



## **AGENDA**

### **RETIREMENT BOARD MEETING**

REGULAR MEETING  
May 24, 2023  
9:00 a.m.

Board Conference Room  
1200 Concord Avenue, Suite 350  
Concord, California

THE RETIREMENT BOARD MAY DISCUSS AND TAKE ACTION ON THE FOLLOWING:

1. Pledge of Allegiance.
2. Public Comment (3 minutes/speaker).
3. Approve minutes from the April 26, 2023 meeting. (Action Item)
4. Review of total portfolio performance for period ending March 31, 2023. (Presentation Item)
  - a. Presentation from Verus
  - b. Presentation from staff
5. Presentation from Verus on capital market assumptions and asset class targets. (Presentation Item)
6. Update on private equity and real estate allocations. (Presentation Item)
7. Pension administration system project update: (Presentation Item)
  - a. Update from staff
  - b. Presentation from Segal
  - c. Presentation from Sagitec
8. Report from Audit Committee Chair on the May 3, 2023 Audit Committee meeting.
9. Consider authorizing the attendance of Board: (Action Item)
  - a. SACRS Board of Directors and Committee meetings, June 19-20, 2023, Sacramento, CA & August 7-8, 2023, San Mateo, CA.
  - b. Catalyst: California's Diverse Investment Manager Forum, June 27-28, 2023,

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.

Burlingame, CA. (Note: Conflict with Board Meeting)

- c. SACRS/UC Berkeley Public Pension Investment Management Program, July 16-19, 2023, Berkeley, CA.
- d. NCPERS Public Pension Funding Forum, August 20-22, 2023, Chicago, IL.
- e. CALAPRS Principles of Pension Governance, August 28-31, 2023, Pepperdine University, Malibu, CA.

10. Miscellaneous

- a. Staff Report
- b. Outside Professionals' Report
- c. Trustees' comments

The Retirement Board will provide reasonable accommodations for persons with disabilities planning to attend Board meetings who contact the Retirement Office at least 24 hours before a meeting.



**RETIREMENT BOARD MEETING MINUTES**

REGULAR MEETING  
April 26, 2023  
9:00 a.m.

Board Conference Room  
1200 Concord Avenue, Suite 350  
Concord, California

Present: Candace Andersen, Dennis Chebotarev, Donald Finley, Scott Gordon, Jerry Holcombe, Louie Kroll, Jay Kwon, David MacDonald, John Phillips, Russell Watts, and Samson Wong

Absent: Mike Sloan

Staff: Gail Strohl, Chief Executive Officer; Christina Dunn, Deputy Chief Executive Officer; Timothy Price, Chief Investment Officer; Karen Levy, General Counsel; Wrally Dutkiewicz, Compliance Officer; and Jasmine Lee, Member Services Manager

Outside Professional Support:	Representing:
Dough Longo	Dimensional Fund Advisors
Ted Simpson	Dimensional Fund Advisors
Jesse Rivera	Segal Company
Aaron Mucha	Sagitec
Srinivas Kolluru	Sagitec

**1. Pledge of Allegiance**

The Board, staff and audience joined in the *Pledge of Allegiance*.

**2. Accept comments from the public**

No member of the public offered comment.

**3. Approval of minutes**

It was **M/S/C** to approve the minutes of the March 22, 2023, meeting. (Yes: Andersen, Chebotarev, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, and Watts).

**4. Consider and take possible action to retain Cordatus for consulting services associated with selecting and implementing a portfolio and risk analytics solution**

It was **M/S/C** to retain Cordatus for consulting services associated with selecting and implementing a portfolio and risk analytics solution. (Yes: Andersen, Chebotarev, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, and Watts).

**5. Review of report on liquidity sub-portfolio**

a. Presentation from staff

Price reviewed the annual liquidity sub-portfolio report.

Mitch Taylor reviewed the portfolio structure and assets, the role of Liquidity in the CCCERA portfolio and the manager structure.

b. Presentation from Dimensional Fund Advisors

Simpson gave a brief overview of the firm and Investment Philosophy.

Longo presented Dimensional's portfolio implementation, market environment and CCCERA's Separate Account review.

**6. Pension administration system project update**

a. Update from staff – Strohl gave an update on the project noting the go live date may be delayed.

b. Presentation from Segal – Rivera gave an update on the project and why the project may be delayed.

c. Presentation from Sagitec – Mucha and KC gave an update on the project timeline and its possible delay.

**7. Consider and take possible action to authorize the CCCERA delegate to vote on the SACRS 2021-2022 Annual Audit Report**

It was **M/S/C** to authorize the CCCERA delegate to vote on the SACRS 2021-2022 Annual Audit Report. (Yes: Andersen, Chebotarev, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, and Watts).

**8. Miscellaneous**

a. Staff Report – None

b. Outside Professionals' Report – None

c. Trustees' Comments – MacDonald thanked Gordon for taking the lead on the Sagitec discussion during Agenda Item #6.

It was **M/S/C** to adjourn the meeting. (Yes: Andersen, Chebotarev, Finley, Gordon, Holcombe, Kroll, MacDonald, Phillips, and Watts)

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Scott W. Gordon, Chairman

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Jerry R. Holcombe, Secretary

*Meeting Date*  
**05/24/2023**  
*Agenda Item*  
**#4a.**



**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**



**PERIOD ENDING: MARCH 31, 2023**

Investment Performance Review for

**Contra Costa County Employees' Retirement Association**

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[VERUSINVESTMENTS.COM](https://www.verusinvestments.com)

**SEATTLE** 206.622.3700

**CHICAGO** 312.815.5228

**PITTSBURGH** 412.784.6678

**LOS ANGELES** 310.297.1777

**SAN FRANCISCO** 415.362.3484

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Investment Landscape

TAB I

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Investment Performance  
Review

TAB II



**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**

2<sup>ND</sup> QUARTER 2023  
Investment Landscape



# Verus business update

## Since our last Investment Landscape webinar:

- Verus hired three employees:
  - **Philip Schmitt**, Director | Public Markets
  - **Christian Reed**, Private Markets Performance Analyst
  - **Jonathan Powell**, Performance Analyst
- Three employees recently passed various levels of the CFA exam. Verus currently has a total of 34 CFA charterholders
- Jonathan Henderson, Director | Operations received the 2022 Verus North Star Award for championing client success
- Verus launched a newly designed website in February, making it easier to find our thought leadership and markets updates
- At the end of March, Verus met with 40 emerging or diverse managers at its Emerging & Diverse Manager Diligence Days event
- Recent research, found at [verusinvestments.com/research](https://verusinvestments.com/research)
  - ***U.S. Equity Index Concentration (short video)***
  - ***2023 Active Management Environment***
  - ***Verus Viewpoints on SVB & Broad Market Stress***
  - ***2023: The Return of Simplicity***
  - ***The Importance of Emerging & Diverse Managers***

# Recent Verus research

Visit: [verusinvestments.com/research](https://verusinvestments.com/research)

## Sound thinking

### 2023: THE RETURN OF SIMPLICITY

Each January, we assess the suggestions that we made the previous year to see what we called correctly and where we got things wrong. We also suggest topics that we believe should be on the agenda for the balance of the coming year:

1. Inflation: Down, bumpily
2. A landing: But what kind?
3. Rates: Lower but slower
4. Zero makes heroes: Funded foolishness failing
5. More office pain: The slow recognition of reality
6. International markets of mystery: Or opportunity?
7. Active opportunities: Decision-making matters
8. Private pain: A drag for a while
9. ESG: Louder not quieter
10. Simple beats complex: With a twist

## Thought leadership

### SVB & BROAD MARKET STRESS

Given recent events around Silicon Valley Bank's failure, heightened market volatility, and broad uncertainty in the banking sector, Verus shared our perspectives, focusing on asset-owner impacts.

### U.S. EQUITY INDEX CONCENTRATION

Does the rising concentration of the U.S. equity market have implications for investors? In a short video, we examined the causes of index concentration, the levels of concentration relative to global markets, and how this environment affects the success of active managers. We answered the following questions:

- What causes index concentration?
- How concentrated has the U.S. equity market become? How does this index concentration compare to other equity markets?
- What are the implications of concentration for active managers?

## Annual research

### 2023 ACTIVE MANAGEMENT ENVIRONMENT

Changing market conditions in recent years continue to suggest a more attractive environment for active managers to demonstrate skill and add value for investors.

- Greater economic uncertainty around the world, aggressive central bank actions, and rising bond yields have created an environment of greater dispersion in active manager performance.
- Higher dispersion is apparent in the most recent 3-year dataset within the document, which also reflects a larger proportion of active managers outperforming the benchmark relative to prior periods.
- Our analysis continues to illustrate stark differences regarding the relationship between risk and return across asset class universes. In many asset classes, there has been a negative relationship between risk-taking relative to the benchmark and total return. These characteristics may provide helpful context to investors when discussing active management.

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# 1<sup>st</sup> quarter summary

## THE ECONOMIC CLIMATE

- Real GDP increased at a 2.7% rate in the fourth quarter (0.9% growth year-over-year). The U.S. economy was supported by mild but positive growth across most aspects of activity. **p. 9**
- Unemployment continued to suggest a strong labor market, unchanged at 3.5% in March. Widespread layoffs in the technology sector have captured headlines, though the sector makes up a rather small segment of overall jobs. The labor participation rate is showing positive signs as workers who had left the job market during the pandemic are once again seeking employment. **p. 12**

## PORTFOLIO IMPACTS

- The U.S. inflation picture continued to improve. March headline CPI came in at 5.0% year-over-year—the lowest since Q2 2021. Core inflation remained stubbornly high at 5.6% year-over-year. Many of the goods and services that initially contributed to high inflation, such as used cars, food, and energy, have moderated in price. **p. 10**
- U.S. real (inflation-adjusted) personal consumption expenditures were modest in February at 2.5% growth year-over-year. Household purchases of services continued to climb, while goods purchases remained flat. During the pandemic, an unprecedented surge in spending on goods occurred to the detriment of services. It appears that trend has now normalized. **p. 13**

## THE INVESTMENT CLIMATE

- U.S. yield curve inversion reached even more extreme levels during Q1. The 10-year 2-year yield spread (short-term interest rates being higher than long-term interest rates) reached ~107 bps on March 8<sup>th</sup>. Inversion has historically preceded recession. **p. 19**
- Silicon Valley Bank (SVB) failed and was transitioned to government ownership on March 10<sup>th</sup>. SVB is among the top 20 largest banks in the United States with approximately 1% of all U.S. domestic bank deposits. In the near-term, sentiment seems to have been shored up by backstops from the Federal Reserve, Treasury, and FDIC, though we are watching conditions closely. **p. 20 & 21**

## ASSET ALLOCATION ISSUES

- Global equities delivered another strong quarter in Q1 (MSCI ACWI +7.3%). A variety of risks are stacking up that could weigh on additional gains, including potential recession in many markets, persistent inflation problems, and tightening credit conditions. **p. 26**
- U.S. growth stocks delivered strong outperformance in the first quarter (Russell 1000 Growth +14.4% vs. Russell 1000 Value +1.0%), effectively reversing value's rally in Q4 2022. This divergence in style behavior appears to be, once again, mostly a result of relative sector returns. Information technology led the index +21.8% over the quarter, while energy (-4.7%) and financials (-5.6%) were laggards. **p. 28**

Markets performed well in Q1, further recovering from the losses of 2022

Recession risk, banking stress, and stubborn inflation may create difficulties going forward

# What drove the market in Q1?

## “U.S. Inflation Eases but Stays High, Putting Fed in a Tough Spot”

### HEADLINE CONSUMER PRICE INFLATION (YEAR-OVER-YEAR)

Oct	Nov	Dec	Jan	Feb	Mar
7.7%	7.1%	6.5%	6.4%	6.0%	5.0%

Article Source: AP, March 14<sup>th</sup>, 2023

## “U.S. Bank Failures Pose Risk to Global Growth”

### FDIC UNREALIZED GAINS (LOSSES) ON BANK'S INVESTMENT SECURITIES

Q3 21	Q4 21	Q1 22	Q2 22	Q3 22	Q4 22
\$29.4B	(\$7.9B)	(\$293.7B)	(\$469.7B)	(\$689.9B)	(\$620.4B)

Article Source: Wall Street Journal, March 26<sup>th</sup>, 2023

## “Federal Reserve’s Path is Murkier After Bank Blowup”

### FED FUNDS FUTURES PEAK IMPLIED RATE (MONTH END)

Oct	Nov	Dec	Jan	Feb	Mar
4.98%	4.92%	4.97%	4.92%	5.42%	4.95%

Article Source: The New York Times, March 13<sup>th</sup>, 2023

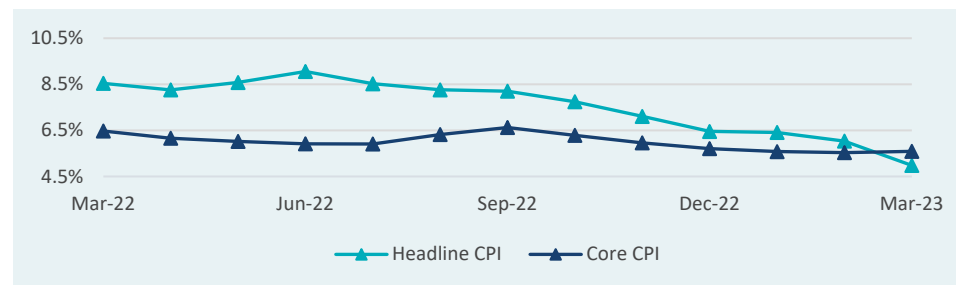
## “Fed Hikes Interest Rates 25 Basis Points in March 2023”

### FED FUNDS TARGET RATE – UPPER BOUND

Q4 21	Q1 22	Q2 22	Q3 22	Q4 22	Q1 23
0.25%	0.50%	1.75%	3.25%	4.50%	5.00%

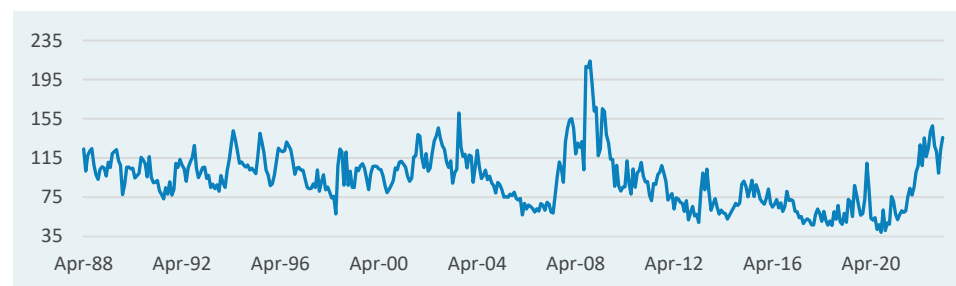
Article Source: Bloomberg, March 22<sup>nd</sup>, 2023

## U.S. HEADLINE VS. CORE INFLATION (YEAR-OVER-YEAR)



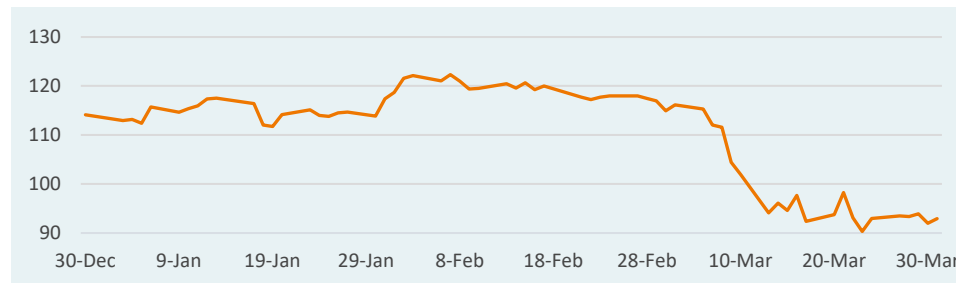
Source: BLS, as of 3/31/23

## U.S. TREASURIES IMPLIED VOLATILITY (ICE BOFA MOVE INDEX)



Source: Bloomberg, as of 3/31/23

## KBW REGIONAL BANKING INDEX



Source: Bloomberg, as of 3/31/23

# Economic environment

# U.S. economics summary

- Real GDP increased at a 2.7% rate in the fourth quarter (0.9% year-over-year). The U.S. economy in Q4 was supported by mild but positive growth across most aspects of activity. First quarter GDP is expected to come in at 2.2%, according to the Atlanta Fed GDPNow forecast, as of April 10<sup>th</sup>.
- The inflation picture improved further. March headline inflation came in at 5.0% year-over-year—the lowest since Q2 2021. Core inflation has remained stubbornly high at 5.6% year-over-year. Many of the goods and services prices that initially contributed to high inflation have moderated or fallen.
- U.S. real personal consumption expenditures were modest in February at 2.5% year-over-year. Household purchases of services continued to climb, while goods purchases were flat. Purchasing trends around goods and services appear to have normalized for the first time since the pandemic.
- Although hiring activity may be slowing and layoffs are occurring in places, the labor participation rate is rebounding as workers who had left the job market during the pandemic are once again seeking employment.
- Consumer sentiment remained weak in Q1. According to the University of Michigan, households increasingly expect a recession in the near-term, especially lower income and younger Americans. Inflation fears have reportedly subsided, with expectations for 3.6% inflation over the next year.
- The U.S. housing market has faced a harsh winter season, as high prices and a significant jump in mortgage interest rates severely crimped demand. Existing home sales are as weak as during the lows of 2009-2011 following the U.S. housing bubble.

	Most Recent	12 Months Prior
Real GDP (YoY)	0.9% 12/31/22	5.7% 12/31/21
Inflation (CPI YoY, Core)	5.6% 3/31/23	8.5% 3/31/22
Expected Inflation (5yr-5yr forward)	2.2% 3/31/23	2.4% 3/31/22
Fed Funds Target Range	4.75% – 5.00% 3/31/23	0.25% – 0.50% 3/31/22
10-Year Rate	3.47% 3/31/23	2.34% 3/31/22
U-3 Unemployment	3.5% 3/31/23	3.6% 3/31/22
U-6 Unemployment	6.7% 3/31/23	6.9% 3/31/22

# GDP growth

Real GDP increased at a 2.7% rate in the fourth quarter (0.9% growth year-over-year). The U.S. economy was supported by mild but positive growth across most aspects of activity. First quarter GDP is expected to come in at 2.2%, according to the Atlanta Fed GDPNow forecast, as of April 10<sup>th</sup>.

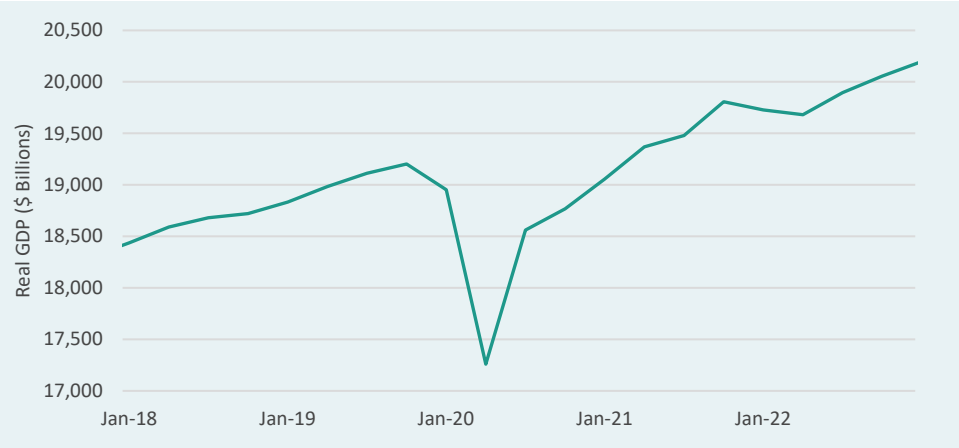
Consumer spending increased at a 2.1% annualized rate, boosted by spending on services but dragged lower by fewer goods purchases. Within services, healthcare and housing saw the largest gains. Private investment spending was fueled by manufacturing—primarily in traditional energy products, mining, utilities, and construction. With regard to government spending, increases were reportedly due to higher compensation of government employees

rather than on new projects or initiatives.

Investors remain undecided regarding whether the U.S. economy will enter recession in 2023. Economist forecasts suggest near-zero growth for most quarters this year, but with no recession. Either way, it is reasonable to assume very weak economic growth for the near-term. Furthermore, the failure of Silicon Valley Bank and ensuing stress on the financial sector has created new risks, as this stress will likely lead to a slowdown in traditional bank lending activity. If many banks reduce lending activity and increase lending standards, this may result in a material tightening of economic activity that compounds the existing effects of higher interest rates.

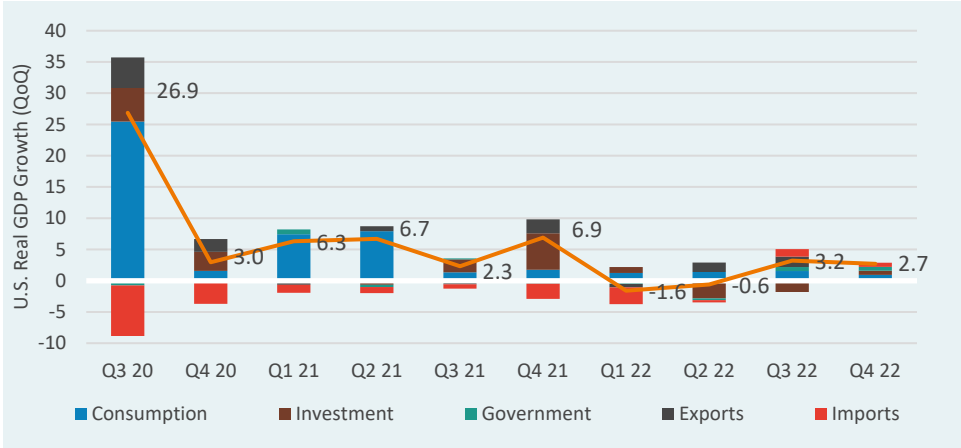
A tightening of bank lending raises the risks of an economic slowdown

U.S. REAL GROSS DOMESTIC PRODUCT



Source: FRED, as of 12/31/22

U.S. REAL GDP COMPONENTS (QOQ)



Source: FRED, as of 12/31/22



# Inflation

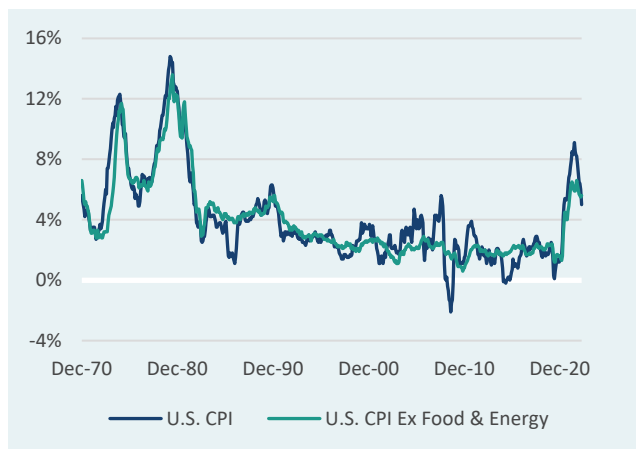
The inflation picture further improved in the United States, as both headline and core inflation figures declined further. March headline inflation came in at 5.0% year-over-year—the lowest since Q2 of 2021. Core inflation has remained stubbornly high at 5.6% year-over-year in March. Many of the goods and services that initially contributed to high inflation, such as used cars, food, and energy, have moderated or are falling in price. Shelter costs remain the largest single driver of inflation. Recent output cuts in oil production by OPEC+ members could reignite some inflation in energy and transportation costs—these effects will be important to watch in the coming months.

U.S. hourly wage gains continued to decelerate during the quarter—now at only a 4.2% year-over-year growth rate. The possibility of persistently high wage increases has been a risk to the inflation story, as accelerating wages can sustain higher spending and therefore higher ongoing inflation. Now that wage growth has slowed, this risk is subsiding.

Overall, inflation (CPI) is very likely to fall to around 4% in Q2, for the technical reasons illustrated below. However, certain persistent monthly price pressures suggest that inflation may stabilize at this level rather than at the 1-2% inflation experienced throughout much of the 2010s.

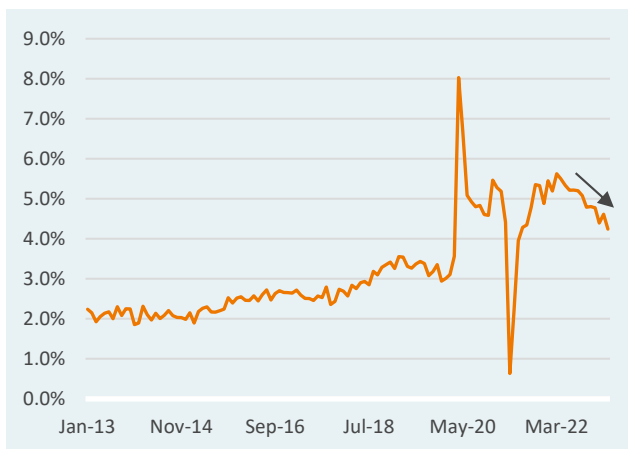
Persistent monthly Core CPI figures suggest inflation may stabilize at a level higher than the Fed's target

U.S. CPI (YOY)



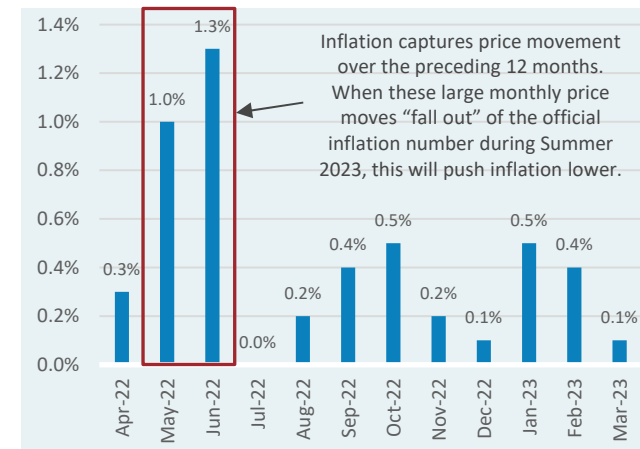
Source: BLS, as of 3/31/23

AVERAGE HOURLY EARNINGS



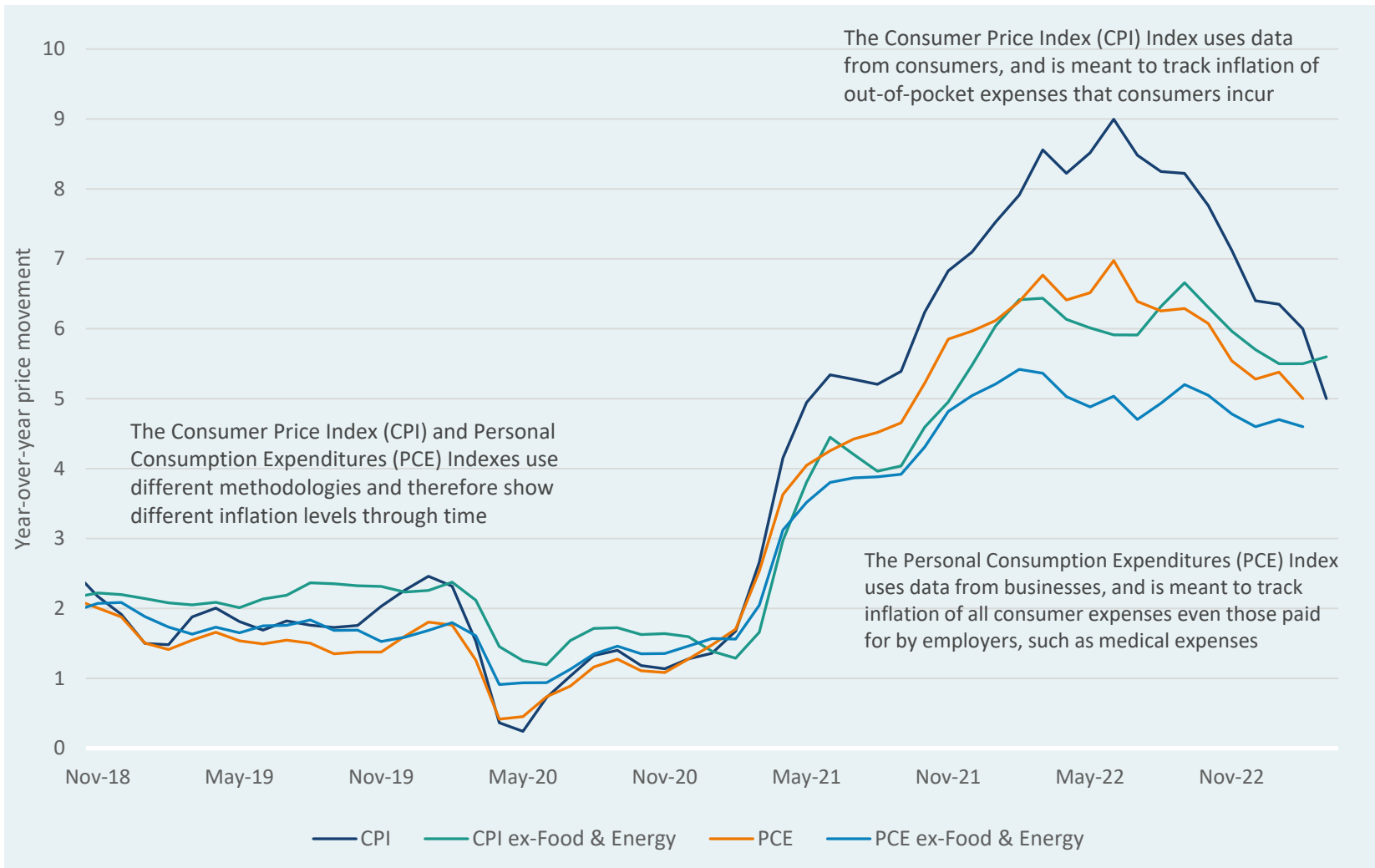
Source: BLS, as of 3/31/23

MONTHLY PRICE MOVEMENT



Source: BLS, as of 3/31/23

# How are inflation conditions evolving?



Official inflation figures continue to fall, though persistent monthly Core CPI figures suggest inflation may stabilize at a level higher than the Fed's target

Source: FRED, Verus, PCE data as of 2/28/23, CPI data as of 3/31/23

# Labor market

Unemployment continues to suggest a strong labor market, unchanged at 3.5% in March. Widespread layoffs in the technology sector have captured headlines in recent months, though it is important to remember that this sector makes up a rather small segment of overall jobs in the country, and the job market remains broadly strong by most measures.

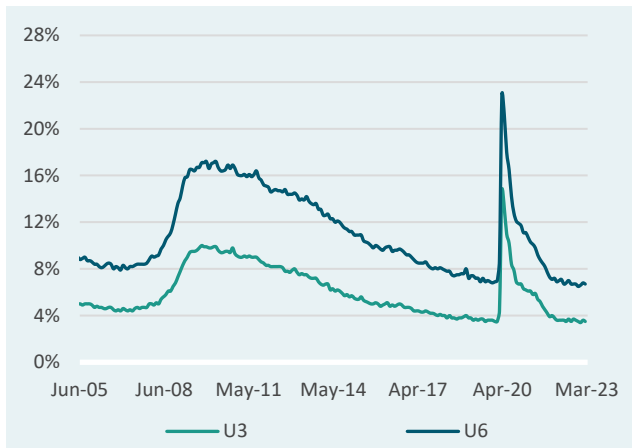
Although hiring activity may be slowing and layoffs are occurring in some places, the labor participation rate is now showing positive signs as workers who had left the job market during the pandemic are once again seeking

employment. Labor data suggests that this recovery has occurred mostly in the age 25 to 55-year cohort, and that older workers are not yet returning to the labor market.

A recovery in total workforce size is a good sign for future economic growth and may take some pressure off wages. This trend also helps relieve the historically large mismatch regarding the number of jobs available and the number of workers available to fill those jobs. An increase in total workforce size while the number of job postings are declining helps to rebalance the labor market.

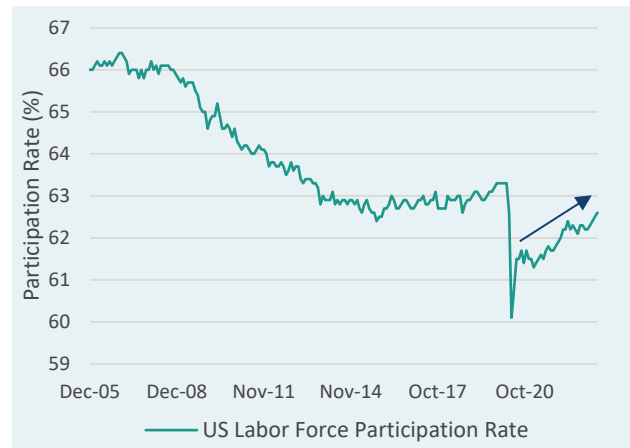
Workers that left the labor force during the pandemic are slowly returning to the job market

**U.S. UNEMPLOYMENT**



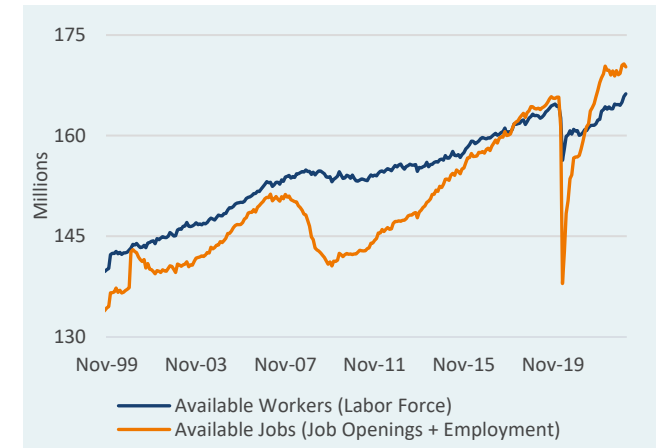
Source: FRED, as of 3/31/23

**LABOR FORCE PARTICIPATION RATE**



Source: FRED, as of 3/31/23

**WORKERS AVAILABLE VS. AVAILABLE JOBS**



Source: BLS, as of 2/28/23

# The consumer

U.S. real (inflation-adjusted) personal consumption expenditure growth has been modest, at 2.5% year-over-year in February. Household purchases of services continued to climb, while goods purchases remained flat. During the pandemic, an unprecedented surge in spending on goods occurred, to the detriment of services. It appears that trend has now normalized.

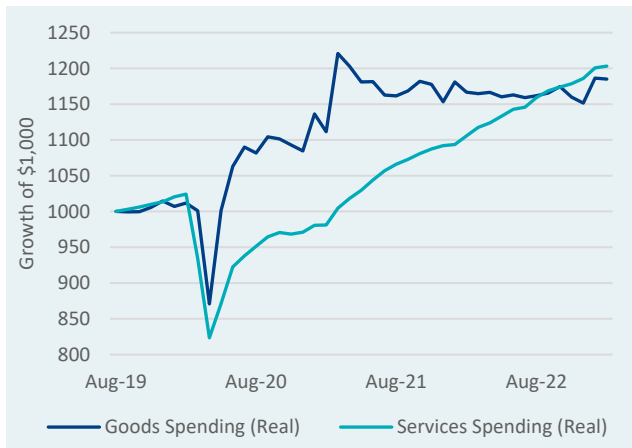
Personal savings rates have improved from extremely low levels. More household savings may be partly a reflection of consumer expectations for recession, as well as weaker job

prospects (these sentiments are discussed on the next slide).

Big ticket items such as automobiles and homes have seen slowing sales activity as higher interest rates make purchases less affordable and budgets come under strain. The average size of a car payment in America over time illustrates the significance of this effect, as monthly payments have outstripped the overall rate of inflation—by a significant margin in the case of used vehicles.

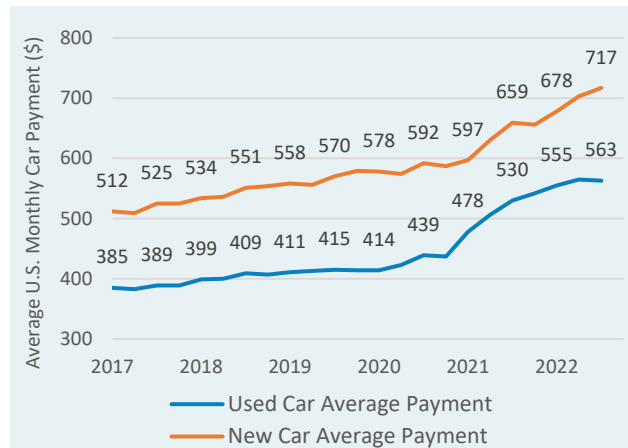
Much of the increase in consumer spending has been due to rising prices rather than more goods purchased

**SPENDING TRENDS: GOODS VS. SERVICES**



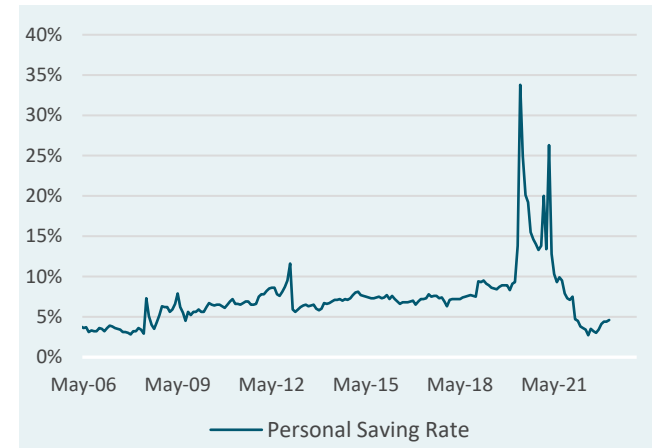
Source: FRED, as of 2/28/23

**AVERAGE SIZE OF CAR PAYMENT**



Source: Irina Ivanova, Edmunds, as of 9/30/22

**PERSONAL SAVINGS RATE**



Source: FRED, as of 2/28/23

# Sentiment

Consumer sentiment was unchanged in the first quarter by most measures but remains depressed. According to the University of Michigan, households increasingly fear a recession in the near-term, especially among lower income and younger Americans. Inflation concerns have subsided, with households expecting 3.6% inflation over the next full year—only moderately higher than the 2.3-3.0% assumed rate of pre-pandemic times.

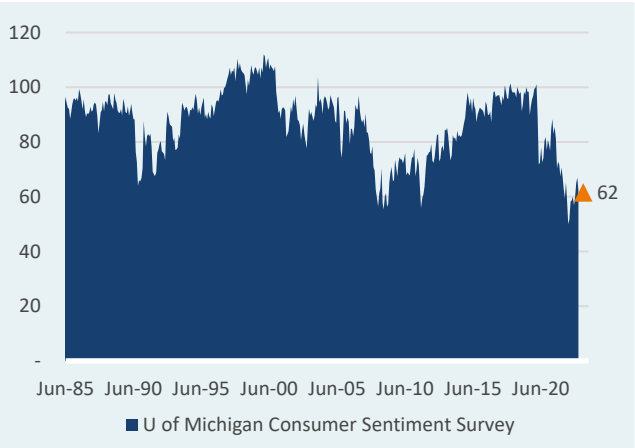
Consumer confidence measured by the Conference Board was also stable. According to the Conference Board survey,

available jobs are ‘not so plentiful’, discretionary spending plans have been cut back, but spending plans for items such as health care and home repairs increased.

The NFIB Small Business Optimism index remains very depressed, reflecting a poor business outlook. Fewer business owners reported inflation as their top concern for business operations, at twenty-four percent in March. During the quarter, a greater number of business owners expected inflation-adjusted sales to fall in the future.

Sentiment, by most measures, remains very poor

**CONSUMER SENTIMENT**



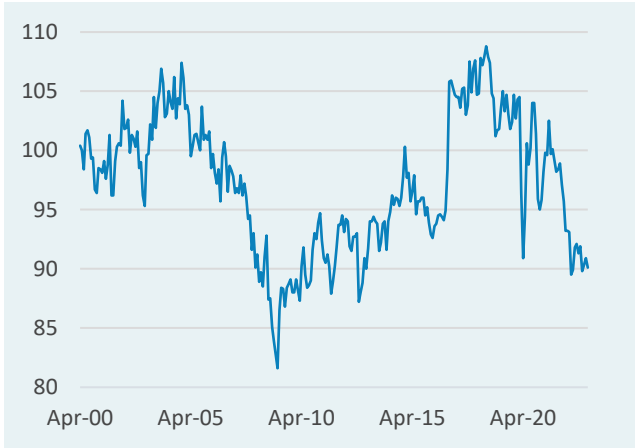
Source: University of Michigan, as of 3/31/23

**CONFERENCE BOARD CONSUMER CONFIDENCE**



Source: Conference Board, as of 3/31/23

**NFIB SMALL BUSINESS SENTIMENT**



Source: NFIB, as of 3/31/23

# Housing

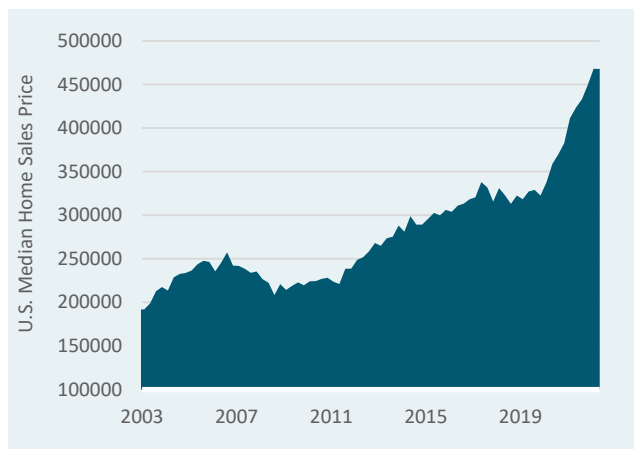
The U.S. housing market has faced a harsh winter season, as high prices and a significant jump in mortgage interest rates severely crimped demand. Existing home sales are as weak as during the lows of 2009-2011 following the housing bubble. However, monthly sales activity surged 14.5% in February, according to the National Association of Realtors, as potential buyers took advantage of a dip in mortgage rates.

By most measures available, average home prices appear to have plateaued over the latter half of 2022. Price movement has varied significantly by marketplace, with larger markets such as San Francisco experiencing double digit losses in home

values, while certain smaller markets—mostly in the southern U.S.—such as Sarasota, Florida seeing some of the largest gains in the nation.

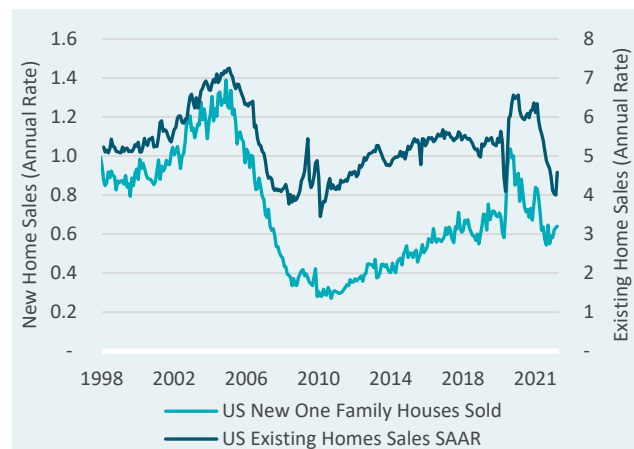
The monthly supply of homes remains high, due to a combination of depressed sales activity and modest increases in inventory levels over the past year. Inventories could stay soft as potential sellers wish to avoid listing their homes and giving up their existing low interest rate mortgage. Additionally, potential sellers who have recently seen the value of their home decline may not wish to sell at lower prices—especially those sellers who may be underwater on a loan.

**U.S. MEDIAN HOME SALES PRICE**



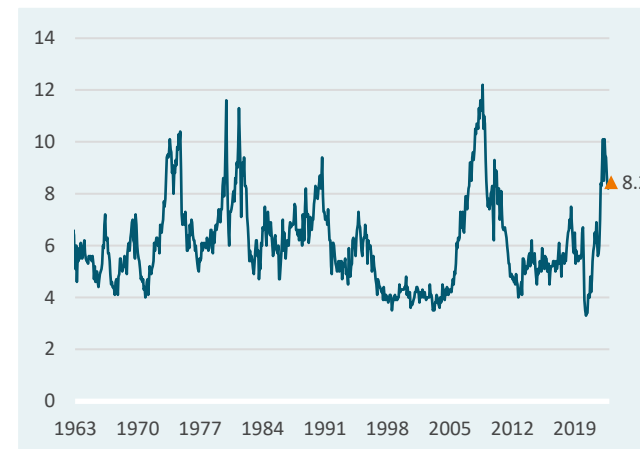
Source: FRED, as of 12/31/22

**HOME SALES: NEW & EXISTING (MILLIONS)**



Source: FRED, as of 2/28/23

**MONTHLY SUPPLY OF HOMES**



Source: FRED, as of 2/28/23

# International economics summary

- Developed economies have experienced a sharp slowdown in growth. The IMF forecasts developed economy GDP to fall from 2.7% in 2022 to 1.3% in 2023. The deteriorating outlook was attributed to monetary tightening by central banks, as well as Russia’s invasion of Ukraine. Meanwhile, emerging market economic growth is expected to accelerate in 2023, rising from 3.9% to 4.0%.
- Inflation trends varied by country during the quarter but seem to suggest broad moderation. European nations continue to cope with very high inflation rates—much of which have been driven by surging energy costs. In many countries, higher energy prices are contributing to half of official inflation figures.
- Developed central banks, in response to inflation, have carried on with their tightening cycles. Both the European Central Bank and Bank of England raised rates in March, with the ECB increasing their Deposit Facility Rate by 50 bps to 3.00%, while the BOE implemented a 25 bps hike, bringing their policy rate to 4.25%.
- February 24<sup>th</sup> marked the one-year anniversary of Russia’s invasion of Ukraine. The war has created much uncertainty around Europe’s economic outlook, and led Finland to apply, and to be accepted as, a NATO member.
- China made progress on its reopening in Q1, as the country aims to ramp up economic activity following nearly three-years of lockdowns. Mobility data has picked up, while gauges of manufacturing and non-manufacturing activity have moved into expansionary territory. March non-manufacturing PMIs came in at 58.2—the highest level since 2011.

Area	GDP (Real, YoY)	Inflation (CPI, YoY)	Unemployment
United States	0.9% 12/31/22	5.0% 3/31/23	3.5% 3/31/23
Eurozone	1.8% 12/31/22	6.9% 3/31/23	6.6% 2/28/23
Japan	0.4% 12/31/22	3.3% 3/31/23	2.5% 2/28/23
BRICS Nations	2.5% 12/31/22	2.9% 3/31/23	5.2% 12/31/21
Brazil	1.9% 12/31/22	4.7% 3/31/23	8.5% 3/31/23
Russia	(2.7%) 12/31/22	3.5% 3/31/23	3.5% 2/28/23
India	4.4% 12/31/22	5.7% 3/31/23	7.8% 3/31/23
China	2.9% 12/31/22	0.7% 3/31/23	5.6% 2/28/23

*NOTE: India lacks reliable government unemployment data. Unemployment rate shown above is estimated from the Centre for Monitoring Indian Economy. The Chinese unemployment rate represents the monthly surveyed urban unemployment rate in China.*

# International economics

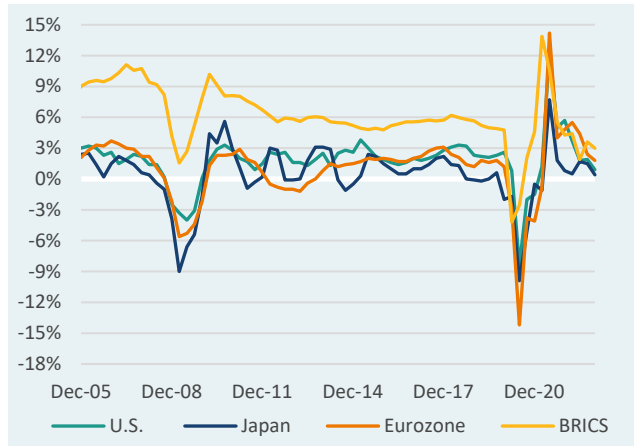
Many developed economies have experienced a sharp slowdown in growth, which is expected to continue in 2023. Near-zero growth or recession is likely in the near-term for the U.S. and many other developed markets. The IMF forecasts developed economy growth to fall from 2.7% in 2022 to 1.3% in 2023. The deteriorating outlook was partly attributed to monetary tightening of central banks, as well as Russia's invasion of Ukraine.

A rosier outlook exists for emerging markets. The IMF forecasts economic growth of 4.0% in 2022 and 3.9% in 2023. Growth

expectations continue to suggest a widening divide between emerging and developed economies, with emerging markets exhibiting a 1.3% *growth premium* over developed markets in 2022, a 2.6% premium in 2023, and a 2.8% premium in 2024.

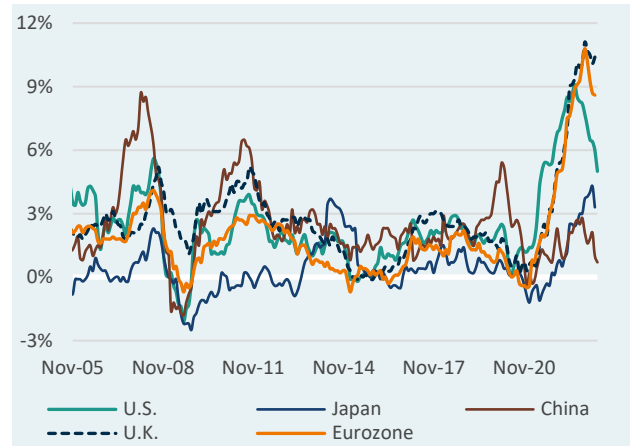
Inflation trends varied by country during the quarter but seem to suggest broad moderation. European countries continue to cope with higher inflation rates—much of which have been driven by surging energy costs. In many areas, higher energy prices are contributing as much as one half of official inflation figures.

REAL GDP GROWTH (YOY)



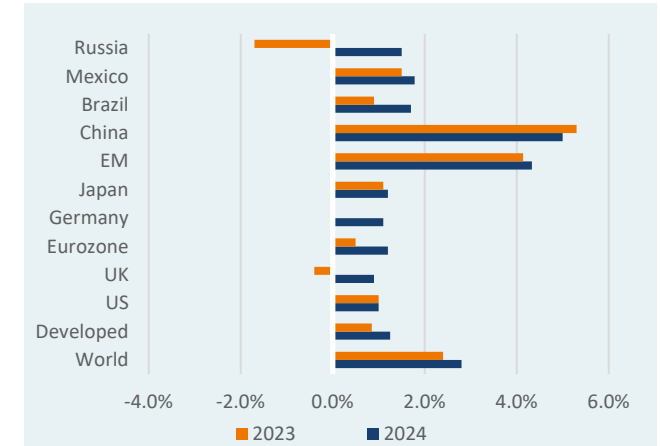
Source: Bloomberg, as of 12/31/22

INFLATION (CPI YOY)



Source: Bloomberg, as of 3/31/23 – or most recent release

ECONOMIC GROWTH FORECASTS



Source: Bloomberg, as of 3/31/23 – or most recent release



# Fixed income rates & credit

# Fixed income environment

- The 10-year U.S. Treasury yield fell during the quarter from 3.88% to 3.47%. It appears increasingly likely that the U.S. has already reached, and is beyond, *peak interest rates*. The looming possibility of recession, effects of banking stress, and implications from the Federal Reserve that only one interest rate hike may remain, suggests that bond yields may have more room to fall than to rise.
- Silicon Valley Bank (SVB) failed and was transitioned to government ownership on March 10<sup>th</sup>. SVB is among the top 20 largest banks in the United States, with approximately 1% of all U.S. domestic bank deposits. New York regulators closed Signature Bank shortly thereafter, and more failures may follow. Banking stress has implications for the future actions of the Federal Reserve and for the economy.
- During the first quarter, fixed income markets delivered strong positive returns despite concerns related to the banking sector and the potential for additional Fed rate hikes. High yield credit performance led the way at 3.6%, followed by 3.5% from investment grade credit and 3.3% from bank loans.
- U.S. yield curve inversion reached even more extreme levels during Q1. The 10-year 2-year yield spread (short-term interest rates being higher than long-term interest rates) reached ~107 bps on March 8<sup>th</sup>, suggesting an incoming recession.
- Uncertainty around the path of Federal Reserve rate hikes and whether inflation is under control has contributed to considerable volatility in bond markets. As indicated by the ICE BofA “MOVE” Index, which measures the volatility priced into U.S. Treasury bonds, domestic and international banking stress further added to fixed income market choppiness in the first quarter.

	QTD Total Return	1 Year Total Return
Core Fixed Income (Bloomberg U.S. Aggregate)	3.0%	(4.8%)
Core Plus Fixed Income (Bloomberg U.S. Universal)	2.9%	(4.6%)
U.S. Treasuries (Bloomberg U.S. Treasury)	3.0%	(4.5%)
U.S. High Yield (Bloomberg U.S. Corporate HY)	3.6%	(3.3%)
Bank Loans (S&P/LSTA Leveraged Loan)	3.3%	2.5%
Emerging Market Debt Local (JPM GBI-EM Global Diversified)	5.2%	(0.7%)
Emerging Market Debt Hard (JPM EMBI Global Diversified)	1.9%	(6.9%)
Mortgage-Backed Securities (Bloomberg MBS)	2.5%	(4.9%)

Source: Bloomberg, as of 3/31/23

# Banking stress

Markets saw significant volatility in March, largely driven by failures within the banking system. We believe these bank failures were widely due to two factors:

First, the bank depositor base was very concentrated in certain lines of business. Silvergate and Signature Bank were both involved in the crypto-currency space (although neither of these banks held crypto-currency directly on their balance sheet). This space came under significant pressure after the crypto-currency exchange FTX and some other smaller firms declared bankruptcy. Silicon Valley Bank had a large exposure to the technology and U.S. venture space, where clients had a greater need to withdraw their cash deposits due to slowing

venture capital deployment and tighter economic conditions.

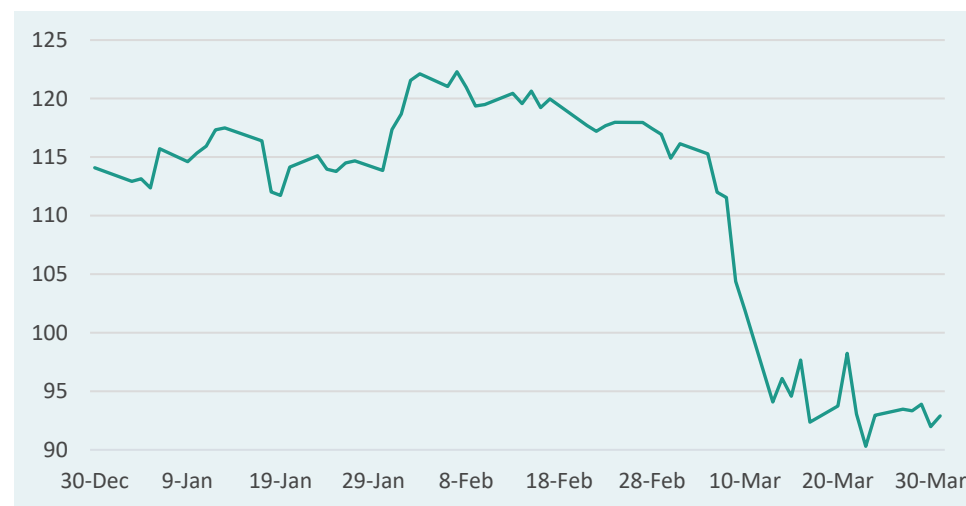
Second, bank assets were sharply devalued as interest rates rose quickly. The rapid rise in interest rates impacted assets such as Treasuries and mortgage-backed securities. In many cases, interest rate duration mismatch between bank assets and liabilities could arguably be attributed to a lack of risk management oversight. It is important to note that although these assets lost value very quickly, most assets are high quality with low default risk. This is a key differentiator from banking stress that occurred during the 2008-2009 Global Financial Crisis when banks held complex securitized assets—many of which turned out to be very low quality with high default risk.

## TIMELINE

Date	Event
March 8 <sup>th</sup>	Silvergate Bank announces it will be winding down operations
March 10 <sup>th</sup>	Silicon Valley Bank falls into FDIC receivership after a failed attempt to raise equity following large losses associated with a substantial sale of its Available-For-Sale securities portfolio
March 12 <sup>th</sup>	Signature Bank fails. The bank had a similar deposit base to Silvergate Bank, who rapidly pulled cash after previous failures
March 16 <sup>th</sup>	Eleven large banks deposit \$30B at First Republic Bank to shore up liquidity and improve confidence. First Republic's shares had tanked as investors feared contagion risks spreading to First Republic
March 19 <sup>th</sup>	The Swiss government announced the acquisition of Credit Suisse by rival UBS. The acquisition was in order to prevent CS from collapsing

Source: Verus, Bloomberg, as of 3/31/23

## KBW REGIONAL BANKING INDEX



# Impacts outside the financial sector

Expectations for the Fed's hiking cycle has weakened dramatically alongside bond yields, as markets began to doubt the Federal Reserve's willingness to hike rates in the face of financial stress. Banking issues will likely translate to a lower risk tolerance for many banks, as well as the offloading of many existing loans, and reduced overall lending activity. These effects would create an additional tightening of financial conditions regardless of future Federal Reserve actions.

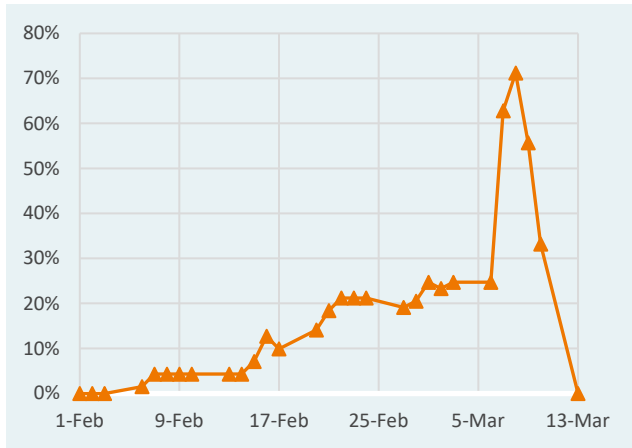
Money market funds have seen very large inflows, as cash is transferred from traditional bank deposits to much higher

yielding, and in many instances safer (if bank deposits were not FDIC insured), vehicles.

It will take time for all implications and effects to be clear. In the near term, sentiment seems to have been largely shored up by backstops from the Federal Reserve, Treasury, and the FDIC. In addition to the Federal Reserve's discount lending window, the Bank Term Funding Program (BTFP) was created to increase liquidity for banks which hold high quality assets. This has increased the Fed's balance sheet, counteracting recent efforts to reduce the size of the balance sheet.

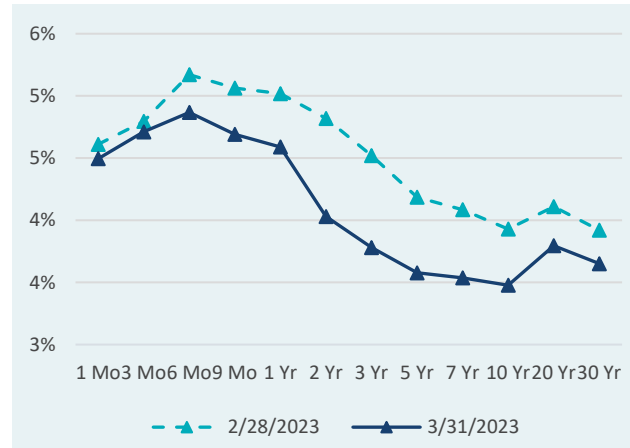
Repricing for a softer FOMC tightening cycle has arguably had the largest impact from a macroeconomic perspective

**IMPLIED PROBABILITY: 50 BP RATE HIKE BY FED**



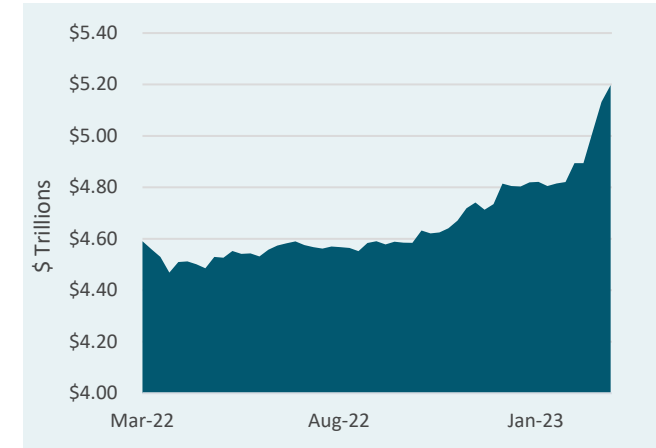
Source: Bloomberg, as of 3/13/23

**U.S. YIELD CURVE**



Source: Bloomberg, as of 3/31/23

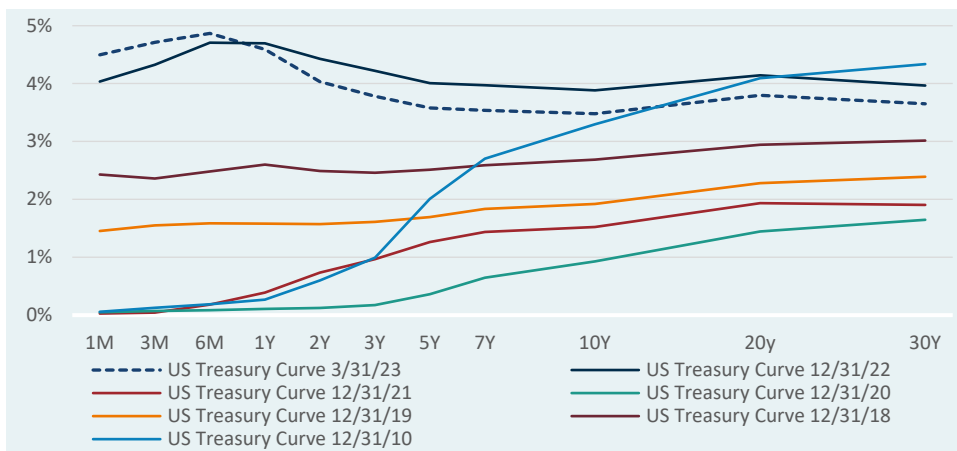
**ICI MONEY MARKET FUNDS ASSETS**



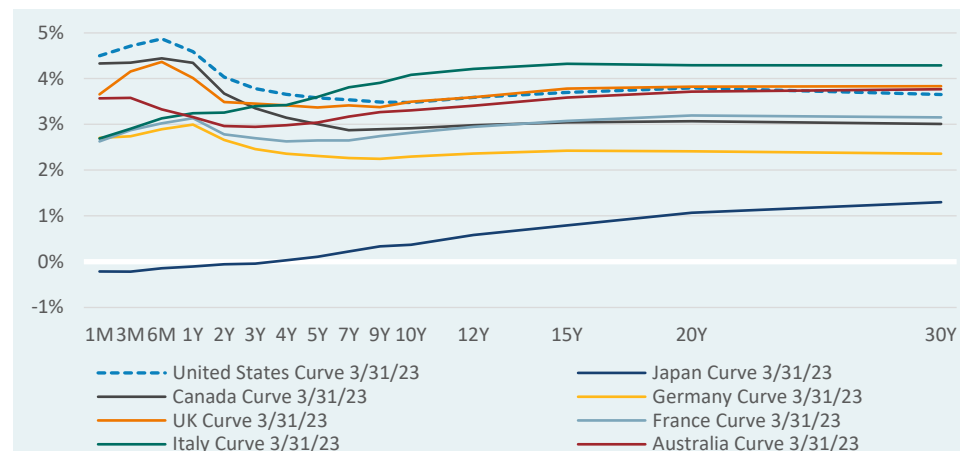
Source: ICI, Bloomberg, as of 3/29/23

# Yield environment

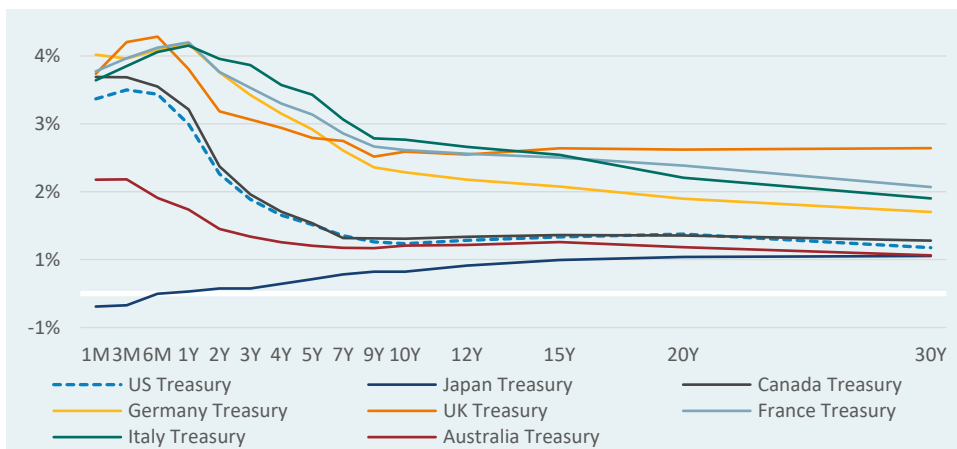
U.S. YIELD CURVE



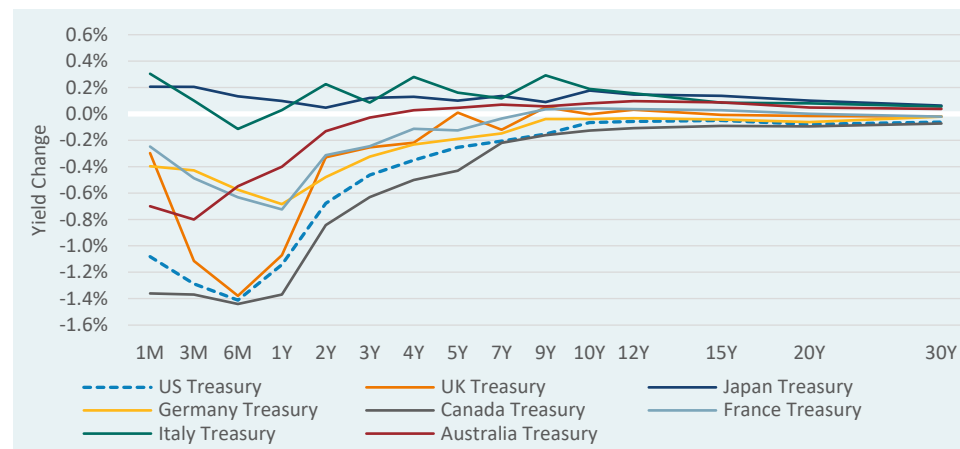
GLOBAL GOVERNMENT YIELD CURVES



YIELD CURVE CHANGES OVER LAST FIVE YEARS



IMPLIED CHANGES OVER NEXT YEAR



Source: Bloomberg, as of 3/31/23

# Credit environment

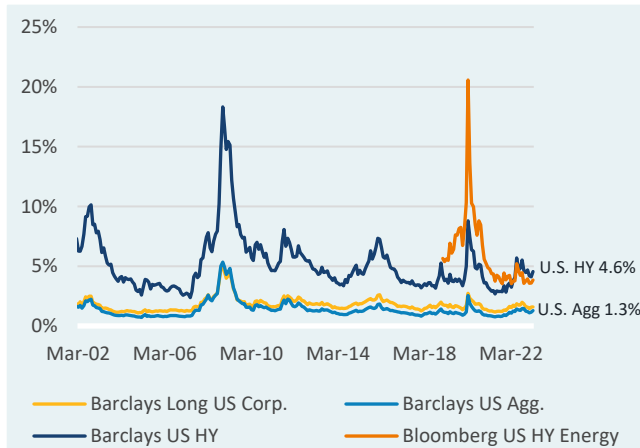
During the first quarter, fixed income markets delivered strong, positive returns despite concerns related to the banking sector and the potential for additional Fed rate hikes. High yield credit returns led the way with 3.6%, followed by 3.5% from investment grade credit and 3.3% from bank loans.

Within high yield bonds, unlike the performance witnessed during the fourth quarter where higher quality credit outperformed, performance was driven primarily by lower quality CCC-rated bonds. These bonds returned 5.1% during the quarter compared to 3.4% and 3.8% for B-rated and BB-rated bonds, respectively. Bank loan performance was

driven primarily by continued strong demand from CLOs.

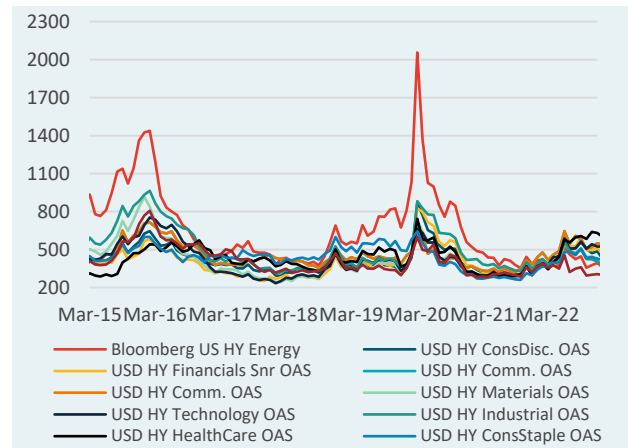
Credit spreads widened with investment grade spreads rising 0.10% to 1.4% while high yield spreads rose by 0.30% to 4.6%. Despite the jump, credit spreads remain below their long-term averages, which suggests that investors remain positive on the health of the market. However, should the economy begin to slow, credit spreads could move wider from here.

## SPREADS



Source: Barclays, Bloomberg, as of 3/31/23

## HIGH YIELD SECTOR SPREADS (BPS)



Source: Bloomberg, as of 3/31/23

Market	Credit Spread (OAS)	
	3/31/23	3/31/22
Long U.S. Corp	1.6%	1.6%
U.S. Inv Grade Corp	1.4%	1.2%
U.S. High Yield	4.6%	3.3%
U.S. Bank Loans*	5.6%	4.3%

Source: Barclays, Credit Suisse, Bloomberg, as of 3/31/23

\*Discount margin (4-year life)

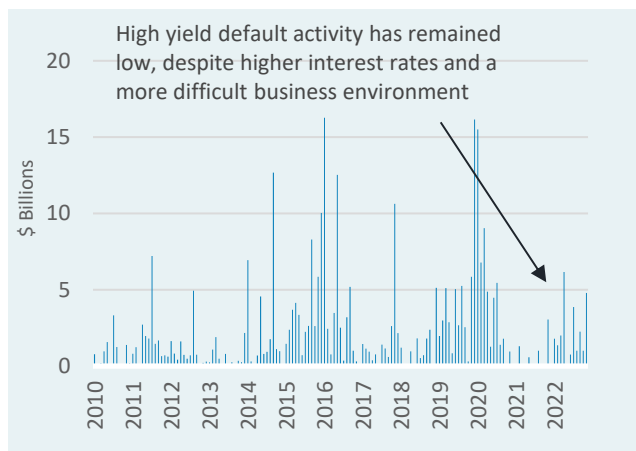
# Default & issuance

Default activity remained below the long-term trend in Q1. During the quarter, 17 companies defaulted totaling \$20.6 billion, with large defaults concentrated in the Media, Technology, and Consumer-related sectors. Combined defaults during the quarter were the highest since the beginning of the pandemic in 2Q 2020.

Past twelve-month default rates for both high yield bonds and bank loans decreased to 1.9% and 2.2%, respectively. This compares favorably to the long-term average of roughly 3.2% for bonds and 3.1% for loans. High yield recovery rates ended the quarter at 47.4%, down roughly 7.9% from the end of last year. Similarly, the recovery rate of bank loans ended the quarter at roughly 45.7%, down from 51.8% in 2022.

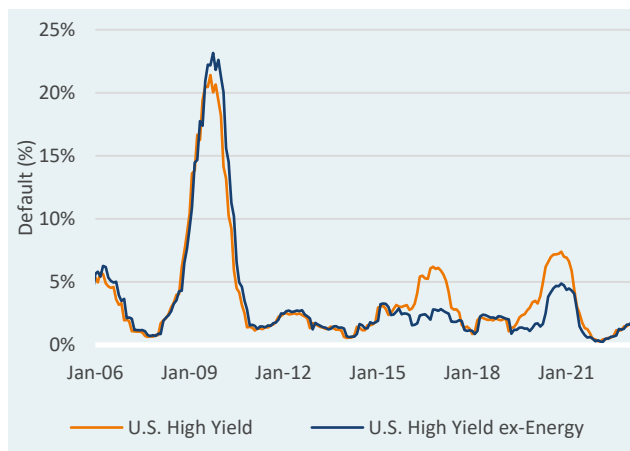
The pace of investment grade credit issuance accelerated in the first quarter with \$404.2 billion of issuance compared with \$200.2 billion in Q4 2022. The story was very different in levered credit which saw high yield bond and bank loan issuance decline to roughly \$40.2 and \$48.3 billion, respectively, during the period. For context, the level of high yield issuance ranked as the second lowest since the Global Financial Crisis in 2008-2009.

**U.S. HY MONTHLY DEFAULTS (PAR WEIGHTED)**



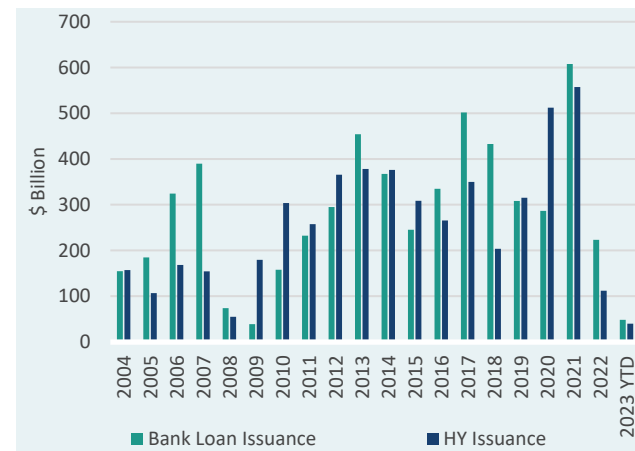
Source: BofA Merrill Lynch, as of 3/31/23

**U.S. HY SECTOR DEFAULTS (LAST 12 MONTHS)**



Source: BofA Merrill Lynch, as of 3/31/23 – par weighted

**DEVELOPED MARKET ISSUANCE (\$ BILLIONS)**



Source: BofA Merrill Lynch, all developed markets, as of 3/31/23

# Equity



# Equity environment

- Global equities delivered another strong quarter in Q1 (MSCI ACWI +7.3%). A variety of risks are stacking up that could weigh on additional gains, including potential recession in many markets, persistent inflation problems, and tightening credit conditions.
- The outlook for domestic stocks remains challenged, especially against the backdrop of high inflation and expectations for slowing economic growth. Earnings growth has started to decline, with year-over-year S&P 500 earnings falling -4.9% in Q4 2022, the first decline seen since Q2 2020.
- The effects of currency volatility on portfolio performance was mixed during the first quarter. Over the past full year, currency movement led to a -8.5% loss for investors with unhedged exposure to international developed equity (MSCI EAFE unhedged -1.4%, MSCI

EAFE hedged +7.1%), led by a -12.6% loss in Japanese equities (TOPIX unhedged -3.1%, TOPIX hedged +9.5%). We continue to believe that a thoughtful currency program may allow investors to reduce their total portfolio risk while also increasing long-term expected returns.

- Growth stocks delivered strong outperformance in the first quarter (Russell 1000 Growth +14.4% vs. Russell 1000 Value +1.0%), effectively reversing value's rally in Q4 2022. This divergence in style behavior appears to be, once again, mostly a result of relative sector returns.
- The Cboe VIX implied volatility index surged in March on the news of Silicon Valley Bank's failure, and the possibility of contagion across the financial sector, but ended the quarter at 18.7%—near the longer-term average.

	QTD TOTAL RETURN		1 YEAR TOTAL RETURN	
	(unhedged)	(hedged)	(unhedged)	(hedged)
U.S. Large Cap (S&P 500)	7.5%		(7.7%)	
U.S. Small Cap (Russell 2000)	2.7%		(11.6%)	
U.S. Equity (Russell 3000)	7.2%		(8.6%)	
U.S. Large Value (Russell 1000 Value)	1.0%		(5.9%)	
US Large Growth (Russell 1000 Growth)	14.4%		(10.9%)	
Global Equity (MSCI ACWI)	7.3%	7.3%	(7.4%)	(4.8%)
International Large (MSCI EAFE)	8.5%	8.3%	(1.4%)	7.1%
Eurozone (EURO STOXX 50)	16.2%	15.0%	10.8%	17.1%
U.K. (FTSE 100)	6.4%	3.8%	(1.1%)	6.9%
Japan (TOPIX)	5.8%	8.5%	(3.1%)	9.5%
Emerging Markets (MSCI Emerging Markets)	4.0%	3.8%	(10.7%)	(6.6%)

Source: Russell Investments, MSCI, STOXX, FTSE, Nikkei, as of 3/31/23

# Domestic equity

U.S. equities finished the first quarter up 7.5%, marking another positive quarter as the S&P 500 recovers from the losses of 2022. Much volatility persisted through recent months, with shares moving higher in January, before falling sharply in line with expectations for a more hawkish Federal Reserve. The fallout in the banking system challenged the financial sector, but ultimately proved to be a significant tailwind to the broader index, as investor expectations for the Federal Reserve’s rate path were significantly cut down. This boosts equity market valuations because lower interest rates increase the present value of equities through the discounting of cash flows. Growth stocks tend to benefit the most from this effect, as businesses with larger earnings expected further into the future are more sensitive to interest rate changes.

Despite recent gains, the outlook for domestic stocks remains challenged, given the backdrop of high inflation and expectations for slowing economic growth. Corporate earnings have been weakening, with year-over-year S&P 500 earnings falling -4.9% in Q4 2022—the first decline seen since Q2 2020. Analysts believe this trend will continue—FactSet expects Q1 2023 earnings to slide -6.6%.

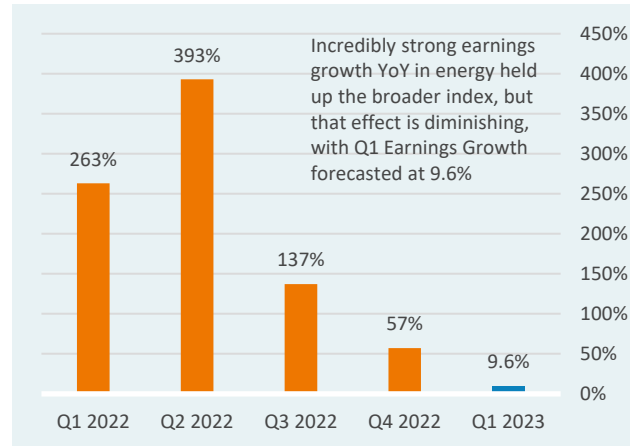
Domestic companies continue to face margin compression due to higher input prices and wages, although many companies are now implementing cost cutting measures—most visibly within the technology and financial sectors—to help retain earnings. The normalization of earnings growth within the energy sector, which had previously provided a large tailwind to broad earnings, has also been a drag.

**S&P 500 PRICE INDEX**



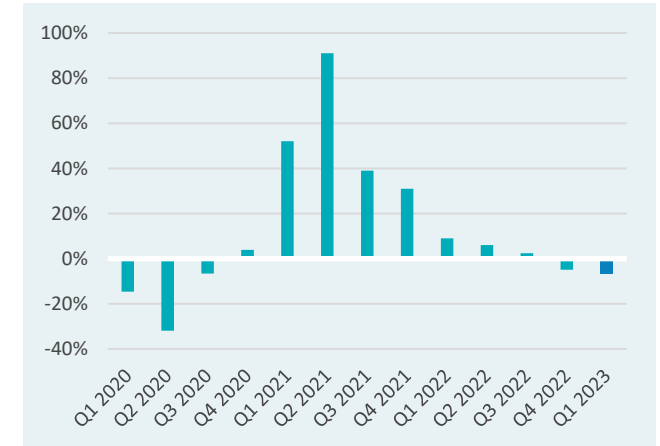
Source: Standard & Poor’s, as of 3/31/23

**ENERGY EARNINGS GROWTH (YEAR-OVER-YEAR)**



Source: FactSet, as of 3/31/23

**S&P 500 EARNINGS GROWTH (YEAR-OVER-YEAR)**



Source: FactSet, as of 3/31/23

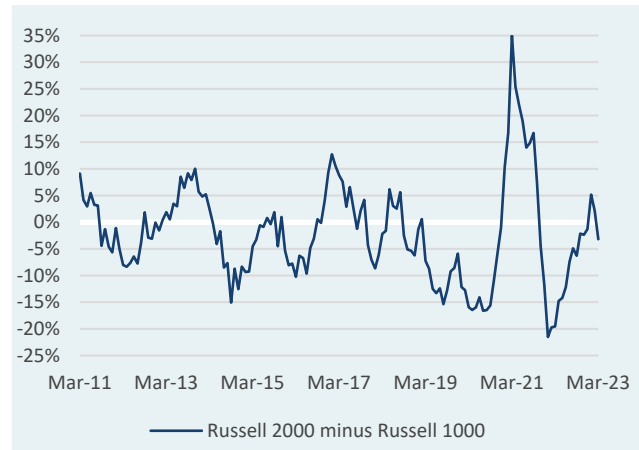
# Domestic equity size & style

Growth stocks delivered strong outperformance in the first quarter (Russell 1000 Growth +14.4% vs. Russell 1000 Value +1.0%), effectively reversing the value rally of Q4 2022. This divergence in style behavior appears to be, once again, mostly a result of relative sector returns. Information technology led the index at +21.8% over the quarter, while energy (-4.7%) and financials (-5.6%) were laggards.

Small capitalization stocks underperformed large capitalization stocks during Q1 (Russell 2000 +2.7%, Russell 1000 +7.5%) and have also lagged over the past year (Russell 2000 -11.6%, Russell 1000 -8.4%).

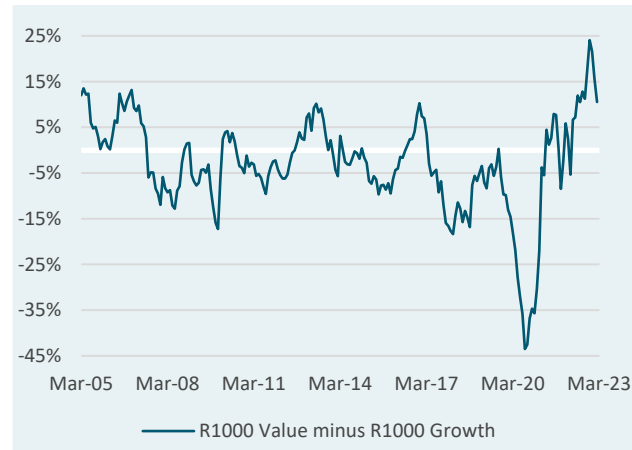
Large disparities in sector performance and the significant impact of this ongoing volatility on style factors supports our view that factor timing should rarely be pursued for most investors. There are occasions when market mispricing offers a compelling case to tilt into a style factor, though these occasions come along perhaps every few decades rather than every few years. We believe that style investing is most appropriately pursued in a strategic manner based on each individual investor's market beliefs and long-term goals.

**SMALL CAP VS LARGE CAP (YOY)**



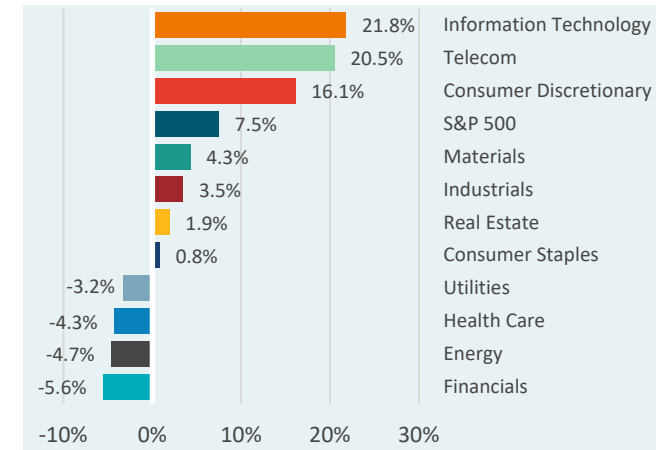
Source: FTSE, as of 3/31/23

**VALUE VS GROWTH (YOY)**



Source: FTSE, as of 3/31/23

**Q1 2023 SECTOR PERFORMANCE**



Source: Morningstar, as of 3/31/23

# International developed equity

International developed equities outperformed global peers for a consecutive quarter, with the MSCI EAFE Index finishing up 8.3% in unhedged currency terms. Currency market movement was more muted, leading to a smaller 0.2% difference between currency hedged and unhedged index returns. This was likely a welcome change, given large and painful currency movements of the past year as the U.S. dollar appreciated.

European shares outperformed, due to larger European companies delivering positive earnings despite much economic uncertainty. The larger capitalization STOXX 50

Index returned 16.2%, compared to the broader STOXX 600 Index which finished the quarter up 10.3%. Japanese equities lagged most other markets in Q1.

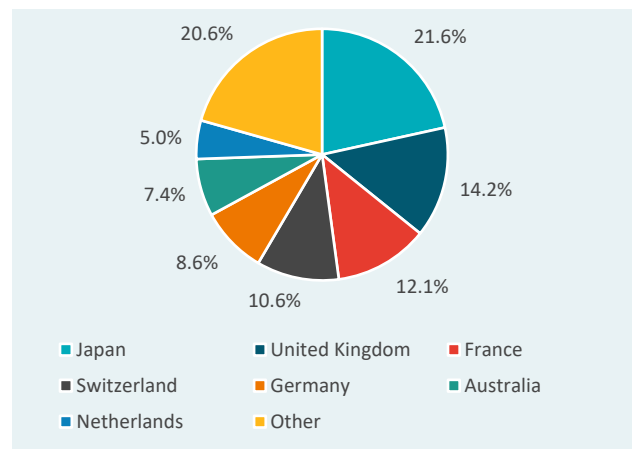
Inflation uncertainty has likely been a key contributor to the cheaper valuations of international developed equities, although inflation pressures have started to show some relief in the Eurozone, driven primarily by moderating energy prices. Despite these positive signs, both the European Central Bank and Bank of England have signaled that additional rate hikes are ahead. The drag presented by central bank hawkishness may be an ongoing theme of 2023.

## INTERNATIONAL DEVELOPED EQUITY



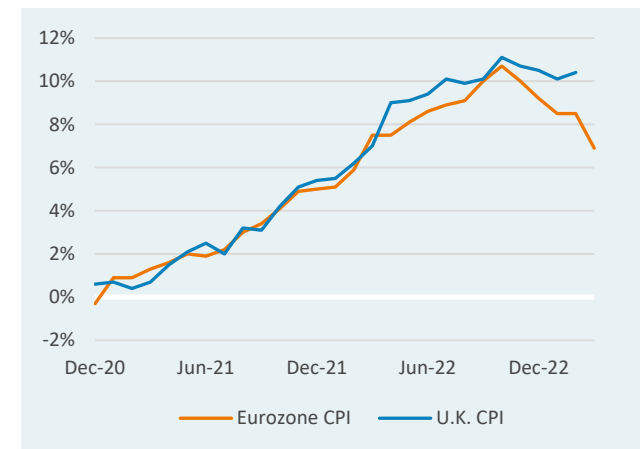
Source: MSCI, as of 3/31/23

## MSCI EAFE INDEX COUNTRY DECOMPOSITION



Source: MSCI, as of 3/31/23

## EUROPEAN INFLATION



Source: Bloomberg, as of 3/31/23. U.K. CPI as of 2/28/23

# Emerging market equity

Emerging market equities lagged the global opportunity set during the quarter. The MSCI EM Index finished up 4.0%, relative to 8.5% from the MSCI EAFE Index and 7.5% from the S&P 500.

Chinese equities—the largest country weight in the index at thirty percent—saw a slowdown in economic momentum from the COVID-19 reopening, yet still finished the quarter +4.7%. China generated a drag on the overall emerging market index despite large gains from markets in Mexico, Taiwan, and South Korea.

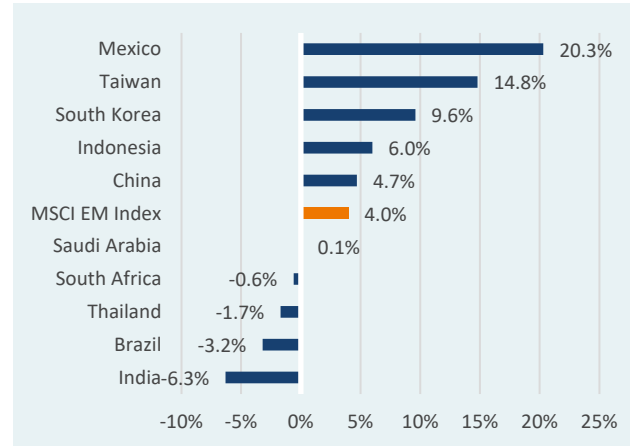
While slowing economic growth amongst developed economies provides a headwind to emerging markets, a lack of inflationary pressures amongst most emerging countries helps paint a more optimistic picture. Fewer inflation problems allows for looser central bank policies, which combined with a continuation of pandemic reopening in China, could allow for higher economic growth in the near-term. The IMF's World Economic Outlook sees emerging & developing economy growth at 3.9% in 2023—much higher than the expected 1.3% for advanced economies.

**EMERGING MARKET EQUITY**



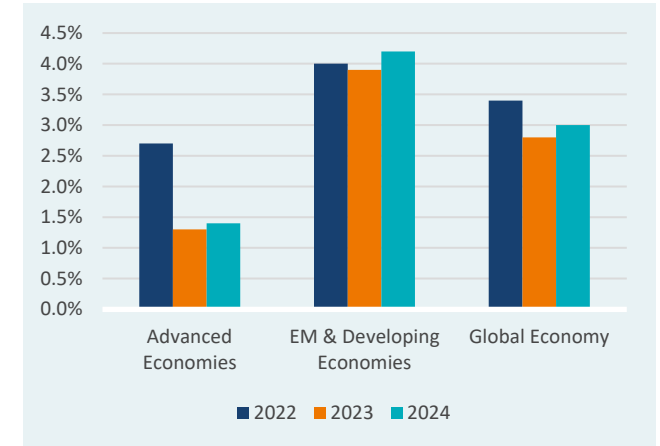
Source: MSCI, as of 3/31/23

**Q1 2023 MSCI COUNTRY RETURNS (USD)**



Source: Bloomberg, MSCI, as of 3/31/23

**IMF'S APRIL REAL GDP GROWTH FORECASTS**



Source: IMF April World Economic Outlook

# Equity valuations

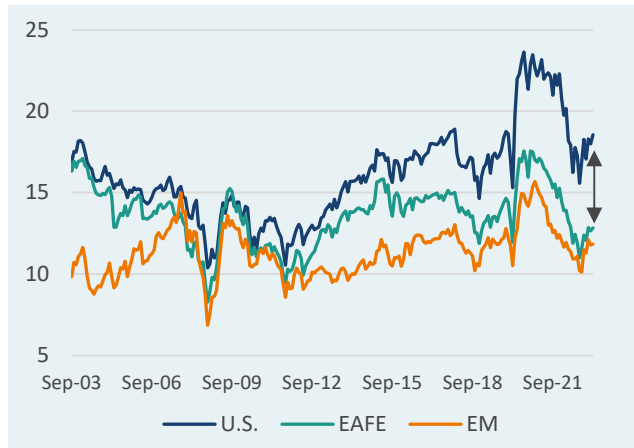
Equity valuations continued to move higher in the first quarter, as global equities advanced and corporate earnings remained relatively flat. Forward price-to-earnings in the U.S. ended March at 18.6x, sliding below the 5-year average, but still higher than the 10-year average of 17.8x. In contrast, international developed (12.8x) and emerging market (11.8x) valuations sit below or at their respective five- and ten-year averages.

U.S. equities led global markets over the past decade largely

due to a boom in corporate earnings and the success of technology-focused mega cap stocks. However, part of that outperformance was due to U.S. equity multiples rising to elevated levels. This is reflected in current U.S. valuations and the near-record divide between U.S. and non-U.S. markets. Lofty multiples may limit further upside of domestic equities without a rebound in earnings, especially given the possibility of U.S. recession, persistent inflation, and recent banking stress. However, an incoming global economic slowdown could support domestic equities as investors tend to prefer high quality markets during times of stress.

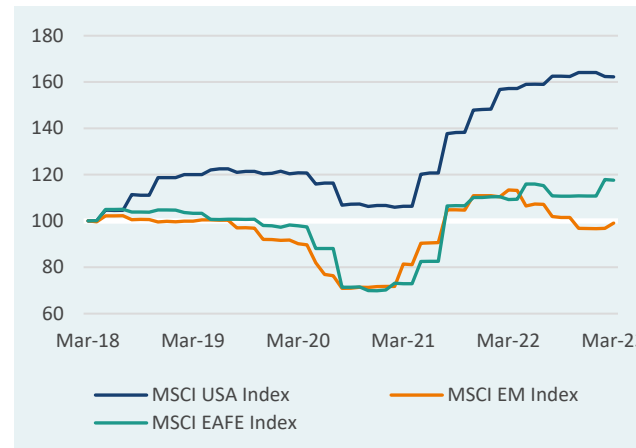
**U.S. markets remain relatively expensive, despite potential recession, inflation, banking, and other risks**

## FORWARD P/E RATIOS



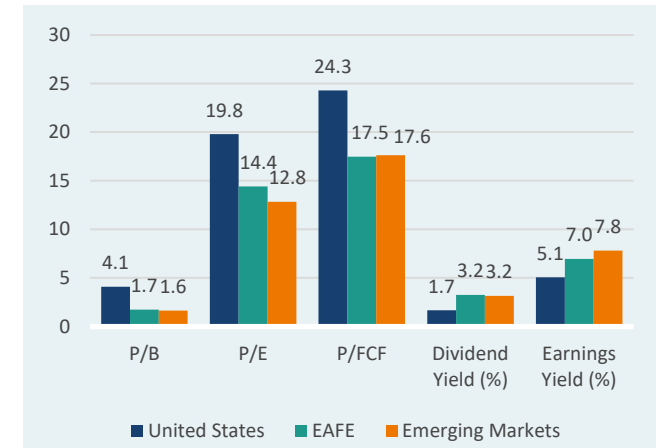
Source: MSCI, 12m forward P/E, as of 3/31/23

## TRAILING 12M EPS (INDEX 100)



Source: Bloomberg, MSCI, as of 3/31/23

## VALUATION METRICS (3-MONTH AVERAGE)



Source: Bloomberg, MSCI, as of 3/31/23 - trailing P/E

# Equity volatility

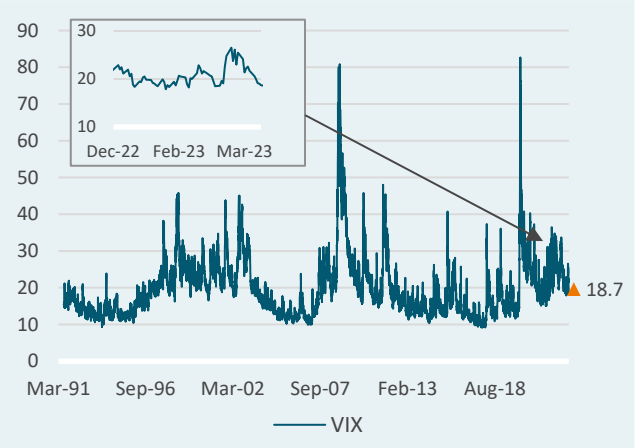
The Cboe VIX implied volatility index surged in March on the news of Silicon Valley Bank’s failure, and the possibility of contagion across the financial sector, but ended the quarter at 18.7%—near the longer-term average. Markets have faced an ongoing drumbeat of risks in recent years, from the global pandemic, to ensuing inflation shock and aggressive response from central banks, now to banking/credit stress and possible recession.

Realized volatility of global equity markets remains above average, while emerging market volatility continues to be in

line with developed markets—a trend that has been uncommon historically.

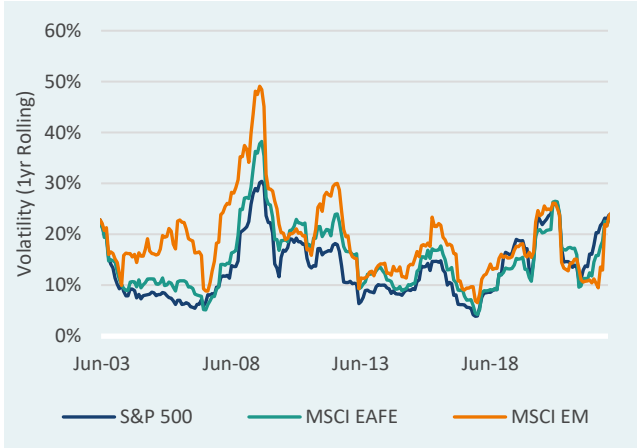
Many market stories of the past year have related to Federal Reserve tightening and the path of interest rates. These stories have contributed to considerable volatility in bond markets. As indicated by the ICE BofA “MOVE” Index, which measures the volatility priced into U.S. Treasury bonds, domestic and international banking stress in the first quarter further added to market choppiness.

**U.S. IMPLIED VOLATILITY (VIX)**



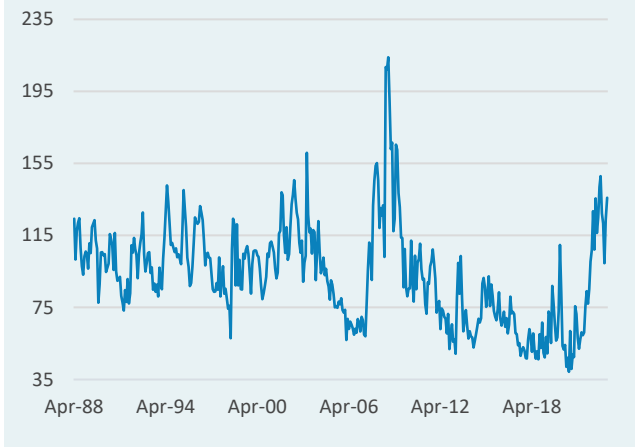
Source: Cboe, as of 3/31/23

**REALIZED VOLATILITY**



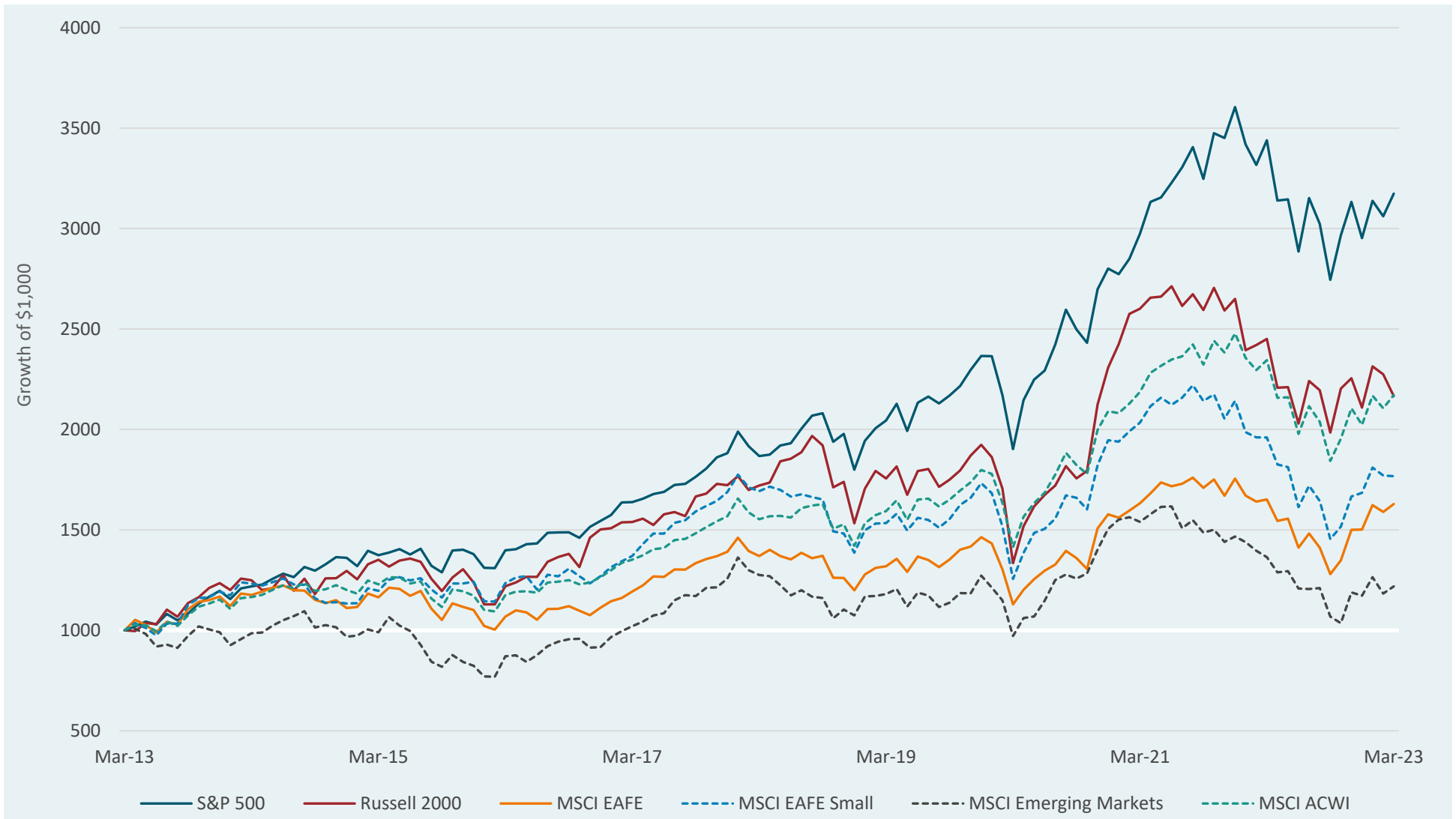
Source: S&P, MSCI, as of 3/31/23

**U.S. TREASURY IMPLIED VOL (“MOVE” INDEX)**



Source: Bloomberg, as of 3/31/23

# Long-term equity performance



Source: MPI, as of 3/31/23



# Other assets

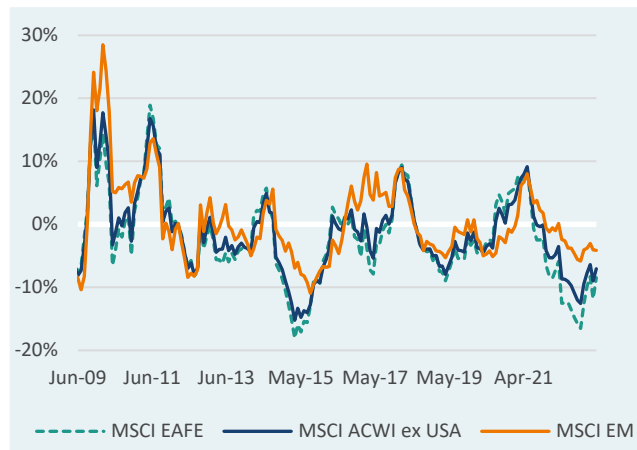
# Currency

The effects of currency volatility on portfolio performance was mixed during the first quarter. Over the past full year, currency movement led to a -8.5% loss for investors with unhedged exposure to international developed equity (MSCI EAFE unhedged -1.4%, MSCI EAFE hedged +7.1%), fueled by a -12.6% currency loss from Japanese equities (TOPIX unhedged -3.1%, TOPIX hedged +9.5%). The U.S. dollar depreciated -1.6% during the quarter, according to the U.S. Trade Weighted Dollar Index, providing a tailwind to most unhedged international investments.

A thoughtful currency program may allow investors to reduce their total portfolio risk while also increasing long-term expected returns. The MSCI

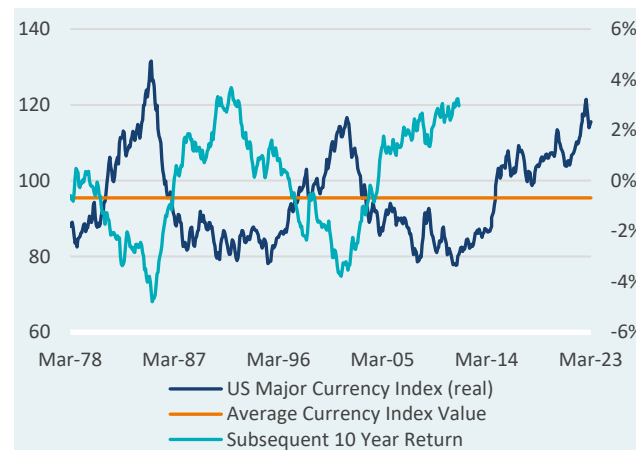
Currency Factor Mix Index—a representation of a passive investment in the currency market—has shown a positive one-year rolling return over most periods with very low volatility. This contrasts to the unhedged currency exposure (what we refer to as “embedded currency”) that most investors own, which has demonstrated high volatility and frequent losses. This currency program would have delivered cumulative outperformance of +22.5% over the past five years for an international developed equity portfolio, and +52.0% cumulative outperformance over the past ten years, while also reducing total risk in the portfolio.

**EFFECT OF CURRENCY (1-YEAR ROLLING)**



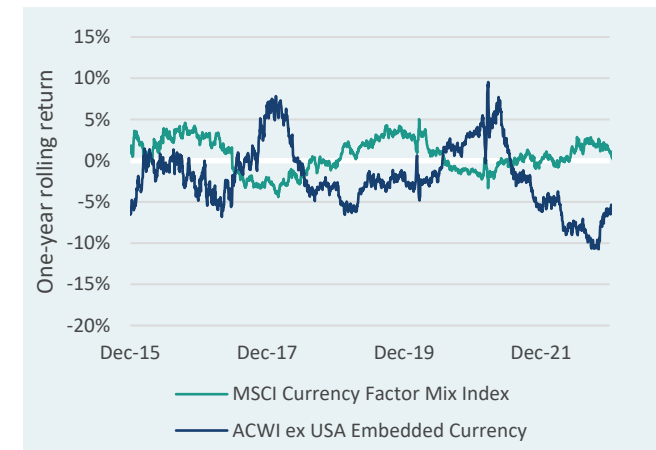
Source: MSCI, as of 3/31/23

**BLOOMBERG DOLLAR SPOT INDEX**



Source: Federal Reserve, as of 3/31/23

**EMBEDDED CURRENCY VS CURRENCY FACTORS**



Source: Bloomberg, MSCI, as of 3/31/23

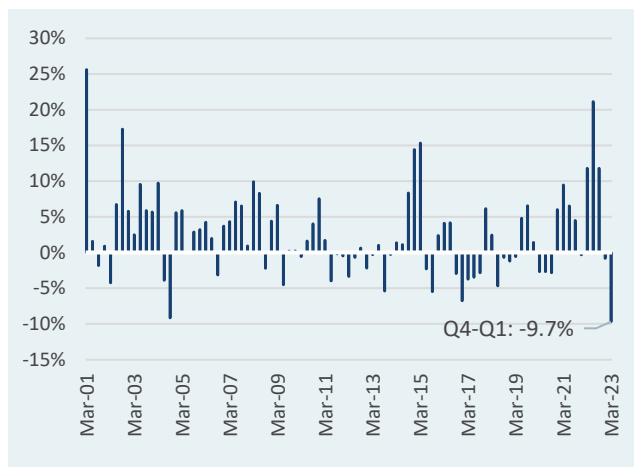
# A reversal in CTA strategy performance

In 2021 and for most of 2022, systematic CTA strategies were the top performing hedge fund strategy. Trend following was paying off after several years of mediocre returns from 2016-2020. This periodicity is typical of trend following/CTA type strategies, and the end of 2022 and first quarter of 2023 served as examples of weak runs for these strategies. CTA strategies, as proxied by the SocGen CTA Index, had their worst ever consecutive quarters from Q4 '22 through Q1 '23, looking back to the year 2000.

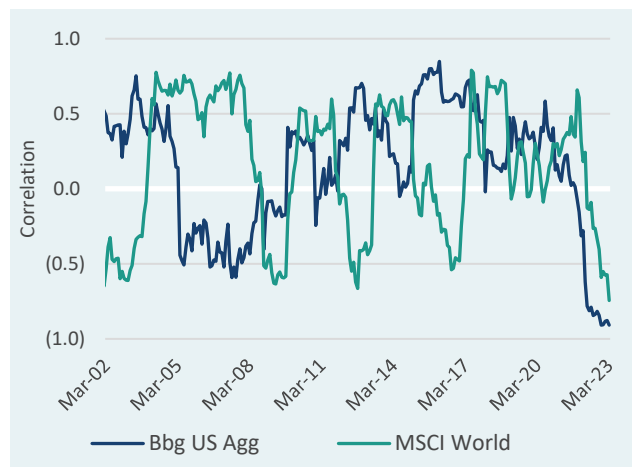
at their all time most-negative levels. Rolling 3-year performance of CTAs relative to other strategy types has reversed after COVID-19 drawdowns begin to roll off and as CTAs have suffered from the recent reversals in both stocks and bonds. As intermediate (6-12 month) trends in markets begin to flatten out and the first half of 2022 rolls off, we believe CTA positioning may level out and potentially support a rebound in performance.

A key driver of underperformance is apparent when examining one-year correlations of these strategies to stocks and bonds, which were recently

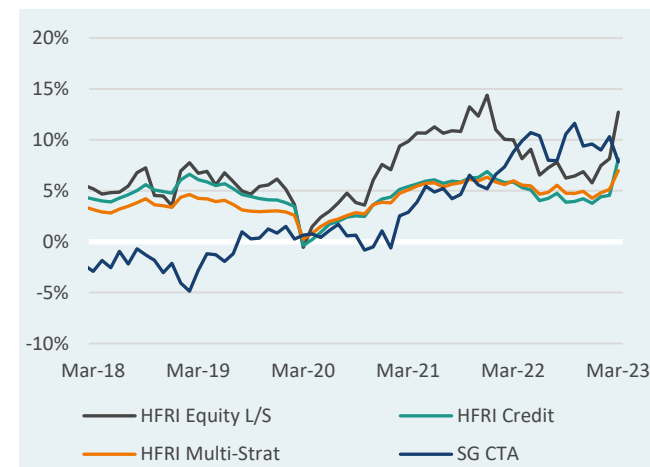
**ROLLING 6-MONTH RETURNS FOR CTA INDEX**



**12-MONTH CORRELATION VS CTA INDEX**



**CUMULATIVE RETURN LAST 12 MONTHS**



Source: HFR, MPI, Morningstar. SocGen, Data as of 3/31/23

# Appendix

# Periodic table of returns

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	YTD	5-Year	10-Year
Large Cap Growth	56.3	26.0	34.5	32.6	39.8	5.2	79.0	29.1	14.3	18.6	43.3	13.5	13.3	31.7	37.3	6.7	36.4	38.5	28.3	16.1	14.4	13.7	14.6
International Equity	48.5	22.2	21.4	26.9	16.2	1.4	37.2	26.9	7.8	18.1	38.8	13.2	5.7	21.3	30.2	1.9	31.4	34.6	27.6	9.4	8.5	10.9	12.0
Large Cap Equity	47.3	20.7	20.1	23.5	15.8	-6.5	34.5	24.5	2.6	17.9	34.5	13.0	0.9	17.3	25.0	0.0	28.5	21.0	27.1	1.5	7.5	7.5	9.1
Small Cap Growth	46.0	18.3	14.0	22.2	11.8	-21.4	32.5	19.2	1.5	17.5	33.5	11.8	0.6	12.1	22.2	-1.5	26.5	20.0	26.5	-4.7	6.1	7.5	8.8
60/40 Global Portfolio	39.2	16.5	7.5	18.4	11.6	-25.9	28.4	16.8	0.4	16.4	33.1	6.0	0.0	11.8	21.7	-3.5	25.5	18.3	25.2	-7.5	5.6	5.4	8.5
Emerging Markets Equity	30.0	14.5	7.1	16.6	10.9	-28.9	27.2	16.7	0.1	16.3	32.5	5.6	-0.4	11.3	17.1	-4.8	22.4	14.0	17.7	-13.0	4.0	4.7	8.0
US Bonds	29.9	14.3	6.3	15.5	10.3	-33.8	23.3	16.1	-2.1	15.3	23.3	4.9	-0.8	11.2	14.6	-6.0	22.0	10.3	14.8	-14.5	3.0	4.5	7.2
Small Cap Equity	29.7	12.9	5.3	15.1	7.0	-35.6	20.6	15.5	-2.9	14.6	12.1	4.2	-1.4	8.0	13.7	-8.3	18.6	7.8	11.3	-14.5	2.7	4.3	5.0
Hedge Funds of Funds	25.2	11.4	4.7	13.3	7.0	-36.8	19.7	13.1	-4.2	11.5	11.0	3.4	-2.5	7.1	7.8	-9.3	18.4	7.5	8.9	-17.3	1.6	3.9	5.0
Cash	23.9	9.1	4.6	10.4	5.8	-37.6	18.9	10.2	-5.5	10.5	9.0	2.8	-3.8	5.7	7.7	-11.0	8.7	4.6	6.5	-19.1	1.1	3.5	3.3
Large Cap Value	11.6	6.9	4.6	9.1	4.4	-38.4	11.5	8.2	-5.7	4.8	0.1	0.0	-4.4	2.6	7.0	-11.2	7.8	2.8	2.8	-20.1	1.0	3.3	2.0
Real Estate	9.0	6.3	4.2	4.8	-0.2	-38.5	5.9	6.5	-11.7	4.2	-2.0	-1.8	-7.5	1.0	3.5	-12.9	7.7	0.5	0.0	-20.4	0.0	1.3	1.4
Small Cap Value	4.1	4.3	3.2	4.3	-1.6	-43.1	0.2	5.7	-13.3	0.1	-2.3	-4.5	-14.9	0.5	1.7	-13.8	6.4	0.5	-1.5	-26.4	-0.7	0.9	0.8
Commodities	1.0	1.4	2.4	2.1	-9.8	-53.2	-16.9	0.1	-18.2	-1.1	-9.5	-17.0	-24.7	0.3	0.9	-14.6	2.1	-3.1	-2.5	-29.1	-5.4	-0.9	-1.7

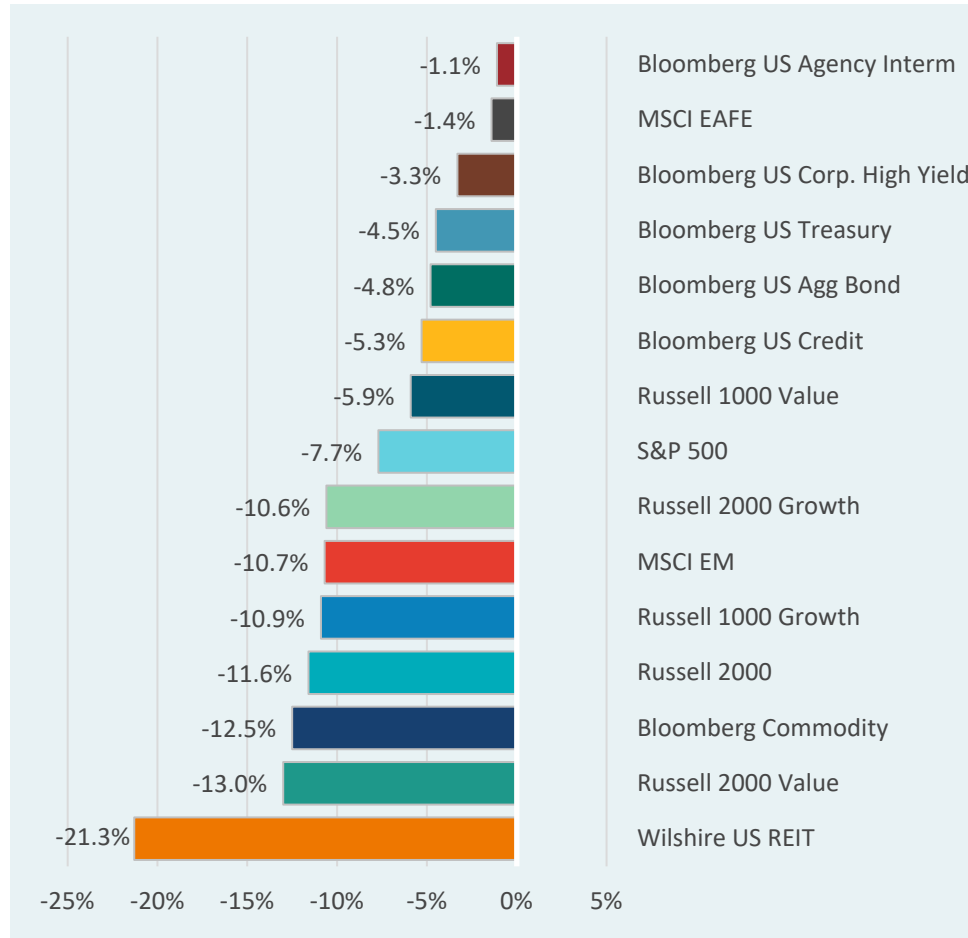
BEST  
↑  
↓  
WORST

 Large Cap Equity	 Small Cap Growth	 Commodities
 Large Cap Value	 International Equity	 Real Estate
 Large Cap Growth	 Emerging Markets Equity	 Hedge Funds of Funds
 Small Cap Equity	 US Bonds	 60% MSCI ACWI/40% Bloomberg Global Bond
 Small Cap Value	 Cash	

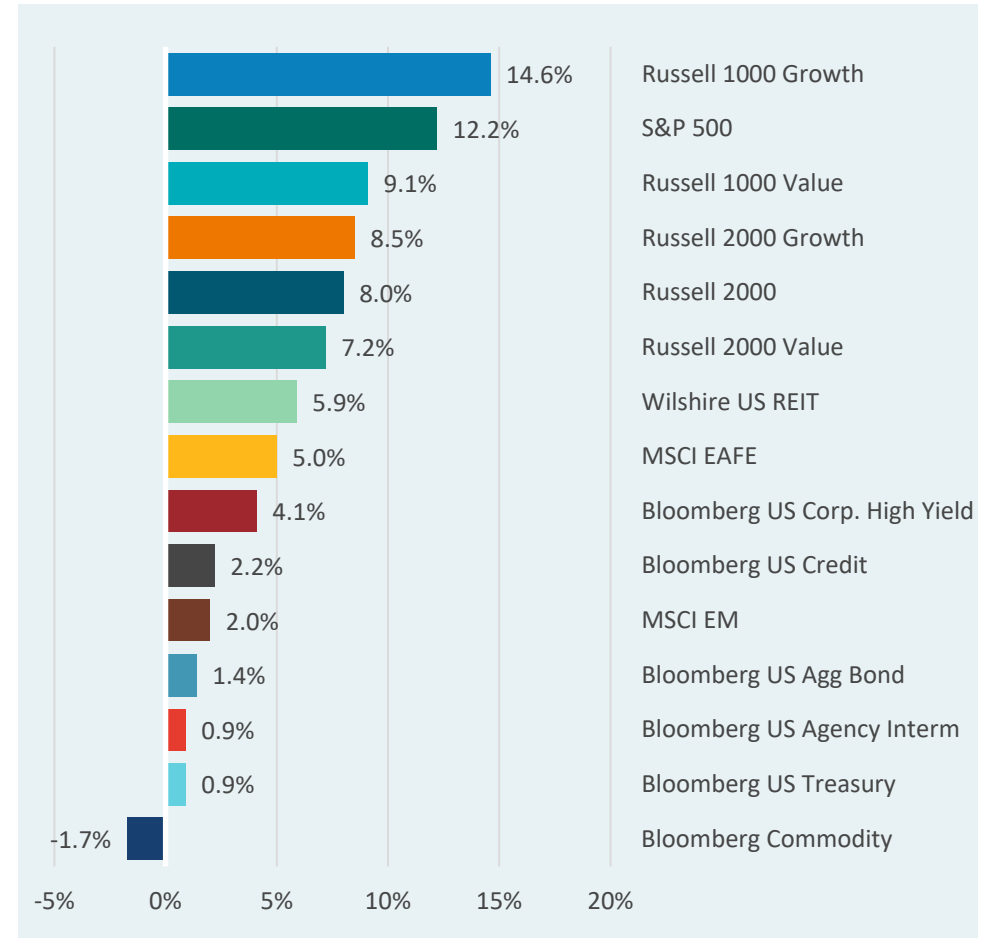
Source Data: Morningstar, Inc., Hedge Fund Research, Inc. (HFR), National Council of Real Estate Investment Fiduciaries (NCREIF). Indices used: Russell 1000, Russell 1000 Value, Russell 1000 Growth, Russell 2000, Russell 2000 Value, Russell 2000 Growth, MSCI EAFE, MSCI EM, Bloomberg US Aggregate, T-Bill 90 Day, Bloomberg Commodity, NCREIF Property, HFRI FOF, MSCI ACWI, Bloomberg Global Bond. NCREIF Property Index performance data as of 12/31/22.

# Major asset class returns

ONE YEAR ENDING MARCH



TEN YEARS ENDING MARCH



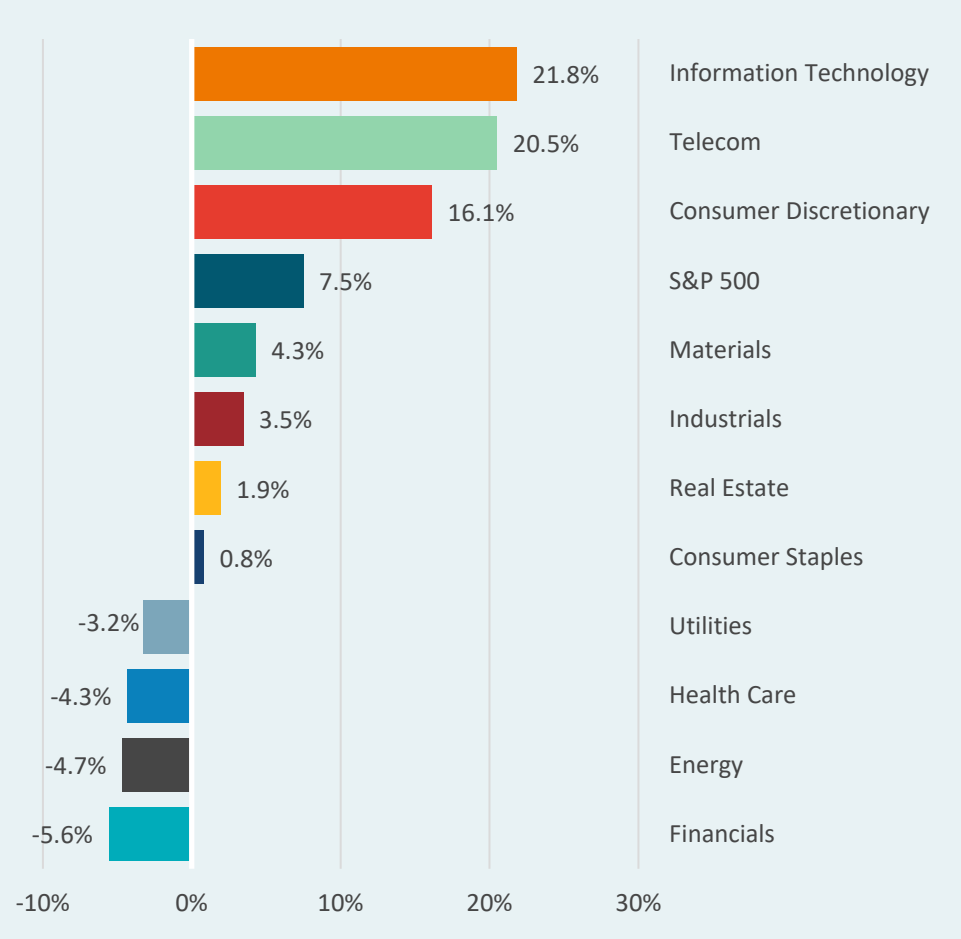
\*Only publicly traded asset performance is shown here. Performance of private assets is typically released with a 3- to 6-month delay.

Source: Morningstar, as of 3/31/23

Source: Morningstar, as of 3/31/23

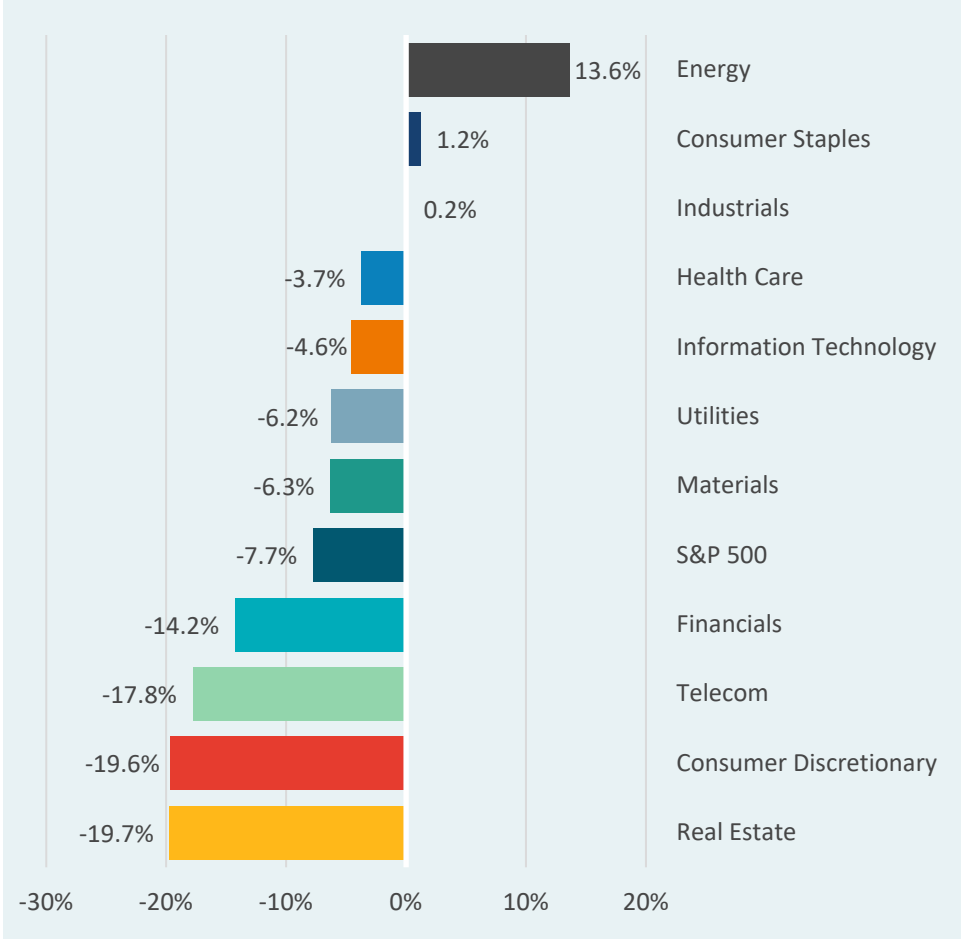
# S&P 500 sector returns

QTD



Source: Morningstar, as of 3/31/23

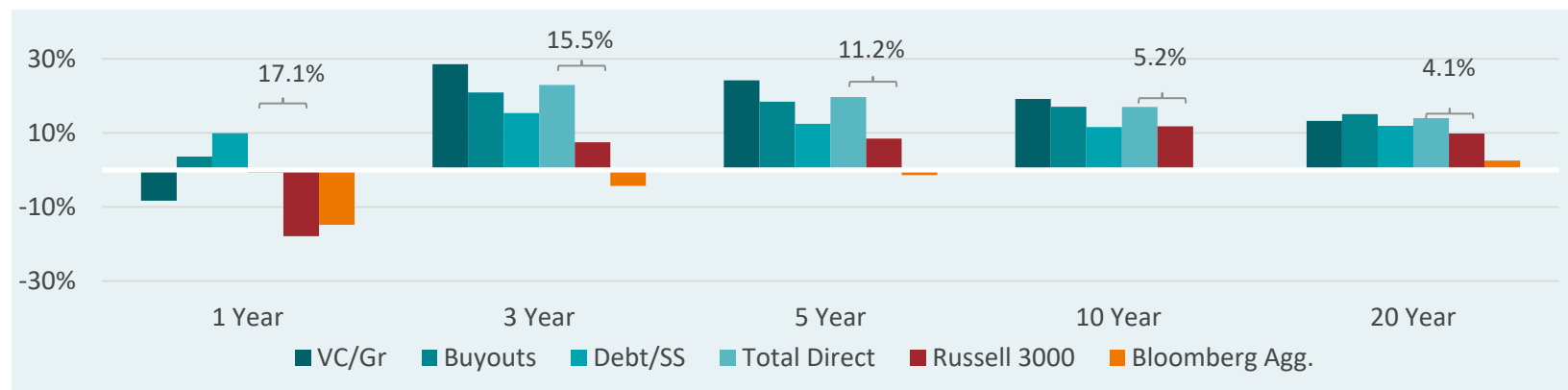
ONE YEAR ENDING MARCH



Source: Morningstar, as of 3/31/23

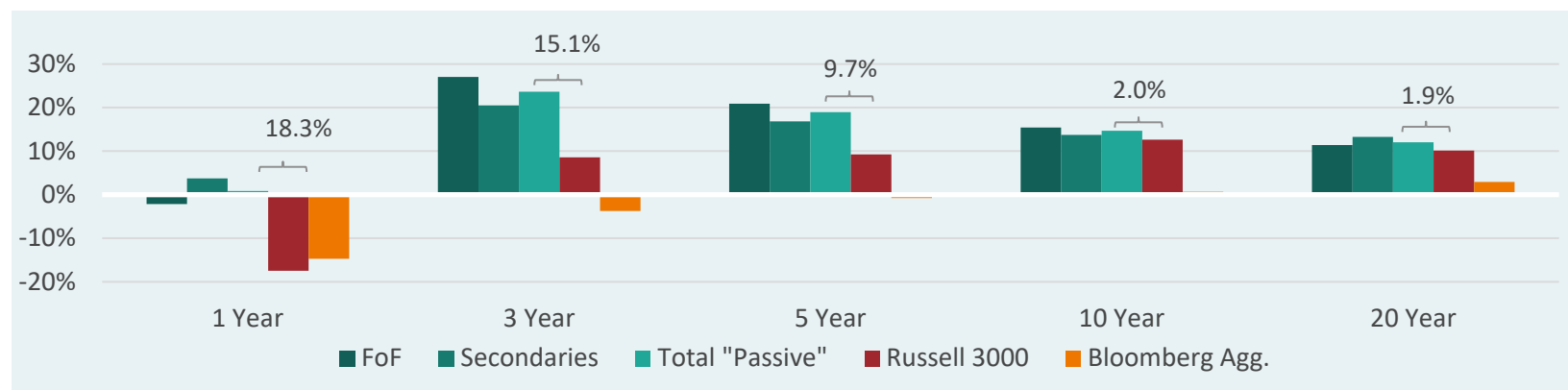
# Private equity vs. traditional assets performance

## DIRECT PRIVATE EQUITY FUND INVESTMENTS



Direct P.E Fund Investments outperformed comparable public equities across all time periods

## “PASSIVE” STRATEGIES



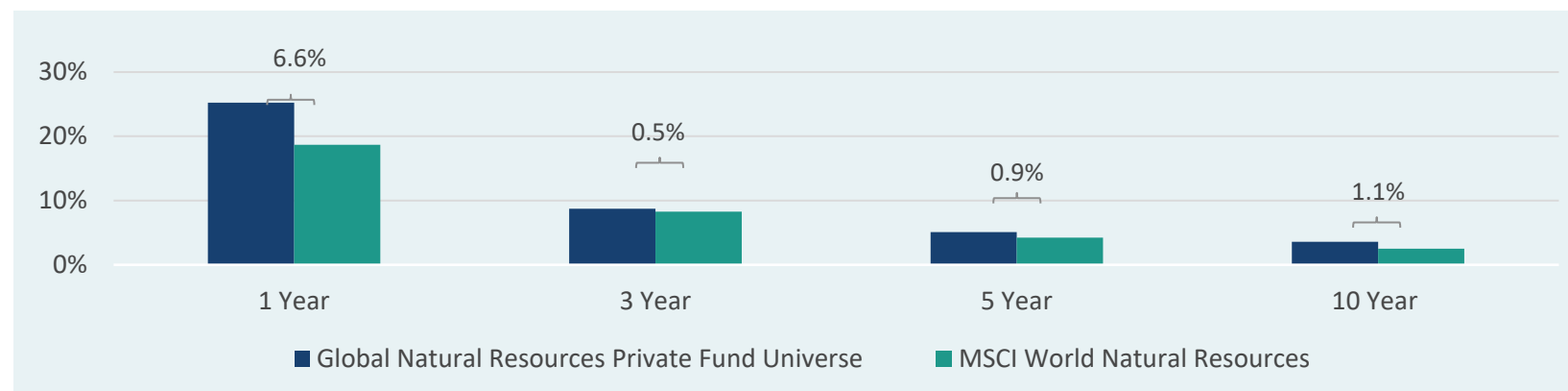
“Passive” strategies outperformed comparable public equities across all time periods

Sources: Refinitiv PME: U.S. Private Equity Funds sub asset classes as of September 30, 2022. Public Market Equivalent returns resulted from “Total Passive” and Total Direct’s identical cash flows invested into and distributed from respective traditional asset comparable.



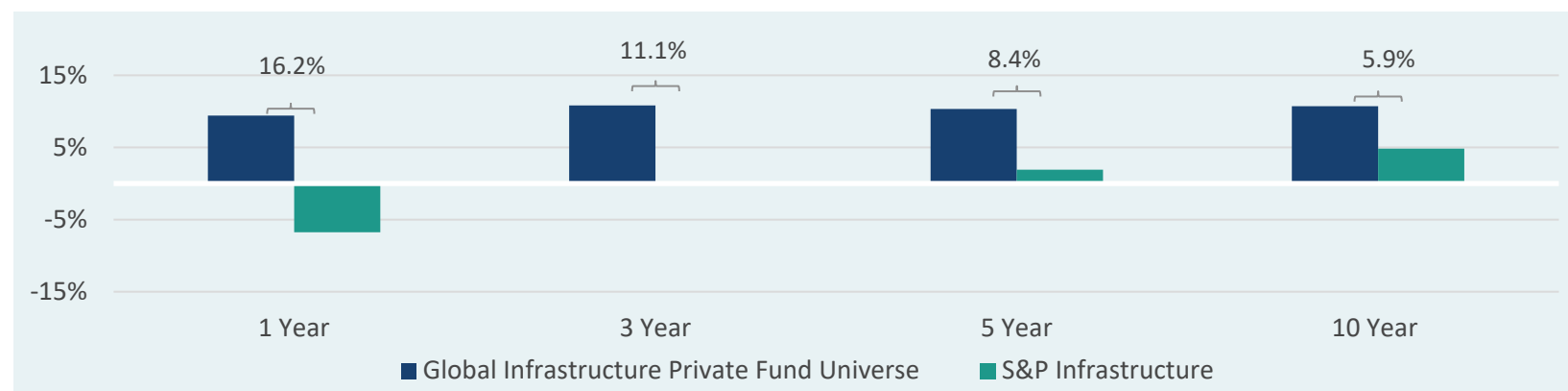
# Private vs. liquid real assets performance

## GLOBAL NATURAL RESOURCES FUNDS



N.R. funds outperformed the MSCI World Natural Resources benchmark across all periods

## GLOBAL INFRASTRUCTURE FUNDS

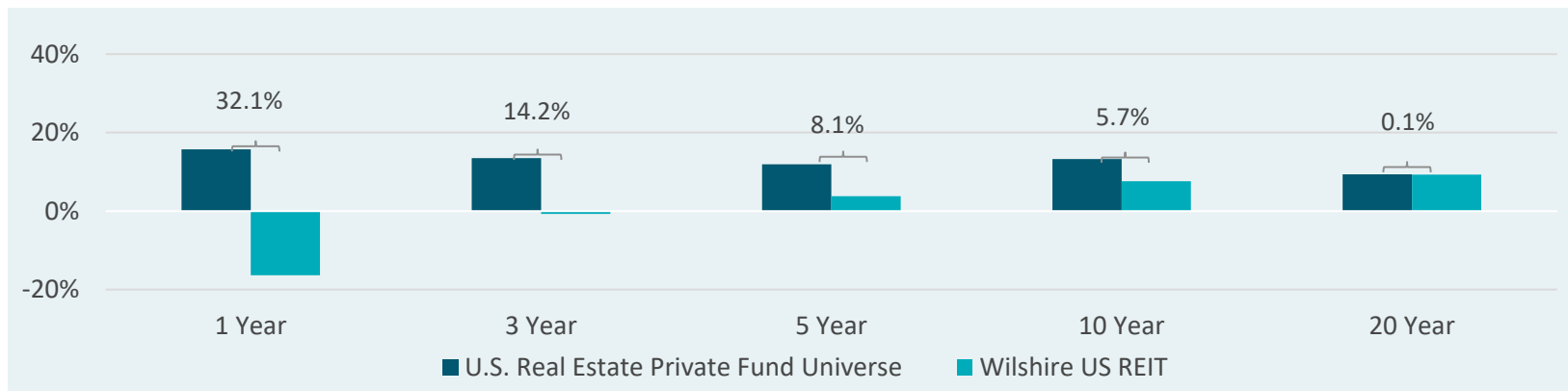


Infra. funds outperformed the S&P Infra. across all periods

Sources: Refinitiv PME: Global Natural Resources (vintage 1999 and later, inception of MSCI World Natural Resources benchmark) and Global Infrastructure (vintage 2002 and later, inception of S&P Infrastructure benchmark) universes as of September 30, 2022. Public Market Equivalent returns resulted from identical cash flows invested into and distributed from respective liquid real assets universes.

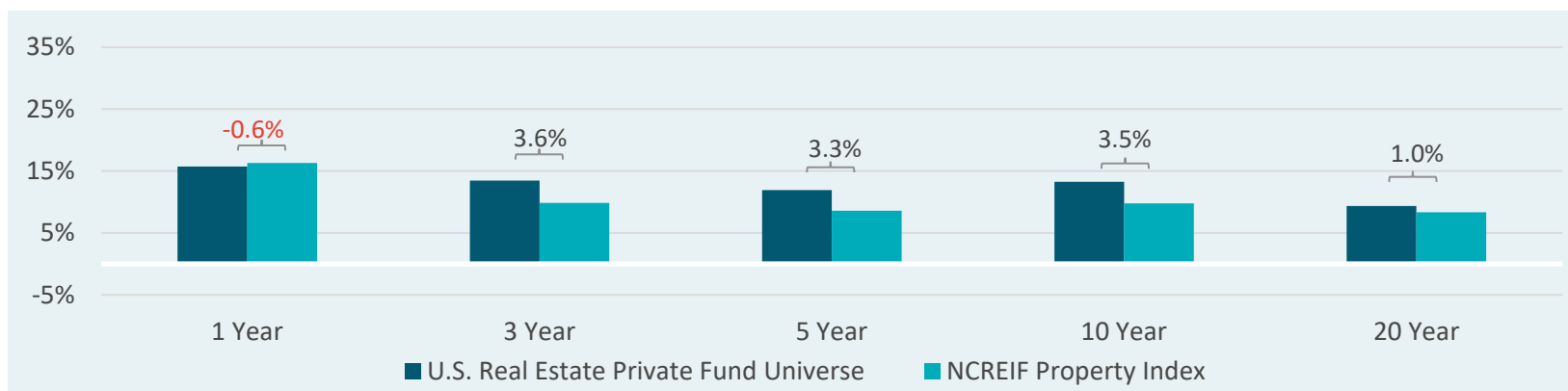
# Private vs. liquid and core real estate performance

## U.S. PRIVATE REAL ESTATE FUNDS VS. LIQUID UNIVERSE



U.S. Private R.E. funds outperformed the Wilshire U.S. REIT Index across all time periods

## U.S. PRIVATE REAL ESTATE FUNDS VS. CORE FUNDS



U.S. Private R.E. Funds outperformed the NCREIF Property Index across all time periods, aside from the 1-year

Sources: Refinitiv PME: U.S. Real Estate universes as of September 30, 2022. Public Market Equivalent returns resulted from identical cash flows invested into and distributed from respective liquid real estate universes.

# Detailed index returns

## DOMESTIC EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Core Index</b>							
S&P 500	3.7	7.5	7.5	(7.7)	18.6	11.2	12.2
S&P 500 Equal Weighted	(0.9)	2.9	2.9	(6.3)	22.1	10.0	11.4
DJ Industrial Average	2.1	0.9	0.9	(2.0)	17.3	9.0	11.1
Russell Top 200	4.9	8.7	8.7	(8.3)	18.4	11.9	12.8
Russell 1000	3.2	7.5	7.5	(8.4)	18.6	10.9	12.0
Russell 2000	(4.8)	2.7	2.7	(11.6)	17.5	4.7	8.0
Russell 3000	2.7	7.2	7.2	(8.6)	18.5	10.5	11.7
Russell Mid Cap	(1.5)	4.1	4.1	(8.8)	19.2	8.1	10.1
<b>Style Index</b>							
Russell 1000 Growth	6.8	14.4	14.4	(10.9)	18.6	13.7	14.6
Russell 1000 Value	(0.5)	1.0	1.0	(5.9)	17.9	7.5	9.1
Russell 2000 Growth	(2.5)	6.1	6.1	(10.6)	13.4	4.3	8.5
Russell 2000 Value	(7.2)	(0.7)	(0.7)	(13.0)	21.0	4.5	7.2

## INTERNATIONAL EQUITY

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Broad Index</b>							
MSCI ACWI	3.1	7.3	7.3	(7.4)	15.4	6.9	8.1
MSCI ACWI ex US	2.4	6.9	6.9	(5.1)	11.8	2.5	4.2
MSCI EAFE	2.5	8.5	8.5	(1.4)	13.0	3.5	5.0
MSCI EM	3.0	4.0	4.0	(10.7)	7.8	(0.9)	2.0
MSCI EAFE Small Cap	(0.2)	4.9	4.9	(9.8)	12.1	0.9	5.9
<b>Style Index</b>							
MSCI EAFE Growth	5.3	11.1	11.1	(2.8)	10.9	4.9	6.0
MSCI EAFE Value	(0.3)	5.9	5.9	(0.3)	14.6	1.7	3.7
<b>Regional Index</b>							
MSCI UK	(0.6)	6.1	6.1	(0.8)	14.6	3.0	3.4
MSCI Japan	4.0	6.2	6.2	(5.2)	7.4	1.3	5.0
MSCI Euro	4.1	15.6	15.6	7.7	17.1	3.9	6.0
MSCI EM Asia	3.6	4.8	4.8	(9.4)	7.1	0.1	4.2
MSCI EM Latin American	0.8	3.9	3.9	(11.1)	18.1	(1.8)	(1.9)

## FIXED INCOME

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Broad Index</b>							
Bloomberg US TIPS	2.9	3.3	3.3	(6.1)	1.8	2.9	1.5
Bloomberg US Treasury Bills	0.4	1.1	1.1	2.5	0.8	1.4	0.9
Bloomberg US Agg Bond	2.5	3.0	3.0	(4.8)	(2.8)	0.9	1.4
Bloomberg US Universal	2.3	2.9	2.9	(4.6)	(2.0)	1.0	1.6
<b>Duration</b>							
Bloomberg US Treasury 1-3 Yr	1.6	1.6	1.6	0.2	(0.8)	1.1	0.8
Bloomberg US Treasury Long	4.7	6.2	6.2	(16.0)	(11.3)	(0.4)	1.5
Bloomberg US Treasury	2.9	3.0	3.0	(4.5)	(4.2)	0.7	0.9
<b>Issuer</b>							
Bloomberg US MBS	1.9	2.5	2.5	(4.9)	(3.3)	0.2	1.0
Bloomberg US Corp. High Yield	1.1	3.6	3.6	(3.3)	5.9	3.2	4.1
Bloomberg US Agency Interm	1.8	1.9	1.9	(1.1)	(1.6)	0.9	0.9
Bloomberg US Credit	2.7	3.5	3.5	(5.3)	(0.7)	1.5	2.2

## OTHER

	Month	QTD	YTD	1 Year	3 Year	5 Year	10 Year
<b>Index</b>							
Bloomberg Commodity	(0.2)	(5.4)	(5.4)	(12.5)	20.8	5.4	(1.7)
Wilshire US REIT	(2.6)	3.2	3.2	(21.3)	11.0	5.7	5.9
CS Leveraged Loans	(0.1)	3.1	3.1	2.1	8.4	3.5	3.9
S&P Global Infrastructure	2.4	3.9	3.9	(3.5)	15.6	5.9	6.4
Alerian MLP	(0.7)	3.4	3.4	13.9	46.3	6.9	0.6
<b>Regional Index</b>							
JPM EMBI Global Div	1.0	1.9	1.9	(6.9)	(0.0)	(0.6)	2.0
JPM GBI-EM Global Div	4.1	5.2	5.2	(0.7)	0.9	(2.4)	(1.5)
<b>Hedge Funds</b>							
HFRI Composite	(0.8)	1.2	1.2	(2.1)	10.5	4.7	4.4
HFRI FOF Composite	0.1	1.6	1.6	(1.1)	7.5	3.3	3.3
<b>Currency (Spot)</b>							
Euro	2.5	1.8	1.8	(2.4)	(0.3)	(2.5)	(1.7)
Pound Sterling	2.1	2.8	2.8	(6.1)	(0.1)	(2.5)	(2.0)
Yen	2.4	(0.9)	(0.9)	(8.8)	(6.7)	(4.4)	(3.4)

Source: Morningstar, HFRI, as of 3/31/23.

# Definitions

**Bloomberg US Weekly Consumer Comfort Index** - tracks the public's economic attitudes each week, providing a high-frequency read on consumer sentiment. The index, based on cell and landline telephone interviews with a random, representative national sample of U.S. adults, tracks Americans' ratings of the national economy, their personal finances and the buying climate on a weekly basis, with views of the economy's direction measured separately each month. ([www.lanqerresearch.com](http://www.lanqerresearch.com))

**University of Michigan Consumer Sentiment Index** - A survey of consumer attitudes concerning both the present situation as well as expectations regarding economic conditions conducted by the University of Michigan. For the preliminary release approximately three hundred consumers are surveyed while five hundred are interviewed for the final figure. The level of consumer sentiment is related to the strength of consumer spending. ([www.Bloomberg.com](http://www.Bloomberg.com))

**NFIB Small Business Outlook** - Small Business Economic Trends (SBET) is a monthly assessment of the U.S. small-business economy and its near-term prospects. Its data are collected through mail surveys to random samples of the National Federal of Independent Business (NFIB) membership. The survey contains three broad question types: recent performance, near-term forecasts, and demographics. The topics addressed include: outlook, sales, earnings, employment, employee compensation, investment, inventories, credit conditions, and single most important problem. (<http://www.nfib-sbet.org/about/>)

**NAHB Housing Market Index** - the housing market index is a weighted average of separate diffusion indices for three key single-family indices: market conditions for the sale of new homes at the present time, market conditions for the sale of new homes in the next six months, and the traffic of prospective buyers of new homes. The first two series are rated on a scale of Good, Fair, and Poor and the last is rated on a scale of High/Very High, Average, and Low/Very Low. A diffusion index is calculated for each series by applying the formula  $(\text{Good-Poor} + 100)/2$  to the present and future sales series and  $(\text{High/Very High-Low/Very Low} + 100)/2$  to the traffic series. Each resulting index is then seasonally adjusted and weighted to produce the HMI. Based on this calculation, the HMI can range between 0 and 100.

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# Contra Costa County Employees Retirement Association

Investment Performance Review

Period Ending: March 31, 2023



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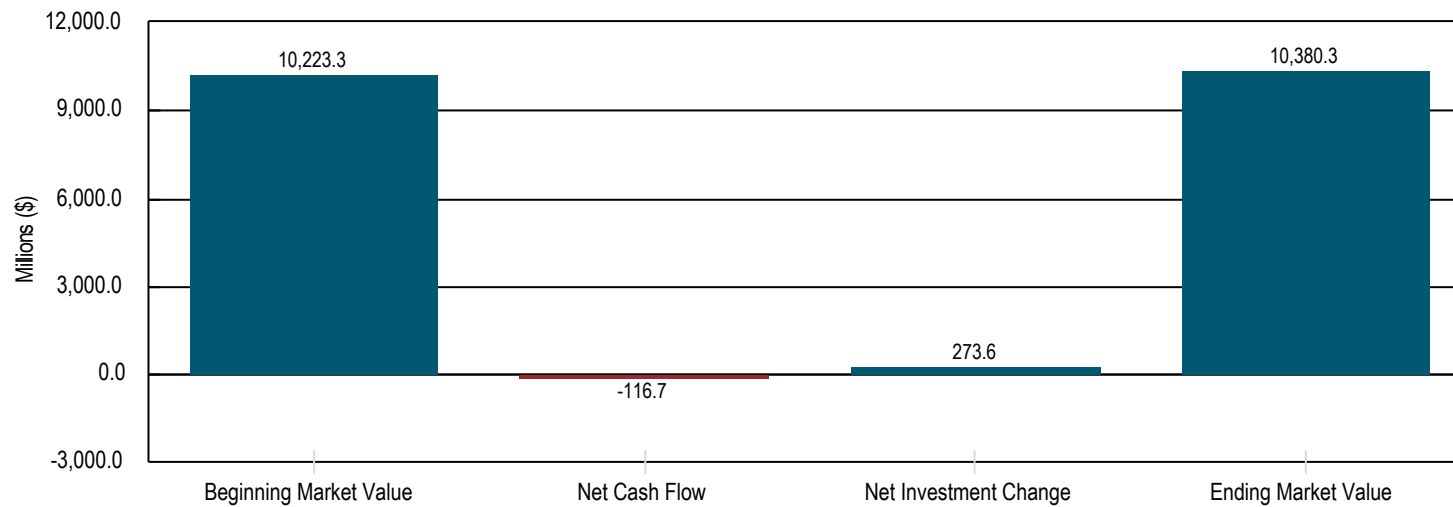
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Portfolio Reconciliation

Last Three  
Months

Beginning Market Value	\$10,223,348,190
Net Cash Flow	-\$116,659,589
Net Investment Change	\$273,645,871
Ending Market Value	\$10,380,334,472

Change in Market Value  
Last Three Months

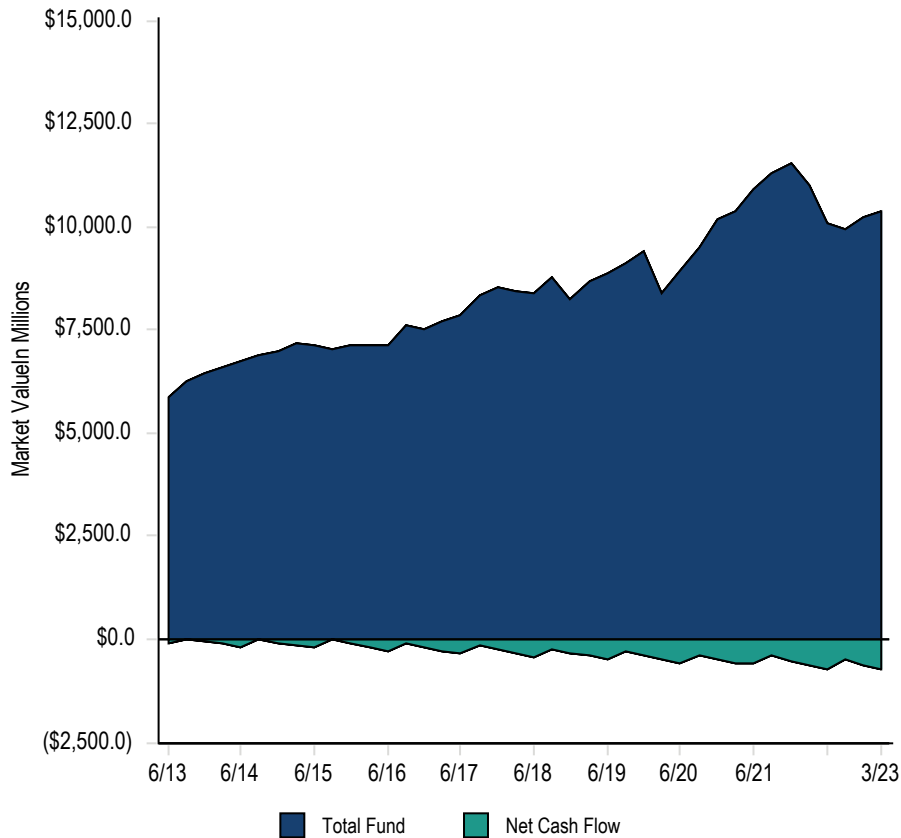


Contributions and withdrawals may include intra-account transfers between managers/funds.

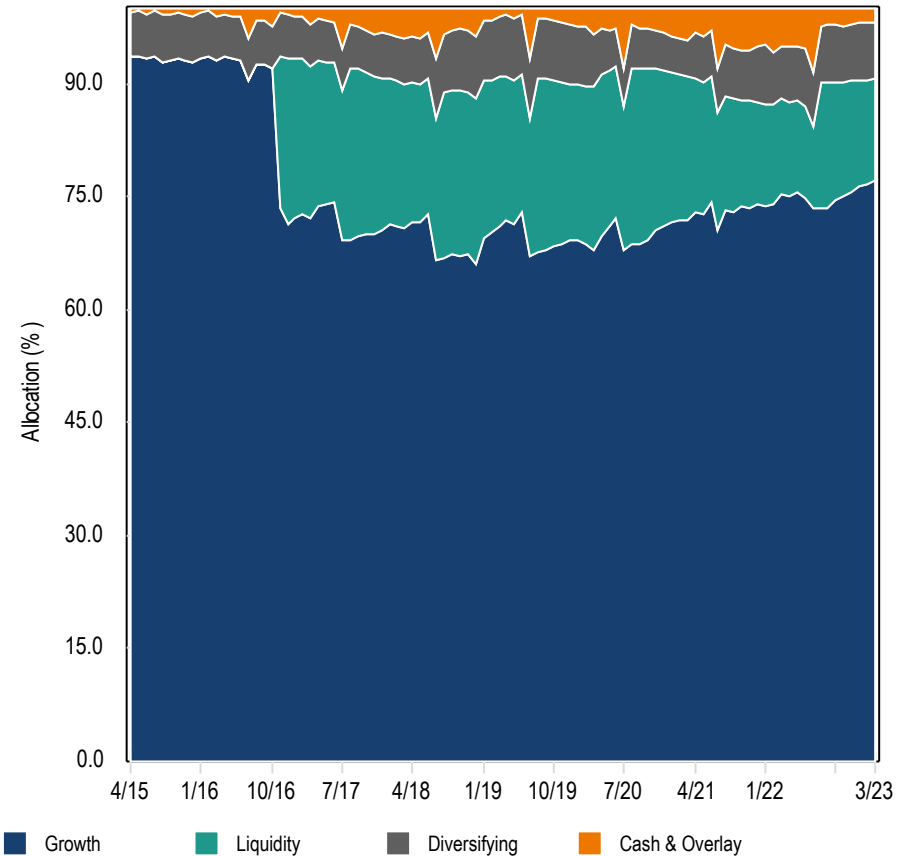
Total Fund  
Asset Allocation History

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Market Value History  
Cumulative Cash Flows



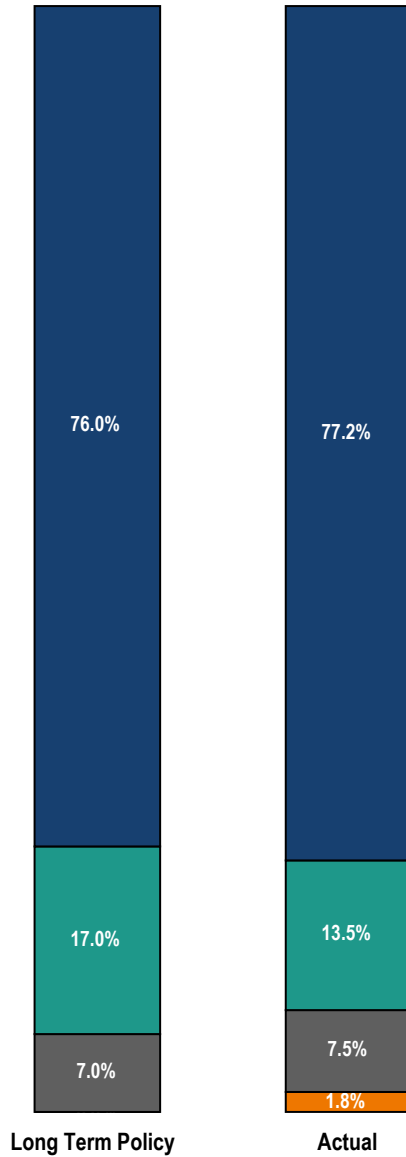
Asset Allocation History



Policy reflects Long-Term Asset Allocation approved July 2022.

Total Fund  
Asset Allocation vs. Long Term Target Policy

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023



Allocation vs. Long Term Target

	Current Balance	Current Allocation	Long Term Target	Difference
Growth	\$8,015,959,818	77.2	76.0	\$126,905,620
Liquidity	\$1,399,754,034	13.5	17.0	-\$364,902,826
Diversifying	\$779,013,701	7.5	7.0	\$52,390,288
Cash & Overlay	\$185,606,918	1.8	0.0	\$185,606,918
<b>Total</b>	<b>\$10,380,334,472</b>	<b>100.0</b>	<b>100.0</b>	

Allocation vs. Current Targets

	Current Balance (\$)	Current Allocation (%)	Current Target (%)	Difference
Growth	\$8,015,959,818	77.2	75.5	\$178,807,292
Liquidity	\$1,399,754,034	13.5	17.0	-\$364,902,826
Diversifying	\$779,013,701	7.5	7.5	\$488,616
Cash & Overlay	\$185,606,918	1.8	0.0	\$185,606,918
<b>Total</b>	<b>\$10,380,334,472</b>	<b>100.0</b>	<b>100.0</b>	

Current and Long-Term Policy Targets approved July 2022.



Total Fund  
Executive Summary (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

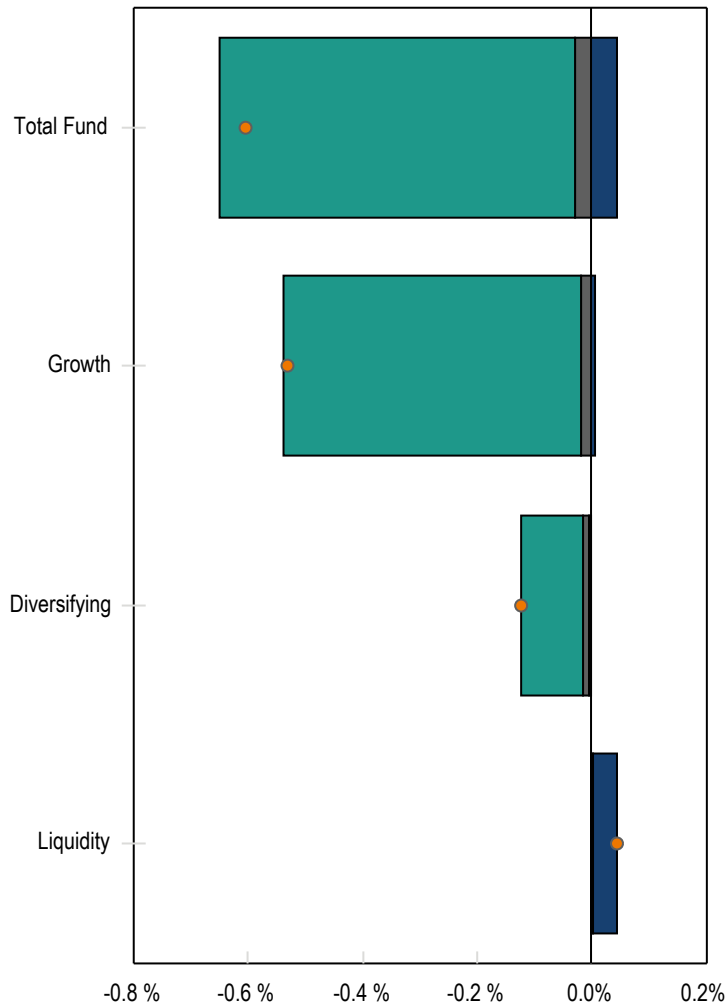
	% of Portfolio	QTD	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018
<b>Total Fund</b>	<b>100.0</b>	<b>2.7</b>	<b>-4.9</b>	<b>8.1</b>	<b>5.0</b>	<b>6.5</b>	<b>-10.6</b>	<b>13.9</b>	<b>9.2</b>	<b>14.6</b>	<b>-2.7</b>
Policy Index		3.2	-3.4	9.8	6.4	7.5	-8.3	15.3	10.8	14.6	-0.9
Policy Index (Adjusted)		3.2	-3.4	9.0	5.9	6.9	-8.3	15.3	8.5	14.1	-1.5
<b>Growth</b>	<b>77.2</b>	<b>3.0</b>	<b>-5.7</b>	<b>11.6</b>	<b>6.6</b>	<b>8.0</b>	<b>-11.6</b>	<b>19.2</b>	<b>12.0</b>	<b>18.3</b>	<b>-3.9</b>
Custom Growth Benchmark		3.7	-4.9	14.0	8.4	9.0	-10.2	21.6	13.8	19.3	-2.1
<b>Diversifying</b>	<b>7.5</b>	<b>1.3</b>	<b>-1.7</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>-5.7</b>	<b>1.7</b>	<b>-1.7</b>	<b>6.8</b>	<b>-2.3</b>
Custom Diversifying Benchmark		2.9	0.2	1.0	2.2	2.6	-5.4	1.6	4.7	6.1	1.4
<b>Liquidity</b>	<b>13.5</b>	<b>1.5</b>	<b>0.4</b>	<b>0.3</b>	<b>1.5</b>	<b>-</b>	<b>-3.5</b>	<b>-0.3</b>	<b>3.4</b>	<b>4.8</b>	<b>1.7</b>
Blmbg. 1-3 Year Gov/Credit index		1.5	0.3	-0.4	1.3	-	-3.7	-0.5	3.3	4.0	1.6

\*Correlation between the Growth and Diversifying composites is .51, .51 and .58 over the previous 1, 3, and 5 year periods respectively.

Total Fund  
 Attribution Analysis - Asset Class Level (Net of Fees)

Contra Costa County Employees' Retirement Association  
 Period Ending: March 31, 2023

Attribution Effects  
 3 Months Ending March 31, 2023



■ Selection Effect    ■ Allocation Effect  
■ Interaction Effect    ● Total Effects

Performance Attribution

	3 Mo
Wtd. Actual Return	2.62
Wtd. Index Return	3.22
<b>Excess Return</b>	<b>-0.60</b>
Selection Effect	-0.62
Allocation Effect	0.05
Interaction Effect	-0.03

Attribution Summary  
 Last 3 Months

	Wtd. Actual Return	Wtd. Index Return	Excess Return	Selection Effect	Allocation Effect	Interaction Effects	Total Effects
Growth	3.0	3.7	-0.7	-0.5	0.0	0.0	-0.5
Diversifying	1.3	2.9	-1.5	-0.1	0.0	0.0	-0.1
Liquidity	1.5	1.5	0.0	0.0	0.0	0.0	0.0
<b>Total Fund</b>	<b>2.6</b>	<b>3.2</b>	<b>-0.6</b>	<b>-0.6</b>	<b>0.0</b>	<b>0.0</b>	<b>-0.6</b>

Performance attribution calculated from benchmark returns and weightings of each component.

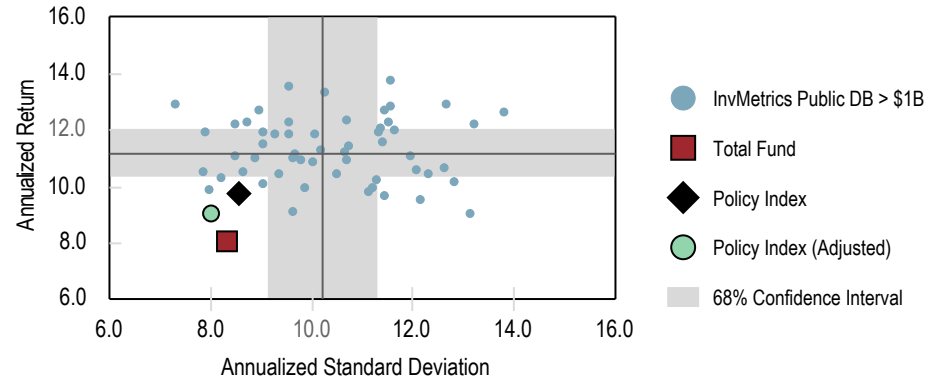
Total Fund  
Executive Summary (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

3 Years

	Anlzd Return	Ann Excess Performance	Anlzd Standard Deviation	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Information Ratio	Up Capture	Down Capture
Total Fund	8.06	-1.70	8.31	-1.06	0.95	2.01	0.94	0.86	-0.79	94.41	107.55

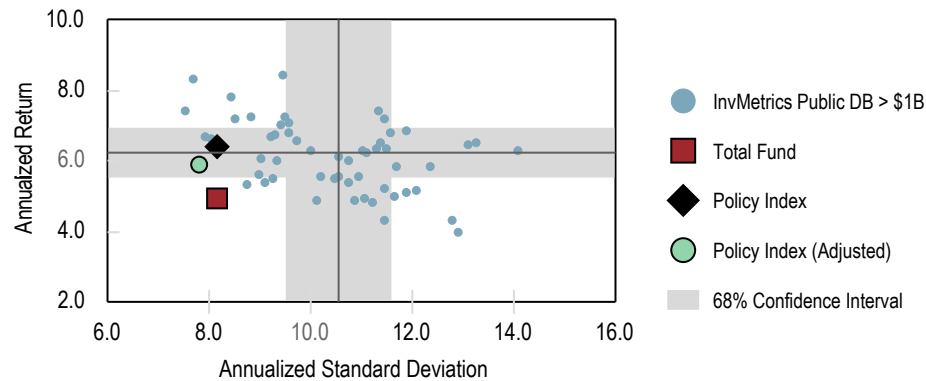
Risk vs. Return



5 Years

	Anlzd Return	Ann Excess Performance	Standard Deviation	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Information Ratio	Up Capture	Down Capture
Total Fund	4.95	-1.48	8.17	-1.25	0.98	1.89	0.95	0.46	-0.74	94.41	106.91

Risk vs. Return



Total Fund  
Performance Summary (Gross of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Total Fund</b>	<b>10,380,334,472</b>	<b>100.0</b>	<b>2.7</b>	<b>-4.7</b>	<b>8.3</b>	<b>5.2</b>	<b>6.9</b>	<b>-10.4</b>	<b>14.2</b>	<b>9.5</b>	<b>14.9</b>	<b>-2.5</b>		
Policy Index			3.2	-3.4	9.8	6.4	7.5	-8.3	15.3	10.8	14.6	-0.9		
Policy Index (Adjusted)			3.2	-3.4	9.0	5.9	6.9	-8.3	15.3	8.5	14.1	-1.5		
InvMetrics Public DB > \$1B Rank			94	58	94	79	48	42	66	79	90	31		
<b>Total Fund ex Overlay &amp; Cash</b>	<b>10,194,727,554</b>	<b>98.2</b>	<b>2.7</b>	<b>-4.3</b>	<b>8.7</b>	<b>5.5</b>	<b>7.0</b>	<b>-9.8</b>	<b>14.6</b>	<b>9.7</b>	<b>14.7</b>	<b>-2.1</b>		
Policy Index			3.2	-3.4	9.8	6.4	7.5	-8.3	15.3	10.8	14.6	-0.9		
Policy Index (Adjusted)			3.2	-3.4	9.0	5.9	6.9	-8.3	15.3	8.5	14.1	-1.5		
InvMetrics Public DB > \$1B Rank			94	49	94	66	46	37	60	74	91	24		
<b>Growth</b>	<b>8,015,959,818</b>	<b>77.2</b>	<b>3.0</b>	<b>-5.5</b>	<b>12.0</b>	<b>7.0</b>	<b>8.5</b>	<b>-11.4</b>	<b>19.6</b>	<b>12.4</b>	<b>18.7</b>	<b>-3.6</b>		
Custom Growth Benchmark			3.7	-4.9	14.0	8.4	9.0	-10.2	21.6	13.8	19.3	-2.1		
<b>Total Domestic Equity</b>	<b>1,738,633,223</b>	<b>16.7</b>	<b>4.8</b>	<b>-8.6</b>	<b>18.0</b>	<b>8.4</b>	<b>11.0</b>	<b>-18.3</b>	<b>20.6</b>	<b>22.2</b>	<b>26.7</b>	<b>-7.2</b>		
Russell 3000 Index			7.2	-8.6	18.5	10.5	11.7	-19.2	25.7	20.9	31.0	-5.2		
InvMetrics Public DB US Equity Rank			87	80	61	100	83	49	99	15	100	77		
BlackRock Russell 1000 Index	936,129,841	9.0	7.5	-8.4	18.6	10.9	-	-19.1	26.5	21.0	31.4	-4.8	11.4	May-17
Russell 1000 Index			7.5	-8.4	18.6	10.9	-	-19.1	26.5	21.0	31.4	-4.8	11.3	
eV US Large Cap Equity Rank			32	71	47	41	-	69	55	36	40	51		
Boston Partners	398,055,747	3.8	-0.2	-4.7	22.1	8.4	10.5	-3.8	31.3	3.0	24.3	-8.7	10.5	Jun-95
Russell 1000 Value Index			1.0	-5.9	17.9	7.5	9.1	-7.5	25.2	2.8	26.5	-8.3	9.1	
eV US Large Cap Value Equity Rank			69	56	27	61	42	36	18	62	79	58		
Emerald Advisers	203,676,202	2.0	4.2	-11.2	15.4	6.7	11.0	-23.8	5.5	39.0	30.3	-10.1	12.2	Apr-03
Russell 2000 Growth Index			6.1	-10.6	13.4	4.3	8.5	-26.4	2.8	34.6	28.5	-9.3	10.0	
eV US Small Cap Growth Equity Rank			85	54	69	80	64	25	76	57	49	86		
Ceredex	200,771,432	1.9	4.0	1.6	23.2	6.4	8.6	-8.5	28.4	2.3	18.4	-11.3	10.1	Nov-11
Russell 2000 Value Index			-0.7	-13.0	21.0	4.5	7.2	-14.5	28.3	4.6	22.4	-12.9	9.0	
eV US Small Cap Value Equity Rank			29	9	64	57	63	27	59	70	88	29		

Individual closed end funds are not shown in performance summary table.

Total Fund  
Performance Summary (Gross of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Total International Equity</b>	<b>1,597,611,656</b>	<b>15.4</b>	<b>6.1</b>	<b>-5.2</b>	<b>12.6</b>	<b>2.8</b>	<b>5.2</b>	<b>-18.2</b>	<b>8.3</b>	<b>15.8</b>	<b>23.7</b>	<b>-14.3</b>		
MSCI AC World ex USA Index			7.0	-4.6	12.3	3.0	4.7	-15.6	8.3	11.1	22.1	-13.8		
MSCI EAFE Index			8.6	-0.9	13.5	4.0	5.5	-14.0	11.8	8.3	22.7	-13.4		
InvMetrics Public DB Global ex-US Equity Rank			96	84	48	67	64	66	50	29	44	67		
<b>International Equity</b>	<b>910,125,208</b>	<b>8.8</b>	<b>7.9</b>	<b>-3.1</b>	<b>12.3</b>	<b>4.9</b>	<b>6.1</b>	<b>-18.1</b>	<b>9.0</b>	<b>19.0</b>	<b>27.0</b>	<b>-13.6</b>		
MSCI AC World ex USA Index			7.0	-4.6	12.3	3.0	4.7	-15.6	8.3	11.1	22.1	-13.8		
InvMetrics Public DB Global ex-US Equity Rank			43	52	57	24	25	63	36	10	18	42		
Pyrford	468,325,309	4.5	7.3	1.6	11.6	4.7	-	-7.0	7.6	4.7	22.1	-10.1	4.2	May-14
MSCI AC World ex USA Value			5.2	-4.0	13.8	1.3	-	-8.6	10.5	-0.8	15.7	-14.0	1.7	
eV ACWI ex-US Value Equity Rank			54	39	98	14	-	20	82	42	34	5		
William Blair	441,799,898	4.3	8.6	-7.8	12.5	4.8	6.4	-27.7	10.5	33.3	32.0	-16.8	6.5	Nov-10
MSCI AC World ex USA Growth			8.6	-6.4	9.5	3.4	5.1	-23.1	5.1	22.2	27.3	-14.4	4.8	
eV ACWI ex-US Growth Equity Rank			62	58	56	45	65	59	43	37	37	72		
<b>Emerging Markets Equity</b>	<b>687,486,448</b>	<b>6.6</b>	<b>3.8</b>	<b>-7.9</b>	<b>13.2</b>	<b>0.1</b>	<b>-</b>	<b>-18.4</b>	<b>7.6</b>	<b>11.4</b>	<b>19.4</b>	<b>-15.3</b>		
MSCI Emerging Markets			4.0	-10.7	7.8	-0.9	-	-20.1	-2.5	18.3	18.4	-14.6		
InvMetrics Public DB Emerging Markets Equity Rank			50	22	10	37	-	28	28	68	27	67		
PIMCO RAE Emerging Markets	362,889,350	3.5	4.3	-2.2	19.0	1.9	-	-9.7	17.1	2.1	14.6	-12.3	4.7	Mar-17
MSCI Emerging Markets Value			3.9	-9.4	10.0	-1.2	-	-15.8	4.0	5.5	12.0	-10.7	2.1	
eV Emg Mkts All Cap Value Equity Rank			77	31	16	34	-	32	8	85	78	44		
TT Emerging Markets	324,597,098	3.1	3.3	-13.5	8.0	-1.6	-	-26.4	-0.2	20.8	24.8	-18.4	0.8	Aug-17
MSCI Emerging Markets			4.0	-10.7	7.8	-0.9	-	-20.1	-2.5	18.3	18.4	-14.6	1.0	
eV Emg Mkts Equity Rank			86	92	74	91	-	90	58	38	24	82		
<b>Total Global Equity</b>	<b>1,028,387,313</b>	<b>9.9</b>	<b>7.5</b>	<b>-6.3</b>	<b>13.9</b>	<b>8.0</b>	<b>9.4</b>	<b>-18.8</b>	<b>14.1</b>	<b>25.3</b>	<b>28.9</b>	<b>-7.8</b>		
MSCI AC World Index			7.3	-7.4	15.4	6.9	8.1	-18.4	18.5	16.3	26.6	-9.4		
InvMetrics Public DB Global Equity Rank			1	25	100	-	-	84	61	1	17	20		
Artisan Partners	506,380,751	4.9	9.2	-11.5	12.8	8.9	11.5	-29.6	15.0	41.7	37.0	-7.9	11.7	Oct-12
MSCI ACWI Growth NR USD			13.8	-10.0	14.7	9.0	9.9	-28.6	17.1	33.6	32.7	-8.1	10.3	
eV Global Growth Equity Rank			47	62	64	36	19	59	55	33	12	59		
First Eagle	521,884,520	5.0	5.8	-0.9	14.5	6.7	7.4	-5.6	13.0	8.5	21.0	-7.6	7.8	Jan-11
MSCI ACWI Value NR USD			1.2	-5.5	15.2	4.3	5.9	-7.5	19.6	-0.3	20.6	-10.8	5.9	
eV Global Value Equity Rank			47	22	73	26	36	20	85	35	65	18		

Individual closed end funds are not shown in performance summary table.

Total Fund  
Performance Summary (Gross of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Private Credit</b>	<b>1,058,374,155</b>	<b>10.2</b>	<b>-0.1</b>	<b>7.5</b>	<b>8.1</b>	<b>7.4</b>	<b>10.0</b>	<b>10.5</b>	<b>10.0</b>	<b>4.0</b>	<b>7.7</b>	<b>8.3</b>		
<b>Total High Yield</b>	<b>145,473,183</b>	<b>1.4</b>	<b>4.0</b>	<b>-2.8</b>	<b>4.9</b>	<b>3.1</b>	<b>3.7</b>	<b>-10.6</b>	<b>5.3</b>	<b>5.2</b>	<b>15.3</b>	<b>-3.2</b>		
ICE BofA U.S. High Yield Index			3.7	-3.6	5.8	3.0	4.0	-11.3	5.3	6.2	14.4	-2.3		
eV US High Yield Fixed Inc Rank			15	58	88	82	87	75	54	73	36	89		
Voya Global Investors	145,473,183	1.4	4.0	-2.8	4.9	3.1	3.7	-10.6	5.3	5.2	15.3	-3.2	6.1	May-00
ICE BofA U.S. High Yield Index			3.7	-3.6	5.8	3.0	4.0	-11.3	5.3	6.2	14.4	-2.3	6.3	
eV US High Yield Fixed Inc Rank			15	58	88	82	87	75	54	73	36	89		
<b>Total Real Estate</b>	<b>786,410,676</b>	<b>7.6</b>	<b>-2.0</b>	<b>-10.3</b>	<b>1.8</b>	<b>3.6</b>	<b>7.4</b>	<b>-4.8</b>	<b>19.2</b>	<b>-5.9</b>	<b>8.1</b>	<b>7.4</b>		
Real Estate Benchmark			-2.0	-8.9	4.8	5.1	6.9	-4.1	19.3	0.7	7.6	6.7		
NCREIF-ODCE			-3.2	-3.1	8.4	7.5	9.5	7.5	22.2	1.2	5.3	8.3		
NCREIF Property Index			-1.8	-1.6	7.2	6.7	8.3	5.5	17.7	1.6	6.4	6.7		
<b>Total Core Real Estate</b>	<b>194,273,370</b>	<b>1.9</b>	<b>2.4</b>	<b>-20.0</b>	<b>12.5</b>	<b>7.2</b>	<b>7.4</b>	<b>-24.8</b>	<b>48.3</b>	<b>-4.6</b>	<b>28.2</b>	<b>-5.0</b>		
Adelante	86,415,978	0.8	3.9	-21.1	12.1	7.0	7.3	-26.7	48.3	-4.6	28.2	-5.0	9.4	Oct-01
Wilshire U.S. REIT Index			3.2	-21.3	11.0	5.7	5.9	-26.8	46.2	-7.9	25.8	-4.8	8.8	
Invesco US Fundamental Beta	107,857,392	1.0	1.2	-19.0	-	-	-	-	-	-	-	-	-12.9	Mar-22
Wilshire U.S. REIT Index			3.2	-21.3	-	-	-	-	-	-	-	-	-14.8	
<b>Total Private Real Estate</b>	<b>592,137,306</b>	<b>5.7</b>	<b>-3.4</b>	<b>-6.2</b>	<b>1.5</b>	<b>3.6</b>	<b>7.8</b>	<b>1.9</b>	<b>15.3</b>	<b>-6.1</b>	<b>6.2</b>	<b>8.8</b>		
<b>Private Equity</b>	<b>1,322,288,594</b>	<b>12.7</b>	<b>-0.9</b>	<b>-4.4</b>	<b>18.9</b>	<b>15.8</b>	<b>14.2</b>	<b>-0.5</b>	<b>60.4</b>	<b>8.7</b>	<b>8.4</b>	<b>12.0</b>		
<b>Risk Parity</b>	<b>338,781,018</b>	<b>3.3</b>	<b>4.4</b>	<b>-13.8</b>	<b>3.1</b>	<b>-</b>	<b>-</b>	<b>-21.5</b>	<b>9.7</b>	<b>10.0</b>	<b>18.1</b>	<b>-</b>		
60% MSCI ACWI Net/40% Blmbg. Global Aggregate			5.6	-7.5	7.7	-	-	-17.3	8.8	14.0	18.6	-		
AQR Global Risk Premium-EL	171,916,484	1.7	4.0	-9.4	4.3	-	-	-16.3	10.7	6.2	18.7	-	4.7	Jan-19
HFR Risk Parity Vol 10 Index			4.4	-10.2	2.4	-	-	-18.3	6.8	3.6	18.4	-	2.7	
PanAgora Risk Parity Multi Asset	166,864,534	1.6	4.9	-17.7	2.0	-	-	-26.1	8.7	14.0	-	-	2.2	Mar-19
HFR Risk Parity Vol 10 Index			4.4	-10.2	2.4	-	-	-18.3	6.8	3.6	-	-	1.3	

Individual closed end funds are not shown in performance summary table.

Total Fund  
Performance Summary (Gross of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Diversifying</b>	<b>779,013,701</b>	<b>7.5</b>	<b>1.4</b>	<b>-1.4</b>	<b>0.6</b>	<b>0.5</b>	<b>0.5</b>	<b>-5.4</b>	<b>2.0</b>	<b>-1.3</b>	<b>7.1</b>	<b>-2.0</b>		
<i>Custom Diversifying Benchmark</i>			2.9	0.2	1.0	2.2	2.6	-5.4	1.6	4.7	6.1	1.4		
<b>Diversifying Fixed Income</b>	<b>225,015,715</b>	<b>2.2</b>	<b>3.0</b>	<b>-5.1</b>	<b>-2.9</b>	<b>-0.6</b>	<b>0.8</b>	<b>-13.3</b>	<b>-0.7</b>	<b>1.6</b>	<b>8.6</b>	<b>-1.7</b>		
<i>Blmbg. U.S. Aggregate Index</i>			3.0	-4.8	-2.8	0.9	1.4	-13.0	-1.5	7.5	8.7	0.0		
<i>eV US Core Fixed Inc Rank</i>			68	85	97	100	100	75	31	100	81	100		
AFL-CIO	224,954,869	2.2	3.0	-5.1	-3.0	0.8	1.5	-13.3	-0.7	6.6	8.2	0.6	5.3	Jul-91
<i>Blmbg. U.S. Aggregate Index</i>			3.0	-4.8	-2.8	0.9	1.4	-13.0	-1.5	7.5	8.7	0.0	5.0	
<i>eV US Core Fixed Inc Rank</i>			70	85	97	98	95	76	31	96	88	13		
<b>Diversifying Multi-Asset</b>	<b>553,997,986</b>	<b>5.3</b>	<b>0.8</b>	<b>0.4</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-1.9</b>	<b>2.8</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<i>Custom Diversifying Multi-Asset Benchmark</i>			2.8	2.0	-	-	-	-3.1	4.1	-	-	-		
Acadian Multi-Asset Absolute Return Fund	251,661,058	2.4	-0.9	1.5	-	-	-	-0.1	1.7	-	-	-	0.9	Aug-20
<i>FTSE 3-Month T-bill +5%</i>			2.4	7.7	-	-	-	6.6	5.0	-	-	-	6.1	
Sit LLCAR	302,336,928	2.9	2.3	-0.6	-	-	-	-3.3	-	-	-	-	1.7	Apr-21
<i>Blmbg. U.S. Aggregate Index +1%</i>			3.2	-3.8	-	-	-	-12.1	-	-	-	-	-3.5	
<b>Liquidity</b>	<b>1,399,754,034</b>	<b>13.5</b>	<b>1.6</b>	<b>0.5</b>	<b>0.4</b>	<b>1.6</b>	<b>-</b>	<b>-3.4</b>	<b>-0.2</b>	<b>3.5</b>	<b>4.9</b>	<b>1.8</b>		
<i>Blmbg. 1-3 Year Gov/Credit Index</i>			1.5	0.3	-0.4	1.3	-	-3.7	-0.5	3.3	4.0	1.6		
<i>eV US Short Duration Fixed Inc Rank</i>			64	52	56	54	-	49	44	75	38	25		
DFA Short Credit	315,541,836	3.0	1.4	-0.3	-0.2	1.1	-	-5.3	-0.4	2.9	5.2	1.2	1.1	Dec-16
<i>ICE BofA 1-5 Year U.S. Corp/Govt Index</i>			1.8	-0.4	-0.7	1.3	-	-5.6	-0.9	4.6	5.1	1.4	1.2	
<i>eV US Short Duration Fixed Inc Rank</i>			88	86	81	97	-	90	66	89	25	89		
Insight Short Duration	510,803,290	4.9	1.2	1.3	1.5	2.0	-	-1.1	0.1	3.2	4.7	1.7	1.8	Dec-16
<i>Blmbg. 1-3 Year Gov/Credit index</i>			1.5	0.3	-0.4	1.3	-	-3.7	-0.5	3.3	4.0	1.6	1.1	
<i>eV US Short Duration Fixed Inc Rank</i>			98	7	23	18	-	5	29	85	47	38		
Sit Short Duration	573,408,908	5.5	1.9	0.1	-0.7	1.7	-	-4.8	-0.3	4.6	4.9	2.5	1.5	Dec-16
<i>Blmbg. 1-3 Year Govt Index</i>			1.6	0.2	-0.8	1.1	-	-3.8	-0.6	3.1	3.6	1.6	0.9	
<i>eV US Short Duration Fixed Inc Rank</i>			12	69	94	45	-	79	57	28	39	2		
<b>Total Cash</b>	<b>74,077,854</b>	<b>0.7</b>	<b>-1.7</b>	<b>0.4</b>	<b>0.6</b>	<b>1.4</b>	<b>1.0</b>	<b>2.4</b>	<b>0.4</b>	<b>1.3</b>	<b>3.3</b>	<b>1.7</b>		
<i>90 Day U.S. Treasury Bill</i>			1.1	2.5	0.9	1.4	0.9	1.5	0.0	0.7	2.3	1.9		
Cash	74,073,662	0.7	-1.2	0.9	0.7	1.5	1.4	2.2	0.4	1.3	3.4	1.7		
Northern Trust Transition	4,192	0.0	-99.3	-99.3	-76.4	-	-	-4.8	-6.1	104.1	-	-		

Total Fund  
Performance Summary (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Total Fund</b>	<b>10,380,334,472</b>	<b>100.0</b>	<b>2.7</b>	<b>-4.9</b>	<b>8.1</b>	<b>5.0</b>	<b>6.5</b>	<b>-10.6</b>	<b>13.9</b>	<b>9.2</b>	<b>14.6</b>	<b>-2.7</b>		
Policy Index			3.2	-3.4	9.8	6.4	7.5	-8.3	15.3	10.8	14.6	-0.9		
Policy Index (Adjusted)			3.2	-3.4	9.0	5.9	6.9	-8.3	15.3	8.5	14.1	-1.5		
<b>Total Fund ex Overlay &amp; Cash</b>	<b>10,194,727,554</b>	<b>98.2</b>	<b>2.6</b>	<b>-4.6</b>	<b>8.4</b>	<b>5.2</b>	<b>6.6</b>	<b>-10.1</b>	<b>14.3</b>	<b>9.4</b>	<b>14.3</b>	<b>-2.4</b>		
Policy Index			3.2	-3.4	9.8	6.4	7.5	-8.3	15.3	10.8	14.6	-0.9		
Policy Index (Adjusted)			3.2	-3.4	9.0	5.9	6.9	-8.3	15.3	8.5	14.1	-1.5		
<b>Growth</b>	<b>8,015,959,818</b>	<b>77.2</b>	<b>3.0</b>	<b>-5.7</b>	<b>11.6</b>	<b>6.6</b>	<b>8.0</b>	<b>-11.6</b>	<b>19.2</b>	<b>12.0</b>	<b>18.3</b>	<b>-3.9</b>		
Custom Growth Benchmark			3.7	-4.9	14.0	8.4	9.0	-10.2	21.6	13.8	19.3	-2.1		
<b>Total Domestic Equity</b>	<b>1,738,633,223</b>	<b>16.7</b>	<b>4.8</b>	<b>-8.8</b>	<b>17.6</b>	<b>8.1</b>	<b>10.6</b>	<b>-18.5</b>	<b>20.2</b>	<b>21.8</b>	<b>26.1</b>	<b>-7.6</b>		
Russell 3000 Index			7.2	-8.6	18.5	10.5	11.7	-19.2	25.7	20.9	31.0	-5.2		
BlackRock Russell 1000 Index	936,129,841	9.0	7.5	-8.4	18.5	10.9	-	-19.1	26.5	20.9	31.4	-4.8	11.3	May-17
Russell 1000 Index			7.5	-8.4	18.6	10.9	-	-19.1	26.5	21.0	31.4	-4.8	11.3	
Boston Partners	398,055,747	3.8	-0.3	-5.0	21.7	8.0	10.1	-4.1	31.0	2.6	23.8	-8.9	10.3	Jun-95
Russell 1000 Value Index			1.0	-5.9	17.9	7.5	9.1	-7.5	25.2	2.8	26.5	-8.3	9.1	
Emerald Advisers	203,676,202	2.0	4.0	-11.7	14.8	6.1	10.3	-24.2	4.9	38.2	29.4	-10.7	11.8	Apr-03
Russell 2000 Growth Index			6.1	-10.6	13.4	4.3	8.5	-26.4	2.8	34.6	28.5	-9.3	9.9	
Ceredex	200,771,432	1.9	3.9	1.0	22.5	5.8	8.0	-9.0	27.7	1.7	17.7	-11.8	9.5	Nov-11
Russell 2000 Value Index			-0.7	-13.0	21.0	4.5	7.2	-14.5	28.3	4.6	22.4	-12.9	9.0	
<b>Total International Equity</b>	<b>1,597,611,656</b>	<b>15.4</b>	<b>6.1</b>	<b>-5.6</b>	<b>12.1</b>	<b>2.3</b>	<b>4.8</b>	<b>-18.6</b>	<b>7.8</b>	<b>15.2</b>	<b>23.2</b>	<b>-14.7</b>		
MSCI AC World ex USA Index			7.0	-4.6	12.3	3.0	4.7	-15.6	8.3	11.1	22.1	-13.8		
MSCI EAFE Index			8.6	-0.9	13.5	4.0	5.5	-14.0	11.8	8.3	22.7	-13.4		
<b>International Equity</b>	<b>910,125,208</b>	<b>8.8</b>	<b>7.8</b>	<b>-3.5</b>	<b>11.9</b>	<b>4.4</b>	<b>5.7</b>	<b>-18.4</b>	<b>8.6</b>	<b>18.5</b>	<b>26.5</b>	<b>-13.9</b>		
MSCI AC World ex USA Index			7.0	-4.6	12.3	3.0	4.7	-15.6	8.3	11.1	22.1	-13.8		
Pyrford	468,325,309	4.5	7.2	1.2	11.2	4.3	-	-7.4	7.1	4.2	21.6	-10.5	3.7	May-14
MSCI AC World ex USA Value			5.2	-4.0	13.8	1.3	-	-8.6	10.5	-0.8	15.7	-14.0	1.7	
William Blair	441,799,898	4.3	8.5	-8.2	12.1	4.4	6.0	-28.0	10.1	32.8	31.5	-17.1	6.1	Nov-10
MSCI AC World ex USA Growth			8.6	-6.4	9.5	3.4	5.1	-23.1	5.1	22.2	27.3	-14.4	4.8	
<b>Emerging Markets Equity</b>	<b>687,486,448</b>	<b>6.6</b>	<b>3.8</b>	<b>-8.3</b>	<b>12.6</b>	<b>-0.5</b>	<b>-</b>	<b>-18.9</b>	<b>7.0</b>	<b>10.7</b>	<b>18.7</b>	<b>-15.7</b>		
MSCI Emerging Markets			4.0	-10.7	7.8	-0.9	-	-20.1	-2.5	18.3	18.4	-14.6		
PIMCO RAE Emerging Markets	362,889,350	3.5	4.2	-2.7	18.3	1.3	-	-10.1	16.5	1.6	14.0	-12.6	4.2	Mar-17
MSCI Emerging Markets Value			3.9	-9.4	10.0	-1.2	-	-15.8	4.0	5.5	12.0	-10.7	2.1	
TT Emerging Markets	324,597,098	3.1	3.3	-13.9	7.3	-2.2	-	-26.8	-0.9	20.0	24.0	-18.9	0.2	Aug-17
MSCI Emerging Markets			4.0	-10.7	7.8	-0.9	-	-20.1	-2.5	18.3	18.4	-14.6	1.0	

Individual closed end funds are not shown in performance summary table.



Total Fund  
Performance Summary (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Total Global Equity</b>	<b>1,028,387,313</b>	<b>9.9</b>	<b>7.3</b>	<b>-7.0</b>	<b>13.0</b>	<b>7.2</b>	<b>8.7</b>	<b>-19.4</b>	<b>13.2</b>	<b>24.4</b>	<b>27.9</b>	<b>-8.5</b>		
MSCI AC World Index			7.3	-7.4	15.4	6.9	8.1	-18.4	18.5	16.3	26.6	-9.4		
Artisan Partners	506,380,751	4.9	9.0	-12.1	11.9	8.1	10.7	-30.1	14.1	40.6	36.0	-8.6	10.9	Oct-12
MSCI ACWI Growth NR USD			13.8	-10.0	14.7	9.0	9.9	-28.6	17.1	33.6	32.7	-8.1	10.3	
First Eagle	521,884,520	5.0	5.6	-1.6	13.7	6.0	6.6	-6.3	12.1	7.7	20.1	-8.3	7.1	Jan-11
MSCI ACWI Value NR USD			1.2	-5.5	15.2	4.3	5.9	-7.5	19.6	-0.3	20.6	-10.8	5.9	
<b>Private Credit</b>	<b>1,058,374,155</b>	<b>10.2</b>	<b>-0.1</b>	<b>7.5</b>	<b>8.1</b>	<b>7.4</b>	<b>9.3</b>	<b>10.5</b>	<b>10.0</b>	<b>4.0</b>	<b>7.7</b>	<b>8.3</b>		
<b>Total High Yield</b>	<b>145,473,183</b>	<b>1.4</b>	<b>3.7</b>	<b>-3.3</b>	<b>4.5</b>	<b>2.6</b>	<b>3.3</b>	<b>-10.9</b>	<b>4.9</b>	<b>4.7</b>	<b>14.7</b>	<b>-3.6</b>		
ICE BofA US High Yield Master II			3.7	-3.6	5.8	3.0	4.0	-11.2	5.3	6.1	14.4	-2.3		
Voya Global Investors	145,473,183	1.4	3.7	-3.3	4.5	2.6	3.3	-10.9	4.9	4.7	14.7	-3.6	5.9	May-00
ICE BofA US High Yield Master II			3.7	-3.6	5.8	3.0	4.0	-11.2	5.3	6.1	14.4	-2.3	6.4	
<b>Total Real Estate</b>	<b>786,410,676</b>	<b>7.6</b>	<b>-2.0</b>	<b>-10.4</b>	<b>1.8</b>	<b>3.5</b>	<b>7.0</b>	<b>-4.9</b>	<b>19.2</b>	<b>-6.0</b>	<b>8.1</b>	<b>7.4</b>		
Real Estate Benchmark			-2.0	-8.9	4.8	5.1	6.9	-4.1	19.3	0.7	7.6	6.7		
NCREIF-ODCE			-3.2	-3.1	8.4	7.5	9.5	7.5	22.2	1.2	5.3	8.3		
NCREIF Property Index			-1.8	-1.6	7.2	6.7	8.3	5.5	17.7	1.6	6.4	6.7		
<b>Total Core Real Estate</b>	<b>194,273,370</b>	<b>1.9</b>	<b>2.3</b>	<b>-20.3</b>	<b>11.9</b>	<b>6.7</b>	<b>6.9</b>	<b>-25.1</b>	<b>47.5</b>	<b>-5.2</b>	<b>27.5</b>	<b>-5.5</b>		
Adelante	86,415,978	0.8	3.8	-21.5	11.4	6.4	6.8	-27.2	47.5	-5.2	27.5	-5.5	9.1	Oct-01
Wilshire U.S. REIT Index			3.2	-21.3	11.0	5.7	5.9	-26.8	46.2	-7.9	25.8	-4.8	8.8	
Invesco US Fundamental Beta	107,857,392	1.0	1.1	-19.1	-	-	-	-	-	-	-	-	-13.0	Mar-22
Wilshire U.S. REIT Index			3.2	-21.3	-	-	-	-	-	-	-	-	-14.8	
<b>Total Private Real Estate</b>	<b>592,137,306</b>	<b>5.7</b>	<b>-3.4</b>	<b>-6.2</b>	<b>1.5</b>	<b>3.6</b>	<b>7.3</b>	<b>1.9</b>	<b>15.3</b>	<b>-6.1</b>	<b>6.2</b>	<b>8.8</b>		
<b>Private Equity</b>	<b>1,322,288,594</b>	<b>12.7</b>	<b>-0.9</b>	<b>-4.4</b>	<b>18.9</b>	<b>15.8</b>	<b>13.6</b>	<b>-0.5</b>	<b>60.4</b>	<b>8.7</b>	<b>8.4</b>	<b>12.0</b>		
<b>Risk Parity</b>	<b>338,781,018</b>	<b>3.3</b>	<b>4.3</b>	<b>-14.1</b>	<b>2.7</b>	<b>-</b>	<b>-</b>	<b>-21.8</b>	<b>9.3</b>	<b>9.6</b>	<b>17.7</b>	<b>-</b>		
60% MSCI ACWI Net/40% Blmbg. Global Aggregate			5.6	-7.5	7.7	-	-	-17.3	8.8	14.0	18.6	-		
AQR Global Risk Premium-EL	171,916,484	1.7	3.9	-9.7	3.9	-	-	-16.6	10.3	5.8	18.3	-	4.3	Jan-19
HFR Risk Parity Vol 10 Index			4.4	-10.2	2.4	-	-	-18.3	6.8	3.6	18.4	-	2.7	
PanAgora Risk Parity Multi Asset	166,864,534	1.6	4.8	-18.0	1.7	-	-	-26.3	8.3	13.6	-	-	1.8	Mar-19
HFR Risk Parity Vol 10 Index			4.4	-10.2	2.4	-	-	-18.3	6.8	3.6	-	-	1.3	

Individual closed end funds are not shown in performance summary table.

Total Fund  
Performance Summary (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

	Market Value	% of Portfolio	3 Mo	1 Yr	3 Yrs	5 Yrs	10 Yrs	2022	2021	2020	2019	2018	Inception	Inception Date
<b>Diversifying</b>	<b>779,013,701</b>	<b>7.5</b>	<b>1.3</b>	<b>-1.7</b>	<b>0.2</b>	<b>0.1</b>	<b>0.1</b>	<b>-5.7</b>	<b>1.7</b>	<b>-1.7</b>	<b>6.8</b>	<b>-2.3</b>		
<i>Custom Diversifying Benchmark</i>			2.9	0.2	1.0	2.2	2.6	-5.4	1.6	4.7	6.1	1.4		
<b>Diversifying Fixed Income</b>	<b>225,015,715</b>	<b>2.2</b>	<b>2.9</b>	<b>-5.4</b>	<b>-3.2</b>	<b>-0.9</b>	<b>0.4</b>	<b>-13.5</b>	<b>-1.0</b>	<b>1.2</b>	<b>8.3</b>	<b>-2.0</b>		
<i>Blmbg. U.S. Aggregate Index</i>			3.0	-4.8	-2.8	0.9	1.4	-13.0	-1.5	7.5	8.7	0.0		
AFL-CIO	224,954,869	2.2	2.9	-5.4	-3.3	0.4	1.1	-13.6	-1.0	6.2	7.8	0.2	4.9	Jul-91
<i>Blmbg. U.S. Aggregate Index</i>			3.0	-4.8	-2.8	0.9	1.4	-13.0	-1.5	7.5	8.7	0.0	5.0	
<b>Diversifying Multi-Asset</b>	<b>553,997,986</b>	<b>5.3</b>	<b>0.7</b>	<b>-0.1</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-2.3</b>	<b>2.4</b>	<b>-</b>	<b>-</b>	<b>-</b>		
<i>Custom Diversifying Multi-Asset Benchmark</i>			2.8	2.0	-	-	-	-3.1	4.1	-	-	-		
Acadian Multi-Asset Absolute Return Fund	251,661,058	2.4	-1.1	0.9	-	-	-	-0.6	1.1	-	-	-	0.4	Aug-20
<i>FTSE 3-Month T-bill +5%</i>			2.4	7.7	-	-	-	6.6	5.0	-	-	-	6.1	
Sit LLCAR	302,336,928	2.9	2.3	-0.9	-	-	-	-3.7	-	-	-	-	1.3	Apr-21
<i>Blmbg. U.S. Aggregate +1%</i>			3.2	-3.8	-	-	-	-12.1	-	-	-	-	-3.5	
<b>Liquidity</b>	<b>1,399,754,034</b>	<b>13.5</b>	<b>1.5</b>	<b>0.4</b>	<b>0.3</b>	<b>1.5</b>	<b>-</b>	<b>-3.5</b>	<b>-0.3</b>	<b>3.4</b>	<b>4.8</b>	<b>1.7</b>		
<i>Blmbg. 1-3 Year Gov/Credit Index</i>			1.5	0.3	-0.4	1.3	-	-3.7	-0.5	3.3	4.0	1.6		
DFA Short Credit	315,541,836	3.0	1.3	-0.4	-0.3	1.0	-	-5.4	-0.5	2.8	5.2	1.1	0.9	Dec-16
<i>ICE BofA 1-5 Year U.S. Corp/Govt</i>			1.8	-0.4	-0.7	1.3	-	-5.6	-0.9	4.6	5.1	1.4	1.2	
Insight Short Duration	510,803,290	4.9	1.2	1.2	1.5	1.9	-	-1.2	0.0	3.1	4.6	1.7	1.7	Dec-16
<i>Blmbg. 1-3 Year Gov/Credit index</i>			1.5	0.3	-0.4	1.3	-	-3.7	-0.5	3.3	4.0	1.6	1.1	
Sit Short Duration	573,408,908	5.5	1.9	0.0	-0.8	1.5	-	-5.0	-0.5	4.4	4.7	2.3	1.4	Dec-16
<i>Blmbg. 1-3 Year Govt Index</i>			1.6	0.2	-0.8	1.1	-	-3.8	-0.6	3.1	3.6	1.6	0.9	
<b>Total Cash</b>	<b>74,077,854</b>	<b>0.7</b>	<b>-1.7</b>	<b>0.4</b>	<b>0.6</b>	<b>1.4</b>	<b>1.0</b>	<b>2.4</b>	<b>0.4</b>	<b>1.3</b>	<b>3.3</b>	<b>1.7</b>		
<i>90 Day U.S. Treasury Bill</i>			1.1	2.5	0.9	1.4	0.9	1.5	0.0	0.7	2.3	1.9	...	
Cash	74,073,662	0.7	-1.2	0.9	0.7	1.5	1.4	2.2	0.4	1.3	3.4	1.7		
Northern Trust Transition	4,192	0.0	-99.3	-99.3	-76.4	-	-	-4.8	-6.1	104.1	-	-		

Total Fund  
Closed End Funds - Investment Summary

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

StepStone Group Analysis (*)												
Closing Date	Manager Name/Fund Name	Estimated Market Value as of 3/31/2023 <sup>1</sup>	Total Commitment	Total % Called	Contributed Capital	Current Qtr. Change in Contributed Capital	Current Qtr. Change in Distributed Capital	Total Distributions	Remaining Commitment	Distrib./Paid-In (DPI) <sup>2</sup>	Tot. Value/Paid-In (TVPI) <sup>3</sup>	Latest Valuation
<b>Private Equity &amp; Venture Capital</b>												
2/11/2004	Adams Street Partners	\$128,321,957	\$210,000,000	93%	\$194,765,257	\$0	\$3,744,467	\$268,508,475	\$15,234,743	1.38	2.04	12/31/2022
1/15/2009	Adams Street Partners II	\$3,567,745	\$30,000,000	95%	\$28,365,000	\$0	\$0	\$45,385,528	\$1,635,000	1.60	1.73	12/31/2022
9/21/2012	Adams Street Partners - Fund 5	\$11,681,265	\$40,000,000	77%	\$30,845,875	\$0	\$0	\$30,186,904	\$9,154,125	0.98	1.36	12/31/2022
1/18/1996	Adams Street Partners - BPF	\$475,365	\$59,565,614	97%	\$57,517,409	\$0	\$0	\$103,896,144	\$2,048,205	1.81	1.81	12/31/2022
3/31/2016	Adams Street Venture Innovation	\$171,195,106	\$75,000,000	88%	\$66,037,500	\$0	\$0	\$30,786,690	\$8,962,500	0.47	3.06	12/31/2022
5/18/2018	AE Industrial Partners Fund II, LP	\$42,105,382	\$35,000,000	95%	\$33,094,426	\$696,644	\$5,682,882	\$14,823,352	\$11,014,253	0.45	1.72	12/31/2022
11/27/2013	Aether Real Assets III	\$18,226,626	\$25,000,000	104%	\$26,027,077	\$170,704	\$298,999	\$6,937,064	\$1,295,313	0.27	0.97	12/31/2022
11/30/2013	Aether Real Assets III Surplus	\$43,185,519	\$50,000,000	106%	\$52,761,318	\$297,145	\$26,413	\$13,496,164	\$855,648	0.26	1.07	9/30/2022
1/30/2016	Aether Real Assets IV	\$58,082,394	\$50,000,000	100%	\$50,036,488	\$0	\$0	\$5,392,364	\$4,516,236	0.11	1.27	9/30/2022
4/30/2004	Bay Area Equity Fund I <sup>4</sup>	\$1,301	\$10,000,000	100%	\$10,000,000	\$0	\$0	\$37,018,019	\$0	3.70	3.70	12/31/2022
6/29/2009	Bay Area Equity Fund II <sup>4</sup>	\$19,818,568	\$10,000,000	100%	\$10,000,000	\$0	\$0	\$3,684,910	\$0	0.37	2.35	12/31/2022
6/30/2013	Commonfund	\$37,569,120	\$50,000,000	95%	\$47,524,993	\$0	\$754,021	\$30,125,608	\$2,475,007	0.63	1.42	9/30/2022
7/15/2005	EIF US Power Fund II <sup>4</sup>	\$37,627	\$50,000,000	130%	\$65,029,556	\$0	\$0	\$76,092,655	\$0	1.17	1.17	9/30/2022
5/31/2007	EIF US Power Fund III <sup>4</sup>	\$2,410,740	\$65,000,000	110%	\$71,409,097	\$0	\$0	\$92,933,824	\$0	1.30	1.34	12/31/2022
11/28/2011	EIF US Power Fund IV	\$21,004,644	\$50,000,000	130%	\$64,917,547	\$0	\$270,580	\$46,554,912	\$4	0.72	1.04	12/31/2022
11/28/2016	EIF US Power Fund V	\$30,859,204	\$50,000,000	139%	\$69,328,438	\$0	\$374,689	\$60,225,766	\$6,194,129	0.87	1.31	12/31/2022
3/31/2023	EQT X, L.P.	-\$1,363,216	\$100,000,000	1%	\$853,097	\$853,097	\$853,097	\$853,097	\$100,000,000	N/A	N/A	N/A
2/21/2019	Genstar Capital Partners IX, L.P.	\$66,510,827	\$50,000,000	95%	\$47,582,741	\$160,747	\$488,440	\$21,471,279	\$7,703,689	0.45	1.85	12/31/2022
4/1/2021	Genstar Capital Partners X, L.P.	\$25,096,539	\$42,500,000	57%	\$24,123,781	\$2,851,770	\$0	\$0	\$18,376,219	0.00	1.04	12/31/2022
3/31/2023	Green Equity Investors IX	\$0	\$60,000,000	0%	\$0	\$0	\$0	\$0	\$60,000,000	N/A	N/A	N/A
10/27/2020	GTCR Fund XIII, L.P.	\$24,666,514	\$50,000,000	51%	\$25,572,753	\$0	\$0	\$5,446,907	\$24,427,247	0.21	1.18	12/31/2022
3/31/2023	GTCR Fund XIV	\$0	\$100,000,000	0%	\$0	\$0	\$0	\$0	\$100,000,000	N/A	N/A	N/A
5/10/2021	Heliman & Friedman Capital Partners X, L.P.	\$52,086,040	\$75,000,000	72%	\$53,972,224	\$13,090,043	\$0	\$0	\$21,027,776	0.00	0.97	12/31/2022
3/31/2023	Jade Equity Investors II, LP	\$0	\$15,000,000	0%	\$0	\$0	\$0	\$0	\$15,000,000	N/A	N/A	N/A
11/18/2009	Oaktree PIF 2009	\$410,257	\$40,000,000	87%	\$34,812,560	\$0	\$0	\$47,032,470	\$6,308,961	1.35	1.36	12/31/2022
5/2/2013	Ocean Avenue Fund II	\$27,429,424	\$30,000,000	90%	\$27,000,000	\$0	\$832,524	\$44,016,744	\$3,000,000	1.63	2.65	12/31/2022
4/15/2016	Ocean Avenue Fund III	\$52,236,036	\$50,000,000	93%	\$46,500,000	\$0	\$0	\$54,209,752	\$3,500,000	1.17	2.29	12/31/2022
11/30/2007	Paladin III	\$7,937,516	\$25,000,000	139%	\$34,836,639	\$0	\$0	\$71,182,958	\$387,482	2.04	2.27	12/31/2022
8/22/2011	Pathway 6	\$31,743,378	\$40,000,000	99%	\$39,455,701	\$54,000	\$242,441	\$49,926,001	\$3,639,746	1.27	2.07	9/30/2022
7/10/2013	Pathway 7	\$68,233,176	\$70,000,000	99%	\$69,394,311	\$116,725	\$630,161	\$80,791,974	\$5,136,859	1.16	2.15	9/30/2022
11/23/2015	Pathway 8	\$70,417,987	\$50,000,000	96%	\$48,049,248	\$97,624	\$1,079,564	\$32,843,538	\$3,908,399	0.68	2.15	9/30/2022
1/19/1999	Pathway	\$3,212,498	\$125,000,000	101%	\$126,198,712	\$75,940	\$711,222	\$189,157,157	\$10,503,340	1.50	1.52	9/30/2022
7/31/2009	Pathway 2008	\$13,933,914	\$30,000,000	100%	\$30,145,886	\$43,905	\$269,415	\$50,595,274	\$2,673,941	1.68	2.14	9/30/2022
6/3/2014	Siguler Guff CCCERA Opportunities	\$135,252,559	\$200,000,000	88%	\$175,083,208	\$0	\$6,820,983	\$209,183,093	\$28,597,500	1.19	1.97	9/30/2022
5/18/2018	Siris Partners IV, L.P.	\$40,343,521	\$35,000,000	84%	\$29,431,510	\$0	\$0	\$4,165,217	\$8,126,210	0.14	1.51	12/31/2022
3/31/2023	Symphony Technology Group VII	\$0	\$50,000,000	0%	\$0	\$0	\$0	\$0	\$50,000,000	N/A	N/A	N/A
5/27/2021	TA XIV-A, L.P.	\$26,301,482	\$50,000,000	58%	\$29,000,000	\$0	\$0	\$21,000,000	\$0	0.00	0.91	N/A
6/28/2019	TPG Healthcare Partners, L.P.	\$138,855	\$24,000,000	84%	\$20,062,184	\$0	\$0	\$6,221,617	\$6,689,553	0.31	0.32	12/31/2022
3/31/2023	TPG Healthcare Partners II	\$19,325,696	\$35,000,000	0%	\$0	\$0	\$0	\$0	\$35,000,000	N/A	N/A	12/31/2022
3/31/2023	TPG Partners IX	-\$250,075	\$65,000,000	0%	\$0	\$0	\$0	\$0	\$65,000,000	N/A	N/A	12/31/2022
9/17/2021	Trident IX, L.P.	\$15,091,410	\$50,000,000	33%	\$16,314,603	\$6,257,283	\$0	\$0	\$33,685,397	N/A	N/A	N/A
5/24/2019	Trident VIII, L.P.	\$45,981,358	\$40,000,000	94%	\$37,584,994	\$0	\$0	\$2,942,939	\$5,062,283	0.08	1.30	12/31/2022
12/8/2015	Wastewater Opportunity Fund	\$9,010,338	\$25,000,000	126%	\$31,512,759	\$0	\$0	\$26,646,664	\$521,541	0.85	1.13	12/31/2022
<b>Total Private Equity and Venture Capital</b>		<b>\$1,322,288,594</b>	<b>\$2,386,065,614</b>	<b>76%</b>	<b>\$1,825,146,890</b>	<b>\$24,765,626</b>	<b>\$23,079,897</b>	<b>\$1,762,735,063</b>	<b>\$702,661,306</b>	<b>0.97</b>	<b>1.69</b>	
<b>% of Portfolio (Market Value)</b>		<b>12.7%</b>										

\* All Data provided by StepStone Group

<sup>1</sup>Latest valuation + capital calls - distributions

<sup>2</sup>(DPI) is equal to (capital returned / capital called)

<sup>3</sup>(TVPI) is equal to (market value + capital returned) / capital called

<sup>4</sup>Capital has been fully called and fund is in redemption.

Total Fund  
Closed End Funds - IRR Summary

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Private Equity & Venture Capital	Closing Date	Fund Level (G) <sup>2</sup>	CCCERA (G)	Fund Level (N) <sup>2,3</sup>	CCCERA (N) <sup>3</sup>
Adams Street Partners	2/11/2004	12.1%	13.8%	-	11.9%
Adams Street Partners II	12/31/2008	16.5%	16.4%	-	13.9%
Adams Street Partners - Fund 5	12/31/2008	9.2%	9.1%	-	6.6%
Adams Street Partners Venture	1/18/1996	40.5%	40.5%	-	38.2%
Adams Street Partners - BPF	3/31/2016	14.2%	14.2%	-	11.6%
AE Industrial Partners Fund II, LP	5/18/2018	30.1%	-	27.9%	-
Aether Real Assets III <sup>1</sup>	11/27/2013	1.0%	-	-0.6%	-
Aether Real Assets III Surplus <sup>1</sup>	11/30/2013	2.4%	-	1.4%	-
Aether Real Assets IV <sup>1</sup>	1/30/2016	8.6%	-	6.8%	-
Bay Area Equity Fund I <sup>9</sup>	11/26/2003	31.3%	31.3%	22.9%	22.9%
Bay Area Equity Fund II <sup>9</sup>	11/26/2003	14.0%	14.0%	9.5%	9.5%
CommonFund <sup>1</sup>	6/30/2013	-	-	-	8.0%
Energy Investor Fund II <sup>9</sup>	7/15/2005	5.7%	5.3%	2.9%	2.6%
Energy Investor Fund III <sup>9</sup>	5/31/2007	6.8%	6.8%	4.4%	4.4%
Energy Investor Fund IV	8/31/2010	4.1%	4.1%	1.0%	0.9%
Energy Investor Fund V	11/28/2016	18.2%	15.7%	14.8%	12.2%
Genstar Capital Partners IX, L.P.	2/21/2019	53.4%	-	36.8%	-
Oaktree PIF 2009	2/28/2010	6.8%	-	6.6%	-
Ocean Avenue II	8/15/2013	-	-	20.3%	-
Ocean Avenue III	4/15/2016	-	-	26.7%	-
Paladin III	11/30/2007	20.1%	-	-	-
Pathway 6	8/22/2011	14.4%	14.4%	16.5%	16.5%
Benchmark <sup>4</sup>		15.2%	-	-	-
Pathway 7	7/10/2013	18.7%	18.7%	16.7%	16.7%
Benchmark <sup>5</sup>		16.3%	-	-	-
Pathway 8	11/23/2015	21.8%	22.6%	20.5%	20.7%
Benchmark <sup>6</sup>		19.5%	-	-	-
Pathway Private Equity Fund	1/19/1999	10.2%	10.2%	8.4%	8.4%
Benchmark <sup>7</sup>		10.4%	-	-	-
Pathway Private Equity Fund 2008	7/31/2009	16.5%	16.5%	14.3%	14.3%
Benchmark <sup>8</sup>		13.8%	-	-	-
Siguler Guff CCCERA Opportunities <sup>1</sup>	6/3/2014	19.5%	20.3%	19.0%	17.8%
Siguler Guff Secondary Opportunities <sup>9</sup>	8/31/2013	55.3%	118.4%	49.5%	69.0%
Siris Partners IV, L.P.	5/18/2018	23.5%	23.5%	19.0%	19.0%
TPG Healthcare Partners, L.P.	6/28/2019	45.0%	-	-	25.0%
Trident VIII, L.P.	5/24/2019	21.4%	-	16.8%	-
Wastewater Opportunity Fund	12/8/2015	8.7%	-	4.6%	-

<sup>1</sup>Manager has yet to report IRR figure.

<sup>2</sup>Fund level data includes CCCERA and all other fund investors.

<sup>3</sup>Net IRR calculated after deductions of management fees and carried interest to the General Partner.

<sup>4</sup>Private iQ global all private equity median pooled return for vintage years 2011-2014, as of September 30, 2022.

<sup>5</sup>Private iQ global all private equity median pooled return for vintage years 2012-2016, as of September 30, 2022.

<sup>6</sup>Private iQ global all private equity median pooled return for vintage years 2015-2018, as of September 30, 2022.

<sup>7</sup>Private iQ global all private equity median pooled return for vintage years 1999-2011, as of September 30, 2022.

<sup>8</sup>Private iQ global all private equity median pooled return for vintage years 2008-2014, as of September 30, 2022.

<sup>9</sup>Capital has been fully called and fund is in redemption.

Total Fund  
Closed End Funds - Investment Summary

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

StepStone Group Analysis (*)													
Closing Date	Manager Name/Fund Name	Estimated Market Value as of 3/31/2023 <sup>1</sup>	Total Commitment	% Called	Contributed Capital	Current Qtr. Change in Contributed Capital	Current Qtr. Change in Distributed Capital	Total Distributions	Remaining Commitment	Distrib./ Paid-In (DPI) <sup>2</sup>	Tot. Value/ Paid-In (TVPI) <sup>3</sup>	Latest Valuation	
<b>Private Credit</b>													
8/31/2015	Angelo Gordon Energy Credit Opp. <sup>4</sup>	\$2,035,995	\$16,500,000	114%	\$18,750,000	\$0	\$0	\$20,410,032	\$2,319,783	1.09	1.20	12/31/2022	
12/18/2017	Stepstone CC Opportunities Fund	\$1,042,983,274	\$1,170,000,000	87%	\$1,013,916,395	\$30,765,114	\$0	\$192,398,791	\$248,443,305	0.19	1.22	9/30/2022	
8/1/2012	Torchlight IV	\$5,654,635	\$60,000,000	141%	\$84,866,971	\$0	\$2,115,017	\$108,261,644	\$0	1.28	1.34	3/31/2023	
3/12/2015	Torchlight V	\$7,700,251	\$75,000,000	80%	\$60,000,000	\$0	\$662,261	\$71,460,214	\$15,000,000	1.19	1.32	12/31/2022	
<b>Total Private Credit</b>		<b>\$1,058,374,155</b>											
<b>% of Portfolio (Market Value)</b>		<b>10.2%</b>											

\*All Data provided by StepStone Group

<sup>1</sup>Latest valuation + capital calls - distributions

<sup>2</sup>(DPI) is equal to (capital returned / capital called)

<sup>3</sup>(TVPI) is equal to (market value + capital returned) / capital called

<sup>4</sup>Capital has been fully called and fund is in redemption.

Total Fund  
Closed End Funds - Investment Summary

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Verus Internal Analysis												
Inception Date	Manager Name/Fund Name	Estimated Market Value as of 3/31/2023 <sup>1</sup>	Total Commitment	Total % Called	Capital Called	Current Qtr. Capital Called	Current Qtr. Distributions	Total Distributions <sup>8</sup>	Remaining Commitment	Distrib./Paid-In (DPI) <sup>2</sup>	Tot. Value/Paid-In (TVPI) <sup>3</sup>	Latest Valuation
<b>Real Estate</b>												
1/23/2012	Angelo Gordon Realty Fund VIII <sup>4</sup>	\$11,729,569	\$80,000,000	94%	\$75,401,855	\$0	\$0	\$101,711,550	\$12,334,302	1.35	1.50	12/31/2022
12/8/2014	Angelo Gordon Realty Fund IX	\$27,401,321	\$65,000,000	93%	\$60,125,000	\$0	\$1,300,000	\$55,250,001	\$7,572,500	0.92	1.37	12/31/2022
3/24/2023	Blackstone Real Estate Partners VIII	\$374,495	\$80,000,000	0%	\$374,495	\$374,495	\$0	\$0	\$79,625,505	0.00	1.00	N/A
6/23/2005	DLJ RECP III	\$12,629,848	\$75,000,000	134%	\$100,709,313 <sup>4</sup>	\$0	\$0	\$69,364,915	\$4,031,338	0.69	0.81	12/31/2022
2/11/2008	DLJ RECP IV	\$45,672,988	\$100,000,000	130%	\$130,117,329 <sup>5</sup>	\$0	\$0	\$99,841,735	\$1,876,084	0.77	1.12	12/31/2022
7/1/2014	DLJ RECP V	\$34,497,367	\$75,000,000	143%	\$107,388,261 <sup>6</sup>	\$8,703,744	\$3,053,234	\$100,933,448	\$15,567,682	0.94	1.26	12/31/2022
3/19/2019	DLJ RECP VI	\$28,353,490	\$50,000,000	67%	\$33,639,828	\$3,536,058	\$0	\$13,276,083	\$22,649,572	0.39	1.24	12/31/2022
6/30/2014	Invesco Real Estate IV <sup>4</sup>	\$661,977	\$35,000,000	87%	\$30,546,401	\$0	\$0	\$39,777,325	\$4,453,599	1.30	1.32	3/31/2023
2/20/2019	Invesco Real Estate V	\$73,326,206	\$75,000,000	87%	\$65,318,898	\$1,638,064	\$0	\$9,319,462	\$9,681,102	0.14	1.27	3/31/2023
9/27/2022	Invesco Real Estate VI	\$39,031,374	\$100,000,000	40%	\$39,967,707	\$6,841,115	\$2,230,131	\$2,230,131	\$66,873,408	0.06	1.03	N/A
7/16/2013	LaSalle Income & Growth VI <sup>4</sup>	\$13,694,008	\$75,000,000	95%	\$71,428,571	\$0	\$6,122	\$84,541,423	\$0	1.18	1.38	12/31/2022
2/28/2017	LaSalle Income & Growth VII	\$52,512,272	\$75,000,000	96%	\$72,154,315	\$2,845,685	\$0	\$50,904,014	\$2,845,685	0.71	1.43	12/31/2022
7/3/2013	Long Wharf Fund IV <sup>4</sup>	\$1,120,806	\$25,000,000	100%	\$25,000,000	\$0	\$0	\$34,948,087	\$0	1.40	1.44	3/31/2023
9/30/2016	Long Wharf Fund V <sup>4</sup>	\$29,868,757	\$50,000,000	100%	\$50,000,000	\$0	\$0	\$37,244,373	\$0	0.74	1.34	3/31/2023
6/27/2019	Long Wharf Fund VI	\$34,044,974	\$50,000,000	96%	\$48,196,232	\$4,132,804	\$0	\$24,876,113	\$1,803,768	0.52	1.22	3/31/2023
12/31/2011	Oaktree REOF V <sup>4</sup>	\$401,783	\$50,000,000	101%	\$50,315,673	\$0	\$363,985	\$78,780,733	\$5,000,000 <sup>6</sup>	1.57	1.57	3/31/2023
9/30/2013	Oaktree REOF VI <sup>4</sup>	\$21,408,654	\$80,000,000	100%	\$80,000,000	\$0	\$0	\$84,810,175	\$18,400,000 <sup>6</sup>	1.06	1.33	3/31/2023
4/1/2015	Oaktree REOF VII	\$45,001,418	\$65,000,000	100%	\$65,000,000	\$0	\$0	\$42,829,688	\$18,915,000 <sup>6</sup>	0.66	1.35	3/31/2023
11/10/2013	Paulson Real Estate Fund II <sup>4</sup>	\$12,720,523	\$20,000,000	97%	\$19,345,623	\$0	\$0	\$25,449,660	\$654,377	1.32	1.97	12/31/2022
4/28/2022	PCCP IX	\$48,147,961	\$75,000,000	61%	\$45,926,564	\$7,500,000	\$0	\$0	\$29,073,436	0.00	1.05	12/31/2022
1/25/2012	Siguler Guff DREOF	\$16,705,041	\$75,000,000	93%	\$69,375,000	\$0	\$714,093	\$104,485,204	\$5,625,000	1.51	1.75	12/31/2022
8/31/2013	Siguler Guff DREOF II	\$28,961,213	\$70,000,000	89%	\$61,985,000	\$0	\$16,384	\$55,708,170	\$8,015,000	0.90	1.37	12/31/2022
1/27/2016	Siguler Guff DREOF II Co-Inv	\$13,871,261	\$25,000,000	82%	\$20,537,862	\$0	\$0	\$13,871,261	\$4,462,138	0.68	1.35	12/31/2022
<b>Total Closed End Real Estate</b>		<b>\$592,137,306</b>	<b>\$1,470,000,000</b>	<b>90%</b>	<b>\$1,322,853,928</b>	<b>\$35,571,965</b>	<b>\$7,683,948</b>	<b>\$1,130,153,552</b>	<b>\$319,459,496</b>	<b>0.85</b>	<b>1.30</b>	
<b>% of Portfolio (Market Value)</b>		<b>5.7%</b>										

<sup>1</sup>Latest valuation + capital calls - distributions

<sup>2</sup>(DPI) is equal to (capital returned / capital called)

<sup>3</sup>(TVPI) is equal to (market value + capital returned) / capital called

<sup>4</sup>Capital has been fully called and fund is in redemption.

<sup>5</sup>Total distributions may include recallable distributions

<sup>6</sup>Remianing commitment includes recallable distributions

Total Fund  
Closed End Funds - IRR Summary

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Private Credit	Inception	Fund Level (G) <sup>2</sup>	CCCERA (G)	Fund Level (N) <sup>2,3</sup>	CCCERA (N) <sup>3</sup>	IRR Date
Angelo Gordon Energy Cred Opp. <sup>4</sup>	9/24/2015	-	-	-	7.8%	12/31/2022
Stepstone CC Opportunities Fund <sup>1</sup>	2/2/2018	-	10.0%	-	9.1%	9/30/2022
Torchlight IV	8/1/2012	11.5%	12.0%	9.3%	10.1%	12/31/2022
Torchlight V	3/12/2015	14.8%	14.8%	10.5%	10.4%	12/31/2022
Real Estate	Inception	Fund Level (G) <sup>2</sup>	CCCERA (G)	Fund Level (N) <sup>2,3</sup>	CCCERA (N) <sup>3</sup>	IRR Date
Angelo Gordon VIII <sup>4</sup>	1/23/2012	-	-	-	12.4%	12/31/2022
Angelo Gordon IX	12/8/2014	-	-	-	7.6%	12/31/2022
Blackstone Real Estate Partners VIII <sup>1</sup>	3/24/2023	-	-	-	-	N/A
DLJ RECP III <sup>1</sup>	6/23/2005	-1.0%	-1.0%	-3.0%	-3.0%	12/31/2022
DLJ RECP IV <sup>1</sup>	2/11/2008	4.0%	4.0%	1.0%	2.0%	12/31/2022
DLJ RECP V <sup>1</sup>	7/1/2014	15.0%	15.0%	9.0%	9.0%	12/31/2022
DLJ RECP VI <sup>1</sup>	3/19/2019	13.0%	13.0%	4.0%	4.0%	12/31/2022
Hearthstone II <sup>4</sup>	6/17/1998	-	30.3%	-	30.3%	3/31/2020
Invesco Fund III <sup>4</sup>	6/30/2013	16.6%	-	13.6%	-	12/31/2020
Invesco Fund IV <sup>4</sup>	6/30/2014	13.7%	-	10.8%	-	12/31/2022
Invesco Fund V	2/20/2019	15.0%	-	11.2%	-	12/31/2022
Invesco Fund VI	9/27/2022	-	-	-	-	N/A
LaSalle Income & Growth VI <sup>4</sup>	7/16/2013	11.0%	11.0%	9.0%	9.0%	3/31/2023
LaSalle Income & Growth VII	2/28/2017	8.2%	8.2%	6.5%	6.4%	3/31/2023
Long Wharf IV <sup>4</sup>	7/3/2013	15.5%	15.3%	11.6%	11.5%	3/31/2023
Long Wharf V <sup>4</sup>	9/30/2016	10.8%	11.2%	8.1%	8.4%	3/31/2023
Long Wharf VI	6/27/2019	35.4%	38.9%	22.0%	23.7%	3/31/2023
Oaktree REOF V <sup>4</sup>	12/31/2011	16.6%	-	12.2%	-	3/31/2023
Oaktree REOF VI <sup>4</sup>	9/30/2013	10.7%	-	6.9%	-	3/31/2023
Oaktree REOF VII	4/1/2015	19.5%	-	12.7%	-	3/31/2023
Paulson <sup>4</sup>	11/10/2013	-	-	12.2%	-	12/31/2022
PCCP IX	5/27/2021	23.9%	-	13.2%	-	12/31/2022
Siguler Guff I <sup>1</sup>	1/25/2012	12.7%	15.4%	11.2%	12.4%	9/30/2022
Siguler Guff II <sup>1</sup>	8/31/2013	10.3%	10.4%	9.0%	8.3%	9/30/2022
Siguler Guff DREOF II Co-Inv <sup>1</sup>	1/27/2016	6.9%	7.1%	5.9%	569.0%	9/30/2022

<sup>1</sup>Manager has yet to report IRR figure.

<sup>2</sup>Fund level data includes CCCERA and all other fund investors.

<sup>3</sup>Net IRR calculated after deductions of management fees and carried interest to the General Partner.

<sup>4</sup>Capital has been fully called and fund is in redemption.

Total Fund  
Risk Analysis - 3 Years (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

3 Years

	Anlzd Return	Anlzd Excess Performance	Anlzd Standard Deviation	Anlzd Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Information Ratio	Up Capture	Down Capture
BlackRock Russell 1000 Index	18.54	-0.02	19.28	-0.01	1.00	0.01	1.00	0.94	-1.15	99.97	100.02
Boston Partners	21.73	3.80	18.27	3.02	1.02	3.09	0.97	1.12	1.07	104.73	90.34
Emerald Advisers	14.76	1.40	22.83	2.09	0.93	5.65	0.94	0.68	0.18	101.18	97.69
Ceredex	22.53	1.52	19.17	4.95	0.80	7.42	0.90	1.11	0.08	87.86	73.56
Pyrford	11.16	-2.66	14.66	0.26	0.79	6.22	0.88	0.74	-0.45	84.29	87.70
William Blair	12.07	2.58	20.12	2.15	1.06	6.09	0.91	0.63	0.45	114.88	109.20
PIMCO RAE Emerging Markets	18.35	8.31	18.60	7.84	1.00	6.52	0.88	0.96	1.16	115.45	80.50
TT Emerging Markets	7.34	-0.49	21.80	-1.04	1.13	6.17	0.93	0.39	0.03	118.83	126.64
Artisan Partners	11.95	-2.72	20.85	-1.84	0.96	5.27	0.94	0.61	-0.46	91.21	95.68
First Eagle	13.68	-1.56	13.95	1.30	0.80	5.14	0.92	0.93	-0.34	84.86	81.15
Voya Global Investors	4.49	-1.33	8.87	-1.15	0.98	1.51	0.97	0.44	-0.84	93.24	103.25
Adelante	11.43	0.39	19.59	0.70	0.96	1.59	0.99	0.60	0.14	97.72	95.63
AQR Global Risk Premium-EL	3.94	1.55	10.18	1.68	0.92	2.23	0.96	0.34	0.65	97.60	87.12
PanAgora Risk Parity Multi Asset	1.69	-0.70	15.23	-1.26	1.39	4.81	0.98	0.13	-0.02	130.36	137.31
AFL-CIO	-3.31	-0.54	5.70	-0.84	0.90	1.22	0.97	-0.72	-0.48	81.25	92.40
DFA Short Credit	-0.34	0.40	2.80	0.38	0.97	0.91	0.90	-0.43	0.44	109.84	97.56
Insight Short Duration	1.45	1.83	1.74	1.73	0.72	1.21	0.61	0.33	1.50	126.64	50.19
Sit Short Duration	-0.83	0.00	2.78	0.34	1.39	1.30	0.85	-0.61	0.01	169.41	145.91

Performance Analysis excludes closed end funds and those funds without 3 years of performance.



Total Fund  
Risk Analysis - 5 Years (Net of Fees)

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

5 Years

	Anlzd Return	Anlzd Excess Performance	Standard Deviation	Alpha	Beta	Tracking Error	R-Squared	Sharpe Ratio	Information Ratio	Up Capture	Down Capture
BlackRock Russell 1000 Index	10.85	-0.02	18.86	-0.01	1.00	0.01	1.00	0.57	-1.10	99.95	99.99
Boston Partners	8.04	0.55	19.50	0.37	1.03	2.96	0.98	0.42	0.23	102.00	99.65
Emerald Advisers	6.08	1.82	23.79	1.95	0.96	5.32	0.95	0.31	0.31	102.74	97.57
Ceredex	5.78	1.24	22.39	1.61	0.88	6.64	0.93	0.30	0.11	90.24	85.35
Pyrford	4.27	3.00	14.42	3.07	0.74	6.79	0.89	0.26	0.33	83.89	71.82
William Blair	4.38	1.02	18.94	1.03	1.06	5.08	0.93	0.25	0.26	110.67	106.88
PIMCO RAE Emerging Markets	1.34	2.49	20.50	2.93	1.07	5.77	0.92	0.10	0.51	110.29	98.10
TT Emerging Markets	-2.16	-1.26	21.93	-0.72	1.14	5.74	0.94	-0.05	-0.11	116.63	119.72
Artisan Partners	8.08	-0.93	18.94	-0.44	0.95	4.55	0.94	0.43	-0.20	93.50	94.59
First Eagle	5.95	1.68	13.80	2.42	0.76	5.64	0.93	0.39	0.17	81.55	71.69
Voya Global Investors	2.62	-0.42	8.79	-0.22	0.93	1.64	0.97	0.18	-0.28	95.26	98.56
Adelante	6.42	0.76	19.25	0.90	0.95	1.78	0.99	0.35	0.29	97.35	94.25
AFL-CIO	0.44	-0.46	5.06	-0.39	0.92	1.05	0.97	-0.17	-0.46	86.72	91.91
DFA Short Credit	0.98	-0.34	2.49	-0.21	0.91	1.18	0.78	-0.16	-0.28	86.22	92.20
Insight Short Duration	1.91	0.65	1.80	1.09	0.65	1.53	0.38	0.28	0.42	90.13	41.07
Sit Short Duration	1.52	0.43	2.69	0.03	1.38	1.31	0.82	0.06	0.34	152.51	160.97

Performance Analysis excludes closed end funds and those funds without 5 years of performance.

Total Fund  
Investment Fund Fee Analysis

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Expense Fee (%)
BlackRock Russell 1000 Index	Growth	0.03 % of Assets	\$936,129,841	\$280,839	0.03
Boston Partners	Growth	0.50 % of First \$25 M 0.30 % Thereafter	\$398,055,747	\$1,244,167	0.31
Emerald Advisers	Growth	0.75 % of First \$10 M 0.60 % Thereafter	\$203,676,202	\$1,237,057	0.61
Ceredex	Growth	0.85 % of First \$10 M 0.68 % of Next \$40 M 0.51 % Thereafter	\$200,771,432	\$1,125,934	0.56
Pyrford	Growth	0.70 % of First \$50 M 0.50 % of Next \$50 M 0.35 % Thereafter	\$468,325,309	\$1,889,139	0.40
William Blair	Growth	0.80 % of First \$20 M 0.60 % of Next \$30 M 0.50 % of Next \$50 M 0.45 % of Next \$50 M 0.40 % of Next \$50 M 0.30 % Thereafter	\$441,799,898	\$1,740,400	0.39
PIMCO RAE Emerging Markets	Growth	0.75 % of First \$50 M 0.68 % of Next \$50 M 0.50 % of Next \$100 M 0.45 % Thereafter	\$362,889,350	\$1,945,502	0.54
TT Emerging Markets	Growth	0.70 % of First \$100 M 0.65 % of Next \$100 M 0.60 % Thereafter	\$324,597,098	\$2,097,583	0.65
Artisan Partners	Growth	0.75 % of Assets	\$506,380,751	\$3,797,856	0.75
First Eagle	Growth	0.75 % of Assets	\$521,884,520	\$3,914,134	0.75
Voya Global Investors	Growth	0.50 % of First \$50 M 0.40 % of Next \$50 M 0.35 % Thereafter	\$145,473,183	\$609,156	0.42
Invesco US Fundamental Beta	Growth	0.15 % of Assets	\$107,857,392	\$161,786	0.15
AQR Global Risk Premium-EL	Growth	0.38 % of Assets	\$171,916,484	\$653,283	0.38

Mutual fund fees shown are sourced from Morningstar and are as of the most current prospectus.

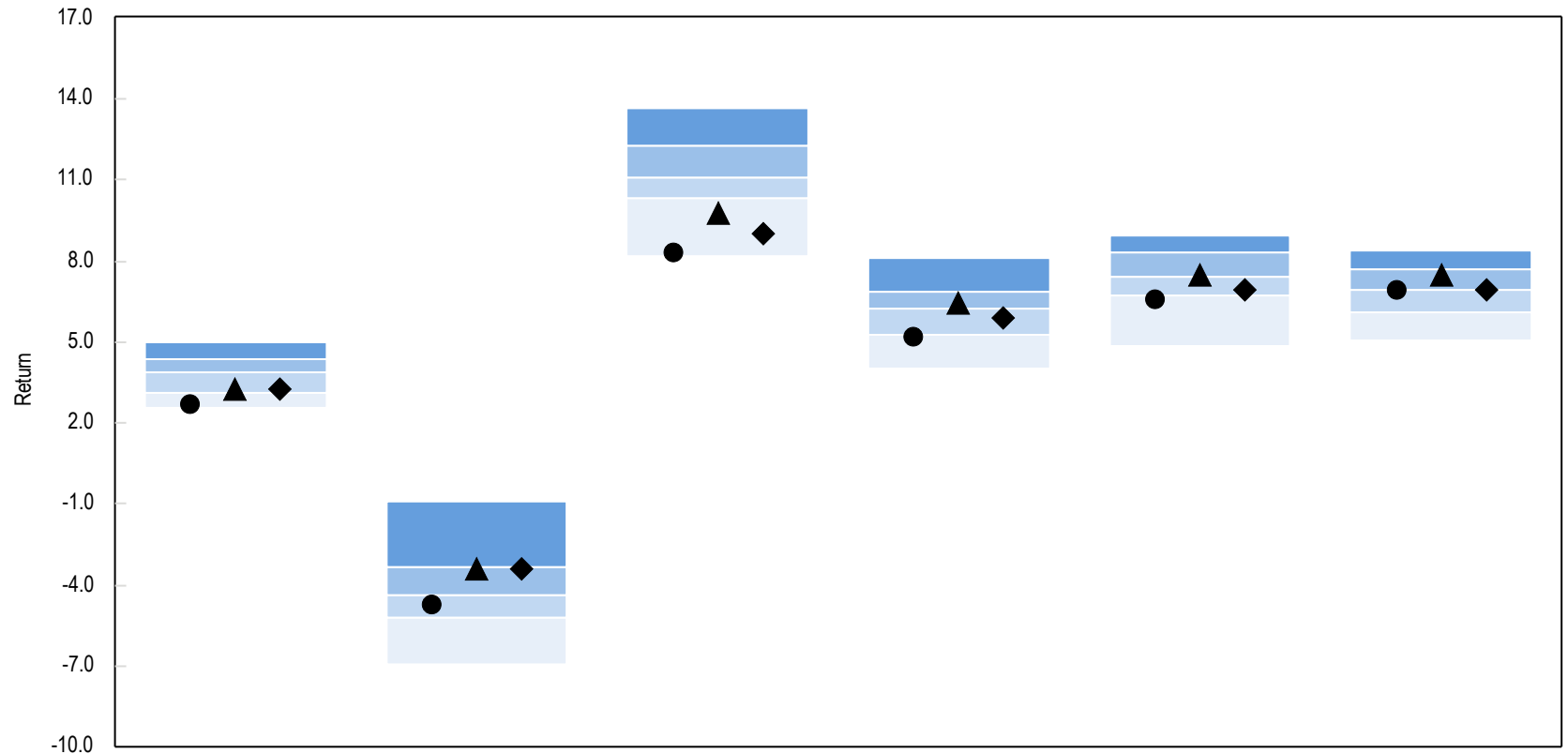
Total Fund  
Investment Fund Fee Analysis

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Name	Asset Class	Fee Schedule	Market Value	Estimated Fee Value	Expense Fee (%)
PanAgora Risk Parity Multi Asset	Growth	0.35 % of Assets	\$166,864,534	\$584,026	0.35
AFL-CIO	Diversifying	0.32 % of Assets	\$224,954,869	\$719,856	0.32
Acadian Multi-Asset Absolute Return Fund	Diversifying	0.50 % of Assets	\$251,661,058	\$1,258,305	0.50
Sit LLCAR	Diversifying	0.39 % of First \$200 M 0.35 % Thereafter	\$302,336,928	\$1,148,880	0.38
DFA Short Credit	Liquidity	0.20 % of First \$25 M 0.10 % Thereafter	\$315,541,836	\$340,542	0.11
Insight Short Duration	Liquidity	0.06 % of First \$500 M 0.05 % of Next \$500 M 0.04 % Thereafter	\$510,803,290	\$305,402	0.06
Sit Short Duration	Liquidity	0.15 % of Assets	\$573,408,908	\$860,113	0.15

Mutual fund fees shown are sourced from Morningstar and are as of the most current prospectus.

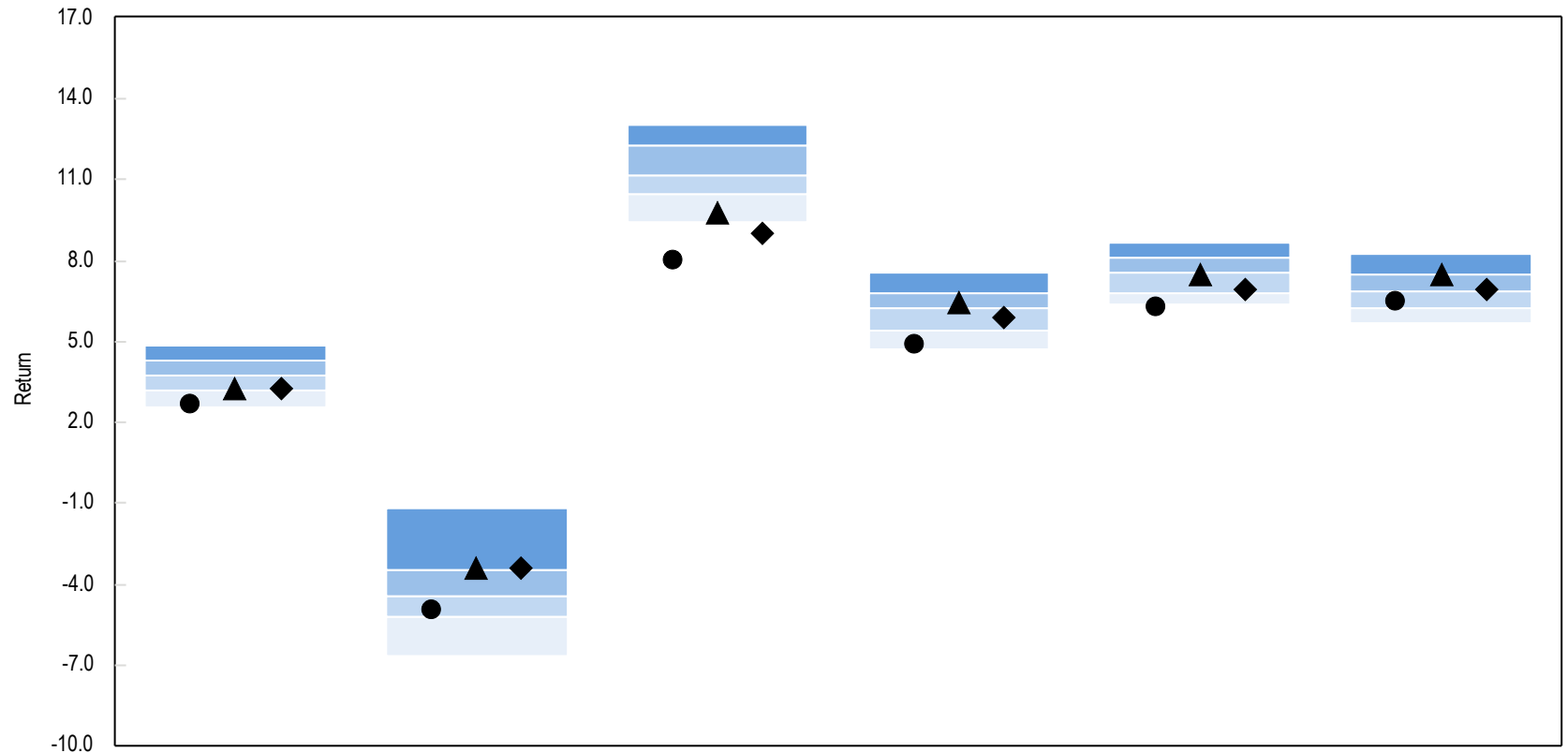
Total Fund Cumulative Performance vs. InvMetrics Public DB >\$1B Gross



	3 Mo	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
● Total Fund	2.73 (94)	-4.70 (58)	8.34 (94)	5.23 (79)	6.60 (80)	6.91 (48)
▲ Policy Index	3.24 (73)	-3.41 (27)	9.77 (88)	6.44 (40)	7.50 (48)	7.46 (36)
◆ Policy Index (Adjusted)	3.24 (73)	-3.41 (27)	9.04 (93)	5.90 (56)	6.93 (72)	6.95 (48)
5th Percentile	4.96	-0.89	13.70	8.10	8.93	8.36
1st Quartile	4.34	-3.36	12.30	6.88	8.35	7.69
Median	3.88	-4.38	11.10	6.21	7.45	6.90
3rd Quartile	3.09	-5.19	10.31	5.25	6.71	6.11
95th Percentile	2.58	-6.91	8.20	4.05	4.88	5.07
Population	74	67	66	65	64	60

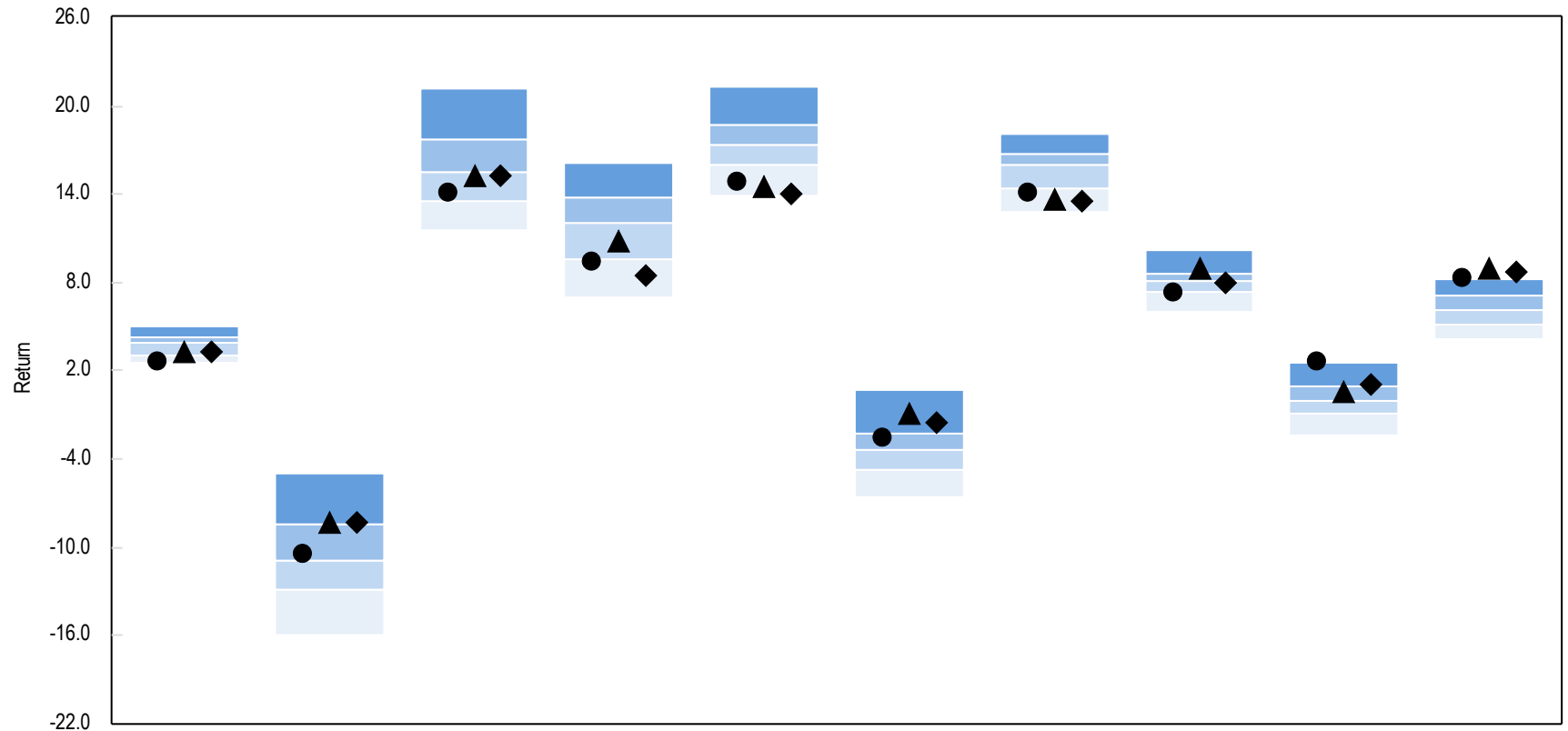
Effective 1/01/2017, only traditional asset class (public equity, public fixed income, REITs) investment management fees will be included in the gross of fee return calculation.

Total Fund Cumulative Performance vs. InvMetrics Public DB >\$1B Net



	3 Mo	1 Yr	3 Yrs	5 Yrs	7 Yrs	10 Yrs
● Total Fund	2.67 (94)	-4.93 (70)	8.06 (100)	4.95 (89)	6.29 (99)	6.50 (67)
▲ Policy Index	3.24 (73)	-3.41 (25)	9.77 (92)	6.44 (40)	7.50 (51)	7.46 (25)
◆ Policy Index (Adjusted)	3.24 (73)	-3.41 (25)	9.04 (98)	5.90 (60)	6.93 (70)	6.95 (49)
5th Percentile	4.82	-1.21	13.06	7.58	8.69	8.23
1st Quartile	4.28	-3.45	12.25	6.80	8.14	7.46
Median	3.73	-4.46	11.19	6.24	7.56	6.83
3rd Quartile	3.19	-5.19	10.47	5.40	6.82	6.26
95th Percentile	2.59	-6.65	9.46	4.70	6.37	5.71
Population	64	57	56	55	55	52

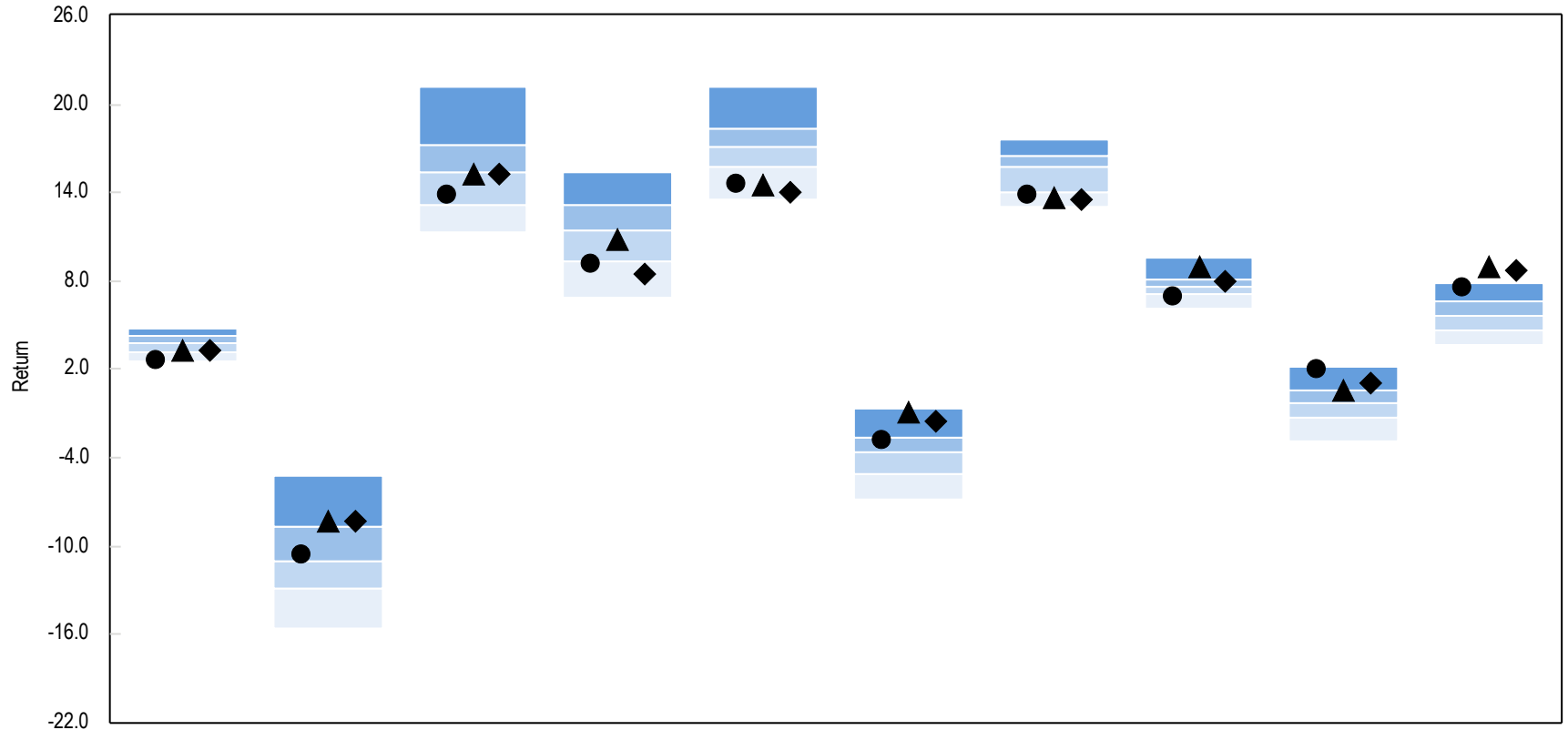
Total Fund Consecutive Periods vs. InvMetrics Public DB >\$1B Gross



	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014
● Total Fund	2.73 (94)	-10.36 (42)	14.21 (66)	9.52 (79)	14.92 (90)	-2.46 (31)	14.18 (79)	7.43 (73)	2.70 (3)	8.40 (5)
▲ Policy Index	3.24 (73)	-8.35 (24)	15.29 (53)	10.81 (64)	14.58 (92)	-0.94 (10)	13.69 (91)	8.93 (19)	0.58 (33)	9.03 (2)
◆ Policy Index (Adjusted)	3.24 (73)	-8.35 (24)	15.29 (53)	8.49 (91)	14.06 (95)	-1.52 (15)	13.51 (92)	8.03 (54)	1.06 (23)	8.67 (3)
5th Percentile	4.96	-4.95	21.18	16.11	21.27	0.69	18.14	10.18	2.50	8.28
1st Quartile	4.34	-8.47	17.69	13.75	18.69	-2.24	16.81	8.63	1.00	7.10
Median	3.88	-10.84	15.48	12.06	17.32	-3.40	16.04	8.08	0.00	6.12
3rd Quartile	3.09	-12.86	13.50	9.63	16.00	-4.77	14.36	7.38	-0.89	5.13
95th Percentile	2.58	-15.93	11.54	7.00	13.93	-6.61	12.79	6.04	-2.43	4.19
Population	74	115	150	165	129	110	120	124	120	118

Effective 1/01/2017, only traditional asset class (public equity, fixed income, REITs) investment management fees will be included in the gross of fee return calculation.

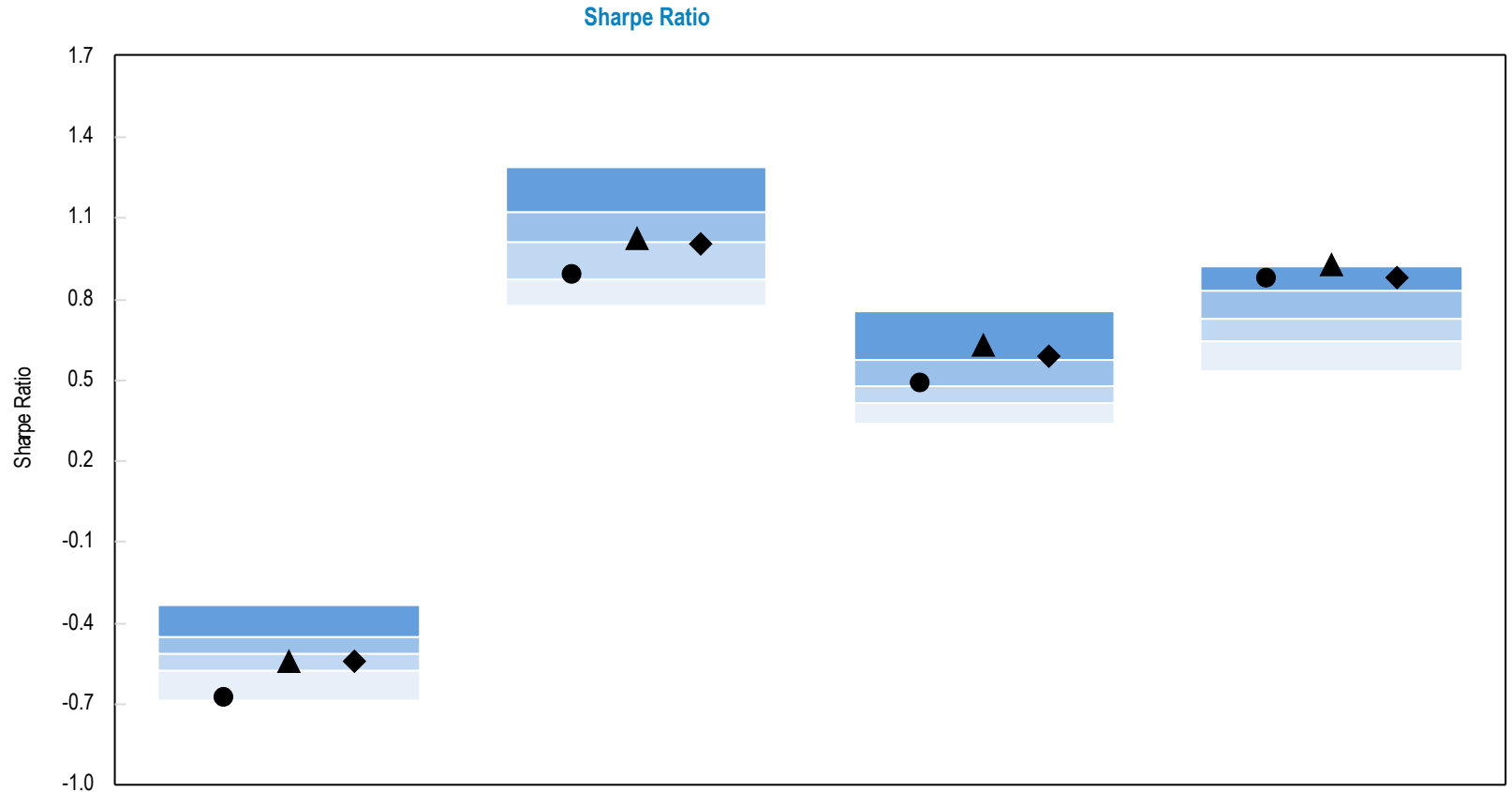
Total Fund Consecutive Periods vs. InvMetrics Public DB >\$1B Net



	YTD	2022	2021	2020	2019	2018	2017	2016	2015	2014
● Total Fund	2.67 (94)	-10.58 (46)	13.90 (65)	9.23 (77)	14.61 (93)	-2.72 (28)	13.86 (81)	6.94 (79)	2.09 (8)	7.67 (8)
▲ Policy Index	3.24 (73)	-8.35 (23)	15.29 (51)	10.81 (62)	14.58 (93)	-0.94 (6)	13.69 (86)	8.93 (14)	0.58 (25)	9.03 (2)
◆ Policy Index (Adjusted)	3.24 (73)	-8.35 (23)	15.29 (51)	8.49 (90)	14.06 (95)	-1.52 (9)	13.51 (88)	8.03 (34)	1.06 (21)	8.67 (3)
5th Percentile	4.82	-5.23	21.14	15.40	21.22	-0.68	17.65	9.59	2.22	7.82
1st Quartile	4.28	-8.69	17.24	13.20	18.32	-2.68	16.55	8.13	0.56	6.59
Median	3.73	-11.07	15.34	11.46	17.08	-3.67	15.72	7.62	-0.34	5.68
3rd Quartile	3.19	-12.93	13.22	9.34	15.74	-5.15	14.04	7.11	-1.28	4.66
95th Percentile	2.59	-15.64	11.37	6.87	13.52	-6.80	13.04	6.16	-2.82	3.69
Population	64	96	129	146	123	103	114	112	109	106

Total Fund  
Sharpe Ratio Ranking (Gross of Fees)

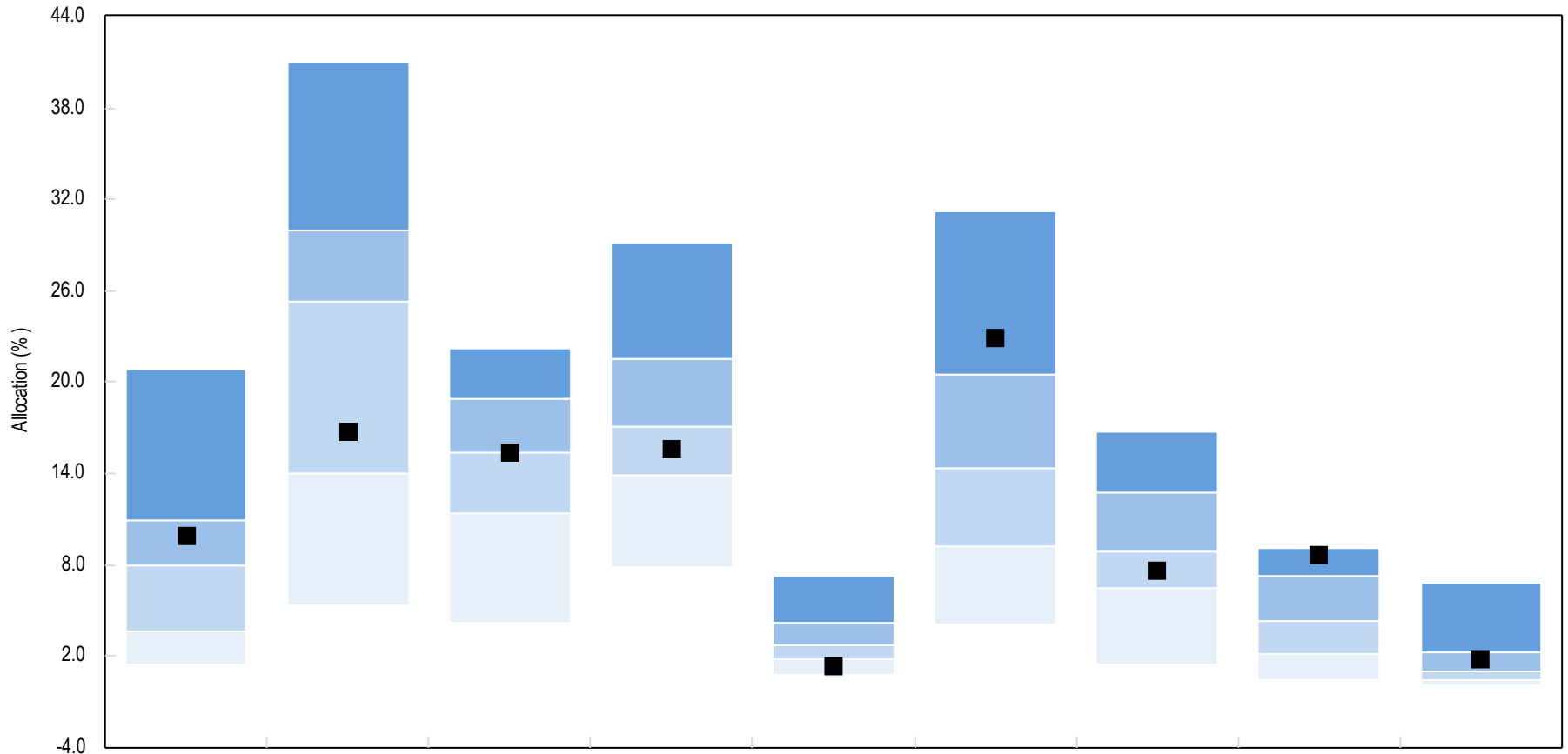
Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023



	1 Yr	3 Yrs	5 Yrs	10 Yrs
● Total Fund	-0.67 (94)	0.89 (74)	0.49 (42)	0.88 (14)
▲ Policy Index	-0.54 (67)	1.03 (43)	0.63 (16)	0.93 (4)
◆ Policy Index (Adjusted)	-0.54 (67)	1.00 (52)	0.59 (24)	0.88 (13)
5th Percentile	-0.33	1.29	0.76	0.92
1st Quartile	-0.45	1.12	0.58	0.83
Median	-0.52	1.01	0.48	0.73
3rd Quartile	-0.58	0.87	0.42	0.64
95th Percentile	-0.69	0.78	0.34	0.53
Population	57	56	55	51



Total Fund vs. InvMetrics Public DB > \$1B



	Global Equity	US Equity	Global ex-US Equity	US Fixed	Global ex-US Fixed	Private Equity	Total Real Estate	Multi-Asset	Cash & Equivalents
■ Total Fund	9.9 (34)	16.7 (71)	15.4 (50)	15.7 (65)	1.4 (82)	22.9 (16)	7.6 (67)	8.6 (8)	1.8 (32)
5th Percentile	20.9	41.1	22.3	29.1	7.3	31.3	16.7	9.1	6.8
1st Quartile	10.9	29.9	18.9	21.5	4.2	20.5	12.7	7.3	2.3
Median	8.0	25.3	15.4	17.1	2.8	14.3	8.8	4.4	1.0
3rd Quartile	3.7	14.0	11.4	13.9	1.8	9.3	6.5	2.2	0.4
95th Percentile	1.5	5.3	4.2	7.9	0.8	4.1	1.5	0.5	0.1
Population	19	61	61	55	23	45	49	15	45

# Domestic Equity Managers

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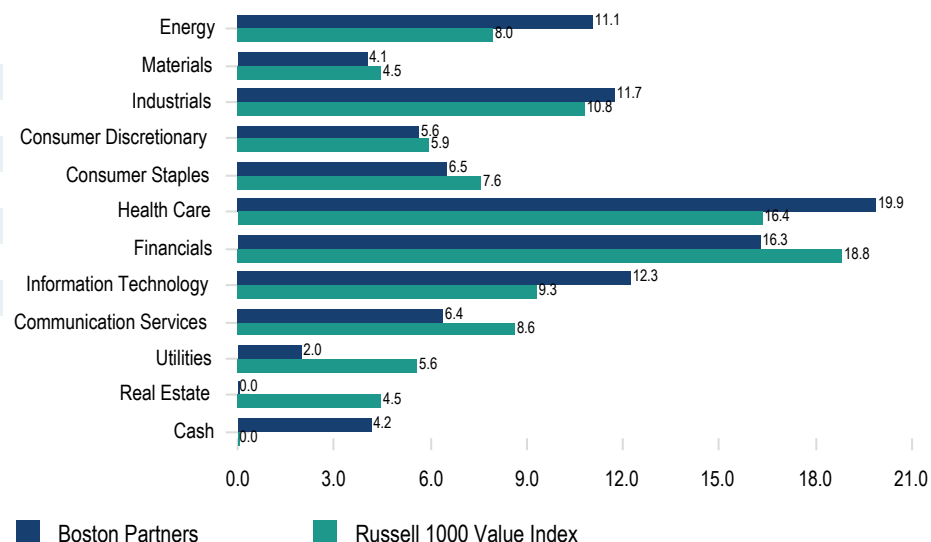
Boston Partners  
Manager Portfolio Overview

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Characteristics

	Portfolio	Benchmark
Number of Stocks	84	849
Wtd. Avg. Mkt. Cap \$M	165,728.18	152,864.43
Median Mkt. Cap \$M	48,195.51	11,529.75
Price/Earnings ratio	16.13	15.93
Price/Book ratio	2.60	2.49
Return on Equity (%)	0.42	3.48
Current Yield (%)	1.97	2.32
Beta (5 Years, Monthly)	1.03	1.00

Sector Allocation (%) vs. Russell 1000 Value Index



Largest Holdings

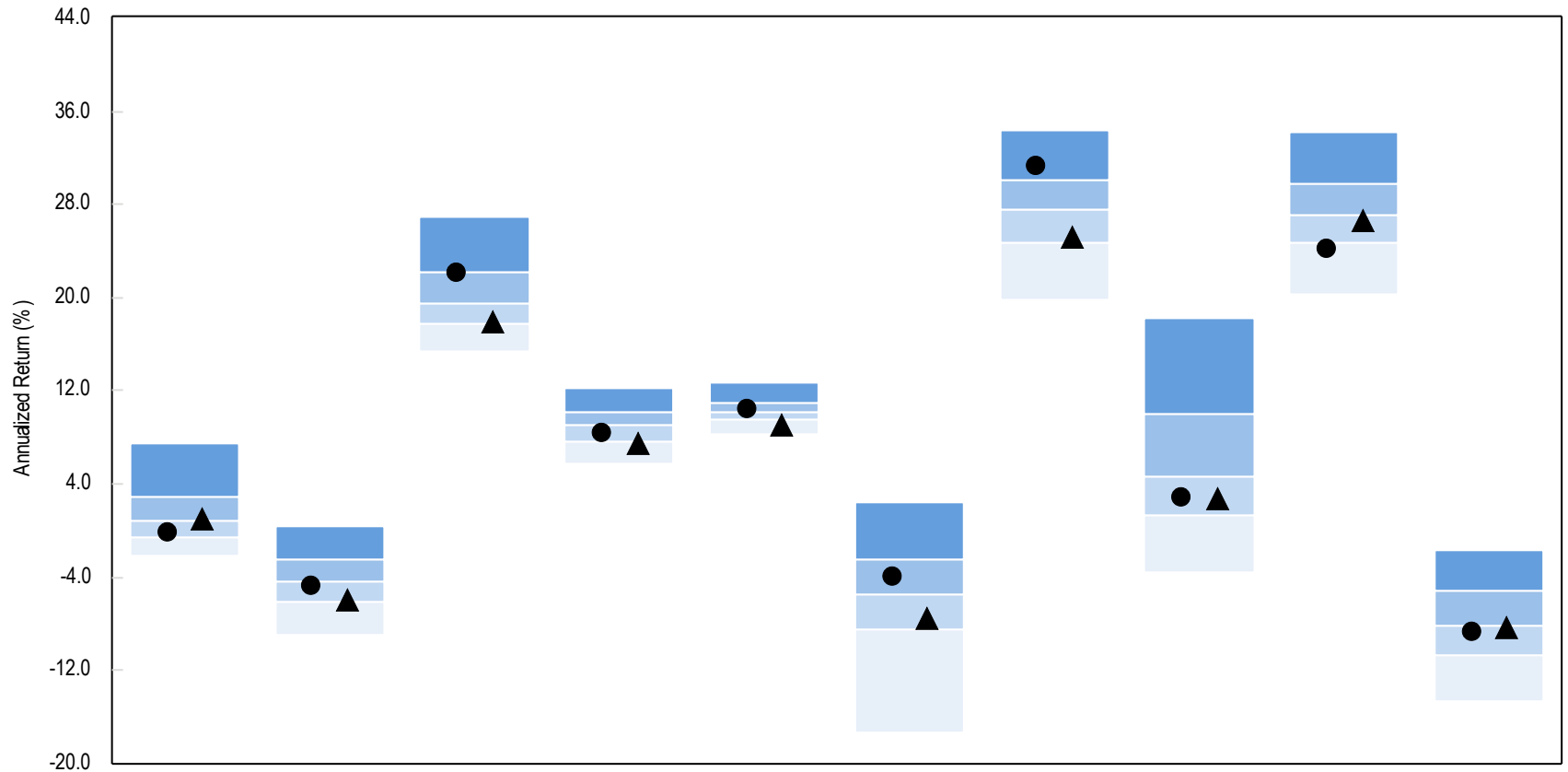
Top Contributors

Top Detractors

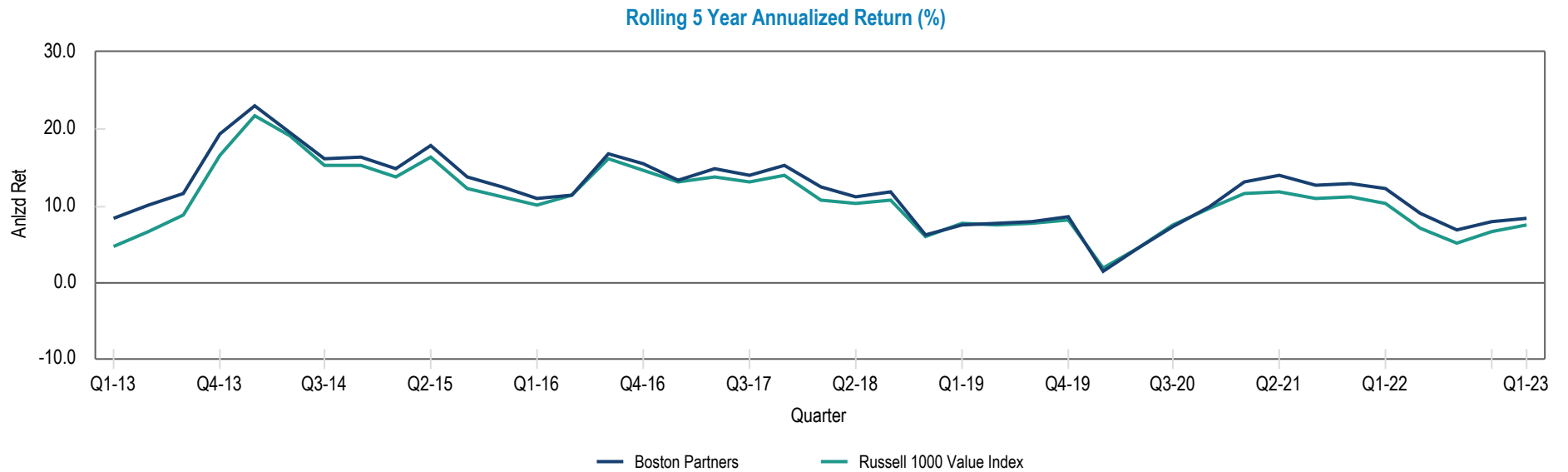
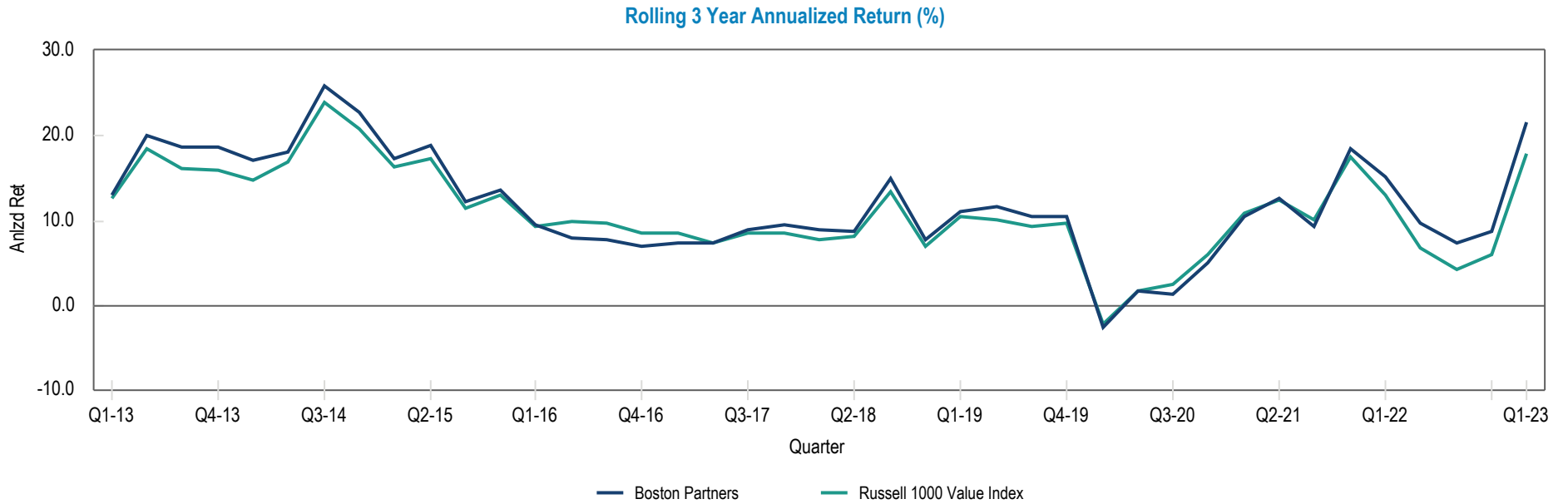
	End Weight (%)	Quarterly Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Berkshire Hathaway Inc	3.56	-0.04	Alphabet Inc	2.21	17.57	0.39	Schwab (Charles) Corp	2.48	-36.89	-0.91
JPMorgan Chase & Co	3.46	-2.11	Sanofi	2.66	12.37	0.33	The Cigna Group	2.40	-22.54	-0.54
Alphabet Inc	3.20	17.57	Advanced Micro Devices Inc	0.64	51.32	0.33	CVS Health Corp	2.39	-19.71	-0.47
Bristol-Myers Squibb Co	3.11	-2.91	CRH PLC	1.01	30.54	0.31	Johnson & Johnson	3.94	-11.64	-0.46
Johnson & Johnson	2.96	-11.64	Marathon Petroleum Corp	1.86	16.53	0.31	Centene Corp	1.88	-22.92	-0.43
Sanofi	2.90	12.37	Applied Materials Inc	1.04	26.43	0.27	Conocophillips	2.57	-15.02	-0.39
Cisco Systems Inc	2.59	10.61	QUALCOMM Inc.	1.59	16.75	0.27	Bank of America Corp	1.73	-13.08	-0.23
AutoZone Inc	2.34	-0.33	Cisco Systems Inc	2.09	10.61	0.22	Unitedhealth Group Inc	2.05	-10.54	-0.22
Activision Blizzard Inc	2.12	11.81	Booking Holdings Inc	0.63	31.61	0.20	Wells Fargo & Co	2.16	-8.90	-0.19
Marathon Petroleum Corp	2.09	16.53	Microchip Technology Inc	0.92	19.77	0.18	Devon Energy Corp	1.10	-16.23	-0.18
			% of Portfolio	14.65		2.80	% of Portfolio	22.70		-4.02

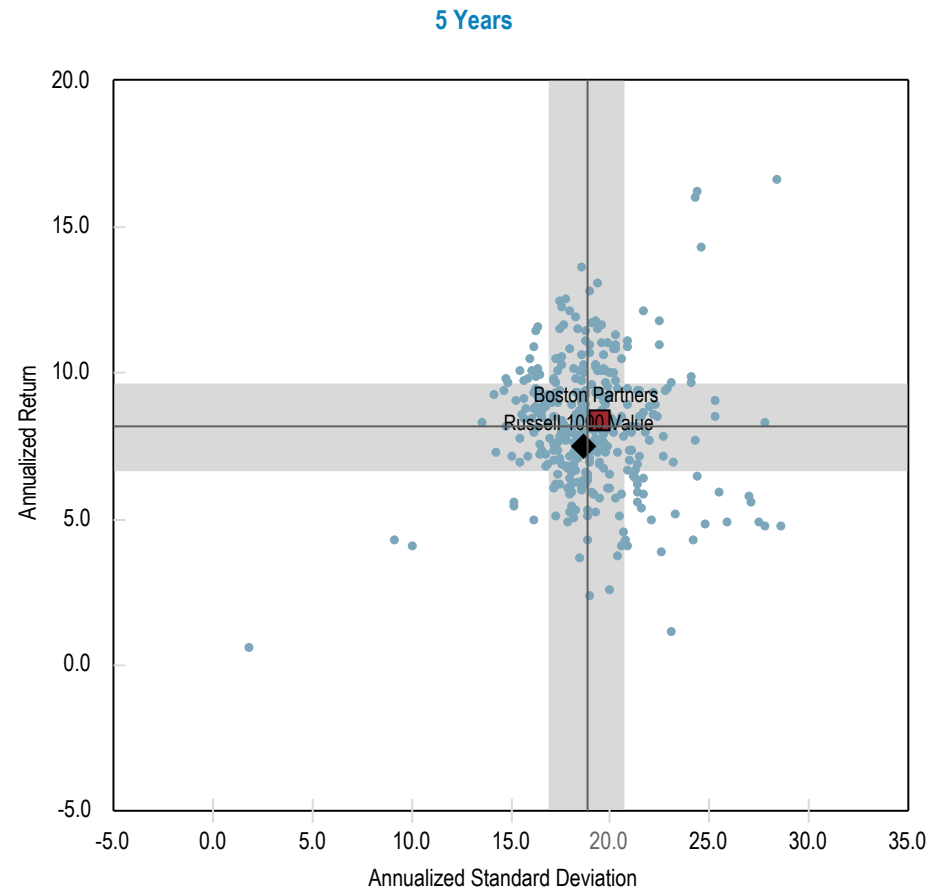
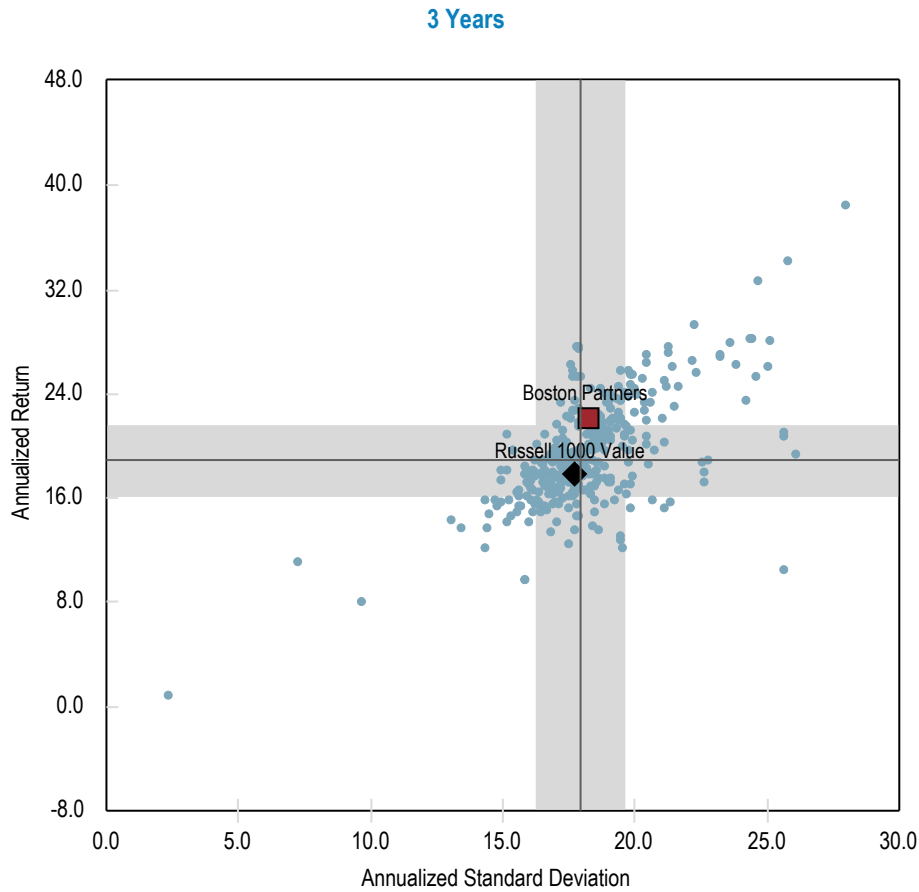
Domestic equity large cap value portfolio exhibiting low turnover in companies with low valuations relative to intrinsic value. Primary personnel include Mark Donovan and David Pyle.

Boston Partners vs. eV US Large Cap Value Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● Boston Partners	-0.16 (69)	-4.68 (56)	22.11 (27)	8.40 (61)	10.46 (42)	-3.82 (36)	31.34 (18)	2.96 (62)	24.26 (79)	-8.65 (58)
▲ Russell 1000 Value Index	1.01 (47)	-5.91 (75)	17.93 (74)	7.50 (78)	9.13 (84)	-7.54 (69)	25.16 (73)	2.80 (63)	26.54 (56)	-8.27 (53)
5th Percentile	7.43	0.36	26.89	12.28	12.68	2.40	34.34	18.18	34.28	-1.71
1st Quartile	2.92	-2.53	22.24	10.15	11.01	-2.48	30.08	10.06	29.83	-5.16
Median	0.81	-4.39	19.55	9.02	10.23	-5.42	27.56	4.58	27.15	-8.17
3rd Quartile	-0.54	-6.08	17.83	7.65	9.55	-8.50	24.70	1.29	24.72	-10.75
95th Percentile	-2.18	-8.88	15.36	5.77	8.33	-17.35	19.82	-3.60	20.33	-14.67
Population	383	383	369	360	325	392	406	413	442	465





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Boston Partners	22.1	18.3	1.1
Russell 1000 Value Index	17.9	17.7	1.0
eV US Large Cap Value Equity Median	19.6	17.9	1.1
Population	369	369	369

	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Boston Partners	8.4	19.5	0.4
Russell 1000 Value Index	7.5	18.7	0.4
eV US Large Cap Value Equity Median	9.0	18.8	0.5
Population	360	360	360

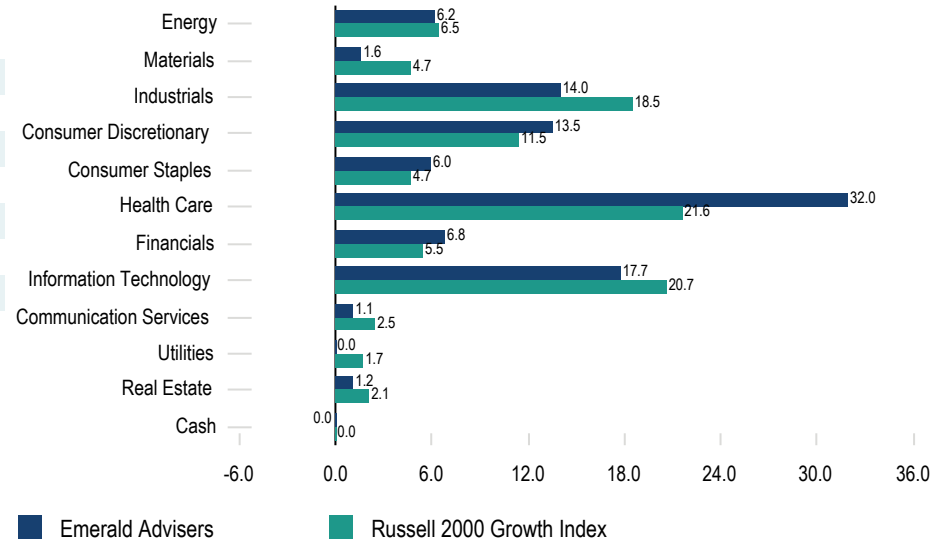
Emerald Advisers  
 Manager Portfolio Overview

Contra Costa County Employees' Retirement Association  
 Period Ending: March 31, 2023

Characteristics

	Portfolio	Benchmark
Number of Stocks	116	1,095
Wtd. Avg. Mkt. Cap \$M	3,237.04	3,316.59
Median Mkt. Cap \$M	2,396.51	1,152.78
Price/Earnings ratio	20.15	15.02
Price/Book ratio	3.65	3.58
Return on Equity (%)	-1.21	-1.38
Current Yield (%)	0.52	0.83
Beta (5 Years, Monthly)	0.96	1.00

Sector Allocation (%) vs. Russell 2000 Growth Index



Largest Holdings

	End Weight (%)	Quarterly Return (%)
Churchill Downs Inc	2.15	21.58
Super Micro Computer Inc	2.14	29.78
Simply Good Foods Co (The)	2.12	4.58
Lantheus Holdings Inc	2.10	62.01
Shift4 Payments Inc	2.09	35.53
Treace Medical Concepts Inc	1.76	9.57
Freshpet Inc	1.70	25.43
Transmedics Group Inc	1.67	22.70
Planet Fitness Inc	1.58	-1.43
Carpenter Technology Corp	1.56	21.67

Top Contributors

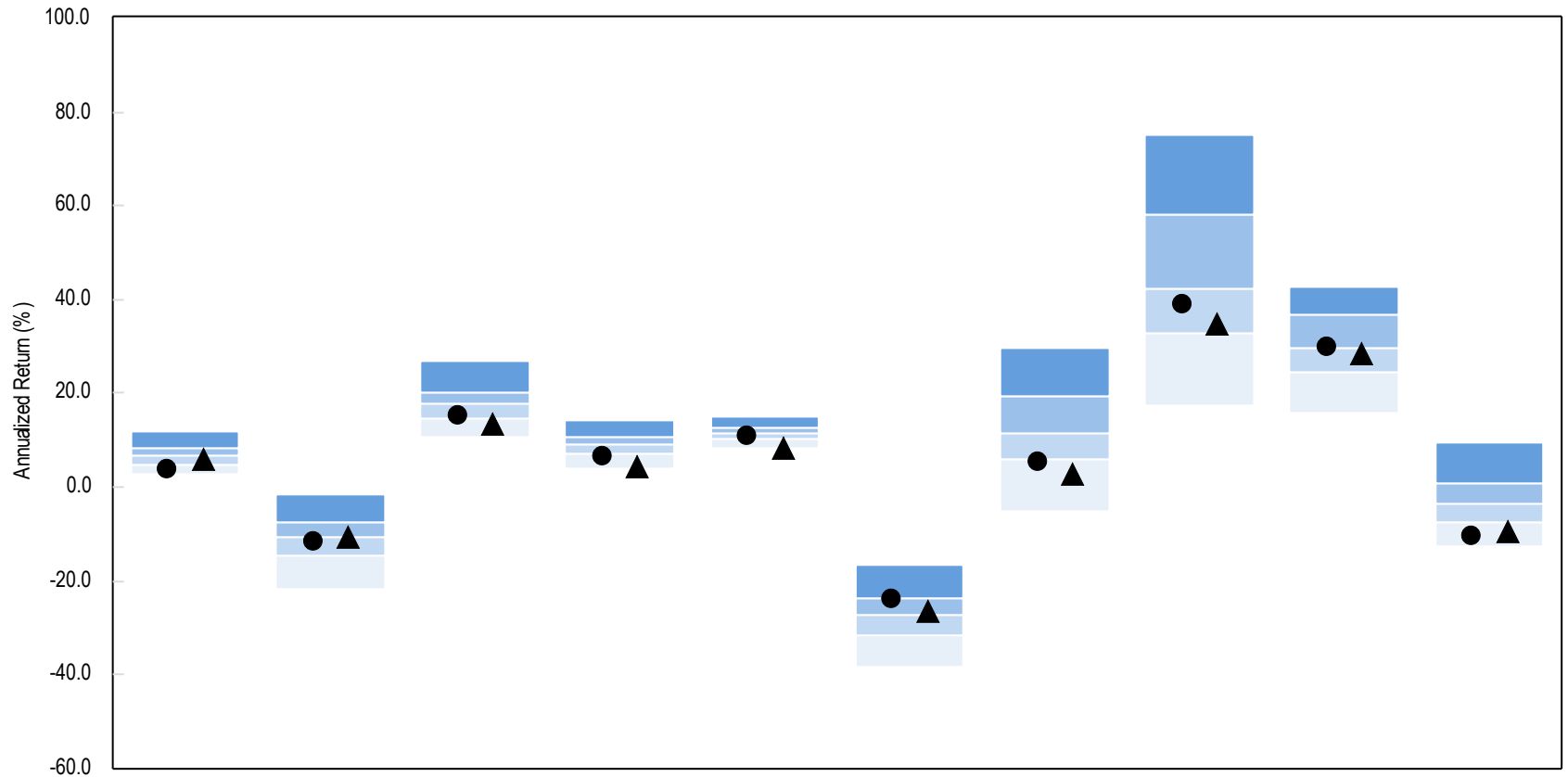
	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Reata Pharmaceuticals Inc	1.32	139.32	1.84
Neogenomics Inc	1.04	88.42	0.92
Lantheus Holdings Inc	1.12	62.01	0.69
Super Micro Computer Inc	2.05	29.78	0.61
Shift4 Payments Inc	1.59	35.53	0.56
Transmedics Group Inc	1.77	22.70	0.40
Churchill Downs Inc	1.83	21.58	0.39
Freshpet Inc	1.40	25.43	0.36
Jack in the Box Inc.	1.09	29.08	0.32
Kratos Defense & Security Solutions	0.97	30.62	0.30
% of Portfolio	14.18		6.40

Top Detractors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
National Vision Holdings Inc	1.55	-51.39	-0.80
ProFrac Holding Corp	1.35	-49.72	-0.67
Replimune Group Inc	1.68	-35.07	-0.59
AdaptHealth Corp	1.11	-35.33	-0.39
NV5 Global Inc	1.76	-21.43	-0.38
Cutera Inc	0.77	-46.59	-0.36
Aris Water Solutions Inc	0.74	-45.37	-0.34
Amylyx Pharmaceuticals Inc	1.58	-20.60	-0.32
Pacific Premier Bancorp Inc	1.39	-23.17	-0.32
Cactus Inc	1.76	-17.78	-0.31
% of Portfolio	13.69		-4.48

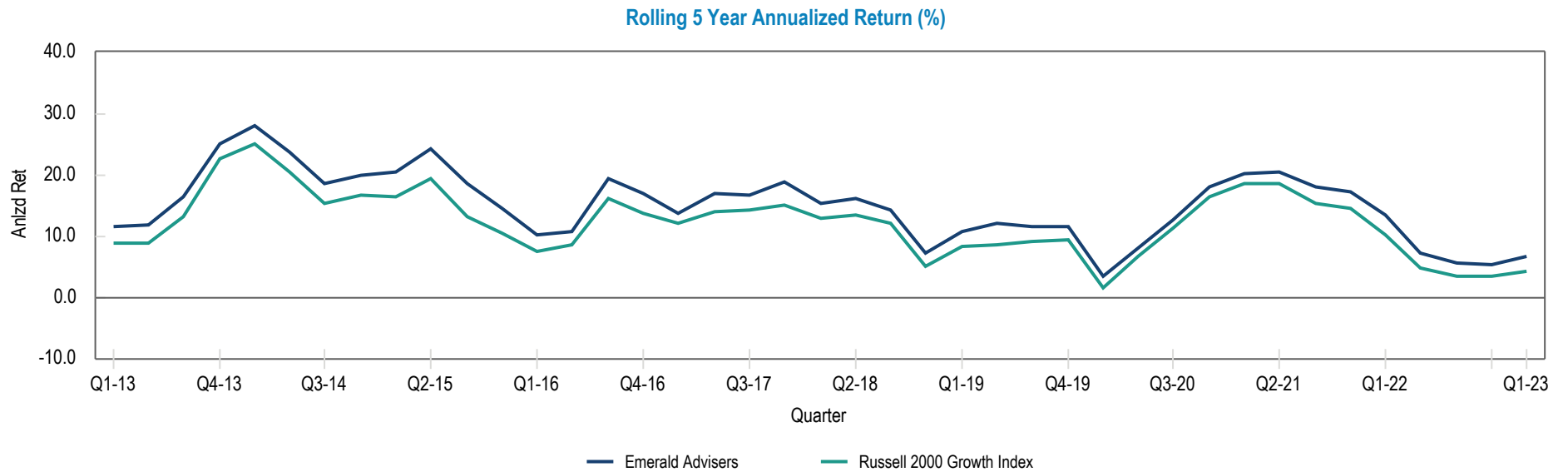
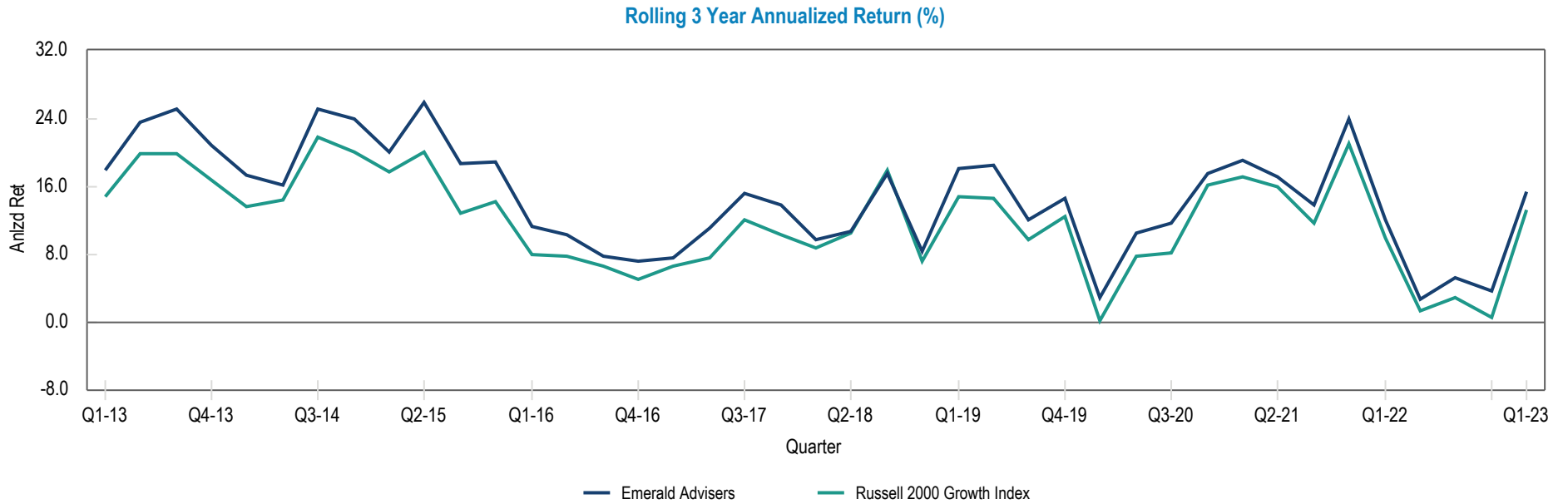
Domestic equity small cap growth portfolio of companies with significantly high growth rates. Primary personnel include Kenneth Mertz, Joseph Garner, and Stacey Sears.

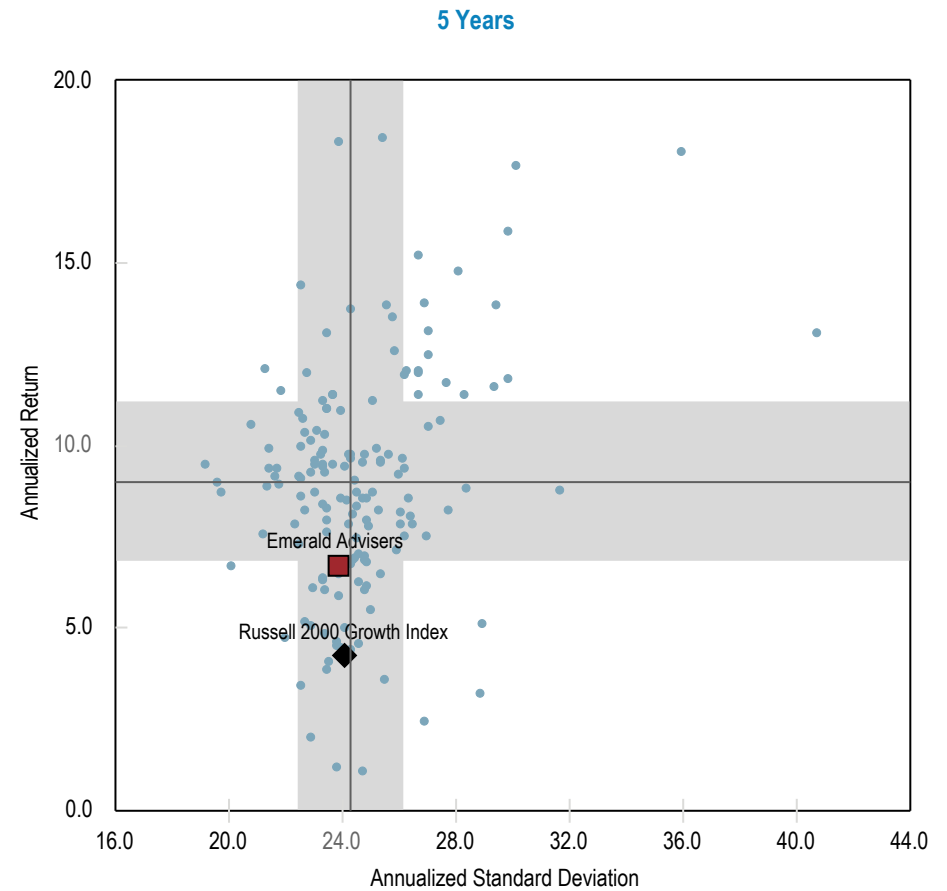
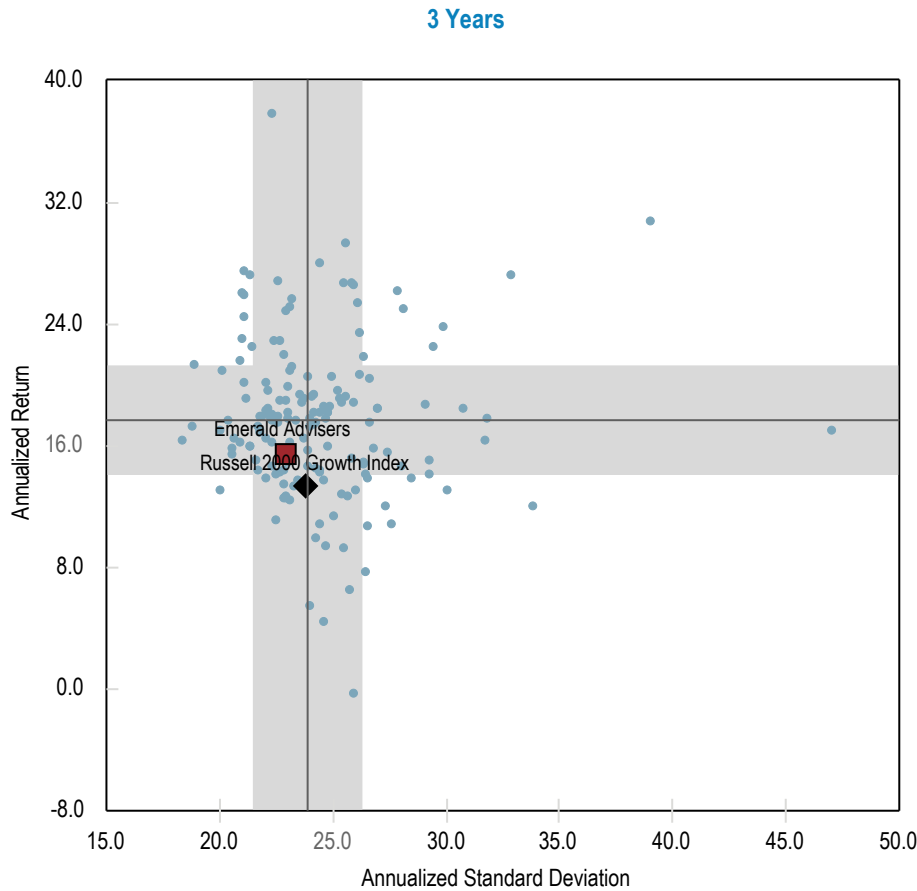
Emerald Advisers vs. eV US Small Cap Growth Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● Emerald Advisers	4.17 (85)	-11.22 (54)	15.44 (69)	6.74 (80)	11.02 (64)	-23.75 (25)	5.53 (76)	38.96 (57)	30.26 (49)	-10.14 (86)
▲ Russell 2000 Growth Index	6.07 (63)	-10.60 (50)	13.36 (85)	4.26 (95)	8.49 (96)	-26.36 (43)	2.83 (84)	34.63 (67)	28.48 (54)	-9.31 (82)
5th Percentile	11.92	-1.44	26.79	14.09	14.95	-16.50	29.84	74.95	42.86	9.65
1st Quartile	8.38	-7.51	20.14	10.76	12.50	-23.78	19.32	58.28	36.60	0.66
Median	6.93	-10.68	17.69	9.03	11.33	-27.30	11.54	42.23	29.63	-3.50
3rd Quartile	4.95	-14.46	14.52	7.09	10.33	-31.48	5.85	32.71	24.64	-7.31
95th Percentile	2.74	-21.62	10.64	4.02	8.53	-38.41	-5.12	17.39	15.92	-12.52
Population	160	160	157	154	133	166	180	181	189	194







**3 Years**

	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Emerald Advisers	15.4	22.9	0.7
Russell 2000 Growth Index	13.4	23.8	0.6
eV US Small Cap Growth Equity Median	17.7	23.9	0.8
Population	157	157	157

**5 Years**

	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Emerald Advisers	6.7	23.8	0.3
Russell 2000 Growth Index	4.3	24.1	0.2
eV US Small Cap Growth Equity Median	9.0	24.3	0.4
Population	154	154	154

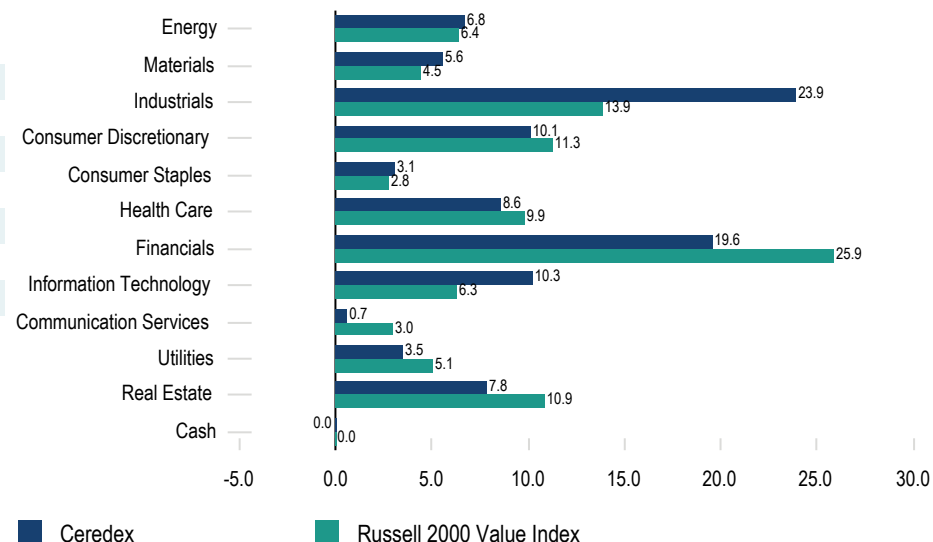
Ceredex  
Manager Portfolio Overview

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Characteristics

	Portfolio	Benchmark
Number of Stocks	80	1,363
Wtd. Avg. Mkt. Cap \$M	5,334.23	2,384.08
Median Mkt. Cap \$M	4,460.78	806.47
Price/Earnings ratio	16.32	10.02
Price/Book ratio	2.53	1.63
Return on Equity (%)	4.00	1.34
Current Yield (%)	2.49	2.38
Beta (5 Years, Monthly)	0.88	1.00

Sector Allocation (%) vs. Russell 2000 Value Index



Largest Holdings

	End Weight (%)	Quarterly Return (%)
Perrigo Co Plc	3.52	6.01
Academy Sports and Outdoors Inc	2.96	24.37
Stantec Inc	2.58	22.14
Ritchie Bros Auctioneers Inc	2.58	-0.26
Power Integrations Inc	2.38	18.29
Dolby Laboratories Inc	2.33	21.49
DENTSPLY SIRONA Inc	2.16	23.81
EMCOR Group Inc.	1.99	9.88
Svenska Kullagerfabriken Skf AB	1.94	33.61
Colliers International Group Inc	1.90	14.68

Top Contributors

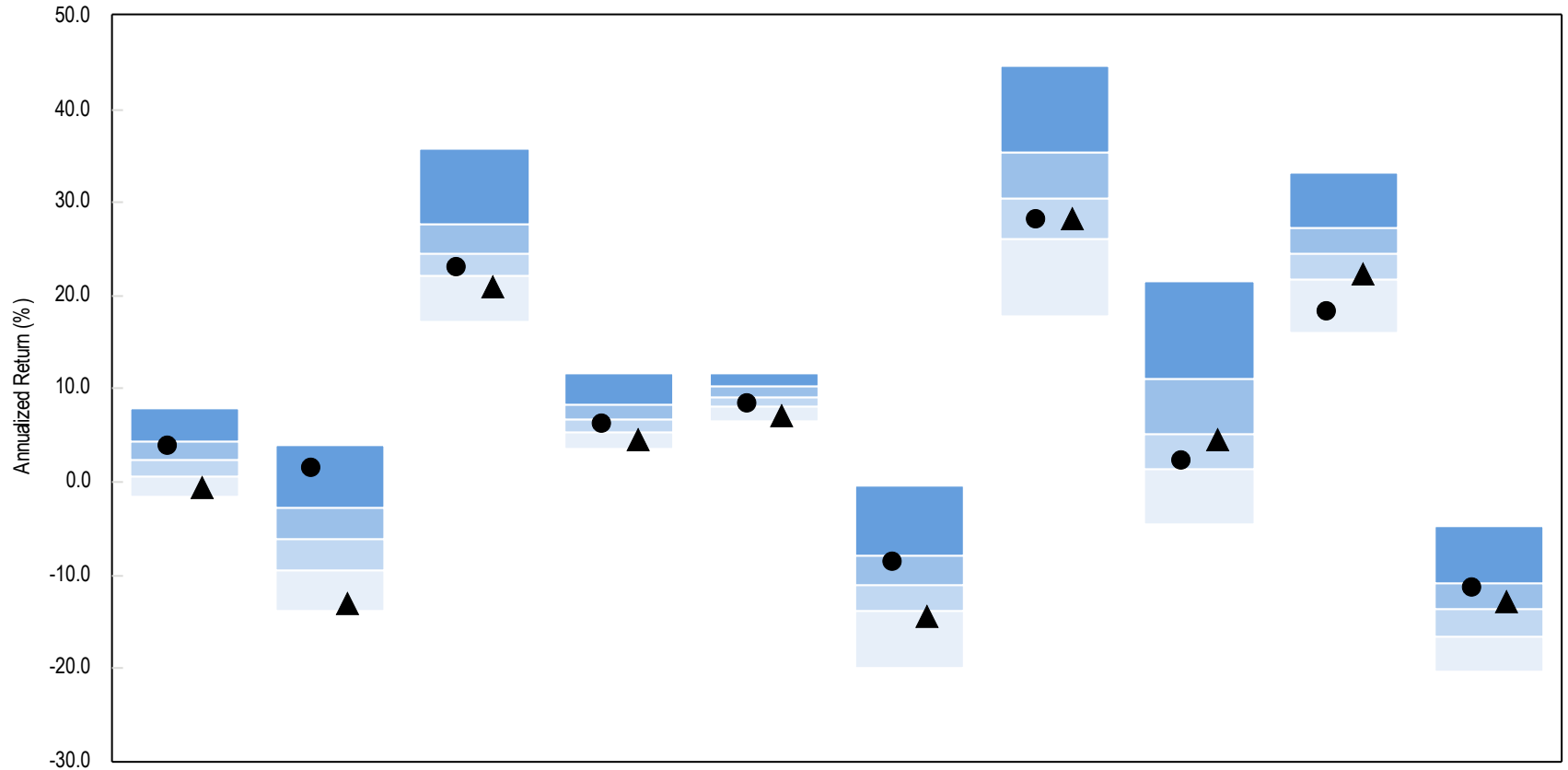
	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Academy Sports and Outdoors Inc	2.32	24.37	0.56
First Citizens BancShares Inc	1.85	28.45	0.53
Svenska Kullagerfabriken Skf AB	1.47	33.61	0.49
National Instruments Corporation	1.12	42.78	0.48
Stantec Inc	2.07	22.14	0.46
Dolby Laboratories Inc	1.87	21.49	0.40
DENTSPLY SIRONA Inc	1.54	23.81	0.37
Power Integrations Inc	1.96	18.29	0.36
Littelfuse Inc	1.33	22.03	0.29
Algonquin Power & Utilities Corp	0.94	30.46	0.29
% of Portfolio	16.47		4.23

Top Detractors

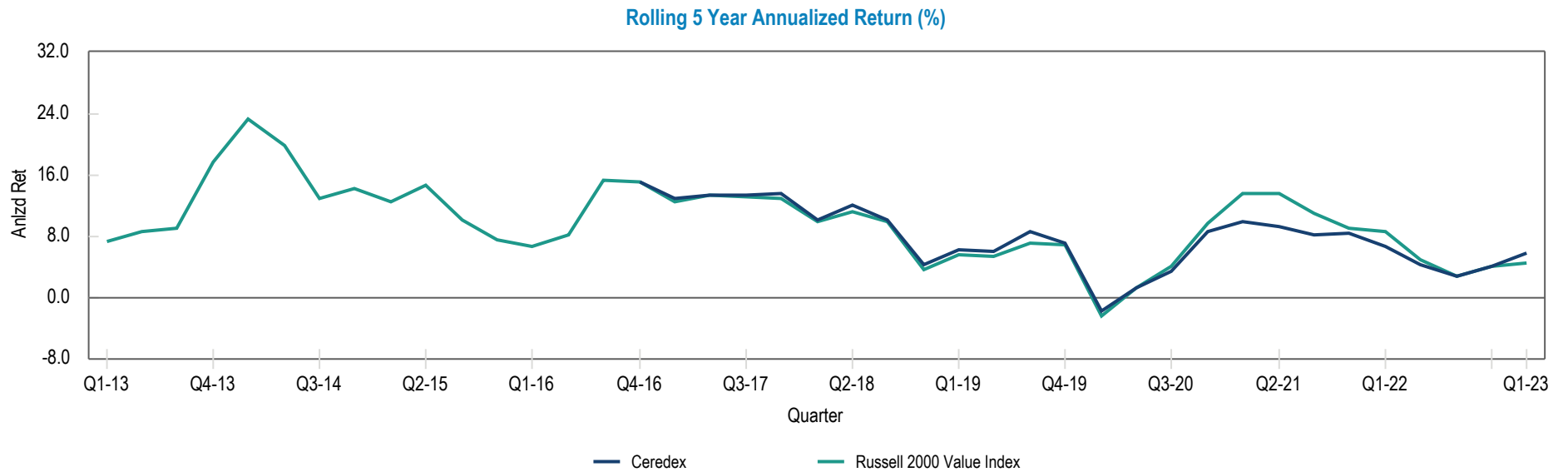
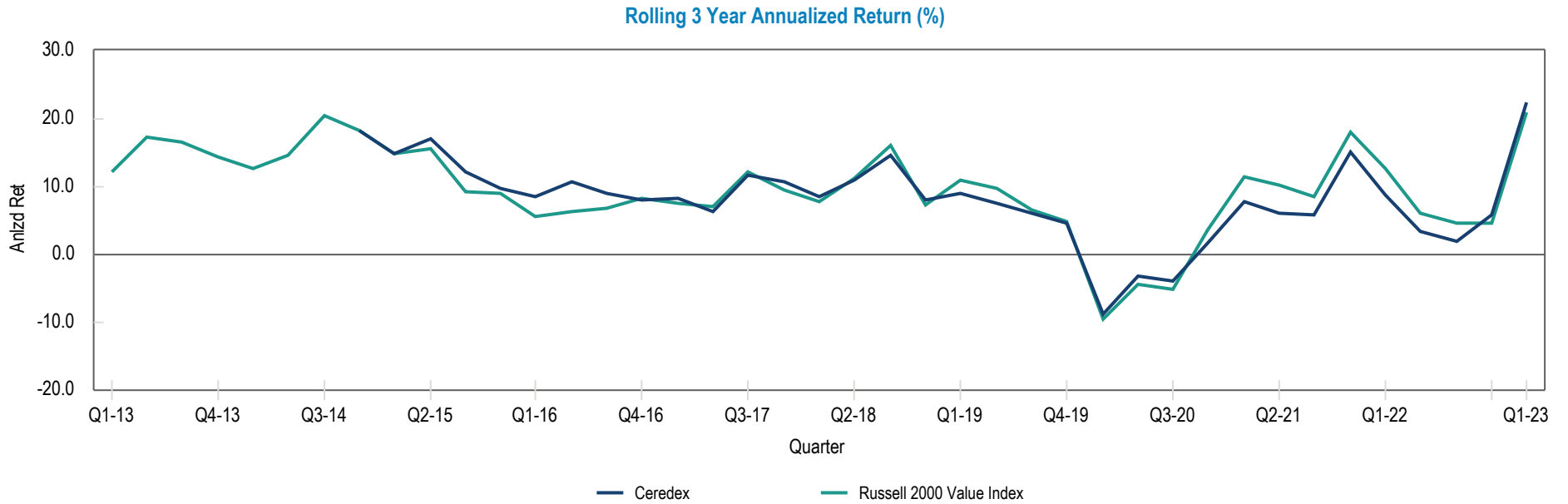
	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Ovintiv Inc	2.41	-28.37	-0.68
SLM Corp	1.44	-24.78	-0.36
Comerica Incorporated	1.04	-33.99	-0.35
First Interstate BancSystem Inc	1.55	-21.76	-0.34
Bank of Hawaii Corp	0.92	-32.22	-0.30
First Hawaiian Inc	1.17	-20.01	-0.23
Cullen/Frost Bankers Inc	1.05	-20.69	-0.22
Seacoast Banking Corp of Florida	0.91	-23.49	-0.21
Ameris Bancorp	0.93	-22.08	-0.21
Organon & Co	1.10	-14.87	-0.16
% of Portfolio	12.52		-3.06

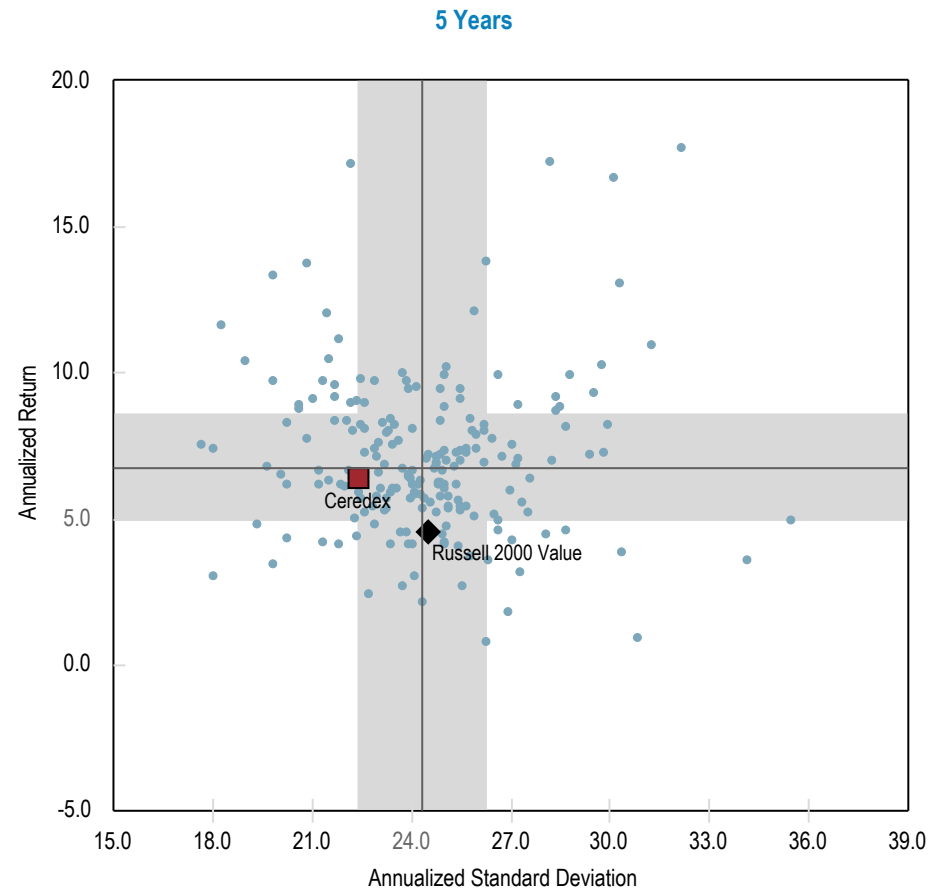
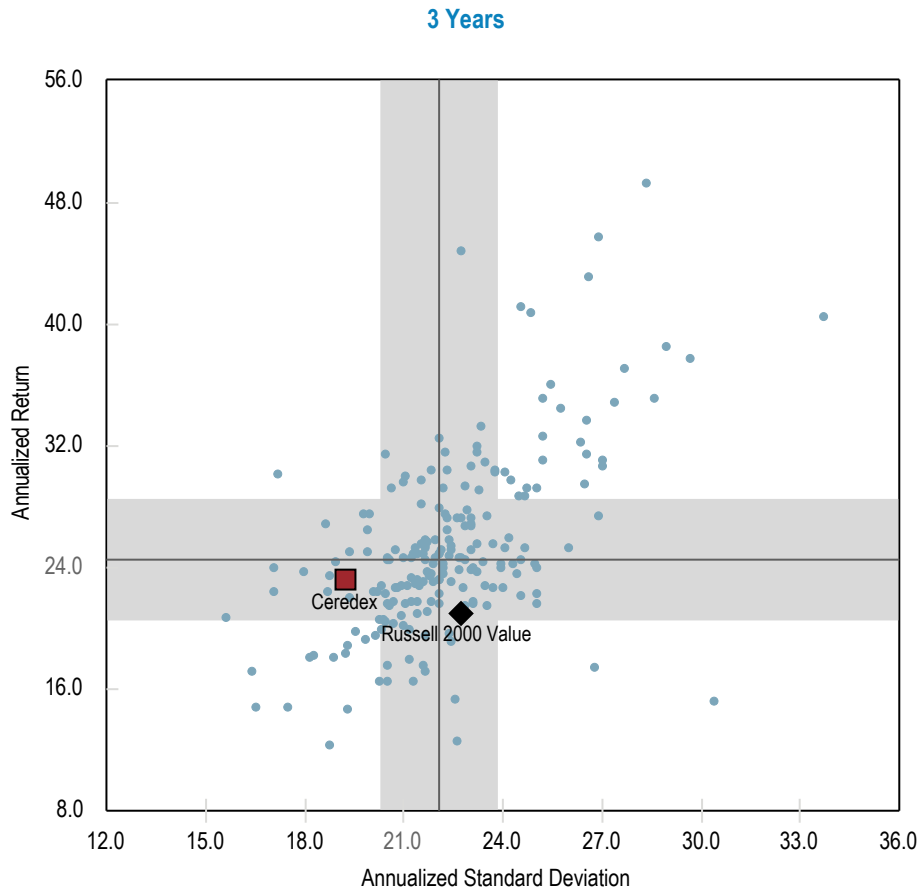
Domestic equity small cap value portfolio of companies with dividend yields and low valuations. Primary personnel include Brett Barner and David Maynard.

Ceredex vs. eV US Small Cap Value Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● Ceredex	4.02 (29)	1.59 (9)	23.22 (64)	6.38 (57)	8.59 (63)	-8.46 (27)	28.37 (59)	2.32 (70)	18.36 (88)	-11.32 (29)
▲ Russell 2000 Value Index	-0.66 (90)	-12.96 (93)	21.01 (83)	4.55 (86)	7.22 (90)	-14.48 (78)	28.27 (60)	4.63 (54)	22.39 (71)	-12.86 (42)
5th Percentile	7.87	3.98	35.72	11.70	11.60	-0.36	44.60	21.50	33.29	-4.66
1st Quartile	4.42	-2.67	27.66	8.34	10.24	-7.91	35.29	11.10	27.36	-10.83
Median	2.32	-6.04	24.51	6.78	9.02	-11.12	30.49	5.25	24.43	-13.65
3rd Quartile	0.67	-9.36	22.11	5.44	8.11	-13.89	26.17	1.32	21.76	-16.61
95th Percentile	-1.57	-13.81	17.16	3.49	6.47	-19.92	17.73	-4.59	15.95	-20.38
Population	212	212	208	200	176	218	232	244	253	264





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Ceredex	23.2	19.2	1.1
Russell 2000 Value Index	21.0	22.7	0.9
eV US Small Cap Value Equity Median	24.5	22.1	1.1
Population	208	208	208

	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Ceredex	6.4	22.4	0.3
Russell 2000 Value Index	4.5	24.5	0.2
eV US Small Cap Value Equity Median	6.8	24.3	0.3
Population	200	200	200

# International Equity Managers

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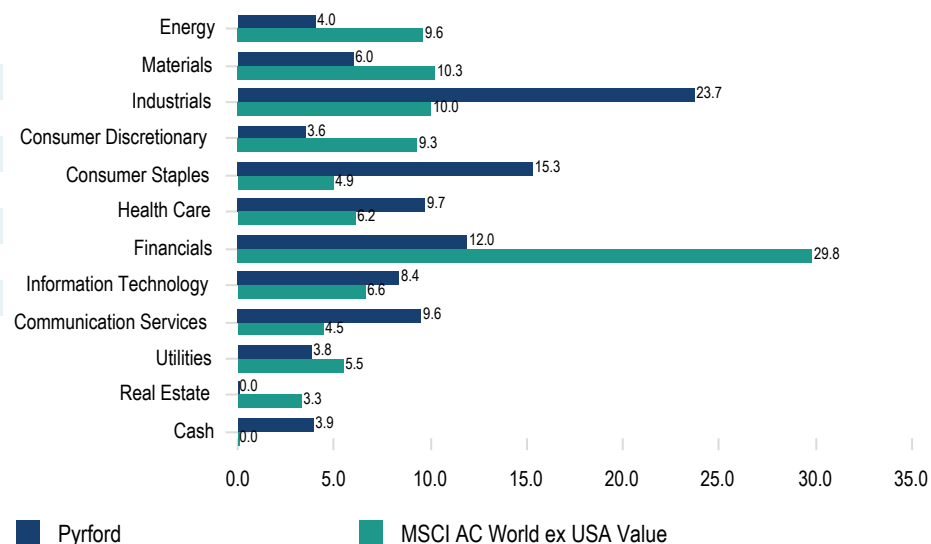
# Pyrford Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

## Characteristics

	Portfolio	Benchmark
Number of Stocks	74	1,341
Wtd. Avg. Mkt. Cap \$M	56,072.72	60,233.98
Median Mkt. Cap \$M	23,885.76	8,437.47
Price/Earnings ratio	16.57	9.33
Price/Book ratio	2.27	1.71
Return on Equity (%)	4.40	4.13
Current Yield (%)	3.96	4.84
Beta (5 Years, Monthly)	0.74	1.00

## Sector Allocation (%) vs. MSCI AC World ex USA Value



## Largest Holdings

## Top Contributors

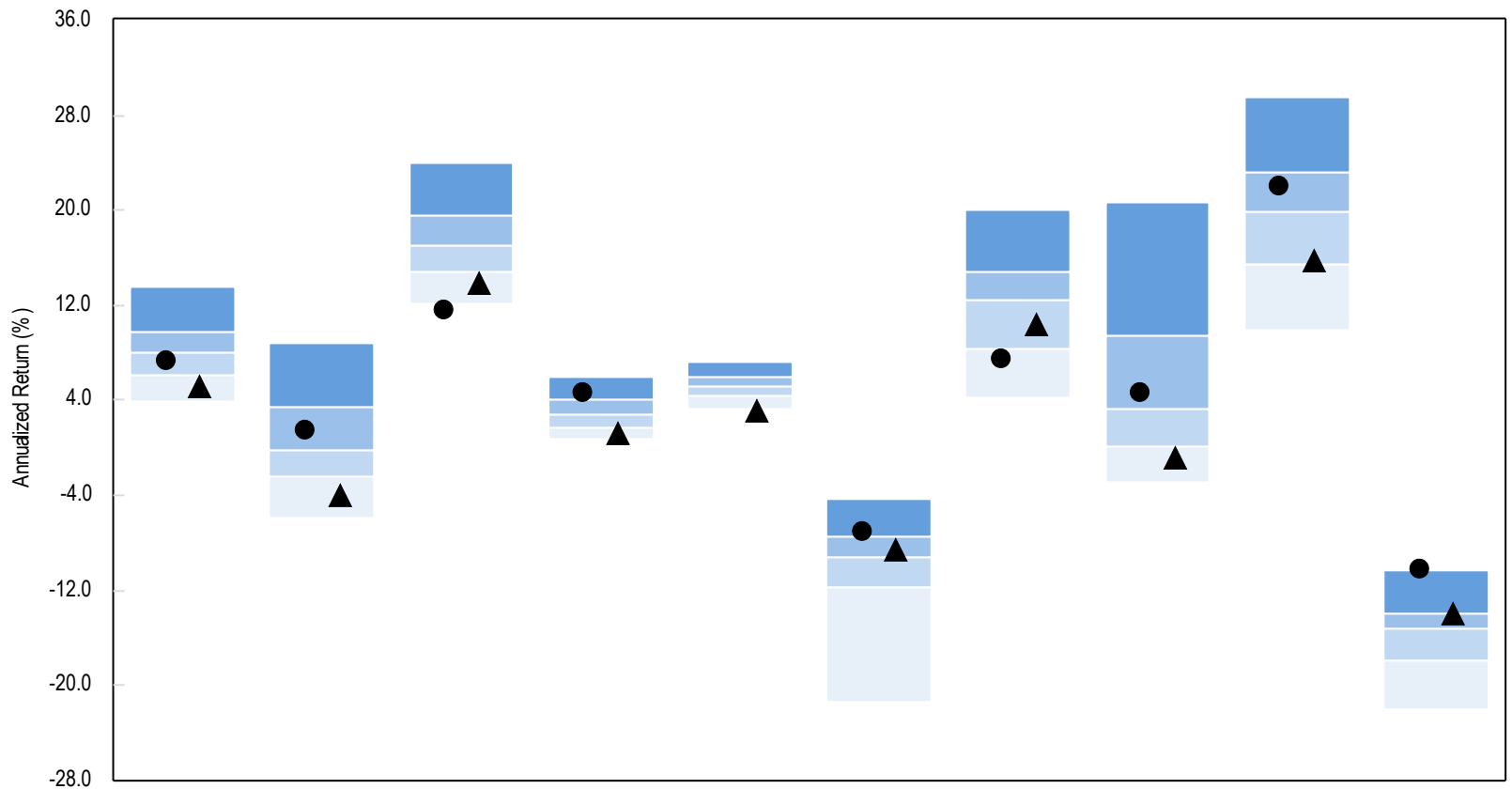
## Top Detractors

	End Weight (%)	Quarterly Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Japan Tobacco Inc	3.01	4.24	SAP SE	2.25	22.57	0.51	Computershare Ltd Cpu	1.67	-17.59	-0.29
SAP SE	2.59	22.57	Deutsche Post AG	1.74	24.69	0.43	Sampo PLC	2.06	-9.34	-0.19
Nestle SA, Cham Und Vevey	2.39	5.36	Mitsubishi Electric Corp	1.94	21.11	0.41	British American Tobacco	1.73	-9.21	-0.16
Fuchs Petrolub SE	2.33	16.73	L'Air Liquide SA	2.07	18.56	0.38	Roche Holding AG	1.96	-5.72	-0.11
L'Air Liquide SA	2.30	18.56	Telenor ASA	1.38	25.99	0.36	AIA Group Ltd	1.74	-5.33	-0.09
Mitsubishi Electric Corp	2.17	21.11	Fuchs Petrolub SE	2.13	16.73	0.36	VTech Holdings Ltd	0.92	-7.19	-0.07
Brenntag SE	2.16	17.96	Brenntag SE	1.96	17.96	0.35	Singapore Telecommunications	1.88	-3.44	-0.06
Roche Holding AG	2.13	-5.72	Nemetschek SE	0.77	35.08	0.27	Nabtesco Corp	1.41	-4.54	-0.06
Brambles Ltd	2.10	11.35	Sanofi	1.80	13.58	0.24	Imperial Brands PLC	1.11	-5.18	-0.06
Kddi Corp	2.10	3.65	ASMP Limited	0.63	38.82	0.24	United Overseas Bank Ltd	2.01	-2.21	-0.04
			% of Portfolio	16.67		3.56	% of Portfolio	16.49		-1.15

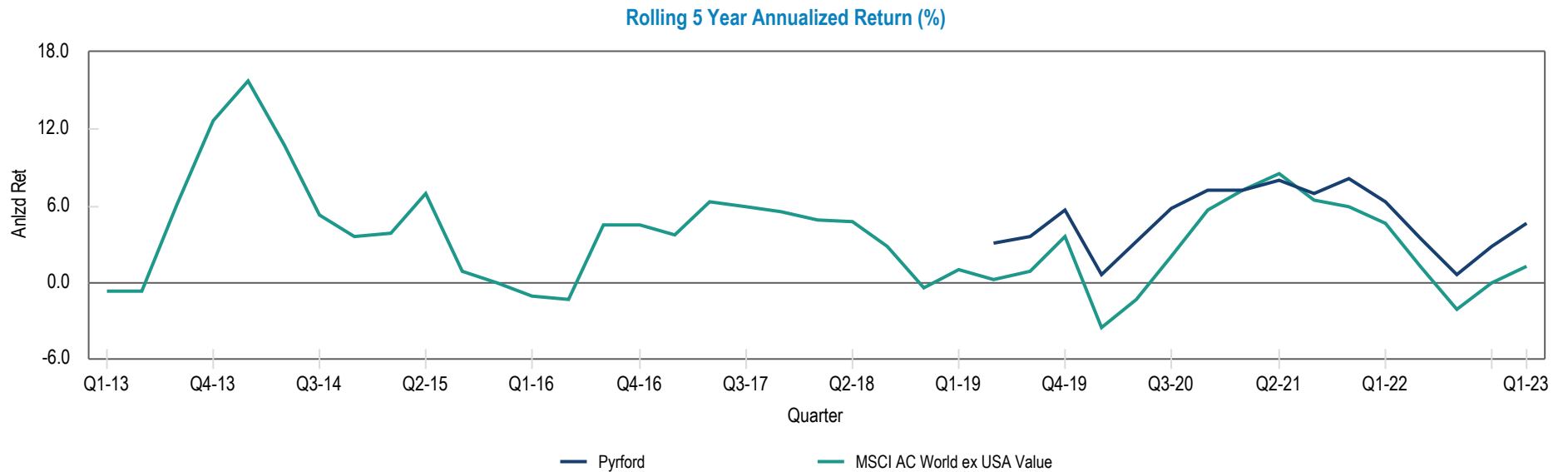
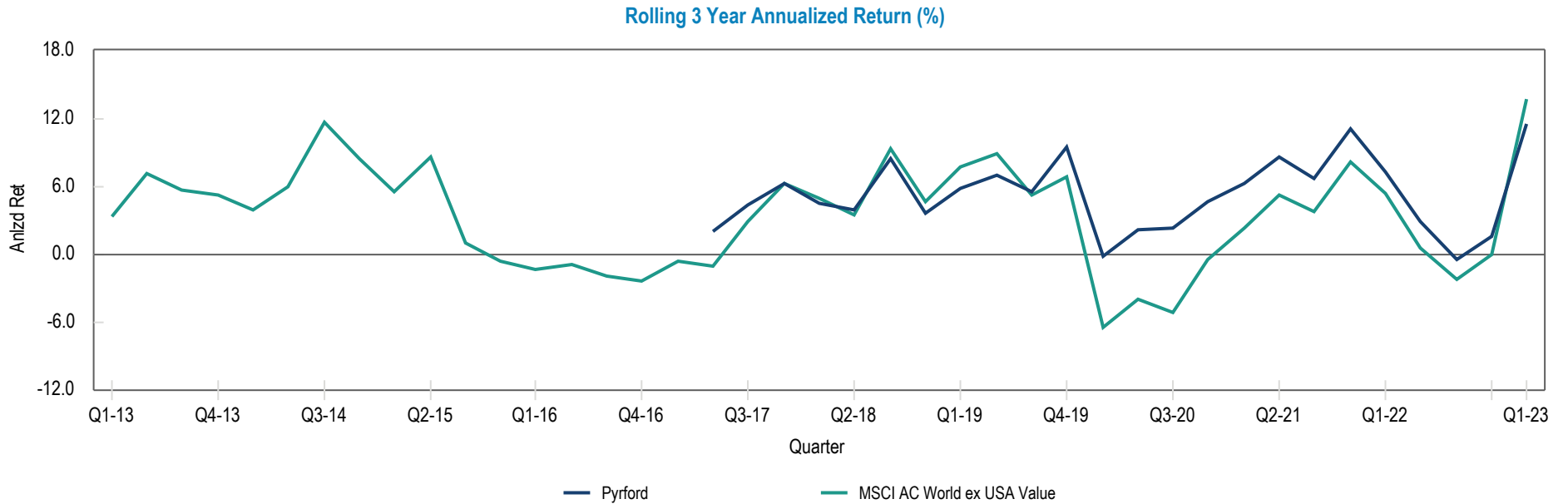
International equity value portfolio of non-US companies with low valuations at the country and stock level. Primary personnel include Tony Cousins, Daniel McDonagh, and Paul Simons.

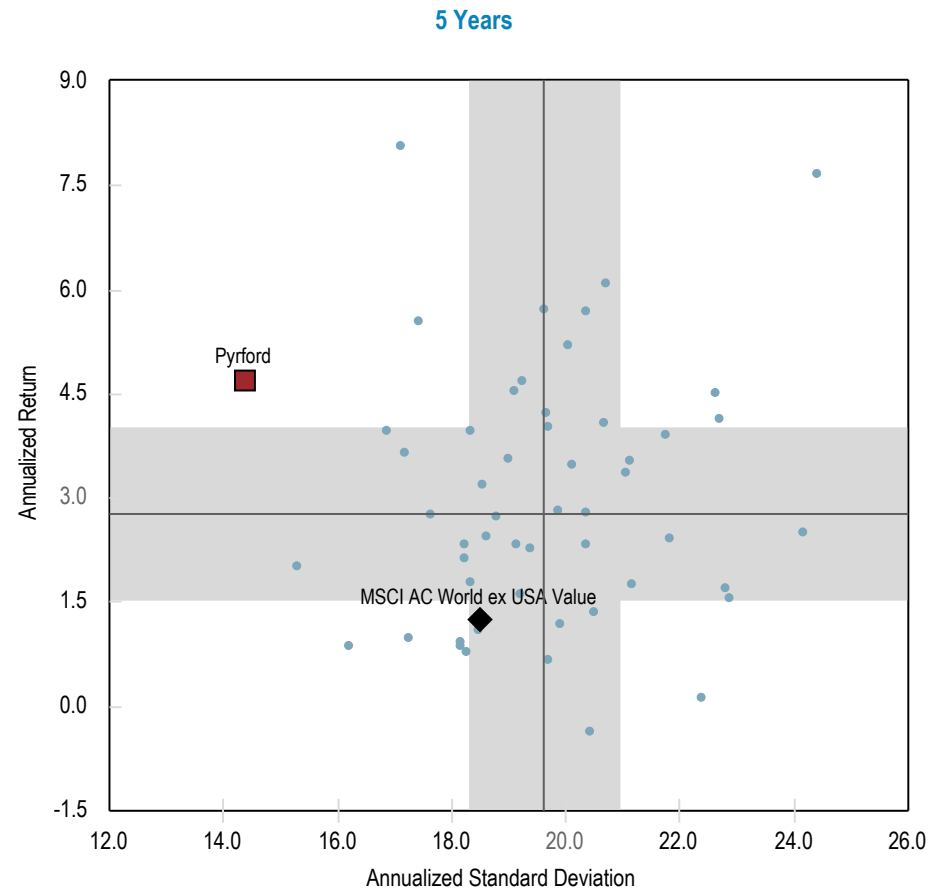
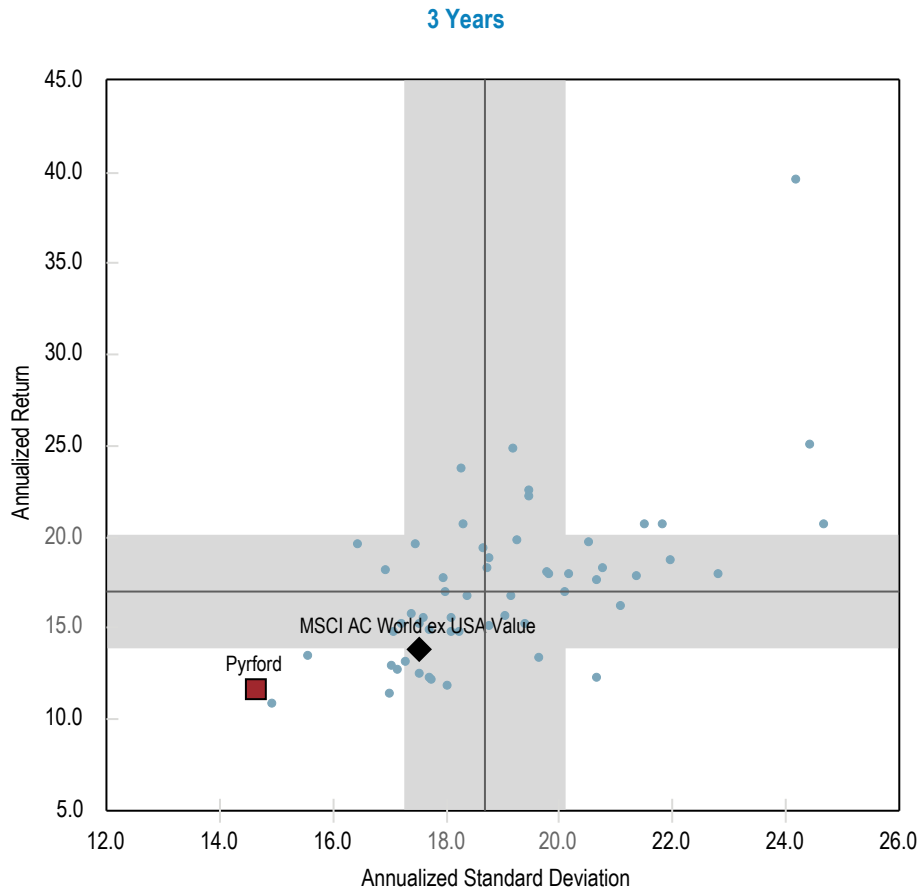


Pyrford vs. eV ACWI ex-US Value Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● Pyrford	7.34 (54)	1.61 (39)	11.62 (98)	4.70 (14)	-	-6.97 (20)	7.57 (82)	4.66 (42)	22.07 (34)	-10.15 (5)
▲ MSCI AC World ex USA Value (Net)	5.16 (89)	-4.00 (85)	13.82 (80)	1.26 (82)	3.06 (98)	-8.59 (41)	10.46 (65)	-0.77 (78)	15.72 (75)	-13.97 (27)
5th Percentile	13.52	8.86	24.05	5.90	7.16	-4.23	19.96	20.73	29.59	-10.25
1st Quartile	9.83	3.52	19.50	4.05	6.01	-7.48	14.79	9.48	23.17	-13.93
Median	8.07	-0.13	17.05	2.77	5.26	-9.23	12.43	3.24	19.88	-15.27
3rd Quartile	6.11	-2.36	14.87	1.68	4.34	-11.69	8.34	0.11	15.48	-17.91
95th Percentile	3.98	-5.81	12.12	0.74	3.34	-21.37	4.18	-2.82	9.94	-22.03
Population	61	60	56	52	37	61	64	65	65	65





**3 Years**

	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Pyrford	11.6	14.6	0.8
MSCI AC World ex USA Value (Net)	13.8	17.5	0.8
eV ACWI ex-US Value Equity Median	17.1	18.7	0.9
Population	56	56	56

**5 Years**

	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Pyrford	4.7	14.4	0.3
MSCI AC World ex USA Value (Net)	1.3	18.5	0.1
eV ACWI ex-US Value Equity Median	2.8	19.6	0.2
Population	52	52	52

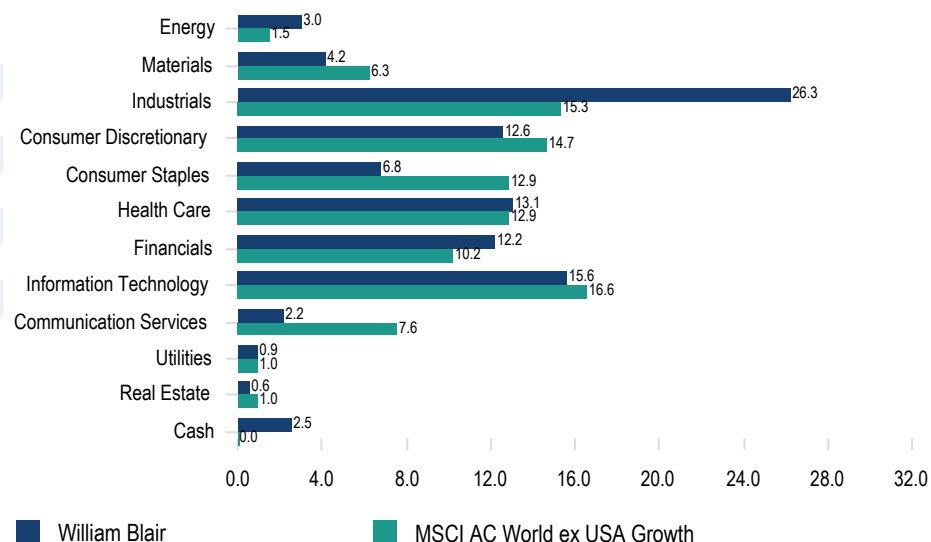
William Blair  
Manager Portfolio Overview

Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Characteristics

	Portfolio	Benchmark
Number of Stocks	183	1,243
Wtd. Avg. Mkt. Cap \$M	77,751.66	111,716.85
Median Mkt. Cap \$M	11,936.48	9,366.70
Price/Earnings ratio	22.42	19.68
Price/Book ratio	3.93	3.48
Return on Equity (%)	17.54	8.32
Current Yield (%)	1.56	1.76
Beta (5 Years, Monthly)	1.06	1.00

Sector Allocation (%) vs. MSCI AC World ex USA Growth



Largest Holdings

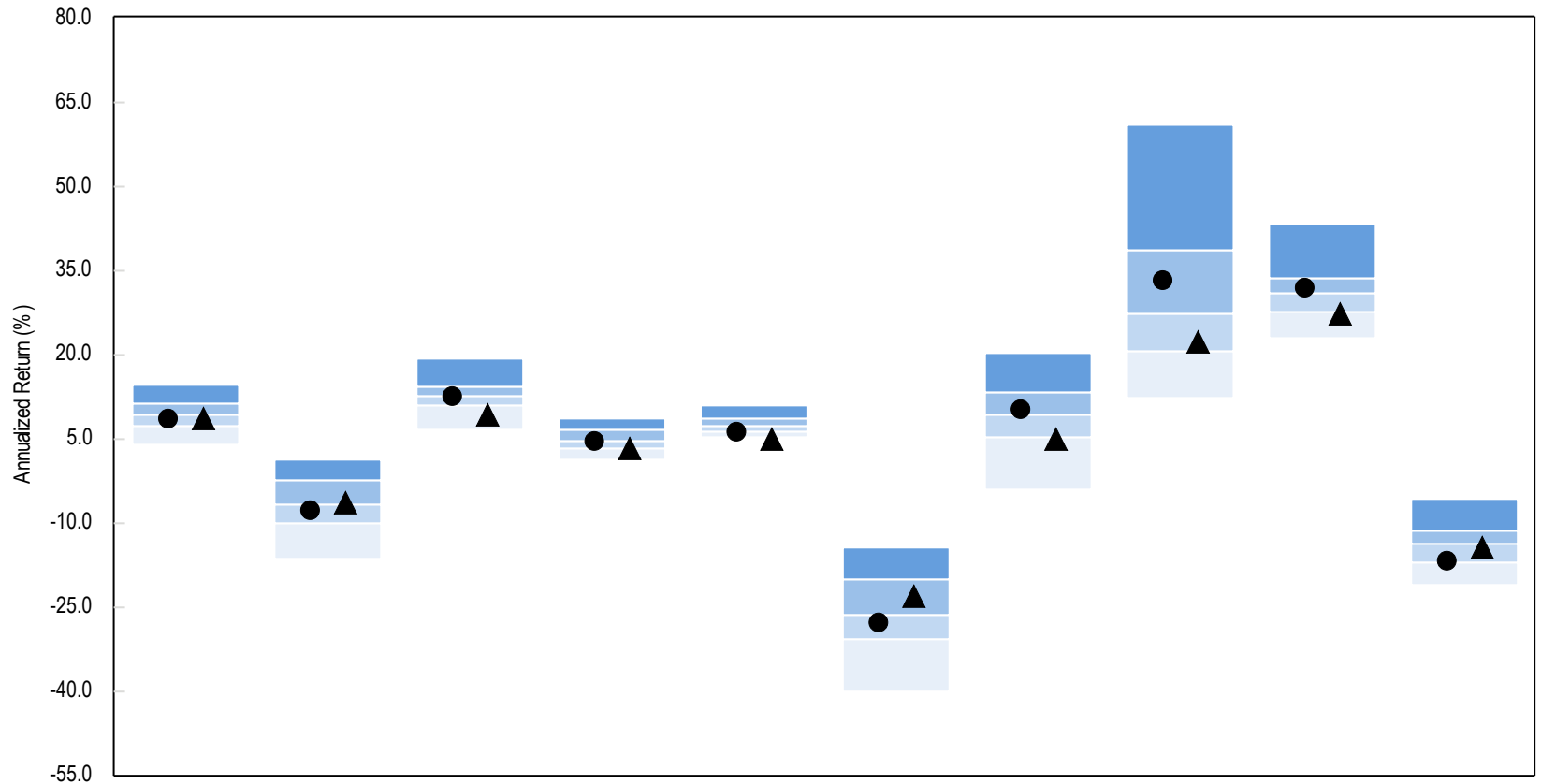
Top Contributors

Top Detractors

	End Weight (%)	Quarterly Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Taiwan Semiconductor Man.	1.79	25.50	Infineon Technologies AG	1.16	36.15	0.42	Tenaris SA, Luxembourg	0.82	-18.11	-0.15
Novo Nordisk A/S	1.72	18.55	LVMH Moet Hennessy Louis V	1.37	26.43	0.36	Reliance Industries Ltd	1.51	-7.88	-0.12
Keyence Corp	1.59	24.57	Amadeus IT Group SA	1.22	29.29	0.36	Nihon M&A Center Holdings Inc	0.28	-39.38	-0.11
Compass Group PLC	1.57	10.25	Novo Nordisk A/S	1.90	18.55	0.35	Equinor ASA	0.52	-17.87	-0.09
Astrazeneca PLC	1.53	4.41	ASML Holding NV	1.20	26.61	0.32	Genmab A/S	0.77	-10.54	-0.08
DSV A/S	1.46	23.58	DSV A/S	1.31	23.58	0.31	Toronto-Dominion Bank (The)	1.21	-6.53	-0.08
Thales	1.45	16.35	Keyence Corp	1.13	24.57	0.28	AIA Group Ltd	1.41	-5.33	-0.07
Amadeus IT Group SA	1.43	29.29	Hermes International SA	0.87	31.59	0.28	Tokio Marine Holdings Inc	0.82	-8.92	-0.07
Alibaba Group Holding Ltd	1.43	15.74	Thales	1.62	16.35	0.26	First Abu Dhabi Bank P.J.S.C	0.30	-21.90	-0.07
Canadian Pacific Kansas City Ltd	1.43	3.34	Taiwan Semiconductor Man.	0.95	25.50	0.24	B3 S.A.-Brasil Bolsa Balcao	0.46	-13.55	-0.06
			% of Portfolio	12.73		3.18	% of Portfolio	8.10		-0.91

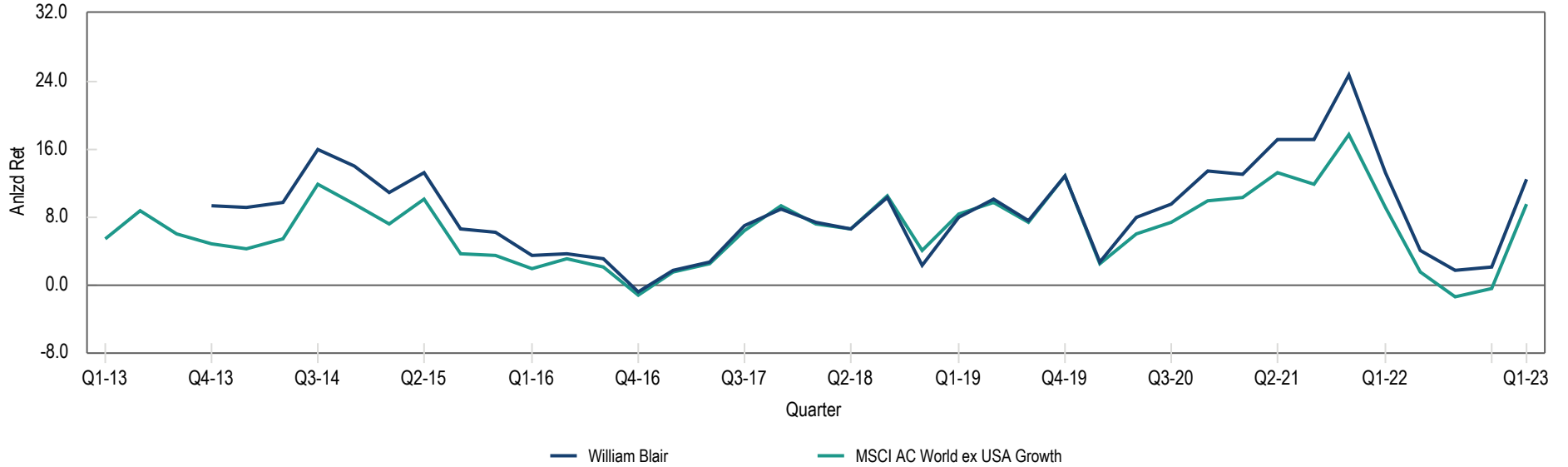
International equity growth portfolio of non-US companies with high growth rates constructed from the security level. Primary personnel include Simon Fennell and Kenneth McAtamney.

William Blair vs. eV ACWI ex-US Growth Equity Gross Universe

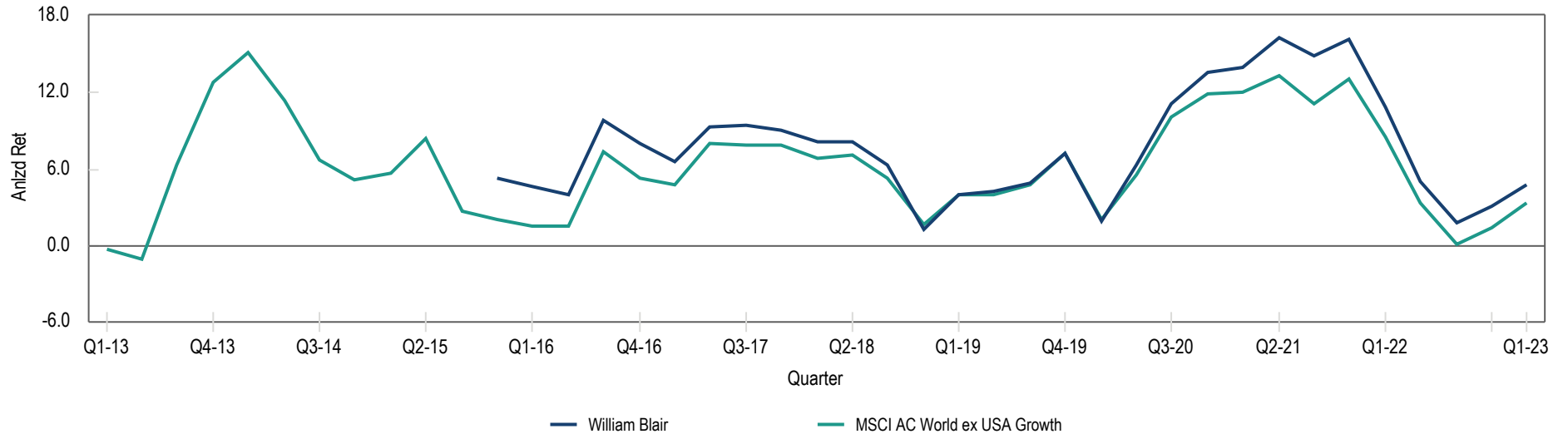


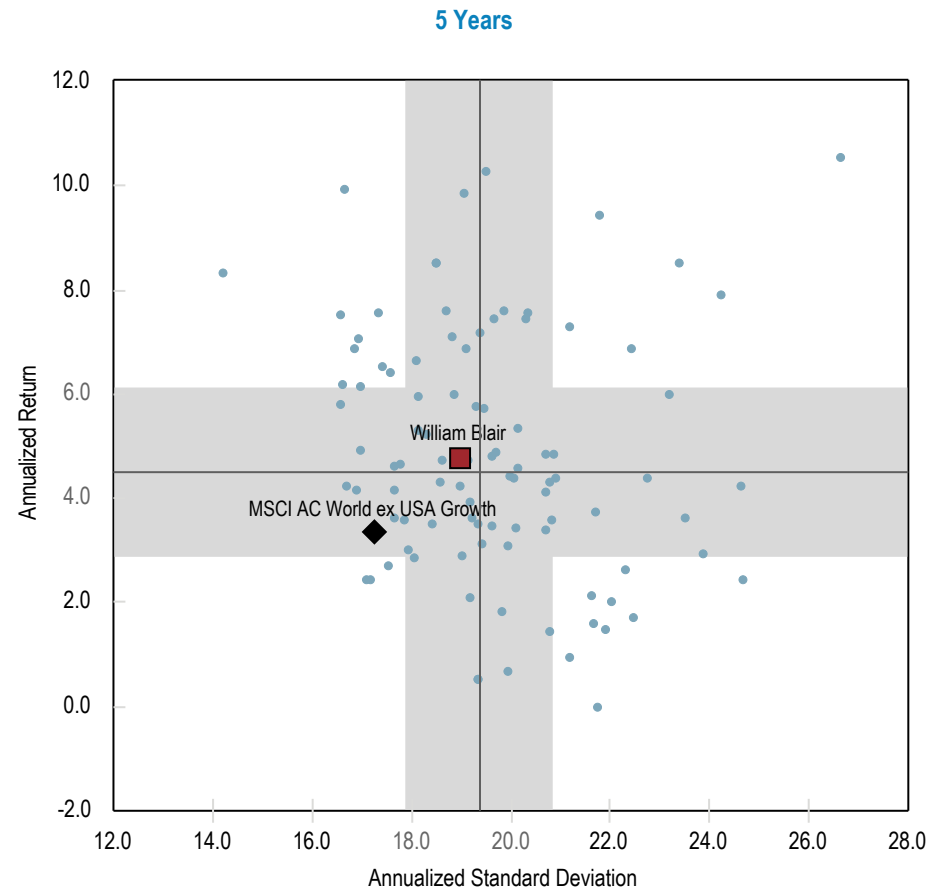
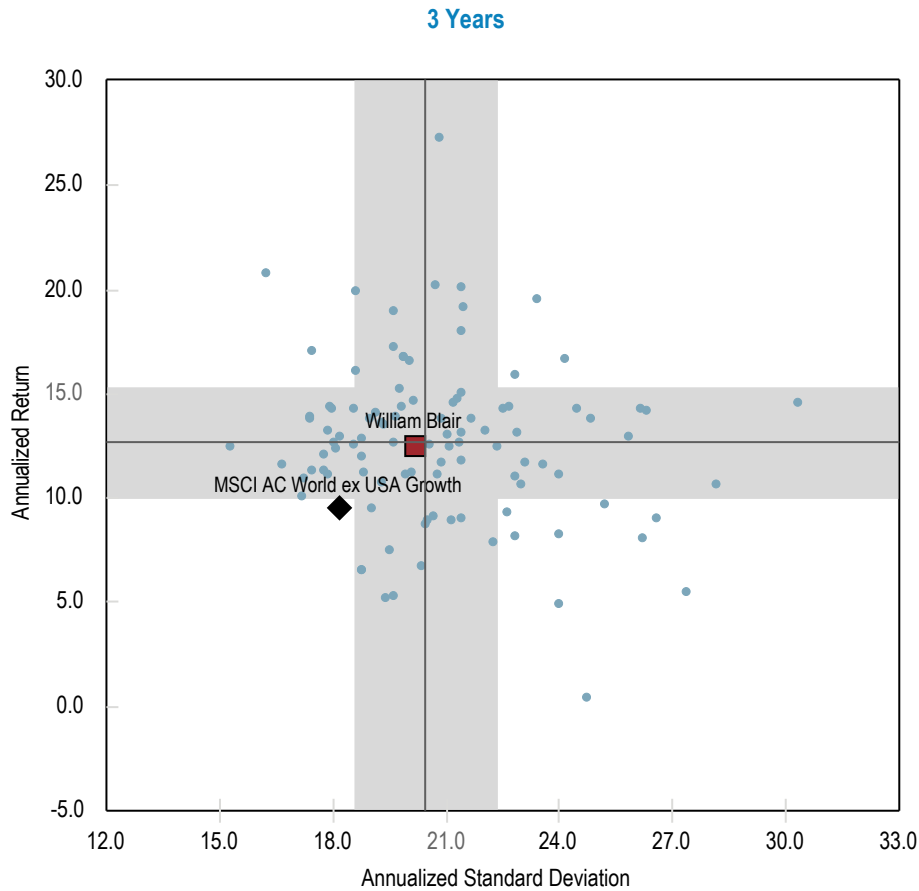
	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● William Blair	8.57 (62)	-7.79 (58)	12.51 (56)	4.78 (45)	6.44 (65)	-27.75 (59)	10.48 (43)	33.25 (37)	32.01 (37)	-16.78 (72)
▲ MSCI AC World ex USA Growth	8.59 (62)	-6.35 (48)	9.49 (81)	3.36 (75)	5.08 (98)	-23.05 (34)	5.09 (76)	22.20 (71)	27.34 (78)	-14.43 (55)
5th Percentile	14.65	1.30	19.47	8.75	10.83	-14.20	20.37	60.94	43.28	-5.69
1st Quartile	11.18	-2.26	14.36	6.71	8.72	-20.01	13.49	38.82	33.55	-11.44
Median	9.42	-6.70	12.64	4.50	7.19	-26.35	9.35	27.38	30.89	-13.53
3rd Quartile	7.25	-9.99	11.01	3.34	6.21	-30.74	5.17	20.82	27.81	-16.86
95th Percentile	4.08	-16.28	6.57	1.33	5.50	-39.95	-4.05	12.25	23.04	-20.93
Population	109	109	105	96	67	112	114	110	110	104

Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
William Blair	12.5	20.2	0.6
MSCI AC World ex USA Growth (Net)	9.5	18.2	0.5
eV ACWI ex-US Growth Equity Median	12.6	20.5	0.6
Population	105	105	105

	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
William Blair	4.8	19.0	0.3
MSCI AC World ex USA Growth (Net)	3.4	17.3	0.2
eV ACWI ex-US Growth Equity Median	4.5	19.4	0.3
Population	96	96	96

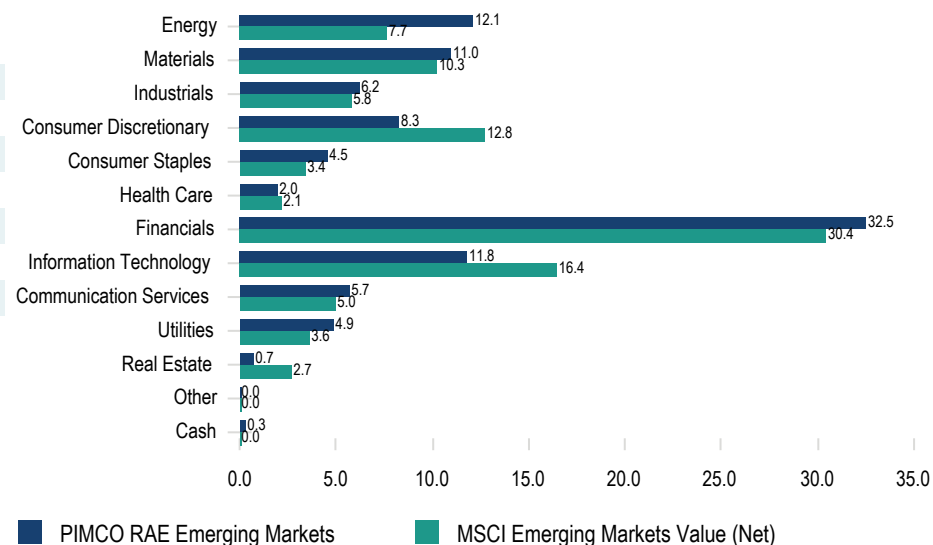
# PIMCO RAE Emerging Markets Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

## Characteristics

	Portfolio	Benchmark
Number of Stocks	369	815
Wtd. Avg. Mkt. Cap \$M	19,111.93	55,505.56
Median Mkt. Cap \$M	3,699.15	5,947.42
Price/Earnings ratio	5.57	8.39
Price/Book ratio	1.72	1.79
Return on Equity (%)	2.23	3.45
Current Yield (%)	5.81	5.18
Beta (5 Years, Monthly)	1.07	1.00

## Sector Allocation (%) vs. MSCI Emerging Markets Value (Net)



## Largest Holdings

	End Weight (%)	Quarterly Return (%)
China Construction Bank Corp	4.29	3.49
Bank of China Ltd	3.11	5.38
China Petroleum & Chemical	2.69	22.37
Industrial & Comm. Bank of China	2.29	3.38
POSCO Holdings Inc	2.10	29.27
Hon Hai Precision Industry	2.02	5.09
SCB X PCL	1.80	-3.92
Kasikornbank Public Co Ltd	1.68	-8.70
Vedanta Ltd	1.62	-6.85
Petrochina Co Ltd	1.59	29.51

## Top Contributors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Cemex SAB de CV	4.47	36.54	1.63
Vipshop Holdings Limited	11.01	11.29	1.24
Banco Do Brasil SA Bb Brasil	3.77	19.34	0.73
China Petroleum & Chemical	3.25	22.37	0.73
Lenovo Group Ltd	1.72	31.85	0.55
National Bank of Greece	2.49	21.44	0.53
Petrochina Co Ltd	1.60	29.51	0.47
Embraer SA	0.67	47.89	0.32
Alpha Services and Holdings SA	2.16	14.52	0.31
Bank of China Ltd	4.75	5.38	0.26

## Top Detractors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Kt Corp	8.34	-16.00	-1.33
Haci Omer Sabanci	0.94	-14.42	-0.14
Hellenic Telecommunications	1.91	-5.88	-0.11
IS Yatirim Menkul Degerler A.S.	0.25	-35.72	-0.09
Braskem SA	0.41	-17.47	-0.07
Thanachart Capital	0.28	-24.89	-0.07
Kasikornbank Public Co Ltd	0.73	-8.70	-0.06
Aygaz	0.17	-30.60	-0.05
Yapi Ve Kredi Bankasi AS	0.34	-13.78	-0.05
Absa Group Ltd	0.46	-10.09	-0.05

% of Portfolio

35.89

6.77

% of Portfolio

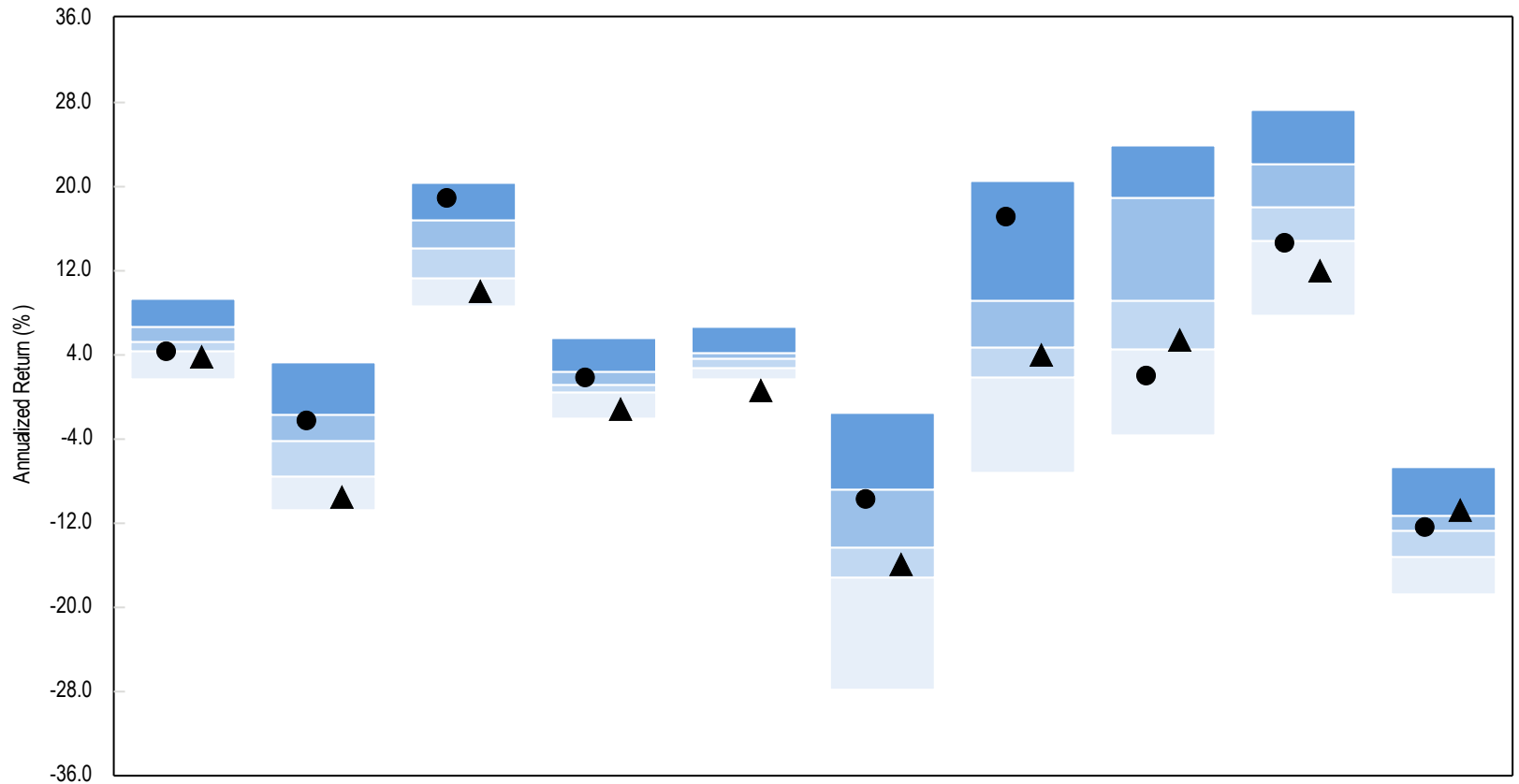
13.83

-2.02

The PIMCO RAE Emerging Markets seeks to invest 80% of its assets in investments that are economically tied to emerging market countries. The portfolio is sub-advised by Research Affiliates, LLC.



PIMCO RAE Emerging Markets vs. eV Emg Mkts All Cap Value Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● PIMCO RAE Emerging Markets	4.29 (77)	-2.24 (31)	18.95 (16)	1.86 (34)	-	-9.66 (32)	17.08 (8)	2.13 (85)	14.63 (78)	-12.30 (44)
▲ MSCI Emerging Markets Value NR	3.91 (84)	-9.44 (88)	10.04 (84)	-1.15 (94)	0.69 (100)	-15.83 (57)	4.00 (62)	5.48 (72)	11.96 (91)	-10.74 (22)
5th Percentile	9.29	3.21	20.31	5.51	6.59	-1.44	20.49	23.96	27.28	-6.62
1st Quartile	6.69	-1.60	16.83	2.49	4.22	-8.83	9.17	18.92	22.09	-11.31
Median	5.19	-4.26	14.05	1.19	3.58	-14.40	4.72	9.16	18.00	-12.73
3rd Quartile	4.35	-7.47	11.23	0.38	2.74	-17.13	1.86	4.47	14.93	-15.24
95th Percentile	1.73	-10.73	8.53	-2.00	1.67	-27.86	-7.27	-3.71	7.66	-18.81
Population	55	55	49	44	28	57	55	58	59	56

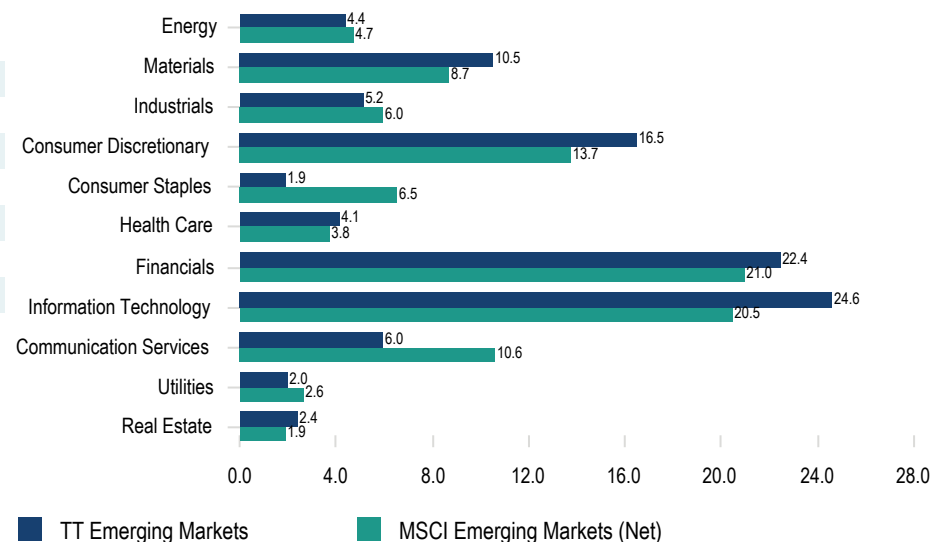
# TT Emerging Markets Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

## Characteristics

	Portfolio	Benchmark
Number of Stocks	75	1,379
Wtd. Avg. Mkt. Cap \$M	133,229.43	102,229.24
Median Mkt. Cap \$M	22,915.22	6,314.73
Price/Earnings ratio	10.80	11.01
Price/Book ratio	2.26	2.42
Return on Equity (%)	5.46	5.16
Current Yield (%)	3.07	3.35
Beta (5 Years, Monthly)	1.14	1.00

## Sector Allocation (%) vs. MSCI Emerging Markets (Net)



## Largest Holdings

	End Weight (%)	Quarterly Return (%)
Taiwan Semiconductor Man.	8.57	20.62
Alibaba Group Holding Ltd	5.41	15.74
Samsung Electronics Co Ltd	3.84	12.41
Grupo Financiero Banorte	3.81	16.35
Axis Bank Ltd	3.55	-7.45
Samsung Electronics Co Ltd	2.79	3.67
Reliance Industries Ltd	2.46	-7.88
Lojas Renner SA	2.44	-6.71
Emaar Properties	2.40	-4.43
Taiwan Semiconductor Man.	2.23	25.50

## Top Contributors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
L & F Co	1.34	75.51	1.01
Alibaba Group Holding Ltd	5.20	15.74	0.82
Nova Ljubljanska Banka d.d	4.59	13.87	0.64
Samsung Electronics Co Ltd	3.96	12.41	0.49
Grupo Financiero Banorte	2.54	16.35	0.41
Americana Restaurants Intl	1.27	32.61	0.41
Mediatek Incorporation	1.49	27.11	0.40
Cie Financiere Richemont	1.62	23.24	0.38
Alibaba Group Holding Ltd	2.31	15.99	0.37
Grupo Aeroportuario del Sureste	0.80	32.17	0.26

% of Portfolio

25.12

5.19

## Top Detractors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Hapvida Participacoes	1.28	-41.84	-0.54
VNET Group Inc	0.97	-42.86	-0.41
Centrais Eletricas Brasileiras	2.28	-15.38	-0.35
XP Inc	0.96	-22.62	-0.22
Axis Bank Ltd	2.59	-7.45	-0.19
Reliance Industries Ltd	2.39	-7.88	-0.19
Zomato Ltd	1.33	-13.42	-0.18
Geely Automobile Holdings Ltd	1.44	-11.91	-0.17
Qifu Technology Inc	3.29	-4.72	-0.16
JD.com Inc	0.68	-22.34	-0.15

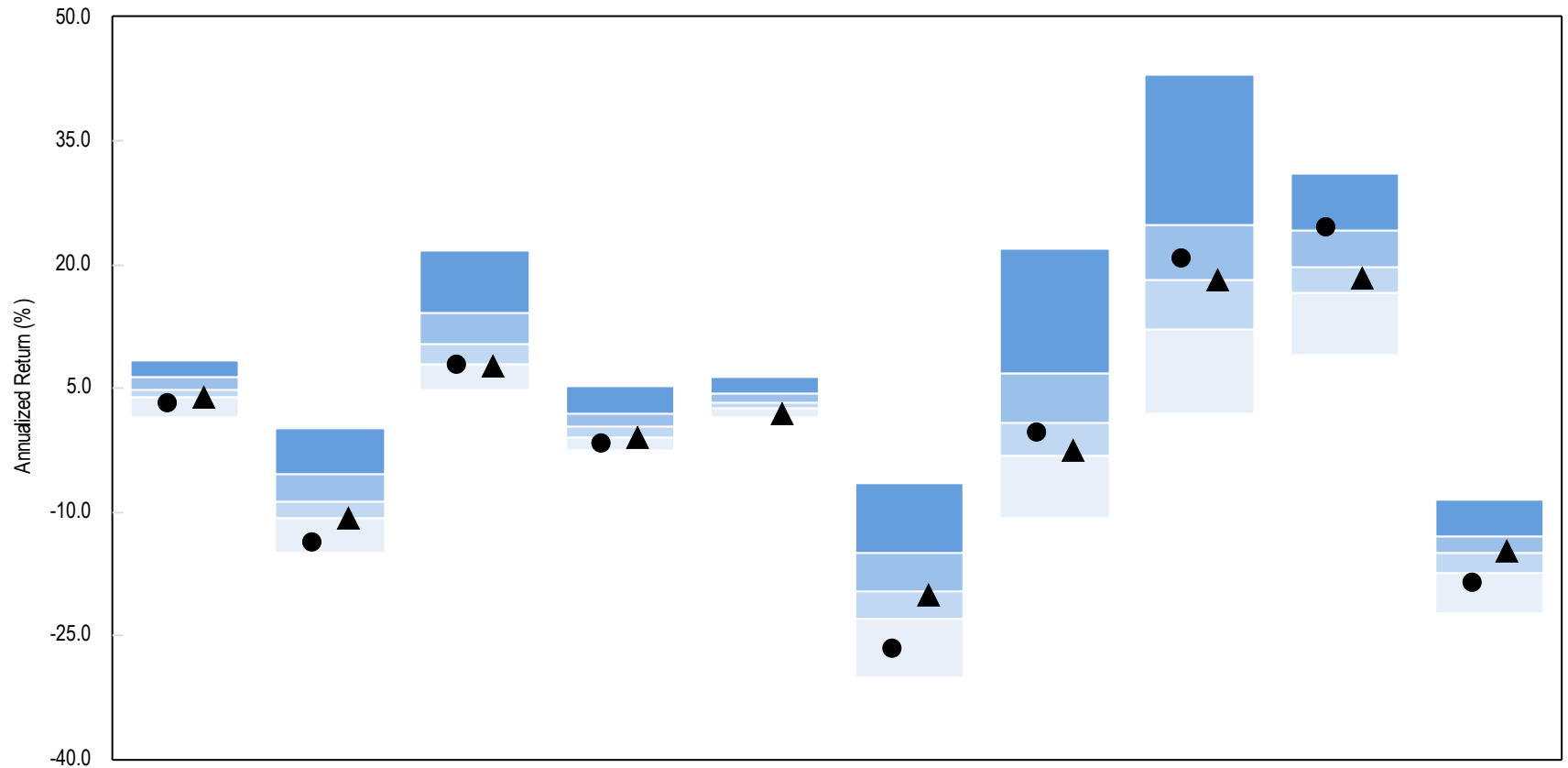
% of Portfolio

17.21

-2.56

The Emerging Markets Unconstrained strategy aims to outperform its benchmark, MSCI Emerging Markets Index by 5% per annum over a three-year rolling period. It targets high returns and long term capital growth by investing in a focused portfolio of primarily equity and equity-related securities traded in the Emerging Markets.

TT Emerging Markets vs. eV Emg Mkts Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● TT Emerging Markets	3.32 (86)	-13.46 (92)	7.97 (74)	-1.56 (91)	-	-26.36 (90)	-0.23 (58)	20.79 (38)	24.77 (24)	-18.39 (82)
▲ MSCI Emerging Markets	3.96 (77)	-10.70 (76)	7.83 (78)	-0.91 (80)	2.00 (90)	-20.09 (56)	-2.54 (72)	18.31 (51)	18.42 (63)	-14.57 (45)
5th Percentile	8.52	0.18	21.79	5.36	6.52	-6.52	22.08	43.20	31.01	-8.50
1st Quartile	6.39	-5.40	14.19	2.06	4.36	-14.94	6.94	24.97	24.31	-12.81
Median	4.98	-8.66	10.35	0.52	3.36	-19.53	0.98	18.32	19.72	-14.92
3rd Quartile	3.99	-10.70	7.89	-0.81	2.57	-22.97	-3.20	12.23	16.61	-17.35
95th Percentile	1.61	-14.99	4.86	-2.44	1.61	-29.95	-10.70	2.10	9.07	-22.11
Population	527	525	482	431	296	545	564	569	592	580

# Global Equity Managers

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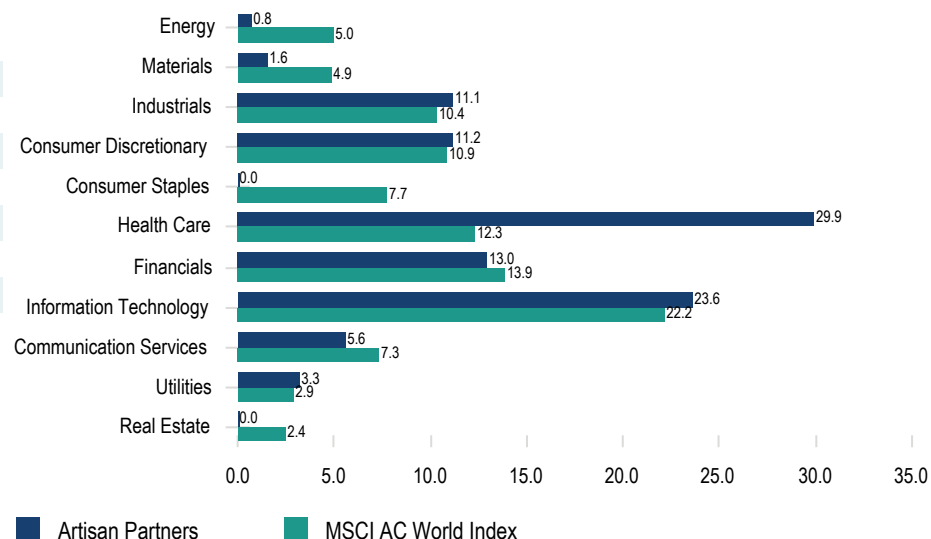
# Artisan Partners Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

## Characteristics

	Portfolio	Benchmark
Number of Stocks	44	2,888
Wtd. Avg. Mkt. Cap \$M	129,470.64	345,636.92
Median Mkt. Cap \$M	51,151.05	11,952.75
Price/Earnings ratio	31.13	16.81
Price/Book ratio	4.42	3.41
Return on Equity (%)	2.75	9.43
Current Yield (%)	0.72	2.29
Beta (5 Years, Monthly)	1.00	1.00

## Sector Allocation (%) vs. MSCI AC World Index



## Largest Holdings

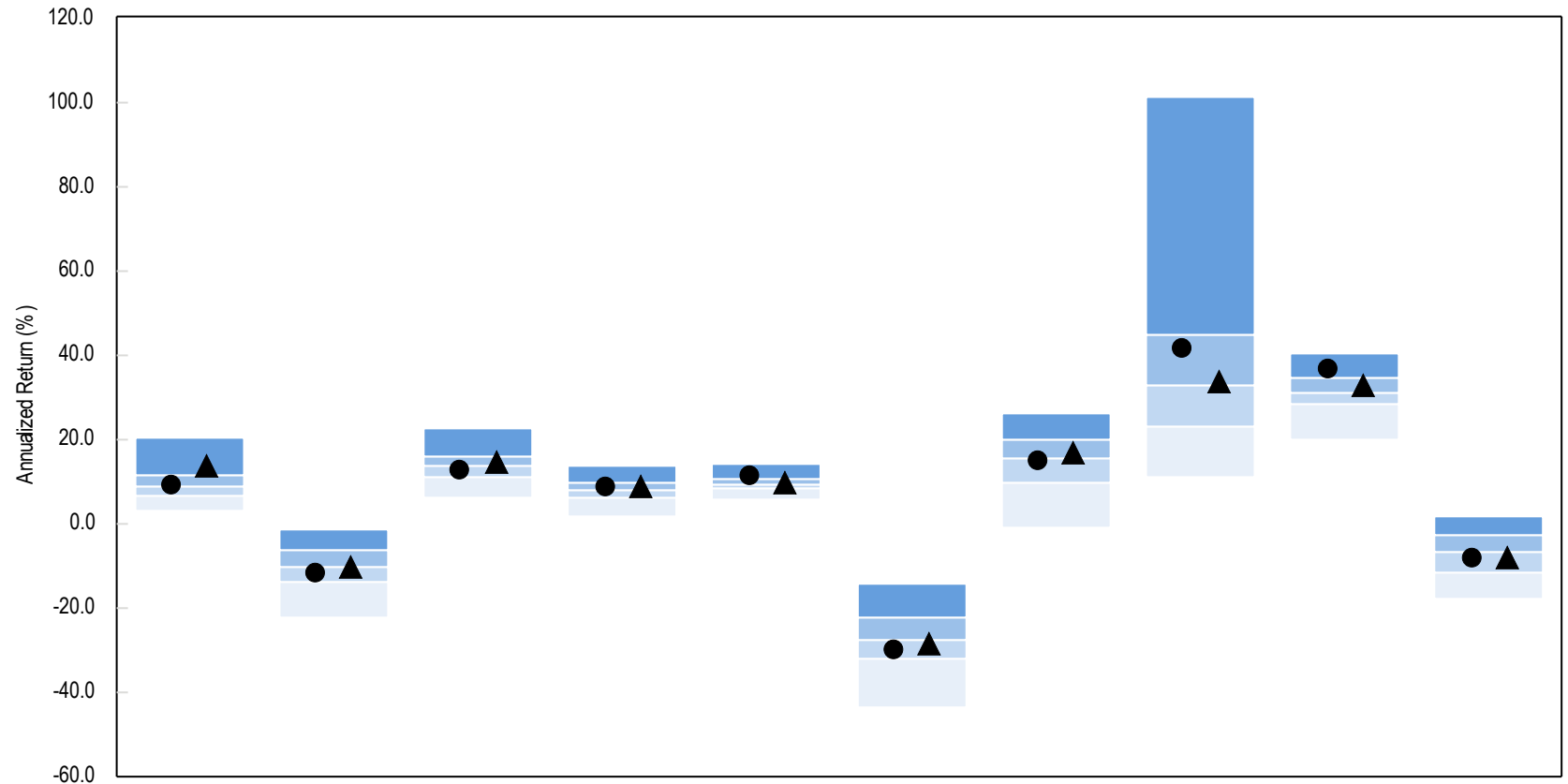
## Top Contributors

## Top Detractors

	End Weight (%)	Quarterly Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)		Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Veeva Systems Inc	5.92	13.89	Advanced Micro Devices Inc	4.19	51.32	2.15	Schwab (Charles) Corp	3.35	-36.89	-1.24
Advanced Micro Devices Inc	5.69	51.32	LONZA GROUP AG	3.59	22.35	0.80	SVB Financial Group	1.09	-99.61	-1.08
Boston Scientific Corp	4.66	8.13	Atlassian Corp	2.27	33.02	0.75	NextEra Energy Inc	5.10	-7.20	-0.37
LONZA GROUP AG	4.38	22.35	Veeva Systems Inc	5.11	13.89	0.71	BioNTech SE	1.21	-17.07	-0.21
Novo Nordisk A/S	4.34	18.55	Novo Nordisk A/S	3.69	18.55	0.69	Techtronic Industries Co Ltd	4.94	-3.14	-0.16
Techtronic Industries Co Ltd	4.09	-3.14	ON Semiconductor Corp	2.09	31.99	0.67	Danaher Corp	2.78	-4.94	-0.14
Astrazeneca PLC	3.46	4.41	Airbnb Inc	1.39	45.50	0.63	AIA Group Ltd	2.41	-5.33	-0.13
NextEra Energy Inc	3.25	-7.20	Keyence Corp	2.51	24.57	0.62	CNH Industrial N.V.	3.03	-4.22	-0.13
Atlassian Corp	3.11	33.02	Arista Networks Inc	1.53	38.33	0.59	Genmab A/S	1.10	-10.54	-0.12
Keyence Corp	3.01	24.57	Alphabet Inc	2.89	17.57	0.51	CoStar Group Inc	0.75	-10.91	-0.08
			% of Portfolio	29.26		8.12	% of Portfolio	25.76		-3.64

Global equity portfolio of companies that is benchmark agnostic with accelerating profit cycles and a focus on capital allocation. Primary personnel include James Hamel, Craigh Cepukenas, and Matthew Kamm.

Artisan Partners vs. eV Global Growth Equity Gross Universe



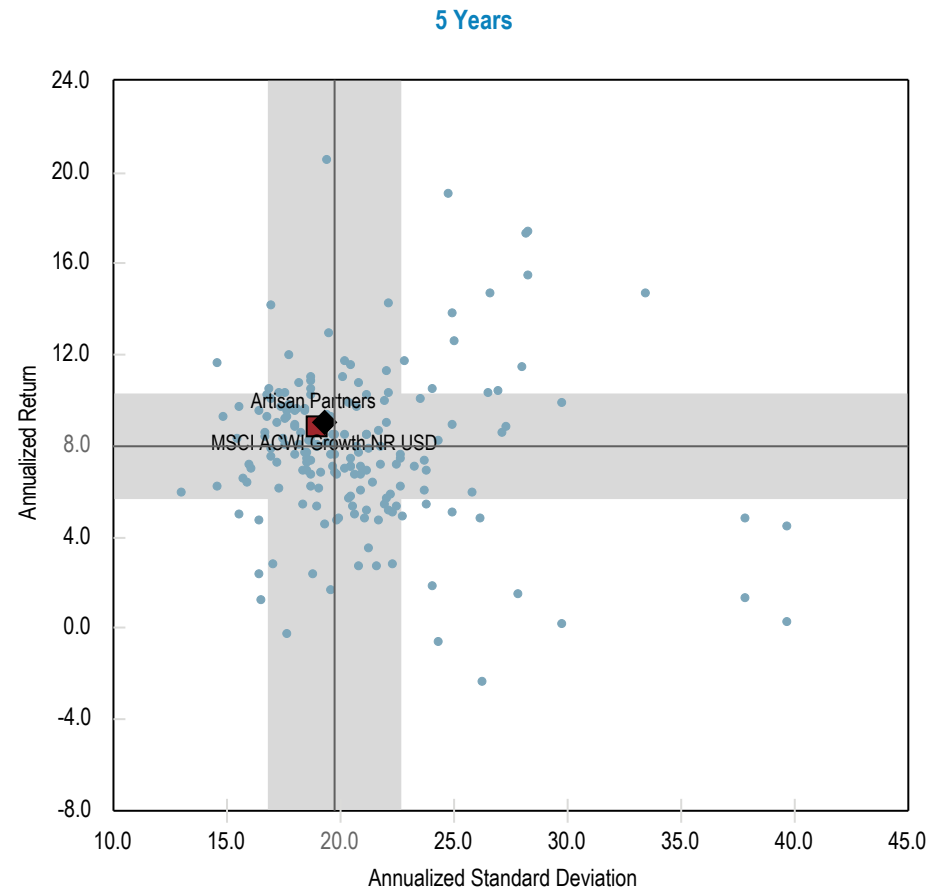
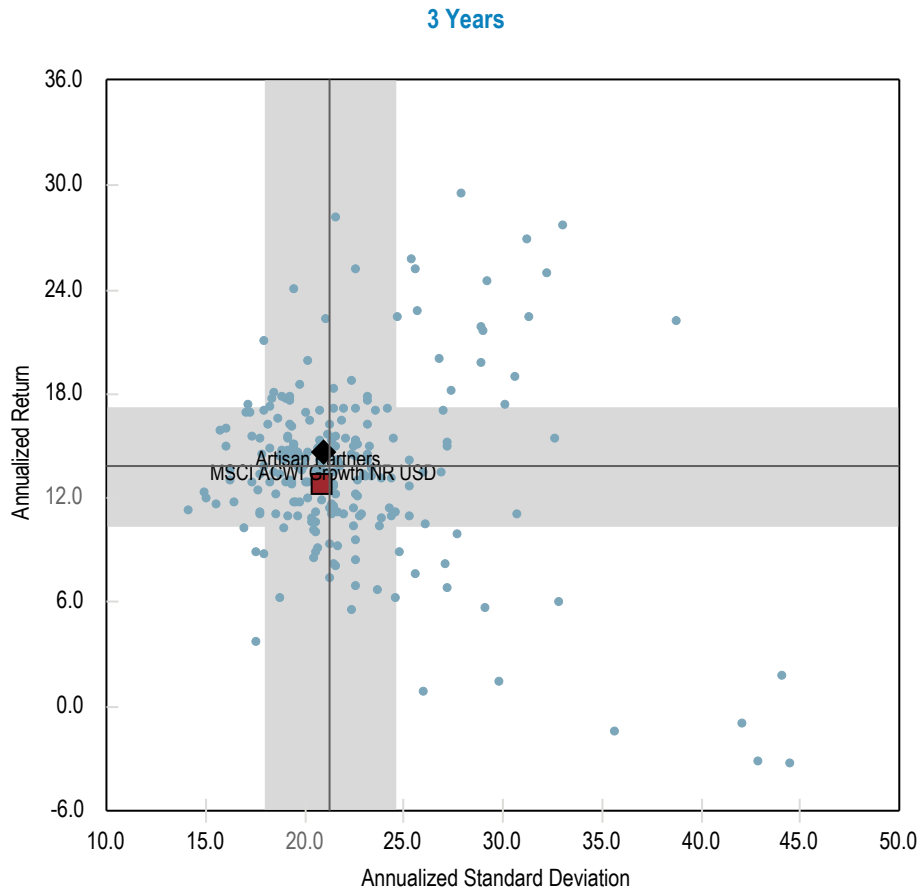
	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● Artisan Partners	9.23 (47)	-11.47 (62)	12.79 (64)	8.89 (36)	11.55 (19)	-29.59 (59)	14.99 (55)	41.66 (33)	37.00 (12)	-7.94 (59)
▲ MSCI ACWI Growth NR USD	13.78 (18)	-10.02 (50)	14.67 (39)	9.01 (33)	9.92 (37)	-28.61 (55)	17.10 (42)	33.60 (50)	32.72 (36)	-8.13 (60)
5th Percentile	20.32	-1.33	22.45	13.65	14.39	-14.21	26.22	101.29	40.25	1.88
1st Quartile	11.63	-6.31	15.98	9.66	10.81	-22.21	19.79	44.91	34.73	-2.84
Median	9.00	-10.08	13.81	7.99	9.44	-27.40	15.45	33.05	31.27	-6.67
3rd Quartile	6.51	-13.67	11.21	6.09	8.42	-31.85	9.57	23.12	28.32	-11.65
95th Percentile	3.20	-22.09	6.26	2.00	5.84	-43.62	-0.83	11.16	20.06	-17.56
Population	256	255	227	186	111	266	257	245	226	209

Rolling 3 Year Annualized Return (%)



Rolling 5 Year Annualized Return (%)





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Artisan Partners	12.8	20.9	0.6
MSCI ACWI Growth NR USD	14.7	20.9	0.7
eV Global Growth Equity Median	13.8	21.3	0.7
Population	227	227	227

	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Artisan Partners	8.9	19.0	0.5
MSCI ACWI Growth NR USD	9.0	19.3	0.5
eV Global Growth Equity Median	8.0	19.7	0.4
Population	186	186	186



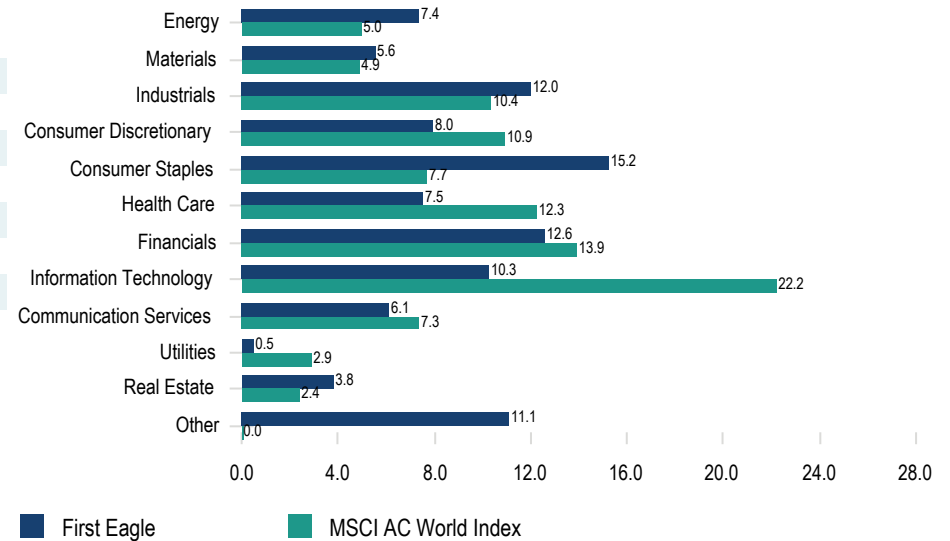
# First Eagle Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

## Characteristics

	Portfolio	Benchmark
Number of Stocks	125	2,888
Wtd. Avg. Mkt. Cap \$M	139,746.59	345,636.92
Median Mkt. Cap \$M	28,808.77	11,952.75
Price/Earnings ratio	16.97	16.81
Price/Book ratio	2.33	3.41
Return on Equity (%)	-2.20	9.43
Current Yield (%)	2.23	2.29
Beta (5 Years, Monthly)	0.75	1.00

## Sector Allocation (%) vs. MSCI AC World Index



## Largest Holdings

	End Weight (%)	Quarterly Return (%)
SPDR Gold Trust	11.09	8.00
Oracle Corp	3.35	14.10
Exxon Mobil Corp	2.57	0.19
Schlumberger Ltd	2.34	-7.73
Meta Platforms Inc	2.08	76.12
Comcast Corp	1.99	9.23
HCA Healthcare Inc	1.94	10.14
Cie Financiere Richemont	1.87	23.24
C.H. Robinson Worldwide Inc.	1.66	9.18
British American Tobacco	1.63	-9.21

## Top Contributors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Meta Platforms Inc	1.40	76.12	1.07
SPDR Gold Trust	12.21	8.00	0.98
Oracle Corp	3.50	14.10	0.49
Cie Financiere Richemont	2.00	23.24	0.47
Danone SA	1.69	18.51	0.31
SALESFORCE INC	0.52	50.67	0.26
Fomento Economico Mexican	1.19	21.85	0.26
Taiwan Semiconductor Man.	1.01	25.50	0.26
IPG Photonics Corp	0.83	30.25	0.25
Analog Devices Inc	1.18	20.80	0.25

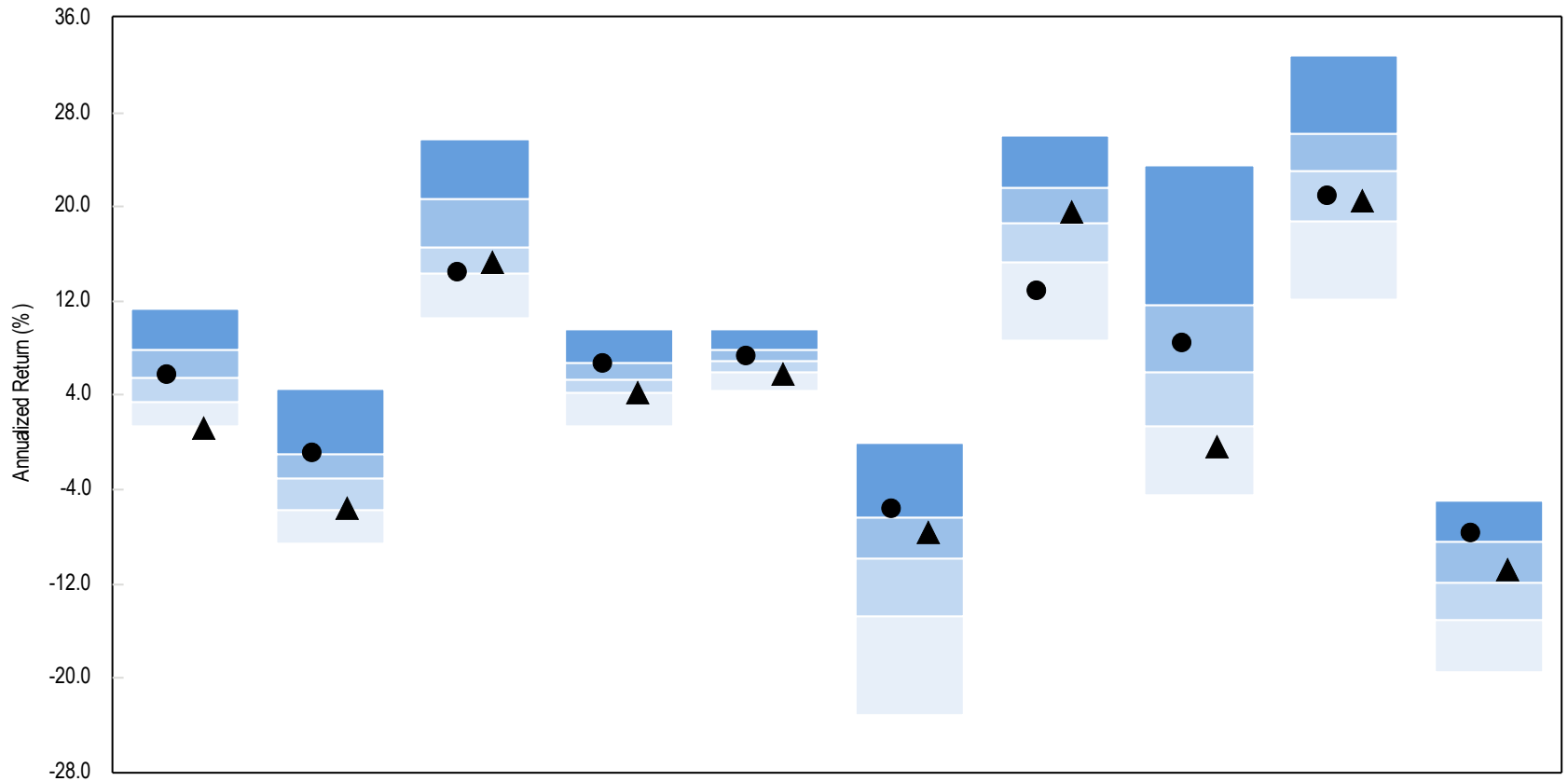
## Top Detractors

	Portfolio Weight (%)	Quarterly Return (%)	Contribution to Return (%)
Schwab (Charles) Corp	0.68	-36.89	-0.25
British American Tobacco	2.67	-9.21	-0.25
Schlumberger Ltd	3.04	-7.73	-0.23
Elevance Health Inc	1.86	-10.07	-0.19
NOV Inc	1.44	-11.15	-0.16
Universal Health Services	1.33	-9.66	-0.13
U.S. Bancorp	0.77	-16.22	-0.12
Boston Properties Inc	0.50	-18.44	-0.09
Willis Towers Watson plc	1.78	-4.64	-0.08
Douglas Emmett Inc	0.36	-20.12	-0.07

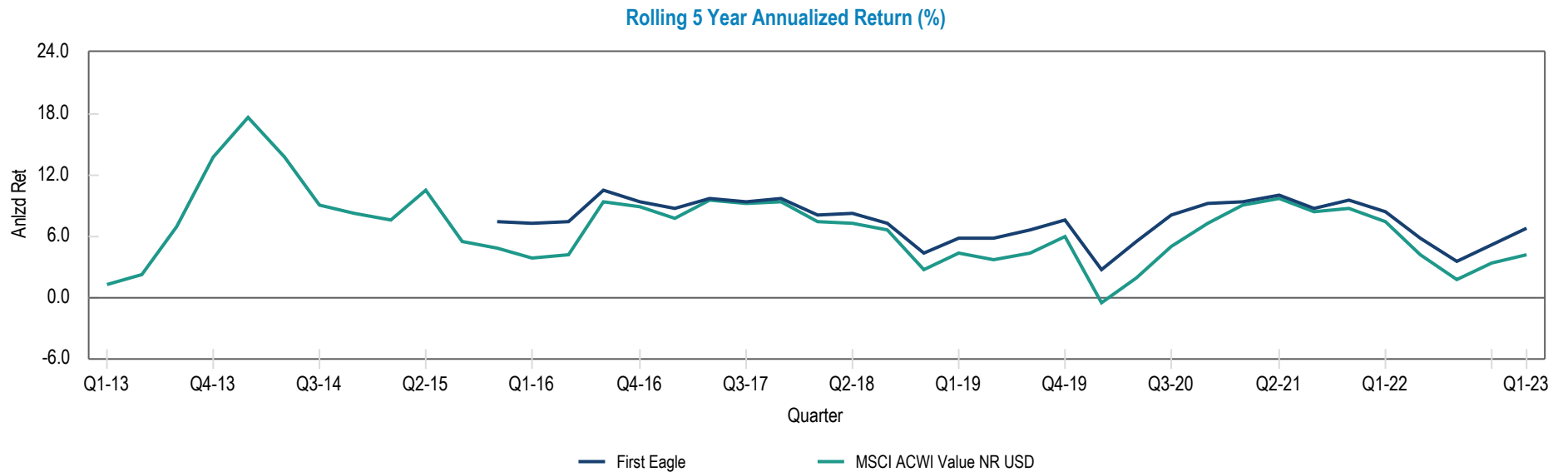
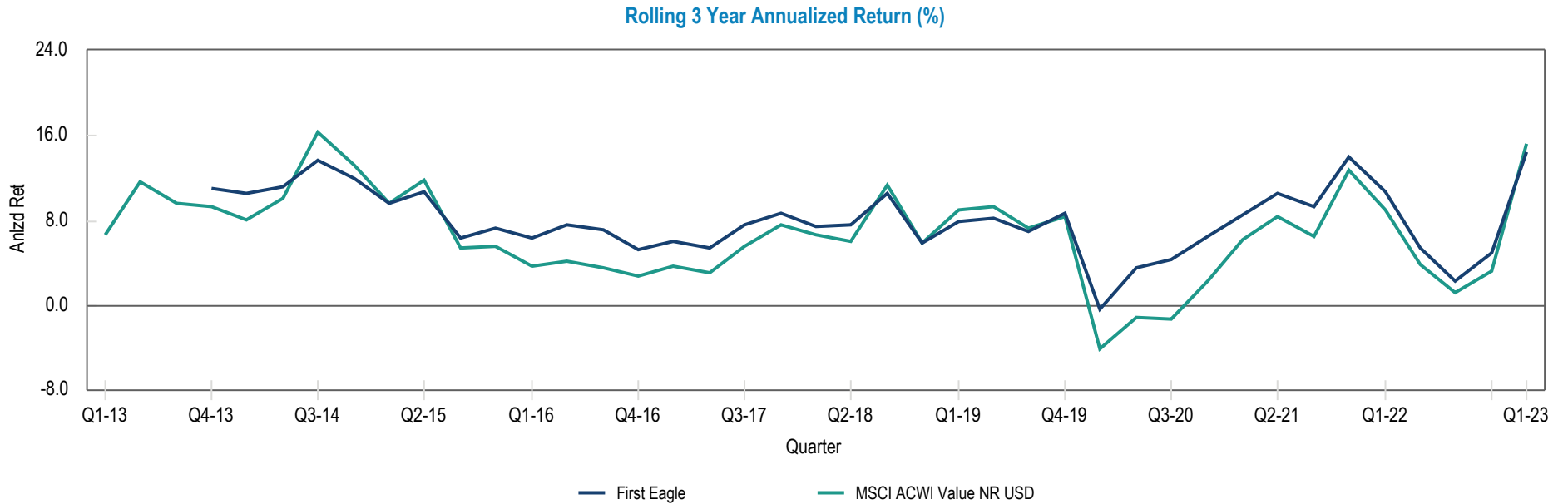
% of Portfolio 25.53 4.59 % of Portfolio 14.43 -1.58

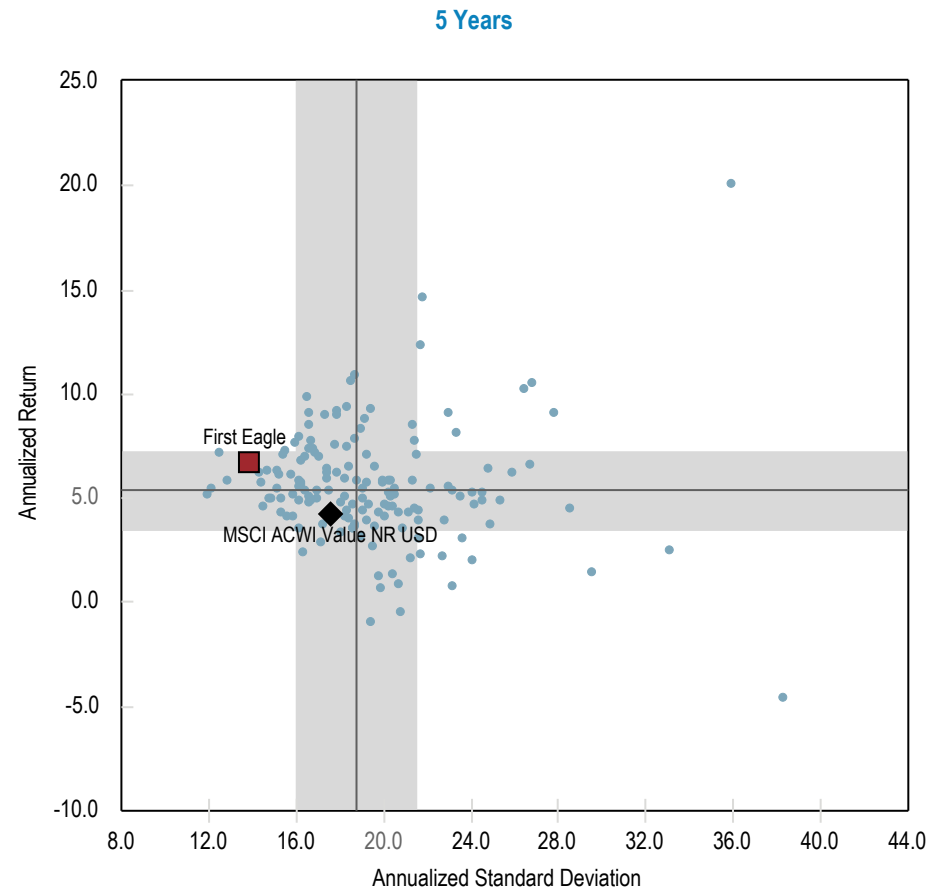
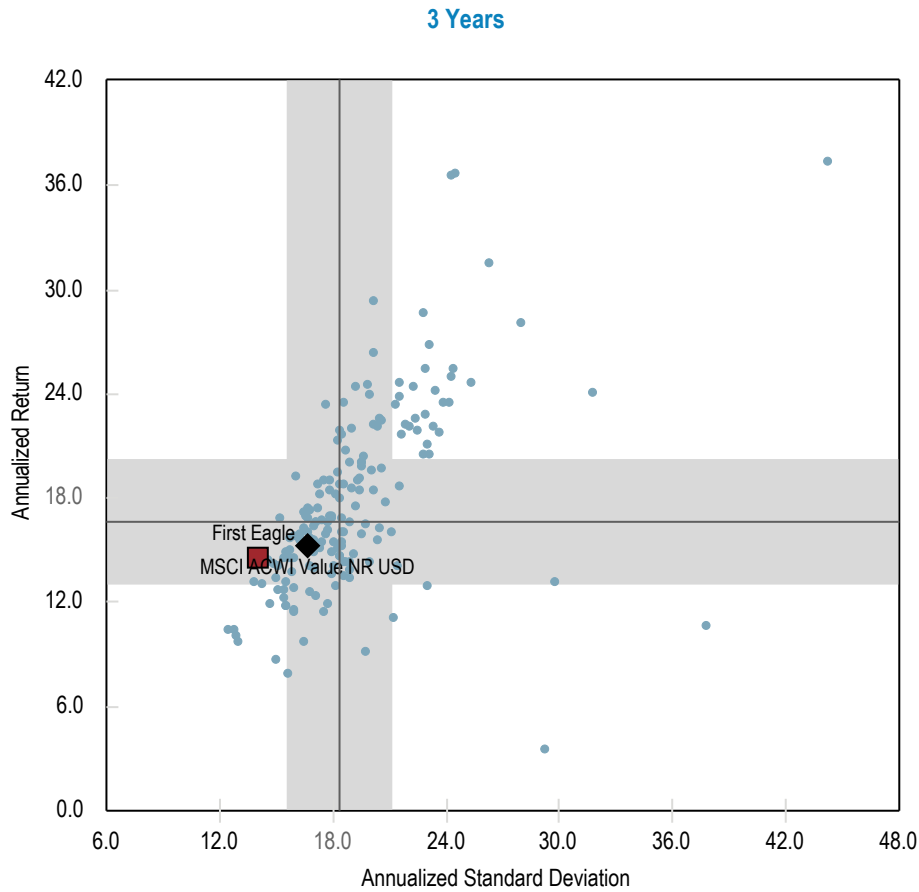
Global equity portfolio that is benchmark agnostic comprised of companies with low valuations. Primary personnel include Matt McLennan and Kimball Brooker.

First Eagle vs. eV Global Value Equity Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● First Eagle	5.83 (47)	-0.87 (22)	14.52 (73)	6.74 (26)	7.43 (36)	-5.61 (20)	12.95 (85)	8.47 (35)	21.01 (65)	-7.64 (18)
▲ MSCI ACWI Value NR USD	1.24 (96)	-5.50 (74)	15.24 (65)	4.27 (75)	5.89 (78)	-7.55 (34)	19.62 (41)	-0.33 (82)	20.59 (67)	-10.79 (45)
5th Percentile	11.39	4.48	25.77	9.57	9.60	0.05	26.10	23.59	32.85	-4.94
1st Quartile	7.91	-1.05	20.69	6.84	7.84	-6.43	21.60	11.70	26.20	-8.33
Median	5.48	-3.02	16.58	5.35	6.95	-9.81	18.60	6.00	22.97	-11.81
3rd Quartile	3.38	-5.68	14.35	4.24	6.04	-14.65	15.34	1.38	18.78	-15.00
95th Percentile	1.47	-8.54	10.61	1.42	4.40	-23.14	8.59	-4.44	12.10	-19.43
Population	193	191	175	153	111	193	205	215	209	216





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
First Eagle	14.5	14.0	1.0
MSCI ACWI Value NR USD	15.2	16.6	0.9
<i>eV Global Value Equity Median</i>	16.6	18.4	0.9
Population	175	175	175

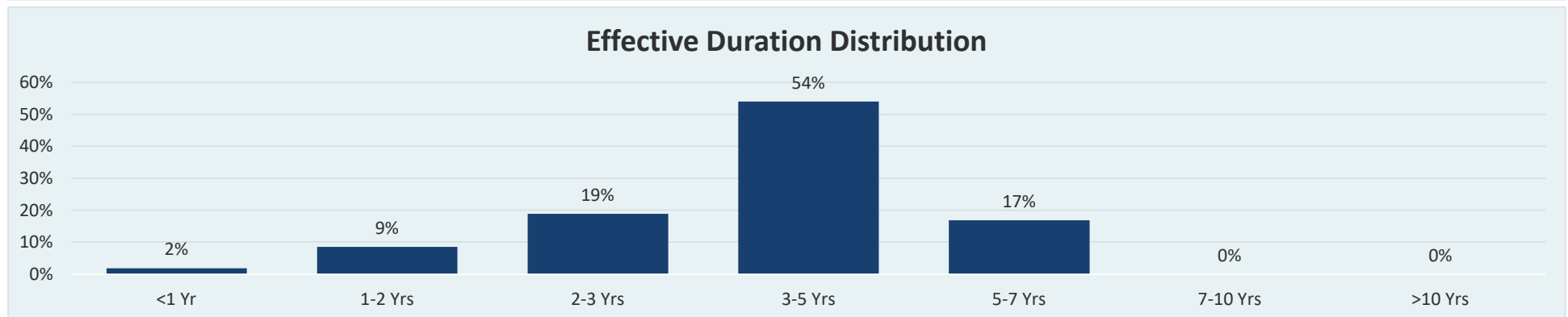
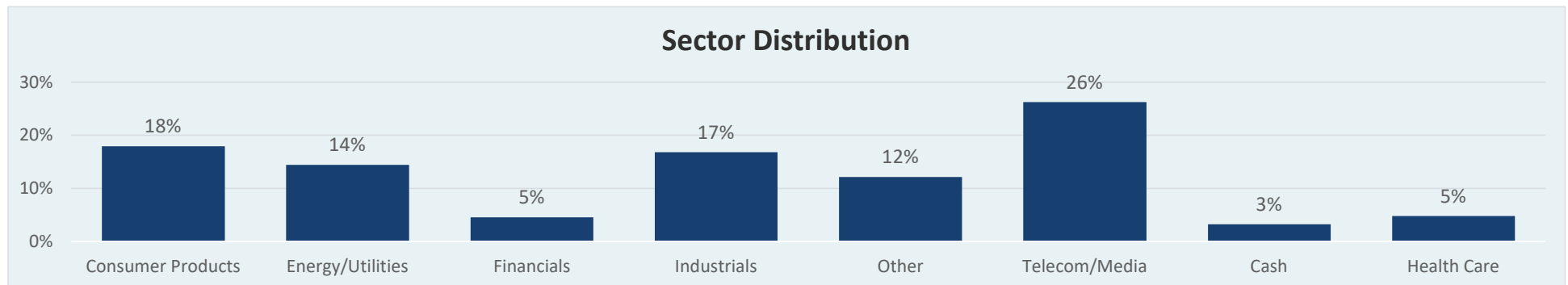
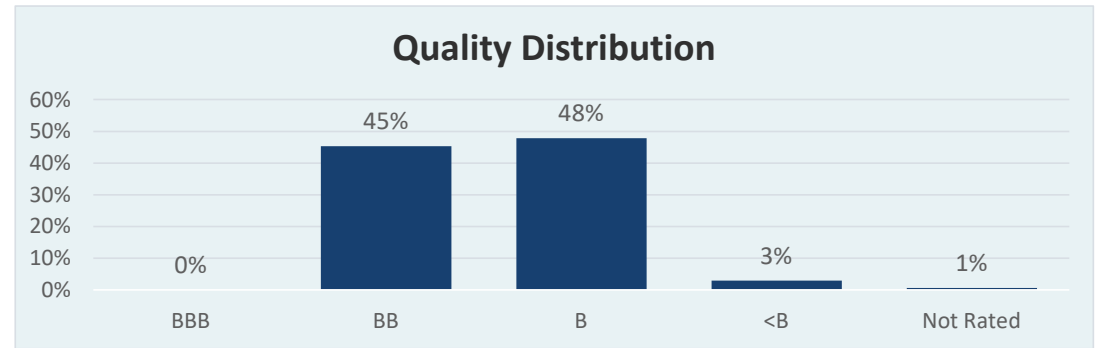
	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
First Eagle	6.7	13.8	0.4
MSCI ACWI Value NR USD	4.3	17.6	0.2
<i>eV Global Value Equity Median</i>	5.4	18.8	0.3
Population	153	153	153

# High Yield Managers

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Domestic high yield fixed income portfolio with a focus on security selection. Primary personnel include Douglas Forsyth, Justin Kass, William Stickney, and Michael Yee.

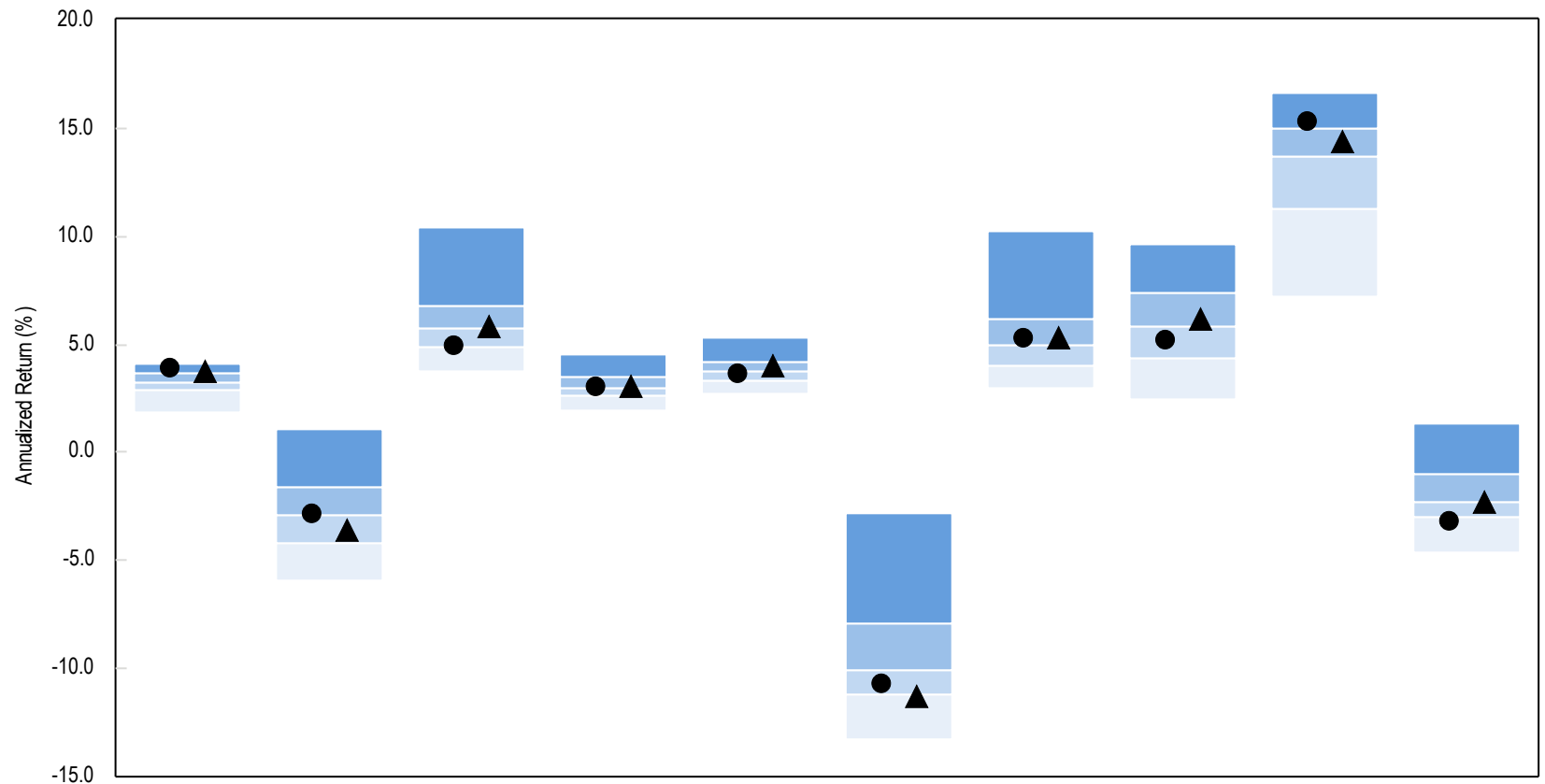
	Voya	ICE BofAML HY Master II
Effective Duration	3.80	3.80
Yield to Maturity	7.70	8.50
Average Quality	B1	B1
Average Coupon	6.6%	5.8%



Quality distribution excludes cash.

Voya Financial acquired Allianz Global Investors in 2022.

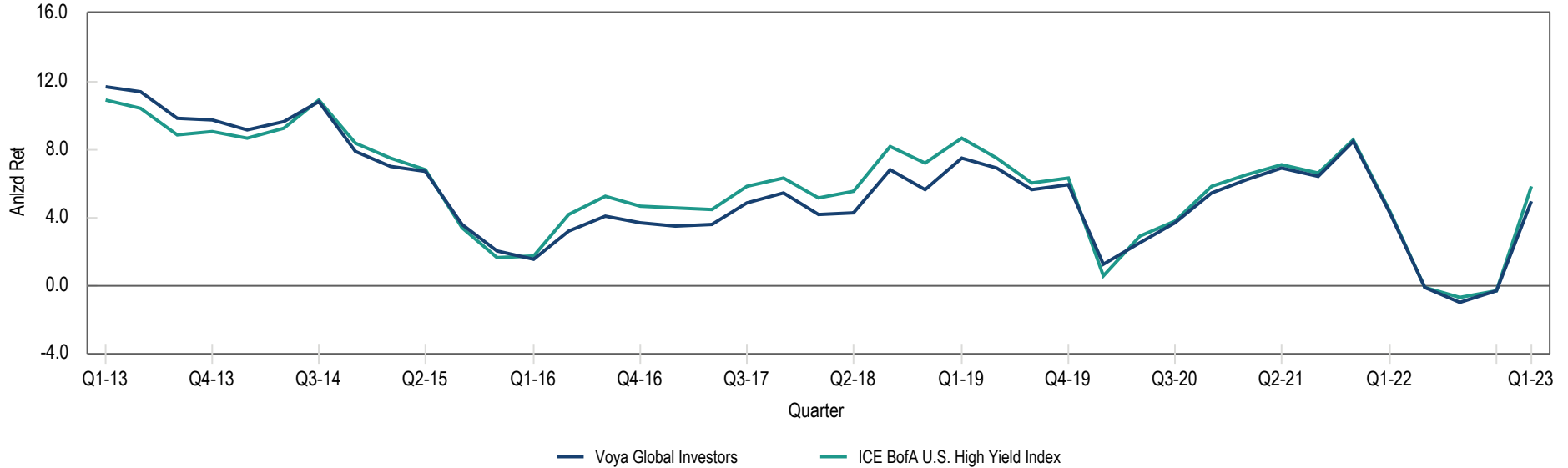
Voya Global Investors vs. eV US High Yield Fixed Inc Gross Universe



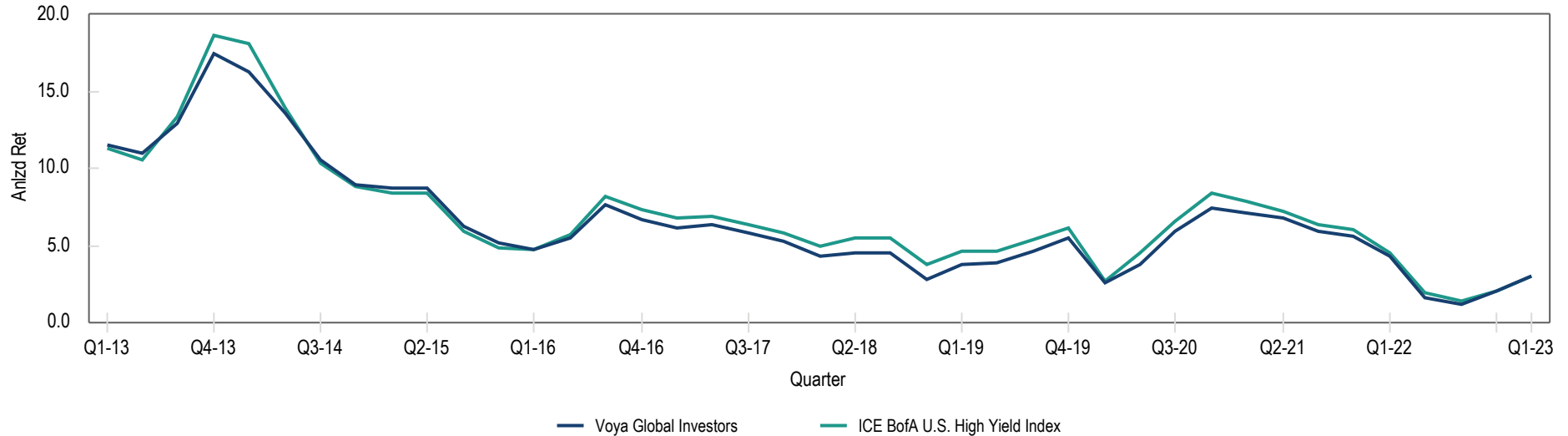
	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● Voya Global Investors	3.96 (9)	-2.84 (49)	4.94 (73)	3.07 (46)	3.68 (58)	-10.64 (64)	5.34 (42)	5.18 (66)	15.32 (19)	-3.20 (78)
▲ ICE BofA U.S. High Yield Index	3.72 (20)	-3.60 (62)	5.82 (47)	3.04 (48)	4.02 (35)	-11.25 (76)	5.35 (42)	6.17 (42)	14.41 (36)	-2.27 (49)
5th Percentile	4.09	1.10	10.43	4.52	5.30	-2.84	10.20	9.66	16.62	1.34
1st Quartile	3.65	-1.59	6.77	3.49	4.20	-7.95	6.17	7.40	14.95	-1.02
Median	3.27	-2.92	5.71	3.01	3.79	-10.05	5.00	5.85	13.70	-2.30
3rd Quartile	2.85	-4.22	4.85	2.67	3.36	-11.21	4.05	4.34	11.25	-3.02
95th Percentile	1.87	-5.96	3.75	1.94	2.71	-13.30	2.95	2.43	7.17	-4.63
Population	220	217	214	206	170	230	235	244	250	252

Voya Financial acquired Allianz Global Investors in 2022.

Rolling 3 Year Annualized Return (%)

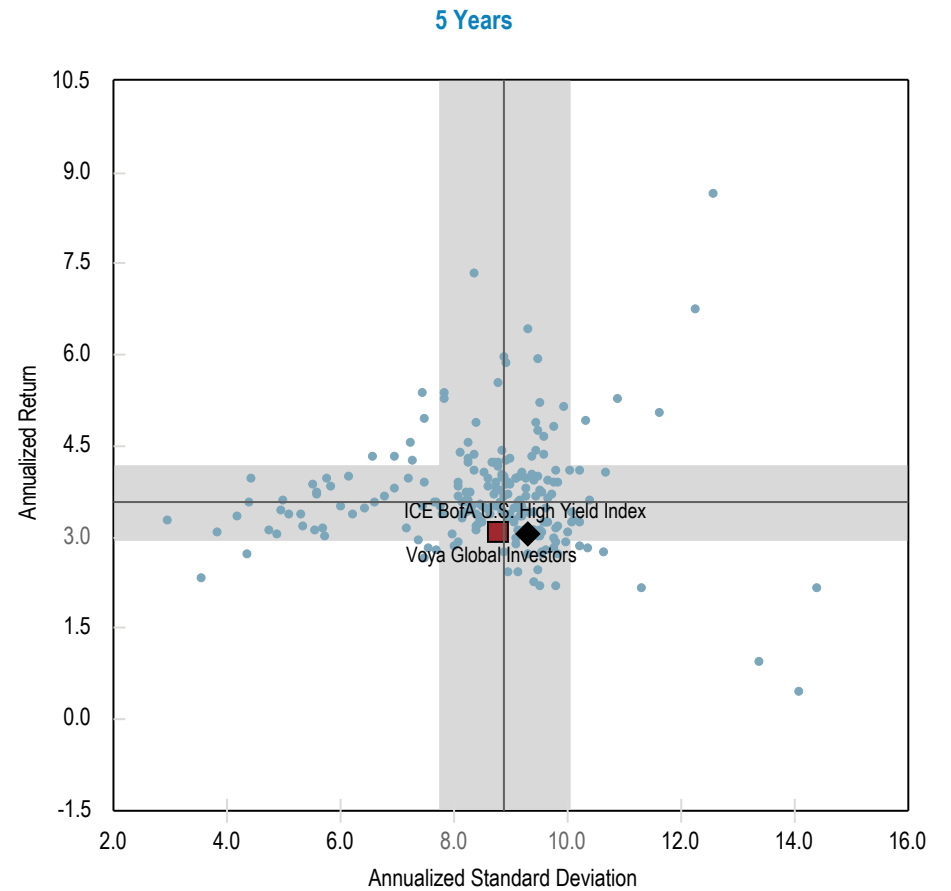
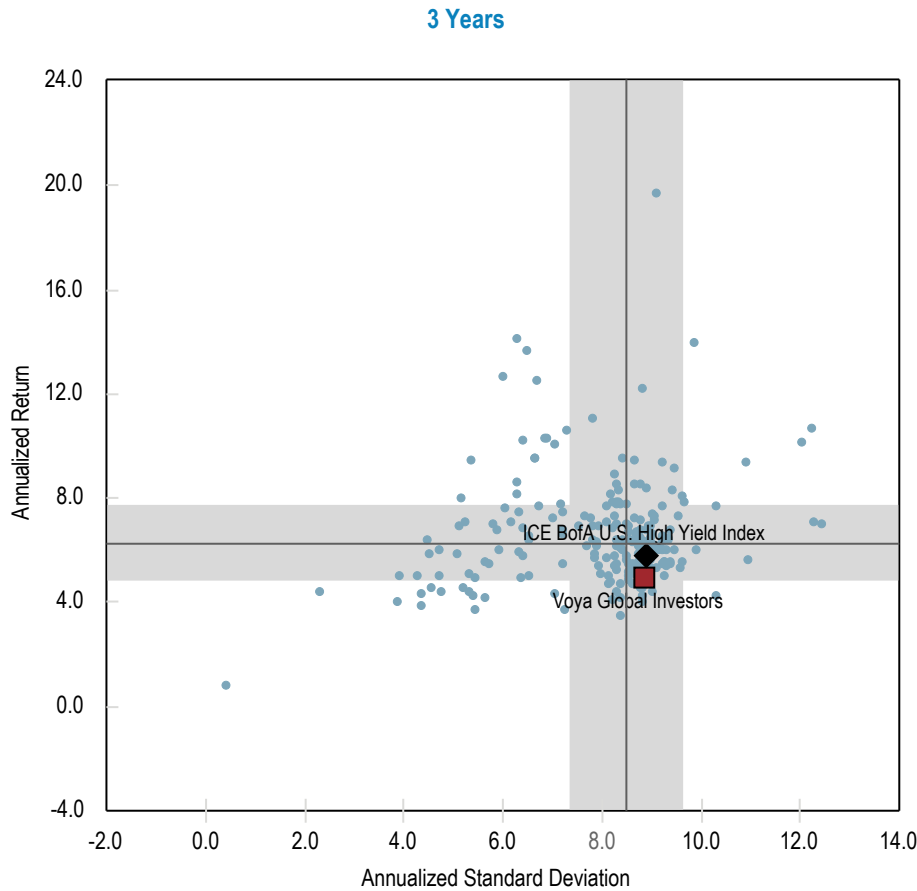


Rolling 5 Year Annualized Return (%)



Voya Financial acquired Allianz Global Investors in 2022.





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Voya Global Investors	4.9	8.9	0.5
ICE BofA U.S. High Yield Index	5.8	8.9	0.6
eV US High Yield Fixed Inc Median	6.3	8.5	0.7
Population	227	227	227

	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
Voya Global Investors	3.1	8.8	0.2
ICE BofA U.S. High Yield Index	3.0	9.3	0.2
eV US High Yield Fixed Inc Median	3.6	8.9	0.3
Population	217	217	217

Voya Financial acquired Allianz Global Investors in 2022.

# Real Estate Managers

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# Adelante Manager Portfolio Overview

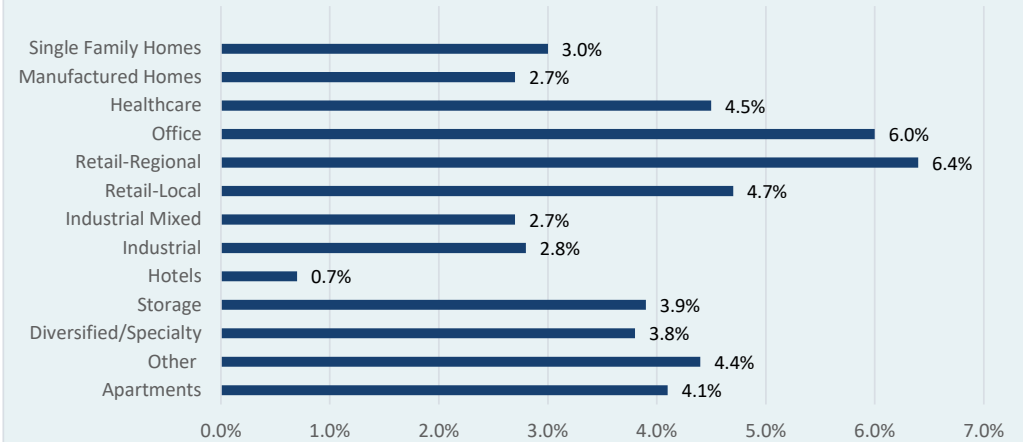
Contra Costa County Employees' Retirement Association  
Period Ending: March 31, 2023

Diversified portfolio of U.S. REITs with a focus on the underlying real estate assets

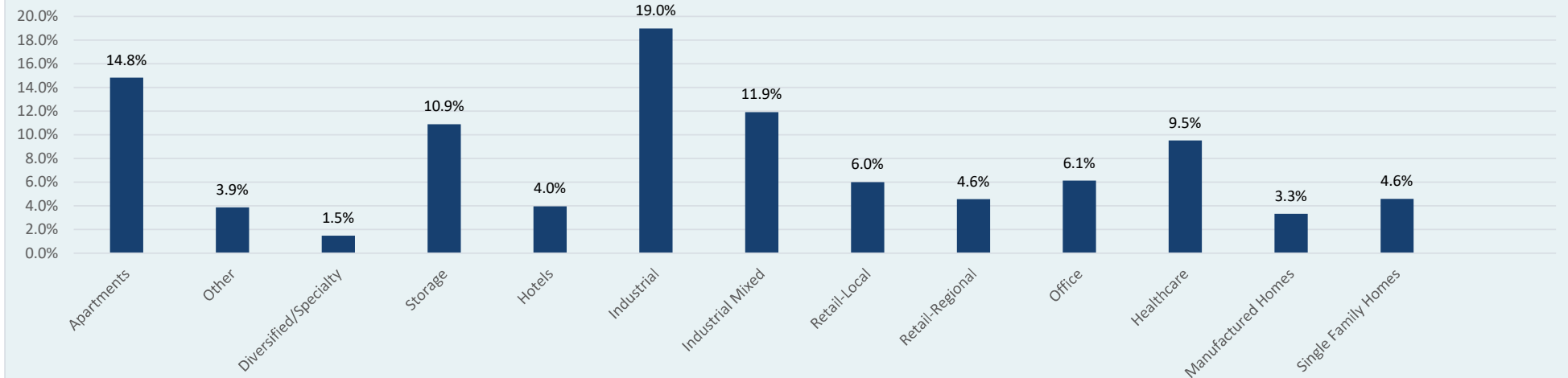
## Top Five Holdings

Company	Property Type	Allocation
ProLogis Inc.	Industrial	16.0%
Equinix Inc	Industrial Mixed	8.2%
Public Storage	Storage	6.0%
Equity Residential	Apartments	5.4%
Welltower Inc.	Industrial Mixed	5.4%

## Dividend Yield by Property Type



## Property Type Allocation



0.019% is allocated to Cash and Cash Equivalents.

# Diversifying Fixed Income Managers

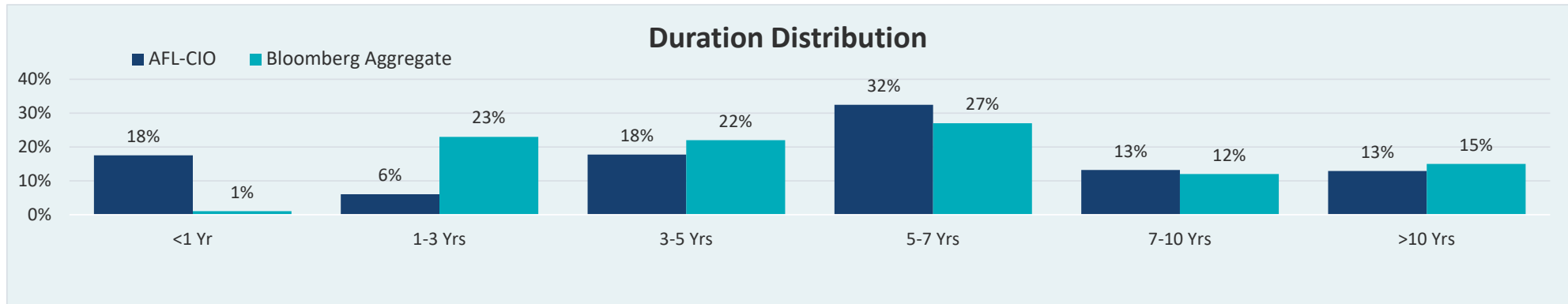
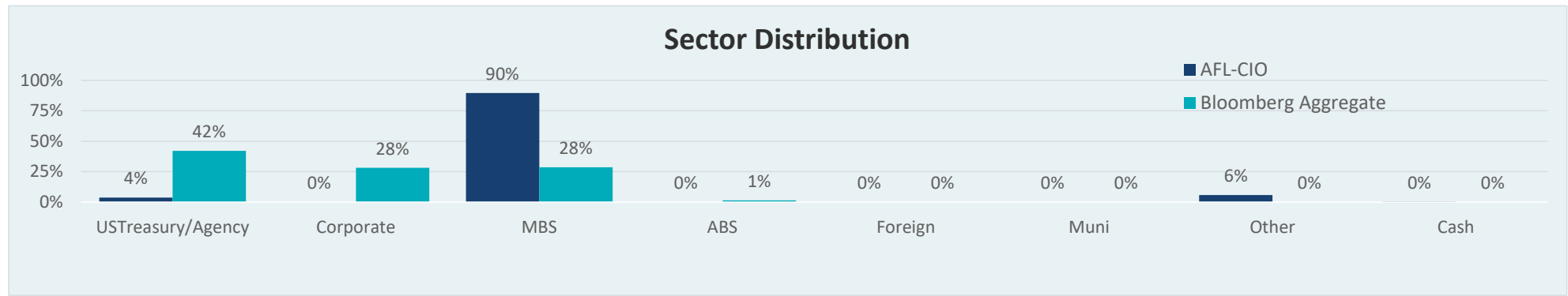
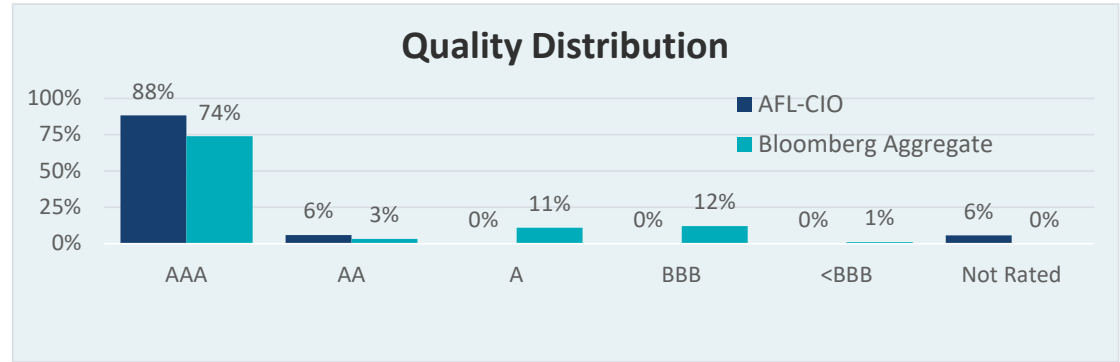
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# AFL-CIO Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

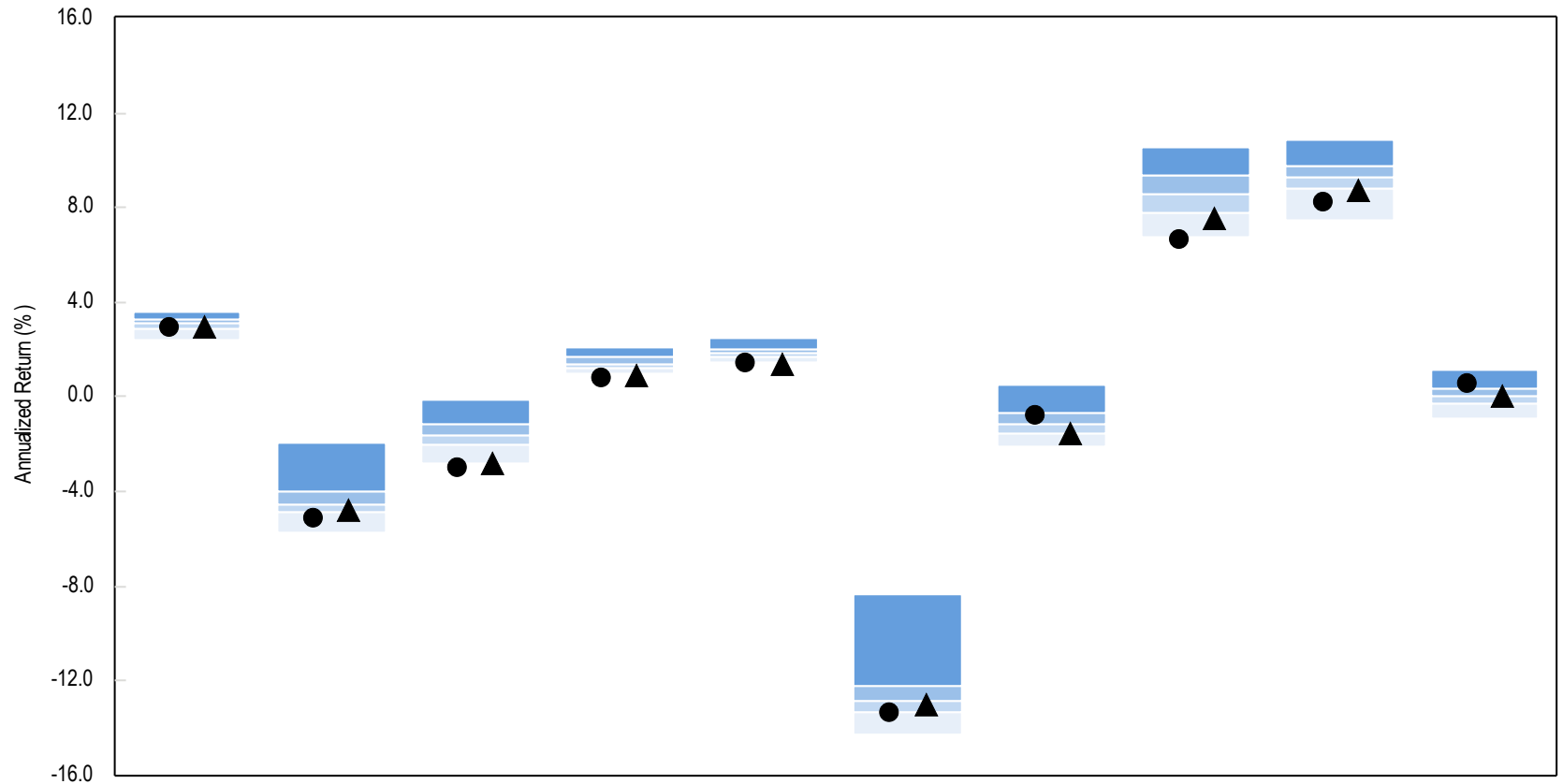
Domestic core fixed income portfolio with an exclusive focus on mortgage-related securities. Primary personnel include Stephen Coyle and Chang Su.

	AFL-CIO	Bloomberg Aggregate
Effective Duration	5.93	6.27
Yield to Maturity	3.60	4.37
Average Quality	AAA	AA
Average Coupon	3.3%	2.8%

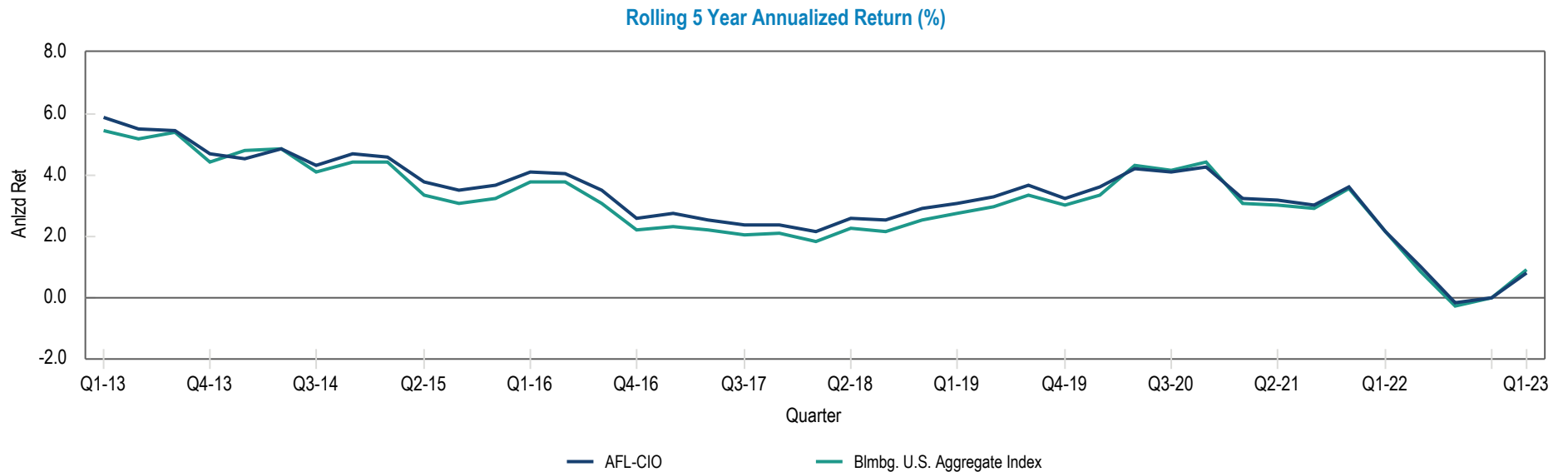
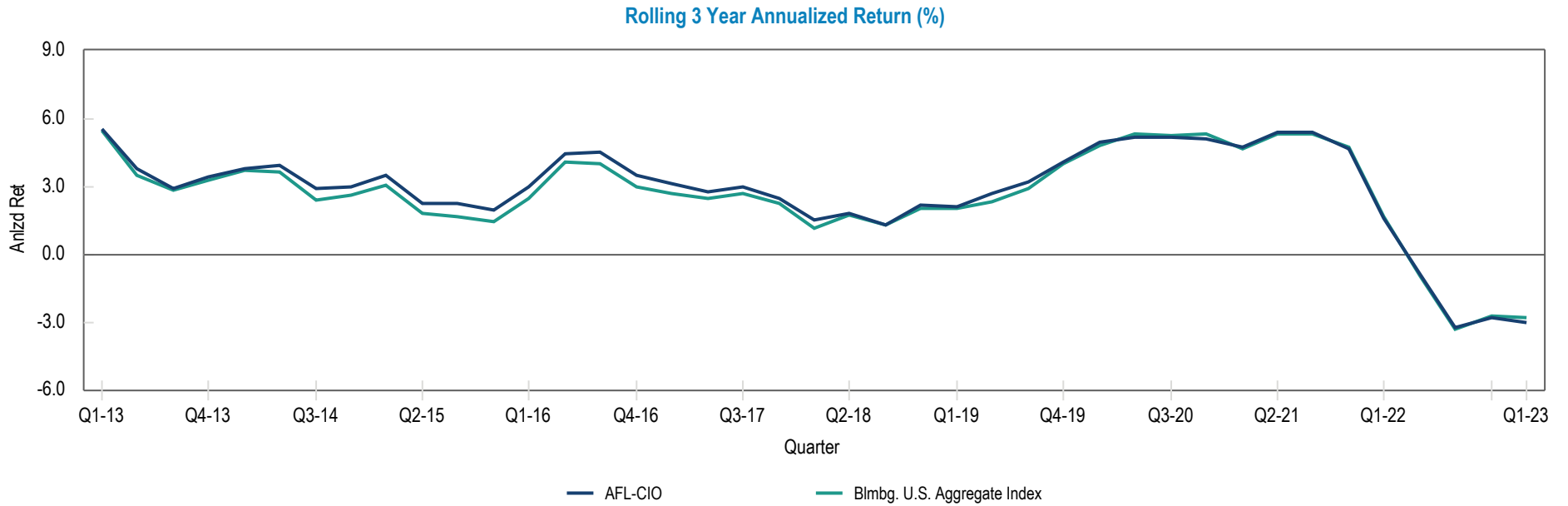


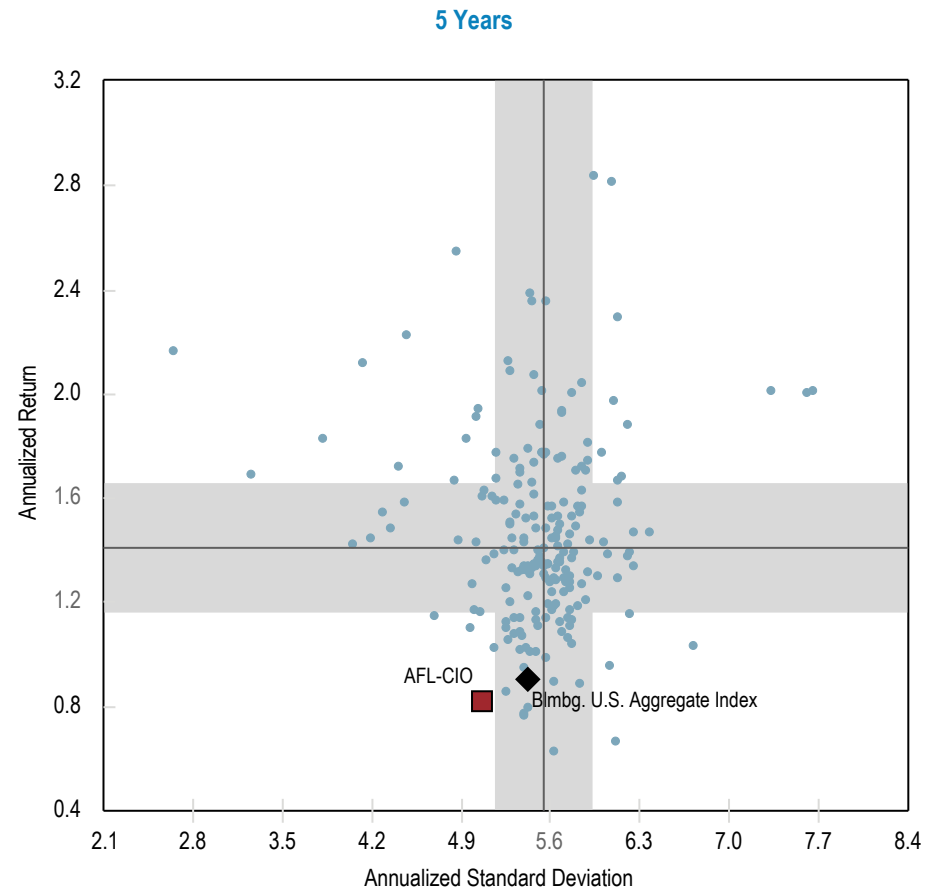
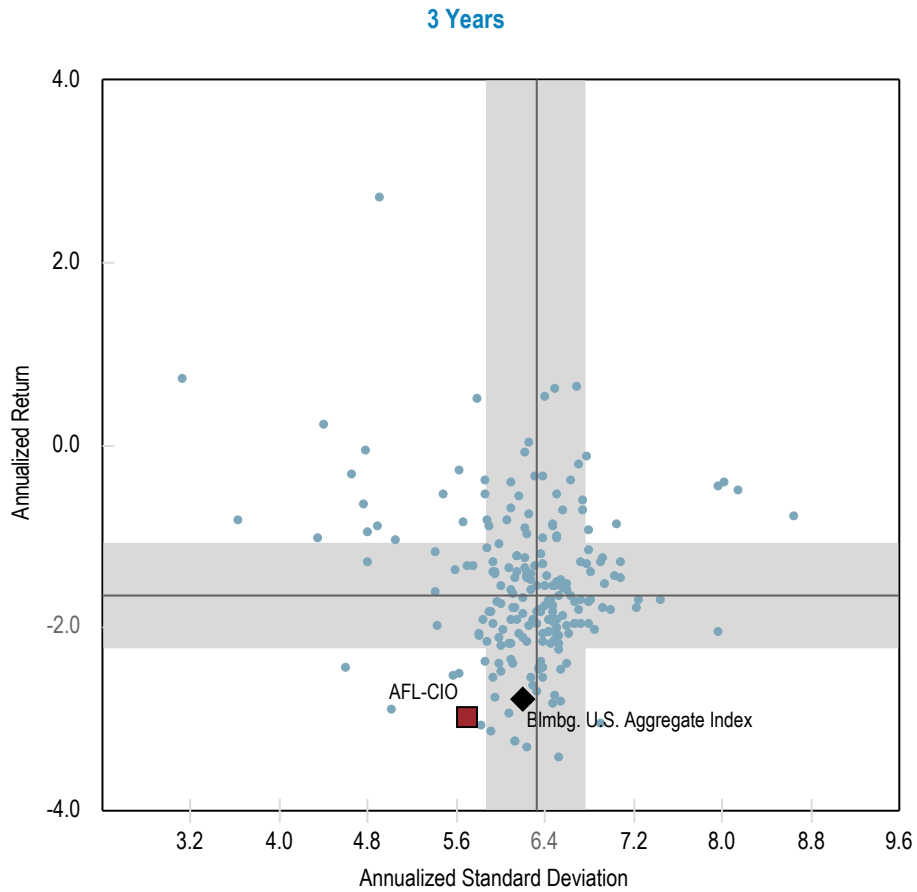
Duration and Quality distributions exclude cash.

AFL-CIO vs. eV US Core Fixed Inc Gross Universe



	Quarter	1 Year	3 Years	5 Years	10 Years	2022	2021	2020	2019	2018
● AFL-CIO	2.98 (70)	-5.13 (85)	-2.98 (97)	0.82 (98)	1.49 (95)	-13.27 (76)	-0.73 (31)	6.65 (96)	8.25 (88)	0.59 (13)
▲ Blmbg. U.S. Aggregate Index	2.96 (71)	-4.78 (70)	-2.77 (95)	0.90 (97)	1.36 (96)	-13.01 (62)	-1.55 (76)	7.51 (85)	8.72 (79)	0.01 (53)
5th Percentile	3.59	-1.94	-0.15	2.12	2.50	-8.33	0.50	10.57	10.86	1.12
1st Quartile	3.30	-4.00	-1.12	1.67	2.03	-12.22	-0.64	9.40	9.76	0.33
Median	3.12	-4.52	-1.64	1.41	1.85	-12.83	-1.15	8.58	9.31	0.03
3rd Quartile	2.92	-4.87	-2.03	1.24	1.67	-13.27	-1.53	7.80	8.85	-0.28
95th Percentile	2.41	-5.70	-2.78	0.99	1.43	-14.25	-2.11	6.76	7.45	-0.87
Population	221	221	210	204	193	240	251	255	261	268





	3 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
AFL-CIO	-3.0	5.7	-0.7
Blmbg. U.S. Aggregate Index	-2.8	6.2	-0.6
eV US Core Fixed Inc Median	-1.6	6.3	-0.4
Population	210	210	210

	5 Years		
	Anlzd Return (%)	Anlzd Standard Deviation (%)	Sharpe Ratio
AFL-CIO	0.8	5.1	-0.1
Blmbg. U.S. Aggregate Index	0.9	5.4	-0.1
eV US Core Fixed Inc Median	1.4	5.5	0.0
Population	204	204	204



# Liquidity Managers

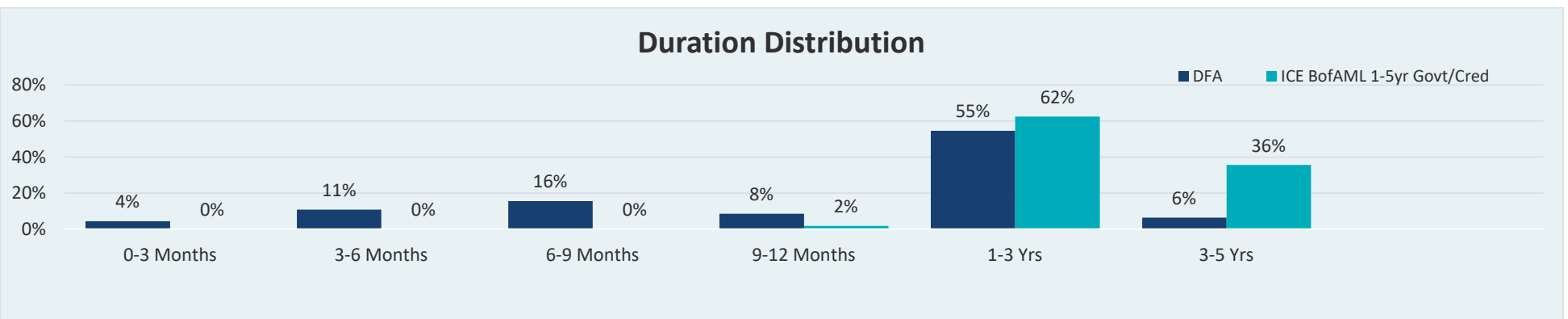
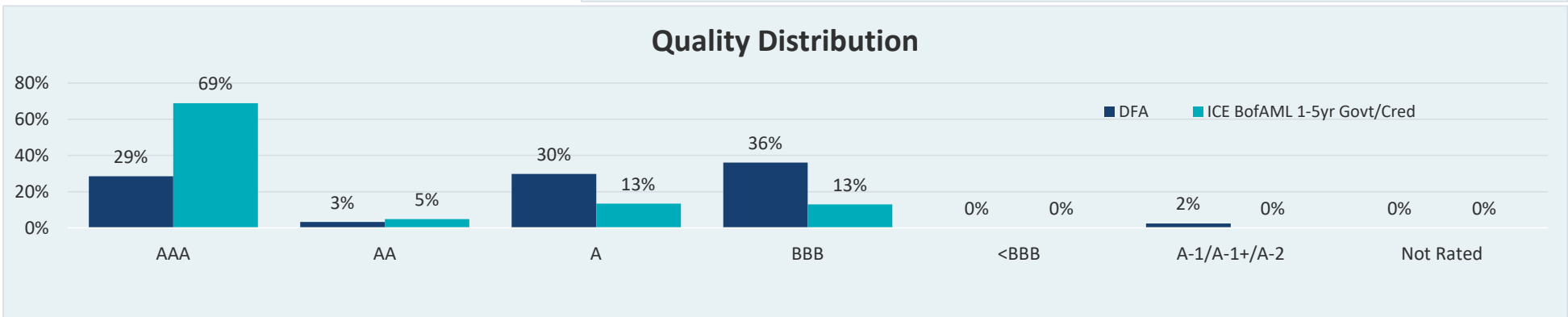
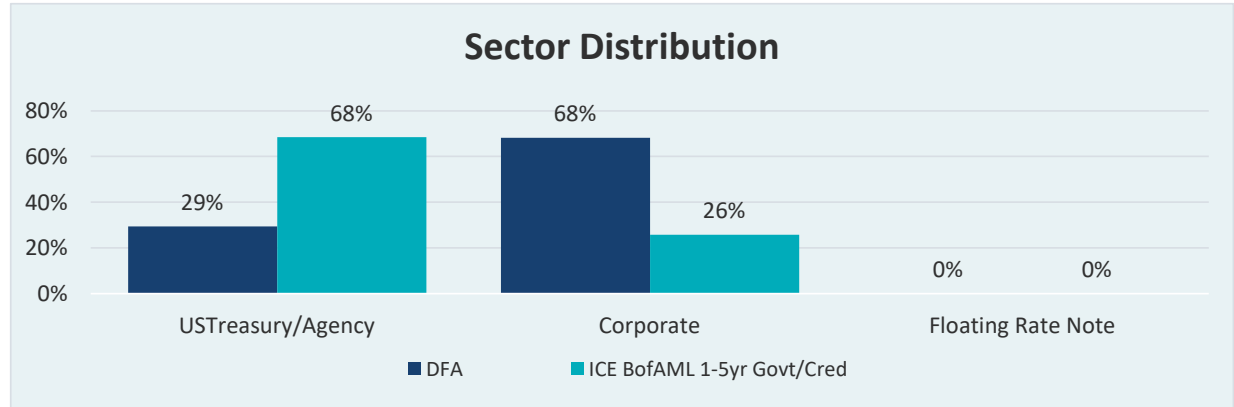
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# DFA Short Credit Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

Domestic short term US credit fixed income portfolio that maximizes total return through income and capital appreciation. Primary personnel include Dave Plecha and Joseph Kolerich.

	DFA	ICE BofAML 1-5yr Govt/Cred
Effective Duration	1.51	2.59
Yield to Maturity	5.36	4.36
Average Quality	A	Aa1
Average Coupon	2.38%	2.40%

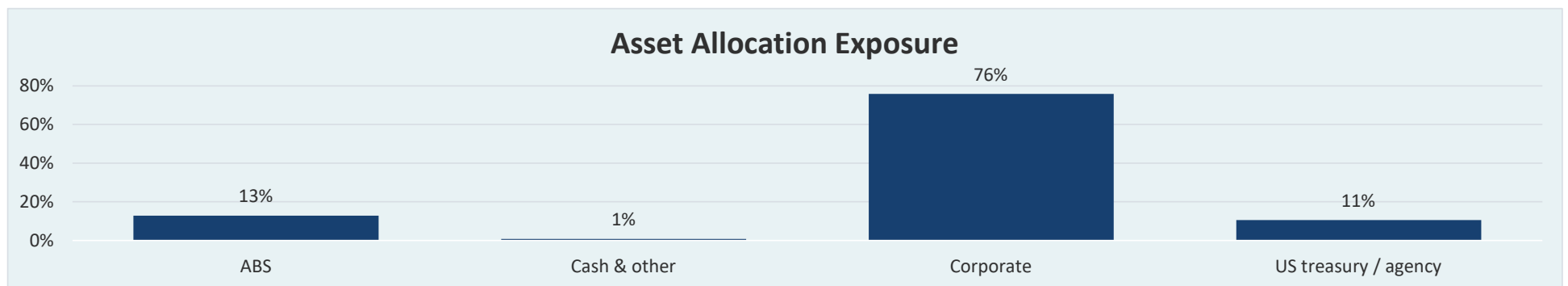
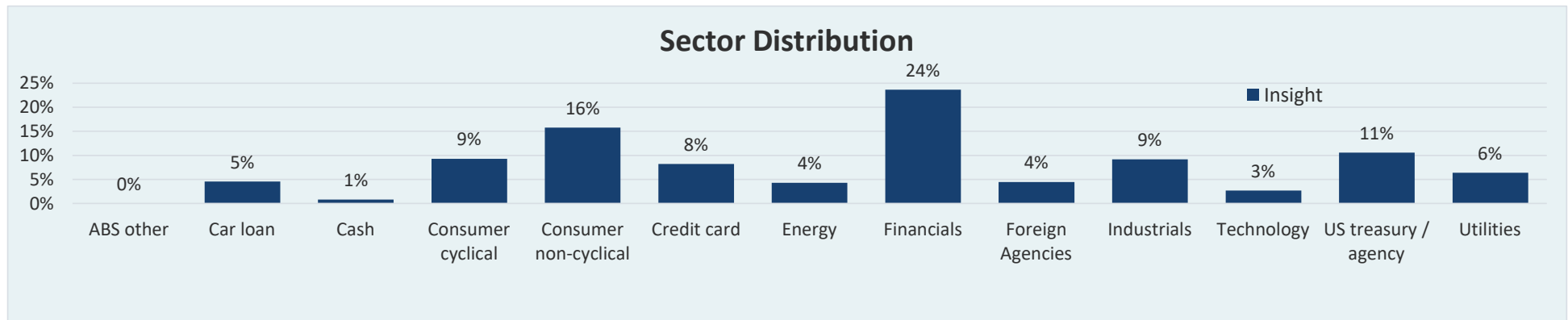
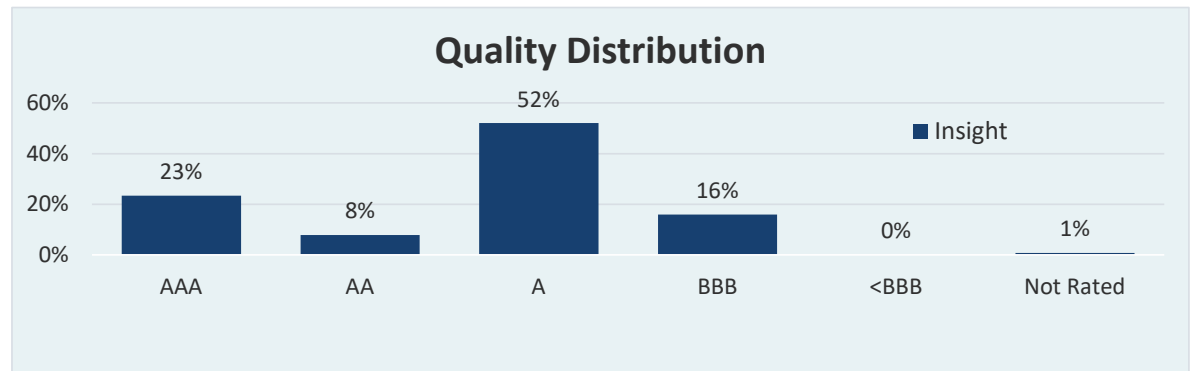


# Insight Short Duration Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

High quality, short duration multi-sector fixed income portfolio comprised of Treasuries, Agencies, investment grade corporates, and ABS designed specifically to meet CCCERA's liabilities. Key personnel include Gerard Berrigan and Jesse Fogarty.

	Insight	BBgBarc 1-3yr Govt
Effective Duration	1.09	1.90
Yield to Maturity	5.63	4.38
Average Quality	A+	AAA
Average Coupon	2.86%	2.00%

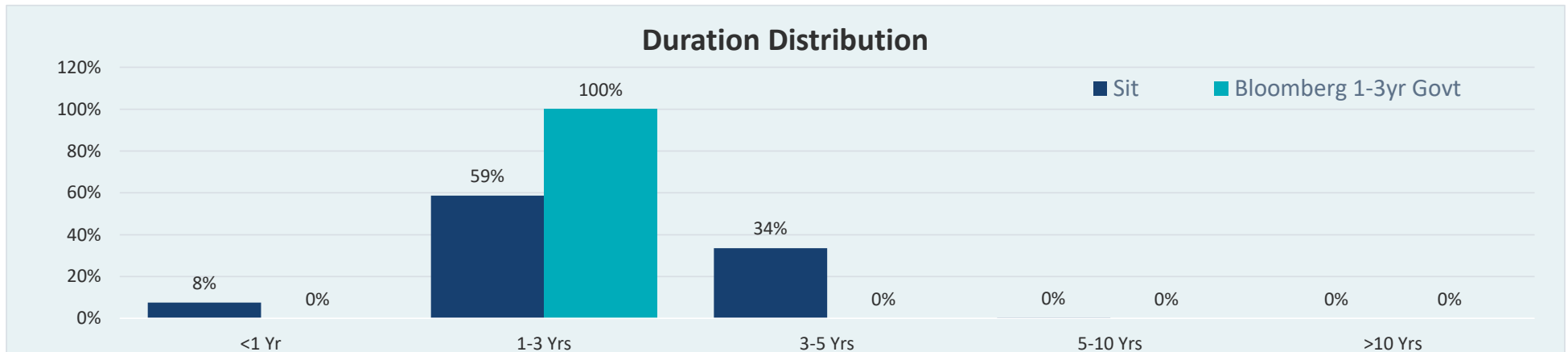
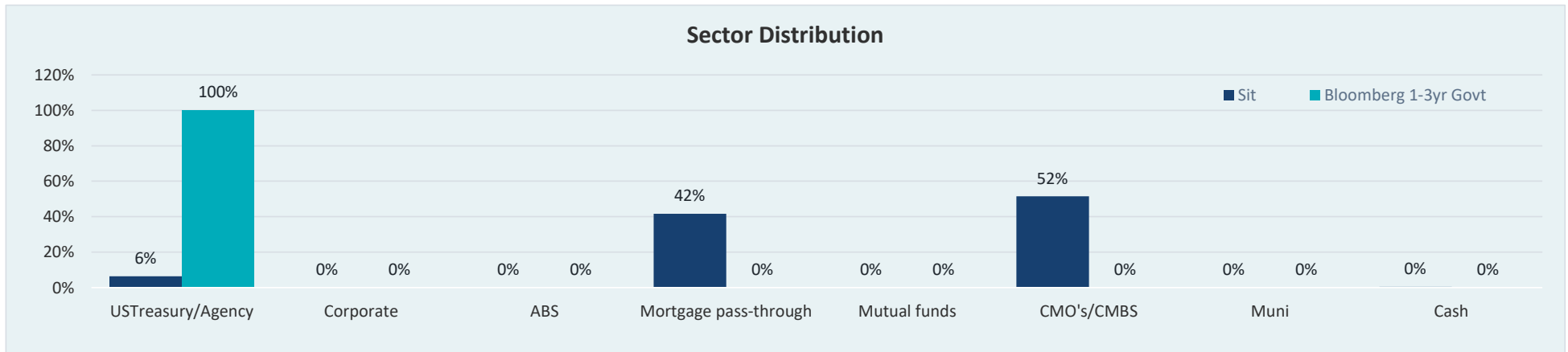
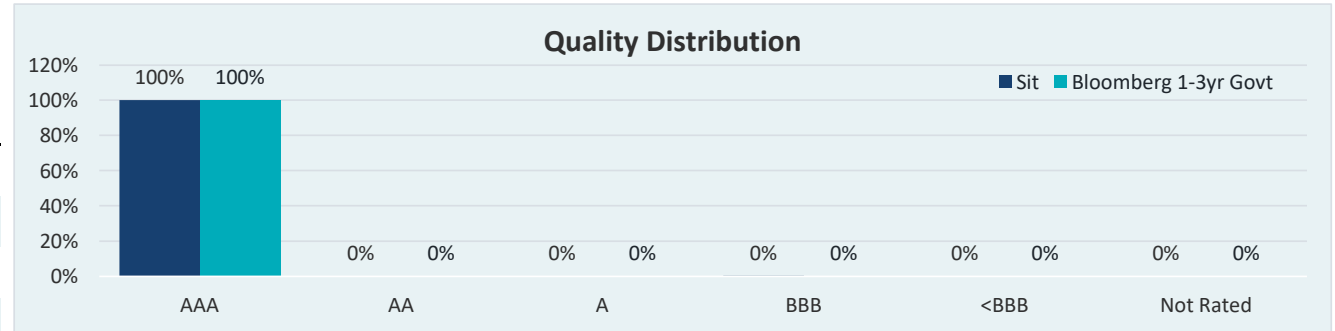


# Sit Short Duration Manager Portfolio Overview

# Contra Costa County Employees' Retirement Association Period Ending: March 31, 2023

Short duration fixed income portfolio with a focus on earning high levels of interest income. Primary personnel include Bryce Doty, Paul Jungquist and Michael Brilley.

	Sit	BBgBarc 1-3yr Govt
<b>Modified Duration</b>	<b>2.80</b>	<b>1.90</b>
<b>Yield to Maturity</b>	<b>5.50</b>	<b>4.38</b>
<b>Average Quality</b>	<b>AAA</b>	<b>AAA</b>
<b>Average Coupon</b>	<b>5.90%</b>	<b>2.00%</b>



Data Sources and Methodology

**Performance Return Calculations**

Performance is calculated using Modified Dietz and for time periods with large cash flow (generally greater than 10% of portfolio value), Time Weighted Rates of Return (TWRR) methodologies. Monthly returns are geometrically linked and annualized for periods longer than one year.

**Data Source**

Verus is an independent third party consulting firm and calculates returns from best source book of record data. Returns calculated by Verus may deviate from those shown by the manager in part, but not limited to, differences in prices and market values reported by the custodian and manager, as well as significant cash flows into or out of an account. It is the responsibility of the manager and custodian to provide insight into the pricing methodologies and any difference in valuation.

**Illiquid Alternatives**

Due to the inability to receive final valuation prior to report production, closed end funds (including but are not limited to Real Estate, Hedge Funds, Private Equity, and Private Credit) performance is typically reported at a one-quarter lag. Valuation is reported at a one-quarter lag, adjusted for current quarter flow (cash flows are captured real time). Closed end fund performance is calculated using a time-weighted return methodology consistent with all portfolio and total fund performance calculations. For Private Markets, performance reports also include Verus-calculated multiples based on flows and valuations (e.g. DPI and TVPI) and manager-provided IRRs.

**Policy & Custom Index Composition**

Policy Index (7/1/2022 - present)	16% Russell 3000, 15% MSCI ACWI ex-US (Gross), 9% MSCI ACWI (Net), 1.5% ICE BofA High Yield Master II, 2% Wilshire REIT, 8% Private Real Estate composite returns, 13% Private Equity composite returns, 8% Private Credit composite returns, 17% Bloomberg 1-3 Yr Gov/Credit, 2.5% Bloomberg US Aggregate, 3% 60% MSCI ACWI Net/40% Bloomberg Global Aggregate 2.5% FTSE 3-month T-Bill +5%, 2.5% Bloomberg US Aggregate +1%.
Policy Index (7/1/2021 - 6/30/2022)	16% Russell 3000, 16% MSCI ACWI ex-US (Gross), 9% MSCI ACWI (Net), 2% Wilshire REIT, 8% Private Real Estate composite returns, 3% CPI + 4%, 11% Private Equity composite returns, 8% Private Credit composite returns, 2% ICE BofAML High Yield Master II, 18% Bloomberg 1-3 Yr Gov/Credit, 2.5% Bloomberg US Aggregate, 3% 60% MSCI ACWI Net/40% Bloomberg Global Aggregate, 1.5% HFRI EH Equity Market Neutral.
Policy Index (1/1/2021 - 6/30/2021)	9% Russell 3000, 18% MSCI ACWI ex-US (Gross), 11% MSCI ACWI (Net), 1% Wilshire REIT, 8% Private Real Estate composite returns, 1.5% CPI + 4%, 11% Private Equity composite returns, 7% Private Credit composite returns, 1.5% ICE BofAML High Yield Master II, 25% Bloomberg 1-3 Yr Gov/Credit, 3% Bloomberg US Aggregate, 2% Bloomberg Global Aggregate, 2% HFRI EH Equity Market Neutral.
Policy Index (7/1/2020 - 12/31/2020)	9% Russell 3000, 18% MSCI ACWI ex-US (Gross), 11% MSCI ACWI (Net), 1% Wilshire REIT, 1.6% NCREIF Property Index, 6.4% NCREIF ODCE Index, 1.5% CPI + 4%, 11% S&P 500 +4% (Lagged), 7% ICE BofAML High Yield Master II +2%, 1.5% ICE BofAML High Yield Master II, 25% Bloomberg 1-3 Yr Gov/Credit, 3% Bloomberg US Aggregate, 2% Bloomberg Global Aggregate, 2% HFRI EH Equity Market Neutral.
Policy Index (7/1/2019 - 6/30/2020)	10% Russell 3000, 18% MSCI ACWI ex-US (Gross), 11% MSCI ACWI (Net), 1% Wilshire REIT, 1.6% NCREIF Property Index, 6.4% NCREIF ODCE Index, 2% CPI + 4%, 11% S&P 500 +4% (Lagged), 5% ICE BofAML High Yield Master II +2%, 2% ICE BofAML High Yield Master II, 24% Bloomberg 1-3 Yr Gov/Credit, 3.5% Bloomberg US Aggregate, 2% Bloomberg Global Aggregate, 2.5% HFRI EH Equity Market Neutral.
Policy Index (7/1/2018 - 6/30/2019)	11% Russell 3000, 19% MSCI ACWI ex-US (Gross), 11% MSCI ACWI (Net), 1% Wilshire REIT, 1.8% NCREIF Property Index, 7.2% NCREIF ODCE Index, 2% CPI + 4%, 10% S&P 500 +4% (Lagged), 4% ICE BofAML High Yield Master II +2%, 2% ICE BofAML High Yield Master II, 23% Bloomberg 1-3 Yr Gov/Credit, 3.5% Bloomberg US Aggregate, 2% Bloomberg Global Aggregate, 2.5% HFRI EH Equity Market Neutral.
Policy Index (10/1/2017 - 6/30/2018)	16.3% Russell 3000, 18.8% MSCI ACWI ex-US (Gross), 8.6% MSCI ACWI (Net), 1% Wilshire REIT, 1.6% NCREIF Property Index, 6.4% NCREIF ODCE Index, 2.5% CPI + 4%, 10.1% S&P 500 +4% (Lagged), 1.9% ICE BofAML High Yield Master II +2%, 4.3% ICE BofAML High Yield Master II, 25% Bloomberg 1-3 Yr Gov/Credit, 3.5% Bloomberg US Aggregate.
Policy Index (1/1/2017 - 9/30/2017)	22.9% Russell 3000, 11% MSCI ACWI ex-US (Gross), 10.9% MSCI ACWI (Net), 1% Wilshire REIT, 1.7% NCREIF Property Index, 6.8% NCREIF ODCE Index, 3.6% CPI + 4%, 8.1% S&P 500 +4% (Lagged), 1.7% ICE BofAML High Yield Master II +2%, 5.1% ICE BofAML High Yield Master II, 22.4% Bloomberg 1-3 Yr Gov/Credit, 3.2% Bloomberg US Aggregate, 1.6% 91-Day T-Bills.
Policy Index (4/1/2012-12/31/2016)	27.7% Russell 3000, 10.6% MSCI ACWI ex-US (Gross), 12.3% MSCI ACWI (Net), 19.6% Bloomberg U.S. Aggregate, 5% ICE BofAML High Yield Master II, 4% Bloomberg Global Aggregate, 13.5% Real Estate Benchmark, 6.8% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.

Data Sources and Methodology

Policy & Custom Index Composition (continued)

Policy Index (4/1/2011-3/31/2012)	31% Russell 3000, 10.4% MSCI EAFE (Gross), 9.6% MSCI ACWI (Net), 25% Bloomberg U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% Bloomberg Global Aggregate, 8.4% DJ Wilshire REIT, 3.1% NCREIF, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Policy Index (4/1/2010-3/31/2011)	35.6% Russell 3000, 10.4% MSCI EAFE (Gross), 5% MSCI ACWI (Net), 25% Bloomberg U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% Bloomberg Global Aggregate, 8.4% DJ Wilshire REIT, 3.1% NCREIF, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Policy Index (7/1/2009-3/31/2010)	40.6% Russell 3000, 10.4% MSCI EAFE (Gross), 25% Bloomberg U.S. Aggregate, 3% ICE BofAML High Yield Master II, 4% Bloomberg Global Aggregate, 8.4% DJ Wilshire REIT, 3.1% NCREIF, 5% S&P 500 +4% (Lagged), 0.5% 91-Day T-Bills.
Custom Growth Benchmark (7/1/2022 - present)	21.2% Russell 3000, 19.9% MSCI ACWI ex-US (Gross), 11.9% MSCI ACWI (Net), 2.6% Wilshire REIT, 10.6% Private Real Estate composite returns, 17.2% Private Equity composite returns, 10.6% Private Credit composite returns, 2.0% ICE BofAML High Yield Master II, 4% 60% MSCI ACWI Net/40% Bloomberg Global Aggregate
Custom Growth Benchmark (7/1/2021 - 6/30/2022)	21.33% Russell 3000, 21.33% MSCI ACWI ex-US (Gross), 12% MSCI ACWI (Net), 2.67% Wilshire REIT, 10.67% Private Real Estate composite returns, 14.67% Private Equity composite returns, 10.67% Private Credit composite returns, 2.67% ICE BofAML High Yield Master II, 4% 60% MSCI ACWI Net/40% Bloomberg Global Aggregate
Custom Growth Benchmark (1/1/2021 - 6/30/2021)	13.14% Russell 3000, 26.28% MSCI ACWI ex-US (Gross), 16.06% MSCI ACWI (Net), 1.46% Wilshire REIT, 11.68 Private Real Estate composite returns%, 16.06% Private Equity composite returns, 10.22% Private Credit composite returns, 2.19% ICE BofAML High Yield Master II, 2.92% Bloomberg Global Bond
Custom Growth Benchmark (7/1/2020 - 12/31/2020)	13.14% Russell 3000, 26.28% MSCI ACWI ex-US (Gross), 16.06% MSCI ACWI (Net), 1.46% Wilshire REIT, 2.34% NCREIF Property Index, 9.33% NCREIF ODCE Index, 16.06% S&P 500 +4% (Lagged), 10.22% ICE BofAML High Yield Master II +2%, 2.19% ICE BofAML High Yield Master II, 2.92% Bloomberg Global Bond
Custom Growth Benchmark (7/1/2019 - 6/30/20)	14.7% Russell 3000, 26.4% MSCI ACWI ex-US (Gross), 16.2% MSCI ACWI (Net), 1.5% Wilshire REIT, 2.4% NCREIF Property Index, 9.4% NCREIF ODCE Index, 16.2% S&P 500 +4% (Lagged), 7.4% ICE BofAML High Yield Master II +2%, 2.9% ICE BofAML High Yield Master II, 2.9% Bloomberg Global Bond
Custom Growth Benchmark (7/1/2018 - 6/30/2019)	16.0% Russell 3000, 27.5% MSCI ACWI ex-US (Gross), 15.9% MSCI ACWI (Net), 1.5% Wilshire REIT, 2.6% NCREIF Property Index, 10.4% NCREIF ODCE Index, 14.5% S&P 500 +4% (Lagged), 5.8% ICE BofAML High Yield Master II +2%, 2.9% ICE BofAML High Yield Master II, 2.9% Bloomberg Global Bond
Custom Growth Benchmark (9/30/2017- 6/30/2018)	23.6% Russell 3000, 27.2% MSCI ACWI ex-US (Gross), 12.5% MSCI ACWI (Net), 1.5% Wilshire REIT, 2.3% NCREIF Property Index, 9.3% NCREIF ODCE Index, 14.6% S&P 500 +4% (Lagged), 2.8% ICE BofAML High Yield Master II +2%, 6.2% ICE BofAML High Yield Master II
Custom Growth Benchmark (1/1/2017-9/30/2017)	32.6% Russell 3000, 15.7% MSCI ACWI ex-US (Gross), 15.5% MSCI ACWI (Net), 1.4% Wilshire REIT, 2.4% NCREIF Property Index, 9.6% NCREIF ODCE Index, 1.6% CPI +4%, 11.5% S&P 500 +4% (Lagged), 2.4% ICE BofAML High Yield Master II +2%, 7.3% ICE BofAML High Yield Master II
Custom Growth Benchmark (Prior to 1/1/2017)	Weighted-average of the benchmarks of the sub-composites that make up the composite.
Custom Diversifying Benchmark (7/1/2021-present)	35.71% Bloomberg US Aggregate, 21.43% FTSE 3-Month T-bill +4%, 21.43 FTSE 3-Month T-bill +5%, 21.43% Bloomberg Barclays US Aggregate +1%
Custom Diversifying Benchmark (8/1/2020 - 6/30/2021)	46.15% Bloomberg US Aggregate, 30.77 FTSE 3-Month T-bill +4%, 23.08 FTSE 3-Month T-bill +5%.
Custom Diversifying Benchmark (7/1/2018 - 7/31/2020)	43.75% Bloomberg US Aggregate, 25% CPI + 4%, 31.25% HFRI EH Equity Market Neutral.
Custom Diversifying Benchmark (10/1/2017 - 6/30/2018)	58.33% Bloomberg US Aggregate, 41.67% CPI + 4%.
Custom Diversifying Benchmark (1/1/2017 - 9/30/2017)	56.1% Bloomberg US Aggregate, 43.9% CPI + 4%.
Custom Diversifying Benchmark (Prior to 1/1/2017)	Weighted-average of the benchmarks of the sub-composites that make up the composite.
Custom Diversifying Multi-Asset Benchmark (current)	50% FTSE 3-Month T-bill +5%, 50% Bloomberg Barclays US Aggregate +1%
Real Estate Benchmark (current)	20% Wilshire REIT, 80% Private Real Estate composite returns.
Real Estate Benchmark (4/1/2012-11/30/2016)	40% Wilshire REIT, 50% NCREIF Property Index, 10% FTSE/EPRA NAREIT Developed ex-US.

Manager Line Up					
Manager	Inception Date	Data Source	Manager	Inception Date	Data Source
BlackRock Russell 1000 Index	4/20/2017	BlackRock	Invesco Real Estate V	2/20/2019	Invesco
Boston Partners	6/1/1995	Northern Trust	Invesco Real Estate V	9/27/2022	Invesco
Emerald Advisors	4/7/2003	Northern Trust	Oaktree REOF V	12/31/2011	Oaktree
Ceredex	11/6/2011	Northern Trust	Oaktree REOF VI	9/30/2013	Oaktree
Pyrford	4/25/2014	State Street	Oaktree REOF VII	4/1/2015	Oaktree
William Blair	10/29/2010	William Blair	PCCI IX	4/28/222	PCCP
PIMCO RAE Emerging Markets	2/28/2017	State Street	Siguler Guff DREOF	1/25/2012	Siguler Guff
TT Emerging Markets	7/27/2017	TT	Siguler Guff DREOF II	8/31/2013	Siguler Guff
Artisan Partners	10/1/2012	SEI Trust	Siguler Guff DREOF II Co-Inv	1/27/2016	Siguler Guff
First Eagle	1/18/2011	Northern Trust	Paulson Real Estate Fund II	11/10/2013	Paulson
Voya Global Investors	4/25/2000	Northern Trust	AE Industrial Partners Fund II	4/8/2019	StepStone Group
Adelante	9/30/2001	Northern Trust	Adams Street Partners	3/18/1996	StepStone Group
AQR Global Risk Premium - EL	1/18/2019	AQR	Adams Street Partners II	1/16/2009	StepStone Group
Panagora Risk Parity Multi Asset	3/15/2019	Panagora	Adams Street Partners Venture	4/28/2017	StepStone Group
AFL-CIO	6/30/1991	AFL-CIO	Adams Street Partners - BFP	1/18/1996	StepStone Group
Wellington Real Total Return (in Liquidation)	2/26/2013	Wellington	Adams Street Partners - Fund 5	9/21/2012	StepStone Group
Acadian Multi-Asset Absolute Return Fund	8/4/2020	Northern Trust	Aether Real Assets IV	3/16/2016	StepStone Group
Sit LLCAR	4/15/2021	Northern Trust	Aether Real Assets III	11/27/2013	StepStone Group
Sit Short Duration	11/2/2016	Northern Trust	Aether Real Assets III Surplus	11/30/2013	StepStone Group
DFA Short Credit	11/21/2016	Northern Trust	Bay Area Equity Fund	6/14/2004	StepStone Group
Insight Short Duration	11/18/2016	Northern Trust	Bay Area Equity Fund II	12/7/2009	StepStone Group
Parametric Overlay	3/29/2017	Northern Trust	Commonfund	6/28/2013	StepStone Group
Cash	-	Northern Trust	EIF US Power Fund II	8/16/2005	StepStone Group
Angelo Gordon Energy Credit Opp	9/24/2015	StepStone Group	EIF US Power Fund III	5/30/2007	StepStone Group
StepStone CC Opportunities Fund	2/1/2018	StepStone Group	EIF US Power Fund IV	11/28/2011	StepStone Group
Torchlight II	9/30/2006	StepStone Group	EIF US Power Fund V	11/28/2016	StepStone Group
Torchlight IV	7/1/2012	StepStone Group	Genstar Capital Partners IX, L.P.	2/21/2019	StepStone Group
Torchlight V	7/1/2012	StepStone Group	Oaktree PIF 2009	2/28/2010	StepStone Group
Angelo Gordon Realty Fund VIII	1/23/2012	Angelo Gordon	Paladin III	11/30/2007	StepStone Group
Angelo Gordon Realty Fund IX	12/8/2014	Angelo Gordon	Ocean Avenue Fund II	6/11/2014	StepStone Group
Blackstone Real Estate Partners VIII	3/24/2023	Blackstone	Ocean Avenue Fund III	4/15/2016	StepStone Group
DLJ RECP III	6/23/2005	DLJ	Pathway 6	5/24/2011	StepStone Group
DLJ RECP IV	2/11/2008	DLJ	Pathway 7	2/7/2013	StepStone Group
DLJ RECP V	7/1/2014	DLJ	Pathway 8	11/23/2015	StepStone Group
DLJ RECP VI	3/19/2019	DLJ	Pathway	11/9/1998	StepStone Group
LaSalle Income & Growth VI	7/16/2013	LaSalle	Pathway 2008	12/26/2008	StepStone Group
LaSalle Income & Growth VII	2/28/2017	LaSalle	Siguler Guff CCCERA Opps	6/3/2014	StepStone Group
Hearthstone II	6/17/1998	Hearthstone	Siguler Guff Secondary Opps	11/30/2016	StepStone Group
Long Wharf Fund IV	7/3/2013	Long Wharf	Siris Partners IV	3/15/2019	StepStone Group
Long Wharf Fund V	9/30/2016	Long Wharf	TPG Healthcare Partners, L.P.	6/28/2019	StepStone Group
Long Wharf Fund VI	2/5/2020	Long Wharf	Trident VIII, L.P.	5/24/2019	StepStone Group
Invesco Real Estate IV	6/30/2014	Invesco	Wastewater Opp. Fund	12/8/2015	StepStone Group

Other Disclosures

All data prior to 12/31/2014 was provided by previous consultant.  
 As of 7/1/2018 all Private Equity and Private Credit data is provided by StepStone Group.

# Glossary

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**Allocation Effect:** An attribution effect that describes the amount attributable to the managers' asset allocation decisions, relative to the benchmark.

**Alpha:** The excess return of a portfolio after adjusting for market risk. This excess return is attributable to the selection skill of the portfolio manager. Alpha is calculated as:  $\text{Portfolio Return} - [\text{Risk free Rate} + \text{Portfolio Beta} \times (\text{Market Return} - \text{Risk free Rate})]$ .

**Benchmark R squared:** Measures how well the Benchmark return series fits the manager's return series. The higher the Benchmark R squared, the more appropriate the benchmark is for the manager.

**Beta:** A measure of systematic, or market risk; the part of risk in a portfolio or security that is attributable to general market movements. Beta is calculated by dividing the covariance of a security by the variance of the market.

**Book to Market:** The ratio of book value per share to market price per share. Growth managers typically have low book to market ratios while value managers typically have high book to market ratios.

**Capture Ratio:** A statistical measure of an investment manager's overall performance in up or down markets. The capture ratio is used to evaluate how well an investment manager performed relative to an index during periods when that index has risen (up market) or fallen (down market). The capture ratio is calculated by dividing the manager's returns by the returns of the index during the up/down market, and multiplying that factor by 100.

**Correlation:** A measure of the relative movement of returns of one security or asset class relative to another over time. A correlation of 1 means the returns of two securities move in lock step, a correlation of -1 means the returns of two securities move in the exact opposite direction over time. Correlation is used as a measure to help maximize the benefits of diversification when constructing an investment portfolio.

**Excess Return:** A measure of the difference in appreciation or depreciation in the price of an investment compared to its benchmark, over a given time period. This is usually expressed as a percentage and may be annualized over a number of years or represent a single period.

**Information Ratio:** A measure of a manager's ability to earn excess return without incurring additional risk. Information ratio is calculated as: excess return divided by tracking error.

**Interaction Effect:** An attribution effect that describes the portion of active management that is contributable to the cross interaction between the allocation and selection effect. This can also be explained as an effect that cannot be easily traced to a source.

**Portfolio Turnover:** The percentage of a portfolio that is sold and replaced (turned over) during a given time period. Low portfolio turnover is indicative of a buy and hold strategy while high portfolio turnover implies a more active form of management.

**Price to Earnings Ratio (P/E):** Also called the earnings multiplier, it is calculated by dividing the price of a company's stock into earnings per share. Growth managers typically hold stocks with high price to earnings ratios whereas value managers hold stocks with low price to earnings ratios.

**R Squared:** Also called the coefficient of determination, it measures the amount of variation in one variable explained by variations in another, i.e., the goodness of fit to a benchmark. In the case of investments, the term is used to explain the amount of variation in a security or portfolio explained by movements in the market or the portfolio's benchmark.

**Selection Effect:** An attribution effect that describes the amount attributable to the managers' stock selection decisions, relative to the benchmark.

**Sharpe Ratio:** A measure of portfolio efficiency. The Sharpe Ratio indicates excess portfolio return for each unit of risk associated with achieving the excess return. The higher the Sharpe Ratio, the more efficient the portfolio. Sharpe ratio is calculated as:  $\text{Portfolio Excess Return} / \text{Portfolio Standard Deviation}$ .

**Sortino Ratio:** Measures the risk adjusted return of an investment, portfolio, or strategy. It is a modification of the Sharpe Ratio, but penalizes only those returns falling below a specified benchmark. The Sortino Ratio uses downside deviation in the denominator rather than standard deviation, like the Sharpe Ratio.

**Standard Deviation:** A measure of volatility, or risk, inherent in a security or portfolio. The standard deviation of a series is a measure of the extent to which observations in the series differ from the arithmetic mean of the series. For example, if a security has an average annual rate of return of 10% and a standard deviation of 5%, then two thirds of the time, one would expect to receive an annual rate of return between 5% and 15%.

**Style Analysis:** A return based analysis designed to identify combinations of passive investments to closely replicate the performance of funds

**Style Map:** A specialized form or scatter plot chart typically used to show where a Manager lies in relation to a set of style indices on a two dimensional plane. This is simply a way of viewing the asset loadings in a different context. The coordinates are calculated by rescaling the asset loadings to range from -1 to 1 on each axis and are dependent on the Style Indices comprising the Map.



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Meeting Date  
**05/24/2023**  
Agenda Item  
**#4b.**

**Memorandum**

Date: May 24, 2023  
To: CCCERA Board of Retirement Trustees  
From: Timothy Price, Chief Investment Officer  
Subject: Investment Staff Report – Q1 2023

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**Overview**

On a quarterly basis CCCERA’s Board receives a report which details critical elements of CCCERA’s Functionally Focused Portfolio’s sub-portfolios. The purpose of the report is to highlight elements of the sub-portfolios which are good indicators to the Board of the program’s efficient and effective operation.

**Summary**

In the wake of some extraordinary market behavior over the past three years, CCCERA’s Total Fund is largely performing as expected, exhibiting returns above expectations for the amount of risk taken. This is measured by the Sharpe Ratio (risk-adjusted return), and a comparison to the Simple Target Index. The Simple Target Index is the most basic index which could replicate CCCERA’s Total Fund, and is made up of 75.5% MSCI ACWI, 17% Bloomberg 1-3 Year Gov/Credit, and 7.5% 3-Month Treasury Bills (please see the Total Fund pages in the appendix for additional details). CCCERA’s portfolio is much more complex, especially as it relates to allocations to private equity, private credit, and real estate.

CCCERA has been rewarded for implementing a more complex portfolio and has outperformed the Simple Target Index over the trailing ten-year period, but has lagged the STI over shorter periods, while experiencing less risk (volatility). Details on performance relative to this index are included in the appendix. It is worth noting that CCCERA’s Total Fund return is an aggregate of the performance of the Liquidity, Growth, and Risk Diversifying sub-portfolios.

### **1) Liquidity**

The purpose of the liquidity program is to match three years of benefit payments with high credit quality, low duration assets. The liquidity sub-portfolio is made up of three fixed income managers, all of whom pursue a high quality, low duration investment approach. In the first quarter of 2023, all managers held high quality (as measured by credit ratings), low duration portfolios. The average credit quality for the entire liquidity program is AA- (AAA is the highest rating), and the duration is 1.9 years, which is considered short.

### **2) Growth**

The Growth portfolio is designed to take advantage of capital appreciation and income opportunities globally. To achieve this, the Growth portfolio includes a variety of assets, from stocks and growth-oriented bonds to private equity, real estate, and private credit.

For the trailing five-year period ending March 31, 2023, the Growth portfolio returned 6.6% relative to the index return of 6.9%, for a relative underperformance of -0.3%. Over this period, the Growth program produced a superior Sharpe ratio of 0.4 relative to the index's 0.3. During the first quarter of 2023, CCCERA's Growth sub-portfolio return of 2.7% relative to MSCI ACWI Index return of 7.3%.

### **3) Risk Diversifying**

The Risk Diversifying mandate holds assets that are expected to diversify the growth portfolio's volatility while offering moderate growth. The mandate as a whole seeks to be highly liquid, have a low beta to the growth market, and produce positive real returns. In the first quarter, the Risk Diversifying mandate fulfilled two of these goals. The entire mandate can be liquidated within 90 days, meeting the requirement of high liquidity. The correlation of the mandate to growth markets is 0.7, the same as in December 2022. The trailing real (net of inflation) return over the past five years is -3.8%, remaining below expectations. Recent changes to diversify this portion of the portfolio away from fixed income have been beneficial over the past year.

By and large, the product teams and asset managers across all managers are stable, and we have no significant organizational concerns with our investment managers. CCCERA's Total Fund in aggregate is performing in line with expectations, having a similar or higher risk-adjusted return but a lower level of volatility compared to the Simple Target Index. Enclosed are additional details on CCCERA's Total Fund, sub-portfolios, and individual investment strategies.

### CCCERA Portfolio Report Card

Below we have itemized those elements of each of CCCERA’s sub-portfolios and Total Fund which we believe the Board should pay particular attention to. Additional details on each of the sub-portfolios are available in the appendix. All CCCERA performance is stated on a net of fees basis.

#### Liquidity

Objective	Measurement	Current Period Data	Status
High Quality	Credit Quality	AA-	Meeting Expectations
Low Risk	Duration	1.9 years	Meeting Expectations
Appropriately Sized	Months of Benefit Payments Invested	28 Months	Meeting Expectations

#### Growth

Objective	Measurement	Current Period Data	Status
Growth of Plan Assets	Absolute Returns	Trailing 5 yr return: 6.6%	Meeting Expectations
	Benchmark Relative Returns	-0.3% relative to ACWI over trailing 5 years	Below Expectations
Efficient Capital Deployment	Sharpe Ratio	CCCERA: 0.4 MSCI ACWI: 0.3 (over trailing 5 years)	Meeting Expectations

#### Risk Diversifying

Objective	Measurement	Current Period Data	Status
Offset Volatility in Growth Portfolio	Correlation	0.7 over trailing 5 years	Below Expectations
Positive Real Returns	Returns	5 yr real return: -3.8% 5 yr nominal return: 0.1%	Below Expectations
High Liquidity	% of Portfolio that can be liquidated within 90 days	100%	Meeting Expectations

#### Total Fund

Objective	Component/Measurement	Status
Store 3 Years of Benefit Payments	Liquidity Sub-portfolio	Meeting Expectations
Participate in Growth Opportunities	Growth Sub-portfolio	Meeting Expectations
Provide an offset to Growth volatility	Risk Diversifying Sub-portfolio	Below Expectations
Produce superior risk adjusted returns	Total Fund Sharpe Ratio	Meeting Expectations

## Appendix – Liquidity Sub-Portfolio

### Manager Reviews

#### Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
Insight	Good	13%	-5%	N
Sit	Good	-16%	-7%	N
DFA	Good	-6%	-7%	N

#### Performance

	Portfolio Average Credit Quality	Portfolio Average Duration	Portfolio Average Yield	1 Year Total Return
Insight	A+	1.1	5.6	0.4%
Sit	AAA	2.8	5.5	-0.2%
DFA	A	1.5	5.4	-0.3%

### Manager Notes:

Fixed income securities have continued to trade off as rates have risen across all fixed income durations. The shorter duration of CCCERA's mandates have provided relative protection, as has the buy and maintain bias of the portfolio.

### Manager Theses:

The Liquidity Portfolio is a combination of three managers which work together to match three years of CCCERA's liabilities. The portfolio is refreshed every year during the annual funding plan.

Insight: Insight plays a completion role in the liquidity program, matching out liabilities with short duration government and corporate fixed income securities.

DFA: Dimensional Fund Advisors runs a strategy that focuses on obtaining fixed income exposures via the most liquid securities available. DFA contributes to the Liquidity Program by selling securities at regular intervals to pay a portion of CCCERA's monthly benefit payment.

Sit: Sit invests in high yielding government backed mortgages. The cash flow from these securities is harvested monthly to make up a portion of CCCERA's monthly benefit payment.

## Appendix – Growth Sub-Portfolio

### Manager Reviews

#### Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
Boston Partners	Good	-8%	-8%	N
BlackRock Index Fund	Good	-17%	-5%	N
Emerald Advisors	Good	-20%	-22%	N
Ceredex	Good	-24%	-23%	N
Pyrford	Good	-20%	-24%	N
William Blair	Good	-18%	-12%	N
First Eagle	Good	-8%	16%	N
Artisan Global	Good	-13%	-13%	N
PIMCO/RAE EM	Good	-17%	-12%	N
TT EM	Good	-16%	-26%	N
Adelante	Good	-36%	-27%	N
Invesco REIT	Good	24%	-11%	N
Voya	Good	-11%	27%	N
AQR	Good	-19%	-17%	N
PanAgora	Good	-34%	-20%	N
Private Equity	Good	--	--	N
Private Credit	Good	--	--	N
Real Estate	Good	--	--	N

### Performance

	Trailing 1-Yr Return	Trailing 5-yr Return	Trailing 10-yr Return	Performance in Line with Expectations?	Inception Date
MSCI ACWI-ND	-7%	7%	8%		
Boston Partners	1%	8%	10%	Y	04/30/1995
BlackRock Index Fund	2%	11%	12%	Y	03/31/2017
Emerald Advisors	-2%	6%	10%	Y	03/31/2003
Ceredex	7%	5%	8%	Y	09/30/2011
<b>Total Domestic Equity</b>	<b>2%</b>	<b>8%</b>	<b>11%</b>	<b>Y</b>	
Pyrford	9%	5%	5%	Y	03/31/2014
William Blair	2%	5%	6%	Y	09/30/2010
PIMCO/RAE EM	6%	2%	3%	N	01/31/2017
TT EM	-11%	-3%	4%	N	06/30/2017
<b>Total International Equity</b>	<b>2%</b>	<b>3%</b>	<b>4%</b>	<b>Y</b>	
First Eagle	6%	6%	7%	Y	12/31/2010
Artisan Global	-1%	7%	10%	Y	11/30/2012
<b>Total Global Equity</b>	<b>2%</b>	<b>7%</b>	<b>8%</b>	<b>Y</b>	
Adelante	-17%	6%	6%	Y	07/31/2001
Invesco REIT	-15%	N/A	N/A	Y	02/28/2022
Voya	1%	3%	3%	N	04/30/2000
AQR	-6%	3%	3%	N	12/31/2018
PanAgora	-13%	2%	4%	N	02/28/2019
Private Equity	-5%	15%	14%	Y	
Private Credit	7%	7%	9%	Y	
Real Estate	-9%	3%	7%	Y	

For periods longer than inception date within CCERA's Total Fund, the return is from a representative composite account.

## **Manager Notes:**

Brett Barner, one of the Portfolio Managers of the Ceredex Small Cap Value strategy, will retire from that role on June 30, 2023. Don Wordell and Charles Carter have been added to the small cap value team. Given the team-based approach to management of Ceredex strategies, we do not have immediate concerns but will meet with the new portfolio managers in the next few months.

On May 15, 2023, TPG announced a deal to acquire Angelo Gordon for \$2.7 billion. The stated rationale is for TPG to add credit capabilities and expand their real estate offerings. CCCERA is a current investor in three TPG private equity funds and three funds from Angelo Gordon spanning both credit and real estate strategies. CCCERA has been in contact with both firms, and we will hold in depth meetings with all relevant teams prior to the deal's expected close by year end.

## **Manager Theses:**

The growth portfolio includes all managers in public and private equity, real estate, and private credit. These managers grow CCCERA's assets for future benefit payments (beyond the three years already covered by the Liquidity program).

**Boston Partners:** Large cap domestic equity which follows a value discipline. Boston Partners will buy out of favor companies and sell them when their intrinsic values are reflected in the market. Expected to outperform in flat to falling markets.

**BlackRock Index Fund:** Large cap domestic equity portfolio which should follow the Russell 1000 Index.

**Emerald Advisors:** Small cap growth equity seeking companies with high growth rates. Expected to produce strong returns in rising markets, and weak returns in falling markets.

**Ceredex:** Domestic equity small cap value portfolio of companies with dividend yields and low valuations. This portfolio should outperform flat markets.

**Pyrford (Columbia):** International equity value portfolio of non-US companies with low valuations at the country and stock level. This portfolio should outperform in flat markets.

**William Blair:** International equity growth portfolio of non-US companies with high growth rates constructed from the security level. This portfolio should outperform in rapidly rising markets.

**First Eagle:** Global equity portfolio that is benchmark agnostic comprised of companies with low valuations.

**Artisan Global Opportunities:** Global equity portfolio of companies that is benchmark agnostic with accelerating profit cycles and a focus on capital allocation.

**PIMCO/RAE Emerging Markets:** Quantitative equity with a value orientation. This portfolio follows the fundamental indexing approach (ranking companies by metrics other than market capitalization), resulting in a diversified, low turnover portfolio. This portfolio underperforms in momentum driven markets.

**TT International Emerging Markets:** Concentrated, growth-oriented manager which invests in small and mid-cap emerging market companies. TT employs both a top-down and a bottom-up research approach and seeks to outperform by identifying companies that have a catalyst to drive future growth.



**Adelante:** Diversified portfolio of U.S. REITs with a focus on the underlying real estate assets. Adelante is a public market proxy of the core real estate market.

**INVESCO Fundamental Beta REIT:** Invesco invests in US REITs following a sector neutral strategy that allocates to the securities that INVESCO believes have the strongest financial conditions.

**Voya High Yield Fixed Income:** Domestic high yield fixed income portfolio with a focus on security selection. Voya will focus on the higher quality segment of the high yield universe. Voya should provide a steady income stream and provide downside protection in falling markets.

**Private Equity:** CCCERA invests in private equity to generate returns above those available in the public equity markets.

**Private Credit:** CCCERA invests in private credit to generate cash flow streams above those available in the public debt markets.

**Real Estate:** CCCERA invests in value-add, distressed, and opportunistic real estate to generate returns from the capital appreciation and cash flow associated with commercial real estate investment.

**Risk Parity:** Multi-asset approach that strives for balanced contributions to total portfolio risk from multiple asset classes.

## Appendix – Risk Diversifying Sub-Portfolio

### Organizational Stability

	Portfolio Management Assessment	1 Year Product Asset Growth	1 Year Firm Asset Growth	Regulatory Action in Last Year?
AFL-CIO	Good	-6%	-6%	N
Acadian	Good	-9%	-11%	N
Sit	Good	8%	-7%	N

### Performance

	Trailing 1 Year Correlation to Growth	Trailing 3 Year Correlation to Growth	1 Year Return	5 Year Return	% of Portfolio Liquid in 90 Days
AFL-CIO	0.9	0.8	-5%	0%	100%
Acadian	-0.9	-0.5	1%	2%	100%
Sit	0.5	N/A	0%	N/A	100%

### Manager Notes:

The Sit LLCAR was funded in the third quarter of 2021. As it is a custom strategy, we have only one year of data to measure at this time.

### Manager Theses:

Managers in the risk diversifying allocation seek to have a low correlation with the growth portfolio, positive returns in flat and falling equity markets, and a high degree of liquidity. These managers work together to offset some of the risks in the growth portfolio.

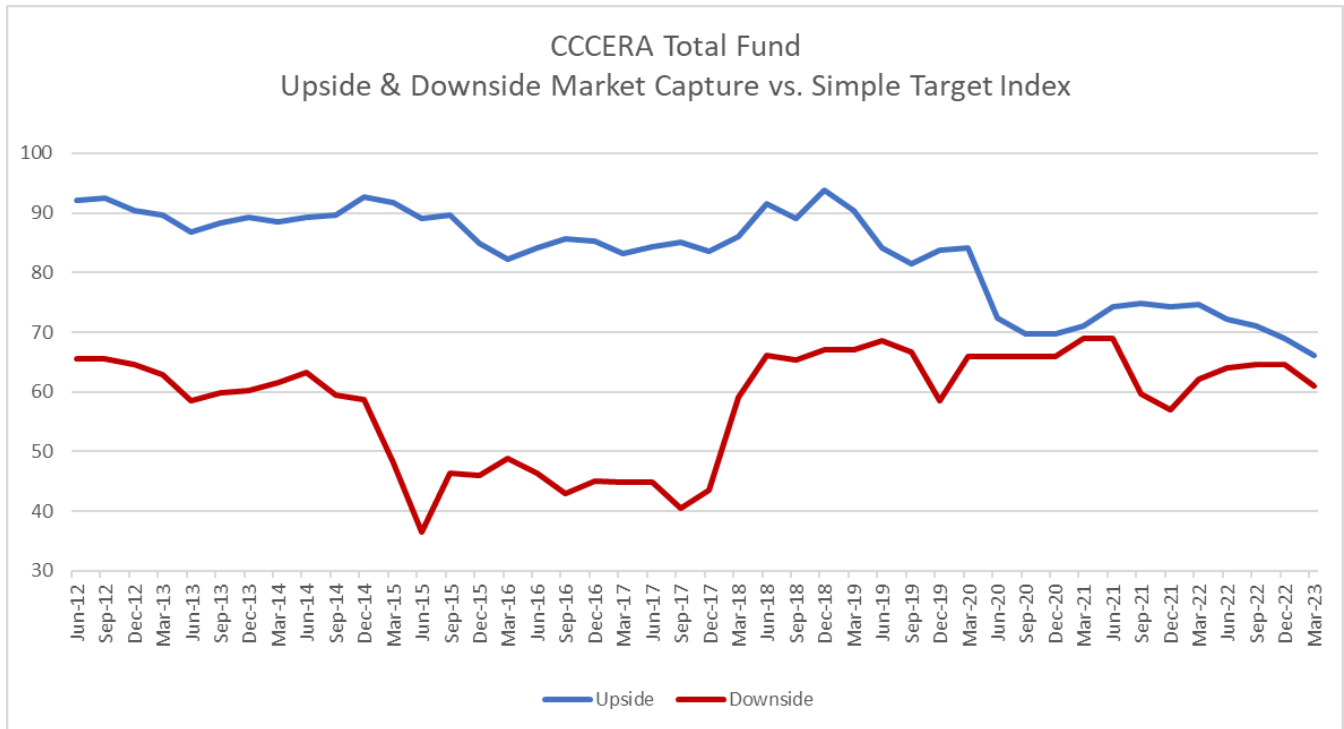
**AFL-CIO:** Portfolio of domestic, high quality fixed income securities which are backed by commercial and residential mortgages.

**Acadian:** Quantitatively managed multi-asset absolute return strategy that uses various models to capture pricing dislocations.

**Sit LLCAR:** Multiple fixed income strategies (closed end funds, mortgages, Treasuries) actively managed to target a modest positive return in most market environments

## Appendix Data – Total Fund

### Rolling 3-Year Total Fund Upside/Downside Market Capture



\*The composition of the Simple Target Index has mirrored changes in CCCERA's asset allocation over time: from 2008 to 2012 the benchmark was 73% MSCI ACWI, 23% Bloomberg 1-3 Year Gov/Credit, and 4% 3-Month Treasury Bills. From 2012 to 2016 the composition was 74% MSCI ACWI, 18% Bloomberg 1-3 Year Gov/Credit, and 9% 3-Month Treasury Bills. From 2016 to 2017 the composition was 63% MSCI ACWI, 25% Bloomberg 1-3 Year Gov/Credit, and 12% 3-Month Treasury Bills, from 2017 to June 2018 the composition was 61% MSCI ACWI, 27% Bloomberg 1-3 Year Gov/Credit, and 12% 3-Month Treasury Bills, from July 2018 to June 2019 the composition is 69% MSCI ACWI, 23% Bloomberg 1-3 Year Gov/Credit, and 8% 3-Month Treasury Bills, from July 2019 to June 2020 the composition is 68% MSCI ACWI, 24% Bloomberg 1-3 Year Gov/Credit, and 8% 3-Month Treasury Bills, from July 2020 to June 2021 the composition is 68.5% MSCI ACWI, 25% Bloomberg 1-3 Year Gov/Credit, and 6.5% 3-Month Treasury Bills; from July 2021 to June 2022 the composition is 75% MSCI ACWI, 18% Bloomberg 1-3 Year Gov/Credit, and 7% 3-Month Treasury Bills; from July 2022 to present the composition is 75.5% MSCI ACWI, 17% Bloomberg 1-3 Year Gov/Credit, and 7.5% 3-Month Treasury Bills.

## Total Fund Quarterly Attribution

	CCCERA Total Fund			Simple Target Index			Analysis		
	Allocation	Return	Contribution	Allocation	Return	Contribution	Allocation Difference	Return Difference	Total Effect
Liquidity	15.9%	1.5%	0.2%	17.0%	1.5%	0.3%	-1.1%	0.0%	0.0%
Growth	75.6%	3.0%	2.2%	75.5%	7.3%	5.5%	0.1%	-4.3%	-3.3%
Risk Diversifying	7.5%	1.3%	0.1%	7.5%	1.1%	0.1%	0.0%	0.3%	0.0%
Overlay	1.0%	-2.1%	0.0%	0%	0%	0%	1.0%	-2.1%	0.0%
Total Fund	100%		2.6%	100%		5.9%	-0.1%		-3.3%

## CCCERA Total Fund Performance vs. Simple Target Index

	One Year		Three Years		Five Years		Ten Years	
	CCCERA	STI	CCCERA	STI	CCCERA	STI	CCCERA	STI
Return	-4.9	-5.0	8.1	10.5	5.0	5.5	6.5	5.9
Volatility	11.0	18.5	9.5	14.3	9.8	14.5	7.5	10.9
Sharpe	<b>-0.7</b>	<b>-0.4</b>	<b>0.7</b>	<b>0.7</b>	<b>0.4</b>	<b>0.3</b>	<b>0.8</b>	<b>0.5</b>

The Simple Target Index is made up of 75.5% MSCI ACWI, 17% Bloomberg 1-3 Year Gov/Credit, and 7.5% 3-Month Treasury Bill. This purpose of this index is to examine whether CCCERA is being rewarded for pursuing a more nuanced portfolio versus a very simple representative portfolio.

CCCERA's Total Fund has produced solid risk adjusted returns over all trailing time periods and has produced a strong absolute return over the past ten years. The Total Fund has lagged the STI over the trailing three and five-year periods. This primarily reflects challenges within the publicly traded equity investments (most notably in emerging markets). The long-term track record indicates that CCCERA has been rewarded over time for engaging in more complex investments which target outperformance versus investing passively in the publicly traded market even though these more complex structures.

The Sharpe ratio is a measure of risk adjusted returns which shows the amount of return a portfolio earns above the risk-free rate per unit of volatility. The Total Fund has matched or exceeded the Sharpe ratio relative to the Simple Target Index over all trailing time periods, indicating that CCCERA is being favorably rewarded for the level of risk taken in the portfolio.



**PERSPECTIVES  
THAT DRIVE  
ENTERPRISE  
SUCCESS**



**MAY 2023**

Strategic Asset Allocation Review

**Contra Costa County Employees' Retirement Association**

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[VERUSINVESTMENTS.COM](http://VERUSINVESTMENTS.COM)

SEATTLE 206.622.3700

CHICAGO 312.815.5228

PITTSBURGH 412.784.6678

LOS ANGELES 310.297.1777

SAN FRANCISCO 415.362.3484

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# Introduction

- When CCCERA’s FFP strategy was initially adopted in December 2015, it was agreed the Plan’s asset allocation would be reviewed annually
- Other than small adjustments to the liquidity pool to meet liquidity targets, the only substantive change since the inception of FFP was to reduce benefit payment coverage from 4 years to 3 in favor of higher long-term growth prospects
- Given significant changes to the investment landscape, this year we have conducted a more holistic review of market risk and potential implications on CCCERA’s Strategic Asset Allocation

# Executive summary

## Objective

- Assess CCCERA’s strategic asset allocation to identify potential improvement opportunities

## Observations / Comments

- The current strategic asset allocation remains broadly appropriate considering the current investment environment of heightened risk, including:
  - Higher rates
  - Stubborn inflation
  - Waning economic growth
  - Increased geopolitical tension
- Modest adjustments biased towards simplicity may also be considered

## Recommendations

- Adjust CCCERA’s Strategic Asset Allocation to reflect higher rate environment and potentially higher tail-risk
  - Reduction in EM Equity
  - Continuing on the path to long-term private markets targets
  - Slight increase in Risk Parity and/or Credit



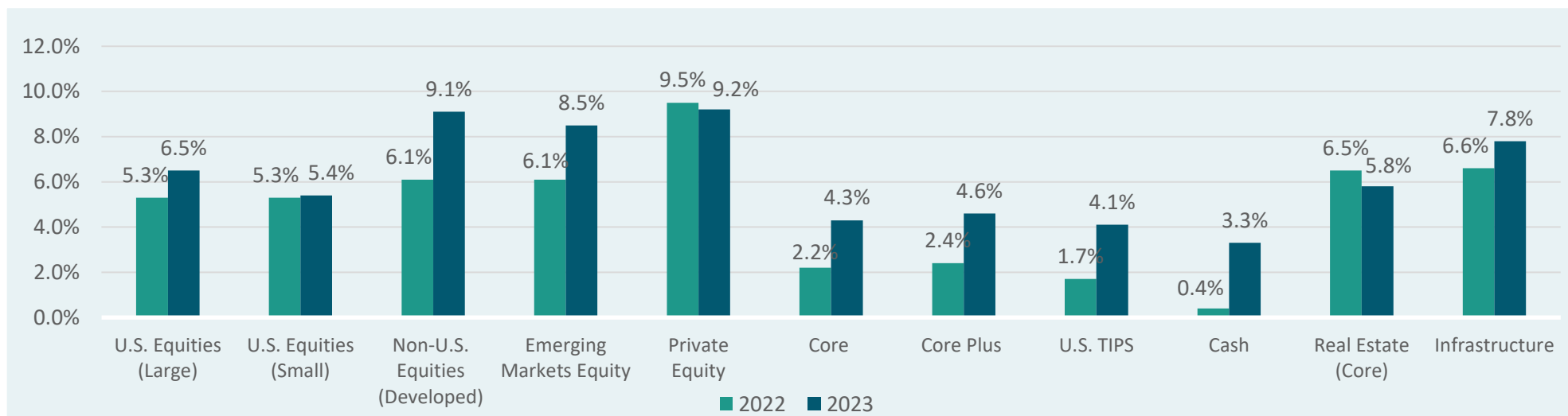
# Background

# The return of simplicity

**Simplicity** is one of the key tenets of Verus' investment philosophy, i.e., an investment program should be as complex as necessary and as simple as possible.

- Over the past few years, simple solutions have been difficult to implement effectively, with low capital market expectations encouraging some to reach for yield and complexity.
- However, the recent repricing of interest rates and risk markets materially changes this, and simple solutions may be practicable again.

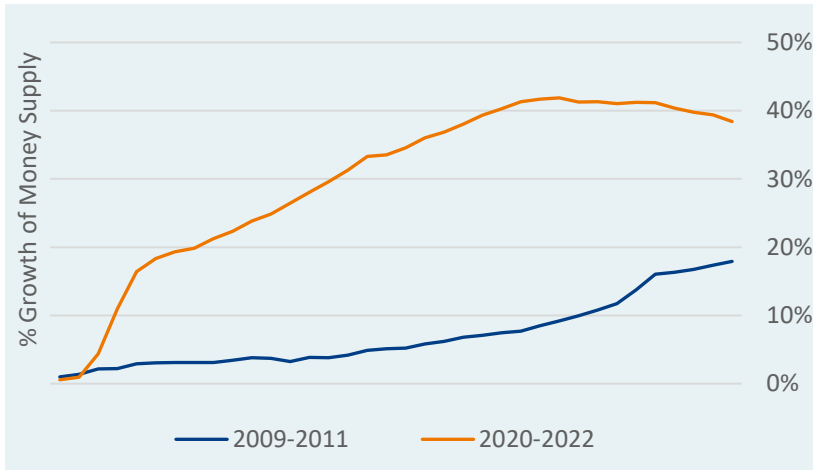
VERUS 10-YEAR CAPITAL MARKET ASSUMPTIONS 2022 VS. 2023



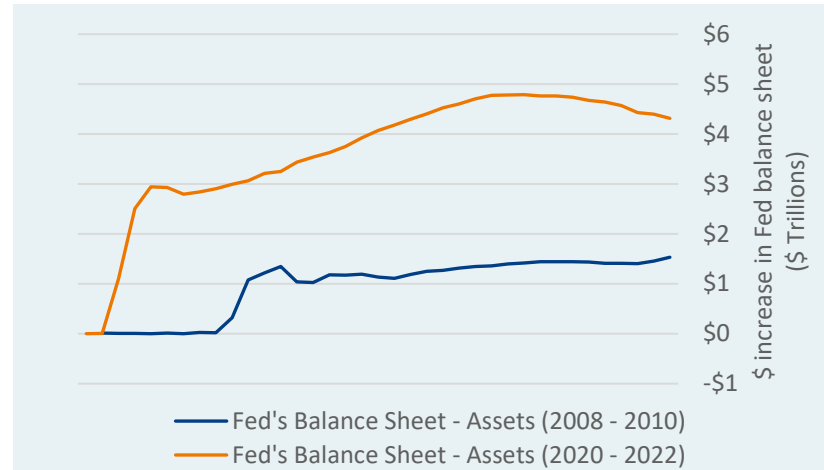
Source: Verus Capital Market Assumptions

# A tale of two crises

CHANGE IN MONEY SUPPLY (M2)



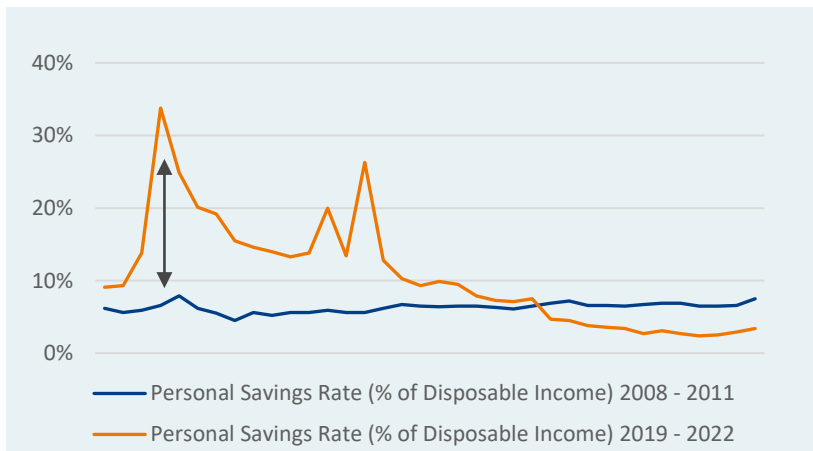
FED BALANCE SHEET



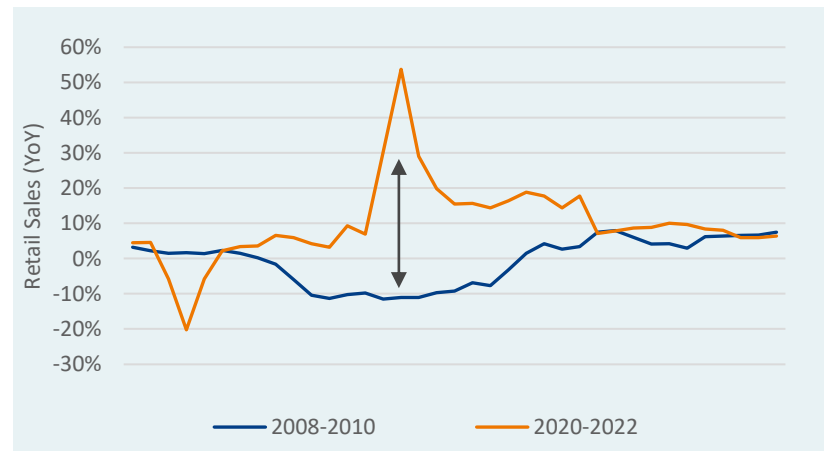
The 2008-2009 Global Financial Crisis was met with vast liquidity to the financial system

The COVID-19 Crisis was met with vast liquidity to households and the financial system

SAVING RATES

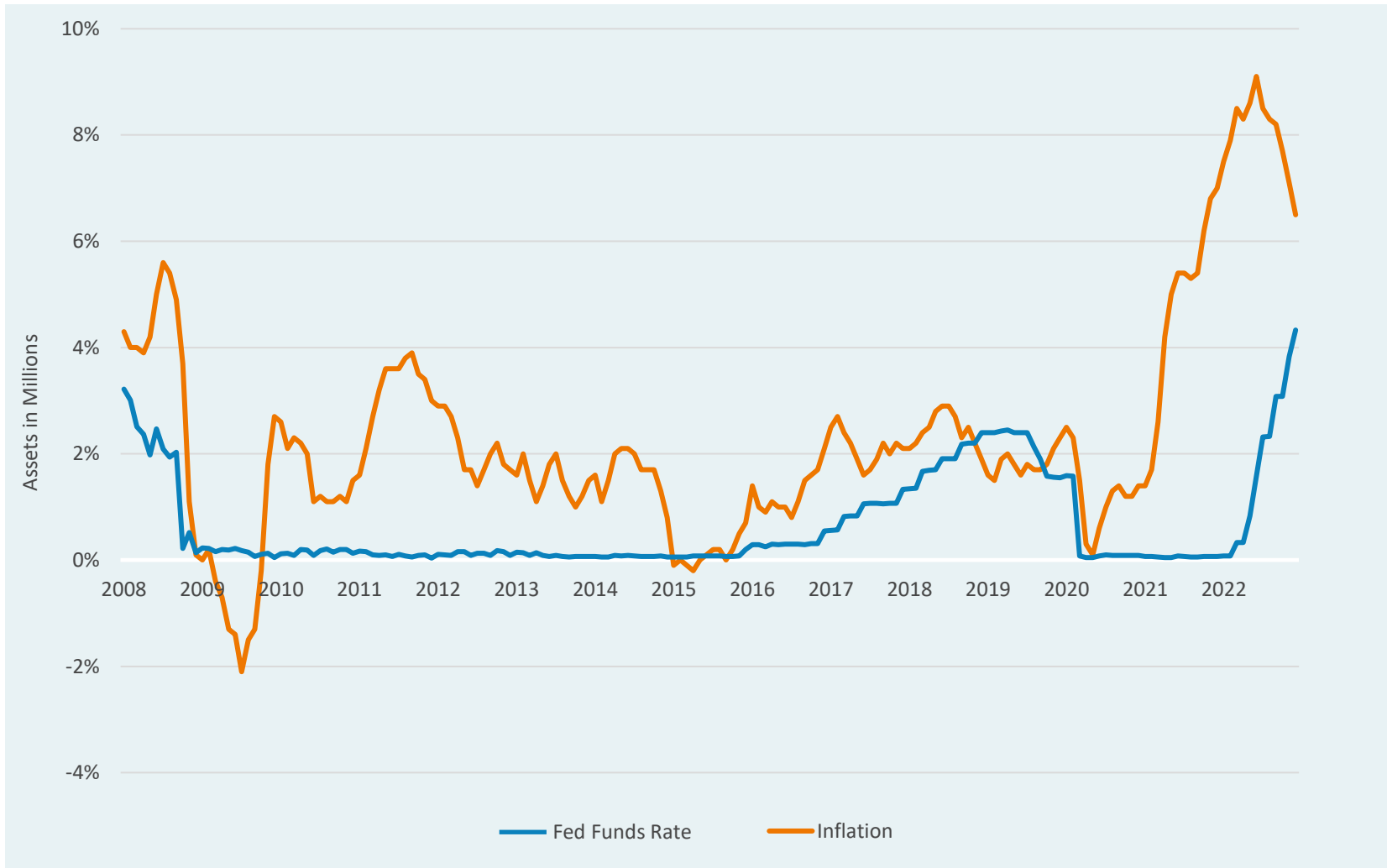


TOTAL CONSUMER SPENDING



Source: FRED

# Rates and inflation

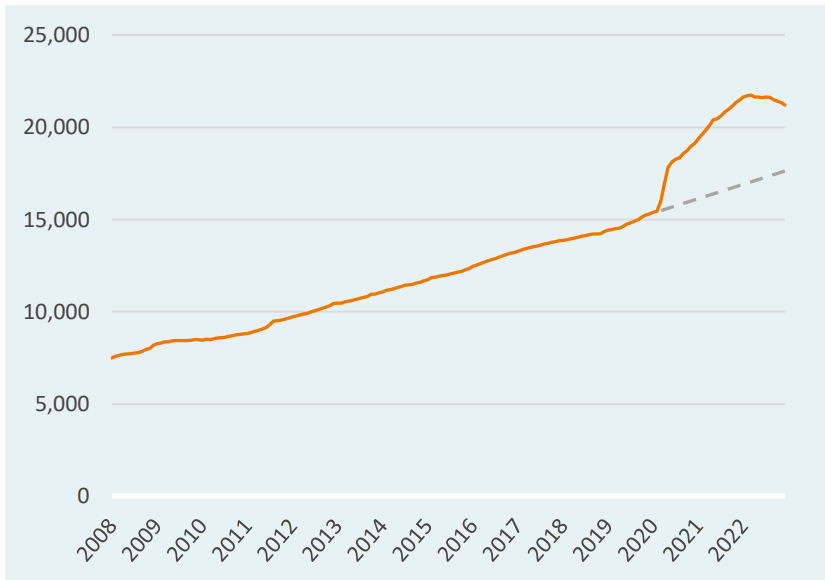


Although we are past cyclical peak inflation, we are still significantly above the Fed's target inflation rate, and the Fed is expected to keep interest rates high to relieve inflationary pressures

As of 12/31/22

# The proverbial punch bowl

M2 MONEY SUPPLY (\$ billions)

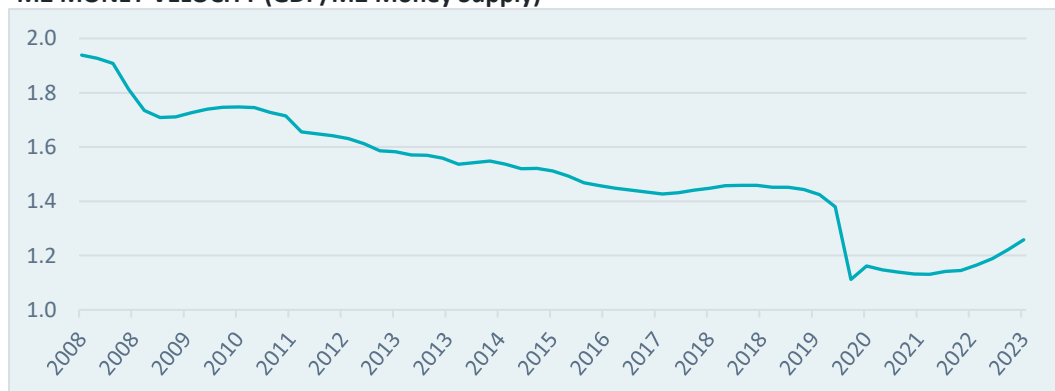


M2 MONEY SUPPLY (year-over-year growth rate)



Following strong money supply growth during the Global Pandemic, growth has slowed significantly and even declined, which could have a chilling effect on economic activity

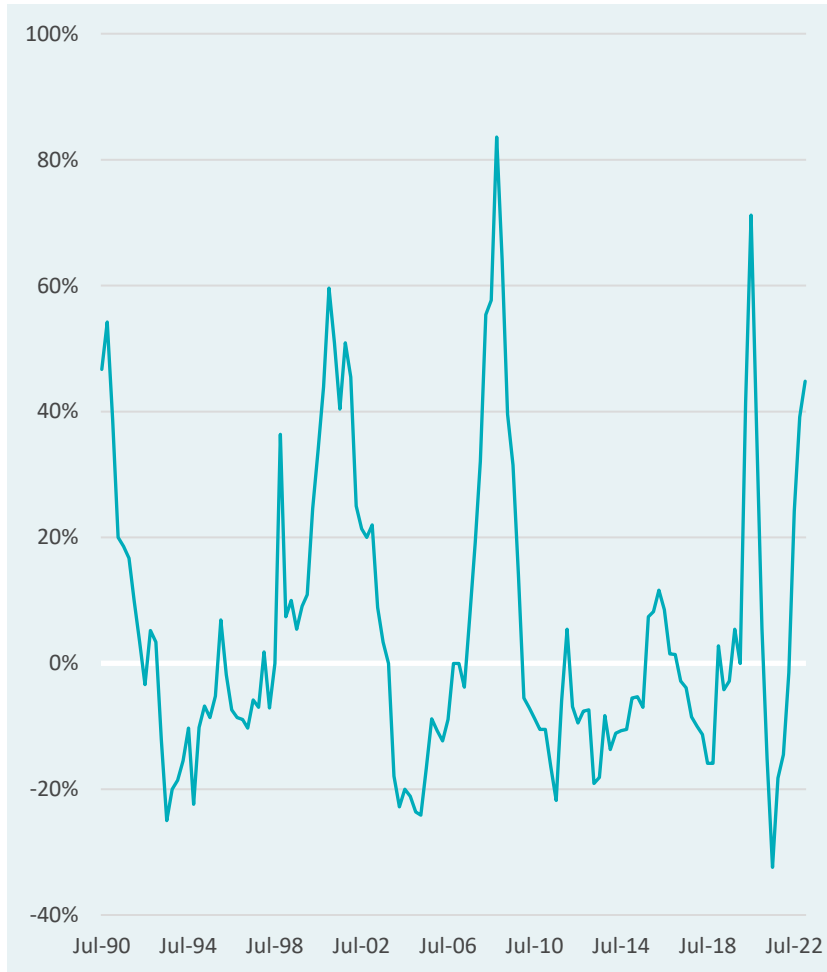
M2 MONEY VELOCITY (GDP/M2 Money Supply)



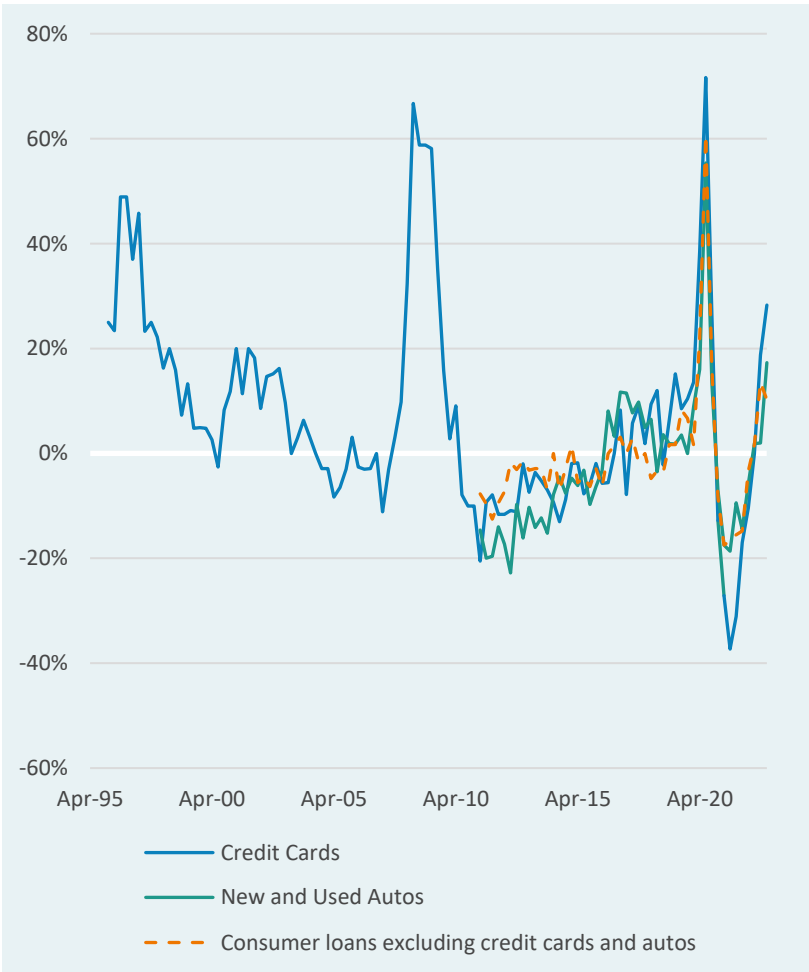
Source: Federal Reserve

# What about the banks?

PERCENTAGE OF SENIOR LOAN OFFICERS TIGHTENING LENDING STANDARDS TO MID-LARGE FIRMS



PERCENTAGE OF SENIOR LOAN OFFICERS TIGHTENING LENDING STANDARDS ON CONSUMER LOANS



Challenges in the banking sector are leading to tighter lending standards, which may exacerbate headwinds to economic growth

Source: Federal Reserve

# A riskier world?

The pace, scope, scale, and sophistication of cyber attacks are increasing. Repeated attacks could cause significant damage and disruption that could spill over to financial markets and the economy.

Russia's invasion of Ukraine is the largest, most dangerous military conflict in Europe since WWII. Russia and Ukraine are both pursuing spring offensives, likely leading to an extended war of attrition. Intentional or accidental escalation between NATO and Russia remains a risk.

U.S.-China relations are deteriorating, and Taiwan remains the most volatile flashpoint between the US and China. China continues to demonstrate a willingness and intention to take a range of steps to pressure Taiwan, presenting risks for investors.

The U.S. administration has underscored the growing risk of domestic terrorism within a polarized U.S. political backdrop.



Al-Qaida has reorganized under new leadership and ISIS is resurgent in Afghanistan and Syria, increasing the risk of attacks on western targets domestically and abroad.

The risk of military action in the Gulf region is at its highest point in a decade. The closer Iran gets to having a nuclear weapon, the higher the likelihood of military conflict. Domestic pressures in Israel have increased this risk.

Source: BlackRock

# Current risk environment

## Inflation

- Annualized inflation peaked in June 2021 at 9.1%
- Steady reduction to 4.9% as of April 30
- Market expects 1-year inflation of 2.7% and 5-year inflation of 2.2%<sup>1</sup>

## Rates

- Rates have generally followed inflation up as Fed is using higher rates to tame inflation
- Fed Funds Rate has increased 10 times from 0% to 5.0% since Mar '22
- 10-year Treasury peaked at 4.2%, off low of 0.54%. Currently at 3.5% as of mid-May<sup>2</sup>
- Inverted yield curve

## Growth

- Economy remains reasonably strong (employment, personal and corporate balance sheets, retail spending)
- But cracks are emerging (credit card debt, lower consumer sentiment, employment, earnings, lending)
- Q1 annualized growth came in at 1.1% and economists are forecasting Q4 annualized growth at -1.2%<sup>2</sup>

## Geopolitics

- Divisive environment globally
- Russia / Ukraine
- China / Taiwan
- Increased tail risk (but impossible to quantify)

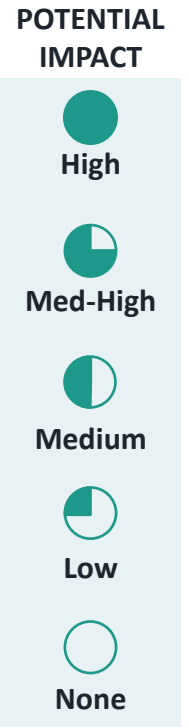
<sup>1</sup>Source: Federal Reserve Bank of Cleveland

<sup>2</sup>Source: Bloomberg



# Asset class impact

Asset Class	Inflation	Rates	Growth	Geopolitical Heat
Domestic Equity				
Int'l Developed Equity				
EM Equities				
Private Equity				
Treasuries				
TIPS				
Investment Grade Credit				
High Yield Credit				
Bank Loans				
Private Credit				
Private Real Estate				
Hedge Funds				
Commodities				
Risk Parity				



# Emerging markets

## Is the juice worth the squeeze?

### OPPORTUNITIES

- Recent higher interest rates have leveled the playing field and presented opportunities for companies where fundamentals are more important than liquidity-driven growth
- This should be an environment where good active managers can outperform

### THREATS

- China
  - Geopolitical and economic tension between the U.S. and China are on the rise
  - Economic growth following Covid lockdown has been lackluster
  - De-globalization and onshoring in the U.S. brings further risk to potential growth
  - Demographic challenges related to China's decades-long one child policy may lead to long-term challenges
  - China makes up more than 30% of the MSCI EME index
- Other
  - High growth beta implies EM will be hurt more by slowing global economy

# Strategic asset allocation review

# Excerpts from Verus' 2023 Capital Market Assumptions

# 10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
<b>Equities</b>								
U.S. Large	S&P 500	6.5%	7.6%	15.6%	0.21	0.28	0.76	0.79
U.S. Small	Russell 2000	5.4%	7.5%	21.5%	0.10	0.20	0.42	0.49
International Developed	MSCI EAFE	9.1%	10.5%	17.8%	0.33	0.40	0.21	0.27
International Small	MSCI EAFE Small Cap	9.2%	11.3%	22.1%	0.27	0.36	0.29	0.36
Emerging Markets	MSCI EM	8.5%	11.2%	25.2%	0.21	0.31	0.02	0.10
Global Equity	MSCI ACWI	7.4%	8.7%	17.1%	0.23	0.32	0.47	0.52
Global Equity ex-US	MSCI ACWI ex-US	9.0%	10.7%	19.9%	0.29	0.37	0.16	0.23
Private Equity	CA U.S. Private Equity	9.2%	12.1%	25.8%	0.23	0.34	-	-
Private Equity Direct	CA U.S. Private Equity	10.2%	13.0%	25.8%	0.27	0.38	-	-
Private Equity (FoF)	CA U.S. Private Equity	8.2%	11.1%	25.8%	0.19	0.30	-	-
<b>Fixed Income</b>								
Cash	30 Day T-Bills	3.3%	3.3%	1.2%	-	-	-	-
U.S. TIPS	Bloomberg U.S. TIPS 5-10	4.1%	4.3%	5.6%	0.14	0.18	0.06	0.08
U.S. Treasury	Bloomberg Treasury 7-10 Year	3.8%	4.0%	7.1%	0.07	0.10	(0.02)	0.01
Long U.S. Treasury	Bloomberg Treasury 20+ Year	3.8%	4.6%	13.2%	0.04	0.10	(0.01)	0.05
Global Sovereign ex U.S.	Bloomberg Global Treasury ex U.S.	2.2%	2.7%	10.0%	(0.11)	(0.06)	(0.47)	(0.44)
Global Aggregate	Bloomberg Global Aggregate	3.0%	3.2%	6.7%	(0.05)	(0.01)	(0.30)	(0.28)
Core Fixed Income	Bloomberg U.S. Aggregate Bond	4.3%	4.4%	4.6%	0.22	0.24	0.05	0.07
Core Plus Fixed Income	Bloomberg U.S. Universal	4.6%	4.7%	4.6%	0.28	0.30	0.17	0.14
Short-Term Gov't/Credit	Bloomberg U.S. Gov't/Credit 1-3 Year	3.9%	4.0%	3.7%	0.16	0.19	0.11	0.11
Short-Term Credit	Bloomberg Credit 1-3 Year	4.3%	4.4%	3.7%	0.27	0.30	0.40	0.40
Long-Term Credit	Bloomberg Long U.S. Credit	5.3%	5.9%	11.0%	0.18	0.24	0.11	0.16
High Yield Corp. Credit	Bloomberg U.S. Corporate High Yield	6.4%	7.0%	11.2%	0.28	0.33	0.44	0.47
Bank Loans	S&P/LSTA Leveraged Loan	6.8%	7.2%	9.2%	0.38	0.42	0.53	0.54
Global Credit	Bloomberg Global Credit	4.5%	4.8%	7.9%	0.15	0.19	0.00	0.03
Emerging Markets Debt (Hard)	JPM EMBI Global Diversified	8.9%	9.4%	10.7%	0.52	0.57	0.05	0.09
Emerging Markets Debt (Local)	JPM GBI-EM Global Diversified	7.0%	7.7%	12.3%	0.30	0.36	(0.28)	(0.23)
Private Credit	S&P LSTA Leveraged Loan Index	8.2%	9.0%	13.0%	0.38	0.44	-	-
Private Credit (Direct Lending - Unlevered)	S&P LSTA Leveraged Loan Index	6.8%	7.2%	9.2%	0.38	0.42	-	-
Private Credit (Direct Lending - Levered)	S&P LSTA Leveraged Loan Index	9.1%	10.1%	15.3%	0.38	0.44	-	-
Private Credit (Credit Opportunities)	S&P LSTA Leveraged Loan Index	8.5%	9.4%	13.8%	0.38	0.44	-	-
Private Credit (Junior Capital / Mezzanine)	S&P LSTA Leveraged Loan Index	9.0%	10.0%	15.1%	0.38	0.44	-	-
Private Credit (Distressed)	S&P LSTA Leveraged Loan Index	9.1%	12.7%	29.1%	0.20	0.32	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

# 10-year return & risk assumptions

Asset Class	Index Proxy	Ten Year Return Forecast		Standard Deviation Forecast	Sharpe Ratio Forecast (g)	Sharpe Ratio Forecast (a)	10-Year Historical Sharpe Ratio (g)	10-Year Historical Sharpe Ratio (a)
		Geometric	Arithmetic					
<b>Other</b>								
Commodities	Bloomberg Commodity	5.7%	6.9%	16.3%	0.15	0.22	(0.20)	(0.13)
Hedge Funds	HFRI Fund Weighted Composite	4.6%	4.9%	7.7%	0.17	0.21	0.70	0.71
Hedge Fund of Funds	HFRI Fund of Funds Composite	3.6%	3.9%	7.7%	0.04	0.08	-	-
Hedge Funds (Equity Style)	Custom HFRI Benchmark Mix*	7.4%	8.4%	14.6%	0.28	0.35	-	-
Hedge Funds (Credit Style)	Custom HFRI Benchmark Mix*	7.1%	7.5%	9.8%	0.39	0.43	-	-
Hedge Funds (Asymmetric Style)	Custom HFRI Benchmark Mix*	4.8%	4.9%	4.8%	0.31	0.33	-	-
Real Estate Debt	Bloomberg CMBS IG	5.2%	5.5%	7.5%	0.25	0.29	0.26	0.28
Core Real Estate	NCREIF Property	5.8%	6.5%	12.6%	0.20	0.25	1.94	1.87
Value-Add Real Estate	NCREIF Property + 200bps	7.8%	8.9%	15.5%	0.29	0.36	-	-
Opportunistic Real Estate	NCREIF Property + 300bps	8.8%	10.8%	21.3%	0.26	0.35	-	-
REITs	Wilshire REIT	5.8%	7.5%	19.4%	0.13	0.22	0.32	0.40
Global Infrastructure	S&P Global Infrastructure	7.8%	9.1%	17.3%	0.26	0.34	0.28	0.35
Risk Parity**	S&P Risk Parity 10% Vol Index	8.3%	8.8%	10.0%	0.50	0.55	-	-
Currency Beta	MSCI Currency Factor Index	1.6%	1.7%	3.4%	(0.49)	(0.46)	0.20	0.21
Inflation		2.5%	-	-	-	-	-	-

Investors wishing to produce expected geometric return forecasts for their portfolios should use the arithmetic return forecasts provided here as inputs into that calculation, rather than the single-asset-class geometric return forecasts. This is the industry standard approach, but requires a complex explanation only a heavy quant could love, so we have chosen not to provide further details in this document – we will happily provide those details to any readers of this who are interested.

\*To represent hedge fund styles, we use a combination of HFRI benchmarks: Equity Style = 33% HFRI Fundamental Growth, 33% HFRI Fundamental Value, 33% HFRI Activist. Credit Style = 20% HFRI Distressed/Restructuring, 20% HFRI Credit Arbitrage, 20% HFRI Fixed Income-Corporate, 20% HFRI Fixed Income-Convertible Arbitrage, 20% HFRI Fixed Income-Asset Backed. Asymmetric Style = 50% HFRI Relative Value, 50% HFRI Macro

\*\*The Risk Parity forecast shown here assumes a 10% target volatility strategy. We recommend customizing this forecast to the target volatility specifications of the risk parity strategy that an investor wishes to model. Please speak with your Verus consultant for customization needs.

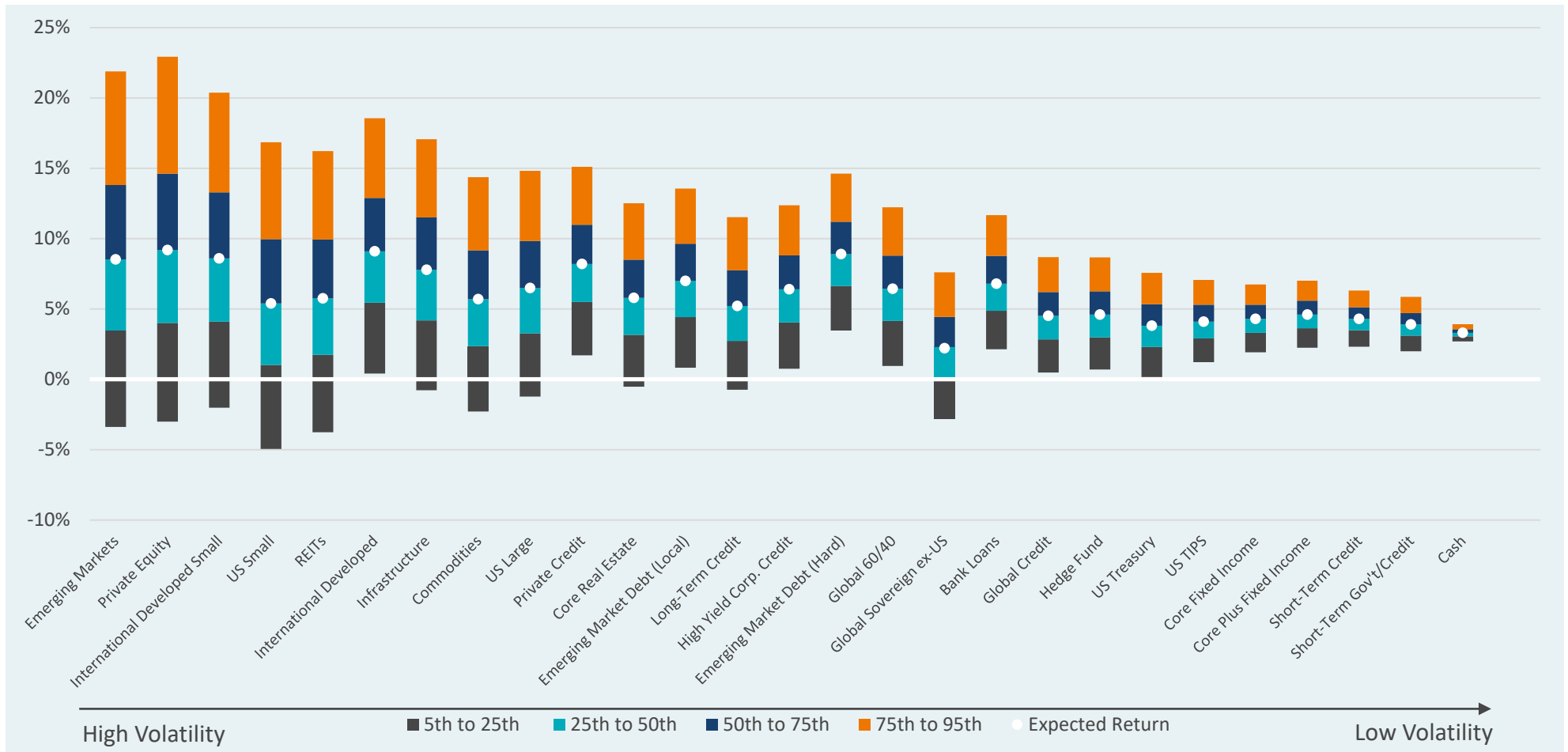
# Correlation assumptions

	Cash	US Large	US Small	Intl Large	Intl Small	EM	Global Equity	PE	US TIPS	US Treasury	Global Sovereign ex-US	US Core	Core Plus	Short-Term Gov't/Credit	Short-Term Credit	Long-Term Credit	US HY	Bank Loans	Global Credit	EMD USD	EMD Local	Commodities	Hedge Funds	Real Estate	REITs	Infrastructure	Risk Parity	Currency Beta		
Cash	1.0																													
US Large	-0.2	1.0																												
US Small	-0.2	0.9	1.0																											
Intl Large	-0.2	0.9	0.8	1.0																										
Intl Small	-0.3	0.9	0.8	1.0	1.0																									
EM	-0.2	0.7	0.6	0.8	0.8	1.0																								
Global Equity	-0.2	1.0	0.9	1.0	0.9	0.8	1.0																							
PE	-0.2	0.7	0.6	0.6	0.6	0.6	0.7	1.0																						
US TIPS	0.0	0.4	0.3	0.4	0.4	0.4	0.4	0.2	1.0																					
US Treasury	0.2	0.0	-0.1	0.0	0.0	0.0	0.0	-0.2	0.8	1.0																				
Global Sovereign ex-US	0.1	0.0	-0.2	-0.1	-0.1	0.0	-0.1	-0.2	0.7	0.9	1.0																			
US Core	0.0	0.3	0.2	0.4	0.4	0.5	0.4	0.1	0.7	0.6	0.5	1.0																		
Core Plus	0.1	0.3	0.2	0.3	0.3	0.3	0.3	0.0	0.8	0.9	0.9	0.7	1.0																	
Short-Term Gov't/Credit	0.0	0.4	0.3	0.4	0.4	0.4	0.4	0.1	0.9	0.8	0.8	0.7	1.0	1.0																
Short-Term Credit	0.2	0.1	0.1	0.2	0.2	0.2	0.2	-0.1	0.7	0.8	0.6	0.6	0.8	0.8	1.0															
Long-Term Credit	0.0	0.4	0.4	0.5	0.5	0.5	0.5	0.0	0.7	0.5	0.4	0.6	0.8	0.8	0.8	1.0														
US HY	0.0	0.5	0.4	0.5	0.5	0.5	0.5	0.1	0.7	0.6	0.7	0.6	0.8	0.9	0.6	0.7	1.0													
Bank Loans	-0.2	0.8	0.8	0.8	0.8	0.7	0.8	0.5	0.5	0.1	0.1	0.5	0.4	0.6	0.3	0.7	0.6	1.0												
Global Credit	-0.3	0.6	0.7	0.6	0.7	0.6	0.7	0.5	0.3	-0.2	-0.2	0.2	0.1	0.3	0.0	0.5	0.4	0.8	1.0											
EMD USD	-0.1	0.6	0.5	0.7	0.7	0.7	0.7	0.4	0.6	0.3	0.3	0.6	0.6	0.7	0.4	0.7	0.7	0.8	0.7	1.0										
EMD Local	0.0	0.5	0.4	0.7	0.6	0.8	0.6	0.4	0.5	0.2	0.1	0.6	0.4	0.5	0.3	0.5	0.5	0.7	0.5	0.8	1.0									
Commodities	-0.2	0.4	0.4	0.5	0.5	0.5	0.5	0.3	0.2	-0.3	-0.3	0.2	-0.1	0.0	-0.1	0.2	0.1	0.5	0.5	0.3	0.4	1.0								
Hedge Funds	-0.2	0.8	0.9	0.9	0.9	0.8	0.9	0.6	0.3	-0.2	-0.2	0.3	0.1	0.3	0.0	0.5	0.4	0.8	0.8	0.7	0.6	0.5	1.0							
Real Estate	-0.2	0.6	0.5	0.5	0.5	0.4	0.6	0.4	0.2	-0.1	-0.1	0.2	0.0	0.1	-0.1	0.1	-0.1	0.4	0.4	0.4	0.4	0.3	0.5	1.0						
REITs	-0.2	0.7	0.6	0.6	0.6	0.5	0.7	0.5	0.6	0.3	0.3	0.4	0.5	0.5	0.2	0.5	0.6	0.6	0.5	0.6	0.5	0.3	0.6	0.7	1.0					
Infrastructure	-0.2	0.8	0.7	0.8	0.8	0.7	0.8	0.7	0.5	0.1	0.0	0.5	0.3	0.5	0.2	0.5	0.6	0.8	0.7	0.7	0.7	0.5	0.8	0.3	0.7	1.0				
Risk Parity	-0.2	0.7	0.7	0.8	0.7	0.7	0.8	0.4	0.6	0.1	0.1	0.4	0.4	0.5	0.2	0.6	0.6	0.8	0.7	0.8	0.6	0.6	0.8	0.4	0.7	0.8	1.0			
Currency Beta	0.0	0.0	0.0	0.0	-0.1	-0.1	0.0	0.2	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	-0.1	0.0	0.1	0.0	0.0	0.0	0.0	1.0	

Note: as of 9/30/22 - Correlation assumptions are based on the last ten years. Private Equity and Real Estate correlations are especially difficult to model – we have therefore used BarraOne correlation data to strengthen these correlation estimates.

# Range of likely 10-year outcomes

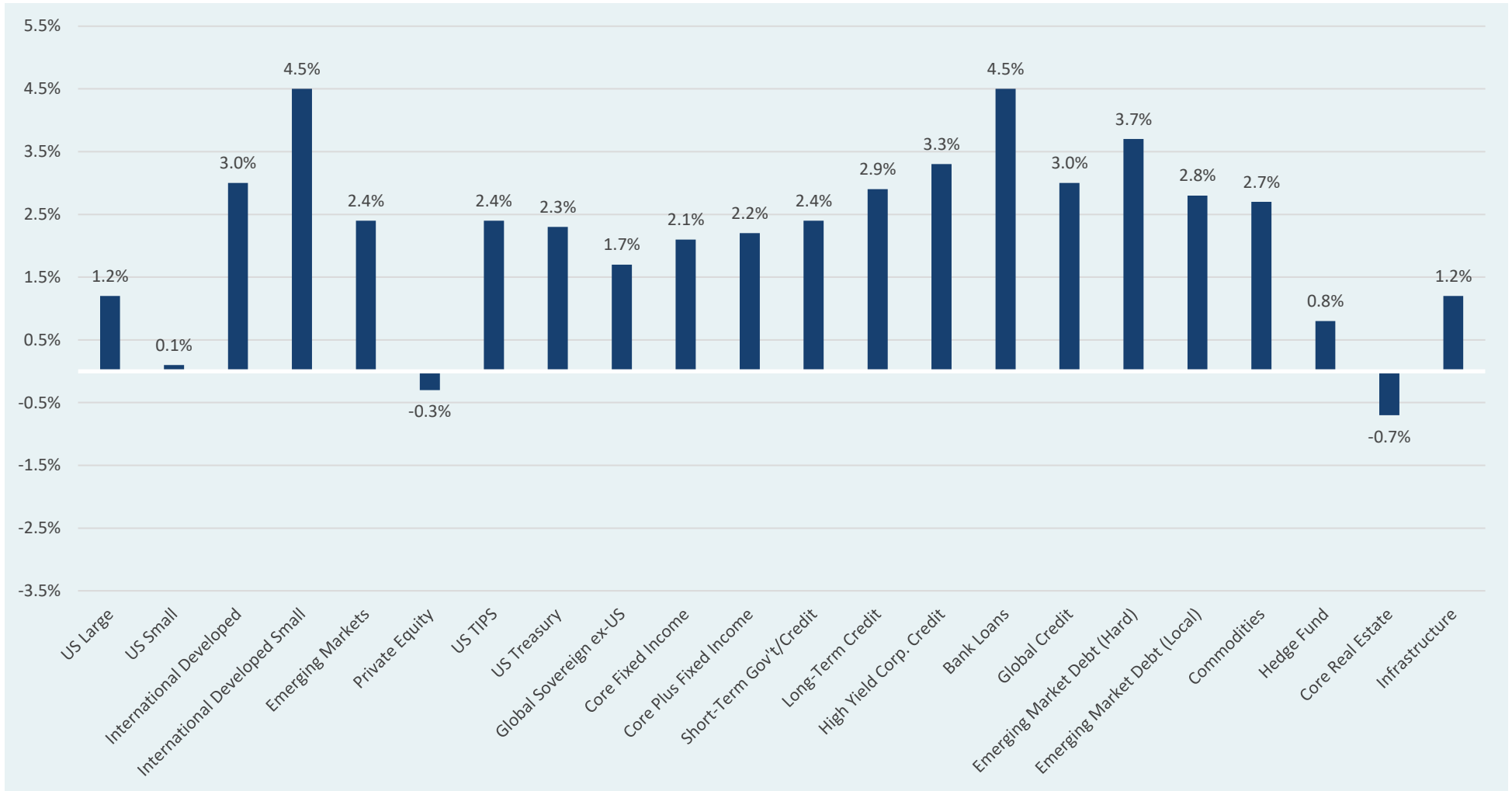
## 10-YEAR RETURN 90% CONFIDENCE INTERVAL



Source: Verus, MPI



# 2023 vs. 2022 return forecast



Source: Verus, as of 9/30/22

# Asset allocation review

# Mean variance analysis

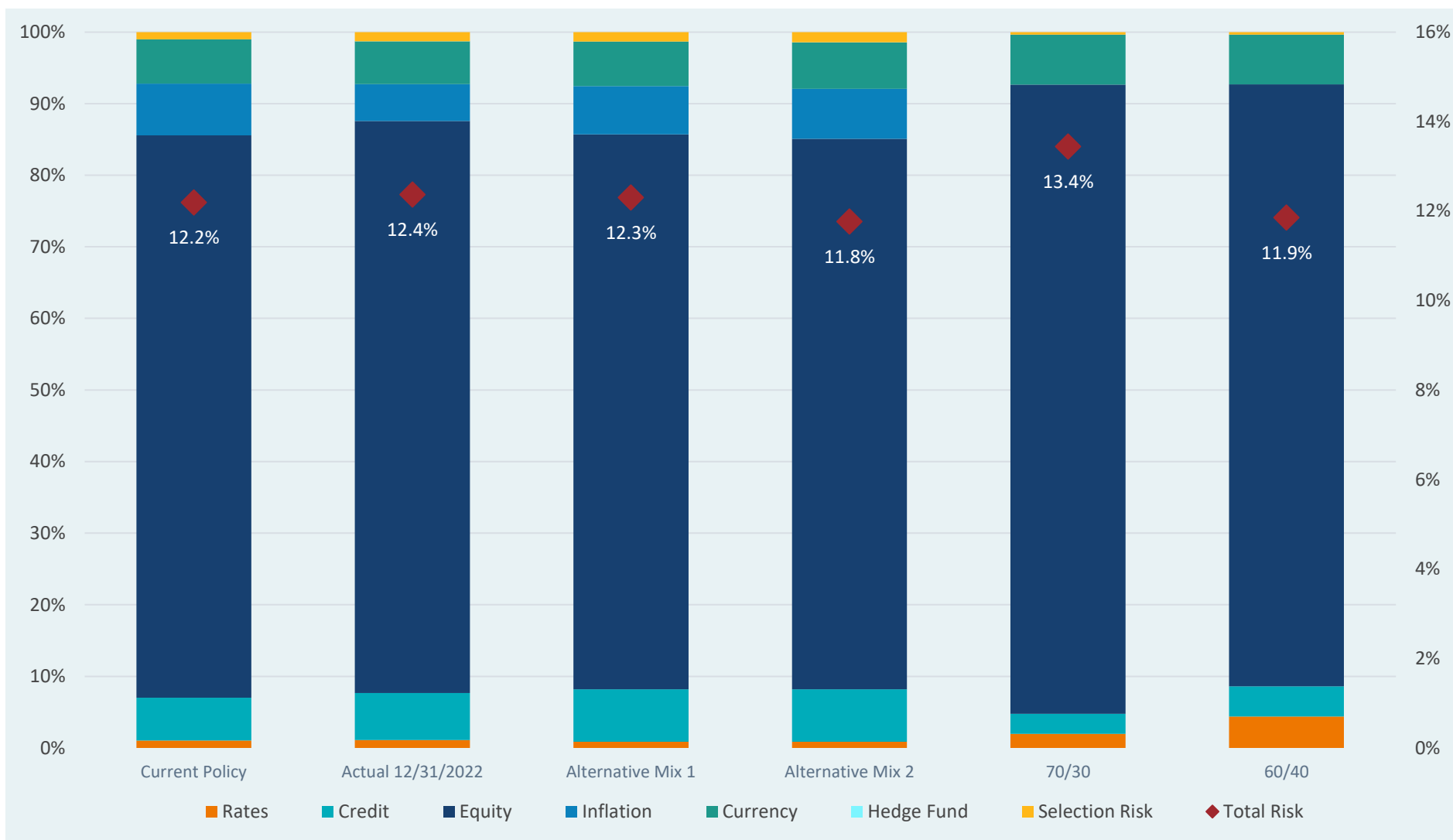
Verus  
2023 Midyear CMA's (10 Yr)

	Current Policy	Actual 12-31-22	Alternative Mix 1	Alternative Mix 2	70/30	60/40	Return (g)	Return (a)	Standard Deviation	Sharpe Ratio (a)
US Large	13.0	12.2	12.0	11.0	0.0	0.0	6.2	7.3	15.6	0.18
US Small	3.0	3.8	3.0	3.0	0.0	0.0	6.1	8.2	21.5	0.17
International Developed	8.0	8.0	10.0	9.0	0.0	0.0	7.9	9.3	17.8	0.27
Emerging Markets	8.0	6.5	4.0	4.0	0.0	0.0	7.3	10.1	25.2	0.22
Global Equity	9.0	9.3	9.0	8.0	70.0	60.0	6.9	8.2	17.1	0.22
Private Equity	11.0	13.0	13.0	13.0	0.0	0.0	8.6	11.5	25.8	0.27
Private Credit	8.0	10.0	10.0	10.0	0.0	0.0	9.8	10.8	15.3	0.41
Opportunistic Credit	0.0	0.0	0.0	5.0	0.0	0.0	8.1	8.5	9.8	0.41
REITs	2.0	1.8	2.0	2.0	0.0	0.0	6.5	8.2	19.4	0.19
Value Add Real Estate	4.0	2.9	4.0	4.0	0.0	0.0	8.5	9.6	15.5	0.33
Opportunistic Real Estate	4.0	2.9	4.0	4.0	0.0	0.0	9.5	11.5	21.3	0.33
Infrastructure	0.0	0.0	0.0	0.0	0.0	0.0	7.6	9.0	17.3	0.26
High Yield Corp. Credit	2.0	1.4	0.0	0.0	0.0	0.0	6.0	6.6	11.2	0.19
Risk Parity	3.0	3.2	5.0	3.0	0.0	0.0	9.5	10.0	10.0	0.55
<b>Total Growth</b>	<b>75</b>	<b>75</b>	<b>76</b>	<b>76</b>	<b>70</b>	<b>60</b>				
Short-Term Gov't/Credit	18.0	18.0	17.0	17.0	0.0	0.0	3.6	3.7	3.7	-0.22
<b>Total Liquidity</b>	<b>18</b>	<b>18</b>	<b>17</b>	<b>17</b>	<b>0</b>	<b>0</b>				
US Treasury	0.0	0.0	0.0	0.0	0.0	0.0	3.5	3.7	7.1	-0.11
Core Fixed Income	2.5	2.5	2.0	2.0	0.0	0.0	3.9	4.0	4.6	-0.11
Core Plus Fixed Income	0.0	0.0	0.0	0.0	30.0	40.0	4.2	4.3	4.6	-0.04
Hedge Fund	4.5	4.5	5.0	5.0	0.0	0.0	4.5	4.8	7.7	0.04
<b>Total Diversifying</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>7</b>	<b>30</b>	<b>40</b>				
<b>Total Allocation</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>	<b>100</b>				

	Current Policy	Actual 12-31-22	Alternative Mix 1	Alternative Mix 2	70/30	60/40
<b>Mean Variance Analysis</b>						
<b>Forecast 10 Year Return</b>	<b>7.4</b>	<b>7.4</b>	<b>7.6</b>	<b>7.6</b>	<b>6.3</b>	<b>6.1</b>
Standard Deviation	12.1	12.2	12.1	11.8	12.7	11.2
Return/Std. Deviation	0.6	0.6	0.6	0.6	0.5	0.5
1st percentile ret. 1 year	-17.2	-17.3	-17.0	-16.5	-19.2	-16.9
Sharpe Ratio	0.29	0.29	0.30	0.31	0.20	0.19

MPI & Verus

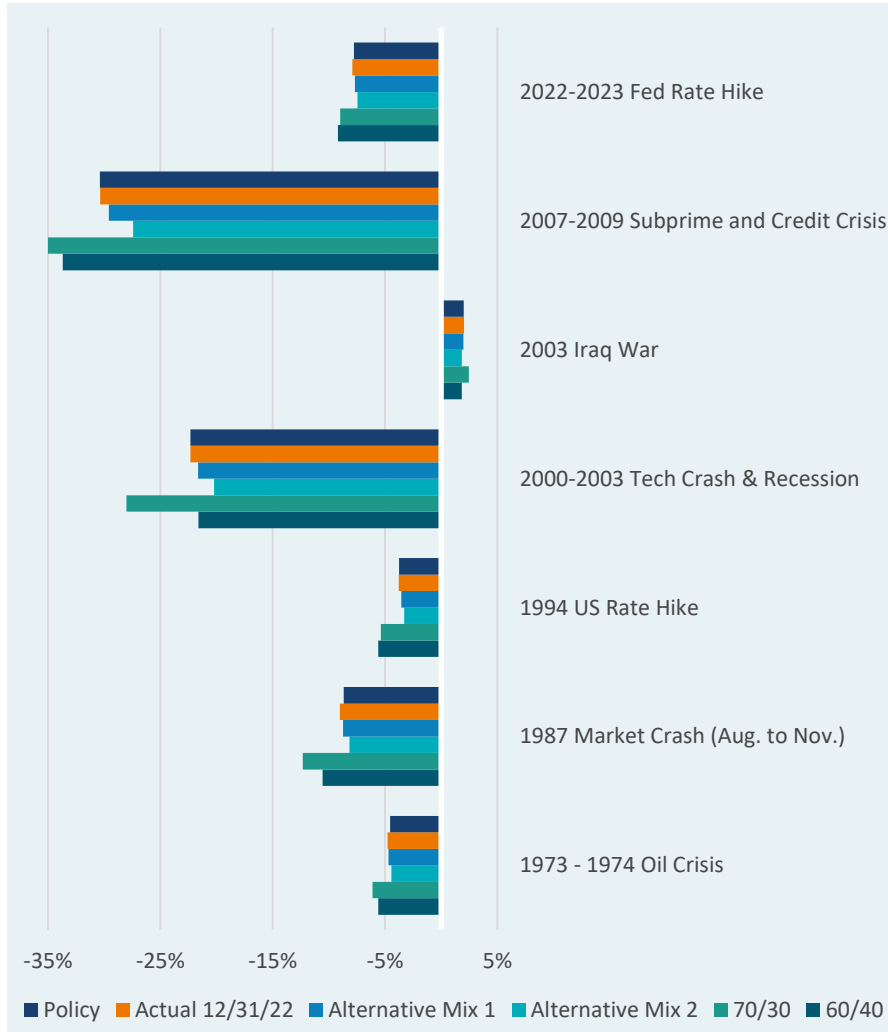
# Risk contribution



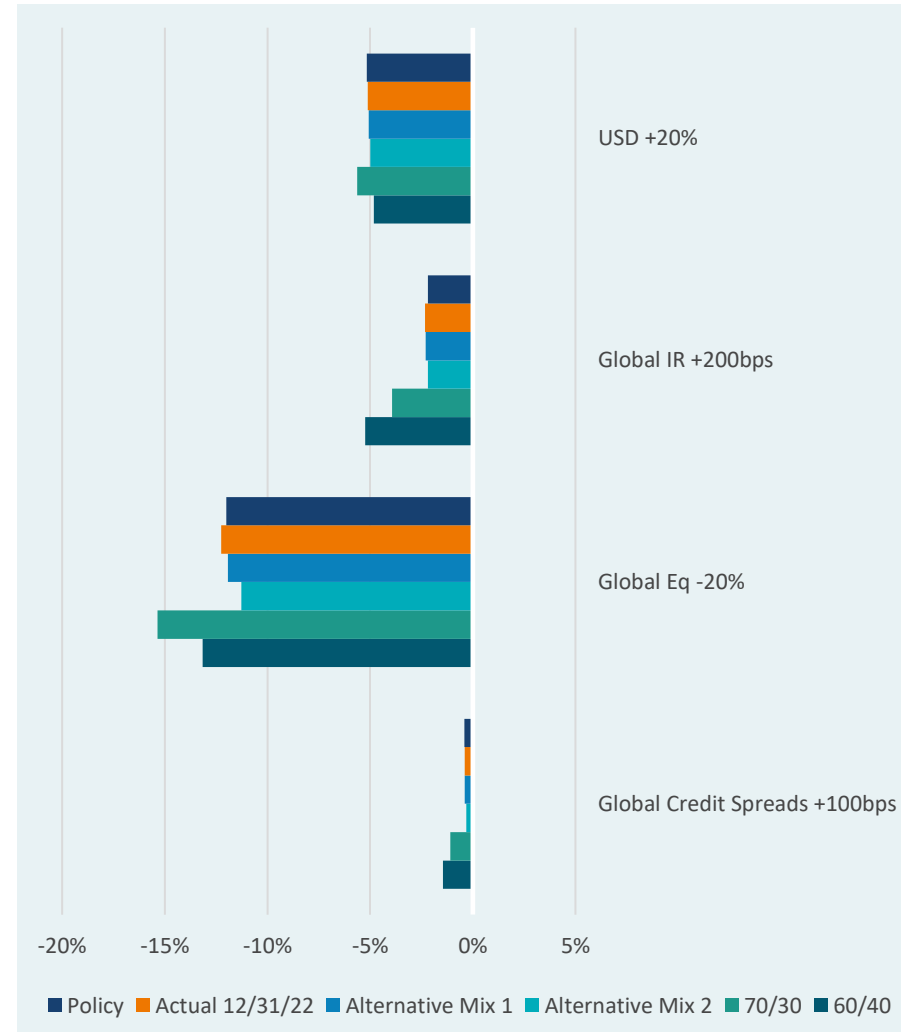
Barra; as of 3/31/22

# Scenario analysis

## HISTORICAL MARKET ENVIRONMENTS



## HYPOTHETICAL STRESS TESTS



Barra; as of 3/31/23

# Recommendations and Next Steps

## Recommendations

- Consider modest allocation adjustments, including:
  - Reduction in EM Equity
  - Continuing on the path to long-term private markets targets
  - Slight increase in Risk Parity and/or Credit

## Next Steps

- Codify in Asset Allocation Resolution to be adopted by the Board
- Develop detailed implementation plan
- Implement and monitor



Memorandum

Date: May 24, 2023

To: CCCERA Board of Retirement

From: Timothy Price, Chief Investment Officer

Subject: Update on Private Equity and Real Estate Allocations

---

**Overview**

CCCERA recently made commitments to one private equity and two real estate funds using the delegated authority granted in the Investment Policy Statement. A brief description of each fund/strategy is included below. This memo is for informational purposes only and no action is required from the Board at this time.

**Investment Policy Statement**

The CCCERA Investment Policy Statement adopted by the Board on September 28, 2016 (amended on April 24, 2019 and May 26, 2021) outlines the hiring process for new investment mandates. Commitments up to a \$150 million per strategy may be approved via a staff review process, while mandates above this threshold require approval by the Board.

**TA Associates Fund XV**

TA operates in the middle market, with investments ranging from profitable-stage minority investments to middle-market growth buyouts. TA targets control and minority transactions in companies with sustainable growth across North America, Europe, and to a lesser extent Asia in the following sectors: technology, healthcare, financial services, consumer, and business services. CCCERA committed \$90 mm to this fund.

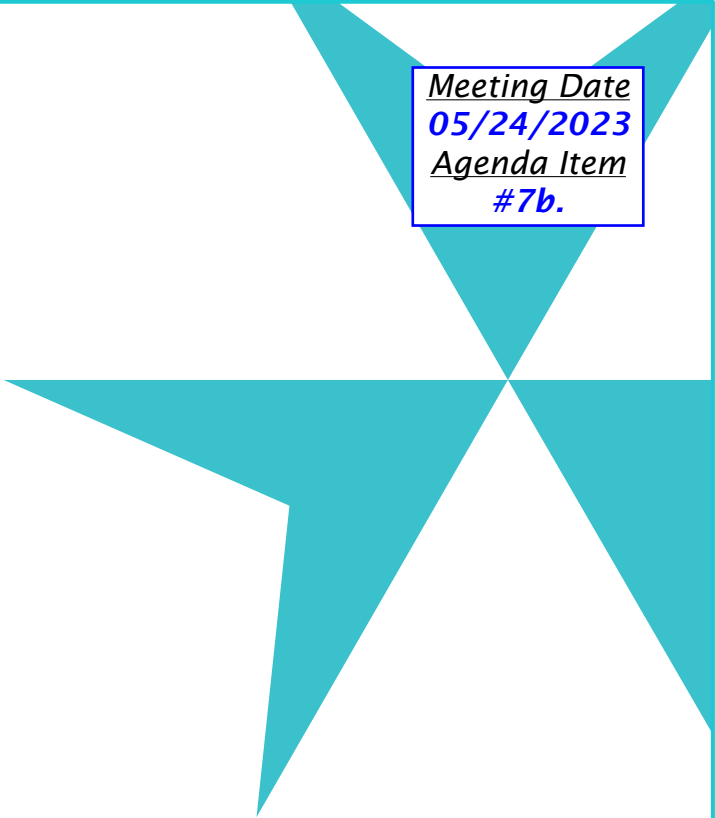
**Cross Lake Real Estate Fund IV**

Cross Lake Fund IV is a closed-end opportunistic real estate fund that targets investments in built-to-rent residential housing and community developments in the growing regions of Southwest, Mountain West, and Southeast. It can also invest in special situations such as lodging and provide rescue capital for select properties and subdivisions. CCCERA committed \$60 mm to this fund.

**Long Wharf Real Estate Partners Fund VII**

Long Wharf Fund VII is a closed-end value-add real estate fund that targets investments in small-to-mid-sized domestic assets. The fund's focus sectors are light industrial, grocery-anchored shopping centers, multi-family, and select alternative sectors such as life science labs and cold storage. CCCERA committed \$50 mm to this fund.





Meeting Date  
**05/24/2023**  
Agenda Item  
**#7b.**

CCCERA Pension Administration System (PAS)  
Modernization Project

# Segal's Board Update

May 24, 2023

# Board Recap from April 26 Meeting

- The project team reported that the project schedule had a large number of tasks delayed and thus informed the Board that the project team was reviewing different delivery options presented by Sagitec.
- CCCERA PAS Project completion percentages from the Sagitec “Re-Baselined” Project Plan as of the last Board Meeting were:

Project Phase	Completion %
Overall PAS Project	64%
Phases 1 – 4	99%
Phase 5 – CORS Line of Business	68%
Phase 6 – Member Self Service Portal	11%

- The project team provided a list of issues negatively impacting the project. Sagitec reaffirmed their commitment to providing the resources necessary for CCCERA to migrate to the new platform.
- Data cleansing was reported to be 99.8% complete and resources, while continuing to identify and cleanse the remaining data, would focus more on data conversion activities.
- Segal provided recommendations and next steps

# Board Update as of May 12, 2023

- **Accomplishments**

- Sagitec provided three delivery options for CCCERA to consider
- CCCERA and Segal have reviewed the options and selected one option to expand and detail. This option would:
  - maintain an aggressive schedule to deliver core functionality on 11/16/23. Because of the aggressive schedule and little room for error, if the proposed option is approved, the project status would be **Yellow**.
  - includes a schedule for non-core functionality that will be delivered In 2024
- Status updates now include more information regarding status of development, quality assurance testing, and data conversion status and occurring weekly.
- CCCERA staff nearing completion of Pilot 1 testing per the current schedule<sup>1</sup>:
  - 77% of Test Cases Completed
  - 50% Pass Rate

1 – Current schedule based on the previously approved “Re-Baselined” Project Plan from May 2022

# Board Update as of May 12, 2023

- Overall CCCERA PAS Project completion :

Project Phase	Completion % <sup>1</sup>
Overall PAS Project	69%
Phases 1 – 4	100%
Phase 5 – CORS Line of Business	74%
Phase 6 – Member Self Service Portal	17%

1 – Completion % are as of 5/12/23 and measured against the previously approved “Re-Baselined” Project Plan from May 2022

- **Next Steps**

- Finalize and approve Sagitec proposed delivery option
- Maintain aggressive pace of delivery and testing

- **Summary**

- The project schedule in its current state is not achievable. Segal regards the project to be in **Red** status until the proposed delivery option is approved.

Questions...?





Meeting Date  
**05/24/2023**  
Agenda Item  
**#7c.**

# CCCERA Online Retirement System Project Implementation Progress

May 24, 2023

- Project Overall Performance
- Project Go Live Accomplishments / Risks

Project Phase	Planned Completion Percentage	Actual Completion Percentage
Overall Status	79%	69%
Phase-5   Line Of Business (LOB) Implementation	85%	74%
Phase-6   Member/Retiree Self Service (MSS) Implementation	44%	17%

Current Planned Project Go-Live dates	Original	Re-Baseline
LOB Go Live	09/05/2023	11/16/2023
MSS Go Live	01/08/2024	02/14/2024

*\*\* As of the date the Presentation was prepared*



## Project Accomplishments

Period	Description
May 2023	Completed the Regression and Integration Testing Tasks for Pilot 1 QA
May 2023	50% of Test Cases Passed in User Acceptance Testing (UAT) for Pilot 1 Functionality
May 2023	Completed 83% of Implementation Tasks for Pilot 2

## Project Risks

Risk Identified	Mitigation Strategies/Steps
The configuration and development activities of Pilot 2 modules have been delayed. These delays pose a risk to the currently planned LOB Go-Live and MSS Go-Live dates.	Sagitec has provided three revised project implementation options for mitigating this risk. These options are in discussions to determine the option best suited for CCCERA's operations.



Thank You

HarbourVest is pleased to co-sponsor Catalyst: California's Diverse Investment Manager Forum, hosted by CalPERS and CalSTRS on June 27-28, 2023. For more information and to register for the event, please see below.

# CATALYST

## California's Diverse Investment Manager Forum

Hosted by CalPERS and CalSTRS

June 27-28, 2023 | Burlingame, CA

**Catalyst: California's Diverse Investment Manager Forum** will bring together global allocators and investor entrepreneurs who are prepared to forge a new path in leadership and growth.

This two-day event will:

- Provide education, inspiration and actionable content to help catalyze the development and mutual success of investor entrepreneurs and allocators
- Introduce you to innovative and diverse entrepreneur investors who will broaden your reach
- Provide networking opportunities with your peers

For more information regarding this event, [click here](#).

Catalyst will spark continued commitment and progress towards developing an ecosystem where allocators can effectively engage with investor entrepreneurs to ensure access to the broadest pipeline of talent possible.

The Catalyst Forum offers complimentary registration to global allocators.

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Included in the registration fee; attendees will receive 24 hours of continuing education and a UC Berkeley certificate of completion. Hotel room reservations are open to attendees only and are based on a rooming list. Fees for the program do not include hotel accommodations or parking. During registration you will be asked to submit your arrival and departure dates. The host hotel is the Claremont Club & Spa, A Fairmont Hotel, in Berkeley, CA.

Claremont Club & Spa, A Fairmont Hotel

41 Tunnel Road, Berkeley, CA 94705

(510) 843-3000

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## for Retirement Systems

**SACRS PUBLIC PENSION INVESTMENT MANAGEMENT PROGRAM 2023**

July 16-19, 2023 | UC Berkeley Haas School of Business Executive Education

### PRELIMINARY AGENDA

<b>SUNDAY, JULY 16</b> ▶ Claremont Hotel & Spa - Skyline A <b>Investing Fundamentals for New Trustees</b>	<b>MONDAY, JULY 17</b> ▶ N-400, Simpson Family Suite, Chou Hall, Berkeley Haas School of Business <b>Asset Allocation</b>	<b>TUESDAY, JULY 18</b> ▶ N-400, Simpson Family Suite, Chou Hall, Berkeley Haas School of Business <b>Managing Investment Managers</b>	<b>WEDNESDAY, JULY 19</b> ▶ N-400, Simpson Family Suite, Chou Hall, Berkeley Haas School of Business <b>Governance &amp; Decision Making</b>
<b>Registration and Breakfast</b> Claremont Hotel & Spa ▶ Lobby Lounge 7:00am – 8:00am	<b>Breakfast</b> Claremont Hotel & Spa ▶ Lobby Lounge 7:00am – 8:00am	<b>Breakfast</b> Claremont Hotel & Spa ▶ Lobby Lounge 7:00am – 8:00am	<b>Breakfast</b> Claremont Hotel & Spa ▶ Lobby Lounge 7:00am – 8:00am
9:00am <b>Session Held Onsite at Claremont Hotel</b> ▶ Skyline A	8:00am <b>Depart Hotel to UC Berkeley</b> Bus leaves at 8:10am ▶ Hotel Lobby	8:00am <b>Depart Hotel to UC Berkeley</b> Bus leaves at 8:10am ▶ Hotel Lobby	8:00am <b>Depart Hotel to UC Berkeley</b> Bus leaves at 8:10am ▶ Hotel Lobby
<b>Pension Fund &amp; Investment Basics</b> Thomas Gilbert, University of Washington	<b>Introduction and Program Overview</b> Greg LaBlanc, Berkeley Haas	<b>Public Pension Landscape Today</b>	<b>Governance Basics or Governance Panel</b>
10:30am – 11:00am <b>Break</b>	10:00am – 10:10am <b>Break</b>	10:00am – 10:10am <b>Break</b>	10:00am – 10:10am <b>Break</b>
<b>Return, Risk, and Diversification</b> Thomas Gilbert, University of Washington	<b>Actuarial/Actuarial Considerations</b> Greg LaBlanc, Berkeley Haas and Graham Schmidt, Consulting Actuary Cheiron, Inc.	<b>Private Equity: How to manage your portfolio</b> Chris Puscasiu, Berkeley Haas	<b>ESG Panel or ESG Case Study</b>
12:30pm – 1:30pm <b>Lunch</b>	12:30pm – 1:00pm <b>Lunch</b>	12:30pm – 1:00pm <b>Lunch</b>	12:00pm – 1:00pm <b>Lunch</b>
<b>Practical Mean-Variance Analysis</b> Thomas Gilbert, University of Washington	<b>Pension Fund Dynamics and Review of Investing Fundamentals</b> Greg LaBlanc, Berkeley Haas and Graham Schmidt, Consulting Actuary Cheiron, Inc.	<b>Digital Assets</b>	<b>Behavioral Finance: Impact on Markets</b> Greg LaBlanc, Berkeley Haas
3:00pm – 3:30pm <b>Break</b>	2:30pm – 2:45pm <b>Break</b>	3:30pm – 3:45pm <b>Break</b>	2:30pm – 3:00pm <b>Break</b>
<b>Asset Classes &amp; Asset Management</b> Thomas Gilbert, University of Washington	<b>The Macro Environment for Pension Funds</b> Kevin Coldiron, Berkeley Haas	<b>The Investment Scenario Today</b>	<b>Team Building/Team Management</b>
	4:15pm – 5:00pm Busses Depart back to hotel 5:15 pm	4:15pm – 5:00pm Busses Depart back to hotel 5:15 pm	4:15pm – 5:00pm Busses Depart back to hotel 5:15 pm
<b>Reception at Claremont Hotel &amp; Spa</b> 5:30pm – 6:30pm ▶ Lobby Lounge Bar	<b>Reception at Claremont Hotel &amp; Spa</b> 5:30pm – 6:30pm ▶ Lobby Lounge Bar	<b>Reception at Claremont Hotel &amp; Spa</b> 5:30pm – 6:30pm ▶ Lobby Lounge Bar	



## AGENDA

### SUNDAY, AUGUST 20

3:00 pm – 6:00 pm    **REGISTRATION**

4:30 pm – 5:30 pm    Understanding Crypto  
*Hilary Allen, American University Washington College of Law*

5:30 pm – 6:30 pm    **WELCOME RECEPTION**

### MONDAY, AUGUST 21

7:00 am – 8:00 am    **BREAKFAST**

7:00 am – 5:30 pm    **REGISTRATION**

8:00 am – 5:30 pm    **GENERAL SESSION I**

8:00 am – 8:15 am    Welcome & Opening Remarks  
*Hank Kim, NCPERS*

8:15 am – 9:00 am    Public Pension Reforms: What Are They and What Drives Them?  
*Dana Bilyeu, NASRA*

9:00 am – 10:00 am    Politics of Pension Reforms: What Can We Do?  
*Sarah LaFrenz, Kansas Organization of State Employees*  
*Brent McKim, Jefferson County Teachers Association, Kentucky*

10:00 am – 10:45 am Proposing a Funding Rate for US State Pension Plans  
*Robinson Reyes Peña, Florida International University*

10:45 am – 11:00 am **BREAK**

11:00 am – 11:45 am What Factors Keep Funding Levels High in North Carolina Retirement Systems?  
*Dale Folwell, Treasurer State of North Carolina*

11:45 am – 12:30 pm What Factors Keep Funding Levels High: Case Study NYSTRS?  
*Thomas Lee, Executive Director, NYSTRS*

12:30 pm – 1:30 pm **NETWORKING LUNCH**

1:30 pm – 2:30 pm Stabilizing Funding Means Better Fiscal Health of Pension Plans: The Case Study of Indiana  
*Robert (Andy) Blough, Indiana Public Retirement System*  
*Seth Stock, Indiana Public Retirement System*

2:30 pm – 3:30 pm Beyond Funding Ratios: Measuring the Health of Public Pension Plans  
*Tom Sgouros, Brown University*  
*Kenneth Kriz, University of Illinois*

3:30 pm – 3:45 pm **BREAK**

3:45 pm – 4:30 pm The 80 % Pension Funding Myth and Beyond  
*Todd Tauzer, Segal*

4:30 pm – 5:15 pm Where will the Money Come from to Enhance Fiscal Health of Pensions?  
*Susan Kennedy, Kennedy Consulting*

5:30 pm – 6:30 pm **NETWORKING RECEPTION**

## **TUESDAY, AUGUST 22**

7:00 am – 8:00 am **BREAKFAST**

7:00 am – 12:00 pm **REGISTRATION**

8:00 am – 11:30 am **GENERAL SESSION II**

- 8:00 am – 8:15 am Welcome Back  
*Hank Kim, NCPERS*
- 8:15 am – 9:00 am Assessing Fiscal Sustainability of Fairfax County Pension Plans  
*Jeff Weiler, Fairfax County Retirement Systems*
- 9:00 am – 10:00 am Enhancing the Health of Your Pension Plan: An Actuarial Perspective  
*Gene Kalwarski, Cheiron*  
*Brian Grinnel, STRS Ohio*
- 10:00 am – 10:45 am Investment Strategies to Enhance the Health of Pensions  
*David Wilson, Nuveen*
- 10:45 am – 11:45 am Public Pension Peer Perspectives  
*Andrew Citron, BlackRock*  
*Jonathan Cogan, BlackRock*  
*Sarah Siwinski, BlackRock*
- 11:45 am – 12:30 pm Economic Outlook  
*David Altig, Federal Reserve Bank of Atlanta*
- 12:30 pm **THANK YOU AND CLOSING REMARKS**  
*Hank Kim and Michael Kahn, NCPERS*

**THIS EVENT IS SPONSORED BY**





Meeting Date  
**05/24/2023**  
Agenda Item  
**#9e.**

# *PRINCIPLES OF PENSION GOVERNANCE*

A COURSE FOR TRUSTEES



*The Crane, An Age-Old  
Symbol Of Long Life*

*Sponsored By*



*to be held at the*  
***Pepperdine University***  
***Villa Graziadio Executive Center***

*Monday-Thursday, August 28-31, 2023*

## ***PRINCIPLES OF PENSION GOVERNANCE***

A Course For Trustees

# **A COURSE FOR TRUSTEES**

### **CALAPRS' MISSION**

*"CALAPRS sponsors educational forums for sharing information and exchanging ideas among Trustees and staff to enhance their ability to administer public pension benefits and manage investments consistent with their fiduciary duty."*

### **ABOUT THE COURSE**

Public Pension Fund Trustees bear a heavy fiduciary burden. On a cumulative basis, California's Constitution holds our members' **350** Trustees accountable for the stewardship of more than **\$450** Billion in retirement fund assets. **40** California public pension systems belong to CALAPRS. Over the past ten years, Trustees of our member retirement systems have participated in this unique training program presented exclusively for California public retirement system board members. This training focuses on the practical aspects of our Trustees' duties.

For over 25 years, CALAPRS has continued to offer this high-caliber coursework and carefully selected faculty.

### **WHO SHOULD ATTEND?**

The course is for Trustees. Attendance is recommended within the first year after assuming office. Experienced Trustees will use the program as a comprehensive refresher course.

For more experienced Trustees, the Advanced Principles of Pension Governance course at UCLA is suggested.

### **WHY ATTEND?**

- To gain insight into public pension policy issues
- To discuss alternative solutions to common problems
- To understand the complexities involved in administering public pension plans
- To appreciate the differences and similarities among California public pension plans
- To network with other Trustees and pension professionals
- To increase familiarity with pension terminology and concepts
- To receive the ethics training required for new Trustees

### **FACULTY**

The Course will be taught by public pension practitioners, including Trustees, Consultants, Actuaries, Investment Managers, Attorneys & Administrators.

### **THE CURRICULUM COMMITTEE**

*Principles of Pension Governance* is managed by CALAPRS' Curriculum Committee led by the course Dean: Kristen Santos, Retirement Plan Administrator, Merced County Employees' Retirement Association.

### **LOGISTICS**

California Association of Public Retirement Systems:

Alison Trejo, Administrator

Adriana Pannick, Administrative Manager

## ***PRINCIPLES OF PENSION GOVERNANCE***

### **A Course For Trustees**

#### **THE CURRICULUM**

Each participant must attend the full 3 days of intensive training. Sessions combine team teaching, case studies and mock board problem solving. All course materials are based on actual California public pension fund law, policies, practices and problems.

The *Tuesday Evening Case Study* will provide practical experience in a disability hearing. The *Wednesday Evening Session* will consist of a **TEAM CASE STUDY** to resolve significant Board of Retirement issues.

#### **MONDAY – AUGUST 28**

6:00 PM      *Reception & Dinner*  
7:30 PM      **Introductions and Course Overview**

#### **TUESDAY – AUGUST 29**

8:00 AM      **Fiduciary Duty and Sound Decision Making**  
**How a Board Should Function**  
**Benefits Provided and the Board's Role**  
**Key Issues in Disability Retirement**  
5:15 PM      **Case Study: Disability Hearing**  
6:30 PM      *Reception & Dinner*

#### **WEDNESDAY – AUGUST 30**

8:00 AM      **Addressing Pension Liabilities**  
**Investment Policy Basics**  
**Overseeing the Investment Program**  
5:30PM      **Stakeholder Case Study**  
6:30PM      *Networking Dinner*

#### **THURSDAY – AUGUST 31**

8:00 AM      **Required Ethics Training for Public Fund Trustees**  
**Course Summary**  
11:30 AM      *Certificate Luncheon* and **Final Course Evaluation**

#### **CERTIFICATE OF COMPLETION**

Participants who successfully complete the course will receive a Certificate of Completion as well as a Certificate for completion of the AB1234 Ethics in Public Service. Trustees must attend all sessions to receive a completion certificate, at the discretion of the course faculty, and attendees who do not complete the course may return the following year to make up missed sessions at no additional charge.

#### **LOCATION & LODGING**

The program and lodging will be located at Villa Graziadio Executive Center, Pepperdine University, 24255 Pacific Coast Highway, Malibu, CA 90263. Lodging will be provided at the Villa Graziadio for the nights of August 28, 29 and 30, and will be arranged by CALAPRS as part of the course for all participants. Meals will also be provided beginning with dinner on August 28 and ending with lunch to-go on August 31.

#### **ENROLLMENT**

Minimum 20, Maximum 34 Trustees.

#### **APPLICATION & TUITION**

All applications must be received no later than **JULY 14, 2023**. Unsigned applications will be returned to the sender for signature. Tuition of \$3,000 (includes lodging, meals and materials) must be paid in advance of the program, no later than **AUGUST 15, 2023**.

## APPLICATION FOR ENROLLMENT 2023

**APPLICATIONS WITH BOTH REQUIRED SIGNATURES MUST BE RECEIVED BY JULY 14, 2023.**

Applicants must be trustees of a California public employee pension system. Attendance is recommended within the first year after assuming office. Experienced trustees will use the program as a comprehensive refresher course. Each system should enroll one Trustee as a "Delegate" and designate one additional Trustee as "1st Alternate" with the remainder as "2nd Alternate". Should it become necessary due to high demand, CALAPRS reserves the right to limit the number of participants from each system based on these designations. All applicants will be notified regarding acceptance the week of July 17<sup>th</sup>.

### Applicant Information

Trustee's Name (for certificate/name badge): \_\_\_\_\_

Retirement System: \_\_\_\_\_

Trustee Type:  Elected  Appointed  Ex-Officio Date Became a Trustee: \_\_\_\_\_ Date Term Expires: \_\_\_\_\_

Trustee's Mailing Address: \_\_\_\_\_

Trustee's Phone: \_\_\_\_\_ Trustees' Email: \_\_\_\_\_

Administrative Contact (name, email): \_\_\_\_\_

Emergency Contact (name, phone): \_\_\_\_\_

Dietary Restrictions (if any): \_\_\_\_\_

**BIOGRAPHY:** Email Trustee's biography (≤150 words) to register@calaprs.org for printing in the attendee binder.

### Applicant Agreement

*If admitted, I agree to attend the program in full and acknowledge that missing one or more sessions may result in forfeiture of my Certificate of Completion, as determined by the Faculty.*

Trustee Signature (required) \_\_\_\_\_ Date: \_\_\_\_\_

### Administrator Approval

Applicant Designation:  Delegate  1<sup>st</sup> Alternate  2<sup>nd</sup> Alternate

Administrator Name: \_\_\_\_\_ Email: \_\_\_\_\_

Administrator Signature (required): \_\_\_\_\_

### Tuition Payment

**Tuition of \$3,000 must be paid in full by August 15, 2023** and includes all meals, materials, and lodging. Payable by check only (no credit cards) to "CALAPRS". This application form serves as an invoice. No additional invoice will be sent. Cancellation refunds may be provided to the extent that costs are not incurred by CALAPRS.

Lodging is mandatory for all participants. CALAPRS will make the hotel reservations and payment for the nights of August 28, 29, and 30.

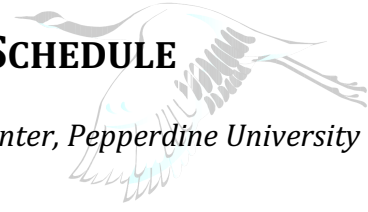
**RETURN COMPLETED APPLICATION BY  
JULY 14, 2023**

Mail, email or fax form and payment to  
CALAPRS  
575 Market Street, Suite 400  
San Francisco, CA 94105  
Phone: 415-764-4860 Fax: 415-764-4915  
register@calaprs.org www.calaprs.org



If, due to a disability, you have any special needs, call 415-764-4860 to let us know. We will do our best to accommodate them.

## 2023 PROGRAM SCHEDULE



*Program Location: The Villa Graziadio Executive Center, Pepperdine University - Malibu, CA*

### **Monday - August 28**

- 4:00 PM Hotel Check-In
- 6:00PM Welcome Dinner
- 7:30PM **Introductions and Course Overview**  
*Kristen Santos, Administrator, Merced County Employees' Retirement Association*

### **Tuesday - August 29**

- 8:00-9:30AM **100: What's the Big Deal About Being A Fiduciary?**  
*Chris W. Waddell, Senior Attorney, Olson, Hagel & Fishburn, LLP*  
*Carl Nelson, Executive Secretary, San Luis Obispo County Pension Trust*
- 9:30-10:00AM Networking Break
- 10:00-11:45AM **101: How Should a Board Function?**
- 11:45AM-12:45PM Lunch
- 12:45-2:00PM **102: What Benefits Do We Provide/What is the Board's Role?**  
*Kristen Santos, Administrator, Merced County Employees' Retirement Association*  
*Ryan Paskin, Board Chair, Merced County Employees' Retirement Association*
- 2:00-2:20PM Break
- 2:20-4:00PM **103: What Are the Key Issues in Disability Retirement?**  
*Suzanne Jenike, Assistant CEO, External Operations, Orange County Employees Retirement System*
- 4:00- 4:45PM Break
- 4:45PM Leave for Off-site Dinner
- 5:15- 6:30 PM **104: Disability Hearing: Case Study**  
*Suzanne Jenike, Assistant CEO, External Operations, Orange County Employees Retirement System*
- 6:30 - 8:00 PM Dinner and Table Topics Content Review



**Wednesday – August 30**

- 8:00-11:15AM      **105: How Should We Manage Our Pension Liabilities?**  
*Paul Angelo, FSA, Senior Vice President & Actuary, Segal*  
*Todd Tauzer, FSA, Vice President & Actuary, Segal*
- 11:15-11:30AM      Break
- 11:30-12:30PM      **106: Investment Basics**  
*Scott Whalen, Executive Vice President, Verus Investments*  
*Tim Price, Chief Investment Officer, Contra Costa County ERA*
- 12:30-1:30PM      Lunch
- 1:30-2:30PM      106 (Cont'd)
- 2:30-2:45PM      Break
- 2:45-4:00PM      **107: How Should We Manage Our Investment Program?**  
*Tim Price, Chief Investment Officer, Contra Costa County ERA*  
*Scott Whalen, Executive Vice President, Verus Investments*
- 4:00-4:30PM      **107: Investments Case Study**  
*Tim Price, Chief Investment Officer, Contra Costa County ERA*  
*Scott Whalen, Executive Vice President, Verus Investments*
- 4:30-5:30PM      Break
- 5:30-6:30PM      **108: Case Study: Who Are Our Stakeholders/What Are Our Roles?**
- 6:30 – 8:00 PM      Dinner and Table Topics Content Review

**Thursday – August 31**

- 8:00-10:00AM      **109: AB1234 Ethics Training**  
*Ashley K. Dunning, Partner, Nossaman LLP*
- 10:10-11:30AM      **110: Course Summary**  
*Carl Nelson, Executive Secretary, San Luis Obispo County Pension Trust*
- 11:30AM      Certificates and Final Course Evaluation with Lunch To-Go