4.6% | 26.0% | -8.0% | -5.4% | 23.1% |

*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 | | | | | | |
|--------------|--------|-------|-------|-------|-------|-------|
| | Sep-21 | YTD | 1 YR | 3 YR | 5 YR | 10 YR |
| MSCI ACWI | -4.1% | 11.1% | 27.4% | 12.6% | 13.2% | 11.9% |
| S&P 500 | -4.7% | 15.9% | 30.0% | 16.0% | 16.9% | 16.6% |
| Russell 1000 | -4.6% | 15.2% | 31.0% | 16.4% | 17.1% | 16.8% |
| Russell 2000 | -2.9% | 12.4% | 47.7% | 10.5% | 13.5% | 14.6% |
| Russell 2500 | -3.1% | 13.8% | 45.0% | 12.5% | 14.3% | 15.3% |
| MSCI EAFE | -2.9% | 8.3% | 25.7% | 7.6% | 8.8% | 8.1% |
| MSCI EM | -4.0% | -1.2% | 18.2% | 8.6% | 9.2% | 6.1% |

| Credit | | | | | | |
|------------------------|--------|--------|--------|-------|------|-------|
| | Sep-21 | YTD | 1 YR | 3 YR | 5 YR | 10 YR |
| BBG Global Agg | -1.8% | -4.1% | -0.9% | 4.2% | 2.0% | 1.9% |
| BBG US Agg | -0.9% | -1.6% | -0.9% | 5.4% | 2.9% | 3.0% |
| BBG Credit | -1.1% | -1.3% | 1.4% | 7.1% | 4.4% | 4.6% |
| BBG US HY | 0.0% | 4.5% | 11.3% | 6.9% | 6.5% | 7.4% |
| BBG Muni | -0.7% | 0.8% | 2.6% | 5.1% | 3.3% | 3.9% |
| BBG Muni HY | -0.7% | 6.5% | 11.3% | 7.4% | 6.0% | 6.7% |
| BBG TIPS | -0.7% | 3.5% | 5.2% | 7.4% | 4.3% | 3.1% |
| BBG 20+ STRIPS | -3.8% | -10.1% | -13.5% | 12.1% | 4.1% | 5.7% |
| BBG Long Treasuries | -2.9% | -7.5% | -10.3% | 9.2% | 3.3% | 4.4% |
| BBG Long Credit | -2.0% | -2.7% | 2.1% | 10.2% | 6.1% | 6.6% |
| BBG Govt/Credit 1-3 Yr | -0.1% | 0.1% | 0.3% | 2.9% | 1.9% | 1.5% |
| JPM EMBI Glob Div | -2.1% | -1.4% | 4.4% | 5.7% | 3.9% | 5.8% |
| JPM GBI-EM Glob Div | -3.4% | -6.4% | 2.6% | 3.7% | 2.1% | 1.1% |

| Real Assets | | | | | | |
|--------------------------|--------|-------|-------|-------|------|-------|
| | Sep-21 | YTD | 1 YR | 3 YR | 5 YR | 10 YR |
| BBG Commodity | 5.0% | 29.1% | 42.3% | 6.9% | 4.5% | -2.7% |
| Alerian Midstream Index | 4.1% | 38.9% | 66.9% | 3.9% | 2.4% | - |
| FTSE NAREIT Equity REITs | -5.4% | 23.1% | 37.4% | 10.0% | 6.8% | 11.3% |



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



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

